

***STORMWATER MANAGEMENT,
WATER QUALITY AND
GROUNDWATER RECHARGE ANALYSIS***

for

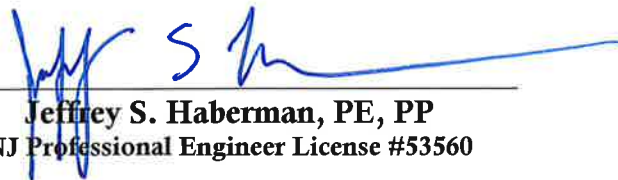
***Sharbell Building Company, LLC
Planned Residential Development – KT Tract***

***17 Research Road
Block 28005, Lot 66
Montgomery Township, Somerset County, NJ***

Prepared by:



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I. SITE DESCRIPTION

The project area consists of Block 28005, Lot 66, in the Township of Montgomery, Somerset County, New Jersey. The subject parcel currently consists of a vacated office building with associated site improvements and wooded areas.

The proposed land development project consists of the construction of 107 townhome dwellings, a 40-unit condominium building, roadways, parking areas, recreational open space areas and other associated improvements and amenities as shown on the Site Plan drawings.

The existing conditions of the tract have been verified by the ALTA/NSPS Land Title Survey, prepared by Dynamic Survey, LLC.

II. DESIGN OVERVIEW

This report has been prepared to define and analyze the stormwater drainage conditions that would occur as a result of the development of Block 28005, Lot 66, in the Township of Montgomery, Somerset County, New Jersey. The project includes new stormwater management facilities to address applicable aspects of the Montgomery Township Land Use Ordinance and NJAC 7:8 – Stormwater Management.

This Stormwater Management Study identifies and describes the manner by which the design and performance measures set forth by the Montgomery Township Land Use Ordinance and NJAC 7:8 are achieved to minimize the adverse impact of stormwater runoff on water quantity, water quality and groundwater recharge in receiving water bodies.

The scope of the study includes the construction of 107 townhome dwellings, a 40-unit condominium building, roadways, parking areas, recreational open space areas and other associated improvements and amenities as shown on the accompanying engineering drawings.

Based upon the scope of the project, the development is classified as a major development per the definition set forth in NJAC 7:8 and is therefore subject to NJAC 7:8 design standards. The stormwater management system has been designed to meet the groundwater recharge, stormwater runoff quantity and stormwater runoff quality standards set forth by NJAC 7:8. Accordingly, the following items are addressed within this report:

- Non-structural stormwater management strategies (7:8-5.3)
- Erosion control, groundwater recharge and runoff quantity standards (7:8-5.4)
- Stormwater runoff quality standards (7:8-5.5)
- Calculation of stormwater runoff (7:8-5.6)

- Standards for structural stormwater management measures (7:8-5.7)

A hydrological evaluation is provided for the NJDEP Water Quality, 2, 10, and 100 year storm events utilizing the Urban Hydrology for Small Watershed TR55 method. The TR55 method is utilized to design the proposed wet pond.

The Montgomery Township and NJDEP flow reduction requirements are as follows:

2-year:	50% reduction
10-year:	25% reduction
100-year:	20% reduction

It is also the intention of the design of this facility to comply with the New Jersey Stormwater Best Management Practices.

III. ENVIRONMENTAL SITE ANALYSIS

Based on the Somerset County soils survey information, the soil types native to the site include:

SOMERSET COUNTY SOIL SURVEY INFORMATION		
SOIL TYPE (SYMBOL)	SOIL TYPE (NAME)	HYDROLOGIC SOIL GROUP
BhnB	Birdsboro silt loam, 2 to 6 percent slopes	B
LbtB	Lansdowne silt loam, 2 to 6 percent slopes	C
RorAt	Rowland silt loam, 0 to 2 percent slopes, frequently flooded	C
RoyB	Royce silt loam, 2 to 6 percent slopes	C

Dynamic Earth, LLC performed numerous test pits within the site to establish seasonal high groundwater table characteristics and percolation tests were conducted for on-site soils to confirm soil classification per the County Soil Survey. Please refer to the Stormwater Test Pit Map and Logs in the Appendix of this Report.

The field investigation recharge map, soil profile pit logs and tube permeameter testing completed reveal a restriction within the upper 40 inches of the soil profile consisting of low permeability, firm, fine-grained soils. The results of testing confirm a permeability rate of less than 0.14 in/hr which is consistent with hydrologic soil group (HSG) "D" as specified in the NJ BMP Manual. In addition, groundwater and evidence of seasonal high water table were not encountered in any test pits. For the purposes of this study, off-site undisturbed soils are assumed to have a Hydrologic Soil Group 'B' Rating per the County Soil Survey as no test pits were performed for off-site soils to confirm otherwise.

Furthermore, pursuant to the “Evaluation of Groundwater Resources of Sourland Mountain Region of Central New Jersey”, prepared by Matthew J. Mulhall and Peter M. Demicco, dated November 19, 2004, approximately 83 percent of the Sourland Mountain region has low to very low infiltration rates and very likely, high to very high surface-water runoff rates and, therefore have hydrologic soil groups of C and/or D. This is evident in the testing that was completed for the subject parcel.

The subject site is situated within the Piedmont physiographic province of New Jersey, characterized by a low rolling plain dissected by higher ridges. Specifically, the site is underlain by the Lower Jurassic/Upper Triassic-aged Passaic Formation which consists, primarily, of red beds of argillaceous siltstone, mudstone, and sandstone. The overburden soils include natural Pennsauken Formation deposits as well as residual deposits that were formed from the weathering of the parent rock. This is confirmed in mapping provided in the “Evaluation of Groundwater Resources of Sourland Mountain Region of Central New Jersey”, prepared by Matthew J. Mulhall and Peter M. Demicco, dated November 19, 2004,

Pursuant to the NJDEP Geoweb Mapping, ALTA Survey, Montgomery Township Natural Resources Inventory and the issued NJDEP Wetlands Letter of Interpretation, it does not appear there are any documented natural resources, including wetlands, flood hazard areas, and threatened/endangered species on the subject parcel. Figure 21 of the Township of Montgomery’s Natural Resources Inventory (Steep Slopes and Ridgelines) identifies areas of critical slopes (in excess of 15% slope) on the subject parcel. In addition, a Steep Slope Analysis Plan (submitted under separate cover) has been prepared which is based upon a topographic survey that was conducted for this site. These critical slopes will be removed for the construction of the proposed development.

IV. EXISTING DRAINAGE CONDITIONS

The tract has been evaluated with the following existing drainage sub-watershed areas as depicted on the Existing Conditions Drainage Area Map:

Study Area Route North Disturbed: This study area currently consists of impervious area, open space and wooded area associated with a majority of the subject parcel and a small portion of Research Road that will be disturbed in post development conditions. Stormwater runoff from this area is tributary to the existing bioretention basin to the north of the site via overland flow.

Study Area North Undisturbed: This study area currently consists of impervious area, open space and wooded area associated with the off-site residential lots to the south. Stormwater runoff from this area is tributary to the existing bioretention basin to the north of the site via overland flow.

Study Area East Disturbed: This study area currently consists of open space and wooded area associated with the easterly portion of the subject parcel. Stormwater runoff from this area is tributary to the property to the east via overland flow.

Study Area East Undisturbed: This study area currently consists of impervious area, open space and wooded area associated with the off-site residential lots to the south. Stormwater runoff from this area is tributary to the property to the east via overland flow.

Study Area CR 518: This study area currently consists of impervious area, open space and wooded area adjacent to County Route 518. Stormwater runoff from this area is tributary to the County Route 518 Right-of-Way via overland flow.

V. PROPOSED DRAINAGE CONDITIONS

The tract has been evaluated with the following drainage sub-watershed areas as depicted on the Proposed Conditions Drainage Area Map:

Study Area – Wet Pond: This study area consists of the majority of the proposed development inclusive of the townhome units and condominium building, paved parking areas, driveways, open space areas and the roadway network, as well as impervious, wooded and open space areas from a portion of the residential lots to the south of the site. In addition, the wet pond system collects stormwater runoff from a portion of the proposed retail facility (1.9 acres with CN of 88) to the east of the site. Stormwater runoff from the wet pond basin is released through an outlet control structure and routed to the existing bioretention facility that is associated with the residential development to the north of the site.

Study Area – North Undetained: This study area consists of impervious and open space area along the northerly property line. Runoff from this area is tributary to the north by way of overland flow.

Study Area – East Undetained: This study area consists of impervious and open space area along the easterly property line. Runoff from this area is tributary to the east by way of overland flow.

Study Area – CR 518 Undetained: This study area consists of impervious and open space area along the easterly property line. Runoff from this area is tributary to the County Route 518 Right-of-Way by way of overland flow.

VI. DESIGN METHODOLOGY

The intention of the design of the proposed stormwater management facilities for this project is to provide measures as required to address applicable aspects of the Montgomery Township Land Use Ordinance and NJAC 7:8. In order to prepare the stormwater management and water quality design system for the subject project, extensive initial investigation of the property and topography was performed. On-site review of the tract was performed by Dynamic Engineering Consultants, PC to verify existing site conditions and land cover characteristics. Dynamic Survey, LLC was contracted to prepare the ALTA/NSPS Survey with topography for the existing site and surrounding watershed areas.

Furthermore, Dynamic Earth, LLC performed test pits within the site to establish seasonal high water table and soil permeability rates.

Based on our review of the existing site conditions and the Topographic Survey, the Drainage Area Maps for the existing and proposed site conditions as defined within this report were established. A grading plan was developed for the proposed site improvements with consideration to the existing drainage patterns. The plan was designed to ensure runoff from the proposed development could be directed to stormwater management facilities in order to address the applicable sections of the Montgomery Township Land Use Ordinance and NJAC 7:8.

Under proposed conditions, stormwater runoff from the easterly portion of the development is tributary to Wet Pond A1 by way of the on-site stormwater conveyance system and overland flow. In addition, Wet Pond A1 collects stormwater runoff from a portion of the proposed retail facility (1.9 acres with CN of 88) to the east of the site. Stormwater runoff from the westerly portion of the development is tributary to Wet Pond A2 by way of the on-site stormwater conveyance system and overland flow. Wet Ponds A1 and A2 are interconnected by way of a 36" reinforced concrete equalization pipe through the condominium lot at the northerly portion of the site. An outlet control structure is proposed within Wet Pond A1 which serves to release stormwater runoff from the combined wet pond system at a controlled rate in order to satisfy the stormwater quantity requirements set forth by NJAC 7:8. Stormwater runoff discharged from the wet pond system is ultimately tributary to the existing bioretention basin on Block 28003, Lot 162 that was designed and constructed for the residential development to the north. It is important to note that the stormwater runoff peak runoff rates to the existing bioretention facility has been reduced by 50%, 25% and 20% for the 2, 10 and 100 year design storm events, respectively, in order to assist in maintaining the functionality of the existing bioretention basin.

In addition, the wet pond system has been designed to provide a ratio of permanent pool volume to water quality storm runoff volume greater than 2.5:1 and a detention time greater than 16 hours. Therefore,

according to the standards set forth by the NJ Stormwater Best Management Practices, the wet pond system provides a TSS Removal Rate of 82.0%, satisfying the water quality standards set forth by NJAC 7:8.

Furthermore, as previously noted, Dynamic Earth, LLC performed numerous test pits within the site to establish seasonal high groundwater table characteristics and percolation tests were conducted for on-site soils to confirm soil classification per the County Soil Survey. The soils encountered during the site investigation consisted of clayey silt, and groundwater and evidence of seasonal high water table were not encountered in any test pits. The field investigation recharge map, soil profile pit logs and tube permeameter testing in the Appendix of this Report reveal a restriction within the upper 40 inches of the soil profile consisting of low permeability, firm, fine-grained soils. The results of testing confirm a permeability rate of less than 0.14 in/hr which is consistent with hydrologic soil group (HSG) "D" as specified in the NJ BMP Manual. The New Jersey Groundwater Recharge Spreadsheet (NJGRS) in the Appendix of this Report indicates that no recharge occurs in the existing condition. Therefore, the proposed development satisfies the groundwater recharge requirements set forth by NJAC 7:8.

The overall stormwater management design for the proposed development as shown on the accompanying engineering drawings has been evaluated by Dynamic Engineering Consultants to ensure that the overall development satisfies the standards set forth in the Montgomery Township Land Use Ordinance and NJAC 7:8.

VII. NON-STRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The site design has been prepared to implement non-structural stormwater management strategies in accordance with NJAC 7:8-5.3 to the maximum extent practicable. As required by the NJDEP, the following is a detailed narrative on how this application addresses each of the nine (9) nonstructural strategies established in NJAC 7:8-5.3 to the maximum extent practicable. The strategies implemented at this site location include the following:

Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment

loss: The existing site consists of a vacated office building with associated site improvements and wooded areas. The existing topography slopes primarily from south to north with critical slope areas (15% and greater) comprising approximately 18% of the parcel. Stormwater runoff traverses the site via sheet flow and shallow concentrated flow to the three (3) points of analysis with no detention, thereby subjecting the site to erosion, particularly in the critical slope areas. In proposed conditions, the development is designed with a wet pond which collects stormwater runoff from the majority of the tract. The wet pond has been designed to provide a ratio of permanent pool volume to water quality storm runoff volume of 2.5:1 and a detention time greater than 16 hours, thereby providing a TSS Removal Rate of 82%. Therefore, the proposed stormwater

management design provides water quality benefits that are not provided in existing conditions. Additionally, the site has been designed to maintain existing drainage patterns while reducing the amount of unprotected critical slope areas. Furthermore, the proposed stormwater management system reduces the peak rates of stormwater runoff rates in the post development condition for the 2, 10, and 100 year design storm, thereby reducing the potential for erosion and sediment loss.

Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces:

The proposed development has been designed to break up and disconnect the flow of runoff from impervious surfaces to the maximum extent practicable. The proposed development has been designed with seven (7) lots that are dedicated as open space for recreational use and to break up impervious surfaces throughout the subject parcel. The parking lot of the 40 unit condominium complex has been designed with curb cuts in order to convey stormwater runoff through vegetated surfaces to the aboveground Wet Pond Basins 'A1' and 'A2'. The alleys adjacent to West Alley Park have been designed with flush ribbon curbs in order to allow stormwater runoff to traverse vegetated surfaces in open space area. The Central Park has been designed with rain gardens at the northerly portion of each of the three plateaus. The rain gardens contain an inlet which collects stormwater runoff from tributary impervious surfaces, and routes runoff to the aboveground wet pond basin at the northerly portion of the site. These methods allow for the disconnect of the flow of runoff over impervious surfaces throughout the site.

Maximize the protection of natural drainage features and vegetation: The proposed development was designed with consideration to the existing drainage patterns. The stormwater management system serves to reduce peak rates of runoff in post-development conditions to each point of analysis. In addition, the proposed development has been designed to preserve existing trees on-site to the maximum extent practicable, particularly along the residential buffer at the southerly line and in dedicated open space lots, and a variety of trees and shrubs are proposed in areas of dedicated open space and along roadway corridors.

Minimize the decrease in the pre-development "time of concentration": The proposed development was designed to minimize the decrease in the pre-development "time of concentration" to the maximum extent feasible. In existing conditions, a majority of the parcel consists of wooded area, and stormwater runoff is tributary to the existing bioretention basin that is associated with the residential development to the north. In addition, stormwater runoff from the off-site area to the south of the parcel is tributary to the subject parcel, and subsequently the bioretention basin to the north. The proposed development is designed with a wet pond basin which collects stormwater runoff from the majority of the subject parcel and off-site areas to the south and detains and releases runoff at a controlled rate to satisfy the water quantity and quality regulations set forth by NJAC 7:8. This design assists in mitigating the potential impacts to the decrease of the time of concentration to the point of analysis for not only the subject parcel, but provides a benefit for the off-site area to the south of the parcel as well. Furthermore, the proposed development is proposed to minimize the

decrease in pre-development time of concentration by clustering the development such that 30% of open space on the parcel is achieved. In addition, several features are proposed throughout the subject parcel to disconnect the flow of impervious surfaces and decrease the time of concentration, including routing stormwater runoff through curb cuts and vegetated areas, proposing rain gardens with infrastructure, and routing runoff through open space elements prior to conveyance to the aboveground wet pond basins at the northerly portion of the site.

Minimize land disturbance including clearing and grading: The proposed development has been designed to minimize clearing/grading and preserves existing trees on-site to the maximum extent practicable. The development is designed to create seven (7) lots dedicated for open space use which will be revegetated with a variety of trees and shrubs. Additionally, the site proposes stormwater facilities to mitigate the impacts caused by the clearing of wooded areas.

Minimize soil compaction: The proposed development proposes to minimize soil compaction to the maximum extent practicable by utilizing light weight construction equipment for landscaped areas of the site.

Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawn fertilizers and pesticides: The proposed landscaping design has been prepared to provide an aesthetic improvement to the interior and perimeter of the site through use of a variety of tree and shrub species.

Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas: The proposed development has been designed to provide vegetated conveyance systems where practicable. The development is clustered in order to allow for the dedication of seven (7) lots as open space for recreational use and to break up impervious surfaces throughout the subject parcel. The parking lot of the 40 unit condominium complex has been designed with curb cuts in order to convey stormwater runoff through vegetated surfaces to the aboveground wet pond Basins 'A1' and 'A2'. The alleys adjacent to West Alley Park have been designed with flush ribbon curbs in order to allow stormwater runoff to traverse vegetated surfaces in the open space area prior to conveyance through the on-site stormwater conveyance system.

Provide other source control to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into the stormwater: Trash receptacles will be provided within the proposed development. The proposed trash receptacles will help prevent accumulation of trash and debris from entering the proposed drainage system. Furthermore, regularly scheduled maintenance of the wet ponds as described in the Operations and Maintenance Manual will remove any trash and debris that may have entered the stormwater management facilities.

VIII. ABOVEGROUND WET POND DESIGN

In order to meet the stormwater runoff quantity and quality requirements set forth by NJAC 7:8 for the developed parcel, the proposed project design incorporates an aboveground wet pond basin system. Stormwater runoff from the overall parcel is conveyed to the wet pond basin by sheet flow and shallow concentrated flow over lawn areas and through the proposed storm sewer pipe network. In accordance with the New Jersey Stormwater Best Management Practices Manual and as demonstrated in the Appendix of this report, the following design considerations have been satisfied:

- Minimum Permanent Pool Volume = Stormwater Design Storm Runoff Volume (Water Quality Storm)
- Minimum Permanent Pool Depth = 3–6 Feet
- Minimum Permanent Pool Surface is 0.25 Acres
- Minimum Drainage Area Size = 20 Acres
- Maximum Permanent Pool Drain Time = 40 hours (By the use of a mechanical pump)
- Recommended Minimum Pool Length to Width Ratio = 3:1

Per the Dam Safety Standards in NJAC 7:20, the wet pond basin is classified as a Class IV – Small Dam as it impounds less than 15 acres/feet of water, has less than 15 feet height-of-dam and has a drainage area below 150 acres. Therefore, the wet pond basin has been designed to satisfy the dam design criteria set for in NJAC 7:20-1.9(a.-o.) as follows:

NJAC 7:20-1.9 Design Criteria

- (a) The emergency spillway has been designed to provide capacity within the wet pond basin and stability for discharge of the 24 hour 100 year frequency, Type III storm plus 50%. Please refer to the emergency spillway calculations in the Appendix of this Report.
- (b) N/A – This is a proposed system.
- (c) N/A – This is a Class IV dam.
- (d) The emergency spillway has been designed to safely pass the 24 hour 100 year frequency, Type III storm plus 50% without endangering the safety of the dam. Please refer to the emergency spillway calculations in the Appendix of this Report.
- (e) The emergency spillway is constructed of a grass paver material to assist in dissipating the energy of flow. In addition, the emergency spillway discharges stormwater at less than 2.0 feet per second, thereby providing a stable condition.
- (f) The entirety of the 100 year design storm is contained within the wet pond basin system below the emergency spillway elevation. Furthermore, the spillway has been designed to safely route stormwater

generated by the 24 hour 100 year frequency, Type III storm plus 50% should the principal spillway (outlet control structure) fail.

- (g) An Outlet Control Structure is proposed with a 36" reinforced concrete outlet pipe.
 - 1. Pipe conduit design
 - i. N/A – Class IV dam.
 - ii. N/A – Class IV dam.
 - iii. A 36" inside diameter pipe is utilized.
 - 2. The 36" outlet pipe is designed to convey stormwater at less than 10 feet per second.
 - 3. The outlet control structure is designed to avoid tailwater and negative pressure effects.
 - 4. Gaskets will be utilized to control seepage within the outlet pipe.
 - 5. Information.
 - 6. Due to the high elevation of the wet pond basin compared to the discharge point within the existing bioretention facility, tailwater is not anticipated and an anti-vortex device is not proposed within the outlet pipe.
 - 7. A trash rack is proposed on the outlet control structure.
 - 8. An emergency spillway is provided within the wet pond basin.
 - 9. Reinforced concrete is utilized, and therefore corrosion is not anticipated.
- (h) The wet pond basin has been designed to contain the entirety of the 100 year design storm below the emergency spillway. Therefore, it is not anticipated that the emergency spillway will route the design storm at a frequency of once in 25 years.
- (i) Drawdown requirements: N/A – Class IV dam that is an excavated impoundment. This is approved by the Department as a Permit-by-Rule.
- (j) Information.
- (k) Information.
- (l) Immediately downstream of the proposed wet pond system is an existing bioretention basin to the north. Stormwater runoff peak runoff rates are reduced to the existing basin to comply with the NJAC 7:8 Stormwater Management Rules.
- (m) An upstream slope no steeper than three horizontal to one vertical ratio is proposed.
- (n) Freeboard requirements: The wet pond system has been designed to provide one foot of freeboard to the top of the dam. Please refer to the stormwater management calculations in the Appendix of this Report.

IX. RUNOFF RATE REDUCTION PERFORMANCE

Pre-development and Post-development Peak Runoff Results **Summary for Each Point of Discharge**

Study Area North

DESIGN STORM	EXISTING CONDITIONS PEAK FLOW (DISTURBED) (CFS)	PEAK REDUCTION REQUIRED	ALLOWABLE PEAK FLOW FOR DISTURBED CONDITIONS (CFS)	EXISTING CONDITIONS PEAK FLOW (UNDISTURBED) (CFS)	ALLOWABLE TOTAL PEAK FLOW (CFS)	PROPOSED CONDITIONS PEAK FLOW (CFS)
2 YR	19.94	50%	9.97	1.795	11.77	11.39
10 YR	39.25	25%	29.44	4.689	34.13	28.70
100 YR	79.10	20%	63.28	12.08	75.36	75.30

Study Area East

DESIGN STORM	EXISTING CONDITIONS PEAK FLOW (DISTURBED) (CFS)	PEAK REDUCTION REQUIRED	ALLOWABLE PEAK FLOW FOR DISTURBED CONDITIONS (CFS)	EXISTING CONDITIONS PEAK FLOW (UNDISTURBED) (CFS)	ALLOWABLE TOTAL PEAK FLOW (CFS)	PROPOSED CONDITIONS PEAK FLOW (CFS)
2 YR	4.898	50%	2.449	0.414	2.86	0.71
10 YR	10.06	25%	7.545	1.167	8.71	1.29
100 YR	20.75	20%	16.60	3.159	19.76	2.46

Study Area CR 518

DESIGN STORM	EXISTING CONDITIONS PEAK FLOW (DISTURBED) (CFS)	PEAK REDUCTION REQUIRED	ALLOWABLE PEAK FLOW FOR DISTURBED CONDITIONS (CFS)	PROPOSED CONDITIONS PEAK FLOW (CFS)
2 YR	0.96	50%	0.48	0.05
10 YR	0.246	25%	0.18	0.082
100 YR	0.615	20%	0.49	0.147

X. WATER QUALITY

As noted previously in this report, the TSS removal rate requirement set forth by the Township of Montgomery Land Use Ordinance and NJAC 7:8 for the subject site is 80% for the site. The design for the subject development meets the obligation for TSS removal by utilizing an aboveground wet pond basin system

capable of a TSS removal of 82% for the proposed development. Therefore, the stormwater management design for the proposed development satisfies the water quality aspect of the Township of Montgomery Land Use Ordinance and NJAC 7:8. Calculations for TSS Removal Rates are provided in the Appendix of this Report.

XI. GROUNDWATER RECHARGE ANALYSIS

As previously noted, Dynamic Earth, LLC performed numerous test pits within the site to establish seasonal high groundwater table characteristics and percolation tests were conducted for on-site soils to confirm soil classification per the County Soil Survey. The soils encountered during the site investigation consisted of clayey silt, and groundwater and evidence of seasonal high water table were not encountered in any test pits. The field investigation recharge map, soil profile pit logs and tube permeameter testing in the Appendix of this Report reveal a restriction within the upper 40 inches of the soil profile consisting of low permeability, firm, fine-grained soils. The results of testing confirm a permeability rate of less than 0.14 in/hr which is consistent with hydrologic soil group (HSG) "D" as specified in the NJ BMP Manual. The New Jersey Groundwater Recharge Spreadsheet (NJGRS) in the Appendix of this Report indicates that no recharge occurs in the existing condition. Therefore, the proposed development satisfies the groundwater recharge requirements set forth by NJAC 7:8.

XII. CONCLUSION

The proposed development has been designed with provisions for the safe and efficient control of stormwater runoff in a manner that will not adversely impact the existing drainage patterns, adjacent roadways, or adjacent parcels. The TSS removal obligations set forth by the Montgomery Township Land Use Ordinance and NJAC 7:8 have been satisfied for the proposed development by utilizing a wet pond system capable of achieving a TSS required removal rate of 82% for the study area, whereas 80% TSS Removal Rate is required per NJAC 7:8.

Dynamic Earth, LLC performed numerous test pits within the site to establish seasonal high groundwater table characteristics and percolation tests were conducted for on-site soils to confirm soil classification per the County Soil Survey. The field investigation recharge map, soil profile pit logs and tube permeameter testing completed reveal a restriction within the upper 40 inches of the soil profile consisting of low permeability, firm, fine-grained soils. The results of testing confirm a permeability rate of less than 0.14 in/hr which is consistent with hydrologic soil group (HSG) "D" as specified in the NJ BMP Manual. The New Jersey Groundwater Recharge Spreadsheet (NJGRS) in the Appendix of this Report indicates that no recharge occurs in the existing condition. Therefore, the proposed development satisfies the groundwater recharge requirements set forth by NJAC 7:8. Supplemental test pit location maps and permeability test results to

confirm soil re-classification in accordance with the NJ BMP Manual is provided in the Appendix of this Report.

Furthermore, the stormwater management design shall reduce peak flow rates for the proposed development area and meets the minimum peak flow reduction for the 2, 10 and 100-year storm frequencies as dictated by NJAC 7:8. With this stated, it is evident that the proposed development will not have a negative impact on the existing stormwater management system, water quality, or groundwater recharge on site or within the vicinity of the subject parcel.

APPENDIX

**RUNOFF CURVE NUMBER (CN)
CALCULATIONS
EXISTING**



Project: Sharbell Montgomery
Job #: 0043-14-015
Location: Montgomery Township, Somerset County
Computed By: MSA
Checked By: JSH
Date: 4/3/18

Drainage Area		Impervious Area (acrs)	Impervious Area (%)	Curve Number (CN) Used	HSG B - Open Space Area (acre)	HSG B - Curve Number (CN) Used	HSG B - Wooded Area (acre)	HSG B - Wooded Area (%)	Curve Number (CN) Used	HSG D - Open Space Area (acre)	HSG D - Open Space Area (%)	HSG D - Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (%)	Avg. Periv. Curve Number	Total Previous Area (acres)	TC (Min)
Ex. Study Area North Undisturbed		1.95	84.83%	98	0.00	-	61	0.00	55	2.62	113.96%	60	10.40	717.11%	77	19.08	32
Ex. Study Area North Undisturbed		0.65	28.03%	98	1.85	60.43%	61	2.40	104.75%	0.00	0.00%	-	0.00	0.00%	77	4.25	35
Ex. Study Area East Undisturbed		0.03	1.25%	98	0.07	-	61	0.00	55	0.08	2.53%	60	4.85	215.62%	77	5.04	26
Ex. Study Area East Undisturbed		0.14	6.03%	98	0.38	16.63%	61	0.67	29.13%	0.00	0.00%	-	0.00	0.00%	57	1.03	23
Ex. Study Area CR 518		1,342	98	0.07	3,153	61	0.08	3,973	55	0.00	0.00%	-	0.00	0.00%	58	0.16	10
Total		2.80			2.30			3.16		2.67			21.41			29.55	32.35
Per County Soil Survey -		Bn+Bg	B														
Per County Soil Survey -		L+PB	HSG C														
Per County Soil Survey -		HSG C															
Per County Soil Survey -		Ro+Bg	HSG C														
Per County Soil Survey -		Ro+Bg	HSG C														
Description		Runoff Curve Number (CN) (HSG B)	Runoff Curve Number (CN) (HSG C)	Runoff Curve Number (CN) (HSG D)													
Impervious Surface		98	76	60													
Open Space (lawn) (grass)		61	76	60													
Woods (good)		55	76	77													

**RUNOFF CURVE NUMBER (CN)
CALCULATIONS
PROPOSED**



DYNAMIC ENGINEERING

PROPOSED DRAINAGE AREA SUMMARY AND AVERAGE CURVE NUMBER(CN) CALCULATIONS

Project: Sharbell Montgomery

Job #: 0043-14-015

Location: Montgomery Township, Somerset County

Computed By: MSA

Checked By: JSH

Date: 4/3/18

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG B - Open Space Area	HSG B - Open Space Area (sf)	Curve Number (CN) Used	HSG B - Wooded Area (acre)	HSG B - Wooded Area (sf)	Curve Number (CN) Used	HSG D - Open Space Area (acre)	HSG D - Open Space Area (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
Wet Pond A	13.30	579,147	98	2.29	99,858	61	3.16	137,863	55	11.70	509,692	80	0.00	-	77	73	17.16	30.45	10
North Undeveloped	0.03	1,270	98	0.00	-	61	0.00	-	55	1.34	58,318	80	0.00	-	77	80	1.34	1.37	10
East Undeveloped	0.07	3,218	98	0.00	-	61	0.00	-	55	0.42	18,408	80	0.00	-	77	80	0.42	0.50	10
County Route 518 Undeveloped	0.02	1,085	98	0.01	356	61	0.00	-	55	0.00	-	80	0.00	-	77	61	0.01	0.03	10
Total	13.42			2.30		61	3.16			13.46			0.00			18.93		32.35	

Per County Soil Survey -	BmB	HSG B	Soil	Birdsboro silt loam, 2 to 6 percent slopes
Per County Soil Survey -	LbB	HSG C	Soil	Lansdowne silt loam, 2 to 6 percent slopes
Per County Soil Survey -	RorA	HSG C	Soil	Rowland silt loam, 0 to 2 percent slopes, frequently flooded
Per County Soil Survey -	RorB	HSG C	Soil	Royce silt loam, 2 to 6 percent slopes

Description	Runoff Curve Number (CN) (HSG B)	Runoff Curve Number (CN) (HSG C)	Runoff Curve Number (CN) (HSG D)
Impervious Surface	98	98	98
Open Space (lawn) (good)	61	74	80
Woods (good)	55	70	77

**EXISTING
TIME OF CONCENTRATION (TC)
CALCULATIONS**



1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 1/15/2018
Project: Sharbell Montgomery
Project No: 0043-14-015

Calculated By: MSA
Checked By: JSH

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: Ex. Study Area East Undisturbed

• Sheet Flow:

1. Surface Description
2. Manning's Roughness Coefficient, n
3. Flow Length, L { total $L \leq 150$ ft }
4. Two-Year 24-hour Rainfall, p_2 for .. Somerset County
5. Land Slope, s (ft/ft)
6. Travel Time, $T_t = \frac{0.007 (n L)^{0.6}}{p_2^{0.5} s^{0.4}}$

AB						
Woods, Light Underbrush						
0.4						
100.0 ft						
3.34 in		3.34 in		3.34 in		
0.020 ft/ft						
0.350 hr	+	0.000 hr	+	0.000 hr	=	0.350 hr

• Shallow Concentrated Flow:

7. Surface Description
8. Flow Length, L
9. Watercourse Slope, s
10. Average velocity, V { see Figure 3.1 }
11. Travel Time, $T_t = \frac{L}{3600 V}$

BC						
Unpaved						
432.0 ft						
0.071 ft/ft						
4.31 ft/s						
0.028 hr	+	0.000 hr	+	0.000 hr	=	0.028 hr

• Channel Flow:

12. Pipe Diameter, D
13. Cross-Sectional Flow Area, A
14. Wetted Perimeter, p_w
15. Hydraulic Radius, $r = A / p_w$
16. Channel Slope, s
17. Pipe Material
18. Manning's Roughness Coefficient, n
19. Velocity, $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$
20. Flow Length, L
21. Travel Time, $T_t = \frac{L}{3600 V}$
22. Watershed or subarea Time of Concentration, T_c { add T_t in steps 6, 11 and 21 }



1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: **1/15/2018**
Project: **Sharbell Montgomery**
Project No: **0043-14-015**

Calculated By: **MSA**
Checked By: **JSH**

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: **Existing**
Drainage Area: **Ex. Study Area North Undisturbed**

• **Sheet Flow :**

1. Surface Description
2. Manning's Roughness Coefficient, n
3. Flow Length, L { total $L \leq 150$ ft }
4. Two-Year 24-hour Rainfall, p_2 for **Somerset County**
5. Land Slope, s (ft/ft)
6. Travel Time, $T_t = \frac{0.007 (n L)^{0.8}}{p_2^{0.5} s^{0.4}}$

AB				
Woods, Light Underbrush				
0.4				
100.0 ft				
3.34 in	3.34 in	3.34 in		
0.010 ft/ft				
0.462 hr	+	0.000 hr	+	0.000 hr = 0.462 hr

