FINAL REVISION

Draft Environmental Impact Statement

Amsterdam Materials Recycling Project
Edson Road
City of Amsterdam, Montgomery County, New York

Lead Agency:
Amsterdam Industrial Development Agency (AIDA)
Amsterdam City Hall
61 Church Street
Amsterdam, New York 12010

February 20, 2007

Project Sponsor:

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VOLUME 2
APPENDICES A-C

A

Appendix A
AIDA Bond Counsel Opinion Letter

HodgsonRuss
ATTORNEYS • LLP

October 7, 2003

City of Amsterdam Industrial
Development Agency
City Hall
Amsterdam, New York 12010
Attention: Chairman Michael Chiara

Re: City of Amsterdam Industrial Development Agency
Proposed Amsterdam Material Recycling LLC Project

Dear Chairman Chiara:

You have requested our opinion, as Bond Counsel to the City of Amsterdam Industrial Development Agency (the "Agency"), in connection with a question relating to the above referenced project. Amsterdam Material Recycling LLC (the "Company") has submitted an application to the Agency proposing to undertake a project (the "Project") consisting of the following:

> (A) (1) the acquisition of a parcel or parcels of real estate, together with certain parcels already owned by the Agency, to contain in the aggregate approximately 37 acres of land located in the Edson Street Industrial Park in the City of Amsterdam, Montgomery County, New York (the "Land"); (2) the construction of various improvements on the Land (the "Facility"); and (3) the acquisition and installation therein and thereon of certain machinery and equipment (the "Equipment") (the Land, the Facility and the Equipment hereinafter collectively referred to as the "Project Facility"), all of the foregoing to be owned by the Agency and leased to the Company for operation by the Company as a site to accommodate the recycling, storage and disposal of construction and demolition material and any other directly or indirectly related activities; (B) the financing all or a portion of the costs of the foregoing by the issuance of its tax-exempt and/or taxable industrial development revenue bonds in an aggregate principal amount not to exceed $10,000,000 (the "Bonds") in one or more issues or series to pay a portion of the cost of undertaking the Project, together with necessary incidental costs in connection therewith; and (C) the granting of certain other "financial assistance" (within the meaning of Section 854(14) of the Act) with respect to the foregoing, including exemption from certain sales taxes, deed transfer taxes, mortgage recording taxes and real property taxes (collectively with the Bonds, the "Financial Assistance").

The Agency will lease the Project Facility to the Company pursuant to a lease agreement (the "Lease Agreement"). Under the Lease Agreement, the Company will agree to pay the Agency $10.00 for each ton of construction and demolition material deposited on the Land. The Agency desires to share a portion of the annual revenue to be generated by the Project and collected by the Agency with the City of Amsterdam (the "City").

The question you have presented to us is whether there is a means to provide by written contract for a sharing of the revenues to be generated by the Project by the Agency with the City. The Agency's desire to share such revenue with the City reflects the determination by the Agency that the Project is a potentially "high impact" project that will be located within the boundaries of the City and which may potentially impose certain financial burdens on the City.

In our view, there are several alternatives under which the Agency could provide by written agreement that the revenues to be generated by the Project be shared with the City. One such alternative consists of the Agency and the City entering into a host agreement (the "Host Agreement") that provides, among other things, for the revenues generated by the Project to be shared by the Agency with the City. Only those revenues actually collected by the Agency would be shared by the Agency with the City pursuant to the Host Agreement. The Project constitutes an authorized "project" under Article 18-A of the General Municipal Law. The execution and delivery of the Host Agreement is directly related to the undertaking by the Agency of the Project.

The Host Agreement would recognize that the siting of the Project in the City potentially results in the City incurring certain health, infrastructure and public safety costs to support the Project. Examples of such costs would include police service, fire protection, road maintenance and cleaning and water and sewer improvements. The amounts paid by the Agency to the City under the Host Agreement would represent moneys intended to compensate the City for the siting costs of the Project. For your information, the entering into of a host agreement by a municipality in connection with the undertaking of a project that results in the imposition of certain associated costs on the municipality is common in New York State.

In conclusion, there are several alternatives that the Agency could use to provide for a sharing with the City of the revenues to be generated by the Project. We would expect that during the development phase of the Project, the Agency and the City would meet to consider the various alternatives and select the alternative best suited for providing for the sharing of the revenues. As Bond Counsel to the Agency, we would assist the Agency in selecting and structuring the selected alternative.

If any of the foregoing should raise any comments or questions, please do not hesitate to contact me.

Very truly yours,

HODGSON RUSS LLP

By _____
A. Joseph Scott, III

cc: Paul L. Wollman, Agency Counsel

B

Appendix B
Geologic and Hydrogeologic Report

Geologic and Hydrogeologic Report

Amsterdam Materials Recycling Project

City of Amsterdam

Montgomery County, New York

December 2003

THE Chazen COMPANIES

Prepared for:

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Geologic and Hydrogeologic Report

Amsterdam Materials Recycling Project

City of Amsterdam

Montgomery County, New York

December 2003

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Appendix E: Groundwater Flux Calculations into the Proposed Landfill Profile

1.0 INTRODUCTION

This hydrogeologic report for the proposed AMR Construction & Demolition Debris (C&D) landfill in the City of Amsterdam (Figure 1) is prepared consistent with requirements of 6 NYCRR Part 360-7 and associated sections of 6 NYCRR Part 360-2.11. As allowed under 6 NYCRR Part 360-7.4(a)(4), only a brief description of regional geology is included.

The proposed facility fails no 6 NYCRR Part 360-7.4(5) siting restrictions. Specifically, on the basis of glacial till deposits documented herein on this site, it appears that the proposed facility site does not overlie an overburden Principal or Primary Aquifer as defined in TOGS 2.1.3; correspondence requesting such a determination is being directed to NYSDEC. Also, on the basis of the site elevation, the project site does not lie within a 100-year floodplain, and the site does not lie within either 5,000 or 10,000 feet of an airport runway. Finally, as documented herein, the site is neither unstable nor unmonitorable.

2.0 SITE INVESTIGATION TASKS & METHODS

2.1 Literature Search

A literature and map search was completed to support the on-site geologic information gathered in support of this proposed C&D landfill. Available files and maps at the NYS Museum were reviewed. Referenced texts are detailed below.

2.2 Topography

A site survey was prepared for the site showing all site features referenced in this report. Elevations are referenced to mean average sea level (amsl).

2.3 Geology

Various geologic sampling formats were used at the site, including preliminary soil borings for site characterization, continuous sampling during installation of monitoring wells, rock core collected during installation of bedrock monitoring wells, and select Shelby tube samples collected for triaxial permeability. Following discussion with NYSDEC personnel, continuous sampling was omitted in overlapping sections during installation of well couplets.

2.3.1 Surficial Geologic Test Borings and Test Pits

Test borings were installed across the site to refusal or bedrock. Borings were conducted in a two-hundred foot grid pattern across the site (Figure 2) using a B47 Track-mounted auger drilling rig employing continuous split-spoon soil sampling techniques. Geologic logs were prepared by a Chazen geologist (Appendix A). Temporary 2-inch piezometers were installed in select borings.

Undisturbed Shelby tube samples for permeability testing were collected from representative clay-rich till horizons on the site, within borings A5, A0 and B3. Unconsolidated bucket samples were also collected from several test pits. Samples from borings were collected on June 6, 9, and 16, respectively. Additional samples for recompacted permeability evaluation were collected from test pits on July 1, 2003, in 5-gallon buckets for laboratory recompaction and permeability analysis (Appendix D). Shelby tubes were collected by advancing a 3-inch diameter, steel tube two feet into site soils. Tubes were allowed to sit *in-situ* for 30 minutes and then were twisted to detach soil and to lift the sample from the ground. Recovery was measured and ends of the tube were waxed to seal soils and prevent expansion. Plastic caps were placed over the ends, taped with black electrical tape, and dipped in wax.

2.3.2 Bedrock Geologic Mapping

A former rock quarry lies immediately south of the site, presently occupied as a restaurant and conference center (Figures 1 and 2). The rock face exhibits fractures potentially enhanced by blasting, but generally exhibiting only limited horizontal partings, related to bedding planes, and various high-angle joints. No large openings associated with solution widening (e.g. karst type features) are exhibited.

Rock cores were collected across the site to contribute site specific descriptions of the critical bedrock stratigraphic unit. Rock cores were collected using Mobile Drill B47 track-mounted and tire-mounted drill rigs. Rock was cored utilizing an NQ diamond-impregnated bit attached to a standard NX rock core barrel having a length of 5-feet and inner diameter of approximately 2-inches. Rock cores were inspected for total recovery, rock quality designation (RQD), lithology, stratigraphy, and fractures. Core logs and photographs of boxes of retrieved core are found in Appendices A and B.

2.4 Hydrogeology

2.4.1 Water Well Survey

All parcels within ¼ mile upgradient of the site to the north, and sites cross gradient to the site to the west lie within the City of Amsterdam and most receive water from the City of Amsterdam Municipal Water System. Cross-gradient properties along the east side of Widow Susan Road, are in the Town of Amsterdam

and are not provided with public water. Properties downgradient of the site, to the south, lie between the site and the Mohawk River, within the Town of Amsterdam, and also receive water from a central water system.

Various parcels continue use of private wells, so a well survey form was mailed to all applicable sites near the project site. A summary of returned survey data indicate that most surrounding properties to the north, west and south of the site are within public water supply water districts and are assumed to receive potable water from central water supplies. Survey results are compiled in a report provided in Appendix C.

The 214 residential properties up gradient of the site were eliminated from the water well inventory mail out survey because these properties are supplied with water from the City of Amsterdam Water Filtration Plant, as reported by the City of Amsterdam Engineering Office in August 2003.

Approximately 36 properties are located down gradient of the site. To determine if any of these use private wells for a potable source, water survey questionnaires were mailed to these residents/owners.

Of the 36 questionnaires, 16 responses were received regarding 17 properties. The returned surveys indicated that ten of the seventeen properties use city water and seven of the properties use well water. Locations of the identified wells are shown on maps in Appendix C.

2.4.2 Piezometers and Monitoring Wells

Ten monitoring wells were installed around the site during August and September of 2003 generally in accordance with 6 NYCRR Part 360a-2.11(a)(8) requirements. Geologic logs and well completion diagrams are included in Appendix A. The logs provide material descriptions, hydrogeologic observations, all pertinent details of the well construction, and elevations of all well features. Rock core logs describe the lithology, mineralogy, color, grain size and other physical characteristics of the rock. The logs also document percent recovery and rock quality designation (RQD). Photographs of all cores are included in Appendix B.

Two well couplets lie along the upgradient, north side of the site, monitoring groundwater in the overburden formation and in the bedrock formation. Distances between these couplets are less than 1,500 feet apart, per 6 NYCRR Part 360-2.11(c)(1)(i)(b). More couplets appeared unnecessary based on the simplicity of site geology.

Two well couplets and two single bedrock monitoring wells lie along the downgradient, south side of the site. The couplets were installed in areas where sufficient overburden allowed installation of overburden and bedrock wells. Single bedrock monitoring wells were installed where there was insufficient overburden thickness for overburden wells. Distances between the downgradient wells are less than 500 feet apart, per 6 NYCRR Part 360-2.11(c)(1)(i)(b).

Bedrock monitoring wells receive water through fractures and joints. Following discussion with NYSDEC personnel, bedrock monitoring wells were installed with an open annulus from the bottom of the well casing to the bottom of the well to ensure adequate groundwater flow into the monitoring wells and to ensure general characterization of all groundwater moving laterally through horizons associated with the proposed project.

Monitoring wells were installed for eventual integration in the site's Environmental Monitoring Plan, per 6 NYCRR Part 360-2.11(c)

2.4.3 Hydraulic Conductivity Testing

In situ hydraulic conductivity testing was completed in all monitoring wells and piezometers. In most cases, the tests were conducted as falling head tests. Rising head tests were used where static water levels were within screened or open annular intervals. Slug tests are best suited for evaluations of formations with primary porosity such as most overburden formations as well as porous bedrock. Slug tests can also provide general although not comprehensive indications of formation permeability in fractured bedrock.

For ease of interpretation, slug test methods were analyzed using the Hvorslev method (1951), requiring only the variables of well diameter, length of the effective screened well or saturated annulus, and the period of time required for the slug disturbance to return to 37% from the undisturbed static level. Calculations and field data are found in Appendix D. Most wells were tested three times to assess consistency of hydrogeologic response and to allow an average permeability finding.

Laboratory Hydraulic Conductivity of undisturbed (Shelby) or recompacted (test pit) samples were analyzed using ASTM method D 5084.

2.4.4 Geophysical, Geochemical and Tracer Studies

Following discussion with NYSDEC personnel, no geophysical and geochemical surveys were conducted. The relative simplicity of site stratigraphy, and a till thickness that limited effectiveness of geophysical techniques made geophysical or geochemical surveys unnecessary and unproductive.

Following discussion of the site with NYSDEC personnel, no tracer studies were conducted. Directions of groundwater flow appeared suitably clear to the extent that this technique appeared unnecessary.

3.0 HYDROGEOLOGICAL REPORT

This hydrogeologic report is submitted in accordance with 6 NYCRR Part 360-7.4(a)(4), and defines the landfill site geology and hydrogeology, defines the site critical stratigraphic section, provides an understanding of groundwater and surfacewater flow, establishes a preliminary environmental monitoring system prepared suitable for detecting a facility contaminant release, and forms the basis for design of the facility and contingency planning.

3.1 Regional Analysis

As allowed under 6 NYCRR Part 360-7.4(a)(4)(i), only regional geology critical to the understanding of routes of groundwater migration onto or off of the site is reviewed herein.

3.1.1 Regional Topography

USGS topographic mapping shows that the site lies on a hillside area within the Mohawk Valley, east of the center of the City of Amsterdam and near the Mohawk River (Figure 1).

Areas north of the site contribute groundwater recharge and overland flow through and over the site toward the Mohawk River. Upland areas include primarily gently-dipping landscapes with few incised streams. The North Creek is the only dominant drainage system in the vicinity, flowing southward through the City of Amsterdam. A smaller, unnamed stream flows southward through the west perimeter of the project site toward the Mohawk River.

Site topography is steeper than in upgradient areas since the project lies within bluffs descending to the Mohawk River. The highest elevation on the site is approximately 430 feet amsl, falling to approximately 330 feet amsl at the base of the project area (Figure 2).

3.1.2 Regional Geology

The Hudson-Mohawk Sheet of the NYS Museum Surficial Geologic Map of New York identifies glacial till and rock outcrop in the vicinity of the site. Areas north and upslope of the site include thin glacial till with potential for exposed bedrock

(Figure 3). Limited glacial-era fluvial gravel and more recent alluvial deposits are mapped south of the site along the banks of the Mohawk River.

Although not differentiated on regional mapping, glacial till deposits often include basal till consisting of mixed sediments deposited and compressed under the Pleistocene-era glacial ice mass, and ablation till consisting of mixed sediments dropped by the ice or transported nominal distances after the last glacial period. Basal and ablation till each usually exhibit a wide and poorly-sorted mixture of rock types and particle sizes transported by the glacial ice from more northerly areas.

The Hudson-Mohawk Sheet of the NYS Museum Geologic Map of New York identifies Ordovician-age Trenton and Black River Groups under upper-elevation portions of the City of Amsterdam and the site. This group includes the Dolgeville, Denley, Sugar River, Kings Falls, Glens Falls, Rockland, Amsterdam and Lowville limestones. In this location, the Amsterdam limestone is most likely to be present since by geologic conventions geologic formations are named by the locations where they are best exhibited.

Dolostones of the Beekmantown Group lie under the Amsterdam limestone. Dolomite and limestone are both carbonate formations, but dolomite contains minerals non-conducive to chemical weathering and so does not support widening of fractures by groundwater or equivalent karst-forming tendencies.

Geologic mapping by Fisher (1980) identifies the Glens Falls Limestone underlying the City of Amsterdam, not exceeding approximately 40 feet in total thickness, overlying the Chuctanunda Creek Dolostone. The Chuctanunda Dolostone is identified as a bluish-gray (fresh rock), medium-to-thick, bedded, fine to medium grained dolostone with some quartz vugs (Figure 4). Although the geologic names used by the two mapping efforts differ, the rock descriptions agree with one another and with observed core collected by Chazen, consisting of interbedded limestone and dolomitic carbonates.

Based on regional mapping and site cores and outcrops, these carbonate bedrock formations are expected to exhibit sub-horizontal bedding plains free of metamorphic modification.

There are no known structural deformations near the City of Amsterdam or on the project site. The nearest-recognized faults shown on the Geologic Map of New York and on the Preliminary Brittle Structures Map of New York lie three or more miles east of the site, consisting of normal faults of limited lateral extent.

3.1.3 Regional Hydrogeology

Regional hydrogeologic conditions consist of general groundwater migration from upland regions in a southward to the Mohawk River, situated in the valley-bottom. Nominal lateral overburden flow is anticipated through the till-mantled bedrock due to low overburden permeability and generally thin overburden thickness. Groundwater migration through bedrock formations is also anticipated to be generally toward the Mohawk River. Some groundwater in the bedrock formation may be locally confined where the till mantle is particularly thick or where less fractured bedrock formations form local caprock limiting groundwater recharge and groundwater movement between saturated overburden and saturated bedrock fractures. No bedrock formations in the region are known to have primary porosity so all groundwater flow in bedrock formations occurs within and between fractures.

3.1.4 Ward Products Site

Ward Products Corporation (Ward), NYSDEC Site Code 4-29-004, does not abut the AMR site and is located approximately 1,500 feet northeast of the proposed AMR facility, at 61 Edson Street in Amsterdam (Figure 1). Based on groundwater flow conditions described at the Ward property, and on directions of groundwater flow on the AMR site, the proposed AMR landfill lies downgradient from the Ward site, although not clearly directly downgradient.

Past industrial activities at Ward site have resulted in trichloroethene (TCE), cis-1,2-dichloroethene, and chromium (III and VI) contamination to groundwater (Normandeau Associates Inc. July 2001). Water level and sampling data from the Ward site indicate these contaminants migrated vertically downward through the glacial till into the bedrock formation. Reportedly, Ward site practices causing the contamination were discontinued in the early 1970s.

Chromium (III and VI) contamination of groundwater under the Ward site has been shown to be limited to the Ward property site. Cis-1,2-dichlorethene is also substantially limited to the site. TCE contamination has migrated approximately 350 feet off the Ward site, approximately one third of the way, and to within approximately 600 feet of, the proposed landfill boundary.

The Normandeau report calculates a groundwater seepage velocity of 277 feet per year through the bedrock aquifer. Normandeau did not, however, estimate the rate of TCE plume advancement at their site, which obviously differs sharply from the seepage velocity of groundwater since the plume has only moved approximately 400 feet in 30 years. Contaminant plumes for many chemicals, including TCE, move more slowly than groundwater because they are subject to attenuation and retardation factors that slow and eventually stop the spread of the contaminant.

Empirical evidence shows that the present TCE plume is moving either extremely slowly, or not at all. Comparison of the TCE plume in May of 2001 (Figure 30, July 2001, RI Report, Normandeau Associates) to the plume more than one year later, in September of 2002 (Figure 4, March 20, 2003, Supporting Information, Normandau Associates) shows there was no advancement of the plume's leading edge over this period of over one year. This field evidence suggests that the TCE plume is presently not moving , and so is not expected to ever reach the AMR site.

The low permeability of the bedrock formation at the Ward site, with hydraulic conductivities ranging from 4.6×10^{-3} cm/sec to 5.6×10^{-4}, with an average value of 1.07×10^{-3} cm/sec, supports field evidence of negligible plume movement (Normandeau, July 2001, Table 2).

3.2 Site Analysis

Detailed site analysis follows:

3.2.1 Topography

The site lies along a hillside bluff overlooking the Mohawk River. The highest elevation on the site is approximately 430 feet amsl falling to approximately 330 feet amsl at the base of the project area (Figure 2). In the western portion of the site, the slope is somewhat uniform. In the eastern section, the land includes relatively level plateaus near the north site areas, below which land drops abruptly to lower elevations.

A perennial, unnamed stream flows along the west site perimeter. The stream follows the bedrock surface in many areas. Where bedrock surfaces are visible, the planar carbonate beds appear generally massive, exhibiting only minor sub-vertical joints and fractures.

Various seasonally active gullies cross the site elsewhere, conveying overland flow southward. Little groundwater is expected to be conveyed though these gulleys since they flow generally above the elevation of shallow groundwater (Figure 4). The deepest of these gullies lies west of a right of way crossing the site, forming a ravine more than 30 feet deep. The ravine does not extend to the bedrock formation.

East of the right-of-way crossing the site, other gullies also extend southward across the site, but none are as deep as the ravine west of the right-of-way.

3.2.2 Geology

The soil boring program identified topsoil, ablation till, and basal or lodgement till on the site. Bedrock under the site consists of interbedded limestone and dolomite, with proportionally more dolomite at depth.

Topsoil on the site includes organic components, silt, and clay. The thickness of topsoil varies from 7 inches to as much as 2 feet.

Ablation till is the dominant site overburden formation. Thickness of ablation till changes from about 25 feet in western part of the site to more than 60 feet to the east. Little to no soil cover exists along the railroad tracks near monitoring wells MW-3D and MW-4D. Blow counts in the ablation till are generally in the range of 20 to 30 blows per six inches of advancement, although some sections show higher blow counts where cobbles or a locally-dense horizon is encountered. The primary composition of ablation till is gray silt and clay, with some brown fine-to-medium sand with rare fine red gravel. Most ablation till is moist to fully saturated, and can exhibit moderate to high plasticity.

Basal till is present under parts of the site, overlying the bedrock topography and underlying the ablation till. Thickness ranges from approximately 10 feet in the northwest to over 50 feet in southeast (Figures 5 and 6). It is usually dense and identified when blow counts exceed 40 blows per 6 inch advancement, though some intermittent softer sections occur. The composition consists primarily of silt and clay, with some gray sand and fine-to-medium red gravel noted in rare instances. No basal till is encountered in northeast and southwest parts of the site, based on the general characterization methodology used, but the distinction between ablation and basal till is not always completely obvious. Where encountered in borings, the basal till was mostly dry.

The bedrock formation was penetrated by various monitoring wells, allowing geologic logging and photographing of cores. The bedrock formation appears to be generally massive, consisting of mixed limestone and dolomite with greater dolomite fractions at depth. RQD values (the ratio of fractures exhibited in cores) are relatively high, indicative of competent rock. Slug test data discussed below are consistent with low-permeability bedrock formations. No solution widening of existing fractures or joints were noted, consistent with the high dolomite presence which discourages such action.

3.2.3 Hydrogeology

Hydrogeology of the site consists of generally low-permeability sediments overlying a low-permeability bedrock aquifer formation. Upper monitoring wells identify a

southward dipping direction of groundwater migration, descending in the direction of the Mohawk River (Figure 7). Permeability of the overburden formation is extremely low, both based on slow recovery noted during well development, slug tests, and on the basis of triaxial permeability testing conducted on Shelby tube and recompacted samples (Table 2).

The Chuctanunda Dolostone is described by Fisher (1980) as having no primary permeability. Where fractures are encountered, groundwater will migrate southward toward the Mohawk River, as confirmed by groundwater mapping at the upgradient Ward site (Normandeau, 2001 and 2003), and by observation of progressively lower potentiometric heads in more southerly bedrock monitoring wells on the AMR site. Rates of groundwater migration in the bedrock aquifer are slow throughout the area because of the absence of notable joints and fractures, and because dolomitic bedrock formations are resistant to chemical weathering by groundwater.

Hydraulic conductivity determination of the site's overburden (glacial till) formation was conducted through slug testing in perimeter monitoring wells. The slug test data were supplemented by Shelby Tube samples collected during the boring program. Hydraulic conductivity of the bedrock formation was also estimated using slug test methods, using the length of the saturated open bedrock annuli in the Hvorslev calculation. Slug tests in overburden identified hydraulic conductivity values consistent with clayey and silty sediments (Fetter, 1994), or about 10^{-5} cm/sec (Table 2). Hydraulic conductivities within the bedrock formation were also low, ranging from between 10^{-4} to 10^{-6} cm/sec (Table 2). Shelby Tube samples identified lower hydraulic conductivity values ranging between 10^{-6} to 10^{-8} cm/sec (Table 2) reflective of clay within the till diamict.

Groundwater flow in the shallow overburden is southward (Figure 7). Bedrock/overburden well couplets measured on November 10, 2003 show lower groundwater in each bedrock monitoring well couplet (Table 1), indicative of a downward component to groundwater flow. A downward gradient is consistent with the lack of groundwater seeps observed near monitoring wells MW-3D and MW-4D or similar areas where seeps might otherwise be expected since overburden thins in areas along the railroad tracks.

Total daily groundwater flux through the proposed landfill profile may be estimated using the Darcy flow calculation. Values for sediment hydraulic conductivity were used by averaging slug test data from site overburden monitoring wells, reasonably also serving as approximations of the bedrock permeability, per Table 2. The cross-sectional area through which groundwater water flow may occur was estimated from proposed site plans, from a potentiometric elevation of 390 feet amsl over the north landfill margin down to an average landfill bottom elevation of 350 feet amsl

(an average of 330 to 370 feet amsl landfill bottom elevations). Hydraulic gradients were estimated from analyses of groundwater flow; gradients in both the overburden formation (viewable on Figure 7) and in the bedrock formation (comparable to Figure 7) are relatively steep, consistent with the low hydraulic conductivity of the site. Calculations indicate that groundwater flux through the proposed landfill profile area is approximately 3.5 gpm (Appendix E). This is unlikely to vary much during different seasonal conditions due to low site soil and bedrock permeability values that will limit fluctuations in discharge.

Draining 3.5 gpm from the site will result in localized dewatering of groundwater from the overburden and upper groundwater profile. This water would otherwise remain below grade as it migrates through this site in the direction of the Mohawk River. Dewatering impacts will be constrained to the immediate boundaries of the landfill excavation due to the low permeability of the rock and soil formations and the small quantity of water involved.

4.0 REFERENCES

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Figures

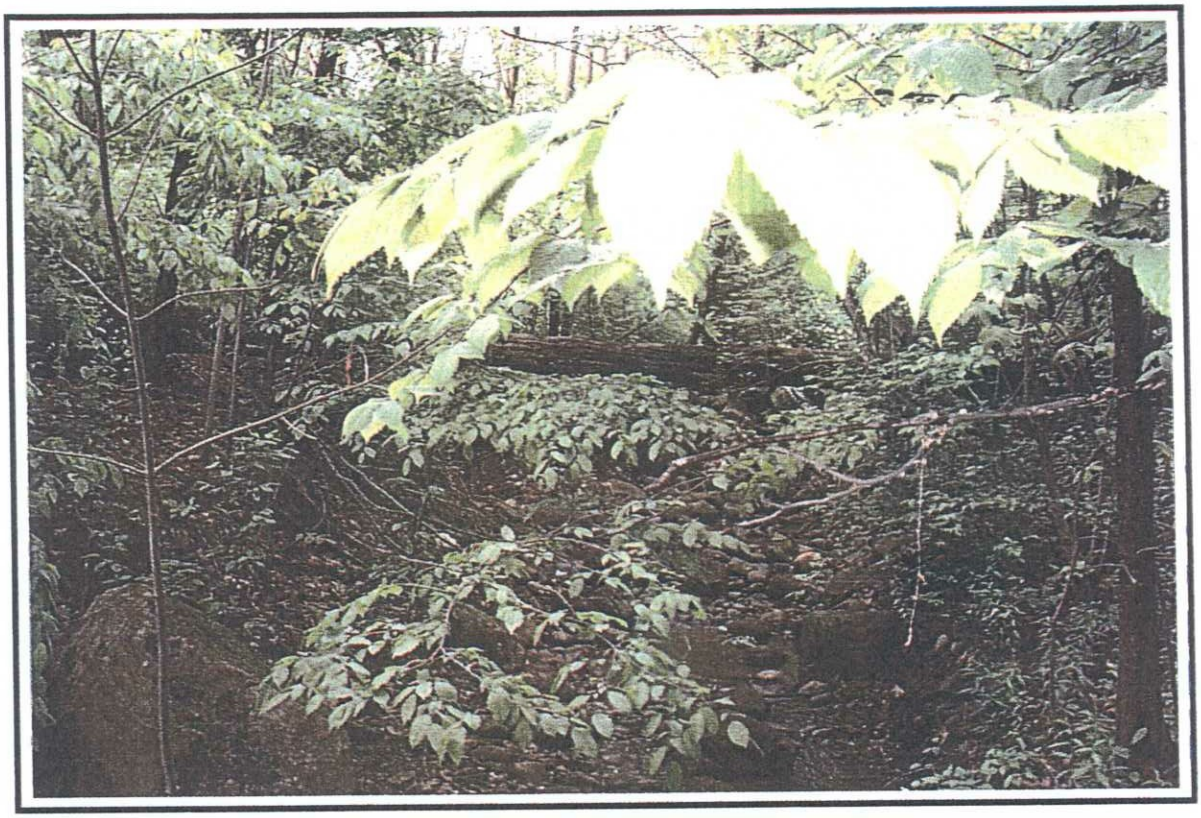
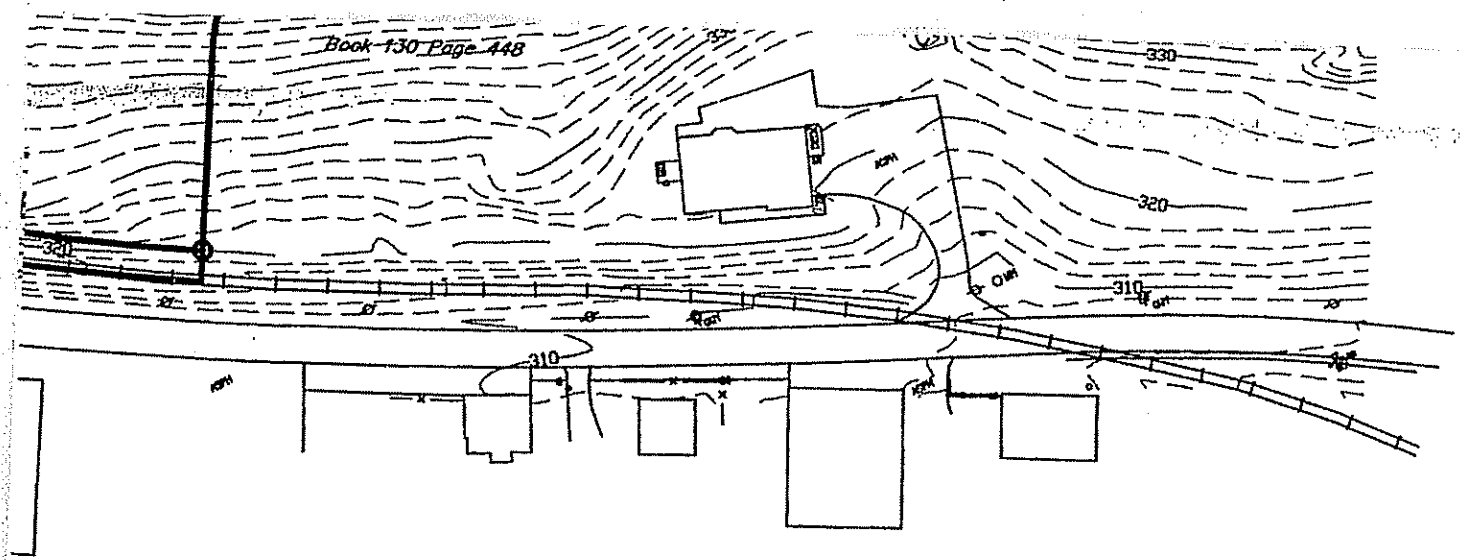


Photo #1
Description: View looking north along from the center line of wetland D. Note the lack of vegetation and the rock and stone covering the ground.

Photo #2
Description: View looking west along Wetland D of upland ravine bank.



AMSTERDAM MATERIALS RECYCLING INC.

FIGURE NO. 2
SITE DETAIL
AMSTERDAM MATERIALS RECYCLING INC.

TOWN OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn DM/DWP	checked RUM
date 12/16/03	scale 1" = 100'
project no. 90303.00	
sheet no. 1 OF 3	

LEGEND

t GLACIAL TILL COVER

r BEDROCK WITHIN 1 METER OF SURFACE

GENERAL NOTES

1. VERTICAL DATUM NAVD88.
2. SURFICIAL GEOLOGY DATA OBTAINED FROM CADWELL AND DINEEN, 1987
3. FISHER, 1980 MAPPING MAY NOT REPRESENT EXISTING BEDROCK BOUNDARY AT SOUTHWEST QUARRY.

THE Chazen COMPANIES

Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Dutchess County Office:
21 Fox Street
Poughkeepsie, NY 12601
Phone: (845) 454-3980

Capital District Office:
20 Gurley Avenue
Troy, New York 12182
Phone: (518) 235-8050

Orange County Office:
263 Route 17K
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North Country Office:
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AMSTERDAM MATERIALS RECYCLING

FIGURE NO. 3
SURFICIAL GEOLOGY

CITY OF AMSTERDAM
MONTGOMERY COUNTY, NEW YORK

drawn: VPA	check: VPA
date: 11/26/03	scale: 1"=200'
project no. 90303.00	
sheet no. 1	

GENERAL NOTES

OCC CHUCTANUNDA CREEK DOLOSTONE

OWF LIMESTONE–GLENS FALLS/AMSTERDAM

GENERAL NOTES

1. VERTICAL DATUM NAVD88.
2. BEDROCK GEOLOGY DATA OBTAINED FROM FISHER, 1980

THE Chazen COMPANIES

Engineers/Surveyors
Planners
Environmental Scientists

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AMSTERDAM MATERIALS RECYCLING

FIGURE NO. 4
BEDROCK GEOLOGY

CITY OF AMSTERDAM
MONTGOMERY COUNTY, NEW YORK

drawn:	check:
VPA	VPA
date: 11/26/03	scale: 1"=200'
project no. 90303.00	
sheet no. 1	

AMSTERDAM MATERIALS RECYCLING INC.

FIGURE NO. 5
SUBSURFACE PROFILES
AMSTERDAM MATERIALS RECYCLING INC.

TOWN OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn DM/DWP	checked RUM
date 12/16/03	scale 1" = 100'
project no. 90303.00	
sheet no. 2 OF 3	

AMSTERDAM MATERIALS RECYCLING INC.

FIGURE NO. 6
SUBSURFACE PROFILES
AMSTERDAM MATERIALS RECYCLING INC.

TOWN OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

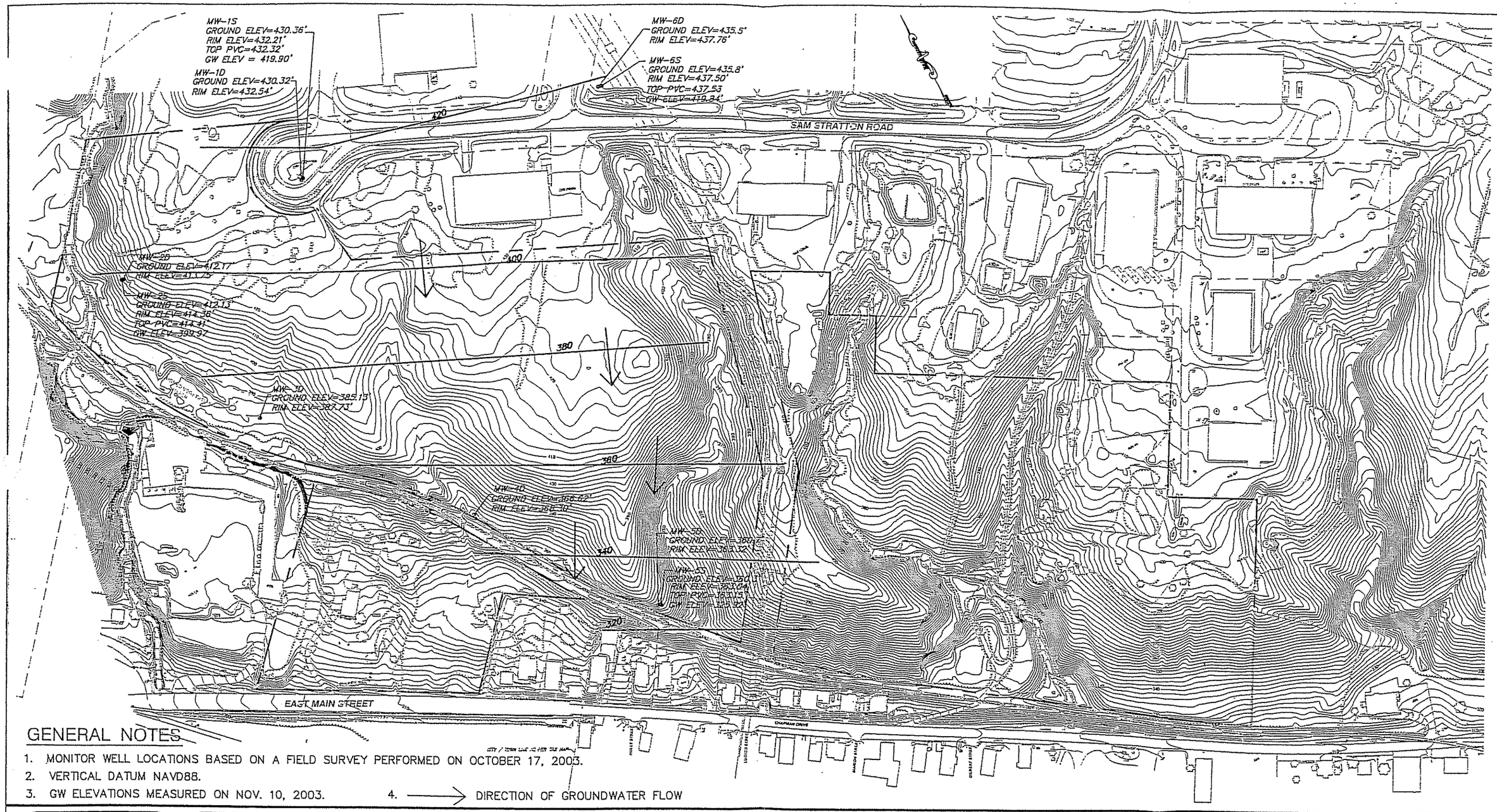
drawn DM/DWP	checked RUM
date 12/16/03	scale 1" = 100'
project no. 90303.00	
sheet no. 3 OF 3	

Tables

Table 1
Well and Groundwater Elevations

Well ID	Date Completed	Well Depth (ft)	Ground Elevation (ft)	Bottom of Well Elevation	Rim Elevation	Depth to water level	TOP PVC Elevation	Groundwater Elevation*
MW-1S	22-Jul	32.50	430.36	397.86	432.21	12.42	432.32	419.90
MW-1D	16-Sep	65.00	430.32	365.32	432.54	19.02	432.54	413.52
MW-2S	10-Sep	24.50	412.13	387.63	414.36	14.44	414.41	399.97
MW-2D	10-Sep	80.00	412.17	332.17	413.75	25.11	413.75	388.64
MW-3D	16-Sep	86.00	385.13	299.13	387.73	56.58	387.73	331.15
MW-4D	29-Oct	50.50	366.62	316.12	368.30	36.88	368.30	331.42
MW-5S	19-Aug	100.00	360.30	260.30	363.04	37.23	363.15	325.92
MW-5D	9-Sep	120.00	360.70	240.70	363.32	41.50	363.32	321.82
MW-6S	30-Jul	31.50	435.80	404.30	437.50	17.69	437.53	419.84
MW-6D	30-Oct	71.00	435.50	364.50	437.76	19.95	437.76	417.81

* Groundwater elevations measured on Nov. 10, 2003



GENERAL NOTES

1. MONITOR WELL LOCATIONS BASED ON A FIELD SURVEY PERFORMED ON OCTOBER 17, 2003.
2. VERTICAL DATUM NAVD88.
3. GW ELEVATIONS MEASURED ON NOV. 10, 2003.
4. ⟶ DIRECTION OF GROUNDWATER FLOW

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

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AMSTERDAM MATERIALS RECYCLING

FIGURE NO. 7
SHALLOW GROUNDWATER FLOW

CITY OF AMSTERDAM
MONTGOMERY COUNTY, NEW YORK

drawn:	check:
VPA	VPA
date:	scale:
11/26/03	1"=200'
project no.	
90303.00	
sheet no.	
1	—

Table 2
Hydraulic Conductivity Test Results

Location	Lab Sample ID	Test Interval (feet bgs)	Method	Test Dates (2003)	k (cm/s)*
TCC-AMR-MW-1D	n/a	28.0 - 65.0	Slug test	10/3, 10/6, 10/7	1.332E-05
TCC-AMR-MW-1S	n/a	22.5 - 32.5	Slug test	10/3, 10/6, 10/7	4.506E-05
TCC-AMR-MW-2D	n/a	24.5 - 80.0	Slug test	10/3, 10/6, 10/7	1.997E-06
TCC-AMR-MW-5D	n/a	100.0 - 120.0	Slug test	10/6, 10/7, 10/7	2.014E-04
TCC-AMR-MW-5S	n/a	89.5 - 100.0	Slug test	10/6, 10/7, 10/7	9.099E-05
TCC-AMR-MW-6S'	n/a	21.0 - 31.0	Slug test	10/3, 10/6, 10/7	1.233E-05
TP-1	AT354S32	5.0 - 8.0	Recompacted Sample**	7/21	2.5E-07
TP-1	AT354S33	18.0 - 21.0	Recompacted Sample**	7/21	2.6E-08
TP-2	AT354S34	7.0 - 9.0	Recompacted Sample**	7/21	3.8E-07
TP-2	AT354S35	14.0 - 16.0	Recompacted Sample**	7/21	8.0E-07
TCC-AMR-A5 (boring A5)	AT354S36	14.1 - 15.9	Shelby Tube Sample**	6/6	3.6E-08
TCC-AMR-A0 (boring A0)	AT354S37	6 - 7.2	Shelby Tube Sample**	6/9	2.5E-06
TCC-AMR-B3 (boring B3)	AT354S38	16 - 18	Shelby Tube Sample**	1/16	3.1E-08

n/a: not applicable
* where multiple slug tests were conducted, the average value is given (Appendix D)
** lab analysis of soil sample (Appendix D)

Appendix A:
Test Boring and Monitoring Wells Logs

The Chazen Companies

BORING NO. TCC-AMR-MW-1D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open bedrock borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 430.32
Water Level Reference Point: 432.54

Water Levels:
Date: 11/10/03
Depth to Water (ft.): 19.02

Starting Date: 7/21/03
Stop Date: 7/22/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Locking cap

Bentonite/ Grout mix

3" ID Schedule 40 Black T&C steel pipe set into bedrock

Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1	S1	3	14		0 - 6" Dk brn grassy SILT, sand, & gravel	
		2			6 - 14" Brn SILT, little sand, soft, mod plasticity	
2		2				
		4				
3	S2	5	20		0 - 20" Brn SILT, tight, mod dense	
		7			Brn moist sandy SILT layer @ 8-10"	
4		9				
		14				
5	S3	23	20		0 - 6" Dk brn fm SAND & SILT, some gravel	
		40			6 - 20" Brn SILT, little CLAY and fine gravel,	
		50/.2			dense	
6						
7	S4	27	24		0 - 6" Brn sandy SILT, moist	
		23			6 - 16" Brn SILT, little clay and fine gravel, dense,	
		18			gray and orange mottling	
8		12			16 - 24" Gry silty CLAY, mod dense	
9	S5	8	20		0 - 14" Brn silty CLAY, tight, mottled	
		14			14 - 20" Dk gry sandy till - sandy CLAY, some	
		50/.4			fine round gravel	
10						
11	S6	50/.2	6		0 - 6" Dk gry till - sandy CLAY, some fine round	
					gravel and rock fragments, high plasticity, mod	
					soft, very low moisture	Augered through dense gravelly material @ 11'
12						
13	S7	8	24		0 - 12" Brn silty CLAY, little fine sand, tight, high	
		14			plasticity	
		18			12 - 24" Dk gry sandy till - sandy CLAY, some	
14		21			fine round gravel, moist	
15	S8	12	20		0 - 20" SAME, wet tube	
		15				
		14				
16		16				
17	S9	10	16		0 - 16" SAME, wet tube	
		14				
		15				Very wet slough in auger cuttings @ 17'
18		18				
19	S10	4	2		0 - 2" SAME, saturated	
		9				
		14				
20		18				

NOTES:

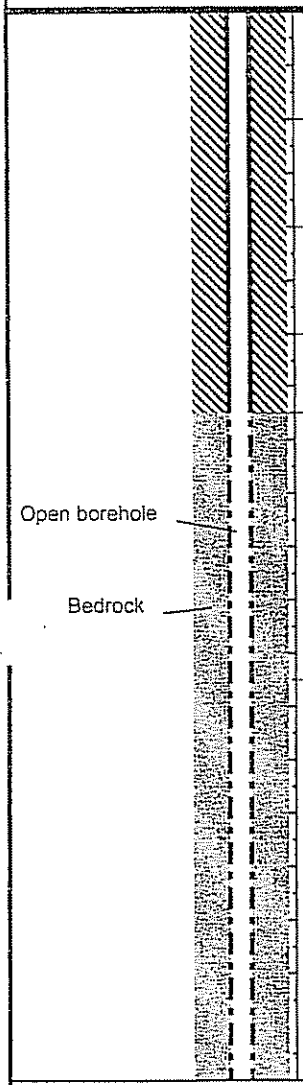
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-1D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open bedrock borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 430.32 Water Level Reference Point: 432.54 Water Levels: Date: 11/10/03 Depth to Water (ft.): 19.02	Starting Date: 7/21/03 Stop Date: 7/22/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



21	S11	8	24	0 - 24" SAME, saturated tube	
		9			
		14			
22		16			
23	S12	10	24	0 - 24" SAME, saturated tube	
		12			
		14			
24		28			
25	S13	50/.4	6	0 - 6" Dk gry till - fine SAND & very fine grained matrix, some fine gravel, very dense	
26					
27	S14	50/.3	4	0 - 4" Dk gry till - fine SAND matrix, some, fine gravel, very dense, tight, very low moisture, tube sat. Auger refusal @ 27.5'; Began coring	Very hard augering @ 27'
28	R1			0-8" Limestone (65%), Dolostone (30%) 5% other calcite 8-62" Dolostone (70%), Limestone (25%) 1/10" vertical calcite vein; grades to 50/50; mostly depositional mixing horz. fractures @ 9, 10, 17, 20.5, 24.5, 36, 52, 54, 58, 58.5"	Run #1 Core 27.5' - 32.5' Recovery = 100% RQD = 50/60 = 83%
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-1D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open bedrock borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 430.32 Water Level Reference Point: 432.54 Water Levels: Date: 11/10/03 Depth to Water (ft.): 19.02	Starting Date: 7/21/03 Stop Date: 7/22/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

41 42 43 44 45 46		
47 48 49 50 51 52 53 54 55 56	Dolostone (70%), Limestone (30%) Horizontal fractures @ 30, 84, 85, 86, 120, 123"	Bedrock Coring: 46.5-56.5 Start: 1322 End: 1348 Rec = 115.5/120 = 96% RQD = 106/120 = 88% Lost 0.5' at end of barrel
57 58 59 60	As above to 64' 64-65' Limestone (90%), Dolostone (10%) Horizontal fractures @ 14, 30, 31, 42, 90, 101, 102	Bedrock Coring: 56.5-65' Start: 1402 End: 1428 Rec = 101/102 = 99% RQD = 100/102 = 98%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

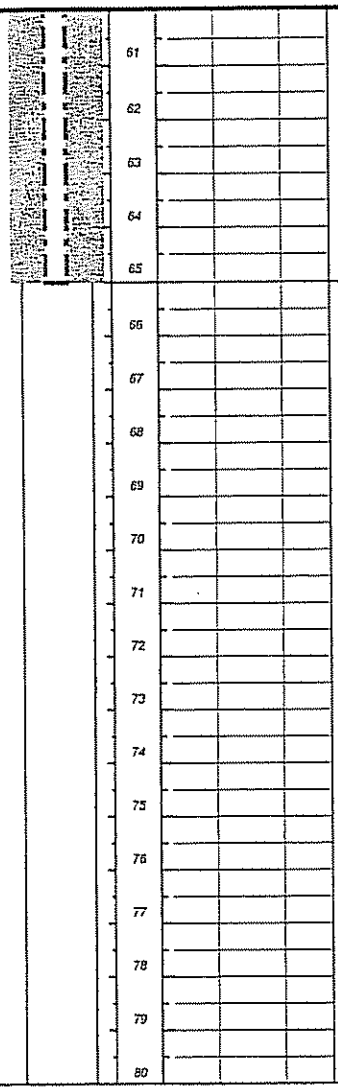
BORING NO. TCC-AMR-MW-1D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open bedrock borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 430.32
Water Level Reference Point: 432.54

Water Levels:
Date: 11/10/03
Depth to Water (ft.): 19.02

Starting Date: 7/21/03
Stop Date: 7/22/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Exploration terminated at 65 ft bgs

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

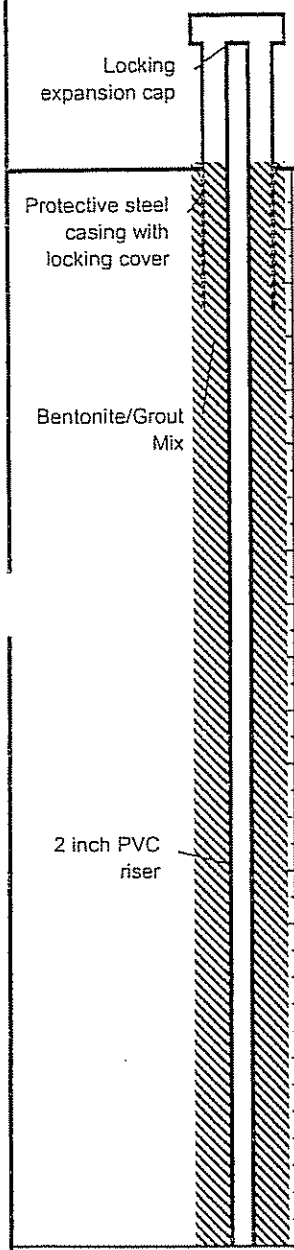
BORING NO. TCC-AMR-MW-1S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 430.36
Water Level Reference Point: 432.32

Water Levels:
Date: 11/10/03
Depth to Water(ft): 12.42

Starting Date: 7/21/03
Stop Date: 10/29/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1–20					Augered to 32.5' at bedrock surface. 2" PVC Monitoring Well installed adjacent to bedrock well MW-1D. See boring log for MW-1D for soil descriptions.	

NOTES:

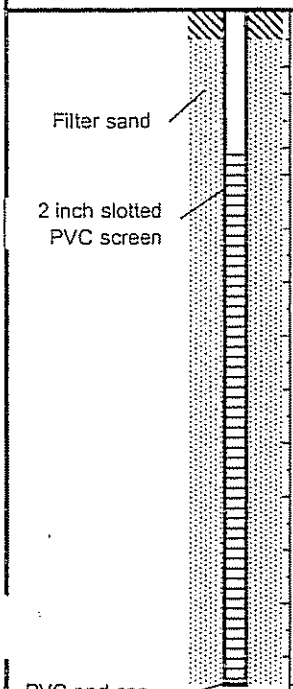
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-1S

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: 2" PVC WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 430.36 Water Level Reference Point: 432.32 Water Levels: Date: 11/10/03 Depth to Water(ft): 12.42	Starting Date: 7/21/03 Stop Date: 10/29/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

Boring terminated on bedrock at 32.5 feet bgs

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-2D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open bedrock borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 412.17
Water Level Reference Point: 413.75

Water Levels:
Date: 11/10/03
Depth to Water (ft): 25.11

Starting Date: 7/21/03
Stop Date: 7/22/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1	S1	2	20		0 - 6 Dk brn organic SILT, SAND, & GRAVEL	
		2			6 - 20 Brn SILT, little sand and gravel	
2		4				
		9				
3	S2	8	24		0 - 24 SAME grading to higher CLAY content (silty CLAY, little sand and gravel)	
		10				
4		13				
		14				
5	S3	12	8		0-8 Brn sandy SILT, little clay, some fm rd gravel	
		17				
6		14				
		14				
7	S4	13	24		0-24 Brn till - sandy SILT, some fm rd gravel, dry, trace rd cobbles	
		15				
8		27				
		18				
9	S5	WH	22		0 - 14 SAME, brn/gry, dry	
		11			14 - 20 Brn f SAND, some clay, moist	
10		18			20-22 Brn/gry w/ orn mottling, sandy clay, some fm rd gravel, moist	
		28				
11	S6	7	24		0-8 SAME w/ gry clay	
		9			8-24 Dk gry sandy CLAY, some fm rd gravel, moist, mod plasticity	
12		9				
		10				
13	S7	50/.4	5		16" in tube, Dk gry sandy CLAY, some fm gravel sat, mod soft - slough	
					0-5 Gry F SAND, some clay, sat, rock in tip	
14						
15	S8	50/.4	5		11" in tube, Brn sandy CLAY, some gravel - slough	
					0-5 Gry F SAND, some clay, dry, friable	
16						
17						
18						
		-				
19						
20	R1				0-28" Dolostone (55%), Limestone (40%), other	Auger refusal @ 19.5

Locking cap

Bentonite/ Grout mix

3" ID Schedule 40 Black T&C steel pipe set 6" into bedrock

NOTES:

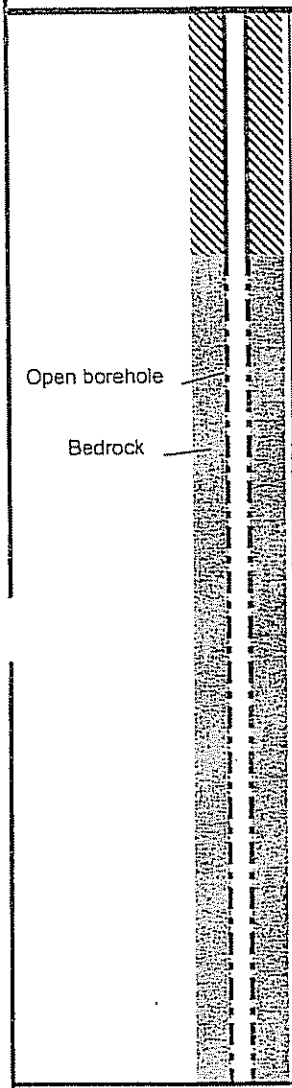
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-2D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open bedrock borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 412.17 Water Level Reference Point: 413.75 Water Levels: Date: 11/10/03 Depth to Water (ft): 25.11	Starting Date: 7/21/03 Stop Date: 7/22/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



(5%) - qtz, calcite, shale, depositional mixing - 1/2" vein of qtz ss (45 angle) @11", near vertical 1 1/8 calcite vein @ 23.5-29" Pipe set at 24.5'		Cored 5' Recovery = 100% RQD = 84%
Limestone (50%), Dolostone (50%) low occurance of fractures	Run #2	Bedrock Coring: 25-35' Start: 1406 End: 1457 Rec = 100% RQD = 99% = 113/120
As above.	Run #3	Bedrock Coring: 35-45' Start: 1515 End: 1624 Rec = 100% RQD = 112/160 = 93%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open bedrock borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 412.17
Water Level Reference Point: 413.75

Water Levels:
Date: 11/10/03
Depth to Water (ft): 25.11

Starting Date: 7/21/03
Stop Date: 7/22/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

41–45		
46–55	As above — Run #4	Bedrock Coring: 45-55' Start: 1650 End: 1745 Rec = 98% RQD = 115/120 = 96%
56–60	Interbedded Limestone (80%), Dolostone (20%) Low occurance of fractures. — Run #5	Bedrock Coring: 55-65 Start: 1803 End: 1919 Rec = 102% RQD = 99%

NOTES:

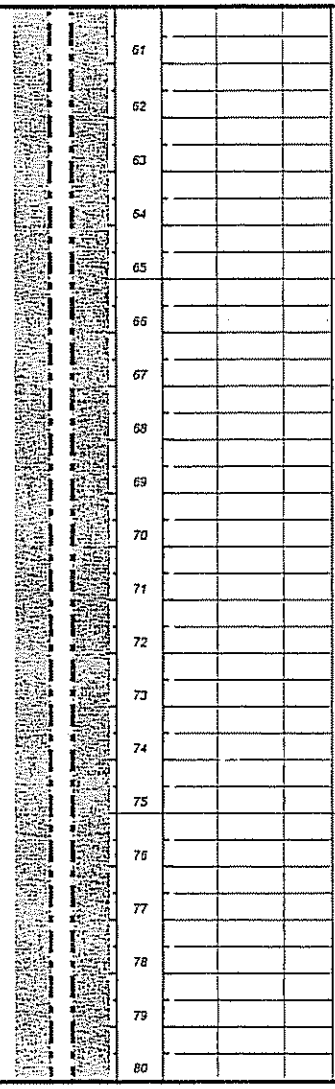
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-2D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open bedrock borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 412.17 Water Level Reference Point: 413.75 Water Levels: Date: 11/10/03 Depth to Water (ft): 25.11	Starting Date: 7/21/03 Stop Date: 7/22/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



Interbedded Limestone (80%) and dolostone (20%), Low occurance of fracturing Run #6	Bedrock Coring: 65-75 Total time elapsed: 46 min Core: 64.8-74.8 Rec = 100% RQD = 116.5/120 = 97%
Alternating 1/4" layers of Limestone (70%) and dolostone (30%) Run #7 Boring Terminated at 80 feet bgs.	Bedrock Coring: 75-80 Total time elapsed: 13 min? Core: 74.8-80 Rec = 64/63 = 102% RQD = 61/63 = 97%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

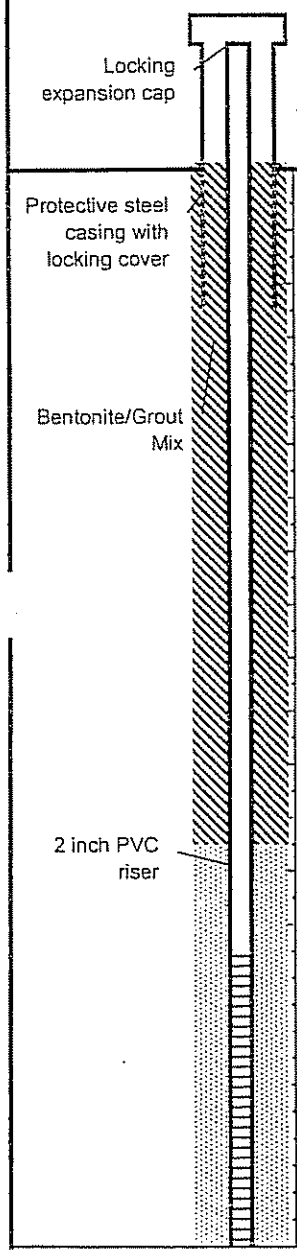
BORING NO. TCC-AMR-MW-2S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 412.13
Water Level Reference Point: 414.41

Water Levels:
Date: 11/10/03
Depth to Water: 14.44

Starting Date: 7/21/03
Stop Date: 7/22/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1–20					Augered to 24.5' at bedrock surface. 2" PVC Monitoring Well installed adjacent to bedrock well MW-2D. See boring log for MW-2D for soil descriptions.	

NOTES:

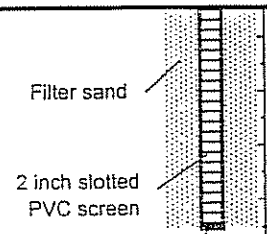
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-2S

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: 2" PVC WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 412.13 Water Level Reference Point: 414.41 Water Levels: Date: 11/10/03 Depth to Water: 14.44	Starting Date: 7/21/03 Stop Date: 7/22/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



Boring terminated on bedrock at 24.5 feet bgs

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

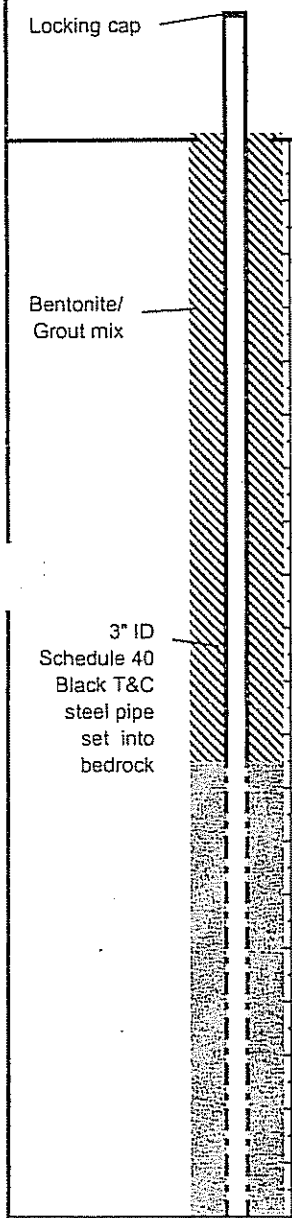
BORING NO. TCC-AMR-MW-3D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam Proposed LF
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 385.13
Water Level Reference Point: 387.73

Water Levels:
Date: 11/10/03
Depth to Water: 56.58

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1						
2	R1				0-18" Dolostone(85%), Limestone (10%), Other (5%), trace calcite veining, horizontal fractures at 2.5", 5.5", 9", 12", 15" 18-46" Alternating <1/2" layers of dolostone and limestone (laminated), horizontal fractures at 20", 25", 33", 46" 46-56" SAME with contact zone mixing between dolomite and limestone, thin calcite veining, horizontal fractures at 52"	Bedrock Coring: 1.5'-6.5" Rec = 56/60 = 93% RQD = 40/60 = 67%
3						
4						
5						
6						
7	R2				0-4" Same 4-62" Dolostone (50%), Limestone (40%), Calcite veining (10%), horizontal fractures at 12", 12.5", 14", 25", 30", 30.25", 30.5", 44"	Bedrock Coring 6.5'-11.5' Rec = 62/60=103% RQD = 58.5/60 = 98%
8						
9						
10						
11					Casing Set at 11.5'	
12						
13	R3				Dolostone (85%) Limestone (15%) Horizontal fractures @ 3.5, 7.5, 15, 17	Bedrock Coring: 12-16 Rec = 45/48 = 94% RQD = 36/48 = 75%
14						
15						
16						
17	R4				0-30" As above 30-120" Limestone (60%) Dolostone (40%) Horizontal Fractures @ 20, 21, 26, 29, 30, 38, 51.5, 62.5, 76, 92.5, 96	Bedrock Coring: 16-26 Rec = 100% RQD = 109/120 = 91%
18						
19						
20						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open Bedrock Borehole WELL LOCATION: Amsterdam Proposed LF CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 385.13 Water Level Reference Point: 387.73 Water Levels: Date: 11/10/03 Depth to Water: 56.58	Starting Date: 8/12/03 Stop Date: 8/19/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

21–26			
26–36	R5	0-24" Limestone (85%), Dolostone (15%) 24-72" Limestone (50%), Dolostone (50%) Horizontal Fractures @ 8, 25, 39.5, 63.5, 65, 83, 93, 112, 118"	Bedrock Coring: 26-36' Rec = 100% RQD = 110/120 = 92%
36–40	R6	Predominantly Dolostone to 42' (90%) 42'-46' Mostly Limestone (85%) Fractures @ 2, 8, 32, 49.5, 71, 100, 110, 118-120"	Bedrock coring: 36-46' Rec = 100% RQD = 114/120 = 95%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-3D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open Bedrock Borehole WELL LOCATION: Amsterdam Proposed LF CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 385.13 Water Level Reference Point: 387.73 Water Levels: Date: 11/10/03 Depth to Water: 56.58	Starting Date: 8/12/03 Stop Date: 8/19/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

41–46		
R7 (46–51)	Limestone (50%), Dolostone (50%) to 50 ' 50-56' Limestone (80%), Dolostone (20%) Fractures @ 1, 2, 4, 7, 8, 11.5, 23, 32.5, 33, 34, 35, 36, 36,5, 38, 51,5, 54, 57,5, 62, 67, highly fractured from 52-56'	Bedrock Coring: 46-56 Rec = 114/120 = 95% RQD = 55/120 = 46%
R8 (56–61)	Predominantly Limestone (90%) fractures mostly on dark, thin Dolostone Layers Highly fractured from 0-72", 100-120"	Bedrock Coring: 56-66 Rec = 118/120 RQD = 42/120 = 35%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam Proposed LF
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 385.13
Water Level Reference Point: 387.73

Water Levels:
Date: 11/10/03
Depth to Water: 56.58

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

61–66			
66–76	R9	As above. Highly fractured from 66-68' fractures every 4-10" from 68' to 76'	Bedrock Coring: 66-76 Rec = 100% RQD = 18/60 = 30%
76–86	R10	As above. Fractures every 4-10"	Bedrock Coring: 76-86 Rec = 100% RQD = 78/120 = 65%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

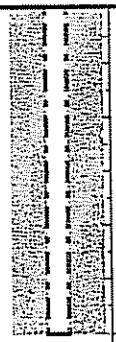
BORING NO. TCC-AMR-MW-3D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam Proposed LF
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 385.13
Water Level Reference Point: 387.73

Water Levels:
Date: 11/10/03
Depth to Water: 56.58

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Exploration terminated at 86' bgs

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

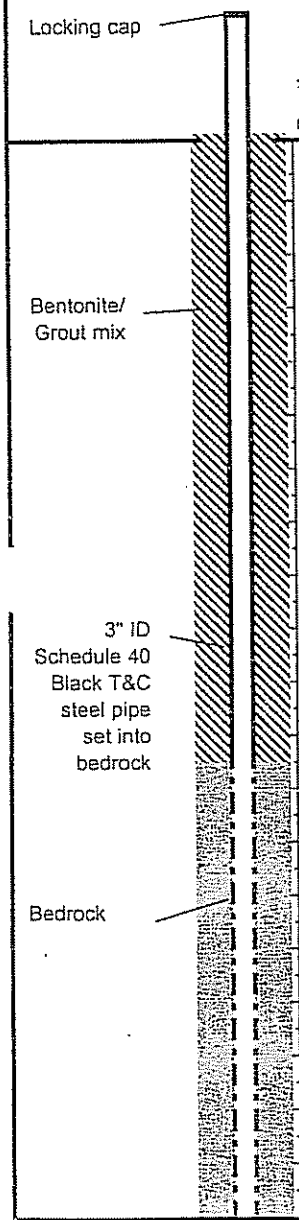
BORING NO. TCC-AMR-MW-4D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 366.62
Water Level Reference Point: 368.30

Water Levels:
Date: 11/10/03
Depth to Water(ft): 36.88

Starting Date: 7/21/03
Stop Date: 10/29/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1–13						
14–16				R1	Dolostone (60%), Limestone (40%) Horizontal fractures @ 10, 16, 24"	Run 1: 13-16.5' Rec. = 97% RQD = 100
17–20				R2	Dolostone (80%), Limestone (20%) Horizontal fractures @ 14, 20, 36, 40, 44"	Run 2: 16.5-21.5' Rec. = 100% RQD = 93%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 366.62
Water Level Reference Point: 368.30

Water Levels:
Date: 11/10/03
Depth to Water(ft): 36.88

Starting Date: 7/21/03
Stop Date: 10/29/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

21		
22–26	Limestone (90%) to 18" then Interbedded Limestone (50%) and dolostone (50%) Fractures in dolostone @ 20, 21, 25" Highly fractured from 23.5' to 26.5'	Run 3: 21.5-26.5' Rec. = 100% RQD = 33%
27–31	Limestone (90%), Dolostone (10%) Moderately fractured	Run 4: 26.5-31.5' Rec. = 100% RQD = 45%
32–36	As above	Run 5: 31.5-36.5' Rec. = 100% RQD = 57%
37–40	As above	Run 6: 36.5-41.5' Rec. = 100% RQD = 65%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-4D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open Bedrock Borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 366.62 Water Level Reference Point: 368.30 Water Levels: Date: 11/10/03 Depth to Water(ft): 36.88	Starting Date: 7/21/03 Stop Date: 10/29/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

41		
42	As above	Run 7: 41.5-46.5' Rec. = 100% RQD = 95%
43		
44		
45		
46		
47	As above.	Run 8: 46.5-50' Rec. = 100% RQD = 95%
48		
49		
50	Exploration terminated at 50 ft bgs.	
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-5D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.70
Water Level Reference Point: 363.32

Water Levels:
Date: 11/10/03
Depth to Water: 41.5

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Locking cap

Bentonite/ Grout mix

3" ID Schedule 40 Black T&C steel pipe set into bedrock

Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1	S1	2	12		0 - 6" Dk brn organic sandy SILT, roots 6 - 12" Lt brn f SAND and SILT, dry	
		2				
2		2				
		3				
3	S2	12	17		0 - 17" Lt brn/brn f SAND and SILT, dry, friable, cobbles @ 8", 10", & 16"	
		10				
4		13				
		15				
5	S3	10	22		0 - 22" Brn till - sandy SILT, little fm gravel, cobbles @ 12-14", trace organics, dry, mod compacted	
		15				
6		16				
		13				
7	S4	13	18		0 - 18" SAME, dk brn silt seam @ 16", mc sand lens @ 17"	
		15				
8		21				
		19				
9	S5	9	17		0 - 6" SAME 6 - 10" Brn/gry silty CLAY, moist 10 - 17" Brn f SAND and SILT, moist	
		13				
10		30				
		46				
11	S6	7	24		0 - 6" Brn till - sandy SILT, little fm gravel 6 - 24" Brn/gry till - sandy SILT, some fm rd gravel, dense	
		17				
12		23				
		50				
13	S7	50/.4	5		0 - 5" Brn till - fm SAND, some fmc rd gravel, dense	
14						V. dense augering - tight
15	S8	31	8		0 - 4" SAME 4 - 8" Rock fragments	
		50/.3				
16						
17	S9	41	20		0 - 12" Brn till - f SAND and SILT, some fm rd gravel, dry, dense 12 - 20" Brn till - f SAND, little fm rd gravel, moist	
		53				
18		50/.4				
19	S10	36	22		0 - 16" Brn f SAND, moist(+) @ 12-16" 16 - 22" Brn till - f SAND and SILT, some fm gravel, dry, dense	
		34				
20		33				
		35				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-5D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.70
Water Level Reference Point: 363.32

Water Levels:
Date: 11/10/03
Depth to Water: 41.5

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

21	S11	50/.2	2	0 - 2" Brn till - sandy SILT, some fm gravel, little gray clay, moist	
22					
23	S12	9	24	0 - 14" Brn f SAND grading to m SAND, wet 14 - 16" White c SAND (quartz), wet 16 - 24" Brn f SAND, wet	
		44			
		46			
24		39			
25	S13	31	24	0 - 24" Brn f SAND grading evenly to lt brn fmc SAND, moist	
		29			
		30			
26		38			
27	S14	27	10	0 - 10" Brn f(-)mc SAND, some fm rd gravel	
		31			
		36			
28		38			
29	S15	24	16	0 - 16" SAME	
		21			
		20			
30		20			
31	S16	32	6	0 - 6" Brn/red fmc SAND, some fmc gravel and cobbles	
		50/.3			Auger refusal @ 31.8'
32				Core 31.8' - 35.5' Boulder	Introduced water into boring for coring
33					
34					
35					
36	S17	17	12	0 - 12" Brn f SAND, CLAY, & fmc GRAVEL (saturation probably related to core fluid)	
		11			
37		17			
		30			
38	S18	17	6	0 - 6" Gry f SAND and Rock Cobbles	Full Spoon of super sat. slough
		14			
39		12			
		11			
40					

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-5D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open Bedrock Borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 360.70 Water Level Reference Point: 363.32 Water Levels: Date: 11/10/03 Depth to Water: 41.5	Starting Date: 8/12/03 Stop Date: 8/19/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

41	S19	50/.2	0	No Recovery	Full Spoon of super sat. slough	
42						
43				Boulder 42 - 44'	Auger through boulders	
44						
45	S20	50/.1	0	No Recovery - Boulder	Full Spoon of super sat. slough	
46						
47				Boulders		
48	S21	54	5	Broke through @ 47.5' 0 - 5" Rock and weathered rock fragments		
49		50/.3				
50						
51	S22	49	6	0 - 6" Rock and weathered rock fragments, sat.	Augered through boulder @ 50.5'	
52		50/.4				
53	S23	60/.4	8	0 - 8" Brn till and weathered rock - f SAND, some clay and fm rd gravel, abundant rock frags and cobbles, sat., v. dense		
54						
55				Boulder		
56					Flushed hole to reduce fines	
57	S24	50/.4	4	0 - 4" Brn till and weathered rock - f SAND, some clay and fm rd gravel, abundant rock frags and cobbles, sat., v. dense		
58						
59	S25	50/.2	3	0 - 3" Rock and weathered rock, some till, sat.	Flushed hole to reduce fines	
60	S26	39	10	0 - 10" Brn mc SAND, little silt and fm gravel,		

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.70
Water Level Reference Point: 363.32

Water Levels:
Date: 11/10/03
Depth to Water: 41.5

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

61			34		sat., dense	Full spoon of washed sand Flushed hole to reduce fines
			37			
			40			
62		S27	4	6	0 - 6" Brn fm SAND and SILT, abundant fmc gravel, little cobbles, loose, sat.	8" of washed sand above sample
			14			
63			37			
			50/.2			
64		S28	50/.4	0	No Recovery	Full spoon of brn mc SAND, little silt, super saturated
65						
66						Flushed hole to remove slough Cleared hole to 68'
67						
68						
69		S29	52	5	0 - 5" Cobble and brn till - fm SAND, some c sand and fm rd gravel, little clay	Full spoon of fmc SAND (slough) Sand does not seem to be flushing out of hole
			35			
			45			
70			50/.4			
71		S30	24	14	0 - 14" Brn fm SAND, sat.	Full spoon of sand (slough)
			40			
			46			
72			50/.4			
73		S31	18	1	0 - 1" Rock	Full spoon of super sat. slough (sand & silt)
			57			
			50/.4			
74						
75		S32	44	0	No Recovery	8" of brn fm SAND (slough)
			50/.4			
76						
77		S33	42	14	0 - 8" Brn fm SAND, some fm gravel 8 - 14" Brn sandy CLAY, some fm rd gravel	
			58			
			50/.4			
78						
79						Due to the threads breaking on the sampling rods, the augers had to be extended beyond the end of the sampling rods preventing any sampling data from 78' to 86'
80						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.70
Water Level Reference Point: 363.32

Water Levels:
Date: 11/10/03
Depth to Water: 41.5

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

81–86		Due to the threads breaking on the sampling rods, the augers had to be extended beyond the end of the sampling rods preventing any sampling data from 78' to 86'
87–90	Auger encountered weathered rock @ 86' Augered to 87.3' Did not feel like competent bedrock - rollerbit broke through @ 89.5'	
90–92	0-2" Weathered dolostone - Horz. Fracture @2" 2-3" Cobbles 3-7" Weathered dolostone (85%), Limestone (15% 7-8" Same; broken fragments 8-36" Limestone (85%) Dolostone (10%) Other (5%) Contact mixing, highly fractured 36-51" Limestone (50%), Dolostone (50%) - moderate degree of weathering along fractures	Competent rock encountered @ 90' Core 90 to 95' Recovery = 100% RQD = 27/60 = 45%
95–100	0-11" Dolostone (85%), Limestone (10%), other (5 Depositional mixing, slight contact zone mixing 11-17" weathered limestone, highly fractured 17-25" Dolostone (75%), Limestone (25%), other (5%); depositional mixing 25-38.5" Limestone (75%), Dolostone (20%), other (5%); contact zone mixing 38.5-49.5" Dolostone (80%), limestone (15%), other (5%), mostly depositional, slight contact zone mixing. 49.5-58" Calcite seam at contact. Qtz Sandstone	Core 95 to 100' Recovery = 100% RQD = 48/60 = 80%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.70
Water Level Reference Point: 363.32

Water Levels:
Date: 11/10/03
Depth to Water: 41.5

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

101–109	Limestone (50%) Dolostone (50%), some angular fractures. Run #3	Bedrock Coring: 100-110' Start: 1248 End: 1459 Barrel Recovery = 9.5' Actual Recovery = 9.5' = 95% RQD = 92/120 = 77%
110–120	Limestone (50%), Dolostone (50%), some angular fractures, very slight secondary porosity @ 119-120' Run #4	Bedrock Coring: 110-120' Start: 1525 End: 1629 Actual Recovery = 10.3' = 103% RQD = 103.5/120 = 86%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

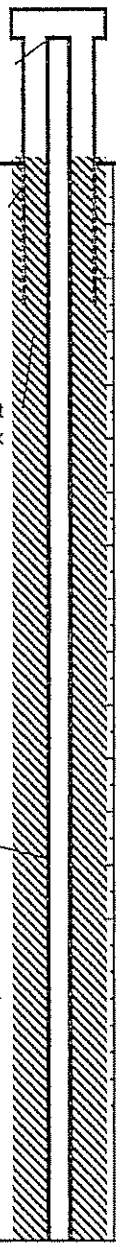
BORING NO. TCC-AMR-MW-5S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.30
Water Level Reference Point: 363.15

Water Levels:
Date: 11/10/03
Depth to Water (ft): 37.23

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1–20					See soil descriptions for adjacent well MW-5D.	Augered to 100' at bedrock surface. 2" PVC Monitoring Well installed

NOTES:

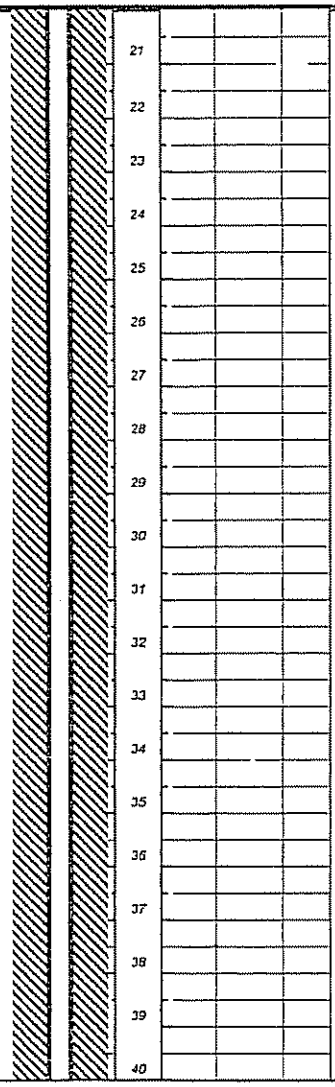
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-5S

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: 2" PVC WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 360.30 Water Level Reference Point: 363.15 Water Levels: Date: 11/10/03 Depth to Water (ft): 37.23	Starting Date: 8/12/03 Stop Date: 8/19/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

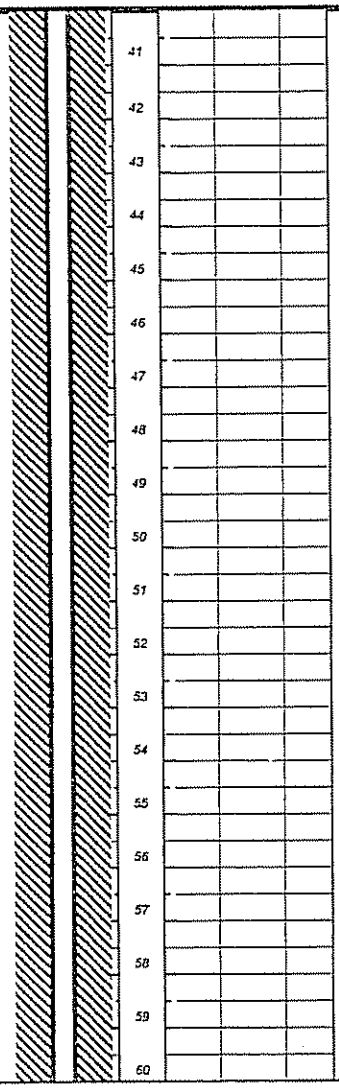
BORING NO. TCC-AMR-MW-5S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.30
Water Level Reference Point: 363.15

Water Levels:
Date: 11/10/03
Depth to Water (ft): 37.23

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

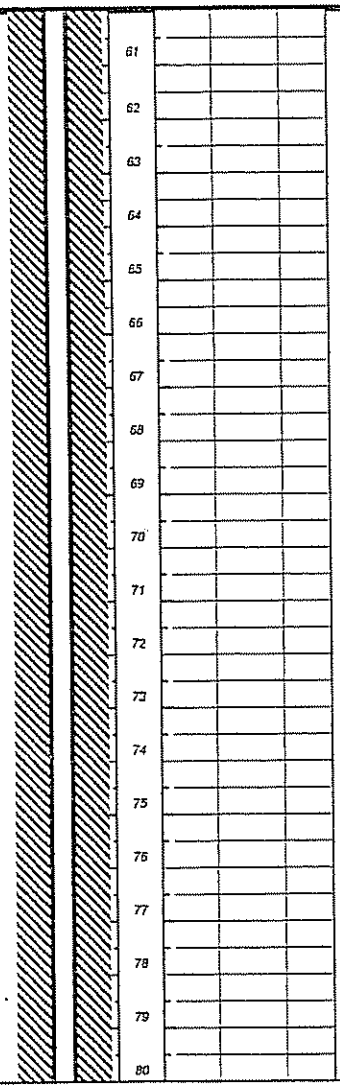
BORING NO. TCC-AMR-MW-5S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 360.30
Water Level Reference Point: 363.15

Water Levels:
Date: 11/10/03
Depth to Water (ft): 37.23

Starting Date: 8/12/03
Stop Date: 8/19/03
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco



NOTES:

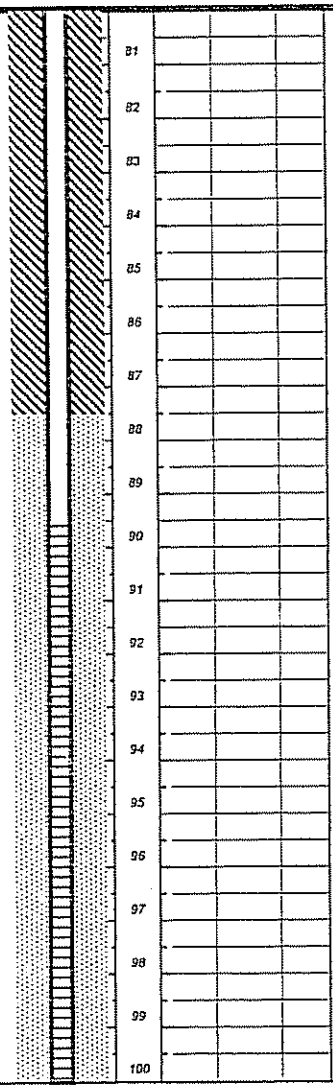
Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-5S

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: 2" PVC WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 360.30 Water Level Reference Point: 363.15 Water Levels: Date: 11/10/03 Depth to Water (ft): 37.23	Starting Date: 8/12/03 Stop Date: 8/19/03 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco



NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-6D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 435.50
Water Level Reference Point: 437.76

Water Levels:
Date: 11/10/2003
Depth to Water(ft): 19.95

Starting Date: 7/30/2003
Stop Date: 7/30/2003
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Craig D'Allaird

Locking cap

Bentonite/ Grout mix

3" ID Schedule 40 Black T&C steel pipe set 6" into bedrock

Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
1	S1	1	11		0-2 Top soil/organics, brn, dry 2-11 Brn CLAY, some silt, trace f sand, dry	
2		2				
		5				
		6				
3	S2	4	7		0-5 SAME 5-7 Wood chips	
		4				
		7				
4		8				
5	S3	4	6		0-6 Same, moist	
		4				
		5				
6		7				
7	S4	5	16		0-16 Gry CLAY, trace f gravel, moist	
		5				
		7				
8		8				
9	S5	9	18		0-18 SAME	
		13				
		14				
10		12				
11	S6	12	24		0-6 Brn CLAY, trace till 6-8 Gry CLAY 8-10 Gry gravel 10-12 Gry/brn layered CLAY	
		17				
		20				
12		23				
13	S7	16	24		0-10 Brn CLAY, some gravel, sat 10-24 Brn CLAY, firm, some gravel	
		16				
		20				
14		23				
15	S8	23	24		0-16 SAME 16-24 Dk gry SILT, trace f sand	
		50				
		6				
16		6				
17	S9	9	18		0-8 Brn/gry CLAY 8-18 Gry clayey SILT, trace gravel and sand	
		9				
		10				
18		11				
19	S10	9	24		0-24 SAME	
		9				
		11				
20		12				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-6D

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: Open Bedrock Borehole
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 435.50
Water Level Reference Point: 437.76

Water Levels:
Date: 11/10/2003
Depth to Water(ft): 19.95

Starting Date: 7/30/2003
Stop Date: 7/30/2003
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Craig D'Allaird

21	S11	10	16	0-3 Brn CLAY, wet 3-13 Gry CLAY, trace sand/silt 13-16 Brn CLAY, wey	
		11			
		12			
22		12			
23	S12	13	22	0-22 SAME	
		12			
		14			
24		15			
25	S13	10	21	0-21 SAME, trace gravel, moist tube sat.	
		15			
		16			
26		14			
27	S14	50/.3	4	0-4 Gry, silty CLAY, some gravel	
28					
29	S15	44	15	0-2 Fine gry SAND, some silt 2-5 f-m gry gravel 5-15 Gry SILT, some clay	
		50/.4			
30					
31	S16	18	23	0-3 f SAND 3-6 gravel 6-23 Gry SILT	
		20			
		50/.4			
32					
33	R1			32-33.7 Limestone and Dolostone - turbid or mixing zone. Fractures @ 9.5, 11" 33.7-37' Dolostone (80%), Limestone (15%), other (5%). Fractures @ 20, 21.5, 22.8, 31, 43.5, 48.5, 56"	Run 1: 32-37' Rec. = 100% RQD = 92%
34					
35					
36					
37					
38	R2			37-37.5 SAME; 37.5- 38.4' Dolostone (65%), limestone (30%), other (5%). Fractures @ 6.5, 7.5, 13, 16"; 38.4-38.8' Limestone. Fracture @ 21"; 38.8-40.9' LS (80%), DS(15%), Other (5%). Fractures @ 50-51" and 54-55"	Run 2: 37-42' Rec. = 100% RQD = 72%
39					
40					

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-6D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open Bedrock Borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 435.50 Water Level Reference Point: 437.76 Water Levels: Date: 11/10/2003 Depth to Water(ft): 19.95	Starting Date: 7/30/2003 Stop Date: 7/30/2003 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Craig D'Allaird

41–42			
43–47	R3	42-44.1 SAME grading to Dolostone (65%), LS (30% other (5%). Fractures @ 5" and 8.5" 44.1-44.8' DS (80%), LS (15%), other (5%) fractures @ 26" 44.8-45.9' DS(65%), LS(30%), other (5%) fractures @ 15, 16, 18, 19.5" 45.9-47' Predominantly LS w/ increase of DS along fractures. Highly fractured from 46.5 - 47'	Run 3: 42-47' Rec. = 100% RQD = 77.5%
48–52	R4	0-4" fractured LS (50%), DS (50%), Turbid depositional environment fractures @ 13, 15, 17, 20, 21, 26.5, 31.5, 32.5, 40.5 45.5, 47, 48.5"	Run 4: 47-52' Rec. = 100% RQD = 68%
53–57	R5	Limestone (70%), Dolostone (30%) Fractures @ 1,4, 41, 55"	Run 5: 52-57' Rec. = 100% RQD = 93%
58–60	R6	DS (80%), LS (20%) Fractures @ 7, 23, 37.5"	Run 6: 57-62' Rec. = 98% RQD = 100%

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-MW-6D

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: Open Bedrock Borehole WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations (ft amsl): Ground Surface Elevation: 435.50 Water Level Reference Point: 437.76 Water Levels: Date: 11/10/2003 Depth to Water(ft): 19.95	Starting Date: 7/30/2003 Stop Date: 7/30/2003 Method: Hollow Stem Auger Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Craig D'Allaird

61			
62			
63	R7	predominantly limestone, nonlinear bedding, increased dolostone @ 66' w/ increase in fractures fractures @ 39, 47, 48, 49, 53, 56"	Run 7: 62-67' Rec. = 100% RQD = 98%
64			
65			
66			
67			
68	R8	Dolostone (70%), Limestone (30%), fractures mostly in DS. Turbid depositional environment Fractures @ 2, 7.5, 10, 15.5, 16.5, 19, 20, 22.5, 28, 35, 37.5, 42"	Run 8: 67-71' Rec. = 94% RQD = 53%
69			
70			
71		Exploration terminated @ 71 ft. bgs.	
72			
73			
74			
75			
76			
77			
78			
79			
80			

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

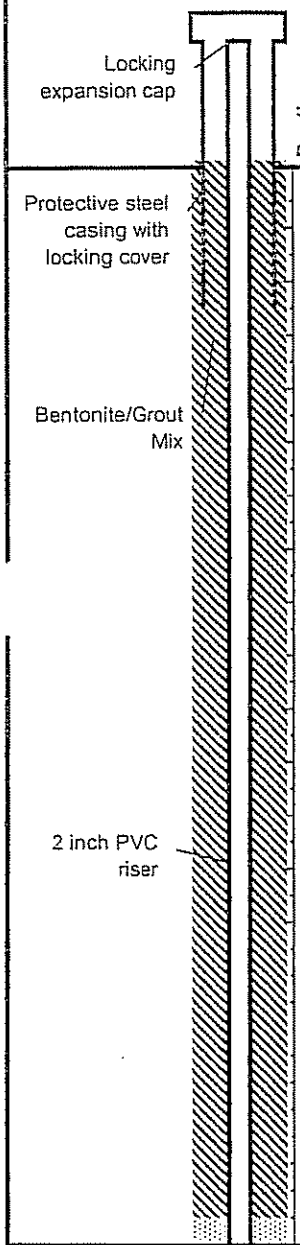
BORING NO. TCC-AMR-MW-6S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 435.80
Water Level Reference Point: 437.53

Water Levels:
Date: 11/10/2003
Depth to Water: 17.69

Starting Date: 7/30/2003
Stop Date: 7/30/2003
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Craig D'Allaird



Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
					See soil descriptions in log of adjacent well MW-5D	Augered to 31.5' at bedrock surface. 2" PVC Monitoring Well installed

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

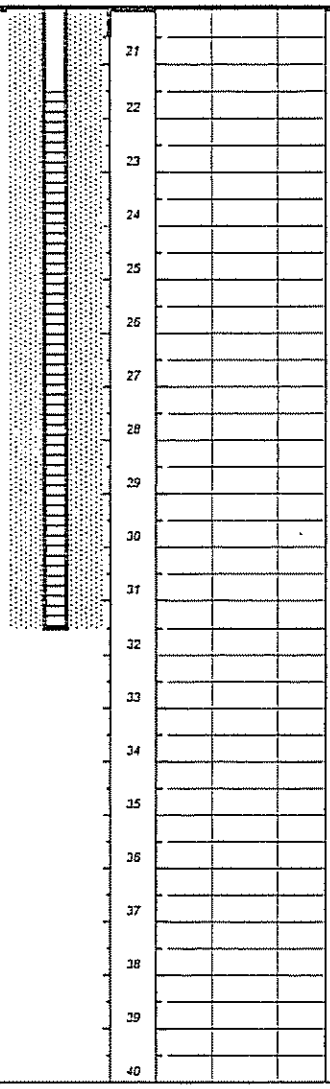
BORING NO. TCC-AMR-MW-6S

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE: 2" PVC
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations (ft amsl):
Ground Surface Elevation: 435.80
Water Level Reference Point: 437.53

Water Levels:
Date: 11/10/2003
Depth to Water: 17.69

Starting Date: 7/30/2003
Stop Date: 7/30/2003
Method: Hollow Stem Auger
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Craig D'Allaird



NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-AA0

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/7/2003
Stop Date: 6/7/2003
Method:
Contractor: Subsurface Drilling Soultions
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	6		0-4 Dk brn organic, rich sandy SILT, loose	
			4			4-6 Weathered rock frags and cobbles	
	2		4				
			7				
	3						
	4						
	5	S2	3	16		0-2 Dk brn sandy SILT, little gravel, roots	
			4			2-10 Brn silty CLAY, some fm gravel	
			5			10-16 Brn sand and clay, abundant fm gravel	
	6		8			and rock frags, wet	
	7						
	8						
	9						
	10	S3	4	24		0-14 Brn silty CLAY and fm SAND, little fm	
			13			gravel, moist, mod soft	
			9			14-20 Cobbles	
	11		14			20-24 Brn tight CLAY, little sand and gravel,	
						mod dense, dry	
	12						
	13						
	14						
	15	S4	8	24		0-10 Brn CLAY and fm SAND, some fm gravel,	
			26			moist, mod soft	
			13			10-12 Rock, 12-24 Dk gry CLAY,	
	16		17			hi plasticity, tight, mod dense	
	17						
	18						
	19						
	20	S5	24	8		0-8 SAME w/ sandy CLAY,	
			29			some fm gravel lens @ 4.5",	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-AA0

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/7/2003 Stop Date: 6/7/2003 Method: Contractor: Subsurface Drilling Soultions Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
			16			Moist spoon, sat	
	21		16				
							EOB @ 21' Refusal Not Encountered
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A0

PROJECT NAME: Amsterdam Materials Recycling Inc. **PROJECT No.:** 90303.00 **CLIENT:** Amsterdam Materials Recycling Inc. **WELL TYPE:** **WELL LOCATION:** Amsterdam **CITY/TOWN:** Amsterdam **COUNTY:** Montgomery **STATE:** New York	**Elevations:** Ground Surface Elevation: Water Level Reference Point: **Water Levels:** Date: Depth to Water:	**Starting Date:** 6/9/2003 **Stop Date:** 6/9/2003 **Method:** **Contractor:** SDS **Driller:** Jeff Grant **Rig:** B47 Track Mounted Drill **Geologist:** Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	3	20		0-4 Dk brn organic SILT and rock frags	
			3			4-20 Brn/gry mottled sandy SILT, trace gravel	
			4			and roots, dry	
	2		6				
	3	S2	6	12		0-12 Brn w/ little orn and gry mottling, fm SAND	
			7			and SILT, little gravel, dry	
			5				
	4		4				
	5	S3	4	22		0-6 Same	
			7			6-22 Brn silty CLAY, dry, tight, mod plasticity	
			10				
	6		19				
	7	S4					Shelby tube 6-7.2'
							Recovery = 1.65
	8						
	9	S5	10	22		0-22 Brn grading to brn/gry, sandy SILT, cobble	
			23			at 5-8" and 10-11", dry, mod tight, low plasticity,	
			19			some fm, rd gravel	
	10		23				
	11	S6	5	24		0-8 SAME	
			14			8-24 Dk gry till alternating 2" layers of CLAY w/	
			24			some fm gravel, moist, hi plasticity sandy	
	12		22			CLAY w/ abndt fm rd gravel and some cobbles	
	13	S7	6	18		0-10 Dk gry alternating 2" layers of CLAY and	
			15			sandy CLAY, some fm rd gravel, moist	
			22			10-18 SAME w/ brn, dry, sandy CLAY	
	14		20			layer, fm sand	
	15	S8	11	24		0-8 Dk gry sandy CLAY, some fm gravel	
			15			8-16 SAME	
			21			16-20 Brn silty CLAY(thin mc sand lens @ 20")	
	16		20			20-24 Brn SILT and fm(-) SAND, moist	
	17	S9	17	24		0-4 Dk gry sandy CLAY, some fm gravel	
			18			4-10 Brn fm SAND, sat	
			19			10-14 Brn CLAY, little f gravel, moist	
	18		16			14-24 Dk gry sandy CLAY, some fm gravel	
	19	S10	6	8		0-3 Brn sandy CLAY, little fm gravel, moist	
			17			3-6 Dk gry sandy CLAY, some fm rd gravel,	
			18			moist	
	20		17			6-8 Brn and gry w/ orn staining, sandy CLAY	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A0

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/9/2003 Stop Date: 6/9/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21	S11	18	8		0-8 Dk gry sandy CLAY, some fm gravel, moist(-), mod soft, pliable, trace organics	
			21				
			20				
	22		28				
	23	S12	10	24		0-24 Dk gry till, sandy CLAY, some fm rd gravel, moist(+), little cobbles, tube sat.	
			12				
			13				
	24		17				
	25	S13	6	24		0-24 Dk gry sandy CLAY, some fm gravel, moist, tube sat.	
			7				
			11				
	26		14				
	27	S14	12	16		Full spoon, super sat slough 0-16 SAME	
			16				
			25				
	28		22				
	29						Auger to bedrock
	30						
	31					AUGER REFUSAL @ 30'	
	32						
						30-35' several vert. fractures, rec=5.0'	
	33					RQD = 37/60 = 61.7%	
	34						
	35						
	36					35-40' rec = 4.5' (bottom fell out),	
						RQD = 46/60 = 77%	
	37						
	38						
	39						
	40					END OF EXPLORATION @ 40'	

NOTES:
Material felt gravelly @ 29.4', auger refusal @ 30', core 30-40'
30' @ 15:16, core barrel disconnected @ 21'
Grout 30-40', set well @ 29.5', 7' screen

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A2

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/13/03
Stop Date: 6/13/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 track mounted
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	2	12		0-2 Grass and Dk brn SILT	
			1			2-12 Brn clayey SILT, little sand and gravel	
	2		5				
			19				
	3						
	4						
	5	S2	7	24		0-24 Alternating 1-2" layer brn silty CLAY AND brn sandy CLAY, some fm gravel. Both dry, tight, cohesive	
			10				
	6		10				
			12				
	7						
	8						
	9						
	10	S3	14	24		0-18 SAME	
			15			18-24 Dk gry sandy CLAY, some fm gravel, moist, mod plasticity	
	11		13				
			11				
	12						
	13						
	14						
	15	S4	4	18		0-6 Brn sandy CLAY, some fm gravel, high plstcty	
			3			6-14 Dk. gry silty CLAY, trace sand and gravel, mod-high plasticity, moist	
			14				
	16		16			14-18 Dk gry till-sandy CLAY, some fm rd gravel, moist	
	17						
	18						
	19						
	20	S5	4	10		0-10 Alt. layers of 3" Sat. gry f SAND and SILT AND 2" dk gry CLAY, little f sand and gravel	
			9				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A2

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/13/03 Stop Date: 6/13/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 track mounted Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		12 12			Dense, dry	
	22 23 24						
	25	S6	36 23 19 25	14		0-8 Gry f SAND and SILT, sat. 8-14 Alternating 1" layers of SAME AND Dk gry CLAY, little fm gravel	
	27 28 29						
	30	S7	38 54 50/.4	0		NO RECOVERY	
	31						
	32 33 34 35 36					Auger Refusal @ 31.7' Core 31.7' - 36.7' 100% Recovery RQD = 83%	
	37 38 39 40					END OF EXPLORATION @ 36.7	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A4

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:
Water Level Reference Point Elevation:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/19/2003
Stop Date: 5/20/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1		2	12		0-12 Gry/brn SILT, little f sand, trace rd mc gravel	
			5				
	2		6				
			6				
	3		4	11		0-5 SAME w/ orn mottling	
			7			5-6 Cobble, quartzite	
	4		7			6-11 Brn/gry silty CLAY	
			8				
	5		4	22		0-22 brn silty CLAY, trace organics	
			8				
	6		9				
			12				
	7		9	19		0-19 brn silty CLAY, little f sand, trace rd f gravel.	
			14			moist(-) @ 7-15".	
	8		18				
			19				
	9		15	24		0-21 SAME, dry	
			17			21-24 brn f SAND and SILT, wet	
	10		19				
			21				
	11	S6	12	20		0-20 sat.brn f SAND and SILT, gw observed	
			18			at 9.7'	
	12		19				
			21				
	13	S7	10	19		0-7 SAME, sat	
			11			7-10 brn silty CLAY	
	14		11			10-17 DK gry CLAY, hi plasticity, moist(-)	
			12			17-19 Lt gry sandy SILT, sat	
	15	S8				14' brn silty CLAY	Shelby tube 14-16
						16' Dk gry CLAY	Rec = 2.2'
	16						
	17	S9	4	24		0-24 Dk gry till, hi plasticity, silty CLAY, little fm	
			5			rd gravel and f sand, moist	
	18		6				
			7				
	19	S10	5	24		0-24 Dk gry till w/ 1/2" f sand lens every 3",	
			7			increase in clay content, little gravel,	
			6			high plasticity	
	20		9				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A4

ROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Level Reference Point Elevation: Water Levels: Date: Depth to Water:	Starting Date: 5/19/2003 Stop Date: 5/20/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21	S11	3	24		0-24 Dk gry till, SAME fm sand lens ~2" every 6", moist(-)	
			4				
			5				
	22		5				
	23	S12	3	24		0-24 Alt. 3" layers of sandy till AND clay till, moist sandy till has high clay content, increase in fm gravel, lo plasticity	
			4				
			6				
	24		8				
	25	S13	4	24		0-24 Dk gry till, CLAY little fm gravel, thin f sand lens every 4", moist	
			4				
			5				
	26		5				
	27	S14	4	16		0-16 Dk gry till-sat, soft CLAY w/ little f sand some fm rd gravel	
			7				
			7				
	28		9				
	29	S15	4	0		No recovery, ~4" super sat slough	
			6				
			8				
	30		11				
	31	S16	3	24		0-24 Dk gry till, CLAY and f SAND, some fm rd gravel, hi plasticity, sat, mod soft	
			10				
			14				
	32		21				
	33	S17	23	24		0-6 SAME as above 6-20 gry compact f SAND ,sat 20-24 Dk gry till, v dense CLAY matrix, some fm gravel	
			19				
			50/.3				
	34						
	35	S18	18	16		0-24 gry sat f SAND, little f gravel	
			23				
			50/.3				
	36						
	37	S19	7	16		0-8 Dk gry sat CLAY, little fm gravel, hi plstcty 8-16 Dk gry sandy till-f SAND, some fmc gravel, trace rk frags, little silt, dry, dense, sat spoon	
			17				
			35				
	38		50/.1				
	39	S20	48	16		0-16 Dk gry sandy TILL-dry, v. dense f SAND, little silt and little fm rd gravel, sat spoon	
			50				
			50/.3				
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A4

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Level Reference Point Elevation: Water Levels: Date: Depth to Water:	Starting Date: 5/19/2003 Stop Date: 5/20/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41	S21	70	8		0-6 SAME, plus some fm rd gravel 6-8 Cobble	
	42						Static gw in augers @ 6.5'
	43	S22	70	8		0-8 Dk gry v. dense till compacted sandy silt, some(+) fmc rd gravel, little clay, sat spoon, dry sample	
	44						
	45	S23	35	14		Auger went through coarser material @ 43.5' 0-14 Dk gry v. dense till, dry f sand, some silt, some(+) fmc rd gravel (spoon sat)	
			36				
	46		50/.2				
	47	S24	42	10		0-10 SAME as above, dry (spoon sat)	
			50/.3				
	48						
	49	S25	20	12		0-12 SAME as above, dry, trace clay Augered into harder/gravelly material @ 49.1'	
			50				
	50		50/.2				
	51	S26	50/0	0		4.7' recovery Core 49'-59' Recovery = 5.1' RQD = 41.5/60 = 69%	
	52						
	53						
	54						
	55					END OF EXPLORATION @ 59 FEET	
	56						
	57						
	58						
	59						
	60						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/6/2003 Stop Date: 6/6/2003 Method: Contractor: SDS Driller: Jeff Grani Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	10		0-10 Bm organic sandy SILT	
			2				
	2		4				
			6				
	3						
	4						
	5	S2	7	24		0-24 SAME, grades to sandy CLAY, little mc rd gravel, roots noted @ 10-14" and 24"	
			15				
	6		7				
			8				
	7						
	8						
	9						
	10	S3	4	24		0-12 Bm sandy CLAY, moist 12-24 DK gry silty CLAY, little f sand and fm gravel, sat.	
			7				
			6				
	11		9				
	12						
	13						
	14						
	15	S4					Shelby Tube 14.1-15.9', recovery = 1.0'
	16						
	17						
	18	S5				Cobble	Auger refusal @ 17' Rollerbit 17 - 18.5' Broke through @ 18.5' sample cuttings
	19	S6	32	10		0-10 Dk gry f SAND, little silt, sat.	
			46				
	20		48				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/6/2003 Stop Date: 6/6/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		37				
	22					END OF EXPLORATION @ 20.5 FEET Refusal not encountered.	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

NOTES:
Artesian effect, groundwater pushed to surface.

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A6

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/7/2003 Stop Date: 6/7/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	14		0-4 DK brn organic SAND and SILT 4-14 Brn/little om sandy SILT, little roots, some fmc gravel	
	2		2				
			4				
			5				
	3						
	4						
	5	S2	4	18		0-8 SAME, grading to brn 8-18 Brn clayey SILT, little fm gravel and f sand	
			7				
	6		11				
			8				
	7						
	8						
	9						
	10	S3	7	18		0-10 Brn sandy SILT,some fmc gravel,little clay 10-13 Dk gry silty CLAY, moist , hi plasticity 13-17 DK gry till -sandy CLAY, some fm gravel 17-18 same as 10-13	
			7				
			4				
	11		6				
	12						
	13						
	14						
	15	S4	5	14		0-1 SAME 1-8 DK gry sandy CLAY, some fm rd gravel 8-14 DK gry f SAND and CLAY, sat	
			4				
			11				
	16		9				
	17						
	18						
	19						
	20	S5	4	17		0-17 Dk gry till-sandy CLAY, some (+) fm rd gravel, dry	
			7				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-A6

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/7/2003 Stop Date: 6/7/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	20		7				
	21		5				
	22						Difficult augering @ 22'
	23						
	24						
	25	S6	13 50/.3	4		0-2 SAME, moist, increase in clay content 2-4 rock frags and cobbles	
	26					END OF EXPLORATION @ 25 FEET	
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B0

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/10/2003
Stop Date: 6/10/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	2	16		0-4 DK brn organic SILT, sat	
			6			4-6 Cobble	
			3			6-16 Brn w/ gry and orn staining SILT, little	
	2		5			sand and gravel, trace roots, dry	
	3						
	4						
	5	S2	10	18		0-18 Brn/gry silty CLAY, trace f sand, moist,	
			7			some orn and dk brn mottling, lo plasticity	
			8				
	6		12				
	7						
	8						
	9						
	10	S3	9	11		0-11 SAME, plus little fmc rd gravel	
			7				
			11				
	11		15				
	12						
	13						
	14						
	15	S4	WH	20		0-6 Brn/little orn and gry mottling, silty CLAY,	
			16			some fm gravel, moist, mod plasticity, mod soft	
			25			6-20 Gry/brn f SAND, sat, cobble 12-13"	
	16		23				
	17						
	18						
	19						
	20	S5	11	10		Full spoon, supersat slough above sample	
			65			0-2 SAME	

NOTES:

Drilling Information:

	Casting	Sample	Tube
Type:			
Diam.:			
Weight:			
Fall:			

The Chazen Companies

BORING NO. TCC-AMR-B0

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/10/2003 Stop Date: 6/10/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21					2-10 DK gry till-sandy CLAY, some fm rd gravel	
	22						Gravelly 20.5 to 22' Smooth augering @ 22' Gravelly @ 23.5'
	23						
	24						
	25	S6	10 11	24		0-12 Gry sandy CLAY, sat, soft 12-24 Brn f SAND and CLAY, sat, soft, some vertical gry CLAY seams	
	26		21 40				
	27					Rollerbit 26' - 31'	Refusal @ 26'
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube
Type:			
Diam.:			
Weight:			
Fall:			

The Chazen Companies

BORING NO. TCC-AMR-B1

PROJECT NAME: Amsterdam Materials Recycling Inc. **PROJECT No.:** 90303.00 **CLIENT:** Amsterdam Materials Recycling Inc. **WELL TYPE:** **WELL LOCATION:** Amsterdam **CITY/TOWN:** Amsterdam **COUNTY:** Montgomery **STATE:** New York	**Elevations:** Ground Surface Elevation: Water Level Reference Point: **Water Levels:** Date: Depth to Water:	**Starting Date:** 6/11/2003 **Stop Date:** 6/11/2003 **Method:** **Contractor:** SDS **Driller:** Jeff Grant **Rig:** B47 Track Mounted Drill **Geologist:** Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	2	8		0-8 Lt. Brn CLAY	
			3				
	2		7				
			8				
	3						
	4						
	5	S2	11	24		0-24 Brn sandy CLAY w/ f rd gravel Moist 0-18 Dry 18-24	
			17				
	6		35				
			45				
	7						
	8						
	9						
	10	S3	17	24		0-4 Dk brn CLAY, dry 4-14 Lt brn CLAY, some fm gravel, moist 14-24 Dk gry till, dry	
			35				
	11		39				
			50/.4				
	12						Refusal @ 13' Rollerbit to 17.5', no recovery
	13						
	14						
	15						
	16						
	17						
	18					END OF EXPLORATION @ 17.5 FEET	
	19						
	20						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B2

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/12/2003 Stop Date: 6/12/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: Mobile B47 Track Rig Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	3	16		0-2 Dk Brown organics (leaf material and roots) 2-16 Brn SILT, little f sand and clay	
			1				
			5				
	2		8				
	3						
	4						
	5						
	6	S2	11	24		0-24 Brn silty CLAY, little fm gravel, tight, dry, slightly friable in tip, mottling in tip	
			11				
			14				
	7		24				
	8						
	9						
	10	S3	5	24		0-24 Alternating 3" layers of Brn. CLAY high plasticity, tight. Iron staining between upper layers AND Brn sandy CLAY, some fm rd gravel, dry.	
			8				
			14				
	11		19				
	12						
	13						
	14						
	15	S4	13	12		0-12 Brn and gry (marbled) w/ Dk brn mottling, silty CLAY	
			20				
			13				
	16		14				
	17						
	18						
	19						
	20	S5	3	20		0-6 Brn f SAND and CLAY, moist 6-14 Dk gry f SAND and CLAY, sat.	
			6				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B2

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/12/2003 Stop Date: 6/12/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: Mobile B47 Track Rig Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		23 35			14-20 Dk gry sandy till some fm rd. gravel little clay, dry	
	22 23 24						
	25 26	S6	40 50/.3	11		0-3 Dk gry CLAY, high plasticity, sat, v.soft 3-5 Brn sandy CLAY, rock @ 5" 5-11 Dk gry sandy TILL, some fm rd gravel, little to trace clay	
	27 28 29						Augering appears gravelly @ 27'
	30 31 32 33	S7	43 50/.1	8		0-6 Dk gry sandy till-fm SAND, some fm gravel, sat, compacted 6-8 SAME plus rock frags	
	34 35 36 37 38		-			Rollerbit 33.5 to 35.5 too difficult, switched to core barrel Cored 35.5' to 38.5'	REFUSAL AT 33.5'
	39 40					END OF EXPLORATION @38.5 '	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B3

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/16/2003
Stop Date: 6/16/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	2	6		0-4 Dk brn organic SILT, soft, sat	
			3			4-6 Brn clayey SILT	
	2		6				
			8				
	3						
	4						
	5	S2	8	24		0-12 Brn silty CLAY, moist	
			10			12-24 SAME, plus some fm rd gravel	
			12			and little f sand, intermittent layers of sandy silt	
	6		21				
	7						
	8						
	9						
	10	S3	9	24		0-8 SAME, moist, root @ 8"	
			8			8-24 Brn silty CLAY, little fmc rd gravel, dense,	
			10			dry	
	11		20				
	12						
	13						
	14						
	15	S4	6	24		0-8 Brn CLAY, little fm gravel, wet, soft	
			8			8-24 DK gry CLAY w/ 1" sandy clay, some fm	
			8			gravel lens every 3"	
	16		13				
	17	S5					Shelby Tube 16-18'
							Recovery = 1.85'
	18						
	19						
	20	S6	4	24		0-23 Dk gry CLAY, moist, hi plasticity w/ 1"	
			6			sandy CLAY, some fm gravel lens every 3-4"	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B3

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/16/2003 Stop Date: 6/16/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		5 9			23-24 Brn fm sand, wet	
	22 23 24						
	25 26	S7	6 10 8 10	20		0-12 Dk gry CLAY, soft, wet, hi plasticity 12-16 Dk gry fm SAND, sat 16-20 Dk gry CLAY, some(-) fmc gravel, wet, hi plasticity, soft	
	27 28 29						
	30 31	S8	WR 3 4 4	24		0-12 DK gry CLAY some(-) fm gravel, sat, hi plasticity, soft 12-24 DK gry f SAND and SILT, sat, soft, increasing CLAY w/ depth	
	32 33 34						Flush hole to reduce fines.
	35 36	S9	4 4 5 8	24		0-14 DK gry CLAY, little fm gravel, soft, sat, hi plasticity 14-24 DK gry CLAY and f SAND, little fm gravel, sat, soft	
	37 38 39 40					Core 38' to 38.6' - cobble, v. dense augering, slow	Auger refusal @ 38'

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B3

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/16/2003
Stop Date: 6/16/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41					Core 41.7' to 42.3' - cobble	
	42						
	43						
	44						
	45		50/0			V. dense material, spoon bouncing, seemed to break through @ 44.5 Cobble @ 45, broke through @ 46, Possible bedrock @ 46.1.	
	46					Core 46.2' to 50.95' - lost water, core barrel full Recovery = 100% RQD = 53/60 = 88%	
	47						
	48						
	49						
	50						
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						
	60						

NOTES:
Grout to 20'

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B4

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:
Water Level Reference Point Elevation:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/5/2003
Stop Date: 6/6/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1						
	2						
	3						
	4						
	5	S1	8	24		0-24 Brn clayey SILT, some fm rd gravel, little sand, mod dense, tight, dry spoon, sat till	
	6		19				
	7		27				
	8		40				
	9						
	10	S2	14	24		0-8 SAME 8-24 Brn sandy CLAY till, some(+) fm rd gravel, moist(-) spoon, sat	
	11		27				
	12		34				
	13		45				Encountered diff. augering @ 11.2' -11.85'
	14						
	15	S3	17	24		0-12 Brn silty CLAY, some(-) fm gravel w/ 2" lense of f sand, gravel and rx frags @ 8-10" 12-24 Dk gry CLAY, little fm gravel	
	16		11				
	17		10				
	18	S4	10				Shelby Tube 17-19', Empty
	19		-				
	20	S5	17	18		0-18 DK gry CLAY, some(-) fm gravel, soft sat 1" sandier layer every 6"	
			5				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B4

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Level Reference Point Elevation: Water Levels: Date: Depth to Water:	Starting Date: 6/5/2003 Stop Date: 6/6/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		5				
			9				
	22						
	23						
	24						
		S6	16	16		0-16 SAME	
	25		7				
			8				
	26		8				
	27						
	28						
	29						
		S7	7	24		0-24 SAME, sat, soft	
	30		5				
			6				
	31		9				
	32						
	33						
	34						
		S8	28	24		0-8 SAME, supersat, v. soft 8-24 Dk gry till-sandy CLAY, some fm gravel mod dense, dry	
	35		28				
			22				
	36		17				
	37						Drilling became tighter @ 36.5'
	38						
			-				
	39						
		S9	50/.4	0		No recovery	
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B4

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Level Reference Point Elevation: Water Levels: Date: Depth to Water:	Starting Date: 6/5/2003 Stop Date: 6/6/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41						
	42						
	43						
	44						
	45	S10	33 50/.3	9		0-9 Dk gry sandy CLAY, some(+) fm gravel, little weathered, rock frags	
	46						
	47						
	48					Auger refusal @ 47' Rollerbit 47' to 52'	
	49						
	50						
	51						
	52						
	53					END OF EXPLORATION @ 52 FEET	
	54						
	55						
	56						
	57						
	58						
	59						
	60						

The Chazen Companies

BORING NO. TCC-AMR-B5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/29/03 Stop Date: 5/30/03 Method: Contractor: SDS Driller: Jeff Grant Rig: 847 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	13		0-5 DK brn/brn organic sandy SILT, moist	
			4			5-13 Brn SILT, little organics, moist (-)	
	2		4				
			5				
	3						Auger to 4'
	4						
	5	S2	7	18		0-16 Brn sandy SILT, some (-) fm gravel, tight, mod dense	
			10				
			12			16-18 Brn f, SAND	
	6		14				
	7						Auger to 9'
	8						
	9						
	10	S3	7	12		0-5 Brn clayey SILT, little sand, trace organics	
			50/.4			5-12 Brn f SAND, grading to SAND and SILT, wet	
	11						
	12						
	13						
	14						
	15	S4	7	20		0-4 SAME	
			7			4-12 Dk gry silty CLAY, trace fm gravel, moist, mod plasticity	
			8				
	16		10			12-20 Brn and gry silty CLAY, some fm gravel, 1/2" vertical iron stained seam	
	17						Auger to 19'
	18						
	19						
	20	S5	5	22		0-6 SAME	
			11				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/29/03 Stop Date: 5/30/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		15 15			6-22 Dk gry till - silty CLAY, little f sand, some fm rd gravel, mod - hi plasticity, moist (-)	
	22 23						
	24 25	S6	5 7 10 16	19		0-19 Dk gry till - sandy CLAY, some fm rd gravel mod plasticity, moist (-)	
	26 27 28 29						
	30 31	S7	7 9 8 10	24		0-3 SAME, 3-8 Gry silty CLAY, dry, lo-mod plasticity, mod soft 8-24 DK gry laminated silty CLAY w/ 1/2" gry silty CLAY lens underlain by 1/2" DK gry sandy CLAY till lens every 2"	
	32 33 34						
	35 36	S8	5 7 8 6	16		Full spoon slough sat 0-16 DK gry CLAY w/ 2" sandy CLAY till, some fm gravel every 2-3", trace cobble, hi plasticity, moist (cobble-grn chlorite)	
	37 38 39						
	40	S9	5 8	24		0-24 DK gry CLAY w/ 2" sandy CLAY till, some fm gravel lenses every 4", moist	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/29/03
Stop Date: 5/30/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41		9 11				
	42 43 44						
	45	S10	5 10 20 11	22		0-22 SAME w/ 6" till lenses, brn 1/2" fm sand lens in till layer @ 14"	
	46 47 48 49						
	50	S11	14 7	16		0-4 Dk gry silty CLAY, little fm gravel, lam, moist 4-6 DK gry till-sandy CLAY, some fm gravel, dry	
	51		13 15			6-14 SAME as 0-4 14-16 SAME as 4-6	
	52 53 54						
	55	S12	11 19	6		0-4 DK gry CLAY, little fm gravel, 1" sandy CLAY till, some fm gravel @ 2-3", sat. 4-6 Rock	
	56		30 33				
	57 58 59						
	60	S13	36 50/.4	8		0-8 DK gry sandy CLAY till, abundant fmc rd gravel moist	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/29/03 Stop Date: 5/30/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	61						
	62						
	63						
	64						
	65	S14	7 5	16		0-8 DK gry v. soft, sat, sandy CLAY, some(+) fmc gravel till 8-16 DK gry sat. f sand	
	66		6 7				
	67						
	68						
	69						
	70	S15	27 24	6		10" of fm(-) sand above sample, sat 0-6 DK gray till-sandy CLAY, some fm rd gravel, mod dense, dry	
	71		26 29				
	72						Difficult augering, refusal on cobble @ 72.5' Auger to 73'
	73						
	74						
	75					Rollerbit to 75' No refusal	
	76					END OF EXPLORATION @ 75'	
	77						
	78						
	79						
	80						

NOTES:

Twisted drive shaft on dense material (rock or till)
ut to 20'

The Chazen Companies

BORING NO. TCC-AMR-B6

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/18/2003 Stop Date: 6/18/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B-47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	16		0-6 Dk brn organic clayey SILT	
			3			6-16 Brn SILT, some fm sand, trace gravel.	
			7			gry and orn mottling @ tip	
	2		9				
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10	S2	6	24		0-10 Brn sandy SILT, some fm gravel	
			10			10-12 Brn/green f SAND and SILT, wet	
			7			12-24 Dk gry sandy CLAY, some fm gravel	
	11		8			moist, high plasticity	
	12						
	13						
	14						
	15	S3	9	0		6" of Brn SILT from auger plug	
			14			No Recovery	
			16				
	16		25				
	17						
	18						
	19						
	20	S4	6	14		0-14 Dk gray f SAND and CLAY,	
			16			some fm gravel, dry	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/18/2003
Stop Date: 6/18/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B-47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		33				
			46				
	22						
	23						
	24						
		S5	15	18		0-5 Dk gray f SAND, wet	
	25		16			5-13 Dk gray till-sandy CLAY, some fm gravel	
			18			13-18 SAME as 0-5, sat	
	26		36				
	27						
	28						
	29						
		S6	13	4		0-4 Dk gray f SAND, sat	
	30		17				
			22				
	31		29				
	32						
	33						
	34						
		S7	3	10		0-10 Dk gray till-F SAND, some fmc rd gravel cobble in tip	
	35		15				
			50/.3				
	36						
	37						
	38						
	39						
		S8	WH	24		0-24 Dk gray sandy TILL-sandy CLAY,	
	40		WH			some fm gravel	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/18/2003 Stop Date: 6/18/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B-47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41		13 16				
	42 43 44 45 46					REFUSAL @ 41.5 FEET Core 41.5' to 46.5'	
	47 48 49 50 51 52 53 54 55 56 57 58 59 60					END OF EXPLORATION @ 46.5	

NOTES:
Grout to 30'

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C2

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/11/2003
Stop Date: 6/12/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	12		0-6 DK brn CLAY w/ organics, moist	
			3			6-12 Brn CLAY, moist	
	2		7				
			8				
	3	S2	7	20		0-20 Brn CLAY, some gravel, moist	
			8				
	4		8				
			50/.4				
	5	S3	7	24		0-24 Brn CLAY, some gravel, moist	
			10				
	6		10				
			8				
	7	S4	12	24		0-24 SAME	
			15				
	8		17				
			44				
	9	S5	7	21		0-9 Brn till, no gravel, moist	
			9			9-21 Brn till w/ gravel, moist	
	10		8				
			8				
	11						
	12						
	13						
	14						
	15	S6	13	20		0-8 Brn till, no gravel, moist	
			9			8-20 Brn CLAY w/ gravel	
			14				
	16		15				
	17						
	18						
	19						
	20		4	22		0-4 Brn CLAY, moist	
			5			4-22 Dk gry CLAY w/ f rd gravel, wet	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C2

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/11/2003 Stop Date: 6/12/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		9 8				
	22 23 24 25						
	26		45 50/.4	18		0-9 Brn till w/ gravel 9-18 Dk gry CLAY w/ f rd gravel	
	27 28 29 30 31 32 33 34 35 36 37 38 39 40					Refusal @ 25.4'	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C4

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/21/2003
Stop Date: 5/21/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	3	14		0-14 Brn moist SILT, little organics, trace shale frags and f sand	
			4				
	2		4				
			5				
	3						
	4						
	5	S2	8	24		0-24 Brn moist(-) clayey SILT some(-) fm gravel, trace sand	
			12				
	6		11				
			12				
	7						
	8						
	9						
	10	S3	8	24		0-24 Brn silty CLAY w/ intermittent 1" seams of SAME plus F SAND every 2", some fm gravel trace c gravel, moist-spoon sat w/ gry clay	
			12				
			16				
	11		8				
	12						
	13						
	14						
	15	S4	11	16		0-7 SAME, 7-8 Dk gry CLAY, moist 8-9 Brn/gry/grn sandy SILT, some rd fm gravel, moist, trace roots; 9-10 SAME as 7-8 10-16 Dk gry/brn sandy CLAY, some fm rd gravel, moist	
			16				
			8				
	16		14				
	17						
	18						
	19						
	20	S5	6	20		0-4 Brn sandy SILT, little shale frags 4-8 Dk gry sat soft sandy SILT, thin sand lens @ 8"	
			8				

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C4

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/21/2003 Stop Date: 5/21/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	8		8			8-14 Dk gry CLAY v. soft, sat, hi plasticity,	
	21		9			some fm gravel. 14-20 Dk gry sandy CLAY mod	
						soft, mod plasticity, some fm gravel	
	22						
	23						
	24						
		S6	14	16		0-4 Dk gry v. soft sat sandy CLAY	
	25		23			4-10 gry/brn sandy SILT, some fm gravel	
			29			10-14 Brn f SAND, little silt, sat	
	26		30			14-16 Brn sandy TILL, some rd fm gravel	
	27						
	28						
	29						
		S7	7	16		0-12 Dk gry CLAY, some fm gravel, little sand,	
	30		8			soft, hi plasticity, moist	
			14			12-16 Dk gry sandy SILT, sat	
	31		19				
	32						Difficult drilling @ 32'
	33						
	34						
		S8	17	7		0-7 Dk gry till sandy CLAY, some fm rd gravel	
	35		23			moist, hi plasticity	
			27				
	36		35				
	37						Auger 36-39'
							Denser srilling @ 37'
	38						
	39						
		S9	37	12		0-3 rock cobble (limestone)	
	40		50/.3			3-8 DK gry f sand and silt, sat	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C4

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/21/2003 Stop Date: 5/21/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41					8-12 Dk gry dense till-CLAY, some fm rd gravel, little sand, moist(-)	
	42						Refusal @ 41.5'
	43						
	44					Rollerbit 41.5' to 47'	
	45					END OF EXPLORATION @ 47'	
	46						
	47						
	48						
	49						
	50						
	51						
	52						
	53						
	54						
	55						
	56						
	57						
	58						
	59						
	60						

NOTES:
Grout to 25'

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C5

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/28/03
Stop Date: 5/28/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	10		0-6 Dk brn organic sandy SILT 6-8 Brn f SAND and SILT 8-10 Brn clayey SILT	
	2		2				
			2				
	3		3				
	4						
	5						
	6	S2	5	24		0-24 Brn silty CLAY w/ 1" f SAND lenses every 4", Trace fm rd gravel, sand sat, clay moist(-)	
	7		6				
			7				
	8		9				
	9						
	10						
	11	S3	5	24		0-24 Brn silty CLAY, little fm rd gravel. tight, cohesive, dry, lo plasticity, thin f sand lense @ 6"	
	12		6				
			7				
	13		10				
	14						
	15						
	16	S4	6	24		0-24 Brn silty CLAY, some fm(-) gravel	
	17		8				
			12				
	18		15				
	19						Attempt Shelby tube 17-19' Pushed to 18.3': difficult - gravel Tube broke off in hole when removing
	20						

NOTES:
Offset 22' to the west
Grout to Surface

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/28/03 Stop Date: 5/28/03 Method: Contractor: SDS Driller: Jeff Grant Rig: 847 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21	S5	3	16		0-4 SAME	
			5			4-16 Dk gry till, sandy CLAY, some fm rd gravel	
			8			Moist, lo to mod plasticity, mod soft	
	22		20				
	23						
	24						
	25						
	26	S6	29	0		No Recovery	Slough in spoon, not actual sample
			17				Run 3" spoon to clean out augers
			14				
	27		18				
	28	S7	5	22		0-22 Alternating 4" layers of CLAY till and sandy	
			6			CLAY till (sand, some fm rd gravel),	
			9			moist, hi plasticity	
	29		10				
	30						
	31	S8	5	24		0-24 SAME	
			8				
			8				
	32		12				
	33						
	34						
	35						
	36	S9	13	22		0-6 Dk gry CLAY, little fm gravel	
			14			Moist, high plasticity	
			15			6-22 Dk gry till-sandy CLAY, some fm rd gravel	
	37		18			Moist, mod to hi plasticity	
	38						
	39						
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/28/03 Stop Date: 5/28/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41	S10	8	6		0-6 Dk gry sat till - sandy CLAY, some fm rd gravel, hi plasticity	
			9				
	42		12				
			14				
	43						
	44						
	45						
	46	S11	13	8		0-8 Dk gry till - CLAY, some fm rd gravel, little f sand, sat, hi plasticity	
			31				
	47		20				
			9				
	48						
	49						
	50						
	51	S12	19	15		0-15 Dk gry till - sandy CLAY, some fm rd gravel moist (-)	Spoon sat, full of slough
			21				
			24				
	52		25				
	53						
	54						
	55						
	56	S13	17	16		0-16 SAME	
			23				
			29				
	57		50/.3				
	58						
	59						
	60						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/28/03 Stop Date: 5/28/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	61	S14	5	24		0-20 Gry f SAND, sat 20-24 Dk gry till -sandy CLAY, some fm rd gravel, Moist	
			6				
			9				
	62		14				
	63						
	64						
	65						
	66	S15	28	8		0-8 Dk gry till-f SAND, some clay and fm gravel moist	
			42				
			28				
	67		36				
	68						
	69						
	70						
	71	S16	50/.2	1		0-1 Rock	
	72						
	73						
	74						
	75						
	76	S17	29	6		0-6 Dk gry till - sandy CLAY, some fm gravel mod soft, sat.	
			17				
			11				
	77		18				
	78						
	79						
	80						

NOTES:

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/28/03
Stop Date: 5/28/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
		S18	48	24		0-24 SAME	
	81		29				
			28				
	82		30				
	83					EOB @ 82' No Refusal	
	84						
	85						
	86						
	87						
	88						
	89						
	90						
	91						
	92						
	93						
	94						
	95						
	96						
	97						
	98						
	99						
	100						

NOTES:
Grout to 30'

The Chazen Companies

BORING NO. TCC-AMR-C8

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/19/2003
Stop Date: 6/19/2003
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B-47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	19		0-6 Dk brn organic SILT, loose	
			3			6-19 Brn clayey SILT, little f sand, orn staining	
	2		4				
			9				
	3						
	4						
	5	S2	8	22		0-6 SAME w/ orn staining	Gravelly @ 6.1'-6.5'
			8			6-22 Brn silty CLAY, little f sand, trace	
			12			fm gravel, moist, mod plasticity	
	6		15				
	7						
	8						
	9						
	10	S3	11	18		0-10 Brn silty CLAY, trace f sand	
			11			mod plasticity, 1" lens of SAME plus f sand and	
			22			gravel @ 4-5"	
	11		39			10-18 Brn sandy CLAY, some fm gravel	
						dry, low plasticity	
	12						
	13						
	14						
	15	S2	5	16		0-5 Brn sandy CLAY, little fm gravel and sand	
			8			5-16 Dk gry CLAY, little silt, trace gravel,	
			10			moist(+), mod plasticity	
	16		13				
	17						
	18						
	19						
	20	S5	4	11		0-3 SAME	
			12			3-7 Gry f SAND and SILT, sat, compact	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-C8

ROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/19/2003 Stop Date: 6/19/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B-47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21		11 32			7-11 Dk gry till -- sandy CLAY some fmc rd gravel, dry, tight, non-plastic	Tight augering at 21'
	22 23 24						
	25 26	S6	14 34 32 53	16		0-4 SAME, 4-6 Gry f SAND 6-10 Dk gry till sandy CLAY, some fm gravel very dense, dry 10-16 Gry fm SAND, sat, tip is till	
	27 28 29						
	30 31	S7	9 9 20 29	6		0-6 Dk gry till - sandy CLAY, some fm rd gravel, mod soft, sat	
	32 33 34						
	35 36	S8	50 50/.3	6		0-2 SAME 2-3 ROCK 3-6 Dk gry super sat, super soft CLAY, little sand, possible slough	
	37 38 39 40					AUGER REFUSAL @ 35 FEET CORE 35'-40' RECOVERY = 4.3' END OF EXPLORATION @ 40 FEET	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-D2

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/23/03
Stop Date: 6/23/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	6	16		0-10 Dk brn/gry SILT, abundant rx frags, little sand	
			7				
			5				
	2		6			10-16 Brn/gry grading to brn clayey SILT, little f sand and fmc rd gravel	
	3	S2	9	10		0-5 SAME	
			13			5-10 brn/orn fmc SAND, abundant rx frags and cobbles	
			12				
	4		14				
	5	S3	6	2		0-2 Brn SILT, some fm rd gravel	
			50/.3				
	6						
	7					AUGER REFUSAL @ 4.8'	
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						

NOTES:
Grout to 2'

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-D4

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/21/03 Stop Date: 5/22/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	3	14		0-6 Dk brn organic SILT	
			4			6-14 Brn sandy SILT, little fm rd gravel, trace	
			5			organics	
	2		8				
	3	S2	8	15		0-15 Brn till-sandy CLAY w/ some rd fm gravel,	
			9			little silt, moist	
			10				
	4		8				
	5	S3	3	18		0-18 SAME w/ orn and gry mottling	
			5			at 10"	
			8				
	6		12				
	7	S4	8	22		0-8 SAME, increase in sand content	
			12			8-14 Brn f SAND, some silt, sat	
			20			14-22 Brn sandy till, some silt, little fm gravel	
	8		25			moist	
	9	S5	18	20		0-4 Brn f SAND, some silt, sat	
			21			4-20 Brn till-sandy SILT, some rd fm gravel,	
			23			cobble @ 4.8", dry	
	10		30				
	11	S6	8	14		0-6 SAME	
			10			6-14 DK gry till-sandy SILT, some fm rd gravel,	
			13			moist(+)	
	12		15				Dense augering @12'
	13	S7	18	16		0-16 Dk gry till-sandy SILT, some fm gravel,	
			20			dense, dry	
			27				
	14		40				
							Hard augering 14'-14.5'
	15	S8	11	12		0-12 SAME, moist *Hard*	
			18				
	16		23				
	17	S9	14	24		0-20 Brn f SAND, sat	
			24			20-24 Dk gry sandy till-sandy silt,	
			28			some fm gravel, moist(-)	
	18		24				
	19	S10	3	4		0-4 SAME, sat	
			12				
			16				
	20		19				
		S11	7	8		0-8 DK gry till-sandy SILT, some clay and fm	

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-D4

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/21/03
Stop Date: 5/22/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21					gravel	
			25			moist, spoon sat.	
			12				
	22		10				
	23	S12	13	14		0-14 DK gry till-sandy CLAY, some fmc(-) rd gravel, moist, mod plasticity	
			15				
			13				
	24		14				
	25	S13	5	4		0-4 SAME, sat. soft	
			8				
			11				
	26		10				
	27	S14	7	8		0-8 SAME, very soft, supersat.	
			9				
			12				
	28		12				
	29	S15	6	16		0-16 DK gry till-sandy CLAY, some fm rd gravel soft, moist (+), spoon sat, mod plasticity	
			7				
			9				
	30		9				
	31	S16	5	22		0-22 Dk gry till-sandy CLAY (increase in sand content) some fm rd gravel, v. soft	
			7				
			6				
	32		5				
	33	S17	7	24		0-24 SAME	
			6				
			5				
	34		50/.4				Difficult augering @ 34'
	35					Refusal @ 34.5'	
	36					Core 34-39'	
						Recovery = 100%	
	37					RQD = 33%	
	38						
	39						
	40					END OF EXPLORATION @ 39 FEET	

NOTES:

Grout to 25'. Set well to 18" w/ 5' screen. 2" PVC. Sand to 11'; Bentonite to 10.5'.