• **Shallow Concentrated Flow :**

7. Surface Description
8. Flow Length, L
9. Watercourse Slope, s
10. Average velocity, V { see Figure 3.1 }
11. Travel Time, $T_t = \frac{L}{3600 V}$

BC	CD	DE		
Unpaved	Paved	Unpaved		
276.0 ft	125.0 ft	550.0 ft		
0.040 ft/ft	0.063 ft/ft	0.071 ft/ft		
3.23 ft/s	5.08 ft/s	4.30 ft/s		
0.024 hr	+	0.007 hr	+	0.036 hr = 0.066 hr

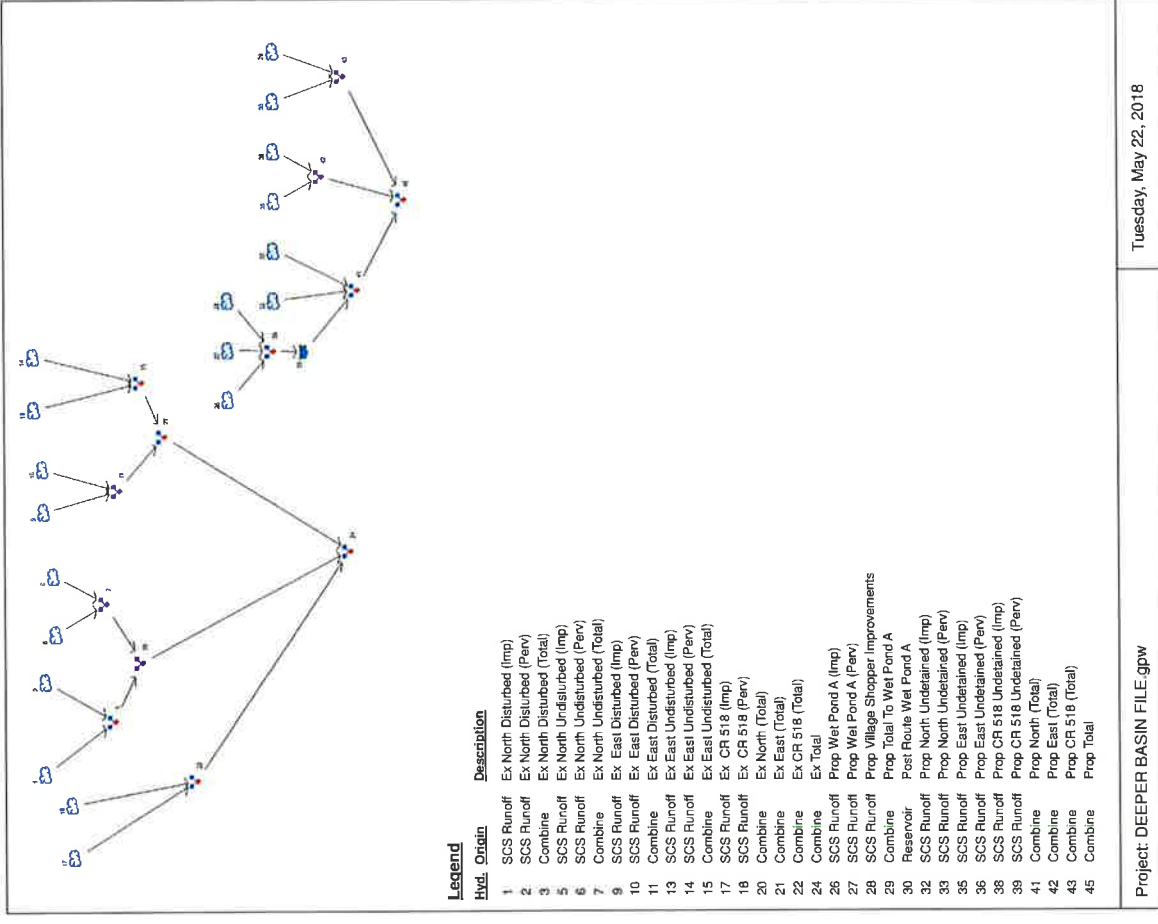
• **Channel Flow :**

12. Pipe Diameter, D
13. Cross-Sectional Flow Area, A
14. Wetted Perimeter, p_w
15. Hydraulic Radius, $r = A / p_w$
16. Channel Slope, s
17. Pipe Material
18. Manning's Roughness Coefficient, n
19. Velocity, $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$
20. Flow Length, L
21. Travel Time, $T_t = \frac{L}{3600 V}$
22. Watershed or subarea Time of Concentration, T_c { add T_t in steps 6, 11 and 21 }

0.000 hr	+	0.000 hr	+	0.000 hr = 0.000 hr
				0.528 hr
				31.7 min

**HYDROGRAPH SUMMARY REPORTS:
EXISTING & PROPOSED CONDITIONS 2, 10 &
100 YEAR STORMS**

Watershed Model Schematic



Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)						Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	
1	SCS Runoff			3.695			5.583		Ex North Disturbed (Imp)
2	SCS Runoff			16.32			33.67		Ex North Disturbed (Perv)
3	Combine	1, 2		19.94			39.25		Ex North Disturbed (Total)
5	SCS Runoff			1.232			1.861		Ex North Undisturbed (Imp)
6	SCS Runoff			0.697			2.908		Ex North Undisturbed (Perv)
7	Combine	5, 6		1.795			4.689		Ex North Undisturbed (Total)
9	SCS Runoff			0.063			0.096		Ex East Disturbed (Imp)
10	SCS Runoff			4.835			9.963		Ex East Disturbed (Perv)
11	Combine	9, 10		4.898			10.06		Ex East Disturbed (Total)
13	SCS Runoff			0.296			0.446		Ex East Undisturbed (Imp)
14	SCS Runoff			0.165			0.750		Ex East Undisturbed (Perv)
15	Combine	13, 14		0.414			1.167		Ex East Undisturbed (Total)
17	SCS Runoff			0.071			0.107		Ex CR 518 (Imp)
18	SCS Runoff			0.031			0.140		Ex CR 518 (Perv)
20	Combine	3, 7		21.68			43.87		Ex North (Total)
21	Combine	11, 15		5.304			11.23		Ex East (Total)
22	Combine	17, 18		0.096			0.246		Ex CR 518 (Total)
24	Combine	20, 21, 22		26.93			54.78		Ex Total
26	SCS Runoff			31.28			47.23		Prop Wet Pond A (Imp)
27	SCS Runoff			15.01			33.48		Prop Wet Pond A (Perv)
28	SCS Runoff			3.431			5.818		Prop Village Shopper Improvements
29	Combine	26, 27, 28		49.72			86.52		Prop Total To Wet Pond A
30	Reservoir	29		10.94			27.41		Post Route Wet Pond A
32	SCS Runoff			0.071			0.107		Prop North Undistained (Imp)
33	SCS Runoff			1.724			3.326		Prop North Undistained (Perv)
35	SCS Runoff			0.165			0.249		Prop East Undistained (Imp)
36	SCS Runoff			0.541			1.043		Prop East Undistained (Perv)
38	SCS Runoff			0.047			0.071		Prop CR 518 Undistained (Imp)
39	SCS Runoff			0.003			0.011		Prop CR 518 Undistained (Perv)

Project: DEEPER BASIN FILE.gpw

Tuesday, May 22, 2018

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)							Hydrograph description			
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr		100-Yr		
41	Combine	30, 32, 33		11.39				28.70				75.30	Prop North (Total) Prop East (Total) Prop CR 518 (Total) Prop Total
42	Combine	35, 36,		0.705				1.291				2.458	
43	Combine	38, 39,		0.050				0.082				0.147	
45	Combine	41, 42, 43		11.61				29.21				76.49	
Proj. file: DEEPER BASIN FILE.gpw													
													Tuesday, May 22, 2018

Hydrograph Summary Report

DEEPER BASIN FILE.gpw										Return Period: 2 Year		Tuesday, May 22, 2018	
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total stage used (cuft)	Hydrograph description				
1	SCS Runoff	3,695	5	740	22,680	1, 2			Ex North Disturbed (Imp)				
2	SCS Runoff	16,32	5	745	93,766				Ex North Disturbed (Perv)				
3	Combine	19,94	5	740	116,446				Ex North Disturbed (Total)				
5	SCS Runoff	1,232	5	740	7,560	5, 6			Ex North Undisturbed (Imp)				
6	SCS Runoff	0,697	5	795	6,232				Ex North Undisturbed (Perv)				
7	Combine	1,795	5	745	13,792				Ex North Undisturbed (Total)				
9	SCS Runoff	0,063	5	735	338	9, 10			Ex East Disturbed (Imp)				
10	SCS Runoff	4,835	5	735	23,875				Ex East Disturbed (Perv)				
11	Combine	4,898	5	735	24,213				Ex East Disturbed (Total)				
13	SCS Runoff	0,296	5	735	1,579	13, 14			Ex East Undisturbed (Imp)				
14	SCS Runoff	0,165	5	750	1,359				Ex East Undisturbed (Perv)				
15	Combine	0,414	5	740	2,938				Ex East Undisturbed (Total)				
17	SCS Runoff	0,071	5	730	317				Ex CR 518 (Imp)				
18	SCS Runoff	0,031	5	740	213				Ex CR 518 (Perv)				
20	Combine	21,68	5	740	130,238				Ex North (Total)				
21	Combine	5,304	5	735	27,151	3, 7, 11, 15, 17, 18,			Ex East (Total)				
22	Combine	0,096	5	730	530				Ex CR 518 (Total)				
24	Combine	26,93	5	740	157,920				Ex Total				
26	SCS Runoff	31,28	5	730	140,627	20, 21, 22,			Prop Wet Pond A (Imp)				
27	SCS Runoff	15,01	5	730	82,686				Prop Wet Pond A (Perv)				
28	SCS Runoff	3,431	5	730	13,729				Prop Village Shopper Improvements				
29	Combine	49,72	5	730	217,042	26, 27, 28 29			Prop Total To Wet Pond A				
30	Reservoir	10,94	5	760	216,767				Post Route Wet Pond A				
32	SCS Runoff	0,071	5	730	317				Prop North Undetained (Imp)				
33	SCS Runoff	1,724	5	730	6,888				Prop North Undetained (Perv)				
35	SCS Runoff	0,165	5	730	740				Prop East Undetained (Imp)				
36	SCS Runoff	0,541	5	730	2,159				Prop East Undetained (Perv)				
38	SCS Runoff	0,047	5	730	211				Prop CR 518 Undetained (Imp)				
39	SCS Runoff	0,003	5	735	17				Prop CR 518 Undetained (Perv)				

Hydrograph Summary Report

Hydratlow Hydrographs by Intellisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total storage used (cuft)	Hydrograph description
41	Combine	11.39	755	223,972	30, 32, 33,	*****	*****	Prop North (Total)
42	Combine	0.705	730	2,899	35, 36,	*****	*****	Prop East (Total)
43	Combine	0.050	730	229	38, 39,	*****	*****	Prop CR 518 (Total)
45	Combine	11.61	755	227,099	41, 42, 43,	*****	*****	Prop Total
DEEPER BASIN FILE.gpw								Return Period: 2 Year
								Tuesday, May 22, 2018

Hydrograph Report

Hydratlow Hydrographs by Intellisolve v9.1

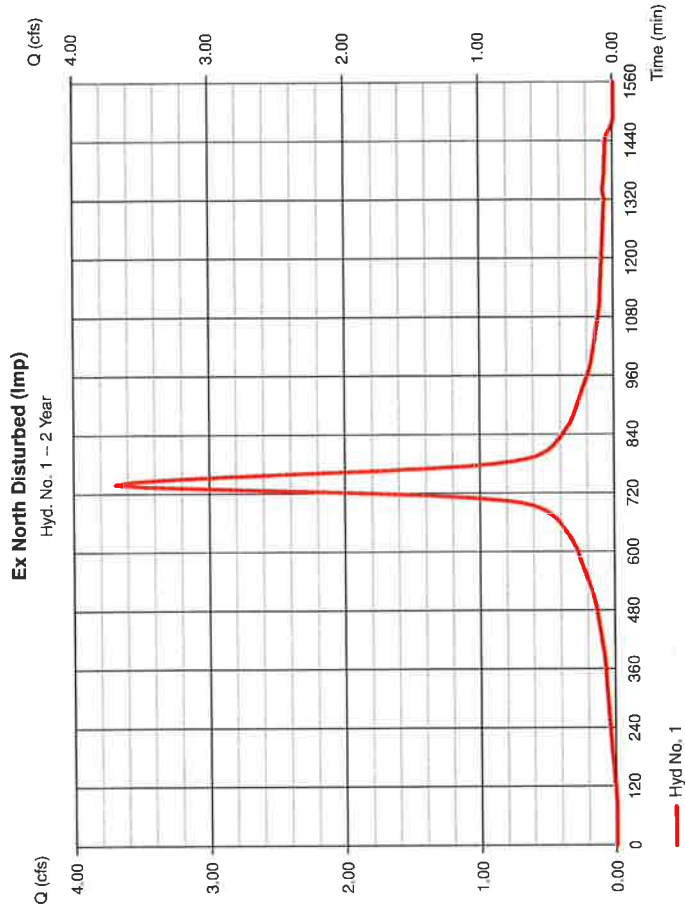
Tuesday, May 22, 2018

Hyd. No. 1

Ex North Disturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 1.950 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 3.695 cfs
Time to peak = 740 min
Hyd. volume = 22,680 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

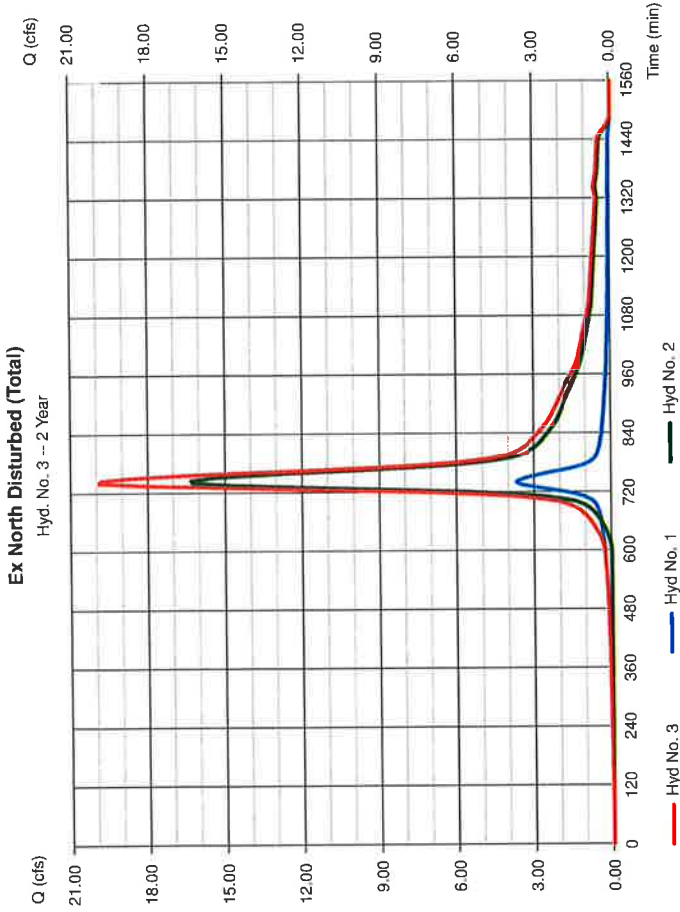
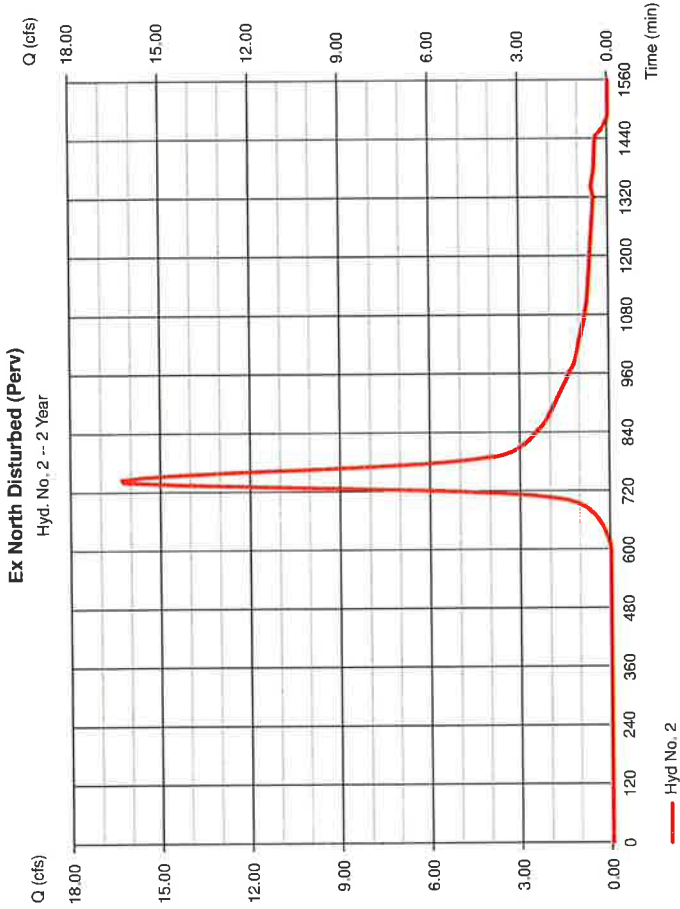
Hyd. No. 2

Ex North Disturbed (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 16.32 cfs
Storm frequency	= 2 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 93,766 cuft
Drainage area	= 19.080 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 32.00 min
Total precip.	= 3.34 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1		Tuesday, May 22, 2018	
Hyd. No. 3			
Ex North Disturbed (Total)			
Hydrograph type	= Combine	Peak discharge	= 19.94 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 116,446 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 21.030 ac



Hydrograph Report

Hydrow Hydrographs by Intellisolve v8.1

Tuesday, May 22, 2018

Hyd. No. 5

Ex North Undisturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 0.650 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 1.232 cfs
Time to peak = 740 min
Hyd. volume = 7,560 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484

Hydrograph Report

Hydrow Hydrographs by Intellisolve v8.1

Tuesday, May 22, 2018

Hyd. No. 6

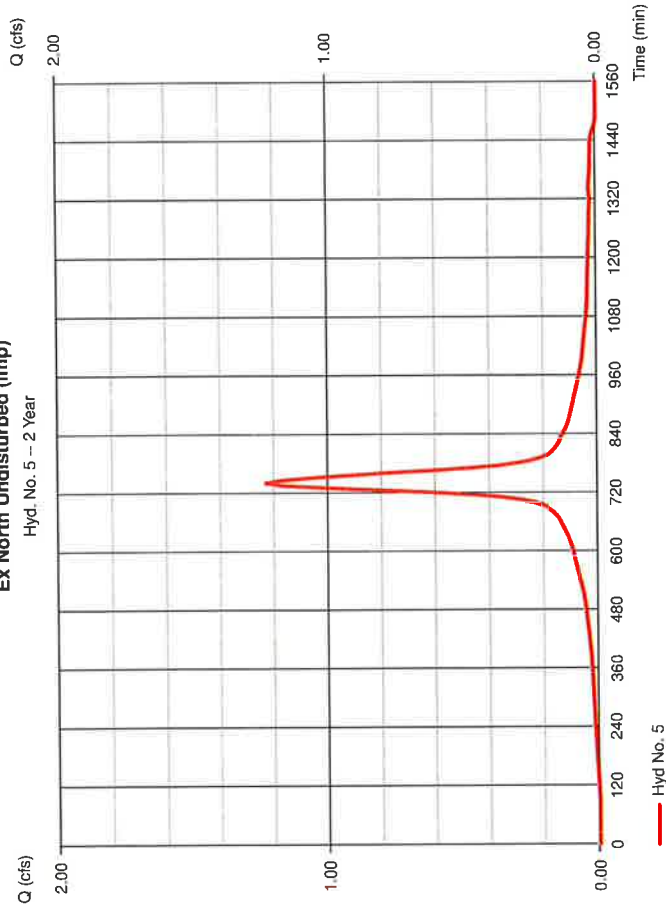
Ex North Undisturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 4.250 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 0.697 cfs
Time to peak = 755 min
Hyd. volume = 6,232 cuft
Curve number = 58
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484

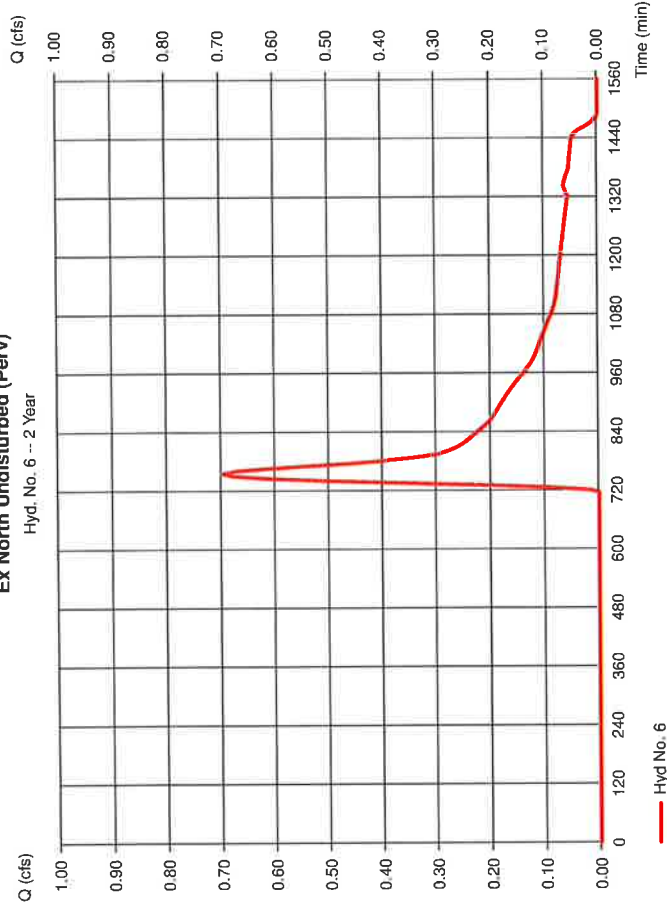
Ex North Undisturbed (Imp)

Hyd. No. 5 -- 2 Year



Ex North Undisturbed (Perv)

Hyd. No. 6 -- 2 Year



Hydrograph Report

Hydralow Hydrographs by Intelsolve v9.1 Tuesday, May 22, 2018

Hyd. No. 7

Ex North Undisturbed (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 5, 6

Peak discharge = 1.795 cfs
Time to peak = 745 min
Hyd. volume = 13,792 cuft
Contrib. drain. area = 4,900 ac

Hydrograph Report

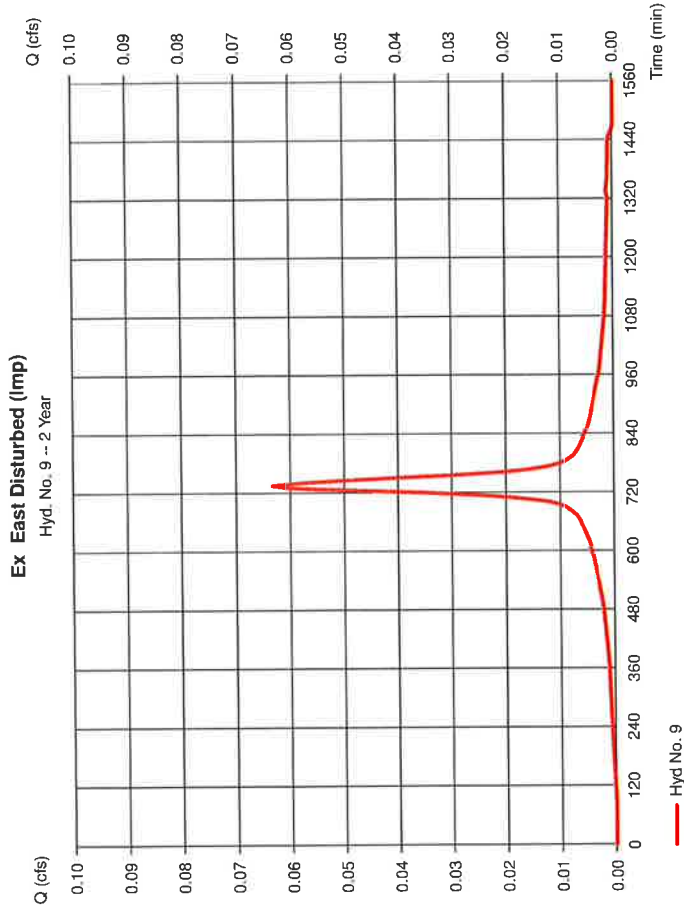
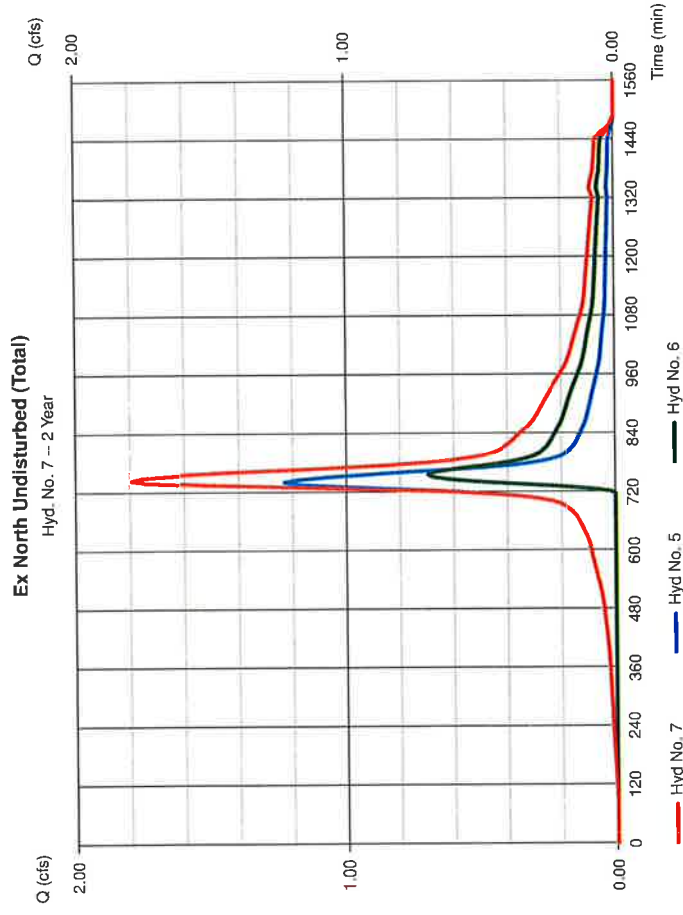
Hydralow Hydrographs by Intelsolve v9.1 Tuesday, May 22, 2018

Hyd. No. 9

Ex East Disturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 0.030 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 0.063 cfs
Time to peak = 735 min
Hyd. volume = 338 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

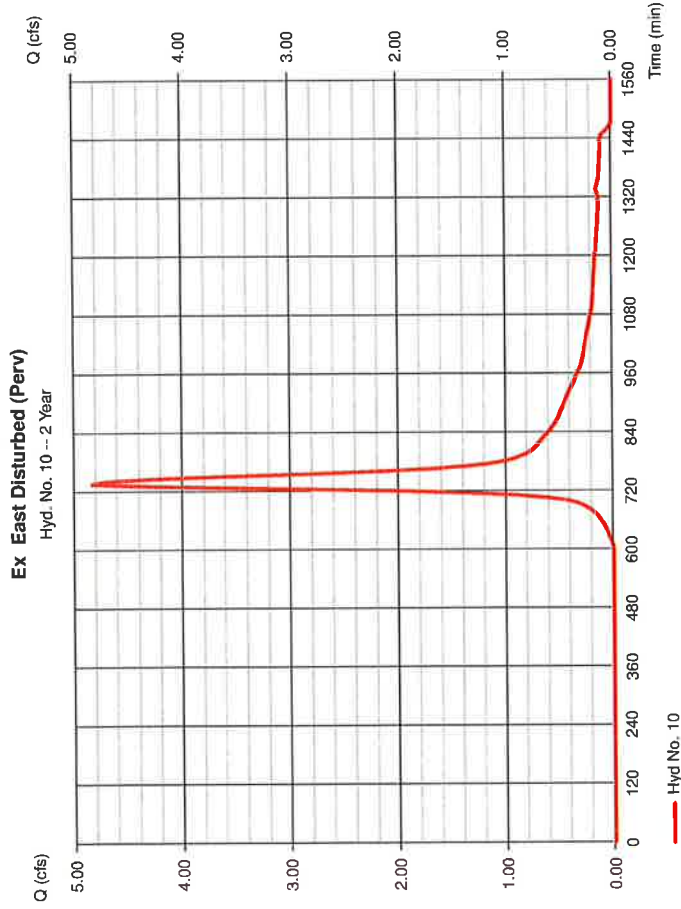
Hydroflow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

Hyd. No. 10

Ex East Disturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 5.010 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 4.835 cfs
Time to peak = 735 min
Hyd. volume = 23,875 cuft
Curve number = 77
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

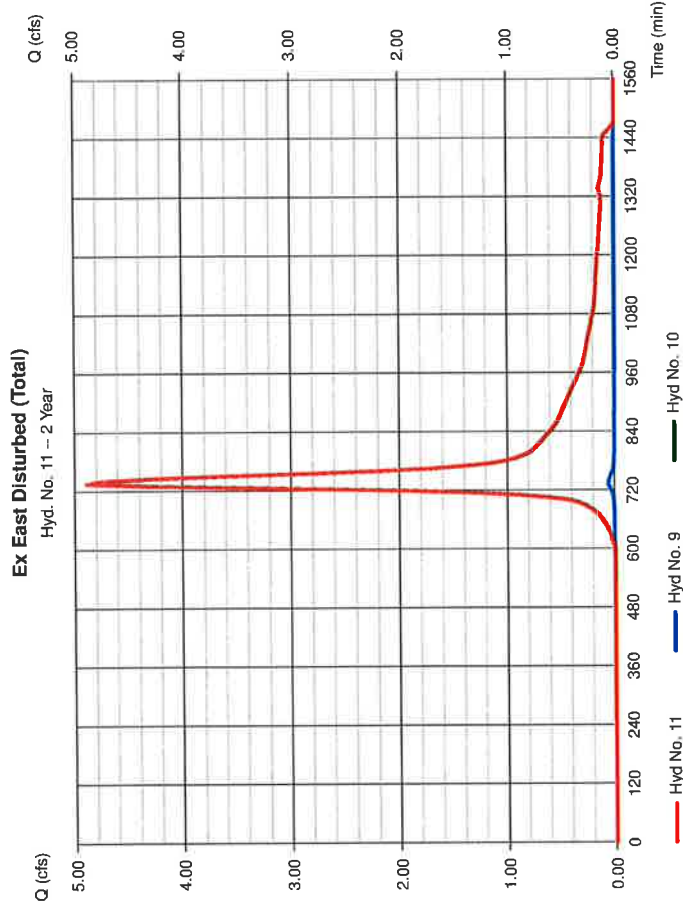
Hydroflow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

Hyd. No. 11

Ex East Disturbed (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 9, 10

Peak discharge = 4.898 cfs
Time to peak = 735 min
Hyd. volume = 24,213 cuft
Contrib. drain. area = 5.040 ac



Hydrograph Report

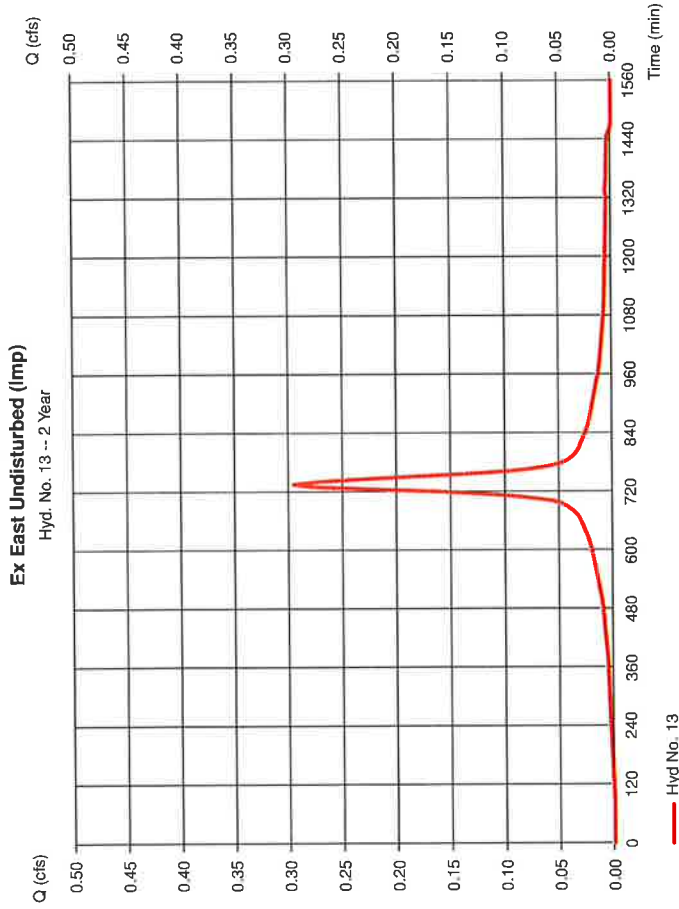
Hydralow Hydrographs by Intellisolve v3.1 Tuesday, May 22, 2018

Hyd. No. 13

Ex East Undisturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 0.140 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 0.296 cfs
Time to peak = 735 min
Hyd. volume = 1,579 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