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-B5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/22/03 Stop Date: 5/27/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	2	16		0-6 Dk brn sandy SILT, organic-rich, trace gravel	
			2			6-16 Brn clayey SILT, moist (-)	
	2		4				
			6				
	3						
	4						
	5						
	6	S2	7	24		0-4 Tree root	
			12			4-24 Brn clayey SILT, some fm gravel, tight lo plasticity, dry, little gry mottling	
	7		13				
			20				
	8						Boulder 7-7.5'
	9						
	10						
	11	S3	16	24		0-24 Brn silty CLAY, some fm rd gravel w/ intermittent 2" lenses of brn/orn SAME plus f sand	
			15				
	12		17				
			19				
	13						
	14						
	15						
	16	S4	14	0		No Recovery	
			17				
	17		18				
			16				
	18						
	19						
	20						

NOTES:
Offset 44' west due to steep stream cut.

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-D5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/22/03 Stop Date: 5/27/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21	S5	4	22		0-6 SAME plus tree root	
			7			6-22 Brn silty CLAY, little fm gravel w/ 3" layers	
			6			of sandy SILT, some fm gravel every 4"	
	22		9			moist (-)	
	23						
	24						
	25						
	26	S6	5	18		0-4 SAME, 4-12 DK gry CLAY, sat, hi	
			10			plasticity, cohesive	
			10			12-18 DK gry till-sandy CLAY, some fmc gravel,	
	27		11			trace cobble, tight, dry to moist, lo plasticity	
	28						
	29						
	30						
	31	S7	13	22		0-8 SAME, dry to moist	
			15			8-15 DK gry f SAND, some silt, sat	
			14			15-22 DK gry sandy till-sandy CLAY, some	
	32		19			fmc(-) rd gravel, dry, lo plasticity, mod dense	
	33					Coarser augering @ 32.5	
	34						
	35						
	36	S8	80/.3	3		0-3 Rock	
	37						
	38						
	39					Rock @ 39 - 39.2	
	40						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-D5

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 5/22/03 Stop Date: 5/27/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	41	S9	18	18		0-18 DK gry f SAND, some silt, sat, mod loose	
			20				
			23				
	42		26				
	43						
	44						
	45						
	46	S10	23	10		0-4 SAME 4-10 Dk gry sandy till-f SAND, some clay and fm rd gravel, dense, moist, tight	
			37				
			40				
	47		50/.4				
	48						
	49						
	50						
	51	S11	9	9		0-9 Dk gry sandy till-f SAND, some clay and fmc(-) rd gravel, little cobbles, moist	
			41				
			24				
	52		25				
	53						
	54						
	55						
	56	S12	12	5		0-5 SAME	Spoon full of super sat slough
			15				
			18				
	57		25				
	58						
	59						
	60						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/22/03
Stop Date: 5/27/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	61	S13	WH	6		0-6 SAME, soft	
			WH				
			8				
	62		6				
	63						
		S14	33	12		0-12 Dk gry sandy till - f SAND, some (+) fmc rd gravel, some clay matrix, sat	
	64		25				
			17				
	65		13				
	66						
	67						
	68						
	69						
	70						
		S15	5	24		0-24 Dk gry sandy till - CLAY w/ f sand, some fm rd gravel, sat, v. soft	
	71		6				
			7				
	72		9				
	73						
	74						
	75						
		S16	23	12		0-2 SAME, 2-3 DK gry f SAND, sat 3-6 SAME as 0-2, sandy TILL 6-8 Dk gry fm(-) SAND, sat 8-10 Dk gry sandy TILL, sat 10-12 DK gry fm(-) SAND, sat	
	76		31				
			34				
	77		36				
	78						
			-				
	79						
	80						

NOTES:

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 5/22/03
Stop Date: 5/27/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	81	S17	25	14		0-4 Dk gry fmc SAND, sat 4-6 Rock cobble 6-14 Dk gry f SAND, little silt, sat	
			40				
			50				
	82		50/.4				
	83						
	84						
	85						
		S18	16	6		0-6 Brn/little orn sandy till-CLAY w/ f sand, some fmc rd gravel, dense, moist	
	86		23				
			50/.4				
	87						
	88						
	89						
	90						
		S19	50/0	0		No Recovery Rollerbit - broke through cobbles @ 91.4'	
	91						
	92						
						END OF EXPLORATION @ 93'	
	93					No Refusal	
	94						
	95						
	96						
	97						
	98						
	99						
	100						

NOTES:

The Chazen Companies

BORING TCC-AMR-D9

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/18/2003 Stop Date: 6/19/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B-47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	2	12		0-12 Brn clayey SILT, some(-) fmc gravel, moist	
			5				
	2		4				
			5				
	3	S2	8	18		0-4 SAME 4-18 Orn and gry mottled clayey SILT, little fm sand and gravel, dense, dry	
			12				
	4		17				
			20				
	5	S3	12	8		0-8 Brn sandy SILT, little fm gravel friable, loose	
			15				
	6		16				
			21				
	7	S4	25	24		0-4 Brn sandy SILT, dense, tight, dry 4-24 Brn f SAND and SILT, roots @ 8", little mc gravel, wet	
			15				
	8		15				
			12				
	9	S5	16	18		0-18 Brn till-sandy SILT, some fm rd gravel dense, dry, friable 14-18"	
			24				
	10		50/.05				
	11						
	12						
	13						
	14	S6	26	20		0-20 Brn Till-f SAND, some fm rd gravel and silt, dense, dry qtzite cobble @7-9" and shale cobble @ 12"	
			27				
	15		42				
			50/.4				
	16						
	17						
	18						
	19	S7	50/.1	2		0-2 Brn f SAND, wet	
	20						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING TCC-AMR-D9

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/18/2003 Stop Date: 6/19/2003 Method: Contractor: SDS Driller: Jeff Grant Rig: B-47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21						
	22						
	23						
	24	S8	15	24		0-10 Brn sandy CLAY, sat, mod soft, possible slough 10-24 Dk gry till-sandy CLAY some fm rd gravel, moist, mod dense	
	25		18				
			18				
			21				
	26						
	27						
	28						
	29	S9	50/.3	0		No Recovery	12" of slough AUGER REFUSAL @ 29 FEET
	30						
	31					CORE 29' - 34' RECOVERY = 100% RQD = 47/60 = 78%	
	32						
	33						
	34						
	35					END OF EXPLORATION AT 34 FEET	
	36						
	37						
	38		-				
	39						
	40						

NOTES:
Grout hole to surface

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-E2

PROJECT NAME: Amsterdam Materials Recycling Inc. **PROJECT No.:** 90303.00 **CLIENT:** Amsterdam Materials Recycling Inc. **WELL TYPE:** **WELL LOCATION:** Amsterdam **CITY/TOWN:** Amsterdam **COUNTY:** Montgomery **STATE:** New York	**Elevations:** Ground Surface Elevation: Water Level Reference Point: **Water Levels:** Date: Depth to Water:	**Starting Date:** 6/23/03 **Stop Date:** 6/23/03 **Method:** **Contractor:** SDS **Driller:** Jeff Grant **Rig:** B47 Track Mounted Drill **Geologist:** Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	1	14		0-4 grassy brn SILT	
			4			4-12 Dk brn SILT, little clay and f sand, trace rx frags	
			5				
	2		10			12-14 Rock	
	3	S2	8	0		No Recovery	
			10				
			8				
	4		8				
	5	S3	5	12		0-2 Dk brn SILT, little clay, trace fm gravel	
			7			2-4 ash, brick - wet	
			6			4-8 Dk brn SILT, some sand, loose	
	6		7			8-12 Brn SAND, some clay and fm gravel	
	7	S4	8	6		0-4 Brn fm(-) SAND and CLAY, some fmc rd gravel	
			13				
			20			4-6 cobbles	
	8		22				
	9	S5	10	16		0-16 Dk brn and brn sandy CLAY, abundant cobbles (~2" qtzite)	
			15				
			8				
	10		9				
	11	S6	18	16		0-6 Cobbles and rx frags	
			11			6-16 Brn sandy CLAY (fm sand), abundant cobbles, wet	
			14				
	12		21				
	13						
	14						
	15	S7	3	12		0-4 Dk brn and brn sandy CLAY, abundant cobbles	
			4				
	16		4			4-12 Brn f SAND, sat	
			2				
	17						
	18						
	19						
	20						

NOTES:

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-E2

PROJECT NAME: Amsterdam Materials Recycling Inc.
PROJECT No.: 90303.00
CLIENT: Amsterdam Materials Recycling Inc.
WELL TYPE:
WELL LOCATION: Amsterdam
CITY/TOWN: Amsterdam
COUNTY: Montgomery
STATE: New York

Elevations:
Ground Surface Elevation:
Water Level Reference Point:

Water Levels:
Date:
Depth to Water:

Starting Date: 6/23/03
Stop Date: 6/23/03
Method:
Contractor: SDS
Driller: Jeff Grant
Rig: B47 Track Mounted Drill
Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	21	S8	7	12		0-6 SAME, sat 6-12 Brn sandy SILT, dry, mod dense	
			7				
	22		44				
			50/.4				
	23						Auger refusal @ 21.9', very hard Cut to 22.5'
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

NOTES:
Grout to 14'

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

The Chazen Companies

BORING NO. TCC-AMR-E9

PROJECT NAME: Amsterdam Materials Recycling Inc. PROJECT No.: 90303.00 CLIENT: Amsterdam Materials Recycling Inc. WELL TYPE: WELL LOCATION: Amsterdam CITY/TOWN: Amsterdam COUNTY: Montgomery STATE: New York	Elevations: Ground Surface Elevation: Water Level Reference Point: Water Levels: Date: Depth to Water:	Starting Date: 6/24/03 Stop Date: 6/24/03 Method: Contractor: SDS Driller: Jeff Grant Rig: B47 Track Mounted Drill Geologist: Chris Monaco

Boring	Depth (Depths in Feet)	Sample #	Blow Counts	Recovery (Depths in Inches)	Unified	Stratum and Field Descriptions:	Field Notes, Comments, PID Readings
	1	S1	4	14		0-14 Brn fm(-) SAND and SILT, little organics, roots	
			5				
	2		5				
			3				
	3					Coarse augering - fmc sand, clay and cobbles	
	4						
	5						
	6	S2	19	5		0-5 SAME plus cobbles	
			27				
	7		24				
			30				
	8					Coarse augering	
	9						
	10						
	11	S3	7	6		0-6 Brn/little orn fmc(-) SAND	
			50/.3				
	12						
	13						
	14						
	15						
	16	S4	30	6		0-6 Brn fm SAND and CLAY, some fmc gravel	
			50/.2				
	17						
	18						
	19						
	20						
		S5	50/0	0		No Recovery	

NOTES:
Grout to surface.

Drilling Information:

	Casting	Sample	Tube	Core
Type:				
Diam.:				
Weight:				
Fall:				

Project Name: Amsterdam Materials Recycling
TEST PIT LOGS

TEST PIT #: TCC-AMR-TP-1 (near 101)

TEST PIT LOCATION INFORMATION:
CITY/TOWN: Amsterdam
COUNTY:
STATE: NY

DATE OF INSTALLATION: 7/1/03
TCC JOB #: 90303.00
GEOLOGIST: C. Monaco

DEPTH IN FEET	HNU READING	MOISTURE	ODOR	DESCRIPTION
				0-12' Brn sandy SILT some Fm rd gravel little cobbles, boulders (~4"-2')
				gy/orn mottling @ ~5'
				12-18' Brn + dk gry sandy CLAY w/ some Fm rd gravel
				18-21' DK gry fill - fn sand + clay some gravel little cobbles

Sample SB-1 5'-8' + 18'-21'

Project Name: Amsterdam Materials Recycling
TEST PIT LOGS

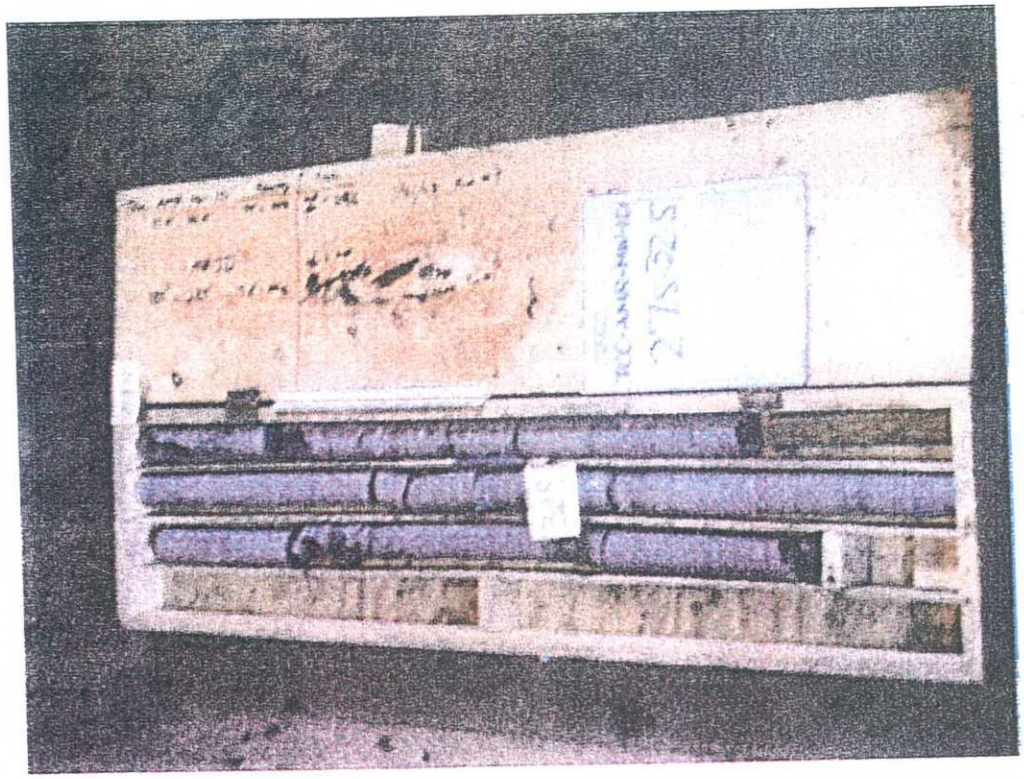
TEST PIT #: TCC-AMR-TP-2 (boring 110)

TEST PIT LOCATION INFORMATION:
CITY/TOWN: Amsterdam
COUNTY:
STATE: NY

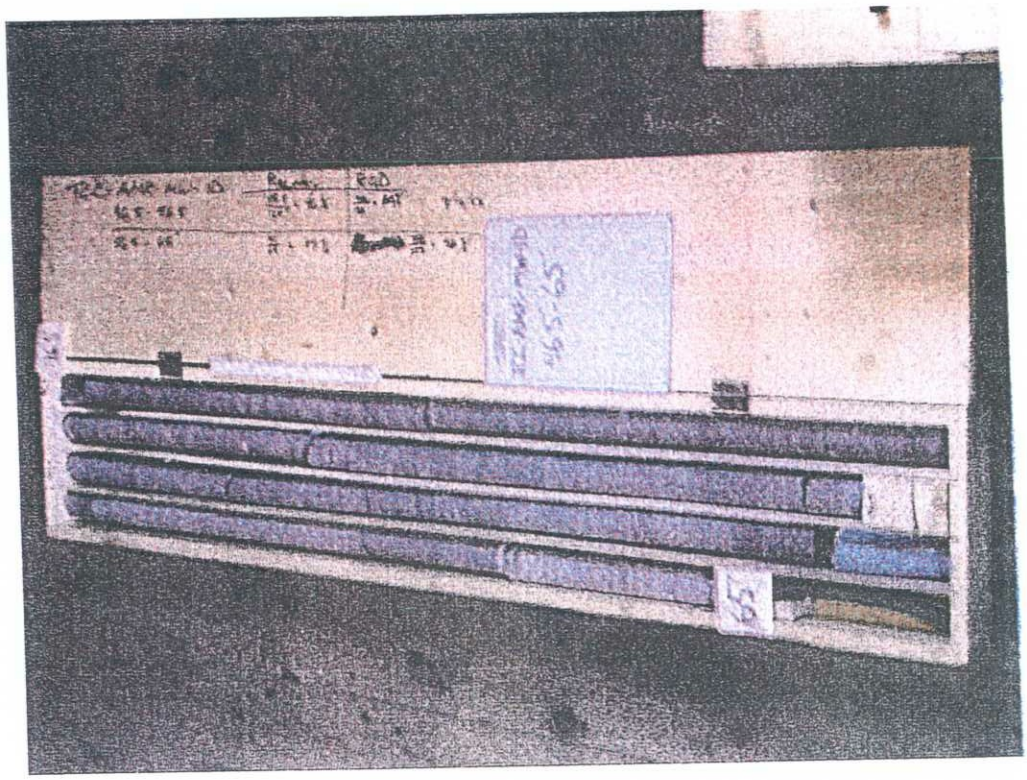
DATE OF INSTALLATION: 7/1/03
TCC JOB #: 90303.00
GEOLOGIST: C. Monaco

DEPTH IN FEET	HNU READING	MOISTURE	ODOR	DESCRIPTION
1 2 3 4 5 6 7 8 9 10 11				0-11 Brn sandy CLAY some Fm rd gravel little cobbles (9"-12")
12 13 14 15 16 17 18 19 20				11-16' Dk gy CLAY dry trace cobbles Sample 5 gal @ 14-16' + 7-9'

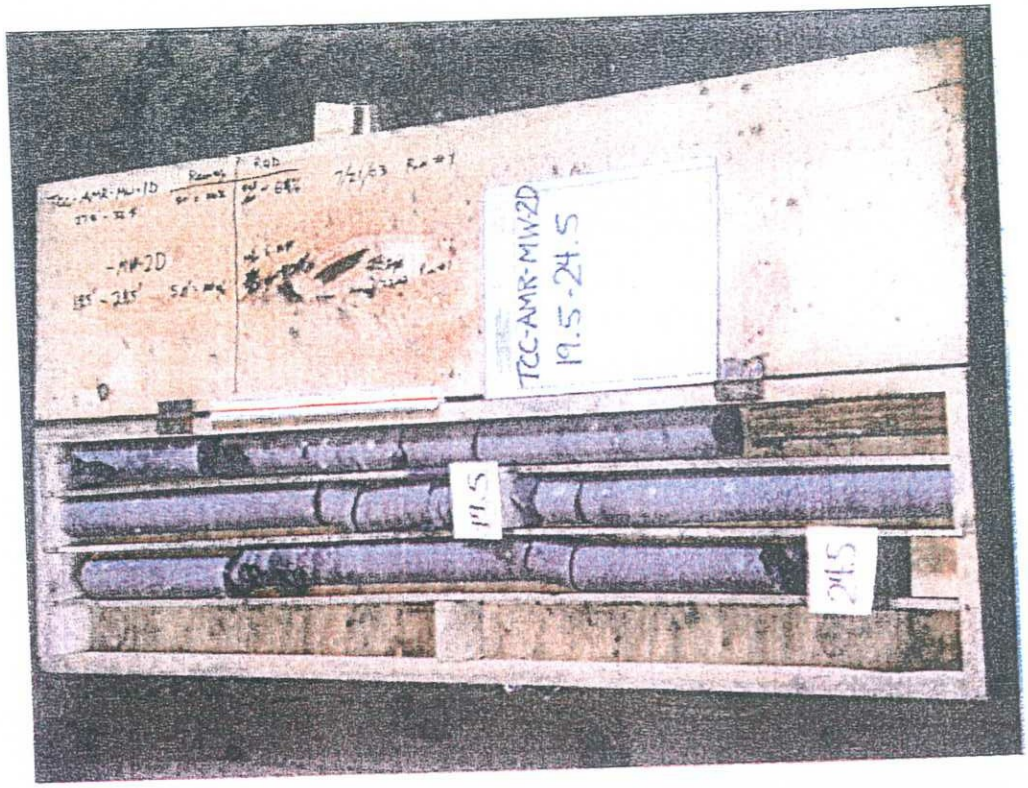
Appendix B:
Core Photographs



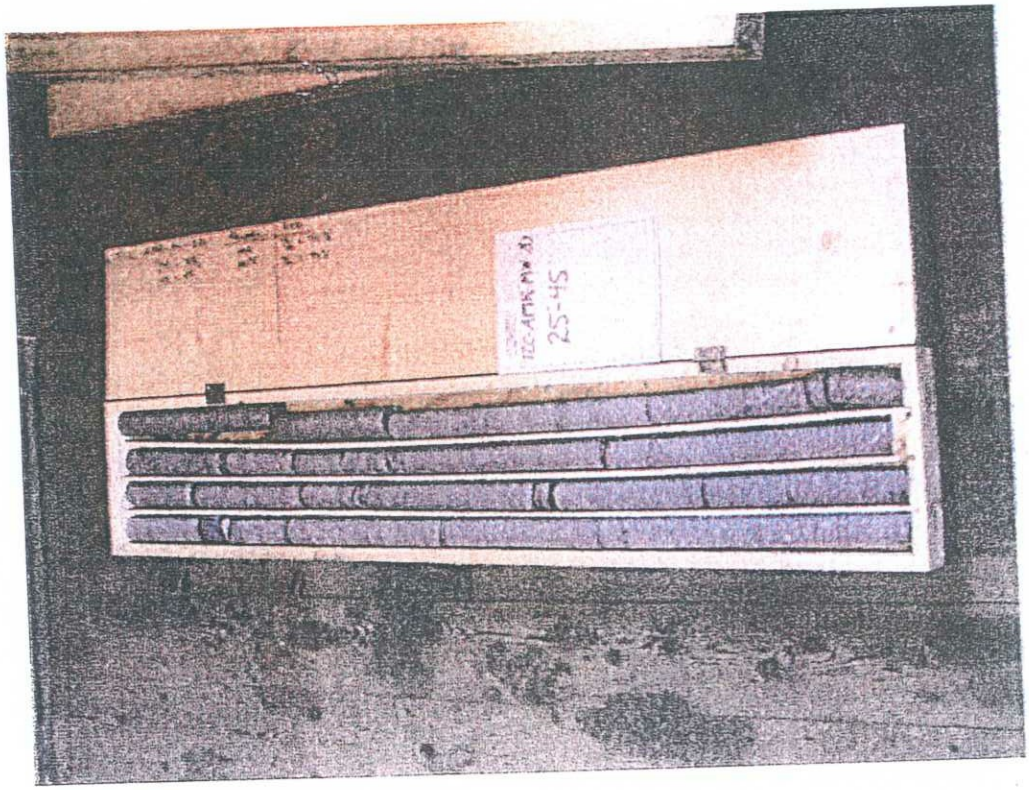
TCC-AMR-MW-1D Rock Core: 27.5'-32.5' (bgs) Interval



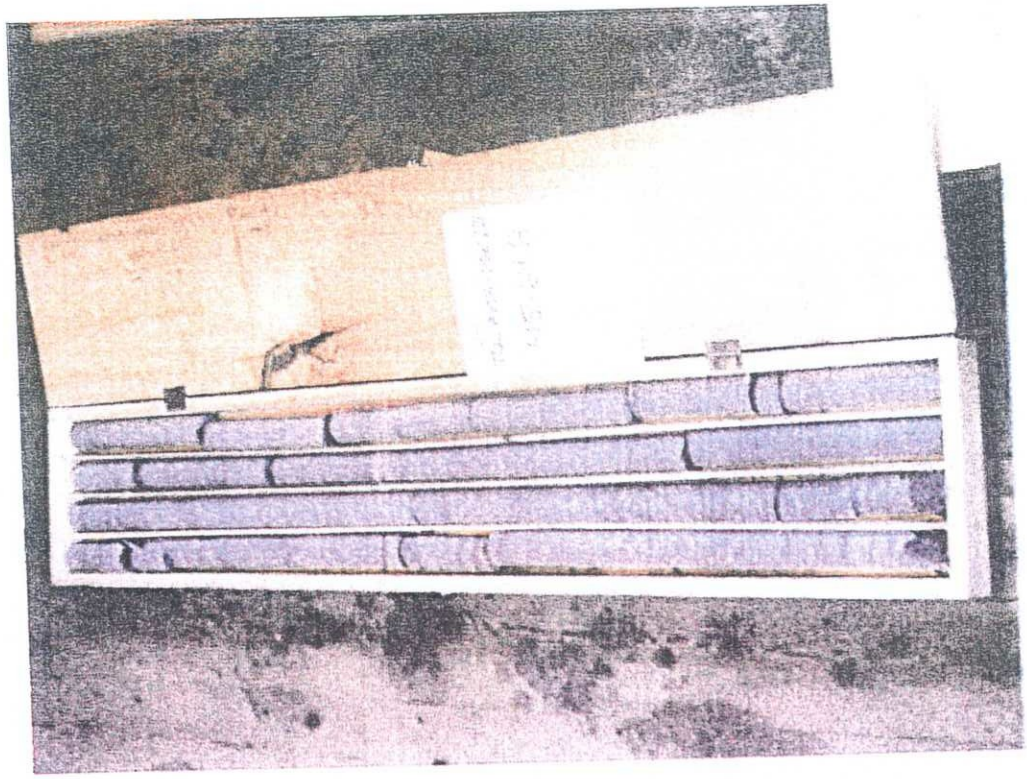
TCC-AMR-MW-1D Rock Core: 46.5'-65.0' (bgs) Interval



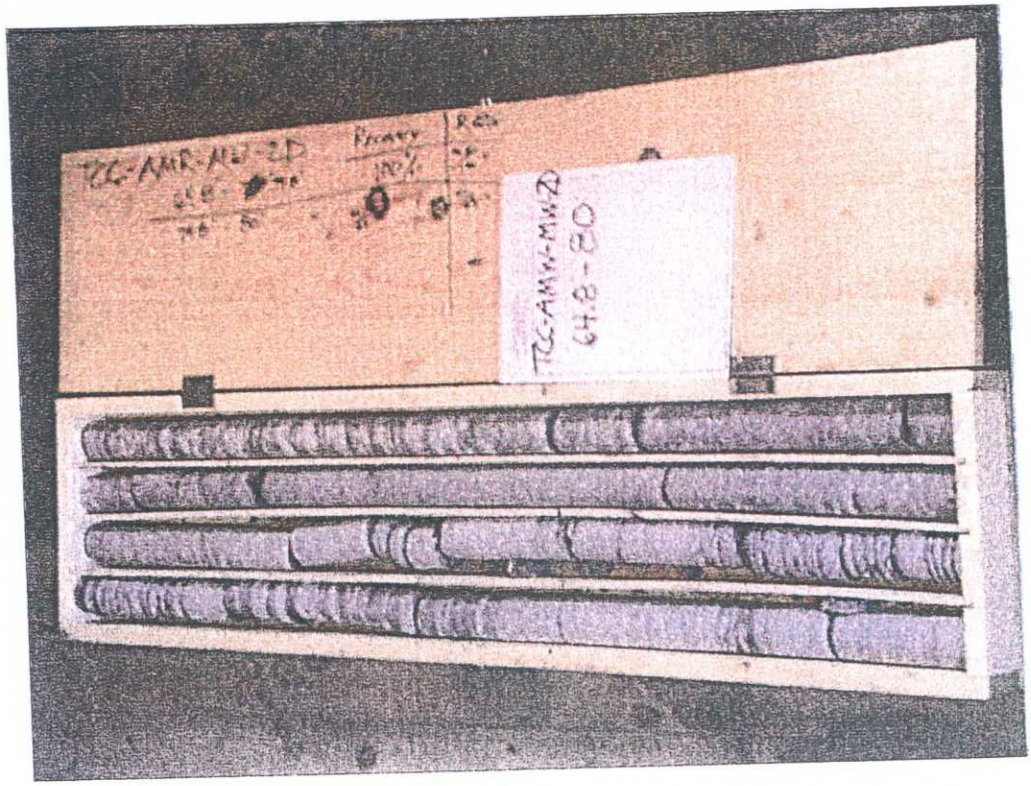
TCC-AMR-MW-2D Rock Core: 19.5'-24.5' (bgs) Interval



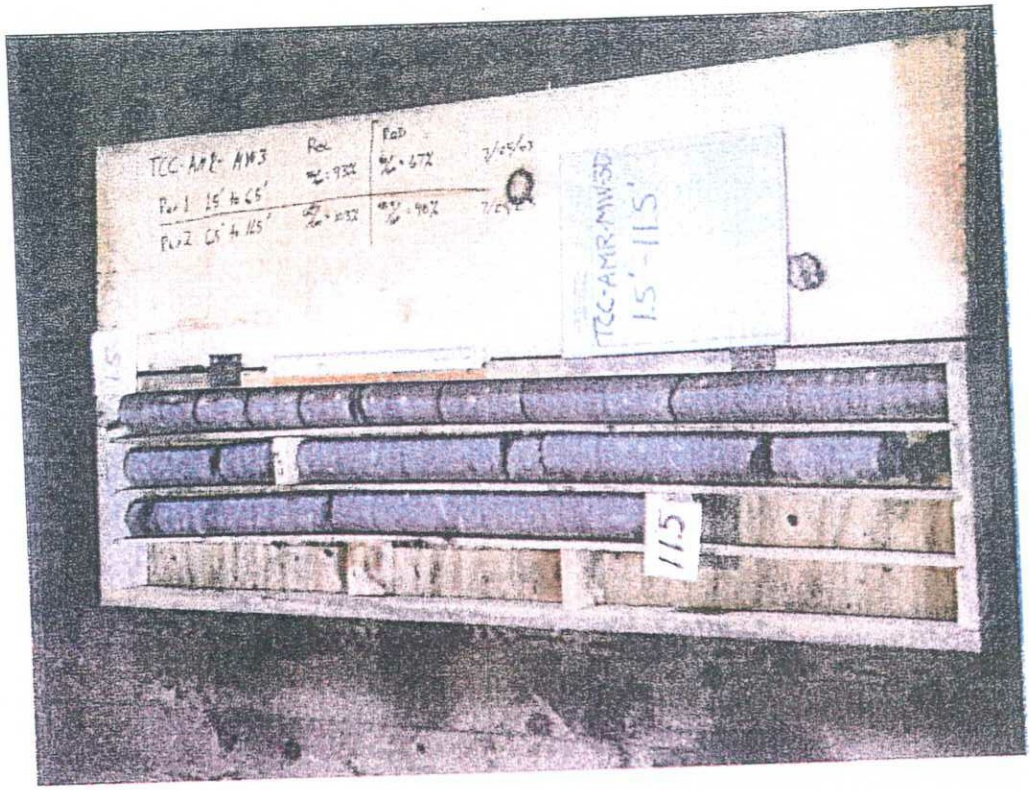
TCC-AMR-MW-2D Rock Core: 25.0'-45.0' (bgs) Interval



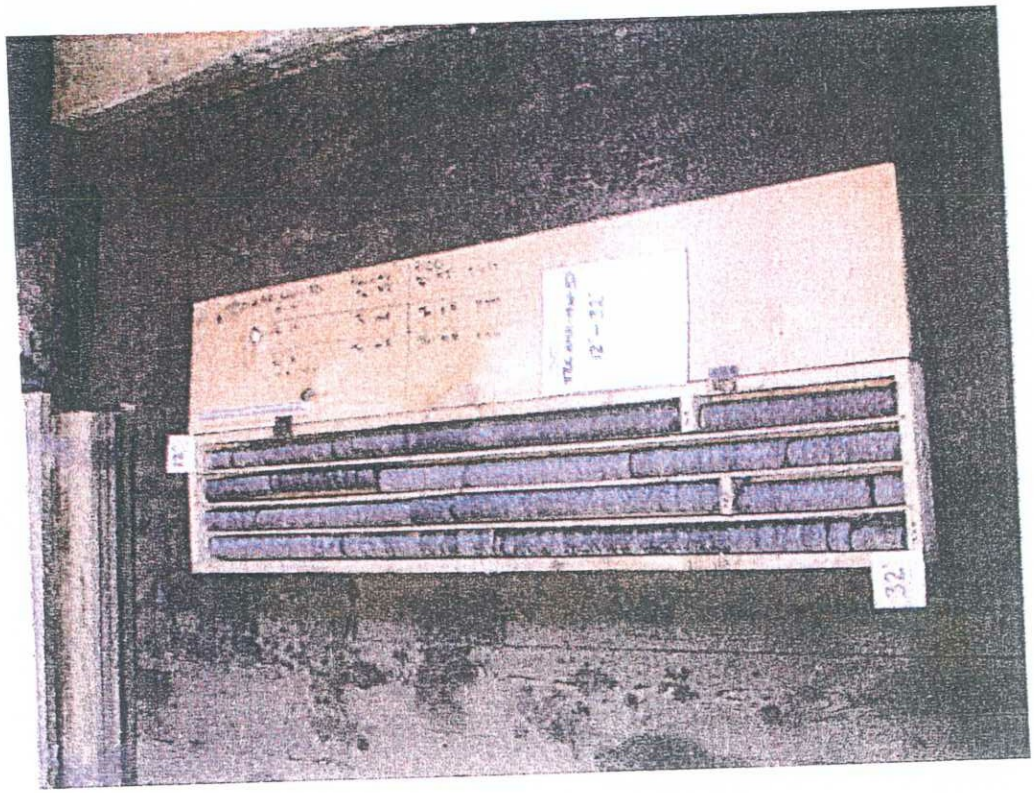
TCC-AMR-MW-2D Rock Core: 45.0'-64.8' (bgs) Interval



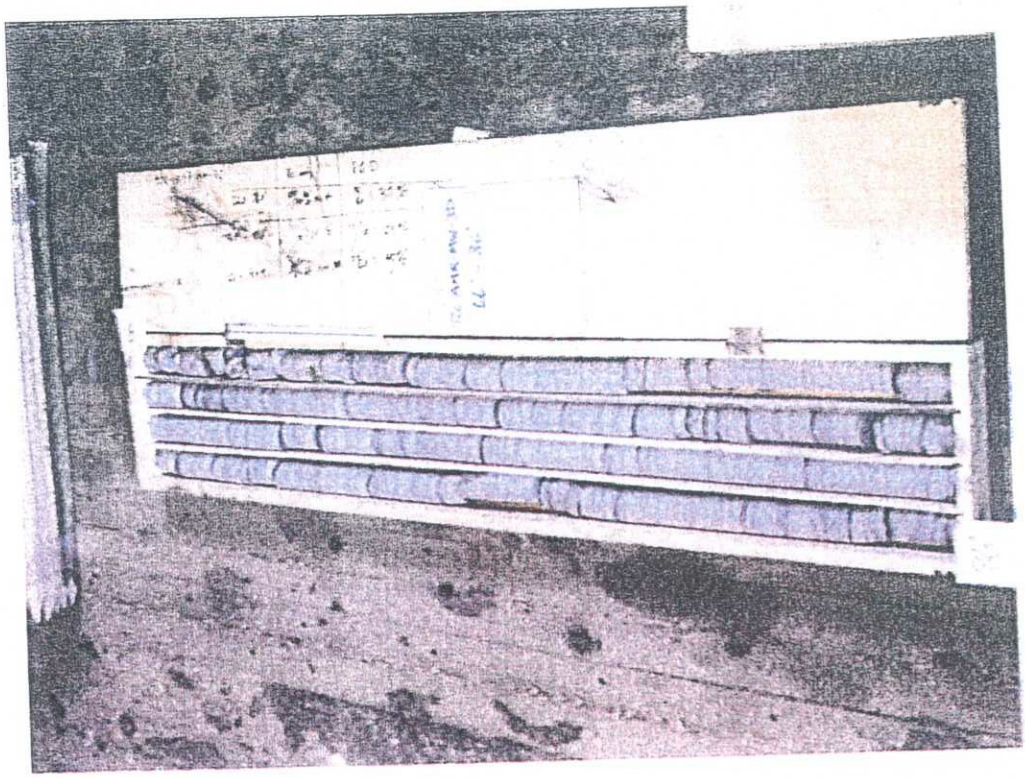
TCC-AMR-MW-2D Rock Core: 64.8'-80.0' (bgs) Interval



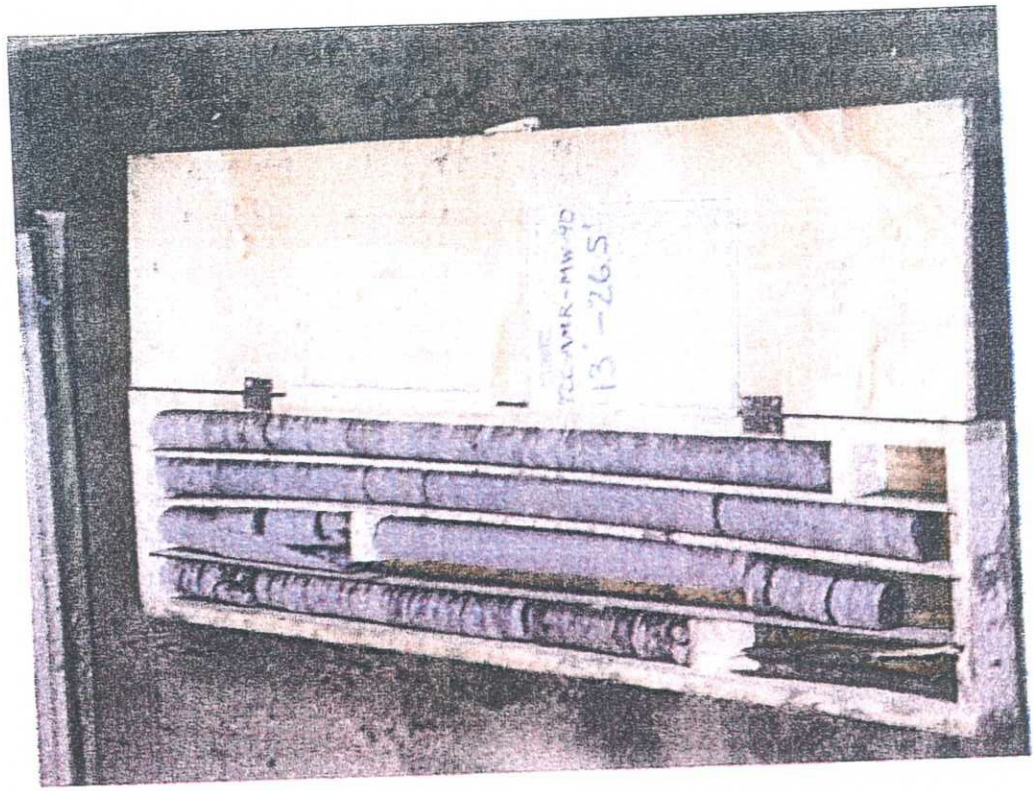
TCC-AMR-MW-3D Rock Core: 1.5'-11.5' (bgs) Interval



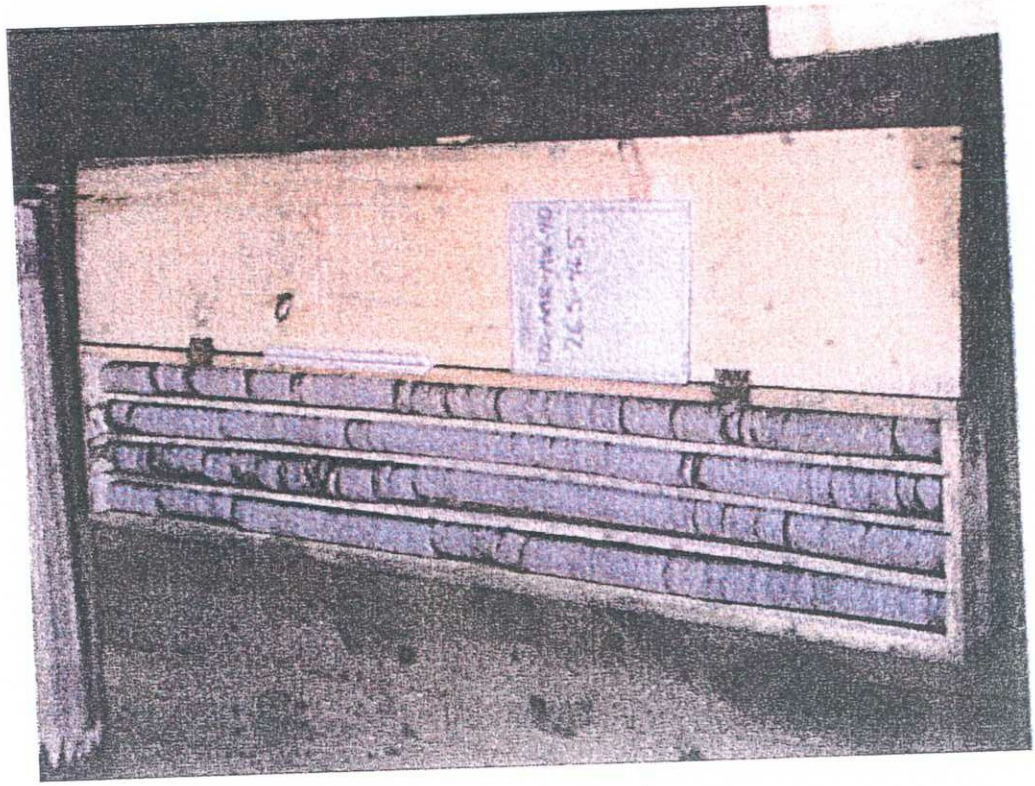
TCC-AMR-MW-3D Rock Core: 12.0'-32.0' (bgs) Interval



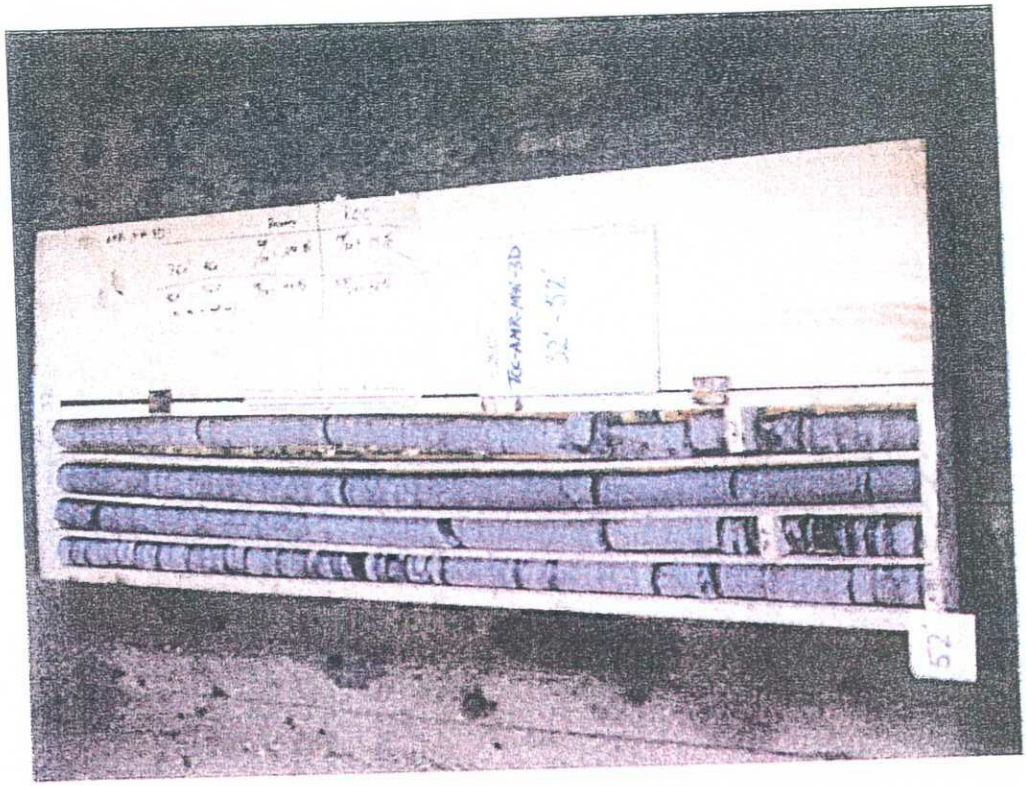
TCC-AMR-MW-3D Rock Core: 66.0'-86.0' (bgs) Interval



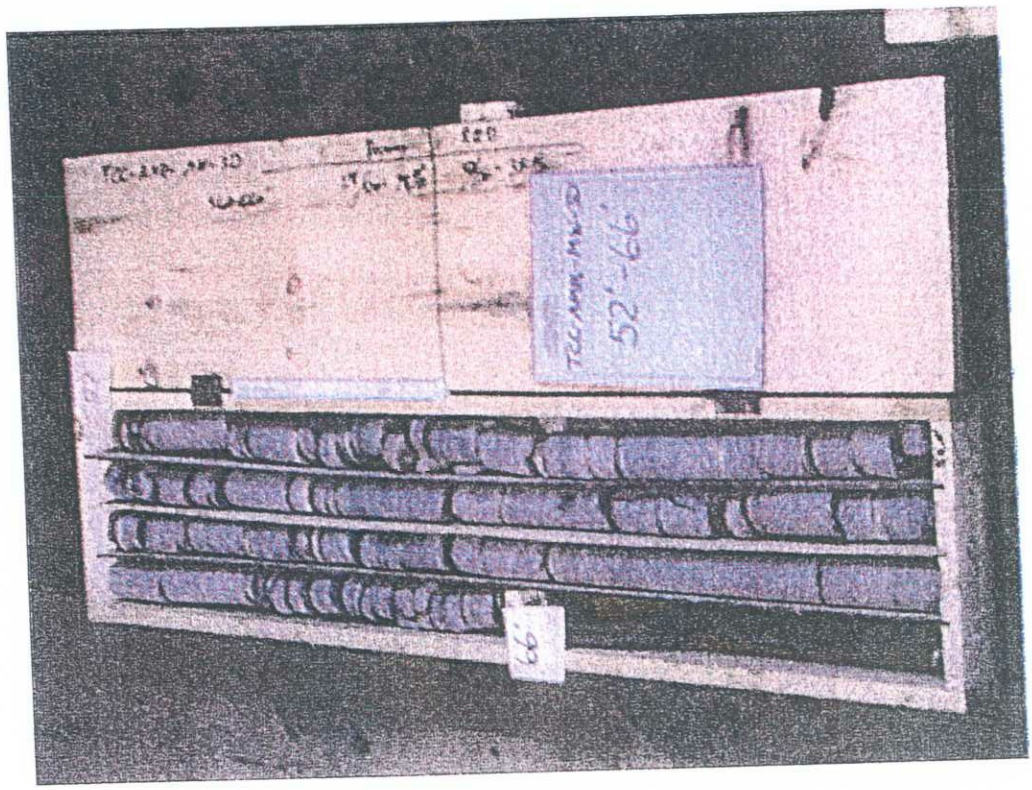
TCC-AMR-MW-4D Rock Core: 13.0'-26.5' Interval



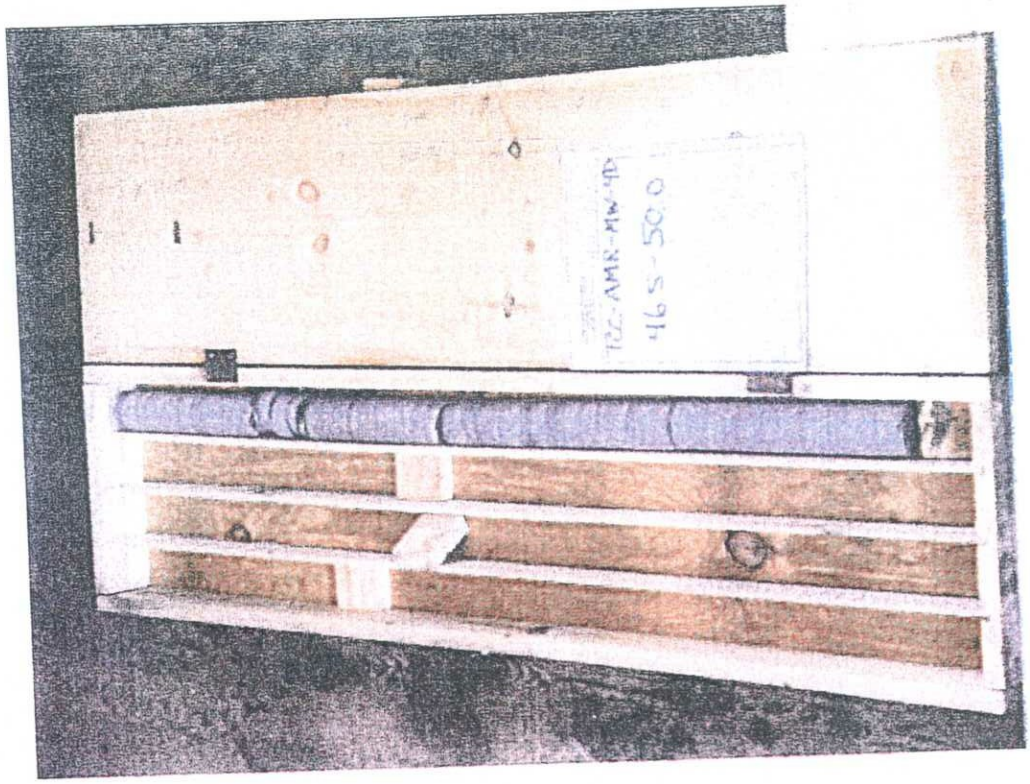
TCC-AMR-MW-4D Rock Core: 26.5'-46.5' (bgs) Interval



TCC-AMR-MW-3D Rock Core: 32.0'-52.0' (bgs) Interval



TCC-AMR-MW-3D Rock Core: 52.0'-66.0' (bgs) Interval



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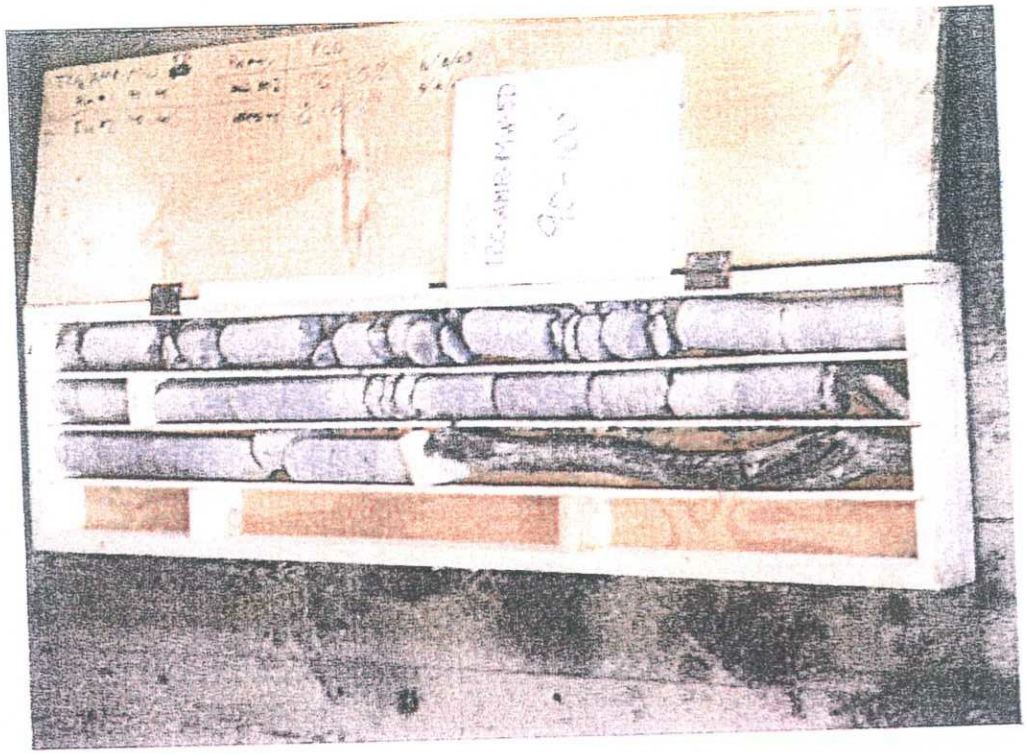
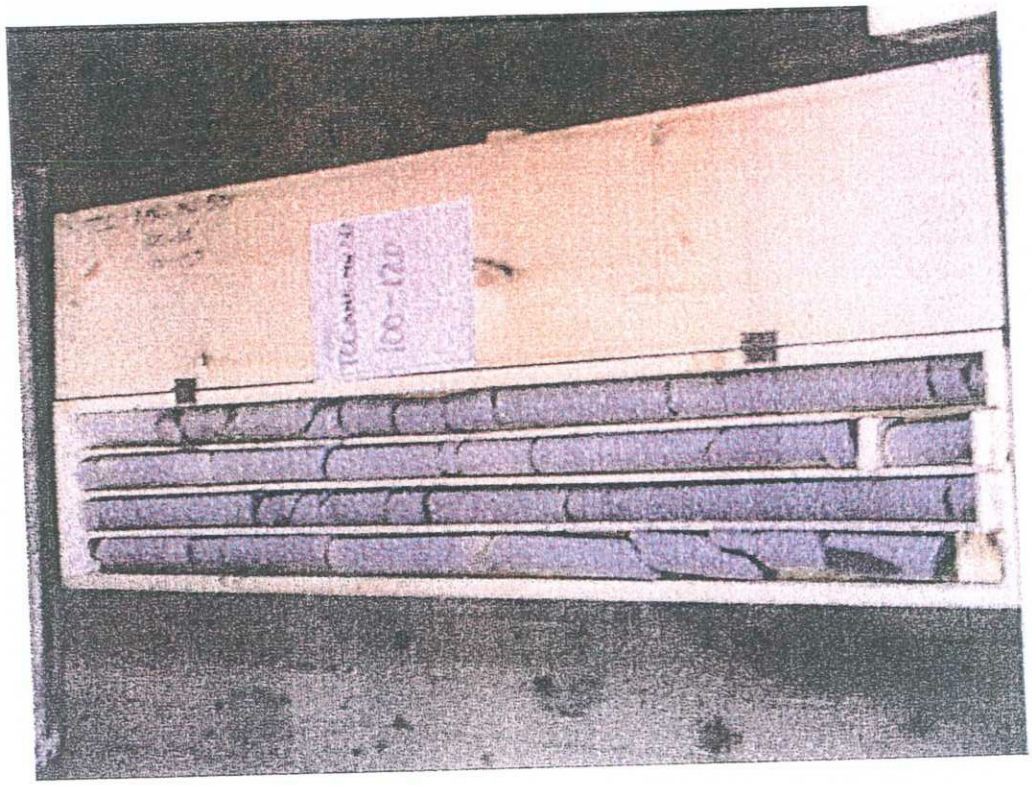
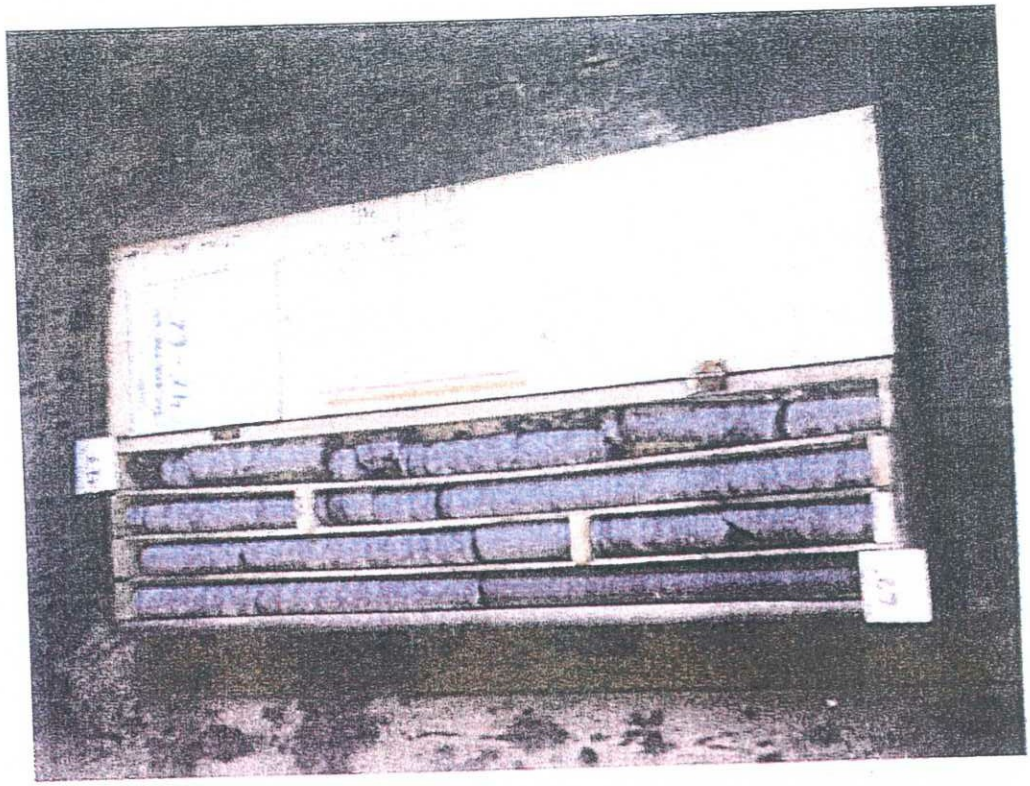


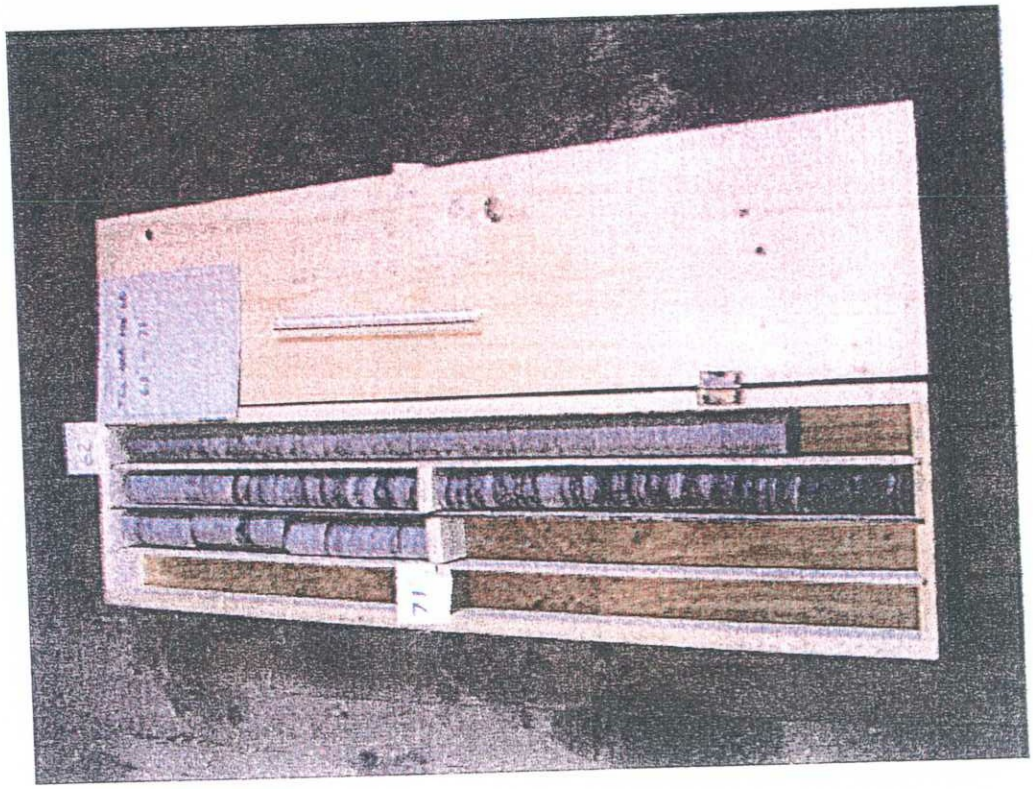
TCC-AMR-MW-5D Rock Core: 90.0'-100.0' (bgs) Interval



TCC-AMR-MW-5D Rock Core: 100.0'-120.0' (bgs) Interval



TCC-AMR-MW-6D Rock Core: 47.0'-62.0' (bgs) Interval



TCC-AMR-MW-6D Rock Core: 62.0'-71.0' (bgs) Interval

Appendix C:
Water Survey Summary

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Appendix B: City of Amsterdam Engineering Letter/Response

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1.0 PURPOSE

In preparation for the construction debris landfill and materials recycling facility proposed by Amsterdam Material Recycling, LLC, TCC conducted a survey targeting residents/owners in the City of Amsterdam and Town of Amsterdam living within 0.25 miles north, east and west (up gradient) and 1 mile south (down gradient) of the project site. These residents/owners were surveyed in order to create an inventory of private wells present to meet compliance with the NYSDEC Permit Application Process. These distances from the project are consistent with NYSDEC Part 360-2.11 which states that up gradient wells within 0.25 miles and down gradient wells within 1.0 mile must be identified and described through a well survey. The Mohawk River was used to define the southern limit of the survey boundary where it exists less than one mile down gradient of the project. A map identifying the boundaries of concern is attached as Figure 1.

2.0 METHODOLOGY

Parcels located within 0.25 miles up gradient and side gradient from the Amsterdam Industrial Development Agency Park were mapped. (See Figure 1) The 2003 Montgomery County tax parcel GIS dataset was used to create the property class map. This dataset is the most current available Real Property Tax based information from the Montgomery County Planning Department.

Approximately 214 residential properties lie within a 0.25 mile radius up gradient of the site within the Amsterdam city limits. The City of Amsterdam Engineering Office was referenced for the 214 properties' current water source. On 20 August 2003, a letter and site location map was faxed to Mr. Michael Palmer of the City of Amsterdam Engineering Department, requesting written verification that the 214 residential properties draw from public water. On 26 August 2003 Senior Engineering Aide, Rosanne Rusnica of the City of Amsterdam Engineering Office, responded that all of the properties within the 0.25 mile up gradient radius were supplied with water from the City of Amsterdam Water Filtration Plant. (See Appendix B for letter.) Thus, the 214 residential properties up gradient of the site were eliminated from the water well inventory mail out survey.

Approximately 31 properties are located down gradient, and one property is located up gradient of the project site in the Town of Amsterdam. Three properties lie down gradient of the site in the City of Amsterdam. In order to determine if any of the down gradient properties use well water as water sources, water survey questionnaires were mailed to the residents/owners of the 35 properties in question. On 20 August 2003, 35 water well surveys were mailed via Return Receipt Requested through the U.S. Postal Service. The survey posed 12 questions to learn

which properties utilize public water, which properties rely on private wells, and what the well locations and details of construction are. If a well was present on the property, a diagram sketch depicting the location of the well in relation to the resident's house and driveway was also requested. (A diagram format and an example diagram were included in the mailing.) A return addressed envelope was provided for the return of the surveys and diagrams to The Chazen Companies office. Finally, TCC asked that the water well surveys be returned to our Troy office within 10 days upon receipt of the mailing. (See Appendix A for the Water Well Survey and Diagram)

3.0 FINDINGS

Of the 35 surveys mailed via Return Receipt Requested, 33 Return Receipt notifications were returned to TCC, successfully delivered, by 8 September 2003. One Return Receipt notification and survey was returned indicating that the recipient party was unknown to the record address. A second Return Receipt notification and survey was returned to TCC indicating that the party refused to receive the mailing. As of October 22, 2003, 16 of the 35 surveys mailed were completed and returned. The remaining 19 surveys have not returned. The 16 responses are attached as Appendix C.

35 parcels are listed on the tax map under TCC boundary guidelines; however, Parcel 056.03-1-19 is two separate addresses according to the owners William and Donna Marotta: 266 Chapman Drive and 268 Chapman Drive. Each property has an active, utilized well. Thus, there are actually 36 parcels/properties located down gradient of the site.

From the 16 responses regarding the corresponding 17 properties, the residents/owners reported that ten of the properties use city water and seven of the properties use well water. There are a total of ten wells present on the 17 properties; two properties host wells of unknown location that are not in use. Table 1 is a tabulation of the survey findings. Table 2 depicts the reported well characteristics.

The returned surveys indicate that the locations of the wells are dispersed. Four active wells lie on the eastern portion of the down gradient boundary. One well lies in the western portion of the down gradient boundary. Another well lies in the northeastern portion of the up gradient boundary. Figure 2 exhibits the survey's findings.

TABLES

TABLE 1. Survey Response Findings

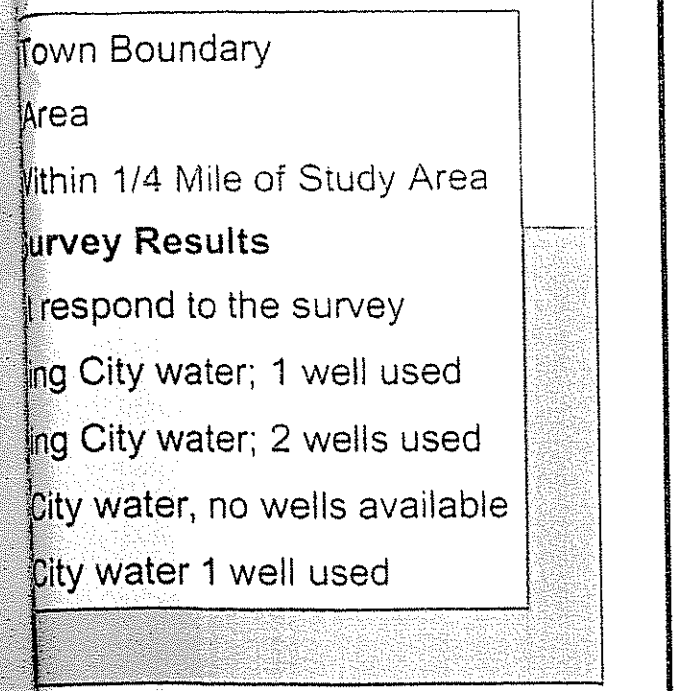
Parcel ID	Property Owner	Address	City/Town of Amsterdam	Provided w/ Public Water	# of Wells on Property	# Wells used	Responded to Survey	Did Not Respond to Survey	Survey Not Delivered
056.03-1-02	Alfred Fleszar	107 Edson Street	Town	no	1	1	x		
		268 Chapman Drive							
056.03-1-19	Donna L. Marotta	266 Chapman Drive	Town	no	2	2	x		
056.13-2-14	Robert Butterfield	364 East Main Street	City	yes	1	0	x		
056.13-2-17	James T. Lenehan	1586 Hampton Road	City	yes	1	0	x		
056.14-1-17	Russell & Phyllis Howe	289 Chapman Drive	Town	no	1	1	x		
056.03-1-22	David Krzynowek	256 Chapman Drive	Town	no	1	1	x		
056.14-1-42	Dorothy Carter	104 Holly Street	Town	no	1	1	x		
056.14-1-40.1	Lisa A. France	421 Chapman Drive	Town	yes	0	0	x		
056.14-1-35	Karl Schmach	109 Shirley Street	Town	yes	0	0	x		
056.14-1-25	Florence Reedy	538 Crane Road	Town	yes	0	0	x		
056.14-1-32	Ronald & Rene Bayes	329 Chapman Drive	Town	yes	0	0	x		
056.14-1-33	Marilyn M. Ciskanow	331 Chapman Drive	Town	yes	0	0	x		
056.14-1-37	David D'Addio	104 Luther Street	Town	yes	0	0	x		
056.14-1-10	Jamie S. Fellows	328 Chapman Drive	Town	yes	0	0	x		
056.03-1-06.1	Richard F. Churchill	282 Chapman Drive	Town	no	2	2	x		
056.14-1-05	John T. FitzGibbon	338 Chapman Drive	Town	yes	0	0	x		
056.03-1-20	Shawn M. Renner	3101 Ridgewood Drive	Town					x	
056.03-1-21	Shawn Renner	3102 Ridgewood Drive	Town					x	
056.13-2-16	Jarosz, Antoni J	410 East Main St	City					x	
056.14-1-01	Oral S. Lewis	96 Forbes Street	Town					x	
056.14-1-02	Bennie Stanionis	346 Chapman Drive	Town					x	
056.14-1-03	Aron H. Lenz	344 Chapman Drive	Town					x	
056.14-1-08	Joseph V. Baranowski	6 Oliver Street	Town					x	
056.14-1-09	Frances Dibartolomeoo	330 Chapman Drive	Town					x	
056.14-1-11	Karen Anne Trzaskos	326 Chapman Drive	Town					x	
056.14-1-15	Albert J. Gegzna	8 Royce Road	Town					x	
056.14-1-21	Emelia Ubra	17 Philips Street	Town						Unknown Party
056.14-1-23	Fred Guzielek	315 Chapman Drive	Town					x	
056.14-1-24	Gregory A. Stinzianni	103 Gilbert Street	Town					x	
056.14-1-26	Dale Cook	441 East Main Street	Town					x	
056.14-1-27	Robert L. Furman	321 Chapman Drive	Town					x	
056.14-1-34	Kimberley & Thomas J. Zara	177 CO HWY 126	Town						Refused
056.14-1-36	Manny & Alba Mistretta	87-05 166TH ST	Town					x	
056.14-1-41	Gerald Gallup	156 Hickory Ridge Road	Town					x	
056.14-1-44	Madelyn Gonzales	351 Chapman Drive	Town						

TABLE 2. Well Characteristics

Parcel ID	Property Owner	Address	Property Size (A)	Well in use?	Well location known?	Well Drilled/Dug	Depth of Well (ft)	Depth to Water (ft)	Depth to Pump (ft)	Depth to Well Casing (ft)	Yield (gpm)
056.03-1-02	Alfred Fleszar	107 Edson Street	1.25	yes	yes	Drilled	NR	NR	167	NR	30-35
		1) 268 Chapman Drive	1) 0.31								
056.03-1-19	Donna L. Marotta	2) 266 Chapman Drive	2) 0.2	yes	yes	Drilled	unknown	unknown	NR	unknown	unknown
056.13-2-14	Robert Butterfield	364 East Main Street	2	no	no	unknown	unknown	unknown	NR	unknown	unknown
056.13-2-17	James T. Lenehan	1586 Hampton Road	1.0 +	no	yes	Dug	unknown	unknown	NR	unknown	unknown
056.14-1-17	Russell & Phyllis Howe	289 Chapman Drive	NR	yes	yes	Drilled	unknown	unknown	NR	unknown	unknown
056.03-1-22	David Krzynowek	256 Chapman Drive	0.5	yes	yes	Drilled	unknown	unknown	NR	unknown	unknown
056.03-1-06.1	Richard F. Churchill	282 Chapman Drive	8.5	yes	yes	Drilled	unknown	unknown	NR	unknown	unknown
056.14-1-42	Dorothy Carter	104 Holly Street	0.75	yes	yes	Drilled	unknown	unknown	NR	1	unknown

NR = No response

FIGURES



Created by:
Carol Conolly

Date:
October 23, 2003

Scale:
1:1,600

Project #:
90309.00

Appendix C:
Water Well Survey

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: _____

Site owner: _____

Size of site (approximate acres):_____

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☐ Yes ☐ No

2. Do you use water from public/city water? ☐ **Yes** ☐ **No** If so, since what date has the City of Amsterdam supplied you with public water?

   _____

3. How many wells are on the property? _____

4. Do you use the well(s)? ☐ **Yes** ☐ **No** If so, for what purpose?

   _____

5. Do you have any information from the driller who installed the well(s)?

   ☐ **Yes** ☐ **No** (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? _____

7. What is the total depth of the well? _____

8. What is the depth to the top of the water in the well? _____

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? _____

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

    _____

    _____

Thank you for your help.

Sincerely,

Sarah K. Solli
Environmental Technician

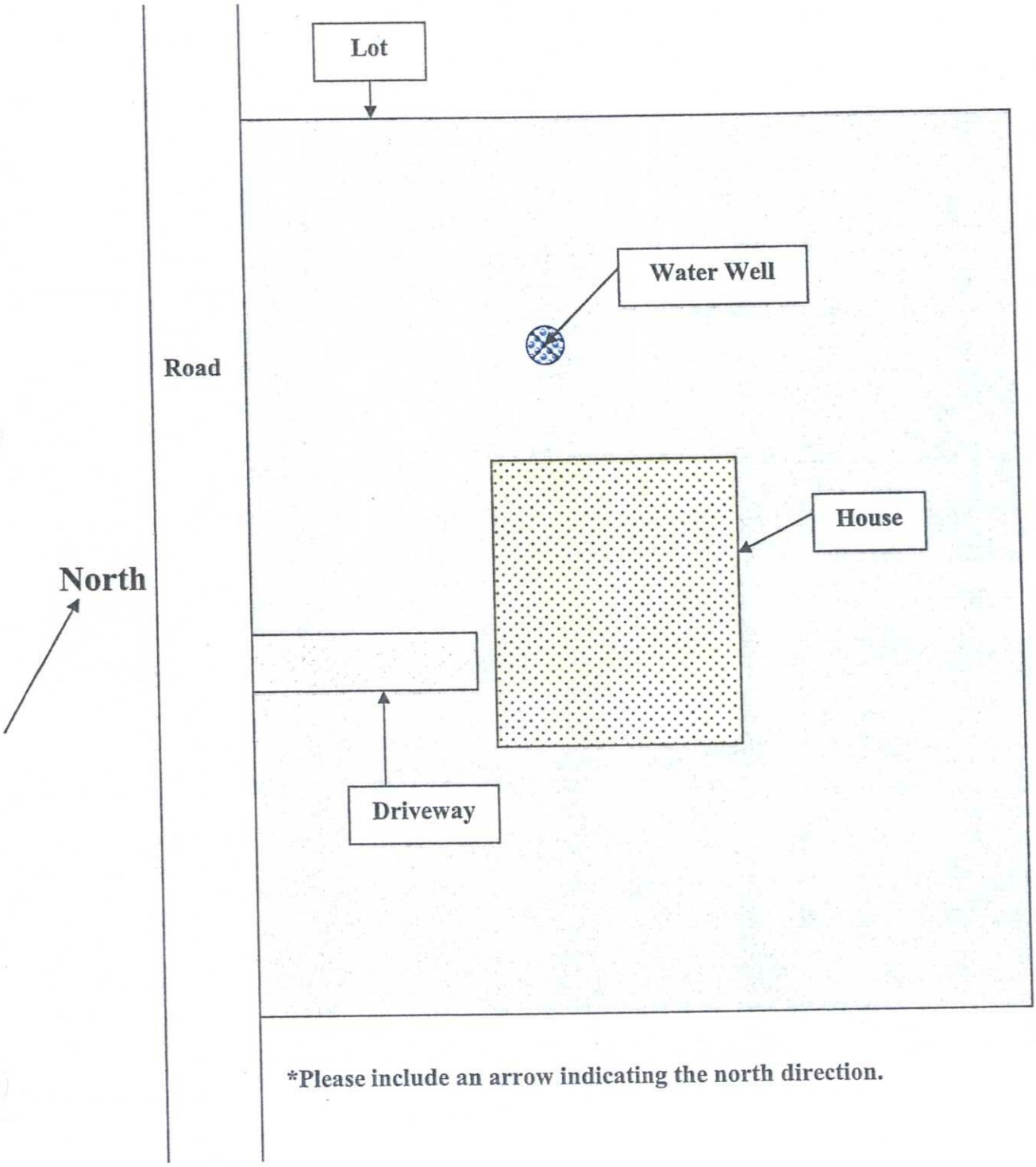
Please Follow this ***EXAMPLE***.

Site Address: _____

_____

Site Owner: _____

Size of Site: _____



***Please include an arrow indicating the north direction.**

Appendix B:
City of Amsterdam Engineering Letter/Response

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

range County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 20, 2003

Mr. Michael Palmer
Amsterdam City Engineering Department
61 Church Street
Amsterdam, New York 12010

Re: Verification Request– Amsterdam Materials Recycling Project Site
Edgin Street Industrial Park
City of Amsterdam, Montgomery County, NY

Dear Mr. Palmer:

In reference to the construction debris landfill and materials recycling facility proposed by Amsterdam Material Recycling, LLC (AMR), The Chazen Companies are assisting AMR to create an inventory of private wells within the area in question (the inventory is a part of the NYSDEC Permit Application Process). The Chazen Companies would appreciate your verification that within 0.25 miles west and north of the project site, all City of Amsterdam residents are supplied with public water. A site location map, depicting the area in question is attached. Please provide a written response to this request to satisfy this component of our survey.

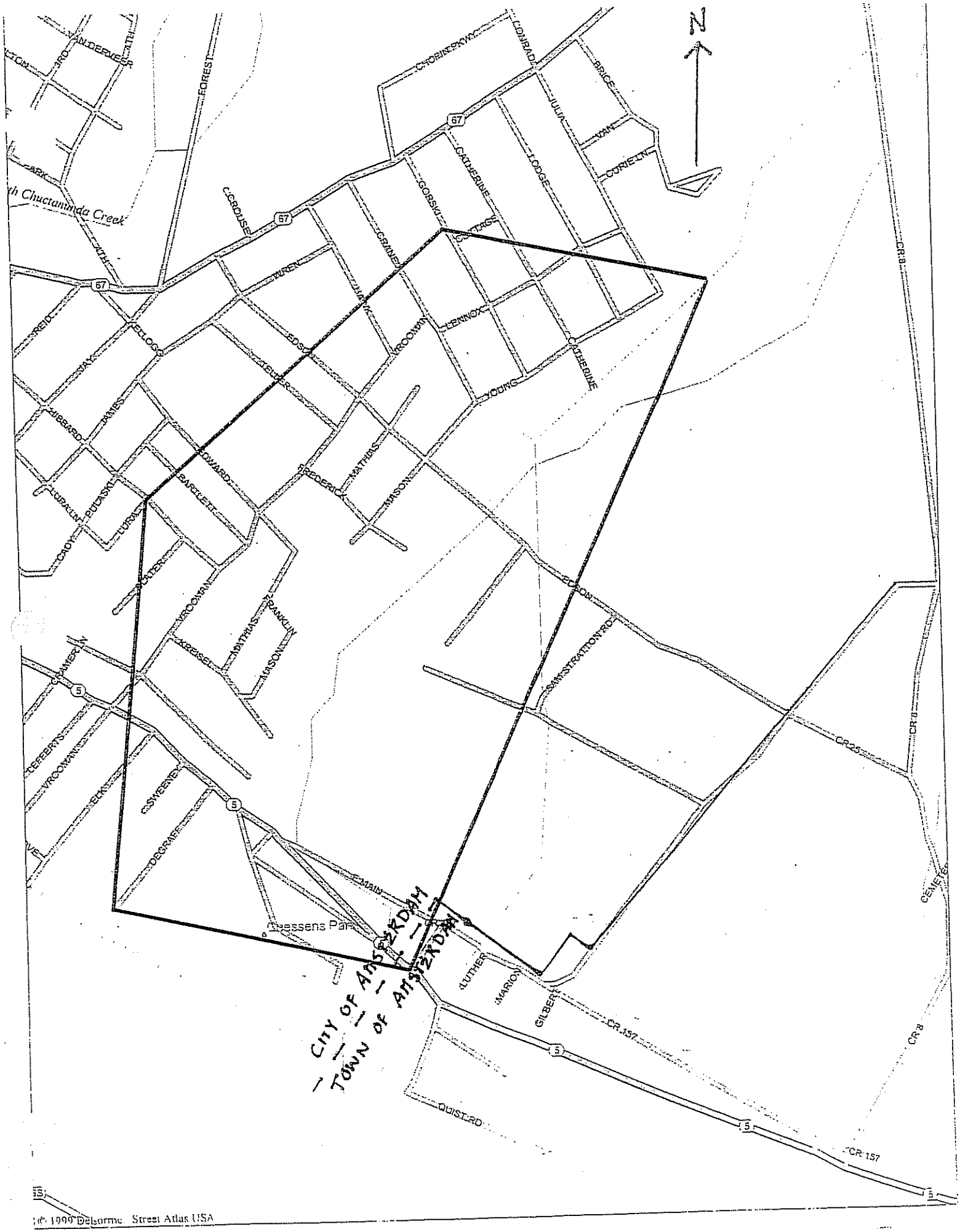
Please contact me or Mr. Kim Baines at (518) 235-8050 with any questions pertaining to this request. Thank you for your cooperation regarding this matter.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

SKS/attachment: map
cc: File
Kim Baines
Dan Stone


N
67
5
CR 157
CR 8
CR 25
Chuctanunda Creek
Queensens Park
CITY OF AMSTERDAM
TOWN OF AMSTERDAM
FOREST
CONRAD
BRIGE
JULIA
VAN
CURIE LN
CATHERINE
LODGE
GORSKI
CRANE
WREN
REID
HIBBARD
JAMES
HOWARD
BARTLETT
FREDERICK
MATHIAS
MASON
LOUIS
LENNOX
VROOMAN
FRANKLIN
ABITHIAS
KREISER
SWEENEY
DEGRAFF
MAIN
LUTHER
MARION
GILBERT
QUIST RD
ADMINISTRATION RD
© 1999 DeLorme Street Atlas USA

The City of Amsterdam

Engineering Department 518-841-4331

Michael J. Palmer P.E., City Engineer

61 Church Street, Amsterdam, NY 12010 Building Inspections

Building Inspector – (518) 841-4301
Plumbing Inspector – (518) 841-4330
Fax – (518) 841-4310

August 25, 2003

Chazen Environmental Services, Inc.
20 Gurley Avenue
Troy, NY 12182
Attn: Sarah K. Solli:

Re: Verification Request – Amsterdam Materials Recycling Project Site – Edson Street Industrial Park – Amsterdam, NY

Dear Ms. Solli:

In response to your letter of August 20, 2003, the City verifies that all City residents within a .25 mile area north and west of the project site are supplied by water from the City of Amsterdam Water Filtration Plant.

If you have any other question please feel free to contact me at (518) 841-4327.

Sincerely,

Rosanne Rusnica

Rosanne Rusnica
Senior Engineering Aide

ms

Appendix C:
Survey Responses

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Mr. Richard F. Churchill
454 East Main Street
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 362 Chapman Dr.

Site owner: F Richard Churchill

Size of site (approximate acres): 8 ½ acres

Site contact # phone number (optional) 843-4656

Questions about groundwater:

1. Does a public water supply line pass by your home? ☐ Yes ☒ No

2. Do you use water from public/city water? ☐ Yes ☒ No If so, since what date has the City of Amsterdam supplied you with public water?

3. How many wells are on the property? 2

4. Do you use the well(s)? ☒ Yes ☐ No If so, for what purpose? drinking water etc.

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? drilled

7. What is the total depth of the well? unknown

8. What is the depth to the top of the water in the well? unknown

9. What is the depth of the well casing? (for drilled wells only) unknown

10. What is the yield in gallons per minute (gpm) from the well? unknown

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

no

Thank you for your help.

Sincerely,

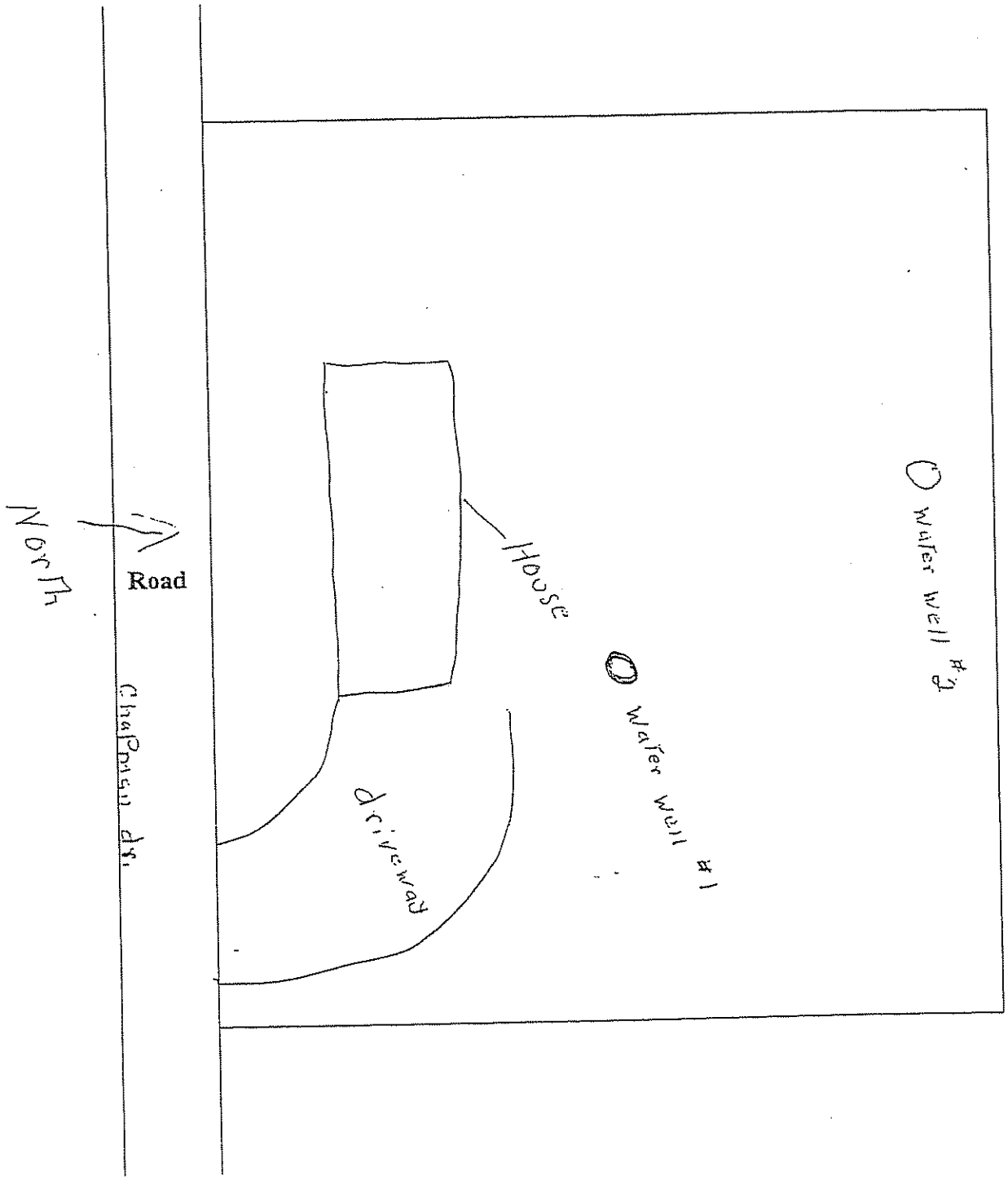
Sarah K. Solli

Sarah K. Solli
Environmental Technician

Site Address: 282 Chapman dr.

Site Owner: Richard Churchill

Size of Site: 5.5 Acres



CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Mr. Alfred Fleszar
107 Edson Street
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 107 EDSON ST. AMSTERDAM

Site owner: ALFRED J. FLESZAR

Size of site (approximate acres): 1 1/4 ACRES

Site contact #-phone number (optional) 518 842 6553

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

108 EDSON HAS CITY H2O.

2. Do you use water from public/city water? ☐ Yes ☒ No If so, since what date has the City of Amsterdam supplied you with public water? _____

3. How many wells are on the property? 1

4. Do you use the well(s)? ☒ Yes ☐ No If so, for what purpose? WATER

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.) FERGUSON & PROKOP – DRILLERS

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? DRILLED

7. What is the total depth of the well? _____

8. What is the depth to the top of the ~~water~~ PUMP in the well? 167 FT.

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? 30-35

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

ACROSS THE STREET 108 - DRILLED DEEPER & STOLE MY VEIN. I HAD TO DRILL DEEPER. THEY ARE NOW ON CITY H2O

Thank you for your help.

Sincerely,

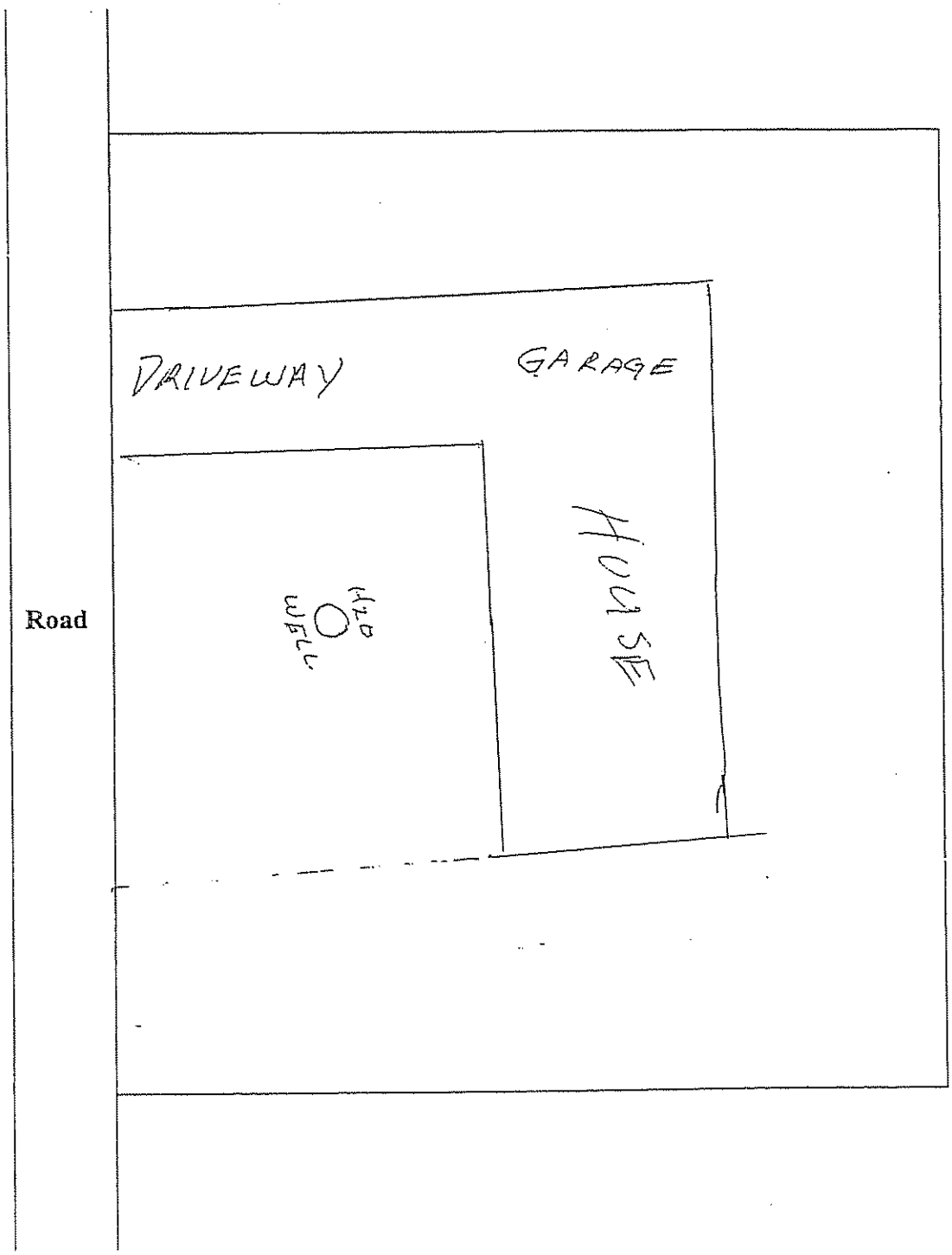
Sarah K Solli

Sarah K. Solli
Environmental Technician

Site Address: 107 EDSON ST
AMSTERDAM, N.Y.

Site Owner: ALFRED J. FLESZAR

Size of Site: 1/4 ACRES.



CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Dorothy Carter
104 Holly Street
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 104 HOLLY ST - AMSTERDAM, N.Y.

Site owner: DOROTHY CARTER

Size of site (approximate acres): 3/4 Approx. ACRE

Site contact # phone number (optional) 518 842-1448

Questions about groundwater:

1. Does a public water supply line pass by your home? ☐ Yes ☒ No

2. Do you use water from public/city water? ☐ Yes ☒ No If so, since what date has the City of Amsterdam supplied you with public water?

3. How many wells are on the property? 1

4. Do you use the well(s)? ☒ Yes ☐ No If so, for what purpose?

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? DRILLED

7. What is the total depth of the well? UNKNOWN

8. What is the depth to the top of the water in the well? UNKNOWN

9. What is the depth of the well casing? (for drilled wells only) 1 FOOT BELOW GROUND LEVEL

10. What is the yield in gallons per minute (gpm) from the well? UNKNOWN

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

No

Thank you for your help.

Sincerely,

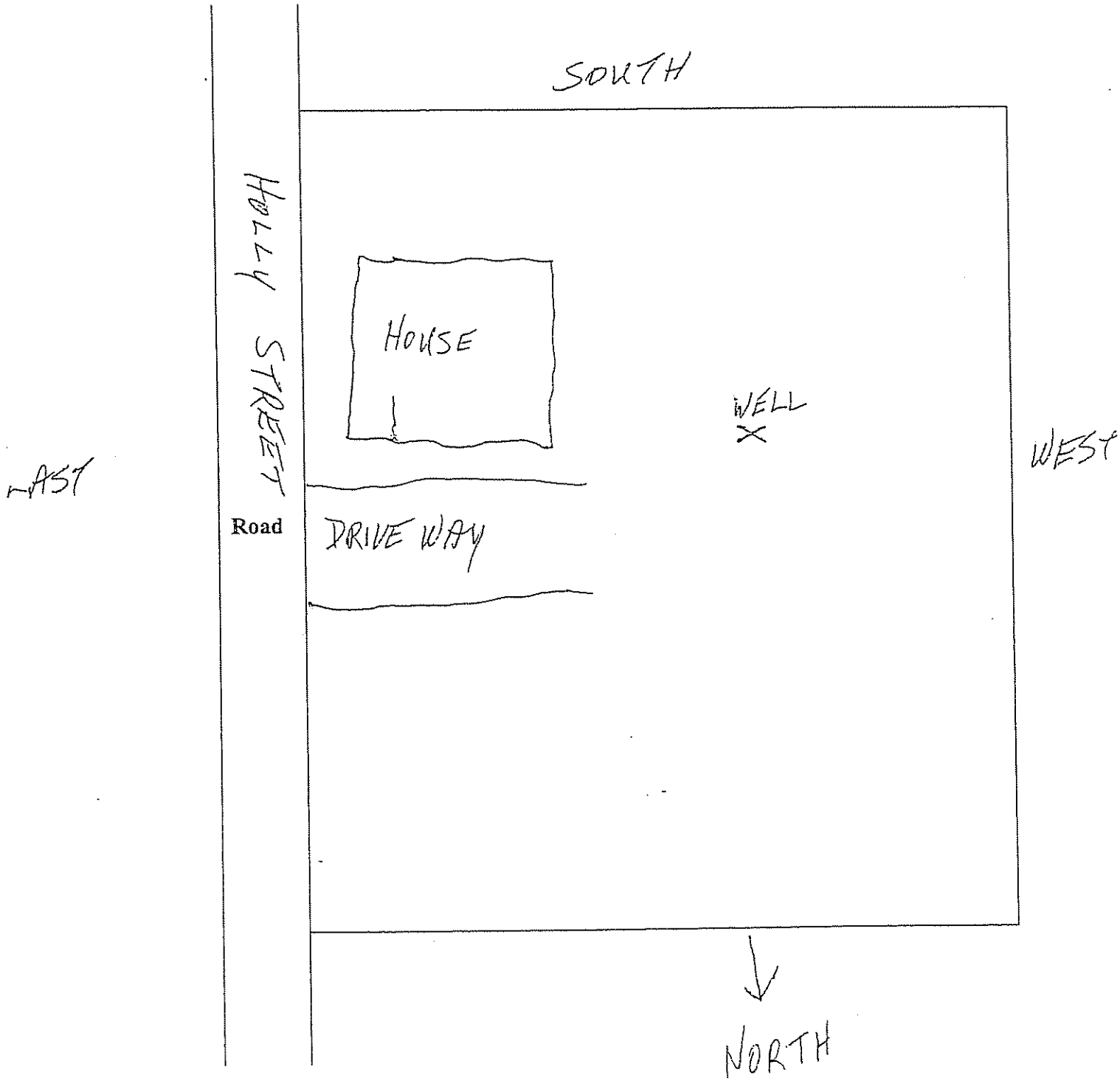
Sarah K Solli

Sarah K. Solli
Environmental Technician

Site Address: 104 HOLLY ST AMSTERDAM, N.Y.

Site Owner: DOROTHY CARTER

Size of Site: ~~APPROX.~~ 3/4 ACRE



CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Mr. David E. Krzynowek
~~460~~ 256 Chapman Drive
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 466 CHAPMAN (PRE-911 ASSIGNMENT) ACTUALLY IS 256 CHAPM

Site owner: DAVID / KATHLEEN KRZYNOWEK

Size of site (approximate acres): 1/2 ACRE

Site contact # phone number (optional) 518-843-2426

Questions about groundwater:

1. Does a public water supply line pass by your home? ☐ Yes ☒ No

8/26/03

2. Do you use water from public/city water? ☐ Yes ☒ No If so, since what date has the City of Amsterdam supplied you with public water?

_____

3. How many wells are on the property? ONE

4. Do you use the well(s)? ☒ Yes ☐ No If so, for what purpose? DRINKING, BATHING, WASHING DISHES & CLOTHES

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? DRILLED
7. What is the total depth of the well? UNKNOWN
8. What is the depth to the top of the water in the well? UNKNOWN
9. What is the depth of the well casing? (for drilled wells only) UNKNOWN
10. What is the yield in gallons per minute (gpm) from the well? UNKNOWN
11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.
12. Have you ever experienced difficulties with your well? Please explain.

NO

Thank you for your help.

Sincerely,

Sarah K Solli

Sarah K. Solli
Environmental Technician

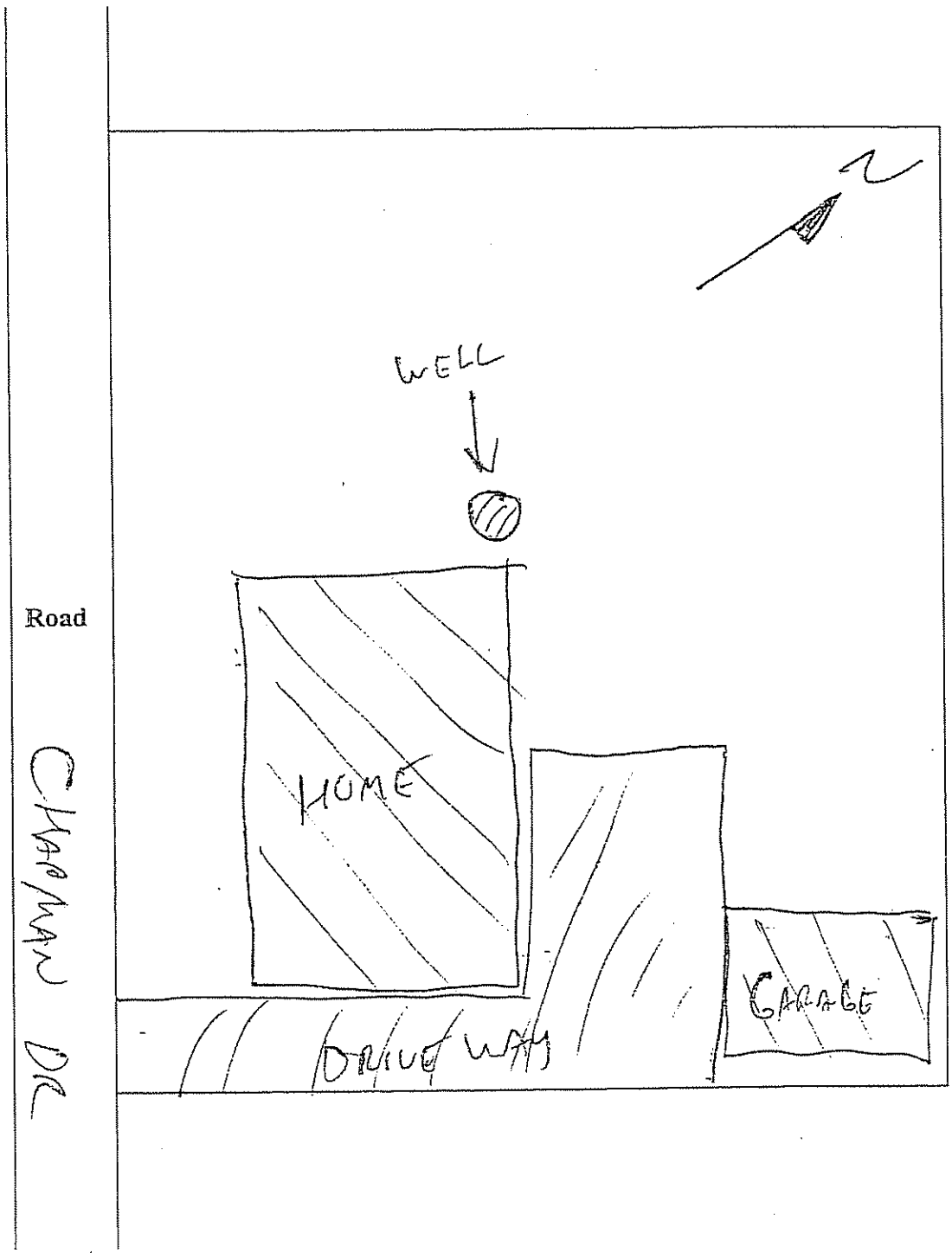
8/26/03

12/4/03

Site Address: 256 CHAPMAN

Site Owner: DAVID KRZYWICKI

Size of Site: 1/2 ACRE



CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

27th AUGUST Signed (Mrs Howe)

Russell & Phyllis Howe
289 Chapman Drive
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself: Phyllis E. Howe.

Site address: 289 CHAPMAN DRIVE. Amsterdam N.Y 12010

Site owner: Phyllis Howe

Size of site (approximate acres): _____

Site contact # phone number (optional) 842-5395

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☒ No
Un Hooked old lead line

2. Do you use water from public/city water? NO ☐ Yes NO ☒ No If so, since what date has the City of Amsterdam supplied you with public water?

3. How many wells are on the property? ONE

4. Do you use the well(s)? ☑ Yes ☐ No If so, for what purpose? I CERTAINLY DO — SUCH AS — FOR LAUNDRY, BATHING, ETC. I depend ENTIRELY ON MY WELLS.

5. Do you have any information from the driller who installed the well(s)?
☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? drilled

7. What is the total depth of the well? ?

8. What is the depth to the top of the water in the well? ?

9. What is the depth of the well casing? (for drilled wells only) ?

10. What is the yield in gallons per minute (gpm) from the well? ?

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

I NEVER HAVE HAD PROBLEMS. I DEPEND ENTIRELY UPON MY WELL.

Thank you for your help.

Sincerely,

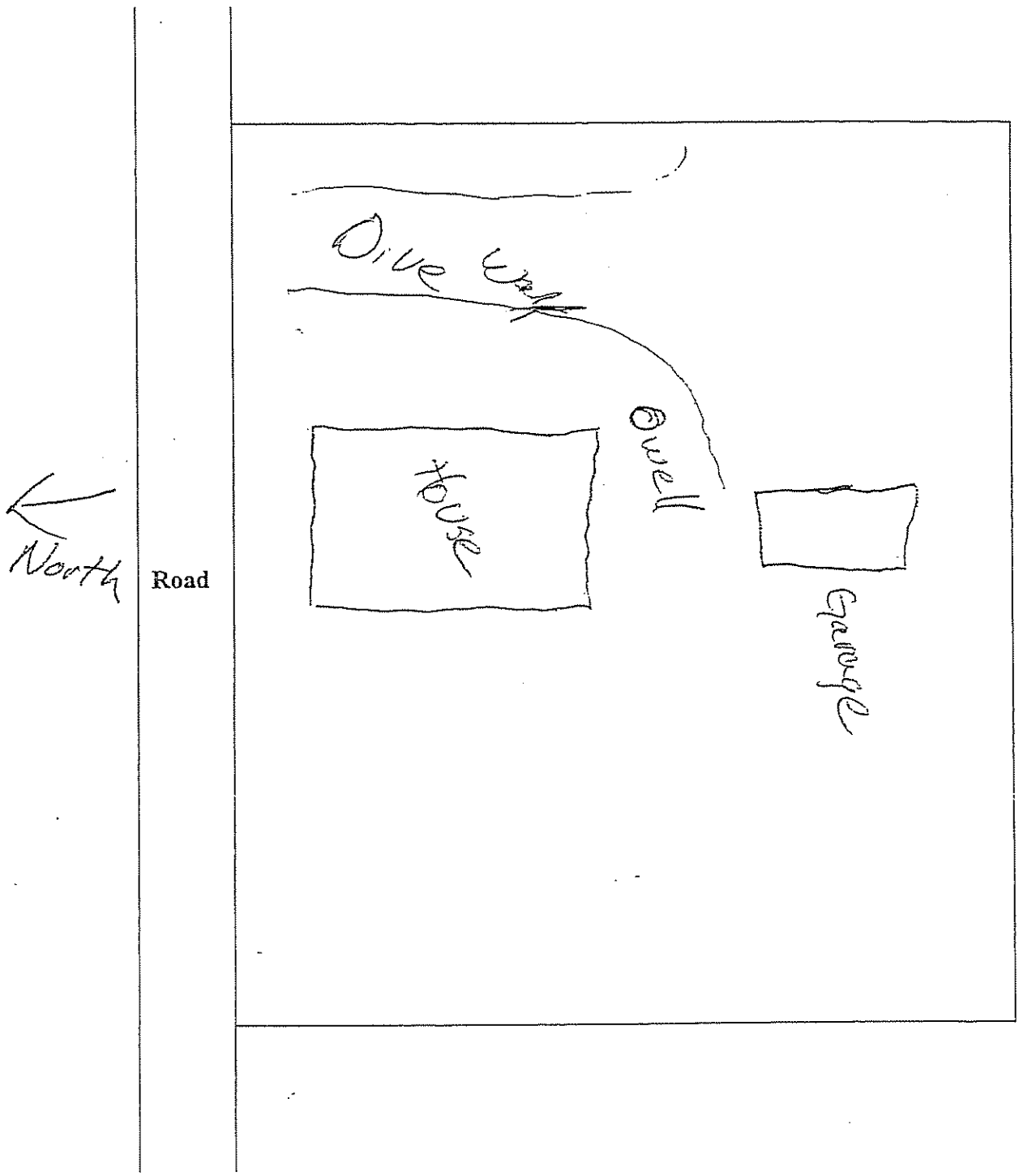
Sarah K Solli

Sarah K. Solli
Environmental Technician

Site Address: 249 CHAPMAN DRIVE, Amsterdam.

Site Owner: Phyllis L. Howe

Size of Site:



R-5

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Mr. James T. Lenehan
1586 Hampton Road
Rydal, PA 19046

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 412 East Main St.

Site owner: James & Christine Lenehan

Size of site (approximate acres): 1 ± acres

Site contact # phone number (optional) 518-842-6166

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

2. Do you use water from public/city water? ☒ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water?

3. How many wells are on the property? 1

4. Do you use the well(s)? ☐ Yes ☒ No If so, for what purpose?

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? in 1880's - Drilled in

7. What is the total depth of the well? Unknown

8. What is the depth to the top of the water in the well? Unknown

9. What is the depth of the well casing? (for drilled wells only) Unknown

10. What is the yield in gallons per minute (gpm) from the well?

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.
Water in basement!

Thank you for your help.

Sincerely,

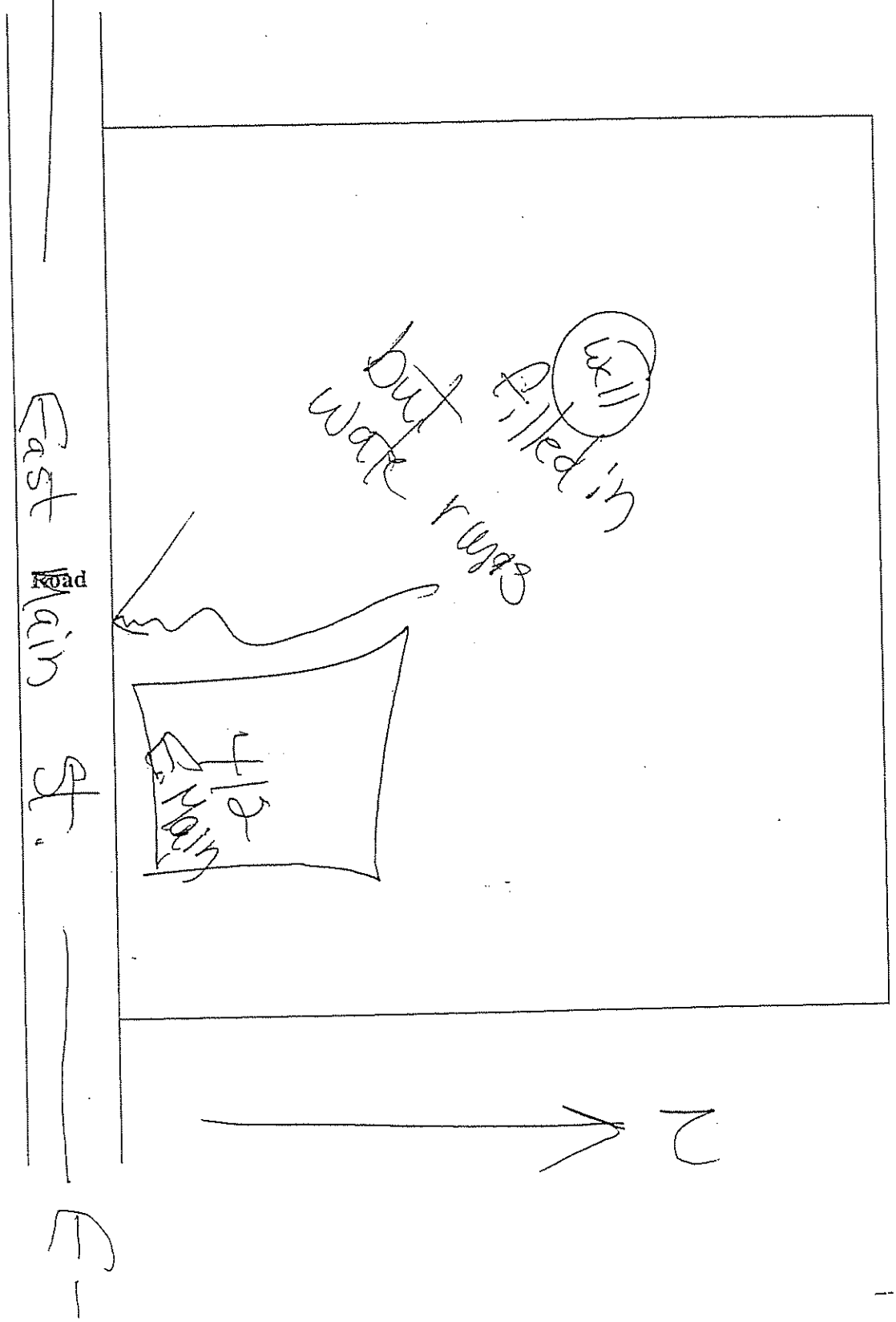
Sarah K. Solli

Sarah K. Solli
Environmental Technician

Site Address: 412 E. Main Amsterdam N.Y. 12010

Site Owner: J. C. Lenehan

Size of Site: 1 Acre or more



CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Mr. Robert Butterfield
364 East Main Street
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 364 EAST MAIN STREET

Site owner: ROBERT + SUSAN BUTTERFIELD

Size of site (approximate acres): 2

Site contact # phone number (optional) (518) 842-1695

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

2. Do you use water from public/city water? ☒ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water?

3. How many wells are on the property? 1 LOCATION UNKNOWN

4. Do you use the well(s)? ☐ Yes ☒ No If so, for what purpose?

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? UNKNOWN

7. What is the total depth of the well? UNKNOWN

8. What is the depth to the top of the water in the well? "

9. What is the depth of the well casing? (for drilled wells only) "

10. What is the yield in gallons per minute (gpm) from the well? "

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

Thank you for your help.