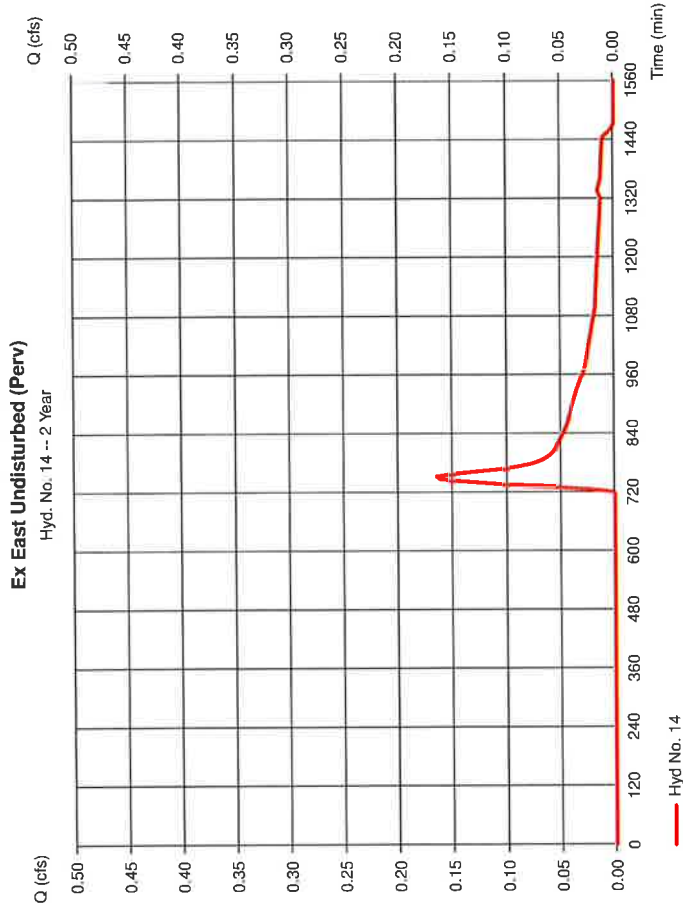
Hydralow Hydrographs by Intellisolve v3.1 Tuesday, May 22, 2018

Hyd. No. 14

Ex East Undisturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 1.050 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 0.165 cfs
Time to peak = 750 min
Hyd. volume = 1,359 cuft
Curve number = 57
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydralflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 15

Ex East Undisturbed (Total)

Hydrograph type	=	Combine
Storm frequency	=	2 yrs
Time interval	=	5 min
Inflow hyds.	=	13, 14
Peak discharge	=	0.414 cfs
Time to peak	=	740 min
Hyd. volume	=	2,938 cuft
Contrib. drain. area	=	1.190 ac

Hydrograph Report

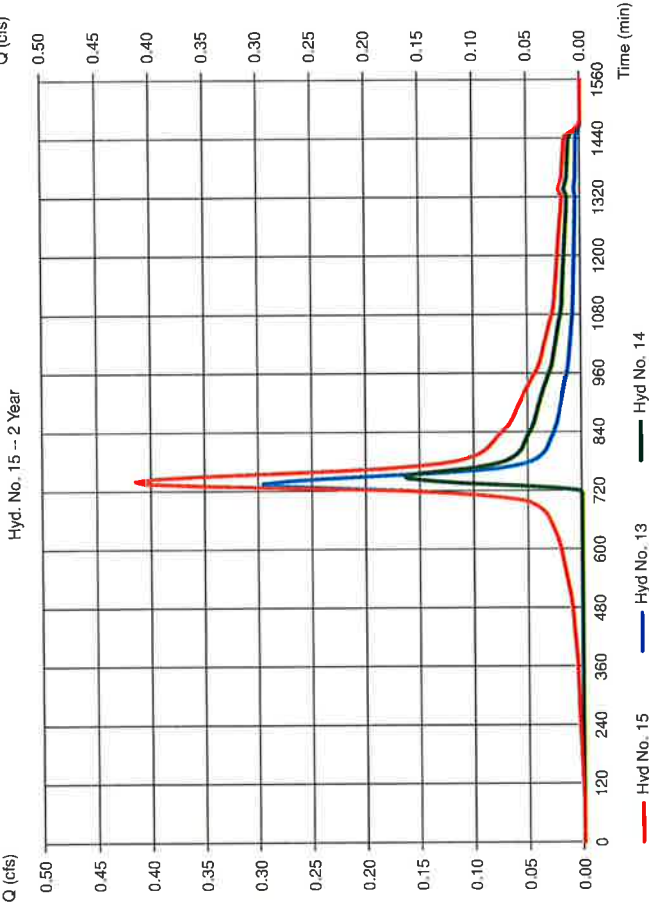
Hydralflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 17

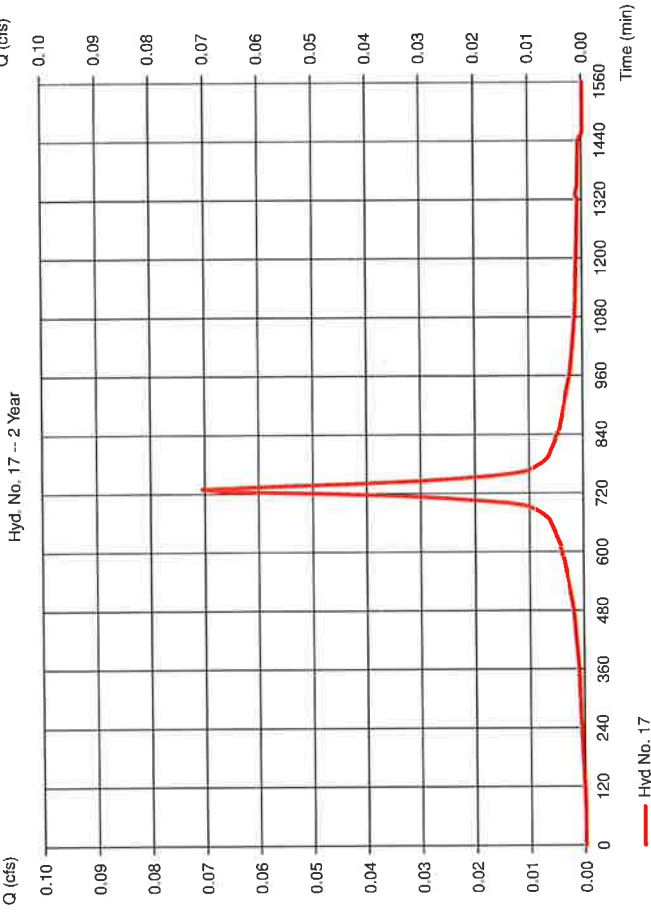
Ex CR 518 (Imp)

Hydrograph type	=	SCS Runoff
Storm frequency	=	2 yrs
Time interval	=	5 min
Drainage area	=	0.030 ac
Basin Slope	=	0.0 %
Tc method	=	USER
Total precip.	=	3.34 in
Storm duration	=	24 hrs
Peak discharge	=	0.071 cfs
Time to peak	=	730 min
Hyd. volume	=	317 cuft
Curve number	=	98
Hydraulic length	=	0 ft
Time of conc. (Tc)	=	10.00 min
Distribution	=	Type III
Shape factor	=	484

Ex East Undisturbed (Total)



Ex CR 518 (Imp)



Hydrograph Report

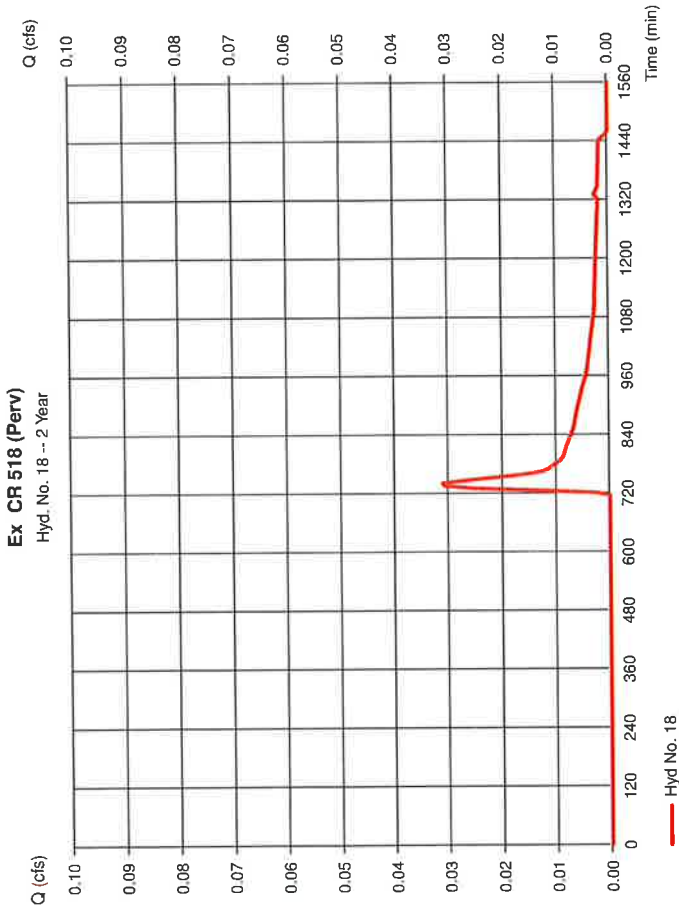
Hydralow Hydrographs by Intelsolve v9.1 Tuesday, May 22, 2018

Hyd. No. 18

Ex CR 518 (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 0.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 0.031 cfs
Time to peak = 740 min
Hyd. volume = 213 cuft
Curve number = 58
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

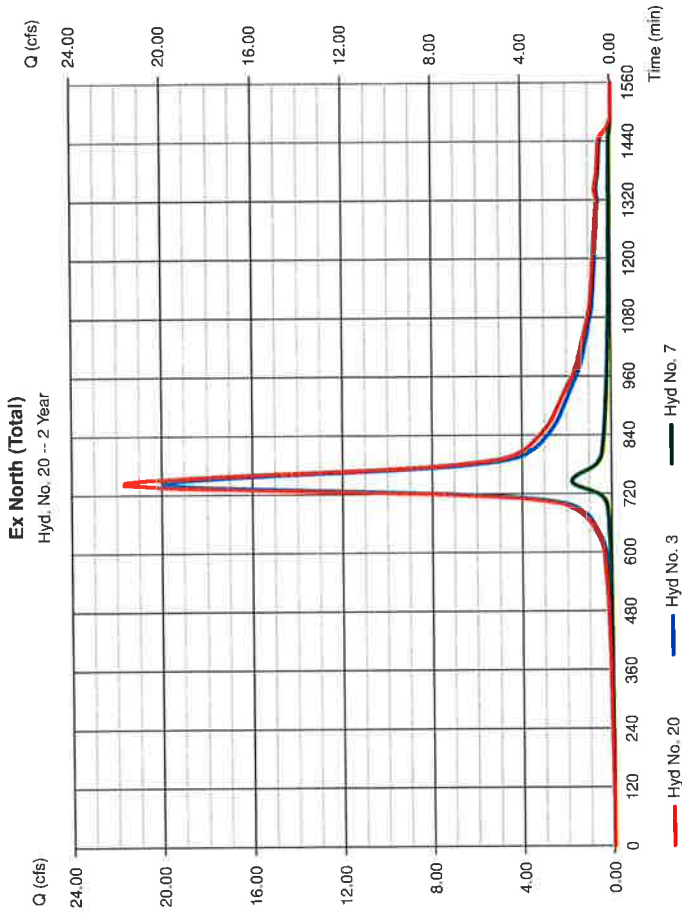
Hydralow Hydrographs by Intelsolve v9.1 Tuesday, May 22, 2018

Hyd. No. 20

Ex North (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 3, 7

Peak discharge = 21.68 cfs
Time to peak = 740 min
Hyd. volume = 130,238 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Report

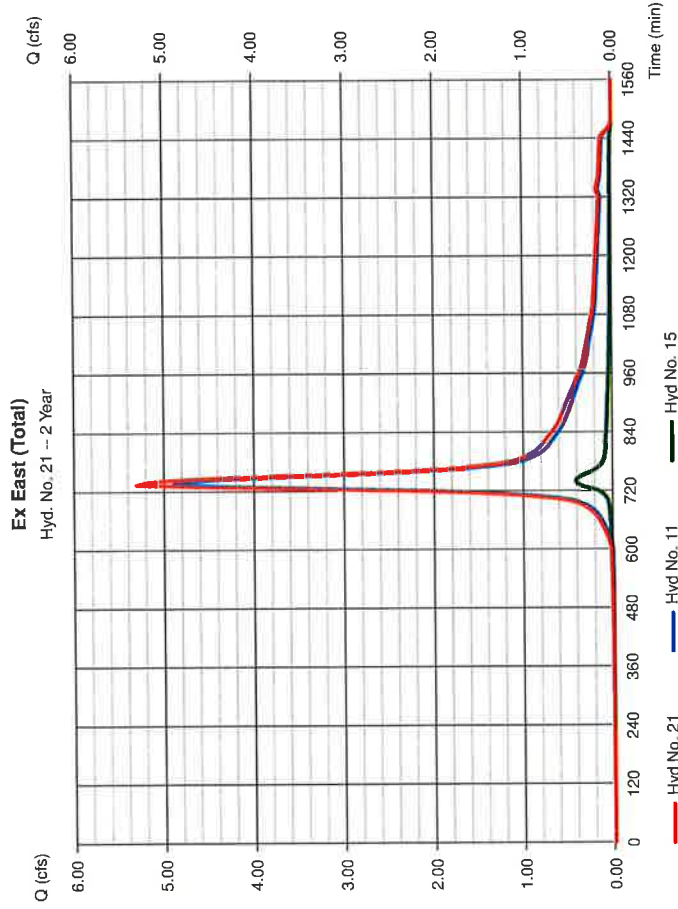
Hydralfow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 21

Ex East (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 11, 15

Peak discharge = 5.304 cfs
Time to peak = 735 min
Hyd. volume = 27,151 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Report

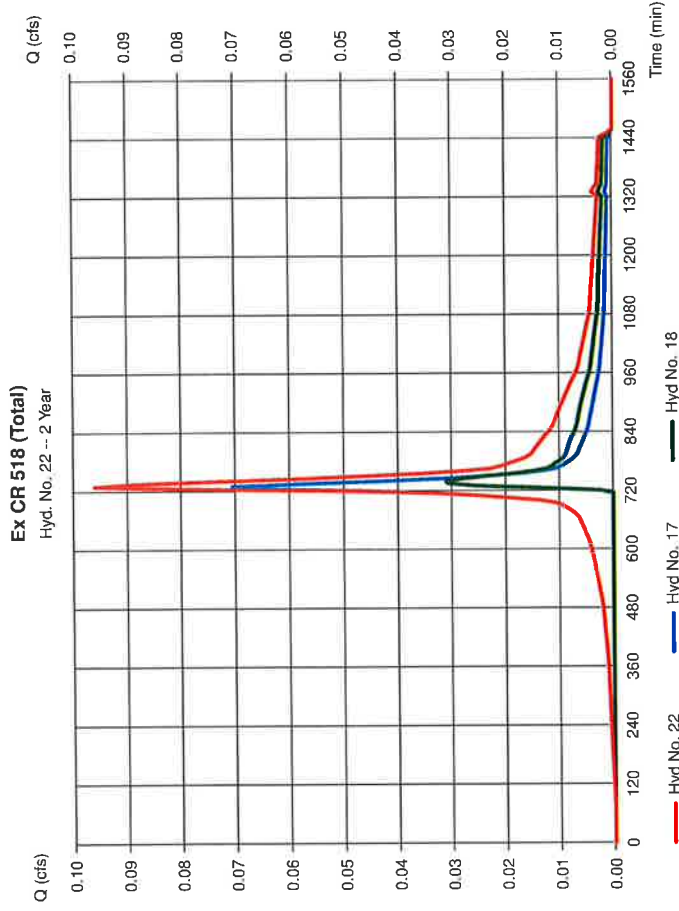
Hydralfow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 22

Ex CR 518 (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 17, 18

Peak discharge = 0.096 cfs
Time to peak = 730 min
Hyd. volume = 530 cuft
Contrib. drain. area = 0.190 ac



Hydrograph Report

Hydroflow Hydrographs by InletSolve v9.1 Tuesday, May 22, 2018

Hyd. No. 24

Ex Total

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 20, 21, 22

Peak discharge = 26.93 cfs
Time to peak = 740 min
Hyd. volume = 157,920 cuft
Contrib. drain. area = 0.000 ac

Hydrograph Report

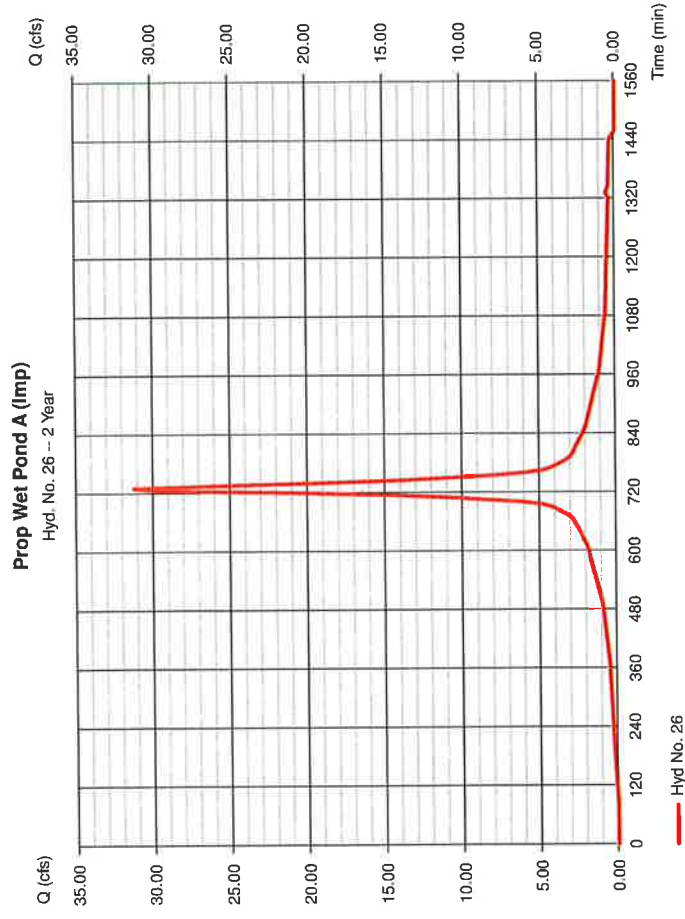
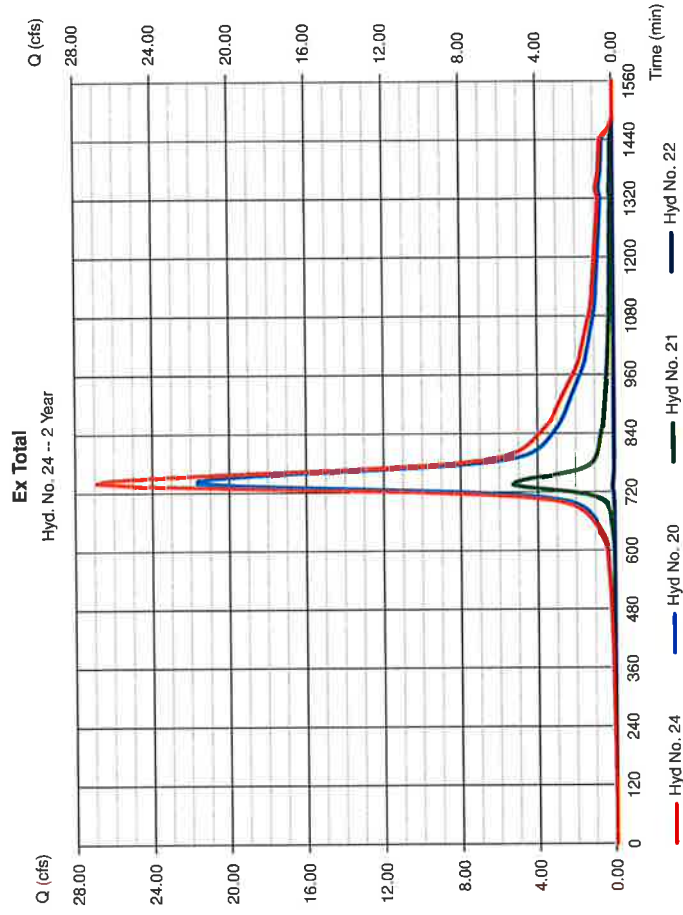
Hydroflow Hydrographs by InletSolve v9.1

Hyd. No. 26

Prop Wet Pond A (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 13.300 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 31.28 cfs
Time to peak = 730 min
Hyd. volume = 140,627 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydrowall Hydrographs by Intellisphere v9.1

Tuesday, May 22, 2018

Hyd. No. 27

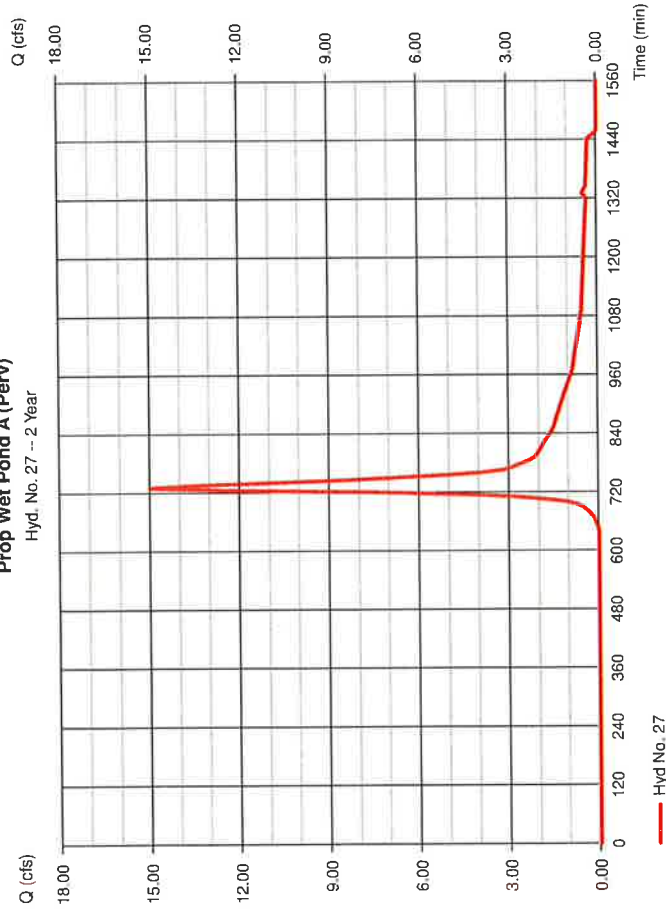
Prop Wet Pond A (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 17.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 15.01 cfs
Time to peak = 730 min
Hyd. volume = 62,686 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Wet Pond A (Perv)

Hyd. No. 27 -- 2 Year



Hydrograph Report

Hydrowall Hydrographs by Intellisphere v9.1

Tuesday, May 22, 2018

Hyd. No. 28

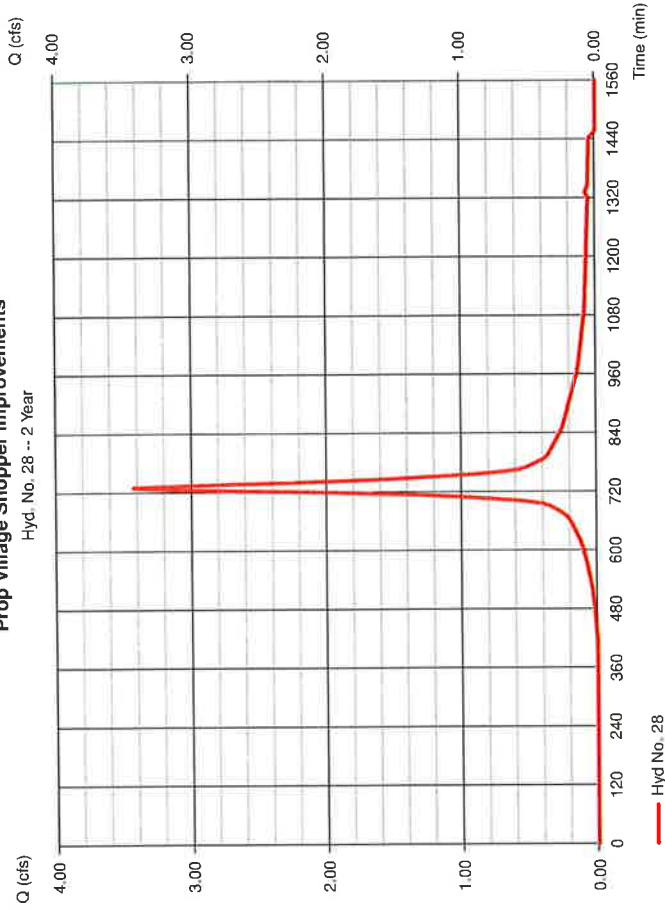
Prop Village Shopper Improvements

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 1.900 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 3.431 cfs
Time to peak = 730 min
Hyd. volume = 13,729 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Village Shopper Improvements

Hyd. No. 28 -- 2 Year



Hydrograph Report

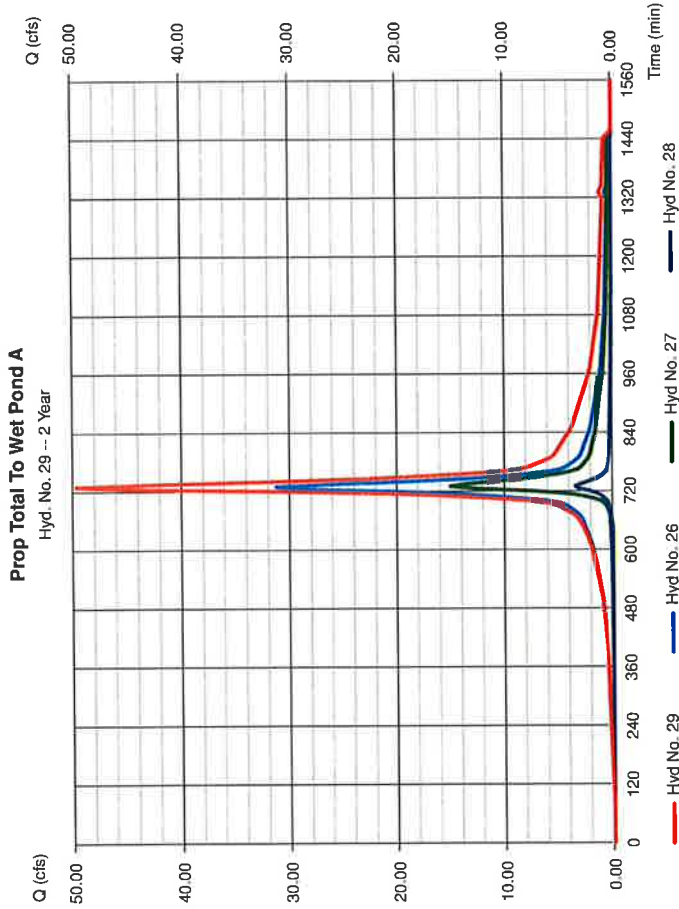
Hydraflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 29

Prop Total To Wet Pond A

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 26, 27, 28

Peak discharge = 49.72 cfs
Time to peak = 730 min
Hyd. volume = 217,042 cuft
Contrib. drain. area = 32.360 ac



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

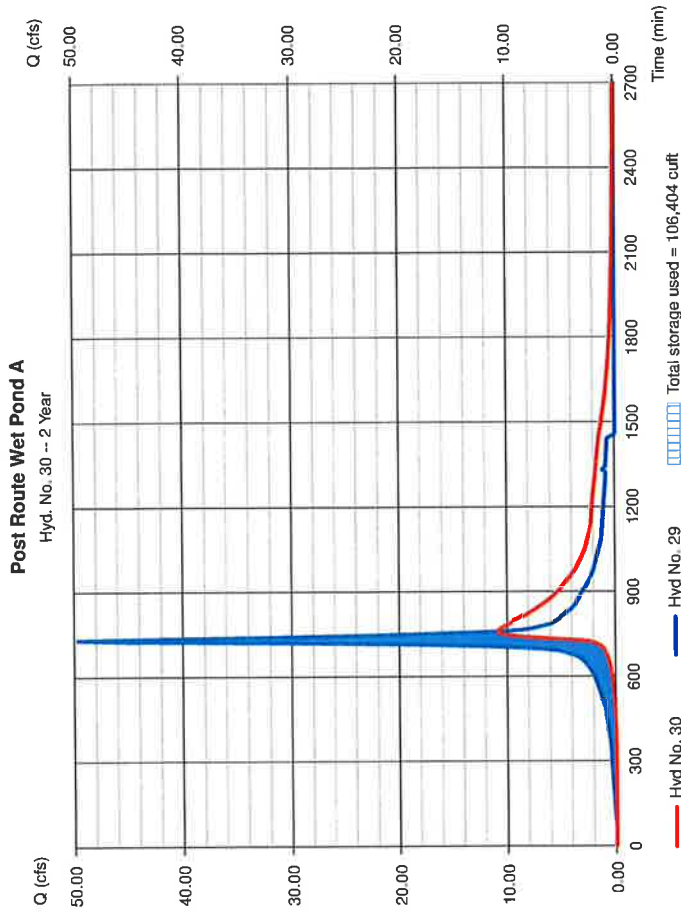
Hyd. No. 30

Post Route Wet Pond A

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyd. No. = 29 - Prop Total To Wet Pond A
Reservoir name = Wet Pond A

Peak discharge = 10.94 cfs
Time to peak = 760 min
Hyd. volume = 216,767 cuft
Max. Elevation = 110.27 ft
Max. Storage = 106,404 cuft

Storage indication method used.



Pond Report

Hydraflow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

Pond No. 2 - Wet Pond A

Fund Data
Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 108.50 ft

Stage / Storage Table			
Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)
0.00	108.50	52,897	0
0.50	109.00	53,872	27,709
1.00	109.50	54,872	88,511
1.50	110.00	55,872	149,313
2.00	110.50	56,872	210,115
2.50	111.00	57,872	270,917
3.00	111.50	58,872	331,719
3.50	112.00	59,872	392,521
4.00	112.50	60,872	453,323
4.50	113.00	61,872	514,125
5.00	113.50	62,872	574,927
			635,729
			696,531
			757,333
			818,135
			878,937
			939,739
			1,000,541
			1,061,343
			1,122,145
			1,182,947
			1,243,749
			1,304,551
			1,365,353
			1,426,155
			1,486,957
			1,547,759
			1,608,561
			1,669,363
			1,730,165
			1,790,967
			1,851,769
			1,912,571
			1,973,373
			2,034,175
			2,094,977
			2,155,779
			2,216,581
			2,277,383
			2,338,185
			2,398,987
			2,459,789
			2,520,591
			2,581,393
			2,642,195
			2,702,997
			2,763,799
			2,824,601
			2,885,403
			2,946,205
			3,007,007
			3,067,809
			3,128,611
			3,189,413
			3,250,215
			3,311,017
			3,371,819
			3,432,621
			3,493,423
			3,554,225
			3,615,027
			3,675,829
			3,736,631
			3,797,433
			3,858,235
			3,919,037
			3,979,839
			4,040,641
			4,101,443
			4,162,245
			4,223,047
			4,283,849
			4,344,651
			4,405,453
			4,466,255
			4,527,057
			4,587,859
			4,648,661
			4,709,463
			4,770,265
			4,831,067
			4,891,869
			4,952,671
			5,013,473
			5,074,275
			5,135,077
			5,195,879
			5,256,681
			5,317,483
			5,378,285
			5,439,087
			5,499,889
			5,560,691
			5,621,493
			5,682,295
			5,743,097
			5,803,899
			5,864,701
			5,925,503
			5,986,305
			6,047,107
			6,107,909
			6,168,711
			6,229,513

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrRsr]	[A]	[B]	[C]	[D]
Rise (in)	= 35.00	11.00	0.00	0.00	Crest Len (ft)	= 3.25	25.00	Inactive
Span (in)	= 35.00	11.00	0.00	0.00	Crest El. (ft)	= 109.50	112.15	0.00
No. Barrels	= 1	1	0	0	Weir Coeff.	= 3.33	3.33	3.33
Invert El. (ft)	= 104.50	108.50	0.00	0.00	Weir Type	= Rect	No	---
Length (ft)	= 406.00	0.00	0.00	0.00	Multi-Stage	= Yes	No	---
Slope (%)	= 1.10	0.00	0.00	n/a				
N-Value	= 0.13	.013	.013	n/a	Exfil. (in/hr)	= 0.000 (by Wet area)		
Office Coeff.	= 0.60	0.60	0.60	0.60	TW Elev. (ft)	= 0.00		
Multi-Stage	= n/a	Yes	No	No				

Note: Culture/Office outflows are analyzed under infl (a) and outfl (oc) control. Way risers checked for office conditions (c) and submergence (s).