Sincerely,

Sarah K. Solli

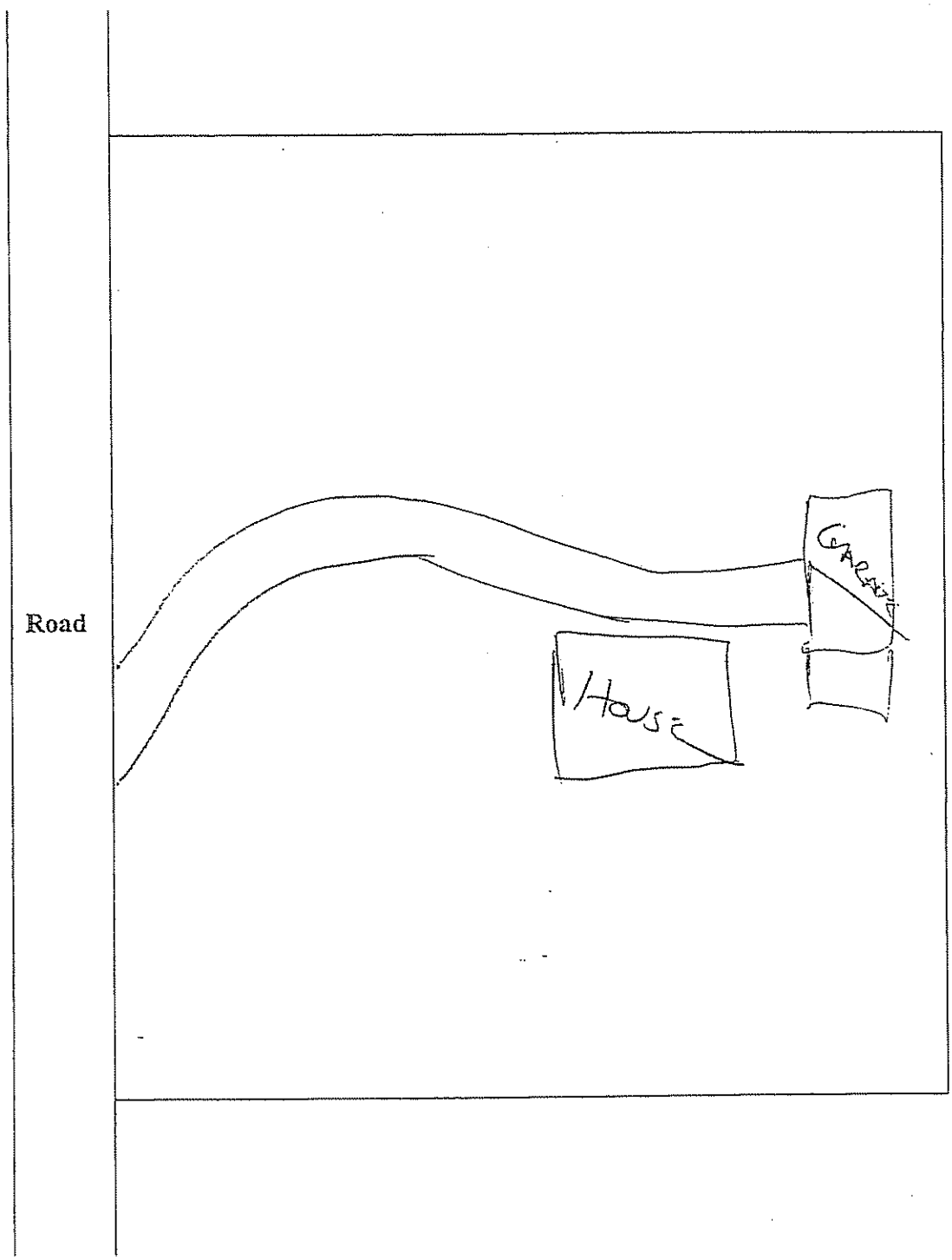
Sarah K. Solli
Environmental Technician

Site Address: _____

_____

Site Owner: _____

Size of Site: _____



CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Marotta
Donna L. ~~Schotts~~
268 Chapman Drive
Amsterdam, NY ~~12086~~ 12010

+ 266 Chapman Drive Amsterdam NY 12010 (2 properties)

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself: 266 Chapman Drive Amsterdam NY 12010

Site address: 268 Chapman Drive Amsterdam N.Y. 12010

Site owner: William Marotta and Donna Marotta (Schotts)

Size of site (approximate acres): 90 X 150, and 50 X 150 (2 properties)

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☐ Yes ☒ No

2. Do you use water from public/city water? ☐ Yes ☒ No If so, since what date has the City of Amsterdam supplied you with public water? _____

3. How many wells are on the property? 1 on each property, total of 2

4. Do you use the well(s)? ☒ Yes ☐ No If so, for what purpose? drinking, cooking & bathing

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? drilled

7. What is the total depth of the well? ? unknown

8. What is the depth to the top of the water in the well? ? unknown

9. What is the depth of the well casing? (for drilled wells only) ? unknown

10. What is the yield in gallons per minute (gpm) from the well? ? unknown

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

No

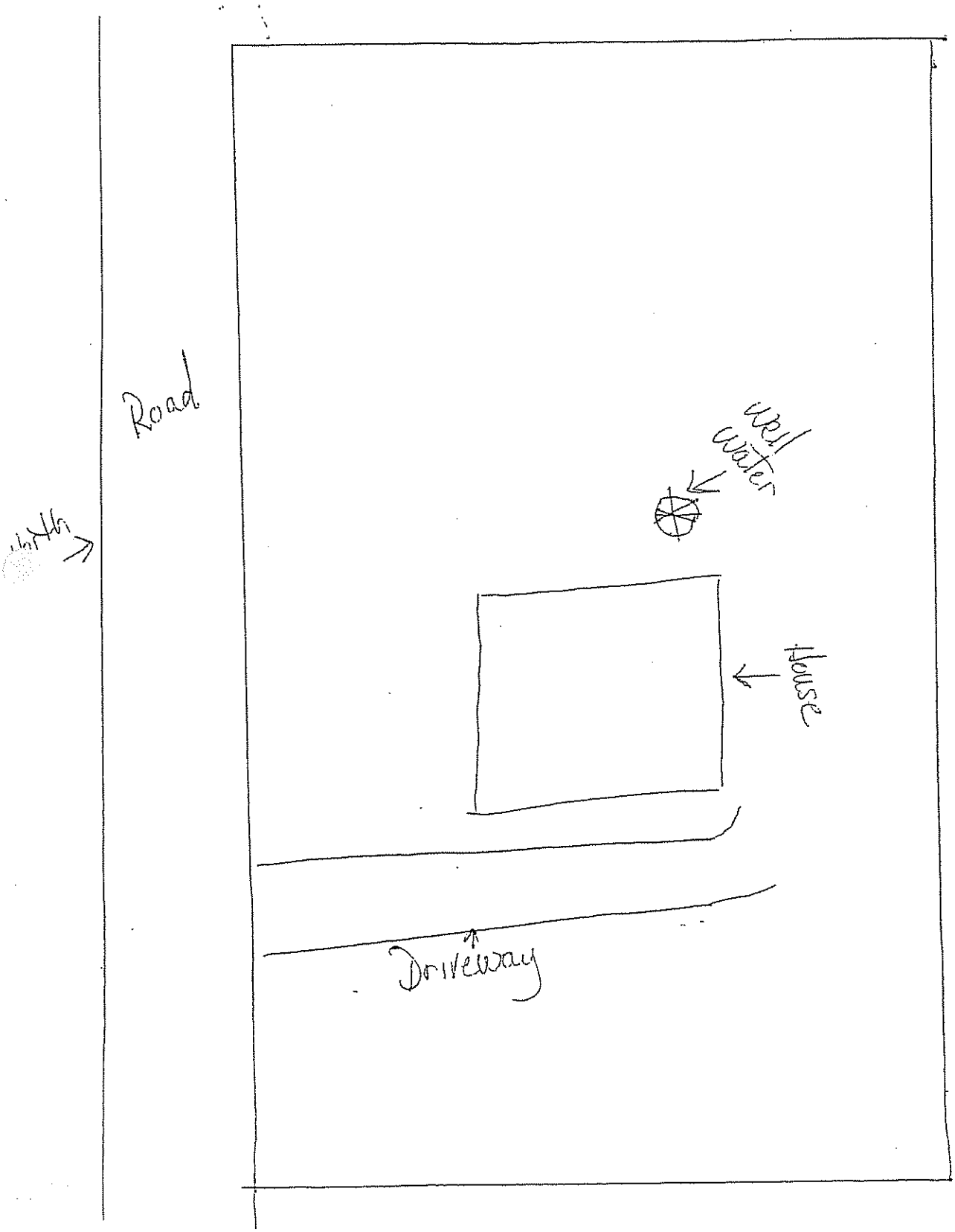
Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

266 Chapman Drive Amsterdam N.Y 12010
William Marotta & Donna Marotta (Schotts)
50 X 150

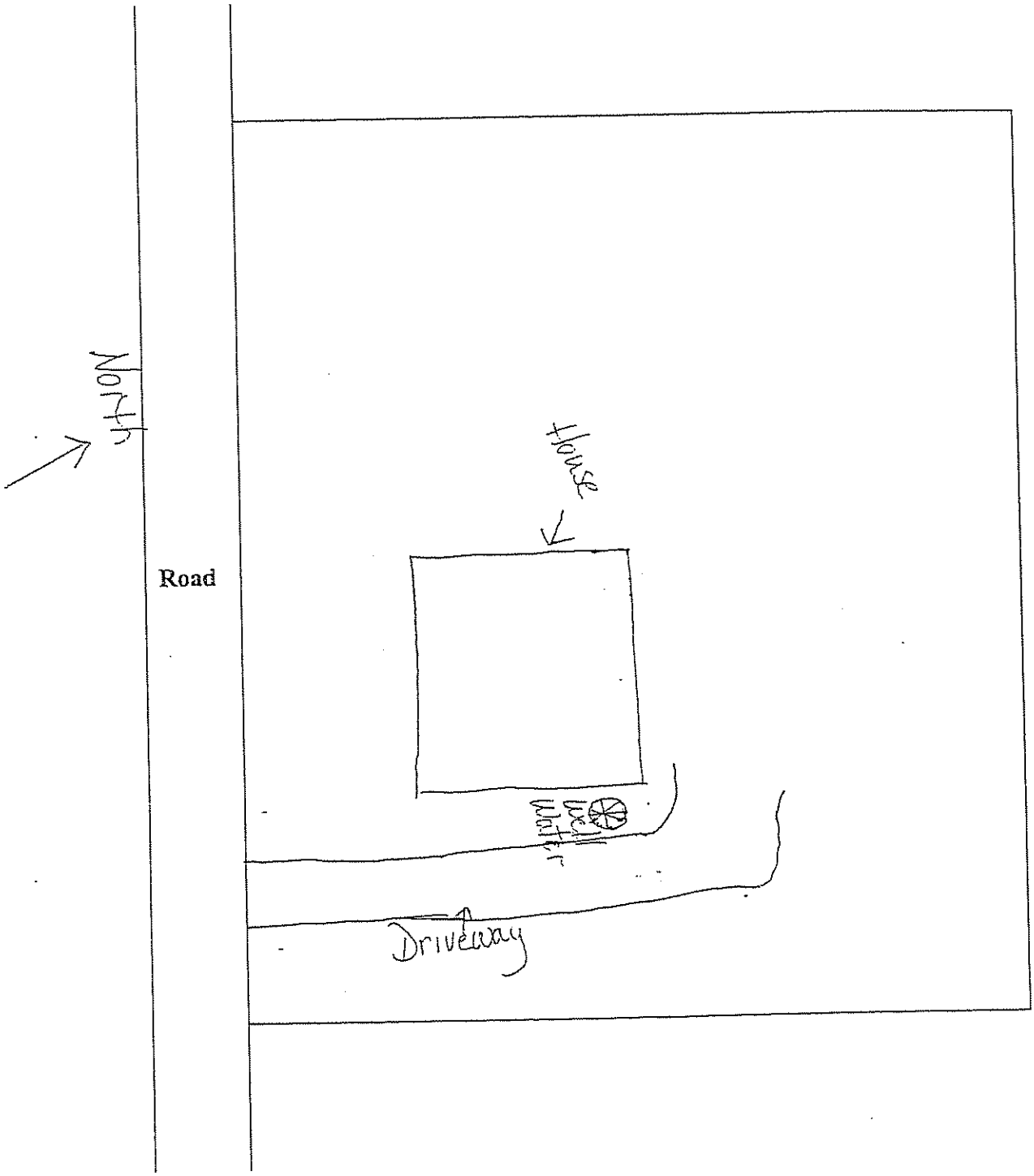


266 Chapman
or

Site Address: 268 Chapman Drive
Amsterdam NY 12010

Site Owner: William Marotta + Donna Marotta (schutts)

Size of Site: 90 x 150



266 Chapman on back →

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Karl Schmach
109 Shirley Street
Fonda, NY 12068

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies; the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 335 Chapman Drive

Site owner: 109 Shirley Fonda NY 12068

Size of site (approximate acres): 80 x 120

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☑ Yes ☐ No

2. Do you use water from public/city water? ☑ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water?

_____

3. How many wells are on the property? NONE

4. Do you use the well(s)? ☐ Yes ☐ No If so, for what purpose?

_____

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? _____

7. What is the total depth of the well? _____

8. What is the depth to the top of the water in the well? _____

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? _____

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

_____

_____

Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

-ange County Office
. none: (845) 567-1133

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Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Florence Reedy
538 Crane Road
Galway, NY 12074

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 105 GILBERT ST. (SBL 56.14-1-25)

Site owner: Florence Reedy

Size of site (approximate acres): 55' FRONTAGE ± 300.00 DEPTH

Site contact # phone number (optional) 882-6674

Questions about groundwater:

1. Does a public water supply line pass by your home? ☑ Yes ☐ No

2. Do you use water from public/city water? ☑ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water?
ALL THE TIME SINCE I HAVE OWNED IT.
AND 50 YEARS OR MORE WHEN MY BROTHER OWNED IT.
3. How many wells are on the property? NONE

4. Do you use the well(s)? ☐ Yes ☐ No If so, for what purpose?

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug?
7. What is the total depth of the well?
8. What is the depth to the top of the water in the well?
9. What is the depth of the well casing? (for drilled wells only)
10. What is the yield in gallons per minute (gpm) from the well?
11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.
12. Have you ever experienced difficulties with your well? Please explain.

Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

Site Address: _____

Site Owner: _____

Size of Site: _____

105 GILBERT ST.
SBL 56 .. 14-1-25

Alteration

Road

To Whom it May Concern.

I strongly oppose the land fill at the Edison Industrial Park.

This fails common sense thinking on Amsterdam Officials for wanting to locate such a monster in the city.

Please think of the good people in Amsterdam that are against this. If you to locate it - locate it someplace away from the population.

From what I have seen and heard when they start dumping stuff in landfills you really don't know what is being dumped there.

Think of Amsterdam will being and health.

Sincerely,
Florence Reidy
842-6674

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Ronald & Rene Bayes
329 Chapman Drive
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 329 CHAPMAN DR

Site owner: RON & RENE BAYES

Size of site (approximate acres): 1/2

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

2. Do you use water from public/city water? ☒ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water? 1988

3. How many wells are on the property? (0)

4. Do you use the well(s)? ☐ Yes ☐ No If so, for what purpose? N/A

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? _____

7. What is the total depth of the well? _____

8. What is the depth to the top of the water in the well? _____

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? _____

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

_____

_____

Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

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Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2008

Marilyn M. Ciskanow
331 Chapman Drive
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 331 Chapman Drive

Site owner: Ms Marilyn M Ciskanow

Size of site (approximate acres): Frontage 96.00 Depth 100.00

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

2. Do you use water from public/city water? ☒ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water? 60+ years or since the House was built

3. How many wells are on the property? none

4. Do you use the well(s)? ☐ Yes ☐ No If so, for what purpose? _____

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? _____

7. What is the total depth of the well? _____

8. What is the depth to the top of the water in the well? _____

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? _____

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

_____

_____

Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

·ange County Office
none: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

David D'Addio
104 Luther Street
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 104 LUTHER ST.

Site owner: DAVID D'ADDIO

Size of site (approximate acres): 1/4

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☑ Yes ☐ No

2. Do you use water from public (city) water? ☑ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water? 1990

3. How many wells are on the property? None

4. Do you use the well(s)? ☐ Yes ☑ No If so, for what purpose?

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug?
7. What is the total depth of the well?
8. What is the depth to the top of the water in the well?
9. What is the depth of the well casing? (for drilled wells only)
10. What is the yield in gallons per minute (gpm) from the well?
11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.
12. Have you ever experienced difficulties with your well? Please explain.

Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

ange County Office
hone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Jamie S. Fellows
328 Chapman Drive
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:
Site address: 328 Chapman Dr. Amsterdam ny
Site owner: Jamie Fellows
Size of site (approximate acres): 1/4
Site contact # phone number (optional) _____

Questions about groundwater:

Does a public water supply line pass by your home? ☒ Yes ☐ No

1. Do you use water from public/city water? ☒ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water?

2. How many wells are on the property? None

3. Do you use the well(s)? ☐ Yes ☐ No If so, for what purpose?

4. Do you have any information from the driller who installed the well(s)?

   ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

5. Was the well drilled or dug? _____
6. What is the total depth of the well? _____
7. What is the depth to the top of the water in the well? _____
8. What is the depth of the well casing? (for drilled wells only) _____
9. What is the yield in gallons per minute (gpm) from the well? _____
10. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.
12. Have you ever experienced difficulties with your well? Please explain.

Thank you for your help.

Sincerely,
Sarah K. Solli
Environmental Technician

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
Phone: (845) 454-3980

Orange County Office
Phone: (845) 567-1133

20 Gurley Avenue, Troy, New York 12182
Phone: (518) 235-8050 Fax: (518) 235-8051
Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

Lisa A. France
421 Chapman Drive
Amsterdam, NY 12010

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself:

Site address: 341 Chapman Dr. Amst

Site owner: Lisa France

Size of site (approximate acres): less than 1

Site contact # phone number (optional) _____

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

2. Do you use water from public/city water? ☒ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water? Since before I purchased property in 1991

3. How many wells are on the property? 0

4. Do you use the well(s)? ☐ Yes ☒ No If so, for what purpose? _____

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☒ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond **UNKNOWN** if not certain):

6. Was the well drilled or dug? _____

7. What is the total depth of the well? _____

8. What is the depth to the top of the water in the well? _____

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? _____

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

_____

_____

Thank you for your help.

Sincerely,

Sarah K. Solli

Sarah K. Solli
Environmental Technician

CHAZEN ENVIRONMENTAL SERVICES, INC.

Dutchess County Office
one: (845) 454-3980

range County Office
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20 Gurley Avenue, Troy, New York 12182
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Email: albany@chazencompanies.com

North Country Office
Phone: (518) 812-0513

August 19, 2003

John T. Fitzgibbons
7412 Church Road
Schenectady, NY 12306

Dear Resident or Property Owner:

Amsterdam Material and Recycling, LLC is proposing to install a construction debris landfill on lands of the Amsterdam Industrial Development Agency. To evaluate potential impacts of this project on groundwater supplies, the New York State Department of Environmental Conservation requires preparation of an inventory of wells near the proposed project. The Chazen Companies are assisting Amsterdam Materials to create this inventory. We would appreciate your assistance in identifying wells near this project.

Please answer the following questions to the best of your knowledge. We would appreciate receiving your response within 10 days, using the enclosed self addressed stamped envelope. Your responses and those of all other responders will become a matter of public record so you will be able to review the results of the inventory in documents being prepared for the New York State Department of Environmental Conservation.

If you have any questions please contact me at (518) 235-8050.

Please identify yourself: John T. FitzGibbon

Site address: 338 Chapman Drive (422 E. Main St.) Amsterdam, N.Y.

Site owner: John T. FitzGibbon

Size of site (approximate acres): 0.134 ± ACRE

Site contact # phone number (optional) (518) 355-9389

Questions about groundwater:

1. Does a public water supply line pass by your home? ☒ Yes ☐ No

2. Do you use water from public/city water? ☑ Yes ☐ No If so, since what date has the City of Amsterdam supplied you with public water?
Date is not known.

3. How many wells are on the property? None. Therefore questions 4 through 12 are not applicable.

4. Do you use the well(s)? ☐ Yes ☐ No If so, for what purpose?

5. Do you have any information from the driller who installed the well(s)? ☐ Yes ☐ No (If so, please provide us with a copy of that information.)

For each well on your property, please provide the following information (respond UNKNOWN if not certain):

6. Was the well drilled or dug? _____

7. What is the total depth of the well? _____

8. What is the depth to the top of the water in the well? _____

9. What is the depth of the well casing? (for drilled wells only) _____

10. What is the yield in gallons per minute (gpm) from the well? _____

11. Where is the well located on the property? On the sketch sheet provided, please indicate the location of the **house**, **driveway**, and **water well**. Also, please draw an arrow pointing to the north on the sketch map.

12. Have you ever experienced difficulties with your well? Please explain.

Thank you for your help.

Sincerely,

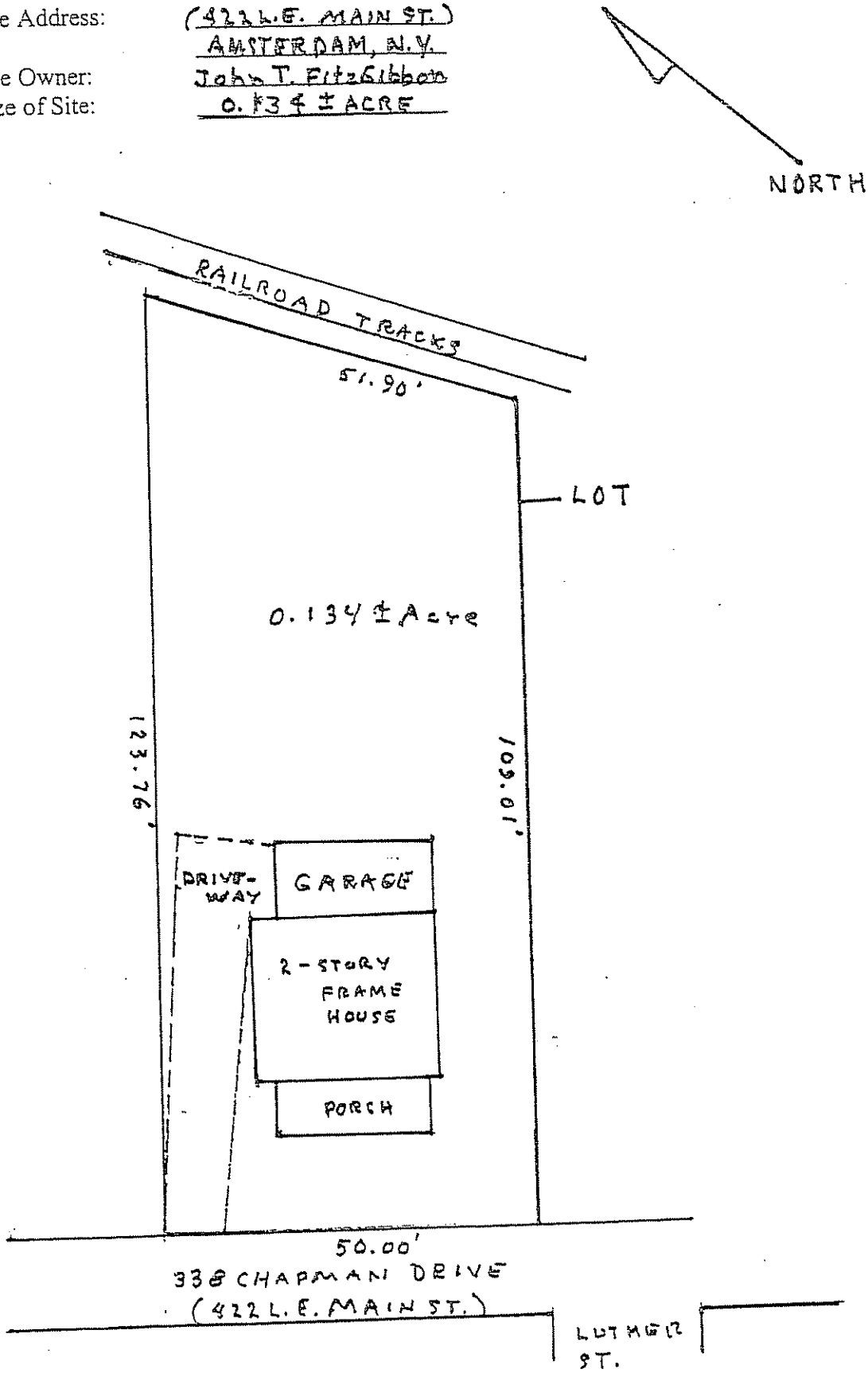
Sarah K. Solli

Sarah K. Solli
Environmental Technician

Site Address: 338 CHAPMAN DRIVE (422 L.E. MAIN ST.) AMSTERDAM, N.Y.

Site Owner: John T. FitzGibbon

Size of Site: 0.134 ± ACRE



Appendix D:
Slug Test Data and Analyses, and Laboratory Permeability Testing

The *Chazen* Companies
December 2003

Slug Test Data Summary
Proposed AMR Landfill Site

Well ID	Total Depth	Top of Screen or bottom of casing	Water Level*	W.L. above or below screen?	r	R	L_e	Test	t_{37}	Hydraulic conductivity k			
										Test Result		Average	
					inch	inch	ft		second	inch/second	ft/day	(ft/day)	(cm/second)
TCC-AMR-MW-1D	65.0	28.0	19.76	A	1.5	1.5	37.00	1	2750	5.243E-06	3.775E-02	3.775E-02	1.332E-05
					1.5	1.5	37.00	2	2750	5.243E-06	3.775E-02		
					1.5	1.5	37.00	3	2750	5.243E-06	3.775E-02		
TCC-AMR-MW-1S	32.5	22.5	12.75	A	1.0	4.0	12.00	1	570	2.183E-05	1.572E-01	1.278E-01	4.506E-05
					1.0	4.0	12.00	2	1300	9.571E-06	6.891E-02		
					1.0	4.0	12.00	3	570	2.183E-05	1.572E-01		
TCC-AMR-MW-2D	80.0	24.5	36.38	B	1.5	1.5	43.62	1	16000	7.865E-07	5.663E-03	5.663E-03	1.997E-06
TCC-AMR-MW-5D	120.0	100.0	41.56	A	1.5	1.5	20.00	1	300	7.930E-05	5.710E-01	5.710E-01	2.014E-04
					1.5	1.5	20.00	2	300	7.930E-05	5.710E-01		
					1.5	1.5	20.00	3	300	7.930E-05	5.710E-01		
TCC-AMR-MW-5S	100.0	89.5	39.32	A	1.0	4.0	12.50	1	500	2.416E-05	1.740E-01	2.580E-01	9.099E-05
					1.0	4.0	12.50	2	290	4.166E-05	2.999E-01		
					1.0	4.0	12.50	3	290	4.166E-05	2.999E-01		
TCC-AMR-MW-6S	31.0	21.0	18.27	A	1.0	4.0	12.00	1	2750	4.525E-06	3.258E-02	3.497E-02	1.233E-05
					1.0	4.0	12.00	2	2980	4.175E-06	3.006E-02		
					1.0	4.0	12.00	3	2120	5.869E-06	4.226E-02		

Hvorslev Method: $K = [r^2 \ln(L_e/R)]/(2L_e t_{37})$ Fetter, Applied Hydrogeology

K: hydraulic conductivity (L/T)

r: the radius of the well casing (L)

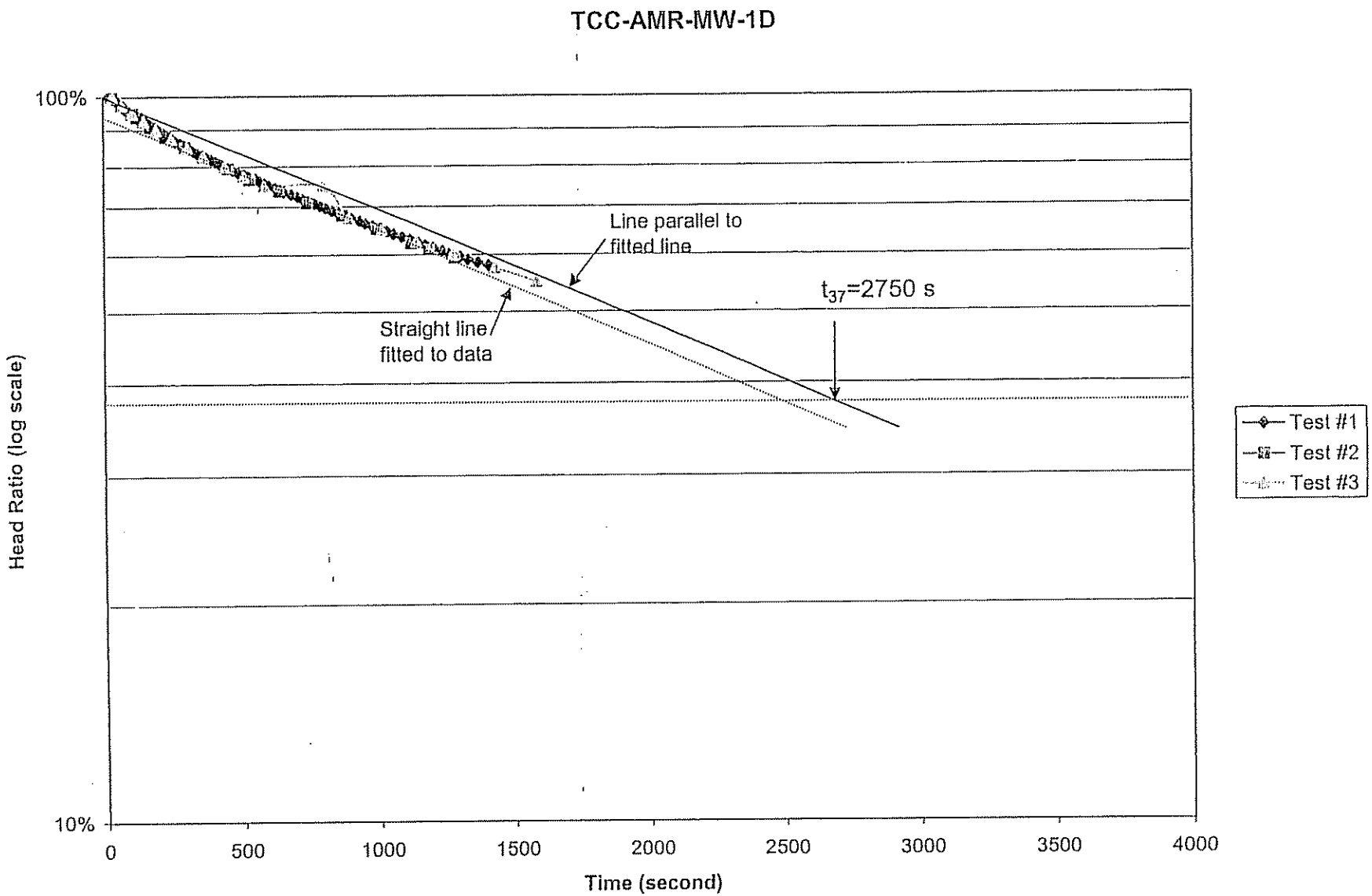
R: the radius of the drilled well annulus (L)

L_e: the length of the well screen (saturated portion of rock annulus or well screen plus 2' sand pack) (L)

t_{37}: adjusted time for the water level to return to 37% of the initial change (T) -
(point of intercept with raw data best-fit t37 line adjusted to intercept the HW/H = 1(Dawson, & Istok, 1991))

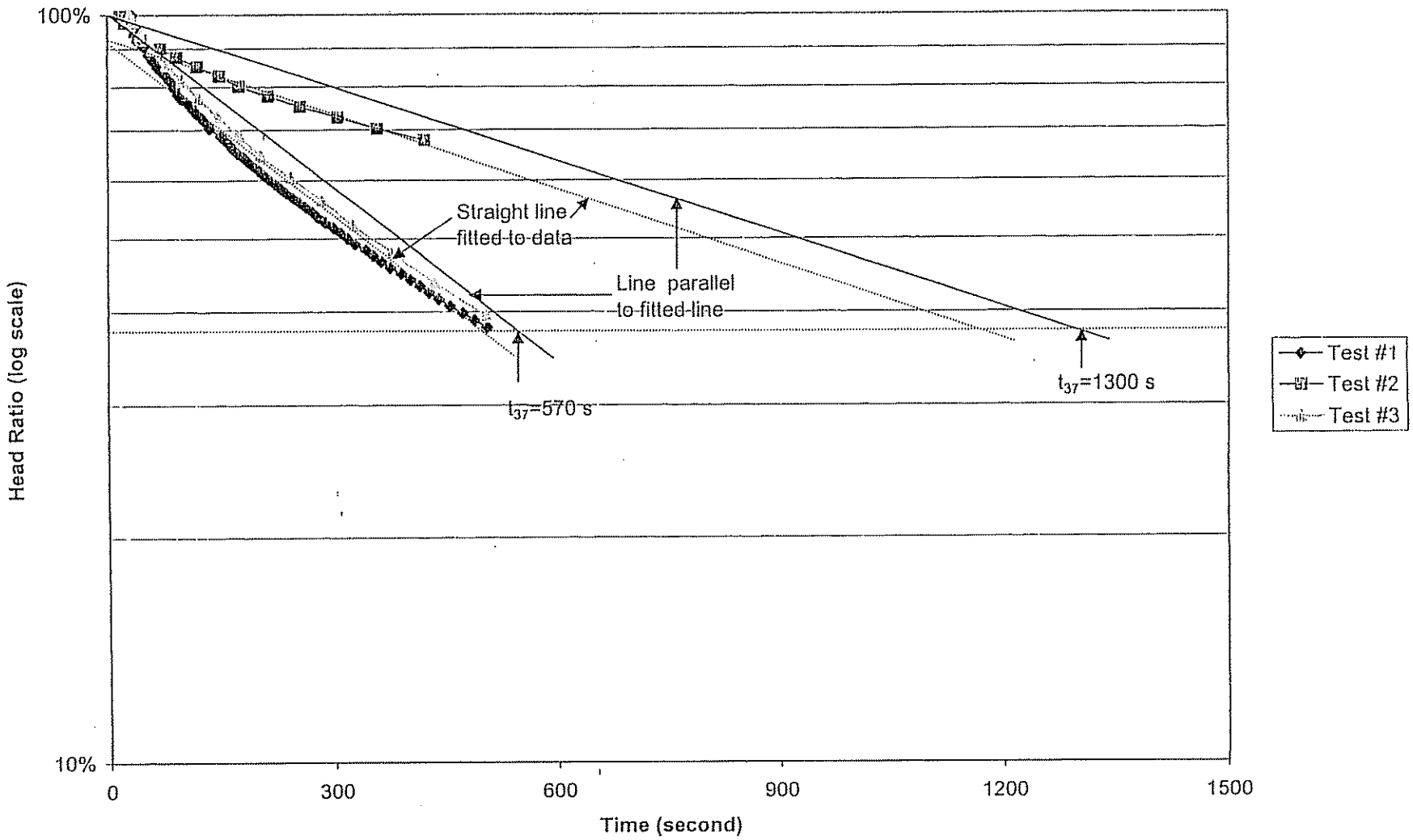
* Water Levels recorded in early October, 2003.

Dawson, K.J. and Istok, J.D *Aquifer Testing: Design and Analysis of Pumping and Slug Tests,* 1991. Lewis Pubs.



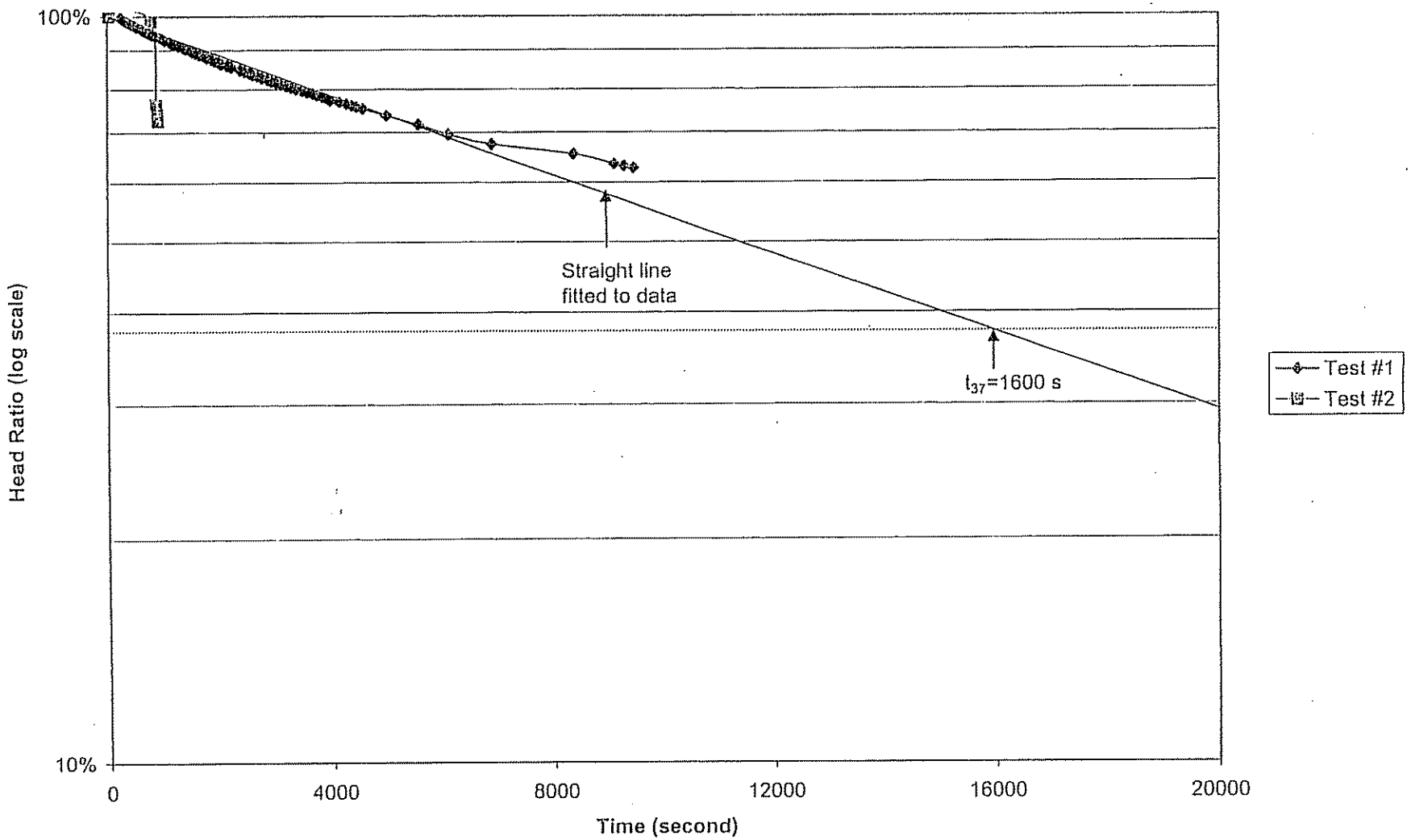
The Chazen Companies
11/26/2003

TCC-AMR-MW-1S



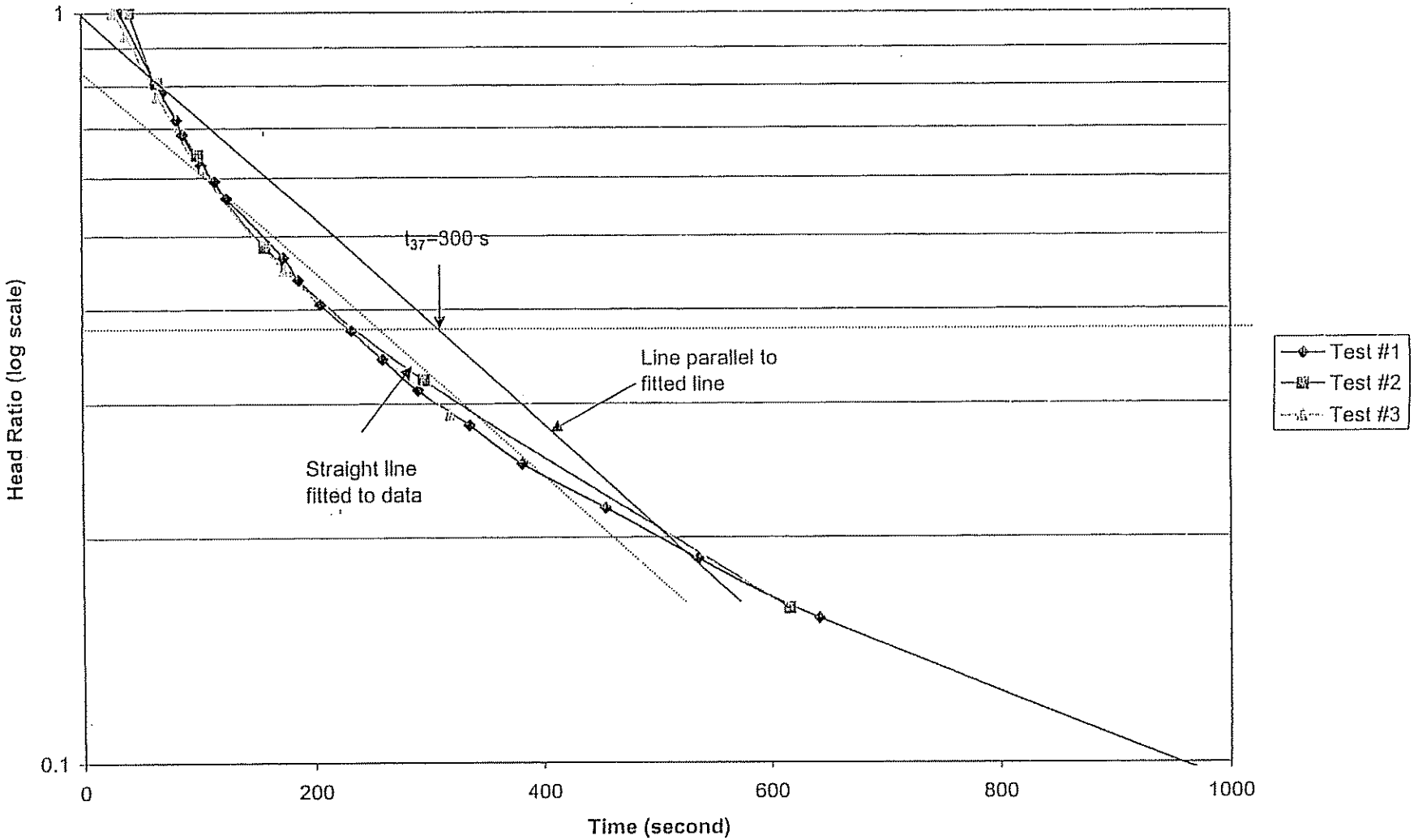
The Chazen Companies
11/26/2003

TCC-AMR-MW-2D



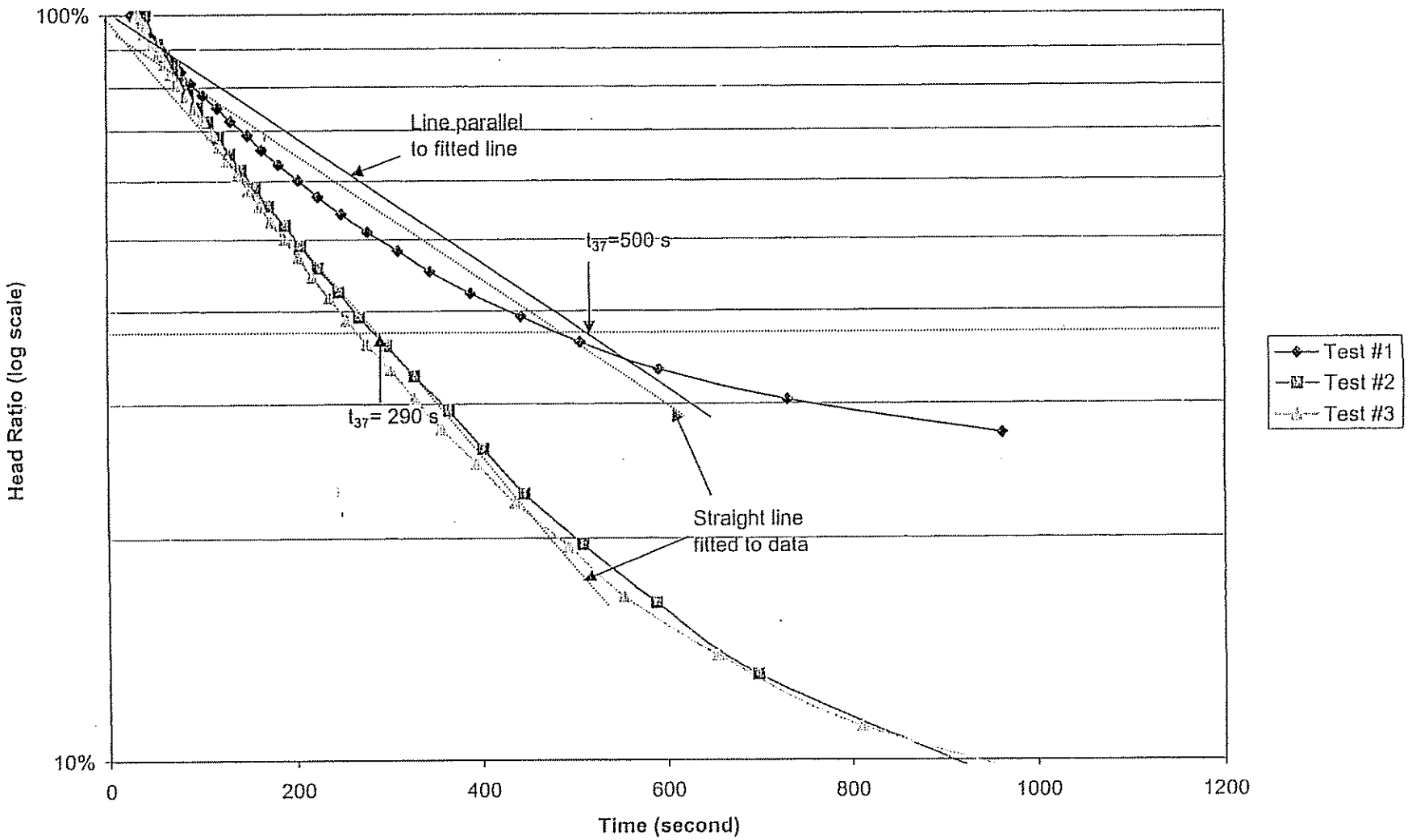
The Chazen Companies
11/26/2003

TCC-AMR-MW-5D



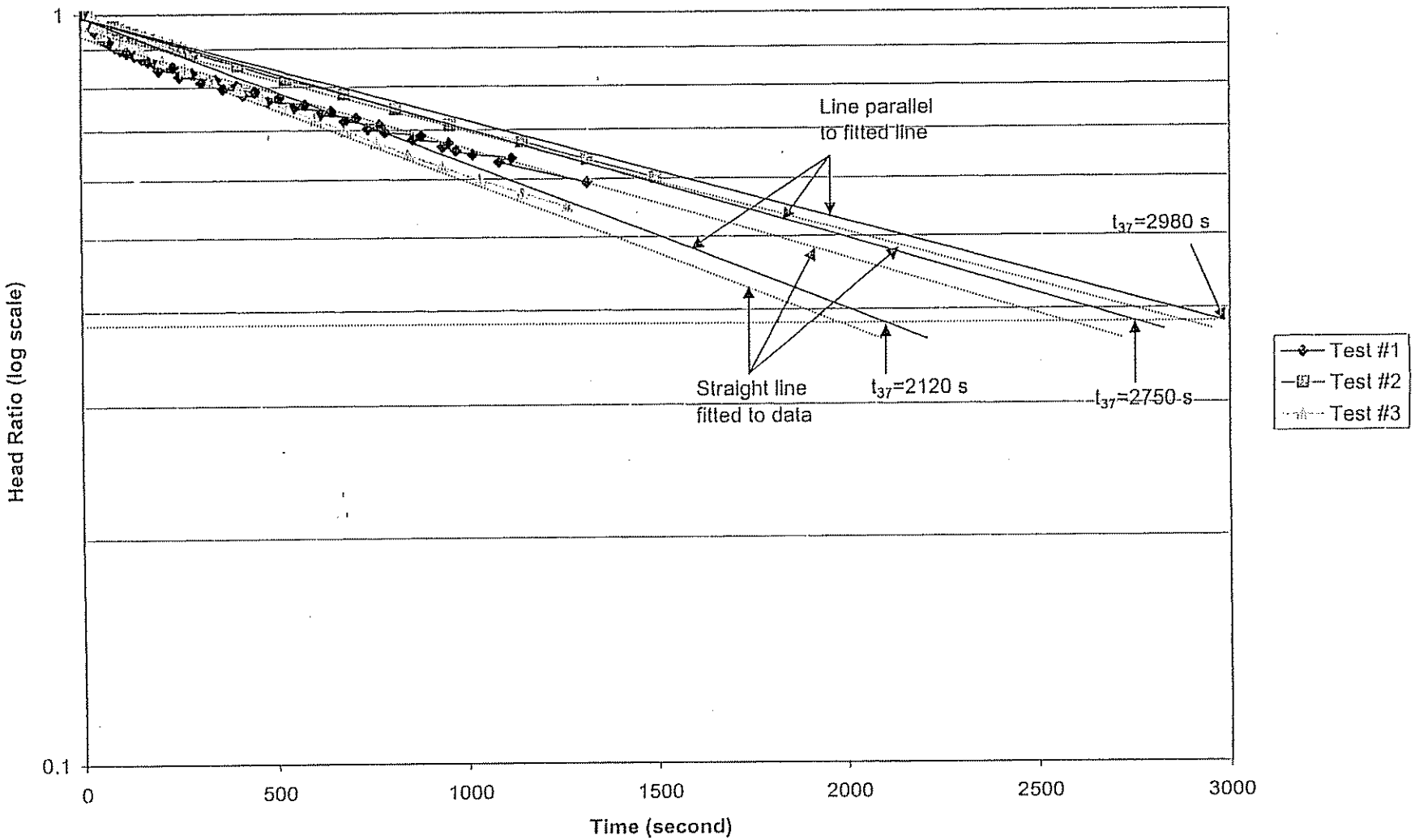
The Chazen Companies
11/26/2003

TCC-AMR-MW-5S



The Chazen Companies
11/26/2003

TCC-AMR-MW-6S



The Chazen Companies
11/26/2003

3 OCT 03.

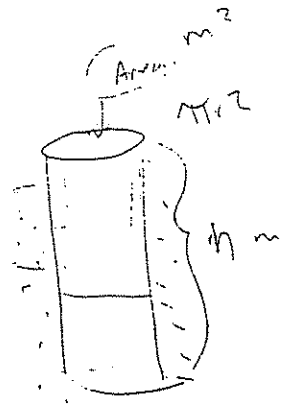
TCC-AMR-MW-1D Slug Test# 1

	Time (seconds)	Water Level (ft)
Water Added	0	19.46.
1 gallon.	4	
	20	17.65
	34	17.66
	44	17.67
	51	17.68
	1.00	17.69.
	1.10	17.70
	1.19.	17.72
	1.37	17.73
	1.40	17.74
	1.45	17.75
	1.56	17.76.
	2.05	17.77
	2.20	17.78
	2.35	17.79
	2.46	17.80
	2.54	17.81
	3.04	17.82
	3.16	17.83
	3.27	17.84
	3.39	17.85
	3.49	17.86
	4.00	17.87
	4.12	17.88
	4.23	17.89
	4.40	17.90
	4.52	17.91
	5.06	17.92
	5.14	17.93
	5.27	17.94
	5.41	17.95
	5.59	17.96
	6.15	17.97
	6.32	17.98
	6.48	17.99
	7.04	18.00
	7.16	18.01
	7.34	18.02
	7.51	18.03
	8.09	18.04
	8.32	18.05
	8.47	18.06
	9.13	18.07
	9.29	18.08
	9.46	18.09
	10.01	18.10
	10.25	18.11
	10.47	18.12

*0.367 ~~gal/foot~~

initial: 19.34'

Time	WL
10.55	18.13.
11.23	18.14
11.46	18.15
12.04	18.16.
12.25	18.17.
12.50	18.18
13.09.	18.19.
13.30	18.20
13.54.	18.21
14.18	18.22
14.45	18.23
15.05	18.24
15.35	18.25
15.55	18.26
16.22	18.27.
16.51	18.28
17.16.	18.29
17.40	18.30
18.10	18.31
18.39.	18.32 * 37%
19.07	18.33
19.36.	18.34
20.06.	18.35
20.39.	18.36.
21.03	18.37
21.45	18.38
22.14.	18.39
22.50	18.40
23.29.	18.41 → 18.41
	18.42
	18.43



$V = m^3$

$V = \pi r^2 h.$

17.51

19.46
17.65
1.81
1.81

1.81
2.37
12.67
5.430
.6797
17.65
18.32

TCC-AMR-MW-1D

Slug Test# 2

6 OCT 03

Water Added	Time	Water Level
1 gal	0	19.44.
	0.31	17.69
	1.46	17.78.
	2.04.	17.80
	2.51	17.85
	3.46	17.90
	4.57	17.95
	7.34	18.05
	8.52.	18. 10
	10.40.	18. 15
	12.23.	18. 20
	14.31	18. 25
	16.38	18.30
	18.45	18.35
	19.50.	18.37
	21.24	18.40

*0.367 gal/foot

1.75

0.65 x 17.69.

18.34.

TCC-AMR-MW-1D

Slug Test# 3

7OCT03.

	Time	Water Level
Water Added	0	19.50
1 gallon	0.34	17.50
	1.08	17.55
	1.75	17.60
	2.27	17.65
	3.12	17.70
	4.07	17.75
	5.05	17.80
	6.03	17.85
	7.21	17.90
	8.30	17.95
	9.95	18.00
	13.20	18.00
	14.57	18.15
	16.56	18.20
	19.05	18.25
	21.17	18.30
	23.57	18.35
	26.27	18.40

*0.367 gal/foot

0.74

18.24.

3 OCT 03

TCC-AMR-MW-1S

Slug Test# 1

	Time (min)	Water Level (ft).
Water Added	0	12.94
0.25 gallon	0.25	11.76.
	0.37	11.85
	0.40	11.87
	0.48	11.90.
	0.55	11.92.
	1.01	11.94.
	1.07	11.96
	1.16	11.98
	1.23	12.00
	1.29	12.02
	1.34	12.03
	1.38	12.04
	1.45	12.05
	1.50	12.06
	1.54	12.07
	1.58	12.08
	2.04	12.09
	2.08	12.10
	2.13	12.11
	2.25	12.13
	2.30	12.14
	2.36	12.15
	2.42	12.16.
	2.46	12.17
	2.52	12.18
	3.00	12.19
	3.06	12.20
	3.13	12.21
	3.20	12.22
	3.27	12.23
	3.34	12.24
	3.47	12.25
	3.50	12.26
	3.57	12.27
	4.06	12.28
	4.15	12.29
	4.23	12.30
	4.32	12.31
	4.39	12.32
	4.49	12.33
	5.00	12.34
	5.10	12.35
	5.19	12.36
	5.29	12.37
	5.43	12.38
	5.53	12.39
	6.04	12.40
	6.16.	12.41

*0.163 gal/foot

Time	WL
6.31	12.42
6.43	12.43
6.56	12.44
7.08	12.45
7.21	12.46
7.36	12.47
7.53	12.48
8.09	12.49
8.26	12.50

L

Bumps

12.94

− 11.76

1.18

× .37

0.4366

+ 11.76

12.20

TCC-AMR-MW-1S

Slug Test# 2

6 OCT 03.

*0.163 gal/foot

	Time	Water Level
Water Added	0	13.07
0.25 gal.	0.17	11.95
	0.23	12.00
	0.37	12.05
	0.44	12.10
	1.10	12.15
	1.32	12.20
	1.59	12.25
	2.28	12.30
	2.54.	12.35
	3.33	12.40
	4.16.	12.45
	5.00	12.50
	5.59.	12.55
	7.07	12.60

12.36

Test #3

7 OCT 03

gallon added = 0.25	0	13.07
	0.30	11.88
	0.35	11.90
	0.44	11.95
	1.00	12.00
	1.19	12.05
	1.39	12.10
	2.01	12.15
	2.26	12.20
	2.54	12.25
	3.23.	12.30.
	4.03	12.35
	4.45	12.40
	5.26	12.45
	6.14	12.50
	7.15	12.55
	8.25	12.60

12.37.

TCC-AMR-MW-2D

Slug Test# 1

~~3 OCT 03~~

	Time (minutes)	Water Level (ft)	Time	*0.367 gal/foot
Water Added	0	35.74	56.14	33.74
1 gallon	0.29	33.24	50.05	33.75
	3.52	33.25	54.30	33.76
	4.29	33.26	1 1.11	33.77
	5.06	33.27	1 2.27	33.78
	5.50	33.28	1 4.03	33.79
	6.31	33.29	1 5.25	33.80
	7.09	33.30	1 6.25	33.81
	8.11	33.31	1 9.09	33.82
	8.47	33.32	1 11.19	33.83
	10.20	33.34	1 12.51	33.84
	11.01	33.35	1 14.17	33.85
	11.52	33.36	1 16.05	33.86
	12.47	33.37	1	33.87
	13.27	33.38	1	33.88
	14.26	33.39		33.89
	15.40	33.40	1 23.12	33.90
	16.20	33.41		33.91
	17.07	33.42		33.92
	18.37	33.43		33.93
	19.02	33.44		33.94
	19.47	33.45	1 32.46	33.95
	21.15	33.46		33.96
	22.31	33.47		33.97
	23.02	33.48		33.98
	24.30	33.49		33.99
	25.24	33.50	1 41.50	34.00
	26.15	33.51		34.01
	27.37	33.52		34.02
	28.50	33.53		34.03
	29.41	33.54		34.04
	31.00	33.55	1 54.57	34.05
	31.55	33.56		34.06
	33.05	33.57		34.07
	33.57	33.58		34.08
	35.39	33.59	2 14.38	34.10
	36.53	33.60		34.11
	39.29	33.62		34.12
	40.53	33.63		34.13
	42.22	33.64		34.14
	43.11	33.65	2 31.55	34.15
	44.36	33.66	2 34.50	34.16
	46.02	33.67	2 37.37	34.17
	47.42	33.68		
	48.52	33.69		
	50.11	33.70		
	51.44	33.71		
	52.[illegible]	33.72		
	54.[illegible]	33.73		

35.74
− 33.24
2.5
> 0.37
0.925
+ 33.24
34.165

TCC-AMR-MW-2D

Slug Test# 2

6 OCT 03.

	Time	Water Level
Water Added	0	29.64.
0.5 gallon	0.37	28.42
	0.45	28.39.
	1302	28.44.
	1437.	28.72
	1752	28.75
	1505.	28.77

*0.367 gal/foot

0.47 + 28.42

28.89.

TCC-AMR-MW-2D

Slug Test# 3

7 OCT @3

	Time	Water Level
Water Added	0	29.42.
0.5 gallon.	0.48	28.08
clocktime →	1314	28.08
EST	1331	28.14.
1314 pm.	1425	28.33

1314 > no change

*0.367 gal/foot

TCC-AMR-MW-2S

Slug Test# 1
30 OCT 03

	Time	Water Level
Water Added	0	15.77

*0.163 gal/foot

Bottom is just mud.

TCC-AMR-MW-3D

Slug Test# 1

30 OCT 03.

	Time/minute	Water Level (ft)
Water Added	0	56.72
1 gallon	0.54	56.69

*0.367 gal/foot

Blockage in well preventing water level probe from dropping straight to desired depth. Water level recovered very quickly.

TCC-AMR-MW-3D

Slug Test# 2
6 OCT 03.

	Time	Water Level
Water Added	0	56.96.
1 gallon.	0.32	56.93
	1.02	56.95

*0.367 gal/foot

probe sticking to side wall in well.

TCC-AMR-MW-3D

Slug Test# 3

9 OCT 03.

	Time (min).	Water Level
Water Added	0	57.01
1 gal.	0.45	57.0

*0.367 gal/foot

TCC-AMR-MW-5D

Slug Test# 1

6 OCT 03.

	Time	Water Level
Water Added	0	41.40
1 gallon	0.33	41.58
	1.09	41.65
	1.22	41.67
	1.27	41.68.
	1.43	41.70.
	1.55	41.71
	2.05	41.72
	2.54	41.75
	3.07	41.76.
	3.26	41.77
	3.53	41.78
	4.20	41.79
	4.51	41.80
	5.31	41.81
	6.22	41.82
	7.35	41.83
	8.56	41.84
	10.42	41.85
	16.43	41.87.

*0.367 gal/foot

TCC-AMR-MW-5D

Slug Test# 2
7 OCT 03

	Time	Water Level
Water Added	0	42.00
1 gallon.	0.41	41.64
	1.05	41.75
	1.40	41.80
	2.38	41.85
	4.56	41.90
	10.11	41.95

*0.367 gal/foot

TCC-AMR-MW-5D

Slug Test# 3
7 OCT 03.

	Time	Water Level
Water Added	0	41.99
1 Gallon.	0.25	41.65
	0.34	41.70
	1.06	41.75
	1.44	41.80
	2.55	41.85
	5.19	41.90

*0.367 gal/foot

TCC-AMR-MW-5S

Slug Test# | 6 OCT 03.

Water Added	Time	Water Level
0.25 gal.	0	39.21
	0.27.	37.53.
	0.45	37.64
	0.52	37.67
	0.54.	37.76.
	1.10	37.75
	1.20	37.80
	1.30	37.85
	1.43	37.90
	1.58	37.95
	2.12	38.00
	2.30.	38.05
	2.45	38.10
	3.03	38.15
	3.24	38.20
	3.45	38.25
	4.10	38.30.
	4.38	38.35
	5.11	38.40
	5.45	38 45
	6.24	38.50
	7.23	38.55
	8.27	38.60
	9.52.	38.65
	12.11	38.70.
	16.02.	38.75

*0.163 gal/foot

39.21
37.53
1.68.

0.62 + 37.53
38.15

TCC-AMR-MW-5S Slug Test# 2

7OCT03

	Time (min)	Water Level (ft)
Water Added	0	39.00
0.25 gal	0.42	37.47
	0.55	37.60
	1.02	37.65
	1.13	37.70
	1.18	37.75
	1.27	37.80
	1.37	37.85
	1.48	37.90
	1.57	37.95
	2.11	38.00
	2.23	38.05
	2.38	38.10
	2.52	38.15
	3.10	38.20
	3.21	38.25
	3.45	38.30
	4.07	38.35
	4.29	38.40
	4.58	38.45
	5.28	38.50
	6.05	38.55
	6.42	38.60
	7.26	38.65
	8.29	38.70
	9.48	38.75
	11.38	38.80
	15.23	38.85
		38.

*0.163 gal/foot

TCC-AMR-MW-5S

Slug Test# 3

7 OCT 03

*0.163 gal/foot

	Time	Water Level
Water Added	0	39.00
0.25 gal.	0.33	37.20
	0.34	37.25
	0.48	37.30
	0.44	37.35
	0.57	37.40
	1.03	37.45
	1.09	37.50
	1.16	37.55
	1.26	37.60
	1.34	37.65
	1.42	37.70
	1.52	37.75
	2.00	37.80
	2.04	37.85
	2.19	37.90
	2.31	37.95
	2.43	38.00
	2.55	38.05
	3.09	38.10
	3.24	38.15
	3.34	38.20
	3.57	38.25
	4.16	38.30
	4.37	38.35
	5.02	38.40
	5.28	38.45
	5.57	38.50
	6.35	38.55
	7.16	38.60
	8.14	38.64
	9.13	38.70
	10.54	38.75
	13.30	38.80
	14.28	38.85
		38.90
		38.95

TCC-AMR-MW-6S Slug Test# /

30CT03

	Time	Water Level
Water Added	0	18.46.
0.25 gallon.	0.19	17.18
	0.30	17.23
	0.41	17.25
	0.57	17.27
	1.08	17.28
	1.17	17.29
	1.30	17.30
	1.44	17.31
	2.00	17.32
	2.20	17.33
	2.39	17.34
	2.54	17.35
	3.15	17.36
	3.37	17.37
	3.58	17.38
	4.22	17.39
	4.47	17.40
	5.15	17.41
	5.49	17.42
	6.11	17.43
	6.43	17.44
	7.08	17.45
	7.30	17.46
	8.00	17.47
	8.32	17.48
	9.04	17.49.
	9.40	17.50
	10.11	17.51
	10.49.	17.52.
	11.20	17.53
	11.54	17.54
	12.24	17.55
	12.55	17.56.
	13.25	17.57
	14.10	17.58
	14.44	17.59
	15.22	17.60
	15.57	17.61
	16.41	17.62
	17.16	17.63
	18.00	17.64
	18.42	17.65
		17.66
		17.67
		17.68
		17.69
	22.10	17.70

*0.163 gal/foot

0.474
+17.18
17.65

TCC-AMR-MW-6S

Slug Test# 2

6 OCT 03.

	Time	Water Level
Water Added	0	18.58
0.25 gallon		17.10.
	0.13	17.20.
	1.25	17.25
	1.38	17.26.
	1.53	17.27
	2.15	17.28
	2.35	17.29.
	2.56	17.30
	3.19	17.31
	3.44	17.32
	4.05	17.33.
	4.20	17.34
	4.47.	17.35
	6.40	17.40
	8.50	17.45
	11.22.	17.50
	13.37	17.55
	16.00	17.60.
	19.09.	17.65
	22.01.	17.70
	25.01	17.75

*0.163 gal/foot

17.65

TCC-AMR-MW-6S

Slug Test# 3

7 OCT 03

	Time (min)	Water Level
Water Added	0	18.66.
0.25 gal.	0.29	16.64.
	0.35.	16.70
	0.55	16.75
	1.38	16.80.
	2.34.	16.85
	3.30	16.90
	4.31	16.95
	5.38	17.00
	6.49	17.05
	7.48.	17.10
	8.55	17.15
	10.09	17.20
	11.28.	17.25
	12.47.	17.30
	14.11	17.35
	15.46	17.40.
	17.19	17.45
	19.09.	17.50
	21.09	17.55.

*0.163 gal/foot

16.64
.74
17.38

ATLANTIC TESTING LABORATORIES, Limited

Albany
22 Corporate Drive
Clifton Park, NY 12065
518/383-9144 (T)
518/383-9166 (F)

August 28, 2003

The Chazen Companies
20 Gurley Avenue
Troy, New York 12182

Attn: Mr. Craig D'Alliard

Re: Laboratory Test Results
Amsterdam Recycling Center
TCC Project No. 90303.00
ATL Report No. AT354SL-36-07-03

Ladies/Gentlemen:

On July 21, 2003, you delivered one Shelby Tube (TCC-AMR-A5) from Amsterdam, New York to our Clifton Park, New York facility for testing. A Natural Moisture Content test in accordance with ASTM D 2216; a Hydraulic Conductivity test in accordance with ASTM D 5084; and a One Dimensional Consolidation of Soil in accordance with ASTM D 2435 was performed on a sample cut from this Shelby Tube.

Natural Moisture Content
ASTM D 2216

Sample Identification	Percent Moisture
AT354S36	26.5

The Hydraulic Conductivity test and One Dimensional Consolidation test results are enclosed.

Please contact our office should you have any questions or if we may be of further service.

Respectfully,

Kristofer R. Miller, I.E.
Engineer

KRM/IJK/krm

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-36-07-03
ASTM D 5084

PROJECT INFORMATION

Client:	The Chazen Companies	Date:	July 25, 2003
Project:	Amsterdam Recycling Center	Delivered by:	Client
		Date Delivered:	July 21, 2003

SAMPLE INFORMATION

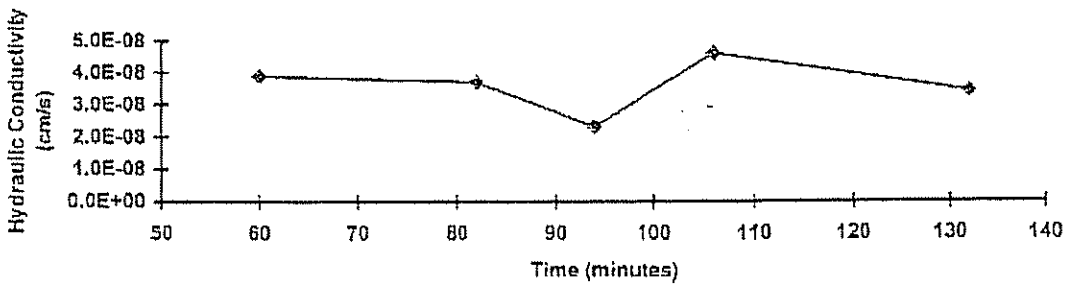
ATL Sample No.:	AT354S36
Sample Location:	On-site, TCC-AMR-A5
Soil Description:	Dark grey, stiff to soft, moist to wet CLAY (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.75	Sample Diameter (in.):	2.73	Permeant Liquid:	Water
Sample Height (in.):	3.50	Sample Height (in.):	3.49	B Value (%):	98
Moisture Content (%):	26.5	Moisture Content (%):	18.9		
Dry Unit Weight (pcf):	114.2	Dry Unit Weight (pcf):	116.2		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	3.6×10^{-8}

HYDRAULIC CONDUCTIVITY vs. TIME



REMARKS

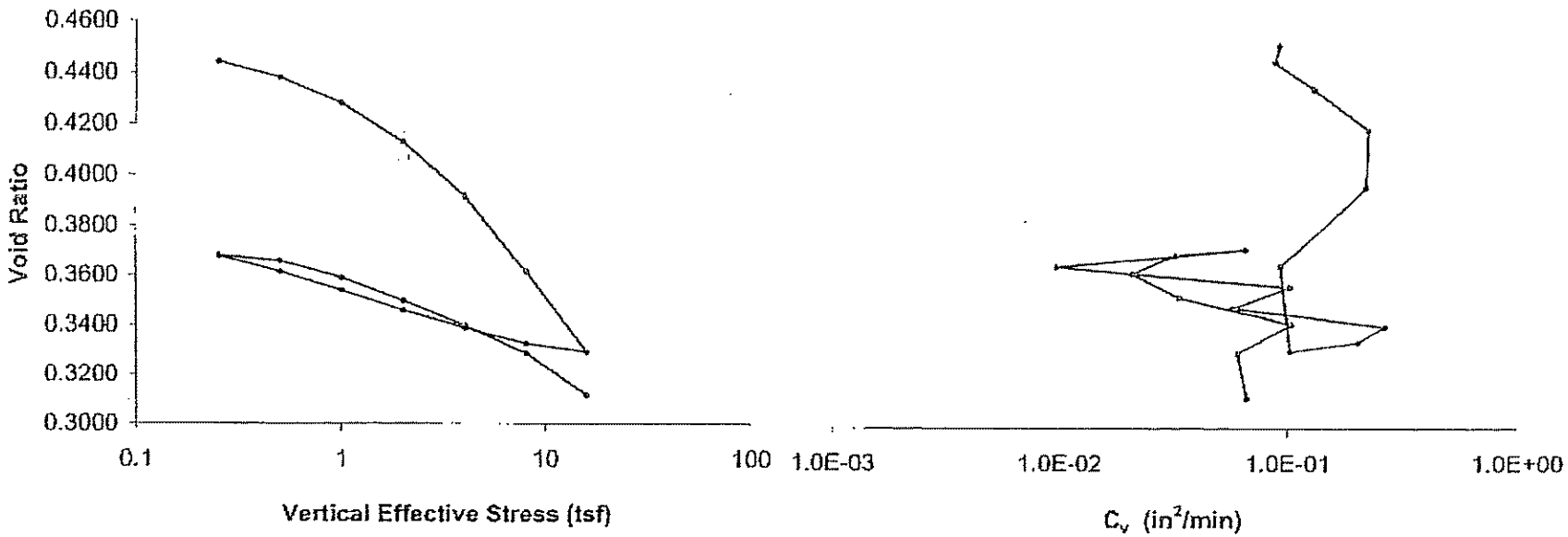
Reviewed By: Kurt Muller Date: 8/28/03

ATLANTIC TESTING LABORATORIES, Limited

ATL Report No. AT354SL-36-07-03
The Chazen Companies
Amsterdam Recycling Center

One-Dimensional Consolidation of Soil
ASTM D 2435
Void Ratio - Stress - Cv

ATL Sample No.: AT354S36



ATLANTIC TESTING LABORATORIES, Limited

Albany
22 Corporate Drive
Clifton Park, NY 12065
518/383-9144 (T)
518/383-9166 (F)

August 28, 2003

The Chazen Companies
20 Gurley Avenue
Troy, New York 12182

Attn: Mr. Craig D'Alliard

Re: Laboratory Test Results
Amsterdam Recycling Center
TCC Project No. 90303.00
ATL Report No. AT354SL-37-07-03

Ladies/Gentlemen:

On July 21, 2003, you delivered one Shelby Tube (TCC-AMR-A0) from Amsterdam, New York to our Clifton Park, New York facility for testing. A Natural Moisture Content test in accordance with ASTM D 2216; a Hydraulic Conductivity test in accordance with ASTM D 5084; and a One Dimensional Consolidation of Soil in accordance with ASTM D 2435 was performed on a sample cut from this Shelby Tube.

Natural Moisture Content
ASTM D 2216

Sample Identification	Percent Moisture
AT354S37	22.7

The Hydraulic Conductivity test and One Dimensional Consolidation test results are enclosed.

Please contact our office should you have any questions or if we may be of further service.

Respectfully,

Kristofer R. Miller, I.E.
Engineer

KRM/JJK/krm

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-37-07-03
ASTM D 5084

PROJECT INFORMATION

Client: The Chazen Companies
Project: Amsterdam Recycling Center

Date: July 25, 2003
Delivered by: Client
Date Delivered: July 21, 2003

SAMPLE INFORMATION

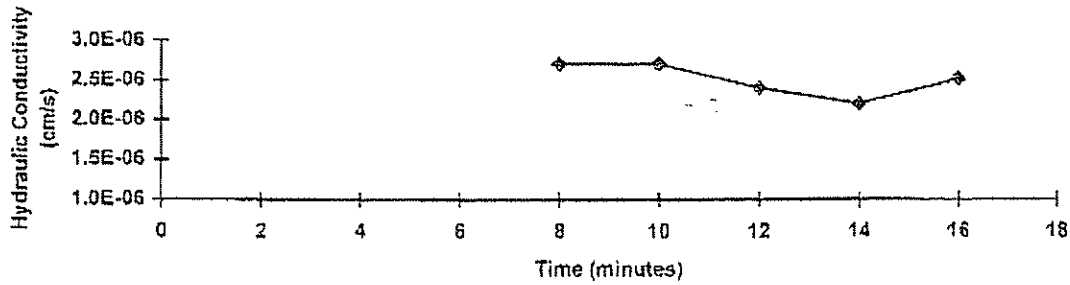
ATL Sample No.: AT354S37
Sample Location: On-site, TCC-AMR-A0
Soil Description: Light brown, stiff, dry/moist CLAY (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.83	Sample Diameter (in.):	2.85	Permeant Liquid:	Water
Sample Height (in.):	4.00	Sample Height (in.):	4.02	B Value (%):	98
Moisture Content (%):	22.7	Moisture Content (%):	26.9		
Dry Unit Weight (pcf):	98.3	Dry Unit Weight (pcf):	96.4		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	2.5×10^{-6}

HYDRAULIC CONDUCTIVITY vs. TIME



REMARKS

Reviewed By: [signature]

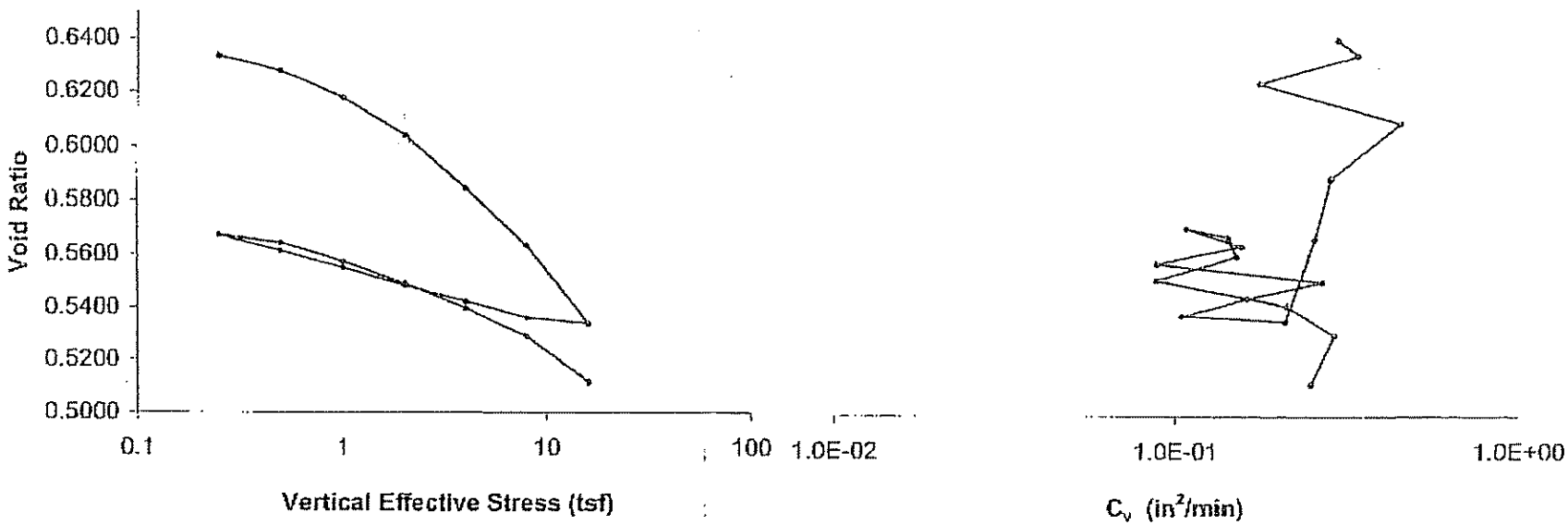
Date: 8/28/03

ATLANTIC TESTING LABORATORIES, Limited

ATL Report No. AT354SL-37-07-03
The Chazen Companies
Amsterdam Recycling Center

One-Dimensional Consolidation of Soil
ASTM D 2435
Void Ratio - Stress - Cv

ATL Sample No.: AT354S37



ATLANTIC TESTING LABORATORIES, Limited

Albany
22 Corporate Drive
Clifton Park, NY 12065
518/383-9144 (T)
518/383-9166 (F)

August 28, 2003

The Chazen Companies
20 Gurley Avenue
Troy, New York 12182

Attn: Mr. Craig D'Alliard

Re: Laboratory Test Results
Amsterdam Recycling Center
TCC Project No. 90303.00
ATL Report No. AT354SL-38-07-03

Ladies/Gentlemen:

On July 21, 2003, you delivered one Shelby Tube (TCC-AMR-B3) from Amsterdam, New York to our Clifton Park, New York facility for testing. A Natural Moisture Content test in accordance with ASTM D 2216; an Atterberg Limits test in accordance with ASTM D 4318; a Hydraulic Conductivity test in accordance with ASTM D 5084; and a Unconfined Compression test in accordance with ASTM D 2166 was performed on a sample cut from this Shelby Tube.

Natural Moisture Content
ASTM D 2216

Sample Identification	Percent Moisture
AT354S38	21.5

Atterberg Limits
ASTM D 4318

Sample Identification	Liquid Limit	Plastic Limit	Plasticity Index
AT354S38	31	14	17

The Hydraulic Conductivity test and Unconfined Compression test results are enclosed.

Please contact our office should you have any questions or if we may be of further service.

Respectfully,

Kristofer R. Miller, LE.
Engineer

KRM/JJK/kmm

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-38-07-03
ASTM D 5084

PROJECT INFORMATION

Client:	The Chazen Companies	Date:	July 25, 2003
Project:	Amsterdam Recycling Center	Delivered by:	Client
		Date Delivered:	July 21, 2003

SAMPLE INFORMATION

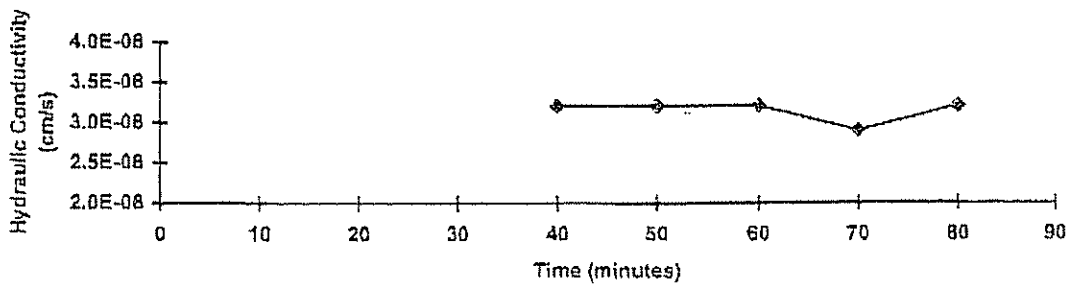
ATL Sample No.:	AT354S38
Sample Location:	On-site, TCC-AMR-B3
Soil Description:	Light grey, stiff, moist CLAY (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.83	Sample Diameter (in.):	2.84	Permeant Liquid:	Water
Sample Height (in.):	4.25	Sample Height (in.):	4.25	B Value (%):	98
Moisture Content (%):	21.5	Moisture Content (%):	22.7		
Dry Unit Weight (pcf):	111.7	Dry Unit Weight (pcf):	110.9		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	3.1×10^{-8}

HYDRAULIC CONDUCTIVITY vs. TIME



REMARKS

Reviewed By: Kristof Marsh Date: 8/28/03

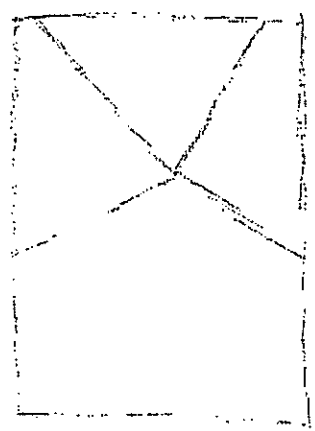
ATLANTIC TESTING LABORATORIES, Limited

Unconfined Compressive Strength of Cohesive Soils

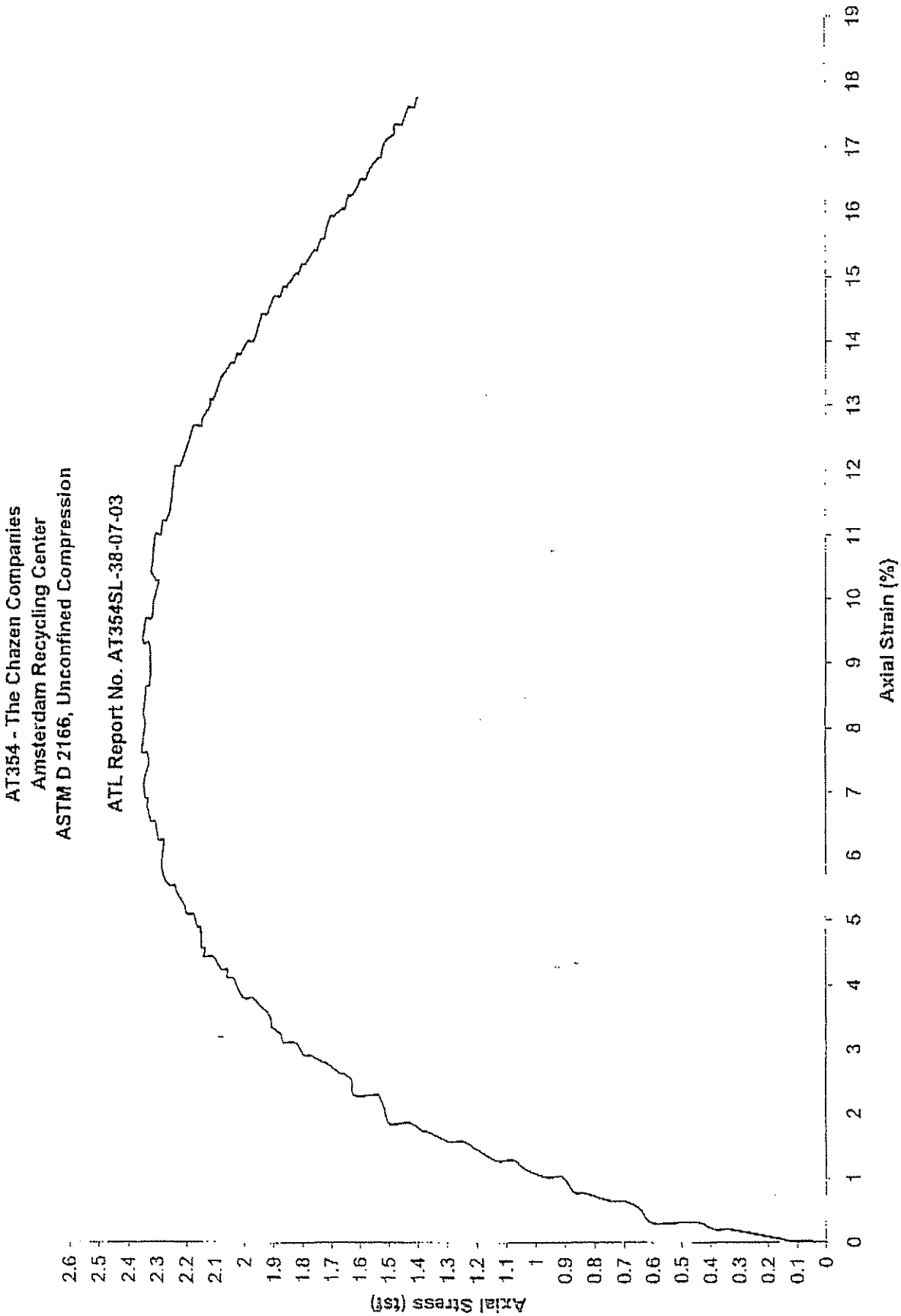
ASTM D 2166

ATL Report No. AT354SL-38-07-03

Client: The Chazen Companies
Project: Amsterdam Recycling Center
Client Sample ID: TCC-AMR-B3 **ATL Sample No.:** AT354S38

Sample Parameters	Results
Average Height (in.)	6.25
Average Diameter (in.)	2.875
Height-to-Diameter Ratio	2.17
Dry Density (pcf)	108.7
Water Content (%)	21.5
Test Parameters	
Average Strain Rate (% / min)	1.0
Test Summary	
Strain at Failure (%)	7.6
Compressive Strength (tsf)	2.36
Sketch at Failure	

Reviewed by: Kristof Miller Date: 8/28/03


AT354 - The Chazen Companies
Amsterdam Recycling Center
ASTM D 2166, Unconfined Compression
ATL Report No. AT354SL-38-07-03
Axial Stress (tsf)
Axial Strain (%)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
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ATLANTIC TESTING LABORATORIES, Limited

Albany
22 Corporate Drive
Clifton Park, NY 12065
518/383-9144 (T)
518/383-9166 (F)

TRANSMITTAL

July 21, 2003

The Chazen Companies
20 Gurley Avenue
Troy, New York 12182

Attn: Mr. Craig D'Alliard

Re: Laboratory Analysis
Amsterdam Recycling Center
TCC Project No. 90303.00
ATL Project No. AT354

Ladies/Gentlemen:

Enclosed please find the following reports:-

AT354SL-32-07-03	Laboratory Compaction Test Atterberg Limits Hydraulic Conductivity Test (remolded)	(July 3, 2003)
AT354SL-33-07-03	Laboratory Compaction Test Atterberg Limits Hydraulic Conductivity Test (remolded)	(July 3, 2003)
AT354SL-34-07-03	Laboratory Compaction Test Atterberg Limits Hydraulic Conductivity Test (remolded)	(July 3, 2003)
AT354SL-35-07-03	Laboratory Compaction Test Atterberg Limits Hydraulic Conductivity Test (remolded)	(July 3, 2003)

Please contact our office should you have any questions or if we may be of further service.

Sincerely,
ATLANTIC TESTING LABORATORIES, LTD.

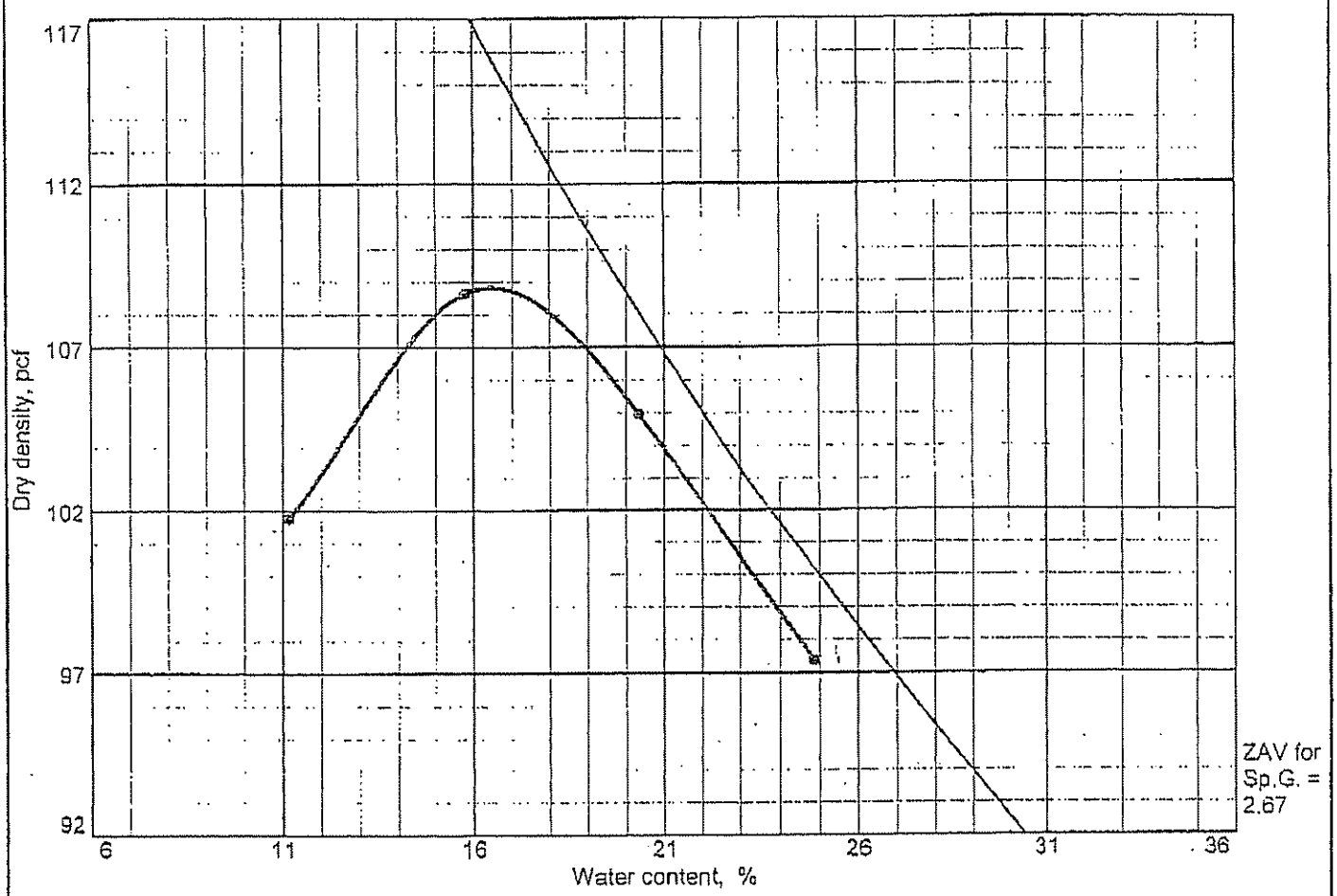
Kristofer R. Miller, I.E.
Engineer

KRM/krm

Enclosures

ATLANTIC TESTING LABORATORIES, Limited

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification USCS	Classification AASHTO	Received Moist.	Sp.G.	LL	PL	PI	% > No.4
5-8'				2.67	34	16	18	0.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.8 pcf Optimum moisture = 16.4 %	Brown CLAY, some SILT, trace fine SAND (Visual Description)

Report No.: AT354SL-32-07-03 **Client:** The Chazen Companies
Project: Amsterdam Recycling Center (TCC Job No. 90303.00)
Sample No.: AT354532 **Source of Sample:** Amsterdam, New York
Location: TP-1 **Date:** 7/9/03

COMPACTION TEST REPORT

ATLANTIC TESTING LABORATORIES, LIMITED

Remarks:
Sample delivered by Client on 7/3/03
Sample preparation method: Dry

Rammer: Manual
Specific Gravity: Assumed

Reviewed by: _____ Date: 7/21/03

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-32-07-03
ASTM D 5084

PROJECT INFORMATION

Client:	The Chazen Companies	Date:	July 18, 2003
Project:	Amsterdam Recycling Center	Delivered by:	Client
		Date Delivered:	July 3, 2003

SAMPLE INFORMATION

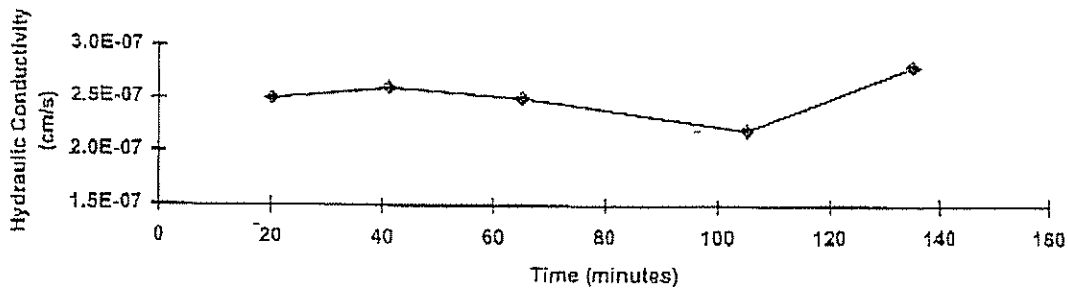
ATL Sample No.:	AT354S32
Sample Location:	On-site, TP-1, 5-8'
Soil Description:	Brown CLAY, some SILT, trace fine SAND (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.875	Sample Diameter (in.):	2.875	Permeant Liquid:	Water
Sample Height (in.):	5.0	Sample Height (in.):	5.0	B Value (%):	98
Moisture Content (%):	16.4	Moisture Content (%):	20.1		
Dry Unit Weight (pcf):	103.4	Dry Unit Weight (pcf):	102.4		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	2.5×10^{-7}

HYDRAULIC CONDUCTIVITY vs. TIME

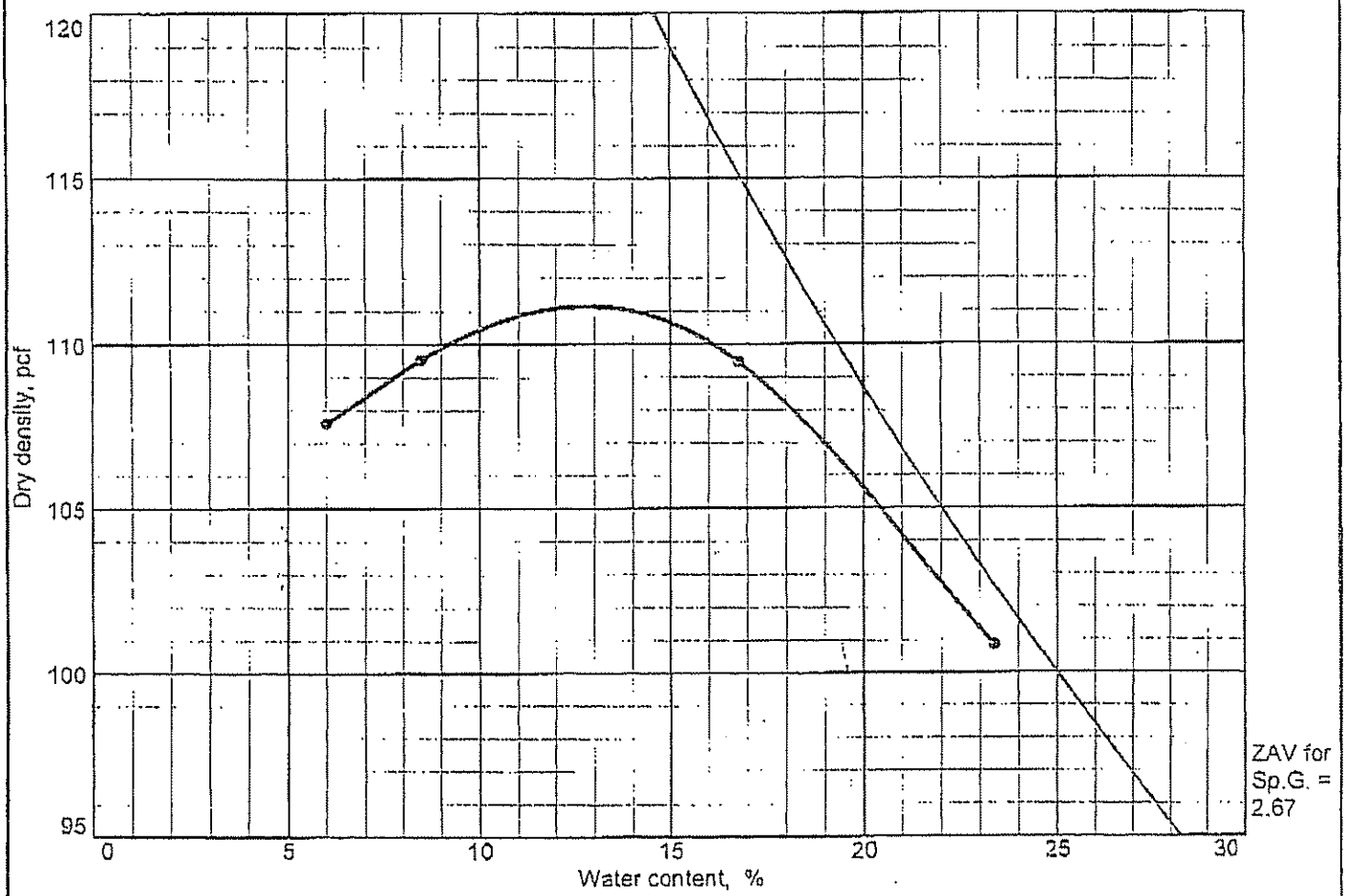


REMARKS

Reviewed By: Kristofer Miller Date: 7/21/03

ATLANTIC TESTING LABORATORIES, Limited

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification USCS	Classification AASHTO	Received Moist.	Sp.G.	LL	PL	PI	% > No.4
18-21'				2.67	25	13	12	0.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 111.1 pcf Optimum moisture = 12.8 %	Grey CLAY, little SILT (Visual Description)

Report No.: AT354SL-33-07-03 **Client:** The Chazen Companies
Project: Amsterdam Recycling Center (TCC Job No. 90303.00)
Sample No.: AT354533 **Source of Sample:** Amsterdam, New York
Location: TP-1 **Date:** 7/10/03

COMPACTION TEST REPORT

ATLANTIC TESTING LABORATORIES, LIMITED

Remarks:
Sample delivered by Client on 7/3/03
Sample preparation method: Dry

Rammer: Manual
Specific Gravity: Assumed

Reviewed by: _____ Date: 7/21/03

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-33-07-03

ASTM D 5084

PROJECT INFORMATION

Client:	The Chazen Companies	Date:	July 18, 2003
Project:	Amsterdam Recycling Center	Delivered by:	Client
		Date Delivered:	July 3, 2003

SAMPLE INFORMATION

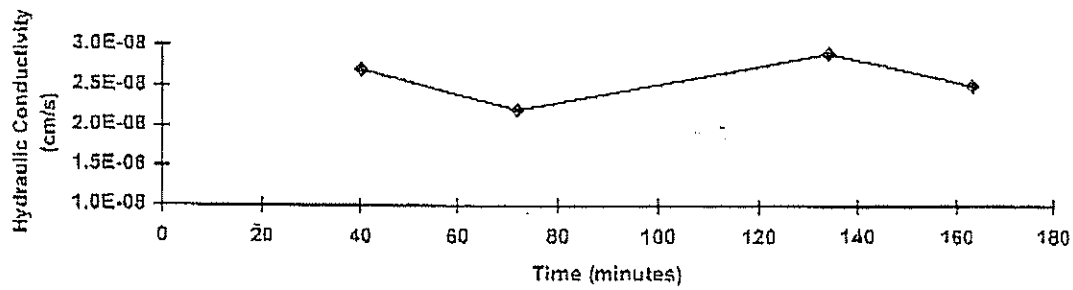
ATL Sample No.:	AT354S33
Sample Location:	On-site, TP-1, 18-21'
Soil Description:	Grey CLAY, little SILT (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.875	Sample Diameter (in.):	2.875	Permeant Liquid:	Water
Sample Height (in.):	5.0	Sample Height (in.):	5.0	B Value (%):	98
Moisture Content (%):	12.8	Moisture Content (%):	12.9		
Dry Unit Weight (pcf):	105.5	Dry Unit Weight (pcf):	105.9		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	2.6×10^{-8}

HYDRAULIC CONDUCTIVITY vs. TIME

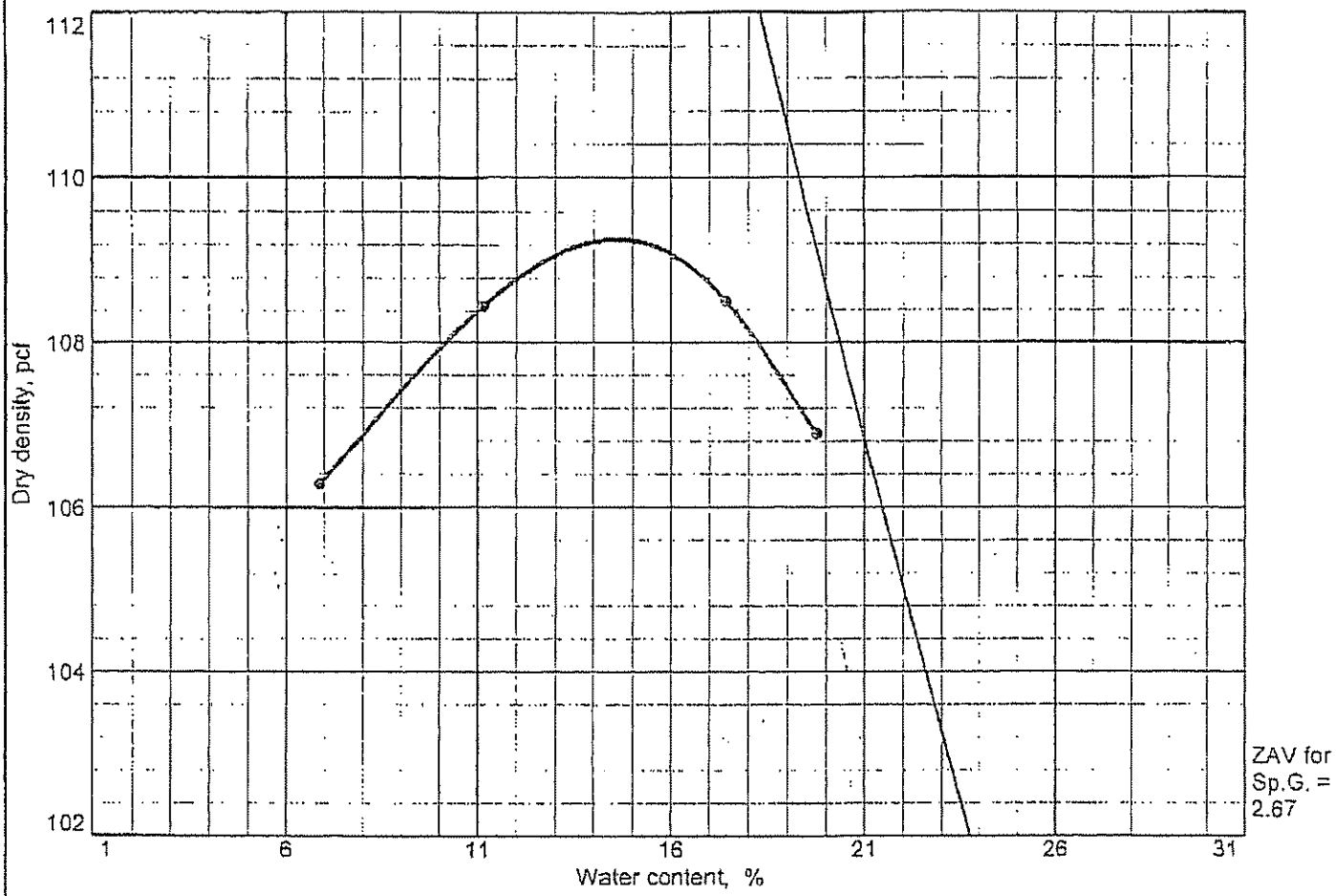


REMARKS

Reviewed By: Kristof Muller Date: 7/21/03

ATLANTIC TESTING LABORATORIES, Limited

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Received Moist.	Sp.G.	LL	PL	PI	% > No.4
	USCS	AASHTO						
7-9'				2.67	34	17	17	0.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 109.3 pcf Optimum moisture = 14.6 %	Brown CLAY, some SILT, trace fine SAND (Visual Description)

Report No.: AT354SL-34-07-03 Client: The Chazen Companies
Project: Amsterdam Recycling Center (TCC Job No. 90303.00)
Sample No.: Source of Sample: Amsterdam, New York
Location: TP-2 Date: 7/10/03

COMPACTION TEST REPORT

ATLANTIC TESTING LABORATORIES, LIMITED

Remarks:
Sample delivered by Client on 7/3/03
Sample preparation method: Dry

Rammer: Manual
Specific Gravity: Assumed

Reviewed by: Kristof Miller Date: 7/21/03

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-34-07-03
ASTM D 5084

PROJECT INFORMATION

Client:	The Chazen Companies	Date:	July 18, 2003
Project:	Amsterdam Recycling Center	Delivered by:	Client
		Date Delivered:	July 3, 2003

SAMPLE INFORMATION

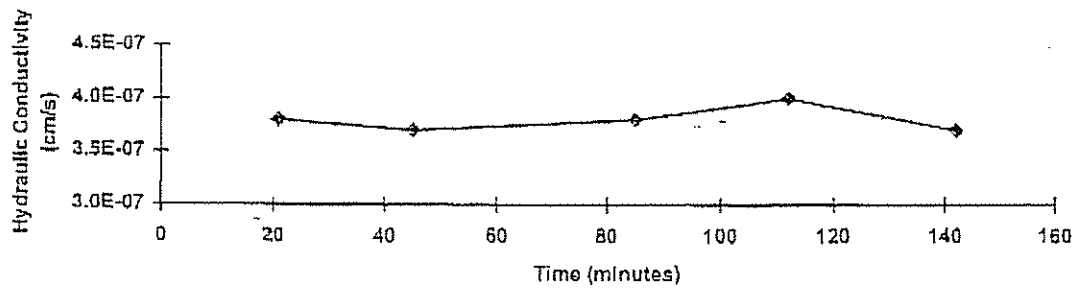
ATL Sample No.:	AT354S34
Sample Location:	On-site, TP-2, 7-9'
Soil Description:	Brown CLAY, some SILT, trace fine SAND (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.875	Sample Diameter (in.):	2.875	Permeant Liquid:	Water
Sample Height (in.):	5.0	Sample Height (in.):	5.0	B Value (%):	98
Moisture Content (%):	14.6	Moisture Content (%):	20.5		
Dry Unit Weight (pcf):	103.8	Dry Unit Weight (pcf):	104.2		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	3.8×10^{-7}

HYDRAULIC CONDUCTIVITY vs. TIME

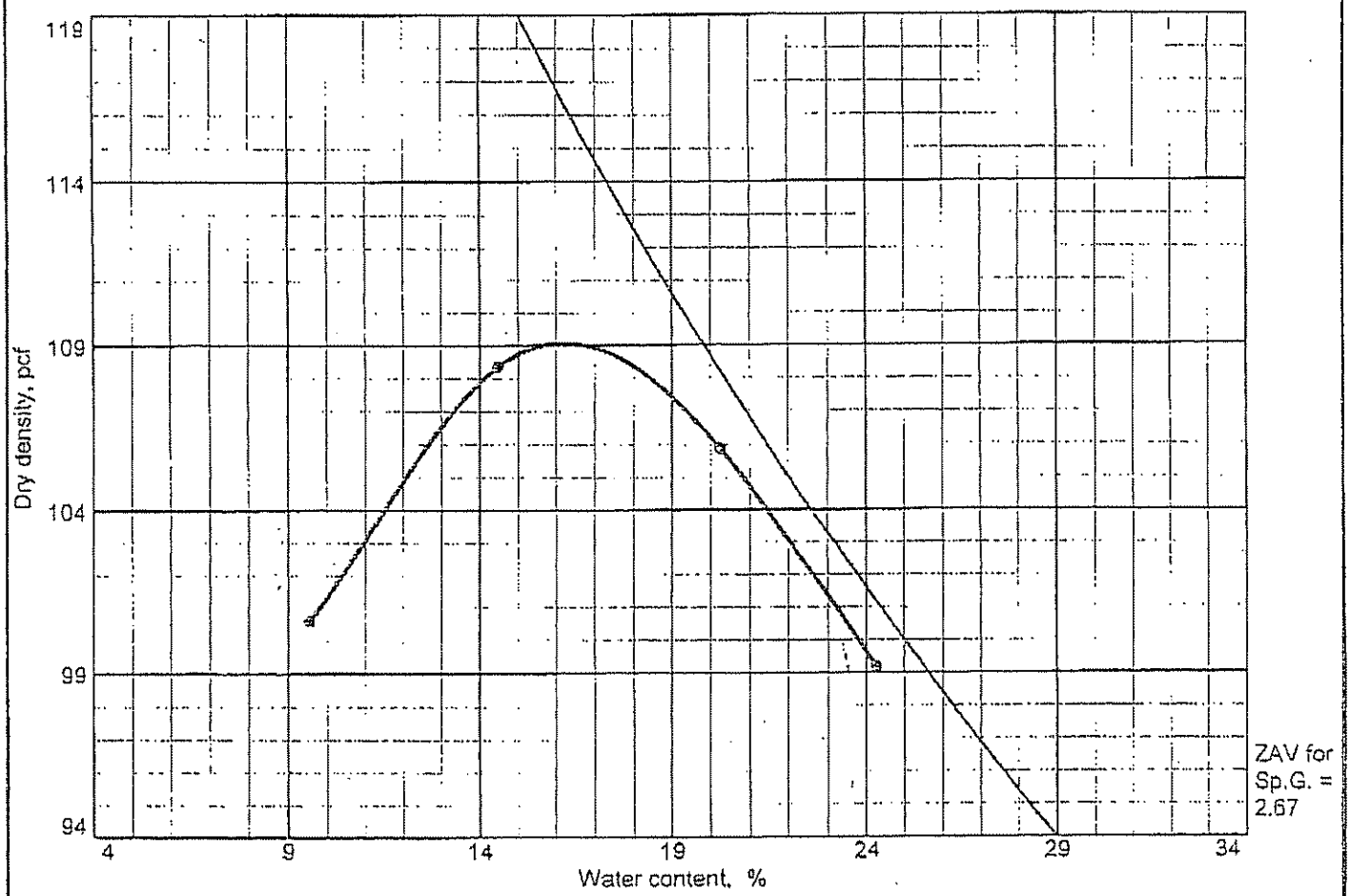


REMARKS

Reviewed By: [signature] Date: 7/21/03

ATLANTIC TESTING LABORATORIES, Limited

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method A Standard

Elev/ Depth	Classification		Received Moist.	Sp.G.	LL	PL	PI	% > No.4
	USCS	AASHTO						
14-16'				2.67	32	16	16	0.0

TEST RESULTS

Maximum dry density = 109.1 pcf

Optimum moisture = 16.2 %

MATERIAL DESCRIPTION

Grey CLAY, little SILT (Visual Description)

Report No.: AT354SL-35-07-03 **Client:** The Chazen Companies

Project: Amsterdam Recycling Center (TCC Job No. 90303.00)

Sample No.: AT354S35 **Source of Sample:**

Location: TP-2 **Date:** 7/9/03

COMPACTION TEST REPORT

ATLANTIC TESTING LABORATORIES, LIMITED

Remarks:

Sample delivered by Client on 7/3/03
Sample preparation method: Dry

Rammer: Manual

Specific Gravity: Assumed

Reviewed by: _____ Date: 7/21/03

ATLANTIC TESTING LABORATORIES, *Limited*

HYDRAULIC CONDUCTIVITY TEST REPORT NO. AT354S-35-07-03
ASTM D 5084

PROJECT INFORMATION

Client:	The Chazen Companies	Date:	July 18, 2003
Project:	Amsterdam Recycling Center	Delivered by:	Client
		Date Delivered:	July 3, 2003

SAMPLE INFORMATION

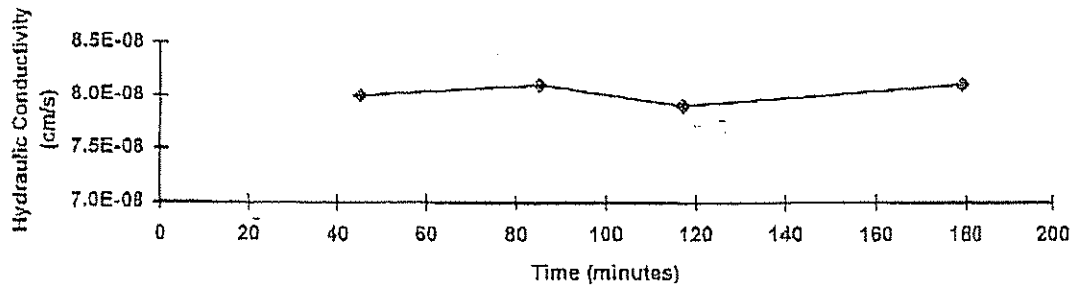
ATL Sample No.:	AT354S35
Sample Location:	On-site, TP-2, 14-16'
Soil Description:	Grey CLAY, little SILT (Visual Description)

INITIAL		FINAL		PARAMETERS	
Sample Diameter (in.):	2.875	Sample Diameter (in.):	2.875	Permeant Liquid:	Water
Sample Height (in.):	5.0	Sample Height (in.):	5.0	B Value (%):	98
Moisture Content (%):	16.2	Moisture Content (%):	18.7		
Dry Unit Weight (pcf):	103.6	Dry Unit Weight (pcf):	104.0		

TEST DATA

Back Pressure (psi)	Confining Pressure (psi)	Maximum Effective Stress (psi)	Minimum Effective Stress (psi)	Range of Hydraulic Gradient (psi)	Average K (cm/sec)
50.0	5.0	6.0	4.0	2.0	8.0×10^{-7}

HYDRAULIC CONDUCTIVITY vs. TIME



REMARKS

Reviewed By: _____ Date: 7/21/03

Appendix E:
Groundwater Flux Calculations into the Proposed Landfill Profile

The *Chazen* Companies
December 2003

Estimation of Groundwater Flux Through the Landfill Profile

Seepage Area Calculation (A)

Length of Topographic Contour Intersecting Water Table (L)	Saturated Thickness* (b)	Cross-Sectional Area of Seepage (A = L * b)
1,300 ft	40 ft	52,000 ft^2

Estimation of Hydraulic Conductivity (k)

Slug Testing Results from Overburden Wells**

Well	*k (ft/day)*	*Average k (ft/day)*
TCC-AMR-MW-1S	$1.28 * 10^{-1}$	
TCC-AMR-MW-5S	$2.58 * 10^{-1}$	$1.40 * 10^{-1}$
TCC-AMR-MW-6S	$3.50 * 10^{-2}$	

Estimation of Hydraulic Gradient (dh/dl)

dh	*dl (ft)*	*dh/dl*
-80	900	-0.0889

Flux Rate Calculation: Q=-k(A)(dh/dl)

k (ft/day)	*A (ft^2)*	*(dh/dl)*	*Q (ft^3/day)*	*Q (gpm)*
$1.40 * 10^{-1}$	52,000	-0.0889	647	3.36

* Approximate vertical section of overburden and bedrock to be exposed across north excavation wall prior to waste emplacement. Highest observed water level is approximately 390 ft amsl, down to the average bottom elevation of 350 feet amsl.

** values from Table 2. conversion of cm/sec to ft/day: 1 cm/sec = 2835 ft/day. Slug test data used rather than shelby tube data since slug tests represent a higher permeability, and thus more conservative estimate, than shelby data.

A seepage velocity value is not calculated since net flux is of interest rather than seepage velocity. All estimates of groundwater flux may be revised if any significant groundwater fractures are encountered within the bedrock formation during site grading.

C

Appendix C
Stormwater Management Plan

VOLUME 1 OF 2

Volume 1 of 2

Storm Water Pollution Prevention Plan
For

Amsterdam Materials Recycling

East Main Street

City of Amsterdam
Montgomery County, New York

December 1, 2003

THE Chazen COMPANIES

Prepared for:

Amsterdam Materials Recycling
20 Gurley Avenue
Troy, NY 12186
PH (518) 272-8142

Project No. 90303.00

©2003 The Chazen Companies

Storm Water Pollution Prevention Plan
For

Amsterdam Materials Recycling

East Main Street

City of Amsterdam
Montgomery County, New York

December 1, 2003

THE Chazen COMPANIES

Prepared by:

The Capital District Office
The Chazen Companies
20 Gurley Avenue
Troy, NY 12182
(518) 235-8050

Prepared for:

Amsterdam Materials Recycling
20 Gurley Avenue
Troy, NY 12186
PH (518) 272-8142

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Appendix E: Contractor's Certification Form

Appendix F: Inspection Report (Sample Form)

Appendix G: Modification Report

Appendix H: Record of Stabilization and Construction Activity Dates

Appendix I: Notice of Termination (NOT)

VOLUME 2

Appendix J: HydroCAD Documentation

Appendix K: Existing Drainage Conditions

Existing Conditions Plan (Pocket)

Up-Gradient Watershed Delineation Map (Pocket)

Storm Water Computations
- 1-Year 24-Hour Storm Event
- 2-Year 24-Hour Storm Event
- 10-Year 24-Hour Storm Event
- 25-Year 24-Hour Storm Event
- 50-Year 24-Hour Storm Event
- 100-Year 24-Hour Storm Event

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Volume 2 (cont.)

Appendix L: Proposed Drainage Conditions – Phase 1

Proposed Conditions Plan – Phase 1 (Pocket)

Storm Water Computations
- 1-Year 24-Hour Storm Event
- 2-Year 24-Hour Storm Event
- 10-Year 24-Hour Storm Event
- 25-Year 24-Hour Storm Event
- 50-Year 24-Hour Storm Event
- 100-Year 24-Hour Storm Event

Appendix M: Proposed Drainage Conditions – Phase 2

Proposed Conditions Plan – Phase 2 (Pocket)

Storm Water Computations
- 1-Year 24-Hour Storm Event
- 2-Year 24-Hour Storm Event
- 10-Year 24-Hour Storm Event
- 25-Year 24-Hour Storm Event
- 50-Year 24-Hour Storm Event
- 100-Year 24-Hour Storm Event

Appendix N: Storm Water Quantity and Quality Control Component(s) Design Calculations

Appendix O: Inspections and System Maintenance After Construction (Pocket)

1.0 EXECUTIVE SUMMARY

This SWPPP has been prepared for major activities associated development of a construction material recycling and disposal facility in the City of Amsterdam, Montgomery County, New York. A site location map has been included in Appendix A.

This Storm Water Pollution Prevention Plan (SWPPP) has been prepared in response to the Environmental Protection Agencies (EPA) and New York State Department of Environmental Conservation (NYSDEC) Phase II Stormwater Regulation, effective March 10, 2003. The general contractor, and all subcontractors involved with construction activity that disturb site soil or who implement pollutant control measures identified in this Storm Water Pollution Prevention Plan (SWPPP) are responsible for complying with the requirements set forth in the National Discharge Elimination System (NPDES) General Permit, NYSDEC, SPDES Permit GP-02-01 and any local governing agencies having jurisdiction with regards to erosion and sediment control. A copy of the SPDES General Permit GP-02-01 is presented in Appendix B. The proposed Sediment and Erosion Control Plan is included in Appendix C. The requirements of the NPDES are as follows:

1. The Owner must sign the Notice of Intent (NOI) presented in Appendix D, and forward to the following agencies at least 5 (five) days prior to starting any construction activities.

   NYS Department of Environmental Conservation
   Division of Water
   625 Broadway
   Albany, New York 12233
   (800) 952-2490

   Michael Palmer, P.E.
   City of Amsterdam Engineer
   City Hall
   61 Church Street
   Amsterdam, NY 12010
   (518) 841-4331

2. The contractor shall send all notifications via certified mail with return receipt. Copies of mailing receipts shall be kept on record at the project site with the SWPPP and shall be considered part of the contract documents.

3. The Contractor shall hold a pre-construction conference at the site with the, Owner and its qualified inspector, NYSDEC, and the City of Amsterdam

representatives at least one week prior to commencement of construction. The contractor shall provide copies of the SWPPP to the Owner, the Engineer, and the City of Amsterdam once all signatures and attachments are complete.

4. A copy of the Notice of Intent (NOI) and a description of the project must be posted in a prominent place for public viewing at the project site.

5. A complete copy of the SWPPP, including copies of all inspection reports, plan revisions, etc., must be retained at the project site at all times during working hours and kept as part of the permanent project records for a duration no less than three years following submission of the Notice of Termination (NOT).

6. The general contractor must provide names and addresses of all subcontractors working on the project who will be involved with the major construction activities that will result in soil disturbance. This information must be retained as part of the SWPPP.

7. The general contractor and all subcontractors involved with construction activities that disturb site soil must sign a copy of the certification statement included in Appendix E.

8. Regular inspections must be made by a qualified professional to determine the effectiveness of the SWPPP. It should be modified as needed to prevent pollutants from discharging from the site. The inspector must be a person familiar with the site, the nature of the major construction activities, and qualified to evaluate both overall system performance and individual component performance. Additionally, the inspector must either be someone empowered to implement modifications to the SWPPP and the pollutant control devices, if needed, in order to increase effectiveness to an acceptable level, or someone with the authority to cause such events to happen. A summary of the construction phase inspections and system maintenance requirements are presented in Appendix O.

9. This SWPPP must be updated each time there is a significant modification to the pollutant prevention system or a change of contractors working on the project who may disturb site soil. The general contractor must notify the governing agency(s) as soon as these modifications are implemented.

10. Discharge of oil or other hazardous substances into the storm water is subject to reporting and cleanup requirements. Refer to Part III.B of the NPDES General Permit for additional information.

11. Once the site reaches final stabilization, the site inspector must complete and submit a Notice of Termination (NOT). A blank form is included as Appendix I.

12. This SWPPP intends to control water-borne and liquid pollutant discharges by some combination of interception, filtration, and containment. The general contractor and subcontractors implementing this SWPPP must remain alert to the need to periodically refine and amend the SWPPP in order to accomplish the intended goals.

13. This SWPPP must be amended as necessary during the course of construction in order to keep it current with the pollutant control measures utilized at the site. Amending the SWPPP does not mean that it has to be reprinted. It is acceptable to add addenda, sketches, new sections, and/or revised drawings.

14. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated must be maintained until the NOT is filed. A log for keeping such records is presented in Appendix H. A different form for the log may be substituted if it is found to be more useful.

15. Regular inspections by the owner should continue post-construction to ensure the pollutant control devices are adequate and the storm water management system is maintained and operating properly. A summary of the post-construction inspections and system maintenance requirements are presented in Appendix P.

2.0 INTRODUCTION

The Chazen Companies have completed a Storm Water Management Plan for major activities associated with the development of a construction material recycling and disposal facility in the City of Amsterdam, Montgomery County, New York. Amsterdam Recycling Material, L.L.C., proposes to develop a construction material recycling and disposal facility on an existing industrial park owned by the Amsterdam Industrial Development Agency (AIDA). A site location map has been included in Appendix A.

The project site is an irregularly shaped 40.1 (±) acre undeveloped property currently owned by the Amsterdam Industrial Development Agency (AIDA) located within the Edson Street Industrial Park. Generally, the project site is located south of Sam Stratton Drive (an internal road within the industrial park) and north of East Main Street. The project is bound by an unnamed stream to the west and contains approximately 275-feet of frontage along East Main Street. The central site area is traversed by a 100-foot wide Niagara Mohawk overhead power line transmission easement which comprises approximately 2.5-acres of the project site.

The analysis included the review of watershed conditions, a hydrologic and hydraulic analysis using computer modeling and an evaluation of the proposed improvements across the subject site. This report is intended to document the proposed storm water management plan associated with the proposed development. This report includes a discussion of the initial construction sediment and erosion control measures to be implemented at the site, as well as a description of the storm water management plan to be implemented during the operation of the landfill and following the closure of the landfill. Phase 1 involves the construction of the storm water management facilities that are to be utilized during the construction/operation of the landfill. Phase 2 involves the construction of the storm water management facilities that are to remain in place following the closure of the landfill.

This SWPPP includes the elements necessary to comply with the national baseline general permit for construction activities administered by the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program and local governing agency requirements. This SWPPP must be implemented at the start of construction.

Construction phase pollutant sources anticipated at the site are disturbed (bare) soil, vehicle fuels and lubricants, chemicals associated with building construction, and building materials. Without adequate control there is the potential for each type of pollutant to be transported by storm water.

Project construction will primarily consist of site grading, paving, storm drainage, water supply and sewage collection to facilitate the development of the materials recycling center and landfill.

This report considers the impacts associated with the intended development with the purpose of:

1. Maintaining existing drainage patterns as much as possible while continuing the conveyance of upland watershed run-off;

2. Controlling increases in storm water run-off resulting from the proposed development without adversely altering downstream conditions; and

3. Mitigating potential storm water quality impacts and preventing soil erosion and sedimentation resulting from storm water run-off both during and after construction and upon completion.

To demonstrate this, existing and proposed storm water run-off conditions were estimated and proposed storm water management facilities have been described and evaluated.

The hydrologic and hydraulic analyses were completed in accordance with the following standards and guides: the "New York State Stormwater Management Design Manual" (Dated October, 2001); the "New York State Department of Environmental Conservation - Reducing the Impacts of Stormwater Runoff From New Development" and the "New York State Guidelines for Urban Erosion and Sediment Control" (1997).

This SWPPP and associated engineering drawings have been submitted as an accompanying plan set entitled "Amsterdam Materials Recycling." References made to "the plans" or to a specific "sheet" refer to these drawings.

The analysis and design completed and documented in this report is intended to be part of the application made for the development proposed by Amsterdam Materials Recycling, LLC. located at 20 Gurley Avenue, Troy, New York.

3.0 METHODOLOGY

The methodology used for the hydrologic and hydraulic analysis was obtained from the United States Department of Agriculture (USDA) Soil Conservation Service's (SCS) Technical Release No. 20, as utilized by the application program HydroCAD. HydroCAD, developed by Applied Microcomputer Systems of Chocorua, New Hampshire, is a Computer-Aided-Design (CAD) program for analyzing the hydrologic and hydraulic characteristics of a given watershed and associated storm water management facilities. It utilizes the latest techniques to predict the consequences of any given storm.

HydroCAD has the capability of computing hydrographs (which represents discharge rates characteristic of specified watershed conditions, precipitation, and geologic factors) combining hydrographs and routing flows though pipes, streams and ponds. Documentation of HydroCAD is provided in Appendix I for reference.

For this analysis, the watershed and drainage system were broken down into a network consisting of four types of components as described below:

1. Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of run-off unique to that area;

2. Reach: Uniform streams, channels or pipes that convey storm water from one point to another;

3. Pond: Natural or man-made impoundment, which temporarily stores storm water run-off and empties in a manner determined by its geometry and the hydraulic structure located at its outlets; and

4. Link: A multi-purpose mechanism used to introduce a hydrograph from another file.

Subcatchments, reaches, ponds and links are represented by hexagons, squares, triangles and broken boxes respectively, on the watershed routing diagrams provided with the computations (included in Appendix K, L and M).

4.0 PROJECT DESCRIPTION

Described below are the major construction activities that are the subject of this SWPPP. The major construction activities are presented in the order (or sequence) they are expected to begin, but each activity will not necessarily be completed before the next begins. Also, these activities could occur in a different order if necessary to maintain adequate erosion and sedimentation control:

1. Selective and limited clearing to facilitate the installation of erosion and sediment control measures.

2. Construct stabilized construction entrance rock pads at all construction entrances/exits. This shall be the first construction work on the project.

3. Install sediment barriers down slope from construction activities that disturb site soil;

4. Install temporary sediment basin adjacent to the access to intercept sediment laden storm water generated during initial construction activities;

5. Construct rock surface for temporary parking;

6. Clear and grub the improvement areas. Sediment barriers shall be in place down slope;

7. Rough grading necessary to form ponds and drainage channels;

8. Rough grading necessary to form the building pad and pavement areas;

9. Install underground utilities – Sediment barriers shall be utilized as required to bound the down slope side of utility construction and soil stockpiles;

10. Final Grading – Sediment barriers will be maintained down slope from disturbed soil during this operation; and

11. Completion of on-site stabilization.

The actual schedule for implementing pollutant control measures will be determined by project construction progress. Down slope protective measures must always be in place before soil is disturbed.

5.0 SITE DESCRIPTION

5.1 Land Use

The project site is primarily undeveloped land covered by brushy and forested areas. No existing buildings or structures were identified on the subject site.

5.2 Soils and Groundwater

The USDA Soil Conservation Survey for Montgomery County, New York (1970,) identifies four general classifications of silt loam within the limits of the study area. Silt loam is typically described as a rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter. Locally, gravels consisting of the aforementioned rock types also make up the composition of these silt loams due to the derivation from glacial till. The permeability of these deposits ranges from poorly-drained to well-drained. Table 5.2 summarizes the characteristics of the soils present within the study area.

Table 5.2

SOIL DATA

Soil	Hydrologic Group	Slope	SOIL PROFILE		Depth to Water Table	Depth to Bedrock	Acidity
			Depth (in)	USDA Texture			
(LMF) Lansing and Mohawk silt loams	B	very steep	0-12 12-32 32-50	Silt loam Gravelly silt loam Gravelly silt loam	>3.5'	>5'	Slightly acidic in the surface layer
(LaD) Lansing silt loam	B	15-25%	0-12 12-32 32-50	Silt loam Gravelly silt loam Gravelly silt loam	>6'	20-40"	Slightly acidic in the surface layer
(DaB) Darien silt loam	C	3-8%	0-10 10-31 31-56	Silt loam, shaly silt loam Silty clay loam, shaly silty clay loam Shaly silty clay loam	0.5-1.5'	>5'	Slightly acidic in the surface layer
(DaC) Darien silt loam	C	8-15%	0-10 10-31 31-56	Silt loam, shaly silt loam Silty clay loam, shaly silty clay loam Shaly silty clay loam	0.5-1.5'	>5'	Slightly acidic in the surface layer

5.3 Topography

A review of the United States Geologic Survey (USGS) topographic map (Amsterdam Quadrangle) indicates that elevations on the project site range from approximately 440-feet above mean sea level (MSL) along the northwestern portion of the site to approximately 330-feet above MSL along the southeastern portion. Long ravines are present on the central and eastern portions of the site. The ravines are areas of concavely-sloped vegetated terrain with grades of approximately 3 percent. Site mapping indicates that approximately 45percent of the project site contains slopes of 15percent or greater. The project site is located approximately 0.23 miles south of the Mohawk River and surrounding properties generally slope south towards the Mohawk River.

Site elevations defined on the USGS topographic map are consistent with elevations determined during a survey of the site performed in May 2003 by The Chazen Companies (TCC). The 2003 survey serves as the base map for Drainage Maps included in the Appendices.

5.4 Wetlands

A wetland delineation performed by The Chazen Companies in May 2003 confirmed that federally regulated wetlands on the site are generally confined to three narrow, intermittent stream corridors. Although, the total area of these wetlands is 2.575-acres, only 1.9-acres of wetlands are located on the project site. Additionally, it has been determined that there are no NYSDEC regulated wetlands present on the project site.

The proposed project will involve minor impacts to some wetland areas. The proposed project has minimized adverse impacts to the maximum extent practical, however, results in impacts to approximately 1.8-acres of low quality ravine wetland habitat. The storm water management system on this site will continue to convey flows at all three stream outlets along the southern portion of the site in a flow rate and volume similar to the pre-existing conditions. Therefore, the downstream ravines will not be adversely impacted by this project.

5.5 Surface Waters and Flood Plains

The site is not located within a FEMA flood zone. Three narrow, intermittent stream corridors are located across the project site which will be filled.

5.6 Rainfall Data

Rainfall data used in the modeling and analysis was taken from Technical Paper No. 40, Rainfall Frequency Atlas of the U.S. Weather Bureau, published by the U.S. Department of Agriculture. Rainfall data specific to the portion of Montgomery County under consideration, for various 24-hour storm events, is as follows:

TABLE 5.6
RAINFALL DATA

STORM EVENT	24-HOUR RAINFALL (inches)
1-year	2.4
2-year	2.7
10-year	3.9
25-year	4.7
50-year	5.0
100-year	5.7

A type II rainfall distribution and these tabulated values were used when evaluating existing and proposed storm water run-off conditions.

6.0 HYDROLOGIC AND HYDRAULIC ANALYSIS

The analysis of hydrologic and hydraulic conditions and proposed storm water management facilities, servicing the study area, was performed by dividing the tributary watershed into relative homogeneous sub-catchments. The separation of the watershed into sub-catchments was dictated by watershed conditions, methods of collection, conveyance, and points of discharge. Watershed characteristics for each subcatchment were then assessed from United States Geological Service (USGS) 7.5-minute topographic maps, aerial photographs, a field topographic survey, soil surveys, site investigations, and land use maps.

Table 6.0 presents the hydrologic and hydraulic analysis considered in this study:

Table 6.0
24-Hour Design Events

FACILITY	DESIGN STORM
Storm Sewer	10-year storm
Detention Basin (pond)	1-year storm 2-year storm 10-year storm 25-year storm 50-year storm
Flood Conditions	100-year storm

6.1 Existing Watershed Conditions

The watershed involved in this analysis encompasses approximately 158.80 acres. Of this 158.8 acres, approximately 100(±) acres is located north if Sam Stratton Road, approximately 23.0(±) acres lies between Sam Stratton Road and the project site and the remaining 35.8(±) acres comprises the site of the proposed development. Refer to Appendix K for reference the watershed delineation mapping.

The watershed was divided into subcatchments to allow for analysis of run-off conditions to six (6) locations around the project site. Each of these locations were defined as a Design Point in order to compare the effects resulting from storm water management facilities proposed as part of the project.

Under existing conditions surface run-off from large upgradient areas north of Sam Stratton Road flows down and across the project site. These areas were included in the modeling to most accurately depict existing conditions and properly size post-development facilities.

Design Point 1 is located at the southeastern corner of the property. The design point is the swale line located adjacent to the CSX railroad. Storm water is conveyed to the design point via overland flow. Storm water run-off flows south southwest across the property. The area contributing storm water run-off to this design point is approximately 2.22-acres in extent and comprised primarily of brush and woods.

Mapping and the results of the computer modeling are presented in Appendix K. The results of the computer modeling are also summarized in Table 6.1(a):

Table 6.1(a)
EXISTING FLOW CONDITIONS
DESIGN POINT 1
(Southern Property Corner)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.07
2-year	0.20
10-year	1.31
25-year	2.39
50-year	2.84
100-year	3.98

Design Point 2 is a 30-inch corrugated metal pipe (CMP) and is located in the southern portion of the property. This pipe is located immediately north of the property line and traverses beneath the CSX railroad tracks. Drainage from the south south-central portion of the property as well as a large area upgradient of Sam Stratton Road discharges to this location.

Storm water originating from approximately 60(±)-acres discharges beneath Sam Stratton Road via two (2), 3-foot diameter reinforced concrete pipes (RCP) to a storm water detention facility located immediately north of the site. This existing detention facility discharges via a 4-feet diameter RCP originating from a concrete outlet structure located within the basin to a large intermittent stream channel. A flat area located atop the berm on the downstream side, acts as an overflow channel for large storm events. This "overflow" channel also discharges to the large intermittent stream channel. The intermittent stream channel flows across the project site to Design Point 2. Also discharging to this intermittent stream channel is approximately 13.2 (±)-acres of on-site area.

Preliminary storm water modeling of the existing storm water detention basin described above indicates that this basin is undersized and currently does not accommodate storm events in excess of the 25-year storm event.

The results of the computer modeling for Design Point 2 are summarized in Table 6.1 (b):

Table 6.1(b)
EXISTING FLOW CONDITIONS
DESIGN POINT 2
(Existing 30"CMP)

STORM EVENT	PEAK FLOW (cfs)
1-year	7.95
2-year	11.76
10-year	36.48
25-year	48.18
50-year	51.60
100-year	62.04

Design Point 3 is a 30-inch CMP and is located in the central southern portion of the property. The culvert is located immediately north of the property and also traverses beneath the CSX railroad tracks. Drainage from the central portion of the property as well as approximately 32.53-acres of area upgradient of Sam Stratton Road discharges at this location. Upgradient areas flow through a 24-inch CMP located beneath Sam Stratton Road to an existing basin located immediately north of the project site. A 24-inch CMP culvert drains this existing basin to a large intermittent stream channel which ultimately discharges to the 30-inch CMP. The result of the computer modeling for Design Point 3 are summarized in Table 6.1 (c):

Table 6.1(c)
EXISTING FLOW CONDITIONS
DESIGN POINT 3
(Existing 24-inch CMP)

STORM EVENT	PEAK FLOW (cfs)
1-year	9.66
2-year	13.80
10-year	30.18
25-year	36.98
50-year	45.44
100-year	61.93

Design Point 4 is located in the southwestern portion of the property. This design point is the southwestern property line. Storm water flows to East Main Street and ultimately to the stream located west of the property. Drainage from the central and southwestern portion of the property, extending up to Sam Stratton Road, as well as areas upgradient of Sam Stratton Road discharges at this location. Storm water originating from approximately 8.0 (±)-acres, flows overland to a drainage swale located immediately upgradient of Sam Stratton Road. This drainage swale discharges to an intermittent stream channel located on the project site.

Approximately 14.07-acres of on-site area flows overland and discharges to this location. The result of the computer modeling for Design Point 4 are summarized in Table 6.1 (d):

Table 6.1(d)
EXISTING FLOW CONDITIONS
DESIGN POINT 4
(Southwestern Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	7.70
2-year	11.41
10-year	29.60
25-year	43.64
50-year	49.17
100-year	62.53

Design Point 5 is located along the western property line. An un-named stream is located along this property line. Storm water originating from approximately 2.9-acres of on-site area discharges to this location. The results of the computer modeling for Design Point 5 are summarized in Table 6.1 (e):

Table 6.1(e)
EXISTING FLOW CONDITIONS
DESIGN POINT 5
(Western Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	1.03
2-year	1.47
10-year	3.61
25-year	5.26
50-year	5.91
100-year	7.45

Design Point 6 is located along the eastern property line. A drainage swale is located in this area. Storm water originating from approximately 0.60-acres of on-site area discharges to this location. The results of the computer modeling for Design Point 6 are summarized in Table 6.1 (f):

Table 6.1(f)
EXISTING FLOW CONDITIONS
DESIGN POINT 6
(Eastern Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.01
2-year	0.02
10-year	0.30
25-year	0.60
50-year	0.73
100-year	1.06

6.2 Proposed Watershed Conditions

The proposed conditions consider the existing drainage patterns and planned site development and grading associated with the proposed site development. The delineated watershed for the proposed developed area is equal to the existing conditions watershed in size and includes the entire site as well as upland areas. The watershed involved in this analysis encompasses approximately 158.80 acres. Of this 158.8 acres, approximately 100(±) acres is located north if Sam Stratton Road, approximately 23.0(±) acres lies between Sam Stratton Road and the project site and the remaining 35.8(±) acres comprises the site of the proposed development. Refer to Appendix J for reference the watershed delineation mapping.

Storm water run off from proposed subcatchments remains consistent with existing conditions drainage patterns. The six design points considered under existing conditions are also considered under proposed conditions.

Under proposed conditions, storm water facilities are planned to include culverts and swales to route storm water to on-site storm water management basins. Four extended detention basins, and one overflow basin (overflow from the existing basin located immediately north of the project site) have been included in the design of the proposed landfill to improve storm water quality and assure that pre-development peak storm water discharges are not exceeded.

This storm water management plan considers two phases of landfill construction. The first phase of the development includes the creation of the haul road and

drainage swales, excavation of the main landfill cell, and excavation and filling to create the material recycling center. This cell will encompass approximately 14-acres. All storm water runoff from this area will be treated as landfill leachate. This leachate will then be piped and discharged to the City of Amsterdam's sanitary sewer system (City of Amsterdam Publicly Owned Treatment Works-POTW). Should the Amsterdam POTW be unable to accept daily leachate quantities, one or more alternate regional treatment facilities will be utilized. Daily leachate quantity, as stated from similar sized facilities, is expected to be approximately 20,000 to 36,000 gallons.

The four storm water management basins and the overflow basin will be created as part of the first phase of the project. Refer to mapping provided in Appendix L for watershed delineations and proposed drainage structures for the first phase of landfill construction.

The second phase of the storm water management plan involves completion of storm water management facilities for the final landfill configuration once the landfill is closed. The four extended detention storm water management basins and the overflow basin will remain in place after closure. Refer to mapping is provided Appendix M for watershed delineations and proposed drainage structures for the second phase of landfill construction.

Landfill Construction Phase 1

Under existing conditions surface run-off from the large upgradient areas north of Sam Stratton Road flows down and across the project site.

For Phase 1 storm water modeling, approximately 14.33 (±) acres of on-site area will not discharge storm water off-site. This is the large landfill area (hole) which will act as a large basin. Storm water runoff from this area will be treated as landfill leachate and will not discharge off-site.

Design Point 1 remains the southern corner of the property. The area contributing storm water run-off to this design point is reduced under proposed conditions thereby reducing the rate of runoff.

The results of the computer modeling for Design Point 1 are summarized in Table 6.2(a):

Table 6.2(a)
PROPOSED FLOW CONDITIONS
DESIGN POINT 1
(Southern Property Corner)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.06
2-year	0.16
10-year	1.08
25-year	1.96
50-year	2.33
100-year	3.26

Design Point 2 remains the 30-inch corrugated metal pipe (CMP) located along the southern portion of the property. Storm water originating from approximately 60(±)-acres discharges beneath Sam Stratton Road via two, 3-foot diameter reinforced concrete pipes (RCP) to a storm water detention facility located immediately north of the site property. This existing detention facility discharges via a 4-foot diameter RCP originating from a concrete outlet structure located within the basin to a large intermittent stream channel. A flat area located atop the berm on the downstream side, acts as an overflow channel for large storm events. Under existing conditions, this "overflow" channel discharges to the intermittent stream channel. Under proposed conditions, the intermittent stream channel will be filled to develop the proposed landfill. Storm water flow originating from the existing storm water basin will be routed around the proposed landfill via storm sewers.

The existing conditions model shows the existing storm water detention basin is undersized and does not accommodate storm events in excess of the 25-year storm event. A basin will be created upgradient of the proposed concrete recycling pad that will detain the flood water from the existing basin during larger storm events. This graded basin will encompass approximately 6,000- sf and will allow for controlled release of storm water during larger events. This basin will discharge to the storm sewer system located beneath the recycling area and ultimately to the proposed storm water management basin located along the eastern portion of the property.

A storm water management basin will be constructed along the eastern side of the project site, east of the recycling center. Storm water flowing from the recycling

center, landscaped bermed area, overflow from the existing basin, and upstream areas will discharge to the basin. This basin will be constructed in accordance with the New York State Stormwater Management Design Manual and will encompass approximately 14,000-sf and be approximately 9-feet deep. This basin will provide storm water quality treatment and will assure pre-development peak storm water discharges are not exceeded.

This eastern basin will then discharge to a swale and ultimately to a storm water basin to be constructed along the southern property line, immediately north of the CSX railroad tracks. Areas draining to the southern basin will include a large portion of the haul road, the back side of the landscaped berm, areas south of the haul road, and discharge from the eastern basin. This southern basin will encompass approximately 20,000-sf and will be approximately 8-feet deep. This basin will be constructed in accordance with the New York State Stormwater Management Design Manual. This basin will discharge to a large diameter manhole located immediately north of the CSX railroad.

Also discharging to the above mentioned manhole is the primary outlet storm sewer from the existing storm water basin. The confluence of these two flows to the manhole and ultimately to Design Point 2 are compared to existing conditions for comparison of peak discharges.

The results of the computer modeling for Design Point 2 are summarized in Table 6.2(b):

Table 6.2(b)
PROPOSED FLOW CONDITIONS
DESIGN POINT 2
(Existing 30"CMP)

STORM EVENT	PEAK FLOW (cfs)
1-year	7.53
2-year	9.68
10-year	31.70
25-year	39.85
50-year	42.33
100-year	47.37

Design Point 3 remains the 30-inch CMP that is located in the central southern portion of the property. Drainage from the central portion of the property between the recycling facility and the landfill cell discharges at this location.

Under proposed conditions, the existing basin located immediately north of the project site will be filled as part of the landfill construction and storm water run-off generated from the 32.53-acres upgradient area will be re-routed toward the west and by-pass the landfill cell. Manholes and storm sewers will be installed on the north side of Sam Stratton Road and will ultimately discharge storm water to the proposed western storm water management basin.

The results of the computer modeling for Design Point 3 are summarized in Table 6.2(c):

Table 6.2(c)
PROPOSED FLOW CONDITIONS
DESIGN POINT 3
(Existing 30-inch CMP)

STORM EVENT	PEAK FLOW (cfs)
1-year	8.48
2-year	12.22
10-year	28.07
25-year	34.95
50-year	36.83
100-year	40.34

Design Point 4 remains the southwestern property line. Under proposed conditions, storm water from the haul road and areas immediately south of the landfill cell will discharge to a proposed storm water management basin that will be constructed immediately adjacent to and east of the access road. This basin will be constructed in accordance with the New York State Stormwater Management Design Manual, will encompass approximately 7,700-sf, and will be approximately 8-feet deep. This basin will provide storm water quality treatment and will assure pre-development peak storm water discharges are not exceeded.

This basin will ultimately discharge to the stream located west of the property.

The results of the computer modeling for Design Point 4 are summarized in Table 6.2(d):

Table 6.2(d)
PROPOSED FLOW CONDITIONS
DESIGN POINT 4
(Southwestern property line)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.88
2-year	1.40
10-year	4.08
25-year	6.27
50-year	7.14
100-year	9.24

Design Point 5 remains the un-named stream located along the western limits of the property. Storm water originating from the areas north of the landfill cell will discharge to the proposed western storm water management basin and ultimately to Design Point 5. Storm water originating from areas north of Sam Stratton Road will be routed around the development into the un-named stream. The un-named stream discharges to a 5'x5' box culvert located just north of East Main Street. The 5'x5' box culvert then discharges to a 6' CMP storm sewer and ultimately into the Mohawk River. This diversion of storm water generated upstream of Sam Stratton Road will not adversely impact downstream receiving waters or structures.

The western storm water management basin will be constructed in accordance with the New York State Storm Water Management Design Manual, will encompass approximately 30,000-sf, and will be approximately 8-feet deep. This basin will provide storm water quality treatment and will assure pre-development peak storm water discharges are not exceeded.

The results of the computer modeling for Design Point 5 are summarized in Table 6.2(e):

Table 6.2(e)
PROPOSED FLOW CONDITIONS
DESIGN POINT 5
(Western Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.94
2-year	1.30
10-year	3.01
25-year	4.29
50-year	4.78
100-year	5.94

Design Point 6 is located is located along the eastern limits of the property. A drainage swale is located in this area. Storm water originating from approximately 0.20-acres of on-site area discharges to this location. The results of the computer modeling for Design Point 6 are summarized in Table 6.1 (f):

Table 6.1(f)
PROPOSED FLOW CONDITIONS
DESIGN POINT 6
(Eastern Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.002
2-year	0.01
10-year	0.17
25-year	0.32
50-year	0.39
100-year	0.54

Phase 2 Post Construction

Under existing conditions surface run-off from large upgradient areas north of Sam Stratton Road flows down and across the project site. These areas were included in the modeling to most accurately depict existing conditions and properly size post-development facilities.

For Phase 1 storm water modeling, approximately 14.33 (±) acres of the on-site area did not discharge storm water off-site. This was the large landfill area (hole) which

acted as a large basin. Storm water incident to this area was to be treated as landfill leachate and did not discharge off-site, but rather discharged to the City of Amsterdam's sanitary sewer system.

For the Phase 2 storm water scenario, the land fill cell is filled above existing grade and a large mound is formed. Storm water will discharge radially away from the approximately 14.33-acre landfill area and center of the mound to the proposed storm water conveyance system. The storm water management facilities constructed as part of Phase 1 were designed to accommodate the additional storm water flows from the landfill area.

Design Point 1 remains the southern corner of the property. The design point is the swale line located adjacent to the CSX railroad line. Storm water is conveyed to the design point via overland flow. Drainage flows south southwest across the property. The area contributing drainage to this design point is reduced under proposed conditions to approximately1.82-acres of brushy and wooded areas.

The results of the computer modeling for Design Point 1 are summarized in Table 6.2(f):

Table 6.2(g)
PROPOSED FLOW CONDITIONS
DESIGN POINT 1
(Southern Property Corner)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.06
2-year	0.16
10-year	1.08
25-year	1.96
50-year	2.33
100-year	3.26

Design Point 2 remains the 30-inch corrugated metal pipe (CMP) and is located along the southern portion of the property. This pipe is located immediately north of the property line and traverses beneath the CSX railroad tracks. Drainage from the south south-central portion of the site property as well as a large area upgradient of Sam Stratton Road discharges to this area. Drainage conditions for this design point remain consistent with Phase 1.

The results of the computer modeling for Design Point 2 are summarized in Table 6.2(g):

Table 6.2(h)
PROPOSED FLOW CONDITIONS
DESIGN POINT 2
(Existing 30-inch CMP)

STORM EVENT	PEAK FLOW (cfs)
1-year	7.53
2-year	9.68
10-year	31.70
25-year	39.85
50-year	42.33
100-year	47.37

Design Point 3 remains the 30-inch CMP and is located along the central southern portion of the property. The culvert is located immediately north of the property and also traverses beneath the CSX railroad tracks. Drainage from the central portion of the property between the recycling facility and the landfill cell discharges at this location. Drainage conditions for this design point remain consistent with Phase 1.

The results of the computer modeling for Design Point 3 are summarized in Table 6.2(h):

Table 6.2(i)
PROPOSED FLOW CONDITIONS
DESIGN POINT 3
(Existing 30-inch CMP)

STORM EVENT	PEAK FLOW (cfs)
1-year	8.48
2-year	12.22
10-year	28.07
25-year	34.95
50-year	36.83
100-year	40.34

Design Point 4 remains located along the southwestern portion of the property. This design point is the southwestern property line. Under existing conditions, storm water flows to East Main Street and ultimately to the stream located west of the property. Drainage from the central and southwestern portion of the property,

extending up to Sam Stratton Road, as well as areas upgradient of Sam Stratton Road discharged at this location.

Under phase 2, storm water from the haul road and the southern, southwestern, and eastern sides of the landfill cell will discharge to the proposed storm water management basin that will be constructed immediately adjacent to and east of the access road. This basin is designed to accommodate the additional storm water discharge and will be constructed in accordance with the New York State Stormwater Management Design Manual. The basin will encompass approximately 7,700sf and will be approximately 8-feet deep. This basin will provide storm water quality treatment and will result in post-development peak storm water discharges less than existing conditions peak storm water discharge.

This basin will ultimately discharge to the stream located west of the property. However for comparison purposes, the outflow from this basin combined with a small area not discharging to the basin are combined to compare discharges for Design Point 4.

The results of the computer modeling for Design Point 4 are summarized in Table 6.2(i):

Table 6.2(j)
PROPOSED FLOW CONDITIONS
DESIGN POINT 4
(Southwestern property line)

STORM EVENT	PEAK FLOW (cfs)
1-year	1.05
2-year	2.48
10-year	16.36
25-year	28.37
50-year	32.52
100-year	37.07

Design Point 5 is located along the western property line. An un-named stream is located along this property line. Storm water originating from the areas north of the landfill cell, and the northern side of the landfill cell will discharge to the proposed western storm water management basin and ultimately to Design Point 5 (un-named stream). Storm water originating from areas north of Sam Stratton Road totaling approximately 40.52 (±) acres will be re-routed to discharge around the development to the un-named stream. The un-named stream discharges to a 5'x5' box culvert located just north of East Main Street. The 5'x5' box culvert then discharges to a 6' CMP storm sewer and ultimately to the Mohawk River. The re-

routing of the storm water will not adversely impact downstream receiving waters or structures.

This basin is designed to accommodate the additional storm water discharge and will be constructed in accordance with the New York State Stormwater Management Design Manual. The basin will encompass approximately 30,000-sf and will be approximately 8-feet deep. This basin will provide storm water quality treatment and will result in post-development peak storm water discharges less than existing conditions peak storm water discharge.

The results of the computer modeling for Design Point 5 are summarized in Table 6.2(j):

Table 6.2(k)
PROPOSED FLOW CONDITIONS
DESIGN POINT 5
(Western Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.97
2-year	1.35
10-year	3.06
25-year	4.35
50-year	4.84
100-year	6.01

Design Point 6 is located is located along the eastern limits of the property. A drainage swale is located in this area. Storm water originating from approximately 0.20-acres of on-site area discharges to this location. The results of the computer modeling for Design Point 6 are summarized in Table 6.1 (k):

Table 6.2(l)
PROPOSED FLOW CONDITIONS
DESIGN POINT 6
(Eastern Area)

STORM EVENT	PEAK FLOW (cfs)
1-year	0.002
2-year	0.01
10-year	0.17
25-year	0.32
50-year	0.39
100-year	0.54

6.3 Proposed Water Quantity and Quality Controls

The proposed storm water quantity controls will include inlet structures and culverts, four storm water management/detention basins with culvert end-sections providing rip-rap protected outfalls located on-site.

The proposed quantity controls have been designed and sized to provide channel protection (Cp_v), overbank flood control (Qp_{10}) and extreme flood protection (Qf_{100}), where:

Channel Protection Volume (Cp_v) requirements are designed to protect stream channels from erosion. This is accomplished by providing 24- hour extended detention of the 1- year, 24-hour storm event.

Overbank Flood Control Volume (Qp_{10}) requirements are designed to prevent flow events that exceed the bankfull capacity of a channel, and therefore must spill over into the floodplain. This requires storage to assure that the post development 10-year, 24-hour peak discharge rates do not exceed predevelopment rates.

Extreme Flood Protection Volume (Qf_{100}) requirements are designed to 1) prevent the increased risk of flood damage from large storm events, 2) maintain the boundaries of predevelopment 100- year floodplain, and 3) protect the physical integrity of the storm water management practices. This requires storage to assure that the post development 100- year, 24-hour peak discharge rates do not exceed predevelopment rates.

The proposed water quality (WQ_v) controls have been sized based on the 90-percent rule methodology as described in Table 6.0, New York Storm Water Sizing Criteria. The Water Quality control (WQv) requirements are designed to improve water quality by capturing and treating 90% of the average annual storm water runoff volume. The WQv is directly related to the amount of impervious cover in the study area. A forebay will be utilized before each detention pond to retain 10% of the total water quality volume required for each pond.

The above conditions have been met with the storm water management facilities proposed. A detailed design of each basin with the above quantity and quality controls for Phase 2 of the storm water management plan is summarized in tables 6.3(a) through 6.3 (d). All basins have been designed with a pre-cast concrete outlet structure with an orifice plate that includes a low flow drain pipe and overflow grate will be used to drain the basin.

Detention Basin # 1 located in the eastern portion of the project site encompasses 14,000-sf. Table 6.3(a) summarizes the results of the analyses performed for detention basin #1.

Table 6.3(a)
Proposed Conditions
Detention Basin # 1

24-hour Storm Event	Water Storage Volume (CF)	Peak Water Elevation (FT)	Freeboard	Outlet Discharge	
				Rate (CFS)	Volume (AF)
1-year	24,641	402.71	5.29	2.71	1.25
2-year	31,275	403.54	4.46	2.95	1.51
10-year (Q_p)	49,373	405.38	2.62	11.59	2.83
25-year	58,222	406.18	1.82	20.07	4.15
50-year	61,336	406.42	1.58	23.19	4.67
100-year (Q_f)	68,189	406.94	1.06	31.09	5.96
WQ_v	8,761				

Permanent Water Surface Elevation =398.0'
Low Flow Orifice Elevation =398.0'
Primary Outlet Elevation = 403.6'
Overflow Weir Elevation = 407.0'
Flood Elevation of basin (top of berm) =408.0'

Detention Basin # 2 located in the southern portion of the project site encompasses 21,000-sf. Table 6.3(b) summarizes the results of the analyses performed for detention basin #2.

Table 6.3(b)
Proposed Conditions
Detention Basin # 2

24-hour Storm Event	Water Storage Volume (CF)	Peak Water Elevation (FT)	Freeboard	Outlet Discharge	
				Rate (CFS)	Volume (AF)
1-year	29,455	324.77	5.23	1.51	0.90
2-year	33,459	325.06	4.94	2.19	1.12
10-year (Q_p)	45,761	325.97	4.03	9.32	2.67
25-year	60,040	326.79	3.21	17.48	4.22
50-year	66,139	327.15	2.85	19.96	4.84
100-year (Q_f)	81,170	328.01	1.99	25.01	6.37
WQ_v	4,458				

Permanent Water Surface Elevation =322.0'
Low Flow Orifice Elevation =322.0'
Primary Outlet Elevation = 324.75'
Overflow Weir Elevation = 329.0'
Flood Elevation of basin (top of berm) =330.0'

Detention Basin # 3 located in the southern portion of the project site encompasses 7,700-sf. Table 6.3(c) summarizes the results of the analyses performed for detention basin #3.

Table 6.3(c)
Proposed Conditions
Detention Basin # 3

24-hour Storm Event	Water Storage Volume (CF)	Peak Water Elevation (FT)	Freeboard	Outlet Discharge	
				Rate (CFS)	Volume (AF)
1-year	17,831	322.08	3.92	0.98	0.40
2-year	20,187	322.43	3.57	2.35	0.59
10-year (Q_p)	30,470	323.96	2.04	15.50	1.51
25-year	36,907	324.73	1.27	26.66	2.21
50-year	39,004	324.98	1.02	30.96	2.47
100-year (Q_f)	40,388	325.14	0.86	35.38	3.12
WQ_v	17,777				

Permanent Water Surface Elevation =318.0'
Low Flow Orifice Elevation =318.0'
Primary Outlet Elevation = 321.8'
Overflow Weir Elevation = 325.0'
Flood Elevation of basin (top of berm) =326.0'

Detention Basin # 4 located in the northern portion of the project site encompasses 30,000-sf. Table 6.3(d) summarizes the results of the analyses performed for detention basin #4.

Table 6.3(d)
Proposed Conditions
Detention Basin # 4

24-hour Storm Event	Water Storage Volume (CF)	Peak Water Elevation (FT)	Freeboard	Outlet Discharge	
				Rate (CFS)	Volume (AF)
1-year	22,239	409.39	6.61	0.27	0.16
2-year	29,915	409.87	6.13	0.31	0.19
10-year (Q_p)	67,955	411.67	4.33	0.45	0.28
25-year	84,920	412.37	3.63	1.30	0.67
50-year	88,691	412.52	3.48	1.84	0.93
100-year (Q_f)	98,854	412.90	3.10	3.82	1.58
WQ_v	10,808				

Permanent Water Surface Elevation =408.0'
Low Flow Orifice Elevation =408.0'
Primary Outlet Elevation = 410.0'
Overflow Weir Elevation = 415.0'
Flood Elevation of basin (top of berm) =416.0'

7.0 SEQUENCE OF MAJOR ACTIVITIES

The Contractor will be responsible for implementing the following erosion/sediment control and storm water management control measures. The Contractor may designate these tasks to certain subcontractors as he sees fit, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the Contractor. The actual schedule for implementing pollutant control measures will be determined by project construction progress. Down slope protective measures must always be in place before soil is disturbed. The activities are presented in the order (or sequence) they are expected to begin, but each activity will not necessarily be completed before the next begins. Also, these activities could occur in a different order if necessary to maintain adequate erosion and sedimentation control:

1. Selectively clear only the areas required for the installation of the stabilized construction entrances/exits and temporary sediment and erosion control measures.

2. Install stabilized construction entrances/exits for all construction entrances/exits. This will be the first construction work on the project.

3. Install sediment barriers down slope from construction activities that disturb site soil;

4. Begin clearing and grubbing operations. Clearing and grubbing shall be done only in areas where earthwork will be performed and only in areas where building is planned to commence within 14 days after clearing and grubbing. Sediment barriers must already be in place down slope;

5. Frequent watering of the excavation and fill areas shall be done to minimize wind erosion.

6. Commence site grading.

7. Disturbed areas of the site where construction activity has ceased for more than 14 days shall be temporarily seeded and watered.

8. Install protective silt fences at the locations of all grate inlets, curb inlets, and at the ends of all exposed storm sewer pipes.

9. Finalize pavement subgrade preparation.

10. Construct all curb and gutter, gutter inlets, area inlets, and storm sewer manholes, as shown on the plans. Inlet protection hay bales may be removed temporarily for this construction. Place required riprap at locations shown on the plans.

11. Remove sediment controls around inlets and manholes no more than 48 hours prior to placing stabilized base course.

12. Install stabilized base course as required for pavement and replace sediment controls around all inlets and manholes.

13. Carry out final grading and seeding and planting.

14. Remove temporary construction exits only prior to pavement construction in these areas (These areas are to be paved last).

15. Complete on-site stabilization.

16. Remove sediment controls only after all paving is complete and exposed surfaces are completely stabilized.

8.0 STORM WATER EROSION AND SEDIMENT CONTROLS

A variety of storm water pollutant controls are recommended for this project. Some controls are intended to function only temporarily and will be used as needed for pollutant control during the construction period. These include temporary sediment barriers and detention ponds (which also function as temporary sediment basins). For most disturbed areas, permanent stabilization will be accomplished by covering the soil with pavement, building, or vegetation.

8.1 Erosion and Sediment Controls

The proposed storm water management system has been designed to convey storm water flows off-site via overflow pipes and spillways, thereby preventing erosion and uncontrolled conveyance to the downgradient facilities.

Use of storm water detention ponds provides treatment of storm water run-off and removal of suspended particles.

Temporary erosion and sediment control measures that shall apply during construction generally include:

1. Minimizing soil erosion and sedimentation by stabilization of disturbed areas and by removing sediment from construction site discharges;

2. Preservation of existing vegetation as much as possible. Following the completion of construction activities in any portion of the site permanent vegetation shall be established an all exposed soils;

3. Site preparation activities shall be planned to minimize the area and duration of soil disruption; and

4. Permanent traffic corridors shall be established and "routes of convenience" shall be avoided.

Grading and erosion control measures will be included as part of the construction documents and include the following.

1. Soil Stabilization – The purpose of soil stabilization is to prevent soil from leaving the site. In the natural condition, soil is stabilized by native vegetation. The primary technique to be used at this project for stabilizing site soil will be to provide a protective cover of turf grass, pavement, or impermeable structures.

   a. Temporary Seeding – Within 14 days after construction activity ceases on any particular area, all disturbed ground where there will not be construction for longer than 21 days must be seeded with fast-germinating temporary seed and protected with mulch.

   b. Permanent Seeding – All areas at final grade must be seeded within 14 days after completion of the major construction activity. Except for small level spots, seeded areas should generally be protected with mulch.

   c. Structural Controls – The storm water will be collected throughout the site utilizing precast inlets and manholes. The storm water will be transported by a series of buried pipes. The storm pipes will drain into four storm water detention areas. The structural controls are shown on the SW2 and SW2a.

   Final site stabilization is achieved when turf grass cover provides permanent stabilization for at least 70 percent of the disturbed soil surface, exclusive of areas that have been paved.

8.2 Other Pollutant Controls

Control of sediments has been described previously. Other aspects of this SWPPP are listed below:

1. Dust Control – Construction traffic must enter and exit the site at the stabilized construction entrance. The purpose is to trap dust and mud that would otherwise be carried off-site by construction traffic.

   Water trucks will be used as needed during construction to reduce dust generated on the site. Dust control must be provided by the general contractor to a degree that is acceptable to the Owner, and in compliance with applicable local and state dust control regulations. After construction, the site will be stabilized (as described elsewhere), which will reduce the potential for dust generation.

2. Solid Waste Disposal – No solid materials, including building materials, are allowed to be discharged from the site with storm water. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied periodically by a contract trash disposal service and hauled away from the site.

   Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

3. Sanitary Facilities – All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a commercial contractor.

4. Water Source – Non-storm water components of site discharge must be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or private well approved by the State Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site. It can be retained in the ponds until it infiltrates and evaporates.

5. Long-Term Pollutant Controls – Storm water pollutant control measures installed during construction that will also provide benefits after construction, include existing wetland vegetation, proposed lawn & landscaped areas and rip-rapped outfalls. Those sediment barriers that do

not interfere with normal operations and appear to provide long-term benefits can be left in place after construction is completed.

8.3 Construction Phase "Best Management Practices"

During the construction phase, the general contractor will implement the following measures:

1. Material resulting from the clearing and grubbing operation will be stockpiled up slope from adequate sedimentation controls.

2. The general contractor will designate areas for equipment cleaning, maintenance, and repair. The general contractor and subcontractors will utilize those areas. The areas will be protected by a temporary perimeter berm.

3. Use of detergents for large scale washing is prohibited (i.e., vehicles, buildings, pavement surfaces, etc.)

   d. Chemicals, paints, solvents, fertilizers, and other toxic material must be stored in waterproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated and disposed at an approved solid waste or chemical disposal facility.

9.0 CONCLUSION

The Chazen Companies have completed a Storm Water Pollution Prevention Plan for major activities associated with the development of a construction material recycling and disposal facility in the City of Amsterdam, Montgomery County, New York. Amsterdam Recycling Material, L.L.C., proposes to develop a construction material recycling and disposal facility on an existing industrial park owned by the Amsterdam Industrial Development Agency (AIDA). A site location map has been included in Appendix A.

The project site is an irregularly shaped 40.1 (±) acre undeveloped property currently owned by the Amsterdam Industrial Development Agency (AIDA) located within the Edson Street Industrial Park. Generally, the project site is located south of Sam Stratton Drive (an internal road within the industrial park) and north of East Main Street. The project is bound by an unnamed stream to the west and contains approximately 275-feet of frontage along East Main Street. The central site area is traversed by a 100-foot wide Niagara Mohawk overhead power line transmission easement which comprises approximately 2.5-acres of the project site.

The analysis included the review of watershed conditions, a hydrologic and hydraulic analysis using computer modeling and an evaluation of the proposed improvements across the subject site. This report is intended to document the proposed storm water management plan associated with the proposed development. This report includes a discussion of the initial construction of and continuous implementation of sediment and erosion control measures. Phase 1 involves the construction of the storm water management facilities that are to be utilized during the construction/operation of the landfill. Phase 2 involves the construction of the storm water management facilities that are to remain in place following the closure of the landfill.

The storm water management facilities provide extended detention of the required water quality volume and safely convey larger storm events across the property. The intent of the storm water management plan was to provide extended detention of the required water quality volume, and to ensure post-development peak storm water discharge rates from the developed site are less than pre-development peak storm water discharge rates. This is demonstrated by comparing flows for various storm events.

Tables 9.0 (a) presents a comparison of pre-development and post-development peak storm water discharges for each design point during Phase 1 of landfill construction.

Table 9.0(a)
COMPARISON AT DESIGN POINTS: PHASE 1

Storm Event	Design Point											
	1		2		3		4		5		6	
	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)
1-yr	0.07	0.06	7.95	7.53	9.66	8.48	7.70	0.88	1.03	0.94	0.01	0.002
2-yr	0.20	0.16	11.76	9.68	13.80	12.22	11.41	1.40	1.47	1.30	0.02	0.01
10-yr	1.31	1.08	36.48	31.70	30.18	28.07	29.60	4.08	3.61	3.01	0.30	0.17
25-yr	2.39	1.96	48.18	39.85	36.98	34.95	43.64	6.27	5.26	4.29	0.60	0.32
50-yr	2.84	2.33	51.60	42.33	45.44	36.83	49.17	7.14	5.91	4.78	0.73	0.39
100-yr	3.98	3.26	62.04	47.37	61.93	40.34	62.53	9.24	7.45	5.94	1.06	0.54

Table 9.0(b) presents a comparison of pre-development and post-development peak storm water discharges rates at each design point upon completion of Phase 2 of the landfill construction.

Table 9.0(b)
COMPARISON AT DESIGN POINTS: PHASE 2

Storm Event	Design Point											
	1		2		3		4		5		6	
	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Pre-Dev. (cfs)	Post-Dev. (cfs)
1-yr	0.07	0.06	7.95	7.53	9.66	8.48	7.70	1.05	1.03	0.97	0.01	0.002
2-yr	0.20	0.16	11.76	9.68	13.80	12.22	11.41	2.48	1.47	1.35	0.02	0.01
10-yr	1.31	1.08	36.48	31.70	30.18	28.07	29.60	16.36	3.61	3.06	0.30	0.17
25-yr	2.39	1.96	48.18	39.85	36.98	34.95	43.64	28.37	5.26	4.35	0.60	0.32
50-yr	2.84	2.33	51.60	42.33	45.44	36.83	49.17	32.52	5.91	4.84	0.73	0.39
100-yr	3.98	3.26	62.04	47.37	61.93	40.34	62.53	37.07	7.45	6.01	1.06	0.54

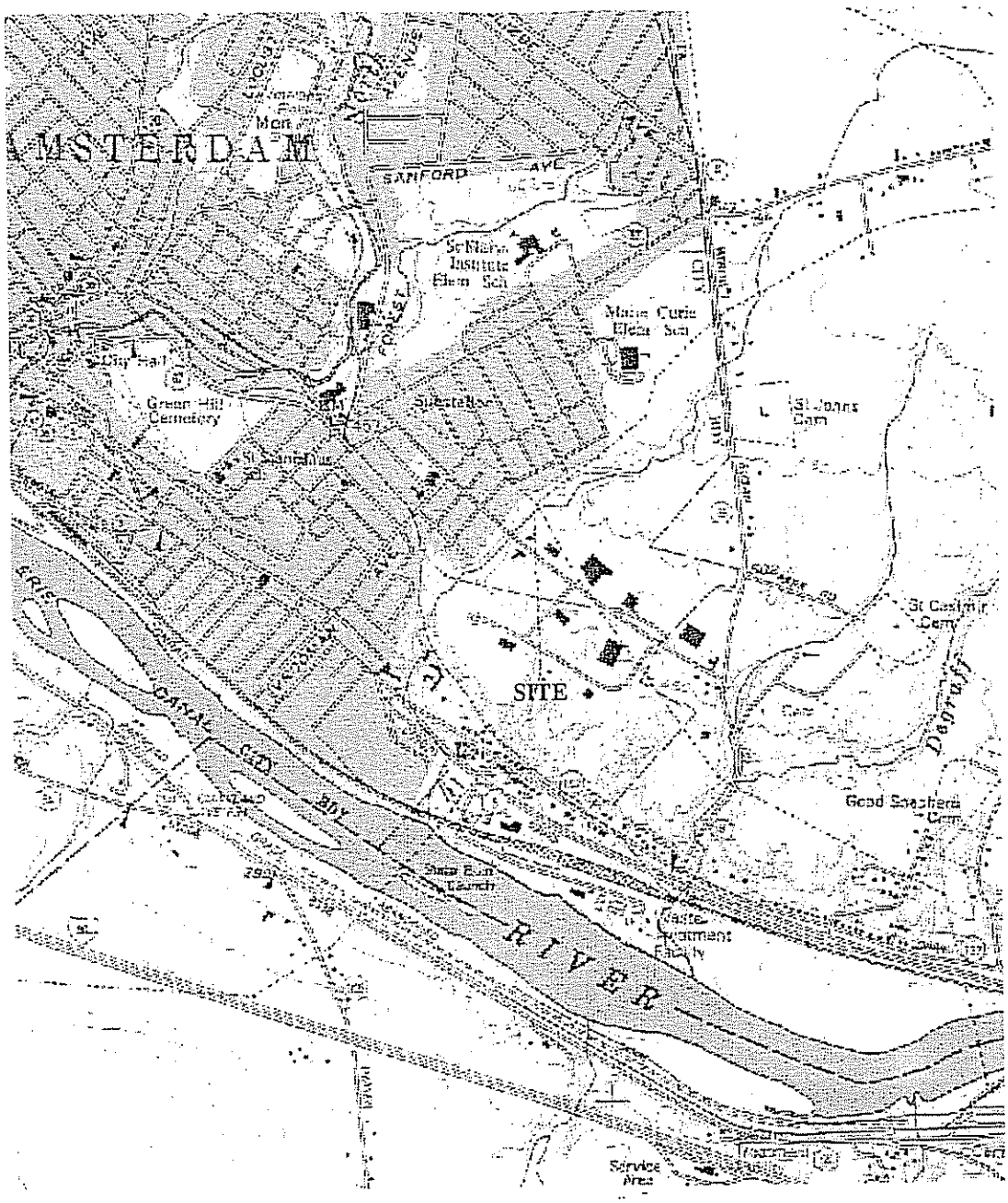
The above comparison demonstrates that post-development off-site peak discharges decreased or remained constant for all storm events at each design point. The proposed storm water management systems have been designed to accommodate both phases of the landfill development.

The proposed storm water collection system consisting of pipes, open drainage ways and on-site detention and treatment facilities will adequately collect, treat and convey the storm water run-off.

Storm water quality will be enhanced through the implementation of proposed management facilities, erosion control measures and suggested maintenance practices.

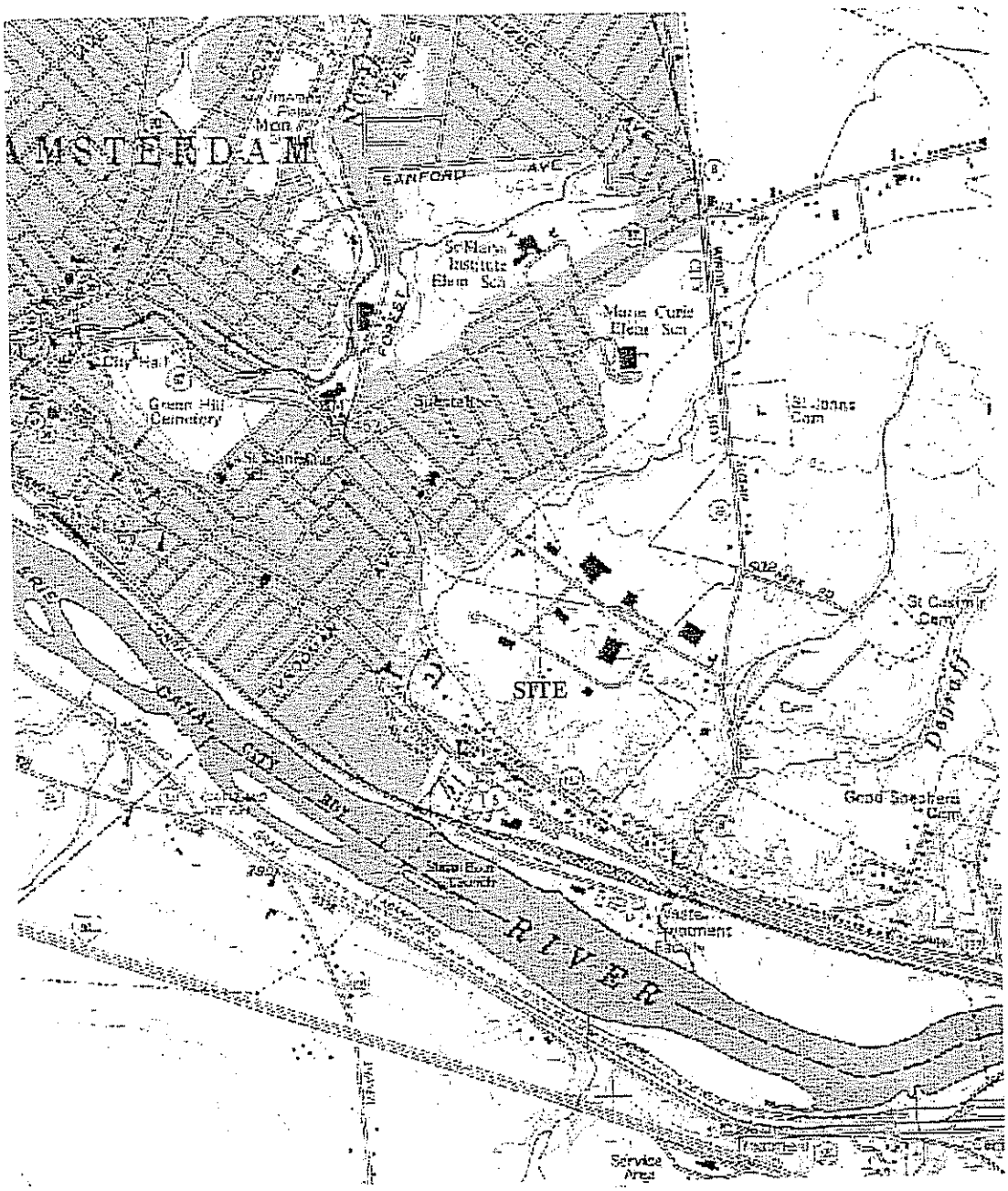
In closing, it is our opinion that the proposed development plan will not adversely impact adjacent or downstream properties if the storm water management facilities are properly constructed and maintained.

Appendix A:
Site Location Map



Map source:-NYDOT Topographic Map, Amsterdam Quadrangle, 1991

Appendix A:
Site Location Map



Map source: - NYDOT Topographic Map, Amsterdam Quadrangle, 1991

Appendix B:
SPDES General Permit GP 02-01

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

from

CONSTRUCTION ACTIVITY

Permit No. GP-02-01

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 8, 2003

Expiration: January 8, 2008

William R. Adriance
Chief Permit Administrator

Address: NYS DEC
Div. Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

Authorized Signature

William R. Adriance

Date: January 8, 2003

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITY

Preface

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater discharges from certain construction activities to waters of the United States[1] are unlawful unless they are authorized by a NPDES (National Pollutant Discharge Elimination System) permit or by a state permit program. New York's SPDES (State Pollutant Discharge Elimination System) is a NPDES-approved program with permits issued in accordance with the Environmental Conservation Law ("ECL"). Discharges of pollutants to all other "Waters of New York State" such as groundwaters are also unlawful unless they are authorized by a SPDES permit.

A discharger, owner, or operator may[2] obtain coverage under this general permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this General Permit and the NOI for New York are available by calling (518) 402-8109 or at any Department of Environmental Conservation (the Department) regional office (see Appendix A on Page 23). They are also available on the Department's website at:

www.dec.state.ny.us

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[1] "Waters of the United States" means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; and
(b) All interstate waters, including interstate "wetlands"; and
(c) All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
    (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    (3) Which are used or could be used for industrial purposes by industries in interstate commerce; and
(d) All impoundments of waters otherwise defined as waters of the United States under this definition; and
(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; and
(f) The territorial sea; and
(g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal areas in wetlands) nor resulted from the impoundment of waters of the United States.

[2] "may" refers to circumstances under which the discharger is ineligible for coverage under this general permit because of other provisions of this permit. Dischargers which are excluded from coverage under this general permit as provided for in Part I, Section C, for example, are not authorized to discharge under this permit. This also applies to possible situations in which an NOI has been submitted and/or a regulatory fee paid pursuant to Article 72 of the ECL. The submittal of an NOI and/or regulatory fee has no bearing or relevance whatsoever on the eligibility of the construction activity discharging stormwater runoff under the authority of this permit.

Local Programs of a Regulated MS4

Under the federal Phase II stormwater program, many cities, villages, towns, and other public entities in New York State which are located within "Urbanized Areas" as defined by the U.S. Census and who operate a Municipal Separate Storm Sewer System ("MS4") will be required to obtain SPDES permit coverage for stormwater discharges under their jurisdiction and control (see 40CFR Part 122 §122.26.32). Additionally, MS4s may be designated by the Department as regulated MS4s. Among other requirements, the Phase 2 NPDES stormwater regulations require regulated MS4s to address stormwater runoff from construction activities. Construction activities covered under this general permit, which are subject to stormwater runoff controls of a regulated MS4, will also need to comply with the MS4's controls.

Five (5) Day Coverage

Prior to the submission of an NOI, the owner or operator must have completed a Storm Water Pollution Prevention Plan (SWPPP) that complies with all requirements of this general permit. Submitting an NOI is an affirmation that a SWPPP has been prepared and will be implemented. If an applicant certifies that the SWPPP has been developed in conformance with the Department's technical standards, the applied-for activity may obtain coverage under this general permit in five (5) business days after the Department's receipt of the NOI provided, that the activity is eligible for coverage under this general permit and that the Department has not informed the applicant otherwise.

Sixty (60) Day Coverage

While the Department's technical standards are appropriate statewide, it is recognized that there may be situations where stormwater management goals can best be met by alternative means that are more suitable given local conditions.

For construction projects in these situations, applicants must identify in their NOI each of the deviations from the Department's technical standards that they are seeking. Applicants must also explain why the deviations are needed or desired and what impacts to water quality, if any, can be expected if the deviation were allowed. Applicants must also explain the actions, if any, that local board(s) have taken with respect to the deviation(s). For applicants which cannot certify conformance with the Department's technical standards, the SWPPP must also be certified by a licensed/certified professional that the SWPPP has been developed in a manner which will insure compliance with water quality standards and with the substantive intent of this permit.

In cases of deviations from the Department's technical standards, applicants must allow sixty (60) business days after the receipt by the Department of a completed NOI and certification before gaining coverage under this general permit and before initiating any construction activity. During this 60 day period, the Department may conduct further review of the NOI and SWPPP. If additional information is needed to complete the review, the NOI will be considered

incomplete and the applicant will be so advised. The intent of this provision is to require conformance the Department's technical standards wherever possible and appropriate. At the same time, alternative means to address stormwater control may be allowed under this general permit where they are more suitable for the site in question and where they will not diminish water quality protection.

There are other scenarios under which coverage under this general permit will not occur until 60 business days from the receipt of a completed NOI. For example, if the construction activity or post construction runoff causes the discharge of a pollutant of concern to a water identified on the 303(d) list or a watershed with an approved TMDL for that pollutant of concern, coverage under the general permit will not occur until sixty (60) business days from the receipt by the Department of a completed NOI. For these projects the operator may be required to submit the SWPPP and/or appropriate certification(s) to the Department for review. The flowchart shown in Figure 1 on page vi will help to describe the process under which certain conditions exist that require possible further analysis and water quality/quantity considerations.

Computer Tool Available For Completion of SWPPPs and NOIs Under Development

The Department is currently developing an interactive computer software tool entitled "How to Prepare SWPPPs and Notices of Intent" to assist applicants in both developing SWPPPs and completing NOIs. This will be available in the near future for use on the Department website as well as being packaged independently on compact discs. This tool will contain guidance as well as many useful links to reference materials and documents concerning erosion and sedimentation control, as well as to the design of stormwater management practices . The Department's website will contain the latest information and guidance on the various tools available.

The Department's Technical Standards

The Department's technical standards for erosion and sediment control are contained in the document, *"New York Standards and Specifications for Erosion and Sediment Control"*[3] published by the Empire State Chapter of the Soil and Water Conservation Society. For the design of water quantity and water quality controls (post-construction stormwater control practices), the Department's technical standards are detailed in the *"New York State Stormwater Management Design Manual."* Both of these documents are available on the Department's website. If an applicant certifies that stormwater management practices will conform to the Department's technical standards, then coverage under the permit may occur sooner than otherwise would be the case if non-conformance with the manuals existed. See Figure 1 on page vi for more information.

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[3] Previously, the *"New York Guidelines for Urban Erosion and Sediment Control"*, also commonly referred to as the "Blue Book".

Permit Valid for Any Size Disturbance

This permit may be used for construction activities involving any amount of disturbed acreage, provided that all other eligibility conditions in subsection B of Part I are satisfactorily met (see page 2 of this permit). Thus, this permit may apply to activities identified under 40 CFR Part 122, subsection 122.26(b)(14)(x) which are also referred to as "NPDES Phase 1 construction activities" involving soil disturbances of five (5) acres or more. This permit may also apply to activities identified under 40 CFR Part 122, subsection 122.26(b)(15) which are also referred to as "NPDES Phase 2 small construction activities" involving soil disturbances of between one (1) and five (5) acres. And, this permit may also apply to construction activities involving soil disturbances of less than one (1) acre if the Department determines that a SPDES permit is required pursuant to the ECL. In any and all cases, all of the eligibility provisions of this general permit must be met in order to gain coverage.

Notice of Termination

After construction is completed as defined in the general permit (see Part II beginning on Page 7), cancellation of coverage is accomplished by the submittal of a Notice of Termination ("NOT"). Failure to submit a NOT may result in the continued obligation to pay a yearly Regulatory Fee established pursuant to Article 72 of the ECL and/or may be cause for suspension of permit coverage.

Previous versions of NOIs, NOTs and Notices of Intent, Transfer and Termination ("NOITT"s) cannot be used in conjunction with this general permit. There is a new NOI required for obtaining coverage under this general permit. Failure to include information identified as "mandatory" entries on the new NOI form may prevent and/or delay discharge authorization being sought under this permit.

The new NOT will also include an identification of any permanent structures that are being left on the site after stabilization occurs and after termination of permit coverage under this general permit. The NOT will also include a certification that the structures were constructed as described in the SWPPP and that an Operation and Maintenance ("O&M") manual has been prepared and has been made available to the owner of such permanent structures who is expected to conduct the necessary O&M over the life of the structure(s).

Ineligible Activities

The submittal of a completed NOI and/or the payment of an annual regulatory fee by an applicant does not necessarily mean that an applicant is covered under this permit if the applicant is ineligible for coverage under this permit under the terms cited in Part I of this permit. In other words, submitting a completed NOI and paying an annual regulatory fee does not automatically gain an applicant permit coverage if the applicant is ineligible for coverage under this permit even if the Department fails to immediately inform the applicant of such ineligibility.

Permit Expiration Date

Coverage under this general permit is available January 8, 2003 and will expire five (5) years after issuance on January 8, 2008.

Activities Previously Covered Under GP-93-06

In a separate proposal, the Department is also concurrently seeking to re-issue GP-93-06 with an expiration of August 1, 2003. The purpose of this action is to provide a transition period for permittees which have had SPDES permit coverage under GP-93-06 immediately prior to January 8, 2003, the effective date of GP-02-01. **Prior to August 1, 2003**, these activities will need to:
(1) stabilize their sites in accordance with GP-93-06 and submit an NOT; or, if necessary,
(2) gain coverage under GP-02-01 by submitting a new NOI.

For **new** construction activities, coverage under GP-93-06 will not be available after the effective date of GP-02-01, January 8, 2003. Such discharges may be eligible for coverage under GP-02-01 (see Part I.B. on page 2 of this permit).

Water Quality Violations Not Permitted

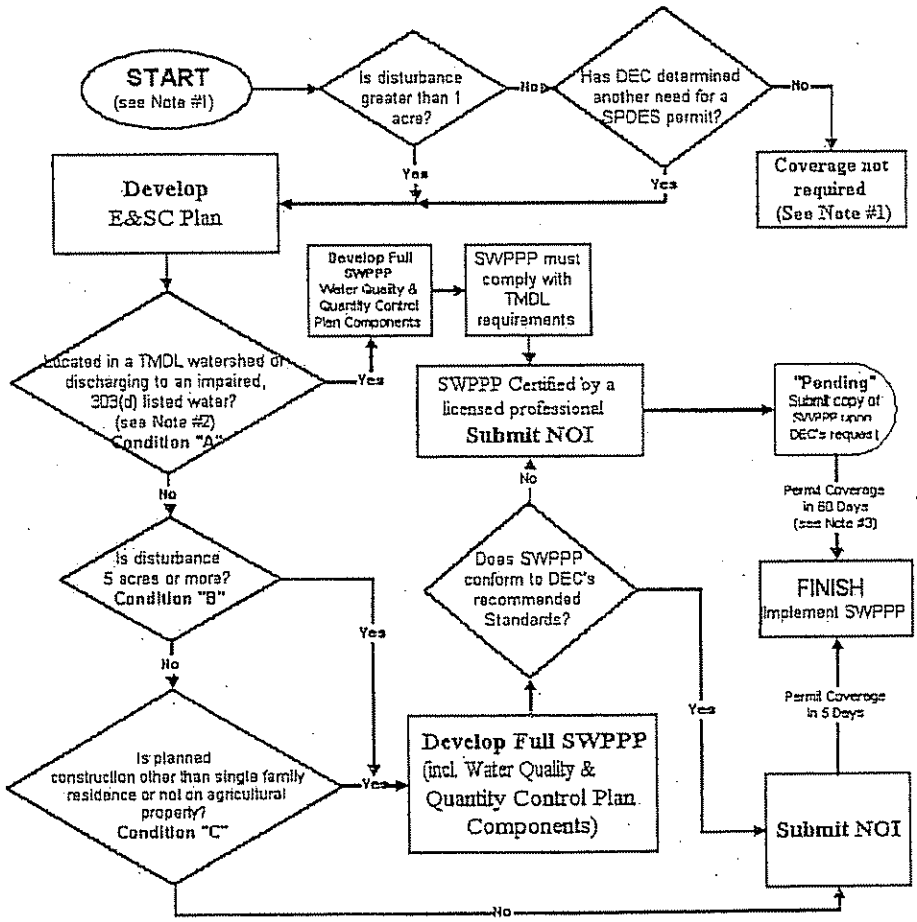
This permit does not authorize any person to cause or contribute to a condition in contravention of any water quality standards that are contained in the Rules and Regulations of the State of New York (see Part I of this permit on page 2) even if the permittee is in compliance with all other provisions of this permit. Any violations of water quality standards may be considered by the Department to be violations of this permit and/or the ECL, including its accompanying regulations.

Other Department Permits

Construction activities may also require other Department permits in addition to the coverage provided by this general permit including, but not limited to, dam safety, wetlands and stream protection. Such other Department permits must be obtained separately from coverage under this general permit. Further information concerning these permits should be sought from the Regional Permit Administrator at the appropriate Department regional office (See Appendix A on page 23).

FIGURE 1

SWPPP and Stormwater Permit Process



NOTES:

1. Under any of the above conditions other environmental permits may be required. DEC may require permit for construction disturbance < 1 acre on a case by case basis.
2. and the following exists: construction and/or stormwater discharges from the construction or post-construction site contain the pollutant of concern identified in the TMDL or 303(d) listing.
3. After receipt by DEC of completed application.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES

FROM CONSTRUCTION ACTIVITIES

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Part I. COVERAGE UNDER THIS PERMIT

A. **Maintaining Water Quality** - It shall be a violation of this general permit and the Environmental Conservation Law ("ECL") for any discharge authorized by this general permit to either cause or contribute to a violation of water quality standards as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York including, but not limited to:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal and settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

B. **Eligibility Under This General Permit**

1. This permit may authorize all discharges of stormwater from construction activity[4] to surface waters and groundwaters except for ineligible discharges identified under subparagraph C of this Part (see below). Discharge authorization under this permit requires the submittal of a completed NOI.

2. Except for non-stormwater discharges explicitly listed in the next paragraph, this permit only authorizes stormwater discharges from construction activities.

3. Notwithstanding paragraphs B.1 and B.2 above, the following non-stormwater discharges may be authorized by this permit: discharges from fire

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[4] This includes discharges of stormwater associated with industrial activity identified under 40 CFR Part 122, subsection 122.26(b)(14)(x), small construction activities identified under 40 CFR Part 122, subsection 122.26(b)(15) or any other stormwater from construction activities that are not otherwise ineligible for coverage under this permit (See Part I, subsection B beginning on page 2).

fighting activities; fire hydrant flushings; waters to which cleansers or other components have **not** been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this general permit, and who discharge as noted in this paragraph, and with the exception of flows from fire fighting activities, these discharges must be identified in the SWPPP(see Part III beginning on Page 7). Under all circumstances, the permittee must still comply with water quality standards (see Part I, subsection A on Page 2).

C. **Activities Which Are Ineligible for Coverage Under This General Permit** - All of the following stormwater discharges from construction activities are **not** authorized by this permit:

1. Discharges after construction activities have been completed and the site has undergone final stabilization[5];

2. Discharges that are mixed with sources of non-stormwater other than those expressly authorized under subsection B.3. of this Part (see page 3) and identified in the SWPPP required by this permit;

3. Discharges that are subject to an existing SPDES individual or general permit or which are required to obtain an individual or alternative general permit pursuant to Part V, subparagraph K (see page 21) of this permit;

4. Discharges that are likely to adversely affect a listed, or proposed to be listed, endangered or threatened species, or its critical habitat;

5. Discharges which are subject to an existing effluent (limitation) guideline addressing stormwater and/or process wastewater unless said guidelines are contained herein; or

6. Discharges which either cause or contribute to a violation of water quality standards adopted pursuant to the ECL and its accompanying regulations (See subsection A of Part I on page 2).

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[5] "Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 80% has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

D. Authorization Under This General Permit

1. An operator[6] must submit a completed NOI form in order to be authorized to discharge under this general permit. The NOI form shall be one which is associated with this general permit, signed in accordance with Part V. H.(see Page 19) of this permit and submitted to the address indicated on the NOI form. NOIs and NOITTs used in association with either previous or other general permits are not valid for obtaining coverage under this general permit. The submittal of an NOI is an affirmation to the operators' understanding and belief that the activity is eligible for coverage under this permit and that a SWPPP has been prepared and will be implemented in accordance with Part III of this permit.

2. All contractors and subcontractors of the operator identified under Part III.E.1 (see page 17) must provide the certification cited under Part III.E.2 (see page 17). Such certifications shall become part of the SWPPP for the construction activity covered under this general permit.

3. Unless notified by the Department to the contrary, operators who are eligible for coverage under this permit **and** who submit an NOI in accordance with the requirements of this permit, may be authorized to discharge stormwater from construction activities under the terms and conditions of this permit, and in accordance with the following timetable:

a. For construction activities which:

(1) develop a SWPPP in conformance with the Department's technical standards (See subsection D of Part III on page 10), and do not or will not discharge a pollutant of concern to an impaired water or a TMDL watershed;

or

(2) as of the effective date of this general permit, GP-02-01, have obtained coverage under, and are operating in compliance with, GP-93-06; and do not or will not discharge a pollutant of concern to an impaired water or a TMDL watershed;

authorization to discharge under this permit may occur five (5) business days after the date on which the NOI is received by the Department.

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6 For the purposes of this permit, the term "operator" means the person, persons, or legal entity which owns or leases the property on which the construction activity is occurring. Also, see Part V., subsection H. on page 19 of this permit.

b. For activities which do not comply with the preceding subsection (i.e. Part I.D.3.a.), authorization to discharge under this permit will begin no sooner than sixty (60) business days from the receipt of the completed NOI unless notified differently by the Department pursuant to Part V, subsection K of this permit (see page 21). For activities not satisfying Part I.D.3.a.(1) above, or for construction site runoff subject to a TMDL (see Figure 1 on page vi), the SWPPP must be prepared by a licensed/certified professional[7] and include a certification stating that the SWPPP has been developed in a manner which will assure compliance with water quality standards (see Part I.A.) and with the substantive intent of this permit.

c. For construction activities which are subject to a sixty-day period provision identified in the preceding subparagraph b., the SWPPP shall include each of the components identified in Part III.A.1.b. (see page 8).

4. At its sole discretion, the Department may deny or terminate coverage under this permit and require coverage under another SPDES permit at any time based on a review of the NOI, the SWPPP or other relevant information (see Part V, subsection K of this permit on page 21).

5. A copy of the NOI and a brief description of the project shall be posted at the construction site in a prominent place for public viewing.

6. A signed copy of the NOI, the SWPPP, and any reports required by this permit shall also be submitted concurrently to the local governing body and any other authorized agency[8] having jurisdiction or regulatory control over the construction project.

7. New stormwater discharges from construction activities that require any other Uniform Procedures Act permit (Environmental Conservation Law, 6 NYCRR Part 621) cannot be covered under this general permit until the other required permits are obtained. Upon satisfaction of the State Environmental Quality Review Act ("SEQRA") for the proposed action and issuance of necessary permits, the applicant may submit an NOI to obtain coverage under this general

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7 A "licensed/certified professional" means a person currently licensed to practice engineering in New York State or is a Certified Professional in Erosion and Sediment Control (CPESC).

8 For the purposes of this general permit, "any other authorized agency" shall include any local, regional, or state entity or agency except the Department which has authority to review stormwater discharge from the project, including authority under any approved watershed protection plan or regulations.

permit.[9] In order to facilitate the Department's review of a multi-permitted project, an applicant should submit, at a minimum, a copy of the SWPPP which contains the information specified in Appendix B (see page 24). This information will assist the Department in determining whether or not coverage under this general permit or another SPDES permit is the more appropriate option. The Department may also require the submission of additional information in order to determine the SWPPP's conformance with the Department's technical standards.

8. Upon renewal of this general permit or issuance of a new general permit, the permittee is required to notify the Department of its intent to be covered by the new general permit. Coverage will continue under this permit for its term unless action is taken to terminate permit coverage as provided elsewhere in this permit. See also Part V. subsection B. on page 18 of this permit.

9. In the event of a transfer of ownership or responsibility for stormwater runoff, there can be no "automatic" transfer of permit coverage from one permittee to the next without appropriate notification from the dischargers. The former permittee must submit an NOT and notify the new discharger of the possible need for the new discharger to submit a new NOI (see Section E, subparagraph 2 below).

E. **Deadlines for Notification**

1. Operators who intend to obtain coverage under this general permit for stormwater runoff from construction activities must submit an NOI in accordance with the requirements of this Part at least five (5), or sixty (60) business days, as appropriately determined from Part I, Section D.3 (see page 4) prior to the commencement of construction[10] activities.

2. For stormwater runoff from construction activities where the operator changes, a new NOI must be submitted by the new operator in accordance with the requirements of this permit. The former operator must submit a NOT in accordance with Part II (see page 7) of this permit and notify the new operator of the requirement to submit a new NOI to obtain coverage under this permit. The new operator must also review and sign the SWPPP in accordance with Part III.B.(see page 9) and continue implementation of the SWPPP as required by this

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9 The purposes of this subsection is to assure that the requirements of SEQRA are fulfilled, if necessary, before any discharge authorization under this general permit is granted.

10 "Commencement of Construction" means the initial disturbance of soils associated with clearing, grading, or excavating activities, or other construction activities.

permit.

Part II. TERMINATION OF COVERAGE[11]

Where a site has been finally stabilized, the operator must submit a NOT form prescribed by the Department for use with this general permit. The NOT shall be signed in accordance with Part V. H.(see page 19) of this permit and submitted to the address indicated on the approved NOT form.

The permittee must identify all permanent stormwater management structures that have been constructed and provide the owner(s) of such structures with a manual describing the operation and maintenance practices that will be necessary in order for the structure to function as designed after the site has been stabilized. The permittee must also certify that the permanent structure(s) have been constructed as described in the SWPPP.

Part III. STORMWATER POLLUTION PREVENTION PLANS ("SWPPP"s)

A. General

1. SWPPP Preparation

a. A SWPPP shall be developed by the operator for construction activities at each site to be covered by this permit, prior to the initiation of activities requiring coverage under this permit. SWPPPs shall be prepared in accordance with sound engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges. In addition, the SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in stormwater discharges and to assure compliance with the terms and conditions of this permit. Operators are encouraged to have their SWPPP reviewed for adequacy and completeness by the local soil and water conservation district ("SWCD") and/or other professionals qualified in erosion and sediment control practices[12] and stormwater management. Moreover, if the construction activity is identified under Part I, subsection D.3.b. (See page 5), or for construction site runoff subject to a TMDL (see Figure 1 on page vi), the SWPPP must include a certification by a licensed/certified professional.

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11 Submittal of an NOT will terminate coverage under this general permit and will also remove the permittee from subsequent billings of the annual regulatory fee levied under Article 72 of the ECL.

12 For example, CPESC, Inc. administers a certified program of individuals under its CPESC (Certified Professional in Erosion and Sediment Control) program which is sponsored by the International Erosion Control Association (IECA) and the Soil and Water Conservation Society (SWCS) and is endorsed by USDA - Natural Resources Conservation Service. CPESC, Inc. also administers the CPSWQ (Certified Professional in Stormwater Quality) program.

b. All SWPPPs shall include erosion and sediment controls. For construction activities meeting either Condition "A", "B" or "C" described below, the SWPPP shall also include water quantity and water quality controls (post-construction stormwater control practices).(see Part III. D.).

(1) Condition A - Construction site or post construction runoff discharging a pollutant of concern to either an impaired water identified on DEC's 303(d) list or a TMDL watershed for which pollutants in stormwater have been identified as a source of the impairment.

(2) Condition B - Construction site runoff from Phase 1 construction activities (construction activities disturbing five (5) or more acres) identified under 40 CFR Part 122, §122.26(b)(14)(x).

(3) Condition C - Construction site runoff from construction activity disturbing between one (1) and five (5) acres of land during the course of the project, exclusive of the construction of single family residences and construction activities at agricultural properties.

2. **SWPPP Implementation** - Operators are responsible for implementing the provisions of the SWPPP and ensuring that all contractors and subcontractors who perform professional services at the site provide certification of the SWPPP in accordance with Part I.D.2. (see page 4) and Part III.E.2. (see page 17) of this permit. All contractors and subcontractors identified in the SWPPP in accordance with Part III.E.1. (see page 17) of this permit must agree to implement applicable provisions of the SWPPP and satisfy the certification requirement of Part III.E.2. (see page17). However, contractors and subcontractors who are not operators, as defined in this permit (see page 4), are not required to submit a NOI in addition to the NOI submitted by the operator.

3. **Deadlines for SWPPP Preparation and Compliance** - The SWPPP must be developed prior to the submittal of an NOI and provide for compliance with the terms and schedule of the SWPPP beginning with the initiation of construction activities. The operator shall also certify in the SWPPP that all appropriate stormwater control measures will be in place before commencement of construction of any segment of the project that requires such measures.

4. **Local Requirements** - Developing a SWPPP that complies with the requirements listed herein does not relieve an operator from the obligation of complying with stormwater management requirements of the local government having jurisdiction over the project.

5. **Activities Previously Covered Under GP-93-06** - For construction activities which are covered by GP-93-06 as of the effective date of this permit (GP-02-01), the continued implementation of their SWPPP that was developed and implemented in accordance with GP-93-06 is acceptable until such time as:

(a) an NOT is submitted;

(b) the Department notifies them otherwise in accordance with this permit, including Part V, subsection K (see page 21); or

(c) this permit expires.

B. **Signature and SWPPP Review**

1. The SWPPP shall be signed in accordance with Part V. H.(see page 19), and be retained at the site where the construction activity occurs in accordance with Part IV (see retention of records on page 17) of this permit.

2. The permittee shall submit a copy of the SWPPP and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity. The operator shall make SWPPPs available upon request to the Department and any local agency having jurisdiction; or in the case of a stormwater discharge associated with industrial activity which discharges through a municipal separate storm sewer system, to the municipal operator of the system.

3. The Department, or its authorized representative, may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. Such notification shall identify those provisions of the permit which are not being met by the SWPPP and identify which provisions of the SWPPP require modifications in order to meet the minimum requirements of this permit. Within seven (7) days of such notification, (or as otherwise provided by the Department) the permittee shall make the required changes to the SWPPP and shall submit to the Department a written certification that the requested changes have been made. Notwithstanding the foregoing, the Department reserves all rights to enforce the terms of the ECL.

C. Keeping SWPPPs Current - The permittee shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or

2. The SWPPP proves to be ineffective in:

a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP required by this permit, or

b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity.

3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP (see Part III.E, page 17 below). Amendments to the SWPPP may be reviewed by the Department in the same manner as provided by Part III.B (see page 9 above).

D. General Contents of SWPPPs -

1. Standards for construction activities covered under this permit - The Department's technical standards for erosion and sediment controls are detailed in the "*New York Standards and Specifications for Erosion and Sediment Control*"[13] published by the Empire State Chapter of the Soil and Water Conservation Society. For the design of water quality and water quantity controls (post-construction stormwater control practices), the Department's technical standards are detailed in the "*New York State Stormwater Management Design Manual.*"

If an operator certifies that the SWPPP has been developed in conformance with the Department's technical standards referenced above, they may obtain coverage under this general permit in five (5) business days from the Department's receipt of the NOI, provided the construction activity does not meet Condition A in Part III.A.1.b. For SWPPPs which will not conform with the Department's technical standards, the SWPPP must be prepared by a licensed/certified professional and include a certification stating that the SWPPP has been developed in a manner which will assure compliance with the State's water quality standards and with the substantive intent of this permit. In addition, coverage under this general permit will not begin until sixty (60) business days from the receipt of a completed NOI.

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13 Previously, the "*New York Guidelines for Urban Erosion and Sediment Control*," also commonly referred to as the "Blue Book."

2. **Minimum SWPPP Components** SWPPPs prepared pursuant to this general permit shall present fully designed and engineered stormwater management practices with all necessary maps, plans and construction drawings. The SWPPP must, at a minimum, include the following:

a. For all construction activities subject to this general permit -

(1). provide background information about the scope of the project, including the location, type and size of project.

(2) provide a site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map should show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s), wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of off-site material, waste, borrow or equipment storage areas; and location(s) of the stormwater discharge(s);

(3) provide a description of the soil(s) present at the site;

(4) provide a construction phasing plan describing the intended sequence of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance. Consistent with the New York Guidelines for Urban Erosion and Sediment Control, there shall not be more than five (5) acres of disturbed soil at any one time without prior written approval from the Department;

(5) provide a description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in the storm water discharges;

(6) provide a description of construction and waste materials expected to be stored on-site with updates as appropriate, and a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response;

(7) describe the temporary and permanent structural and vegetative measures to be used for soil stabilization, runoff control and sediment control for each stage of the project from initial land

clearing and grubbing to project close-out;

(8) identify and show on a site map/construction drawing(s) the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

(9) provide the dimensions, material specifications and installation details for all erosion and sediment control practices, including the siting and sizing of any temporary sediment basins;

(10) identify temporary practices that will be converted to permanent control measures;

(11) provide an implementation schedule for staging temporary erosion and sediment control practices, including the timing of initial placement and the duration that each practice should remain in place;

(12) provide a maintenance schedule to ensure continuous and effective operation of the erosion and sediment control practices;

(13) provide the names(s) of the receiving water(s);

(14) provide a delineation of SWPPP implementation responsibilities for each part of the site;

(15) provide a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable; and

(16) provide any existing data that describes the stormwater runoff characteristics at the site.

b. For construction activities meeting Condition A. B or C in Part III.A.1.b.

(1) provide all the information required in Parts III.D.2.a.1 - 16 above;

(2) provide a description of each post-construction stormwater control practice;

(3) identify and show on a site map/construction drawing(s) the specific location(s) and size(s) of each post-construction stormwater control practice;

(4) provide a hydrologic and hydraulic analysis for all structural components of the stormwater control system for the applicable design storms;

(5) provide a comparison of post-development stormwater runoff conditions with pre-development conditions;

(6) provide the dimensions, material specifications and installation details for each post-construction stormwater control practice;

(7) provide a maintenance schedule to ensure continuous and effective operation of each post-construction stormwater control practice.

The following three subsections, Part III.D. 3. through Part III.D. 5., apply only to construction activities covered under this general permit which meet Conditions "A" , "B"[14] or "C" in Part III. A.1.b. Beginning with Part III.E. below (see page 17) the requirements set forth therein apply to all permittees covered under this permit.

3. Site Assessment and Inspections -

a. The operator shall have a qualified professional[15] conduct an assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment controls described in the SWPPP and required by Part III.D. (see page 10) of this permit have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction. Following the commencement of construction, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. During each inspection, the qualified professional shall record the following information:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and

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14 Condition "B" includes construction activities covered under GP-93-06 and, therefore, are subject to Part III.D.3 through Part III.D. 5.

15 "Qualified professional" means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), or soil scientist.

containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water;
and

(6) All deficiencies that are identified with the implementation of the SWPPP.

b. The operator shall maintain a record of all inspection reports in a site log book. The site log book shall be maintained on site and be made available to the permitting authority upon request. Prior to the commencement of construction,[16] the operator shall certify in the site log book that the SWPPP, prepared in accordance with Part III.D. (see page 10) of this permit, meets all Federal, State and local erosion and sediment control requirements.

The operator shall post at the site, in a publicly-accessible location, a summary of the site inspection activities on a monthly basis.

c. Prior to filing of the Notice of Termination or the end of permit term, the operator shall have the qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[17] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed.

d. The operator shall certify that the requirements of Parts III.D.3., III.D.4. and III.D.5 of this permit have been satisfied within 48 hours of actually meeting such requirements.

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16 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

17 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

4. **Stabilization**[18] - The operator shall initiate stabilization measures as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:

a. Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable;

b. Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within twenty-one (21) days, temporary stabilization measures need not be initiated on that portion of the site.

5. **Maintenance** - Sediment shall be removed from sediment traps or sediment ponds whenever their capacity has been reduced by fifty (50) percent from the design capacity.

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18 "Stabilization" means covering or maintaining an existing cover over soil. Cover can be vegetative (e.g. grass, trees, seed and mulch, shrubs, or turf) or non-vegetative (e.g. geotextiles, riprap, or gabions).

E. Contractors

1. The SWPPP must clearly identify for each measure identified in the SWPPP, the contractor(s) and subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part III.E.2 (see below) of this permit in accordance with Part V.H.(see page 19) of this permit. All certifications must be included in the SWPPP. Additionally, new contractors and subcontractors (see subsection C.3. above) need to similarly certify.

2. Certification Statement - All contractors and subcontractors identified in a SWPPP in accordance with Part III.E.1 (see above) of this permit shall sign a copy of the following certification statement before undertaking any construction activity at the site identified in the SWPPP:

> "I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

The certification must include the name and title of the person providing the signature in accordance with Part V.H.(see page 19) of this permit; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

Part IV. MONITORING, REPORTING AND RETENTION OF RECORDS

A. The Department may, at its sole discretion, require monitoring of discharge(s) from the permitted construction activity after notifying the permittee in writing of the basis for such monitoring, the parameters and frequency at which monitoring shall occur and the associated reporting requirements, if any.

B. The operator shall retain copies of SWPPPs and any reports submitted in conjunction with this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by the Department, in its sole discretion, at any time upon written notification.

C. The operator shall retain a copy of the SWPPP required by this permit at the construction site from the date of initiation of construction activities to the date of final

stabilization.

D. The operator shall also prepare a written summary of its status with respect to compliance with this general permit at a minimum frequency of every three months during which coverage under this permit exists. The summary should address the status of achieving each component of the SWPPP . This summary shall be handled in the same manner as prescribed for SWPPPs under Part III, subsection B (see Page 9).

E. **Addresses** - Except for the submittal of NOIs and NOTs, all written correspondence under this permit directed to the Department, including the submittal of individual permit applications, shall be sent to the address of the appropriate Department Office as listed in Appendix A (see page 23).

Part V. STANDARD PERMIT CONDITIONS

A. **Duty to Comply** - The operator must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against either the operator or the contractor/subcontractor; permit revocation or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all construction activity at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the operator or the operator's on-site representative.

B. **Continuation of the Expired General Permit** - This permit expires five (5) years after issuance on January 8, 2008. However, coverage may be obtained under the expired general permit which will continue in force and effect until a new general permit is issued. After issuance of a new general permit, those with coverage under GP-02-01 will have six (6) months from the effective date of the new general permit to complete their project or obtain coverage under the new permit. Unless otherwise notified by the Department in writing, operators seeking authorization under a new general permit must submit a new NOI in accordance with the terms of such new general permit. See also Part I, subsection D.8. on page 6.

C. **Penalties for Violations of Permit Conditions** - There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $25,000 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to halt or reduce activity not a defense - It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the construction activity in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate - The permittee and its contractors and subcontractors shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information - The permittee shall furnish any information requested by any agency with regulatory or review authority over this project for the purpose of determining compliance with this permit or compliance with any other regulatory requirements placed on the project in conjunction with this permit. Failure to provide requested information shall be a violation of this permit. Such regulating agencies include but are not limited to the Department, SWCDs,[19] local planning, zoning, health, and building departments that review and approve erosion and sediment control plans, grading plans, and Stormwater Management Plans, as well as MS4s into whose system runoff from the permitted project or activity discharges. The SWPPP and inspection reports required by this general permit are public documents that the operator must make available for inspection, review and copying by any person within five (5) business days of the operator receiving a written request by any such person to review the SWPPP and/or the inspection reports. Copying of documents will be done at the requester's expense.

G. Other Information - When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to the Department, he or she shall promptly submit such facts or information.

H. Signatory Requirements - All NOIs, NOTs, SWPPPs, reports, certifications or information required by this permit or submitted pursuant to this permit, shall be signed as follows:

1. All NOIs and NOTs shall be signed as follows:

a. For a corporation: by (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person authorized to and who performs similar policy or decision-making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

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19 "SWCD" means Soil and Water Conservation District

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and all reports required by the permit and other information requested by the Department or local agency shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Department.

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

c. **Certification** - Except for NOIs and NOTs, any person signing documents in accordance with this Part shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

I. **Property Rights** - The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

J. Severability - The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Denial of Coverage Under This Permit

1. At its sole discretion, the Department may require any person authorized by this permit to apply for and/or obtain either an individual SPDES permit or an alternative SPDES general permit. Where the Department requires a discharger authorized to discharge under this permit to apply for an individual SPDES permit, the Department shall notify the discharger in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of issuance or denial of the individual SPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate Department Office indicated in Appendix A of this permit. The Department may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual SPDES permit application as required by the Department under this paragraph, then the applicability of this permit to the individual SPDES permittee is automatically terminated at the end of the day specified by the Department for application submittal.

2. Any discharger authorized by this permit may request to be excluded from the coverage under this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii) and 6 NYCRR Part 621, with reasons supporting the request, to the Department at the address for the appropriate Department Office (see addresses in Appendix A on page 23 of this permit). The request may be granted by issuance of an individual permit or an alternative general permit at the discretion of the Department.

3. When an individual SPDES permit is issued to a discharger covered by this permit, or the discharger is authorized to discharge under an alternative SPDES general permit, the applicability of this permit to the individual SPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual SPDES permit is denied to an operator otherwise subject to this permit, or the operator is denied for coverage under an alternative SPDES general permit, the applicability of this permit to the individual SPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Department.

L. **Proper Operation and Maintenance** - The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWPPPs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

M. **Inspection and Entry** - The permittee shall allow the Department or an authorized representative of EPA, the State, or, in the case of a construction site which discharges through an MS4, an authorized representative of the MS4 receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

N. **Permit Actions** - At the Department's sole discretion, this permit may, at any time, be modified, revoked, or renewed. The filing of a request by the permittee for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not stay compliance with any terms of this permit.

APPENDIX A

List of NYS DEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	Bldg 40 - SUNY @ Stony Brook Stony Brook, NY 11790-2356 Tel. (631) 444-0365	Bldg 40 - SUNY @ Stony Brook Stony Brook, NY 11790-2356 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	200 White Plains Road, 5th Floor Tarrytown, NY 10591-5805 Tel. (845) 332-1835
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	Route 86, PO Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Hudson Street Warrensburg, NY 12885-0220 Tel. (518) 623-1200
6	Herkimer, Jefferson, Lewis, Oneida and St. Lawrence	State Office Building 317 Washington Street Watertown, NY 13601-3787 Tel. (315) 785-2245	State Office Building 207 Genesee Street Utica, NY 13501-2885 Tel. (315) 793-2554
7	Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga and Tompkins	615 Erie Blvd. West Syracuse, NY 13204-2400 Tel. (315) 426-7438	615 Erie Blvd. West Syracuse, NY 13204-2400 Tel. (315) 426-7500
8	Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne and Yates	6274 East Avon-Lima Road Avon, NY 14414-9519 Tel. (585) 226-2466	6274 East Avon-Lima Rd. Avon, NY 14414-9519 Tel. (585) 226-2466
9	Allegany, Cattaraugus, Chautauqua, Erie, Niagara and Wyoming	270 Michigan Avenue Buffalo, NY 14203-2999 Tel. (716) 851-7165	270 Michigan Ave. Buffalo, NY 14203-2999 Tel. (716) 851-7070

APPENDIX B

Information Required of Construction Activities Which Are Identified Under Part I. subsection D.7. (see page 5)

A. The location (including a map) and the nature of the construction activity;

B. The total area of the site and the area of the site that is expected to undergo excavation during the life of the permit;

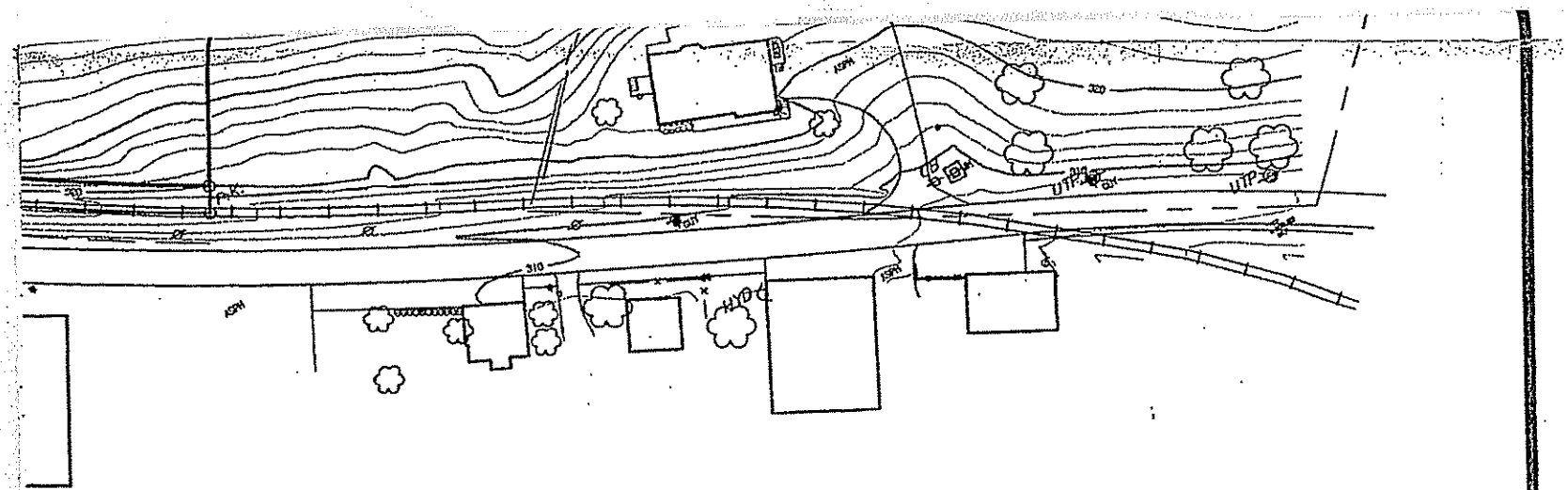
C. Proposed measures, including best management practices, to control pollutants in storm water discharges during construction, including a brief description of applicable State and local erosion and sediment control requirements;

D. Proposed measures to control pollutants in storm water discharges that will occur after construction operations have been completed, including a brief description of applicable State or local erosion and sediment control requirements;

E. An estimate of the runoff coefficient of the site and the increase in impervious area after the construction addressed in the permit application is completed, the nature of the fill material and existing data describing the soil or the quality of the discharge; and

F. The name of the receiving water(s).

Appendix C:
Sediment and Erosion Control Plan (Pocket)



AMSTERDAM MATERIALS RECYCLING

EROSION AND SEDEMENT CONTROL PLAN
AMSTERDAM MATERIALS RECYCLING
AIDA - EDSON STREET

CITY OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn	checked
GMT	JEM
date	scale
12/5/03	AS SHOWN
project no.	
90303.00	
sheet no.	
SP6	

90303.00

Appendix D: Notice of Intent (NOI)

Two copies of the Notice of Intent, Transfer or Termination must be completed when construction activities that disturb site soil have been completed and the site has achieved final stabilization. One should be forwarded to the project Owner/Operator. The other should be sent via registered or certified mail, with return receipt requested, to the following address:

NYS Department of Environmental Conservation
Division of Water
625 Broadway
Albany, New York 12233

Notice of Intent ("NOI")

New York State Department of Environmental Conservation

Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NOTICE OF INTENT for Stormwater Discharges Associated with Construction Activity UNDER SPDES GENERAL PERMIT #GP-02-01

NYR _ _ _ _ _ _
(for DEC use only)

IMPORTANT: **All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this general permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to completing and submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.**

Section I. Applicant/Activity Information

1. Owner/Operator Name: Amsterdam Materials Recycling, LLC			
2a. Mailing Address: 20 Gurley Avenue	2b. City Troy	2c. State NY	2d. Zip 12182
3. Contact Person: 3a. First Name: Robert 3b. Last Name: Noel	3c. Phone: 235-8050	3d. E-mail:	
4a. Site/Project Name: Amsterdam Materials Recycling		4b. Existing use of the site: vacant	
5a. Street Address: Sam Stratton Road	5b. City: Amsterdam	State: NY	5c. Zip 12010
6. County: Montgomery	7. Site Location: 7a. X Coordinates: N 42'-43"	7b. Y coordinates: 74'-10"	

Section II. Disturbance Activity/Discharge Characteristics

8. Future use of the site: recycling facility	9. Duration of disturbance activity: from 9a. 4 / 1 / 04 to 9b. 4 / 1 / 09
10. Total site acreage: 40.1 (acres)	11. Total amount of disturbed area of overall plan of development or sale: 40.1 (acres)
12. Soil (Hydrologic Soil Group): B, C	13. What is the maximum slope of disturbed area: % 45
14. What is the percentage of impervious area of the site? 14a. before commencement of the project % 0 14b. after completion of the project %	
15. Will there be permanent stormwater management practices? ☒ yes ☐ no	16. Is this a phased project? ☐ yes ☒ no

Section III. Receiving System(s)

17. Does any part of the project lie within a regulated 100-year flood plain? ☐ yes ☒ no
18. Does the site/activity lie within the boundaries of the New York City watershed? ☐ yes ☒ no
19. Does runoff from site enter a storm sewer or ditch maintained by a local, Federal or State governmental unit (MS4)? ☒ yes ☐ no
If the answer to 19 is no, skip to question 20.
19a. Provide the name of the government owning the storm sewer system: City of Amsterdam
19b. Is the MS4 a "regulated MS4" as defined under 40 CFR Section 122.32? ☒ yes ☐ no ☐ don't know
19c. Does the MS4 have a SPDES permit for their storm sewer system? ☐ yes ☐ no ☒ don't know
19d. Is the runoff from the site tributary to a Combined Sewer Overflow (CSO)? ☐ yes ☒ no
20. What is the name of the nearest surface water body into which the runoff will enter?: Mohawk River
21. Does the runoff discharge to a receiving water identified as 303(d) listed segment ☐, or "TMDL" water ☐, or neither ☒?

Section IV. Stormwater Pollution Prevention Plan:

22. What components are required for the SWPPP? (Consult the SWPPP and Stormwater Permit Process flow chart and check all that apply): 22a. ☒ Erosion and Sediment Control Plan 22b. ☒ Water Quality and Quantity Controls

23. Is the Construction Sequence Schedule for the planned management practices prepared? ☒ yes ☐ no

Will the Stormwater Pollution Prevention Plan be in conformance with:
24a. local government requirements? ☒ yes ☐ no 24b. NYSDEC requirements? ☒ yes ☐ no
If the answer to 24b. is yes, skip to Section VI.

Section V. Supplemental Information (only if you answered "no" to question 24.b.)

25. **Before submitting this NOI, you must have your SWPPP certified by a licensed Professional.**
This certification must state that the SWPPP has been developed in a manner which will enssure compliance with water quality standards and with the substantive intent of this permit (see general permit for additional information).
Is your plan certified by a licensed Professional? ☒ yes ☐ no

- Do not submit your SWPPP to DEC unless requested.
- A copy of your SWPPP must be submitted to the local jurisdiction(s) as required under Part III, subsection B.2 (also see question #29 below).
- State each deviation from the Department's Technical Standards, reasons supporting each deviation request and an analysis of the water quality impacts in your SWPPP.
- Use Section VII below to summarize the justification statement in one paragraph.
- Allow sixty (60) days from the receipt of your completed application for permit coverage to provide DEC an opportunity to review the application and supporting information.

Section VI. Reviews and Approvals

Has your SWPPP been reviewed by: 26a. ☐ local Soil and Water Conservation District 26b. ☒ Professional Engineer
26c. ☐ Certified Professional Erosion Control Specialist 26d. ☐ Licensed Landscape Architect. 26e. ☐ None

27. Are there other DEC permits required or already obtained for this project? ☒ yes ☐ no
28. If the answer to 27 is no, skip to question 29.
28a. If this NOI is submitted for the purpose of continuing previous coverage under the general permit for stormwater runoff from construction activities (GP-93-06), please indicate the SPDES reference number assigned under GP-93-06: NYR1_____
28b. If there is another SPDES permit, please indicate the permit number: NY _____
28c. If there are other DEC permits, please provide one of the permit numbers: _____

29. Has a copy of your SWPPP been submitted to the governing jurisdiction as required by the permit? ☒ yes ☐ no

Section VII. Details (use this space , maximum 100 words or 600 characters, to further explain answers where necessary).

Section VIII. Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I also certify under penalty of law that this document and the corresponding documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

30a. Printed Name: Robert Noel	30b. Title/Position: Amsterdam Materials Recy.	30c. Phone: 235-8050
Signature:	30d. E-mail:	30e. Date:

Appendix E:
Contractor's Certification Form

STORM WATER POLLUTION PREVENTION PLAN
CONTRACTOR CERTIFICATION
for
Amsterdam Materials Recycling

PROJECT TITLE: _____

PROJECT LOCATION: _____

The general contractor and/or subcontractor(s) that will implement the pollutant control measures described in the SWPPP must be identified below. Each must sign a statement certifying that they understand the NPDES general permit authorizing storm water discharges during construction. These statements must be maintained in the SWPPP file on site.

Contractor implementing the SWPPP: _____
(Business Name)

_____
(Business Address)

_____
(Business Telephone No.)

CERTIFICATION: (Note signature requirements in Part VI.G. of the NPDES General Permit.)

"I certify under penalty of law that I understand the terms and conditions of the general State Pollutant Discharge Elimination System (SPDES) permit that authorizes the storm water discharges associated with construction activities from the construction site identified as part of this certification."

CONTRACTOR_____ _____
Signature Date

_____
Printed Name

Appendix F:
Inspection Report (Sample Form)

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION REPORT
for
Amsterdam Materials Recycling

Note: This form shall be completed by a Professional Engineer or Certified Sediment and Erosion Control Specialist.

PROJECT LOCATION: _____

INSPECTOR: _____

DATE: _____

SITE CONDITIONS:

POLLUTANT CONTROL	IN CONFORMANCE	EFFECTIVE
Construction Entrance	YES/NO (See Below)	YES/NO (See Below)
Sediment Barriers	YES/NO (See Below)	YES/NO (See Below)
Vehicle Service Area Berm	YES/NO (See Below)	YES/NO (See Below)
	YES/NO (See Below)	YES/NO (See Below)
	YES/NO (See Below)	YES/NO (See Below)
	YES/NO (See Below)	YES/NO (See Below)
	YES/NO (See Below)	YES/NO (See Below)

VIOLATION NOTED: (Explain each "NO" circled above) _____

RECOMMENDED REMEDIAL ACTION(S): _____

COMMENTS: _____

Based on the results of the inspection, necessary control modifications shall be implemented within 7 calendar days. These reports shall be kept on file as part of the Storm Water Pollution Prevention Plan for at least three years from the date of completion and submission of the Notice of Termination. A copy of the SWPPP shall be kept at the site at all times during construction.

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonments for knowing violations.

INSPECTOR _____ _____

Signature Date

_____

Printed Name

Appendix G:
Modification Report

STORM WATER POLLUTION PREVENTION PLAN
MODIFICATION REPORT
for
Amsterdam Materials Recycling

Note: This form shall be completed by a Professional Engineer or Certified Sediment and Erosion Control Specialist and directs specific changes and/or modifications required for the Storm water Pollution Prevention Plan which shall be forwarded to the Project Manager and/or Contractor's representative.

CHANGES REQUIRED FOR STORM WATER POLLUTION PREVENTION PLAN

Individual implementing the SWPPP:

_____
(Business Name)

_____
_____
_____
(Business Address)

_____
(Business Telephone No.)

_____
(Business Facsmile No.)

Sent Via: ☐ Facsimile ☐ Courier ☐ Courier

CHANGES REQUIRED TO THE STORM WATER POLLUTION PREVENTION PLAN: _____

_____

_____

REASONS FOR CHANGES: _____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

INSPECTOR _____ _____
Signature Date

_____
Printed Name

Appendix H:
Record of Stabilization and Construction Activity Dates

SITE STABILIZATION
and
CONSTRUCTION ACTIVITY DATES
for
Amsterdam Materials Recycling

Note: This form shall be completed by the Contractor and shall remain as part of the Storm water Pollution Prevention Plan that is to remain at the project site for the duration of construction.

A record of dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be maintained until final site stabilization is achieved and the Notice of Termination is filed. The dates can be entered in the following form, or on a different form.

MAJOR GRADING ACTIVITIES:

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

CONTRACTOR_____ _____
Signature Date

_____
Printed Name

Appendix I:
Notice of Termination (NOT)

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NOTICE OF TERMINATION for Storm Water Discharges Associated with Construction Activity UNDER SPDES GENERAL PERMIT: ☐ #GP-93-06 or ☐ #GP-02-01

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Permittee Information

1. Owner/Operator Name:		
2a. Mailing Address:	2b. City/State/Zip:	
3a. Contact Person:	3b. Phone:	3c. E-mail:

II. Site /Activity Information

4. Facility/Project Site Name:	
5a. Street Address:	5b. City/State/Zip:
6. County:	

III. Reason for Termination

7. ☐ Is site stabilized in accordance with permit and SWPPP? ☐ yes ☐ no ☐ Other reason for termination of permit coverage: (briefly explain)

IV. Final Site Information:

8a. Are there permanent stormwater control structures remaining on the site? ☐ yes ☐ no

If the answer to question 8a. is no, go to question 8e.

If the answer to question 8a. is yes, answer the following questions 8b., 8c., and 8d.:

8b. Is the design and function of each described in the final SWPPP? ☐ yes ☐ no

8c. Have the new owners been given a copy of the operation and maintenance requirements for long-term operation? ☐ yes ☐ no

8d. Who will be responsible for long-term maintenance?

8e. What is the final percent imperviousness of the site? _____%

V. Certification

I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name:	Title/Position:	
Mailing Address:	Telephone:	E-mail:
Signature:	Date:	

VOLUME 2 OF 2

Volume 2 of 2

Storm Water Pollution Prevention Plan
For

Amsterdam Materials Recycling

East Main Street

City of Amsterdam
Montgomery County, New York

December 1, 2003

THE Chazen COMPANIES

Prepared for:

Amsterdam Materials Recycling
20 Gurley Avenue
Troy, NY 12186
PH (518) 272-8142

Project No. 90303.00

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Storm Water Pollution Prevention Plan
For

Amsterdam Materials Recycling

East Main Street

City of Amsterdam
Montgomery County, New York

December 1, 2003

THE Chazen COMPANIES

Prepared by:

The Capital District Office
The Chazen Companies
20 Gurley Avenue
Troy, NY 12182
(518) 235-8050

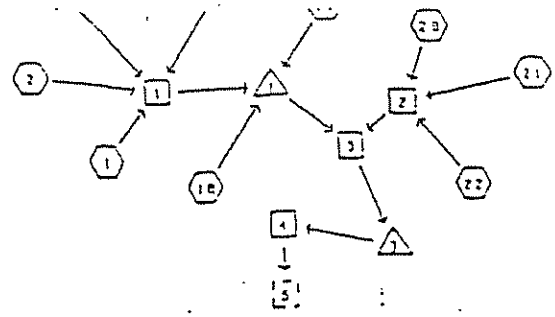
Prepared for:

Amsterdam Materials Recycling
20 Gurley Avenue
Troy, NY 12186
PH (518) 272-8142

Appendix J:
HydroCAD Documentation

HydroCAD™

STORMWATER ANALYSIS PROGRAM



WHAT IS HYDROCAD?

HydroCAD is a Computer Aided Design program for analyzing the hydrology and hydraulics of stormwater runoff. It utilizes the latest techniques from both fields to accurately predict the consequences of any given storm. Typically, this allows the engineer to verify that a given drainage system is adequate for the area under consideration, or to predict where flooding or erosion are likely to occur.

Subcatchment runoff is calculated in accordance with SCS TR-20 methodology. Reaches and Ponds use the Storage-Indication method. The user may choose between 24-hour type I, II, and III storms.

CONSTRUCTION OF THE DRAINAGE DIAGRAM

A diagram is constructed which shows the functional components, or structures, which make up the watershed. For any analysis of a watershed and drainage system, you have a choice of three types of structures; *SUBCATCHMENT, REACH, and DETENTION POND.* The diagram shows the location of each structure and how water is routed from one structure to another.

DESCRIBING THE STRUCTURES

The user simply fills in the blanks which ask for the information pertinent to that structure. For instance, a subcatchment screen will ask for the area in acres, the hydraulic length and slope, and one to four SCS curve numbers with percentage coverage. Or, when describing a pond, you enter the storage vs. elevation data, and then you have a choice of designing one or more outlet devices plus a special outlet device. The standard devices include *v-notch, weir, sharp-crested rectangular weir, broadcrested rectangular weir, orifice, and culvert.* The fill-in screens for each device allow the user to proceed quickly by essentially prompting him for all the necessary information.

CALCULATING RESULTS

Once a diagram has been created and each structure is described, HydroCAD can calculate the flows throughout the system. The process begins at the head of the watershed and proceeds downstream so that the inflows are known when each structure is calculated. You specify whether you are running a Type I, II, or III storm, the storm rainfall, and the runoff calculation period. All results are stored in the database for examination at any later time.

EXAMINING RESULTS: DATA SUMMARY and GRAPHICS OUTPUT

In order to evaluate both data and results HydroCAD provides several report formats. Each format can be produced on the computer display for quick access, on a printer for reports or permanent records, or on a plotter for the highest quality graphics. The report types include not only data summaries and tabulations, but also hydrographs and discharge curves. *(samples on back).*

In addition to producing individual report formats, HydroCAD has a special report generator which will automatically produce any combination of formats for one or more structures. This allows complete proposals and reports to be produced with an absolute minimum of manual preparation.

SOLVING YOUR PROBLEMS

Because HydroCAD maintains a complete database for the watershed and drainage system, you have a WORKING MODEL where changes can easily be made and their effects viewed. With HydroCAD this takes just minutes, not hours, so the engineer can interact with the watershed model in a way never before possible. This makes HydroCAD not just another analysis tool, but an integral part of the engineering design process. It lets the engineer evaluate numerous possible designs and choose the one most suitable just from a safety and environmental standpoint but based on cost and other considerations as well.

APPLIED MICROCOMPUTER SYSTEMS

Page Hill Road, Chocorua, N.H. 03817 (603) 323-8666

HydroCAD SPECIFICATIONS

- Up to 50 independent projects may be maintained on each mass storage unit (depending on disk capacity). Projects are identified by name and listed alphabetically.

- Each project may contain up to 9,999 subcatchments, reaches, and ponds.

- Subcatchments are described according to standard SCS (Soil Conservation Service) methods including area, curve number, and time-of-concentration.

- Subcatchment runoff is calculated by performing a convolution of the unit hydrograph with the rainfall distribution curve. This is the method employed by the SCS TR-20 program and provides the most accurate runoff predictions available by any method. HydroCAD runoff results agree with the SCS TR-20 program to better than 1%.

- Other runoff methods will be added to HydroCAD as the need arises. TR-55 is specifically envisioned for consistency with earlier calculations, although TR-20 is considered to provide more accurate predictions.

- The user may choose between 24-hour type I, II and III storms. Any other rainfall distribution can be added on an individual basis.

- Reach calculations presently employ the Storage-Indication method. Other methods (such as the Attenuation-Kinematic method used in TR-20) will be added as the need arises.

- Each reach may have a constant base flow to represent continous non-storm conditions.

- Reaches may be a pipe or open channel. A channel may be rectangular, V-shaped, or trapezoidal. Left and right side-slopes may be different. Other channels may be utilized by entering the end-area and discharge vs. elevation curves.

- Pipes which exceed capacity will cause water to be detained and a warning message to appear. For channels which overtop HydroCAD will extrapolate from the end-area and discharge curves, and display a warning message.

- Pond calculations employ the Storage-Indication method. This is highly accurate for ponds where the stored water has near zero velocity.

- A starting elevation may be specified for each pond to represent the seasonal pre-storm water level.

- Ponds may have multiple outlet control devices including a V-Notch weir, Sharp-crested or Broad-crested weir, Orifice (partially or fully submerged), or a culvert. A special device may be employed by entering its discharge vs. elevation curve. Standard and special devices may be used in any combination.

Exfiltration Calculations

Since exfiltration is incorporated into a pond's stage-discharge curve, it is classified as an "outlet device." Exfiltration is also distinct from an "inflow loss," in that it continues to occur even when there is no inflow.

To separate exfiltration from other "true" outflows, it is usually directed to a "secondary outflow" to prevent further routing. Although there are few standards as to how to determine exfiltration, HydroCAD provides two basic procedures that can be used to implement a wide range of design methods:

1) A **constant exfiltration rate** Q may be specified in CFS. This value is applied at all stage-discharge increments above the specified invert elevation. Zero exfiltration is used for all stage-discharge increments at or below the invert elevation. A constant exfiltration may also be used to model a pump or other "outlet" that "turns on" at a given elevation.

The invert elevation is commonly set to the bottom of the pond. This yields zero exfiltration when the pond is empty, increasing to the specified rate at the first stage-discharge increment. A higher invert may be specified if lower levels of the pond are impervious and have no exfiltration.

2) An **exfiltration velocity** V may be specified in FPM. This is multiplied by the available exfiltration area at a given elevation to determine the exfiltration rate in CFS.

$$Q_Y = \frac{V}{60} (A_Y - A_{invert}) \qquad \text{Eq. 32}$$

Q_Y=Exfiltration at elevation Y [CFS]
V=Exfiltration velocity [FPM]
A_Y=Exfiltration area at elevation Y [SF]
A_{invert}=Exfiltration area at invert elevation [SF]

The exfiltration area may be defined in two ways: A) if all exfiltration is assumed to be downward (none through the sides of the pond), you may use the pond's *surface area*; B) if exfiltration occurs through all exposed surfaces regardless of slope, you may use the pond's *wetted area*.

In either case, the *available* area is the additional exfiltration area lying above the invert elevation. No exfiltration will occur through the portion of the pond that lies at or below the invert elevation. To allow exfiltration through the bottom of the pond, set the invert elevation to zero.

For shallow ponds, the surface area and wetted area are almost identical, so the surface area method is recommended. Only for drywells and other ponds with significant side-areas is the wetted area method needed. (See page 131 for details on wetted area calculations.)

Using a prec rate

A measured perc rate *can* be converted to an equivalent exfiltration velocity by the following equation. However, other factors must be considered to determine if this is a reasonable design value for a proposed exfiltration area. (For example, can a large pond be expected to perc at the same rate as a small test pit?)

$$V = \frac{1}{12\ P} \qquad \text{Eq. 33}$$

V=Exfiltration velocity [FPM]
P=Perc Rate [Minutes per Inch]

Tips for using exfiltration

Setting the invert elevation

The invert elevation is intended to exclude the impervious lower elevations of the pond. Exfiltration will occur only when the water surface exceeds this level. When using the velocity method, exfiltration will apply only to any additional area lying *above* the invert. This distinction is particularly important in the case of flat bottomed ponds, such as drywells. With the invert at this lowest level, any bottom area will be excluded from exfiltration. *If you want to allow exfiltration through a flat bottom by the velocity method*, you must set the exfiltration invert to zero.

Using surface area vs. wetted area

By basing exfiltration on *surface area*, you are stating that all flow will essentially be downward. Only horizontal areas (above the invert) are available for exfiltration. All vertical areas are excluded.

If you wish to include vertical surfaces, such as the sides of a drywell, then you may want to specify *wetted area*. As always, it is your responsibility to ensure that this computation is applicable to your particular situation.

Advanced techniques

While most cases will require just a single exfiltration device, it is also possible to use several exfiltration devices on a single pond. This could be used to model multi-stage exfiltration schemes, such as a drywell that overflows into a perforated pipe.

As with all pond designs, you should view and understand the stage-discharge plot to make sure the pond is exhibiting the behavior you expect. Do not rely solely on a review of the hydrograph where the pond's behavior is intertwined with the complexities of the inflow hydrograph.

SOIL CONSERVATION SERVICE TECHNICAL RELEASE NO. 20

TR-20 represents the computerized application of hydrologic practices advocated by the Soil Conservation Service. By using historic rainfall data compiled by the National Weather Service, curve numbers (CN) correlated to watershed surface characteristics and soil types, identified by the SCS, and basic routing information, TR-20 synthesizes a hydrograph unique to a specific watershed.

RAINFALL-RUNOFF RELATIONSHIPS

Basic to SCS methods is the relationship between rainfall and runoff. The volume of runoff (Q) depends upon the volume of precipitation (P), the volume of retention, and that portion of precipitation that at the beginning of a storm preceding runoff termed the initial abstraction (Ia). Retention, then, is defined as

$$F = (P-Ia) - Q \qquad (1).$$

Letting S equal the potential maximum retention, the SCS established the following relationship:

$$\frac{F}{S} = \frac{Q}{P-Ia} \qquad (2).$$

The initial abstraction is a function of land use, interception, infiltration, depression storage, and antecedent soil moisture. Empirically, the SCS recommends a 20 percent initial abstraction.

$$Ia = 0.2\ S \qquad (3).$$

Substitution and rearrangement of equations (1), (2), and (3) yields

$$Q = \frac{(P - 0.2S)^2}{P + 0.8\ S} \qquad (4).$$

Since the volume of precipitation (P) may be determined from historical data based upon an assumed return interval, the volume of runoff may be determined by one unknown variable, the potential maximum retention (S). To solve equation (4), the SCS developed the correlation

$$S = \frac{1000}{CN} - 10 \qquad (5)$$ where CN= Curve Number.

TIME OF CONCENTRATION

Time of concentration (tc) represents the time required for a water to travel from the hydraulically most distant point in a watershed to a desired design point. For use in developing the SCS unit hydrograph, the time of concentration is considered to be the time from the end of excess rainfall to the inflection point on the recession limb of the hydrograph.

SCS methods employ the Lag Method which relates the time lag (L), representing the time in hours from the center of the mass of rainfall excess to the peak discharge, to the slope (Y) in percent, hydraulic length (HL) in feet, and the maximum retention (S). In equation form,

$$L = \frac{HL^{0.8}\,(S+1)^{0.7}}{1900Y^{0.5}} \qquad (6).$$

The empirical relationship between the time lag and time of concentration (tc) in hours is represented by

$$tc = 5/3L \qquad (7).$$

SCS UNIT HYDROGRAPHS

By definition, a hydrograph is a graph of the discharge rate at a particular point versus time. A specialized application of hydrograph theories, a unit hydrograph represents the discharge generated by 1 inch of excess precipitation over a homogeneous watershed during a specified period of time (i.e. duration). SCS methods employ dimensionless unit hydrographs which the peak flow rate and time to peak are established by empirical relationships.

The area under the unit hydrograph equals the volume of direct runoff (Q) as defined in equation (4). Figure 1A below depicts the unit hydrograph relationship. As shown, direct runoff may be computed by

$$Q = 1/2\ qp\ (tp + tr) \qquad (8)$$

where qp= Peak Rate of Runoff, tp= Time to Peak, and tr= Recession Time.

Given that the SCS has assumed that tr=1.67 and to convert qp to cfs, tp in hours, and Q in inches, the following

relationship may be derived:

$$qp = \frac{484\ AQ}{tp} \quad (9)$$ where A=watershed area (sq.mi.).

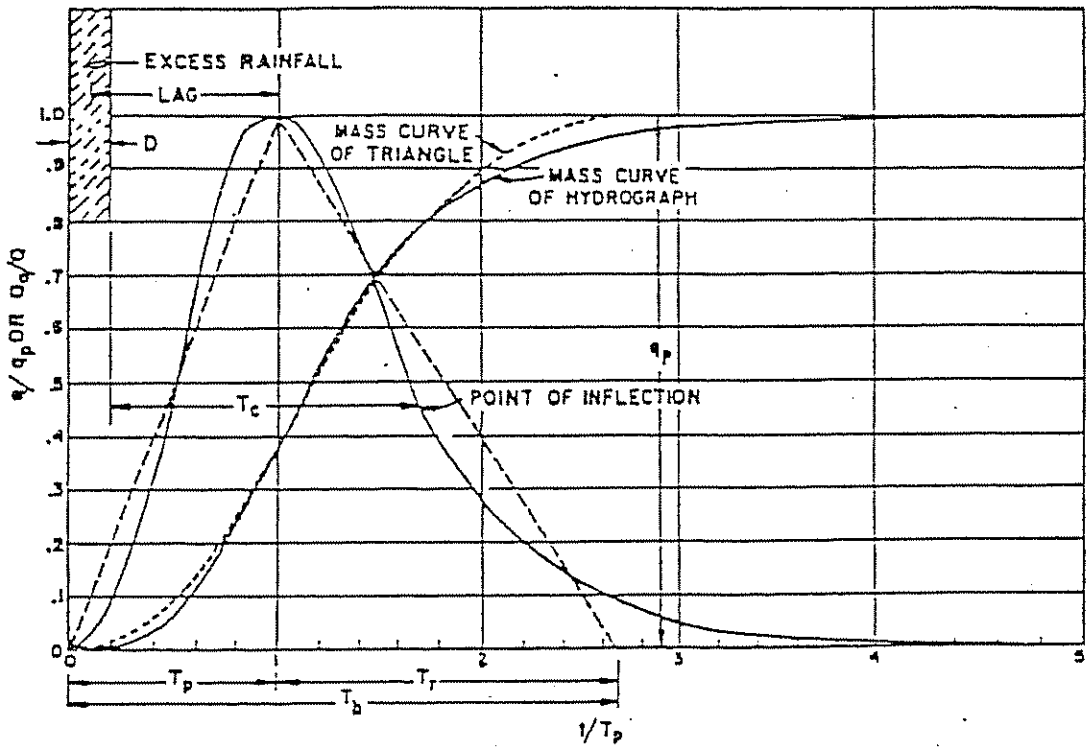


TABLE 1A Dimensionless curvilinear unit hydrograph and equivalent triangular hydrograph

As shown by Figure 1A, the time to peak can be expressed in terms of the duration of unit precipitation excess (D) and time of concentration by

$$tc + D = 1.7\ tp \quad (10)$$

and

$$D/2 + 0.6\ tc = tp \quad (11).$$

Reduction of equations (9), (10), and (11) yields

$$qp = \frac{726\ AQ}{tc} \quad (12).$$

CONVOLUTION

As previously noted, the unit hydrograph represents the discharge versus time relationship for one inch of rainfall uniformly distributed over a time period D, but does not directly provide a design hydrograph or the total runoff volume. In order to achieve this translation, the typical distribution of excess rainfall as observed by SCS and National Weather Service record data are synthesized with the rainfall relationship represented by the unit hydrograph by performing a convolution process.

Convolution is the multiplication of a unit hydrograph ordinate value times a corresponding excess precipitation value at time t. The unit hydrograph is then translated by a time equal to the duration D and is again multiplied times the corresponding value of the excess precipitation distribution. Assuming a linear relationship exists, these computed values are then superposed at each time increment of D. The resulting rate versus time relationship is the design hydrograph for a specific watershed under a given rainfall recurrence.

To facilitate the computation of design hydrographs, the SCS developed a computer program as a part of TR-20. Numerous software companies have also developed application programs predicated upon TR-20 data and SCS methodology. HydroCad, as developed and marketed by Applied Microcomputer Systems, utilizes these tenets and was employed for the subject drainage study. As a summary of its features, a copy of HydroCad Specifications has been provided.

REFERENCES AND BIBLIOGRAPHY

For a more extensive discussion of TR-20 and SCS methodology, the following references are recommended.

1. A Guide to Hydrologic Analysis Using SCS Methods, Richard H. McCuen (1982).

2. Computer Program for Project Formulation Hydrology, Soil Conservation Service Technical Release Number 20 (TR-20) National Technical Information Service (1982).

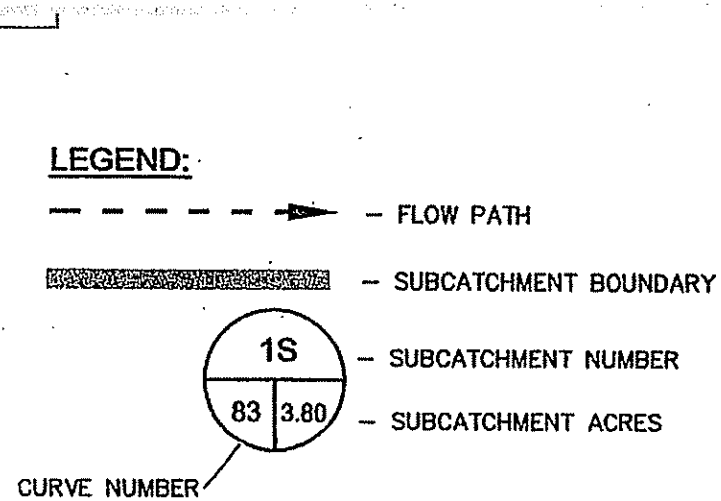
3. Urban Hydrology for Small watersheds, Soil Conservation Service Technical Release Number 55 (TR-55), National Technical Information Service (1986).