Stage / Storage / Discharge Table													Total
Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	
0.00	0	108.50	0.00	0.00			0.00	0.00				0.00	
0.05	2.771	108.55	53.81 ic	0.01 ic			0.00	0.00				0.04	
0.10	5.542	108.60	53.81 ic	0.04 ic			0.00	0.00				0.10	
0.15	8.313	108.65	53.81 ic	0.16 ic			0.00	0.00				0.16	
0.20	11.083	108.70	53.81 ic	0.25 ic			0.00	0.00				0.25	
0.25	13.854	108.75	53.81 ic	0.36 ic			0.00	0.00				0.36	
0.30	16.625	108.80	53.81 ic	0.36 ic			0.00	0.00				0.47	
0.35	19.396	108.85	53.81 ic	0.47 ic			0.00	0.00				0.60	
0.40	22.167	108.90	53.81 ic	0.60 ic			0.00	0.00				0.76	
0.45	24.938	108.95	53.81 ic	0.74 ic			0.00	0.00				0.99	
0.50	27.709	109.00	53.81 ic	0.89 ic			0.00	0.00				1.22	
0.55	30.480	109.05	53.81 ic	1.02 ic			0.00	0.00				1.55	
0.60	33.251	109.10	53.81 ic	1.16 ic			0.00	0.00				1.86	
0.70	39.669	109.30	53.81 ic	1.86 ic			0.00	0.00				2.12	
0.80	46.087	109.50	53.81 ic	2.12 ic			0.00	0.00				2.34	
0.90	52.505	109.60	53.81 ic	2.34 ic			0.00	0.00				2.59	
1.00	58.911	109.50	53.81 ic	2.55 ic			0.00	0.00				2.84	
1.10	64.190	109.60	53.81 ic	2.74 ic			0.34	0.00				3.09	
1.20	70.270	109.70	53.81 ic	2.91 ic			0.97	0.00				3.34	
1.30	76.350	109.80	53.81 ic	2.91 ic			2.74	0.00				3.59	
1.40	82.430	109.90	53.81 ic	3.24 ic			3.83	0.00				3.84	
1.50	88.510	110.00	53.81 ic	3.24 ic			5.03	0.00				4.09	
1.60	95.171	110.10	53.81 ic	3.39 ic			6.34	0.00				4.34	
1.70	101.630	110.20	53.81 ic	3.54 ic			7.74	0.00				4.59	
1.80	108.489	110.30	53.81 ic	3.68 ic			9.24	0.00				4.84	
1.90	115.149	110.40	53.81 ic	3.81 ic			10.82	0.00				5.09	
2.00	121.809	110.50	53.81 ic	3.95 ic			12.40	0.00				5.34	
2.10	128.468	110.60	53.81 ic	4.07 ic			14.23	0.00				5.59	
2.20	135.127	110.70	53.81 ic	4.19 ic			16.04	0.00				5.84	
2.30	141.787	110.80	53.81 ic	4.31 ic			17.93	0.00				6.09	
2.40	148.447	110.90	53.81 ic	4.43 ic			19.88	0.00				6.34	
2.50	155.107	111.00	53.81 ic	4.54 ic			21.90	0.00				6.59	
2.60	162.331	111.10	53.81 ic	4.65 ic			23.99	0.00				6.84	
2.70	169.556	111.20	53.81 ic	4.76 ic			26.14	0.00				7.09	
2.80	176.781	111.30	53.81 ic	4.88 ic			28.34	0.00				7.34	
2.90	184.006	111.40	53.81 ic	5.00 ic			30.61	0.00				7.59	
3.00	191.231	111.50	53.81 ic	5.11 ic			32.93	0.00				7.84	
3.10	198.455	111.60	53.81 ic	5.16 ic			32.93	0.00				8.09	

Continues on next page

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Wet Pond A

Stage / Storage / Discharge Table													
Stage ft	Storage cu ft	Elevation ft	Civ A	Civ B	Civ C	PrRsr	Wr A	Wr B	Wr C	Wr D	Exfil	User	Total
			cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs
3.20	205,660	111.70	53.81 ic	5.26 ic	---	---	35.32	0.00	---	---	---	---	40.58
3.40	213,130	111.80	53.81 ic	5.26 ic	---	---	37.75	0.00	---	---	---	---	43.11
3.60	220,125	111.90	53.81 ic	5.45 ic	---	---	40.24	0.00	---	---	---	---	45.69
3.80	227,354	112.00	53.81 ic	5.54 ic	---	---	42.78	0.00	---	---	---	---	48.32
3.60	235,408	112.10	53.81 ic	5.63 ic	---	---	45.37	0.00	---	---	---	---	51.00
3.70	243,462	112.20	54.67 ic	5.72 ic	---	---	48.01	0.93	---	---	---	---	54.67
3.90	251,516	112.30	61.12 ic	5.57 ic	---	---	50.71	4.84	---	---	---	---	61.11
3.80	259,570	112.40	67.56 ic	4.96 ic	---	---	52.19	10.41	---	---	---	---	67.56
4.00	267,624	112.50	72.94 ic	4.40 ic	---	---	51.26	25.13	---	---	---	---	72.94
4.20	275,677	112.60	77.94 ic	3.75 ic	---	---	49.38	33.96	---	---	---	---	77.94
4.40	283,731	112.70	81.96 ic	2.94 ic	---	---	37.18	42.45	---	---	---	---	81.96
4.60	291,785	112.80	83.03 ic	2.01 ic	---	---	34.38	46.63	---	---	---	---	83.02
4.50	307,883	113.00	83.85 ic	1.77 ic	---	---	32.32	49.75	---	---	---	---	83.85
4.55	312,392	113.05	84.21 ic	1.67 ic	---	---	31.45	51.09	---	---	---	---	84.21
4.60	316,891	113.10	84.55 ic	1.58 ic	---	---	30.66	52.30	---	---	---	---	84.54
4.65	321,389	113.15	84.87 ic	1.50 ic	---	---	29.93	53.43	---	---	---	---	84.96
4.70	325,888	113.20	85.19 ic	1.43 ic	---	---	29.26	54.48	---	---	---	---	85.16
4.75	330,387	113.25	85.47 ic	1.36 ic	---	---	28.64	55.49	---	---	---	---	85.46
4.80	334,886	113.30	85.75 ic	1.30 ic	---	---	28.04	56.47	---	---	---	---	85.74
4.85	339,394	113.35	86.02 ic	1.24 ic	---	---	27.44	57.43	---	---	---	---	86.02
4.90	343,903	113.40	86.29 ic	1.19 ic	---	---	26.87	58.38	---	---	---	---	86.27
4.95	348,383	113.45	86.55 ic	1.14 ic	---	---	26.57	59.31	---	---	---	---	86.52
5.00	352,881	113.50	86.80 ic	1.10 ic	---	---	26.14	59.54	---	---	---	---	86.77
5.00	352,881	113.50	86.80 ic	1.10 ic	---	---	26.14	59.54	---	---	---	---	86.77

End

End

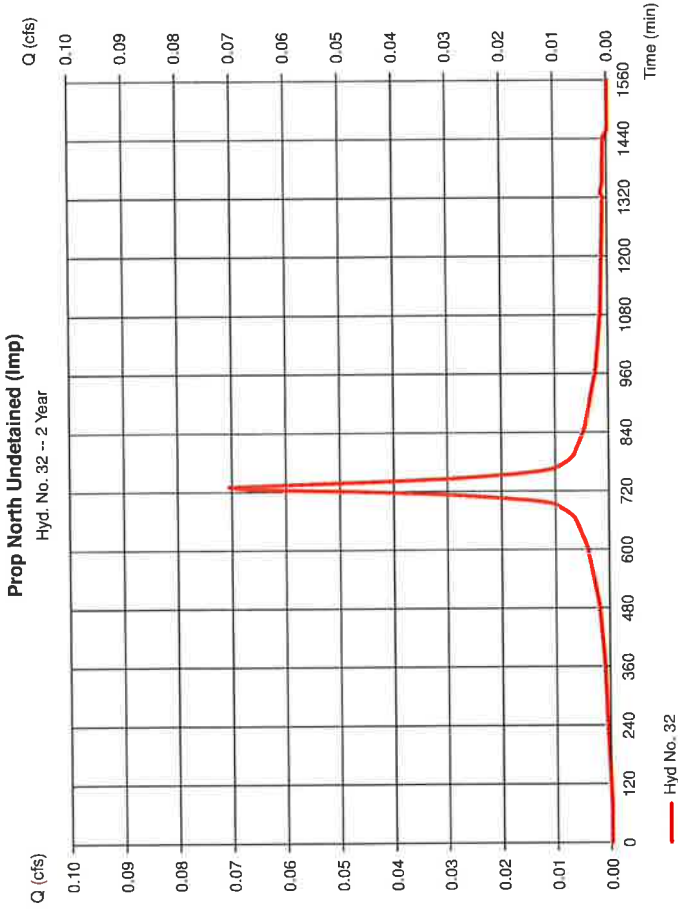
Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 32

Prop North Undetained (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.071 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	317 cuft
Drainage area	=	0.030 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.34 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



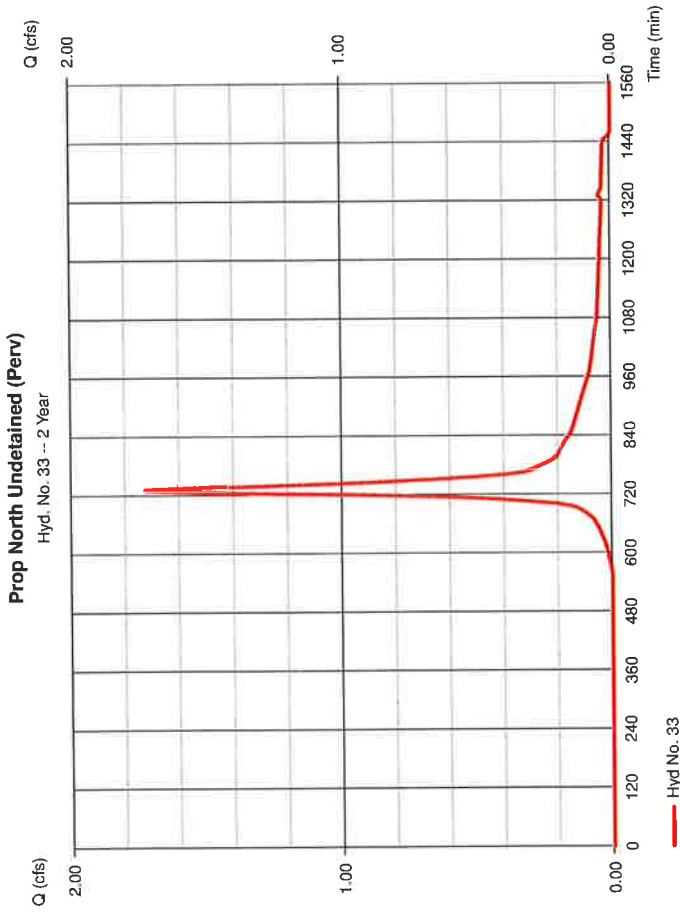
Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 33

Prop North Undetained (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.724 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	6.888 cuft
Drainage area	=	1.340 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.34 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



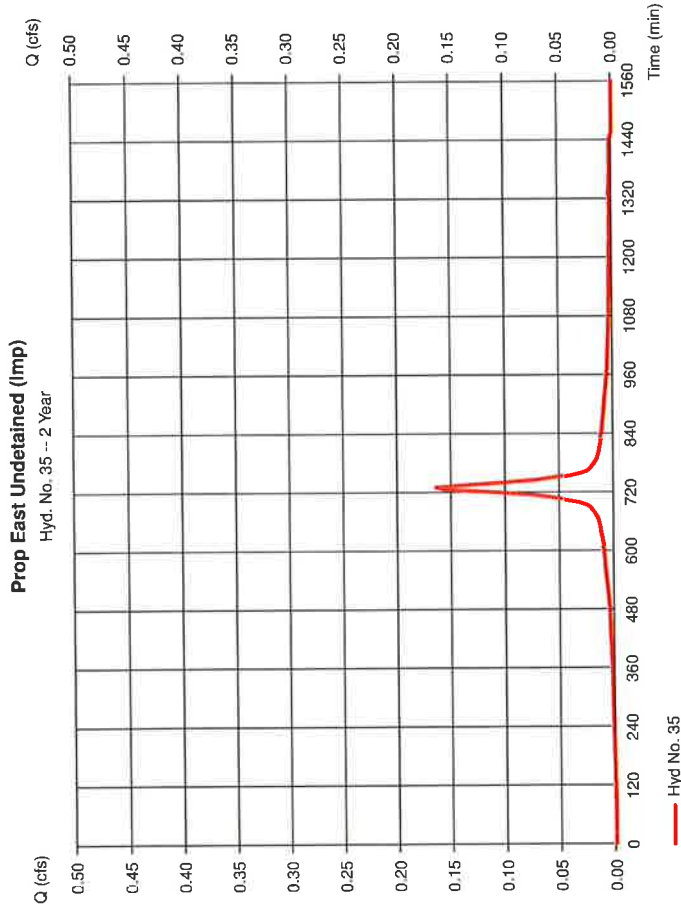
Hydrograph Report

Hydraflo Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 35

Prop East Undetained (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.165 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	740 cuft
Drainage area	=	0.070 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.34 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

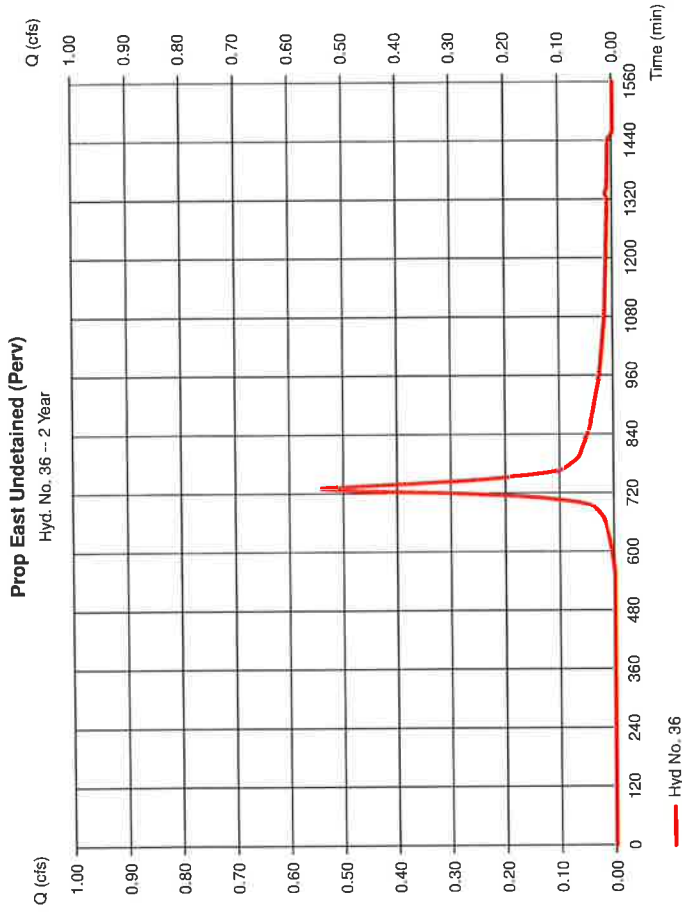
Hydraflo Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

Hyd. No. 36

Prop East Undetained (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.541 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	2,159 cuft
Drainage area	=	0.420 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.34 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

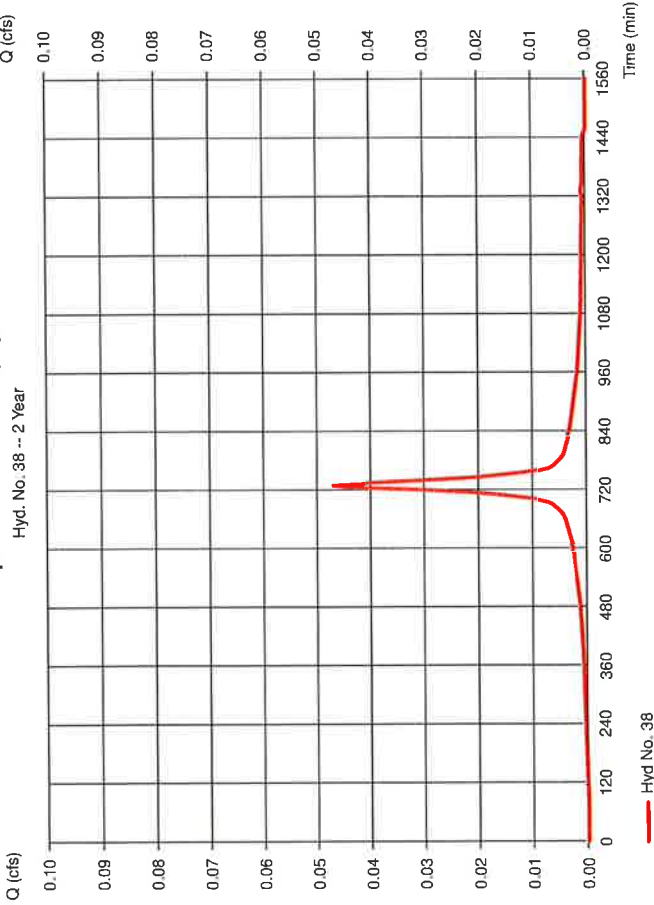
Hydralflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 38

Prop CR 518 Undetained (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.047 cfs
Storm frequency	=	2 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	211 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.34 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Prop CR 518 Undetained (Imp)



Hydrograph Report

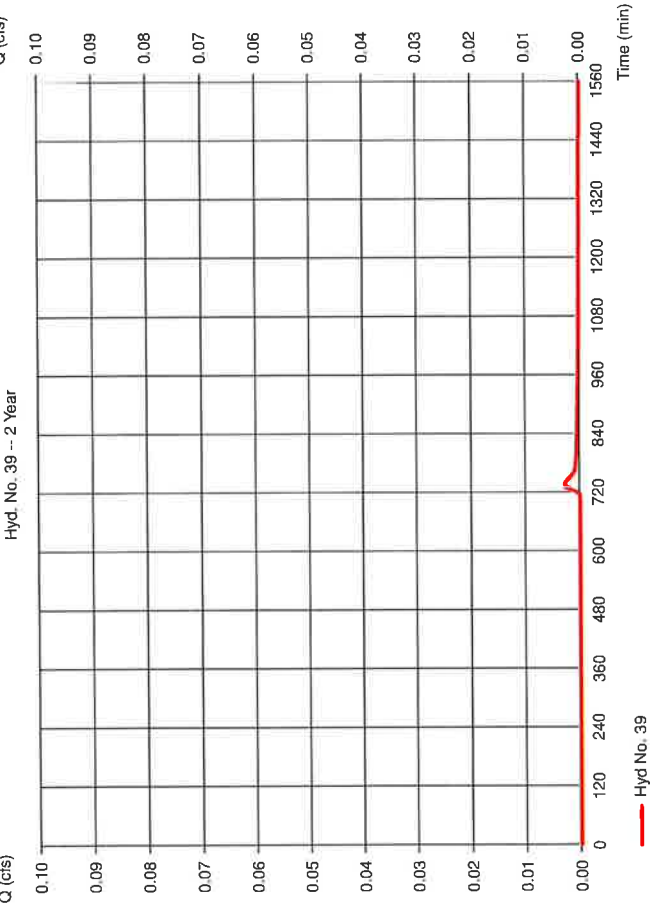
Hydralflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 39

Prop CR 518 Undetained (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.003 cfs
Storm frequency	=	2 yrs	Time to peak	=	735 min
Time interval	=	5 min	Hyd. volume	=	17 cuft
Drainage area	=	0.010 ac	Curve number	=	61
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.34 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Prop CR 518 Undetained (Perv)



Hydrograph Report

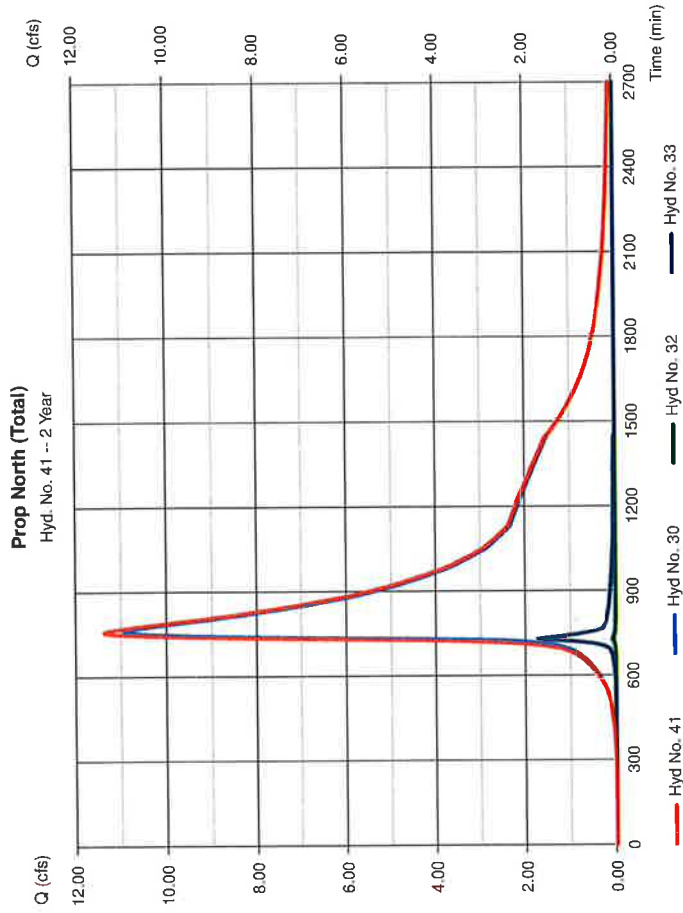
Hydralow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 41

Prop North (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 30, 32, 33

Peak discharge = 11.39 cfs
Time to peak = 755 min
Hyd. volume = 223,972 cuft
Contrib. drain. area = 1.370 ac



Hydrograph Report

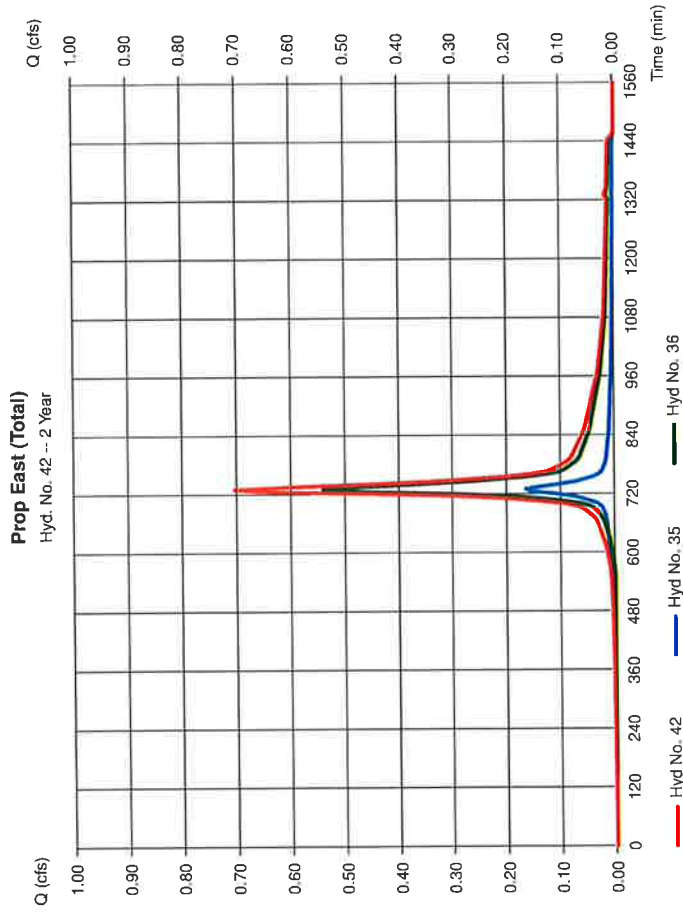
Hydralow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 42

Prop East (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 35, 36

Peak discharge = 0.705 cfs
Time to peak = 730 min
Hyd. volume = 2,899 cuft
Contrib. drain. area = 0.490 ac



Hydrograph Report

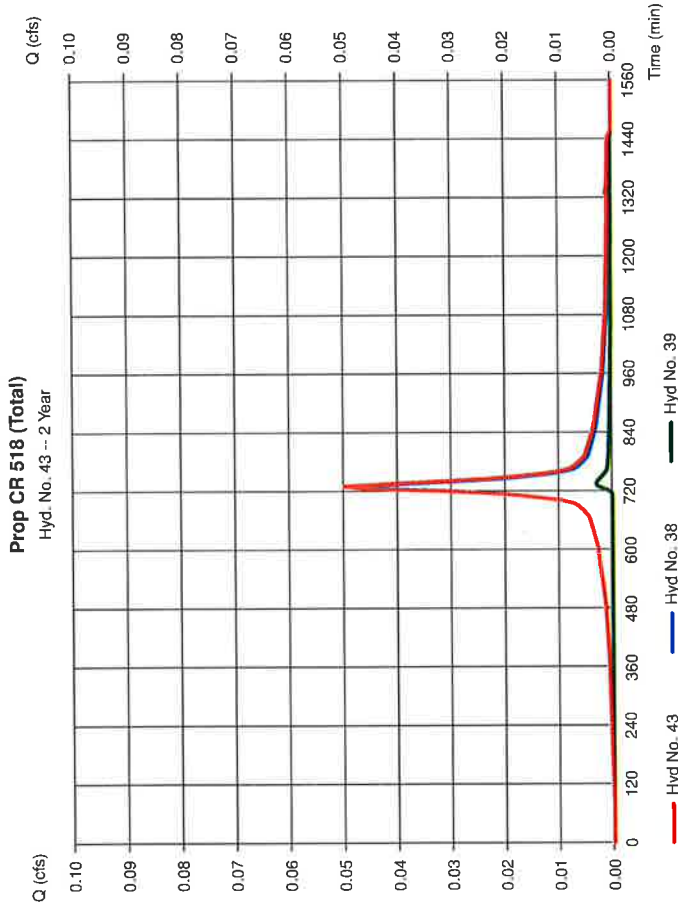
Hydralow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 43

Prop CR 518 (Total)

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 38, 39

Peak discharge = 0.050 cfs
Time to peak = 730 min
Hyd. volume = 229 cuft
Contrib. drain. area = 0.030 ac



Hydrograph Report

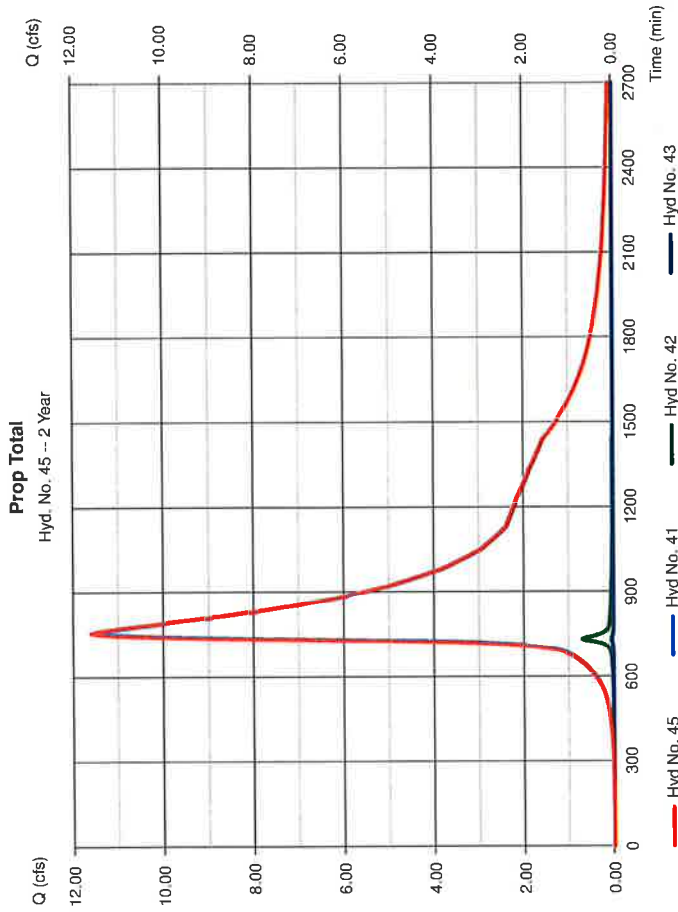
Hydralow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 45

Prop Total

Hydrograph type = Combine
Storm frequency = 2 yrs
Time interval = 5 min
Inflow hyds. = 41, 42, 43

Peak discharge = 11.61 cfs
Time to peak = 755 min
Hyd. volume = 227,099 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	5,583	5	740	34,843	----	-----	-----	Ex North Disturbed (Imp)
2	SCS Runoff	33.67	5	740	187,944	-----	-----	-----	Ex North Disturbed (Perv)
3	Combine	39.25	5	740	222,786	1, 2	-----	-----	Ex North Disturbed (Total)
5	SCS Runoff	1,881	5	740	11,614	-----	-----	-----	Ex North Undisturbed (Imp)
6	SCS Runoff	2,908	5	745	18,882	-----	-----	-----	Ex North Undisturbed (Perv)
7	Combine	4,689	5	745	30,297	5, 6	-----	-----	Ex North Undisturbed (Total)
9	SCS Runoff	0,096	5	735	520	-----	-----	-----	Ex East Disturbed (Imp)
10	SCS Runoff	9,963	5	735	47,855	-----	-----	-----	Ex East Disturbed (Perv)
11	Combine	10.06	5	735	48,374	9, 10	-----	-----	Ex East Disturbed (Total)
13	SCS Runoff	0,448	5	735	2,426	-----	-----	-----	Ex East Undisturbed (Imp)
14	SCS Runoff	0,750	5	740	4,230	-----	-----	-----	Ex East Undisturbed (Perv)
15	Combine	1,167	5	735	6,656	13, 14	-----	-----	Ex East Undisturbed (Total)
17	SCS Runoff	0,107	5	730	487	-----	-----	-----	Ex CR 518 (Imp)
18	SCS Runoff	0,140	5	730	639	-----	-----	-----	Ex CR 518 (Perv)
20	Combine	43.87	5	740	253,083	3, 7,	-----	-----	Ex North (Total)
21	Combine	11.23	5	735	55,030	11, 15,	-----	-----	Ex East (Total)
22	Combine	0,246	5	730	1,127	17, 18,	-----	-----	Ex CR 518 (Total)
24	Combine	54.78	5	740	308,240	20, 21, 22,	-----	-----	Ex Total
26	SCS Runoff	47.23	5	730	216,040	-----	-----	-----	Prop Wet Pond A (Imp)
27	SCS Runoff	33.48	5	730	133,631	-----	-----	-----	Prop Wet Pond A (Perv)
28	SCS Runoff	5,918	5	730	23,784	-----	-----	-----	Prop Village Shopper Improvements
29	Combine	86.52	5	730	373,455	26, 27, 28	-----	-----	Prop Total To Wet Pond A
30	Reservoir	27.41	5	750	373,173	29	111, 15	165,160	Post Route Wet Pond A
32	SCS Runoff	0,107	5	730	487	-----	-----	-----	Prop North Undetained (Imp)
33	SCS Runoff	3,326	5	730	13,232	-----	-----	-----	Prop North Undetained (Perv)
35	SCS Runoff	0,249	5	730	1,137	-----	-----	-----	Prop East Undetained (Imp)
36	SCS Runoff	1,043	5	730	4,147	-----	-----	-----	Prop East Undetained (Perv)
38	SCS Runoff	0,071	5	730	325	-----	-----	-----	Prop CR 518 Undetained (Imp)
39	SCS Runoff	0,011	5	730	47	-----	-----	-----	Prop CR 518 Undetained (Perv)

DEEPER BASIN FILE.gpw

Return Period: 10 Year

Tuesday, May 22, 2018

Hydrograph Summary Report

[illegible]

Hydrograph Report

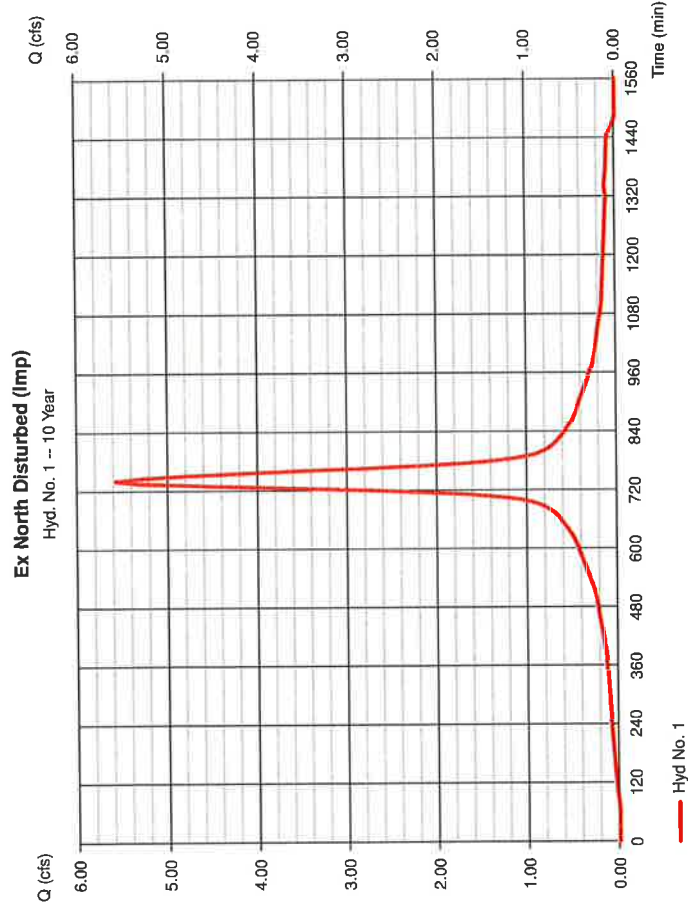
Hydralfow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

Hyd. No. 1

Ex North Disturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 1.950 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 5.583 cfs
Time to peak = 740 min
Hyd. volume = 34,843 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