4. HydroCad Storm Water Modeling System, Applied Microcomputer Systems (1986).

Appendix K:
Existing Drainage Conditions

Existing Conditions Plan (Pocket)

DESIGN POINT NO. 1 SOUTHEASTERN CORNER



AMSTERDAM MATERIALS RECYCLING

EXISTING CONDITIONS PLAN

CITY OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn	checked
JMD	JC
date	scale
12/1/03	1"= 100'
project no.	
90303.00	
sheet no.	
SW1	

90303.00

Up-Gradient Watershed Delineation Map (Pocket)

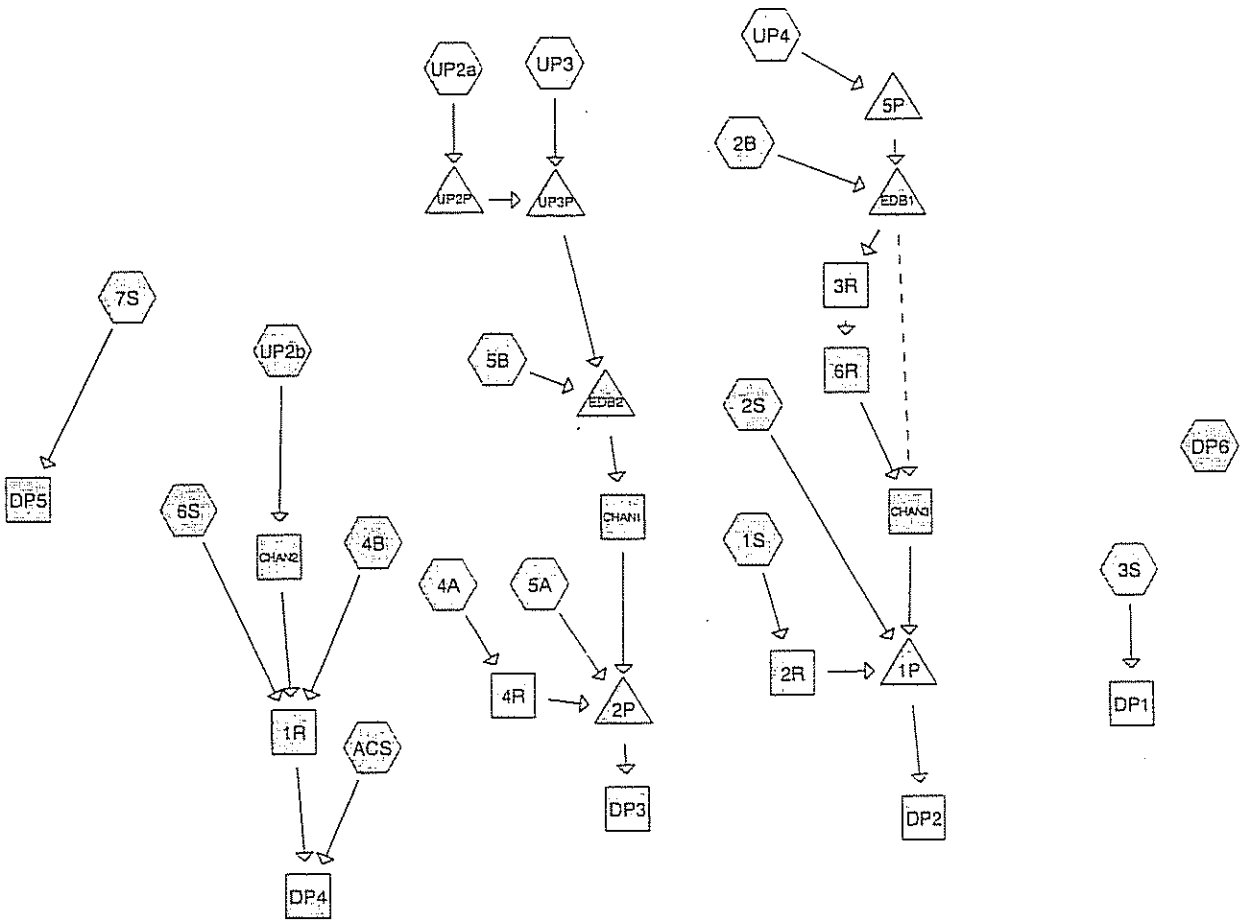
AMSTERDAM MATERIALS RECYCLING

USGS UPGRADIENT WATERSHED PLAN

CITY OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn	checked
JMD	JC
date	scale
12/1/03	1"= 300'
project no.	
90303.00	
sheet no.	
SW1-A	

Existing Drainage Conditions
1-YEAR 24-HOUR STORM WATER COMPUTATIONS



Drainage Diagram for Existing 12-03
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: south central section btw. gorges Runoff Area=2.720 ac Runoff Depth=0.10"
Flow Length=730' Tc=13.7 min CN=59 Runoff=0.09 cfs 0.023 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=0.89"
Flow Length=330' Tc=17.1 min CN=83 Runoff=4.43 cfs 0.282 af

Subcatchment 2S: Central Area Runoff Area=18.730 ac Runoff Depth=0.42"
Flow Length=1,400' Tc=23.9 min CN=72 Runoff=7.13 cfs 0.649 af

Subcatchment 3S: Eastern Area Runoff Area=2.220 ac Runoff Depth=0.10"
Flow Length=460' Tc=18.1 min CN=59 Runoff=0.07 cfs 0.019 af

Subcatchment 4A: Central Area Runoff Area=2.690 ac Runoff Depth=0.45"
Flow Length=730' Tc=23.4 min CN=73 Runoff=1.16 cfs 0.101 af

Subcatchment 4B: Runoff Area=6.630 ac Runoff Depth=0.49"
Flow Length=844' Tc=18.0 min CN=74 Runoff=3.73 cfs 0.269 af

Subcatchment 5A: Runoff Area=7.440 ac Runoff Depth=0.38"
Flow Length=1,128' Tc=25.1 min CN=71 Runoff=2.44 cfs 0.237 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.600 ac Runoff Depth=0.78"
Flow Length=220' Tc=26.1 min CN=81 Runoff=1.26 cfs 0.105 af

Subcatchment 6S: Western Central Area Runoff Area=4.750 ac Runoff Depth=0.42"
Flow Length=630' Tc=20.4 min CN=72 Runoff=2.02 cfs 0.165 af

Subcatchment 7S: Western Area Runoff Area=2.900 ac Runoff Depth=0.41"
Flow Length=410' Tc=26.1 min CN=72 Runoff=1.04 cfs 0.100 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=4.290 ac Runoff Depth=0.24"
Flow Length=465' Tc=13.8 min CN=66 Runoff=1.03 cfs 0.087 af

Subcatchment DP6: Runoff Area=0.600 ac Runoff Depth=0.06"
Flow Length=200' Tc=13.4 min CN=56 Runoff=0.01 cfs 0.003 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=0.41"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=1.83 cfs 0.252 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=0.38"
Flow Length=750' Tc=26.5 min CN=71 Runoff=2.52 cfs 0.255 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=0.38"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=5.60 cfs 0.793 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=0.41"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=11.86 cfs 2.028 af

Reach 1R: Bottom Swale Peak Depth=0.33' Max Vel=4.2 fps Inflow=6.87 cfs 0.686 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=6.86 cfs 0.686 af

Reach 2R: Bottom Swale Peak Depth=0.03' Max Vel=0.9 fps Inflow=0.09 cfs 0.023 af
n=0.030 L=75.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.09 cfs 0.023 af

Reach 3R: Peak Depth=0.91' Max Vel=3.9 fps Inflow=6.32 cfs 2.224 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=6.32 cfs 2.223 af

Reach 4R: Bottom Swale Peak Depth=0.12' Max Vel=2.2 fps Inflow=1.16 cfs 0.101 af
n=0.030 L=80.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.15 cfs 0.101 af

Reach 6R: 36 "RCP Peak Depth=0.45' Max Vel=9.5 fps Inflow=6.32 cfs 2.223 af
D=36.0" n=0.013 L=85.0' S=0.0384 '/' Capacity=130.62 cfs Outflow=6.32 cfs 2.222 af

Reach CHAN1: INTERMITTENT STREAM CHA Peak Depth=0.20' Max Vel=4.8 fps Inflow=7.91 cfs 1.141 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=7.88 cfs 1.135 af

Reach CHAN2: INTERMITTENT STREAM CHA Peak Depth=0.10' Max Vel=3.1 fps Inflow=2.52 cfs 0.255 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=2.47 cfs 0.252 af

Reach CHAN3: Peak Depth=0.17' Max Vel=4.5 fps Inflow=6.32 cfs 2.222 af
n=0.030 L=970.0' S=0.0920 '/' Capacity=454.77 cfs Outflow=6.32 cfs 2.205 af

Reach DP1: Bottom Swale Peak Depth=0.02' Max Vel=0.8 fps Inflow=0.07 cfs 0.019 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.07 cfs 0.019 af

Reach DP2: CULVERT Peak Depth=0.43' Max Vel=14.1 fps Inflow=7.95 cfs 2.875 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=7.95 cfs 2.874 af

Reach DP3: 30" Peak Depth=0.46' Max Vel=15.5 fps Inflow=9.66 cfs 1.471 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=9.66 cfs 1.470 af

Reach DP4: Inflow=7.70 cfs 0.773 af
Outflow=7.70 cfs 0.773 af

Reach DP5: STREAM Peak Depth=0.06' Max Vel=1.8 fps Inflow=1.04 cfs 0.100 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=1.03 cfs 0.100 af

Pond 1P: DEPRESSION ADJACENT TO TRACK Peak Elev=309.18' Storage=65 cf Inflow=7.95 cfs 2.876 af
30.0" x 50.0' Culvert Outflow=7.95 cfs 2.875 af

Pond 2P: CULVERT POND Peak Elev=329.58' Storage=316 cf Inflow=9.66 cfs 1.473 af
24.0" x 185.0' Culvert Outflow=9.66 cfs 1.471 af

Pond 5P: CULVET INLET Peak Elev=420.04' Storage=49 cf Inflow=11.86 cfs 2.028 af
Outflow=11.86 cfs 2.028 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=413.68' Storage=26,124 cf Inflow=12.50 cfs 2.310 af
Primary=6.32 cfs 2.224 af Secondary=0.00 cfs 0.000 af Outflow=6.32 cfs 2.224 af

Pond EDB2: DETENTION BASIN ADJACENT T Peak Elev=407.90' Storage=57 cf Inflow=7.91 cfs 1.141 af
24.0" x 80.0' Culvert Outflow=7.91 cfs 1.141 af

Pond UP2P: CULVERT INLET Peak Elev=432.63' Storage=822 cf Inflow=1.83 cfs 0.252 af
18.0" x 75.0' Culvert Outflow=1.76 cfs 0.247 af

Pond UP3P: CULVERT INLET Peak Elev=425.74' Storage=538 cf Inflow=7.31 cfs 1.040 af
24.0" x 95.0' Culvert Outflow=7.32 cfs 1.037 af

Total Runoff Area = 158.800 ac Runoff Volume = 5.367 af Average Runoff Depth = 0.41"

Subcatchment 1S: south central section btw. gorges

Runoff = 0.09 cfs @ 12.17 hrs, Volume= 0.023 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
2.020	60	Woods, Fair, HSG B
0.700	56	Brush, Fair, HSG B
2.720	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2400	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.5	80	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	500	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
13.7	730	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 4.43 cfs @ 12.10 hrs, Volume= 0.282 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2S: Central Area

Runoff = 7.13 cfs @ 12.21 hrs, Volume= 0.649 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
3.400	98	Driveways
1.450	73	Woods, Fair, HSG C
6.650	60	Woods, Fair, HSG B
1.050	70	Brush, Fair, HSG C
2.480	56	Brush, Fair, HSG B
3.700	79	50-75% Grass cover, Fair, HSG C
18.730	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	150	0.0530	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	100	0.1600	2.8		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	1,150	0.1000	13.5	53.99	**Channel Flow,** Area= 4.0 sf Perim= 5.0' r= 0.80' n= 0.030
23.9	1,400	Total			

Subcatchment 3S: Eastern Area

Runoff = 0.07 cfs @ 12.27 hrs, Volume= 0.019 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.790	60	Woods, Fair, HSG B
0.430	56	Brush, Fair, HSG B
2.220	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity - (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.16 cfs @ 12.20 hrs, Volume= 0.101 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
2.690	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	380	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	200	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
23.4	730	Total			

Subcatchment 4B:

Runoff = 3.73 cfs @ 12.13 hrs, Volume= 0.269 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
5.010	73	Woods, Fair, HSG C
0.520	70	Brush, Fair, HSG C
0.180	98	Paved parking & roofs
0.920	79	50-75% Grass cover, Fair, HSG C
6.630	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.1	256	0.0660	3.9		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	438	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
18.0	844	Total			

Subcatchment 5A:

Runoff = 2.44 cfs @ 12.23 hrs, Volume= 0.237 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
4.670	73	Woods, Fair, HSG C
0.920	60	Woods, Fair, HSG B
0.290	56	Brush, Fair, HSG B
0.730	70	Brush, Fair, HSG C
0.710	79	50-75% Grass cover, Fair, HSG C
0.120	98	Paved parking & roofs
7.440	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	76	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.3	74	0.0670	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	160	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	818	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
25.1	1,128	Total			

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 1.26 cfs @ 12.21 hrs, Volume= 0.105 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.880	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.600	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
26.1	220	Total			

Subcatchment 6S: Western Central Area

Runoff = 2.02 cfs @ 12.17 hrs, Volume= 0.165 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
3.200	73	Woods, Fair, HSG C
1.550	70	Brush, Fair, HSG C
4.750	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0460	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	110	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	370	0.1100	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	630	Total			

Subcatchment 7S: Western Area

Runoff = 1.04 cfs @ 12.24 hrs, Volume= 0.100 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
2.300	73	Woods, Fair, HSG C
0.600	70	Brush, Fair, HSG C
2.900	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	110	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	40	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	260	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	410	Total			

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 1.03 cfs @ 12.10 hrs, Volume= 0.087 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
2.360	60	Woods, Fair, HSG B
0.240	98	Paved parking & roofs
1.690	69	50-75% Grass cover, Fair, HSG B
4.290	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment DP6:

Runoff = 0.01 cfs @ 12.57 hrs, Volume= 0.003 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.600	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0660	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.1	50	0.2000	6.7		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.4	200	Total			

Subcatchment UP2a:

Runoff = 1.83 cfs @ 12.49 hrs, Volume= 0.252 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 2.52 cfs @ 12.25 hrs, Volume= 0.255 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 5.60 cfs @ 12.49 hrs, Volume= 0.793 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 19.370 ac, Inflow Depth = 0.43"
Inflow = 6.87 cfs @ 12.19 hrs, Volume= 0.686 af
Outflow = 6.86 cfs @ 12.19 hrs, Volume= 0.686 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.33' @ 12.19 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: Bottom Swale

Inflow Area = 2.720 ac, Inflow Depth = 0.10"
Inflow = 0.09 cfs @ 12.17 hrs, Volume= 0.023 af
Outflow = 0.09 cfs @ 12.22 hrs, Volume= 0.023 af, Atten= 1%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.9 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 2.1 min

Peak Depth= 0.03' @ 12.20 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 75.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 3R:

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.45 hrs, Volume= 2.224 af
Outflow = 6.32 cfs @ 13.46 hrs, Volume= 2.223 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.91' @ 13.46 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 4R: Bottom Swale

Inflow Area = 2.690 ac, Inflow Depth = 0.45"
Inflow = 1.16 cfs @ 12.20 hrs, Volume= 0.101 af
Outflow = 1.15 cfs @ 12.22 hrs, Volume= 0.101 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.2 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 1.4 min

Peak Depth= 0.12' @ 12.21 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 80.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: 36 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.46 hrs, Volume= 2.223 af
Outflow = 6.32 cfs @ 13.46 hrs, Volume= 2.222 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.45' @ 13.46 hrs
Capacity at bank full= 130.62 cfs
36.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0384 '/'

Reach CHAN1: INTERMITTENT STREAM CHANNEL

Inflow Area = 34.130 ac, Inflow Depth = 0.40"
Inflow = 7.91 cfs @ 12.50 hrs, Volume= 1.141 af
Outflow = 7.88 cfs @ 12.56 hrs, Volume= 1.135 af, Atten= 0%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.8 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 2.3 fps, Avg. Travel Time= 4.0 min

Peak Depth= 0.20' @ 12.52 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN2: INTERMITTENT STREAM CHANNEL

Inflow Area = 7.990 ac, Inflow Depth = 0.38"
Inflow = 2.52 cfs @ 12.25 hrs, Volume= 0.255 af
Outflow = 2.47 cfs @ 12.34 hrs, Volume= 0.252 af, Atten= 2%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 7.0 min

Peak Depth= 0.10' @ 12.29 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN3:

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.46 hrs, Volume= 2.222 af
Outflow = 6.32 cfs @ 13.57 hrs, Volume= 2.205 af, Atten= 0%, Lag= 6.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.5 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 5.4 min

Peak Depth= 0.17' @ 13.50 hrs
Capacity at bank full= 454.77 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 970.0' Slope= 0.0920 '/'
Side Slope Z-value= 2.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 2.220 ac, Inflow Depth = 0.10"
Inflow = 0.07 cfs @ 12.27 hrs, Volume= 0.019 af
Outflow = 0.07 cfs @ 12.29 hrs, Volume= 0.019 af, Atten= 1%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.8 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.02' @ 12.27 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 0.41"
Inflow = 7.95 cfs @ 12.26 hrs, Volume= 2.875 af
Outflow = 7.95 cfs @ 12.27 hrs, Volume= 2.874 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.1 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 10.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.43' @ 12.26 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 44.260 ac, Inflow Depth = 0.40"
Inflow = 9.66 cfs @ 12.51 hrs, Volume= 1.471 af
Outflow = 9.66 cfs @ 12.51 hrs, Volume= 1.470 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.5 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 9.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.46' @ 12.51 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 23.660 ac, Inflow Depth = 0.39"
Inflow = 7.70 cfs @ 12.17 hrs, Volume= 0.773 af
Outflow = 7.70 cfs @ 12.17 hrs, Volume= 0.773 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 2.900 ac, Inflow Depth = 0.41"
Inflow = 1.04 cfs @ 12.24 hrs, Volume= 0.100 af
Outflow = 1.03 cfs @ 12.27 hrs, Volume= 0.100 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.06' @ 12.25 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DEPRESSION ADJACENT TO TRACKS AND CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 0.41"
Inflow = 7.95 cfs @ 12.26 hrs, Volume= 2.876 af
Outflow = 7.95 cfs @ 12.26 hrs, Volume= 2.875 af, Atten= 0%, Lag= 0.1 min
Primary = 7.95 cfs @ 12.26 hrs, Volume= 2.875 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.18' @ 12.26 hrs Surf.Area= 63 sf Storage= 65 cf
Plug-Flow detention time= 0.2 min calculated for 2.866 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (893.4 - 893.3)

#	Invert	Avail.Storage	Storage Description
1	308.00'	35,632 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.00	10	0	0
310.00	100	110	110
312.00	312	412	522
314.00	698	1,010	1,532
316.00	1,751	2,449	3,981
318.00	4,150	5,901	9,882
320.00	6,500	10,650	20,532
322.00	8,600	15,100	35,632

#	Routing	Invert	Outlet Devices
1	Primary	308.00'	**30.0" x 50.0' long Culvert** Ke= 0.600

Outlet Invert= 302.40' S= 0.1120 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.90 cfs @ 12.26 hrs HW=309.18' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.90 cfs @ 3.5 fps)

Pond 2P: CULVERT POND

Inflow Area =	44.260 ac,	Inflow Depth =	0.40"	
Inflow =	9.66 cfs @	12.50 hrs, Volume=	1.473 af	
Outflow =	9.66 cfs @	12.51 hrs, Volume=	1.471 af,	Atten= 0%, Lag= 0.3 min
Primary =	9.66 cfs @	12.51 hrs, Volume=	1.471 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 329.58' @ 12.51 hrs Surf.Area= 258 sf Storage= 316 cf
Plug-Flow detention time= 1.0 min calculated for 1.466 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (858.3 - 857.7)

#	Invert	Avail.Storage	Storage Description
1	328.00'	12,900 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	100	0	0
330.00	300	400	400
332.00	1,500	1,800	2,200
334.00	2,800	4,300	6,500
336.00	3,600	6,400	12,900

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 306.27' S= 0.1180 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.65 cfs @ 12.51 hrs HW=329.58' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.65 cfs @ 3.9 fps)

Pond 5P: CULVET INLET

Inflow Area =	59.910 ac,	Inflow Depth =	0.41"	
Inflow =	11.86 cfs @	12.71 hrs, Volume=	2.028 af	
Outflow =	11.86 cfs @	12.71 hrs, Volume=	2.028 af,	Atten= 0%, Lag= 0.0 min
Primary =	11.86 cfs @	12.71 hrs, Volume=	2.028 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 420.04' @ 12.71 hrs Surf.Area= 1,004 sf Storage= 49 cf
Plug-Flow detention time= 0.1 min calculated for 2.022 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (867.2 - 867.2)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=20.65 cfs @ 12.71 hrs HW=420.04' (Free Discharge)
↑—1=**Culvert** (Inlet Controls 10.33 cfs @ 4.0 fps)
└—2=**Culvert** (Inlet Controls 10.33 cfs @ 4.0 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	0.44"	
Inflow =	12.50 cfs @	12.69 hrs, Volume=	2.310 af	
Outflow =	6.32 cfs @	13.45 hrs, Volume=	2.224 af,	Atten= 49%, Lag= 45.8 min
Primary =	6.32 cfs @	13.45 hrs, Volume=	2.224 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.68' @ 13.45 hrs Surf.Area= 8,737 sf Storage= 26,124 cf
Plug-Flow detention time= 53.9 min calculated for 2.224 af (96% of inflow)
Center-of-Mass det. time= 41.8 min (901.7 - 859.8)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.32 cfs @ 13.45 hrs HW=413.68' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)
—**2=Orifice/Grate** (Controls 0.00 cfs)
└—**3=Culvert** (Inlet Controls 6.32 cfs @ 8.0 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=410.00' (Free Discharge)
↑└—**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.130 ac, Inflow Depth = 0.40"
Inflow = 7.91 cfs @ 12.50 hrs, Volume= 1.141 af
Outflow = 7.91 cfs @ 12.50 hrs, Volume= 1.141 af, Atten= 0%, Lag= 0.0 min
Primary = 7.91 cfs @ 12.50 hrs, Volume= 1.141 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.90' @ 12.50 hrs Surf.Area= 48 sf Storage= 57 cf
Plug-Flow detention time= 0.3 min calculated for 1.141 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (858.1 - 857.9)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.60'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0680 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.91 cfs @ 12.50 hrs HW=407.90' (Free Discharge)
↑└—**1=Culvert** (Inlet Controls 7.91 cfs @ 3.6 fps)

Pond UP2P: CULVERT INLET

Inflow Area = 7.360 ac, Inflow Depth = 0.41"
Inflow = 1.83 cfs @ 12.49 hrs, Volume= 0.252 af
Outflow = 1.76 cfs @ 12.57 hrs, Volume= 0.247 af, Atten= 3%, Lag= 5.0 min
Primary = 1.76 cfs @ 12.57 hrs, Volume= 0.247 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.63' @ 12.57 hrs Surf.Area= 906 sf Storage= 822 cf
Plug-Flow detention time= 14.5 min calculated for 0.247 af (98% of inflow)
Center-of-Mass det. time= 8.1 min (864.5 - 856.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=1.76 cfs @ 12.57 hrs HW=432.62' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.76 cfs @ 2.5 fps)

Pond UP3P: CULVERT INLET

Inflow Area = 32.530 ac, Inflow Depth = 0.38"
Inflow = 7.31 cfs @ 12.52 hrs, Volume= 1.040 af
Outflow = 7.32 cfs @ 12.52 hrs, Volume= 1.037 af, Atten= 0%, Lag= 0.6 min
Primary = 7.32 cfs @ 12.52 hrs, Volume= 1.037 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 425.74' @ 12.52 hrs Surf.Area= 638 sf Storage= 538 cf
Plug-Flow detention time= 2.5 min calculated for 1.037 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (861.8 - 860.5)

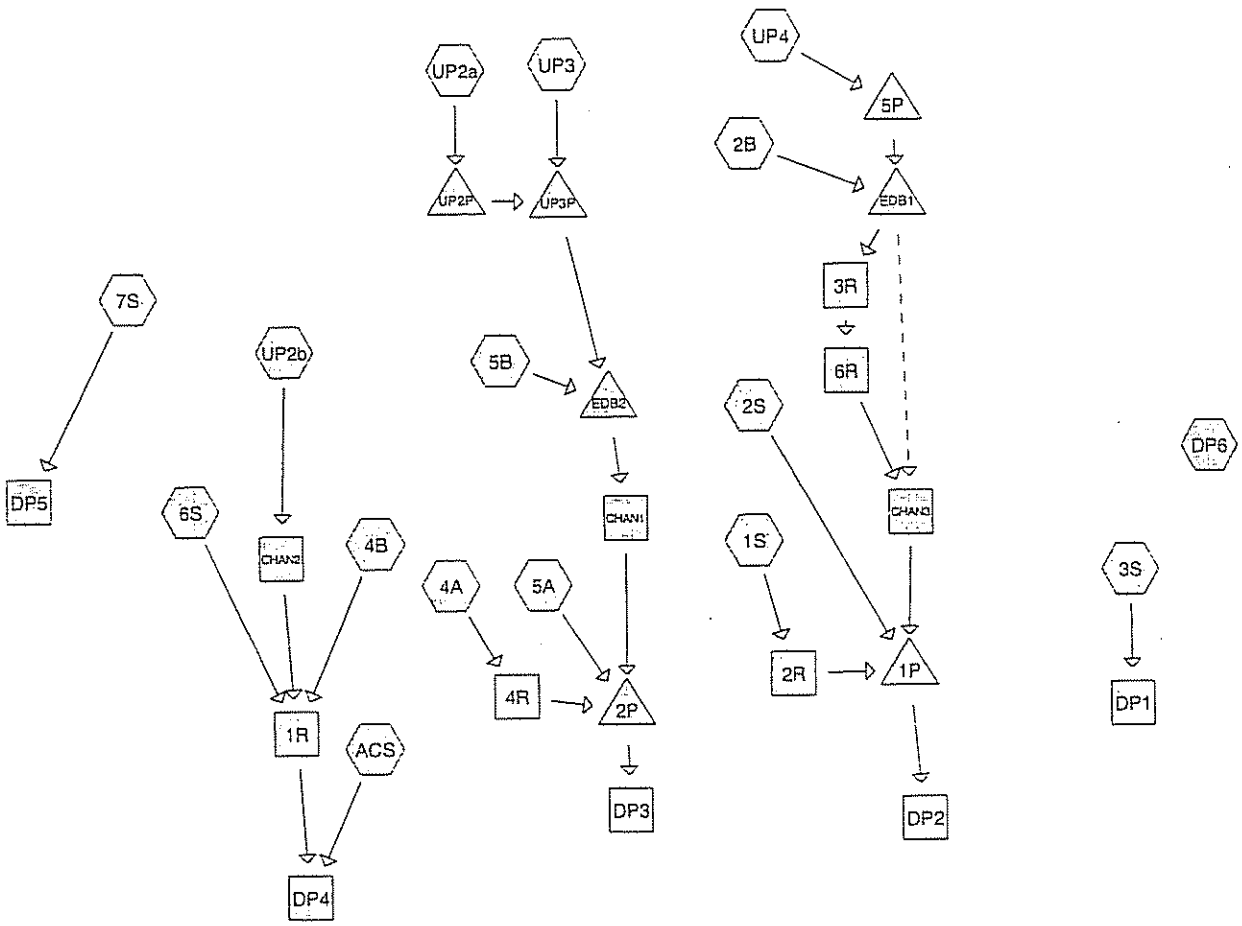
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.29 cfs @ 12.52 hrs HW=425.74' (Free Discharge)
└─**1=Culvert** (Inlet Controls 7.29 cfs @ 3.6 fps)

Existing Drainage Conditions
2-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Existing 12-03
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: south central section btw. gorges Runoff Area=2.720 ac Runoff Depth=0.17"
Flow Length=730' Tc=13.7 min CN=59 Runoff=0.29 cfs 0.038 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=1.10"
Flow Length=330' Tc=17.1 min CN=83 Runoff=5.50 cfs 0.349 af

Subcatchment 2S: Central Area Runoff Area=18.730 ac Runoff Depth=0.56"
Flow Length=1,400' Tc=23.9 min CN=72 Runoff=10.18 cfs 0.872 af

Subcatchment 3S: Eastern Area Runoff Area=2.220 ac Runoff Depth=0.17"
Flow Length=460' Tc=18.1 min CN=59 Runoff=0.20 cfs 0.031 af

Subcatchment 4A: Central Area Runoff Area=2.690 ac Runoff Depth=0.60"
Flow Length=730' Tc=23.4 min CN=73 Runoff=1.62 cfs 0.134 af

Subcatchment 4B: Runoff Area=6.630 ac Runoff Depth=0.64"
Flow Length=844' Tc=18.0 min CN=74 Runoff=5.14 cfs 0.355 af

Subcatchment 5A: Runoff Area=7.440 ac Runoff Depth=0.52"
Flow Length=1,128' Tc=25.1 min CN=71 Runoff=3.57 cfs 0.322 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.600 ac Runoff Depth=0.98"
Flow Length=220' Tc=26.1 min CN=81 Runoff=1.60 cfs 0.131 af

Subcatchment 6S: Western Central Area Runoff Area=4.750 ac Runoff Depth=0.56"
Flow Length=630' Tc=20.4 min CN=72 Runoff=2.87 cfs 0.222 af

Subcatchment 7S: Western Area Runoff Area=2.900 ac Runoff Depth=0.56"
Flow Length=410' Tc=26.1 min CN=72 Runoff=1.48 cfs 0.135 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=4.290 ac Runoff Depth=0.35"
Flow Length=465' Tc=13.8 min CN=66 Runoff=1.73 cfs 0.126 af

Subcatchment DP6: Runoff Area=0.600 ac Runoff Depth=0.11"
Flow Length=200' Tc=13.4 min CN=56 Runoff=0.02 cfs 0.006 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=0.55"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=2.61 cfs 0.339 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=0.52"
Flow Length=750' Tc=26.5 min CN=71 Runoff=3.67 cfs 0.346 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=0.51"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=8.20 cfs 1.079 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=0.55"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=16.95 cfs 2.733 af

Reach 1R: Bottom Swale Peak Depth=0.41' Max Vel=4.7 fps Inflow=10.01 cfs 0.920 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=10.01 cfs 0.920 af

Reach 2R: Bottom Swale Peak Depth=0.05' Max Vel=1.3 fps Inflow=0.29 cfs 0.038 af
n=0.030 L=75.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.28 cfs 0.038 af

Reach 3R: Peak Depth=1.06' Max Vel=4.2 fps Inflow=8.39 cfs 2.984 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=8.39 cfs 2.982 af

Reach 4R: Bottom Swale Peak Depth=0.14' Max Vel=2.5 fps Inflow=1.62 cfs 0.134 af
n=0.030 L=80.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.61 cfs 0.134 af

Reach 6R: 36 "RCP Peak Depth=0.52' Max Vel=10.4 fps Inflow=8.39 cfs 2.982 af
D=36.0" n=0.013 L=85.0' S=0.0384 '/' Capacity=130.62 cfs Outflow=8.38 cfs 2.981 af

Reach CHAN1: INTERMITTENT STREAM CH Peak Depth=0.24' Max Vel=5.5 fps Inflow=11.37 cfs 1.539 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=11.33 cfs 1.532 af

Reach CHAN2: INTERMITTENT STREAM CHA Peak Depth=0.12' Max Vel=3.5 fps Inflow=3.67 cfs 0.346 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=3.63 cfs 0.343 af

Reach CHAN3: Peak Depth=0.20' Max Vel=5.0 fps Inflow=8.38 cfs 2.981 af
n=0.030 L=970.0' S=0.0920 '/' Capacity=454.77 cfs Outflow=8.35 cfs 2.961 af

Reach DP1: Bottom Swale Peak Depth=0.04' Max Vel=1.2 fps Inflow=0.20 cfs 0.031 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.20 cfs 0.031 af

Reach DP2: CULVERT Peak Depth=0.52' Max Vel=15.8 fps Inflow=11.77 cfs 3.871 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=11.76 cfs 3.870 af

Reach DP3: 30" Peak Depth=0.55' Max Vel=17.2 fps Inflow=13.81 cfs 1.987 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=13.80 cfs 1.986 af

Reach DP4: Inflow=11.41 cfs 1.046 af
Outflow=11.41 cfs 1.046 af

Reach DP5: STREAM Peak Depth=0.07' Max Vel=2.1 fps Inflow=1.48 cfs 0.135 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=1.47 cfs 0.135 af

Pond 1P: DEPRESSION ADJACENT TO TRAC Peak Elev=309.48' Storage=81 cf Inflow=11.77 cfs 3.872 af
30.0" x 50.0' Culvert Outflow=11.77 cfs 3.871 af

Pond 2P: CULVERT POND Peak Elev=330.04' Storage=434 cf Inflow=13.87 cfs 1.989 af
24.0" x 185.0' Culvert Outflow=13.81 cfs 1.987 af

Pond 5P: CULVET INLET Peak Elev=420.06' Storage=70 cf Inflow=16.95 cfs 2.733 af
Outflow=16.95 cfs 2.733 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=415.08' Storage=40,107 cf Inflow=17.79 cfs 3.082 af
Primary=8.39 cfs 2.984 af Secondary=0.00 cfs 0.000 af Outflow=8.39 cfs 2.984 af

Pond EDB2: DETENTION BASIN ADJACENT Peak Elev=408.25' Storage=179 cf Inflow=11.39 cfs 1.540 af
24.0" x 80.0' Culvert Outflow=11.37 cfs 1.539 af

Pond UP2P: CULVERT INLET Peak Elev=432.77' Storage=1,009 cf Inflow=2.61 cfs 0.339 af
18.0" x 75.0' Culvert Outflow=2.55 cfs 0.334 af

Pond UP3P: CULVERT INLET Peak Elev=426.08' Storage=714 cf Inflow=10.67 cfs 1.413 af
24.0" x 95.0' Culvert Outflow=10.64 cfs 1.409 af

Total Runoff Area = 158.800 ac Runoff Volume = 7.219 af Average Runoff Depth = 0.55"

Subcatchment 1S: south central section btw. gorges

Runoff = 0.29 cfs @ 12.13 hrs, Volume= 0.038 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
2.020	60	Woods, Fair, HSG B
0.700	56	Brush, Fair, HSG B
2.720	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2400	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.5	80	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	500	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
13.7	730	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 5.50 cfs @ 12.10 hrs, Volume= 0.349 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2S: Central Area

Runoff = 10.18 cfs @ 12.20 hrs, Volume= 0.872 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
3.400	98	Driveways
1.450	73	Woods, Fair, HSG C
6.650	60	Woods, Fair, HSG B
1.050	70	Brush, Fair, HSG C
2.480	56	Brush, Fair, HSG B
3.700	79	50-75% Grass cover, Fair, HSG C
18.730	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	150	0.0530	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	100	0.1600	2.8		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	1,150	0.1000	13.5	53.99	**Channel Flow,** Area= 4.0 sf Perim= 5.0' r= 0.80' n= 0.030
23.9	1,400	Total			

Subcatchment 3S: Eastern Area

Runoff = 0.20 cfs @ 12.20 hrs, Volume= 0.031 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.790	60	Woods, Fair, HSG B
0.430	56	Brush, Fair, HSG B
2.220	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.62 cfs @ 12.19 hrs, Volume= 0.134 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
2.690	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	380	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	200	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
23.4	730	Total			

Subcatchment 4B:

Runoff = 5.14 cfs @ 12.12 hrs, Volume= 0.355 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
5.010	73	Woods, Fair, HSG C
0.520	70	Brush, Fair, HSG C
0.180	98	Paved parking & roofs
0.920	79	50-75% Grass cover, Fair, HSG C
6.630	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.1	256	0.0660	3.9		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	438	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
18.0	844	Total			

Subcatchment 5A:

Runoff = 3.57 cfs @ 12.22 hrs, Volume= 0.322 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
4.670	73	Woods, Fair, HSG C
0.920	60	Woods, Fair, HSG B
0.290	56	Brush, Fair, HSG B
0.730	70	Brush, Fair, HSG C
0.710	79	50-75% Grass cover, Fair, HSG C
0.120	98	Paved parking & roofs
7.440	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	76	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.3	74	0.0670	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	160	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	818	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
25.1	1,128	Total			

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 1.60 cfs @ 12.21 hrs, Volume= 0.131 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.880	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.600	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
26.1	220	Total			

Subcatchment 6S: Western Central Area

Runoff = 2.87 cfs @ 12.16 hrs, Volume= 0.222 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
3.200	73	Woods, Fair, HSG C
1.550	70	Brush, Fair, HSG C
4.750	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0460	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	110	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	370	0.1100	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	630	Total			

Subcatchment 7S: Western Area

Runoff = 1.48 cfs @ 12.23 hrs, Volume= 0.135 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
2.300	73	Woods, Fair, HSG C
0.600	70	Brush, Fair, HSG C
2.900	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	110	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	40	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	260	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	410	Total			

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 1.73 cfs @ 12.09 hrs, Volume= 0.126 af, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
2.360	60	Woods, Fair, HSG B
0.240	98	Paved parking & roofs
1.690	69	50-75% Grass cover, Fair, HSG B
4.290	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment DP6:

Runoff = 0.02 cfs @ 12.17 hrs, Volume= 0.006 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.600	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0660	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.1	50	0.2000	6.7		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.4	200	Total			

Subcatchment UP2a:

Runoff = 2.61 cfs @ 12.47 hrs, Volume= 0.339 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 3.67 cfs @ 12.24 hrs, Volume= 0.346 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 8.20 cfs @ 12.47 hrs, Volume= 1.079 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 16.95 cfs @ 12.68 hrs, Volume= 2.733 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 19.370 ac, Inflow Depth = 0.57"
Inflow = 10.01 cfs @ 12.18 hrs, Volume= 0.920 af
Outflow = 10.01 cfs @ 12.18 hrs, Volume= 0.920 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.0 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.41' @ 12.18 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: Bottom Swale

Inflow Area = 2.720 ac, Inflow Depth = 0.17"
Inflow = 0.29 cfs @ 12.13 hrs, Volume= 0.038 af
Outflow = 0.28 cfs @ 12.16 hrs, Volume= 0.038 af, Atten= 1%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.3 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 1.8 min

Peak Depth= 0.05' @ 12.14 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 75.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 3R:

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.39 cfs @ 13.46 hrs, Volume= 2.984 af
Outflow = 8.39 cfs @ 13.47 hrs, Volume= 2.982 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.8 fps, Avg. Travel Time= 0.4 min

Peak Depth= 1.06' @ 13.46 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 4R: Bottom Swale

Inflow Area = 2.690 ac, Inflow Depth = 0.60"
Inflow = 1.62 cfs @ 12.19 hrs, Volume= 0.134 af
Outflow = 1.61 cfs @ 12.21 hrs, Volume= 0.134 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.14' @ 12.20 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 80.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: 36 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.39 cfs @ 13.47 hrs, Volume= 2.982 af
Outflow = 8.38 cfs @ 13.47 hrs, Volume= 2.981 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.9 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.52' @ 13.47 hrs
Capacity at bank full= 130.62 cfs
36.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0384 '/'

Reach CHAN1: INTERMITTENT STREAM CHANNEL

Inflow Area = 34.130 ac, Inflow Depth = 0.54"
Inflow = 11.37 cfs @ 12.51 hrs, Volume= 1.539 af
Outflow = 11.33 cfs @ 12.55 hrs, Volume= 1.532 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.5 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.5 fps, Avg. Travel Time= 3.8 min

Peak Depth= 0.24' @ 12.53 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN2: INTERMITTENT STREAM CHANNEL

Inflow Area = 7.990 ac, Inflow Depth = 0.52"
Inflow = 3.67 cfs @ 12.24 hrs, Volume= 0.346 af
Outflow = 3.63 cfs @ 12.32 hrs, Volume= 0.343 af, Atten= 1%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 6.3 min

Peak Depth= 0.12' @ 12.27 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN3:

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.38 cfs @ 13.47 hrs, Volume= 2.981 af
Outflow = 8.35 cfs @ 13.56 hrs, Volume= 2.961 af, Atten= 0%, Lag= 5.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.0 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 3.2 fps, Avg. Travel Time= 5.0 min

Peak Depth= 0.20' @ 13.51 hrs
Capacity at bank full= 454.77 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 970.0' Slope= 0.0920 '/'
Side Slope Z-value= 2.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 2.220 ac, Inflow Depth = 0.17"
Inflow = 0.20 cfs @ 12.20 hrs, Volume= 0.031 af
Outflow = 0.20 cfs @ 12.21 hrs, Volume= 0.031 af, Atten= 1%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.2 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.04' @ 12.20 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 0.55"
Inflow = 11.77 cfs @ 12.24 hrs, Volume= 3.871 af
Outflow = 11.76 cfs @ 12.25 hrs, Volume= 3.870 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.8 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 10.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.52' @ 12.25 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 44.260 ac, Inflow Depth = 0.54"
Inflow = 13.81 cfs @ 12.51 hrs, Volume= 1.987 af
Outflow = 13.80 cfs @ 12.51 hrs, Volume= 1.986 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 17.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 9.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.55' @ 12.51 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 23.660 ac, Inflow Depth = 0.53"
Inflow = 11.41 cfs @ 12.16 hrs, Volume= 1.046 af
Outflow = 11.41 cfs @ 12.16 hrs, Volume= 1.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 2.900 ac, Inflow Depth = 0.56"
Inflow = 1.48 cfs @ 12.23 hrs, Volume= 0.135 af
Outflow = 1.47 cfs @ 12.26 hrs, Volume= 0.135 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.1 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.07' @ 12.24 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DEPRESSION ADJACENT TO TRACKS AND CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 0.55"
Inflow = 11.77 cfs @ 12.24 hrs, Volume= 3.872 af
Outflow = 11.77 cfs @ 12.24 hrs, Volume= 3.871 af, Atten= 0%, Lag= 0.1 min
Primary = 11.77 cfs @ 12.24 hrs, Volume= 3.871 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.48' @ 12.24 hrs Surf.Area= 77 sf Storage= 81 cf
Plug-Flow detention time= 0.2 min calculated for 3.858 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (895.8 - 895.7)

#	Invert	Avail.Storage	Storage Description
1	308.00'	35,632 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.00	10	0	0
310.00	100	110	110
312.00	312	412	522
314.00	698	1,010	1,532
316.00	1,751	2,449	3,981
318.00	4,150	5,901	9,882
320.00	6,500	10,650	20,532
322.00	8,600	15,100	35,632

#	Routing	Invert	Outlet Devices
1	Primary	308.00'	**30.0" x 50.0' long Culvert** Ke= 0.600

Outlet Invert= 302.40' S= 0.1120 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.73 cfs @ 12.24 hrs HW=309.48' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.73 cfs @ 3.9 fps)

Pond 2P: CULVERT POND

Inflow Area =	44.260 ac,	Inflow Depth =	0.54"	
Inflow =	13.87 cfs @	12.47 hrs, Volume=	1.989 af	
Outflow =	13.81 cfs @	12.51 hrs, Volume=	1.987 af,	Atten= 0%, Lag= 2.1 min
Primary =	13.81 cfs @	12.51 hrs, Volume=	1.987 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 330.04' @ 12.51 hrs Surf.Area= 323 sf Storage= 434 cf
Plug-Flow detention time= 0.9 min calculated for 1.987 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (850.6 - 850.1)

#	Invert	Avail.Storage	Storage Description
1	328.00'	12,900 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	100	0	0
330.00	300	400	400
332.00	1,500	1,800	2,200
334.00	2,800	4,300	6,500
336.00	3,600	6,400	12,900

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 306.27' S= 0.1180 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=13.82 cfs @ 12.51 hrs HW=330.04' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 13.82 cfs @ 4.4 fps)

Pond 5P: CULVET INLET

Inflow Area =	59.910 ac,	Inflow Depth =	0.55"	
Inflow =	16.95 cfs @	12.68 hrs, Volume=	2.733 af	
Outflow =	16.95 cfs @	12.69 hrs, Volume=	2.733 af,	Atten= 0%, Lag= 0.1 min
Primary =	16.95 cfs @	12.69 hrs, Volume=	2.733 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 420.06' @ 12.69 hrs Surf.Area= 1,006 sf Storage= 70 cf
Plug-Flow detention time= 0.1 min calculated for 2.733 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (860.4 - 860.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=21.03 cfs @ 12.69 hrs HW=420.06' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.52 cfs @ 4.0 fps)
└─**2=Culvert** (Inlet Controls 10.52 cfs @ 4.0 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	0.58"	
Inflow =	17.79 cfs @	12.67 hrs, Volume=	3.082 af	
Outflow =	8.39 cfs @	13.46 hrs, Volume=	2.984 af,	Atten= 53%, Lag= 47.3 min
Primary =	8.39 cfs @	13.46 hrs, Volume=	2.984 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 415.08' @ 13.46 hrs Surf.Area= 10,682 sf Storage= 40,107 cf
Plug-Flow detention time= 64.4 min calculated for 2.984 af (97% of inflow)
Center-of-Mass det. time= 53.8 min (907.7 - 853.8)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.32 cfs @ 13.46 hrs HW=415.08' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.74 cfs @ 0.9 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Culvert** (Inlet Controls 7.58 cfs @ 9.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=410.00' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.130 ac,	Inflow Depth =	0.54"	
Inflow =	11.39 cfs @	12.50 hrs, Volume=	1.540 af	
Outflow =	11.37 cfs @	12.51 hrs, Volume=	1.539 af,	Atten= 0%, Lag= 0.8 min
Primary =	11.37 cfs @	12.51 hrs, Volume=	1.539 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 408.25' @ 12.51 hrs Surf.Area= 156 sf Storage= 179 cf
Plug-Flow detention time= 0.3 min calculated for 1.534 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (850.8 - 850.6)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.60'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0680 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.35 cfs @ 12.51 hrs HW=408.25' (Free Discharge)
- **1=Culvert** (Inlet Controls 11.35 cfs @ 4.1 fps)

Pond UP2P: CULVERT INLET

Inflow Area =	7.360 ac,	Inflow Depth =	0.55"	
Inflow =	2.61 cfs @	12.47 hrs, Volume=	0.339 af	
Outflow =	2.55 cfs @	12.54 hrs, Volume=	0.334 af,	Atten= 2%, Lag= 4.2 min
Primary =	2.55 cfs @	12.54 hrs, Volume=	0.334 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.77' @ 12.54 hrs Surf.Area= 1,061 sf Storage= 1,009 cf
Plug-Flow detention time= 12.5 min calculated for 0.334 af (98% of inflow)
Center-of-Mass det. time= 7.1 min (856.4 - 849.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.55 cfs @ 12.54 hrs HW=432.77' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.55 cfs @ 2.8 fps)

Pond UP3P: CULVERT INLET

Inflow Area = 32.530 ac, Inflow Depth = 0.52"
Inflow = 10.67 cfs @ 12.49 hrs, Volume= 1.413 af
Outflow = 10.64 cfs @ 12.52 hrs, Volume= 1.409 af, Atten= 0%, Lag= 1.8 min
Primary = 10.64 cfs @ 12.52 hrs, Volume= 1.409 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 426.08' @ 12.52 hrs Surf.Area= 767 sf Storage= 714 cf
Plug-Flow detention time= 2.1 min calculated for 1.404 af (99% of inflow)
Center-of-Mass det. time= 1.1 min (854.0 - 852.9)

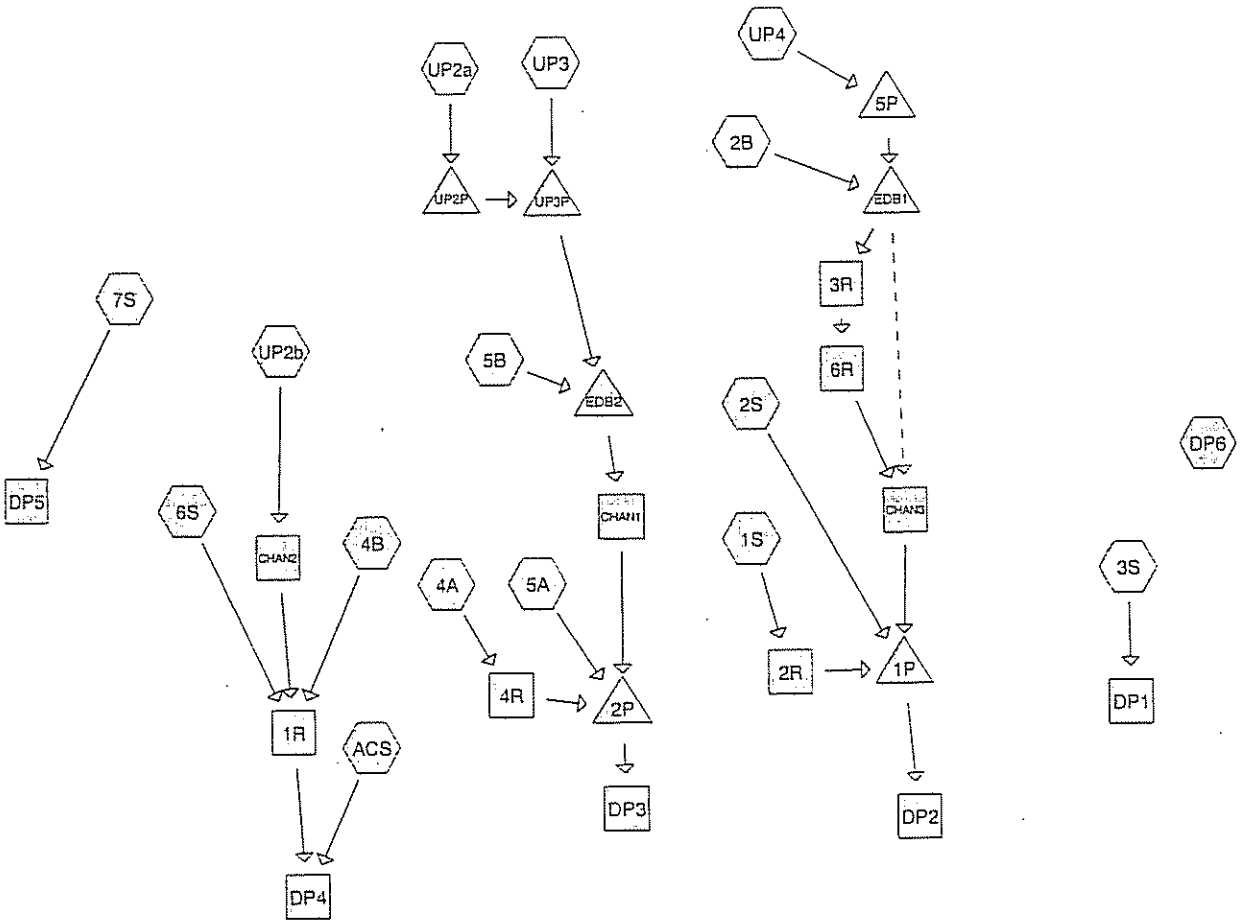
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=10.61 cfs @ 12.52 hrs HW=426.07' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.61 cfs @ 4.0 fps)

Existing Drainage Conditions
10-YEAR 24-HOUR STORM WATER COMPUTATIONS



Drainage Diagram for Existing 12-03
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: south central section btw. gorges Runoff Area=2.720 ac Runoff Depth=0.58"
Flow Length=730' Tc=13.7 min CN=59 Runoff=1.91 cfs 0.131 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.03"
Flow Length=330' Tc=17.1 min CN=83 Runoff=10.06 cfs 0.642 af

Subcatchment 2S: Central Area Runoff Area=18.730 ac Runoff Depth=1.25"
Flow Length=1,400' Tc=23.9 min CN=72 Runoff=24.86 cfs 1.951 af

Subcatchment 3S: Eastern Area Runoff Area=2.220 ac Runoff Depth=0.58"
Flow Length=460' Tc=18.1 min CN=59 Runoff=1.32 cfs 0.107 af

Subcatchment 4A: Central Area Runoff Area=2.690 ac Runoff Depth=1.31"
Flow Length=730' Tc=23.4 min CN=73 Runoff=3.82 cfs 0.294 af

Subcatchment 4B: Runoff Area=6.630 ac Runoff Depth=1.38"
Flow Length=844' Tc=18.0 min CN=74 Runoff=11.62 cfs 0.762 af

Subcatchment 5A: Runoff Area=7.440 ac Runoff Depth=1.19"
Flow Length=1,128' Tc=25.1 min CN=71 Runoff=9.07 cfs 0.737 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.600 ac Runoff Depth=1.87"
Flow Length=220' Tc=26.1 min CN=81 Runoff=3.08 cfs 0.249 af

Subcatchment 6S: Western Central Area Runoff Area=4.750 ac Runoff Depth=1.25"
Flow Length=630' Tc=20.4 min CN=72 Runoff=6.96 cfs 0.496 af

Subcatchment 7S: Western Area Runoff Area=2.900 ac Runoff Depth=1.25"
Flow Length=410' Tc=26.1 min CN=72 Runoff=3.64 cfs 0.302 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=4.290 ac Runoff Depth=0.91"
Flow Length=465' Tc=13.8 min CN=66 Runoff=5.44 cfs 0.326 af

Subcatchment DP6: Runoff Area=0.600 ac Runoff Depth=0.46"
Flow Length=200' Tc=13.4 min CN=56 Runoff=0.30 cfs 0.023 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.24"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=6.49 cfs 0.760 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.19"
Flow Length=750' Tc=26.5 min CN=71 Runoff=9.38 cfs 0.791 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.18"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=21.13 cfs 2.472 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.23"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=42.24 cfs 6.136 af

Reach 1R: Bottom Swale Peak Depth=0.68' Max Vel=6.2 fps Inflow=25.29 cfs 2.045 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=25.27 cfs 2.045 af

Reach 2R: Bottom Swale Peak Depth=0.16' Max Vel=2.7 fps Inflow=1.91 cfs 0.131 af
n=0.030 L=75.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.89 cfs 0.131 af

Reach 3R: Peak Depth=2.50' Max Vel=5.2 fps Inflow=32.34 cfs 6.242 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.89 cfs 6.239 af

Reach 4R: Bottom Swale Peak Depth=0.24' Max Vel=3.4 fps Inflow=3.82 cfs 0.294 af
n=0.030 L=80.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.80 cfs 0.294 af

Reach 6R: 36 "RCP Peak Depth=0.85' Max Vel=13.9 fps Inflow=22.89 cfs 6.239 af
D=36.0" n=0.013 L=85.0' S=0.0384 '/' Capacity=130.62 cfs Outflow=22.85 cfs 6.238 af

Reach CHAN1: INTERMITTENT STREAM CH Peak Depth=0.40' Max Vel=7.4 fps Inflow=26.40 cfs 3.467 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=26.34 cfs 3.458 af

Reach CHAN2: INTERMITTENT STREAM CHA Peak Depth=0.22' Max Vel=5.1 fps Inflow=9.38 cfs 0.791 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=9.26 cfs 0.787 af

Reach CHAN3: Peak Depth=0.44' Max Vel=8.1 fps Inflow=31.55 cfs 6.582 af
n=0.030 L=970.0' S=0.0920 '/' Capacity=454.77 cfs Outflow=31.52 cfs 6.552 af

Reach DP1: Bottom Swale Peak Depth=0.13' Max Vel=2.4 fps Inflow=1.32 cfs 0.107 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.31 cfs 0.107 af

Reach DP2: CULVERT Peak Depth=0.93' Max Vel=21.8 fps Inflow=36.51 cfs 8.633 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=36.48 cfs 8.631 af

Reach DP3: 30" Peak Depth=0.82' Max Vel=21.5 fps Inflow=30.19 cfs 4.486 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=30.18 cfs 4.485 af

Reach DP4: Inflow=29.60 cfs 2.371 af
Outflow=29.60 cfs 2.371 af

Reach DP5: STREAM Peak Depth=0.12' Max Vel=2.9 fps Inflow=3.64 cfs 0.302 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=3.61 cfs 0.302 af

Pond 1P: DEPRESSION ADJACENT TO TRA Peak Elev=311.97' Storage=515 cf Inflow=36.51 cfs 8.634 af
30.0" x 50.0' Culvert Outflow=36.51 cfs 8.633 af

Pond 2P: CULVERT POND Peak Elev=333.63' Storage=5,708 cf Inflow=31.57 cfs 4.489 af
24.0" x 185.0' Culvert Outflow=30.19 cfs 4.486 af

Pond 5P: CULVET INLET Peak Elev=421.70' Storage=1,868 cf Inflow=42.24 cfs 6.136 af
Outflow=42.05 cfs 6.135 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.50' Storage=56,443 cf Inflow=43.43 cfs 6.778 af
Primary=32.34 cfs 6.242 af Secondary=9.24 cfs 0.344 af Outflow=41.58 cfs 6.586 af

Pond EDB2: DETENTION BASIN ADJACEN Peak Elev=411.06' Storage=2,980 cf Inflow=27.29 cfs 3.468 af
24.0" x 80.0' Culvert Outflow=26.40 cfs 3.467 af

Pond UP2P: CULVERT INLET Peak Elev=433.38' Storage=1,805 cf Inflow=6.49 cfs 0.760 af
18.0" x 75.0' Culvert Outflow=6.35 cfs 0.752 af

Pond UP3P: CULVERT INLET Peak Elev=428.87' Storage=4,150 cf Inflow=27.37 cfs 3.224 af
24.0" x 95.0' Culvert Outflow=26.02 cfs 3.219 af

Total Runoff Area = 158.800 ac Runoff Volume = 16.178 af Average Runoff Depth = 1.22"

Subcatchment 1S: south central section btw. gorges

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.131 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
2.020	60	Woods, Fair, HSG B
0.700	56	Brush, Fair, HSG B
2.720	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2400	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.5	80	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	500	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
13.7	730	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 10.06 cfs @ 12.10 hrs, Volume= 0.642 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2S: Central Area

Runoff = 24.86 cfs @ 12.19 hrs, Volume= 1.951 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
3.400	98	Driveways
1.450	73	Woods, Fair, HSG C
6.650	60	Woods, Fair, HSG B
1.050	70	Brush, Fair, HSG C
2.480	56	Brush, Fair, HSG B
3.700	79	50-75% Grass cover, Fair, HSG C
18.730	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	150	0.0530	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	100	0.1600	2.8		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	1,150	0.1000	13.5	53.99	**Channel Flow,** Area= 4.0 sf Perim= 5.0' r= 0.80' n= 0.030
23.9	1,400	Total			

Subcatchment 3S: Eastern Area

Runoff = 1.32 cfs @ 12.14 hrs, Volume= 0.107 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.790	60	Woods, Fair, HSG B
0.430	56	Brush, Fair, HSG B
2.220	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 3.82 cfs @ 12.18 hrs, Volume= 0.294 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
2.690	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	380	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	200	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
23.4	730	Total			

Subcatchment 4B:

Runoff = 11.62 cfs @ 12.11 hrs, Volume= 0.762 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
5.010	73	Woods, Fair, HSG C
0.520	70	Brush, Fair, HSG C
0.180	98	Paved parking & roofs
0.920	79	50-75% Grass cover, Fair, HSG C
6.630	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.1	256	0.0660	3.9		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	438	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
18.0	844	Total			

Subcatchment 5A:

Runoff = 9.07 cfs @ 12.20 hrs, Volume= 0.737 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
4.670	73	Woods, Fair, HSG C
0.920	60	Woods, Fair, HSG B
0.290	56	Brush, Fair, HSG B
0.730	70	Brush, Fair, HSG C
0.710	79	50-75% Grass cover, Fair, HSG C
0.120	98	Paved parking & roofs
7.440	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	76	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.3	74	0.0670	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	160	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	818	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
25.1	1,128	Total			

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 3.08 cfs @ 12.20 hrs, Volume= 0.249 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.880	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.600	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
26.1	220	Total			

Subcatchment 6S: Western Central Area

Runoff = 6.96 cfs @ 12.14 hrs, Volume= 0.496 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
3.200	73	Woods, Fair, HSG C
1.550	70	Brush, Fair, HSG C
4.750	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0460	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	110	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	370	0.1100	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	630	Total			

Subcatchment 7S: Western Area

Runoff = 3.64 cfs @ 12.21 hrs, Volume= 0.302 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
2.300	73	Woods, Fair, HSG C
0.600	70	Brush, Fair, HSG C
2.900	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	110	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	40	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	260	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	410	Total			

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 5.44 cfs @ 12.07 hrs, Volume= 0.326 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
2.360	60	Woods, Fair, HSG B
0.240	98	Paved parking & roofs
1.690	69	50-75% Grass cover, Fair, HSG B
4.290	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment DP6:

Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.600	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0660	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.1	50	0.2000	6.7		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.4	200	Total			

Subcatchment UP2a:

Runoff = 6.49 cfs @ 12.43 hrs, Volume= 0.760 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 9.38 cfs @ 12.22 hrs, Volume= 0.791 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 21.13 cfs @ 12.44 hrs, Volume= 2.472 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 42.24 cfs @ 12.65 hrs, Volume= 6.136 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 19.370 ac, Inflow Depth = 1.27"
Inflow = 25.29 cfs @ 12.16 hrs, Volume= 2.045 af
Outflow = 25.27 cfs @ 12.16 hrs, Volume= 2.045 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.4 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.68' @ 12.16 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: Bottom Swale

Inflow Area =	2.720 ac,	Inflow Depth =	0.58"
Inflow =	1.91 cfs @	12.09 hrs, Volume=	0.131 af
Outflow =	1.89 cfs @	12.10 hrs, Volume=	0.131 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.16' @ 12.09 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 75.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 3R:

Inflow Area =	63.710 ac,	Inflow Depth =	1.18"
Inflow =	32.34 cfs @	12.80 hrs, Volume=	6.242 af
Outflow =	22.89 cfs @	14.15 hrs, Volume=	6.239 af, Atten= 29%, Lag= 80.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.60 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 4R: Bottom Swale

Inflow Area =	2.690 ac,	Inflow Depth =	1.31"
Inflow =	3.82 cfs @	12.18 hrs, Volume=	0.294 af
Outflow =	3.80 cfs @	12.19 hrs, Volume=	0.294 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.4 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 1.1 min

Peak Depth= 0.24' @ 12.18 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 80.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: 36 "RCP

Inflow Area =	63.710 ac,	Inflow Depth =	1.18"
Inflow =	22.89 cfs @	14.15 hrs, Volume=	6.239 af
Outflow =	22.85 cfs @	14.15 hrs, Volume=	6.238 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.5 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.85' @ 14.15 hrs
Capacity at bank full= 130.62 cfs
36.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0384 '/'

Reach CHAN1: INTERMITTENT STREAM CHANNEL

Inflow Area = 34.130 ac, Inflow Depth = 1.22"
Inflow = 26.40 cfs @ 12.63 hrs, Volume= 3.467 af
Outflow = 26.34 cfs @ 12.66 hrs, Volume= 3.458 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.4 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 3.2 min

Peak Depth= 0.40' @ 12.64 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN2: INTERMITTENT STREAM CHANNEL

Inflow Area = 7.990 ac, Inflow Depth = 1.19"
Inflow = 9.38 cfs @ 12.22 hrs, Volume= 0.791 af
Outflow = 9.26 cfs @ 12.27 hrs, Volume= 0.787 af, Atten= 1%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 5.0 min

Peak Depth= 0.22' @ 12.24 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN3:

Inflow Area = 63.710 ac, Inflow Depth = 1.24"
Inflow = 31.55 cfs @ 12.81 hrs, Volume= 6.582 af
Outflow = 31.52 cfs @ 12.86 hrs, Volume= 6.552 af, Atten= 0%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.1 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 3.7 fps, Avg. Travel Time= 4.4 min

Peak Depth= 0.44' @ 12.82 hrs
Capacity at bank full= 454.77 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 970.0' Slope= 0.0920 '/'
Side Slope Z-value= 2.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 2.220 ac, Inflow Depth = 0.58"
Inflow = 1.32 cfs @ 12.14 hrs, Volume= 0.107 af
Outflow = 1.31 cfs @ 12.15 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.13' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 1.22"
Inflow = 36.51 cfs @ 12.84 hrs, Volume= 8.633 af
Outflow = 36.48 cfs @ 12.85 hrs, Volume= 8.631 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.7 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.93' @ 12.85 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 44.260 ac, Inflow Depth = 1.22"
Inflow = 30.19 cfs @ 12.66 hrs, Volume= 4.486 af
Outflow = 30.18 cfs @ 12.67 hrs, Volume= 4.485 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.8 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.82' @ 12.66 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 23.660 ac, Inflow Depth = 1.20"
Inflow = 29.60 cfs @ 12.14 hrs, Volume= 2.371 af
Outflow = 29.60 cfs @ 12.14 hrs, Volume= 2.371 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 2.900 ac, Inflow Depth = 1.25"
Inflow = 3.64 cfs @ 12.21 hrs, Volume= 0.302 af
Outflow = 3.61 cfs @ 12.23 hrs, Volume= 0.302 af, Atten= 1%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 1.1 min

Peak Depth= 0.12' @ 12.22 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DEPRESSION ADJACENT TO TRACKS AND CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 1.22"
Inflow = 36.51 cfs @ 12.83 hrs, Volume= 8.634 af
Outflow = 36.51 cfs @ 12.84 hrs, Volume= 8.633 af, Atten= 0%, Lag= 0.6 min
Primary = 36.51 cfs @ 12.84 hrs, Volume= 8.633 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 311.97' @ 12.84 hrs Surf.Area= 308 sf Storage= 515 cf
Plug-Flow detention time= 0.2 min calculated for 8.604 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (869.9 - 869.7)

#	Invert	Avail.Storage	Storage Description
1	308.00'	35,632 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.00	10	0	0
310.00	100	110	110
312.00	312	412	522
314.00	698	1,010	1,532
316.00	1,751	2,449	3,981
318.00	4,150	5,901	9,882
320.00	6,500	10,650	20,532
322.00	8,600	15,100	35,632

#	Routing	Invert	Outlet Devices
1	Primary	308.00'	**30.0" x 50.0' long Culvert** Ke= 0.600

Outlet Invert= 302.40' S= 0.1120 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=36.48 cfs @ 12.84 hrs HW=311.96' (Free Discharge)
↑—1=**Culvert** (Inlet Controls 36.48 cfs @ 7.4 fps)

Pond 2P: CULVERT POND

Inflow Area =	44.260 ac,	Inflow Depth =	1.22"	
Inflow =	31.57 cfs @	12.35 hrs, Volume=	4.489 af	
Outflow =	30.19 cfs @	12.66 hrs, Volume=	4.486 af,	Atten= 4%, Lag= 18.3 min
Primary =	30.19 cfs @	12.66 hrs, Volume=	4.486 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 333.63' @ 12.66 hrs Surf.Area= 2,561 sf Storage= 5,708 cf
Plug-Flow detention time= 1.7 min calculated for 4.486 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (834.3 - 832.8)

#	Invert	Avail.Storage	Storage Description
1	328.00'	12,900 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	100	0	0
330.00	300	400	400
332.00	1,500	1,800	2,200
334.00	2,800	4,300	6,500
336.00	3,600	6,400	12,900

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 306.27' S= 0.1180 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=30.18 cfs @ 12.66 hrs HW=333.63' (Free Discharge)
↑—1=**Culvert** (Inlet Controls 30.18 cfs @ 9.6 fps)

Pond 5P: CULVET INLET

Inflow Area =	59.910 ac,	Inflow Depth =	1.23"	
Inflow =	42.24 cfs @	12.65 hrs, Volume=	6.136 af	
Outflow =	42.05 cfs @	12.68 hrs, Volume=	6.135 af,	Atten= 0%, Lag= 1.9 min
Primary =	42.05 cfs @	12.68 hrs, Volume=	6.135 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.70' @ 12.68 hrs Surf.Area= 1,170 sf Storage= 1,868 cf
Plug-Flow detention time= 0.3 min calculated for 6.135 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (844.2 - 844.0)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60', S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=41.97 cfs @ 12.68 hrs HW=421.69' (Free Discharge)
└─**1=Culvert** (Inlet Controls 20.98 cfs @ 6.7 fps)
└─**2=Culvert** (Inlet Controls 20.98 cfs @ 6.7 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	1.28"	
Inflow =	43.43 cfs @	12.67 hrs, Volume=	6.778 af	
Outflow =	41.58 cfs @	12.80 hrs, Volume=	6.586 af,	Atten= 4%, Lag= 8.1 min
Primary =	32.34 cfs @	12.80 hrs, Volume=	6.242 af	
Secondary =	9.24 cfs @	12.80 hrs, Volume=	0.344 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.50' @ 12.80 hrs Surf.Area= 13,244 sf Storage= 56,443 cf
Plug-Flow detention time= 48.7 min calculated for 6.564 af (97% of inflow)
Center-of-Mass det. time= 39.1 min (878.1 - 839.0)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=32.28 cfs @ 12.80 hrs HW=416.50' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 19.70 cfs @ 5.6 fps)
—**2=Orifice/Grate** (Weir Controls 3.89 cfs @ 1.4 fps)
—**3=Culvert** (Inlet Controls 8.68 cfs @ 11.1 fps)

Secondary OutFlow Max=9.21 cfs @ 12.80 hrs HW=416.50' (Free Discharge)
↑—**4=Broad-Crested Rectangular Weir** (Weir Controls 9.21 cfs @ 1.9 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.130 ac,	Inflow Depth =	1.22"	
Inflow =	27.29 cfs @	12.53 hrs, Volume=	3.468 af	
Outflow =	26.40 cfs @	12.63 hrs, Volume=	3.467 af,	Atten= 3%, Lag= 6.1 min
Primary =	26.40 cfs @	12.63 hrs, Volume=	3.467 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 411.06' @ 12.63 hrs Surf.Area= 1,912 sf Storage= 2,980 cf
Plug-Flow detention time= 0.7 min calculated for 3.456 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (834.4 - 833.8)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.60'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0680 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=26.36 cfs @ 12.63 hrs HW=411.05' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 26.36 cfs @ 8.4 fps)

Pond UP2P: CULVERT INLET

Inflow Area =	7.360 ac,	Inflow Depth =	1.24"	
Inflow =	6.49 cfs @	12.43 hrs, Volume=	0.760 af	
Outflow =	6.35 cfs @	12.50 hrs, Volume=	0.752 af,	Atten= 2%, Lag= 4.1 min
Primary =	6.35 cfs @	12.50 hrs, Volume=	0.752 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 433.38' @ 12.50 hrs Surf.Area= 1,721 sf Storage= 1,805 cf
Plug-Flow detention time= 8.6 min calculated for 0.752 af (99% of inflow)
Center-of-Mass det. time= 5.2 min (837.6 - 832.5)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

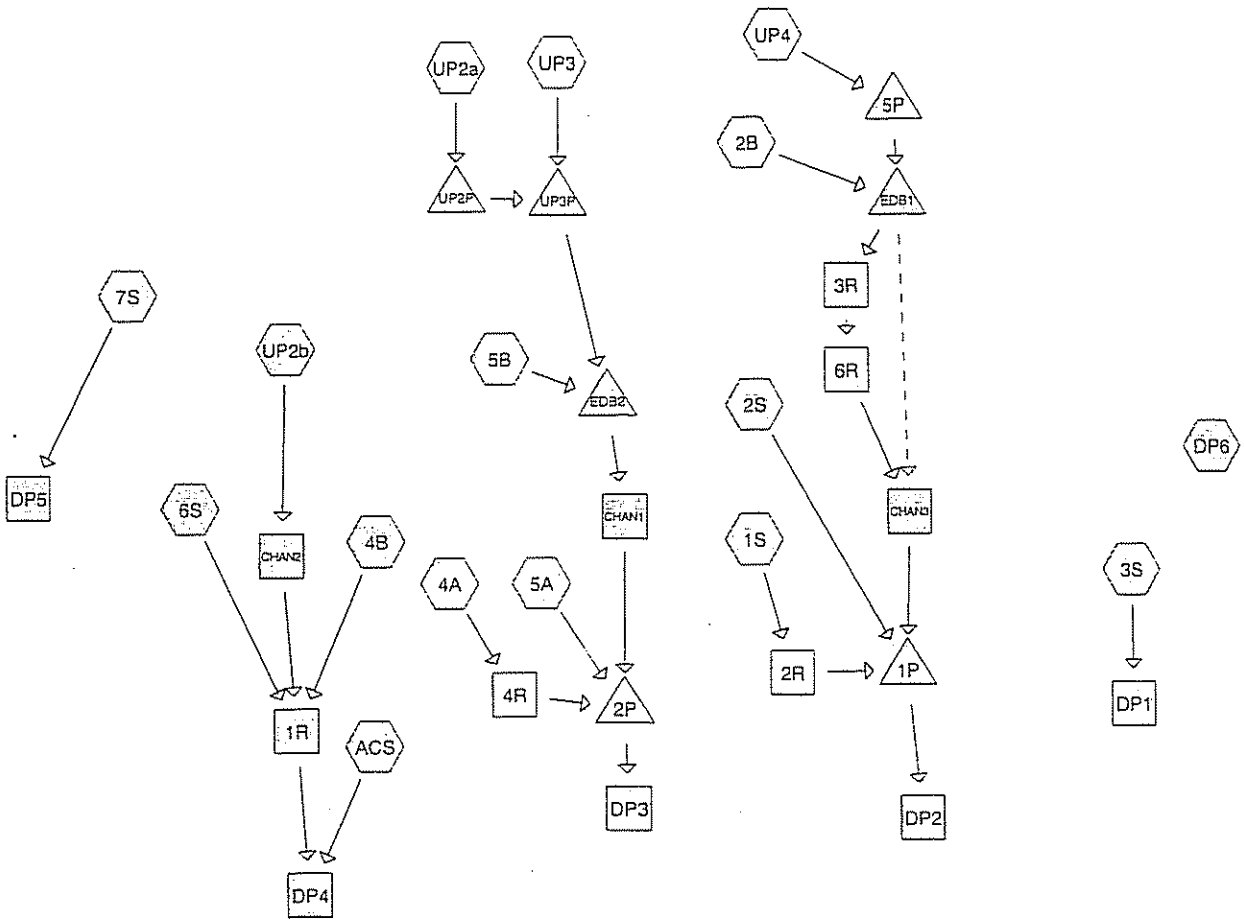
Primary OutFlow Max=6.35 cfs @ 12.50 hrs HW=433.37' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.35 cfs @ 3.7 fps)

Pond UP3P: CULVERT INLET

Inflow Area =	32.530 ac,	Inflow Depth =	1.19"	
Inflow =	27.37 cfs @	12.45 hrs, Volume=	3.224 af	
Outflow =	26.02 cfs @	12.55 hrs, Volume=	3.219 af,	Atten= 5%, Lag= 6.0 min
Primary =	26.02 cfs @	12.55 hrs, Volume=	3.219 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 428.87' @ 12.55 hrs Surf.Area= 1,720 sf Storage= 4,150 cf

Existing Drainage Conditions
25-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Existing 12-03
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: south central section btw. gorges Runoff Area=2.720 ac Runoff Depth=0.94"
Flow Length=730' Tc=13.7 min CN=59 Runoff=3.44 cfs 0.214 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.69"
Flow Length=330' Tc=17.1 min CN=83 Runoff=13.24 cfs 0.852 af

Subcatchment 2S: Central Area Runoff Area=18.730 ac Runoff Depth=1.79"
Flow Length=1,400' Tc=23.9 min CN=72 Runoff=36.04 cfs 2.787 af

Subcatchment 3S: Eastern Area Runoff Area=2.220 ac Runoff Depth=0.94"
Flow Length=460' Tc=18.1 min CN=59 Runoff=2.39 cfs 0.174 af

Subcatchment 4A: Central Area Runoff Area=2.690 ac Runoff Depth=1.86"
Flow Length=730' Tc=23.4 min CN=73 Runoff=5.49 cfs 0.417 af

Subcatchment 4B: Runoff Area=6.630 ac Runoff Depth=1.94"
Flow Length=844' Tc=18.0 min CN=74 Runoff=16.45 cfs 1.072 af

Subcatchment 5A: Runoff Area=7.440 ac Runoff Depth=1.71"
Flow Length=1,128' Tc=25.1 min CN=71 Runoff=13.30 cfs 1.061 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.600 ac Runoff Depth=2.51"
Flow Length=220' Tc=26.1 min CN=81 Runoff=4.12 cfs 0.334 af

Subcatchment 6S: Western Central Area Runoff Area=4.750 ac Runoff Depth=1.79"
Flow Length=630' Tc=20.4 min CN=72 Runoff=10.07 cfs 0.708 af

Subcatchment 7S: Western Area Runoff Area=2.900 ac Runoff Depth=1.78"
Flow Length=410' Tc=26.1 min CN=72 Runoff=5.29 cfs 0.431 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=4.290 ac Runoff Depth=1.37"
Flow Length=465' Tc=13.8 min CN=66 Runoff=8.44 cfs 0.491 af

Subcatchment DP6: Runoff Area=0.600 ac Runoff Depth=0.78"
Flow Length=200' Tc=13.4 min CN=56 Runoff=0.60 cfs 0.039 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.77"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=9.48 cfs 1.086 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.71"
Flow Length=750' Tc=26.5 min CN=71 Runoff=13.78 cfs 1.139 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.70"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=31.17 cfs 3.561 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.76"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=61.70 cfs 8.774 af

Reach 1R: Bottom Swale Peak Depth=0.83' Max Vel=6.9 fps Inflow=36.91 cfs 2.914 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=36.88 cfs 2.914 af

Reach 2R: Bottom Swale Peak Depth=0.22' Max Vel=3.3 fps Inflow=3.44 cfs 0.214 af
n=0.030 L=75.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.41 cfs 0.213 af

Reach 3R: Peak Depth=2.50' Max Vel=5.0 fps Inflow=44.57 cfs 8.285 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.36 cfs 8.282 af

Reach 4R: Bottom Swale Peak Depth=0.29' Max Vel=3.8 fps Inflow=5.49 cfs 0.417 af
n=0.030 L=80.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=5.45 cfs 0.417 af

Reach 6R: 36 "RCP Peak Depth=0.84' Max Vel=13.8 fps Inflow=22.36 cfs 8.282 af
D=36.0" n=0.013 L=85.0' S=0.0384 '/' Capacity=130.62 cfs Outflow=22.50 cfs 8.280 af

Reach CHAN1: INTERMITTENT STREAM CH Peak Depth=0.46' Max Vel=8.0 fps Inflow=32.95 cfs 4.966 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=32.93 cfs 4.954 af

Reach CHAN2: INTERMITTENT STREAM CH Peak Depth=0.27' Max Vel=5.8 fps Inflow=13.78 cfs 1.139 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=13.60 cfs 1.135 af

Reach CHAN3: Peak Depth=0.50' Max Vel=8.7 fps Inflow=39.49 cfs 9.291 af
n=0.030 L=970.0' S=0.0920 '/' Capacity=454.77 cfs Outflow=39.48 cfs 9.253 af

Reach DP1: Bottom Swale Peak Depth=0.18' Max Vel=2.9 fps Inflow=2.39 cfs 0.174 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.39 cfs 0.174 af

Reach DP2: CULVERT Peak Depth=1.09' Max Vel=23.5 fps Inflow=48.17 cfs 12.251 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=48.18 cfs 12.249 af

Reach DP3: 30" Peak Depth=0.91' Max Vel=22.8 fps Inflow=36.97 cfs 6.428 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=36.98 cfs 6.427 af

Reach DP4: Inflow=43.64 cfs 3.405 af
Outflow=43.64 cfs 3.405 af

Reach DP5: STREAM Peak Depth=0.15' Max Vel=3.3 fps Inflow=5.29 cfs 0.431 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=5.26 cfs 0.431 af

Pond 1P: DEPRESSION ADJACENT TO T Peak Elev=313.98' Storage=1,520 cf Inflow=48.30 cfs 12.252 af
30.0" x 50.0' Culvert Outflow=48.17 cfs 12.251 af

Pond 2P: CULVERT POND Peak Elev=335.90' Storage=12,573 cf Inflow=40.93 cfs 6.432 af
24.0" x 185.0' Culvert Outflow=36.97 cfs 6.428 af

Pond 5P: CULVET INLET Peak Elev=424.02' Storage=6,495 cf Inflow=61.70 cfs 8.774 af
Outflow=60.32 cfs 8.774 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.74' Storage=59,659 cf Inflow=61.95 cfs 9.625 af
Primary=44.57 cfs 8.285 af Secondary=17.16 cfs 1.011 af Outflow=61.73 cfs 9.296 af

Pond EDB2: DETENTION BASIN ADJACEN Peak Elev=413.00' Storage=9,109 cf Inflow=35.47 cfs 4.966 af
24.0" x 80.0' Culvert Outflow=32.95 cfs 4.966 af

Pond UP2P: CULVERT INLET Peak Elev=434.02' Storage=2,696 cf Inflow=9.48 cfs 1.086 af
18.0" x 75.0' Culvert Outflow=8.99 cfs 1.077 af

Pond UP3P: CULVERT INLET Peak Elev=431.29' Storage=11,880 cf Inflow=39.94 cfs 4.638 af
24.0" x 95.0' Culvert Outflow=34.13 cfs 4.632 af

Total Runoff Area = 158.800 ac Runoff Volume = 23.137 af Average Runoff Depth = 1.75"

Subcatchment 1S: south central section btw. gorges

Runoff = 3.44 cfs @ 12.08 hrs, Volume= 0.214 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
2.020	60	Woods, Fair, HSG B
0.700	56	Brush, Fair, HSG B
2.720	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2400	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.5	80	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	500	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
13.7	730	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 13.24 cfs @ 12.09 hrs, Volume= 0.852 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2S: Central Area

Runoff = 36.04 cfs @ 12.18 hrs, Volume= 2.787 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
3.400	98	Driveways
1.450	73	Woods, Fair, HSG C
6.650	60	Woods, Fair, HSG B
1.050	70	Brush, Fair, HSG C
2.480	56	Brush, Fair, HSG B
3.700	79	50-75% Grass cover, Fair, HSG C
18.730	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	150	0.0530	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	100	0.1600	2.8		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	1,150	0.1000	13.5	53.99	**Channel Flow,** Area= 4.0 sf Perim= 5.0' r= 0.80' n= 0.030
23.9	1,400	Total			

Subcatchment 3S: Eastern Area

Runoff = 2.39 cfs @ 12.13 hrs, Volume= 0.174 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.790	60	Woods, Fair, HSG B
0.430	56	Brush, Fair, HSG B
2.220	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 5.49 cfs @ 12.17 hrs, Volume= 0.417 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
2.690	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	380	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	200	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
23.4	730	Total			

Subcatchment 4B:

Runoff = 16.45 cfs @ 12.11 hrs, Volume= 1.072 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
5.010	73	Woods, Fair, HSG C
0.520	70	Brush, Fair, HSG C
0.180	98	Paved parking & roofs
0.920	79	50-75% Grass cover, Fair, HSG C
6.630	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.1	256	0.0660	3.9		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	438	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
18.0	844	Total			

Subcatchment 5A:

Runoff = 13.30 cfs @ 12.20 hrs, Volume= 1.061 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
4.670	73	Woods, Fair, HSG C
0.920	60	Woods, Fair, HSG B
0.290	56	Brush, Fair, HSG B
0.730	70	Brush, Fair, HSG C
0.710	79	50-75% Grass cover, Fair, HSG C
0.120	98	Paved parking & roofs
7.440	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	76	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.3	74	0.0670	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	160	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	818	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
25.1	1,128	Total			

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 4.12 cfs @ 12.20 hrs, Volume= 0.334 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.880	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.600	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
26.1	220	Total			

Subcatchment 6S: Western Central Area

Runoff = 10.07 cfs @ 12.14 hrs, Volume= 0.708 af, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
3.200	73	Woods, Fair, HSG C
1.550	70	Brush, Fair, HSG C
4.750	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0460	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	110	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	370	0.1100	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	630	Total			

Subcatchment 7S: Western Area

Runoff = 5.29 cfs @ 12.21 hrs, Volume= 0.431 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
2.300	73	Woods, Fair, HSG C
0.600	70	Brush, Fair, HSG C
2.900	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	110	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	40	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	260	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	410	Total			

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 8.44 cfs @ 12.07 hrs, Volume= 0.491 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
2.360	60	Woods, Fair, HSG B
0.240	98	Paved parking & roofs
1.690	69	50-75% Grass cover, Fair, HSG B
4.290	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment DP6:

Runoff = 0.60 cfs @ 12.08 hrs, Volume= 0.039 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.600	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0660	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.1	50	0.2000	6.7		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.4	200	Total			

Subcatchment UP2a:

Runoff = 9.48 cfs @ 12.42 hrs, Volume= 1.086 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 13.78 cfs @ 12.21 hrs, Volume= 1.139 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 31.17 cfs @ 12.43 hrs, Volume= 3.561 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 61.70 cfs @ 12.64 hrs, Volume= 8.774 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 19.370 ac, Inflow Depth = 1.81"
Inflow = 36.91 cfs @ 12.15 hrs, Volume= 2.914 af
Outflow = 36.88 cfs @ 12.16 hrs, Volume= 2.914 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.9 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.6 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.83' @ 12.16 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: Bottom Swale

Inflow Area = 2.720 ac, Inflow Depth = 0.94"
Inflow = 3.44 cfs @ 12.08 hrs, Volume= 0.214 af
Outflow = 3.41 cfs @ 12.09 hrs, Volume= 0.213 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.3 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 1.0 min

Peak Depth= 0.22' @ 12.08 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 75.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 3R:

Inflow Area = 63.710 ac, Inflow Depth = 1.56"
Inflow = 44.57 cfs @ 12.75 hrs, Volume= 8.285 af
Outflow = 22.36 cfs @ 12.45 hrs, Volume= 8.282 af, Atten= 50%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.40 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 4R: Bottom Swale

Inflow Area = 2.690 ac, Inflow Depth = 1.86"
Inflow = 5.49 cfs @ 12.17 hrs, Volume= 0.417 af
Outflow = 5.45 cfs @ 12.18 hrs, Volume= 0.417 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.8 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 1.0 min

Peak Depth= 0.29' @ 12.18 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 80.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: 36 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.56"
Inflow = 22.36 cfs @ 12.45 hrs, Volume= 8.282 af
Outflow = 22.50 cfs @ 12.50 hrs, Volume= 8.280 af, Atten= 0%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.9 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.84' @ 12.50 hrs
Capacity at bank full= 130.62 cfs
36.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0384 '/'

Reach CHAN1: INTERMITTENT STREAM CHANNEL

Inflow Area =	34.130 ac,	Inflow Depth =	1.75"	
Inflow =	32.95 cfs @	12.81 hrs, Volume=	4.966 af	
Outflow =	32.93 cfs @	12.85 hrs, Volume=	4.954 af,	Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.0 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.2 fps, Avg. Travel Time= 2.9 min

Peak Depth= 0.46' @ 12.83 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN2: INTERMITTENT STREAM CHANNEL

Inflow Area =	7.990 ac,	Inflow Depth =	1.71"	
Inflow =	13.78 cfs @	12.21 hrs, Volume=	1.139 af	
Outflow =	13.60 cfs @	12.26 hrs, Volume=	1.135 af,	Atten= 1%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.8 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.1 fps, Avg. Travel Time= 4.6 min

Peak Depth= 0.27' @ 12.23 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN3:

Inflow Area =	63.710 ac,	Inflow Depth =	1.75"	
Inflow =	39.49 cfs @	12.70 hrs, Volume=	9.291 af	
Outflow =	39.48 cfs @	12.80 hrs, Volume=	9.253 af,	Atten= 0%, Lag= 6.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.7 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 4.0 fps, Avg. Travel Time= 4.1 min

Peak Depth= 0.50' @ 12.77 hrs
Capacity at bank full= 454.77 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 970.0' Slope= 0.0920 '/'
Side Slope Z-value= 2.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 2.220 ac, Inflow Depth = 0.94"
Inflow = 2.39 cfs @ 12.13 hrs, Volume= 0.174 af
Outflow = 2.39 cfs @ 12.13 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.18' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 1.73"
Inflow = 48.17 cfs @ 12.69 hrs, Volume= 12.251 af
Outflow = 48.18 cfs @ 12.70 hrs, Volume= 12.249 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 23.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 12.3 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.09' @ 12.70 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 44.260 ac, Inflow Depth = 1.74"
Inflow = 36.97 cfs @ 12.76 hrs, Volume= 6.428 af
Outflow = 36.98 cfs @ 12.76 hrs, Volume= 6.427 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.5 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.91' @ 12.76 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 23.660 ac, Inflow Depth = 1.73"
Inflow = 43.64 cfs @ 12.13 hrs, Volume= 3.405 af
Outflow = 43.64 cfs @ 12.13 hrs, Volume= 3.405 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 2.900 ac, Inflow Depth = 1.78"
Inflow = 5.29 cfs @ 12.21 hrs, Volume= 0.431 af
Outflow = 5.26 cfs @ 12.22 hrs, Volume= 0.431 af, Atten= 1%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.3 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 1.1 min

Peak Depth= 0.15' @ 12.21 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DEPRESSION ADJACENT TO TRACKS AND CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 1.73"
Inflow = 48.30 cfs @ 12.66 hrs, Volume= 12.252 af
Outflow = 48.17 cfs @ 12.69 hrs, Volume= 12.251 af, Atten= 0%, Lag= 2.0 min
Primary = 48.17 cfs @ 12.69 hrs, Volume= 12.251 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 313.98' @ 12.69 hrs Surf.Area= 693 sf Storage= 1,520 cf
Plug-Flow detention time= 0.2 min calculated for 12.211 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (864.5 - 864.3)

#	Invert	Avail.Storage	Storage Description
1	308.00'	35,632 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.00	10	0	0
310.00	100	110	110
312.00	312	412	522
314.00	698	1,010	1,532
316.00	1,751	2,449	3,981
318.00	4,150	5,901	9,882
320.00	6,500	10,650	20,532
322.00	8,600	15,100	35,632

#	Routing	Invert	Outlet Devices
1	Primary	308.00'	**30.0" x 50.0' long Culvert** Ke= 0.600

Outlet Invert= 302.40' S= 0.1120 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=48.15 cfs @ 12.69 hrs HW=313.97' (Free Discharge)
└─**1=Culvert** (Inlet Controls 48.15 cfs @ 9.8 fps)

Pond 2P: CULVERT POND

Inflow Area =	44.260 ac,	Inflow Depth =	1.74"	
Inflow =	40.93 cfs @	12.27 hrs, Volume=	6.432 af	
Outflow =	36.97 cfs @	12.76 hrs, Volume=	6.428 af,	Atten= 10%, Lag= 29.3 min
Primary =	36.97 cfs @	12.76 hrs, Volume=	6.428 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 335.90' @ 12.76 hrs Surf.Area= 3,559 sf Storage= 12,573 cf
Plug-Flow detention time= 3.0 min calculated for 6.428 af (100% of inflow)
Center-of-Mass det. time= 2.8 min (830.0 - 827.2)

#	Invert	Avail.Storage	Storage Description
1	328.00'	12,900 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	100	0	0
330.00	300	400	400
332.00	1,500	1,800	2,200
334.00	2,800	4,300	6,500
336.00	3,600	6,400	12,900

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 306.27' S= 0.1180 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=36.97 cfs @ 12.76 hrs HW=335.90' (Free Discharge)
└─**1=Culvert** (Inlet Controls 36.97 cfs @ 11.8 fps)

Pond 5P: CULVET INLET

Inflow Area =	59.910 ac,	Inflow Depth =	1.76"	
Inflow =	61.70 cfs @	12.64 hrs, Volume=	8.774 af	
Outflow =	60.32 cfs @	12.72 hrs, Volume=	8.774 af,	Atten= 2%, Lag= 4.9 min
Primary =	60.32 cfs @	12.72 hrs, Volume=	8.774 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 424.02' @ 12.72 hrs Surf.Area= 3,024 sf Storage= 6,495 cf
Plug-Flow detention time= 0.6 min calculated for 8.774 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (837.7 - 837.1)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60'. S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=60.24 cfs @ 12.72 hrs HW=424.01' (Free Discharge)
↑—1=**Culvert** (Inlet Controls 30.12 cfs @ 9.6 fps)
└—2=**Culvert** (Inlet Controls 30.12 cfs @ 9.6 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	1.81"	
Inflow =	61.95 cfs @	12.71 hrs, Volume=	9.625 af	
Outflow =	61.73 cfs @	12.75 hrs, Volume=	9.296 af,	Atten= 0%, Lag= 2.5 min
Primary =	44.57 cfs @	12.75 hrs, Volume=	8.285 af	
Secondary =	17.16 cfs @	12.75 hrs, Volume=	1.011 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.74' @ 12.75 hrs Surf.Area= 13,803 sf Storage= 59,659 cf
Plug-Flow detention time= 41.6 min calculated for 9.265 af (96% of inflow)
Center-of-Mass det. time= 30.0 min (862.9 - 832.9)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=44.53 cfs @ 12.75 hrs HW=416.74' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 21.43 cfs @ 6.0 fps)
- **2=Orifice/Grate** (Weir Controls 14.25 cfs @ 2.1 fps)
- **3=Culvert** (Inlet Controls 8.86 cfs @ 11.3 fps)

Secondary OutFlow Max=17.15 cfs @ 12.75 hrs HW=416.74' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 17.15 cfs @ 2.3 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.130 ac,	Inflow Depth =	1.75"	
Inflow =	35.47 cfs @	12.60 hrs, Volume=	4.966 af	
Outflow =	32.95 cfs @	12.81 hrs, Volume=	4.966 af,	Atten= 7%, Lag= 12.9 min
Primary =	32.95 cfs @	12.81 hrs, Volume=	4.966 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.00' @ 12.81 hrs Surf.Area= 4,400 sf Storage= 9,109 cf
Plug-Flow detention time= 1.8 min calculated for 4.966 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (829.4 - 827.7)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.60'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0680 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=32.94 cfs @ 12.81 hrs HW=413.00' (Free Discharge)
- **1=Culvert** (Inlet Controls 32.94 cfs @ 10.5 fps)

Pond UP2P: CULVERT INLET

Inflow Area =	7.360 ac,	Inflow Depth =	1.77"	
Inflow =	9.48 cfs @	12.42 hrs, Volume=	1.086 af	
Outflow =	8.99 cfs @	12.53 hrs, Volume=	1.077 af,	Atten= 5%, Lag= 6.3 min
Primary =	8.99 cfs @	12.53 hrs, Volume=	1.077 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.02' @ 12.53 hrs Surf.Area= 2,450 sf Storage= 2,696 cf
Plug-Flow detention time= 7.7 min calculated for 1.074 af (99% of inflow)
Center-of-Mass det. time= 4.9 min (830.3 - 825.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.97 cfs @ 12.53 hrs HW=434.02' (Free Discharge)
↑**1=Culvert** (Inlet Controls 8.97 cfs @ 5.1 fps)

Pond UP3P: CULVERT INLET

Inflow Area =	32.530 ac,	Inflow Depth = 1.71"	
Inflow =	39.94 cfs @	12.44 hrs, Volume=	4.638 af
Outflow =	34.13 cfs @	12.63 hrs, Volume=	4.632 af, Atten= 15%, Lag= 11.4 min
Primary =	34.13 cfs @	12.63 hrs, Volume=	4.632 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 431.29' @ 12.63 hrs Surf.Area= 4,986 sf Storage= 11,880 cf
Plug-Flow detention time= 2.9 min calculated for 4.632 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (830.1 - 827.6)

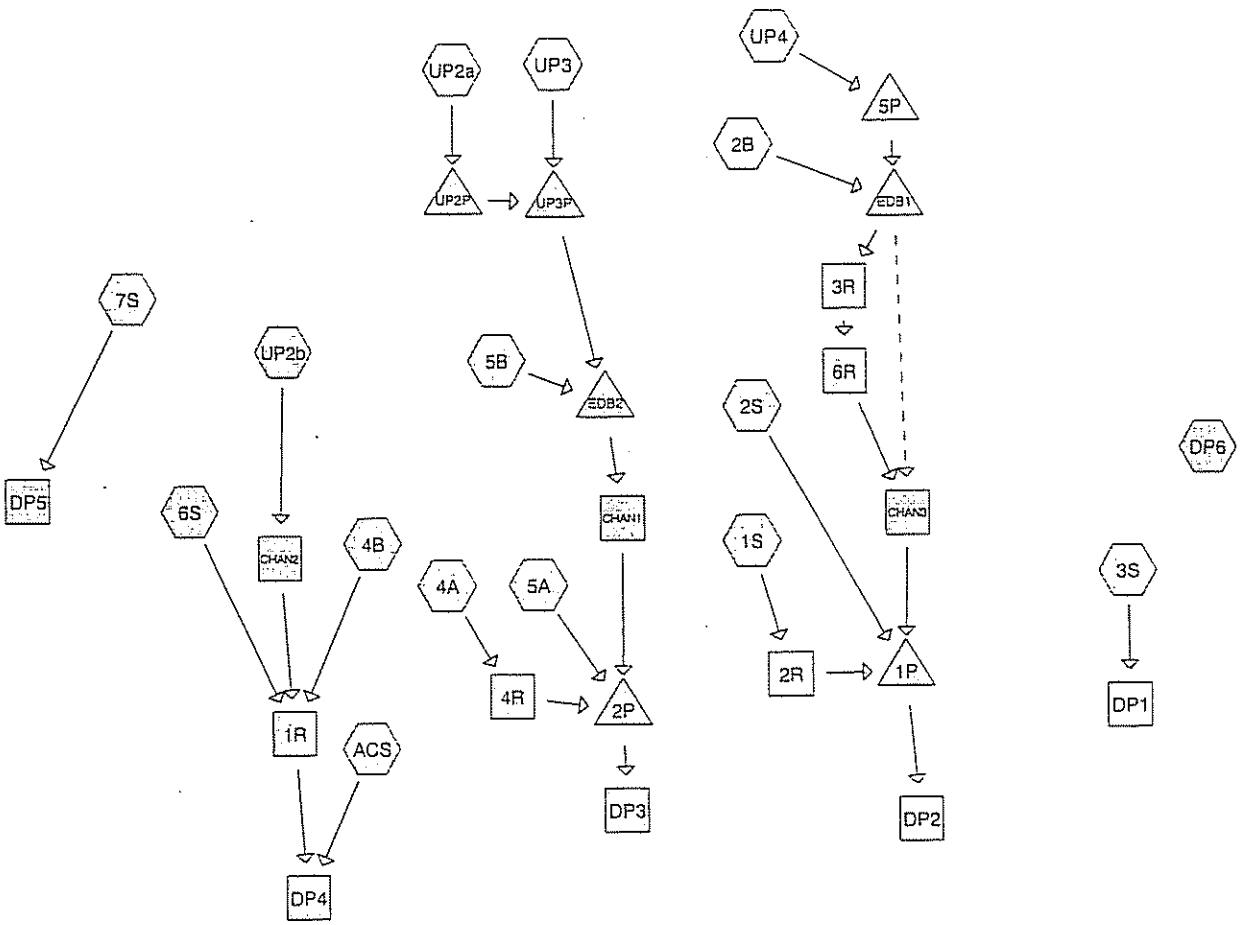
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=34.10 cfs @ 12.63 hrs HW=431.28' (Free Discharge)
↑**1=Culvert** (Inlet Controls 34.10 cfs @ 10.9 fps)

Existing Drainage Conditions
50-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Existing 12-03
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: south central section btw. gorges Runoff Area=2.720 ac Runoff Depth=1.09"
Flow Length=730' Tc=13.7 min CN=59 Runoff=4.09 cfs 0.248 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.94"
Flow Length=330' Tc=17.1 min CN=83 Runoff=14.44 cfs 0.932 af

Subcatchment 2S: Central Area Runoff Area=18.730 ac Runoff Depth=2.00"
Flow Length=1,400' Tc=23.9 min CN=72 Runoff=40.43 cfs 3.117 af

Subcatchment 3S: Eastern Area Runoff Area=2.220 ac Runoff Depth=1.09"
Flow Length=460' Tc=18.1 min CN=59 Runoff=2.84 cfs 0.202 af

Subcatchment 4A: Central Area Runoff Area=2.690 ac Runoff Depth=2.08"
Flow Length=730' Tc=23.4 min CN=73 Runoff=6.14 cfs 0.465 af

Subcatchment 4B: Runoff Area=6.630 ac Runoff Depth=2.16"
Flow Length=844' Tc=18.0 min CN=74 Runoff=18.33 cfs 1.194 af

Subcatchment 5A: Runoff Area=7.440 ac Runoff Depth=1.92"
Flow Length=1,128' Tc=25.1 min CN=71 Runoff=14.97 cfs 1.190 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.600 ac Runoff Depth=2.75"
Flow Length=220' Tc=26.1 min CN=81 Runoff=4.52 cfs 0.367 af

Subcatchment 6S: Western Central Area Runoff Area=4.750 ac Runoff Depth=2.00"
Flow Length=630' Tc=20.4 min CN=72 Runoff=11.29 cfs 0.792 af

Subcatchment 7S: Western Area Runoff Area=2.900 ac Runoff Depth=2.00"
Flow Length=410' Tc=26.1 min CN=72 Runoff=5.93 cfs 0.482 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=4.290 ac Runoff Depth=1.56"
Flow Length=465' Tc=13.8 min CN=66 Runoff=9.64 cfs 0.557 af

Subcatchment DP6: Runoff Area=0.600 ac Runoff Depth=0.91"
Flow Length=200' Tc=13.4 min CN=56 Runoff=0.73 cfs 0.046 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.98"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=10.65 cfs 1.215 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.92"
Flow Length=750' Tc=26.5 min CN=71 Runoff=15.51 cfs 1.277 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.90"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=35.12 cfs 3.993 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.97"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=69.36 cfs 9.819 af

Reach 1R: Bottom Swale Peak Depth=0.88' Max Vel=7.1 fps Inflow=41.46 cfs 3.258 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=41.44 cfs 3.258 af

Reach 2R: Bottom Swale Peak Depth=0.25' Max Vel=3.5 fps Inflow=4.09 cfs 0.248 af
n=0.030 L=75.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=4.04 cfs 0.248 af

Reach 3R: Peak Depth=2.50' Max Vel=5.1 fps Inflow=48.24 cfs 9.073 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=24.06 cfs 9.069 af

Reach 4R: Bottom Swale Peak Depth=0.31' Max Vel=4.0 fps Inflow=6.14 cfs 0.465 af
n=0.030 L=80.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=6.10 cfs 0.465 af

Reach 6R: 36 "RCP Peak Depth=0.88' Max Vel=14.0 fps Inflow=24.06 cfs 9.069 af
D=36.0" n=0.013 L=85.0' S=0.0384 '/' Capacity=130.62 cfs Outflow=24.00 cfs 9.067 af

Reach CHAN1: INTERMITTENT STREAM CH Peak Depth=0.48' Max Vel=8.2 fps Inflow=34.98 cfs 5.559 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=34.96 cfs 5.547 af

Reach CHAN2: INTERMITTENT STREAM CH Peak Depth=0.29' Max Vel=6.1 fps Inflow=15.51 cfs 1.277 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=15.31 cfs 1.272 af

Reach CHAN3: Peak Depth=0.52' Max Vel=8.9 fps Inflow=41.66 cfs 10.354 af
n=0.030 L=970.0' S=0.0920 '/' Capacity=454.77 cfs Outflow=41.63 cfs 10.313 af

Reach DP1: Bottom Swale Peak Depth=0.20' Max Vel=3.1 fps Inflow=2.84 cfs 0.202 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.84 cfs 0.202 af

Reach DP2: CULVERT Peak Depth=1.13' Max Vel=24.0 fps Inflow=51.62 cfs 13.677 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=51.60 cfs 13.674 af

Reach DP3: 30" Peak Depth=1.03' Max Vel=24.1 fps Inflow=46.21 cfs 7.198 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=45.44 cfs 7.197 af

Reach DP4: Inflow=49.17 cfs 3.815 af
Outflow=49.17 cfs 3.815 af

Reach DP5: STREAM Peak Depth=0.17' Max Vel=3.5 fps Inflow=5.93 cfs 0.482 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=5.91 cfs 0.482 af

Pond 1P: DEPRESSION ADJACENT TO T Peak Elev=314.68' Storage=2,361 cf Inflow=52.27 cfs 13.678 af
30.0" x 50.0' Culvert Outflow=51.62 cfs 13.677 af

Pond 2P: CULVERT POND Peak Elev=339.72' Storage=12,900 cf Inflow=44.21 cfs 7.202 af
24.0" x 185.0' Culvert Outflow=46.21 cfs 7.198 af

Pond 5P: CULVET INLET Peak Elev=424.92' Storage=10,097 cf Inflow=69.36 cfs 9.819 af
Outflow=66.06 cfs 9.818 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.80' Storage=60,469 cf Inflow=67.70 cfs 10.750 af
Primary=48.24 cfs 9.073 af Secondary=19.31 cfs 1.287 af Outflow=67.54 cfs 10.360 af

Pond EDB2: DETENTION BASIN ADJACE Peak Elev=413.69' Storage=12,125 cf Inflow=37.95 cfs 5.560 af
24.0" x 80.0' Culvert Outflow=34.98 cfs 5.559 af

Pond UP2P: CULVERT INLET Peak Elev=434.20' Storage=3,376 cf Inflow=10.65 cfs 1.215 af
18.0" x 75.0' Culvert Outflow=9.62 cfs 1.206 af

Pond UP3P: CULVERT INLET Peak Elev=432.15' Storage=16,080 cf Inflow=44.39 cfs 5.199 af
24.0" x 95.0' Culvert Outflow=36.56 cfs 5.193 af

Total Runoff Area = 158.800 ac Runoff Volume = 25.895 af Average Runoff Depth = 1.96"

Subcatchment 1S: south central section btw. gorges

Runoff = 4.09 cfs @ 12.07 hrs, Volume= 0.248 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
2.020	60	Woods, Fair, HSG B
0.700	56	Brush, Fair, HSG B
2.720	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2400	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.5	80	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	500	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
13.7	730	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 14.44 cfs @ 12.09 hrs, Volume= 0.932 af, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2S: Central Area

Runoff = 40.43 cfs @ 12.18 hrs, Volume= 3.117 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
3.400	98	Driveways
1.450	73	Woods, Fair, HSG C
6.650	60	Woods, Fair, HSG B
1.050	70	Brush, Fair, HSG C
2.480	56	Brush, Fair, HSG B
3.700	79	50-75% Grass cover, Fair, HSG C
18.730	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	150	0.0530	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	100	0.1600	2.8		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	1,150	0.1000	13.5	53.99	**Channel Flow,** Area= 4.0 sf Perim= 5.0' r= 0.80' n= 0.030
23.9	1,400	Total			

Subcatchment 3S: Eastern Area

Runoff = 2.84 cfs @ 12.13 hrs, Volume= 0.202 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.790	60	Woods, Fair, HSG B
0.430	56	Brush, Fair, HSG B
2.220	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 6.14 cfs @ 12.17 hrs, Volume= 0.465 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
2.690	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	380	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	200	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
23.4	730	Total			

Subcatchment 4B:

Runoff = 18.33 cfs @ 12.11 hrs, Volume= 1.194 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
5.010	73	Woods, Fair, HSG C
0.520	70	Brush, Fair, HSG C
0.180	98	Paved parking & roofs
0.920	79	50-75% Grass cover, Fair, HSG C
6.630	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.1	256	0.0660	3.9		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	438	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
18.0	844	Total			

Subcatchment 5A:

Runoff = 14.97 cfs @ 12.20 hrs, Volume= 1.190 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
4.670	73	Woods, Fair, HSG C
0.920	60	Woods, Fair, HSG B
0.290	56	Brush, Fair, HSG B
0.730	70	Brush, Fair, HSG C
0.710	79	50-75% Grass cover, Fair, HSG C
0.120	98	Paved parking & roofs
7.440	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	76	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.3	74	0.0670	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	160	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	818	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
25.1	1,128	Total			

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 4.52 cfs @ 12.20 hrs, Volume= 0.367 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.880	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.600	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
26.1	220	Total			

Subcatchment 6S: Western Central Area

Runoff = 11.29 cfs @ 12.14 hrs, Volume= 0.792 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
3.200	73	Woods, Fair, HSG C
1.550	70	Brush, Fair, HSG C
4.750	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0460	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	110	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	370	0.1100	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	630	Total			

Subcatchment 7S: Western Area

Runoff = 5.93 cfs @ 12.21 hrs, Volume= 0.482 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
2.300	73	Woods, Fair, HSG C
0.600	70	Brush, Fair, HSG C
2.900	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	110	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	40	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	260	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	410	Total			

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 9.64 cfs @ 12.07 hrs, Volume= 0.557 af, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
2.360	60	Woods, Fair, HSG B
0.240	98	Paved parking & roofs
1.690	69	50-75% Grass cover, Fair, HSG B
4.290	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment DP6:

Runoff = 0.73 cfs @ 12.08 hrs, Volume= 0.046 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.600	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0660	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.1	50	0.2000	6.7		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.4	200	Total			

Subcatchment UP2a:

Runoff = 10.65 cfs @ 12.42 hrs, Volume= 1.215 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 15.51 cfs @ 12.21 hrs, Volume= 1.277 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 35.12 cfs @ 12.42 hrs, Volume= 3.993 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 69.36 cfs @ 12.64 hrs, Volume= 9.819 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 19.370 ac, Inflow Depth = 2.02"
Inflow = 41.46 cfs @ 12.15 hrs, Volume= 3.258 af
Outflow = 41.44 cfs @ 12.15 hrs, Volume= 3.258 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.1 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.7 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.88' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: Bottom Swale

Inflow Area = 2.720 ac, Inflow Depth = 1.09"
Inflow = 4.09 cfs @ 12.07 hrs, Volume= 0.248 af
Outflow = 4.04 cfs @ 12.09 hrs, Volume= 0.248 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 1.0 min

Peak Depth= 0.25' @ 12.08 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 75.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 3R:

Inflow Area = 63.710 ac, Inflow Depth = 1.71"
Inflow = 48.24 cfs @ 12.78 hrs, Volume= 9.073 af
Outflow = 24.06 cfs @ 12.37 hrs, Volume= 9.069 af, Atten= 50%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.40 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 4R: Bottom Swale

Inflow Area = 2.690 ac, Inflow Depth = 2.08"
Inflow = 6.14 cfs @ 12.17 hrs, Volume= 0.465 af
Outflow = 6.10 cfs @ 12.18 hrs, Volume= 0.465 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.0 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.0 min

Peak Depth= 0.31' @ 12.18 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 80.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: 36 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.71"
Inflow = 24.06 cfs @ 12.37 hrs, Volume= 9.069 af
Outflow = 24.00 cfs @ 12.37 hrs, Volume= 9.067 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 8.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.88' @ 12.37 hrs
Capacity at bank full= 130.62 cfs
36.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0384 '/'

Reach CHAN1: INTERMITTENT STREAM CHANNEL

Inflow Area = 34.130 ac, Inflow Depth = 1.95"
Inflow = 34.98 cfs @ 12.87 hrs, Volume= 5.559 af
Outflow = 34.96 cfs @ 12.90 hrs, Volume= 5.547 af, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.2 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 3.3 fps, Avg. Travel Time= 2.9 min

Peak Depth= 0.48' @ 12.88 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN2: INTERMITTENT STREAM CHANNEL

Inflow Area = 7.990 ac, Inflow Depth = 1.92"
Inflow = 15.51 cfs @ 12.21 hrs, Volume= 1.277 af
Outflow = 15.31 cfs @ 12.26 hrs, Volume= 1.272 af, Atten= 1%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.1 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.1 fps, Avg. Travel Time= 4.5 min

Peak Depth= 0.29' @ 12.23 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN3:

Inflow Area = 63.710 ac, Inflow Depth = 1.95"
Inflow = 41.66 cfs @ 12.78 hrs, Volume= 10.354 af
Outflow = 41.63 cfs @ 12.83 hrs, Volume= 10.313 af, Atten= 0%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.9 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 4.1 fps, Avg. Travel Time= 4.0 min

Peak Depth= 0.52' @ 12.80 hrs
Capacity at bank full= 454.77 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 970.0' Slope= 0.0920 '/'
Side Slope Z-value= 2.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 2.220 ac, Inflow Depth = 1.09"
Inflow = 2.84 cfs @ 12.13 hrs, Volume= 0.202 af
Outflow = 2.84 cfs @ 12.13 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.20' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 1.93"
Inflow = 51.62 cfs @ 12.67 hrs, Volume= 13.677 af
Outflow = 51.60 cfs @ 12.68 hrs, Volume= 13.674 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 24.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 12.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.13' @ 12.68 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 44.260 ac, Inflow Depth = 1.95"
Inflow = 46.21 cfs @ 12.45 hrs, Volume= 7.198 af
Outflow = 45.44 cfs @ 12.45 hrs, Volume= 7.197 af, Atten= 2%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 24.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.7 fps, Avg. Travel Time= 0.3 min

Peak Depth= 1.03' @ 12.45 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 23.660 ac, Inflow Depth = 1.93"
Inflow = 49.17 cfs @ 12.13 hrs, Volume= 3.815 af
Outflow = 49.17 cfs @ 12.13 hrs, Volume= 3.815 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 2.900 ac, Inflow Depth = 2.00"
Inflow = 5.93 cfs @ 12.21 hrs, Volume= 0.482 af
Outflow = 5.91 cfs @ 12.22 hrs, Volume= 0.482 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 1.1 min

Peak Depth= 0.17' @ 12.21 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DEPRESSION ADJACENT TO TRACKS AND CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 1.93"
Inflow = 52.27 cfs @ 12.59 hrs, Volume= 13.678 af
Outflow = 51.62 cfs @ 12.67 hrs, Volume= 13.677 af, Atten= 1%, Lag= 4.6 min
Primary = 51.62 cfs @ 12.67 hrs, Volume= 13.677 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 314.68' @ 12.67 hrs Surf.Area= 1,054 sf Storage= 2,361 cf
Plug-Flow detention time= 0.3 min calculated for 13.677 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (864.2 - 863.9)

#	Invert	Avail.Storage	Storage Description
1	308.00'	35,632 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.00	10	0	0
310.00	100	110	110
312.00	312	412	522
314.00	698	1,010	1,532
316.00	1,751	2,449	3,981
318.00	4,150	5,901	9,882
320.00	6,500	10,650	20,532
322.00	8,600	15,100	35,632

#	Routing	Invert	Outlet Devices
1	Primary	308.00'	**30.0" x 50.0' long Culvert** Ke= 0.600

Outlet Invert= 302.40' S= 0.1120 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=51.55 cfs @ 12.67 hrs HW=314.66' (Free Discharge)
└1=**Culvert** (Inlet Controls 51.55 cfs @ 10.5 fps)

Pond 2P: CULVERT POND

Inflow Area =	44.260 ac,	Inflow Depth =	1.95"	
Inflow =	44.21 cfs @	12.27 hrs, Volume=	7.202 af	
Outflow =	46.21 cfs @	12.45 hrs, Volume=	7.198 af,	Atten= 0%, Lag= 10.8 min
Primary =	46.21 cfs @	12.45 hrs, Volume=	7.198 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 339.72' @ 12.45 hrs Surf.Area= 3,600 sf Storage= 12,900 cf
Plug-Flow detention time= 3.2 min calculated for 7.198 af (100% of inflow)
Center-of-Mass det. time= 3.1 min (828.9 - 825.8)

#	Invert	Avail.Storage	Storage Description
1	328.00'	12,900 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	100	0	0
330.00	300	400	400
332.00	1,500	1,800	2,200
334.00	2,800	4,300	6,500
336.00	3,600	6,400	12,900

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 306.27' S= 0.1180 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=46.07 cfs @ 12.45 hrs HW=339.65' (Free Discharge)
└1=**Culvert** (Inlet Controls 46.07 cfs @ 14.7 fps)

Pond 5P: CULVET INLET

Inflow Area =	59.910 ac,	Inflow Depth =	1.97"	
Inflow =	69.36 cfs @	12.64 hrs, Volume=	9.819 af	
Outflow =	66.06 cfs @	12.76 hrs, Volume=	9.818 af,	Atten= 5%, Lag= 7.3 min
Primary =	66.06 cfs @	12.76 hrs, Volume=	9.818 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 424.92' @ 12.76 hrs Surf.Area= 3,924 sf Storage= 10,097 cf
Plug-Flow detention time= 0.9 min calculated for 9.818 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (835.8 - 834.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60', S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=66.02 cfs @ 12.76 hrs HW=424.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 33.01 cfs @ 10.5 fps)
└—**2=Culvert** (Inlet Controls 33.01 cfs @ 10.5 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	2.02"	
Inflow =	67.70 cfs @	12.75 hrs, Volume=	10.750 af	
Outflow =	67.54 cfs @	12.78 hrs, Volume=	10.360 af,	Atten= 0%, Lag= 2.2 min
Primary =	48.24 cfs @	12.78 hrs, Volume=	9.073 af	
Secondary =	19.31 cfs @	12.78 hrs, Volume=	1.287 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.80' @ 12.78 hrs Surf.Area= 13,943 sf Storage= 60,469 cf
Plug-Flow detention time= 39.3 min calculated for 10.325 af (96% of inflow)
Center-of-Mass det. time= 26.9 min (858.0 - 831.1)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=48.18 cfs @ 12.78 hrs HW=416.80' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 21.84 cfs @ 6.2 fps)
- **2=Orifice/Grate** (Weir Controls 17.44 cfs @ 2.3 fps)
- **3=Culvert** (Inlet Controls 8.90 cfs @ 11.3 fps)

Secondary OutFlow Max=19.28 cfs @ 12.78 hrs HW=416.80' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 19.28 cfs @ 2.4 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.130 ac,	Inflow Depth =	1.95"	
Inflow =	37.95 cfs @	12.60 hrs, Volume=	5.560 af	
Outflow =	34.98 cfs @	12.87 hrs, Volume=	5.559 af,	Atten= 8%, Lag= 16.2 min
Primary =	34.98 cfs @	12.87 hrs, Volume=	5.559 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.69' @ 12.87 hrs Surf.Area= 5,496 sf Storage= 12,125 cf
Plug-Flow detention time= 2.3 min calculated for 5.541 af (100% of inflow)
Center-of-Mass det. time= 2.3 min (828.4 - 826.1)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.60'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0680 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=34.97 cfs @ 12.87 hrs HW=413.68' (Free Discharge)
- **1=Culvert** (Inlet Controls 34.97 cfs @ 11.1 fps)

Pond UP2P: CULVERT INLET

Inflow Area =	7.360 ac,	Inflow Depth =	1.98"	
Inflow =	10.65 cfs @	12.42 hrs, Volume=	1.215 af	
Outflow =	9.62 cfs @	12.57 hrs, Volume=	1.206 af,	Atten= 10%, Lag= 8.9 min
Primary =	9.62 cfs @	12.57 hrs, Volume=	1.206 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.20' @ 12.57 hrs Surf.Area= 2,928 sf Storage= 3,376 cf
Plug-Flow detention time= 7.6 min calculated for 1.202 af (99% of inflow)
Center-of-Mass det. time= 5.0 min (828.2 - 823.2)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.60 cfs @ 12.57 hrs HW=434.20' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.60 cfs @ 5.4 fps)

Pond UP3P: CULVERT INLET

Inflow Area =	32.530 ac,	Inflow Depth = 1.92"	
Inflow =	44.39 cfs @	12.43 hrs, Volume=	5.199 af
Outflow =	36.56 cfs @	12.66 hrs, Volume=	5.193 af, Atten= 18%, Lag= 13.6 min
Primary =	36.56 cfs @	12.66 hrs, Volume=	5.193 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.15' @ 12.66 hrs Surf.Area= 6,554 sf Storage= 16,080 cf
Plug-Flow detention time= 3.5 min calculated for 5.193 af (100% of inflow)
Center-of-Mass det. time= 3.1 min (828.4 - 825.4)

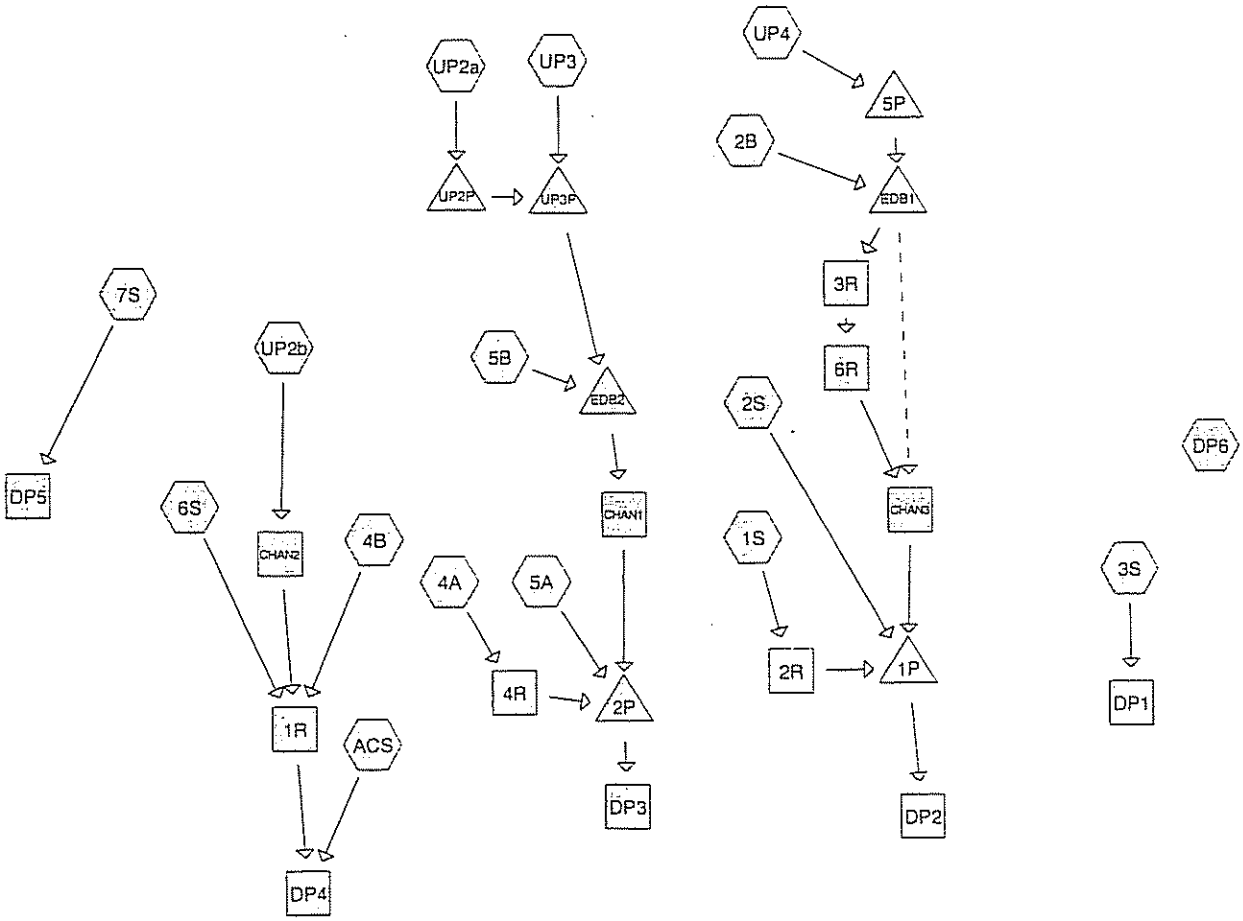
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=36.55 cfs @ 12.66 hrs HW=432.14' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 36.55 cfs @ 11.6 fps)

Existing Drainage Conditions
100-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Existing 12-03
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: south central section btw. gorges Runoff Area=2.720 ac Runoff Depth=1.47"
Flow Length=730' Tc=13.7 min CN=59 Runoff=5.69 cfs 0.334 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=3.55"
Flow Length=330' Tc=17.1 min CN=83 Runoff=17.26 cfs 1.123 af

Subcatchment 2S: Central Area Runoff Area=18.730 ac Runoff Depth=2.51"
Flow Length=1,400' Tc=23.9 min CN=72 Runoff=50.99 cfs 3.918 af

Subcatchment 3S: Eastern Area Runoff Area=2.220 ac Runoff Depth=1.47"
Flow Length=460' Tc=18.1 min CN=59 Runoff=3.99 cfs 0.272 af

Subcatchment 4A: Central Area Runoff Area=2.690 ac Runoff Depth=2.60"
Flow Length=730' Tc=23.4 min CN=73 Runoff=7.70 cfs 0.583 af

Subcatchment 4B: Runoff Area=6.630 ac Runoff Depth=2.69"
Flow Length=844' Tc=18.0 min CN=74 Runoff=22.82 cfs 1.488 af

Subcatchment 5A: Runoff Area=7.440 ac Runoff Depth=2.42"
Flow Length=1,128' Tc=25.1 min CN=71 Runoff=18.99 cfs 1.502 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.600 ac Runoff Depth=3.34"
Flow Length=220' Tc=26.1 min CN=81 Runoff=5.46 cfs 0.445 af

Subcatchment 6S: Western Central Area Runoff Area=4.750 ac Runoff Depth=2.51"
Flow Length=630' Tc=20.4 min CN=72 Runoff=14.22 cfs 0.995 af

Subcatchment 7S: Western Area Runoff Area=2.900 ac Runoff Depth=2.51"
Flow Length=410' Tc=26.1 min CN=72 Runoff=7.49 cfs 0.606 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=4.290 ac Runoff Depth=2.01"
Flow Length=465' Tc=13.8 min CN=66 Runoff=12.56 cfs 0.720 af

Subcatchment DP6: Runoff Area=0.600 ac Runoff Depth=1.26"
Flow Length=200' Tc=13.4 min CN=56 Runoff=1.06 cfs 0.063 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=2.49"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=13.48 cfs 1.527 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=2.42"
Flow Length=750' Tc=26.5 min CN=71 Runoff=19.69 cfs 1.612 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=2.40"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=44.69 cfs 5.043 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=2.47"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=87.80 cfs 12.350 af

Reach 1R: Bottom Swale Peak Depth=0.99' Max Vel=7.6 fps Inflow=52.42 cfs 4.090 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=52.39 cfs 4.089 af

Reach 2R: Bottom Swale Peak Depth=0.30' Max Vel=3.9 fps Inflow=5.69 cfs 0.334 af
n=0.030 L=75.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=5.61 cfs 0.334 af

Reach 3R: Peak Depth=2.50' Max Vel=5.2 fps Inflow=56.84 cfs 10.959 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=24.75 cfs 10.954 af

Reach 4R: Bottom Swale Peak Depth=0.35' Max Vel=4.3 fps Inflow=7.70 cfs 0.583 af
n=0.030 L=80.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=7.65 cfs 0.582 af

Reach 6R: 36 "RCP Peak Depth=0.86' Max Vel=14.0 fps Inflow=24.75 cfs 10.954 af
D=36.0" n=0.013 L=85.0' S=0.0384 '/' Capacity=130.62 cfs Outflow=24.54 cfs 10.952 af

Reach CHAN1: INTERMITTENT STREAM CH Peak Depth=0.50' Max Vel=8.5 fps Inflow=38.32 cfs 6.999 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=38.31 cfs 6.985 af

Reach CHAN2: INTERMITTENT STREAM CH Peak Depth=0.34' Max Vel=6.7 fps Inflow=19.69 cfs 1.612 af
n=0.030 L=570.0' S=0.0870 '/' Capacity=442.24 cfs Outflow=19.44 cfs 1.607 af

Reach CHAN3: Peak Depth=0.55' Max Vel=9.2 fps Inflow=46.56 cfs 12.927 af
n=0.030 L=970.0' S=0.0920 '/' Capacity=454.77 cfs Outflow=46.53 cfs 12.882 af

Reach DP1: Bottom Swale Peak Depth=0.24' Max Vel=3.5 fps Inflow=3.99 cfs 0.272 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.98 cfs 0.272 af

Reach DP2: CULVERT Peak Depth=1.26' Max Vel=25.1 fps Inflow=62.03 cfs 17.133 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=62.04 cfs 17.130 af

Reach DP3: 30" Peak Depth=1.23' Max Vel=26.2 fps Inflow=63.92 cfs 9.065 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=61.93 cfs 9.063 af

Reach DP4: Inflow=62.53 cfs 4.809 af
Outflow=62.53 cfs 4.809 af

Reach DP5: STREAM Peak Depth=0.19' Max Vel=3.8 fps Inflow=7.49 cfs 0.606 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=7.45 cfs 0.606 af

Pond 1P: DEPRESSION ADJACENT TO T Peak Elev=317.09' Storage=7,191 cf Inflow=63.89 cfs 17.134 af
30.0" x 50.0' Culvert Outflow=62.03 cfs 17.133 af

Pond 2P: CULVERT POND Peak Elev=349.41' Storage=12,900 cf Inflow=52.24 cfs 9.069 af
24.0" x 185.0' Culvert Outflow=63.92 cfs 9.065 af

Pond 5P: CULVET INLET Peak Elev=427.34' Storage=22,423 cf Inflow=87.80 cfs 12.350 af
Outflow=79.40 cfs 12.350 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.93' Storage=62,218 cf Inflow=81.17 cfs 13.472 af
Primary=56.84 cfs 10.959 af Secondary=24.20 cfs 1.975 af Outflow=81.04 cfs 12.934 af

Pond EDB2: DETENTION BASIN ADJACE Peak Elev=414.90' Storage=19,592 cf Inflow=42.45 cfs 6.999 af
24.0" x 80.0' Culvert Outflow=38.32 cfs 6.999 af

Pond UP2P: CULVERT INLET Peak Elev=434.77' Storage=5,491 cf Inflow=13.48 cfs 1.527 af
18.0" x 75.0' Culvert Outflow=11.35 cfs 1.518 af

Pond UP3P: CULVERT INLET Peak Elev=433.88' Storage=29,032 cf Inflow=55.21 cfs 6.561 af
24.0" x 95.0' Culvert Outflow=41.06 cfs 6.554 af

Total Runoff Area = 158.800 ac Runoff Volume = 32.581 af Average Runoff Depth = 2.46"

Subcatchment 1S: south central section btw. gorges

Runoff = 5.69 cfs @ 12.07 hrs, Volume= 0.334 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
2.020	60	Woods, Fair, HSG B
0.700	56	Brush, Fair, HSG B
2.720	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	150	0.2400	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.5	80	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	500	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
13.7	730	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 17.26 cfs @ 12.09 hrs, Volume= 1.123 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2S: Central Area

Runoff = 50.99 cfs @ 12.18 hrs, Volume= 3.918 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
3.400	98	Driveways
1.450	73	Woods, Fair, HSG C
6.650	60	Woods, Fair, HSG B
1.050	70	Brush, Fair, HSG C
2.480	56	Brush, Fair, HSG B
3.700	79	50-75% Grass cover, Fair, HSG C
18.730	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.9	150	0.0530	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	100	0.1600	2.8		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.4	1,150	0.1000	13.5	53.99	**Channel Flow,** Area= 4.0 sf Perim= 5.0' r= 0.80' n= 0.030
23.9	1,400	Total			

Subcatchment 3S: Eastern Area

Runoff = 3.99 cfs @ 12.12 hrs, Volume= 0.272 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.790	60	Woods, Fair, HSG B
0.430	56	Brush, Fair, HSG B
2.220	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 7.70 cfs @ 12.17 hrs, Volume= 0.583 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
2.690	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.6	150	0.0700	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
3.3	380	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	200	0.0400	7.2	18.10	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
23.4	730	Total			

Subcatchment 4B:

Runoff = 22.82 cfs @ 12.11 hrs, Volume= 1.488 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
5.010	73	Woods, Fair, HSG C
0.520	70	Brush, Fair, HSG C
0.180	98	Paved parking & roofs
0.920	79	50-75% Grass cover, Fair, HSG C
6.630	74	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.1	256	0.0660	3.9		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.6	438	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
18.0	844	Total			

Subcatchment 5A:

Runoff = 18.99 cfs @ 12.19 hrs, Volume= 1.502 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
4.670	73	Woods, Fair, HSG C
0.920	60	Woods, Fair, HSG B
0.290	56	Brush, Fair, HSG B
0.730	70	Brush, Fair, HSG C
0.710	79	50-75% Grass cover, Fair, HSG C
0.120	98	Paved parking & roofs
7.440	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	76	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
11.3	74	0.0670	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
1.4	160	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	818	0.1000	11.5	28.63	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
25.1	1,128	Total			

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 5.46 cfs @ 12.20 hrs, Volume= 0.445 af, Depth= 3.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.880	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.600	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.5	150	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
26.1	220	Total			

Subcatchment 6S: Western Central Area

Runoff = 14.22 cfs @ 12.14 hrs, Volume= 0.995 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
3.200	73	Woods, Fair, HSG C
1.550	70	Brush, Fair, HSG C
4.750	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	150	0.0460	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.3	110	0.0800	1.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	370	0.1100	1.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	630	Total			

Subcatchment 7S: Western Area

Runoff = 7.49 cfs @ 12.20 hrs, Volume= 0.606 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
2.300	73	Woods, Fair, HSG C
0.600	70	Brush, Fair, HSG C
2.900	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	110	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	40	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	260	0.1500	1.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.1	410	Total			

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 12.56 cfs @ 12.06 hrs, Volume= 0.720 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
2.360	60	Woods, Fair, HSG B
0.240	98	Paved parking & roofs
1.690	69	50-75% Grass cover, Fair, HSG B
4.290	66	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment DP6:

Runoff = 1.06 cfs @ 12.07 hrs, Volume= 0.063 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.600	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	150	0.0660	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.1	50	0.2000	6.7		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.4	200	Total			

Subcatchment UP2a:

Runoff = 13.48 cfs @ 12.42 hrs, Volume= 1.527 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 19.69 cfs @ 12.21 hrs, Volume= 1.612 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 44.69 cfs @ 12.42 hrs, Volume= 5.043 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 87.80 cfs @ 12.63 hrs, Volume= 12.350 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 19.370 ac, Inflow Depth = 2.53"
Inflow = 52.42 cfs @ 12.15 hrs, Volume= 4.090 af
Outflow = 52.39 cfs @ 12.15 hrs, Volume= 4.089 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.6 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.8 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.99' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: Bottom Swale

Inflow Area = 2.720 ac, Inflow Depth = 1.47"
Inflow = 5.69 cfs @ 12.07 hrs, Volume= 0.334 af
Outflow = 5.61 cfs @ 12.08 hrs, Volume= 0.334 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 0.9 min

Peak Depth= 0.30' @ 12.07 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 75.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 3R:

Inflow Area = 63.710 ac, Inflow Depth = 2.06"
Inflow = 56.84 cfs @ 12.84 hrs, Volume= 10.959 af
Outflow = 24.75 cfs @ 16.88 hrs, Volume= 10.954 af, Atten= 56%, Lag= 242.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.30 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 4R: Bottom Swale

Inflow Area = 2.690 ac, Inflow Depth = 2.60"
Inflow = 7.70 cfs @ 12.17 hrs, Volume= 0.583 af
Outflow = 7.65 cfs @ 12.18 hrs, Volume= 0.582 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.3 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 0.9 min

Peak Depth= 0.35' @ 12.17 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 80.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 6R: 36 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 2.06"
Inflow = 24.75 cfs @ 16.88 hrs, Volume= 10.954 af
Outflow = 24.54 cfs @ 16.88 hrs, Volume= 10.952 af, Atten= 1%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 8.5 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.86' @ 16.90 hrs
Capacity at bank full= 130.62 cfs
36.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0384 '/'

Reach CHAN1: INTERMITTENT STREAM CHANNEL

Inflow Area = 34.130 ac, Inflow Depth = 2.46"
Inflow = 38.32 cfs @ 13.05 hrs, Volume= 6.999 af
Outflow = 38.31 cfs @ 13.08 hrs, Volume= 6.985 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.5 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 3.5 fps, Avg. Travel Time= 2.7 min

Peak Depth= 0.50' @ 13.06 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN2: INTERMITTENT STREAM CHANNEL