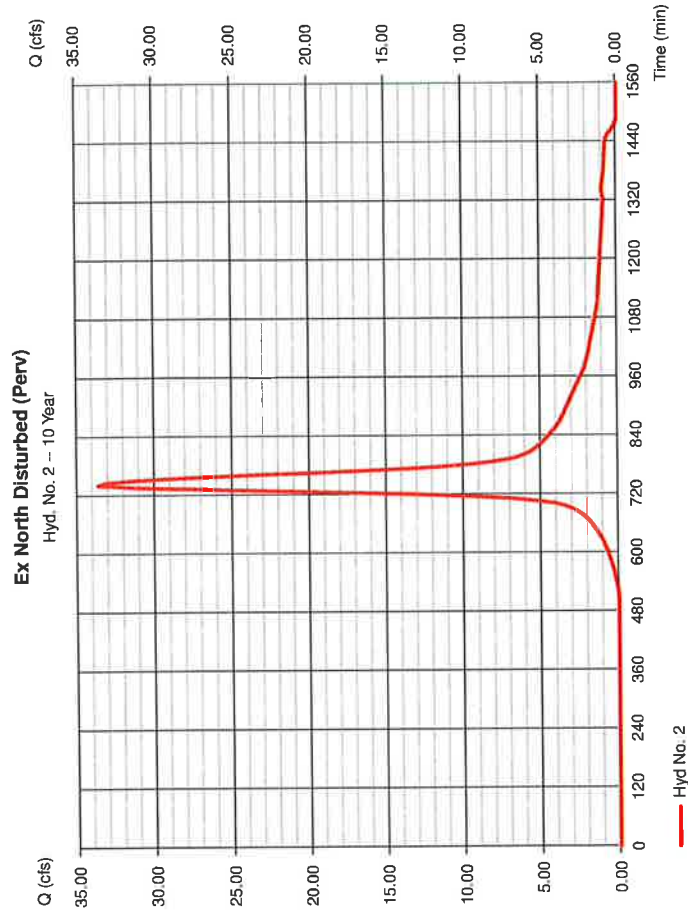
Hydralfow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

Hyd. No. 2

Ex North Disturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 19.080 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 33.67 cfs
Time to peak = 740 min
Hyd. volume = 187,944 cuft
Curve number = 77
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydroflow Hydrographs by Intelisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 3

Ex North Disturbed (Total)

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 1, 2

Peak discharge = 39.25 cfs
Time to peak = 740 min
Hyd. volume = 222,786 cuft
Contrib. drain. area = 21,030 ac

Hydrograph Report

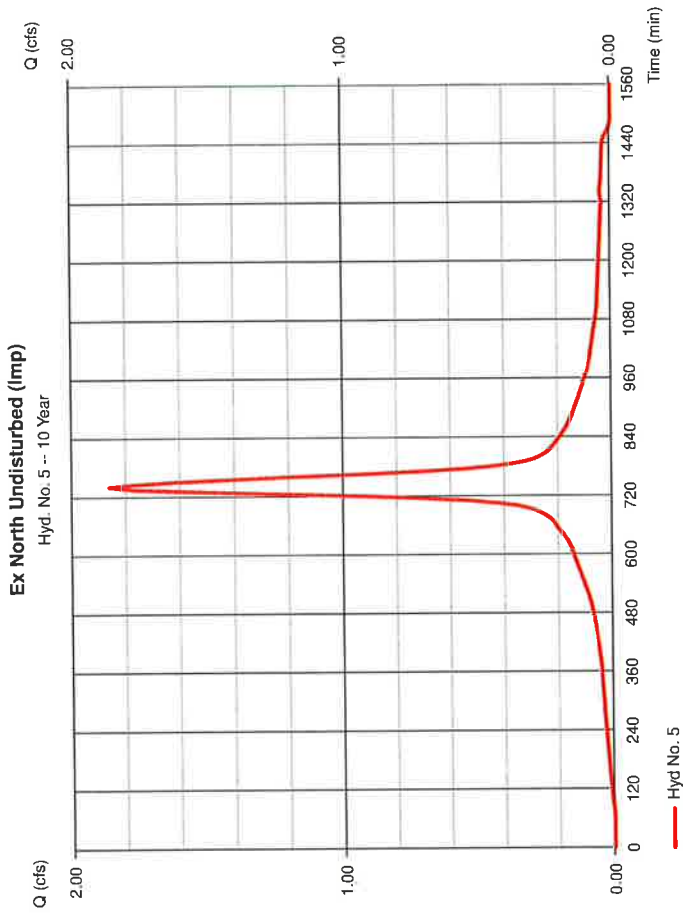
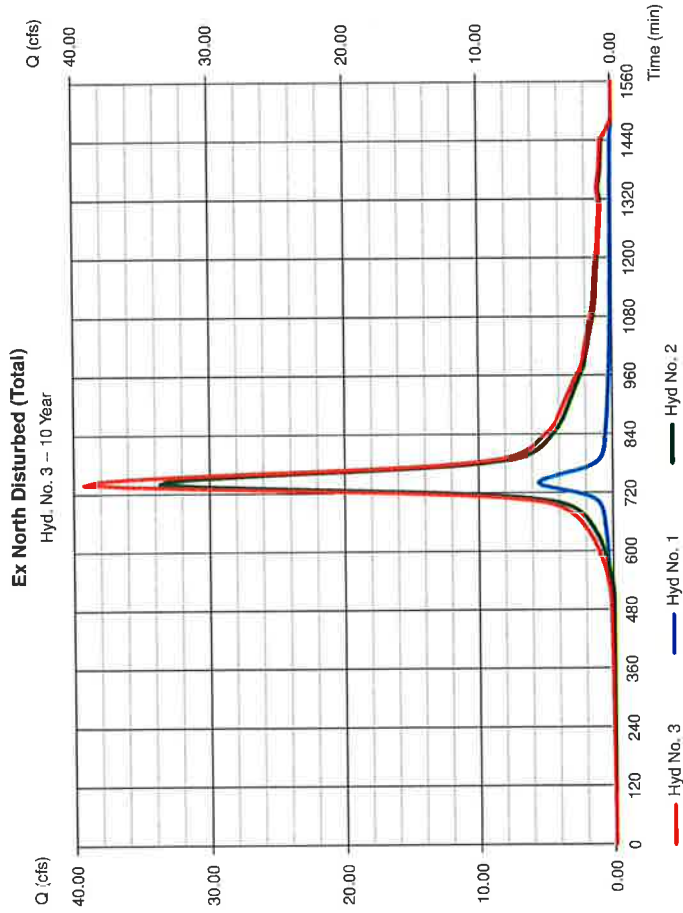
Hydroflow Hydrographs by Intelisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 5

Ex North Undisturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.650 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 1.861 cfs
Time to peak = 740 min
Hyd. volume = 11,614 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1

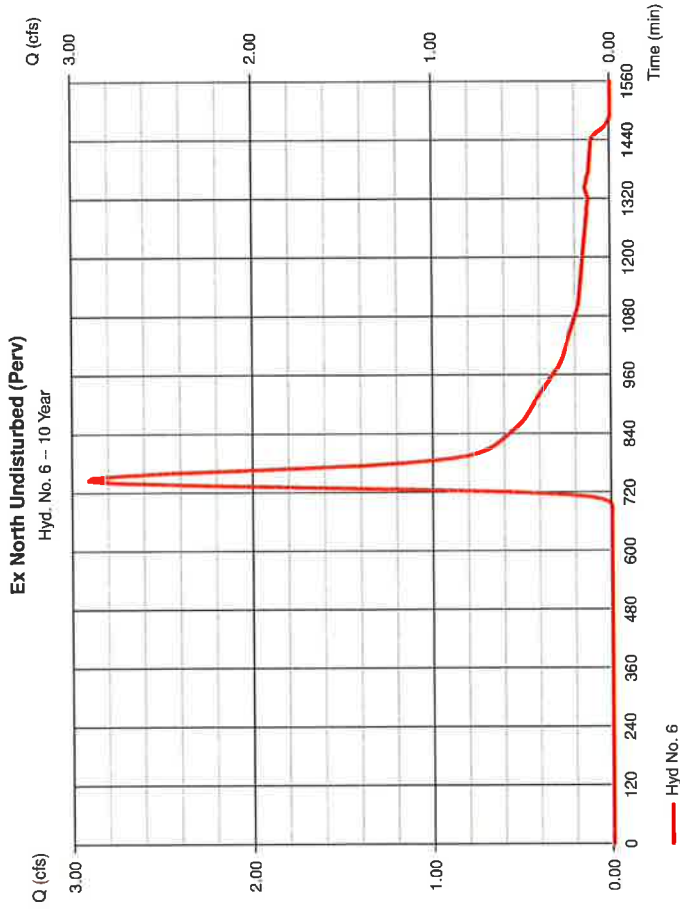
Tuesday, May 22, 2018

Hyd. No. 6

Ex North Undisturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 4.250 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 2.908 cfs
Time to peak = 745 min
Hyd. volume = 18,682 cuft
Curve number = 58
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1

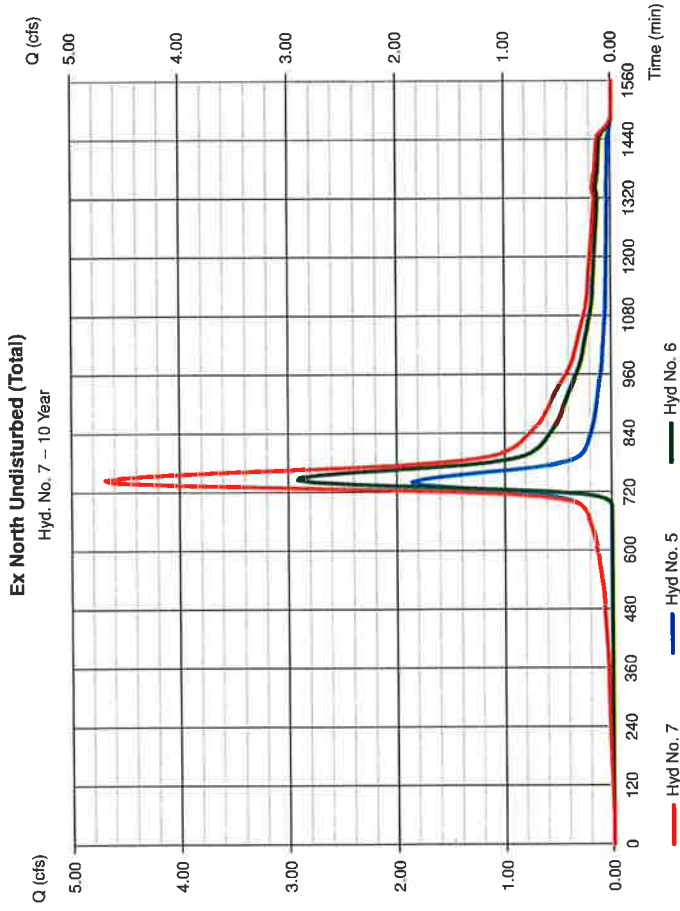
Tuesday, May 22, 2018

Hyd. No. 7

Ex North Undisturbed (Total)

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 5, 6

Peak discharge = 4.689 cfs
Time to peak = 745 min
Hyd. volume = 30,297 cuft
Contrib. drain. area = 4.900 ac



Hydrograph Report

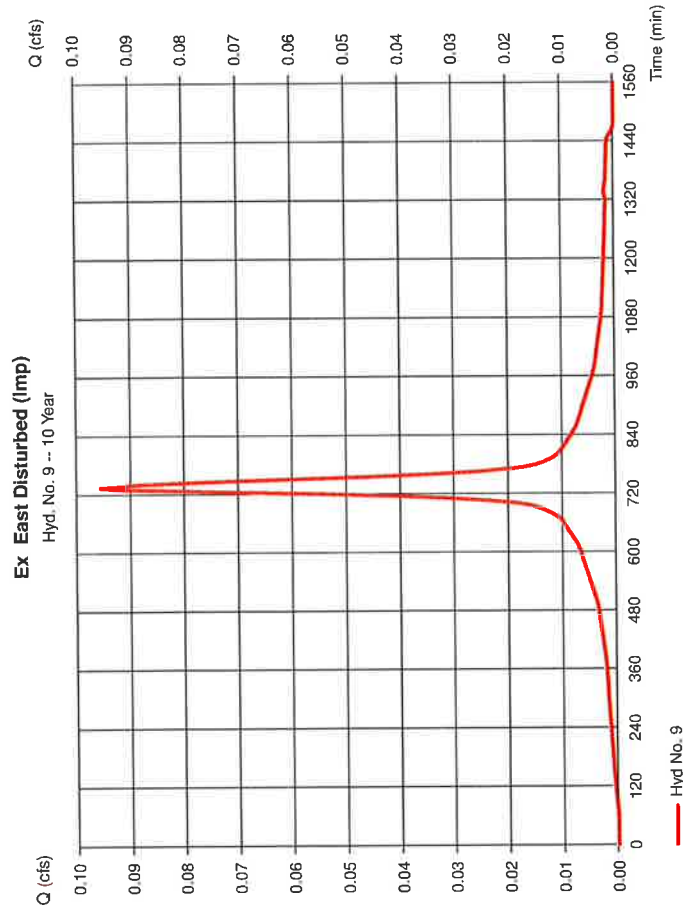
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 9

Ex East Disturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.030 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 0.096 cfs
Time to peak = 735 min
Hyd. volume = 520 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

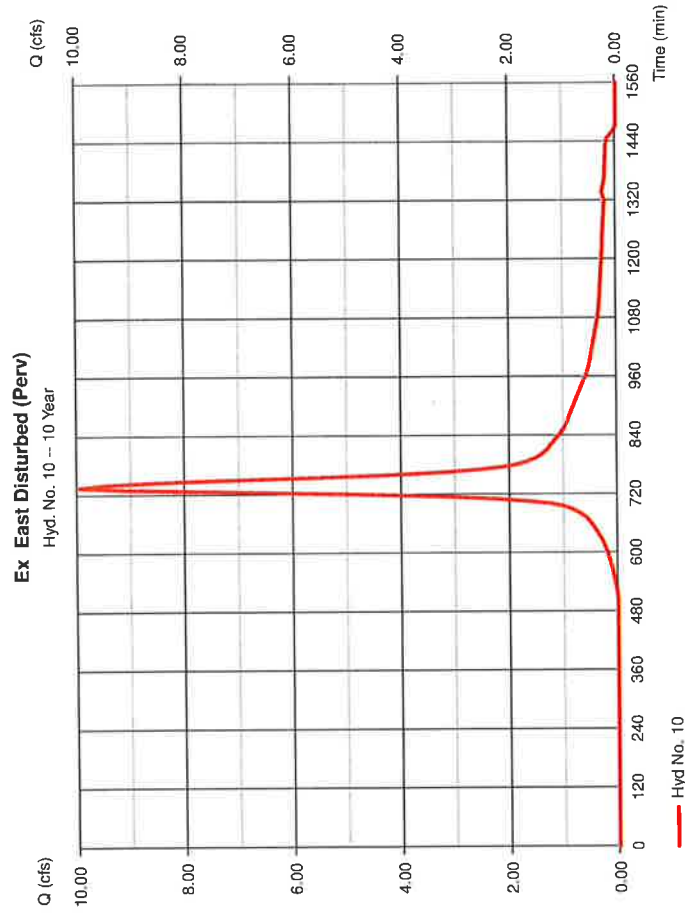
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 10

Ex East Disturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 5.010 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 9.963 cfs
Time to peak = 735 min
Hyd. volume = 47,855 cuft
Curve number = 77
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydrallow Hydrographs by InletSolve v9.1
Tuesday, May 22, 2018

Hyd. No. 11

Ex East Disturbed (Total)

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 9, 10

Peak discharge = 10.06 cfs
Time to peak = 735 min
Hyd. volume = 48,374 cuft
Contrib. drain. area = 5,040 ac

Hydrograph Report

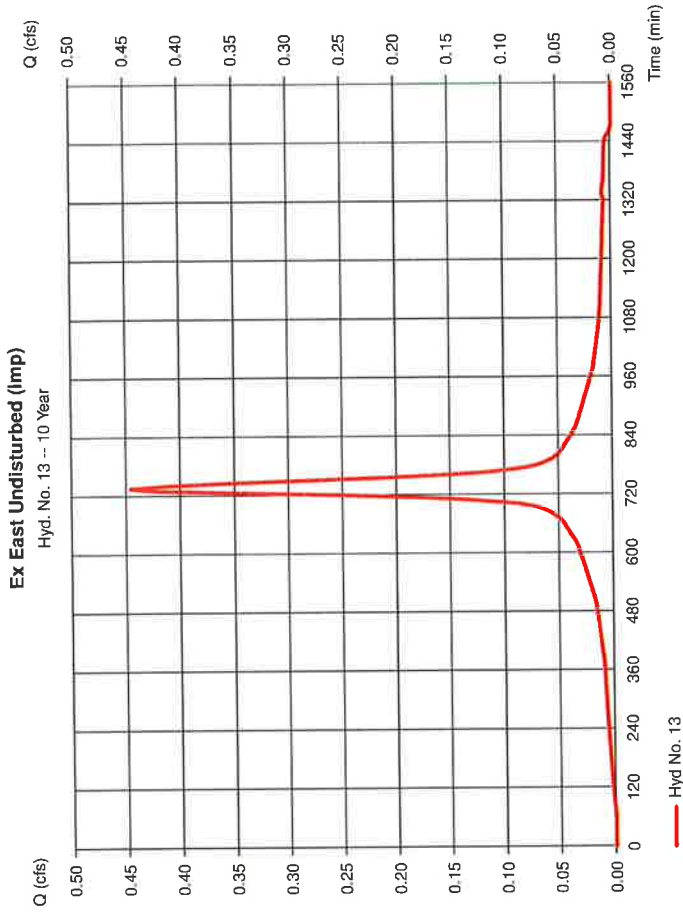
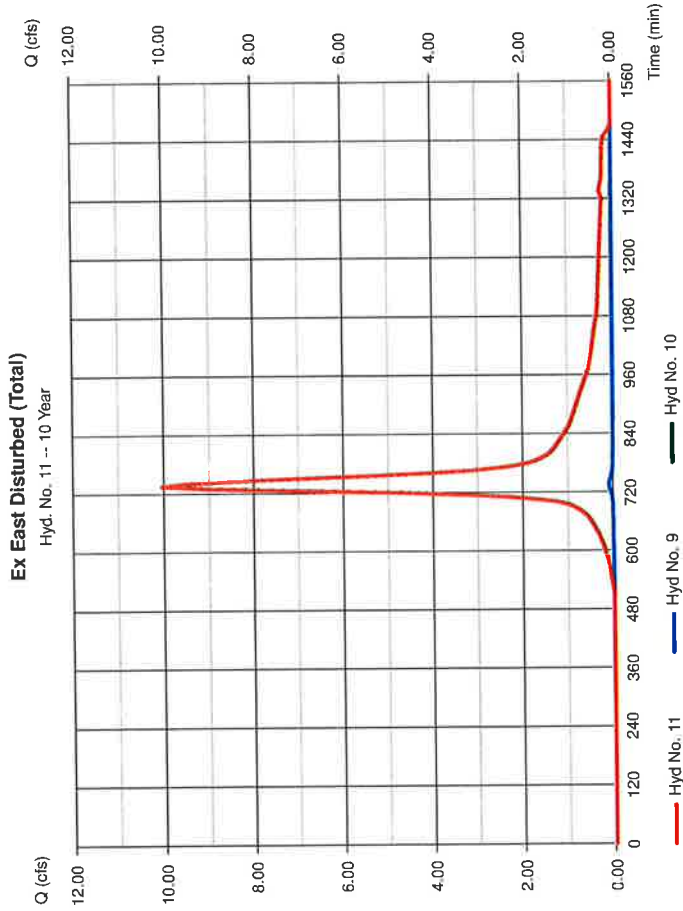
Hydrallow Hydrographs by InletSolve v9.1
Tuesday, May 22, 2018

Hyd. No. 13

Ex East Undisturbed (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.140 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 0.446 cfs
Time to peak = 735 min
Hyd. volume = 2,426 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



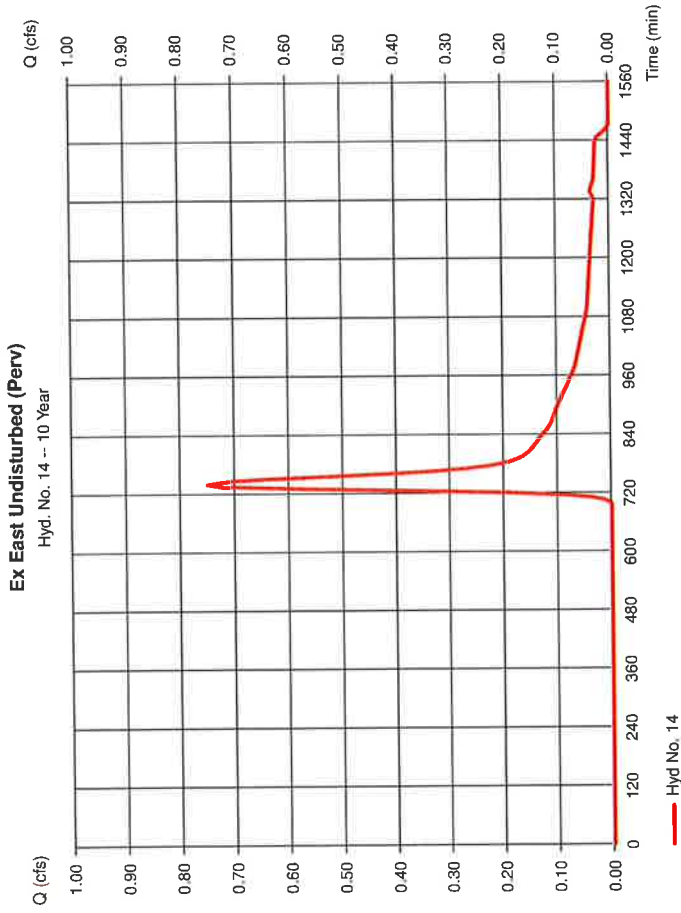
Hydrograph Report

Hydrow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

Hyd. No. 14

Ex East Undisturbed (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.750 cfs
Storm frequency	=	10 yrs	Time to peak	=	740 min
Time interval	=	5 min	Hyd. volume	=	4,230 cuft
Drainage area	=	1.050 ac	Curve number	=	57
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.00 min
Total precip.	=	5.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



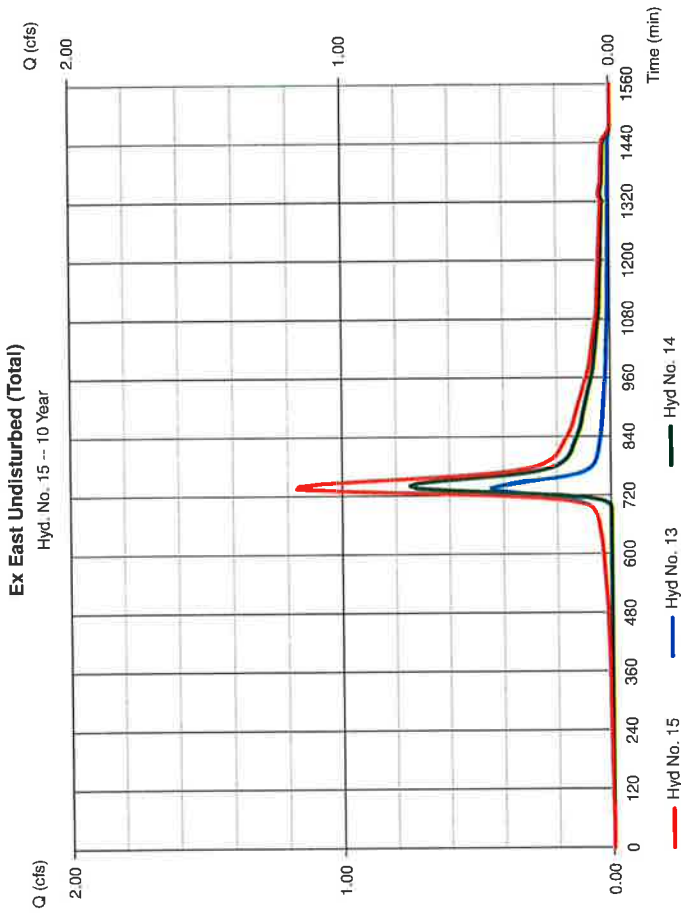
Hydrograph Report

Hydrow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

Hyd. No. 15

Ex East Undisturbed (Total)

Hydrograph type	=	Combine	Peak discharge	=	1.167 cfs
Storm frequency	=	10 yrs	Time to peak	=	735 min
Time interval	=	5 min	Hyd. volume	=	6,656 cuft
Inflow hyds.	=	13, 14	Contrib. drain. area	=	1.190 ac



Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 17

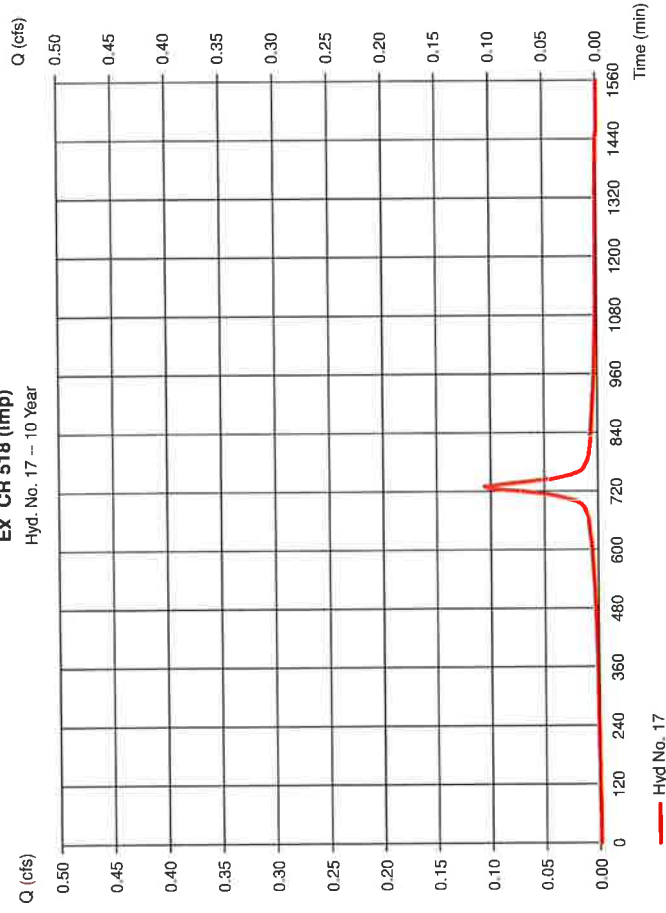
Ex CR 518 (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.030 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 0.107 cfs
Time to peak = 730 min
Hyd. volume = 487 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Ex CR 518 (Imp)

Hyd. No. 17 -- 10 Year



Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 18

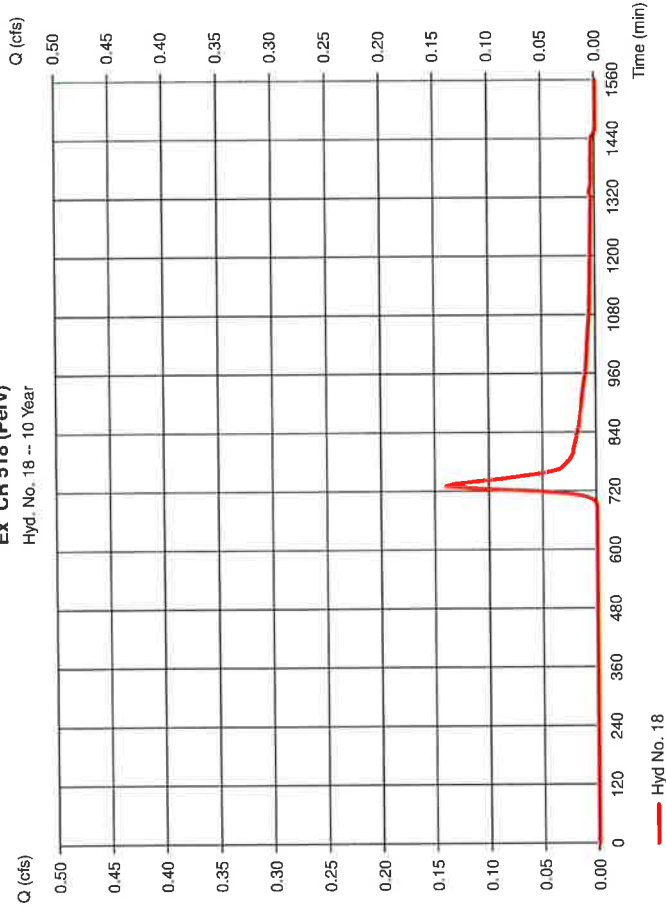
Ex CR 518 (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 0.140 cfs
Time to peak = 730 min
Hyd. volume = 639 cuft
Curve number = 58
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

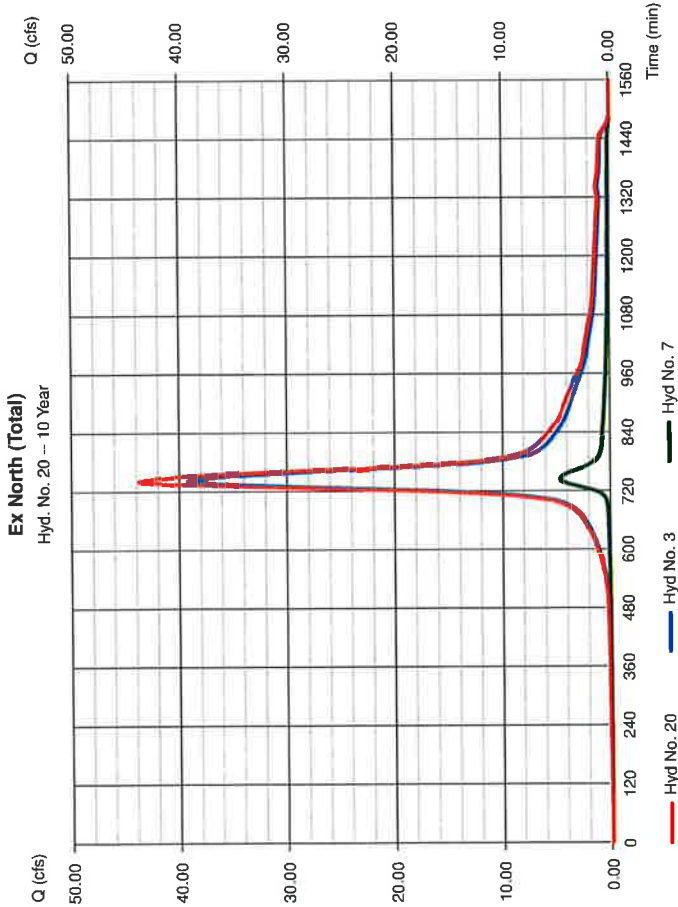
Ex CR 518 (Perv)

Hyd. No. 18 -- 10 Year



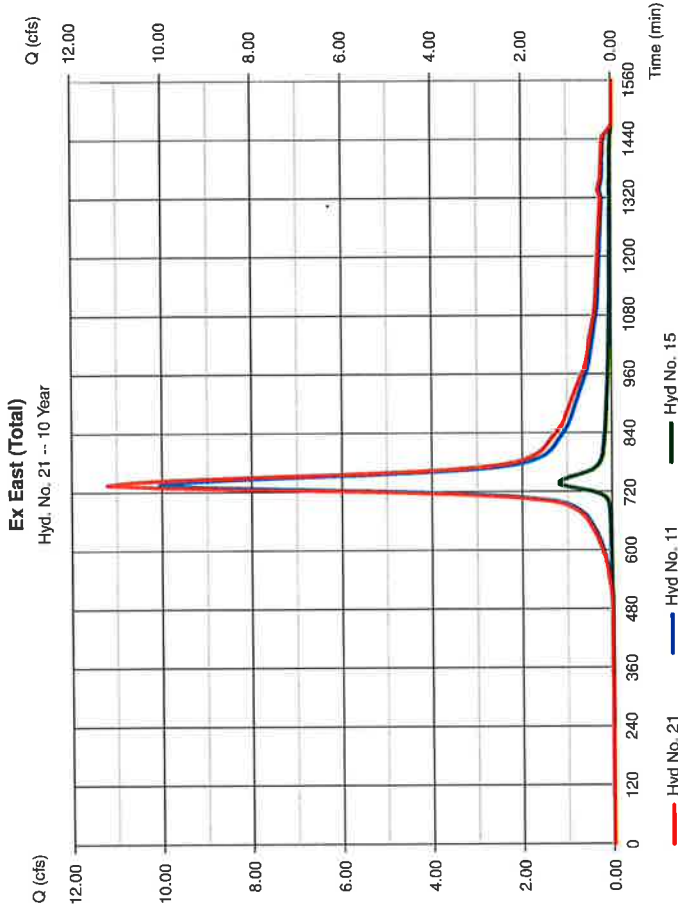
Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1		Tuesday, May 22, 2018	
Hyd. No. 20			
Ex North (Total)			
Hydrograph type	= Combine	Peak discharge	= 43.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 253,083 cuft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 0.000 ac



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1		Tuesday, May 22, 2018	
Hyd. No. 21			
Ex East (Total)			
Hydrograph type	= Combine	Peak discharge	= 11.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 55,030 cuft
Inflow hyds.	= 11, 15	Contrib. drain. area	= 0.000 ac



Hydrograph Report

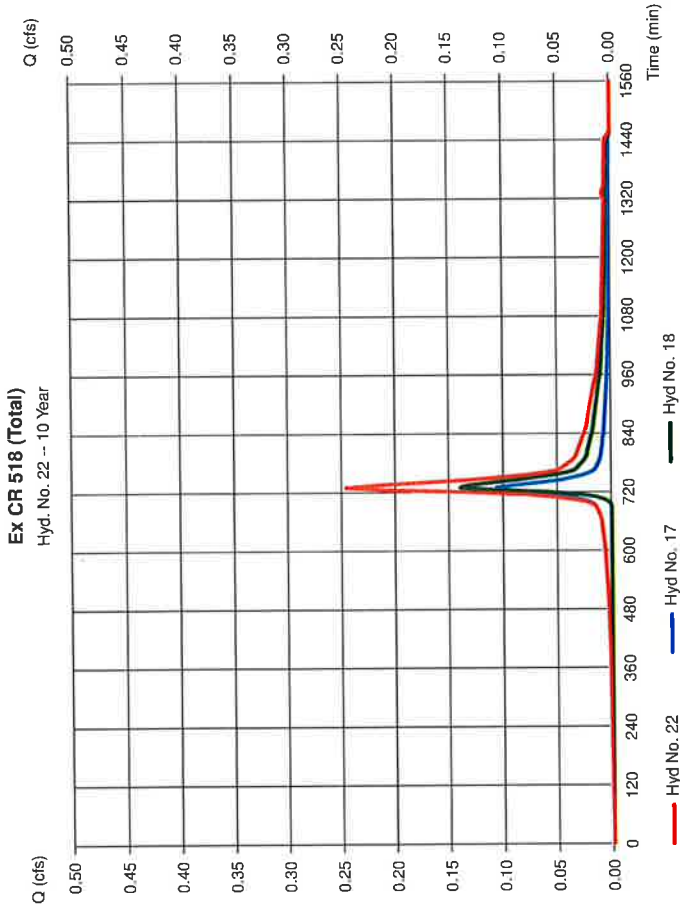
Hydralow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 22