Inflow Area = 7.990 ac, Inflow Depth = 2.42"
Inflow = 19.69 cfs @ 12.21 hrs, Volume= 1.612 af
Outflow = 19.44 cfs @ 12.25 hrs, Volume= 1.607 af, Atten= 1%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.7 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.2 fps, Avg. Travel Time= 4.2 min

Peak Depth= 0.34' @ 12.22 hrs
Capacity at bank full= 442.24 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 570.0' Slope= 0.0870 '/'
Side Slope Z-value= 2.0 '/'

Reach CHAN3:

Inflow Area = 63.710 ac, Inflow Depth = 2.43"
Inflow = 46.56 cfs @ 12.83 hrs, Volume= 12.927 af
Outflow = 46.53 cfs @ 12.89 hrs, Volume= 12.882 af, Atten= 0%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.2 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 4.4 fps, Avg. Travel Time= 3.7 min

Peak Depth= 0.55' @ 12.86 hrs
Capacity at bank full= 454.77 cfs
8.00' x 2.00' deep channel, n= 0.030 Length= 970.0' Slope= 0.0920 '/'
Side Slope Z-value= 2.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 2.220 ac, Inflow Depth = 1.47"
Inflow = 3.99 cfs @ 12.12 hrs, Volume= 0.272 af
Outflow = 3.98 cfs @ 12.12 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.24' @ 12.12 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 2.41"
Inflow = 62.03 cfs @ 12.51 hrs, Volume= 17.133 af
Outflow = 62.04 cfs @ 12.53 hrs, Volume= 17.130 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 25.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 13.2 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.26' @ 12.53 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 44.260 ac, Inflow Depth = 2.46"
Inflow = 63.92 cfs @ 12.30 hrs, Volume= 9.065 af
Outflow = 61.93 cfs @ 12.30 hrs, Volume= 9.063 af, Atten= 3%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 26.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 12.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.23' @ 12.30 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 23.660 ac, Inflow Depth = 2.44"
Inflow = 62.53 cfs @ 12.13 hrs, Volume= 4.809 af
Outflow = 62.53 cfs @ 12.13 hrs, Volume= 4.809 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 2.900 ac, Inflow Depth = 2.51"
Inflow = 7.49 cfs @ 12.20 hrs, Volume= 0.606 af
Outflow = 7.45 cfs @ 12.22 hrs, Volume= 0.606 af, Atten= 1%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.8 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 1.1 min

Peak Depth= 0.19' @ 12.21 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DEPRESSION ADJACENT TO TRACKS AND CULVERT

Inflow Area = 85.160 ac, Inflow Depth = 2.41"
Inflow = 63.89 cfs @ 12.32 hrs, Volume= 17.134 af
Outflow = 62.03 cfs @ 12.51 hrs, Volume= 17.133 af, Atten= 3%, Lag= 11.5 min
Primary = 62.03 cfs @ 12.51 hrs, Volume= 17.133 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 317.09' @ 12.51 hrs Surf.Area= 3,056 sf Storage= 7,191 cf
Plug-Flow detention time= 0.6 min calculated for 17.076 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (867.3 - 866.7)

#	Invert	Avail.Storage	Storage Description
1	308.00'	35,632 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.00	10	0	0
310.00	100	110	110
312.00	312	412	522
314.00	698	1,010	1,532
316.00	1,751	2,449	3,981
318.00	4,150	5,901	9,882
320.00	6,500	10,650	20,532
322.00	8,600	15,100	35,632

#	Routing	Invert	Outlet Devices
1	Primary	308.00'	**30.0" x 50.0' long Culvert** Ke= 0.600

Outlet Invert= 302.40' S= 0.1120 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=62.01 cfs @ 12.51 hrs HW=317.08' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 62.01 cfs @ 12.6 fps)

Pond 2P: CULVERT POND

Inflow Area =	44.260 ac,	Inflow Depth =	2.46"	
Inflow =	52.24 cfs @	12.26 hrs, Volume=	9.069 af	
Outflow =	63.92 cfs @	12.30 hrs, Volume=	9.065 af,	Atten= 0%, Lag= 2.6 min
Primary =	63.92 cfs @	12.30 hrs, Volume=	9.065 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 349.41' @ 12.30 hrs Surf.Area= 3,600 sf Storage= 12,900 cf
Plug-Flow detention time= 3.3 min calculated for 9.065 af (100% of inflow)
Center-of-Mass det. time= 3.2 min (826.9 - 823.7)

#	Invert	Avail.Storage	Storage Description
1	328.00'	12,900 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	100	0	0
330.00	300	400	400
332.00	1,500	1,800	2,200
334.00	2,800	4,300	6,500
336.00	3,600	6,400	12,900

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600
			Outlet Invert= 306.27' S= 0.1180 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=63.69 cfs @ 12.30 hrs HW=349.27' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 63.69 cfs @ 20.3 fps)

Pond 5P: CULVET INLET

Inflow Area =	59.910 ac,	Inflow Depth =	2.47"	
Inflow =	87.80 cfs @	12.63 hrs, Volume=	12.350 af	
Outflow =	79.40 cfs @	12.81 hrs, Volume=	12.350 af,	Atten= 10%, Lag= 11.0 min
Primary =	79.40 cfs @	12.81 hrs, Volume=	12.350 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 427.34' @ 12.81 hrs Surf.Area= 6,337 sf Storage= 22,423 cf
Plug-Flow detention time= 1.7 min calculated for 12.309 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (832.1 - 830.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=79.34 cfs @ 12.81 hrs HW=427.33' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 39.67 cfs @ 12.6 fps)
└—**2=Culvert** (Inlet Controls 39.67 cfs @ 12.6 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	2.54"	
Inflow =	81.17 cfs @	12.80 hrs, Volume=	13.472 af	
Outflow =	81.04 cfs @	12.84 hrs, Volume=	12.934 af,	Atten= 0%, Lag= 2.1 min
Primary =	56.84 cfs @	12.84 hrs, Volume=	10.959 af	
Secondary =	24.20 cfs @	12.84 hrs, Volume=	1.975 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.93' @ 12.84 hrs Surf.Area= 14,247 sf Storage= 62,218 cf
Plug-Flow detention time= 34.5 min calculated for 12.891 af (96% of inflow)
Center-of-Mass det. time= 21.0 min (848.5 - 827.5)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=56.80 cfs @ 12.84 hrs HW=416.93' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 22.70 cfs @ 6.4 fps)
—**2=Orifice/Grate** (Weir Controls 25.11 cfs @ 2.6 fps)
└—**3=Culvert** (Inlet Controls 8.99 cfs @ 11.4 fps)

Secondary OutFlow Max=24.18 cfs @ 12.84 hrs HW=416.93' (Free Discharge)
↑—**4=Broad-Crested Rectangular Weir** (Weir Controls 24.18 cfs @ 2.6 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.130 ac,	Inflow Depth =	2.46"	
Inflow =	42.45 cfs @	12.68 hrs, Volume=	6.999 af	
Outflow =	38.32 cfs @	13.05 hrs, Volume=	6.999 af,	Atten= 10%, Lag= 22.6 min
Primary =	38.32 cfs @	13.05 hrs, Volume=	6.999 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 414.90' @ 13.05 hrs Surf.Area= 7,331 sf Storage= 19,592 cf
Plug-Flow detention time= 3.7 min calculated for 6.999 af (100% of inflow)
Center-of-Mass det. time= 3.7 min (827.2 - 823.5)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.60'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0680 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=38.32 cfs @ 13.05 hrs HW=414.90' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 38.32 cfs @ 12.2 fps)

Pond UP2P: CULVERT INLET

Inflow Area =	7.360 ac,	Inflow Depth =	2.49"	
Inflow =	13.48 cfs @	12.42 hrs, Volume=	1.527 af	
Outflow =	11.35 cfs @	12.61 hrs, Volume=	1.518 af,	Atten= 16%, Lag= 11.7 min
Primary =	11.35 cfs @	12.61 hrs, Volume=	1.518 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.77' @ 12.61 hrs Surf.Area= 4,414 sf Storage= 5,491 cf
Plug-Flow detention time= 7.9 min calculated for 1.513 af (99% of inflow)
Center-of-Mass det. time= 5.5 min (824.2 - 818.6)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.34 cfs @ 12.61 hrs HW=434.77' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.34 cfs @ 6.4 fps)

Pond UP3P: CULVERT INLET

Inflow Area = 32.530 ac, Inflow Depth = 2.42"
Inflow = 55.21 cfs @ 12.43 hrs, Volume= 6.561 af
Outflow = 41.06 cfs @ 12.72 hrs, Volume= 6.554 af, Atten= 26%, Lag= 17.3 min
Primary = 41.06 cfs @ 12.72 hrs, Volume= 6.554 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 433.88' @ 12.72 hrs Surf.Area= 8,379 sf Storage= 29,032 cf
Plug-Flow detention time= 5.3 min calculated for 6.554 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (825.8 - 820.9)

#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

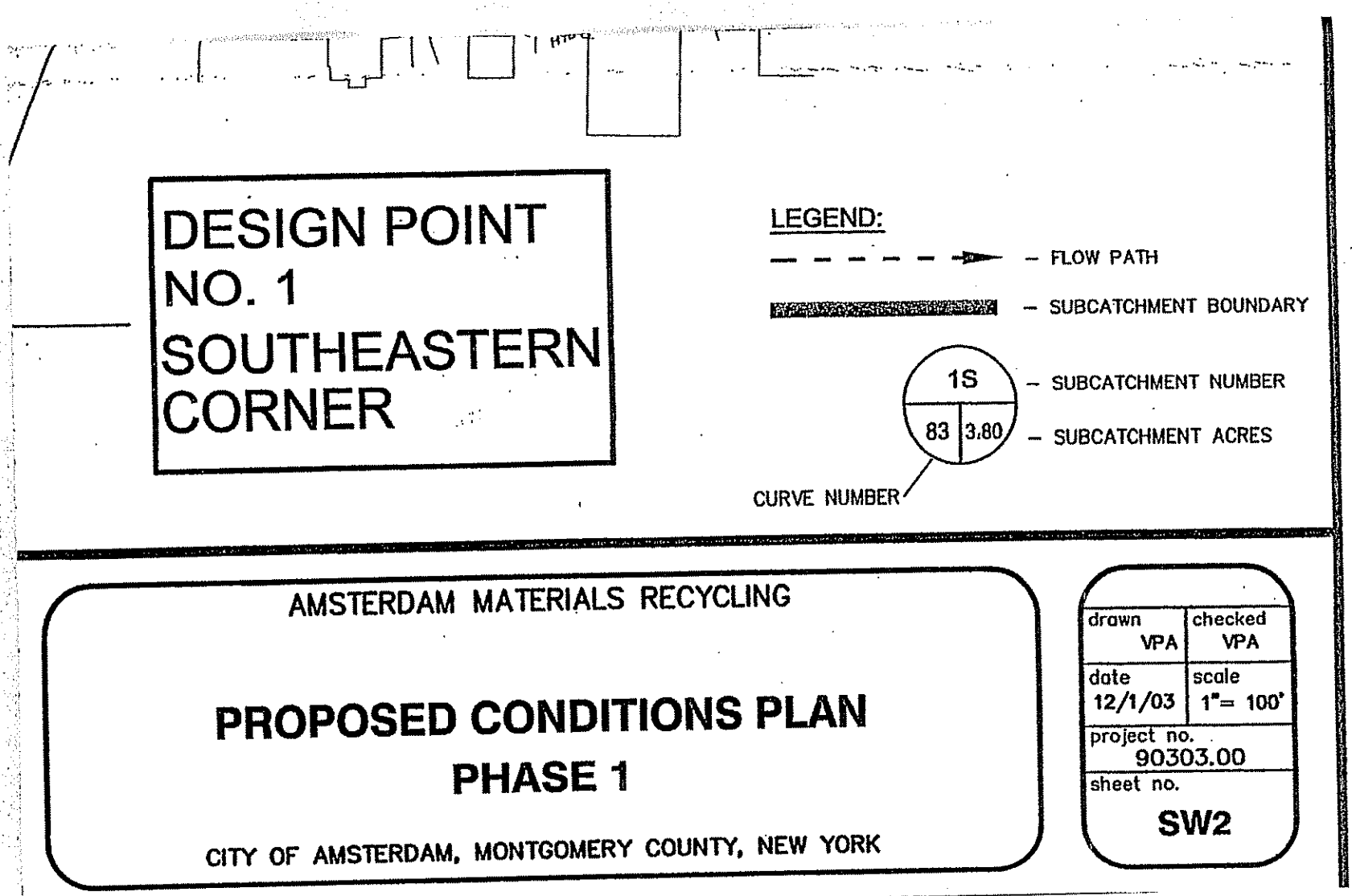
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=41.04 cfs @ 12.72 hrs HW=433.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 41.04 cfs @ 13.1 fps)

Appendix L:
Proposed Drainage Conditions -Phase 1

Proposed Conditions Plan - Phase 1 (Pocket)



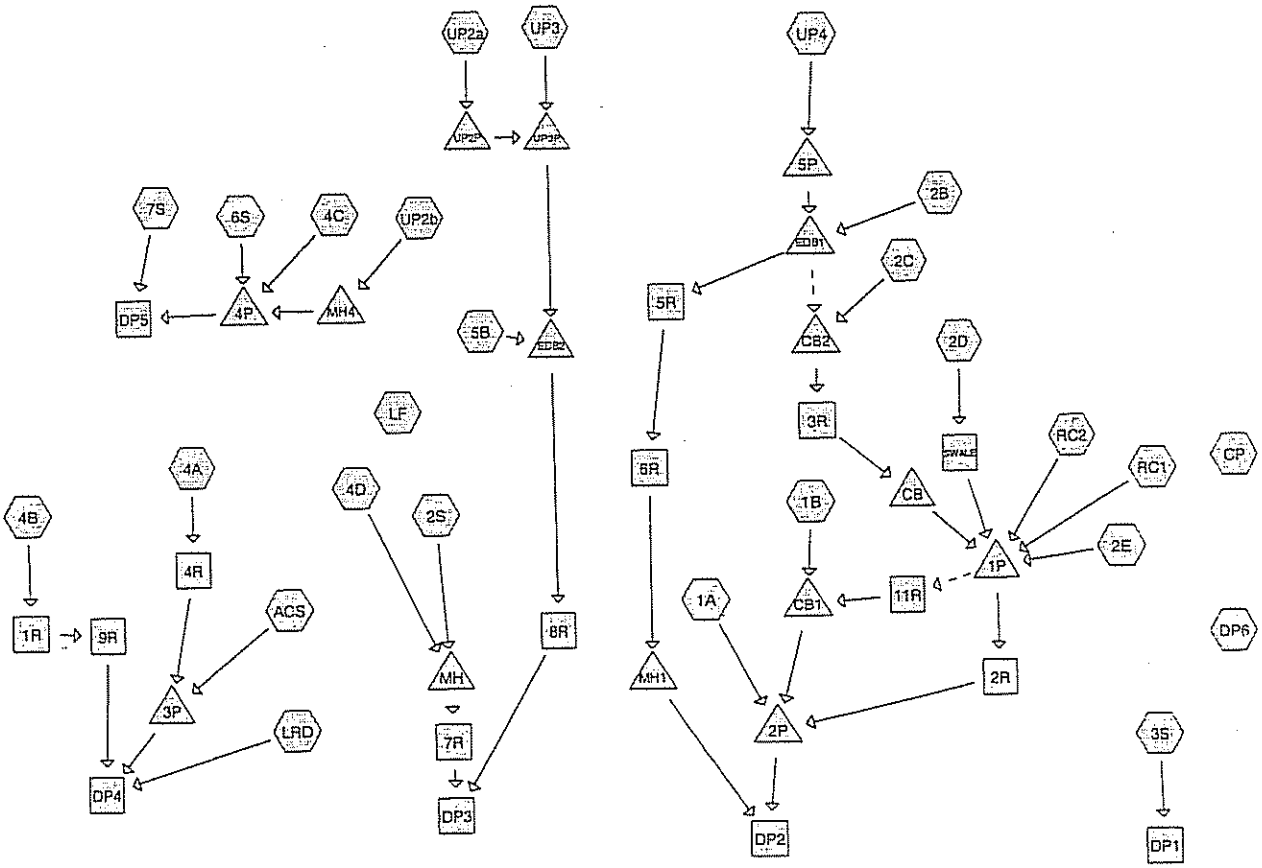
AMSTERDAM MATERIALS RECYCLING

PROPOSED CONDITIONS PLAN
PHASE 1

CITY OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn	checked
VPA	VPA
date	scale
12/1/03	1"= 100'
project no.	
90303.00	
sheet no.	
SW2	

Proposed Drainage Conditions - Phase 1
1-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat | Reach | Pond | Link

Drainage Diagram for Proposed 12-03-construction
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=0.17"
Flow Length=310' Tc=13.5 min CN=63 Runoff=0.51 cfs 0.056 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=0.84"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=3.68 cfs 0.156 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=0.89"
Flow Length=330' Tc=17.1 min CN=83 Runoff=4.43 cfs 0.282 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=0.60"
Flow Length=340' Tc=22.7 min CN=77 Runoff=1.21 cfs 0.096 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=1.13"
Flow Length=310' Tc=20.4 min CN=87 Runoff=10.62 cfs 0.743 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=0.74"
Flow Length=60' Tc=4.0 min CN=80 Runoff=0.49 cfs 0.020 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=0.32"
Flow Length=840' Tc=21.3 min CN=69 Runoff=1.35 cfs 0.127 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.10"
Flow Length=460' Tc=18.1 min CN=59 Runoff=0.06 cfs 0.015 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=0.74"
Flow Length=510' Tc=7.8 min CN=80 Runoff=0.56 cfs 0.026 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=0.45"
Flow Length=620' Tc=19.3 min CN=73 Runoff=0.49 cfs 0.038 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=0.69"
Flow Length=250' Tc=16.7 min CN=79 Runoff=1.98 cfs 0.127 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=0.14"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.02 cfs 0.002 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=0.78"
Flow Length=210' Tc=24.8 min CN=81 Runoff=1.39 cfs 0.111 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=0.49"
Flow Length=80' Tc=5.2 min CN=74 Runoff=1.44 cfs 0.063 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=0.45"
Flow Length=95' Tc=8.4 min CN=73 Runoff=0.96 cfs 0.048 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=0.20"
Flow Length=465' Tc=13.8 min CN=64 Runoff=0.34 cfs 0.034 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=2.02"
Flow Length=110' Tc=1.9 min CN=98 Runoff=2.47 cfs 0.116 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.06"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.00 cfs 0.001 af

Subcatchment LF: landfill area Runoff Area=14.330 ac Runoff Depth=2.02"
Flow Length=1,250' Tc=4.5 min CN=98 Runoff=49.62 cfs 2.411 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=0.20"
Flow Length=401' Tc=12.0 min CN=64 Runoff=0.38 cfs 0.035 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=1.41"
Flow Length=245' Tc=3.9 min CN=91 Runoff=4.16 cfs 0.176 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=1.41"
Flow Length=245' Tc=3.9 min CN=91 Runoff=6.98 cfs 0.295 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=0.41"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=1.83 cfs 0.252 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=0.38"
Flow Length=750' Tc=26.5 min CN=71 Runoff=2.52 cfs 0.255 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=0.38"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=5.60 cfs 0.793 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=0.41"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=11.86 cfs 2.028 af

Reach 1R: Bottom Swale Peak Depth=0.07' Max Vel=1.6 fps Inflow=0.49 cfs 0.038 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.49 cfs 0.038 af

Reach 2R: 18" Peak Depth=0.24' Max Vel=14.5 fps Inflow=2.71 cfs 1.253 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=2.71 cfs 1.253 af

Reach 3R: CULVERT Peak Depth=0.15' Max Vel=3.3 fps Inflow=0.34 cfs 0.059 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=0.34 cfs 0.059 af

Reach 4R: Bottom Swale Peak Depth=0.08' Max Vel=1.6 fps Inflow=0.56 cfs 0.026 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=0.55 cfs 0.026 af

Reach 5R: 24" CULVERT Peak Depth=0.91' Max Vel=3.9 fps Inflow=6.32 cfs 2.224 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=6.32 cfs 2.223 af

Reach 6R: 30 "RCP Peak Depth=0.56' Max Vel=7.7 fps Inflow=6.32 cfs 2.223 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=6.32 cfs 2.222 af

Reach 7R: 24" Peak Depth=0.18' Max Vel=9.5 fps Inflow=1.35 cfs 0.129 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=1.35 cfs 0.129 af

Reach 8R: 24 CULVERT Peak Depth=0.47' Max Vel=13.8 fps Inflow=7.92 cfs 1.148 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=7.88 cfs 1.145 af

Reach 9R: 18" culvert Peak Depth=0.13' Max Vel=6.8 fps Inflow=0.49 cfs 0.038 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=0.49 cfs 0.038 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.02' Max Vel=0.7 fps Inflow=0.06 cfs 0.015 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.06 cfs 0.015 af

Reach DP2: CULVERT Peak Depth=0.42' Max Vel=13.9 fps Inflow=7.53 cfs 3.123 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=7.53 cfs 3.122 af

Reach DP3: 30" Peak Depth=0.43' Max Vel=14.9 fps Inflow=8.49 cfs 1.274 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=8.48 cfs 1.273 af

Reach DP4: Inflow=0.88 cfs 0.120 af
Outflow=0.88 cfs 0.120 af

Reach DP5: STREAM Peak Depth=0.05' Max Vel=1.8 fps Inflow=0.98 cfs 0.172 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=0.94 cfs 0.171 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.53' Max Vel=3.9 fps Inflow=10.62 cfs 0.743 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=10.44 cfs 0.741 af

Pond 1P: DETENTION BASIN 1 Peak Elev=402.71' Storage=24,641 cf Inflow=15.52 cfs 1.290 af
Primary=2.71 cfs 1.253 af Secondary=0.00 cfs 0.000 af Outflow=2.71 cfs 1.253 af

Pond 2P: DETENTION BASIN 2 Peak Elev=324.77' Storage=29,455 cf Inflow=5.61 cfs 1.464 af
Primary=1.51 cfs 0.902 af Secondary=0.00 cfs 0.000 af Outflow=1.51 cfs 0.902 af

Pond 3P: DETENTION BASIN 3 Peak Elev=318.28' Storage=1,031 cf Inflow=0.75 cfs 0.060 af
Outflow=0.09 cfs 0.047 af

Pond 4P: DETENTION BASIN 4 Peak Elev=408.87' Storage=13,976 cf Inflow=4.24 cfs 0.444 af
Outflow=0.20 cfs 0.124 af

Pond 5P: ROADSIDE POND UPGRAD. OF EXI Peak Elev=420.04' Storage=49 cf Inflow=11.86 cfs 2.028 af
Outflow=11.86 cfs 2.028 af

Pond CB: PROPOSED CB Peak Elev=404.27' Storage=27 cf Inflow=0.34 cfs 0.059 af
24.0" x 300.0' Culvert Outflow=0.41 cfs 0.058 af

Pond CB1: proposed cb Peak Elev=1.74' Storage=21 cf Inflow=3.68 cfs 0.156 af
36.0" x 500.0' Culvert Outflow=3.67 cfs 0.155 af

Pond CB2: PROPOSED CB Peak Elev=406.26' Storage=1,824 cf Inflow=1.21 cfs 0.096 af
18.0" x 100.0' Culvert Outflow=0.34 cfs 0.059 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=413.68' Storage=26,124 cf Inflow=12.50 cfs 2.310 af
Primary=6.32 cfs 2.224 af Secondary=0.00 cfs 0.000 af Outflow=6.32 cfs 2.224 af

Pond EDB2: DETENTION BASIN ADJACENT T Peak Elev=407.30' Storage=39 cf Inflow=7.92 cfs 1.148 af
24.0" x 80.0' Culvert Outflow=7.92 cfs 1.148 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=328.59' Storage=12 cf Inflow=1.36 cfs 0.129 af
24.0" x 185.0' Culvert Outflow=1.35 cfs 0.129 af

Pond MH1: PROPOSED MH Peak Elev=2.04' Storage=25 cf Inflow=6.32 cfs 2.222 af
30.0" x 80.0' Culvert Outflow=6.32 cfs 2.222 af

Pond MH4: PROPOSED MH Peak Elev=421.69' Storage=34 cf Inflow=2.52 cfs 0.255 af
24.0" x 300.0' Culvert Outflow=2.52 cfs 0.254 af

Pond UP2P: CULVERT Peak Elev=432.63' Storage=822 cf Inflow=1.83 cfs 0.252 af
18.0" x 75.0' Culvert Outflow=1.76 cfs 0.247 af

Pond UP3P: ROAD CULVERT Peak Elev=425.74' Storage=538 cf Inflow=7.31 cfs 1.040 af
24.0" x 95.0' Culvert Outflow=7.32 cfs 1.037 af

Total Runoff Area = 158.800 ac Runoff Volume = 8.307 af Average Runoff Depth = 0.63"

Subcatchment 1A: south central section btw. gorges

Runoff = 0.51 cfs @ 12.12 hrs, Volume= 0.056 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 3.68 cfs @ 11.96 hrs, Volume= 0.156 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 4.43 cfs @ 12.10 hrs, Volume= 0.282 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 1.21 cfs @ 12.18 hrs, Volume= 0.096 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 10.62 cfs @ 12.13 hrs, Volume= 0.743 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 0.49 cfs @ 11.95 hrs, Volume= 0.020 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt=.0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 1.35 cfs @ 12.19 hrs, Volume= 0.127 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 0.06 cfs @ 12.27 hrs, Volume= 0.015 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 0.56 cfs @ 12.00 hrs, Volume= 0.026 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	500	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.3	620	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 1.98 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.02 cfs @ 12.05 hrs, Volume= 0.002 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 1.39 cfs @ 12.20 hrs, Volume= 0.111 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 1.44 cfs @ 11.98 hrs, Volume= 0.063 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 0.96 cfs @ 12.01 hrs, Volume= 0.048 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 0.34 cfs @ 12.11 hrs, Volume= 0.034 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 2.47 cfs @ 11.91 hrs, Volume= 0.116 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.00 cfs @ 12.38 hrs, Volume= 0.001 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LF: landfill area

Runoff = 49.62 cfs @ 11.95 hrs, Volume= 2.411 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
14.330	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	150	0.3300	4.2		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
3.9	1,100	0.0540	4.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	1,250	Total			

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 4.16 cfs @ 11.94 hrs, Volume= 0.176 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 6.98 cfs @ 11.94 hrs, Volume= 0.295 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 1.83 cfs @ 12.49 hrs, Volume= 0.252 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 2.52 cfs @ 12.25 hrs, Volume= 0.255 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 5.60 cfs @ 12.49 hrs, Volume= 0.793 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 0.45"
Inflow = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af
Outflow = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.07' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 1.06"
Inflow = 2.71 cfs @ 12.78 hrs, Volume= 1.253 af
Outflow = 2.71 cfs @ 12.79 hrs, Volume= 1.253 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.5 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 9.3 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.24' @ 12.79 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 0.37"
Inflow = 0.34 cfs @ 12.66 hrs, Volume= 0.059 af
Outflow = 0.34 cfs @ 12.71 hrs, Volume= 0.059 af, Atten= 1%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.3 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.2 fps, Avg. Travel Time= 2.3 min

Peak Depth= 0.15' @ 12.67 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 0.74"
Inflow = 0.56 cfs @ 12.00 hrs, Volume= 0.026 af
Outflow = 0.55 cfs @ 12.00 hrs, Volume= 0.026 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.08' @ 12.00 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.45 hrs, Volume= 2.224 af
Outflow = 6.32 cfs @ 13.46 hrs, Volume= 2.223 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.91' @ 13.46 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.46 hrs, Volume= 2.223 af
Outflow = 6.32 cfs @ 13.47 hrs, Volume= 2.222 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.7 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.3 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.56' @ 13.46 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 0.32"
Inflow = 1.35 cfs @ 12.19 hrs, Volume= 0.129 af
Outflow = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.5 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.9 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.18' @ 12.20 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 0.40"
Inflow = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af
Outflow = 7.88 cfs @ 12.54 hrs, Volume= 1.145 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.8 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 7.4 fps, Avg. Travel Time= 2.3 min

Peak Depth= 0.47' @ 12.52 hrs
~~Capacity at bank full= 63.99 cfs~~
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 1.000 ac, Inflow Depth = 0.45"
Inflow = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af
Outflow = 0.49 cfs @ 12.16 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.8 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.13' @ 12.16 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.10"
Inflow = 0.06 cfs @ 12.27 hrs, Volume= 0.015 af
Outflow = 0.06 cfs @ 12.29 hrs, Volume= 0.015 af, Atten= 1%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.02' @ 12.27 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 0.45"
Inflow = 7.53 cfs @ 13.56 hrs, Volume= 3.123 af
Outflow = 7.53 cfs @ 13.57 hrs, Volume= 3.122 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 8.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.42' @ 13.57 hrs
Capacity at bank full= 123.05 cfs
Inlet Invert= 323.40', Outlet Invert= 309.90'
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 0.39"
Inflow = 8.49 cfs @ 12.52 hrs, Volume= 1.274 af
Outflow = 8.48 cfs @ 12.53 hrs, Volume= 1.273 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 8.1 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.43' @ 12.52 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 5.670 ac, Inflow Depth = 0.25"
Inflow = 0.88 cfs @ 12.12 hrs, Volume= 0.120 af
Outflow = 0.88 cfs @ 12.12 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 13.020 ac, Inflow Depth = 0.16"
Inflow = 0.98 cfs @ 12.02 hrs, Volume= 0.172 af
Outflow = 0.94 cfs @ 12.04 hrs, Volume= 0.171 af, Atten= 4%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.05' @ 12.02 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 1.13"
Inflow = 10.62 cfs @ 12.13 hrs, Volume= 0.743 af
Outflow = 10.44 cfs @ 12.17 hrs, Volume= 0.741 af, Atten= 2%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 3.9 min

Peak Depth= 0.53' @ 12.15 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 1.09"
Inflow = 15.52 cfs @ 11.96 hrs, Volume= 1.290 af
Outflow = 2.71 cfs @ 12.78 hrs, Volume= 1.253 af, Atten= 83%, Lag= 49.4 min
Primary = 2.71 cfs @ 12.78 hrs, Volume= 1.253 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 402.71' @ 12.78 hrs Surf.Area= 7,721 sf Storage= 24,641 cf
Plug-Flow detention time= 105.1 min calculated for 1.253 af (97% of inflow)
Center-of-Mass det. time= 94.3 min (888.7 - 794.3)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.71 cfs @ 12.78 hrs HW=402.71' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 2.71 cfs @ 10.1 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	0.87"	
Inflow =	5.61 cfs @	11.98 hrs, Volume=	1.464 af	
Outflow =	1.51 cfs @	17.30 hrs, Volume=	0.902 af,	Atten= 73%, Lag= 319.2 min
Primary =	1.51 cfs @	17.30 hrs, Volume=	0.902 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 324.77' @ 17.30 hrs Surf.Area= 13,010 sf Storage= 29,455 cf
Plug-Flow detention time= 182.5 min calculated for 0.899 af (61% of inflow)
Center-of-Mass det. time= 94.2 min (973.5 - 879.3)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.50 cfs @ 17.30 hrs HW=324.77' (Free Discharge)
└─**2=Orifice/Grate** (Orifice Controls 1.50 cfs @ 7.6 fps)
└─**3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.5 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 2.520 ac, Inflow Depth = 0.29"
Inflow = 0.75 cfs @ 12.04 hrs, Volume= 0.060 af
Outflow = 0.09 cfs @ 13.47 hrs, Volume= 0.047 af, Atten= 88%, Lag= 85.7 min
Primary = 0.09 cfs @ 13.47 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.28' @ 13.47 hrs Surf.Area= 3,339 sf Storage= 1,031 cf
Plug-Flow detention time= 155.4 min calculated for 0.047 af (78% of inflow)
Center-of-Mass det. time= 91.4 min (935.0 - 843.6)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.09 cfs @ 13.47 hrs HW=318.28' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.9 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 11.740 ac, Inflow Depth = 0.45"
Inflow = 4.24 cfs @ 12.17 hrs, Volume= 0.444 af
Outflow = 0.20 cfs @ 19.74 hrs, Volume= 0.124 af, Atten= 95%, Lag= 454.3 min
Primary = 0.20 cfs @ 19.74 hrs, Volume= 0.124 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 408.87' @ 19.74 hrs Surf.Area= 15,747 sf Storage= 13,976 cf
Plug-Flow detention time= 251.0 min calculated for 0.123 af (28% of inflow)
Center-of-Mass det. time= 140.9 min (976.6 - 835.7)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.20 cfs @ 19.74 hrs HW=408.87' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 4.2 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area = 59.910 ac, Inflow Depth = 0.41"
Inflow = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af
Outflow = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af, Atten= 0%, Lag= 0.0 min
Primary = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 420.04' @ 12.71 hrs Surf.Area= 1,004 sf Storage= 49 cf
Plug-Flow detention time= 0.1 min calculated for 2.022 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (867.2 - 867.2)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=20.65 cfs @ 12.71 hrs HW=420.04' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.33 cfs @ 4.0 fps)
└─**2=Culvert** (Inlet Controls 10.33 cfs @ 4.0 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 0.37"
Inflow = 0.34 cfs @ 12.71 hrs, Volume= 0.059 af
Outflow = 0.41 cfs @ 12.65 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min
Primary = 0.41 cfs @ 12.65 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 404.27' @ 12.66 hrs Surf.Area= 12 sf Storage= 27 cf
Plug-Flow detention time= 4.5 min calculated for 0.058 af (99% of inflow)
Center-of-Mass det. time= 1.6 min (900.5 - 898.9)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.38 cfs @ 12.65 hrs HW=404.26' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.38 cfs @ 2.4 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 0.84"
Inflow = 3.68 cfs @ 11.96 hrs, Volume= 0.156 af
Outflow = 3.67 cfs @ 11.96 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
Primary = 3.67 cfs @ 11.96 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1.74' @ 11.96 hrs Surf.Area= 12 sf Storage= 21 cf
Plug-Flow detention time= 1.1 min calculated for 0.155 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (800.6 - 800.2)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=3.54 cfs @ 11.96 hrs HW=1.72' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.54 cfs @ 2.7 fps)

Pond CB2: PROPOSED CB

Inflow Area =	1.910 ac,	Inflow Depth =	0.60"	
Inflow =	1.21 cfs @	12.18 hrs, Volume=	0.096 af	
Outflow =	0.34 cfs @	12.66 hrs, Volume=	0.059 af,	Atten= 72%, Lag= 28.8 min
Primary =	0.34 cfs @	12.66 hrs, Volume=	0.059 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.26' @ 12.66 hrs Surf.Area= 1,065 sf Storage= 1,824 cf
Plug-Flow detention time= 152.6 min calculated for 0.059 af (61% of inflow)
Center-of-Mass det. time= 69.8 min (896.6 - 826.9)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.33 cfs @ 12.66 hrs HW=406.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.33 cfs @ 1.6 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	0.44"	
Inflow =	12.50 cfs @	12.69 hrs, Volume=	2.310 af	
Outflow =	6.32 cfs @	13.45 hrs, Volume=	2.224 af,	Atten= 49%, Lag= 45.8 min
Primary =	6.32 cfs @	13.45 hrs, Volume=	2.224 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.68' @ 13.45 hrs Surf.Area= 8,737 sf Storage= 26,124 cf
Plug-Flow detention time= 53.9 min calculated for 2.224 af (96% of inflow)
Center-of-Mass det. time= 41.8 min (901.7 - 859.8)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.32 cfs @ 13.45 hrs HW=413.68' (Free Discharge)
- **1=Orifice/Grate** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Culvert** (Inlet Controls 6.32 cfs @ 8.0 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=410.00' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 0.40"
Inflow = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af
Outflow = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af, Atten= 0%, Lag= 0.0 min
Primary = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.30' @ 12.50 hrs Surf.Area= 36 sf Storage= 39 cf
Plug-Flow detention time= 0.2 min calculated for 1.148 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (857.7 - 857.6)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.91 cfs @ 12.50 hrs HW=407.30' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.91 cfs @ 3.6 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area = 4.910 ac, Inflow Depth = 0.32"
Inflow = 1.36 cfs @ 12.19 hrs, Volume= 0.129 af
Outflow = 1.35 cfs @ 12.19 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.35 cfs @ 12.19 hrs, Volume= 0.129 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 328.59' @ 12.19 hrs Surf.Area= 20 sf Storage= 12 cf
Plug-Flow detention time= 0.1 min calculated for 0.129 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (852.3 - 852.2)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=1.34 cfs @ 12.19 hrs HW=328.59' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.34 cfs @ 2.2 fps)

Pond MH1: PROPOSED MH

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.47 hrs, Volume= 2.222 af
Outflow = 6.32 cfs @ 13.46 hrs, Volume= 2.222 af, Atten= 0%, Lag= 0.0 min
Primary = 6.32 cfs @ 13.46 hrs, Volume= 2.222 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.04' @ 13.46 hrs Surf.Area= 12 sf Storage= 25 cf
Plug-Flow detention time= 0.1 min calculated for 2.214 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (902.5 - 902.4)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=6.32 cfs @ 13.46 hrs HW=2.04' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.32 cfs @ 3.3 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac, Inflow Depth = 0.38"		
Inflow =	2.52 cfs @ 12.25 hrs, Volume=	0.255 af	
Outflow =	2.52 cfs @ 12.25 hrs, Volume=	0.254 af, Atten= 0%, Lag= 0.0 min	
Primary =	2.52 cfs @ 12.25 hrs, Volume=	0.254 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.69' @ 12.25 hrs Surf.Area= 20 sf Storage= 34 cf
Plug-Flow detention time= 1.1 min calculated for 0.253 af (99% of inflow)
Center-of-Mass det. time= 0.4 min (848.2 - 847.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.51 cfs @ 12.25 hrs HW=421.68' (Free Discharge)
└─**1=Culvert** (Inlet Controls 2.51 cfs @ 2.6 fps)

Pond UP2P: CULVERT

Inflow Area =	7.360 ac, Inflow Depth = 0.41"		
Inflow =	1.83 cfs @ 12.49 hrs, Volume=	0.252 af	
Outflow =	1.76 cfs @ 12.57 hrs, Volume=	0.247 af, Atten= 3%, Lag= 5.0 min	
Primary =	1.76 cfs @ 12.57 hrs, Volume=	0.247 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.63' @ 12.57 hrs Surf.Area= 906 sf Storage= 822 cf
Plug-Flow detention time= 14.5 min calculated for 0.247 af (98% of inflow)
Center-of-Mass det. time= 8.1 min (864.5 - 856.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=1.76 cfs @ 12.57 hrs HW=432.62' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.76 cfs @ 2.5 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac, Inflow Depth = 0.38"		
Inflow =	7.31 cfs @ 12.52 hrs, Volume=	1.040 af	
Outflow =	7.32 cfs @ 12.52 hrs, Volume=	1.037 af, Atten= 0%, Lag= 0.6 min	
Primary =	7.32 cfs @ 12.52 hrs, Volume=	1.037 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 425.74' @ 12.52 hrs Surf.Area= 638 sf Storage= 538 cf
Plug-Flow detention time= 2.5 min calculated for 1.037 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (861.8 - 860.5)

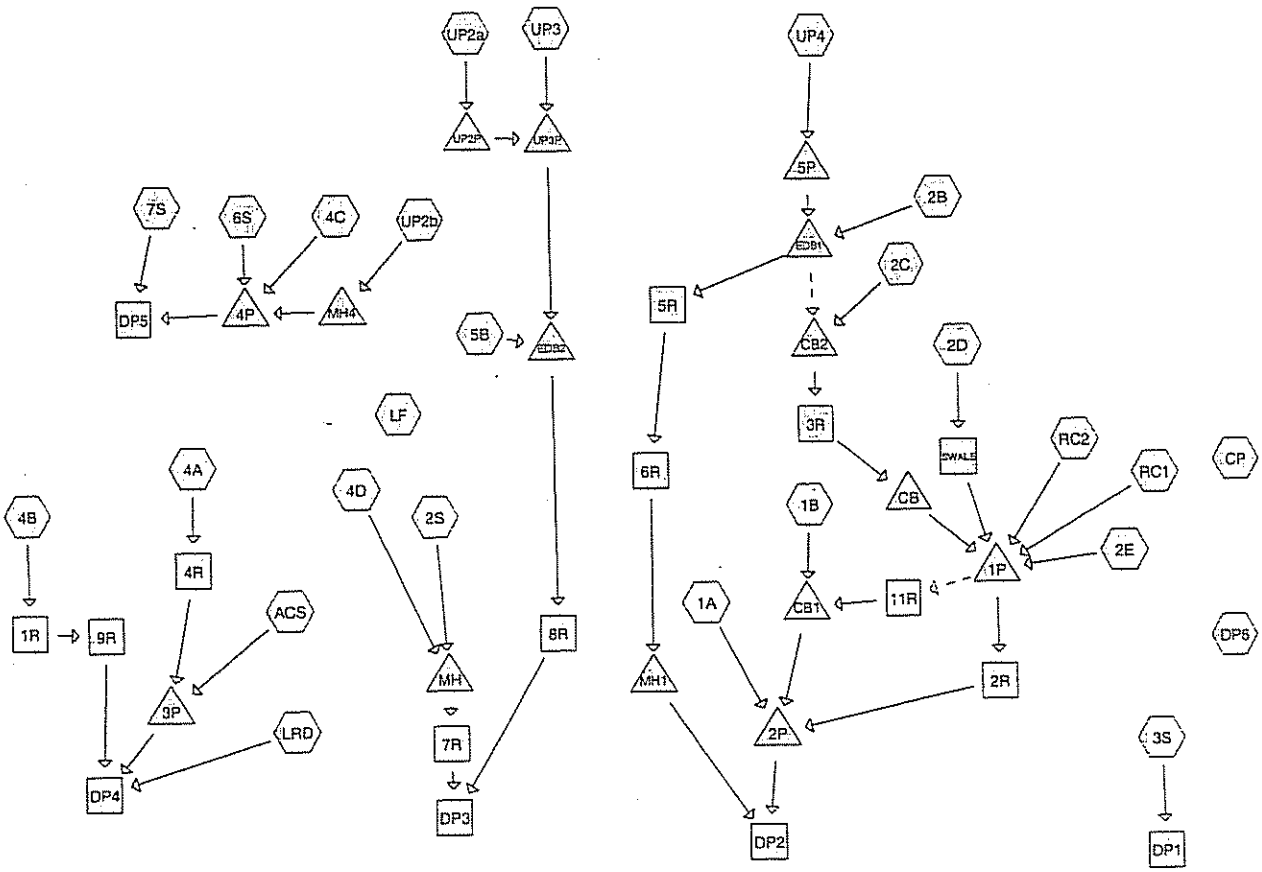
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.29 cfs @ 12.52 hrs HW=425.74' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.29 cfs @ 3.6 fps)

Proposed Drainage Conditions - Phase 1
2-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-construction
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=0.27"
Flow Length=310' Tc=13.5 min CN=63 Runoff=1.01 cfs 0.085 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=1.05"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=4.57 cfs 0.194 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=1.10"
Flow Length=330' Tc=17.1 min CN=83 Runoff=5.50 cfs 0.349 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=0.78"
Flow Length=340' Tc=22.7 min CN=77 Runoff=1.61 cfs 0.124 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=1.36"
Flow Length=310' Tc=20.4 min CN=87 Runoff=12.82 cfs 0.898 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=0.94"
Flow Length=60' Tc=4.0 min CN=80 Runoff=0.62 cfs 0.025 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=0.45"
Flow Length=840' Tc=21.3 min CN=69 Runoff=2.06 cfs 0.177 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.17"
Flow Length=460' Tc=18.1 min CN=59 Runoff=0.16 cfs 0.026 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=0.94"
Flow Length=510' Tc=7.8 min CN=80 Runoff=0.71 cfs 0.033 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=0.60"
Flow Length=620' Tc=19.3 min CN=73 Runoff=0.68 cfs 0.050 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO. Runoff Area=2.200 ac Runoff Depth=0.88"
Flow Length=250' Tc=16.7 min CN=79 Runoff=2.54 cfs 0.161 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=0.22"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.04 cfs 0.003 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=0.98"
Flow Length=210' Tc=24.8 min CN=81 Runoff=1.76 cfs 0.139 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=0.65"
Flow Length=80' Tc=5.2 min CN=74 Runoff=1.93 cfs 0.084 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=0.60"
Flow Length=95' Tc=8.4 min CN=73 Runoff=1.32 cfs 0.064 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=0.29"
Flow Length=465' Tc=13.8 min CN=64 Runoff=0.64 cfs 0.051 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=2.29"
Flow Length=110' Tc=1.9 min CN=98 Runoff=2.79 cfs 0.132 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.11"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.01 cfs 0.002 af

Subcatchment LF: landfill area Runoff Area=14.330 ac Runoff Depth=2.29"
Flow Length=1,250' Tc=4.5 min CN=98 Runoff=56.04 cfs 2.736 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=0.29"
Flow Length=401' Tc=12.0 min CN=64 Runoff=0.70 cfs 0.053 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=1.67"
Flow Length=245' Tc=3.9 min CN=91 Runoff=4.87 cfs 0.208 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=1.67"
Flow Length=245' Tc=3.9 min CN=91 Runoff=8.16 cfs 0.349 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=0.55"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=2.61 cfs 0.339 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=0.52"
Flow Length=750' Tc=26.5 min CN=71 Runoff=3.67 cfs 0.346 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=0.51"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=8.20 cfs 1.079 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=0.55"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=16.95 cfs 2.733 af

Reach 1R: Bottom Swale Peak Depth=0.09' Max Vel=1.9 fps Inflow=0.68 cfs 0.050 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.68 cfs 0.050 af

Reach 2R: 18" Peak Depth=0.25' Max Vel=14.8 fps Inflow=2.95 cfs 1.512 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=2.95 cfs 1.511 af

Reach 3R: CULVERT Peak Depth=0.21' Max Vel=4.2 fps Inflow=0.76 cfs 0.087 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=0.74 cfs 0.086 af

Reach 4R: Bottom Swale Peak Depth=0.10' Max Vel=1.7 fps Inflow=0.71 cfs 0.033 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=0.70 cfs 0.033 af

Reach 5R: 24" CULVERT Peak Depth=1.06' Max Vel=4.2 fps Inflow=8.39 cfs 2.984 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=8.39 cfs 2.982 af

Reach 6R: 30 "RCP Peak Depth=0.64' Max Vel=8.4 fps Inflow=8.39 cfs 2.982 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=8.38 cfs 2.981 af

Reach 7R: 24" Peak Depth=0.22' Max Vel=10.7 fps Inflow=2.07 cfs 0.180 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=2.06 cfs 0.180 af

Reach 8R: 24 CULVERT Peak Depth=0.57' Max Vel=15.4 fps Inflow=11.39 cfs 1.548 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=11.35 cfs 1.544 af

Reach 9R: 18" culvert Peak Depth=0.15' Max Vel=7.5 fps Inflow=0.68 cfs 0.050 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=0.68 cfs 0.050 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.04' Max Vel=1.1 fps Inflow=0.16 cfs 0.026 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.16 cfs 0.026 af

Reach DP2: CULVERT Peak Depth=0.47' Max Vel=14.9 fps Inflow=9.68 cfs 4.098 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=9.68 cfs 4.096 af

Reach DP3: 30" Peak Depth=0.52' Max Vel=16.6 fps Inflow=12.22 cfs 1.724 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=12.22 cfs 1.723 af

Reach DP4: Inflow=1.40 cfs 0.170 af
Outflow=1.40 cfs 0.170 af

Reach DP5: STREAM Peak Depth=0.07' Max Vel=2.0 fps Inflow=1.36 cfs 0.214 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=1.30 cfs 0.213 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.59' Max Vel=4.2 fps Inflow=12.82 cfs 0.898 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=12.61 cfs 0.896 af

Pond 1P: DETENTION BASIN 1 Peak Elev=403.54' Storage=31,275 cf Inflow=18.58 cfs 1.563 af
Primary=2.95 cfs 1.512 af Secondary=0.00 cfs 0.000 af Outflow=2.95 cfs 1.512 af

Pond 2P: DETENTION BASIN 2 Peak Elev=325.06' Storage=33,459 cf Inflow=6.89 cfs 1.790 af
Primary=2.19 cfs 1.117 af Secondary=0.00 cfs 0.000 af Outflow=2.19 cfs 1.117 af

Pond 3P: DETENTION BASIN 3 Peak Elev=318.41' Storage=1,523 cf Inflow=1.15 cfs 0.084 af
Outflow=0.13 cfs 0.067 af

Pond 4P: DETENTION BASIN 4 Peak Elev=409.20' Storage=19,200 cf Inflow=5.93 cfs 0.590 af
Outflow=0.25 cfs 0.149 af

Pond 5P: ROADSIDE POND UPGRAD. OF EXI Peak Elev=420.06' Storage=70 cf Inflow=16.95 cfs 2.733 af
Outflow=16.95 cfs 2.733 af

Pond CB: PROPOSED CB Peak Elev=404.38' Storage=29 cf Inflow=0.74 cfs 0.086 af
24.0" x 300.0' Culvert Outflow=0.82 cfs 0.086 af

Pond CB1: proposed cb Peak Elev=1.82' Storage=22 cf Inflow=4.57 cfs 0.194 af
36.0" x 500.0' Culvert Outflow=4.57 cfs 0.194 af

Pond CB2: PROPOSED CB Peak Elev=406.40' Storage=1,995 cf Inflow=1.61 cfs 0.124 af
18.0" x 100.0' Culvert Outflow=0.76 cfs 0.087 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=415.08' Storage=40,107 cf Inflow=17.79 cfs 3.082 af
Primary=8.39 cfs 2.984 af Secondary=0.00 cfs 0.000 af Outflow=8.39 cfs 2.984 af

Pond EDB2: DETENTION BASIN ADJACENT T Peak Elev=407.65' Storage=50 cf Inflow=11.39 cfs 1.548 af
24.0" x 80.0' Culvert Outflow=11.39 cfs 1.548 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=328.72' Storage=14 cf Inflow=2.07 cfs 0.180 af
24.0" x 185.0' Culvert Outflow=2.07 cfs 0.180 af

Pond MH1: PROPOSED MH Peak Elev=2.22' Storage=27 cf Inflow=8.38 cfs 2.981 af
30.0" x 80.0' Culvert Outflow=8.38 cfs 2.981 af

Pond MH4: PROPOSED MH Peak Elev=421.84' Storage=37 cf Inflow=3.67 cfs 0.346 af
24.0" x 300.0' Culvert Outflow=3.64 cfs 0.345 af

Pond UP2P: CULVERT Peak Elev=432.77' Storage=1,009 cf Inflow=2.61 cfs 0.339 af
18.0" x 75.0' Culvert Outflow=2.55 cfs 0.334 af

Pond UP3P: ROAD CULVERT Peak Elev=426.08' Storage=714 cf Inflow=10.67 cfs 1.413 af
24.0" x 95.0' Culvert Outflow=10.64 cfs 1.409 af

Total Runoff Area = 158.800 ac Runoff Volume = 10.440 af Average Runoff Depth = 0.79"

Subcatchment 1A: south central section btw. gorges

Runoff = 1.01 cfs @ 12.10 hrs, Volume= 0.085 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense- n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 5.50 cfs @ 12.10 hrs, Volume= 0.349 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 1.61 cfs @ 12.17 hrs, Volume= 0.124 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 12.82 cfs @ 12.13 hrs, Volume= 0.898 af, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 0.62 cfs @ 11.95 hrs, Volume= 0.025 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 2.06 cfs @ 12.18 hrs, Volume= 0.177 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 0.16 cfs @ 12.20 hrs, Volume= 0.026 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 0.71 cfs @ 12.00 hrs, Volume= 0.033 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 0.68 cfs @ 12.14 hrs, Volume= 0.050 af, Depth= 0.60"

~~Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs~~
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	500	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.3	620	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 2.54 cfs @ 12.10 hrs, Volume= 0.161 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.04 cfs @ 12.04 hrs, Volume= 0.003 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 1.76 cfs @ 12.19 hrs, Volume= 0.139 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 1.93 cfs @ 11.97 hrs, Volume= 0.084 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 1.32 cfs @ 12.01 hrs, Volume= 0.064 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 2.79 cfs @ 11.91 hrs, Volume= 0.132 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.01 cfs @ 12.00 hrs, Volume= 0.002 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LF: landfill area

Runoff = 56.04 cfs @ 11.95 hrs, Volume= 2.736 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
14.330	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	150	0.3300	4.2		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
3.9	1,100	0.0540	4.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	1,250	Total			

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 0.70 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 4.87 cfs @ 11.94 hrs, Volume= 0.208 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 8.16 cfs @ 11.94 hrs, Volume= 0.349 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 2.61 cfs @ 12.47 hrs, Volume= 0.339 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 3.67 cfs @ 12.24 hrs, Volume= 0.346 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 8.20 cfs @ 12.47 hrs, Volume= 1.079 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 16.95 cfs @ 12.68 hrs, Volume= 2.733 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 0.60"
Inflow = 0.68 cfs @ 12.14 hrs, Volume= 0.050 af
Outflow = 0.68 cfs @ 12.15 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.09' @ 12.14 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 1.28"
Inflow = 2.95 cfs @ 12.84 hrs, Volume= 1.512 af
Outflow = 2.95 cfs @ 12.85 hrs, Volume= 1.511 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.8 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 9.8 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.25' @ 12.85 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 0.54"
Inflow = 0.76 cfs @ 12.45 hrs, Volume= 0.087 af
Outflow = 0.74 cfs @ 12.49 hrs, Volume= 0.086 af, Atten= 2%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.4 fps, Avg. Travel Time= 2.1 min

Peak Depth= 0.21' @ 12.47 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 0.94"
Inflow = 0.71 cfs @ 12.00 hrs, Volume= 0.033 af
Outflow = 0.70 cfs @ 12.00 hrs, Volume= 0.033 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.10' @ 12.00 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.39 cfs @ 13.46 hrs, Volume= 2.984 af
Outflow = 8.39 cfs @ 13.47 hrs, Volume= 2.982 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.8 fps, Avg. Travel Time= 0.4 min

Peak Depth= 1.06' @ 13.46 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.39 cfs @ 13.47 hrs, Volume= 2.982 af
Outflow = 8.38 cfs @ 13.47 hrs, Volume= 2.981 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.4 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.64' @ 13.47 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 0.44"
Inflow = 2.07 cfs @ 12.18 hrs, Volume= 0.180 af
Outflow = 2.06 cfs @ 12.19 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.7 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.3 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.22' @ 12.18 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 0.54"
Inflow = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af
Outflow = 11.35 cfs @ 12.53 hrs, Volume= 1.544 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.4 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 7.7 fps, Avg. Travel Time= 2.2 min

Peak Depth= 0.57' @ 12.51 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 1.000 ac, Inflow Depth = 0.60"
Inflow = 0.68 cfs @ 12.15 hrs, Volume= 0.050 af
Outflow = 0.68 cfs @ 12.15 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.5 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 3.4 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.15' @ 12.15 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.17"
Inflow = 0.16 cfs @ 12.20 hrs, Volume= 0.026 af
Outflow = 0.16 cfs @ 12.21 hrs, Volume= 0.026 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.1 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.04' @ 12.20 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 0.59"
Inflow = 9.68 cfs @ 13.47 hrs, Volume= 4.098 af
Outflow = 9.68 cfs @ 13.48 hrs, Volume= 4.096 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 9.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.47' @ 13.48 hrs
Capacity at bank full= 123.05 cfs
Inlet Invert= 323.40', Outlet Invert= 309.90'
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 0.53"
Inflow = 12.22 cfs @ 12.50 hrs, Volume= 1.724 af
Outflow = 12.22 cfs @ 12.50 hrs, Volume= 1.723 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 8.4 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.52' @ 12.50 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 5.670 ac, Inflow Depth = 0.36"
Inflow = 1.40 cfs @ 12.11 hrs, Volume= 0.170 af
Outflow = 1.40 cfs @ 12.11 hrs, Volume= 0.170 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 13.020 ac, Inflow Depth = 0.20"
Inflow = 1.36 cfs @ 12.01 hrs, Volume= 0.214 af
Outflow = 1.30 cfs @ 12.04 hrs, Volume= 0.213 af, Atten= 4%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.07' @ 12.03 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 1.36"
Inflow = 12.82 cfs @ 12.13 hrs, Volume= 0.898 af
Outflow = 12.61 cfs @ 12.17 hrs, Volume= 0.896 af, Atten= 2%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 3.8 min

Peak Depth= 0.59' @ 12.15 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 1.33"
Inflow = 18.58 cfs @ 11.96 hrs, Volume= 1.563 af
Outflow = 2.95 cfs @ 12.84 hrs, Volume= 1.512 af, Atten= 84%, Lag= 53.1 min
Primary = 2.95 cfs @ 12.84 hrs, Volume= 1.512 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 403.54' @ 12.84 hrs Surf.Area= 8,669 sf Storage= 31,275 cf
Plug-Flow detention time= 121.4 min calculated for 1.512 af (97% of inflow)
Center-of-Mass det. time= 108.9 min (899.1 - 790.2)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.95 cfs @ 12.84 hrs HW=403.54' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 2.95 cfs @ 11.0 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	1.06"	
Inflow =	6.89 cfs @	11.98 hrs, Volume=	1.790 af	
Outflow =	2.19 cfs @	16.78 hrs, Volume=	1.117 af,	Atten= 68%, Lag= 288.2 min
Primary =	2.19 cfs @	16.78 hrs, Volume=	1.117 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.06' @ 16.78 hrs Surf.Area= 13,779 sf Storage= 33,459 cf
Plug-Flow detention time= 182.0 min calculated for 1.117 af (62% of inflow)
Center-of-Mass det. time= 89.7 min (976.3 - 886.6)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.18 cfs @ 16.78 hrs HW=325.06' (Free Discharge)
└─**2=Orifice/Grate** (Orifice Controls 1.59 cfs @ 8.1 fps)
└─**3=Orifice/Grate** (Orifice Controls 0.59 cfs @ 1.9 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 2.520 ac, Inflow Depth = 0.40"
Inflow = 1.15 cfs @ 12.05 hrs, Volume= 0.084 af
Outflow = 0.13 cfs @ 13.41 hrs, Volume= 0.067 af, Atten= 89%, Lag= 81.8 min
Primary = 0.13 cfs @ 13.41 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 318.41' @ 13.41 hrs Surf.Area= 3,406 sf Storage= 1,523 cf
Plug-Flow detention time= 160.9 min calculated for 0.067 af (80% of inflow)
Center-of-Mass det. time= 101.4 min (937.2 - 835.7)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.13 cfs @ 13.41 hrs HW=318.41' (Free Discharge)
↑
├─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 2.6 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 11.740 ac, Inflow Depth = 0.60"
Inflow = 5.93 cfs @ 12.18 hrs, Volume= 0.590 af
Outflow = 0.25 cfs @ 19.95 hrs, Volume= 0.149 af, Atten= 96%, Lag= 466.5 min
Primary = 0.25 cfs @ 19.95 hrs, Volume= 0.149 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 409.20' @ 19.95 hrs Surf.Area= 16,400 sf Storage= 19,200 cf
Plug-Flow detention time= 251.8 min calculated for 0.149 af (25% of inflow)
Center-of-Mass det. time= 145.4 min (974.7 - 829.2)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.25 cfs @ 19.95 hrs HW=409.20' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.0 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area = 59.910 ac, Inflow Depth = 0.55"
Inflow = 16.95 cfs @ 12.68 hrs, Volume= 2.733 af
Outflow = 16.95 cfs @ 12.69 hrs, Volume= 2.733 af, Atten= 0%, Lag= 0.1 min
Primary = 16.95 cfs @ 12.69 hrs, Volume= 2.733 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 420.06' @ 12.69 hrs Surf.Area= 1,006 sf Storage= 70 cf
Plug-Flow detention time= 0.1 min calculated for 2.733 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (860.4 - 860.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=21.03 cfs @ 12.69 hrs HW=420.06' (Free Discharge)
- **1=Culvert** (Inlet Controls 10.52 cfs @ 4.0 fps)
- **2=Culvert** (Inlet Controls 10.52 cfs @ 4.0 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 0.54"
Inflow = 0.74 cfs @ 12.49 hrs, Volume= 0.086 af
Outflow = 0.82 cfs @ 12.50 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.6 min
Primary = 0.82 cfs @ 12.50 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 404.38' @ 12.50 hrs Surf.Area= 12 sf Storage= 29 cf
Plug-Flow detention time= 3.1 min calculated for 0.085 af (99% of inflow)
Center-of-Mass det. time= 1.0 min (873.4 - 872.4)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.81 cfs @ 12.50 hrs HW=404.38' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.81 cfs @ 2.0 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 1.05"
Inflow = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af
Outflow = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1.82' @ 11.96 hrs Surf.Area= 12 sf Storage= 22 cf
Plug-Flow detention time= 0.9 min calculated for 0.194 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (796.0 - 795.6)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=4.42 cfs @ 11.96 hrs HW=1.81' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.42 cfs @ 2.9 fps)

Pond CB2: PROPOSED CB

Inflow Area =	1.910 ac, Inflow Depth = 0.78"		
Inflow =	1.61 cfs @ 12.17 hrs, Volume=	0.124 af	
Outflow =	0.76 cfs @ 12.45 hrs, Volume=	0.087 af, Atten= 53%, Lag= 16.7 min	
Primary =	0.76 cfs @ 12.45 hrs, Volume=	0.087 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.40' @ 12.45 hrs Surf.Area= 1,099 sf Storage= 1,995 cf
Plug-Flow detention time= 120.8 min calculated for 0.086 af (70% of inflow)
Center-of-Mass det. time= 49.0 min (870.4 - 821.4)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.75 cfs @ 12.45 hrs HW=406.40' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.75 cfs @ 2.0 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac, Inflow Depth = 0.58"		
Inflow =	17.79 cfs @ 12.67 hrs, Volume=	3.082 af	
Outflow =	8.39 cfs @ 13.46 hrs, Volume=	2.984 af, Atten= 53%, Lag= 47.3 min	
Primary =	8.39 cfs @ 13.46 hrs, Volume=	2.984 af	
Secondary =	0.00 cfs @ 5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
~~Peak Elev= 415.08' @ 13.46 hrs Surf.Area= 10,682 sf Storage= 40,107 cf~~
Plug-Flow detention time= 64.4 min calculated for 2.984 af (97% of inflow)
Center-of-Mass det. time= 53.8 min (907.7 - 853.8)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.32 cfs @ 13.46 hrs HW=415.08' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 0.74 cfs @ 0.9 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Culvert** (Inlet Controls 7.58 cfs @ 9.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=410.00' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 0.54"
Inflow = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af
Outflow = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af, Atten= 0%, Lag= 0.0 min
Primary = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.65' @ 12.50 hrs Surf.Area= 43 sf Storage= 50 cf
Plug-Flow detention time= 0.1 min calculated for 1.543 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (850.4 - 850.3)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.39 cfs @ 12.50 hrs HW=407.65' (Free Discharge)
└**1=Culvert** (Inlet Controls 11.39 cfs @ 4.1 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth = 0.44"	
Inflow =	2.07 cfs @	12.18 hrs, Volume=	0.180 af
Outflow =	2.07 cfs @	12.18 hrs, Volume=	0.180 af, Atten= 0%, Lag= 0.0 min
Primary =	2.07 cfs @	12.18 hrs, Volume=	0.180 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 328.72' @ 12.18 hrs Surf.Area= 20 sf Storage= 14 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.05 cfs @ 12.18 hrs HW=328.71' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.05 cfs @ 2.5 fps)

Pond MH1: PROPOSED MH

Inflow Area =	63.710 ac,	Inflow Depth = 0.56"	
Inflow =	8.38 cfs @	13.47 hrs, Volume=	2.981 af
Outflow =	8.38 cfs @	13.47 hrs, Volume=	2.981 af, Atten= 0%, Lag= 0.0 min
Primary =	8.38 cfs @	13.47 hrs, Volume=	2.981 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.22' @ 13.47 hrs Surf.Area= 12 sf Storage= 27 cf
Plug-Flow detention time= 0.1 min calculated for 2.971 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (908.4 - 908.4)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.37 cfs @ 13.47 hrs HW=2.22' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.37 cfs @ 3.5 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac, Inflow Depth = 0.52"		
Inflow =	3.67 cfs @ 12.24 hrs, Volume=	0.346 af	
Outflow =	3.64 cfs @ 12.23 hrs, Volume=	0.345 af, Atten= 1%, Lag= 0.0 min	
Primary =	3.64 cfs @ 12.23 hrs, Volume=	0.345 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.84' @ 12.23 hrs Surf.Area= 20 sf Storage= 37 cf
Plug-Flow detention time= 0.8 min calculated for 0.344 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (840.4 - 840.1)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=3.63 cfs @ 12.23 hrs HW=421.84' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 3.63 cfs @ 2.9 fps)

Pond UP2P: CULVERT

Inflow Area =	7.360 ac, Inflow Depth = 0.55"		
Inflow =	2.61 cfs @ 12.47 hrs, Volume=	0.339 af	
Outflow =	2.55 cfs @ 12.54 hrs, Volume=	0.334 af, Atten= 2%, Lag= 4.2 min	
Primary =	2.55 cfs @ 12.54 hrs, Volume=	0.334 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.77' @ 12.54 hrs Surf.Area= 1,061 sf Storage= 1,009 cf
Plug-Flow detention time= 12.5 min calculated for 0.334 af (98% of inflow)
Center-of-Mass det. time= 7.1 min (856.4 - 849.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.55 cfs @ 12.54 hrs HW=432.77' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.55 cfs @ 2.8 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	0.52"	
Inflow =	10.67 cfs @	12.49 hrs, Volume=	1.413 af	
Outflow =	10.64 cfs @	12.52 hrs, Volume=	1.409 af,	Atten= 0%, Lag= 1.8 min
Primary =	10.64 cfs @	12.52 hrs, Volume=	1.409 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 426.08' @ 12.52 hrs Surf.Area= 767 sf Storage= 714 cf
Plug-Flow detention time= 2.1 min calculated for 1.404 af (99% of inflow)
Center-of-Mass det. time= 1.1 min (854.0 - 852.9)

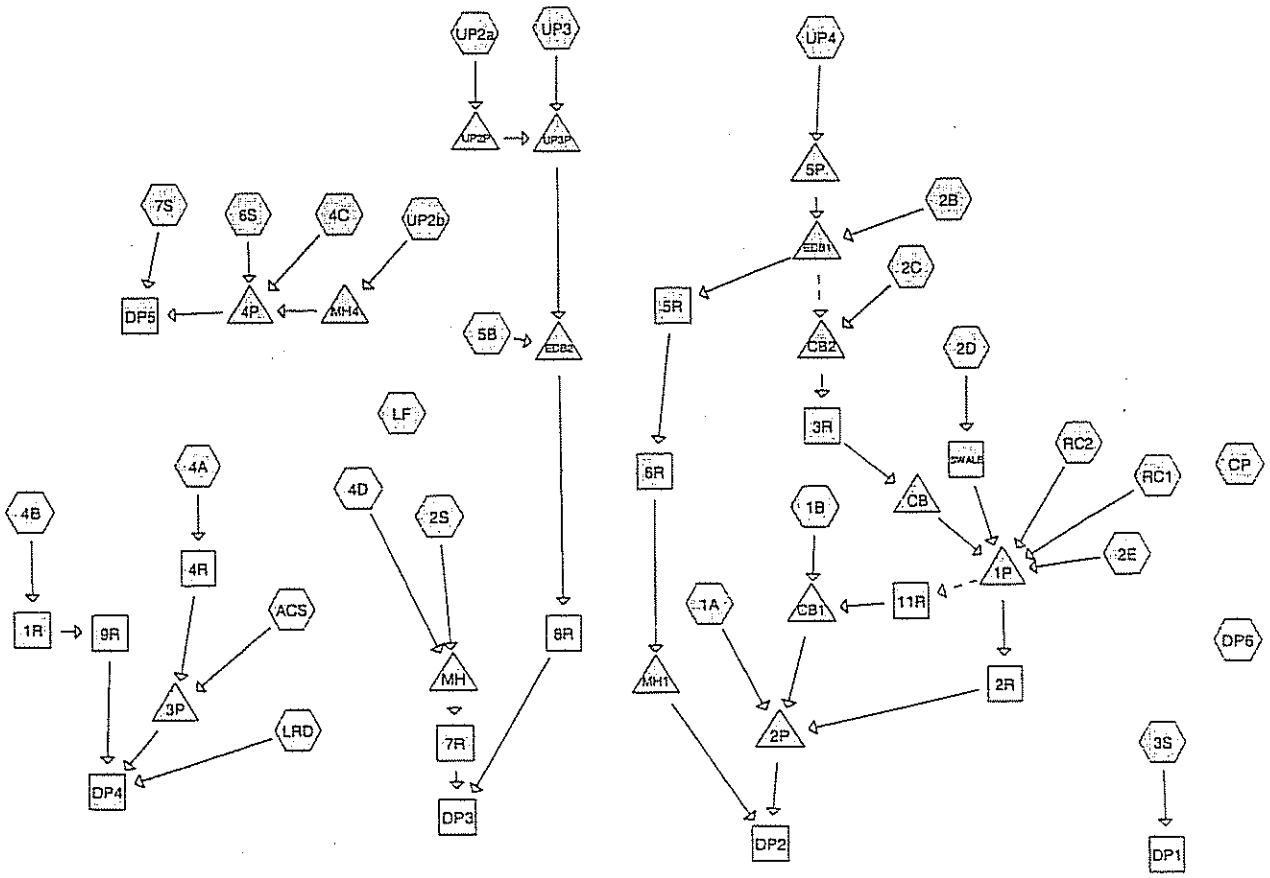
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=10.61 cfs @ 12.52 hrs HW=426.07' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.61 cfs @ 4.0 fps)

Proposed Drainage Conditions - Phase 1
10-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-construction
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=0.76"
Flow Length=310' Tc=13.5 min CN=63 Runoff=3.97 cfs 0.245 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=1.96"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=8.38 cfs 0.362 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.03"
Flow Length=330' Tc=17.1 min CN=83 Runoff=10.06 cfs 0.642 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=1.58"
Flow Length=340' Tc=22.7 min CN=77 Runoff=3.37 cfs 0.251 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=2.36"
Flow Length=310' Tc=20.4 min CN=87 Runoff=21.91 cfs 1.558 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=1.81"
Flow Length=60' Tc=4.0 min CN=80 Runoff=1.18 cfs 0.048 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=1.07"
Flow Length=840' Tc=21.3 min CN=69 Runoff=5.68 cfs 0.423 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.58"
Flow Length=460' Tc=18.1 min CN=59 Runoff=1.08 cfs 0.087 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=1.80"
Flow Length=510' Tc=7.8 min CN=80 Runoff=1.36 cfs 0.063 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=1.31"
Flow Length=620' Tc=19.3 min CN=73 Runoff=1.59 cfs 0.110 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=1.72"
Flow Length=250' Tc=16.7 min CN=79 Runoff=5.04 cfs 0.316 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=0.67"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.20 cfs 0.010 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=1.87"
Flow Length=210' Tc=24.8 min CN=81 Runoff=3.37 cfs 0.264 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=1.39"
Flow Length=80' Tc=5.2 min CN=74 Runoff=4.21 cfs 0.179 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=1.32"
Flow Length=95' Tc=8.4 min CN=73 Runoff=2.99 cfs 0.141 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=0.81"
Flow Length=465' Tc=13.8 min CN=64 Runoff=2.30 cfs 0.142 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=3.38"
Flow Length=110' Tc=1.9 min CN=98 Runoff=4.06 cfs 0.194 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.46"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.17 cfs 0.008 af

Subcatchment LF: landfill area Runoff Area=14.330 ac Runoff Depth=3.38"
Flow Length=1,250' Tc=4.5 min CN=98 Runoff=81.61 cfs 4.034 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=0.81"
Flow Length=401' Tc=12.0 min CN=64 Runoff=2.54 cfs 0.145 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=2.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=7.69 cfs 0.340 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=2.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=12.91 cfs 0.571 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.24"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=6.49 cfs 0.760 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.19"
Flow Length=750' Tc=26.5 min CN=71 Runoff=9.38 cfs 0.791 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.18"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=21.13 cfs 2.472 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.23"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=42.24 cfs 6.136 af

Reach 1R: Bottom Swale Peak Depth=0.14' Max Vel=2.5 fps Inflow=1.59 cfs 0.110 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.59 cfs 0.110 af

Reach 2R: 18" Peak Depth=0.51' Max Vel=22.0 fps Inflow=11.59 cfs 2.829 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=11.58 cfs 2.828 af

Reach 3R: CULVERT Peak Depth=0.66' Max Vel=8.3 fps Inflow=7.50 cfs 0.475 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=7.48 cfs 0.475 af

Reach 4R: Bottom Swale Peak Depth=0.14' Max Vel=2.2 fps Inflow=1.36 cfs 0.063 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=1.35 cfs 0.063 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.2 fps Inflow=34.05 cfs 6.324 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.36 cfs 6.321 af

Reach 6R: 30 "RCP Peak Depth=1.08' Max Vel=11.1 fps Inflow=22.36 cfs 6.321 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=22.43 cfs 6.320 af

Reach 7R: 24" Peak Depth=0.37' Max Vel=14.6 fps Inflow=5.74 cfs 0.433 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=5.72 cfs 0.433 af

Reach 8R: 24 CULVERT Peak Depth=0.90' Max Vel=19.4 fps Inflow=26.57 cfs 3.483 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=26.54 cfs 3.478 af

Reach 9R: 18" culvert Peak Depth=0.22' Max Vel=9.7 fps Inflow=1.59 cfs 0.110 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=1.59 cfs 0.110 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.11' Max Vel=2.2 fps Inflow=1.08 cfs 0.087 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.08 cfs 0.087 af

Reach DP2: CULVERT Peak Depth=0.87' Max Vel=21.0 fps Inflow=31.68 cfs 8.990 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=31.70 cfs 8.987 af

Reach DP3: 30" Peak Depth=0.79' Max Vel=21.1 fps Inflow=28.07 cfs 3.911 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=28.07 cfs 3.910 af

Reach DP4: Inflow=4.08 cfs 0.402 af
Outflow=4.08 cfs 0.402 af

Reach DP5: STREAM Peak Depth=0.11' Max Vel=2.7 fps Inflow=3.12 cfs 0.376 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=3.01 cfs 0.375 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.80' Max Vel=4.9 fps Inflow=21.91 cfs 1.558 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=21.61 cfs 1.555 af

Pond 1P: DETENTION BASIN 1 Peak Elev=405.38' Storage=49,373 cf Inflow=31.19 cfs 2.989 af
Primary=11.59 cfs 2.829 af Secondary=0.00 cfs 0.000 af Outflow=11.59 cfs 2.829 af

Pond 2P: DETENTION BASIN 2 Peak Elev=325.97' Storage=45,761 cf Inflow=13.27 cfs 3.435 af
Primary=9.32 cfs 2.671 af Secondary=0.00 cfs 0.000 af Outflow=9.32 cfs 2.671 af

Pond 3P: DETENTION BASIN 3 Peak Elev=319.22' Storage=4,526 cf Inflow=3.35 cfs 0.205 af
Outflow=0.25 cfs 0.148 af

Pond 4P: DETENTION BASIN 4 Peak Elev=410.64' Storage=45,752 cf Inflow=14.01 cfs 1.286 af
Outflow=0.37 cfs 0.235 af

Pond 5P: ROADSIDE POND UPGRAD. OF E Peak Elev=421.70' Storage=1,868 cf Inflow=42.24 cfs 6.136 af
Outflow=42.05 cfs 6.135 af

Pond CB: PROPOSED CB Peak Elev=405.26' Storage=39 cf Inflow=7.48 cfs 0.475 af
24.0" x 300.0' Culvert Outflow=7.43 cfs 0.474 af

Pond CB1: proposed cb Peak Elev=2.14' Storage=26 cf Inflow=8.38 cfs 0.362 af
36.0" x 500.0' Culvert Outflow=8.37 cfs 0.362 af

Pond CB2: PROPOSED CB Peak Elev=407.63' Storage=3,544 cf Inflow=8.09 cfs 0.513 af
18.0" x 100.0' Culvert Outflow=7.50 cfs 0.475 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.54' Storage=56,966 cf Inflow=43.43 cfs 6.778 af
Primary=34.05 cfs 6.324 af Secondary=7.50 cfs 0.262 af Outflow=41.54 cfs 6.586 af

Pond EDB2: DETENTION BASIN ADJACEN Peak Elev=410.51' Storage=1,954 cf Inflow=27.28 cfs 3.484 af
24.0" x 80.0' Culvert Outflow=26.57 cfs 3.483 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.18' Storage=24 cf Inflow=5.75 cfs 0.433 af
24.0" x 185.0' Culvert Outflow=5.74 cfs 0.433 af

Pond MH1: PROPOSED MH Peak Elev=3.26' Storage=39 cf Inflow=22.43 cfs 6.320 af
30.0" x 80.0' Culvert Outflow=22.44 cfs 6.319 af

Pond MH4: PROPOSED MH Peak Elev=422.45' Storage=49 cf Inflow=9.38 cfs 0.791 af
24.0" x 300.0' Culvert Outflow=9.38 cfs 0.790 af

Pond UP2P: CULVERT Peak Elev=433.38' Storage=1,805 cf Inflow=6.49 cfs 0.760 af
18.0" x 75.0' Culvert Outflow=6.35 cfs 0.752 af

Pond UP3P: ROAD CULVERT Peak Elev=428.87' Storage=4,150 cf Inflow=27.37 cfs 3.224 af
24.0" x 95.0' Culvert Outflow=26.02 cfs 3.219 af

Total Runoff Area = 158.800 ac Runoff Volume = 20.293 af Average Runoff Depth = 1.53"

Subcatchment 1A: south central section btw. gorges

Runoff = 3.97 cfs @ 12.07 hrs, Volume= 0.245 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 8.38 cfs @ 11.96 hrs, Volume= 0.362 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** - Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 10.06 cfs @ 12.10 hrs, Volume= 0.642 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 3.37 cfs @ 12.16 hrs, Volume= 0.251 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 21.91 cfs @ 12.13 hrs, Volume= 1.558 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 1.18 cfs @ 11.95 hrs, Volume= 0.048 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 5.68 cfs @ 12.16 hrs, Volume= 0.423 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.087 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.36 cfs @ 11.99 hrs, Volume= 0.063 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	500	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.3	620	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 5.04 cfs @ 12.09 hrs, Volume= 0.316 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.20 cfs @ 12.01 hrs, Volume= 0.010 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 3.37 cfs @ 12.19 hrs, Volume= 0.264 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 4.21 cfs @ 11.96 hrs, Volume= 0.179 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 2.99 cfs @ 12.00 hrs, Volume= 0.141 af, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 2.30 cfs @ 12.08 hrs, Volume= 0.142 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 4.06 cfs @ 11.91 hrs, Volume= 0.194 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.17 cfs @ 11.95 hrs, Volume= 0.008 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LF: landfill area

Runoff = 81.61 cfs @ 11.95 hrs, Volume= 4.034 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
14.330	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	150	0.3300	4.2		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
3.9	1,100	0.0540	4.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	1,250	Total			

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 2.54 cfs @ 12.06 hrs, Volume= 0.145 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 7.69 cfs @ 11.94 hrs, Volume= 0.340 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 12.91 cfs @ 11.94 hrs, Volume= 0.571 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 6.49 cfs @ 12.43 hrs, Volume= 0.760 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 9.38 cfs @ 12.22 hrs, Volume= 0.791 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 21.13 cfs @ 12.44 hrs, Volume= 2.472 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 42.24 cfs @ 12.65 hrs, Volume= 6.136 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 1.31"
Inflow = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.14' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 2.40"
Inflow = 11.59 cfs @ 12.46 hrs, Volume= 2.829 af
Outflow = 11.58 cfs @ 12.47 hrs, Volume= 2.828 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 11.4 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.51' @ 12.46 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 2.99"
Inflow = 7.50 cfs @ 12.88 hrs, Volume= 0.475 af
Outflow = 7.48 cfs @ 12.90 hrs, Volume= 0.475 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.3 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.2 fps, Avg. Travel Time= 1.6 min

Peak Depth= 0.66' @ 12.89 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 1.80"
Inflow = 1.36 cfs @ 11.99 hrs, Volume= 0.063 af
Outflow = 1.35 cfs @ 12.00 hrs, Volume= 0.063 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.14' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 1.19"
Inflow = 34.05 cfs @ 12.81 hrs, Volume= 6.324 af
Outflow = 22.36 cfs @ 12.65 hrs, Volume= 6.321 af, Atten= 34%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.60 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.19"
Inflow = 22.36 cfs @ 12.65 hrs, Volume= 6.321 af
Outflow = 22.43 cfs @ 12.65 hrs, Volume= 6.320 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.08' @ 12.65 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 1.06"
Inflow = 5.74 cfs @ 12.16 hrs, Volume= 0.433 af
Outflow = 5.72 cfs @ 12.16 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 6.5 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.37' @ 12.16 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 1.22"
Inflow = 26.57 cfs @ 12.62 hrs, Volume= 3.483 af
Outflow = 26.54 cfs @ 12.64 hrs, Volume= 3.478 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 19.4 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 8.6 fps, Avg. Travel Time= 1.9 min

Peak Depth= 0.90' @ 12.63 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 1.000 ac, Inflow Depth = 1.31"
Inflow = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.7 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.0 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.22' @ 12.13 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.58"
Inflow = 1.08 cfs @ 12.14 hrs, Volume= 0.087 af
Outflow = 1.08 cfs @ 12.15 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.11' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 1.29"
Inflow = 31.68 cfs @ 13.31 hrs, Volume= 8.990 af
Outflow = 31.70 cfs @ 13.31 hrs, Volume= 8.987 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.87' @ 13.31 hrs
Capacity at bank full= 123.05 cfs
Inlet Invert= 323.40', Outlet Invert= 309.90'
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 1.20"
Inflow = 28.07 cfs @ 12.60 hrs, Volume= 3.911 af
Outflow = 28.07 cfs @ 12.61 hrs, Volume= 3.910 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 9.5 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.79' @ 12.60 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 5.670 ac, Inflow Depth = 0.85"
Inflow = 4.08 cfs @ 12.08 hrs, Volume= 0.402 af
Outflow = 4.08 cfs @ 12.08 hrs, Volume= 0.402 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 13.020 ac, Inflow Depth = 0.35"
Inflow = 3.12 cfs @ 12.01 hrs, Volume= 0.376 af
Outflow = 3.01 cfs @ 12.02 hrs, Volume= 0.375 af, Atten= 4%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.11' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 2.36"
Inflow = 21.91 cfs @ 12.13 hrs, Volume= 1.558 af
Outflow = 21.61 cfs @ 12.16 hrs, Volume= 1.555 af, Atten= 1%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.9 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 3.3 min

Peak Depth= 0.80' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 2.54"
Inflow = 31.19 cfs @ 11.96 hrs, Volume= 2.989 af
Outflow = 11.59 cfs @ 12.46 hrs, Volume= 2.829 af, Atten= 63%, Lag= 30.1 min
Primary = 11.59 cfs @ 12.46 hrs, Volume= 2.829 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 405.38' @ 12.46 hrs Surf.Area= 10,919 sf Storage= 49,373 cf
Plug-Flow detention time= 105.5 min calculated for 2.829 af (95% of inflow)
Center-of-Mass det. time= 85.9 min (864.3 - 778.4)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=11.56 cfs @ 12.46 hrs HW=405.37' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 8.14 cfs @ 4.0 fps)
└—**3=Orifice/Grate** (Orifice Controls 3.42 cfs @ 12.8 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	2.04"	
Inflow =	13.27 cfs @	12.44 hrs, Volume=	3.435 af	
Outflow =	9.32 cfs @	13.31 hrs, Volume=	2.671 af,	Atten= 30%, Lag= 52.2 min
Primary =	9.32 cfs @	13.31 hrs, Volume=	2.671 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.97' @ 13.31 hrs Surf.Area= 16,144 sf Storage= 45,761 cf
Plug-Flow detention time= 122.8 min calculated for 2.671 af (78% of inflow)
Center-of-Mass det. time= 58.2 min (911.8 - 853.6)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) .0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=9.32 cfs @ 13.31 hrs HW=325.96' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.82 cfs @ 9.3 fps)
└—**3=Orifice/Grate** (Orifice Controls 7.49 cfs @ 3.8 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 2.520 ac, Inflow Depth = 0.98"
Inflow = 3.35 cfs @ 12.04 hrs, Volume= 0.205 af
Outflow = 0.25 cfs @ 13.60 hrs, Volume= 0.148 af, Atten= 93%, Lag= 93.1 min
Primary = 0.25 cfs @ 13.60 hrs, Volume= 0.148 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 319.22' @ 13.60 hrs Surf.Area= 3,812 sf Storage= 4,526 cf
Plug-Flow detention time= 203.7 min calculated for 0.148 af (72% of inflow)
Center-of-Mass det. time= 131.1 min (947.3 - 816.2)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.25 cfs @ 13.60 hrs HW=319.22' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.0 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 11.740 ac, Inflow Depth = 1.31"
Inflow = 14.01 cfs @ 12.16 hrs, Volume= 1.286 af
Outflow = 0.37 cfs @ 20.00 hrs, Volume= 0.235 af, Atten= 97%, Lag= 470.6 min
Primary = 0.37 cfs @ 20.00 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 410.64' @ 20.00 hrs Surf.Area= 20,239 sf Storage= 45,752 cf
Plug-Flow detention time= 257.7 min calculated for 0.235 af (18% of inflow)
Center-of-Mass det. time= 155.5 min (968.6 - 813.0)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.37 cfs @ 20.00 hrs HW=410.64' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 7.6 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area =	59.910 ac,	Inflow Depth =	1.23"	
Inflow =	42.24 cfs @	12.65 hrs, Volume=	6.136 af	
Outflow =	42.05 cfs @	12.68 hrs, Volume=	6.135 af,	Atten= 0%, Lag= 1.9 min
Primary =	42.05 cfs @	12.68 hrs, Volume=	6.135 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.70' @ 12.68 hrs Surf.Area= 1,170 sf Storage= 1,868 cf
Plug-Flow detention time= 0.3 min calculated for 6.135 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (844.2 - 844.0)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=41.97 cfs @ 12.68 hrs HW=421.69' (Free Discharge)
- **1=Culvert** (Inlet Controls 20.98 cfs @ 6.7 fps)
- **2=Culvert** (Inlet Controls 20.98 cfs @ 6.7 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 2.98"
Inflow = 7.48 cfs @ 12.90 hrs, Volume= 0.475 af
Outflow = 7.43 cfs @ 12.95 hrs, Volume= 0.474 af, Atten= 1%, Lag= 2.8 min
Primary = 7.43 cfs @ 12.95 hrs, Volume= 0.474 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 405.26' @ 12.95 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.6 min calculated for 0.474 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (803.3 - 803.1)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.43 cfs @ 12.95 hrs HW=405.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.43 cfs @ 3.6 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 1.96"
Inflow = 8.38 cfs @ 11.96 hrs, Volume= 0.362 af
Outflow = 8.37 cfs @ 11.96 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min
Primary = 8.37 cfs @ 11.96 hrs, Volume= 0.362 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.14' @ 11.96 hrs Surf.Area= 12 sf Storage= 26 cf
Plug-Flow detention time= 0.6 min calculated for 0.362 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (782.6 - 782.3)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.17 cfs @ 11.96 hrs HW=2.12' (Free Discharge)
└**1=Culvert** (Inlet Controls 8.17 cfs @ 3.4 fps)

Pond CB2: PROPOSED CB

Inflow Area =	1.910 ac,	Inflow Depth =	3.22"	
Inflow =	8.09 cfs @	12.80 hrs, Volume=	0.513 af	
Outflow =	7.50 cfs @	12.88 hrs, Volume=	0.475 af,	Atten= 7%, Lag= 4.9 min
Primary =	7.50 cfs @	12.88 hrs, Volume=	0.475 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.63' @ 12.88 hrs Surf.Area= 1,409 sf Storage= 3,544 cf
Plug-Flow detention time= 32.5 min calculated for 0.474 af (92% of inflow)
Center-of-Mass det. time= 11.7 min (801.9 - 790.2)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.47 cfs @ 12.88 hrs HW=407.63' (Free Discharge)
└**1=Culvert** (Inlet Controls 7.47 cfs @ 4.2 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	1.28"	
Inflow =	43.43 cfs @	12.67 hrs, Volume=	6.778 af	
Outflow =	41.54 cfs @	12.81 hrs, Volume=	6.586 af,	Atten= 4%, Lag= 8.3 min
Primary =	34.05 cfs @	12.81 hrs, Volume=	6.324 af	
Secondary =	7.50 cfs @	12.81 hrs, Volume=	0.262 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.54' @ 12.81 hrs Surf.Area= 13,335 sf Storage= 56,966 cf
Plug-Flow detention time= 48.8 min calculated for 6.564 af (97% of inflow)
Center-of-Mass det. time= 39.2 min (878.2 - 839.0)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=33.95 cfs @ 12.81 hrs HW=416.54'. (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 19.99 cfs @ 5.6 fps)
- **2=Orifice/Grate** (Weir Controls 5.25 cfs @ 1.5 fps)
- **3=Culvert** (Inlet Controls 8.71 cfs @ 11.1 fps)

Secondary OutFlow Max=7.44 cfs @ 12.81 hrs HW=416.54' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 7.44 cfs @ 1.7 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.230 ac,	Inflow Depth =	1.22"	
Inflow =	27.28 cfs @	12.53 hrs, Volume=	3.484 af	
Outflow =	26.57 cfs @	12.62 hrs, Volume=	3.483 af,	Atten= 3%, Lag= 5.4 min
Primary =	26.57 cfs @	12.62 hrs, Volume=	3.483 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 410.51' @ 12.62 hrs Surf.Area= 1,385 sf Storage= 1,954 cf
Plug-Flow detention time= 0.4 min calculated for 3.472 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (833.9 - 833.5)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=26.54 cfs @ 12.62 hrs HW=410.50' (Free Discharge)
└─**1=Culvert** (Inlet Controls 26.54 cfs @ 8.4 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth =	1.06"	
Inflow =	5.75 cfs @	12.16 hrs, Volume=	0.433 af	
Outflow =	5.74 cfs @	12.16 hrs, Volume=	0.433 af,	Atten= 0%, Lag= 0.0 min
Primary =	5.74 cfs @	12.16 hrs, Volume=	0.433 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.18' @ 12.16 hrs Surf.Area= 20 sf Storage= 24 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=5.70 cfs @ 12.16 hrs HW=329.18' (Free Discharge)
└─**1=Culvert** (Inlet Controls 5.70 cfs @ 3.3 fps)

Pond MH1: PROPOSED MH

Inflow Area =	63.710 ac,	Inflow Depth =	1.19"	
Inflow =	22.43 cfs @	12.65 hrs, Volume=	6.320 af	
Outflow =	22.44 cfs @	12.65 hrs, Volume=	6.319 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.44 cfs @	12.65 hrs, Volume=	6.319 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.26' @ 12.65 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.0 min calculated for 6.319 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (887.8 - 887.8)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.44 cfs @ 12.65 hrs HW=3.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.44 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac,	Inflow Depth =	1.19"	
Inflow =	9.38 cfs @	12.22 hrs, Volume=	0.791 af	
Outflow =	9.38 cfs @	12.22 hrs, Volume=	0.790 af,	Atten= 0%, Lag= 0.0 min
Primary =	9.38 cfs @	12.22 hrs, Volume=	0.790 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 422.45' @ 12.22 hrs Surf.Area= 20 sf Storage= 49 cf
Plug-Flow detention time= 0.4 min calculated for 0.788 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (822.1 - 821.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.30 cfs @ 12.22 hrs HW=422.44' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.30 cfs @ 3.8 fps)

Pond UP2P: CULVERT

Inflow Area =	7.360 ac,	Inflow Depth =	1.24"	
Inflow =	6.49 cfs @	12.43 hrs, Volume=	0.760 af	
Outflow =	6.35 cfs @	12.50 hrs, Volume=	0.752 af,	Atten= 2%, Lag= 4.1 min
Primary =	6.35 cfs @	12.50 hrs, Volume=	0.752 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 433.38' @ 12.50 hrs Surf.Area= 1,721 sf Storage= 1,805 cf
Plug-Flow detention time= 8.6 min calculated for 0.752 af (99% of inflow)
Center-of-Mass det. time= 5.2 min (837.6 - 832.5)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=6.35 cfs @ 12.50 hrs HW=433.37' (Free Discharge)
↑**1=Culvert** (Inlet Controls 6.35 cfs @ 3.7 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	1.19"	
Inflow =	27.37 cfs @	12.45 hrs, Volume=	3.224 af	
Outflow =	26.02 cfs @	12.55 hrs, Volume=	3.219 af,	Atten= 5%, Lag= 6.0 min
Primary =	26.02 cfs @	12.55 hrs, Volume=	3.219 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 428.87' @ 12.55 hrs Surf.Area= 1,720 sf Storage= 4,150 cf
Plug-Flow detention time= 2.0 min calculated for 3.209 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (836.3 - 834.9)

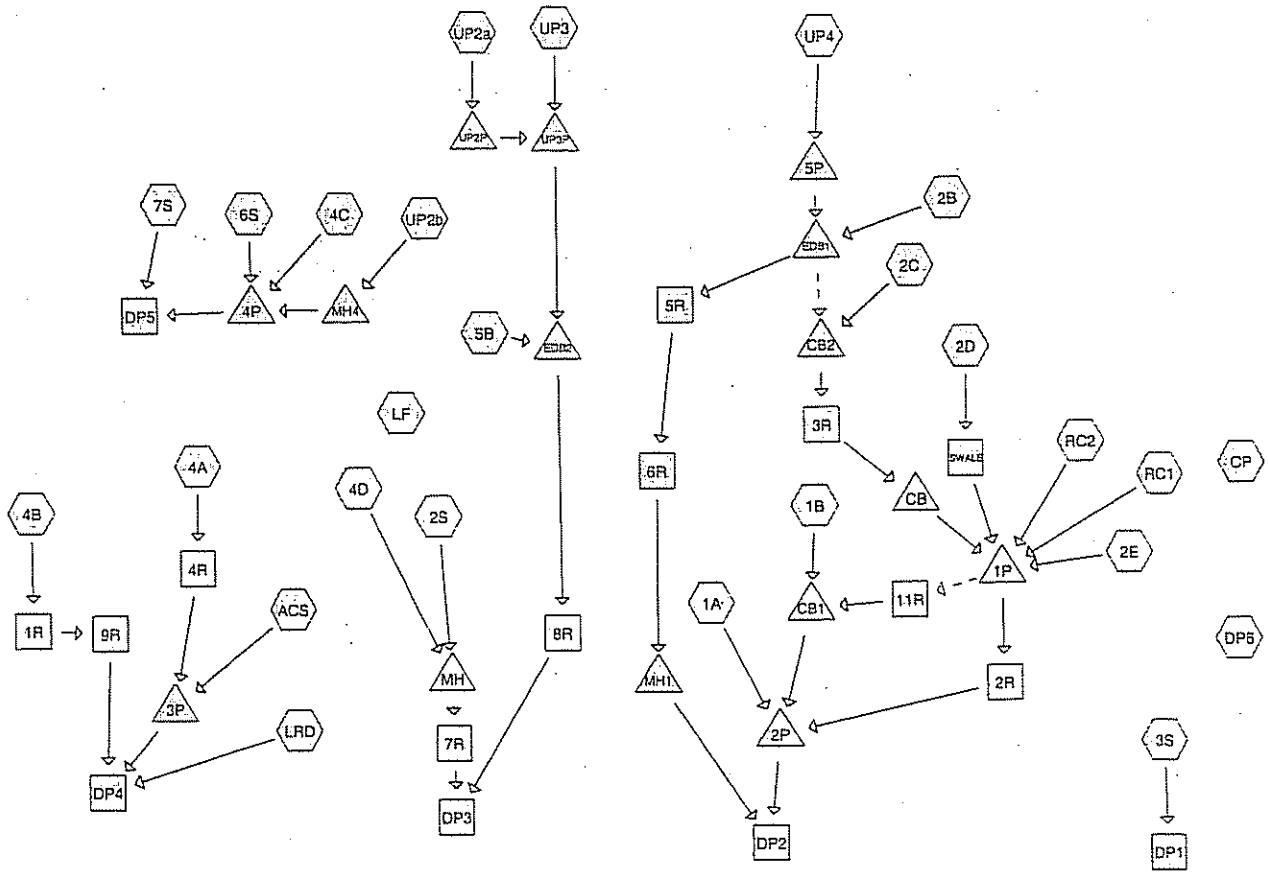
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=26.02 cfs @ 12.55 hrs HW=428.87' (Free Discharge)
└**1=Culvert** (Inlet Controls 26.02 cfs @ 8.3 fps)

Proposed Drainage Conditions - Phase 1
25-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-construction
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=1.18"
Flow Length=310' Tc=13.5 min CN=63 Runoff=6.48 cfs 0.380 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=2.61"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=11.03 cfs 0.483 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.69"
Flow Length=330' Tc=17.1 min CN=83 Runoff=13.24 cfs 0.852 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=2.17"
Flow Length=340' Tc=22.7 min CN=77 Runoff=4.66 cfs 0.346 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=3.06"
Flow Length=310' Tc=20.4 min CN=87 Runoff=28.08 cfs 2.018 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=2.44"
Flow Length=60' Tc=4.0 min CN=80 Runoff=1.57 cfs 0.065 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=1.57"
Flow Length=840' Tc=21.3 min CN=69 Runoff=8.52 cfs 0.619 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.94"
Flow Length=460' Tc=18.1 min CN=59 Runoff=1.96 cfs 0.143 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=2.43"
Flow Length=510' Tc=7.8 min CN=80 Runoff=1.81 cfs 0.085 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=1.86"
Flow Length=620' Tc=19.3 min CN=73 Runoff=2.29 cfs 0.155 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=2.34"
Flow Length=250' Tc=16.7 min CN=79 Runoff=6.83 cfs 0.430 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=1.06"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.34 cfs 0.016 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=2.51"
Flow Length=210' Tc=24.8 min CN=81 Runoff=4.51 cfs 0.355 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=1.95"
Flow Length=80' Tc=5.2 min CN=74 Runoff=5.89 cfs 0.252 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=1.87"
Flow Length=95' Tc=8.4 min CN=73 Runoff=4.23 cfs 0.200 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=1.24"
Flow Length=465' Tc=13.8 min CN=64 Runoff=3.70 cfs 0.218 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=4.10"
Flow Length=110' Tc=1.9 min CN=98 Runoff=4.90 cfs 0.236 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.78"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.32 cfs 0.013 af

Subcatchment LF: landfill area Runoff Area=14.330 ac Runoff Depth=4.10"
Flow Length=1,250' Tc=4.5 min CN=98 Runoff=98.59 cfs 4.896 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=1.24"
Flow Length=401' Tc=12.0 min CN=64 Runoff=4.06 cfs 0.223 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=3.46"
Flow Length=245' Tc=3.9 min CN=91 Runoff=9.57 cfs 0.430 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=3.46"
Flow Length=245' Tc=3.9 min CN=91 Runoff=16.06 cfs 0.722 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.77"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=9.48 cfs 1.086 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.71"
Flow Length=750' Tc=26.5 min CN=71 Runoff=13.78 cfs 1.139 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.70"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=31.17 cfs 3.561 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.76"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=61.70 cfs 8.774 af

Reach 1R: Bottom Swale Peak Depth=0.18' Max Vel=2.9 fps Inflow=2.29 cfs 0.155 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.28 cfs 0.155 af

Reach 2R: 18" Peak Depth=0.68' Max Vel=25.5 fps Inflow=20.07 cfs 4.147 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=20.03 cfs 4.145 af

Reach 3R: CULVERT Peak Depth=0.94' Max Vel=9.9 fps Inflow=14.32 cfs 1.153 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=14.30 cfs 1.153 af

Reach 4R: Bottom Swale Peak Depth=0.17' Max Vel=2.4 fps Inflow=1.81 cfs 0.085 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=1.80 cfs 0.085 af

~~**Reach 5R: 24" CULVERT** Peak Depth=2.50' Max Vel=5.0 fps Inflow=46.71 cfs 8.451 af~~
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.36 cfs 8.447 af

Reach 6R: 30 "RCP Peak Depth=1.08' Max Vel=11.1 fps Inflow=22.36 cfs 8.447 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=22.51 cfs 8.445 af

Reach 7R: 24" Peak Depth=0.45' Max Vel=16.4 fps Inflow=8.62 cfs 0.635 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=8.60 cfs 0.635 af

Reach 8R: 24 CULVERT Peak Depth=1.03' Max Vel=20.6 fps Inflow=33.42 cfs 4.987 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=33.40 cfs 4.980 af

Reach 9R: 18" culvert Peak Depth=0.27' Max Vel=10.7 fps Inflow=2.28 cfs 0.155 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=2.28 cfs 0.155 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.16' Max Vel=2.7 fps Inflow=1.96 cfs 0.143 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.96 cfs 0.143 af

Reach DP2: CULVERT Peak Depth=0.98' Max Vel=22.4 fps Inflow=39.85 cfs 12.666 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=39.85 cfs 12.663 af

Reach DP3: 30" Peak Depth=0.89' Max Vel=22.4 fps Inflow=34.95 cfs 5.616 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=34.95 cfs 5.615 af

Reach DP4: Inflow=6.27 cfs 0.576 af
Outflow=6.27 cfs 0.576 af

Reach DP5: STREAM Peak Depth=0.14' Max Vel=3.1 fps Inflow=4.41 cfs 0.480 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=4.29 cfs 0.479 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.91' Max Vel=5.3 fps Inflow=28.08 cfs 2.018 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=27.72 cfs 2.015 af

Pond 1P: DETENTION BASIN 1 Peak Elev=406.18' Storage=58,222 cf Inflow=39.77 cfs 4.384 af
Primary=20.07 cfs 4.147 af Secondary=0.00 cfs 0.000 af Outflow=20.07 cfs 4.147 af

Pond 2P: DETENTION BASIN 2 Peak Elev=326.79' Storage=60,040 cf Inflow=22.90 cfs 5.008 af
Primary=17.48 cfs 4.221 af Secondary=0.00 cfs 0.000 af Outflow=17.48 cfs 4.221 af

Pond 3P: DETENTION BASIN 3 Peak Elev=319.95' Storage=7,226 cf Inflow=5.11 cfs 0.303 af
Outflow=0.32 cfs 0.198 af

Pond 4P: DETENTION BASIN 4 Peak Elev=411.63' Storage=67,042 cf Inflow=20.10 cfs 1.819 af
Outflow=0.44 cfs 0.280 af

~~**Pond 5P: ROADSIDE POND UPGRAD. OF E** Peak Elev=424.02' Storage=6,495 cf Inflow=61.70 cfs 8.774 af~~
Outflow=60.32 cfs 8.774 af

Pond CB: PROPOSED CB Peak Elev=406.03' Storage=48 cf Inflow=14.30 cfs 1.153 af
24.0" x 300.0' Culvert Outflow=14.39 cfs 1.152 af

Pond CB1: proposed cb Peak Elev=2.32' Storage=28 cf Inflow=11.03 cfs 0.483 af
36.0" x 500.0' Culvert Outflow=11.02 cfs 0.483 af

Pond CB2: PROPOSED CB Peak Elev=409.97' Storage=7,452 cf Inflow=15.90 cfs 1.191 af
18.0" x 100.0' Culvert Outflow=14.32 cfs 1.153 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.78' Storage=60,139 cf Inflow=61.95 cfs 9.625 af
Primary=46.71 cfs 8.451 af Secondary=15.01 cfs 0.846 af Outflow=61.73 cfs 9.296 af

Pond EDB2: DETENTION BASIN ADJACEN Peak Elev=412.55' Storage=7,144 cf Inflow=35.46 cfs 4.987 af
24.0" x 80.0' Culvert Outflow=33.42 cfs 4.987 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.48' Storage=30 cf Inflow=8.63 cfs 0.635 af
24.0" x 185.0' Culvert Outflow=8.62 cfs 0.635 af

Pond MH1: PROPOSED MH Peak Elev=3.27' Storage=39 cf Inflow=22.51 cfs 8.445 af
30.0" x 80.0' Culvert Outflow=22.52 cfs 8.444 af

Pond MH4: PROPOSED MH Peak Elev=422.93' Storage=59 cf Inflow=13.78 cfs 1.139 af
24.0" x 300.0' Culvert Outflow=13.78 cfs 1.138 af

Pond UP2P: CULVERT Peak Elev=434.02' Storage=2,696 cf Inflow=9.48 cfs 1.086 af
18.0" x 75.0' Culvert Outflow=8.99 cfs 1.077 af

Pond UP3P: ROAD CULVERT Peak Elev=431.29' Storage=11,880 cf Inflow=39.94 cfs 4.638 af
24.0" x 95.0' Culvert Outflow=34.13 cfs 4.632 af

Total Runoff Area = 158.800 ac Runoff Volume = 27.694 af Average Runoff Depth = 2.09"

Subcatchment 1A: south central section btw. gorges

Runoff = 6.48 cfs @ 12.07 hrs, Volume= 0.380 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 11.03 cfs @ 11.96 hrs, Volume= 0.483 af, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 13.24 cfs @ 12.09 hrs, Volume= 0.852 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 4.66 cfs @ 12.16 hrs, Volume= 0.346 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 28.08 cfs @ 12.13 hrs, Volume= 2.018 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 1.57 cfs @ 11.95 hrs, Volume= 0.065 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 8.52 cfs @ 12.15 hrs, Volume= 0.619 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 1.96 cfs @ 12.13 hrs, Volume= 0.143 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.81 cfs @ 11.99 hrs, Volume= 0.085 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 2.29 cfs @ 12.12 hrs, Volume= 0.155 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	500	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.3	620	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 6.83 cfs @ 12.09 hrs, Volume= 0.430 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.34 cfs @ 12.00 hrs, Volume= 0.016 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 4.51 cfs @ 12.18 hrs, Volume= 0.355 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 5.89 cfs @ 11.96 hrs, Volume= 0.252 af, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 4.23 cfs @ 12.00 hrs, Volume= 0.200 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 3.70 cfs @ 12.07 hrs, Volume= 0.218 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 4.90 cfs @ 11.91 hrs, Volume= 0.236 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.32 cfs @ 11.94 hrs, Volume= 0.013 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LF: landfill area

Runoff = 98.59 cfs @ 11.95 hrs, Volume= 4.896 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
14.330	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	150	0.3300	4.2		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
3.9	1,100	0.0540	4.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	1,250	Total			

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 4.06 cfs @ 12.05 hrs, Volume= 0.223 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 9.57 cfs @ 11.94 hrs, Volume= 0.430 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 16.06 cfs @ 11.94 hrs, Volume= 0.722 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 9.48 cfs @ 12.42 hrs, Volume= 1.086 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 13.78 cfs @ 12.21 hrs, Volume= 1.139 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 31.17 cfs @ 12.43 hrs, Volume= 3.561 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 61.70 cfs @ 12.64 hrs, Volume= 8.774 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 1.86"
Inflow = 2.29 cfs @ 12.12 hrs, Volume= 0.155 af
Outflow = 2.28 cfs @ 12.13 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.18' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 3.52"
Inflow = 20.07 cfs @ 12.37 hrs, Volume= 4.147 af
Outflow = 20.03 cfs @ 12.38 hrs, Volume= 4.145 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 25.5 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 12.5 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.68' @ 12.38 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 7.25"
Inflow = 14.32 cfs @ 12.91 hrs, Volume= 1.153 af
Outflow = 14.30 cfs @ 12.93 hrs, Volume= 1.153 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.9 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.8 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.94' @ 12.92 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 2.43"
Inflow = 1.81 cfs @ 11.99 hrs, Volume= 0.085 af
Outflow = 1.80 cfs @ 11.99 hrs, Volume= 0.085 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.17' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 1.59"
Inflow = 46.71 cfs @ 12.75 hrs, Volume= 8.451 af
Outflow = 22.36 cfs @ 12.45 hrs, Volume= 8.447 af, Atten= 52%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.40 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.59"
Inflow = 22.36 cfs @ 12.45 hrs, Volume= 8.447 af
Outflow = 22.51 cfs @ 12.50 hrs, Volume= 8.445 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.4 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.08' @ 12.50 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 1.55"
Inflow = 8.62 cfs @ 12.15 hrs, Volume= 0.635 af
Outflow = 8.60 cfs @ 12.16 hrs, Volume= 0.635 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.4 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 7.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.45' @ 12.15 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 1.75"
Inflow = 33.42 cfs @ 12.79 hrs, Volume= 4.987 af
Outflow = 33.40 cfs @ 12.81 hrs, Volume= 4.980 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 20.6 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 9.1 fps, Avg. Travel Time= 1.8 min

Peak Depth= 1.03' @ 12.80 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 1.000 ac, Inflow Depth = 1.86"
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.155 af
Outflow = 2.28 cfs @ 12.13 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.7 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.27' @ 12.13 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.94"
Inflow = 1.96 cfs @ 12.13 hrs, Volume= 0.143 af
Outflow = 1.96 cfs @ 12.13 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.16' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 1.81"
Inflow = 39.85 cfs @ 13.29 hrs, Volume= 12.666 af
Outflow = 39.85 cfs @ 13.27 hrs, Volume= 12.663 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.7 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.98' @ 13.27 hrs
Capacity at bank full= 123.05 cfs
Inlet Invert= 323.40', Outlet Invert= 309.90'
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 1.72"
Inflow = 34.95 cfs @ 12.74 hrs, Volume= 5.616 af
Outflow = 34.95 cfs @ 12.74 hrs, Volume= 5.615 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.89' @ 12.74 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 5.670 ac, Inflow Depth = 1.22"
Inflow = 6.27 cfs @ 12.07 hrs, Volume= 0.576 af
Outflow = 6.27 cfs @ 12.07 hrs, Volume= 0.576 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 13.020 ac, Inflow Depth = 0.44"
Inflow = 4.41 cfs @ 12.00 hrs, Volume= 0.480 af
Outflow = 4.29 cfs @ 12.02 hrs, Volume= 0.479 af, Atten= 3%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.14' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 3.06"
Inflow = 28.08 cfs @ 12.13 hrs, Volume= 2.018 af
Outflow = 27.72 cfs @ 12.15 hrs, Volume= 2.015 af, Atten= 1%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.3 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 3.1 min

Peak Depth= 0.91' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 3.72"
Inflow = 39.77 cfs @ 11.96 hrs, Volume= 4.384 af
Outflow = 20.07 cfs @ 12.37 hrs, Volume= 4.147 af, Atten= 50%, Lag= 24.7 min
Primary = 20.07 cfs @ 12.37 hrs, Volume= 4.147 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.18' @ 12.37 hrs Surf.Area= 11,944 sf Storage= 58,222 cf
Plug-Flow detention time= 83.6 min calculated for 4.133 af (94% of inflow)
Center-of-Mass det. time= 64.5 min (838.5 - 774.1)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=19.97 cfs @ 12.37 hrs HW=406.17' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 16.36 cfs @ 4.7 fps)
└─**3=Orifice/Grate** (Orifice Controls 3.61 cfs @ 13.5 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	2.97"	
Inflow =	22.90 cfs @	12.35 hrs, Volume=	5.008 af	
Outflow =	17.48 cfs @	13.29 hrs, Volume=	4.221 af,	Atten= 24%, Lag= 56.0 min
Primary =	17.48 cfs @	13.29 hrs, Volume=	4.221 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.79' @ 13.29 hrs Surf.Area= 17,135 sf Storage= 60,040 cf
Plug-Flow detention time= 92.3 min calculated for 4.221 af (84% of inflow)
Center-of-Mass det. time= 44.2 min (875.6 - 831.4)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=17.47 cfs @ 13.29 hrs HW=326.79' (Free Discharge)
└─**2=Orifice/Grate** (Orifice Controls 2.02 cfs @ 10.3 fps)
└─**3=Orifice/Grate** (Orifice Controls 15.46 cfs @ 4.9 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area =	2.520 ac, Inflow Depth = 1.44"		
Inflow =	5.11 cfs @ 12.04 hrs, Volume=	0.303 af	
Outflow =	0.32 cfs @ 13.76 hrs, Volume=	0.198 af, Atten= 94%, Lag= 102.8 min	
Primary =	0.32 cfs @ 13.76 hrs, Volume=	0.198 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 319.95' @ 13.76 hrs Surf.Area= 4,177 sf Storage= 7,226 cf
Plug-Flow detention time= 219.4 min calculated for 0.197 af (65% of inflow)
Center-of-Mass det. time= 141.2 min (949.6 - 808.4)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.32 cfs @ 13.76 hrs HW=319.95' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.5 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area =	11.740 ac, Inflow Depth = 1.86"		
Inflow =	20.10 cfs @ 12.15 hrs, Volume=	1.819 af	
Outflow =	0.44 cfs @ 20.00 hrs, Volume=	0.280 af, Atten= 98%, Lag= 470.8 min	
Primary =	0.44 cfs @ 20.00 hrs, Volume=	0.280 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 411.63' @ 20.00 hrs Surf.Area= 23,704 sf Storage= 67,042 cf
Plug-Flow detention time= 263.6 min calculated for 0.279 af (15% of inflow)
Center-of-Mass det. time= 159.4 min (965.5 - 806.1)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.44 cfs @ 20.00 hrs HW=411.63' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.44 cfs @ 9.0 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area =	59.910 ac,	Inflow Depth =	1.76"	
Inflow =	61.70 cfs @	12.64 hrs, Volume=	8.774 af	
Outflow =	60.32 cfs @	12.72 hrs, Volume=	8.774 af,	Atten= 2%, Lag= 4.9 min
Primary =	60.32 cfs @	12.72 hrs, Volume=	8.774 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 424.02' @ 12.72 hrs Surf.Area= 3,024 sf Storage= 6,495 cf
Plug-Flow detention time= 0.6 min calculated for 8.774 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (837.7 - 837.1)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

~~**Primary OutFlow** Max=60.24 cfs @ 12.72 hrs HW=424.01' (Free Discharge)~~
- **1=Culvert** (Inlet Controls 30.12 cfs @ 9.6 fps)
- **2=Culvert** (Inlet Controls 30.12 cfs @ 9.6 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 7.24"
Inflow = 14.30 cfs @ 12.93 hrs, Volume= 1.153 af
Outflow = 14.39 cfs @ 12.94 hrs, Volume= 1.152 af, Atten= 0%, Lag= 1.0 min
Primary = 14.39 cfs @ 12.94 hrs, Volume= 1.152 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.03' @ 12.94 hrs Surf.Area= 12 sf Storage= 48 cf
Plug-Flow detention time= 0.3 min calculated for 1.148 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (790.4 - 790.3)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=14.35 cfs @ 12.94 hrs HW=406.02' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 14.35 cfs @ 4.6 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 2.61"
Inflow = 11.03 cfs @ 11.96 hrs, Volume= 0.483 af
Outflow = 11.02 cfs @ 11.96 hrs, Volume= 0.483 af, Atten= 0%, Lag= 0.0 min
Primary = 11.02 cfs @ 11.96 hrs, Volume= 0.483 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.32' @ 11.96 hrs Surf.Area= 12 sf Storage= 28 cf
Plug-Flow detention time= 0.5 min calculated for 0.481 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (776.2 - 776.0)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=10.79 cfs @ 11.96 hrs HW=2.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.79 cfs @ 3.6 fps)

Pond CB2: PROPOSED CB

Inflow Area =	1.910 ac,	Inflow Depth =	7.49"	
Inflow =	15.90 cfs @	12.73 hrs, Volume=	1.191 af	
Outflow =	14.32 cfs @	12.91 hrs, Volume=	1.153 af,	Atten= 10%, Lag= 10.9 min
Primary =	14.32 cfs @	12.91 hrs, Volume=	1.153 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 409.97' @ 12.91 hrs Surf.Area= 1,993 sf Storage= 7,452 cf
Plug-Flow detention time= 18.1 min calculated for 1.149 af (96% of inflow)
Center-of-Mass det. time= 8.8 min (789.3 - 780.5)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=14.30 cfs @ 12.91 hrs HW=409.97' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 14.30 cfs @ 8.1 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	1.81"	
Inflow =	61.95 cfs @	12.71 hrs, Volume=	9.625 af	
Outflow =	61.73 cfs @	12.75 hrs, Volume=	9.296 af,	Atten= 0%, Lag= 2.5 min
Primary =	46.71 cfs @	12.75 hrs, Volume=	8.451 af	
Secondary =	15.01 cfs @	12.75 hrs, Volume=	0.846 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
~~Peak Elev= 416.78' @ 12.75 hrs Surf.Area= 13,886 sf Storage= 60,139 cf~~
Plug-Flow detention time= 41.7 min calculated for 9.265 af (96% of inflow)
Center-of-Mass det. time= 30.1 min (863.0 - 832.9)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=46.69 cfs @ 12.75 hrs HW=416.78' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 21.67 cfs @ 6.1 fps)
- **2=Orifice/Grate** (Weir Controls 16.13 cfs @ 2.2 fps)
- **3=Culvert** (Inlet Controls 8.88 cfs @ 11.3 fps)

Secondary OutFlow Max=15.00 cfs @ 12.75 hrs HW=416.78' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 15.00 cfs @ 2.2 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 1.75"
Inflow = 35.46 cfs @ 12.60 hrs, Volume= 4.987 af
Outflow = 33.42 cfs @ 12.79 hrs, Volume= 4.987 af, Atten= 6%, Lag= 11.6 min
Primary = 33.42 cfs @ 12.79 hrs, Volume= 4.987 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.55' @ 12.79 hrs Surf.Area= 3,685 sf Storage= 7,144 cf
Plug-Flow detention time= 1.3 min calculated for 4.970 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (828.8 - 827.5)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=33.41 cfs @ 12.79 hrs HW=412.55' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 33.41 cfs @ 10.6 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth =	1.55"	
Inflow =	8.63 cfs @	12.15 hrs, Volume=	0.635 af	
Outflow =	8.62 cfs @	12.15 hrs, Volume=	0.635 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.62 cfs @	12.15 hrs, Volume=	0.635 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.48' @ 12.15 hrs Surf.Area= 20 sf Storage= 30 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.61 cfs @ 12.15 hrs HW=329.47' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.61 cfs @ 3.7 fps)

Pond MH1: PROPOSED MH

Inflow Area =	63.710 ac,	Inflow Depth =	1.59"	
Inflow =	22.51 cfs @	12.50 hrs, Volume=	8.445 af	
Outflow =	22.52 cfs @	12.50 hrs, Volume=	8.444 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.52 cfs @	12.50 hrs, Volume=	8.444 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.27' @ 12.50 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.0 min calculated for 8.444 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (891.6 - 891.5)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.51 cfs @ 12.50 hrs HW=3.27' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.51 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area = 7.990 ac, Inflow Depth = 1.71"
Inflow = 13.78 cfs @ 12.21 hrs, Volume= 1.139 af
Outflow = 13.78 cfs @ 12.21 hrs, Volume= 1.138 af, Atten= 0%, Lag= 0.0 min
Primary = 13.78 cfs @ 12.21 hrs, Volume= 1.138 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 422.93' @ 12.21 hrs Surf.Area= 20 sf Storage= 59 cf
Plug-Flow detention time= 0.3 min calculated for 1.138 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (814.6 - 814.5)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=13.69 cfs @ 12.21 hrs HW=422.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 13.69 cfs @ 4.4 fps)

Pond UP2P: CULVERT

Inflow Area = 7.360 ac, Inflow Depth = 1.77"
Inflow = 9.48 cfs @ 12.42 hrs, Volume= 1.086 af
Outflow = 8.99 cfs @ 12.53 hrs, Volume= 1.077 af, Atten= 5%, Lag= 6.3 min
Primary = 8.99 cfs @ 12.53 hrs, Volume= 1.077 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.02' @ 12.53 hrs Surf.Area= 2,450 sf Storage= 2,696 cf
Plug-Flow detention time= 7.7 min calculated for 1.074 af (99% of inflow)
Center-of-Mass det. time= 4.9 min (830.3 - 825.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.97 cfs @ 12.53 hrs HW=434.02' (Free Discharge)
↑**1=Culvert** (Inlet Controls 8.97 cfs @ 5.1 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	1.71"	
Inflow =	39.94 cfs @	12.44 hrs,	Volume=	4.638 af
Outflow =	34.13 cfs @	12.63 hrs,	Volume=	4.632 af, Atten= 15%, Lag= 11.4 min
Primary =	34.13 cfs @	12.63 hrs,	Volume=	4.632 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 431.29' @ 12.63 hrs Surf.Area= 4,986 sf Storage= 11,880 cf
Plug-Flow detention time= 2.9 min calculated for 4.632 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (830.1 - 827.6)

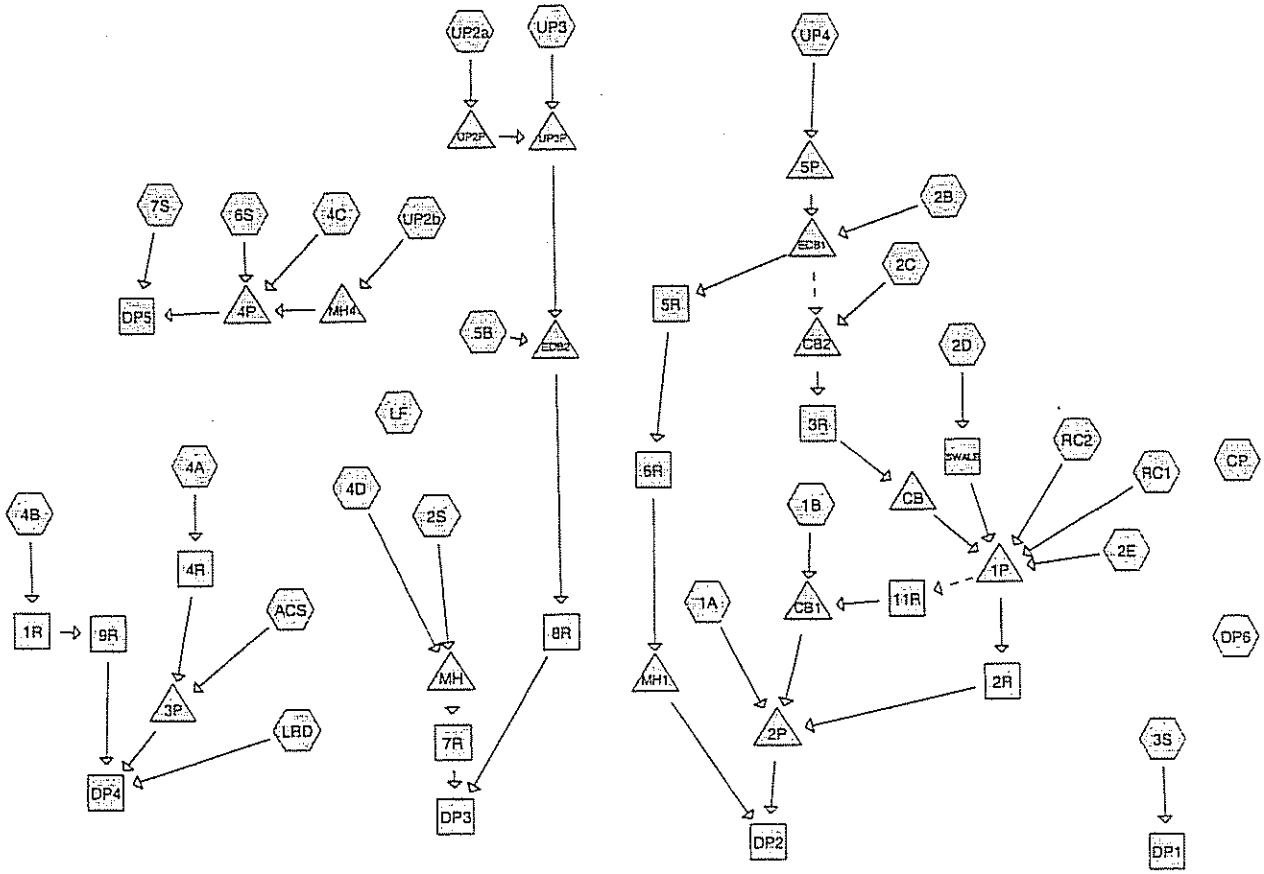
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=34.10 cfs @ 12.63 hrs HW=431.28' (Free Discharge)
└─**1=Culvert** (Inlet Controls 34.10 cfs @ 10.9 fps)

Proposed Drainage Conditions - Phase 1
50-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-construction
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=1.35"
Flow Length=310' Tc=13.5 min CN=63 Runoff=7.50 cfs 0.435 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=2.86"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=12.03 cfs 0.530 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.94"
Flow Length=330' Tc=17.1 min CN=83 Runoff=14.44 cfs 0.932 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=2.41"
Flow Length=340' Tc=22.7 min CN=77 Runoff=5.15 cfs 0.383 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=3.32"
Flow Length=310' Tc=20.4 min CN=87 Runoff=30.40 cfs 2.194 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=2.68"
Flow Length=60' Tc=4.0 min CN=80 Runoff=1.72 cfs 0.072 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=1.77"
Flow Length=840' Tc=21.3 min CN=69 Runoff=9.65 cfs 0.698 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=1.09"
Flow Length=460' Tc=18.1 min CN=59 Runoff=2.33 cfs 0.166 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=2.68"
Flow Length=510' Tc=7.8 min CN=80 Runoff=1.98 cfs 0.094 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=2.08"
Flow Length=620' Tc=19.3 min CN=73 Runoff=2.56 cfs 0.173 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=2.58"
Flow Length=250' Tc=16.7 min CN=79 Runoff=7.52 cfs 0.474 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=1.22"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.39 cfs 0.018 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=2.75"
Flow Length=210' Tc=24.8 min CN=81 Runoff=4.95 cfs 0.390 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=2.17"
Flow Length=80' Tc=5.2 min CN=74 Runoff=6.54 cfs 0.280 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=2.09"
Flow Length=95' Tc=8.4 min CN=73 Runoff=4.71 cfs 0.223 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=1.42"
Flow Length=465' Tc=13.8 min CN=64 Runoff=4.26 cfs 0.248 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=4.37"
Flow Length=110' Tc=1.9 min CN=98 Runoff=5.22 cfs 0.251 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.92"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.39 cfs 0.015 af

Subcatchment LF: landfill area Runoff Area=14.330 ac Runoff Depth=4.37"
Flow Length=1,250' Tc=4.5 min CN=98 Runoff=104.95 cfs 5.218 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=1.42"
Flow Length=401' Tc=12.0 min CN=64 Runoff=4.67 cfs 0.254 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=3.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=10.27 cfs 0.464 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=3.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=17.23 cfs 0.778 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.98"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=10.65 cfs 1.215 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.92"
Flow Length=750' Tc=26.5 min CN=71 Runoff=15.51 cfs 1.277 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.90"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=35.12 cfs 3.993 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.97"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=69.36 cfs 9.819 af