Ex CR 518 (Total)

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 17, 18

Peak discharge = 0.246 cfs
Time to peak = 730 min
Hyd. volume = 1,127 cuft
Contrib. drain. area = 0.190 ac



Hydrograph Report

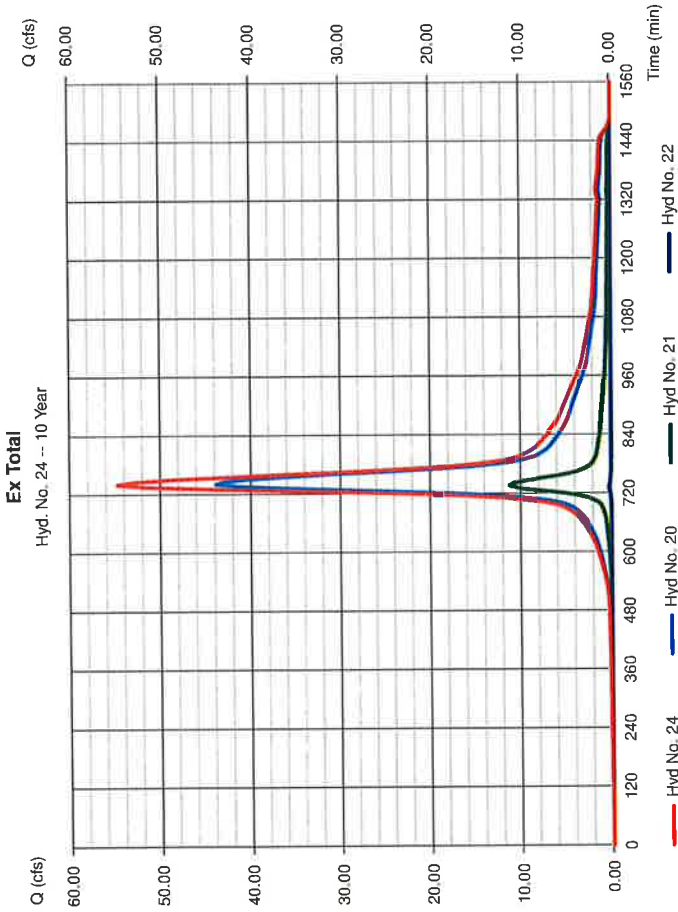
Hydralow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 24

Ex Total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 20, 21, 22

Peak discharge = 54.78 cfs
Time to peak = 740 min
Hyd. volume = 309,240 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Report

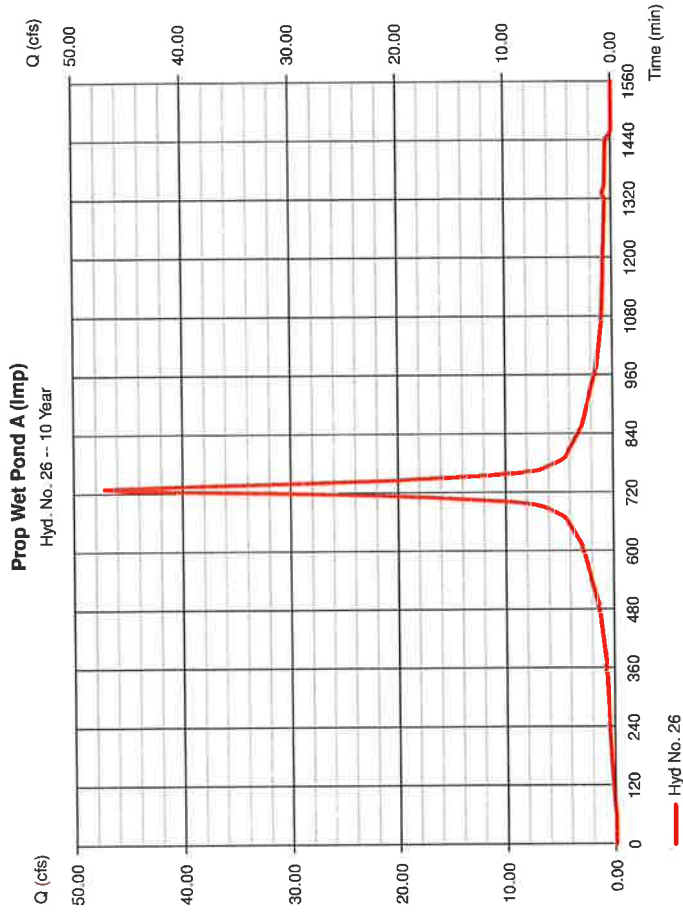
Hydroflow Hydrographs by Intelisolve v8.1 Tuesday, May 22, 2018

Hyd. No. 26

Prop Wet Pond A (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 13,300 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 47.23 cfs
Time to peak = 730 min
Hyd. volume = 216,040 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydroflow Hydrographs by Intelisolve v8.1

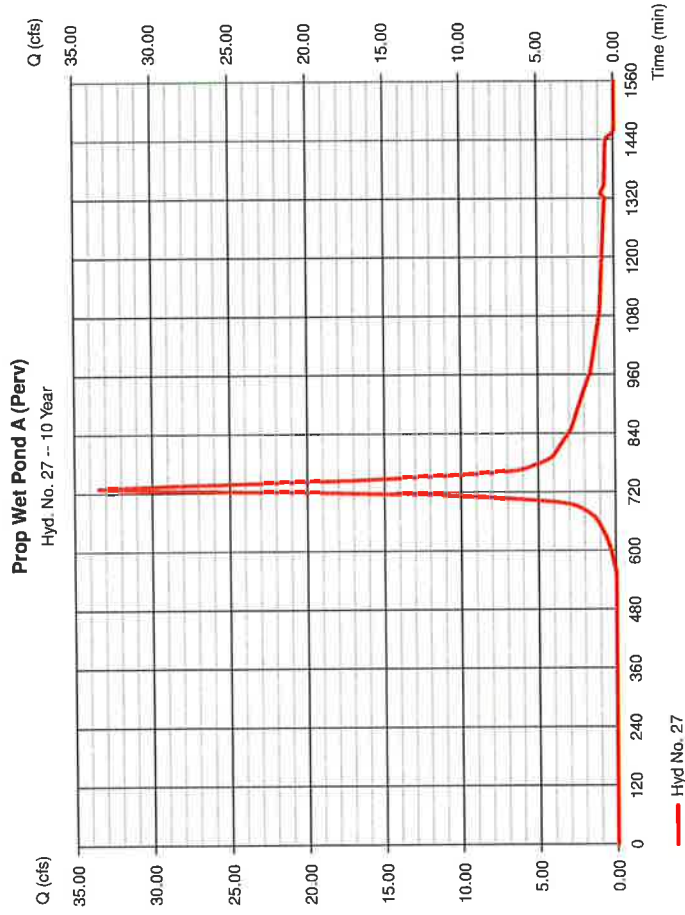
Tuesday, May 22, 2018

Hyd. No. 27

Prop Wet Pond A (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 17,160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 33.48 cfs
Time to peak = 730 min
Hyd. volume = 133,631 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydraflo Hydrographs by Intellisolve v9.1

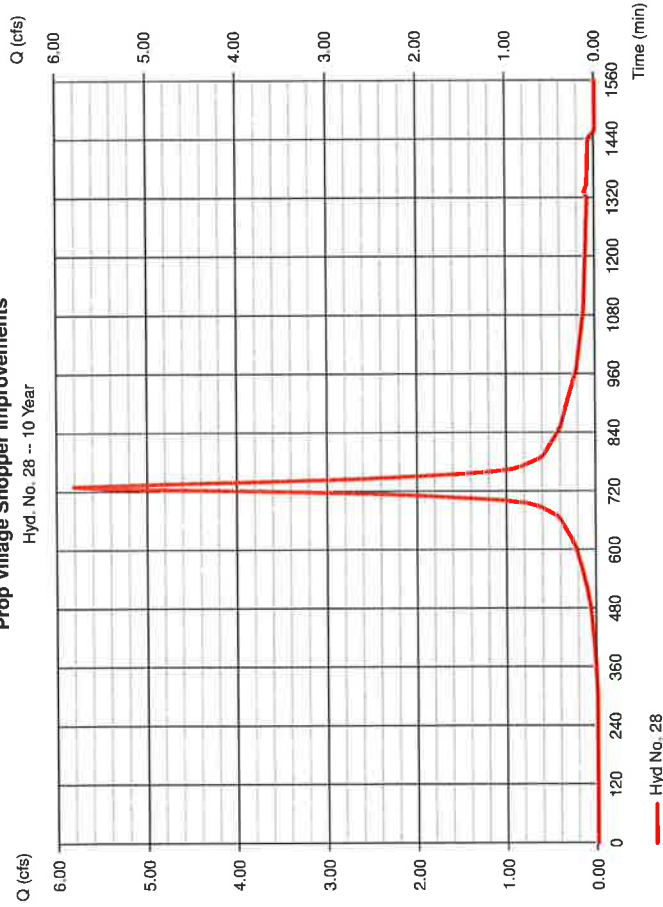
Tuesday, May 22, 2018

Hyd. No. 28

Prop Village Shopper Improvements

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.818 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	23,784 cuft
Drainage area	=	1.900 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Prop Village Shopper Improvements



Hydrograph Report

Hydraflo Hydrographs by Intellisolve v9.1

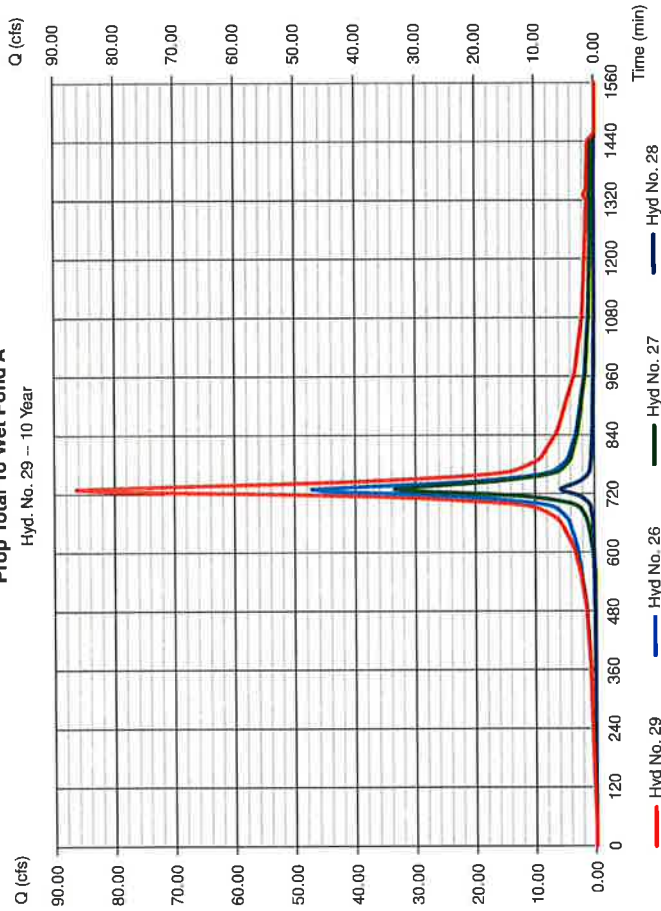
Tuesday, May 22, 2018

Hyd. No. 29

Prop Total To Wet Pond A

Hydrograph type	=	Combine	Peak discharge	=	86.52 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	373,455 cuft
Inflow hyds.	=	26, 27, 28	Contrib. drain. area	=	32,360 ac

Prop Total To Wet Pond A



Hydrograph Report

Hydrallow Hydrographs by Intelisolve v9.1
Tuesday, May 22, 2018

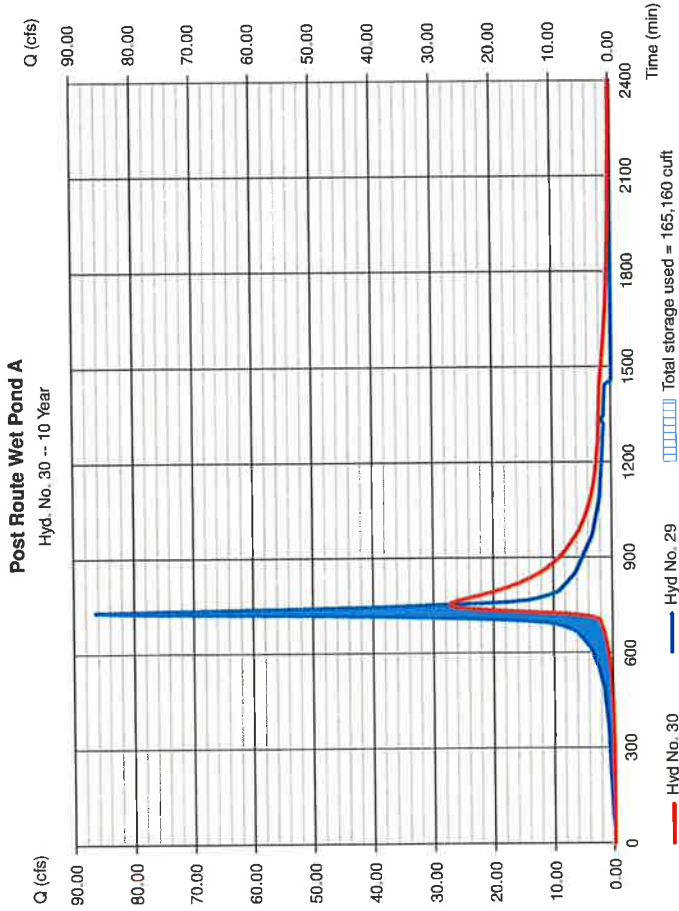
Hyd. No. 30

Post Route Wet Pond A

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyd. No. = 29 - Prop Total To Wet Pond A
Reservoir name = Wet Pond A

Peak discharge = 27.41 cfs
Time to peak = 750 min
Hyd. volume = 373,173 cuft
Max. Elevation = 111.15 ft
Max. Storage = 165,160 cuft

Storage Indication method used.



Hydrograph Report

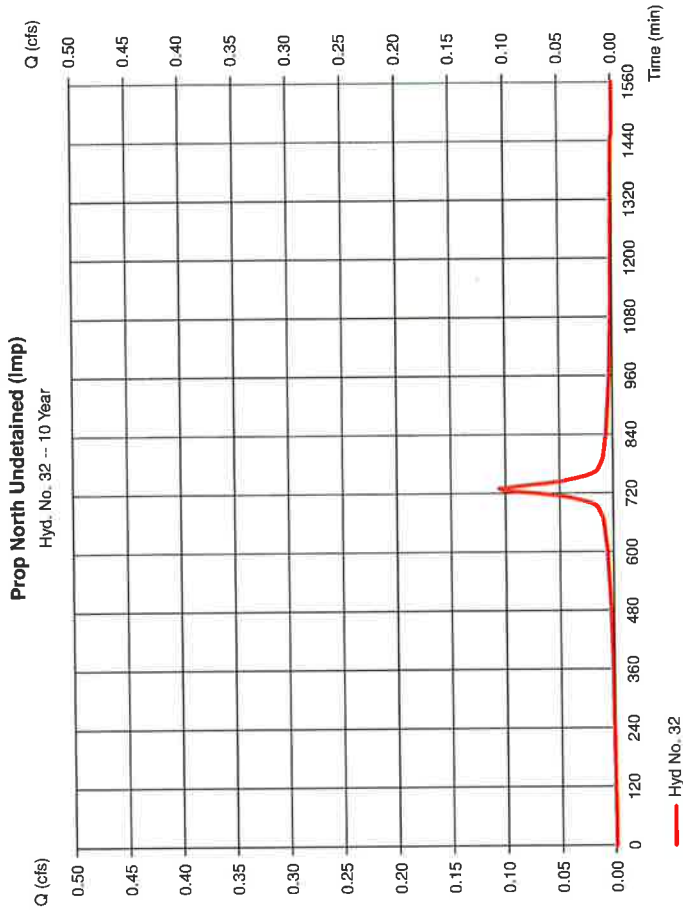
Hydrallow Hydrographs by Intelisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 32

Prop North Undetained (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.030 ac
Basin Slope = 0.0 %
To method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 0.107 cfs
Time to peak = 730 min
Hyd. volume = 487 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

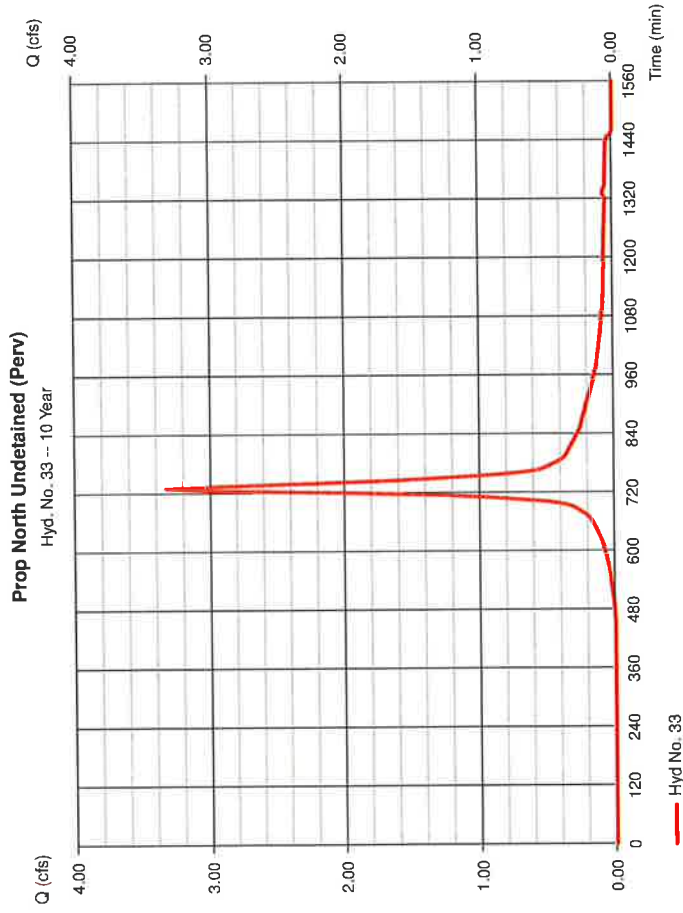
Hydroflow Hydrographs by Intellisphere v9.1
Tuesday, May 22, 2018

Hyd. No. 33

Prop North Undetained (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 1,340 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 3.326 cfs
Time to peak = 730 min
Hyd. volume = 13,232 cuft
Curve number = 80
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

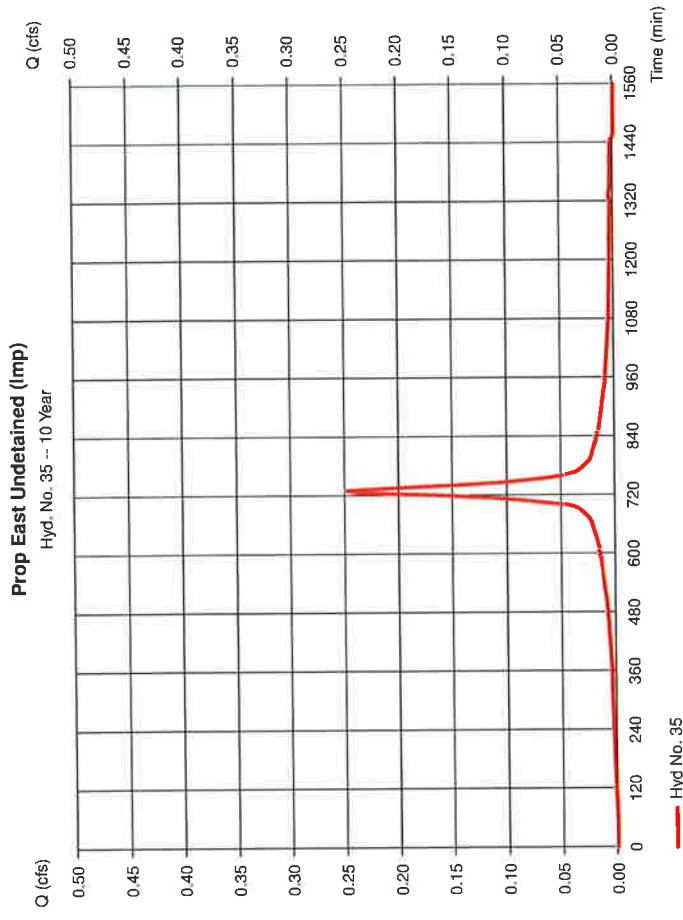
Hydroflow Hydrographs by Intellisphere v9.1
Tuesday, May 22, 2018

Hyd. No. 35

Prop East Undetained (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 0.070 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 0.249 cfs
Time to peak = 730 min
Hyd. volume = 1,137 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



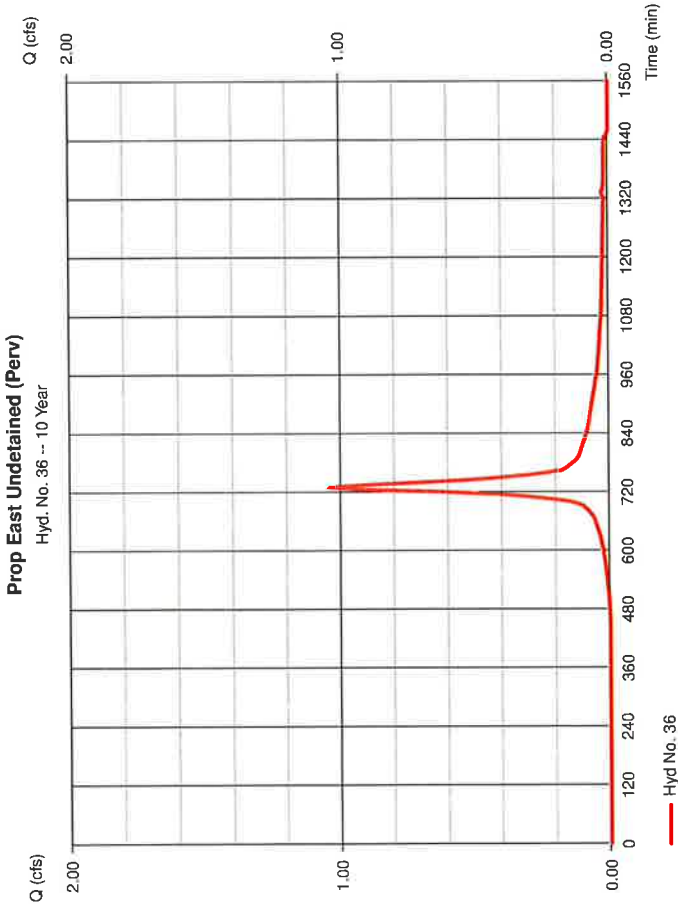
Hydrograph Report

Hydralflow Hydrographs by IntelliSolve v9.1 Tuesday, May 22, 2018

Hyd. No. 36

Prop East Undetained (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.043 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	4,147 cuft
Drainage area	=	0.420 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



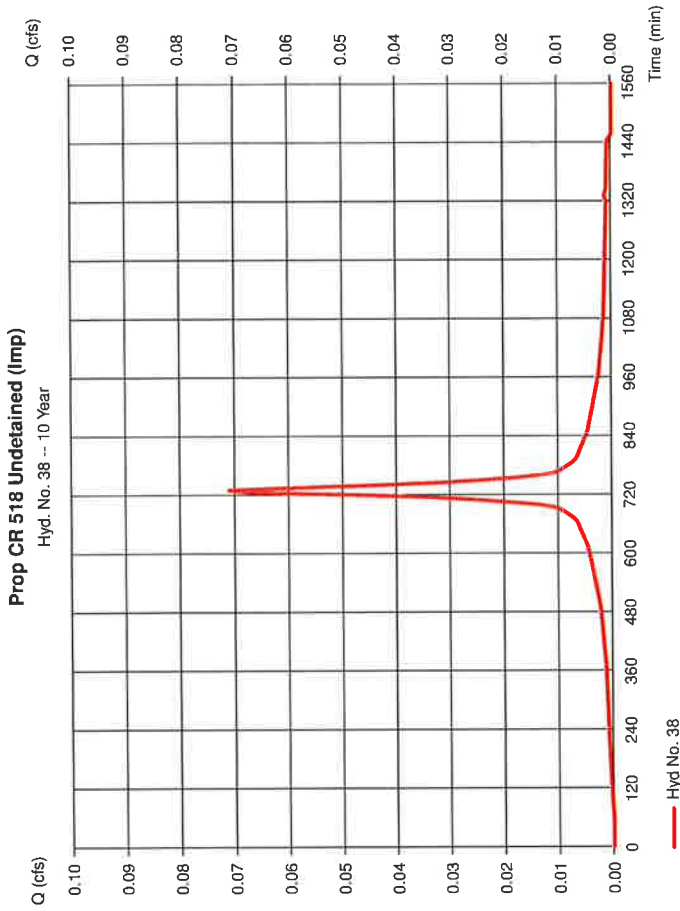
Hydrograph Report

Hydralflow Hydrographs by IntelliSolve v9.1 Tuesday, May 22, 2018

Hyd. No. 38

Prop CR 518 Undetained (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.071 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	325 cuft
Drainage area	=	0.020 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

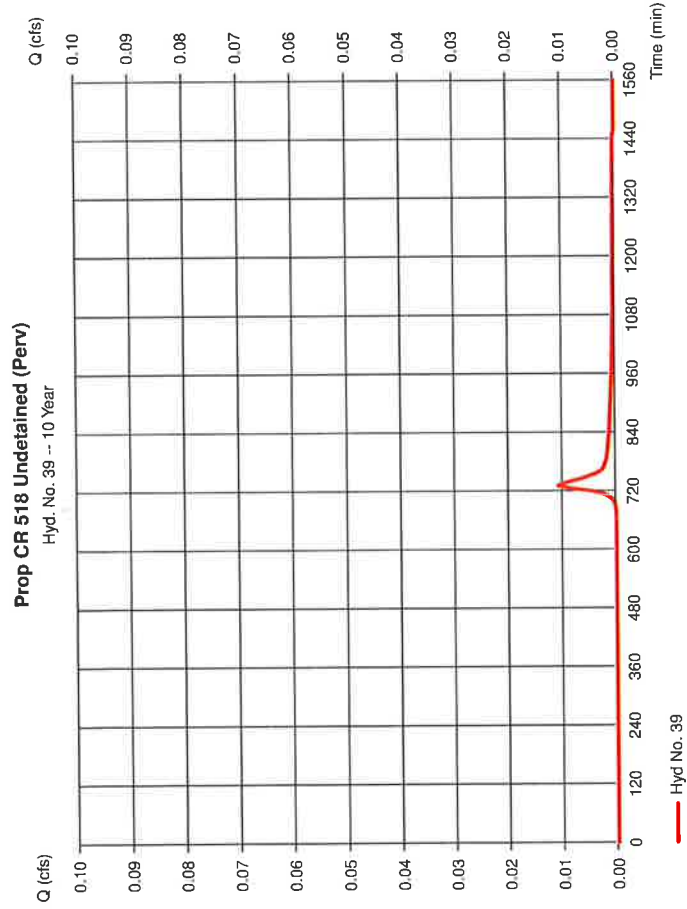
Hydroflow Hydrographs by Intelsolve v9.1

Tuesday, May 22, 2018

Hyd. No. 39

Prop CR 518 Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.011 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 47 cuft
Drainage area	= 0.010 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

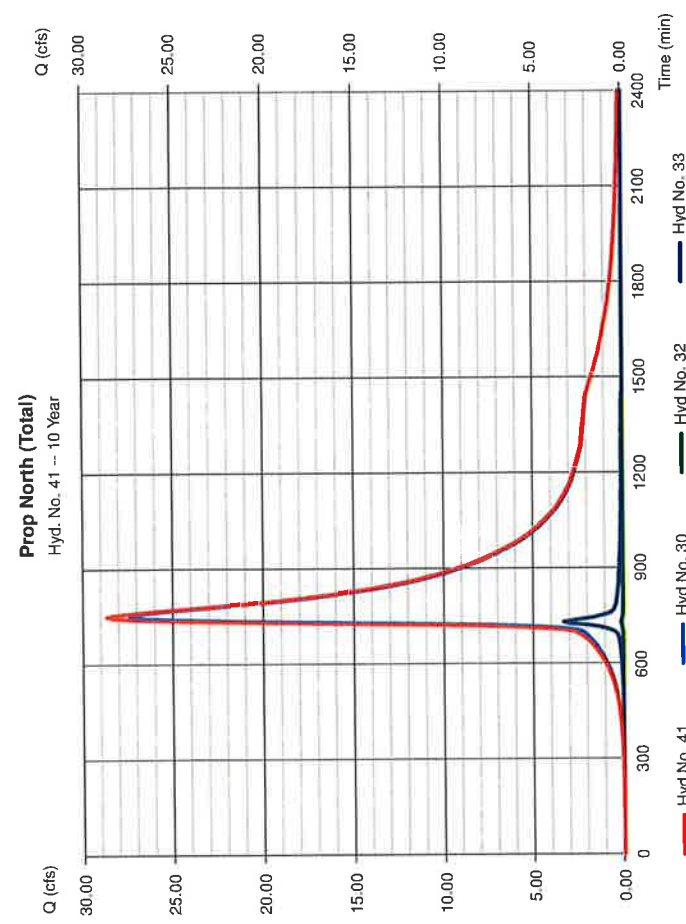
Hydroflow Hydrographs by Intelsolve v9.1

Tuesday, May 22, 2018

Hyd. No. 41

Prop North (Total)

Hydrograph type	= Combine	Peak discharge	= 28.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 386.892 cuft
Inflow hyds.	= 30, 32, 33	Contrib. drain. area	= 1.370 ac



Hydrograph Report

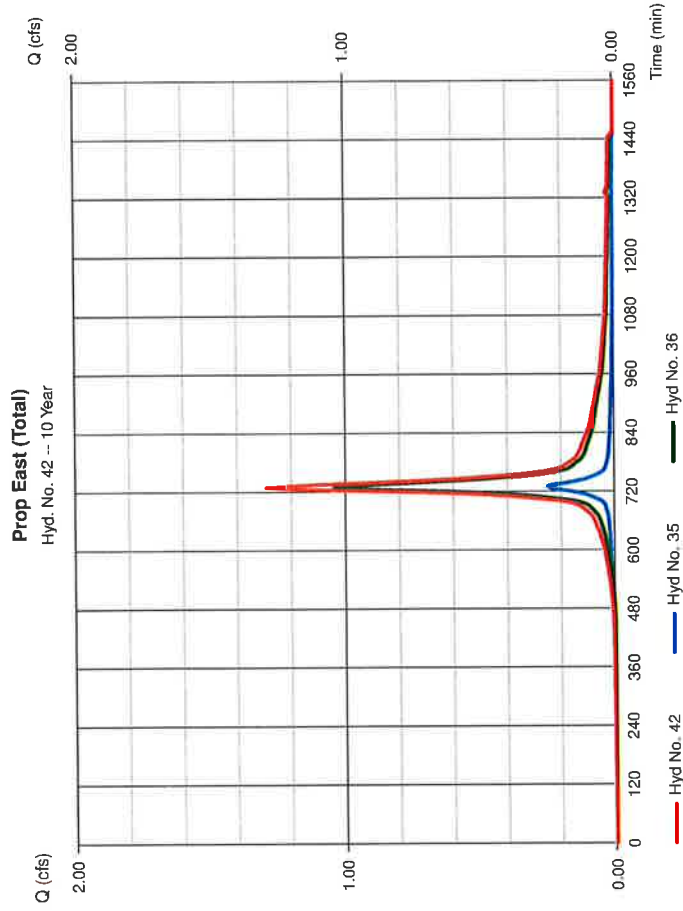
Hydralow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 42

Prop East (Total)

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 35, 36

Peak discharge = 1.291 cfs
Time to peak = 730 min
Hyd. volume = 5,284 cuft
Contrib. drain. area = 0.490 ac



Hydrograph Report

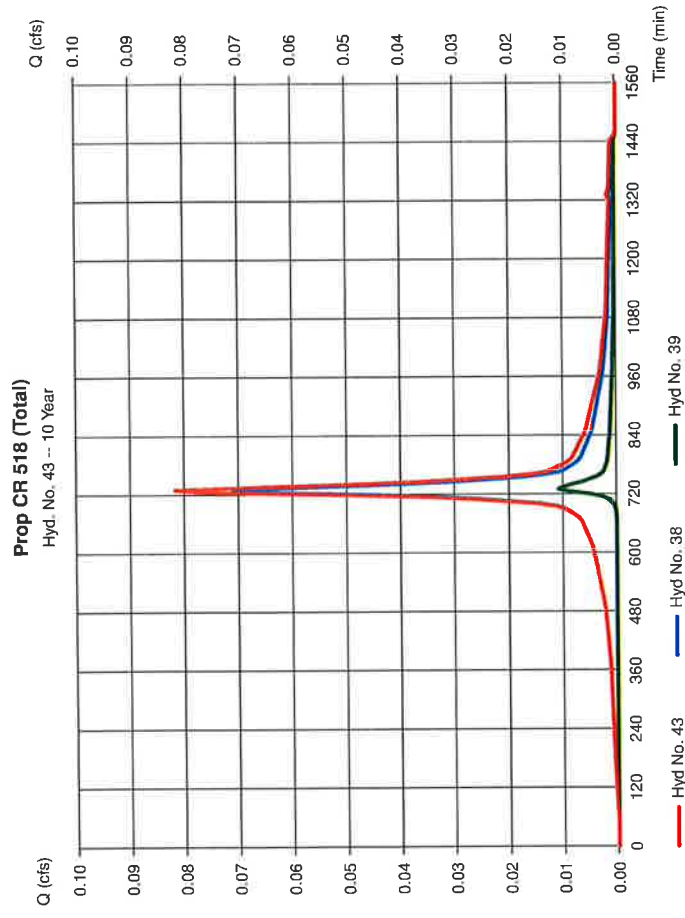
Hydralow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 43