Reach 1R: Bottom Swale Peak Depth=0.19' Max Vel=3.0 fps Inflow=2.56 cfs 0.173 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.54 cfs 0.173 af

Reach 2R: 18" Peak Depth=0.74' Max Vel=26.5 fps Inflow=23.19 cfs 4.676 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=23.19 cfs 4.674 af

Reach 3R: CULVERT Peak Depth=1.01' Max Vel=10.2 fps Inflow=16.18 cfs 1.438 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=16.17 cfs 1.438 af

Reach 4R: Bottom Swale Peak Depth=0.18' Max Vel=2.5 fps Inflow=1.98 cfs 0.094 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=1.97 cfs 0.094 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.1 fps Inflow=50.49 cfs 9.266 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=24.07 cfs 9.262 af

Reach 6R: 30 "RCP Peak Depth=1.13' Max Vel=11.2 fps Inflow=24.07 cfs 9.262 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=23.97 cfs 9.260 af

Reach 7R: 24" Peak Depth=0.48' Max Vel=17.0 fps Inflow=9.76 cfs 0.716 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=9.74 cfs 0.716 af

Reach 8R: 24 CULVERT Peak Depth=1.06' Max Vel=20.9 fps Inflow=35.33 cfs 5.583 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=35.31 cfs 5.576 af

Reach 9R: 18" culvert Peak Depth=0.28' Max Vel=11.1 fps Inflow=2.54 cfs 0.173 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=2.54 cfs 0.173 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.18' Max Vel=2.9 fps Inflow=2.33 cfs 0.166 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.33 cfs 0.165 af

Reach DP2: CULVERT Peak Depth=1.01' Max Vel=22.7 fps Inflow=42.33 cfs 14.104 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=42.33 cfs 14.101 af

Reach DP3: 30" Peak Depth=0.91' Max Vel=22.8 fps Inflow=36.83 cfs 6.292 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=36.83 cfs 6.291 af

Reach DP4: Inflow=7.14 cfs 0.642 af
Outflow=7.14 cfs 0.642 af

Reach DP5: STREAM Peak Depth=0.15' Max Vel=3.2 fps Inflow=4.92 cfs 0.520 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=4.78 cfs 0.519 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.95' Max Vel=5.4 fps Inflow=30.40 cfs 2.194 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=30.02 cfs 2.190 af

Pond 1P: DETENTION BASIN 1 Peak Elev=406.42' Storage=61,336 cf Inflow=43.23 cfs 4.941 af
Primary=23.19 cfs 4.676 af Secondary=0.00 cfs 0.000 af Outflow=23.19 cfs 4.676 af

Pond 2P: DETENTION BASIN 2 Peak Elev=327.15' Storage=66,139 cf Inflow=26.52 cfs 5.638 af
Primary=19.96 cfs 4.845 af Secondary=0.00 cfs 0.000 af Outflow=19.96 cfs 4.845 af

Pond 3P: DETENTION BASIN 3 Peak Elev=320.20' Storage=8,369 cf Inflow=5.82 cfs 0.342 af
Outflow=0.34 cfs 0.215 af

Pond 4P: DETENTION BASIN 4 Peak Elev=412.02' Storage=75,473 cf Inflow=22.48 cfs 2.030 af
Outflow=0.48 cfs 0.297 af

Pond 5P: ROADSIDE POND UPGRAD. OF Peak Elev=424.92' Storage=10,097 cf Inflow=69.36 cfs 9.819 af
Outflow=66.06 cfs 9.818 af

Pond CB: PROPOSED CB Peak Elev=406.32' Storage=52 cf Inflow=16.17 cfs 1.438 af
24.0" x 300.0' Culvert Outflow=16.26 cfs 1.437 af

Pond CB1: proposed cb Peak Elev=2.39' Storage=29 cf Inflow=12.03 cfs 0.530 af
36.0" x 500.0' Culvert Outflow=12.02 cfs 0.529 af

Pond CB2: PROPOSED CB Peak Elev=410.86' Storage=9,442 cf Inflow=17.96 cfs 1.477 af
18.0" x 100.0' Culvert Outflow=16.18 cfs 1.438 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.84' Storage=60,941 cf Inflow=67.70 cfs 10.750 af
Primary=50.49 cfs 9.266 af Secondary=17.05 cfs 1.094 af Outflow=67.54 cfs 10.360 af

Pond EDB2: DETENTION BASIN ADJACE Peak Elev=413.21' Storage=10,019 cf Inflow=37.94 cfs 5.583 af
24.0" x 80.0' Culvert Outflow=35.33 cfs 5.583 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.59' Storage=32 cf Inflow=9.77 cfs 0.716 af
24.0" x 185.0' Culvert Outflow=9.76 cfs 0.716 af

Pond MH1: PROPOSED MH Peak Elev=3.39' Storage=41 cf Inflow=23.97 cfs 9.260 af
30.0" x 80.0' Culvert Outflow=23.98 cfs 9.259 af

Pond MH4: PROPOSED MH Peak Elev=423.20' Storage=64 cf Inflow=15.51 cfs 1.277 af
24.0" x 300.0' Culvert Outflow=15.52 cfs 1.276 af

Pond UP2P: CULVERT Peak Elev=434.20' Storage=3,376 cf Inflow=10.65 cfs 1.215 af
18.0" x 75.0' Culvert Outflow=9.62 cfs 1.206 af

Pond UP3P: ROAD CULVERT Peak Elev=432.15' Storage=16,080 cf Inflow=44.39 cfs 5.199 af
24.0" x 95.0' Culvert Outflow=36.56 cfs 5.193 af

Total Runoff Area = 158.800 ac Runoff Volume = 30.593 af Average Runoff Depth = 2.31"

Subcatchment 1A: south central section btw. gorges

Runoff = 7.50 cfs @ 12.07 hrs, Volume= 0.435 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 12.03 cfs @ 11.96 hrs, Volume= 0.530 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 14.44 cfs @ 12.09 hrs, Volume= 0.932 af, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 5.15 cfs @ 12.16 hrs, Volume= 0.383 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 30.40 cfs @ 12.13 hrs, Volume= 2.194 af, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 1.72 cfs @ 11.95 hrs, Volume= 0.072 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 9.65 cfs @ 12.15 hrs, Volume= 0.698 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 2.33 cfs @ 12.13 hrs, Volume= 0.166 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.98 cfs @ 11.99 hrs, Volume= 0.094 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 2.56 cfs @ 12.12 hrs, Volume= 0.173 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	500	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.3	620	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 7.52 cfs @ 12.09 hrs, Volume= 0.474 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.39 cfs @ 12.00 hrs, Volume= 0.018 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 4.95 cfs @ 12.18 hrs, Volume= 0.390 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 6.54 cfs @ 11.96 hrs, Volume= 0.280 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 4.71 cfs @ 12.00 hrs, Volume= 0.223 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 4.26 cfs @ 12.07 hrs, Volume= 0.248 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 5.22 cfs @ 11.91 hrs, Volume= 0.251 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.39 cfs @ 11.94 hrs, Volume= 0.015 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LF: landfill area

Runoff = 104.95 cfs @ 11.94 hrs, Volume= 5.218 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
14.330	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	150	0.3300	4.2		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
3.9	1,100	0.0540	4.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	1,250	Total			

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 4.67 cfs @ 12.05 hrs, Volume= 0.254 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 10.27 cfs @ 11.94 hrs, Volume= 0.464 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 17.23 cfs @ 11.94 hrs, Volume= 0.778 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 10.65 cfs @ 12.42 hrs, Volume= 1.215 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 15.51 cfs @ 12.21 hrs, Volume= 1.277 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 35.12 cfs @ 12.42 hrs, Volume= 3.993 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 69.36 cfs @ 12.64 hrs, Volume= 9.819 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 2.08"
Inflow = 2.56 cfs @ 12.12 hrs, Volume= 0.173 af
Outflow = 2.54 cfs @ 12.13 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.19' @ 12.12 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 3.97"
Inflow = 23.19 cfs @ 12.36 hrs, Volume= 4.676 af
Outflow = 23.19 cfs @ 12.36 hrs, Volume= 4.674 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 26.5 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 12.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.74' @ 12.36 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 9.04"
Inflow = 16.18 cfs @ 12.97 hrs, Volume= 1.438 af
Outflow = 16.17 cfs @ 12.99 hrs, Volume= 1.438 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.2 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 4.0 fps, Avg. Travel Time= 1.2 min

Peak Depth= 1.01' @ 12.98 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 2.68"
Inflow = 1.98 cfs @ 11.99 hrs, Volume= 0.094 af
Outflow = 1.97 cfs @ 11.99 hrs, Volume= 0.094 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.18' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 1.75"
Inflow = 50.49 cfs @ 12.78 hrs, Volume= 9.266 af
Outflow = 24.07 cfs @ 12.37 hrs, Volume= 9.262 af, Atten= 52%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.40 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.74"
Inflow = 24.07 cfs @ 12.37 hrs, Volume= 9.262 af
Outflow = 23.97 cfs @ 12.37 hrs, Volume= 9.260 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.5 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.13' @ 12.37 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 1.75"
Inflow = 9.76 cfs @ 12.15 hrs, Volume= 0.716 af
Outflow = 9.74 cfs @ 12.15 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 17.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 7.2 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.48' @ 12.15 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 1.96"
Inflow = 35.33 cfs @ 12.86 hrs, Volume= 5.583 af
Outflow = 35.31 cfs @ 12.88 hrs, Volume= 5.576 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 20.9 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 9.3 fps, Avg. Travel Time= 1.8 min

Peak Depth= 1.06' @ 12.87 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 1.000 ac, Inflow Depth = 2.08"
Inflow = 2.54 cfs @ 12.13 hrs, Volume= 0.173 af
Outflow = 2.54 cfs @ 12.13 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.3 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.28' @ 12.13 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 1.09"
Inflow = 2.33 cfs @ 12.13 hrs, Volume= 0.166 af
Outflow = 2.33 cfs @ 12.13 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.18' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 2.02"
Inflow = 42.33 cfs @ 13.32 hrs, Volume= 14.104 af
Outflow = 42.33 cfs @ 13.32 hrs, Volume= 14.101 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 12.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.01' @ 13.32 hrs
Capacity at bank full= 123.05 cfs
Inlet Invert= 323.40', Outlet Invert= 309.90'
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 1.93"
Inflow = 36.83 cfs @ 12.83 hrs, Volume= 6.292 af
Outflow = 36.83 cfs @ 12.84 hrs, Volume= 6.291 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.91' @ 12.83 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 5.670 ac, Inflow Depth = 1.36"
Inflow = 7.14 cfs @ 12.07 hrs, Volume= 0.642 af
Outflow = 7.14 cfs @ 12.07 hrs, Volume= 0.642 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 13.020 ac, Inflow Depth = 0.48"
Inflow = 4.92 cfs @ 12.00 hrs, Volume= 0.520 af
Outflow = 4.78 cfs @ 12.01 hrs, Volume= 0.519 af, Atten= 3%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 1.1 min

Peak Depth= 0.15' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 3.32"
Inflow = 30.40 cfs @ 12.13 hrs, Volume= 2.194 af
Outflow = 30.02 cfs @ 12.15 hrs, Volume= 2.190 af, Atten= 1%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.4 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 3.0 min

Peak Depth= 0.95' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 4.19"
Inflow = 43.23 cfs @ 11.96 hrs, Volume= 4.941 af
Outflow = 23.19 cfs @ 12.36 hrs, Volume= 4.676 af, Atten= 46%, Lag= 23.6 min
Primary = 23.19 cfs @ 12.36 hrs, Volume= 4.676 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.42' @ 12.36 hrs Surf.Area= 12,271 sf Storage= 61,336 cf
Plug-Flow detention time= 78.1 min calculated for 4.676 af (95% of inflow)
Center-of-Mass det. time= 58.9 min (832.1 - 773.1)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=23.13 cfs @ 12.36 hrs HW=406.41' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 19.46 cfs @ 4.9 fps)
└—**3=Orifice/Grate** (Orifice Controls 3.67 cfs @ 13.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	3.35"	
Inflow =	26.52 cfs @	12.34 hrs,	Volume=	5.638 af
Outflow =	19.96 cfs @	13.33 hrs,	Volume=	4.845 af, Atten= 25%, Lag= 59.9 min
Primary =	19.96 cfs @	13.33 hrs,	Volume=	4.845 af
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.15' @ 13.33 hrs Surf.Area= 17,533 sf Storage= 66,139 cf
Plug-Flow detention time= 85.4 min calculated for 4.829 af (86% of inflow)
Center-of-Mass det. time= 42.1 min (867.8 - 825.8)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=19.96 cfs @ 13.33 hrs HW=327.15' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 2.09 cfs @ 10.7 fps)
└—**3=Orifice/Grate** (Orifice Controls 17.87 cfs @ 5.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 2.520 ac, Inflow Depth = 1.63"
Inflow = 5.82 cfs @ 12.04 hrs, Volume= 0.342 af
Outflow = 0.34 cfs @ 13.85 hrs, Volume= 0.215 af, Atten= 94%, Lag= 108.3 min
Primary = 0.34 cfs @ 13.85 hrs, Volume= 0.215 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 320.20' @ 13.85 hrs Surf.Area= 4,346 sf Storage= 8,369 cf
Plug-Flow detention time= 224.2 min calculated for 0.214 af (63% of inflow)
Center-of-Mass det. time= 144.6 min (950.6 - 806.0)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.34 cfs @ 13.85 hrs HW=320.20' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.9 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 11.740 ac, Inflow Depth = 2.08"
Inflow = 22.48 cfs @ 12.15 hrs, Volume= 2.030 af
Outflow = 0.48 cfs @ 20.00 hrs, Volume= 0.297 af, Atten= 98%, Lag= 470.8 min
Primary = 0.48 cfs @ 20.00 hrs, Volume= 0.297 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.02' @ 20.00 hrs Surf.Area= 25,027 sf Storage= 75,473 cf
Plug-Flow detention time= 267.5 min calculated for 0.297 af (15% of inflow)
Center-of-Mass det. time= 160.6 min (964.6 - 803.9)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.47 cfs @ 20.00 hrs HW=412.02' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.01 cfs @ 0.4 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 9.5 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area =	59.910 ac,	Inflow Depth =	1.97"	
Inflow =	69.36 cfs @	12.64 hrs, Volume=		9.819 af
Outflow =	66.06 cfs @	12.76 hrs, Volume=		9.818 af, Atten= 5%, Lag= 7.3 min
Primary =	66.06 cfs @	12.76 hrs, Volume=		9.818 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 424.92' @ 12.76 hrs Surf.Area= 3,924 sf Storage= 10,097 cf
Plug-Flow detention time= 0.9 min calculated for 9.818 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (835.8 - 834.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=66.02 cfs @ 12.76 hrs HW=424.92' (Free Discharge)
- **1=Culvert** (Inlet Controls 33.01 cfs @ 10.5 fps)
- **2=Culvert** (Inlet Controls 33.01 cfs @ 10.5 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 9.03"
Inflow = 16.17 cfs @ 12.99 hrs, Volume= 1.438 af
Outflow = 16.26 cfs @ 13.00 hrs, Volume= 1.437 af, Atten= 0%, Lag= 0.6 min
Primary = 16.26 cfs @ 13.00 hrs, Volume= 1.437 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.32' @ 13.00 hrs Surf.Area= 12 sf Storage= 52 cf
Plug-Flow detention time= 0.2 min calculated for 1.432 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (789.4 - 789.3)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=16.25 cfs @ 13.00 hrs HW=406.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 16.25 cfs @ 5.2 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 2.86"
Inflow = 12.03 cfs @ 11.96 hrs, Volume= 0.530 af
Outflow = 12.02 cfs @ 11.96 hrs, Volume= 0.529 af, Atten= 0%, Lag= 0.0 min
Primary = 12.02 cfs @ 11.96 hrs, Volume= 0.529 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.39' @ 11.96 hrs Surf.Area= 12 sf Storage= 29 cf
Plug-Flow detention time= 0.5 min calculated for 0.527 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (774.2 - 773.9)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.79 cfs @ 11.96 hrs HW=2.37' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.79 cfs @ 3.7 fps)

Pond CB2: PROPOSED CB

Inflow Area =	1.910 ac,	Inflow Depth =	9.28"		
Inflow =	17.96 cfs @	12.76 hrs,	Volume=	1.477 af	
Outflow =	16.18 cfs @	12.97 hrs,	Volume=	1.438 af,	Atten= 10%, Lag= 13.0 min
Primary =	16.18 cfs @	12.97 hrs,	Volume=	1.438 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 410.86' @ 12.97 hrs Surf.Area= 2,216 sf Storage= 9,442 cf
Plug-Flow detention time= 16.6 min calculated for 1.433 af (97% of inflow)
Center-of-Mass det. time= 9.0 min (788.3 - 779.3)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=16.16 cfs @ 12.97 hrs HW=410.85' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 16.16 cfs @ 9.1 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	2.02"		
Inflow =	67.70 cfs @	12.75 hrs,	Volume=	10.750 af	
Outflow =	67.54 cfs @	12.78 hrs,	Volume=	10.360 af,	Atten= 0%, Lag= 2.2 min
Primary =	50.49 cfs @	12.78 hrs,	Volume=	9.266 af	
Secondary =	17.05 cfs @	12.78 hrs,	Volume=	1.094 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.84' @ 12.78 hrs Surf.Area= 14,025 sf Storage= 60,941 cf
Plug-Flow detention time= 39.4 min calculated for 10.325 af (96% of inflow)
Center-of-Mass det. time= 27.1 min (858.1 - 831.1)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=50.42 cfs @ 12.78 hrs HW=416.84' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 22.07 cfs @ 6.2 fps)
- **2=Orifice/Grate** (Weir Controls 19.42 cfs @ 2.3 fps)
- **3=Culvert** (Inlet Controls 8.92 cfs @ 11.4 fps)

Secondary OutFlow Max=17.02 cfs @ 12.78 hrs HW=416.84' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 17.02 cfs @ 2.3 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.230 ac,	Inflow Depth =	1.96"	
Inflow =	37.94 cfs @	12.60 hrs,	Volume=	5.583 af
Outflow =	35.33 cfs @	12.86 hrs,	Volume=	5.583 af, Atten= 7%, Lag= 15.3 min
Primary =	35.33 cfs @	12.86 hrs,	Volume=	5.583 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.21' @ 12.86 hrs Surf.Area= 4,731 sf Storage= 10,019 cf
Plug-Flow detention time= 1.8 min calculated for 5.583 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (827.7 - 825.9)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=35.32 cfs @ 12.86 hrs HW=413.20' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 35.32 cfs @ 11.2 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth =	1.75"	
Inflow =	9.77 cfs @	12.15 hrs, Volume=	0.716 af	
Outflow =	9.76 cfs @	12.15 hrs, Volume=	0.716 af,	Atten= 0%, Lag= 0.0 min
Primary =	9.76 cfs @	12.15 hrs, Volume=	0.716 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.59' @ 12.15 hrs Surf.Area= 20 sf Storage= 32 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.76 cfs @ 12.15 hrs HW=329.59' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.76 cfs @ 3.9 fps)

Pond MH1: PROPOSED MH

Inflow Area =	63.710 ac,	Inflow Depth =	1.74"	
Inflow =	23.97 cfs @	12.37 hrs, Volume=	9.260 af	
Outflow =	23.98 cfs @	12.37 hrs, Volume=	9.259 af,	Atten= 0%, Lag= 0.0 min
Primary =	23.98 cfs @	12.37 hrs, Volume=	9.259 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.39' @ 12.37 hrs Surf.Area= 12 sf Storage= 41 cf
Plug-Flow detention time= 0.0 min calculated for 9.228 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (894.7 - 894.7)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.93 cfs @ 12.37 hrs HW=3.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.93 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area = 7.990 ac, Inflow Depth = 1.92"
Inflow = 15.51 cfs @ 12.21 hrs, Volume= 1.277 af
Outflow = 15.52 cfs @ 12.21 hrs, Volume= 1.276 af, Atten= 0%, Lag= 0.0 min
Primary = 15.52 cfs @ 12.21 hrs, Volume= 1.276 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 423.20' @ 12.21 hrs Surf.Area= 20 sf Storage= 64 cf
Plug-Flow detention time= 0.3 min calculated for 1.272 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (812.3 - 812.2)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=15.41 cfs @ 12.21 hrs HW=423.18' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 15.41 cfs @ 4.9 fps)

Pond UP2P: CULVERT

Inflow Area = 7.360 ac, Inflow Depth = 1.98"
Inflow = 10.65 cfs @ 12.42 hrs, Volume= 1.215 af
Outflow = 9.62 cfs @ 12.57 hrs, Volume= 1.206 af, Atten= 10%, Lag= 8.9 min
Primary = 9.62 cfs @ 12.57 hrs, Volume= 1.206 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.20' @ 12.57 hrs Surf.Area= 2,928 sf Storage= 3,376 cf
Plug-Flow detention time= 7.6 min calculated for 1.202 af (99% of inflow)
Center-of-Mass det. time= 5.0 min (828.2 - 823.2)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.60 cfs @ 12.57 hrs HW=434.20' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.60 cfs @ 5.4 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	1.92"	
Inflow =	44.39 cfs @	12.43 hrs, Volume=	5.199 af	
Outflow =	36.56 cfs @	12.66 hrs, Volume=	5.193 af,	Atten= 18%, Lag= 13.6 min
Primary =	36.56 cfs @	12.66 hrs, Volume=	5.193 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.15' @ 12.66 hrs Surf.Area= 6,554 sf Storage= 16,080 cf
Plug-Flow detention time= 3.5 min calculated for 5.193 af (100% of inflow)
Center-of-Mass det. time= 3.1 min (828.4 - 825.4)

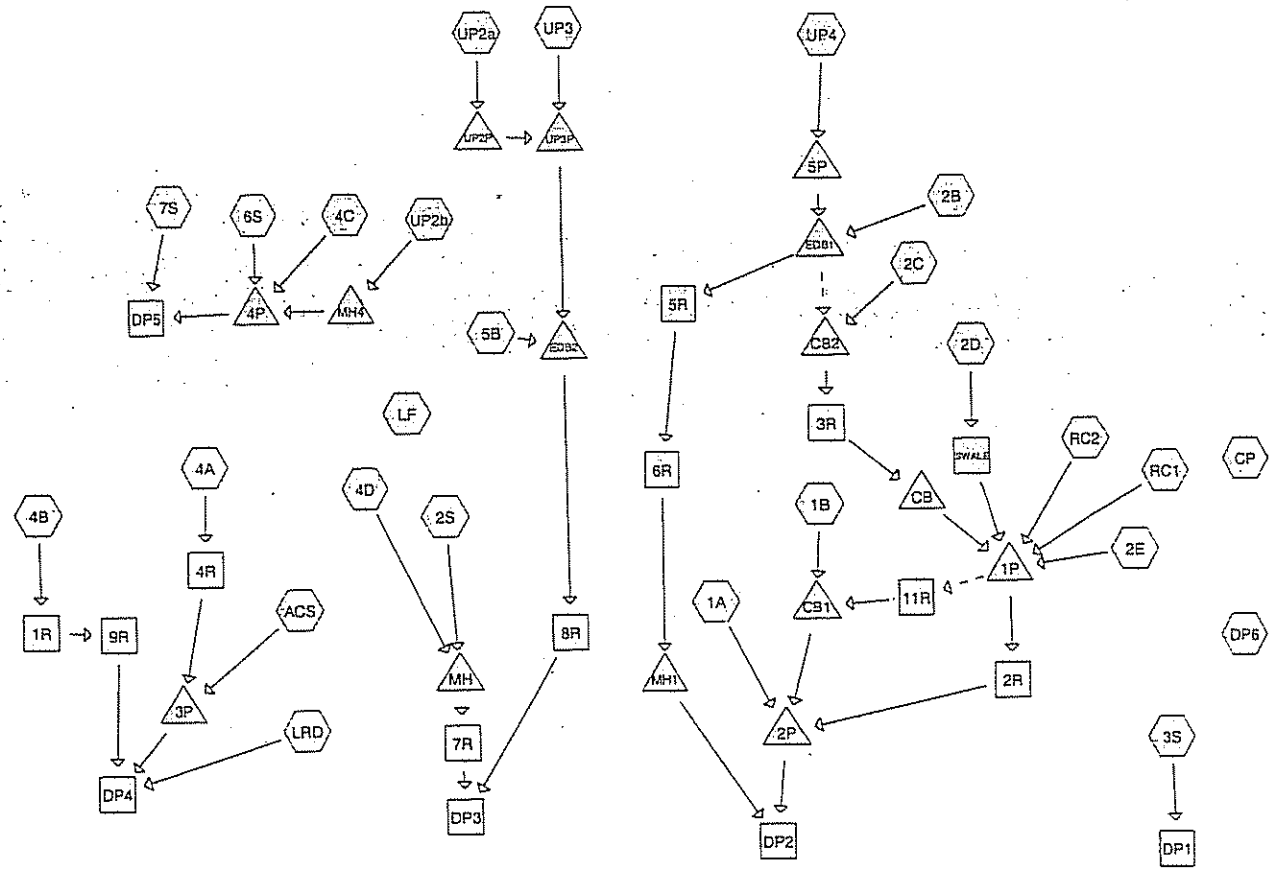
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=36.55 cfs @ 12.66 hrs HW=432.14' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 36.55 cfs @ 11.6 fps)

Proposed Drainage Conditions - Phase 1
100-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-construction
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=1.78"
Flow Length=310' Tc=13.5 min CN=63 Runoff=10.00 cfs 0.571 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=3.46"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=14.38 cfs 0.640 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=3.55"
Flow Length=330' Tc=17.1 min CN=83 Runoff=17.26 cfs 1.123 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=2.96"
Flow Length=340' Tc=22.7 min CN=77 Runoff=6.33 cfs 0.471 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=3.95"
Flow Length=310' Tc=20.4 min CN=87 Runoff=35.87 cfs 2.606 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=3.27"
Flow Length=60' Tc=4.0 min CN=80 Runoff=2.07 cfs 0.087 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=2.26"
Flow Length=840' Tc=21.3 min CN=69 Runoff=12.37 cfs 0.889 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=1.47"
Flow Length=460' Tc=18.1 min CN=59 Runoff=3.27 cfs 0.223 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=3.26"
Flow Length=510' Tc=7.8 min CN=80 Runoff=2.39 cfs 0.114 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=2.60"
Flow Length=620' Tc=19.3 min CN=73 Runoff=3.20 cfs 0.217 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=3.16"
Flow Length=250' Tc=16.7 min CN=79 Runoff=9.14 cfs 0.579 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=1.63"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.53 cfs 0.024 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=3.34"
Flow Length=210' Tc=24.8 min CN=81 Runoff=5.97 cfs 0.473 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=2.71"
Flow Length=80' Tc=5.2 min CN=74 Runoff=8.09 cfs 0.349 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=2.61"
Flow Length=95' Tc=8.4 min CN=73 Runoff=5.87 cfs 0.279 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=1.85"
Flow Length=465' Tc=13.8 min CN=64 Runoff=5.64 cfs 0.324 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=5.00"
Flow Length=110' Tc=1.9 min CN=98 Runoff=5.96 cfs 0.287 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=1.27"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.54 cfs 0.021 af

Subcatchment LF: landfill area Runoff Area=14.330 ac Runoff Depth=5.00"
Flow Length=1,250' Tc=4.5 min CN=98 Runoff=119.79 cfs 5.970 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=1.86"
Flow Length=401' Tc=12.0 min CN=64 Runoff=6.16 cfs 0.332 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=4.37"
Flow Length=245' Tc=3.9 min CN=91 Runoff=11.90 cfs 0.543 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=4.37"
Flow Length=245' Tc=3.9 min CN=91 Runoff=19.96 cfs 0.911 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=2.49"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=13.48 cfs 1.527 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=2.42"
Flow Length=750' Tc=26.5 min CN=71 Runoff=19.69 cfs 1.612 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=2.40"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=44.69 cfs 5.043 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=2.47"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=87.80 cfs 12.350 af

Reach 1R: Bottom Swale Peak Depth=0.21' Max Vel=3.2 fps Inflow=3.20 cfs 0.217 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.19 cfs 0.217 af

Reach 2R: 18" Peak Depth=0.89' Max Vel=28.4 fps Inflow=31.09 cfs 5.965 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=31.10 cfs 5.964 af

Reach 3R: CULVERT Peak Depth=1.15' Max Vel=10.7 fps Inflow=20.00 cfs 2.152 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=20.00 cfs 2.152 af

Reach 4R: Bottom Swale Peak Depth=0.20' Max Vel=2.7 fps Inflow=2.39 cfs 0.114 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=2.38 cfs 0.114 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.2 fps Inflow=59.29 cfs 11.215 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.90 cfs 11.210 af

Reach 6R: 30 "RCP Peak Depth=1.09' Max Vel=11.1 fps Inflow=22.90 cfs 11.210 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=22.52 cfs 11.208 af

Reach 7R: 24" Peak Depth=0.54' Max Vel=18.3 fps Inflow=12.53 cfs 0.913 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=12.49 cfs 0.913 af

Reach 8R: 24 CULVERT Peak Depth=1.12' Max Vel=21.3 fps Inflow=38.81 cfs 7.027 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=38.80 cfs 7.019 af

Reach 9R: 18" culvert Peak Depth=0.31' Max Vel=11.8 fps Inflow=3.19 cfs 0.217 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=3.19 cfs 0.217 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.22' Max Vel=3.2 fps Inflow=3.27 cfs 0.223 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.26 cfs 0.223 af

Reach DP2: CULVERT Peak Depth=1.08' Max Vel=23.4 fps Inflow=47.38 cfs 17.575 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=47.37 cfs 17.572 af

Reach DP3: 30" Peak Depth=0.96' Max Vel=23.3 fps Inflow=40.35 cfs 7.932 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=40.34 cfs 7.931 af

Reach DP4: Inflow=9.24 cfs 0.799 af
Outflow=9.24 cfs 0.799 af

Reach DP5: STREAM Peak Depth=0.17' Max Vel=3.5 fps Inflow=6.11 cfs 0.927 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=5.94 cfs 0.925 af

Reach SWALE: DRAINAGE SWALE Peak Depth=1.04' Max Vel=5.7 fps Inflow=35.87 cfs 2.606 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=35.39 cfs 2.602 af

Pond 1P: DETENTION BASIN 1 Peak Elev=406.94' Storage=68,189 cf Inflow=52.19 cfs 6.295 af
Primary=31.09 cfs 5.965 af Secondary=0.00 cfs 0.000 af Outflow=31.09 cfs 5.965 af

Pond 2P: DETENTION BASIN 2 Peak Elev=328.01' Storage=81,170 cf Inflow=35.57 cfs 7.175 af
Primary=25.01 cfs 6.368 af Secondary=0.00 cfs 0.000 af Outflow=25.01 cfs 6.368 af

Pond 3P: DETENTION BASIN 3 Peak Elev=320.78' Storage=11,261 cf Inflow=7.52 cfs 0.439 af
Outflow=0.39 cfs 0.250 af

Pond 4P: DETENTION BASIN 4 Peak Elev=412.36' Storage=84,513 cf Inflow=28.20 cfs 2.539 af
Outflow=1.25 cfs 0.648 af

~~**Pond 5P: ROADSIDE POND UPGRAD. O** Peak Elev=427.34' Storage=22,423 cf Inflow=87.80 cfs 12.350 af~~
Outflow=79.40 cfs 12.350 af

Pond CB: PROPOSED CB Peak Elev=407.10' Storage=61 cf Inflow=20.00 cfs 2.152 af
24.0" x 300.0' Culvert Outflow=19.97 cfs 2.151 af

Pond CB1: proposed cb Peak Elev=2.53' Storage=30 cf Inflow=14.38 cfs 0.640 af
36.0" x 500.0' Culvert Outflow=14.38 cfs 0.640 af

Pond CB2: PROPOSED CB Peak Elev=413.04' Storage=15,116 cf Inflow=22.73 cfs 2.191 af
18.0" x 100.0' Culvert Outflow=20.00 cfs 2.152 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.97' Storage=62,681 cf Inflow=81.17 cfs 13.472 af
Primary=59.29 cfs 11.215 af Secondary=21.75 cfs 1.719 af Outflow=81.04 cfs 12.934 af

Pond EDB2: DETENTION BASIN ADJACE Peak Elev=414.49' Storage=16,813 cf Inflow=42.44 cfs 7.027 af
24.0" x 80.0' Culvert Outflow=38.81 cfs 7.027 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.87' Storage=37 cf Inflow=12.54 cfs 0.913 af
24.0" x 185.0' Culvert Outflow=12.53 cfs 0.913 af

Pond MH1: PROPOSED MH Peak Elev=3.27' Storage=39 cf Inflow=22.52 cfs 11.208 af
30.0" x 80.0' Culvert Outflow=22.54 cfs 11.207 af

Pond MH4: PROPOSED MH Peak Elev=423.93' Storage=79 cf Inflow=19.69 cfs 1.612 af
24.0" x 300.0' Culvert Outflow=19.69 cfs 1.611 af

Pond UP2P: CULVERT Peak Elev=434.77' Storage=5,491 cf Inflow=13.48 cfs 1.527 af
18.0" x 75.0' Culvert Outflow=11.35 cfs 1.518 af

Pond UP3P: ROAD CULVERT Peak Elev=433.88' Storage=29,032 cf Inflow=55.21 cfs 6.561 af
24.0" x 95.0' Culvert Outflow=41.06 cfs 6.554 af

Total Runoff Area = 158.800 ac Runoff Volume = 37.568 af Average Runoff Depth = 2.84"

Subcatchment 1A: south central section btw. gorges

Runoff = 10.00 cfs @ 12.06 hrs, Volume= 0.571 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 17.26 cfs @ 12.09 hrs, Volume= 1.123 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 6.33 cfs @ 12.16 hrs, Volume= 0.471 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 35.87 cfs @ 12.12 hrs, Volume= 2.606 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 2.07 cfs @ 11.94 hrs, Volume= 0.087 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 12.37 cfs @ 12.15 hrs, Volume= 0.889 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 3.27 cfs @ 12.12 hrs, Volume= 0.223 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 2.39 cfs @ 11.99 hrs, Volume= 0.114 af, Depth= 3.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 3.20 cfs @ 12.12 hrs, Volume= 0.217 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.6	500	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.3	620	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 9.14 cfs @ 12.09 hrs, Volume= 0.579 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.53 cfs @ 12.00 hrs, Volume= 0.024 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 5.97 cfs @ 12.18 hrs, Volume= 0.473 af, Depth= 3.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 8.09 cfs @ 11.96 hrs, Volume= 0.349 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 5.87 cfs @ 12.00 hrs, Volume= 0.279 af, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 5.64 cfs @ 12.07 hrs, Volume= 0.324 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 5.96 cfs @ 11.91 hrs, Volume= 0.287 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.54 cfs @ 11.94 hrs, Volume= 0.021 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LF: landfill area

Runoff = 119.79 cfs @ 11.94 hrs, Volume= 5.970 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
14.330	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	150	0.3300	4.2		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"
3.9	1,100	0.0540	4.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.5	1,250	Total			

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 6.16 cfs @ 12.05 hrs, Volume= 0.332 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 11.90 cfs @ 11.94 hrs, Volume= 0.543 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 19.96 cfs @ 11.94 hrs, Volume= 0.911 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 13.48 cfs @ 12.42 hrs, Volume= 1.527 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 19.69 cfs @ 12.21 hrs, Volume= 1.612 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 44.69 cfs @ 12.42 hrs, Volume= 5.043 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 87.80 cfs @ 12.63 hrs, Volume= 12.350 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 2.60"
Inflow = 3.20 cfs @ 12.12 hrs, Volume= 0.217 af
Outflow = 3.19 cfs @ 12.12 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.21' @ 12.12 hrs
Capacity at bank full= 53.52 cfs
~~4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'~~
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 5.06"
Inflow = 31.09 cfs @ 12.34 hrs, Volume= 5.965 af
Outflow = 31.10 cfs @ 12.35 hrs, Volume= 5.964 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 28.4 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 13.7 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.89' @ 12.35 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 13.52"
Inflow = 20.00 cfs @ 13.09 hrs, Volume= 2.152 af
Outflow = 20.00 cfs @ 13.10 hrs, Volume= 2.152 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 4.4 fps, Avg. Travel Time= 1.1 min

Peak Depth= 1.15' @ 13.09 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 3.26"
Inflow = 2.39 cfs @ 11.99 hrs, Volume= 0.114 af
Outflow = 2.38 cfs @ 11.99 hrs, Volume= 0.114 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.20' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 2.11"
Inflow = 59.29 cfs @ 12.84 hrs, Volume= 11.215 af
Outflow = 22.90 cfs @ 12.25 hrs, Volume= 11.210 af, Atten= 61%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.1 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.30 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 2.11"
Inflow = 22.90 cfs @ 12.25 hrs, Volume= 11.210 af
Outflow = 22.52 cfs @ 12.30 hrs, Volume= 11.208 af, Atten= 2%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.8 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.09' @ 12.25 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 2.23"
Inflow = 12.53 cfs @ 12.15 hrs, Volume= 0.913 af
Outflow = 12.49 cfs @ 12.15 hrs, Volume= 0.913 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 18.3 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 7.5 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.54' @ 12.15 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 2.46"
Inflow = 38.81 cfs @ 13.03 hrs, Volume= 7.027 af
Outflow = 38.80 cfs @ 13.05 hrs, Volume= 7.019 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.3 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 9.8 fps, Avg. Travel Time= 1.7 min

Peak Depth= 1.12' @ 13.04 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 1.000 ac, Inflow Depth = 2.60"
Inflow = 3.19 cfs @ 12.12 hrs, Volume= 0.217 af
Outflow = 3.19 cfs @ 12.13 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.8 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.5 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.31' @ 12.12 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 1.47"
Inflow = 3.27 cfs @ 12.12 hrs, Volume= 0.223 af
Outflow = 3.26 cfs @ 12.12 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.22' @ 12.12 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 2.51"
Inflow = 47.38 cfs @ 13.40 hrs, Volume= 17.575 af
Outflow = 47.37 cfs @ 13.41 hrs, Volume= 17.572 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 23.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 13.0 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.08' @ 13.41 hrs
Capacity at bank full= 123.05 cfs
Inlet Invert= 323.40', Outlet Invert= 309.90'
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 2.43"
Inflow = 40.35 cfs @ 12.98 hrs, Volume= 7.932 af
Outflow = 40.34 cfs @ 12.98 hrs, Volume= 7.931 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 23.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.8 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.96' @ 12.98 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 5.670 ac, Inflow Depth = 1.69"
Inflow = 9.24 cfs @ 12.06 hrs, Volume= 0.799 af
Outflow = 9.24 cfs @ 12.06 hrs, Volume= 0.799 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 13.020 ac, Inflow Depth = 0.85"
Inflow = 6.11 cfs @ 12.00 hrs, Volume= 0.927 af
Outflow = 5.94 cfs @ 12.01 hrs, Volume= 0.925 af, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 0.9 min

Peak Depth= 0.17' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 3.95"
Inflow = 35.87 cfs @ 12.12 hrs, Volume= 2.606 af
Outflow = 35.39 cfs @ 12.15 hrs, Volume= 2.602 af, Atten= 1%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.7 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 2.8 min

Peak Depth= 1.04' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 5.34"
Inflow = 52.19 cfs @ 11.96 hrs, Volume= 6.295 af
Outflow = 31.09 cfs @ 12.34 hrs, Volume= 5.965 af, Atten= 40%, Lag= 22.8 min
Primary = 31.09 cfs @ 12.34 hrs, Volume= 5.965 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.94' @ 12.34 hrs Surf.Area= 12,992 sf Storage= 68,189 cf
Plug-Flow detention time= 67.5 min calculated for 5.965 af (95% of inflow)
Center-of-Mass det. time= 49.1 min (821.2 - 772.1)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=31.06 cfs @ 12.34 hrs HW=406.94' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 27.27 cfs @ 5.3 fps)
└─**3=Orifice/Grate** (Orifice Controls 3.78 cfs @ 14.2 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	4.26"	
Inflow =	35.57 cfs @	12.30 hrs, Volume=	7.175 af	
Outflow =	25.01 cfs @	13.41 hrs, Volume=	6.368 af,	Atten= 30%, Lag= 66.1 min
Primary =	25.01 cfs @	13.41 hrs, Volume=	6.368 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 328.01' @ 13.41 hrs Surf.Area= 18,515 sf Storage= 81,170 cf
Plug-Flow detention time= 76.1 min calculated for 6.368 af (89% of inflow)
Center-of-Mass det. time= 40.3 min (856.4 - 816.1)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=25.01 cfs @ 13.41 hrs HW=328.01' (Free Discharge)
└─**2=Orifice/Grate** (Orifice Controls 2.27 cfs @ 11.6 fps)
└─**3=Orifice/Grate** (Orifice Controls 22.74 cfs @ 7.2 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 2.520 ac, Inflow Depth = 2.09"
Inflow = 7.52 cfs @ 12.04 hrs, Volume= 0.439 af
Outflow = 0.39 cfs @ 14.03 hrs, Volume= 0.250 af, Atten= 95%, Lag= 119.4 min
Primary = 0.39 cfs @ 14.03 hrs, Volume= 0.250 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 320.78' @ 14.03 hrs Surf.Area= 4,782 sf Storage= 11,261 cf
Plug-Flow detention time= 232.2 min calculated for 0.250 af (57% of inflow)
Center-of-Mass det. time= 150.1 min (951.3 - 801.2)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.39 cfs @ 14.03 hrs HW=320.78' (Free Discharge)
↑
├─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
├─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 7.8 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 11.740 ac, Inflow Depth = 2.60"
Inflow = 28.20 cfs @ 12.15 hrs, Volume= 2.539 af
Outflow = 1.25 cfs @ 16.28 hrs, Volume= 0.648 af, Atten= 96%, Lag= 247.6 min
Primary = 1.25 cfs @ 16.28 hrs, Volume= 0.648 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.36' @ 16.28 hrs Surf.Area= 25,538 sf Storage= 84,513 cf
Plug-Flow detention time= 284.8 min calculated for 0.648 af (26% of inflow)
Center-of-Mass det. time= 188.7 min (988.1 - 799.4)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.24 cfs @ 16.28 hrs HW=412.36' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.75 cfs @ 1.9 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.49 cfs @ 9.9 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area = 59.910 ac, Inflow Depth = 2.47"
Inflow = 87.80 cfs @ 12.63 hrs, Volume= 12.350 af
Outflow = 79.40 cfs @ 12.81 hrs, Volume= 12.350 af, Atten= 10%, Lag= 11.0 min
Primary = 79.40 cfs @ 12.81 hrs, Volume= 12.350 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 427.34' @ 12.81 hrs Surf.Area= 6,337 sf Storage= 22,423 cf
Plug-Flow detention time= 1.7 min calculated for 12.309 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (832.1 - 830.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=79.34 cfs @ 12.81 hrs HW=427.33' (Free Discharge)
- **1=Culvert** (Inlet Controls 39.67 cfs @ 12.6 fps)
- **2=Culvert** (Inlet Controls 39.67 cfs @ 12.6 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 13.52"
Inflow = 20.00 cfs @ 13.10 hrs, Volume= 2.152 af
Outflow = 19.97 cfs @ 13.05 hrs, Volume= 2.151 af, Atten= 0%, Lag= 0.0 min
Primary = 19.97 cfs @ 13.05 hrs, Volume= 2.151 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.10' @ 13.05 hrs Surf.Area= 12 sf Storage= 61 cf
Plug-Flow detention time= 0.2 min calculated for 2.151 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (789.8 - 789.7)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=19.97 cfs @ 13.05 hrs HW=407.10' (Free Discharge)
↑**1=Culvert** (Barrel Controls 19.97 cfs @ 6.4 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 3.46"
Inflow = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af
Outflow = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af, Atten= 0%, Lag= 0.0 min
Primary = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.53' @ 11.96 hrs Surf.Area= 12 sf Storage= 30 cf
Plug-Flow detention time= 0.4 min calculated for 0.638 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (769.8 - 769.6)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=14.12 cfs @ 11.96 hrs HW=2.52' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 14.12 cfs @ 3.9 fps)

Pond CB2: PROPOSED CB

Inflow Area =	1.910 ac,	Inflow Depth = 13.76"		
Inflow =	22.73 cfs @	12.81 hrs, Volume=	2.191 af	
Outflow =	20.00 cfs @	13.09 hrs, Volume=	2.152 af,	Atten= 12%, Lag= 16.5 min
Primary =	20.00 cfs @	13.09 hrs, Volume=	2.152 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.04' @ 13.09 hrs Surf.Area= 3,019 sf Storage= 15,116 cf
Plug-Flow detention time= 16.2 min calculated for 2.152 af (98% of inflow)
Center-of-Mass det. time= 10.5 min (788.7 - 778.2)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=19.99 cfs @ 13.09 hrs HW=413.03' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 19.99 cfs @ 11.3 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth = 2.54"		
Inflow =	81.17 cfs @	12.80 hrs, Volume=	13.472 af	
Outflow =	81.04 cfs @	12.84 hrs, Volume=	12.934 af,	Atten= 0%, Lag= 2.0 min
Primary =	59.29 cfs @	12.84 hrs, Volume=	11.215 af	
Secondary =	21.75 cfs @	12.84 hrs, Volume=	1.719 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.97' @ 12.84 hrs Surf.Area= 14,327 sf Storage= 62,681 cf
Plug-Flow detention time= 34.6 min calculated for 12.891 af (96% of inflow)
Center-of-Mass det. time= 21.1 min (848.6 - 827.5)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600
			Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=59.23 cfs @ 12.84 hrs HW=416.97' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 22.93 cfs @ 6.5 fps)
- **2=Orifice/Grate** (Weir Controls 27.28 cfs @ 2.6 fps)
- **3=Culvert** (Inlet Controls 9.02 cfs @ 11.5 fps)

Secondary OutFlow Max=21.72 cfs @ 12.84 hrs HW=416.97' (Free Discharge)
- **4=Broad-Crested Rectangular Weir** (Weir Controls 21.72 cfs @ 2.5 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 2.46"
Inflow = 42.44 cfs @ 12.68 hrs, Volume= 7.027 af
Outflow = 38.81 cfs @ 13.03 hrs, Volume= 7.027 af, Atten= 9%, Lag= 21.1 min
Primary = 38.81 cfs @ 13.03 hrs, Volume= 7.027 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 414.49' @ 13.03 hrs Surf.Area= 6,723 sf Storage= 16,813 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=38.80 cfs @ 13.03 hrs HW=414.49' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 38.80 cfs @ 12.4 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth =	2.23"	
Inflow =	12.54 cfs @	12.15 hrs, Volume=	0.913 af	
Outflow =	12.53 cfs @	12.15 hrs, Volume=	0.913 af,	Atten= 0%, Lag= 0.0 min
Primary =	12.53 cfs @	12.15 hrs, Volume=	0.913 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.87' @ 12.15 hrs Surf.Area= 20 sf Storage= 37 cf
Plug-Flow detention time= 0.1 min calculated for 0.910 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (807.0 - 807.0)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=12.49 cfs @ 12.15 hrs HW=329.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 12.49 cfs @ 4.2 fps)

Pond MH1: PROPOSED MH

Inflow Area =	63.710 ac,	Inflow Depth =	2.11"	
Inflow =	22.52 cfs @	12.30 hrs, Volume=	11.208 af	
Outflow =	22.54 cfs @	12.30 hrs, Volume=	11.207 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.54 cfs @	12.30 hrs, Volume=	11.207 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.27' @ 12.30 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.0 min calculated for 11.207 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (906.6 - 906.6)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.54 cfs @ 12.30 hrs HW=3.27' (Free Discharge)
↑**1=Culvert** (Inlet Controls 22.54 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area = 7.990 ac, Inflow Depth = 2.42"
Inflow = 19.69 cfs @ 12.21 hrs, Volume= 1.612 af
Outflow = 19.69 cfs @ 12.21 hrs, Volume= 1.611 af, Atten= 0%, Lag= 0.1 min
Primary = 19.69 cfs @ 12.21 hrs, Volume= 1.611 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 423.93' @ 12.21 hrs Surf.Area= 20 sf Storage= 79 cf
Plug-Flow detention time= 0.3 min calculated for 1.606 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (807.5 - 807.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=19.57 cfs @ 12.21 hrs HW=423.91' (Free Discharge)
↑**1=Culvert** (Inlet Controls 19.57 cfs @ 6.2 fps)

Pond UP2P: CULVERT

Inflow Area = 7.360 ac, Inflow Depth = 2.49"
Inflow = 13.48 cfs @ 12.42 hrs, Volume= 1.527 af
Outflow = 11.35 cfs @ 12.61 hrs, Volume= 1.518 af, Atten= 16%, Lag= 11.7 min
Primary = 11.35 cfs @ 12.61 hrs, Volume= 1.518 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.77' @ 12.61 hrs Surf.Area= 4,414 sf Storage= 5,491 cf
Plug-Flow detention time= 7.9 min calculated for 1.513 af (99% of inflow)
Center-of-Mass det. time= 5.5 min (824.2 - 818.6)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.34 cfs @ 12.61 hrs HW=434.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 11.34 cfs @ 6.4 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	2.42"	
Inflow =	55.21 cfs @	12.43 hrs, Volume=	6.561 af	
Outflow =	41.06 cfs @	12.72 hrs, Volume=	6.554 af,	Atten= 26%, Lag= 17.3 min
Primary =	41.06 cfs @	12.72 hrs, Volume=	6.554 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 433.88' @ 12.72 hrs Surf.Area= 8,379 sf Storage= 29,032 cf
Plug-Flow detention time= 5.3 min calculated for 6.554 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (825.8 - 820.9)

#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=41.04 cfs @ 12.72 hrs HW=433.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 41.04 cfs @ 13.1 fps)

Appendix M:
Proposed Drainage Conditions - Phase 2

Proposed Conditions Plan - Phase 2

DESIGN POINT NO. 1 SOUTHEASTERN CORNER

LEGEND:

- FLOW PATH
- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT NUMBER
- SUBCATCHMENT ACRES

1S
83 | 3.80

CURVE NUMBER

AMSTERDAM MATERIALS RECYCLING

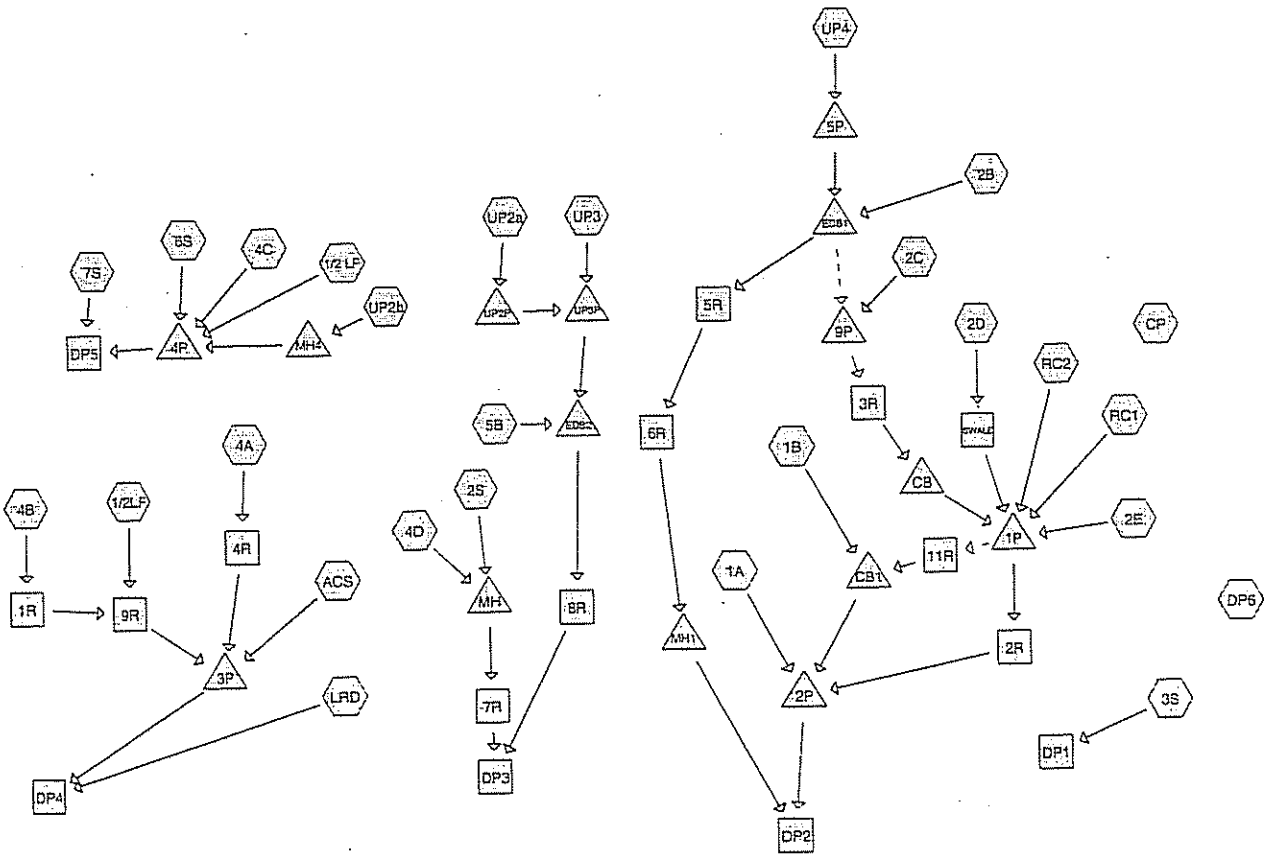
PROPOSED CONDITIONS PLAN
PHASE 2

CITY OF AMSTERDAM, MONTGOMERY COUNTY, NEW YORK

drawn	checked
VPA	VPA
date	scale
12-1-03	1"= 100'
project no.	
90303.00	
sheet no.	
SW2-A	

90303.00

Proposed Drainage Conditions - Phase 2
1-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-closed
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1/2 LF: landfill area Runoff Area=3.710 ac Runoff Depth=0.74"
Flow Length=1,050' Tc=17.0 min CN=80 Runoff=3.55 cfs 0.228 af

Subcatchment 1/2LF: Runoff Area=10.620 ac Runoff Depth=0.74"
Flow Length=1,090' Tc=16.2 min CN=80 Runoff=10.43 cfs 0.654 af

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=0.17"
Flow Length=310' Tc=13.5 min CN=63 Runoff=0.51 cfs 0.056 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=0.84"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=3.68 cfs 0.156 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=0.89"
Flow Length=330' Tc=17.1 min CN=83 Runoff=4.43 cfs 0.282 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=0.60"
Flow Length=340' Tc=22.7 min CN=77 Runoff=1.21 cfs 0.096 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=1.13"
Flow Length=310' Tc=20.4 min CN=87 Runoff=10.62 cfs 0.743 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=0.74"
Flow Length=60' Tc=4.0 min CN=80 Runoff=0.49 cfs 0.020 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=0.32"
Flow Length=840' Tc=21.3 min CN=69 Runoff=1.35 cfs 0.127 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.10"
Flow Length=460' Tc=18.1 min CN=59 Runoff=0.06 cfs 0.015 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=0.74"
Flow Length=510' Tc=7.8 min CN=80 Runoff=0.56 cfs 0.026 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=0.45"
Flow Length=720' Tc=19.4 min CN=73 Runoff=0.49 cfs 0.038 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=0.69"
Flow Length=250' Tc=16.7 min CN=79 Runoff=1.98 cfs 0.127 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=0.14"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.02 cfs 0.002 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=0.78"
Flow Length=210' Tc=24.8 min CN=81 Runoff=1.39 cfs 0.111 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=0.49"
Flow Length=80' Tc=5.2 min CN=74 Runoff=1.44 cfs 0.063 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=0.45"
Flow Length=95' Tc=8.4 min CN=73 Runoff=0.96 cfs 0.048 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=0.20"
Flow Length=465' Tc=13.8 min CN=64 Runoff=0.34 cfs 0.034 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=2.02"
Flow Length=110' Tc=1.9 min CN=98 Runoff=2.47 cfs 0.116 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.06"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.00 cfs 0.001 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=0.20"
Flow Length=401' Tc=12.0 min CN=64 Runoff=0.38 cfs 0.035 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=1.41"
Flow Length=245' Tc=3.9 min CN=91 Runoff=4.16 cfs 0.176 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=1.41"
Flow Length=245' Tc=3.9 min CN=91 Runoff=6.98 cfs 0.295 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=0.41"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=1.83 cfs 0.252 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=0.38"
Flow Length=750' Tc=26.5 min CN=71 Runoff=2.52 cfs 0.255 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=0.38"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=5.60 cfs 0.793 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=0.41"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=11.86 cfs 2.028 af

Reach 1R: Bottom Swale Peak Depth=0.07' Max Vel=1.6 fps Inflow=0.49 cfs 0.038 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.49 cfs 0.038 af

Reach 2R: 18" Peak Depth=0.24' Max Vel=14.5 fps Inflow=2.71 cfs 1.253 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=2.71 cfs 1.253 af

Reach 3R: CULVERT Peak Depth=0.15' Max Vel=3.3 fps Inflow=0.34 cfs 0.059 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=0.34 cfs 0.059 af

Reach 4R: Bottom Swale Peak Depth=0.08' Max Vel=1.6 fps Inflow=0.56 cfs 0.026 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=0.55 cfs 0.026 af

Reach 5R: 24" CULVERT Peak Depth=0.91' Max Vel=3.9 fps Inflow=6.32 cfs 2.224 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=6.32 cfs 2.223 af

Reach 6R: 30 "RCP Peak Depth=0.56' Max Vel=7.7 fps Inflow=6.32 cfs 2.223 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=6.32 cfs 2.222 af

Reach 7R: 24" Peak Depth=0.18' Max Vel=9.5 fps Inflow=1.35 cfs 0.129 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=1.35 cfs 0.129 af

Reach 8R: 24 CULVERT Peak Depth=0.47' Max Vel=13.8 fps Inflow=7.92 cfs 1.148 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=7.88 cfs 1.145 af

Reach 9R: 18" culvert Peak Depth=0.59' Max Vel=16.8 fps Inflow=10.87 cfs 0.691 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=10.86 cfs 0.691 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.02' Max Vel=0.7 fps Inflow=0.06 cfs 0.015 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.06 cfs 0.015 af

Reach DP2: CULVERT Peak Depth=0.42' Max Vel=13.9 fps Inflow=7.53 cfs 3.123 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=7.53 cfs 3.122 af

Reach DP3: 30" Peak Depth=0.43' Max Vel=14.9 fps Inflow=8.49 cfs 1.274 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=8.48 cfs 1.273 af

Reach DP4: Inflow=1.05 cfs 0.435 af
Outflow=1.05 cfs 0.435 af

Reach DP5: STREAM Peak Depth=0.06' Max Vel=1.8 fps Inflow=1.01 cfs 0.210 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=0.97 cfs 0.209 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.53' Max Vel=3.9 fps Inflow=10.62 cfs 0.743 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=10.44 cfs 0.741 af

Pond 1P: DETENTION BASIN 1 Peak Elev=402.71' Storage=24,641 cf Inflow=15.52 cfs 1.290 af
Primary=2.71 cfs 1.253 af Secondary=0.00 cfs 0.000 af Outflow=2.71 cfs 1.253 af

Pond 2P: DETENTION BASIN 2 Peak Elev=324.77' Storage=29,455 cf Inflow=5.61 cfs 1.464 af
Primary=1.51 cfs 0.902 af Secondary=0.00 cfs 0.000 af Outflow=1.51 cfs 0.902 af

Pond 3P: DETENTION BASIN 3 Peak Elev=322.08' Storage=17,831 cf Inflow=11.51 cfs 0.752 af
Outflow=0.98 cfs 0.399 af

Pond 4P: DETENTION BASIN 4 Peak Elev=409.39' Storage=22,239 cf Inflow=7.62 cfs 0.673 af
Outflow=0.27 cfs 0.162 af

Pond 5P: ROADSIDE POND UPGRAD. OF EXI Peak Elev=420.04' Storage=49 cf Inflow=11.86 cfs 2.028 af
Outflow=11.86 cfs 2.028 af

Pond 9P: PROPOSED MH Peak Elev=406.26' Storage=1,824 cf Inflow=1.21 cfs 0.096 af
18.0" x 100.0' Culvert Outflow=0.34 cfs 0.059 af

Pond CB: PROPOSED CB Peak Elev=404.27' Storage=27 cf Inflow=0.34 cfs 0.059 af
24.0" x 300.0' Culvert Outflow=0.41 cfs 0.058 af

Pond CB1: proposed cb Peak Elev=1.74' Storage=21 cf Inflow=3.68 cfs 0.156 af
36.0" x 500.0' Culvert Outflow=3.67 cfs 0.155 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=413.68' Storage=26,124 cf Inflow=12.50 cfs 2.310 af
Primary=6.32 cfs 2.224 af Secondary=0.00 cfs 0.000 af Outflow=6.32 cfs 2.224 af

Pond EDB2: DETENTION BASIN ADJACENT T Peak Elev=407.30' Storage=39 cf Inflow=7.92 cfs 1.148 af
24.0" x 80.0' Culvert Outflow=7.92 cfs 1.148 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=328.59' Storage=12 cf Inflow=1.36 cfs 0.129 af
24.0" x 185.0' Culvert Outflow=1.35 cfs 0.129 af

Pond MH1: Peak Elev=2.04' Storage=25 cf Inflow=6.32 cfs 2.222 af
30.0" x 80.0' Culvert Outflow=6.32 cfs 2.222 af

Pond MH4: PROPOSED MH Peak Elev=421.69' Storage=34 cf Inflow=2.52 cfs 0.255 af
24.0" x 300.0' Culvert Outflow=2.52 cfs 0.254 af

Pond UP2P: BASIN ADJACENT TO SAM STRA Peak Elev=432.63' Storage=822 cf Inflow=1.83 cfs 0.252 af
18.0" x 75.0' Culvert Outflow=1.76 cfs 0.247 af

Pond UP3P: ROAD CULVERT Peak Elev=425.74' Storage=538 cf Inflow=7.31 cfs 1.040 af
24.0" x 95.0' Culvert Outflow=7.32 cfs 1.037 af

Total Runoff Area = 158.800 ac Runoff Volume = 6.778 af Average Runoff Depth = 0.51"

Subcatchment 1/2 LF: landfill area

Runoff = 3.55 cfs @ 12.10 hrs, Volume= 0.228 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
3.710	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	150	0.3300	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
10.0	900	0.0100	1.5		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
17.0	1,050	Total			

Subcatchment 1/2LF:

Runoff = 10.43 cfs @ 12.10 hrs, Volume= 0.654 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
10.620	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	150	0.3200	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.1	940	0.0600	1.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,090	Total			

Subcatchment 1A: south central section btw. gorges

Runoff = 0.51 cfs @ 12.12 hrs, Volume= 0.056 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 3.68 cfs @ 11.96 hrs, Volume= 0.156 af, Depth= 0.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 4.43 cfs @ 12.10 hrs, Volume= 0.282 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 1.21 cfs @ 12.18 hrs, Volume= 0.096 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 10.62 cfs @ 12.13 hrs, Volume= 0.743 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 0.49 cfs @ 11.95 hrs, Volume= 0.020 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 1.35 cfs @ 12.19 hrs, Volume= 0.127 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 0.06 cfs @ 12.27 hrs, Volume= 0.015 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 0.56 cfs @ 12.00 hrs, Volume= 0.026 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.7	600	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.4	720	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 1.98 cfs @ 12.10 hrs, Volume= 0.127 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.02 cfs @ 12.05 hrs, Volume= 0.002 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 1.39 cfs @ 12.20 hrs, Volume= 0.111 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 1.44 cfs @ 11.98 hrs, Volume= 0.063 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 0.96 cfs @ 12.01 hrs, Volume= 0.048 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 0.34 cfs @ 12.11 hrs, Volume= 0.034 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 2.47 cfs @ 11.91 hrs, Volume= 0.116 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.00 cfs @ 12.38 hrs, Volume= 0.001 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 0.38 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 4.16 cfs @ 11.94 hrs, Volume= 0.176 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 6.98 cfs @ 11.94 hrs, Volume= 0.295 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 1.83 cfs @ 12.49 hrs, Volume= 0.252 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 2.52 cfs @ 12.25 hrs, Volume= 0.255 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 5.60 cfs @ 12.49 hrs, Volume= 0.793 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.40"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 0.45"
Inflow = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af
Outflow = 0.49 cfs @ 12.16 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.07' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 1.06"
Inflow = 2.71 cfs @ 12.78 hrs, Volume= 1.253 af
Outflow = 2.71 cfs @ 12.79 hrs, Volume= 1.253 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.5 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 9.3 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.24' @ 12.79 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 0.37"
Inflow = 0.34 cfs @ 12.66 hrs, Volume= 0.059 af
Outflow = 0.34 cfs @ 12.71 hrs, Volume= 0.059 af, Atten= 1%, Lag= 2.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.3 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.2 fps, Avg. Travel Time= 2.3 min

Peak Depth= 0.15' @ 12.67 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 0.74"
Inflow = 0.56 cfs @ 12.00 hrs, Volume= 0.026 af
Outflow = 0.55 cfs @ 12.00 hrs, Volume= 0.026 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.08' @ 12.00 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.45 hrs, Volume= 2.224 af
Outflow = 6.32 cfs @ 13.46 hrs, Volume= 2.223 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.91' @ 13.46 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.46 hrs, Volume= 2.223 af
Outflow = 6.32 cfs @ 13.47 hrs, Volume= 2.222 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.7 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.3 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.56' @ 13.46 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 0.32"
Inflow = 1.35 cfs @ 12.19 hrs, Volume= 0.129 af
Outflow = 1.35 cfs @ 12.20 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.5 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 4.9 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.18' @ 12.20 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 0.40"
Inflow = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af
Outflow = 7.88 cfs @ 12.54 hrs, Volume= 1.145 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.8 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 7.4 fps, Avg. Travel Time= 2.3 min

Peak Depth= 0.47' @ 12.52 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 11.620 ac, Inflow Depth = 0.71"
Inflow = 10.87 cfs @ 12.10 hrs, Volume= 0.691 af
Outflow = 10.86 cfs @ 12.10 hrs, Volume= 0.691 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.8 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 7.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.59' @ 12.10 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.10"
Inflow = 0.06 cfs @ 12.27 hrs, Volume= 0.015 af
Outflow = 0.06 cfs @ 12.29 hrs, Volume= 0.015 af, Atten= 1%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.02' @ 12.27 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 0.45"
Inflow = 7.53 cfs @ 13.56 hrs, Volume= 3.123 af
Outflow = 7.53 cfs @ 13.57 hrs, Volume= 3.122 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 13.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 8.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.42' @ 13.57 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 0.39"
Inflow = 8.49 cfs @ 12.52 hrs, Volume= 1.274 af
Outflow = 8.48 cfs @ 12.53 hrs, Volume= 1.273 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 8.1 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.43' @ 12.52 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 16.290 ac, Inflow Depth = 0.32"
Inflow = 1.05 cfs @ 13.42 hrs, Volume= 0.435 af
Outflow = 1.05 cfs @ 13.42 hrs, Volume= 0.435 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 16.730 ac, Inflow Depth = 0.15"
Inflow = 1.01 cfs @ 12.02 hrs, Volume= 0.210 af
Outflow = 0.97 cfs @ 12.05 hrs, Volume= 0.209 af, Atten= 4%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.8 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.06' @ 12.02 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 1.13"
Inflow = 10.62 cfs @ 12.13 hrs, Volume= 0.743 af
Outflow = 10.44 cfs @ 12.17 hrs, Volume= 0.741 af, Atten= 2%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 3.9 min

Peak Depth= 0.53' @ 12.15 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 1.09"
Inflow = 15.52 cfs @ 11.96 hrs, Volume= 1.290 af
Outflow = 2.71 cfs @ 12.78 hrs, Volume= 1.253 af, Atten= 83%, Lag= 49.4 min
Primary = 2.71 cfs @ 12.78 hrs, Volume= 1.253 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 402.71' @ 12.78 hrs Surf.Area= 7,721 sf Storage= 24,641 cf
Plug-Flow detention time= 105.1 min calculated for 1.253 af (97% of inflow)
Center-of-Mass det. time= 94.3 min (888.7 - 794.3)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.71 cfs @ 12.78 hrs HW=402.71' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 2.71 cfs @ 10.1 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	0.87"	
Inflow =	5.61 cfs @	11.98 hrs,	Volume=	1.464 af
Outflow =	1.51 cfs @	17.30 hrs,	Volume=	0.902 af, Atten= 73%, Lag= 319.2 min
Primary =	1.51 cfs @	17.30 hrs,	Volume=	0.902 af
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 324.77' @ 17.30 hrs Surf.Area= 13,010 sf Storage= 29,455 cf
Plug-Flow detention time= 182.5 min calculated for 0.899 af (61% of inflow)
Center-of-Mass det. time= 94.2 min (973.5 - 879.3)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.50 cfs @ 17.30 hrs HW=324.77' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.50 cfs @ 7.6 fps)
└—**3=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.5 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 14.140 ac, Inflow Depth = 0.64"
Inflow = 11.51 cfs @ 12.10 hrs, Volume= 0.752 af
Outflow = 0.98 cfs @ 13.45 hrs, Volume= 0.399 af, Atten= 91%, Lag= 81.6 min
Primary = 0.98 cfs @ 13.45 hrs, Volume= 0.399 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 322.08' @ 13.45 hrs Surf.Area= 5,772 sf Storage= 17,831 cf
Plug-Flow detention time= 204.2 min calculated for 0.398 af (53% of inflow)
Center-of-Mass det. time= 115.7 min (933.2 - 817.5)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.98 cfs @ 13.45 hrs HW=322.08' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.51 cfs @ 1.7 fps)
—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 9.6 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 15.450 ac, Inflow Depth = 0.52"
Inflow = 7.62 cfs @ 12.13 hrs, Volume= 0.673 af
Outflow = 0.27 cfs @ 20.00 hrs, Volume= 0.162 af, Atten= 97%, Lag= 472.3 min
Primary = 0.27 cfs @ 20.00 hrs, Volume= 0.162 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 409.39' @ 20.00 hrs Surf.Area= 16,780 sf Storage= 22,239 cf
Plug-Flow detention time= 253.2 min calculated for 0.162 af (24% of inflow)
Center-of-Mass det. time= 145.7 min (974.2 - 828.5)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.27 cfs @ 20.00 hrs HW=409.39' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.4 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area = 59.910 ac, Inflow Depth = 0.41"
Inflow = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af
Outflow = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af, Atten= 0%, Lag= 0.0 min
Primary = 11.86 cfs @ 12.71 hrs, Volume= 2.028 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 420.04' @ 12.71 hrs Surf.Area= 1,004 sf Storage= 49 cf
Plug-Flow detention time= 0.1 min calculated for 2.022 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (867.2 - 867.2)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=20.65 cfs @ 12.71 hrs HW=420.04' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.33 cfs @ 4.0 fps)
└—**2=Culvert** (Inlet Controls 10.33 cfs @ 4.0 fps)

Pond 9P: PROPOSED MH

Inflow Area = 1.910 ac, Inflow Depth = 0.60"
Inflow = 1.21 cfs @ 12.18 hrs, Volume= 0.096 af
Outflow = 0.34 cfs @ 12.66 hrs, Volume= 0.059 af, Atten= 72%, Lag= 28.8 min
Primary = 0.34 cfs @ 12.66 hrs, Volume= 0.059 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.26' @ 12.66 hrs Surf.Area= 1,065 sf Storage= 1,824 cf
Plug-Flow detention time= 152.6 min calculated for 0.059 af (61% of inflow)
Center-of-Mass det. time= 69.8 min (896.6 - 826.9)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.33 cfs @ 12.66 hrs HW=406.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.33 cfs @ 1.6 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 0.37"
Inflow = 0.34 cfs @ 12.71 hrs, Volume= 0.059 af
Outflow = 0.41 cfs @ 12.65 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min
Primary = 0.41 cfs @ 12.65 hrs, Volume= 0.058 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 404.27' @ 12.66 hrs Surf.Area= 12 sf Storage= 27 cf
Plug-Flow detention time= 4.5 min calculated for 0.058 af (99% of inflow)
Center-of-Mass det. time= 1.6 min (900.5 - 898.9)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.38 cfs @ 12.65 hrs HW=404.26' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.38 cfs @ 2.4 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 0.84"
Inflow = 3.68 cfs @ 11.96 hrs, Volume= 0.156 af
Outflow = 3.67 cfs @ 11.96 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min
Primary = 3.67 cfs @ 11.96 hrs, Volume= 0.155 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1.74' @ 11.96 hrs Surf.Area= 12 sf Storage= 21 cf
Plug-Flow detention time= 1.1 min calculated for 0.155 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (800.6 - 800.2)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=3.54 cfs @ 11.96 hrs HW=1.72' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.54 cfs @ 2.7 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	0.44"	
Inflow =	12.50 cfs @	12.69 hrs, Volume=	2.310 af	
Outflow =	6.32 cfs @	13.45 hrs, Volume=	2.224 af,	Atten= 49%, Lag= 45.8 min
Primary =	6.32 cfs @	13.45 hrs, Volume=	2.224 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.68' @ 13.45 hrs Surf.Area= 8,737 sf Storage= 26,124 cf
Plug-Flow detention time= 53.9 min calculated for 2.224 af (96% of inflow)
Center-of-Mass det. time= 41.8 min (901.7 - 859.8)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=6.32 cfs @ 13.45 hrs HW=413.68' (Free Discharge)
├**1=Orifice/Grate** (Controls 0.00 cfs)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Culvert** (Inlet Controls 6.32 cfs @ 8.0 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=410.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 0.40"
Inflow = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af
Outflow = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af, Atten= 0%, Lag= 0.0 min
Primary = 7.92 cfs @ 12.50 hrs, Volume= 1.148 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.30' @ 12.50 hrs Surf.Area= 36 sf Storage= 39 cf
Plug-Flow detention time= 0.2 min calculated for 1.148 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (857.7 - 857.6)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.91 cfs @ 12.50 hrs HW=407.30' (Free Discharge)
↑**1=Culvert** (Inlet Controls 7.91 cfs @ 3.6 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area = 4.910 ac, Inflow Depth = 0.32"
Inflow = 1.36 cfs @ 12.19 hrs, Volume= 0.129 af
Outflow = 1.35 cfs @ 12.19 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min
Primary = 1.35 cfs @ 12.19 hrs, Volume= 0.129 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 328.59' @ 12.19 hrs Surf.Area= 20 sf Storage= 12 cf
Plug-Flow detention time= 0.1 min calculated for 0.129 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (852.3 - 852.2)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=1.34 cfs @ 12.19 hrs HW=328.59' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.34 cfs @ 2.2 fps)

Pond MH1:

Inflow Area = 63.710 ac, Inflow Depth = 0.42"
Inflow = 6.32 cfs @ 13.47 hrs, Volume= 2.222 af
Outflow = 6.32 cfs @ 13.46 hrs, Volume= 2.222 af, Atten= 0%, Lag= 0.0 min
Primary = 6.32 cfs @ 13.46 hrs, Volume= 2.222 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.04' @ 13.46 hrs Surf.Area= 12 sf Storage= 25 cf
Plug-Flow detention time= 0.1 min calculated for 2.214 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (902.5 - 902.4)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=6.32 cfs @ 13.46 hrs HW=2.04' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.32 cfs @ 3.3 fps)

Pond MH4: PROPOSED MH

Inflow Area = 7.990 ac, Inflow Depth = 0.38"
Inflow = 2.52 cfs @ 12.25 hrs, Volume= 0.255 af
Outflow = 2.52 cfs @ 12.25 hrs, Volume= 0.254 af, Atten= 0%, Lag= 0.0 min
Primary = 2.52 cfs @ 12.25 hrs, Volume= 0.254 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.69' @ 12.25 hrs Surf.Area= 20 sf Storage= 34 cf
Plug-Flow detention time= 1.1 min calculated for 0.253 af (99% of inflow)
Center-of-Mass det. time= 0.4 min (848.2 - 847.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.51 cfs @ 12.25 hrs HW=421.68' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.51 cfs @ 2.6 fps)

Pond UP2P: BASIN ADJACENT TO SAM STRATTON

Inflow Area =	7.360 ac, Inflow Depth = 0.41"		
Inflow =	1.83 cfs @ 12.49 hrs, Volume=	0.252 af	
Outflow =	1.76 cfs @ 12.57 hrs, Volume=	0.247 af, Atten= 3%, Lag= 5.0 min	
Primary =	1.76 cfs @ 12.57 hrs, Volume=	0.247 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.63' @ 12.57 hrs Surf.Area= 906 sf Storage= 822 cf
Plug-Flow detention time= 14.5 min calculated for 0.247 af (98% of inflow)
Center-of-Mass det. time= 8.1 min (864.5 - 856.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=1.76 cfs @ 12.57 hrs HW=432.62' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.76 cfs @ 2.5 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac, Inflow Depth = 0.38"		
~~Inflow =~~	~~7.31 cfs @ 12.52 hrs, Volume=~~	~~1.040 af~~	
Outflow =	7.32 cfs @ 12.52 hrs, Volume=	1.037 af, Atten= 0%, Lag= 0.6 min	
Primary =	7.32 cfs @ 12.52 hrs, Volume=	1.037 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 425.74' @ 12.52 hrs Surf.Area= 638 sf Storage= 538 cf
Plug-Flow detention time= 2.5 min calculated for 1.037 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (861.8 - 860.5)

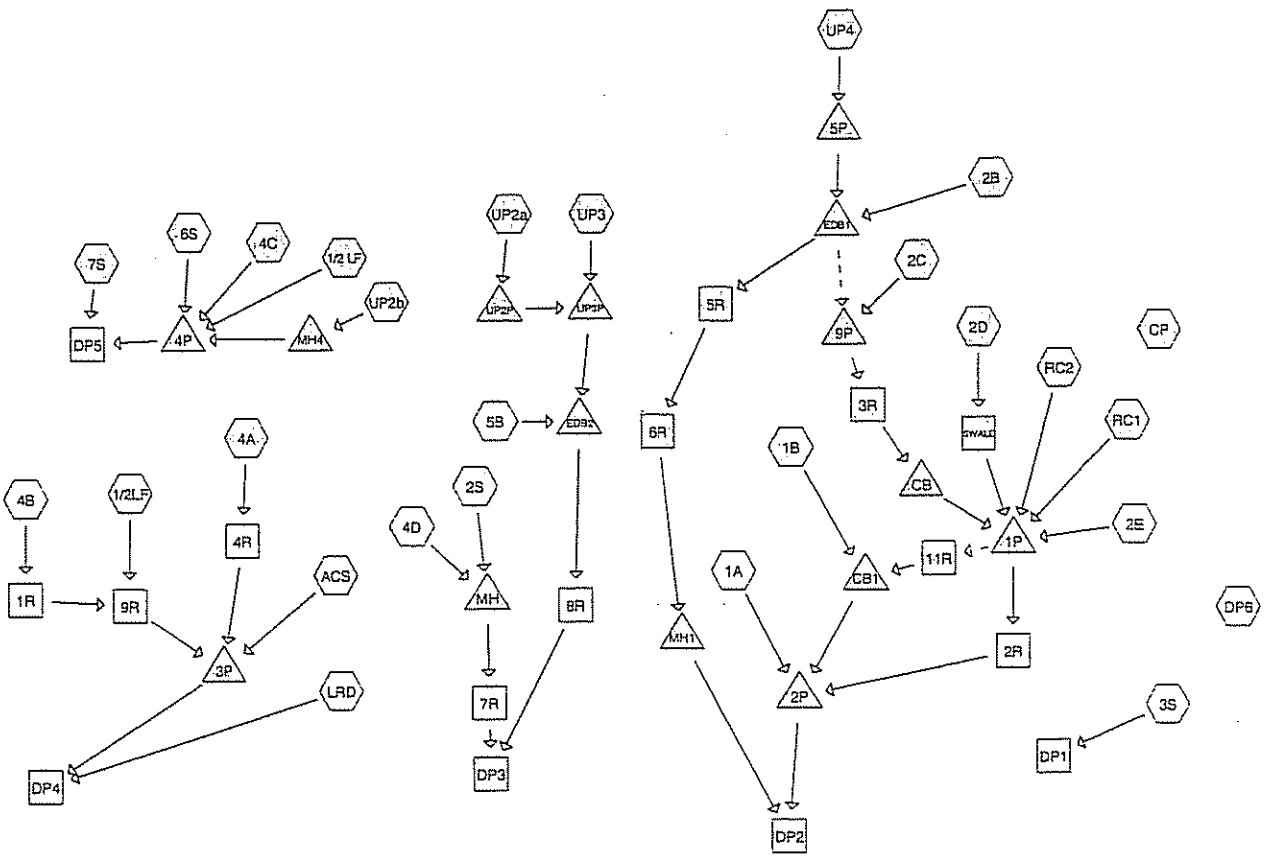
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.29 cfs @ 12.52 hrs HW=425.74' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.29 cfs @ 3.6 fps)

Proposed Drainage Conditions - Phase 2
2-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-closed
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1/2 LF: landfill area Runoff Area=3.710 ac Runoff Depth=0.93"
Flow Length=1,050' Tc=17.0 min CN=80 Runoff=4.52 cfs 0.288 af

Subcatchment 1/2LF: Runoff Area=10.620 ac Runoff Depth=0.93"
Flow Length=1,090' Tc=16.2 min CN=80 Runoff=13.28 cfs 0.825 af

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=0.27"
Flow Length=310' Tc=13.5 min CN=63 Runoff=1.01 cfs 0.085 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=1.05"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=4.57 cfs 0.194 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=1.10"
Flow Length=330' Tc=17.1 min CN=83 Runoff=5.50 cfs 0.349 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=0.78"
Flow Length=340' Tc=22.7 min CN=77 Runoff=1.61 cfs 0.124 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=1.36"
Flow Length=310' Tc=20.4 min CN=87 Runoff=12.82 cfs 0.898 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=0.94"
Flow Length=60' Tc=4.0 min CN=80 Runoff=0.62 cfs 0.025 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=0.45"
Flow Length=840' Tc=21.3 min CN=69 Runoff=2.06 cfs 0.177 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.17"
Flow Length=460' Tc=18.1 min CN=59 Runoff=0.16 cfs 0.026 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=0.94"
Flow Length=510' Tc=7.8 min CN=80 Runoff=0.71 cfs 0.033 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=0.60"
Flow Length=720' Tc=19.4 min CN=73 Runoff=0.68 cfs 0.050 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=0.88"
Flow Length=250' Tc=16.7 min CN=79 Runoff=2.54 cfs 0.161 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=0.22"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.04 cfs 0.003 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=0.98"
Flow Length=210' Tc=24.8 min CN=81 Runoff=1.76 cfs 0.139 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=0.65"
Flow Length=80' Tc=5.2 min CN=74 Runoff=1.93 cfs 0.084 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=0.60"
Flow Length=95' Tc=8.4 min CN=73 Runoff=1.32 cfs 0.064 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=0.29"
Flow Length=465' Tc=13.8 min CN=64 Runoff=0.64 cfs 0.051 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=2.29"
Flow Length=110' Tc=1.9 min CN=98 Runoff=2.79 cfs 0.132 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.11"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.01 cfs 0.002 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=0.29"
Flow Length=401' Tc=12.0 min CN=64 Runoff=0.70 cfs 0.053 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=1.67"
Flow Length=245' Tc=3.9 min CN=91 Runoff=4.87 cfs 0.208 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=1.67"
Flow Length=245' Tc=3.9 min CN=91 Runoff=8.16 cfs 0.349 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=0.55"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=2.61 cfs 0.339 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=0.52"
Flow Length=750' Tc=26.5 min CN=71 Runoff=3.67 cfs 0.346 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=0.51"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=8.20 cfs 1.079 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=0.55"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=16.95 cfs 2.733 af

Reach 1R: Bottom Swale Peak Depth=0.09' Max Vel=1.9 fps Inflow=0.68 cfs 0.050 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.68 cfs 0.050 af

Reach 2R: 18" Peak Depth=0.25' Max Vel=14.8 fps Inflow=2.95 cfs 1.512 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=2.95 cfs 1.511 af

Reach 3R: CULVERT Peak Depth=0.21' Max Vel=4.2 fps Inflow=0.76 cfs 0.087 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=0.74 cfs 0.086 af

Reach 4R: Bottom Swale Peak Depth=0.10' Max Vel=1.7 fps Inflow=0.71 cfs 0.033 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=0.70 cfs 0.033 af

Reach 5R: 24" CULVERT Peak Depth=1.06' Max Vel=4.2 fps Inflow=8.39 cfs 2.984 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=8.39 cfs 2.982 af

Reach 6R: 30 "RCP Peak Depth=0.64' Max Vel=8.4 fps Inflow=8.39 cfs 2.982 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=8.38 cfs 2.981 af

Reach 7R: 24" Peak Depth=0.22' Max Vel=10.7 fps Inflow=2.07 cfs 0.180 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=2.06 cfs 0.180 af

Reach 8R: 24 CULVERT Peak Depth=0.57' Max Vel=15.4 fps Inflow=11.39 cfs 1.548 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=11.35 cfs 1.544 af

Reach 9R: 18" culvert Peak Depth=0.68' Max Vel=18.0 fps Inflow=13.90 cfs 0.875 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=13.90 cfs 0.875 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.04' Max Vel=1.1 fps Inflow=0.16 cfs 0.026 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=0.16 cfs 0.026 af

Reach DP2: CULVERT Peak Depth=0.47' Max Vel=14.9 fps Inflow=9.68 cfs 4.098 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=9.68 cfs 4.096 af

Reach DP3: 30" Peak Depth=0.52' Max Vel=16.6 fps Inflow=12.22 cfs 1.724 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=12.22 cfs 1.723 af

Reach DP4: Inflow=2.48 cfs 0.643 af
Outflow=2.48 cfs 0.643 af

Reach DP5: STREAM Peak Depth=0.07' Max Vel=2.0 fps Inflow=1.41 cfs 0.256 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=1.35 cfs 0.255 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.59' Max Vel=4.2 fps Inflow=12.82 cfs 0.898 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=12.61 cfs 0.896 af

Pond 1P: DETENTION BASIN 1 Peak Elev=403.54' Storage=31,275 cf Inflow=18.58 cfs 1.563 af
Primary=2.95 cfs 1.512 af Secondary=0.00 cfs 0.000 af Outflow=2.95 cfs 1.512 af

Pond 2P: DETENTION BASIN 2 Peak Elev=325.06' Storage=33,459 cf Inflow=6.89 cfs 1.790 af
Primary=2.19 cfs 1.117 af Secondary=0.00 cfs 0.000 af Outflow=2.19 cfs 1.117 af

Pond 3P: DETENTION BASIN 3 Peak Elev=322.43' Storage=20,187 cf Inflow=14.93 cfs 0.959 af
Outflow=2.35 cfs 0.591 af

Pond 4P: DETENTION BASIN 4 Peak Elev=409.87' Storage=29,915 cf Inflow=10.25 cfs 0.878 af
Outflow=0.31 cfs 0.191 af

Pond 5P: ROADSIDE POND UPGRAD. OF EXI Peak Elev=420.06' Storage=70 cf Inflow=16.95 cfs 2.733 af
Outflow=16.95 cfs 2.733 af

Pond 9P: PROPOSED MH Peak Elev=406.40' Storage=1,995 cf Inflow=1.61 cfs 0.124 af
18.0" x 100.0' Culvert Outflow=0.76 cfs 0.087 af

Pond CB: PROPOSED CB Peak Elev=404.38' Storage=29 cf Inflow=0.74 cfs 0.086 af
24.0" x 300.0' Culvert Outflow=0.82 cfs 0.086 af

Pond CB1: proposed cb Peak Elev=1.82' Storage=22 cf Inflow=4.57 cfs 0.194 af
36.0" x 500.0' Culvert Outflow=4.57 cfs 0.194 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=415.08' Storage=40,107 cf Inflow=17.79 cfs 3.082 af
Primary=8.39 cfs 2.984 af Secondary=0.00 cfs 0.000 af Outflow=8.39 cfs 2.984 af

Pond EDB2: DETENTION BASIN ADJACENT T Peak Elev=407.65' Storage=50 cf Inflow=11.39 cfs 1.548 af
24.0" x 80.0' Culvert Outflow=11.39 cfs 1.548 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=328.72' Storage=14 cf Inflow=2.07 cfs 0.180 af
24.0" x 185.0' Culvert Outflow=2.07 cfs 0.180 af

Pond MH1: Peak Elev=2.22' Storage=27 cf Inflow=8.38 cfs 2.981 af
30.0" x 80.0' Culvert Outflow=8.38 cfs 2.981 af

Pond MH4: PROPOSED MH Peak Elev=421.84' Storage=37 cf Inflow=3.67 cfs 0.346 af
24.0" x 300.0' Culvert Outflow=3.64 cfs 0.345 af

Pond UP2P: BASIN ADJACENT TO SAM STR Peak Elev=432.77' Storage=1,009 cf Inflow=2.61 cfs 0.339 af
18.0" x 75.0' Culvert Outflow=2.55 cfs 0.334 af

Pond UP3P: ROAD CULVERT Peak Elev=426.08' Storage=714 cf Inflow=10.67 cfs 1.413 af
24.0" x 95.0' Culvert Outflow=10.64 cfs 1.409 af

Total Runoff Area = 158.800 ac Runoff Volume = 8.817 af Average Runoff Depth = 0.67"

Subcatchment 1/2 LF: landfill area

Runoff = 4.52 cfs @ 12.10 hrs, Volume= 0.288 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
3.710	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	150	0.3300	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
10.0	900	0.0100	1.5		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
17.0	1,050	Total			

Subcatchment 1/2LF:

Runoff = 13.28 cfs @ 12.09 hrs, Volume= 0.825 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
10.620	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	150	0.3200	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.1	940	0.0600	1.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,090	Total			

Subcatchment 1A: south central section btw. gorges

Runoff = 1.01 cfs @ 12.10 hrs, Volume= 0.085 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 5.50 cfs @ 12.10 hrs, Volume= 0.349 af, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 1.61 cfs @ 12.17 hrs, Volume= 0.124 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 12.82 cfs @ 12.13 hrs, Volume= 0.898 af, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 0.62 cfs @ 11.95 hrs, Volume= 0.025 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 2.06 cfs @ 12.18 hrs, Volume= 0.177 af, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 0.16 cfs @ 12.20 hrs, Volume= 0.026 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 0.71 cfs @ 12.00 hrs, Volume= 0.033 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 0.68 cfs @ 12.14 hrs, Volume= 0.050 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.7	600	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.4	720	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 2.54 cfs @ 12.10 hrs, Volume= 0.161 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.04 cfs @ 12.04 hrs, Volume= 0.003 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 1.76 cfs @ 12.19 hrs, Volume= 0.139 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 1.93 cfs @ 11.97 hrs, Volume= 0.084 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 1.32 cfs @ 12.01 hrs, Volume= 0.064 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 0.64 cfs @ 12.10 hrs, Volume= 0.051 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 2.79 cfs @ 11.91 hrs, Volume= 0.132 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.01 cfs @ 12.00 hrs, Volume= 0.002 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 0.70 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 4.87 cfs @ 11.94 hrs, Volume= 0.208 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 8.16 cfs @ 11.94 hrs, Volume= 0.349 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 2.61 cfs @ 12.47 hrs, Volume= 0.339 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 3.67 cfs @ 12.24 hrs, Volume= 0.346 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 8.20 cfs @ 12.47 hrs, Volume= 1.079 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 16.95 cfs @ 12.68 hrs, Volume= 2.733 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 0.60"
Inflow = 0.68 cfs @ 12.14 hrs, Volume= 0.050 af
Outflow = 0.68 cfs @ 12.15 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.09' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 1.28"
Inflow = 2.95 cfs @ 12.84 hrs, Volume= 1.512 af
Outflow = 2.95 cfs @ 12.85 hrs, Volume= 1.511 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.8 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 9.8 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.25' @ 12.85 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 0.54"
Inflow = 0.76 cfs @ 12.45 hrs, Volume= 0.087 af
Outflow = 0.74 cfs @ 12.49 hrs, Volume= 0.086 af, Atten= 2%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.4 fps, Avg. Travel Time= 2.1 min

Peak Depth= 0.21' @ 12.47 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 0.94"
Inflow = 0.71 cfs @ 12.00 hrs, Volume= 0.033 af
Outflow = 0.70 cfs @ 12.00 hrs, Volume= 0.033 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.7 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.5 fps, Avg. Travel Time= 0.7 min

Peak Depth= 0.10' @ 12.00 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.39 cfs @ 13.46 hrs, Volume= 2.984 af
Outflow = 8.39 cfs @ 13.47 hrs, Volume= 2.982 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.8 fps, Avg. Travel Time= 0.4 min

Peak Depth= 1.06' @ 13.46 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 0.56"
Inflow = 8.39 cfs @ 13.47 hrs, Volume= 2.982 af
Outflow = 8.38 cfs @ 13.47 hrs, Volume= 2.981 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.4 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 5.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.64' @ 13.47 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 0.44"
Inflow = 2.07 cfs @ 12.18 hrs, Volume= 0.180 af
Outflow = 2.06 cfs @ 12.19 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.7 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 5.3 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.22' @ 12.18 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 0.54"
Inflow = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af
Outflow = 11.35 cfs @ 12.53 hrs, Volume= 1.544 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 15.4 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 7.7 fps, Avg. Travel Time= 2.2 min

Peak Depth= 0.57' @ 12.51 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 11.620 ac, Inflow Depth = 0.90"
Inflow = 13.90 cfs @ 12.10 hrs, Volume= 0.875 af
Outflow = 13.90 cfs @ 12.10 hrs, Volume= 0.875 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 18.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 7.3 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.68' @ 12.10 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.17"
Inflow = 0.16 cfs @ 12.20 hrs, Volume= 0.026 af
Outflow = 0.16 cfs @ 12.21 hrs, Volume= 0.026 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.1 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.04' @ 12.20 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 0.59"
Inflow = 9.68 cfs @ 13.47 hrs, Volume= 4.098 af
Outflow = 9.68 cfs @ 13.48 hrs, Volume= 4.096 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.9 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 9.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.47' @ 13.48 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 0.53"
Inflow = 12.22 cfs @ 12.50 hrs, Volume= 1.724 af
Outflow = 12.22 cfs @ 12.50 hrs, Volume= 1.723 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 8.4 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.52' @ 12.50 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 16.290 ac, Inflow Depth = 0.47"
Inflow = 2.48 cfs @ 12.65 hrs, Volume= 0.643 af
Outflow = 2.48 cfs @ 12.65 hrs, Volume= 0.643 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 16.730 ac, Inflow Depth = 0.18"
Inflow = 1.41 cfs @ 12.01 hrs, Volume= 0.256 af
Outflow = 1.35 cfs @ 12.04 hrs, Volume= 0.255 af, Atten= 4%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.0 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.07' @ 12.03 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 1.36"
Inflow = 12.82 cfs @ 12.13 hrs, Volume= 0.898 af
Outflow = 12.61 cfs @ 12.17 hrs, Volume= 0.896 af, Atten= 2%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.2 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.3 fps, Avg. Travel Time= 3.8 min

Peak Depth= 0.59' @ 12.15 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 1.33"
Inflow = 18.58 cfs @ 11.96 hrs, Volume= 1.563 af
Outflow = 2.95 cfs @ 12.84 hrs, Volume= 1.512 af, Atten= 84%, Lag= 53.1 min
Primary = 2.95 cfs @ 12.84 hrs, Volume= 1.512 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 403.54' @ 12.84 hrs Surf Area= 8,669 sf Storage= 31,275 cf
Plug-Flow detention time= 121.4 min calculated for 1.512 af (97% of inflow)
Center-of-Mass det. time= 108.9 min (899.1 - 790.2)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.95 cfs @ 12.84 hrs HW=403.54' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 2.95 cfs @ 11.0 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	1.06"	
Inflow =	6.89 cfs @	11.98 hrs, Volume=	1.790 af	
Outflow =	2.19 cfs @	16.78 hrs, Volume=	1.117 af,	Atten= 68%, Lag= 288.2 min
Primary =	2.19 cfs @	16.78 hrs, Volume=	1.117 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.06' @ 16.78 hrs Surf.Area= 13,779 sf Storage= 33,459 cf
Plug-Flow detention time= 182.0 min calculated for 1.117 af (62% of inflow)
Center-of-Mass det. time= 89.7 min (976.3 - 886.6)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.18 cfs @ 16.78 hrs HW=325.06' (Free Discharge)
└─**2=Orifice/Grate** (Orifice Controls 1.59 cfs @ 8.1 fps)
└─**3=Orifice/Grate** (Orifice Controls 0.59 cfs @ 1.9 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 14.140 ac, Inflow Depth = 0.81"
Inflow = 14.93 cfs @ 12.09 hrs, Volume= 0.959 af
Outflow = 2.35 cfs @ 12.66 hrs, Volume= 0.591 af, Atten= 84%, Lag= 34.3 min
Primary = 2.35 cfs @ 12.66 hrs, Volume= 0.591 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 322.43' @ 12.66 hrs Surf.Area= 6,131 sf Storage= 20,187 cf
Plug-Flow detention time= 164.1 min calculated for 0.591 af (62% of inflow)
Center-of-Mass det. time= 82.9 min (895.4 - 812.6)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.34 cfs @ 12.66 hrs HW=322.43' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.85 cfs @ 2.5 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 0.49 cfs @ 10.0 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 15.450 ac, Inflow Depth = 0.68"
Inflow = 10.25 cfs @ 12.12 hrs, Volume= 0.878 af
Outflow = 0.31 cfs @ 20.00 hrs, Volume= 0.191 af, Atten= 97%, Lag= 472.7 min
Primary = 0.31 cfs @ 20.00 hrs, Volume= 0.191 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 409.87' @ 20.00 hrs Surf.Area= 17,739 sf Storage= 29,915 cf
Plug-Flow detention time= 254.7 min calculated for 0.191 af (22% of inflow)
Center-of-Mass det. time= 149.9 min (972.7 - 822.8)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.31 cfs @ 20.00 hrs HW=409.87' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.4 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area = 59.910 ac, Inflow Depth = 0.55"
Inflow = 16.95 cfs @ 12.68 hrs, Volume= 2.733 af
Outflow = 16.95 cfs @ 12.69 hrs, Volume= 2.733 af, Atten= 0%, Lag= 0.1 min
Primary = 16.95 cfs @ 12.69 hrs, Volume= 2.733 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 420.06' @ 12.69 hrs Surf.Area= 1,006 sf Storage= 70 cf
Plug-Flow detention time= 0.1 min calculated for 2.733 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (860.4 - 860.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=21.03 cfs @ 12.69 hrs HW=420.06' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.52 cfs @ 4.0 fps)
└—**2=Culvert** (Inlet Controls 10.52 cfs @ 4.0 fps)

Pond 9P: PROPOSED MH

Inflow Area = 1.910 ac, Inflow Depth = 0.78"
Inflow = 1.61 cfs @ 12.17 hrs, Volume= 0.124 af
Outflow = 0.76 cfs @ 12.45 hrs, Volume= 0.087 af, Atten= 53%, Lag= 16.7 min
Primary = 0.76 cfs @ 12.45 hrs, Volume= 0.087 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.40' @ 12.45 hrs Surf.Area= 1,099 sf Storage= 1,995 cf
Plug-Flow detention time= 120.8 min calculated for 0.086 af (70% of inflow)
Center-of-Mass det. time= 49.0 min (870.4 - 821.4)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.75 cfs @ 12.45 hrs HW=406.40' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.75 cfs @ 2.0 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 0.54"
Inflow = 0.74 cfs @ 12.49 hrs, Volume= 0.086 af
Outflow = 0.82 cfs @ 12.50 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.6 min
Primary = 0.82 cfs @ 12.50 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 404.38' @ 12.50 hrs Surf.Area= 12 sf Storage= 29 cf
Plug-Flow detention time= 3.1 min calculated for 0.085 af (99% of inflow)
Center-of-Mass det. time= 1.0 min (873.4 - 872.4)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=0.81 cfs @ 12.50 hrs HW=404.38' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.81 cfs @ 2.0 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 1.05"
Inflow = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af
Outflow = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af, Atten= 0%, Lag= 0.0 min
Primary = 4.57 cfs @ 11.96 hrs, Volume= 0.194 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1.82' @ 11.96 hrs Surf.Area= 12 sf Storage= 22 cf
Plug-Flow detention time= 0.9 min calculated for 0.194 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (796.0 - 795.6)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=4.42 cfs @ 11.96 hrs HW=1.81' (Free Discharge)
└─**1=Culvert** (Inlet Controls 4.42 cfs @ 2.9 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	0.58"	
Inflow =	17.79 cfs @	12.67 hrs, Volume=	3.082 af	
Outflow =	8.39 cfs @	13.46 hrs, Volume=	2.984 af,	Atten= 53%, Lag= 47.3 min
Primary =	8.39 cfs @	13.46 hrs, Volume=	2.984 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 415.08' @ 13.46 hrs Surf.Area= 10,682 sf Storage= 40,107 cf
Plug-Flow detention time= 64.4 min calculated for 2.984 af (97% of inflow)
Center-of-Mass det. time= 53.8 min (907.7 - 853.8)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.32 cfs @ 13.46 hrs HW=415.08' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 0.74 cfs @ 0.9 fps)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Culvert** (Inlet Controls 7.58 cfs @ 9.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=410.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 0.54"
Inflow = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af
Outflow = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af, Atten= 0%, Lag= 0.0 min
Primary = 11.39 cfs @ 12.50 hrs, Volume= 1.548 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.65' @ 12.50 hrs Surf.Area= 43 sf Storage= 50 cf
Plug-Flow detention time= 0.1 min calculated for 1.543 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (850.4 - 850.3)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.39 cfs @ 12.50 hrs HW=407.65' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.39 cfs @ 4.1 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area = 4.910 ac, Inflow Depth = 0.44"
Inflow = 2.07 cfs @ 12.18 hrs, Volume= 0.180 af
Outflow = 2.07 cfs @ 12.18 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Primary = 2.07 cfs @ 12.18 hrs, Volume= 0.180 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 328.72' @ 12.18 hrs Surf.Area= 20 sf Storage= 14 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.05 cfs @ 12.18 hrs HW=328.71' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.05 cfs @ 2.5 fps)

Pond MH1:

Inflow Area =	63.710 ac,	Inflow Depth =	0.56"	
Inflow =	8.38 cfs @	13.47 hrs, Volume=	2.981 af	
Outflow =	8.38 cfs @	13.47 hrs, Volume=	2.981 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.38 cfs @	13.47 hrs, Volume=	2.981 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.22' @ 13.47 hrs Surf.Area= 12 sf Storage= 27 cf
Plug-Flow detention time= 0.1 min calculated for 2.971 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (908.4 - 908.4)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.37 cfs @ 13.47 hrs HW=2.22' (Free Discharge)
↑**1=Culvert** (Inlet Controls 8.37 cfs @ 3.5 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac,	Inflow Depth =	0.52"	
Inflow =	3.67 cfs @	12.24 hrs, Volume=	0.346 af	
Outflow =	3.64 cfs @	12.23 hrs, Volume=	0.345 af,	Atten= 1%, Lag= 0.0 min
Primary =	3.64 cfs @	12.23 hrs, Volume=	0.345 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.84' @ 12.23 hrs Surf.Area= 20 sf Storage= 37 cf
Plug-Flow detention time= 0.8 min calculated for 0.344 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (840.4 - 840.1)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=3.63 cfs @ 12.23 hrs HW=421.84' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.63 cfs @ 2.9 fps)

Pond UP2P: BASIN ADJACENT TO SAM STRATTON

Inflow Area = 7.360 ac, Inflow Depth = 0.55"
Inflow = 2.61 cfs @ 12.47 hrs, Volume= 0.339 af
Outflow = 2.55 cfs @ 12.54 hrs, Volume= 0.334 af, Atten= 2%, Lag= 4.2 min
Primary = 2.55 cfs @ 12.54 hrs, Volume= 0.334 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.77' @ 12.54 hrs Surf.Area= 1,061 sf Storage= 1,009 cf
Plug-Flow detention time= 12.5 min calculated for 0.334 af (98% of inflow)
Center-of-Mass det. time= 7.1 min (856.4 - 849.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=2.55 cfs @ 12.54 hrs HW=432.77' (Free Discharge)
↑**1=Culvert** (Inlet Controls 2.55 cfs @ 2.8 fps)

Pond UP3P: ROAD CULVERT

Inflow Area = 32.530 ac, Inflow Depth = 0.52"
Inflow = 10.67 cfs @ 12.49 hrs, Volume= 1.413 af
Outflow = 10.64 cfs @ 12.52 hrs, Volume= 1.409 af, Atten= 0%, Lag= 1.8 min
Primary = 10.64 cfs @ 12.52 hrs, Volume= 1.409 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 426.08' @ 12.52 hrs Surf.Area= 767 sf Storage= 714 cf
Plug-Flow detention time= 2.1 min calculated for 1.404 af (99% of inflow)
Center-of-Mass det. time= 1.1 min (854.0 - 852.9)

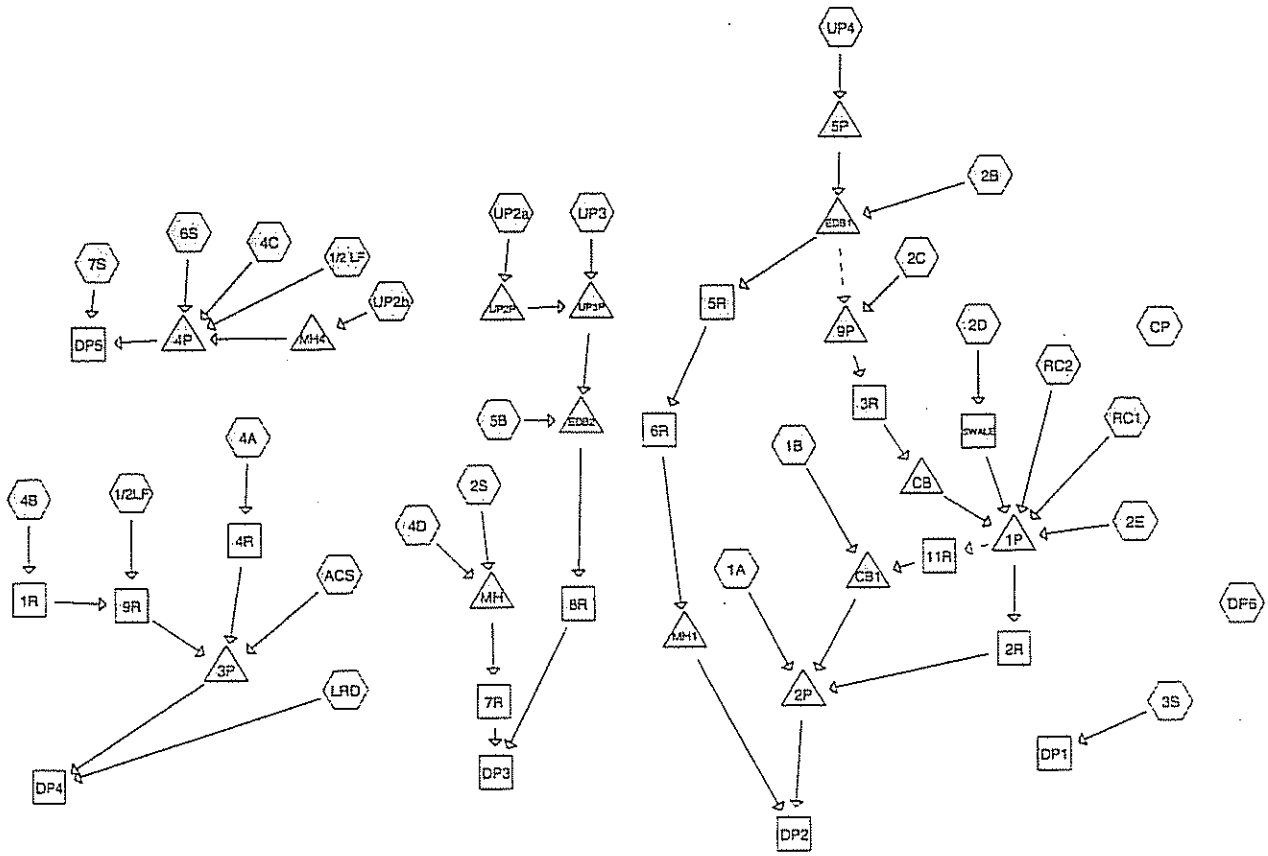
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=10.61 cfs @ 12.52 hrs HW=426.07' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.61 cfs @ 4.0 fps)

Proposed Drainage Conditions - Phase 2
10-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-closed
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1/2 LF: landfill area Runoff Area=3.710 ac Runoff Depth=1.80"
Flow Length=1,050' Tc=17.0 min CN=80 Runoff=8.77 cfs 0.556 af

Subcatchment 1/2LF: Runoff Area=10.620 ac Runoff Depth=1.80"
Flow Length=1,090' Tc=16.2 min CN=80 Runoff=25.74 cfs 1.591 af

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=0.76"
Flow Length=310' Tc=13.5 min CN=63 Runoff=3.97 cfs 0.245 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=1.96"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=8.38 cfs 0.362 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.03"
Flow Length=330' Tc=17.1 min CN=83 Runoff=10.06 cfs 0.642 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=1.58"
Flow Length=340' Tc=22.7 min CN=77 Runoff=3.37 cfs 0.251 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=2.36"
Flow Length=310' Tc=20.4 min CN=87 Runoff=21.91 cfs 1.558 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=1.81"
Flow Length=60' Tc=4.0 min CN=80 Runoff=1.18 cfs 0.048 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=1.07"
Flow Length=840' Tc=21.3 min CN=69 Runoff=5.68 cfs 0.423 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.58"
Flow Length=460' Tc=18.1 min CN=59 Runoff=1.08 cfs 0.087 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=1.80"
Flow Length=510' Tc=7.8 min CN=80 Runoff=1.36 cfs 0.063 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=1.31"
Flow Length=720' Tc=19.4 min CN=73 Runoff=1.59 cfs 0.110 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=1.72"
Flow Length=250' Tc=16.7 min CN=79 Runoff=5.04 cfs 0.316 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=0.67"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.20 cfs 0.010 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=1.87"
Flow Length=210' Tc=24.8 min CN=81 Runoff=3.37 cfs 0.264 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=1.39"
Flow Length=80' Tc=5.2 min CN=74 Runoff=4.21 cfs 0.179 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=1.32"
Flow Length=95' Tc=8.4 min CN=73 Runoff=2.99 cfs 0.141 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=0.81"
Flow Length=465' Tc=13.8 min CN=64 Runoff=2.30 cfs 0.142 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=3.38"
Flow Length=110' Tc=1.9 min CN=98 Runoff=4.06 cfs 0.194 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.46"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.17 cfs 0.008 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=0.81"
Flow Length=401' Tc=12.0 min CN=64 Runoff=2.54 cfs 0.145 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=2.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=7.69 cfs 0.340 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=2.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=12.91 cfs 0.571 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.24"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=6.49 cfs 0.760 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.19"
Flow Length=750' Tc=26.5 min CN=71 Runoff=9.38 cfs 0.791 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.18"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=21.13 cfs 2.472 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.23"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=42.24 cfs 6.136 af

Reach 1R: Bottom Swale Peak Depth=0.14' Max Vel=2.5 fps Inflow=1.59 cfs 0.110 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.59 cfs 0.110 af

Reach 2R: 18" Peak Depth=0.51' Max Vel=22.0 fps Inflow=11.59 cfs 2.829 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=11.58 cfs 2.828 af

Reach 3R: CULVERT Peak Depth=0.66' Max Vel=8.3 fps Inflow=7.50 cfs 0.475 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=7.48 cfs 0.475 af

~~**Reach 4R: Bottom Swale** Peak Depth=0.14' Max Vel=2.2 fps Inflow=1.36 cfs 0.063 af~~
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=1.35 cfs 0.063 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.2 fps Inflow=34.05 cfs 6.324 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.36 cfs 6.321 af

Reach 6R: 30 "RCP Peak Depth=1.08' Max Vel=11.1 fps Inflow=22.36 cfs 6.321 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=22.43 cfs 6.320 af

Reach 7R: 24" Peak Depth=0.37' Max Vel=14.6 fps Inflow=5.74 cfs 0.433 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=5.72 cfs 0.433 af

Reach 8R: 24 CULVERT Peak Depth=0.90' Max Vel=19.4 fps Inflow=26.57 cfs 3.483 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=26.54 cfs 3.478 af

Reach 9R: 18" culvert Peak Depth=1.03' Max Vel=21.0 fps Inflow=27.25 cfs 1.700 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=27.24 cfs 1.700 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.11' Max Vel=2.2 fps Inflow=1.08 cfs 0.087 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.08 cfs 0.087 af

Reach DP2: CULVERT Peak Depth=0.87' Max Vel=21.0 fps Inflow=31.68 cfs 8.990 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=31.70 cfs 8.987 af

Reach DP3: 30" Peak Depth=0.79' Max Vel=21.1 fps Inflow=28.07 cfs 3.911 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=28.07 cfs 3.910 af

Reach DP4: Inflow=16.36 cfs 1.660 af
Outflow=16.36 cfs 1.660 af

Reach DP5: STREAM Peak Depth=0.11' Max Vel=2.7 fps Inflow=3.17 cfs 0.422 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=3.06 cfs 0.420 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.80' Max Vel=4.9 fps Inflow=21.91 cfs 1.558 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=21.61 cfs 1.555 af

Pond 1P: DETENTION BASIN 1 Peak Elev=405.38' Storage=49,373 cf Inflow=31.19 cfs 2.989 af
Primary=11.59 cfs 2.829 af Secondary=0.00 cfs 0.000 af Outflow=11.59 cfs 2.829 af

Pond 2P: DETENTION BASIN 2 Peak Elev=325.97' Storage=45,761 cf Inflow=13.27 cfs 3.435 af
Primary=9.32 cfs 2.671 af Secondary=0.00 cfs 0.000 af Outflow=9.32 cfs 2.671 af

Pond 3P: DETENTION BASIN 3 Peak Elev=323.96' Storage=30,470 cf Inflow=30.30 cfs 1.905 af
Outflow=15.50 cfs 1.515 af

Pond 4P: DETENTION BASIN 4 Peak Elev=411.67' Storage=67,955 cf Inflow=22.34 cfs 1.841 af
Outflow=0.45 cfs 0.281 af

Pond 5P: ROADSIDE POND UPGRAD. OF E Peak Elev=421.70' Storage=1,868 cf Inflow=42.24 cfs 6.136 af
Outflow=42.05 cfs 6.135 af

Pond 9P: PROPOSED MH Peak Elev=407.63' Storage=3,544 cf Inflow=8.09 cfs 0.513 af
18.0" x 100.0' Culvert Outflow=7.50 cfs 0.475 af

Pond CB: PROPOSED CB Peak Elev=405.26' Storage=39 cf Inflow=7.48 cfs 0.475 af
24.0" x 300.0' Culvert Outflow=7.43 cfs 0.474 af

Pond CB1: proposed cb Peak Elev=2.14' Storage=26 cf Inflow=8.38 cfs 0.362 af
36.0" x 500.0' Culvert Outflow=8.37 cfs 0.362 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.54' Storage=56,966 cf Inflow=43.43 cfs 6.778 af
Primary=34.05 cfs 6.324 af Secondary=7.50 cfs 0.262 af Outflow=41.54 cfs 6.586 af

Pond EDB2: DETENTION BASIN ADJACEN Peak Elev=410.51' Storage=1,954 cf Inflow=27.28 cfs 3.484 af
24.0" x 80.0' Culvert Outflow=26.57 cfs 3.483 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.18' Storage=24 cf Inflow=5.75 cfs 0.433 af
24.0" x 185.0' Culvert Outflow=5.74 cfs 0.433 af

Pond MH1: Peak Elev=3.26' Storage=39 cf Inflow=22.43 cfs 6.320 af
30.0" x 80.0' Culvert Outflow=22.44 cfs 6.319 af

Pond MH4: PROPOSED MH Peak Elev=422.45' Storage=49 cf Inflow=9.38 cfs 0.791 af
24.0" x 300.0' Culvert Outflow=9.38 cfs 0.790 af

Pond UP2P: BASIN ADJACENT TO SAM STR Peak Elev=433.38' Storage=1,805 cf Inflow=6.49 cfs 0.760 af
18.0" x 75.0' Culvert Outflow=6.35 cfs 0.752 af

Pond UP3P: ROAD CULVERT Peak Elev=428.87' Storage=4,150 cf Inflow=27.37 cfs 3.224 af
24.0" x 95.0' Culvert Outflow=26.02 cfs 3.219 af

Total Runoff Area = 158.800 ac Runoff Volume = 18.405 af Average Runoff Depth = 1.39"

Subcatchment 1/2 LF: landfill area

Runoff = 8.77 cfs @ 12.10 hrs, Volume= 0.556 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
3.710	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	150	0.3300	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
10.0	900	0.0100	1.5		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
17.0	1,050	Total			

Subcatchment 1/2LF:

Runoff = 25.74 cfs @ 12.09 hrs, Volume= 1.591 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
10.620	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	150	0.3200	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.1	940	0.0600	1.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,090	Total			

Subcatchment 1A: south central section btw. gorges

Runoff = 3.97 cfs @ 12.07 hrs, Volume= 0.245 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 8.38 cfs @ 11.96 hrs, Volume= 0.362 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 10.06 cfs @ 12.10 hrs, Volume= 0.642 af, Depth= 2.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 3.37 cfs @ 12.16 hrs, Volume= 0.251 af, Depth= 1.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 21.91 cfs @ 12.13 hrs, Volume= 1.558 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 1.18 cfs @ 11.95 hrs, Volume= 0.048 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 5.68 cfs @ 12.16 hrs, Volume= 0.423 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.087 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.36 cfs @ 11.99 hrs, Volume= 0.063 af, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.7	600	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.4	720	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 5.04 cfs @ 12.09 hrs, Volume= 0.316 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.20 cfs @ 12.01 hrs, Volume= 0.010 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 3.37 cfs @ 12.19 hrs, Volume= 0.264 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 4.21 cfs @ 11.96 hrs, Volume= 0.179 af, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 2.99 cfs @ 12.00 hrs, Volume= 0.141 af, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 2.30 cfs @ 12.08 hrs, Volume= 0.142 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 4.06 cfs @ 11.91 hrs, Volume= 0.194 af, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.17 cfs @ 11.95 hrs, Volume= 0.008 af, Depth= 0.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 2.54 cfs @ 12.06 hrs, Volume= 0.145 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 7.69 cfs @ 11.94 hrs, Volume= 0.340 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 12.91 cfs @ 11.94 hrs, Volume= 0.571 af, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 6.49 cfs @ 12.43 hrs, Volume= 0.760 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 9.38 cfs @ 12.22 hrs, Volume= 0.791 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 21.13 cfs @ 12.44 hrs, Volume= 2.472 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 42.24 cfs @ 12.65 hrs, Volume= 6.136 af, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.90"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 1.31"
Inflow = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af
Outflow = 1.59 cfs @ 12.13 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.14' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 2.40"
Inflow = 11.59 cfs @ 12.46 hrs, Volume= 2.829 af
Outflow = 11.58 cfs @ 12.47 hrs, Volume= 2.828 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 11.4 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.51' @ 12.46 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 2.99"
Inflow = 7.50 cfs @ 12.88 hrs, Volume= 0.475 af
Outflow = 7.48 cfs @ 12.90 hrs, Volume= 0.475 af, Atten= 0%, Lag= 1.2 min

~~Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs~~
Max. Velocity= 8.3 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.2 fps, Avg. Travel Time= 1.6 min

Peak Depth= 0.66' @ 12.89 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 1.80"
Inflow = 1.36 cfs @ 11.99 hrs, Volume= 0.063 af
Outflow = 1.35 cfs @ 12.00 hrs, Volume= 0.063 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.6 min

Peak Depth= 0.14' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 1.19"
Inflow = 34.05 cfs @ 12.81 hrs, Volume= 6.324 af
Outflow = 22.36 cfs @ 12.65 hrs, Volume= 6.321 af, Atten= 34%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.60 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.19"
Inflow = 22.36 cfs @ 12.65 hrs, Volume= 6.321 af
Outflow = 22.43 cfs @ 12.65 hrs, Volume= 6.320 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.08' @ 12.65 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 1.06"
Inflow = 5.74 cfs @ 12.16 hrs, Volume= 0.433 af
Outflow = 5.72 cfs @ 12.16 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.6 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 6.5 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.37' @ 12.16 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 1.22"
Inflow = 26.57 cfs @ 12.62 hrs, Volume= 3.483 af
Outflow = 26.54 cfs @ 12.64 hrs, Volume= 3.478 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 19.4 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 8.6 fps, Avg. Travel Time= 1.9 min

Peak Depth= 0.90' @ 12.63 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 11.620 ac, Inflow Depth = 1.76"
Inflow = 27.25 cfs @ 12.09 hrs, Volume= 1.700 af
Outflow = 27.24 cfs @ 12.09 hrs, Volume= 1.700 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 8.2 fps, Avg. Travel Time= 0.0 min

Peak Depth= 1.03' @ 12.09 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

~~Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs~~
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.58"
Inflow = 1.08 cfs @ 12.14 hrs, Volume= 0.087 af
Outflow = 1.08 cfs @ 12.15 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.11' @ 12.15 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 1.29"
Inflow = 31.68 cfs @ 13.31 hrs, Volume= 8.990 af
Outflow = 31.70 cfs @ 13.31 hrs, Volume= 8.987 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.87' @ 13.31 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 1.20"
Inflow = 28.07 cfs @ 12.60 hrs, Volume= 3.911 af
Outflow = 28.07 cfs @ 12.61 hrs, Volume= 3.910 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 9.5 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.79' @ 12.60 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 16.290 ac, Inflow Depth = 1.22"
Inflow = 16.36 cfs @ 12.26 hrs, Volume= 1.660 af
Outflow = 16.36 cfs @ 12.26 hrs, Volume= 1.660 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 16.730 ac, Inflow Depth = 0.30"
Inflow = 3.17 cfs @ 12.01 hrs, Volume= 0.422 af
Outflow = 3.06 cfs @ 12.02 hrs, Volume= 0.420 af, Atten= 4%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.11' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 2.36"
Inflow = 21.91 cfs @ 12.13 hrs, Volume= 1.558 af
Outflow = 21.61 cfs @ 12.16 hrs, Volume= 1.555 af, Atten= 1%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.9 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 3.3 min

Peak Depth= 0.80' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 2.54"
Inflow = 31.19 cfs @ 11.96 hrs, Volume= 2.989 af
Outflow = 11.59 cfs @ 12.46 hrs, Volume= 2.829 af, Atten= 63%, Lag= 30.1 min
Primary = 11.59 cfs @ 12.46 hrs, Volume= 2.829 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
~~Peak Elev= 405.38' @ 12.46 hrs Surf.Area= 10,919 sf Storage= 49,373 cf~~
Plug-Flow detention time= 105.5 min calculated for 2.829 af (95% of inflow)
Center-of-Mass det. time= 85.9 min (864.3 - 778.4)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=11.56 cfs @ 12.46 hrs HW=405.37' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 8.14 cfs @ 4.0 fps)
└—**3=Orifice/Grate** (Orifice Controls 3.42 cfs @ 12.8 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	2.04"	
Inflow =	13.27 cfs @	12.44 hrs, Volume=	3.435 af	
Outflow =	9.32 cfs @	13.31 hrs, Volume=	2.671 af,	Atten= 30%, Lag= 52.2 min
Primary =	9.32 cfs @	13.31 hrs, Volume=	2.671 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.97' @ 13.31 hrs Surf.Area= 16,144 sf Storage= 45,761 cf
Plug-Flow detention time= 122.8 min calculated for 2.671 af (78% of inflow)
Center-of-Mass det. time= 58.2 min (911.8 - 853.6)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=9.32 cfs @ 13.31 hrs HW=325.96' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.82 cfs @ 9.3 fps)
└—**3=Orifice/Grate** (Orifice Controls 7.49 cfs @ 3.8 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area =	14.140 ac,	Inflow Depth =	1.62"	
Inflow =	30.30 cfs @	12.08 hrs, Volume=	1.905 af	
Outflow =	15.50 cfs @	12.27 hrs, Volume=	1.515 af,	Atten= 49%, Lag= 10.9 min
Primary =	15.50 cfs @	12.27 hrs, Volume=	1.515 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 323.96' @ 12.27 hrs Surf.Area= 7,694 sf Storage= 30,470 cf
Plug-Flow detention time= 97.3 min calculated for 1.510 af (79% of inflow)
Center-of-Mass det. time= 41.7 min (840.5 - 798.8)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=15.32 cfs @ 12.27 hrs HW=323.95' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 14.75 cfs @ 4.5 fps)
├—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 0.57 cfs @ 11.6 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area = 15.450 ac, Inflow Depth = 1.43"
Inflow = 22.34 cfs @ 12.12 hrs, Volume= 1.841 af
Outflow = 0.45 cfs @ 20.00 hrs, Volume= 0.281 af, Atten= 98%, Lag= 472.8 min
Primary = 0.45 cfs @ 20.00 hrs, Volume= 0.281 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 411.67' @ 20.00 hrs Surf.Area= 23,853 sf Storage= 67,955 cf
Plug-Flow detention time= 262.4 min calculated for 0.280 af (15% of inflow)
Center-of-Mass det. time= 158.2 min (966.1 - 807.9)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.45 cfs @ 20.00 hrs HW=411.67' (Free Discharge)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)
└─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Orifice/Grate** (Orifice Controls 0.45 cfs @ 9.1 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area = 59.910 ac, Inflow Depth = 1.23"
Inflow = 42.24 cfs @ 12.65 hrs, Volume= 6.136 af
Outflow = 42.05 cfs @ 12.68 hrs, Volume= 6.135 af, Atten= 0%, Lag= 1.9 min
Primary = 42.05 cfs @ 12.68 hrs, Volume= 6.135 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 421.70' @ 12.68 hrs Surf.Area= 1,170 sf Storage= 1,868 cf
Plug-Flow detention time= 0.3 min calculated for 6.135 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (844.2 - 844.0)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=41.97 cfs @ 12.68 hrs HW=421.69' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 20.98 cfs @ 6.7 fps)
└—**2=Culvert** (Inlet Controls 20.98 cfs @ 6.7 fps)

Pond 9P: PROPOSED MH

Inflow Area = 1.910 ac, Inflow Depth = 3.22"
Inflow = 8.09 cfs @ 12.80 hrs, Volume= 0.513 af
Outflow = 7.50 cfs @ 12.88 hrs, Volume= 0.475 af, Atten= 7%, Lag= 4.9 min
Primary = 7.50 cfs @ 12.88 hrs, Volume= 0.475 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.63' @ 12.88 hrs Surf.Area= 1,409 sf Storage= 3,544 cf
Plug-Flow detention time= 32.5 min calculated for 0.474 af (92% of inflow)
Center-of-Mass det. time= 11.7 min (801.9 - 790.2)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.47 cfs @ 12.88 hrs HW=407.63' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 7.47 cfs @ 4.2 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 2.98"
Inflow = 7.48 cfs @ 12.90 hrs, Volume= 0.475 af
Outflow = 7.43 cfs @ 12.95 hrs, Volume= 0.474 af, Atten= 1%, Lag= 2.8 min
Primary = 7.43 cfs @ 12.95 hrs, Volume= 0.474 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 405.26' @ 12.95 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.6 min calculated for 0.474 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (803.3 - 803.1)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=7.43 cfs @ 12.95 hrs HW=405.26' (Free Discharge)
↑**1=Culvert** (Inlet Controls 7.43 cfs @ 3.6 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 1.96"
Inflow = 8.38 cfs @ 11.96 hrs, Volume= 0.362 af
Outflow = 8.37 cfs @ 11.96 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min
Primary = 8.37 cfs @ 11.96 hrs, Volume= 0.362 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.14' @ 11.96 hrs Surf.Area= 12 sf Storage= 26 cf
Plug-Flow detention time= 0.6 min calculated for 0.362 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (782.6 - 782.3)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.17 cfs @ 11.96 hrs HW=2.12' (Free Discharge)
└─**1=Culvert** (Inlet Controls 8.17 cfs @ 3.4 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	1.28"	
Inflow =	43.43 cfs @	12.67 hrs, Volume=	6.778 af	
Outflow =	41.54 cfs @	12.81 hrs, Volume=	6.586 af,	Atten= 4%, Lag= 8.3 min
Primary =	34.05 cfs @	12.81 hrs, Volume=	6.324 af	
Secondary =	7.50 cfs @	12.81 hrs, Volume=	0.262 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.54' @ 12.81 hrs Surf.Area= 13,335 sf Storage= 56,966 cf
Plug-Flow detention time= 48.8 min calculated for 6.564 af (97% of inflow)
Center-of-Mass det. time= 39.2 min (878.2 - 839.0)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=33.95 cfs @ 12.81 hrs HW=416.54' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 19.99 cfs @ 5.6 fps)
├─**2=Orifice/Grate** (Weir Controls 5.25 cfs @ 1.5 fps)
└─**3=Culvert** (Inlet Controls 8.71 cfs @ 11.1 fps)

Secondary OutFlow Max=7.44 cfs @ 12.81 hrs HW=416.54' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 7.44 cfs @ 1.7 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 1.22"
Inflow = 27.28 cfs @ 12.53 hrs, Volume= 3.484 af
Outflow = 26.57 cfs @ 12.62 hrs, Volume= 3.483 af, Atten= 3%, Lag= 5.4 min
Primary = 26.57 cfs @ 12.62 hrs, Volume= 3.483 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 410.51' @ 12.62 hrs Surf.Area= 1,385 sf Storage= 1,954 cf
Plug-Flow detention time= 0.4 min calculated for 3.472 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (833.9 - 833.5)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=26.54 cfs @ 12.62 hrs HW=410.50' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 26.54 cfs @ 8.4 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area = 4.910 ac, Inflow Depth = 1.06"
Inflow = 5.75 cfs @ 12.16 hrs, Volume= 0.433 af
Outflow = 5.74 cfs @ 12.16 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.0 min
Primary = 5.74 cfs @ 12.16 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.18' @ 12.16 hrs Surf.Area= 20 sf Storage= 24 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=5.70 cfs @ 12.16 hrs HW=329.18' (Free Discharge)
└**1=Culvert** (Inlet Controls 5.70 cfs @ 3.3 fps)

Pond MH1:

Inflow Area =	63.710 ac,	Inflow Depth =	1.19"	
Inflow =	22.43 cfs @	12.65 hrs, Volume=	6.320 af	
Outflow =	22.44 cfs @	12.65 hrs, Volume=	6.319 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.44 cfs @	12.65 hrs, Volume=	6.319 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.26' @ 12.65 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.0 min calculated for 6.319 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (887.8 - 887.8)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.44 cfs @ 12.65 hrs HW=3.26' (Free Discharge)
└**1=Culvert** (Inlet Controls 22.44 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac,	Inflow Depth =	1.19"	
Inflow =	9.38 cfs @	12.22 hrs, Volume=	0.791 af	
Outflow =	9.38 cfs @	12.22 hrs, Volume=	0.790 af,	Atten= 0%, Lag= 0.0 min
Primary =	9.38 cfs @	12.22 hrs, Volume=	0.790 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 422.45' @ 12.22 hrs Surf.Area= 20 sf Storage= 49 cf
Plug-Flow detention time= 0.4 min calculated for 0.788 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (822.1 - 821.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.30 cfs @ 12.22 hrs HW=422.44' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.30 cfs @ 3.8 fps)

Pond UP2P: BASIN ADJACENT TO SAM STRATTON

Inflow Area =	7.360 ac, Inflow Depth = 1.24"		
Inflow =	6.49 cfs @ 12.43 hrs, Volume=	0.760 af	
Outflow =	6.35 cfs @ 12.50 hrs, Volume=	0.752 af, Atten= 2%, Lag= 4.1 min	
Primary =	6.35 cfs @ 12.50 hrs, Volume=	0.752 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 433.38' @ 12.50 hrs Surf.Area= 1,721 sf Storage= 1,805 cf
Plug-Flow detention time= 8.6 min calculated for 0.752 af (99% of inflow)
Center-of-Mass det. time= 5.2 min (837.6 - 832.5)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=6.35 cfs @ 12.50 hrs HW=433.37' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 6.35 cfs @ 3.7 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac, Inflow Depth = 1.19"		
Inflow =	27.37 cfs @ 12.45 hrs, Volume=	3.224 af	
Outflow =	26.02 cfs @ 12.55 hrs, Volume=	3.219 af, Atten= 5%, Lag= 6.0 min	
Primary =	26.02 cfs @ 12.55 hrs, Volume=	3.219 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 428.87' @ 12.55 hrs Surf.Area= 1,720 sf Storage= 4,150 cf
Plug-Flow detention time= 2.0 min calculated for 3.209 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (836.3 - 834.9)

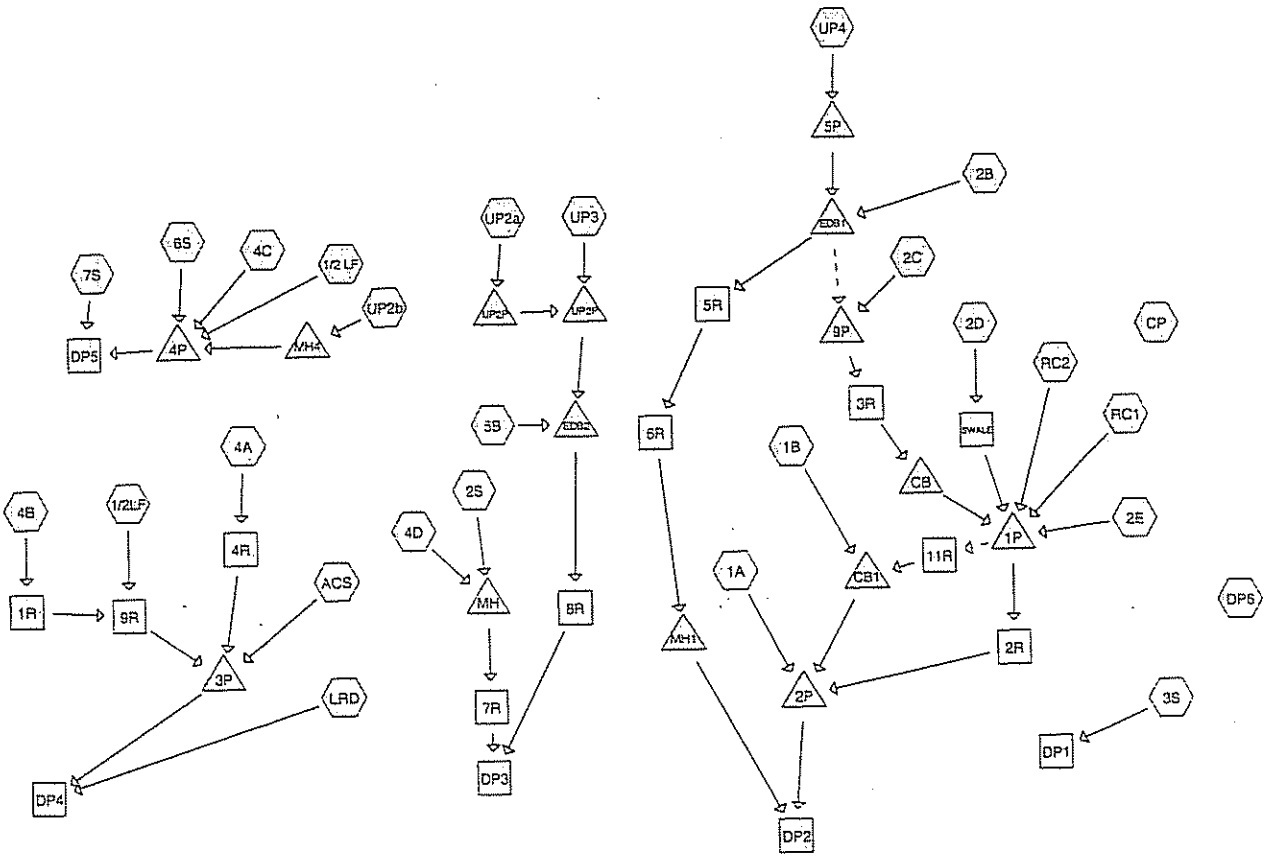
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=26.02 cfs @ 12.55 hrs HW=428.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 26.02 cfs @ 8.3 fps)

Proposed Drainage Conditions - Phase 2
25-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-closed
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1/2 LF: landfill area Runoff Area=3.710 ac Runoff Depth=2.43"
Flow Length=1,050' Tc=17.0 min CN=80 Runoff=11.80 cfs 0.750 af

Subcatchment 1/2LF: Runoff Area=10.620 ac Runoff Depth=2.43"
Flow Length=1,090' Tc=16.2 min CN=80 Runoff=34.59 cfs 2.149 af

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=1.18"
Flow Length=310' Tc=13.5 min CN=63 Runoff=6.48 cfs 0.380 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=2.61"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=11.03 cfs 0.483 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.69"
Flow Length=330' Tc=17.1 min CN=83 Runoff=13.24 cfs 0.852 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=2.17"
Flow Length=340' Tc=22.7 min CN=77 Runoff=4.66 cfs 0.346 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=3.06"
Flow Length=310' Tc=20.4 min CN=87 Runoff=28.08 cfs 2.018 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=2.44"
Flow Length=60' Tc=4.0 min CN=80 Runoff=1.57 cfs 0.065 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=1.57"
Flow Length=840' Tc=21.3 min CN=69 Runoff=8.52 cfs 0.619 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=0.94"
Flow Length=460' Tc=18.1 min CN=59 Runoff=1.96 cfs 0.143 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=2.43"
Flow Length=510' Tc=7.8 min CN=80 Runoff=1.81 cfs 0.085 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=1.86"
Flow Length=720' Tc=19.4 min CN=73 Runoff=2.28 cfs 0.155 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=2.34"
Flow Length=250' Tc=16.7 min CN=79 Runoff=6.83 cfs 0.430 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=1.06"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.34 cfs 0.016 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=2.51"
Flow Length=210' Tc=24.8 min CN=81 Runoff=4.51 cfs 0.355 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=1.95"
Flow Length=80' Tc=5.2 min CN=74 Runoff=5.89 cfs 0.252 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=1.87"
Flow Length=95' Tc=8.4 min CN=73 Runoff=4.23 cfs 0.200 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=1.24"
Flow Length=465' Tc=13.8 min CN=64 Runoff=3.70 cfs 0.218 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=4.10"
Flow Length=110' Tc=1.9 min CN=98 Runoff=4.90 cfs 0.236 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.78"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.32 cfs 0.013 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=1.24"
Flow Length=401' Tc=12.0 min CN=64 Runoff=4.06 cfs 0.223 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=3.46"
Flow Length=245' Tc=3.9 min CN=91 Runoff=9.57 cfs 0.430 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=3.46"
Flow Length=245' Tc=3.9 min CN=91 Runoff=16.06 cfs 0.722 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.77"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=9.48 cfs 1.086 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.71"
Flow Length=750' Tc=26.5 min CN=71 Runoff=13.78 cfs 1.139 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.70"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=31.17 cfs 3.561 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.76"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=61.70 cfs 8.774 af

Reach 1R: Bottom Swale Peak Depth=0.18' Max Vel=2.9 fps Inflow=2.28 cfs 0.155 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.27 cfs 0.155 af

Reach 2R: 18" Peak Depth=0.68' Max Vel=25.5 fps Inflow=20.07 cfs 4.147 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=20.03 cfs 4.145 af

Reach 3R: CULVERT Peak Depth=0.94' Max Vel=9.9 fps Inflow=14.32 cfs 1.153 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=14.30 cfs 1.153 af

Reach 4R: Bottom Swale Peak Depth=0.17' Max Vel=2.4 fps Inflow=1.81 cfs 0.085 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=1.80 cfs 0.085 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.0 fps Inflow=46.71 cfs 8.451 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.36 cfs 8.447 af

Reach 6R: 30 "RCP Peak Depth=1.08' Max Vel=11.1 fps Inflow=22.36 cfs 8.447 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=22.51 cfs 8.445 af

Reach 7R: 24" Peak Depth=0.45' Max Vel=16.4 fps Inflow=8.62 cfs 0.635 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=8.60 cfs 0.635 af

Reach 8R: 24 CULVERT Peak Depth=1.03' Max Vel=20.6 fps Inflow=33.42 cfs 4.987 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=33.40 cfs 4.980 af

Reach 9R: 18" culvert Peak Depth=1.50' Max Vel=21.2 fps Inflow=36.76 cfs 2.304 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=35.48 cfs 2.304 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.16' Max Vel=2.7 fps Inflow=1.96 cfs 0.143 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=1.96 cfs 0.143 af

Reach DP2: CULVERT Peak Depth=0.98' Max Vel=22.4 fps Inflow=39.85 cfs 12.666 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=39.85 cfs 12.663 af

Reach DP3: 30" Peak Depth=0.89' Max Vel=22.4 fps Inflow=34.95 cfs 5.616 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=34.95 cfs 5.615 af

Reach DP4: Inflow=28.37 cfs 2.429 af
Outflow=28.37 cfs 2.429 af

Reach DP5: STREAM Peak Depth=0.14' Max Vel=3.1 fps Inflow=4.47 cfs 0.870 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=4.35 cfs 0.868 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.91' Max Vel=5.3 fps Inflow=28.08 cfs 2.018 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=27.72 cfs 2.015 af

Pond 1P: DETENTION BASIN 1 Peak Elev=406.18' Storage=58,222 cf Inflow=39.77 cfs 4.384 af
Primary=20.07 cfs 4.147 af Secondary=0.00 cfs 0.000 af Outflow=20.07 cfs 4.147 af

Pond 2P: DETENTION BASIN 2 Peak Elev=326.79' Storage=60,040 cf Inflow=22.90 cfs 5.008 af
Primary=17.48 cfs 4.221 af Secondary=0.00 cfs 0.000 af Outflow=17.48 cfs 4.221 af

Pond 3P: DETENTION BASIN 3 Peak Elev=324.73' Storage=36,907 cf Inflow=40.52 cfs 2.606 af
Outflow=26.66 cfs 2.206 af

Pond 4P: DETENTION BASIN 4 Peak Elev=412.37' Storage=84,920 cf Inflow=31.30 cfs 2.570 af
Outflow=1.30 cfs 0.671 af

Pond 5P: ROADSIDE POND UPGRAD. OF E Peak Elev=424.02' Storage=6,495 cf Inflow=61.70 cfs 8.774 af
Outflow=60.32 cfs 8.774 af

Pond 9P: PROPOSED MH Peak Elev=409.97' Storage=7,452 cf Inflow=15.90 cfs 1.191 af
18.0" x 100.0' Culvert Outflow=14.32 cfs 1.153 af

Pond CB: PROPOSED CB Peak Elev=406.03' Storage=48 cf Inflow=14.30 cfs 1.153 af
24.0" x 300.0' Culvert Outflow=14.39 cfs 1.152 af

Pond CB1: proposed cb Peak Elev=2.32' Storage=28 cf Inflow=11.03 cfs 0.483 af
36.0" x 500.0' Culvert Outflow=11.02 cfs 0.483 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.78' Storage=60,139 cf Inflow=61.95 cfs 9.625 af
Primary=46.71 cfs 8.451 af Secondary=15.01 cfs 0.846 af Outflow=61.73 cfs 9.296 af

Pond EDB2: DETENTION BASIN ADJACEN Peak Elev=412.55' Storage=7,144 cf Inflow=35.46 cfs 4.987 af
24.0" x 80.0' Culvert Outflow=33.42 cfs 4.987 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.48' Storage=30 cf Inflow=8.63 cfs 0.635 af
24.0" x 185.0' Culvert Outflow=8.62 cfs 0.635 af

Pond MH1: Peak Elev=3.27' Storage=39 cf Inflow=22.51 cfs 8.445 af
30.0" x 80.0' Culvert Outflow=22.52 cfs 8.444 af

Pond MH4: PROPOSED MH Peak Elev=422.93' Storage=59 cf Inflow=13.78 cfs 1.139 af
24.0" x 300.0' Culvert Outflow=13.78 cfs 1.138 af

Pond UP2P: BASIN ADJACENT TO SAM STR Peak Elev=434.02' Storage=2,696 cf Inflow=9.48 cfs 1.086 af
18.0" x 75.0' Culvert Outflow=8.99 cfs 1.077 af

Pond UP3P: ROAD CULVERT Peak Elev=431.29' Storage=11,880 cf Inflow=39.94 cfs 4.638 af
24.0" x 95.0' Culvert Outflow=34.13 cfs 4.632 af

Total Runoff Area = 158.800 ac Runoff Volume = 25.697 af Average Runoff Depth = 1.94"

Subcatchment 1/2 LF: landfill area

Runoff = 11.80 cfs @ 12.09 hrs, Volume= 0.750 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
3.710	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	150	0.3300	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
10.0	900	0.0100	1.5		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
17.0	1,050	Total			

Subcatchment 1/2LF:

Runoff = 34.59 cfs @ 12.09 hrs, Volume= 2.149 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
10.620	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	150	0.3200	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.1	940	0.0600	1.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,090	Total			

Subcatchment 1A: south central section btw. gorges

Runoff = 6.48 cfs @ 12.07 hrs, Volume= 0.380 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 11.03 cfs @ 11.96 hrs, Volume= 0.483 af, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 13.24 cfs @ 12.09 hrs, Volume= 0.852 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 4.66 cfs @ 12.16 hrs, Volume= 0.346 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 28.08 cfs @ 12.13 hrs, Volume= 2.018 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 1.57 cfs @ 11.95 hrs, Volume= 0.065 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 8.52 cfs @ 12.15 hrs, Volume= 0.619 af, Depth= 1.57"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 1.96 cfs @ 12.13 hrs, Volume= 0.143 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.81 cfs @ 11.99 hrs, Volume= 0.085 af, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 2.28 cfs @ 12.13 hrs, Volume= 0.155 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.7	600	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.4	720	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 6.83 cfs @ 12.09 hrs, Volume= 0.430 af, Depth= 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.34 cfs @ 12.00 hrs, Volume= 0.016 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 4.51 cfs @ 12.18 hrs, Volume= 0.355 af, Depth= 2.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 5.89 cfs @ 11.96 hrs, Volume= 0.252 af, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 4.23 cfs @ 12.00 hrs, Volume= 0.200 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 3.70 cfs @ 12.07 hrs, Volume= 0.218 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 4.90 cfs @ 11.91 hrs, Volume= 0.236 af, Depth= 4.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.32 cfs @ 11.94 hrs, Volume= 0.013 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 4.06 cfs @ 12.05 hrs, Volume= 0.223 af, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 9.57 cfs @ 11.94 hrs, Volume= 0.430 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 16.06 cfs @ 11.94 hrs, Volume= 0.722 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 9.48 cfs @ 12.42 hrs, Volume= 1.086 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 13.78 cfs @ 12.21 hrs, Volume= 1.139 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 31.17 cfs @ 12.43 hrs, Volume= 3.561 af, Depth= 1.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 61.70 cfs @ 12.64 hrs, Volume= 8.774 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 1.86"
Inflow = 2.28 cfs @ 12.13 hrs, Volume= 0.155 af
Outflow = 2.27 cfs @ 12.13 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.18' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 3.52"
Inflow = 20.07 cfs @ 12.37 hrs, Volume= 4.147 af
Outflow = 20.03 cfs @ 12.38 hrs, Volume= 4.145 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 25.5 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 12.5 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.68' @ 12.38 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 7.25"
Inflow = 14.32 cfs @ 12.91 hrs, Volume= 1.153 af
Outflow = 14.30 cfs @ 12.93 hrs, Volume= 1.153 af, Atten= 0%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.9 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.8 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.94' @ 12.92 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 2.43"
Inflow = 1.81 cfs @ 11.99 hrs, Volume= 0.085 af
Outflow = 1.80 cfs @ 11.99 hrs, Volume= 0.085 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.17' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 1.59"
Inflow = 46.71 cfs @ 12.75 hrs, Volume= 8.451 af
Outflow = 22.36 cfs @ 12.45 hrs, Volume= 8.447 af, Atten= 52%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.40 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.59"
Inflow = 22.36 cfs @ 12.45 hrs, Volume= 8.447 af
Outflow = 22.51 cfs @ 12.50 hrs, Volume= 8.445 af, Atten= 0%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.4 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.08' @ 12.50 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 1.55"
Inflow = 8.62 cfs @ 12.15 hrs, Volume= 0.635 af
Outflow = 8.60 cfs @ 12.16 hrs, Volume= 0.635 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 16.4 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 7.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.45' @ 12.15 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 1.75"
Inflow = 33.42 cfs @ 12.79 hrs, Volume= 4.987 af
Outflow = 33.40 cfs @ 12.81 hrs, Volume= 4.980 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 20.6 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 9.1 fps, Avg. Travel Time= 1.8 min

Peak Depth= 1.03' @ 12.80 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 11.620 ac, Inflow Depth = 2.38"
Inflow = 36.76 cfs @ 12.09 hrs, Volume= 2.304 af
Outflow = 35.48 cfs @ 12.06 hrs, Volume= 2.304 af, Atten= 3%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.2 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 8.6 fps, Avg. Travel Time= 0.0 min

Peak Depth= 1.50' @ 12.13 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area = 1.820 ac, Inflow Depth = 0.94"
Inflow = 1.96 cfs @ 12.13 hrs, Volume= 0.143 af
Outflow = 1.96 cfs @ 12.13 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.16' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area = 83.930 ac, Inflow Depth = 1.81"
Inflow = 39.85 cfs @ 13.29 hrs, Volume= 12.666 af
Outflow = 39.85 cfs @ 13.27 hrs, Volume= 12.663 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.7 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.98' @ 13.27 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area = 39.140 ac, Inflow Depth = 1.72"
Inflow = 34.95 cfs @ 12.74 hrs, Volume= 5.616 af
Outflow = 34.95 cfs @ 12.74 hrs, Volume= 5.615 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.89' @ 12.74 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area = 16.290 ac, Inflow Depth = 1.79"
Inflow = 28.37 cfs @ 12.22 hrs, Volume= 2.429 af
Outflow = 28.37 cfs @ 12.22 hrs, Volume= 2.429 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area = 16.730 ac, Inflow Depth = 0.62"
Inflow = 4.47 cfs @ 12.00 hrs, Volume= 0.870 af
Outflow = 4.35 cfs @ 12.02 hrs, Volume= 0.868 af, Atten= 3%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.1 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 0.9 min

Peak Depth= 0.14' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area = 7.920 ac, Inflow Depth = 3.06"
Inflow = 28.08 cfs @ 12.13 hrs, Volume= 2.018 af
Outflow = 27.72 cfs @ 12.15 hrs, Volume= 2.015 af, Atten= 1%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.3 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 3.1 min

Peak Depth= 0.91' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area = 14.140 ac, Inflow Depth = 3.72"
Inflow = 39.77 cfs @ 11.96 hrs, Volume= 4.384 af
Outflow = 20.07 cfs @ 12.37 hrs, Volume= 4.147 af, Atten= 50%, Lag= 24.7 min
Primary = 20.07 cfs @ 12.37 hrs, Volume= 4.147 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.18' @ 12.37 hrs Surf.Area= 11,944 sf Storage= 58,222 cf
Plug-Flow detention time= 83.6 min calculated for 4.133 af (94% of inflow)
Center-of-Mass det. time= 64.5 min (838.5 - 774.1)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=19.97 cfs @ 12.37 hrs HW=406.17' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 16.36 cfs @ 4.7 fps)
└—**3=Orifice/Grate** (Orifice Controls 3.61 cfs @ 13.5 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	2.97"	
Inflow =	22.90 cfs @	12.35 hrs, Volume=	5.008 af	
Outflow =	17.48 cfs @	13.29 hrs, Volume=	4.221 af,	Atten= 24%, Lag= 56.0 min
Primary =	17.48 cfs @	13.29 hrs, Volume=	4.221 af	
Secondary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.79' @ 13.29 hrs Surf.Area= 17,135 sf Storage= 60,040 cf
Plug-Flow detention time= 92.3 min calculated for 4.221 af (84% of inflow)
Center-of-Mass det. time= 44.2 min (875.6 - 831.4)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=17.47 cfs @ 13.29 hrs HW=326.79' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 2.02 cfs @ 10.3 fps)
└—**3=Orifice/Grate** (Orifice Controls 15.46 cfs @ 4.9 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area = 14.140 ac, Inflow Depth = 2.21"
Inflow = 40.52 cfs @ 12.06 hrs, Volume= 2.606 af
Outflow = 26.66 cfs @ 12.23 hrs, Volume= 2.206 af, Atten= 34%, Lag= 10.0 min
Primary = 26.66 cfs @ 12.23 hrs, Volume= 2.206 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 324.73' @ 12.23 hrs Surf.Area= 8,269 sf Storage= 36,907 cf
Plug-Flow detention time= 79.8 min calculated for 2.206 af (85% of inflow)
Center-of-Mass det. time= 33.6 min (826.0 - 792.4)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=26.39 cfs @ 12.23 hrs HW=324.72' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 25.78 cfs @ 5.1 fps)
├—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 12.4 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area =	15.450 ac,	Inflow Depth =	2.00"	
Inflow =	31.30 cfs @	12.12 hrs,	Volume=	2.570 af
Outflow =	1.30 cfs @	16.26 hrs,	Volume=	0.671 af, Atten= 96%, Lag= 248.4 min
Primary =	1.30 cfs @	16.26 hrs,	Volume=	0.671 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.37' @ 16.26 hrs Surf.Area= 25,562 sf Storage= 84,920 cf
Plug-Flow detention time= 283.6 min calculated for 0.671 af (26% of inflow)
Center-of-Mass det. time= 188.1 min (989.5 - 801.3)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.29 cfs @ 16.26 hrs HW=412.37' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 0.81 cfs @ 2.0 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.49 cfs @ 9.9 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area =	59.910 ac,	Inflow Depth =	1.76"	
Inflow =	61.70 cfs @	12.64 hrs,	Volume=	8.774 af
Outflow =	60.32 cfs @	12.72 hrs,	Volume=	8.774 af, Atten= 2%, Lag= 4.9 min
Primary =	60.32 cfs @	12.72 hrs,	Volume=	8.774 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 424.02' @ 12.72 hrs Surf.Area= 3,024 sf Storage= 6,495 cf
Plug-Flow detention time= 0.6 min calculated for 8.774 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (837.7 - 837.1)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=60.24 cfs @ 12.72 hrs HW=424.01' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 30.12 cfs @ 9.6 fps)
└—**2=Culvert** (Inlet Controls 30.12 cfs @ 9.6 fps)

Pond 9P: PROPOSED MH

Inflow Area = 1.910 ac, Inflow Depth = 7.49"
Inflow = 15.90 cfs @ 12.73 hrs, Volume= 1.191 af
Outflow = 14.32 cfs @ 12.91 hrs, Volume= 1.153 af, Atten= 10%, Lag= 10.9 min
Primary = 14.32 cfs @ 12.91 hrs, Volume= 1.153 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 409.97' @ 12.91 hrs Surf.Area= 1,993 sf Storage= 7,452 cf
Plug-Flow detention time= 18.1 min calculated for 1.149 af (96% of inflow)
Center-of-Mass det. time= 8.8 min (789.3 - 780.5)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=14.30 cfs @ 12.91 hrs HW=409.97' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 14.30 cfs @ 8.1 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 7.24"
Inflow = 14.30 cfs @ 12.93 hrs, Volume= 1.153 af
Outflow = 14.39 cfs @ 12.94 hrs, Volume= 1.152 af, Atten= 0%, Lag= 1.0 min
Primary = 14.39 cfs @ 12.94 hrs, Volume= 1.152 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.03' @ 12.94 hrs Surf.Area= 12 sf Storage= 48 cf
Plug-Flow detention time= 0.3 min calculated for 1.152 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (790.4 - 790.3)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=14.35 cfs @ 12.94 hrs HW=406.02' (Free Discharge)
1=Culvert (Inlet Controls 14.35 cfs @ 4.6 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 2.61"
Inflow = 11.03 cfs @ 11.96 hrs, Volume= 0.483 af
Outflow = 11.02 cfs @ 11.96 hrs, Volume= 0.483 af, Atten= 0%, Lag= 0.0 min
Primary = 11.02 cfs @ 11.96 hrs, Volume= 0.483 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.32' @ 11.96 hrs Surf.Area= 12 sf Storage= 28 cf
Plug-Flow detention time= 0.5 min calculated for 0.481 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (776.2 - 776.0)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=10.79 cfs @ 11.96 hrs HW=2.31' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.79 cfs @ 3.6 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	1.81"	
Inflow =	61.95 cfs @	12.71 hrs, Volume=	9.625 af	
Outflow =	61.73 cfs @	12.75 hrs, Volume=	9.296 af,	Atten= 0%, Lag= 2.5 min
Primary =	46.71 cfs @	12.75 hrs, Volume=	8.451 af	
Secondary =	15.01 cfs @	12.75 hrs, Volume=	0.846 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.78' @ 12.75 hrs Surf.Area= 13,886 sf Storage= 60,139 cf
Plug-Flow detention time= 41.7 min calculated for 9.265 af (96% of inflow)
Center-of-Mass det. time= 30.1 min (863.0 - 832.9)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=46.69 cfs @ 12.75 hrs HW=416.78' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 21.67 cfs @ 6.1 fps)
├─**2=Orifice/Grate** (Weir Controls 16.13 cfs @ 2.2 fps)
└─**3=Culvert** (Inlet Controls 8.88 cfs @ 11.3 fps)

Secondary OutFlow Max=15.00 cfs @ 12.75 hrs HW=416.78' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 15.00 cfs @ 2.2 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.230 ac,	Inflow Depth =	1.75"	
Inflow =	35.46 cfs @	12.60 hrs, Volume=		4.987 af
Outflow =	33.42 cfs @	12.79 hrs, Volume=		4.987 af, Atten= 6%, Lag= 11.6 min
Primary =	33.42 cfs @	12.79 hrs, Volume=		4.987 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.55' @ 12.79 hrs Surf.Area= 3,685 sf Storage= 7,144 cf
Plug-Flow detention time= 1.3 min calculated for 4.970 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (828.8 - 827.5)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=33.41 cfs @ 12.79 hrs HW=412.55' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 33.41 cfs @ 10.6 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth =	1.55"	
Inflow =	8.63 cfs @	12.15 hrs, Volume=		0.635 af
Outflow =	8.62 cfs @	12.15 hrs, Volume=		0.635 af, Atten= 0%, Lag= 0.0 min
Primary =	8.62 cfs @	12.15 hrs, Volume=		0.635 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.48' @ 12.15 hrs Surf.Area= 20 sf Storage= 30 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.61 cfs @ 12.15 hrs HW=329.47' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.61 cfs @ 3.7 fps)

Pond MH1:

Inflow Area =	63.710 ac,	Inflow Depth =	1.59"	
Inflow =	22.51 cfs @	12.50 hrs, Volume=	8.445 af	
Outflow =	22.52 cfs @	12.50 hrs, Volume=	8.444 af,	Atten= 0%, Lag= 0.0 min
Primary =	22.52 cfs @	12.50 hrs, Volume=	8.444 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.27' @ 12.50 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.0 min calculated for 8.444 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (891.6 - 891.5)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.51 cfs @ 12.50 hrs HW=3.27' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.51 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac,	Inflow Depth =	1.71"	
Inflow =	13.78 cfs @	12.21 hrs, Volume=	1.139 af	
Outflow =	13.78 cfs @	12.21 hrs, Volume=	1.138 af,	Atten= 0%, Lag= 0.0 min
Primary =	13.78 cfs @	12.21 hrs, Volume=	1.138 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 422.93' @ 12.21 hrs Surf.Area= 20 sf Storage= 59 cf
Plug-Flow detention time= 0.3 min calculated for 1.138 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (814.6 - 814.5)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=13.69 cfs @ 12.21 hrs HW=422.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 13.69 cfs @ 4.4 fps)

Pond UP2P: BASIN ADJACENT TO SAM STRATTON

Inflow Area =	7.360 ac,	Inflow Depth =	1.77"	
Inflow =	9.48 cfs @	12.42 hrs, Volume=	1.086 af	
Outflow =	8.99 cfs @	12.53 hrs, Volume=	1.077 af,	Atten= 5%, Lag= 6.3 min
Primary =	8.99 cfs @	12.53 hrs, Volume=	1.077 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.02' @ 12.53 hrs Surf.Area= 2,450 sf Storage= 2,696 cf
Plug-Flow detention time= 7.7 min calculated for 1.074 af (99% of inflow)
Center-of-Mass det. time= 4.9 min (830.3 - 825.4)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=8.97 cfs @ 12.53 hrs HW=434.02' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 8.97 cfs @ 5.1 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	1.71"	
Inflow =	39.94 cfs @	12.44 hrs, Volume=	4.638 af	
Outflow =	34.13 cfs @	12.63 hrs, Volume=	4.632 af,	Atten= 15%, Lag= 11.4 min
Primary =	34.13 cfs @	12.63 hrs, Volume=	4.632 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 431.29' @ 12.63 hrs Surf.Area= 4,986 sf Storage= 11,880 cf
Plug-Flow detention time= 2.9 min calculated for 4.632 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (830.1 - 827.6)

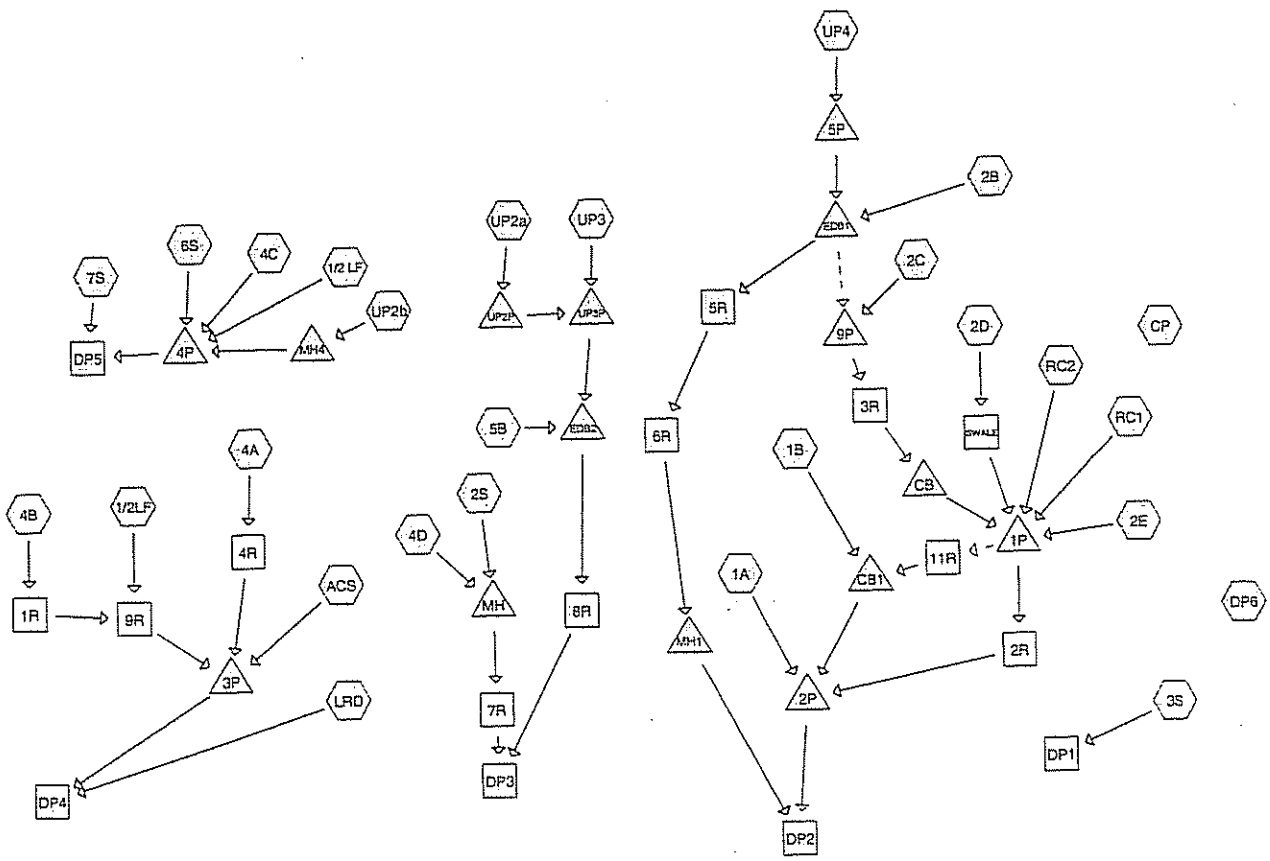
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=34.10 cfs @ 12.63 hrs HW=431.28' (Free Discharge)
↳**1=Culvert** (Inlet Controls 34.10 cfs @ 10.9 fps)

Proposed Drainage Conditions - Phase 2
50-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-closed
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1/2 LF: landfill area Runoff Area=3.710 ac Runoff Depth=2.67"
Flow Length=1,050' Tc=17.0 min CN=80 Runoff=12.95 cfs 0.826 af

Subcatchment 1/2LF: Runoff Area=10.620 ac Runoff Depth=2.67"
Flow Length=1,090' Tc=16.2 min CN=80 Runoff=37.97 cfs 2.364 af

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=1.35"
Flow Length=310' Tc=13.5 min CN=63 Runoff=7.50 cfs 0.435 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=2.86"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=12.03 cfs 0.530 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=2.94"
Flow Length=330' Tc=17.1 min CN=83 Runoff=14.44 cfs 0.932 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=2.41"
Flow Length=340' Tc=22.7 min CN=77 Runoff=5.15 cfs 0.383 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=3.32"
Flow Length=310' Tc=20.4 min CN=87 Runoff=30.40 cfs 2.194 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=2.68"
Flow Length=60' Tc=4.0 min CN=80 Runoff=1.72 cfs 0.072 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=1.77"
Flow Length=840' Tc=21.3 min CN=69 Runoff=9.65 cfs 0.698 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=1.09"
Flow Length=460' Tc=18.1 min CN=59 Runoff=2.33 cfs 0.166 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=2.68"
Flow Length=510' Tc=7.8 min CN=80 Runoff=1.98 cfs 0.094 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=2.08"
Flow Length=720' Tc=19.4 min CN=73 Runoff=2.54 cfs 0.173 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=2.58"
Flow Length=250' Tc=16.7 min CN=79 Runoff=7.52 cfs 0.474 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=1.22"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.39 cfs 0.018 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=2.75"
Flow Length=210' Tc=24.8 min CN=81 Runoff=4.95 cfs 0.390 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=2.17"
Flow Length=80' Tc=5.2 min CN=74 Runoff=6.54 cfs 0.280 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=2.09"
Flow Length=95' Tc=8.4 min CN=73 Runoff=4.71 cfs 0.223 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=1.42"
Flow Length=465' Tc=13.8 min CN=64 Runoff=4.26 cfs 0.248 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=4.37"
Flow Length=110' Tc=1.9 min CN=98 Runoff=5.22 cfs 0.251 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=0.92"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.39 cfs 0.015 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=1.42"
Flow Length=401' Tc=12.0 min CN=64 Runoff=4.67 cfs 0.254 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=3.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=10.27 cfs 0.464 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=3.74"
Flow Length=245' Tc=3.9 min CN=91 Runoff=17.23 cfs 0.778 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=1.98"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=10.65 cfs 1.215 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=1.92"
Flow Length=750' Tc=26.5 min CN=71 Runoff=15.51 cfs 1.277 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=1.90"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=35.12 cfs 3.993 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=1.97"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=69.36 cfs 9.819 af

Reach 1R: Bottom Swale Peak Depth=0.19' Max Vel=3.0 fps Inflow=2.54 cfs 0.173 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.54 cfs 0.173 af

Reach 2R: 18" Peak Depth=0.74' Max Vel=26.5 fps Inflow=23.19 cfs 4.676 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=23.19 cfs 4.674 af

Reach 3R: CULVERT Peak Depth=1.01' Max Vel=10.2 fps Inflow=16.18 cfs 1.438 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=16.17 cfs 1.438 af

Reach 4R: Bottom Swale Peak Depth=0.18' Max Vel=2.5 fps Inflow=1.98 cfs 0.094 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=1.97 cfs 0.094 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.1 fps Inflow=50.49 cfs 9.266 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=24.07 cfs 9.262 af

Reach 6R: 30 "RCP Peak Depth=1.13' Max Vel=11.2 fps Inflow=24.07 cfs 9.262 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=23.97 cfs 9.260 af

Reach 7R: 24" Peak Depth=0.48' Max Vel=17.0 fps Inflow=9.76 cfs 0.716 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=9.74 cfs 0.716 af

Reach 8R: 24 CULVERT Peak Depth=1.06' Max Vel=20.9 fps Inflow=35.33 cfs 5.583 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=35.31 cfs 5.576 af

Reach 9R: 18" culvert Peak Depth=1.50' Max Vel=21.4 fps Inflow=40.40 cfs 2.538 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=33.22 cfs 2.538 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.18' Max Vel=2.9 fps Inflow=2.33 cfs 0.166 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=2.33 cfs 0.165 af

Reach DP2: CULVERT Peak Depth=1.01' Max Vel=22.7 fps Inflow=42.33 cfs 14.104 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=42.33 cfs 14.101 af

Reach DP3: 30" Peak Depth=0.91' Max Vel=22.8 fps Inflow=36.83 cfs 6.292 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=36.83 cfs 6.291 af

Reach DP4: Inflow=32.52 cfs 2.730 af
Outflow=32.52 cfs 2.730 af

Reach DP5: STREAM Peak Depth=0.15' Max Vel=3.3 fps Inflow=4.97 cfs 1.155 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=4.84 cfs 1.153 af

Reach SWALE: DRAINAGE SWALE Peak Depth=0.95' Max Vel=5.4 fps Inflow=30.40 cfs 2.194 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=30.02 cfs 2.190 af

Pond 1P: DETENTION BASIN 1 Peak Elev=406.42' Storage=61,336 cf Inflow=43.23 cfs 4.941 af
Primary=23.19 cfs 4.676 af Secondary=0.00 cfs 0.000 af Outflow=23.19 cfs 4.676 af

Pond 2P: DETENTION BASIN 2 Peak Elev=327.15' Storage=66,139 cf Inflow=26.52 cfs 5.638 af
Primary=19.96 cfs 4.845 af Secondary=0.00 cfs 0.000 af Outflow=19.96 cfs 4.845 af

Pond 3P: DETENTION BASIN 3 Peak Elev=324.98' Storage=39,004 cf Inflow=39.05 cfs 2.880 af
Outflow=30.96 cfs 2.476 af

Pond 4P: DETENTION BASIN 4 Peak Elev=412.52' Storage=88,691 cf Inflow=34.78 cfs 2.856 af
Outflow=1.84 cfs 0.932 af

Pond 5P: ROADSIDE POND UPGRAD. OF Peak Elev=424.92' Storage=10,097 cf Inflow=69.36 cfs 9.819 af
Outflow=66.06 cfs 9.818 af

Pond 9P: PROPOSED MH Peak Elev=410.86' Storage=9,442 cf Inflow=17.96 cfs 1.477 af
18.0" x 100.0' Culvert Outflow=16.18 cfs 1.438 af

Pond CB: PROPOSED CB Peak Elev=406.32' Storage=52 cf Inflow=16.17 cfs 1.438 af
24.0" x 300.0' Culvert Outflow=16.26 cfs 1.437 af

Pond CB1: proposed cb Peak Elev=2.39' Storage=29 cf Inflow=12.03 cfs 0.530 af
36.0" x 500.0' Culvert Outflow=12.02 cfs 0.529 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.84' Storage=60,941 cf Inflow=67.70 cfs 10.750 af
Primary=50.49 cfs 9.266 af Secondary=17.05 cfs 1.094 af Outflow=67.54 cfs 10.360 af

Pond EDB2: DETENTION BASIN ADJACE Peak Elev=413.21' Storage=10,019 cf Inflow=37.94 cfs 5.583 af
24.0" x 80.0' Culvert Outflow=35.33 cfs 5.583 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.59' Storage=32 cf Inflow=9.77 cfs 0.716 af
24.0" x 185.0' Culvert Outflow=9.76 cfs 0.716 af

Pond MH1: Peak Elev=3.39' Storage=41 cf Inflow=23.97 cfs 9.260 af
30.0" x 80.0' Culvert Outflow=23.98 cfs 9.259 af

Pond MH4: PROPOSED MH Peak Elev=423.20' Storage=64 cf Inflow=15.51 cfs 1.277 af
24.0" x 300.0' Culvert Outflow=15.52 cfs 1.276 af

Pond UP2P: BASIN ADJACENT TO SAM ST Peak Elev=434.20' Storage=3,376 cf Inflow=10.65 cfs 1.215 af
18.0" x 75.0' Culvert Outflow=9.62 cfs 1.206 af

Pond UP3P: ROAD CULVERT Peak Elev=432.15' Storage=16,080 cf Inflow=44.39 cfs 5.199 af
24.0" x 95.0' Culvert Outflow=36.56 cfs 5.193 af

Total Runoff Area = 158.800 ac Runoff Volume = 28.565 af Average Runoff Depth = 2.16"

Subcatchment 1/2 LF: landfill area

Runoff = 12.95 cfs @ 12.09 hrs, Volume= 0.826 af, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
3.710	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	150	0.3300	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
10.0	900	0.0100	1.5		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
17.0	1,050	Total			

Subcatchment 1/2LF:

Runoff = 37.97 cfs @ 12.08 hrs, Volume= 2.364 af, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
10.620	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	150	0.3200	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.1	940	0.0600	1.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,090	Total			

Subcatchment 1A: south central section btw. gorges

Runoff = 7.50 cfs @ 12.07 hrs, Volume= 0.435 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 12.03 cfs @ 11.96 hrs, Volume= 0.530 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 14.44 cfs @ 12.09 hrs, Volume= 0.932 af, Depth= 2.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 5.15 cfs @ 12.16 hrs, Volume= 0.383 af, Depth= 2.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 30.40 cfs @ 12.13 hrs, Volume= 2.194 af, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 1.72 cfs @ 11.95 hrs, Volume= 0.072 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 9.65 cfs @ 12.15 hrs, Volume= 0.698 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 2.33 cfs @ 12.13 hrs, Volume= 0.166 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 1.98 cfs @ 11.99 hrs, Volume= 0.094 af, Depth= 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 2.54 cfs @ 12.13 hrs, Volume= 0.173 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.7	600	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.4	720	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 7.52 cfs @ 12.09 hrs, Volume= 0.474 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.39 cfs @ 12.00 hrs, Volume= 0.018 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 4.95 cfs @ 12.18 hrs, Volume= 0.390 af, Depth= 2.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 6.54 cfs @ 11.96 hrs, Volume= 0.280 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 4.71 cfs @ 12.00 hrs, Volume= 0.223 af, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 4.26 cfs @ 12.07 hrs, Volume= 0.248 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 5.22 cfs @ 11.91 hrs, Volume= 0.251 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.39 cfs @ 11.94 hrs, Volume= 0.015 af, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 4.67 cfs @ 12.05 hrs, Volume= 0.254 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 10.27 cfs @ 11.94 hrs, Volume= 0.464 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 17.23 cfs @ 11.94 hrs, Volume= 0.778 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 10.65 cfs @ 12.42 hrs, Volume= 1.215 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 15.51 cfs @ 12.21 hrs, Volume= 1.277 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 35.12 cfs @ 12.42 hrs, Volume= 3.993 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 69.36 cfs @ 12.64 hrs, Volume= 9.819 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.00"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 2.08"
Inflow = 2.54 cfs @ 12.13 hrs, Volume= 0.173 af
Outflow = 2.54 cfs @ 12.13 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.19' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 3.97"
Inflow = 23.19 cfs @ 12.36 hrs, Volume= 4.676 af
Outflow = 23.19 cfs @ 12.36 hrs, Volume= 4.674 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 26.5 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 12.9 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.74' @ 12.36 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 9.04"
Inflow = 16.18 cfs @ 12.97 hrs, Volume= 1.438 af
Outflow = 16.17 cfs @ 12.99 hrs, Volume= 1.438 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.2 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 4.0 fps, Avg. Travel Time= 1.2 min

Peak Depth= 1.01' @ 12.98 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area = 0.420 ac, Inflow Depth = 2.68"
Inflow = 1.98 cfs @ 11.99 hrs, Volume= 0.094 af
Outflow = 1.97 cfs @ 11.99 hrs, Volume= 0.094 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.6 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.18' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area = 63.710 ac, Inflow Depth = 1.75"
Inflow = 50.49 cfs @ 12.78 hrs, Volume= 9.266 af
Outflow = 24.07 cfs @ 12.37 hrs, Volume= 9.262 af, Atten= 52%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.0 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.40 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area = 63.710 ac, Inflow Depth = 1.74"
Inflow = 24.07 cfs @ 12.37 hrs, Volume= 9.262 af
Outflow = 23.97 cfs @ 12.37 hrs, Volume= 9.260 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.5 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.13' @ 12.37 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 1.75"
Inflow = 9.76 cfs @ 12.15 hrs, Volume= 0.716 af
Outflow = 9.74 cfs @ 12.15 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 17.0 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 7.2 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.48' @ 12.15 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 1.96"
Inflow = 35.33 cfs @ 12.86 hrs, Volume= 5.583 af
Outflow = 35.31 cfs @ 12.88 hrs, Volume= 5.576 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 20.9 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 9.3 fps, Avg. Travel Time= 1.8 min

Peak Depth= 1.06' @ 12.87 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 11.620 ac, Inflow Depth = 2.62"
Inflow = 40.40 cfs @ 12.09 hrs, Volume= 2.538 af
Outflow = 33.22 cfs @ 12.10 hrs, Volume= 2.538 af, Atten= 18%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.4 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 8.7 fps, Avg. Travel Time= 0.0 min

Peak Depth= 1.50' @ 12.05 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area =	1.820 ac,	Inflow Depth =	1.09"
Inflow =	2.33 cfs @	12.13 hrs, Volume=	0.166 af
Outflow =	2.33 cfs @	12.13 hrs, Volume=	0.165 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.18' @ 12.13 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area =	83.930 ac,	Inflow Depth =	2.02"
Inflow =	42.33 cfs @	13.32 hrs, Volume=	14.104 af
Outflow =	42.33 cfs @	13.32 hrs, Volume=	14.101 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 12.1 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.01' @ 13.32 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area =	39.140 ac,	Inflow Depth =	1.93"
Inflow =	36.83 cfs @	12.83 hrs, Volume=	6.292 af
Outflow =	36.83 cfs @	12.84 hrs, Volume=	6.291 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.91' @ 12.83 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area =	16.290 ac,	Inflow Depth =	2.01"
Inflow =	32.52 cfs @ 12.25 hrs,	Volume=	2.730 af
Outflow =	32.52 cfs @ 12.25 hrs,	Volume=	2.730 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area =	16.730 ac,	Inflow Depth =	0.83"
Inflow =	4.97 cfs @ 12.00 hrs,	Volume=	1.155 af
Outflow =	4.84 cfs @ 12.01 hrs,	Volume=	1.153 af, Atten= 3%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.3 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.9 min

Peak Depth= 0.15' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area =	7.920 ac,	Inflow Depth =	3.32"
Inflow =	30.40 cfs @ 12.13 hrs,	Volume=	2.194 af
Outflow =	30.02 cfs @ 12.15 hrs,	Volume=	2.190 af, Atten= 1%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.4 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 3.0 min

Peak Depth= 0.95' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area =	14.140 ac,	Inflow Depth =	4.19"
Inflow =	43.23 cfs @ 11.96 hrs,	Volume=	4.941 af
Outflow =	23.19 cfs @ 12.36 hrs,	Volume=	4.676 af, Atten= 46%, Lag= 23.6 min
Primary =	23.19 cfs @ 12.36 hrs,	Volume=	4.676 af
Secondary =	0.00 cfs @ 5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.42' @ 12.36 hrs Surf.Area= 12,271 sf Storage= 61,336 cf
Plug-Flow detention time= 78.1 min calculated for 4.676 af (95% of inflow)
Center-of-Mass det. time= 58.9 min (832.1 - 773.1)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=23.13 cfs @ 12.36 hrs HW=406.41' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 19.46 cfs @ 4.9 fps)
└—**3=Orifice/Grate** (Orifice Controls 3.67 cfs @ 13.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area =	20.220 ac,	Inflow Depth =	3.35"	
Inflow =	26.52 cfs @	12.34 hrs,	Volume=	5.638 af
Outflow =	19.96 cfs @	13.33 hrs,	Volume=	4.845 af, Atten= 25%, Lag= 59.9 min
Primary =	19.96 cfs @	13.33 hrs,	Volume=	4.845 af
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.15' @ 13.33 hrs Surf.Area= 17,533 sf Storage= 66,139 cf
Plug-Flow detention time= 85.4 min calculated for 4.829 af (86% of inflow)
Center-of-Mass det. time= 42.1 min (867.8 - 825.8)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
328.00	18,500	34,735	80,970
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=19.96 cfs @ 13.33 hrs HW=327.15' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 2.09 cfs @ 10.7 fps)
└—**3=Orifice/Grate** (Orifice Controls 17.87 cfs @ 5.7 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area =	14.140 ac,	Inflow Depth =	2.44"	
Inflow =	39.05 cfs @	12.06 hrs, Volume=		2.880 af
Outflow =	30.96 cfs @	12.25 hrs, Volume=		2.476 af, Atten= 21%, Lag= 11.7 min
Primary =	30.96 cfs @	12.25 hrs, Volume=		2.476 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 324.98' @ 12.25 hrs Surf.Area= 8,451 sf Storage= 39,004 cf
Plug-Flow detention time= 75.0 min calculated for 2.476 af (86% of inflow)
Center-of-Mass det. time= 31.8 min (822.2 - 790.5)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=30.83 cfs @ 12.25 hrs HW=324.97' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 30.21 cfs @ 5.3 fps)
├—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└—**3=Orifice/Grate** (Orifice Controls 0.62 cfs @ 12.6 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area =	15.450 ac,	Inflow Depth =	2.22"	
Inflow =	34.78 cfs @	12.12 hrs, Volume=	2.856 af	
Outflow =	1.84 cfs @	15.15 hrs, Volume=	0.932 af,	Atten= 95%, Lag= 182.0 min
Primary =	1.84 cfs @	15.15 hrs, Volume=	0.932 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.52' @ 15.15 hrs Surf.Area= 25,775 sf Storage= 88,691 cf
Plug-Flow detention time= 261.8 min calculated for 0.929 af (33% of inflow)
Center-of-Mass det. time= 171.7 min (970.9 - 799.2)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.84 cfs @ 15.15 hrs HW=412.52' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 1.34 cfs @ 2.3 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.50 cfs @ 10.1 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area =	59.910 ac,	Inflow Depth =	1.97"	
Inflow =	69.36 cfs @	12.64 hrs, Volume=	9.819 af	
Outflow =	66.06 cfs @	12.76 hrs, Volume=	9.818 af,	Atten= 5%, Lag= 7.3 min
Primary =	66.06 cfs @	12.76 hrs, Volume=	9.818 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 424.92' @ 12.76 hrs Surf.Area= 3,924 sf Storage= 10,097 cf
Plug-Flow detention time= 0.9 min calculated for 9.818 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (835.8 - 834.9)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=66.02 cfs @ 12.76 hrs HW=424.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 33.01 cfs @ 10.5 fps)
└—**2=Culvert** (Inlet Controls 33.01 cfs @ 10.5 fps)

Pond 9P: PROPOSED MH

Inflow Area = 1.910 ac, Inflow Depth = 9.28"
Inflow = 17.96 cfs @ 12.76 hrs, Volume= 1.477 af
Outflow = 16.18 cfs @ 12.97 hrs, Volume= 1.438 af, Atten= 10%, Lag= 13.0 min
Primary = 16.18 cfs @ 12.97 hrs, Volume= 1.438 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 410.86' @ 12.97 hrs Surf.Area= 2,216 sf Storage= 9,442 cf
Plug-Flow detention time= 16.6 min calculated for 1.433 af (97% of inflow)
Center-of-Mass det. time= 9.0 min (788.3 - 779.3)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=16.16 cfs @ 12.97 hrs HW=410.85' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 16.16 cfs @ 9.1 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 9.03"
Inflow = 16.17 cfs @ 12.99 hrs, Volume= 1.438 af
Outflow = 16.26 cfs @ 13.00 hrs, Volume= 1.437 af, Atten= 0%, Lag= 0.6 min
Primary = 16.26 cfs @ 13.00 hrs, Volume= 1.437 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.32' @ 13.00 hrs Surf.Area= 12 sf Storage= 52 cf
Plug-Flow detention time= 0.2 min calculated for 1.432 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (789.4 - 789.3)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=16.25 cfs @ 13.00 hrs HW=406.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 16.25 cfs @ 5.2 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 2.86"
Inflow = 12.03 cfs @ 11.96 hrs, Volume= 0.530 af
Outflow = 12.02 cfs @ 11.96 hrs, Volume= 0.529 af, Atten= 0%, Lag= 0.0 min
Primary = 12.02 cfs @ 11.96 hrs, Volume= 0.529 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.39' @ 11.96 hrs Surf.Area= 12 sf Storage= 29 cf
Plug-Flow detention time= 0.5 min calculated for 0.527 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (774.2 - 773.9)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.79 cfs @ 11.96 hrs HW=2.37' (Free Discharge)
└─**1=Culvert** (Inlet Controls 11.79 cfs @ 3.7 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth = 2.02"		
Inflow =	67.70 cfs @	12.75 hrs, Volume=	10.750 af	
Outflow =	67.54 cfs @	12.78 hrs, Volume=	10.360 af,	Atten= 0%, Lag= 2.2 min
Primary =	50.49 cfs @	12.78 hrs, Volume=	9.266 af	
Secondary =	17.05 cfs @	12.78 hrs, Volume=	1.094 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.84' @ 12.78 hrs Surf.Area= 14,025 sf Storage= 60,941 cf
Plug-Flow detention time= 39.4 min calculated for 10.325 af (96% of inflow)
Center-of-Mass det. time= 27.1 min (858.1 - 831.1)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=50.42 cfs @ 12.78 hrs HW=416.84' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 22.07 cfs @ 6.2 fps)
├─**2=Orifice/Grate** (Weir Controls 19.42 cfs @ 2.3 fps)
└─**3=Culvert** (Inlet Controls 8.92 cfs @ 11.4 fps)

Secondary OutFlow Max=17.02 cfs @ 12.78 hrs HW=416.84' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 17.02 cfs @ 2.3 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area = 34.230 ac, Inflow Depth = 1.96"
Inflow = 37.94 cfs @ 12.60 hrs, Volume= 5.583 af
Outflow = 35.33 cfs @ 12.86 hrs, Volume= 5.583 af, Atten= 7%, Lag= 15.3 min
Primary = 35.33 cfs @ 12.86 hrs, Volume= 5.583 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.21' @ 12.86 hrs Surf.Area= 4,731 sf Storage= 10,019 cf
Plug-Flow detention time= 1.8 min calculated for 5.583 af (100% of inflow)
Center-of-Mass det. time= 1.8 min (827.7 - 825.9)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=35.32 cfs @ 12.86 hrs HW=413.20' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 35.32 cfs @ 11.2 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area = 4.910 ac, Inflow Depth = 1.75"
Inflow = 9.77 cfs @ 12.15 hrs, Volume= 0.716 af
Outflow = 9.76 cfs @ 12.15 hrs, Volume= 0.716 af, Atten= 0%, Lag= 0.0 min
Primary = 9.76 cfs @ 12.15 hrs, Volume= 0.716 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.59' @ 12.15 hrs Surf.Area= 20 sf Storage= 32 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.76 cfs @ 12.15 hrs HW=329.59' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.76 cfs @ 3.9 fps)

Pond MH1:

Inflow Area =	63.710 ac,	Inflow Depth =	1.74"	
Inflow =	23.97 cfs @	12.37 hrs, Volume=	9.260 af	
Outflow =	23.98 cfs @	12.37 hrs, Volume=	9.259 af,	Atten= 0%, Lag= 0.0 min
Primary =	23.98 cfs @	12.37 hrs, Volume=	9.259 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.39' @ 12.37 hrs Surf.Area= 12 sf Storage= 41 cf
Plug-Flow detention time= 0.0 min calculated for 9.228 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (894.7 - 894.7)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.93 cfs @ 12.37 hrs HW=3.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.93 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area =	7.990 ac,	Inflow Depth =	1.92"	
Inflow =	15.51 cfs @	12.21 hrs, Volume=	1.277 af	
Outflow =	15.52 cfs @	12.21 hrs, Volume=	1.276 af,	Atten= 0%, Lag= 0.0 min
Primary =	15.52 cfs @	12.21 hrs, Volume=	1.276 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 423.20' @ 12.21 hrs Surf.Area= 20 sf Storage= 64 cf
Plug-Flow detention time= 0.3 min calculated for 1.272 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (812.3 - 812.2)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=15.41 cfs @ 12.21 hrs HW=423.18' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 15.41 cfs @ 4.9 fps)

Pond UP2P: BASIN ADJACENT TO SAM STRATTON

Inflow Area =	7.360 ac,	Inflow Depth =	1.98"	
Inflow =	10.65 cfs @	12.42 hrs, Volume=	1.215 af	
Outflow =	9.62 cfs @	12.57 hrs, Volume=	1.206 af,	Atten= 10%, Lag= 8.9 min
Primary =	9.62 cfs @	12.57 hrs, Volume=	1.206 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.20' @ 12.57 hrs Surf.Area= 2,928 sf Storage= 3,376 cf
Plug-Flow detention time= 7.6 min calculated for 1.202 af (99% of inflow)
Center-of-Mass det. time= 5.0 min (828.2 - 823.2)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=9.60 cfs @ 12.57 hrs HW=434.20' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 9.60 cfs @ 5.4 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	1.92"	
Inflow =	44.39 cfs @	12.43 hrs, Volume=	5.199 af	
Outflow =	36.56 cfs @	12.66 hrs, Volume=	5.193 af,	Atten= 18%, Lag= 13.6 min
Primary =	36.56 cfs @	12.66 hrs, Volume=	5.193 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 432.15' @ 12.66 hrs Surf.Area= 6,554 sf Storage= 16,080 cf
Plug-Flow detention time= 3.5 min calculated for 5.193 af (100% of inflow)
Center-of-Mass det. time= 3.1 min (828.4 - 825.4)

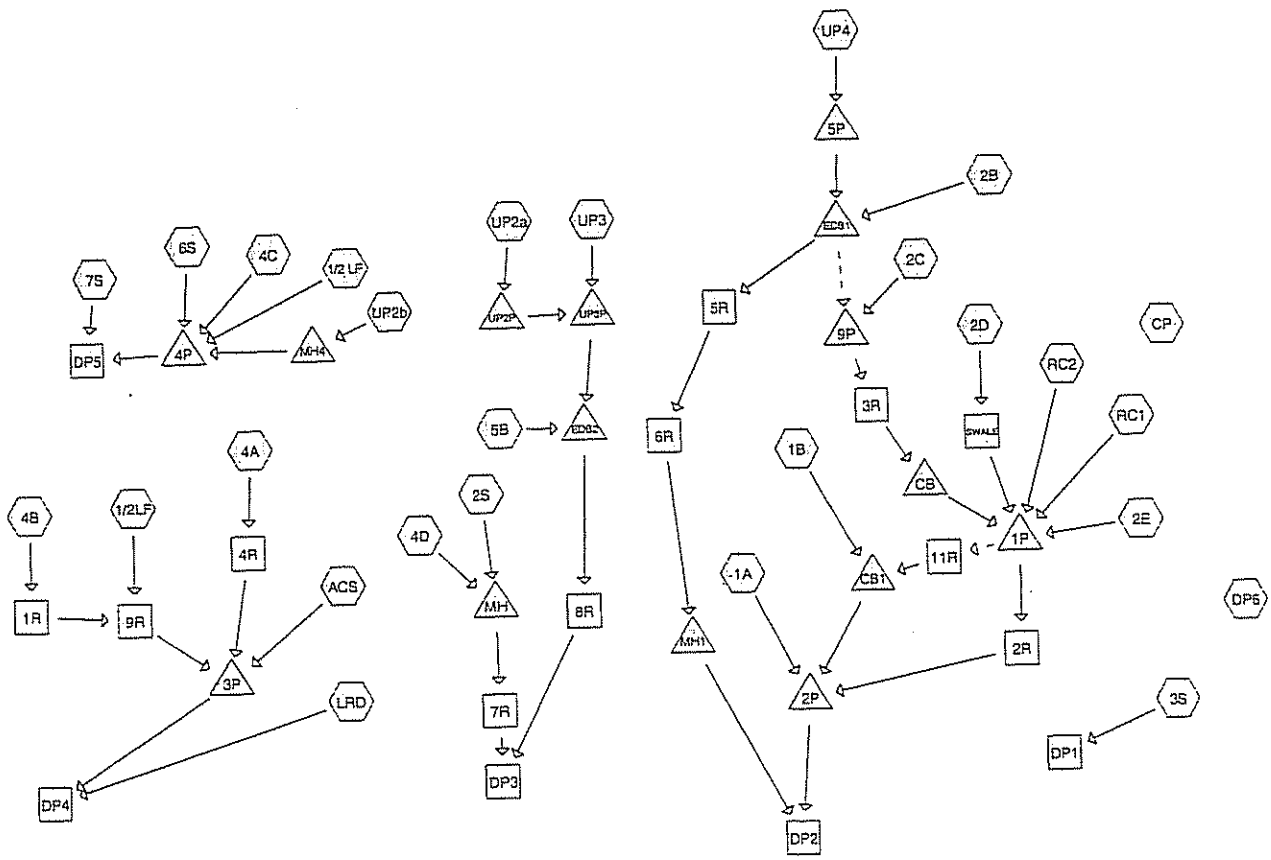
#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=36.55 cfs @ 12.66 hrs HW=432.14' (Free Discharge)
↑**1=Culvert** (Inlet Controls 36.55 cfs @ 11.6 fps)

Proposed Drainage Conditions - Phase 2
100-YEAR 24-HOUR STORM WATER COMPUTATIONS



Subcat Reach Pond Link

Drainage Diagram for Proposed 12-03-closed
Prepared by The Chazen Companies 12/5/2003
HydroCAD® 7.00 s/n 000927 © 1986-2003 Applied Microcomputer Systems

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1/2 LF: landfill area Runoff Area=3.710 ac Runoff Depth=3.25"
Flow Length=1,050' Tc=17.0 min CN=80 Runoff=15.68 cfs 1.005 af

Subcatchment 1/2LF: Runoff Area=10.620 ac Runoff Depth=3.25"
Flow Length=1,090' Tc=16.2 min CN=80 Runoff=45.94 cfs 2.879 af

Subcatchment 1A: south central section btw. gorges Runoff Area=3.860 ac Runoff Depth=1.78"
Flow Length=310' Tc=13.5 min CN=63 Runoff=10.00 cfs 0.571 af

Subcatchment 1B: AREA NORTH OF ACCESS ROAD Runoff Area=2.220 ac Runoff Depth=3.46"
Flow Length=1,055' Tc=5.1 min CN=82 Runoff=14.38 cfs 0.640 af

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP. Runoff Area=3.800 ac Runoff Depth=3.55"
Flow Length=330' Tc=17.1 min CN=83 Runoff=17.26 cfs 1.123 af

Subcatchment 2C: AREA SOUTH OF JANES CORP Runoff Area=1.910 ac Runoff Depth=2.96"
Flow Length=340' Tc=22.7 min CN=77 Runoff=6.33 cfs 0.471 af

Subcatchment 2D: Runoff Area=7.920 ac Runoff Depth=3.95"
Flow Length=310' Tc=20.4 min CN=87 Runoff=35.87 cfs 2.606 af

Subcatchment 2E: POND AREA Runoff Area=0.320 ac Runoff Depth=3.27"
Flow Length=60' Tc=4.0 min CN=80 Runoff=2.07 cfs 0.087 af

Subcatchment 2S: Central Area Runoff Area=4.730 ac Runoff Depth=2.26"
Flow Length=840' Tc=21.3 min CN=69 Runoff=12.37 cfs 0.889 af

Subcatchment 3S: Eastern Area Runoff Area=1.820 ac Runoff Depth=1.47"
Flow Length=460' Tc=18.1 min CN=59 Runoff=3.27 cfs 0.223 af

Subcatchment 4A: Central Area Runoff Area=0.420 ac Runoff Depth=3.26"
Flow Length=510' Tc=7.8 min CN=80 Runoff=2.39 cfs 0.114 af

Subcatchment 4B: Runoff Area=1.000 ac Runoff Depth=2.60"
Flow Length=720' Tc=19.4 min CN=73 Runoff=3.19 cfs 0.217 af

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CO Runoff Area=2.200 ac Runoff Depth=3.16"
Flow Length=250' Tc=16.7 min CN=79 Runoff=9.14 cfs 0.579 af

Subcatchment 4D: Runoff Area=0.180 ac Runoff Depth=1.63"
Flow Length=150' Tc=7.7 min CN=61 Runoff=0.53 cfs 0.024 af

Subcatchment 5B: EAST OF WARD PRODUCTS CORP Runoff Area=1.700 ac Runoff Depth=3.34"
Flow Length=210' Tc=24.8 min CN=81 Runoff=5.97 cfs 0.473 af

Subcatchment 6S: Upper proposed detention basin area Runoff Area=1.550 ac Runoff Depth=2.71"
Flow Length=80' Tc=5.2 min CN=74 Runoff=8.09 cfs 0.349 af

Subcatchment 7S: Western Area Runoff Area=1.280 ac Runoff Depth=2.61"
Flow Length=95' Tc=8.4 min CN=73 Runoff=5.87 cfs 0.279 af

Subcatchment ACS: ACCESS ROAD AREA Runoff Area=2.100 ac Runoff Depth=1.85"
Flow Length=465' Tc=13.8 min CN=64 Runoff=5.64 cfs 0.324 af

Subcatchment CP: Concrete Pad area Runoff Area=0.690 ac Runoff Depth=5.00"
Flow Length=110' Tc=1.9 min CN=98 Runoff=5.96 cfs 0.287 af

Subcatchment DP6: Runoff Area=0.200 ac Runoff Depth=1.27"
Flow Length=40' Tc=2.5 min CN=56 Runoff=0.54 cfs 0.021 af

Subcatchment LRD: LOWER ACCESS ROAD Runoff Area=2.150 ac Runoff Depth=1.86"
Flow Length=401' Tc=12.0 min CN=64 Runoff=6.16 cfs 0.332 af

Subcatchment RC1: RECYCLING AREA Runoff Area=1.490 ac Runoff Depth=4.37"
Flow Length=245' Tc=3.9 min CN=91 Runoff=11.90 cfs 0.543 af

Subcatchment RC2: RECYCLING AREA Runoff Area=2.500 ac Runoff Depth=4.37"
Flow Length=245' Tc=3.9 min CN=91 Runoff=19.96 cfs 0.911 af

Subcatchment UP2a: Runoff Area=7.360 ac Runoff Depth=2.49"
Flow Length=2,450' Tc=43.4 min CN=72 Runoff=13.48 cfs 1.527 af

Subcatchment UP2b: Runoff Area=7.990 ac Runoff Depth=2.42"
Flow Length=750' Tc=26.5 min CN=71 Runoff=19.69 cfs 1.612 af

Subcatchment UP3: Runoff Area=25.170 ac Runoff Depth=2.40"
Flow Length=1,850' Tc=42.9 min CN=71 Runoff=44.69 cfs 5.043 af

Subcatchment UP4: Runoff Area=59.910 ac Runoff Depth=2.47"
Flow Length=9,150' Tc=59.0 min CN=72 Runoff=87.80 cfs 12.350 af

Reach 1R: Bottom Swale Peak Depth=0.21' Max Vel=3.2 fps Inflow=3.19 cfs 0.217 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.18 cfs 0.217 af

Reach 2R: 18" Peak Depth=0.89' Max Vel=28.4 fps Inflow=31.09 cfs 5.965 af
D=18.0" n=0.013 L=280.0' S=0.2000 '/' Capacity=46.98 cfs Outflow=31.10 cfs 5.964 af

Reach 3R: CULVERT Peak Depth=1.15' Max Vel=10.7 fps Inflow=20.00 cfs 2.152 af
D=24.0" n=0.013 L=300.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=20.00 cfs 2.152 af

Reach 4R: Bottom Swale Peak Depth=0.20' Max Vel=2.7 fps Inflow=2.39 cfs 0.114 af
n=0.030 L=20.0' S=0.0300 '/' Capacity=46.35 cfs Outflow=2.38 cfs 0.114 af

Reach 5R: 24" CULVERT Peak Depth=2.50' Max Vel=5.2 fps Inflow=59.29 cfs 11.215 af
D=30.0" n=0.013 L=74.0' S=0.0030 '/' Capacity=22.36 cfs Outflow=22.90 cfs 11.210 af

Reach 6R: 30 "RCP Peak Depth=1.09' Max Vel=11.1 fps Inflow=22.90 cfs 11.210 af
D=30.0" n=0.013 L=85.0' S=0.0200 '/' Capacity=58.01 cfs Outflow=22.52 cfs 11.208 af

Reach 7R: 24" Peak Depth=0.54' Max Vel=18.3 fps Inflow=12.53 cfs 0.913 af
D=24.0" n=0.013 L=185.0' S=0.1200 '/' Capacity=78.37 cfs Outflow=12.49 cfs 0.913 af

Reach 8R: 24 CULVERT Peak Depth=1.12' Max Vel=21.3 fps Inflow=38.81 cfs 7.027 af
D=24.0" n=0.013 L=1,000.0' S=0.0800 '/' Capacity=63.99 cfs Outflow=38.80 cfs 7.019 af

Reach 9R: 18" culvert Peak Depth=1.50' Max Vel=21.2 fps Inflow=49.00 cfs 3.096 af
D=18.0" n=0.013 L=20.0' S=0.1000 '/' Capacity=33.22 cfs Outflow=33.22 cfs 3.095 af

Reach 11R: Peak Depth=0.00' Max Vel=0.0 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=600.0' S=0.0300 '/' Capacity=145.59 cfs Outflow=0.00 cfs 0.000 af

Reach DP1: Bottom Swale Peak Depth=0.22' Max Vel=3.2 fps Inflow=3.27 cfs 0.223 af
n=0.030 L=20.0' S=0.0400 '/' Capacity=53.52 cfs Outflow=3.26 cfs 0.223 af

Reach DP2: CULVERT Peak Depth=1.08' Max Vel=23.4 fps Inflow=47.38 cfs 17.575 af
D=30.0" n=0.013 L=150.0' S=0.0900 '/' Capacity=123.05 cfs Outflow=47.37 cfs 17.572 af

Reach DP3: 30" Peak Depth=0.96' Max Vel=23.3 fps Inflow=40.35 cfs 7.932 af
D=30.0" n=0.013 L=175.0' S=0.1000 '/' Capacity=129.71 cfs Outflow=40.34 cfs 7.931 af

Reach DP4: Inflow=37.07 cfs 3.455 af
Outflow=37.07 cfs 3.455 af

Reach DP5: STREAM Peak Depth=0.17' Max Vel=3.5 fps Inflow=6.17 cfs 1.860 af
n=0.030 L=100.0' S=0.0570 '/' Capacity=1,602.40 cfs Outflow=6.01 cfs 1.857 af

Reach SWALE: DRAINAGE SWALE Peak Depth=1.04' Max Vel=5.7 fps Inflow=35.87 cfs 2.606 af
n=0.030 L=300.0' S=0.0200 '/' Capacity=129.09 cfs Outflow=35.39 cfs 2.602 af

Pond 1P: DETENTION BASIN 1 Peak Elev=406.94' Storage=68,189 cf Inflow=52.19 cfs 6.295 af
Primary=31.09 cfs 5.965 af Secondary=0.00 cfs 0.000 af Outflow=31.09 cfs 5.965 af

Pond 2P: DETENTION BASIN 2 Peak Elev=328.01' Storage=81,170 cf Inflow=35.57 cfs 7.175 af
Primary=25.01 cfs 6.368 af Secondary=0.00 cfs 0.000 af Outflow=25.01 cfs 6.368 af

Pond 3P: DETENTION BASIN 3 Peak Elev=325.14' Storage=40,388 cf Inflow=40.74 cfs 3.534 af
Outflow=35.38 cfs 3.122 af

Pond 4P: DETENTION BASIN 4 Peak Elev=412.90' Storage=98,854 cf Inflow=43.06 cfs 3.545 af
Outflow=3.82 cfs 1.581 af

Pond 5P: ROADSIDE POND UPGRAD. O Peak Elev=427.34' Storage=22,423 cf Inflow=87.80 cfs 12.350 af
Outflow=79.40 cfs 12.350 af

Pond 9P: PROPOSED MH Peak Elev=413.04' Storage=15,116 cf Inflow=22.73 cfs 2.191 af
18.0" x 100.0' Culvert Outflow=20.00 cfs 2.152 af

Pond CB: PROPOSED CB Peak Elev=407.10' Storage=61 cf Inflow=20.00 cfs 2.152 af
24.0" x 300.0' Culvert Outflow=19.97 cfs 2.151 af

Pond CB1: proposed cb Peak Elev=2.53' Storage=30 cf Inflow=14.38 cfs 0.640 af
36.0" x 500.0' Culvert Outflow=14.38 cfs 0.640 af

Pond EDB1: EXISTING DETENTION BASI Peak Elev=416.97' Storage=62,681 cf Inflow=81.17 cfs 13.472 af
Primary=59.29 cfs 11.215 af Secondary=21.75 cfs 1.719 af Outflow=81.04 cfs 12.934 af

Pond EDB2: DETENTION BASIN ADJACE Peak Elev=414.49' Storage=16,813 cf Inflow=42.44 cfs 7.027 af
24.0" x 80.0' Culvert Outflow=38.81 cfs 7.027 af

Pond MH: DRAINAGE MANHOLE AT BASE OF Peak Elev=329.87' Storage=37 cf Inflow=12.54 cfs 0.913 af
24.0" x 185.0' Culvert Outflow=12.53 cfs 0.913 af

Pond MH1: Peak Elev=3.27' Storage=39 cf Inflow=22.52 cfs 11.208 af
30.0" x 80.0' Culvert Outflow=22.54 cfs 11.207 af

Pond MH4: PROPOSED MH Peak Elev=423.93' Storage=79 cf Inflow=19.69 cfs 1.612 af
24.0" x 300.0' Culvert Outflow=19.69 cfs 1.611 af

Pond UP2P: BASIN ADJACENT TO SAM ST Peak Elev=434.77' Storage=5,491 cf Inflow=13.48 cfs 1.527 af
18.0" x 75.0' Culvert Outflow=11.35 cfs 1.518 af

Pond UP3P: ROAD CULVERT Peak Elev=433.88' Storage=29,032 cf Inflow=55.21 cfs 6.561 af
24.0" x 95.0' Culvert Outflow=41.06 cfs 6.554 af

Total Runoff Area = 158.800 ac Runoff Volume = 35.483 af Average Runoff Depth = 2.68"

Subcatchment 1/2 LF: landfill area

Runoff = 15.68 cfs @ 12.09 hrs, Volume= 1.005 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
3.710	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	150	0.3300	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
10.0	900	0.0100	1.5		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
17.0	1,050	Total			

Subcatchment 1/2LF:

Runoff = 45.94 cfs @ 12.08 hrs, Volume= 2.879 af, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
10.620	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	150	0.3200	0.4		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.1	940	0.0600	1.7		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.2	1,090	Total			

Subcatchment 1A: south central section btw. gorges

Runoff = 10.00 cfs @ 12.06 hrs, Volume= 0.571 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
3.640	61	>75% Grass cover, Good, HSG B
3.860	63	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	150	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.9	160	0.3200	2.8		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	310	Total			

Subcatchment 1B: AREA NORTH OF ACCESS ROAD

Runoff = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af, Depth= 3.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.220	98	Paved parking & roofs
2.000	80	>75% Grass cover, Good, HSG D
2.220	82	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.1	55	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.0	1,000	0.0200	8.5	67.89	**Channel Flow,** Area= 8.0 sf Perim= 6.0' r= 1.33' n= 0.030
5.1	1,055	Total			

Subcatchment 2B: AREA EAST OF WARD PRODUCTS CORP.

Runoff = 17.26 cfs @ 12.09 hrs, Volume= 1.123 af, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.840	98	Paved parking & roofs
0.400	73	Woods, Fair, HSG C
2.560	79	50-75% Grass cover, Fair, HSG C
3.800	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	100	0.0400	3.0		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.2	80	0.0210	6.6	5.16	**Circular Channel (pipe),** Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
17.1	330	Total			

Subcatchment 2C: AREA SOUTH OF JANES CORP

Runoff = 6.33 cfs @ 12.16 hrs, Volume= 0.471 af, Depth= 2.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.050	79	50-75% Grass cover, Fair, HSG C
0.060	98	Paved parking & roofs
0.800	73	Woods, Fair, HSG C
1.910	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0460	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
9.6	50	0.0460	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.0	190	0.1050	1.6		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.7	340	Total			

Subcatchment 2D:

Runoff = 35.87 cfs @ 12.12 hrs, Volume= 2.606 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
3.400	98	Paved parking & roofs
4.520	79	50-75% Grass cover, Fair, HSG C
7.920	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.3	150	0.0260	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	100	0.0266	2.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	60	0.2000	2.2		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.4	310	Total			

Subcatchment 2E: POND AREA

Runoff = 2.07 cfs @ 11.94 hrs, Volume= 0.087 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.320	80	>75% Grass cover, Good, HSG D

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	60	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 2S: Central Area

Runoff = 12.37 cfs @ 12.15 hrs, Volume= 0.889 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.100	98	Driveways
3.400	70	Brush, Fair, HSG C
0.800	56	Brush, Fair, HSG B
0.430	80	>75% Grass cover, Good, HSG D
4.730	69	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	150	0.0240	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.7	140	0.2300	3.4		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.6	550	0.0800	15.5	108.69	**Channel Flow,** Area= 7.0 sf Perim= 6.0' r= 1.17' n= 0.030
21.3	840	Total			

Subcatchment 3S: Eastern Area

Runoff = 3.27 cfs @ 12.12 hrs, Volume= 0.223 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.180	60	Woods, Fair, HSG B
0.640	56	Brush, Fair, HSG B
1.820	59	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	100	0.1000	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
7.7	50	0.0800	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
2.2	310	0.2250	2.4		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.1	460	Total			

Subcatchment 4A: Central Area

Runoff = 2.39 cfs @ 11.99 hrs, Volume= 0.114 af, Depth= 3.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.310	74	>75% Grass cover, Good, HSG C
0.110	98	Paved parking & roofs
0.420	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	80	0.2200	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
2.8	430	0.0300	2.6		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.8	510	Total			

Subcatchment 4B:

Runoff = 3.19 cfs @ 12.12 hrs, Volume= 0.217 af, Depth= 2.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.000	73	Woods, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	120	0.0500	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
0.7	600	0.1370	13.4	33.51	**Channel Flow,** Area= 2.5 sf Perim= 4.0' r= 0.63' n= 0.030
19.4	720	Total			

Subcatchment 4C: WESTERN SIDE OF WARD PRODUCTS CORP

Runoff = 9.14 cfs @ 12.09 hrs, Volume= 0.579 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.500	73	Woods, Fair, HSG C
1.520	79	50-75% Grass cover, Fair, HSG C
0.180	98	Paved parking & roofs
2.200	79	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	150	0.0400	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.4	100	0.0800	4.2		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.7	250	Total			

Subcatchment 4D:

Runoff = 0.53 cfs @ 12.00 hrs, Volume= 0.024 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.180	61	>75% Grass cover, Good, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	150	0.2600	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 5B: EAST OF WARD PRODUCTS CORP

Runoff = 5.97 cfs @ 12.18 hrs, Volume= 0.473 af, Depth= 3.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.300	98	Paved parking & roofs
0.980	79	50-75% Grass cover, Fair, HSG C
0.420	73	Woods, Fair, HSG C
1.700	81	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.2	140	0.0130	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
0.6	70	0.0100	2.0		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.8	210	Total			

Subcatchment 6S: Upper proposed detention basin area

Runoff = 8.09 cfs @ 11.96 hrs, Volume= 0.349 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.550	74	>75% Grass cover, Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	80	0.2000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment 7S: Western Area

Runoff = 5.87 cfs @ 12.00 hrs, Volume= 0.279 af, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.070	73	Woods, Fair, HSG C
0.210	70	Brush, Fair, HSG C
1.280	73	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	95	0.2300	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"

Subcatchment ACS: ACCESS ROAD AREA

Runoff = 5.64 cfs @ 12.07 hrs, Volume= 0.324 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.680	60	Woods, Fair, HSG B
0.250	69	50-75% Grass cover, Fair, HSG B
0.170	98	Paved parking & roofs
2.100	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	90	0.2100	0.2		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.70"
4.4	60	0.1700	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.0	315	0.1300	5.4		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.8	465	Total			

Subcatchment CP: Concrete Pad area

Runoff = 5.96 cfs @ 11.91 hrs, Volume= 0.287 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.690	98	Paved parking & roofs

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	110	0.0100	1.0		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.70"

Subcatchment DP6:

Runoff = 0.54 cfs @ 11.94 hrs, Volume= 0.021 af, Depth= 1.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.200	56	Brush, Fair, HSG B

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	40	0.3000	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"

Subcatchment LRD: LOWER ACCESS ROAD

Runoff = 6.16 cfs @ 12.05 hrs, Volume= 0.332 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.170	98	Paved parking & roofs
1.980	61	>75% Grass cover, Good, HSG B
2.150	64	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	150	0.1300	0.2		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.8	251	0.0240	2.3		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
12.0	401	Total			

Subcatchment RC1: RECYCLING AREA

Runoff = 11.90 cfs @ 11.94 hrs, Volume= 0.543 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
0.880	98	Paved parking & roofs
0.610	80	>75% Grass cover, Good, HSG D
1.490	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment RC2: RECYCLING AREA

Runoff = 19.96 cfs @ 11.94 hrs, Volume= 0.911 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
1.560	98	Paved parking & roofs
0.940	80	>75% Grass cover, Good, HSG D
2.500	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	45	0.3300	0.3		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
1.2	200	0.0180	2.7		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.9	245	Total			

Subcatchment UP2a:

Runoff = 13.48 cfs @ 12.42 hrs, Volume= 1.527 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
6.910	70	Brush, Fair, HSG C
0.450	98	Paved parking & roofs
7.360	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.0	150	0.0300	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
14.9	1,000	0.0500	1.1		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	1,300	0.0500	14.0	280.98	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
43.4	2,450	Total			

Subcatchment UP2b:

Runoff = 19.69 cfs @ 12.21 hrs, Volume= 1.612 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
7.760	70	Brush, Fair, HSG C
0.230	98	Paved parking & roofs
7.990	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0300	0.1		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.70"
8.2	600	0.0300	1.2		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.5	750	Total			

Subcatchment UP3:

Runoff = 44.69 cfs @ 12.42 hrs, Volume= 5.043 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
24.682	70	Brush, Fair, HSG C
0.488	98	Paved parking & roofs
25.170	71	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
17.8	1,000	0.0350	0.9		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	700	0.0350	11.8	235.09	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
42.9	1,850	Total			

Subcatchment UP4:

Runoff = 87.80 cfs @ 12.63 hrs, Volume= 12.350 af, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.70"

Area (ac)	CN	Description
49.590	70	Brush, Fair, HSG C
8.430	77	Brush, Fair, HSG D
1.890	98	Paved parking & roofs
59.910	72	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	150	0.0400	0.1		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.80"
23.6	1,000	0.0200	0.7		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.2	3,400	0.0300	10.9	217.65	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
6.1	4,600	0.0400	12.6	251.32	**Channel Flow,** Area= 20.0 sf Perim= 14.0' r= 1.43' n= 0.030
59.0	9,150	Total			

Reach 1R: Bottom Swale

Inflow Area = 1.000 ac, Inflow Depth = 2.60"
Inflow = 3.19 cfs @ 12.12 hrs, Volume= 0.217 af
Outflow = 3.18 cfs @ 12.13 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.21' @ 12.12 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach 2R: 18"

Inflow Area = 14.140 ac, Inflow Depth = 5.06"
Inflow = 31.09 cfs @ 12.34 hrs, Volume= 5.965 af
Outflow = 31.10 cfs @ 12.35 hrs, Volume= 5.964 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 28.4 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 13.7 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.89' @ 12.35 hrs
Capacity at bank full= 46.98 cfs
18.0" Diameter Pipe n= 0.013 Length= 280.0' Slope= 0.2000 '/'

Reach 3R: CULVERT

Inflow Area = 1.910 ac, Inflow Depth = 13.52"
Inflow = 20.00 cfs @ 13.09 hrs, Volume= 2.152 af
Outflow = 20.00 cfs @ 13.10 hrs, Volume= 2.152 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.7 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 4.4 fps, Avg. Travel Time= 1.1 min

Peak Depth= 1.15' @ 13.09 hrs
Capacity at bank full= 31.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 300.0' Slope= 0.0200 '/'

Reach 4R: Bottom Swale

Inflow Area =	0.420 ac,	Inflow Depth = 3.26"	
Inflow =	2.39 cfs @ 11.99 hrs,	Volume=	0.114 af
Outflow =	2.38 cfs @ 11.99 hrs,	Volume=	0.114 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 0.5 min

Peak Depth= 0.20' @ 11.99 hrs
Capacity at bank full= 46.35 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach 5R: 24" CULVERT

Inflow Area =	63.710 ac,	Inflow Depth = 2.11"	
Inflow =	59.29 cfs @ 12.84 hrs,	Volume=	11.215 af
Outflow =	22.90 cfs @ 12.25 hrs,	Volume=	11.210 af, Atten= 61%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.2 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.1 fps, Avg. Travel Time= 0.4 min

Peak Depth= 2.50' @ 12.30 hrs
Capacity at bank full= 22.36 cfs
30.0" Diameter Pipe n= 0.013 Length= 74.0' Slope= 0.0030 '/'

Reach 6R: 30 "RCP

Inflow Area =	63.710 ac,	Inflow Depth = 2.11"	
Inflow =	22.90 cfs @ 12.25 hrs,	Volume=	11.210 af
Outflow =	22.52 cfs @ 12.30 hrs,	Volume=	11.208 af, Atten= 2%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 6.8 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.09' @ 12.25 hrs
Capacity at bank full= 58.01 cfs
30.0" Diameter Pipe n= 0.013 Length= 85.0' Slope= 0.0200 '/'

Reach 7R: 24"

Inflow Area = 4.910 ac, Inflow Depth = 2.23"
Inflow = 12.53 cfs @ 12.15 hrs, Volume= 0.913 af
Outflow = 12.49 cfs @ 12.15 hrs, Volume= 0.913 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 18.3 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 7.5 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.54' @ 12.15 hrs
Capacity at bank full= 78.37 cfs
24.0" Diameter Pipe n= 0.013 Length= 185.0' Slope= 0.1200 '/'

Reach 8R: 24 CULVERT

Inflow Area = 34.230 ac, Inflow Depth = 2.46"
Inflow = 38.81 cfs @ 13.03 hrs, Volume= 7.027 af
Outflow = 38.80 cfs @ 13.05 hrs, Volume= 7.019 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.3 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 9.8 fps, Avg. Travel Time= 1.7 min

Peak Depth= 1.12' @ 13.04 hrs
Capacity at bank full= 63.99 cfs
24.0" Diameter Pipe n= 0.013 Length= 1,000.0' Slope= 0.0800 '/'

Reach 9R: 18" culvert

Inflow Area = 11.620 ac, Inflow Depth = 3.20"
Inflow = 49.00 cfs @ 12.09 hrs, Volume= 3.096 af
Outflow = 33.22 cfs @ 12.05 hrs, Volume= 3.095 af, Atten= 32%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 21.2 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 9.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 1.50' @ 12.00 hrs
Capacity at bank full= 33.22 cfs
18.0" Diameter Pipe n= 0.013 Length= 20.0' Slope= 0.1000 '/'

Reach 11R:

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.0 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.00' @ 5.00 hrs
Capacity at bank full= 145.59 cfs
2.00' x 2.00' deep channel, n= 0.030 Length= 600.0' Slope= 0.0300 '/'
Side Slope Z-value= 3.0 '/'

Reach DP1: Bottom Swale

Inflow Area =	1.820 ac,	Inflow Depth = 1.47"	
Inflow =	3.27 cfs @	12.12 hrs, Volume=	0.223 af
Outflow =	3.26 cfs @	12.12 hrs, Volume=	0.223 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.22' @ 12.12 hrs
Capacity at bank full= 53.52 cfs
4.00' x 1.00' deep channel, n= 0.030 Length= 20.0' Slope= 0.0400 '/'
Side Slope Z-value= 3.0 '/'

Reach DP2: CULVERT

Inflow Area =	83.930 ac,	Inflow Depth = 2.51"	
Inflow =	47.38 cfs @	13.40 hrs, Volume=	17.575 af
Outflow =	47.37 cfs @	13.41 hrs, Volume=	17.572 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 23.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 13.0 fps, Avg. Travel Time= 0.2 min

Peak Depth= 1.08' @ 13.41 hrs
Capacity at bank full= 123.05 cfs
30.0" Diameter Pipe n= 0.013 Length= 150.0' Slope= 0.0900 '/'

Reach DP3: 30"

Inflow Area =	39.140 ac,	Inflow Depth = 2.43"	
Inflow =	40.35 cfs @	12.98 hrs, Volume=	7.932 af
Outflow =	40.34 cfs @	12.98 hrs, Volume=	7.931 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 23.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.8 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.96' @ 12.98 hrs
Capacity at bank full= 129.71 cfs
30.0" Diameter Pipe n= 0.013 Length= 175.0' Slope= 0.1000 '/'

Reach DP4:

Inflow Area =	16.290 ac,	Inflow Depth =	2.54"	
Inflow =	37.07 cfs @	12.27 hrs,	Volume=	3.455 af
Outflow =	37.07 cfs @	12.27 hrs,	Volume=	3.455 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DP5: STREAM

Inflow Area =	16.730 ac,	Inflow Depth =	1.33"	
Inflow =	6.17 cfs @	12.00 hrs,	Volume=	1.860 af
Outflow =	6.01 cfs @	12.01 hrs,	Volume=	1.857 af, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.1 fps, Avg. Travel Time= 0.8 min

Peak Depth= 0.17' @ 12.01 hrs
Capacity at bank full= 1,602.40 cfs
10.00' x 4.00' deep channel, n= 0.030 Length= 100.0' Slope= 0.0570 '/'
Side Slope Z-value= 2.0 '/'

Reach SWALE: DRAINAGE SWALE

Inflow Area =	7.920 ac,	Inflow Depth =	3.95"	
Inflow =	35.87 cfs @	12.12 hrs,	Volume=	2.606 af
Outflow =	35.39 cfs @	12.15 hrs,	Volume=	2.602 af, Atten= 1%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.7 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 2.8 min

Peak Depth= 1.04' @ 12.14 hrs
Capacity at bank full= 129.09 cfs
4.00' x 2.00' deep channel, n= 0.030 Length= 300.0' Slope= 0.0200 '/'
Side Slope Z-value= 2.0 '/'

Pond 1P: DETENTION BASIN 1

Inflow Area =	14.140 ac,	Inflow Depth =	5.34"	
Inflow =	52.19 cfs @	11.96 hrs,	Volume=	6.295 af
Outflow =	31.09 cfs @	12.34 hrs,	Volume=	5.965 af, Atten= 40%, Lag= 22.8 min
Primary =	31.09 cfs @	12.34 hrs,	Volume=	5.965 af
Secondary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 406.94' @ 12.34 hrs Surf.Area= 12,992 sf Storage= 68,189 cf
Plug-Flow detention time= 67.5 min calculated for 5.965 af (95% of inflow)
Center-of-Mass det. time= 49.1 min (821.2 - 772.1)

#	Invert	Avail.Storage	Storage Description
1	398.00'	82,054 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
398.00	2,800	0	0
400.00	4,600	7,400	7,400
402.00	6,900	11,500	18,900
404.00	9,202	16,102	35,002
406.00	11,700	20,902	55,904
408.00	14,450	26,150	82,054

#	Routing	Invert	Outlet Devices
1	Primary	403.60'	**28.0 deg x 0.7' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Secondary	407.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	398.00'	**7.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=31.06 cfs @ 12.34 hrs HW=406.94' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 27.27 cfs @ 5.3 fps)
└—**3=Orifice/Grate** (Orifice Controls 3.78 cfs @ 14.2 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=398.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: DETENTION BASIN 2

Inflow Area = 20.220 ac, Inflow Depth = 4.26"
Inflow = 35.57 cfs @ 12.30 hrs, Volume= 7.175 af
Outflow = 25.01 cfs @ 13.41 hrs, Volume= 6.368 af, Atten= 30%, Lag= 66.1 min
Primary = 25.01 cfs @ 13.41 hrs, Volume= 6.368 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 328.01' @ 13.41 hrs Surf.Area= 18,515 sf Storage= 81,170 cf
Plug-Flow detention time= 76.1 min calculated for 6.368 af (89% of inflow)
Center-of-Mass det. time= 40.3 min (856.4 - 816.1)

#	Invert	Avail.Storage	Storage Description
1	322.00'	121,002 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
322.00	8,000	0	0
324.00	11,000	19,000	19,000
326.00	16,235	27,235	46,235
~~328.00~~	~~18,500~~	~~34,735~~	~~80,970~~
330.00	21,532	40,032	121,002

#	Routing	Invert	Outlet Devices
1	Secondary	329.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	322.00'	**6.0" Vert. Orifice/Grate** C= 0.600
3	Primary	324.75'	**24.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=25.01 cfs @ 13.41 hrs HW=328.01' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 2.27 cfs @ 11.6 fps)
└—**3=Orifice/Grate** (Orifice Controls 22.74 cfs @ 7.2 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=322.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: DETENTION BASIN 3

Inflow Area =	14.140 ac,	Inflow Depth =	3.00"	
Inflow =	40.74 cfs @	12.04 hrs, Volume=	3.534 af	
Outflow =	35.38 cfs @	12.32 hrs, Volume=	3.122 af,	Atten= 13%, Lag= 16.5 min
Primary =	35.38 cfs @	12.32 hrs, Volume=	3.122 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.14' @ 12.32 hrs Surf.Area= 8,571 sf Storage= 40,388 cf
Plug-Flow detention time= 65.9 min calculated for 3.112 af (88% of inflow)
Center-of-Mass det. time= 28.8 min (815.6 - 786.8)

#	Invert	Avail.Storage	Storage Description
1	318.00'	47,642 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
318.00	3,200	0	0
320.00	4,200	7,400	7,400
322.00	5,690	9,890	17,290
324.00	7,731	13,421	30,711
326.00	9,200	16,931	47,642

#	Routing	Invert	Outlet Devices
1	Primary	321.80'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	325.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
3	Primary	318.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=35.30 cfs @ 12.32 hrs HW=325.14' (Free Discharge)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 33.34 cfs @ 5.4 fps)
├—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.33 cfs @ 0.9 fps)
└—**3=Orifice/Grate** (Orifice Controls 0.63 cfs @ 12.8 fps)

Pond 4P: DETENTION BASIN 4

Inflow Area =	15.450 ac,	Inflow Depth =	2.75"	
Inflow =	43.06 cfs @	12.12 hrs,	Volume=	3.545 af
Outflow =	3.82 cfs @	13.53 hrs,	Volume=	1.581 af, Atten= 91%, Lag= 84.7 min
Primary =	3.82 cfs @	13.53 hrs,	Volume=	1.581 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 412.90' @ 13.53 hrs Surf.Area= 26,350 sf Storage= 98,854 cf
Plug-Flow detention time= 221.2 min calculated for 1.581 af (45% of inflow)
Center-of-Mass det. time= 137.9 min (932.7 - 794.8)

#	Invert	Avail.Storage	Storage Description
1	408.00'	186,000 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	14,000	0	0
410.00	18,000	32,000	32,000
412.00	25,000	43,000	75,000
414.00	28,000	53,000	128,000
416.00	30,000	58,000	186,000

#	Routing	Invert	Outlet Devices
1	Primary	412.00'	**28.0 deg x 1.0' long Sharp-Crested Vee/Trap Weir** C= 2.62
2	Primary	415.00'	**3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	408.00'	**3.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.82 cfs @ 13.53 hrs HW=412.90' (Free Discharge)
- **1=Sharp-Crested Vee/Trap Weir** (Weir Controls 3.30 cfs @ 3.0 fps)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Orifice Controls 0.52 cfs @ 10.5 fps)

Pond 5P: ROADSIDE POND UPGRAD. OF EXISTING DETENTION BASIN

Inflow Area =	59.910 ac,	Inflow Depth =	2.47"	
Inflow =	87.80 cfs @	12.63 hrs,	Volume=	12.350 af
Outflow =	79.40 cfs @	12.81 hrs,	Volume=	12.350 af, Atten= 10%, Lag= 11.0 min
Primary =	79.40 cfs @	12.81 hrs,	Volume=	12.350 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 427.34' @ 12.81 hrs Surf.Area= 6,337 sf Storage= 22,423 cf
Plug-Flow detention time= 1.7 min calculated for 12.309 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (832.1 - 830.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	26,400 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	1,000	0	0
422.00	1,200	2,200	2,200
424.00	3,000	4,200	6,400
426.00	5,000	8,000	14,400
428.00	7,000	12,000	26,400

#	Routing	Invert	Outlet Devices
1	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900
2	Primary	418.50'	**24.0" x 105.0' long Culvert** Ke= 0.600 Outlet Invert= 416.60' S= 0.0181 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=79.34 cfs @ 12.81 hrs HW=427.33' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 39.67 cfs @ 12.6 fps)
└—**2=Culvert** (Inlet Controls 39.67 cfs @ 12.6 fps)

Pond 9P: PROPOSED MH

Inflow Area = 1.910 ac, Inflow Depth = 13.76"
Inflow = 22.73 cfs @ 12.81 hrs, Volume= 2.191 af
Outflow = 20.00 cfs @ 13.09 hrs, Volume= 2.152 af, Atten= 12%, Lag= 16.5 min
Primary = 20.00 cfs @ 13.09 hrs, Volume= 2.152 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 413.04' @ 13.09 hrs Surf.Area= 3,019 sf Storage= 15,116 cf
Plug-Flow detention time= 16.2 min calculated for 2.152 af (98% of inflow)
Center-of-Mass det. time= 10.5 min (788.7 - 778.2)

#	Invert	Avail.Storage	Storage Description
1	404.00'	37,500 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
404.00	500	0	0
406.00	1,000	1,500	1,500
408.00	1,500	2,500	4,000
410.00	2,000	3,500	7,500
412.00	2,500	4,500	12,000
414.00	3,500	6,000	18,000
416.00	5,000	8,500	26,500
418.00	6,000	11,000	37,500

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**18.0" x 100.0' long Culvert** Ke= 0.600 Outlet Invert= 401.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=19.99 cfs @ 13.09 hrs HW=413.03' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 19.99 cfs @ 11.3 fps)

Pond CB: PROPOSED CB

Inflow Area = 1.910 ac, Inflow Depth = 13.52"
Inflow = 20.00 cfs @ 13.10 hrs, Volume= 2.152 af
Outflow = 19.97 cfs @ 13.05 hrs, Volume= 2.151 af, Atten= 0%, Lag= 0.0 min
Primary = 19.97 cfs @ 13.05 hrs, Volume= 2.151 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 407.10' @ 13.05 hrs Surf.Area= 12 sf Storage= 61 cf
Plug-Flow detention time= 0.2 min calculated for 2.151 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (789.8 - 789.7)

#	Invert	Avail.Storage	Storage Description
1	402.00'	99 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
402.00	12	0	0
410.00	12	96	96
410.20	20	3	99

#	Routing	Invert	Outlet Devices
1	Primary	404.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 401.75' S= 0.0075 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=19.97 cfs @ 13.05 hrs HW=407.10' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 19.97 cfs @ 6.4 fps)

Pond CB1: proposed cb

Inflow Area = 2.220 ac, Inflow Depth = 3.46"
Inflow = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af
Outflow = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af, Atten= 0%, Lag= 0.0 min
Primary = 14.38 cfs @ 11.96 hrs, Volume= 0.640 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.53' @ 11.96 hrs Surf.Area= 12 sf Storage= 30 cf
Plug-Flow detention time= 0.4 min calculated for 0.638 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (769.8 - 769.6)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**36.0" x 500.0' long Culvert** Ke= 0.600

Outlet Invert= -24.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=14.12 cfs @ 11.96 hrs HW=2.52' (Free Discharge)
└─**1=Culvert** (Inlet Controls 14.12 cfs @ 3.9 fps)

Pond EDB1: EXISTING DETENTION BASIN

Inflow Area =	63.710 ac,	Inflow Depth =	2.54"	
Inflow =	81.17 cfs @	12.80 hrs, Volume=	13.472 af	
Outflow =	81.04 cfs @	12.84 hrs, Volume=	12.934 af,	Atten= 0%, Lag= 2.0 min
Primary =	59.29 cfs @	12.84 hrs, Volume=	11.215 af	
Secondary =	21.75 cfs @	12.84 hrs, Volume=	1.719 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 416.97' @ 12.84 hrs Surf.Area= 14,327 sf Storage= 62,681 cf
Plug-Flow detention time= 34.6 min calculated for 12.891 af (96% of inflow)
Center-of-Mass det. time= 21.1 min (848.6 - 827.5)

#	Invert	Avail.Storage	Storage Description
1	410.00'	63,100 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
410.00	5,250	0	0
412.00	7,225	12,475	12,475
414.00	9,025	16,250	28,725
416.00	12,100	21,125	49,850
417.00	14,400	13,250	63,100

#	Routing	Invert	Outlet Devices
1	Primary	415.00'	**10.75' x 0.33' Vert. Orifice/Grate** C= 0.600
2	Primary	416.32'	**4.00' x 4.00' Horiz. Orifice/Grate** Limited to weir flow C= 0.600
3	Primary	410.00'	**12.0" x 20.0' long Culvert** Ke= 0.600 Outlet Invert= 409.60' S= 0.0200 '/' n= 0.013 Cc= 0.900
4	Secondary	416.10'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=59.23 cfs @ 12.84 hrs HW=416.97' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 22.93 cfs @ 6.5 fps)
├─**2=Orifice/Grate** (Weir Controls 27.28 cfs @ 2.6 fps)
└─**3=Culvert** (Inlet Controls 9.02 cfs @ 11.5 fps)

Secondary OutFlow Max=21.72 cfs @ 12.84 hrs HW=416.97' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 21.72 cfs @ 2.5 fps)

Pond EDB2: DETENTION BASIN ADJACENT TO WARD PRODUCTS

Inflow Area =	34.230 ac,	Inflow Depth =	2.46"	
Inflow =	42.44 cfs @	12.68 hrs, Volume=	7.027 af	
Outflow =	38.81 cfs @	13.03 hrs, Volume=	7.027 af,	Atten= 9%, Lag= 21.1 min
Primary =	38.81 cfs @	13.03 hrs, Volume=	7.027 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 414.49' @ 13.03 hrs Surf.Area= 6,723 sf Storage= 16,813 cf
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	406.00'	20,248 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	10	0	0
408.00	50	60	60
410.00	900	950	1,010
412.00	2,800	3,700	4,710
414.00	6,000	8,800	13,510
415.00	7,475	6,738	20,248

#	Routing	Invert	Outlet Devices
1	Primary	406.00'	**24.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= 401.16' S= 0.0605 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=38.80 cfs @ 13.03 hrs HW=414.49' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 38.80 cfs @ 12.4 fps)

Pond MH: DRAINAGE MANHOLE AT BASE OF NIMO

Inflow Area =	4.910 ac,	Inflow Depth =	2.23"	
Inflow =	12.54 cfs @	12.15 hrs, Volume=	0.913 af	
Outflow =	12.53 cfs @	12.15 hrs, Volume=	0.913 af,	Atten= 0%, Lag= 0.0 min
Primary =	12.53 cfs @	12.15 hrs, Volume=	0.913 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 329.87' @ 12.15 hrs Surf.Area= 20 sf Storage= 37 cf
Plug-Flow detention time= 0.1 min calculated for 0.910 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (807.0 - 807.0)

#	Invert	Avail.Storage	Storage Description
1	328.00'	106 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.00	20	0	0
333.00	20	100	100
333.10	100	6	106

#	Routing	Invert	Outlet Devices
1	Primary	328.10'	**24.0" x 185.0' long Culvert** Ke= 0.600 Outlet Invert= 305.90' S= 0.1200 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=12.49 cfs @ 12.15 hrs HW=329.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 12.49 cfs @ 4.2 fps)

Pond MH1:

Inflow Area = 63.710 ac, Inflow Depth = 2.11"
Inflow = 22.52 cfs @ 12.30 hrs, Volume= 11.208 af
Outflow = 22.54 cfs @ 12.30 hrs, Volume= 11.207 af, Atten= 0%, Lag= 0.0 min
Primary = 22.54 cfs @ 12.30 hrs, Volume= 11.207 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.27' @ 12.30 hrs Surf.Area= 12 sf Storage= 39 cf
Plug-Flow detention time= 0.0 min calculated for 11.207 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (906.6 - 906.6)

#	Invert	Avail.Storage	Storage Description
1	0.00'	60 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	12	0	0
4.90	12	59	59
5.00	20	2	60

#	Routing	Invert	Outlet Devices
1	Primary	1.00'	**30.0" x 80.0' long Culvert** Ke= 0.600 Outlet Invert= -15.00' S= 0.2000 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=22.54 cfs @ 12.30 hrs HW=3.27' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 22.54 cfs @ 4.8 fps)

Pond MH4: PROPOSED MH

Inflow Area = 7.990 ac, Inflow Depth = 2.42"
Inflow = 19.69 cfs @ 12.21 hrs, Volume= 1.612 af
Outflow = 19.69 cfs @ 12.21 hrs, Volume= 1.611 af, Atten= 0%, Lag= 0.1 min
Primary = 19.69 cfs @ 12.21 hrs, Volume= 1.611 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 423.93' @ 12.21 hrs Surf.Area= 20 sf Storage= 79 cf
Plug-Flow detention time= 0.3 min calculated for 1.606 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (807.5 - 807.4)

#	Invert	Avail.Storage	Storage Description
1	420.00'	143 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
420.00	20	0	0
427.00	20	140	140
427.10	40	3	143

#	Routing	Invert	Outlet Devices
1	Primary	421.00'	**24.0" x 300.0' long Culvert** Ke= 0.600 Outlet Invert= 406.00' S= 0.0500 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=19.57 cfs @ 12.21 hrs HW=423.91' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 19.57 cfs @ 6.2 fps)

Pond UP2P: BASIN ADJACENT TO SAM STRATTON

Inflow Area =	7.360 ac,	Inflow Depth =	2.49"	
Inflow =	13.48 cfs @	12.42 hrs, Volume=	1.527 af	
Outflow =	11.35 cfs @	12.61 hrs, Volume=	1.518 af,	Atten= 16%, Lag= 11.7 min
Primary =	11.35 cfs @	12.61 hrs, Volume=	1.518 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 434.77' @ 12.61 hrs Surf.Area= 4,414 sf Storage= 5,491 cf
Plug-Flow detention time= 7.9 min calculated for 1.513 af (99% of inflow)
Center-of-Mass det. time= 5.5 min (824.2 - 818.6)

#	Invert	Avail.Storage	Storage Description
1	432.00'	6,325 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
432.00	225	0	0
434.00	2,400	2,625	2,625
435.00	5,000	3,700	6,325

#	Routing	Invert	Outlet Devices
1	Primary	432.00'	**18.0" x 75.0' long Culvert** Ke= 0.600 Outlet Invert= 430.40' S= 0.0213 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=11.34 cfs @ 12.61 hrs HW=434.77' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 11.34 cfs @ 6.4 fps)

Pond UP3P: ROAD CULVERT

Inflow Area =	32.530 ac,	Inflow Depth =	2.42"	
Inflow =	55.21 cfs @	12.43 hrs, Volume=	6.561 af	
Outflow =	41.06 cfs @	12.72 hrs, Volume=	6.554 af,	Atten= 26%, Lag= 17.3 min
Primary =	41.06 cfs @	12.72 hrs, Volume=	6.554 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 433.88' @ 12.72 hrs Surf.Area= 8,379 sf Storage= 29,032 cf
Plug-Flow detention time= 5.3 min calculated for 6.554 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (825.8 - 820.9)

#	Invert	Avail.Storage	Storage Description
1	424.40'	29,890 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
424.40	50	0	0
426.00	750	640	640
428.00	1,200	1,950	2,590
430.00	2,400	3,600	6,190
432.00	6,400	8,800	14,990
434.00	8,500	14,900	29,890

#	Routing	Invert	Outlet Devices
1	Primary	424.50'	**24.0" x 95.0' long Culvert** Ke= 0.600 Outlet Invert= 416.05' S= 0.0889 '/' n= 0.013 Cc= 0.900

Primary OutFlow Max=41.04 cfs @ 12.72 hrs HW=433.87' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 41.04 cfs @ 13.1 fps)

Appendix N:
Storm Water Quantity and Quality Control Component(s) Design Calculations

THE CHAZEN COMPANIES
Engineers & Environmental Professionals
20 Gurley Avenue
TROY, NEW YORK 12182
(518) 235-8050 Fax (518) 235-8051

JOB Amsterdam Recycling
SHEET NO. ____ OF ____
CALCULATED BY ____ DATE ____
CHECKED BY ____ DATE ____
SCALE ____

1) Approximately the Entire Site is disturbed ≈ 40.1 Acres
2) Lower Road Area = 4.297 ; Imp = .60
3) P = 1.0

∴ Landfill & Recycling Area

$$\text{Landfill} = WQ_v = \frac{(P)(R_v)(A)}{12} = \frac{(1)(.2)(20.17)}{12} = .33 \text{ ac-ft}$$

= Landfill Area WQ_v = ~~.24 ac-ft~~ .33 ac-ft
= 14605 cf

Recycling Area = 4.31 acres ; Imp = 2.44 ; % Imp = 56.6 ; R_v = .56

$$WQ_v = \frac{(P)(R_v)(A)}{12} = \frac{(1)(.56)(4.31)}{12} = .201 \text{ ac-ft}$$

WQ_v = .201 ac-ft = 8761 cf

Southern Basin Area = 6.14 Acre ; Imp = .44 ; % Imp = 7.2 ; R_v = .2

$$WQ_v = \frac{(P)(R_v)(A)}{12} = \frac{(1)(.2)(6.14)}{12} = .102 \text{ ac-ft}$$

WQ_v = .102 ac-ft = 4458 cf

Lower (Access Road) Area & Central = 9.5 Acres ; Imp = 3.4% ; Imp = .7 ac
R_v = .2

$$WQ_v = \frac{(P)(R_v)(A)}{12} = \frac{(1)(.2)(9.5)}{12} = .16 \text{ ac-ft}$$

WQ_v = .16 ac-ft = 6970 cf

THE CHAZEN COMPANIES
Engineers & Environmental Professionals
20 Gurley Avenue
TROY, NEW YORK 12182
(518) 235-8050 Fax (518) 235-8051

JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Landfill Area - Pond in Phase 1
Mound in Phase 2

WQv - Phase 1 - treated as leachate

WQv - Phase 2 = 14605 cf

- will flow to 2 basins

≃ 26% to the north basin = 3797.3 cf

≃ 74% to the Access Road basin = 10807.7 cf

- Lower Access Rd Basin = 6970 + 10807.7 = 17777.7 cf

Appendix O:
Construction Phase Inspections and Maintenance

Amsterdam Materials Recycling
County Route 157
City of Amsterdam, New York

CONSTRUCTION PHASE INSPECTIONS AND SYSTEM MAINTENANCE

Between the time this SWPPP is implemented and final site stabilization is achieved, all disturbed areas and pollutant controls must be inspected at least once every seven calendar days and within 24 hours following a rainfall of 0.5 inches or greater. The purpose of site inspections is to assess performance of pollutant controls. The inspections will be conducted by the owner's designated representative. The designated representative must meet the qualification requirements outlined in SPDES General Permit GP02-01. Based on these inspections, the general contractor will decide whether it is necessary to modify this SWPPP, add or relocate sediment barriers, or whatever else may be needed in order to prevent pollutants from leaving the site via storm water runoff. The general contractor has the duty to cause pollutant control measures to be repaired, modified, maintained, supplemented, or whatever else is necessary in order to achieve effective pollutant control.

Examples of particular items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances.

1. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance will be constructed where vehicles enter and exit. This entrance will be maintained or supplemented as necessary to prevent sediment from leaving the site on vehicles.

2. Sediment barriers must be inspected and, if necessary, they must be enlarged or cleaned in order to provide additional capacity. All material from behind sediment barriers will be stockpiled on the up slope side. Additional sediment barriers must be constructed as needed.

3. Inspections will evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas.

4. Grassed areas will be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 70 percent density. The density of 70 percent or greater must be

maintained to be considered as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this goal.

5. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

Based on inspection results, any modification necessary to increase effectiveness of this SWPPP to an acceptable level must be made within seven calendar days of the inspection. The inspection reports must be completed entirely and additional remarks should be included if needed to fully describe a situation. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWPPP at the time of inspection and specifically identify all incidents of non-compliance.

Inspection reports must be kept on file by the general contractor as an integral part of this SWPPP for at least three years from the date of completion of the project.

Ultimately, it is the responsibility of the general contractor to assure the adequacy of site pollutant discharge controls. Actual physical site conditions or contractor practices could make it necessary to install more structural controls than are shown on the plans. (For example, localized concentrations of runoff could make it necessary to install additional sediment barriers.) Assessing the need for additional controls and implementing them or adjusting existing controls will be a continuing aspect of this SWPPP until the site achieves final stabilization.

Appendix P:
Inspections And System Maintenance After Construction

Amsterdam Materials Recycling
County Route 157
City of Amsterdam, New York

POST CONSTRUCTION INSPECTIONS AND SYSTEM MAINTENANCE

1. SITE COVER

a. Inspections

Site cover and associated structures and embankments should be inspected periodically for the first few months following construction and then on a biannual basis. Site inspections should also be performed following all major (i.e., intense storms, thunder storms, cloud burst, etc.) storm events. Items to check for include (but are not limited to):

i. Differential settlement of embankments, cracking or erosion.
ii. Lack of vigor and density of grass turf.
iii. Accumulation of sediments or litter on lawn areas, paved areas, or within catch basin sumps.
iv. Accumulation of pollutants, including oils or grease, in catch basin sumps.
v. Damage or fatigue of storm sewer structures or associated components.

b. Mowing and Sweeping

Vegetated areas and landscaping should be maintained to promote vigorous and dense growth. Lawn areas should be mowed at least three times a year (more frequent mowing may be desired for aesthetic reasons). Resultant yard waste shall be collected and disposed of off-site.

Paved areas should be swept at least twice a year. Additional sweeping may be appropriate in the early spring for removal of deicing materials

c. Debris and Litter Removal

Accumulation of litter and debris should be removed during each mowing or sweep operation.

d. Structural Repair or Replacement

Components of the system which require repair or replacement should be addressed immediately following identification.

e. Catch Basins

The frequency for cleanout of catch basin sumps will depend on the efficiency of mowing, sweeping and debris and litter removal. Sumps should be cleaned when accumulation of sediments are within six inches of the catch basin outlet pipe.

f. Grassed Swales

Swale maintenance will include periodic mowing, occasional spot reseeding and weed control to keep grass cover dense and vigorous. Resultant yard waste shall be collected and disposed of off-site. Application of fertilizers and pesticides should be restricted or limited.

g. Winter Maintenance

To prevent impacts to storm water management facilities, the following winter maintenance limitations, restrictions or requirements are recommended:

i. Remove snow and ice from inlet structures, basin inlet and outlet structures and away from culvert end sections.
ii. Snow removed from paved areas should not be piled at inlets/outlets of the storm water management basin.
iii. Use of deicing materials should be limited to sand and "environmentally friendly" chemical products. Use of salt mixtures should be kept to a minimum.
iv. Sand used for deicing should be clean, course material free of fines, silt, and clay.
v. Materials used for deicing should be removed during the early spring by sweeping and/ or vacuuming.

2. DETENTION BASINS

a. Inspections

Detention Basins should be inspected periodically for the first few months after construction and then on an annual basis. Detention Basins should be inspected after major storm events to ensure inlets and outlets remain clear. Items to check for include (but are not limited to):

i. Differential settlement of embankments.
ii. Cracking, erosion or seepage through embankments.
iii. Evidence of clogging at inlets or outlets.
iv. Erosion of the flow path through the detention basin.
v. Brush, shrub or tree growth on embankments.
vi. Condition of the overflow spillway.
vii. Lack of vigor and density of grass turf on the basin embankments.

b. **Mowing**

The side slopes, embankments, inlets, and overflow spillways of the detention basins should be mowed at least three times a year and resultant yard wastes collected and disposed of off-site.

c. **Debris and Litter Control**

Removal of debris and litter should be accomplished during mowing operations. Inlet and outlet structures should be cleared of all debris and litter.

d. **Structural repairs and Replacement**

Components of the detention basin, which require repair or replacement, should be addressed immediately following identification.

e. **Erosion Control**

Sources of sedimentation, specifically eroded areas in upland drainage areas, should be stabilized immediately upon identification. Stabilization should be with vegetative practices or other erosion control practices when vegetative measures do not prove effective.

Soil slumpage, erosion of the basin embankment or around inlets/outlets, and cracking should be stabilized and repaired immediately upon identification. Repair, replacement or addition of rip-rap aprons, channels or embankments should be pursued as required.

f. **Sediment removal**

Sediments, which accumulate in the detention basin, should be removed periodically to prevent clogging of inlet or outlet structures. A typical clean-out cycle should be between 5 to 10 years with more frequent cleanings near inlet and outlet structures.

3. FOREBAYS AND WET POOLS

a. Inspections

Forebays and Wet Pools should be inspected periodically for the first few months after construction and then on an annual basis. Forebays and Wet Pools should be inspected following all major storm events. Items to check for include (but are not limited to):

i. Differential settlement of embankments.
ii. Cracking, erosion or seepage through embankments.
iii. Erosion of the flow path through the facility.
iv. Brush, shrub or tree growth on embankments.
v. Condition of the overflow spillway.
vi. Accumulation of sediment.

b. Mowing

Tree and brush growth must be prevented on basin embankments, side slopes, bottoms and around inlets and the overflow spillway(s). Mowing of the embankments shall be at least three times a year unless more frequent mowing is required to control vegetative growth. Resultant yard waste shall be collected and disposed of off-site.

c. Debris and Litter Removal

Removal of debris and litter shall be accomplished during mowing operations. Inlet structures should be cleared of all debris and litter.

d. Structural Repairs and Replacement

Components of the forbay or wet pool, which require repair or replacement, should be addressed immediately following identification.

e. Erosion Control

Sources of sedimentation, specifically eroded areas in upland drainage areas, should be stabilized immediately upon identification.

Stabilization should be with vegetative practices or other erosion control practices when vegetative measures do not prove effective.

Soil slumpage, erosion of the basin embankment or around inlets or overflow outlets, and cracking should be stabilized and repaired immediately upon identification. Repair, replacement or addition of rip-rap aprons, channels or embankments should be pursued as required.

f. **Sediment Removal**

Cleanout frequency of Forebays and Wet Pools is dependent upon bottom cover, storage capacity, volume of inflow, and sediment load.

Sediment shall be removed from the Forebays and Wet Pools every 5 to 6 years or when accumulations reach 12 inches in depth. Monitoring the depth of sediments can be measured by installing permanent markers in the newly constructed facilities with a mark 12 inches above the permanent water surface. Markers should not be spaced more than 50 feet apart along the flow path through the facility. A log should be kept indicating the date that the facility was inspected and the distance to the bottom.

When sediment removal is required, the original grades depicted on the project drawings should be reestablished by a qualified contractor. If any of the impermeable material used in the construction of the basin bottom is removed it must be replaced with clean material consistent with the original material specifications.

4. **Aquatic Benches**

a. **Inspection**

Aquatic Benches should be inspected periodically for the first few months after construction and then on an annual basis. Aquatic Benches should be inspected after all major storm events. Items to check for include (but are not limited to):

i. Checking basin embankments for subsidence, erosion, cracking, tree growth and the presence of burrowing animals.
ii. Health and vigor of wetland vegetation.
iii. Accumulation of sediment.

b. **Mowing**

Mowing is not desirable nor allowed in the Aquatic Benches. Trees and shrubs should be removed from around inlet and outlet structures. Removal should be biannual.

c. **Debris, Trash and Litter Control**

Debris, trash, and litter should be removed from the Aquatic Benches immediately upon discovery.

d. **Erosion Control**

Soil slumpage, erosion of the Aquatic Bench embankment or around inlets or outlets, and cracking should be stabilized and repaired immediately upon identification.