Prop CR 518 (Total)

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 38, 39

Peak discharge = 0.082 cfs
Time to peak = 730 min
Hyd. volume = 372 cuft
Contrib. drain. area = 0.030 ac



Hydrograph Report

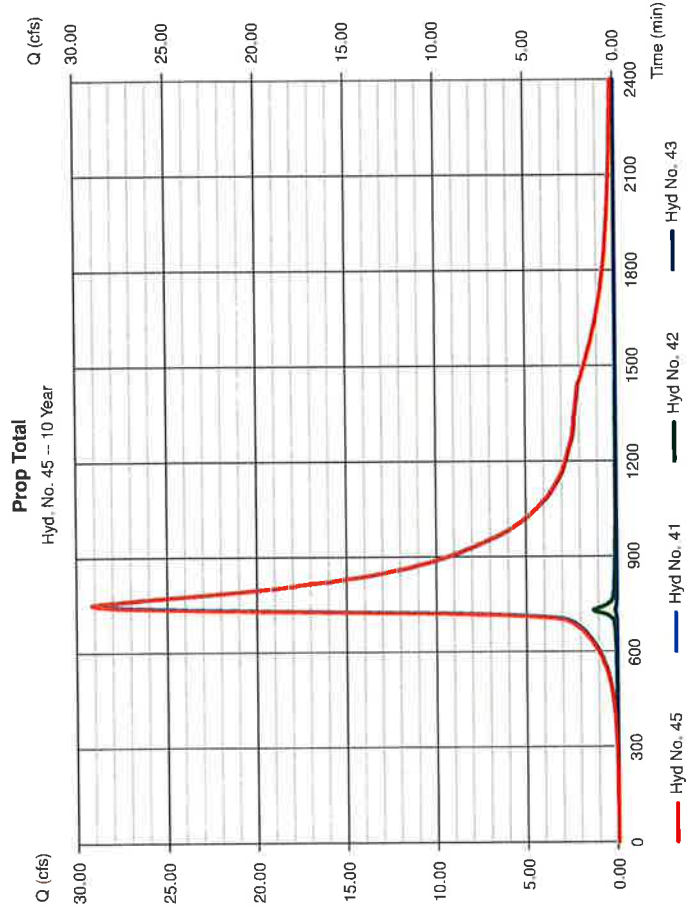
Hydrograph by Intalissolve v8.1 Tuesday, May 22, 2018

Hyd. No. 45

Prop Total

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 5 min
Inflow hyds. = 41, 42, 43

Peak discharge = 29.21 cfs
Time to peak = 750 min
Hyd. volume = 392,548 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Summary Report

Hydrograph by Intalissolve v8.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total storage used (cuft)	Hydrograph description
1	SCS Runoff	9.186	5	740	58,179				Ex North Disturbed (Imp)
2	SCS Runoff	69.91	5	740	390,503				Ex North Disturbed (Perv)
3	Combine	79.10	5	740	448,682	1, 2			Ex North Disturbed (Total)
5	SCS Runoff	3.062	5	740	13,393				Ex North Undisturbed (Imp)
6	SCS Runoff	9.053	5	745	51,946				Ex North Undisturbed (Perv)
7	Combine	12.08	5	740	71,339	5, 6			Ex North Undisturbed (Total)
9	SCS Runoff	0.157	5	735	868				Ex East Disturbed (Imp)
10	SCS Runoff	20.60	5	735	99,430				Ex East Disturbed (Perv)
11	Combine	20.75	5	735	100,299	9, 10			Ex East Disturbed (Total)
13	SCS Runoff	0.734	5	735	4,050				Ex East Undisturbed (Imp)
14	SCS Runoff	2.424	5	735	12,015				Ex East Undisturbed (Perv)
15	Combine	3.159	5	735	16,066	13, 14			Ex East Undisturbed (Total)
17	SCS Runoff	0.175	5	730	814				Ex CR 518 (Imp)
18	SCS Runoff	0.440	5	730	1,778				Ex CR 518 (Perv)
20	Combine	91.18	5	740	520,021	3, 7,			Ex North (Total)
21	Combine	23.91	5	735	116,364	11, 15,			Ex East (Total)
22	Combine	0.615	5	730	2,592	17, 18,			Ex CR 518 (Total)
24	Combine	114.08	5	740	639,976	20, 21, 22,			Ex Total
26	SCS Runoff	77.67	5	730	360,738				Prop Wet Pond A (Imp)
27	SCS Runoff	73.16	5	730	291,781				Prop Wet Pond A (Perv)
28	SCS Runoff	10.36	5	730	43,797				Prop Village Shopper Improvements
29	Combine	161.19	5	730	696,317	26, 27, 28			Prop Total To Wet Pond A
30	Reservoir	72.22	5	745	696,027	29	112.49	286,672	Post Route Wet Pond A
32	SCS Runoff	0.175	5	730	814				Prop North Undetained (Imp)
33	SCS Runoff	6.539	5	730	26,550				Prop North Undetained (Perv)
35	SCS Runoff	0.409	5	730	1,899				Prop East Undetained (Imp)
36	SCS Runoff	2.050	5	730	8,322				Prop East Undetained (Perv)
38	SCS Runoff	0.117	5	730	542				Prop CR 518 Undetained (Imp)
39	SCS Runoff	0.031	5	730	123				Prop CR 518 Undetained (Perv)
DEEPER BASIN FILE.gpw							Return Period: 100 Year	Tuesday, May 22, 2018	

Hydrograph Summary Report

Hydrow Hydrographs by Intellisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total surge used (cuft)	Hydrograph description
41	Combine	75.30	5	745	723,351	30, 32, 33,	-----	-----	Prop North (Total)
42	Combine	2,458	5	730	10,220	35, 36,	-----	-----	Prop East (Total)
43	Combine	0.147	5	730	665	38, 39,	-----	-----	Prop CR 518 (Total)
45	Combine	76.49	5	745	734,277	41, 42, 43,	-----	-----	Prop Total
DEEPER BASIN FILE.gpw									
Return Period: 100 Year							Tuesday, May 22, 2018		

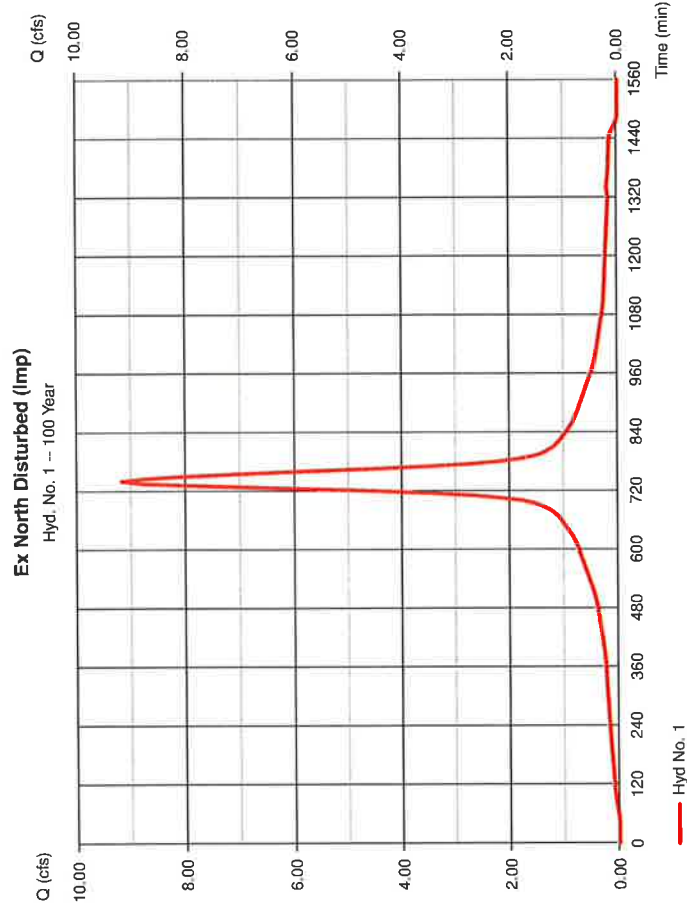
Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1

Hyd. No. 1

Ex North Disturbed (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.186 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 58,179 cuft
Drainage area	= 1.950 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 32.00 min
Total precip.	= 8.21 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

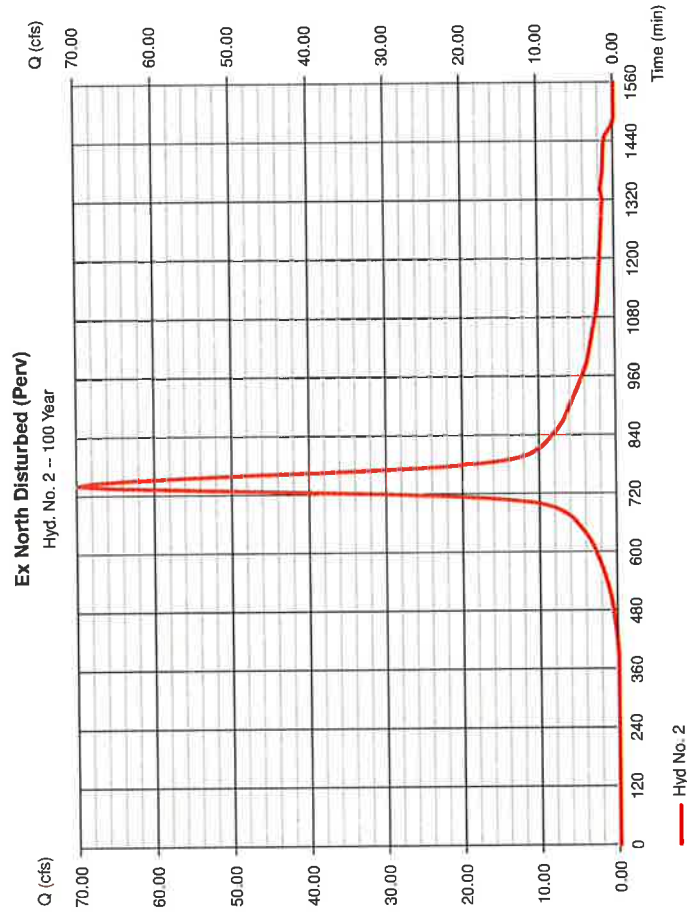
Hydralflow Hydrographs by Intelisolve v3.1
Tuesday, May 22, 2018

Hyd. No. 2

Ex North Disturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 19.080 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 69.91 cfs
Time to peak = 740 min
Hyd. volume = 390,503 cuft
Curve number = 77
Hydraulic length = 0 ft
Time of conc. (Tc) = 32.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

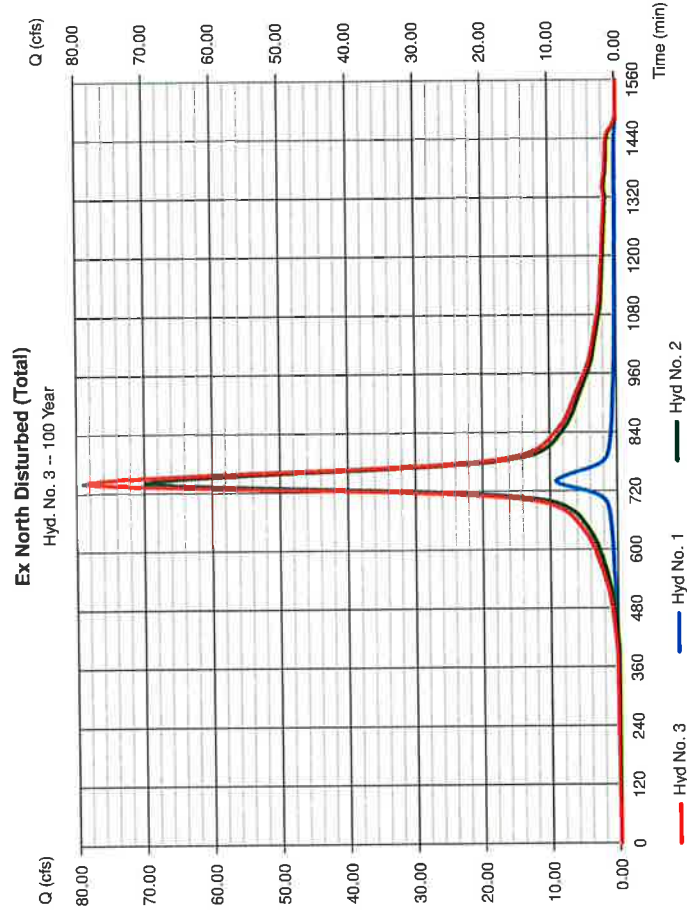
Hydralflow Hydrographs by Intelisolve v3.1
Tuesday, May 22, 2018

Hyd. No. 3

Ex North Disturbed (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 1, 2

Peak discharge = 79.10 cfs
Time to peak = 740 min
Hyd. volume = 448,682 cuft
Contrib. drain. area = 21.030 ac



Hydrograph Report

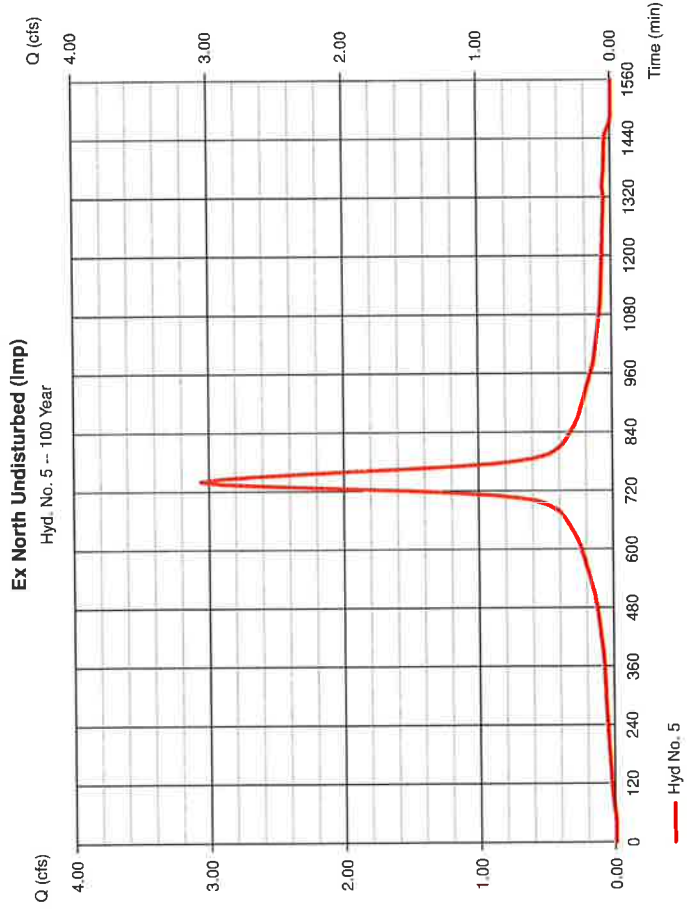
Hydroflow Hydrographs by Intellisolve v8.1

Tuesday, May 22, 2018

Hyd. No. 5

Ex North Undisturbed (Imp)

Hydrograph type	=	SCS Runoff
Storm frequency	=	100 yrs
Time interval	=	5 min
Drainage area	=	0.650 ac
Basin Slope	=	0.0 %
Tc method	=	USER
Total precip.	=	8.21 in
Storm duration	=	24 hrs
Peak discharge	=	3.062 cfs
Time to peak	=	740 min
Hyd. volume	=	19,393 cuft
Curve number	=	98
Hydraulic length	=	0 ft
Time of conc. (Tc)	=	32.00 min
Distribution	=	Type III
Shape factor	=	484



Hydrograph Report

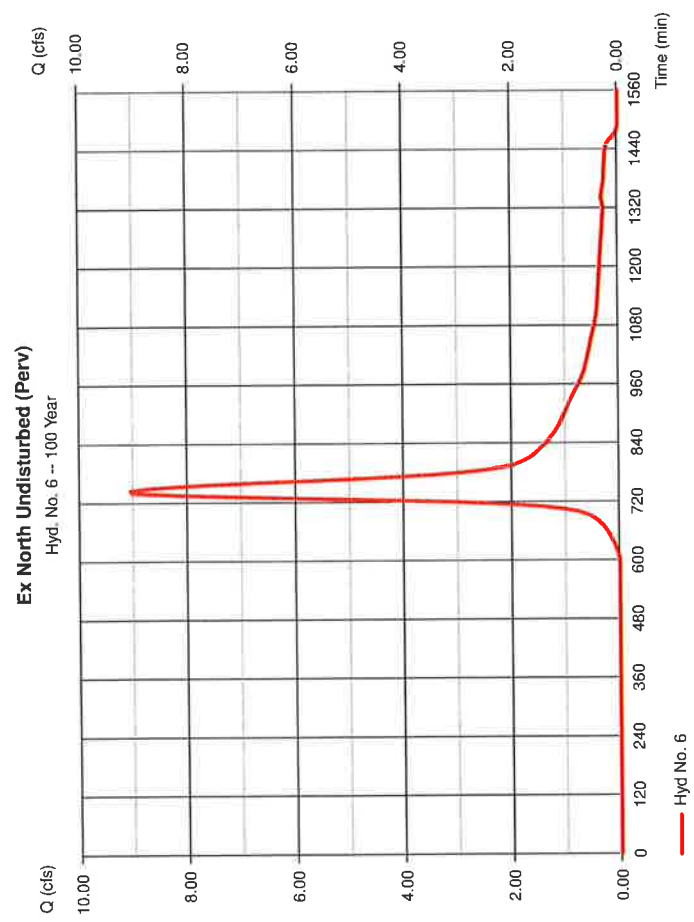
Hydroflow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

Hyd. No. 6

Ex North Undisturbed (Perv)

Hydrograph type	=	SCS Runoff
Storm frequency	=	100 yrs
Time interval	=	5 min
Drainage area	=	4.250 ac
Basin Slope	=	0.0 %
Tc method	=	USER
Total precip.	=	8.21 in
Storm duration	=	24 hrs
Peak discharge	=	9.053 cfs
Time to peak	=	745 min
Hyd. volume	=	51,946 cuft
Curve number	=	58
Hydraulic length	=	0 ft
Time of conc. (Tc)	=	32.00 min
Distribution	=	Type III
Shape factor	=	484



Hydrograph Report

Hyd. No. 7

Ex North Undisturbed (Total)

Hydrograph type = Combine

Storm frequency = 100 yrs

Time interval = 5 min

Inflow hyds. = 5, 6

Peak discharge = 12.08 cfs

Time to peak = 740 min

Hyd. volume = 71,339 cuft

Contrib. drain. area = 4,900 ac

Hydrograph Report

Hyd. No. 9

Ex East Disturbed (Imp)

Hydrograph type = SCS Runoff

Storm frequency = 100 yrs

Time interval = 5 min

Drainage area = 0.030 ac

Basin Slope = 0.0 %

Tc method = USER

Total precip. = 8.21 in

Storm duration = 24 hrs

Peak discharge = 0.157 cfs

Time to peak = 735 min

Hyd. volume = 868 cuft

Curve number = 98

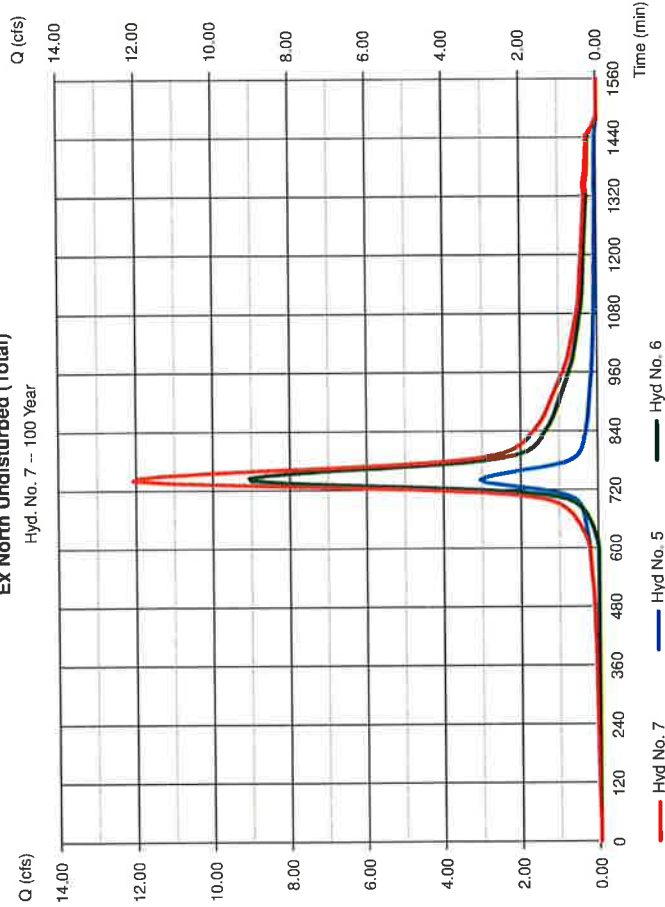
Hydraulic length = 0 ft

Time of conc. (Tc) = 23.00 min

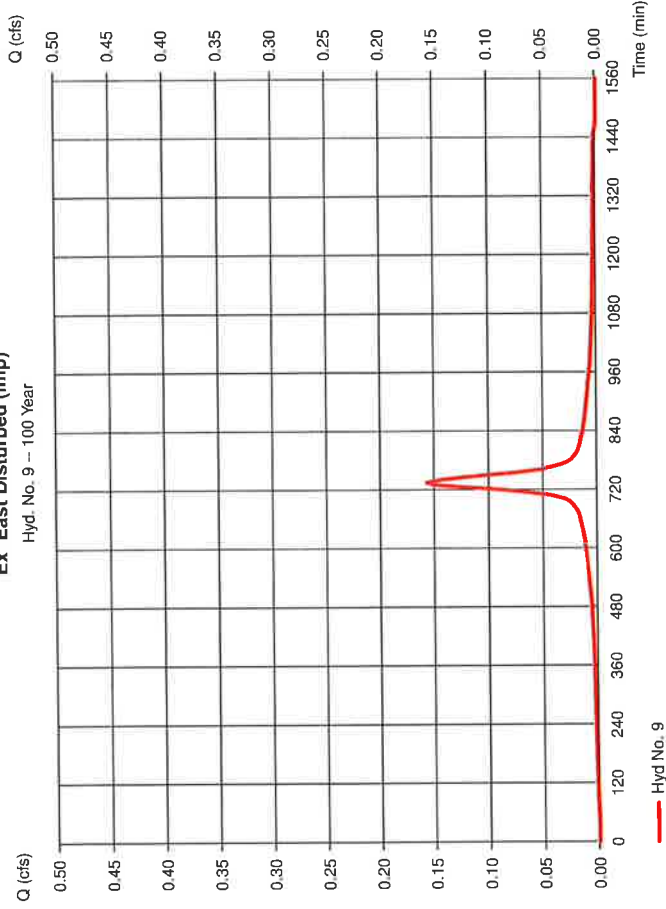
Distribution = Type III

Shape factor = 484

Ex North Undisturbed (Total)



Ex East Disturbed (Imp)



Hydrograph Report

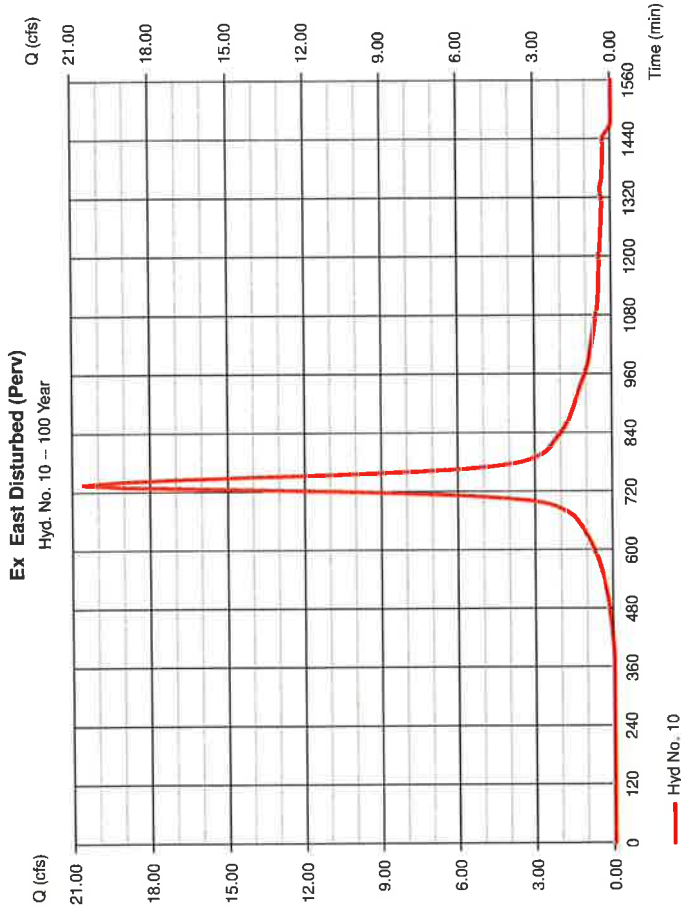
Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 10

Ex East Disturbed (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 5,010 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 20.60 cfs
Time to peak = 735 min
Hyd. volume = 99,430 cuft
Curve number = 77
Hydraulic length = 0 ft
Time of conc. (Tc) = 23.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

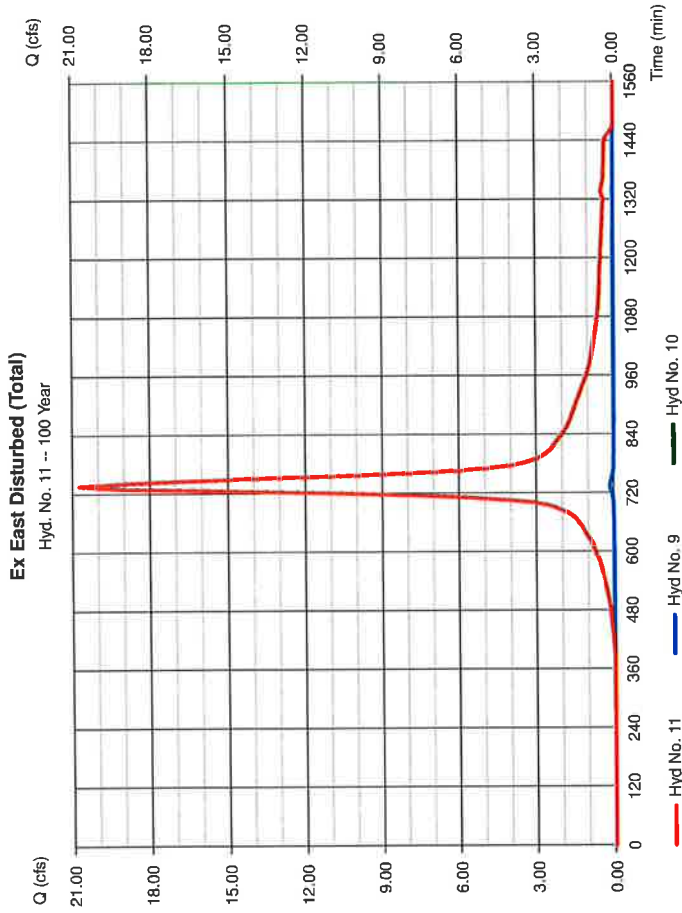
Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 11

Ex East Disturbed (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 9, 10

Peak discharge = 20.75 cfs
Time to peak = 735 min
Hyd. volume = 100,299 cuft
Contrib. drain. area = 5.040 ac



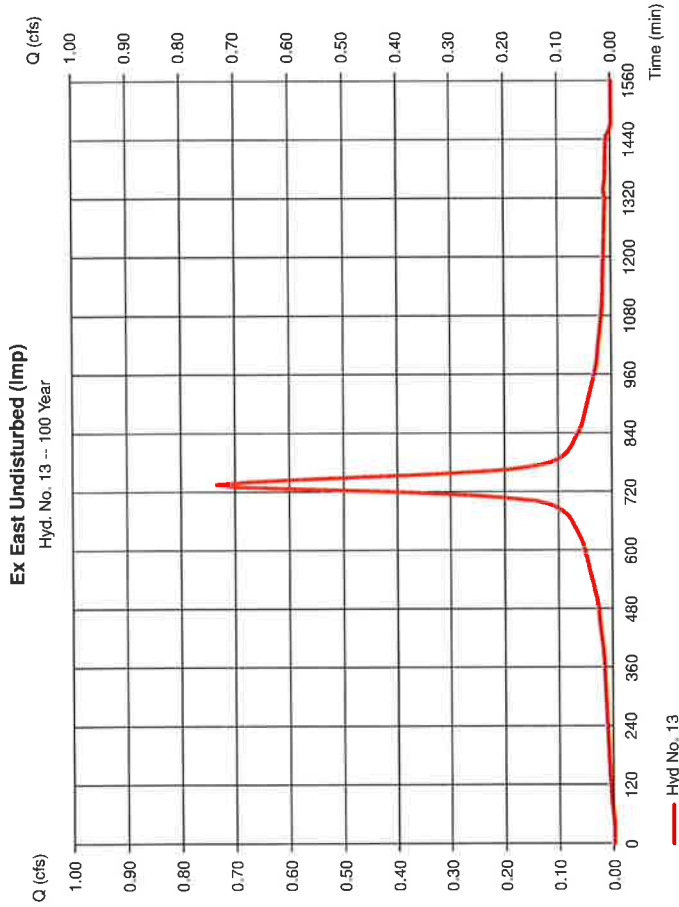
Hydrograph Report

Hydratlow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 13

Ex East Undisturbed (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.734 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	5 min	Hyd. volume	=	4,050 cuft
Drainage area	=	0.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.00 min
Total precip.	=	8.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

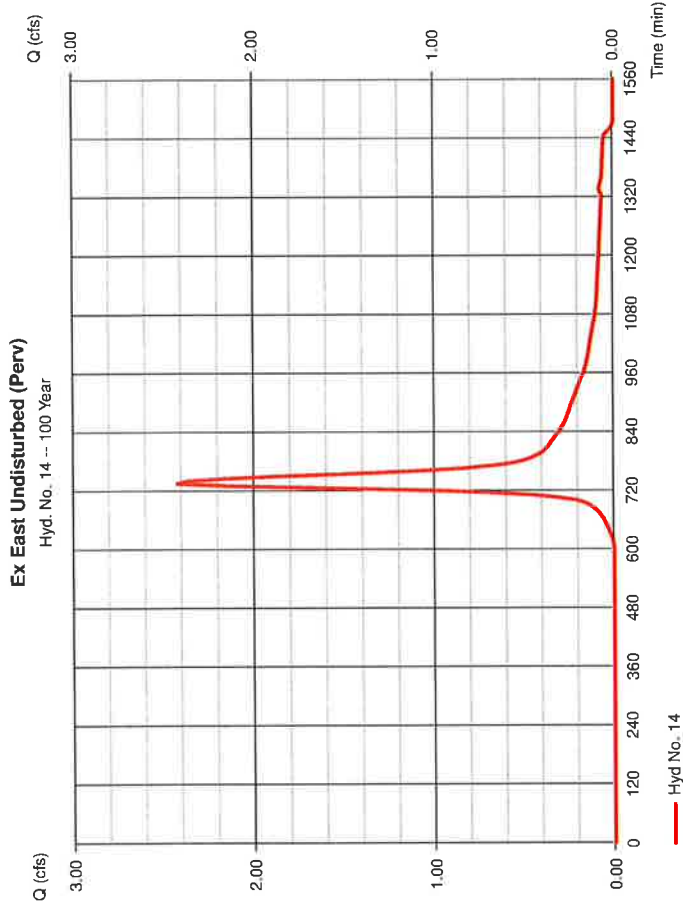
Hydratlow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

Hyd. No. 14

Ex East Undisturbed (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.424 cfs
Storm frequency	=	100 yrs	Time to peak	=	735 min
Time interval	=	5 min	Hyd. volume	=	12,015 cuft
Drainage area	=	1.050 ac	Curve number	=	57
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	23.00 min
Total precip.	=	8.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 15

Ex East Undisturbed (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 13, 14

Peak discharge = 3.159 cfs
Time to peak = 735 min
Hyd. volume = 16,066 cuft
Contrib. drain. area = 1.190 ac

Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

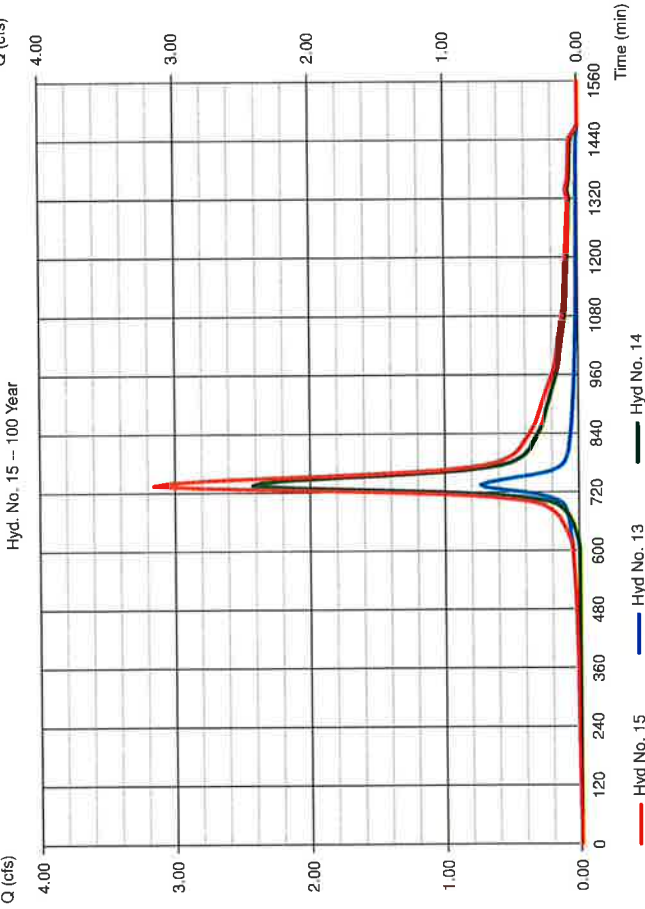
Hyd. No. 17

Ex CR 518 (Imp)

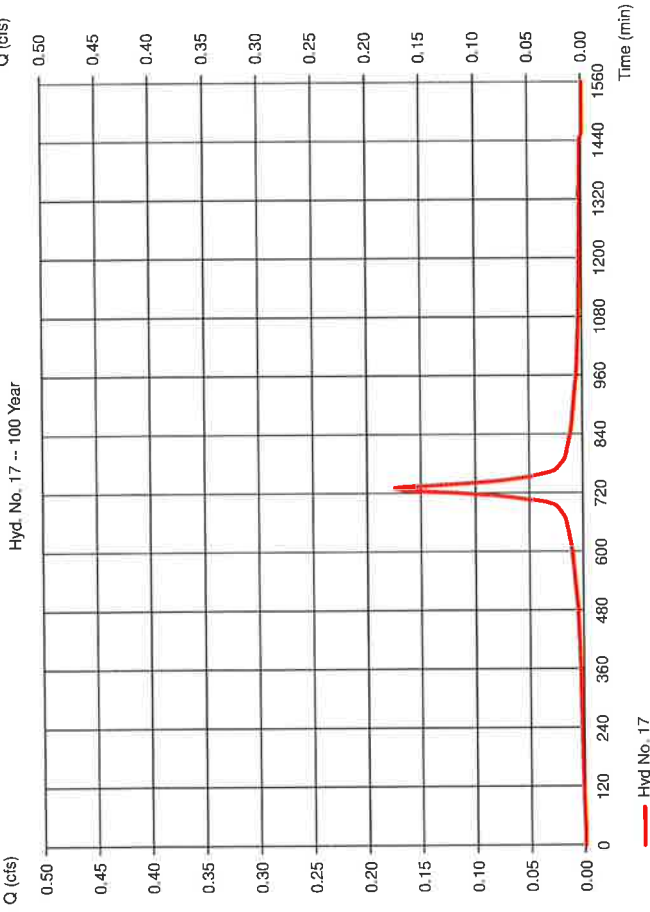
Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 0.030 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 0.175 cfs
Time to peak = 730 min
Hyd. volume = 814 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Ex East Undisturbed (Total)



Ex CR 518 (Imp)



Hydrograph Report

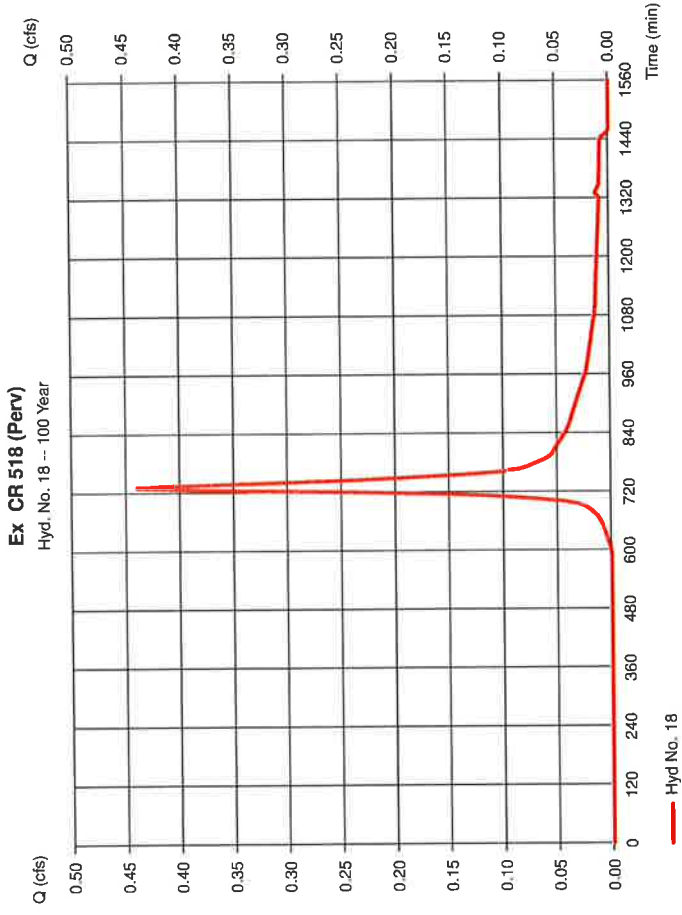
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 18

Ex CR 518 (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 0.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 0.440 cfs
Time to peak = 730 min
Hyd. volume = 1,778 cuft
Curve number = 58
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

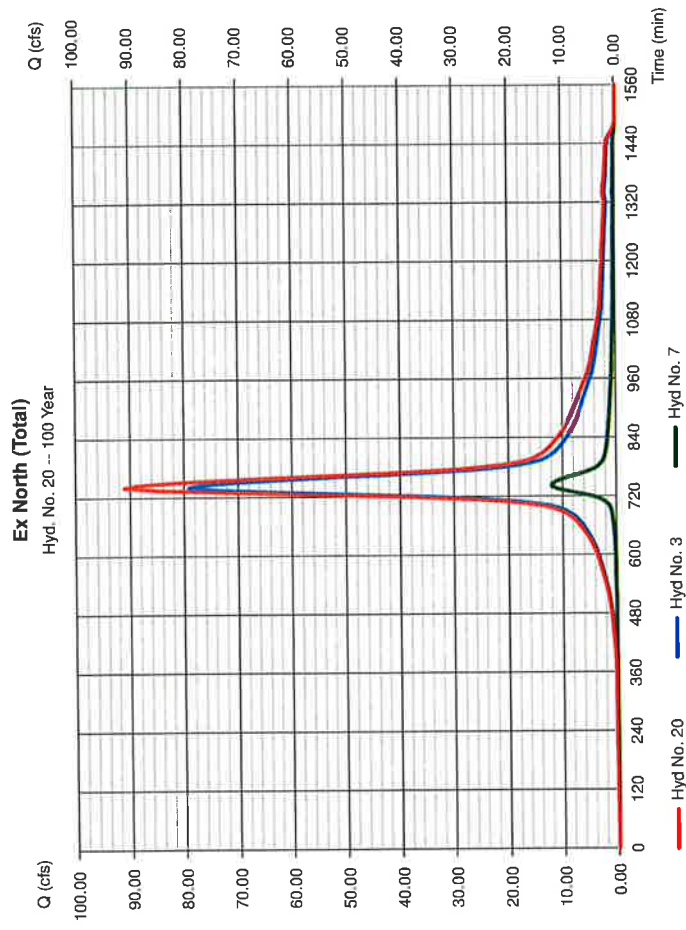
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 20

Ex North (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 3, 7

Peak discharge = 91.18 cfs
Time to peak = 740 min
Hyd. volume = 520.021 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Report

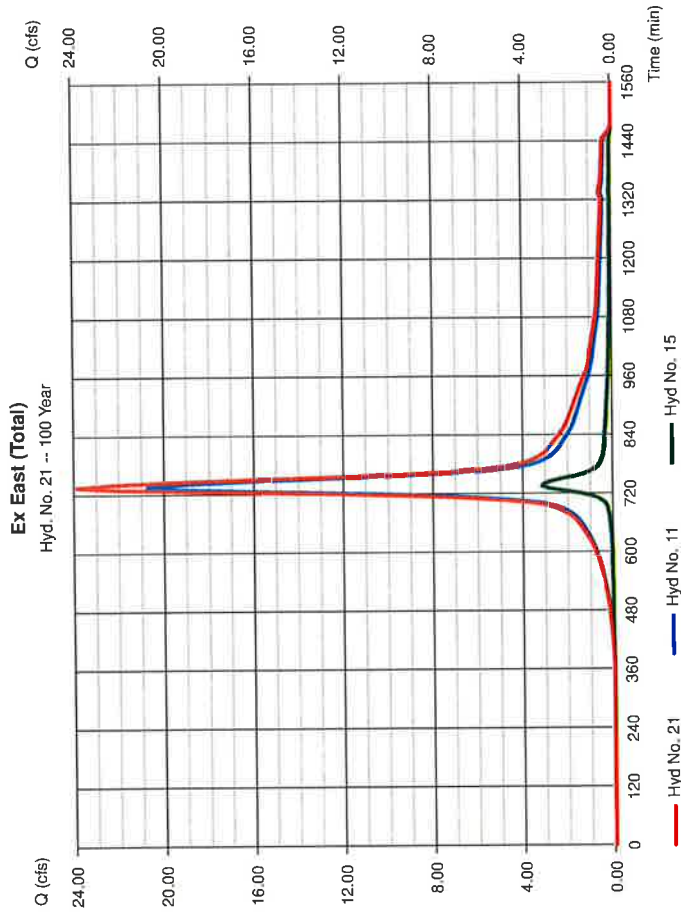
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 21

Ex East (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 11, 15

Peak discharge = 23.91 cfs
Time to peak = 735 min
Hyd. volume = 116,364 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Report

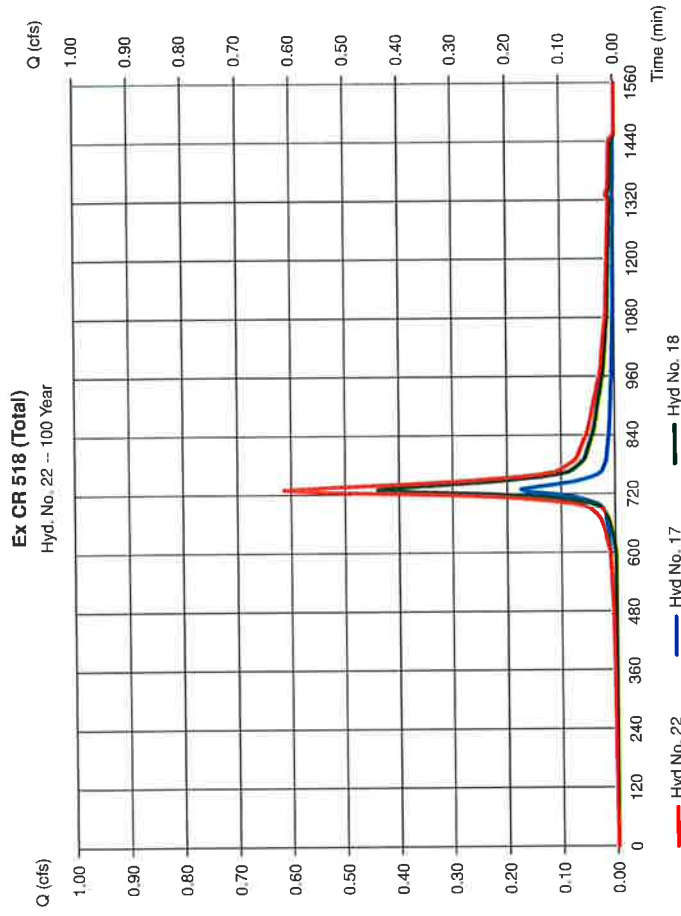
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 22

Ex CR 518 (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 17, 18

Peak discharge = 0.615 cfs
Time to peak = 730 min
Hyd. volume = 2,592 cuft
Contrib. drain. area = 0.190 ac



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 24

Ex Total

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 20, 21, 22

Peak discharge = 114.08 cfs
Time to peak = 740 min
Hyd. volume = 638,976 cuft
Contrib. drain. area = 0.000 ac

Hydrograph Report

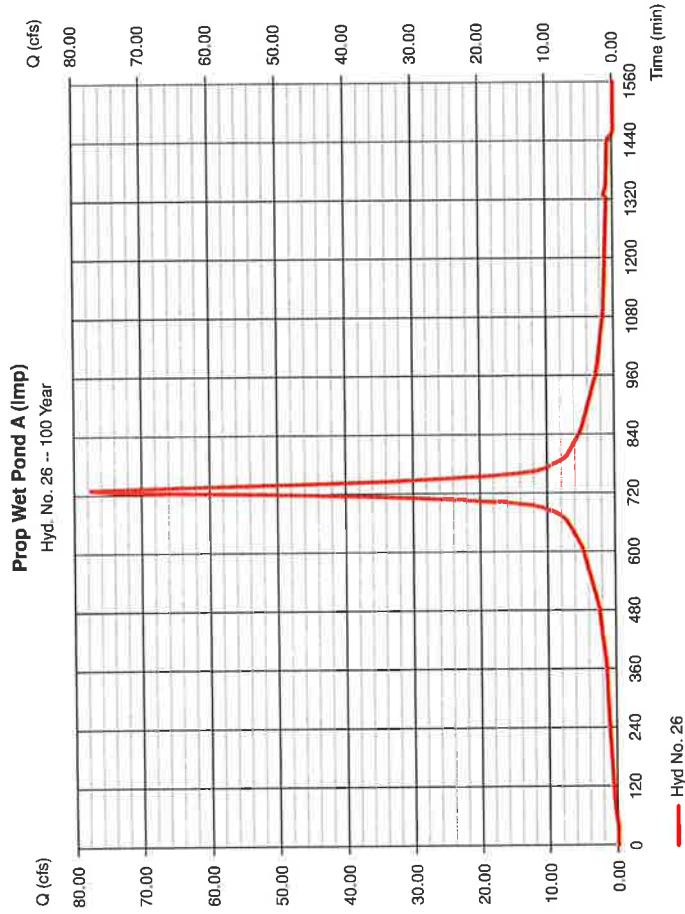
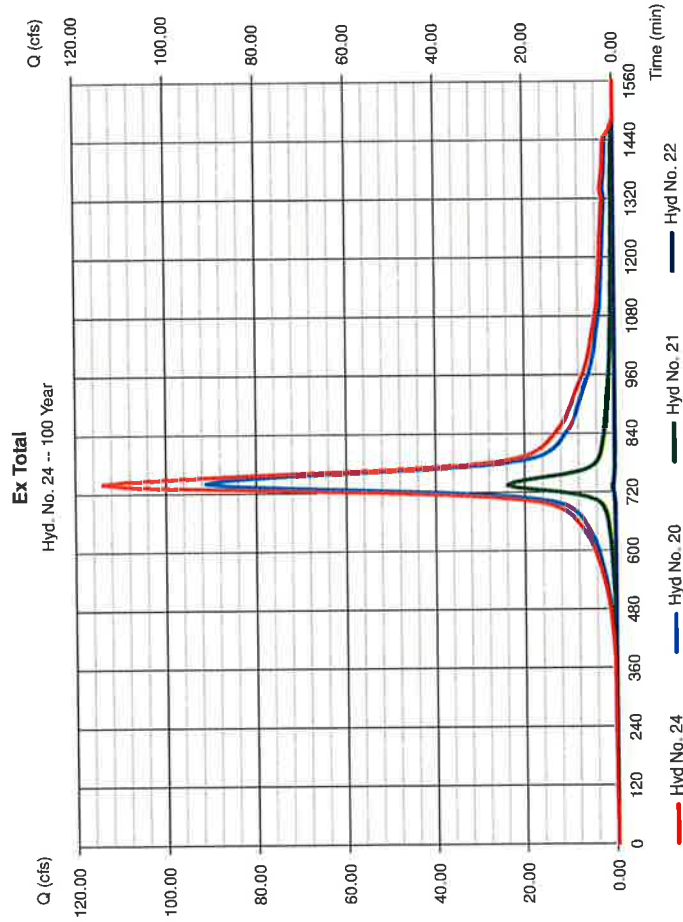
Hydralow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 26

Prop Wet Pond A (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 13.300 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 77.67 cfs
Time to peak = 730 min
Hyd. volume = 360,738 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

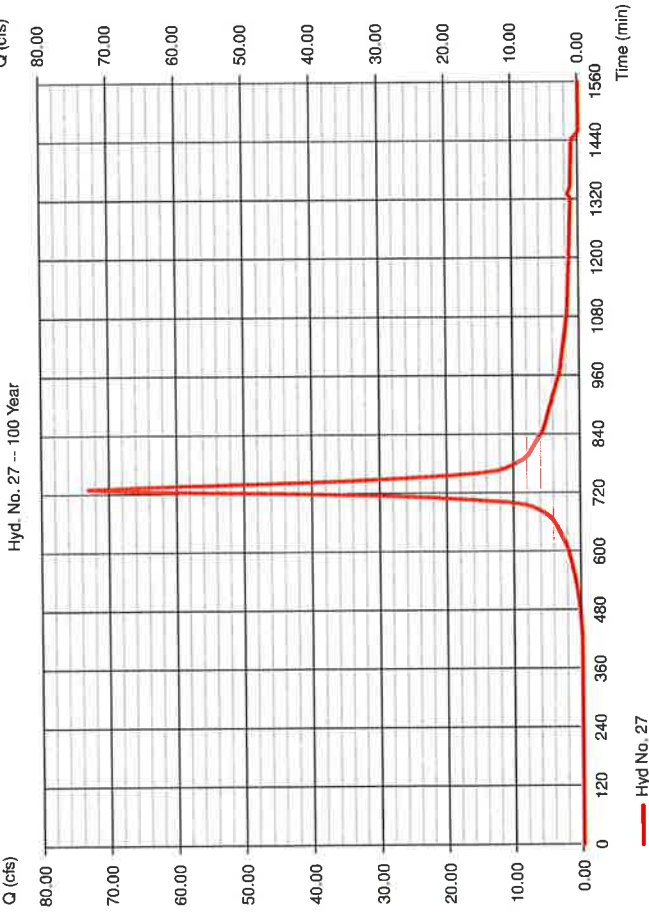
Hyd. No. 27

Prop Wet Pond A (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 17.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 73.16 cfs
Time to peak = 730 min
Hyd. volume = 291,781 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Wet Pond A (Perv)



Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

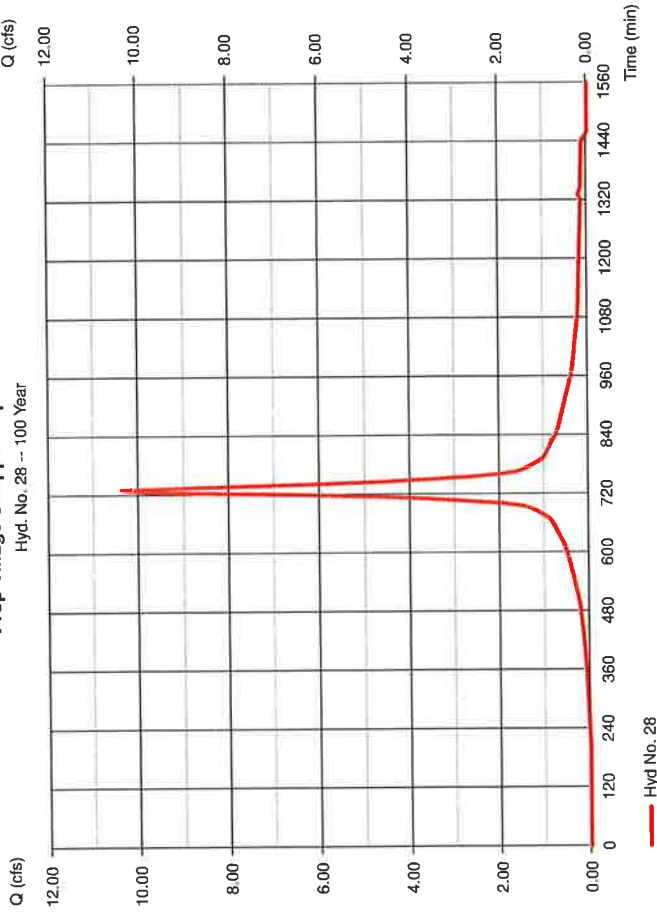
Hyd. No. 28

Prop Village Shopper Improvements

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 1.900 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 8.21 in
Storm duration = 24 hrs

Peak discharge = 10.36 cfs
Time to peak = 730 min
Hyd. volume = 43,797 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Village Shopper Improvements



Hydrograph Report

Hydralow Hydrographs by Intelliscave v8.1 Tuesday, May 22, 2018

Hyd. No. 29

Prop Total To Wet Pond A

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 26, 27, 28

Peak discharge = 161.19 cfs
Time to peak = 730 min
Hyd. volume = 696,317 cuft
Contrib. drain. area = 32.360 ac

Hydrograph Report

Hydralow Hydrographs by Intelliscave v9.1 Tuesday, May 22, 2018

Hyd. No. 30

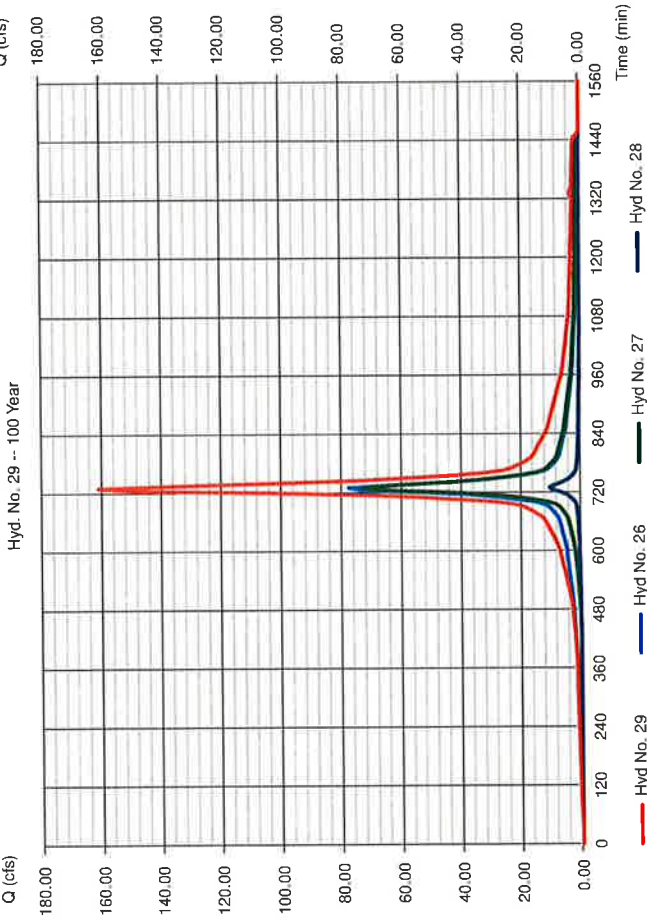
Post Route Wet Pond A

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyd. No. = 29 - Prop Total To Wet Pond A
Reservoir name = Wet Pond A

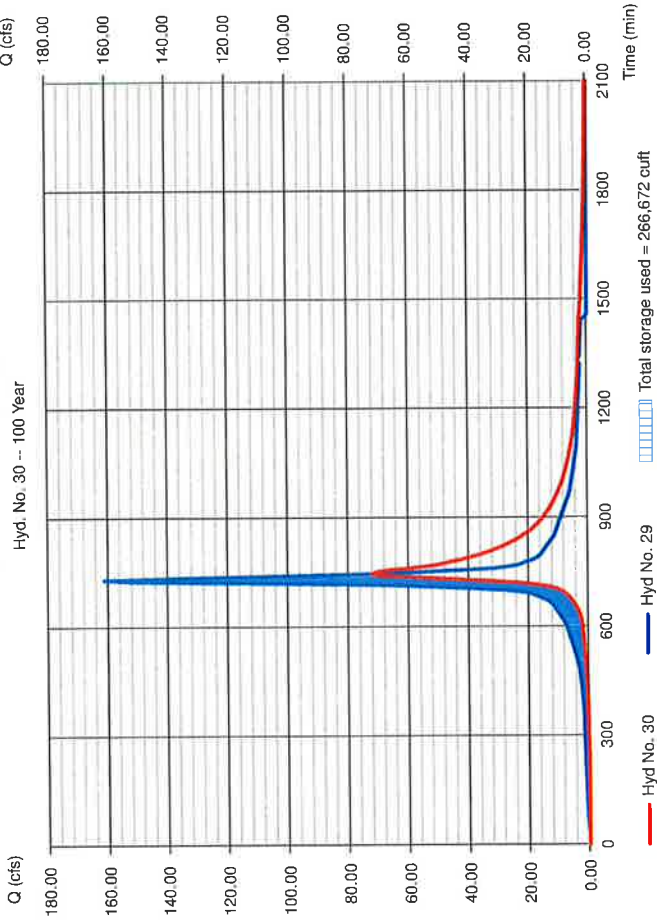
Peak discharge = 72.22 cfs
Time to peak = 745 min
Hyd. volume = 696,027 cuft
Max. Elevation = 112.49 ft
Max. Storage = 266,672 cuft

Storage Indication method used.

Prop Total To Wet Pond A



Post Route Wet Pond A



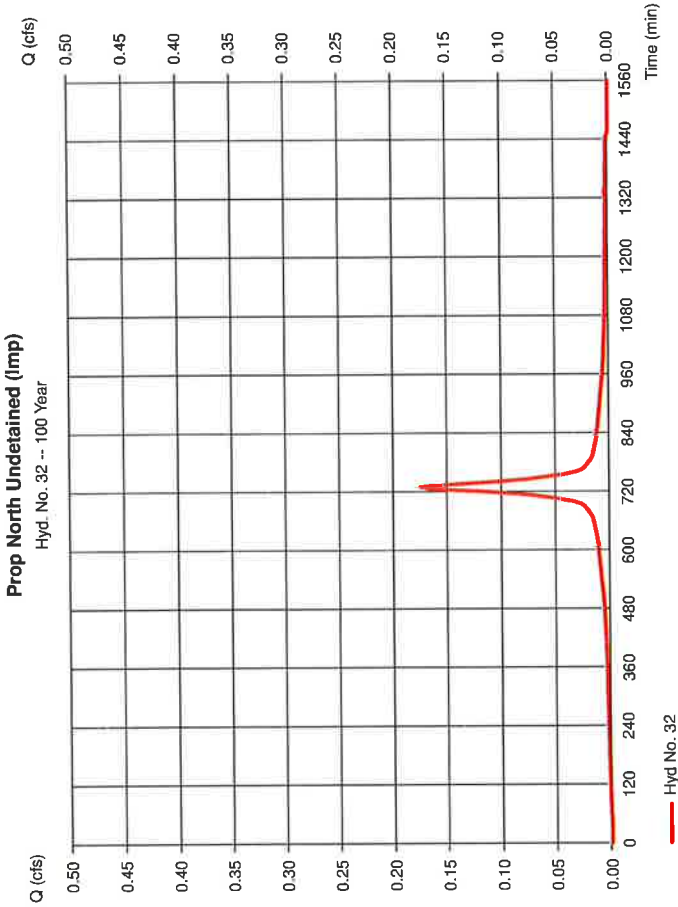
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 32

Prop North Undetained (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.175 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	814 cuft
Drainage area	=	0.030 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



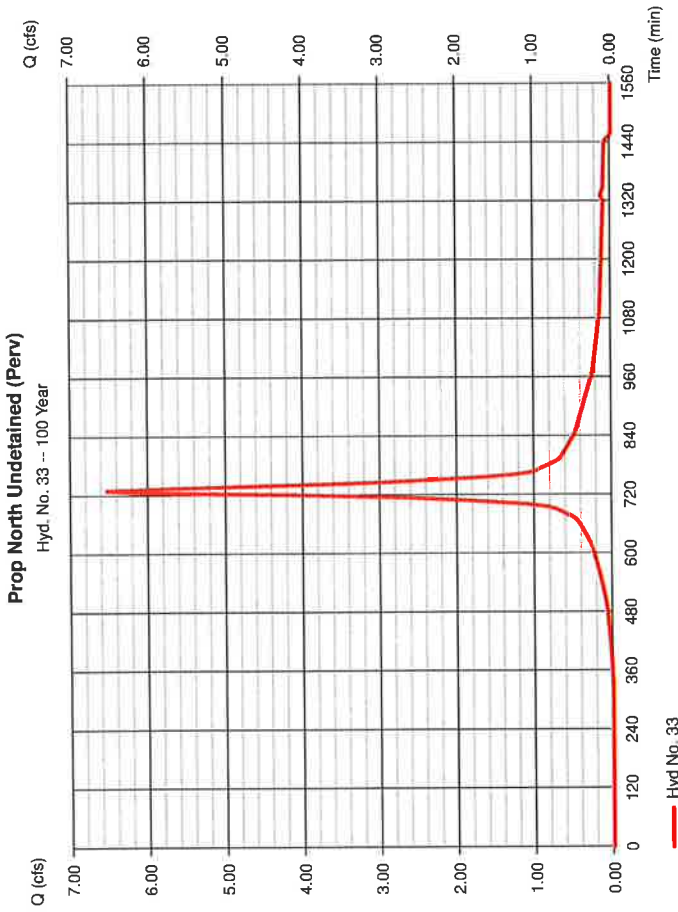
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 33

Prop North Undetained (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.539 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	26.550 cuft
Drainage area	=	1.340 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



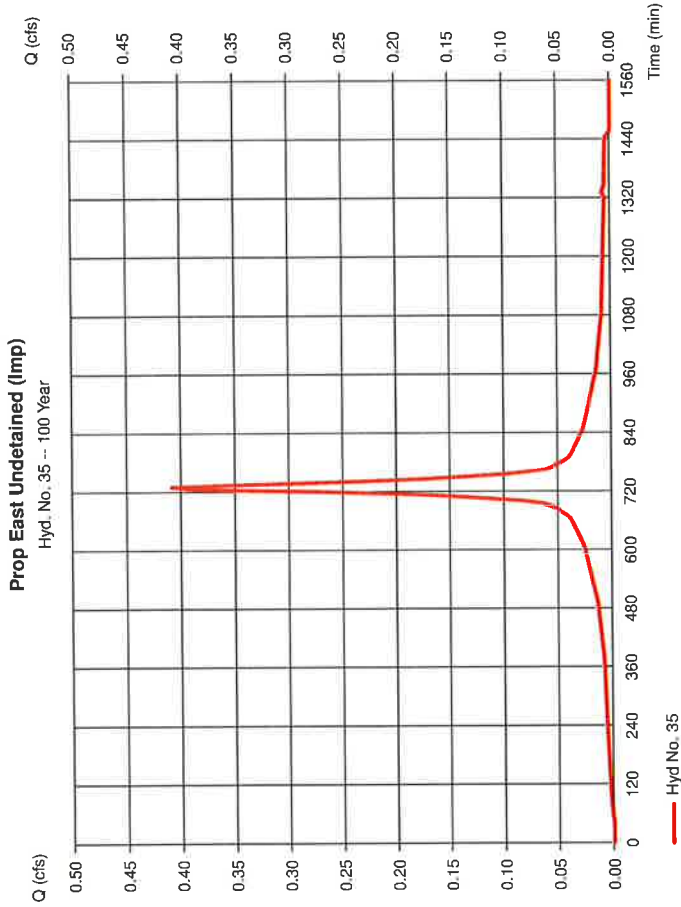
Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 35

Prop East Undetained (Imp)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.409 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	1,899 cuft
Drainage area	=	0.070 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



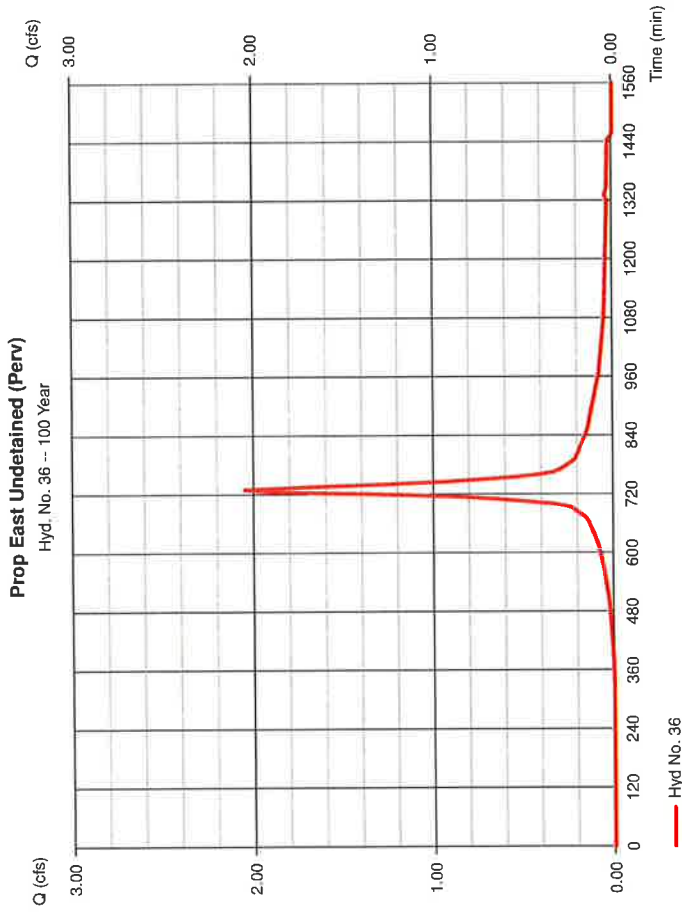
Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 36

Prop East Undetained (Perv)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.050 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	8,322 cuft
Drainage area	=	0.420 ac	Curve number	=	80
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.21 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



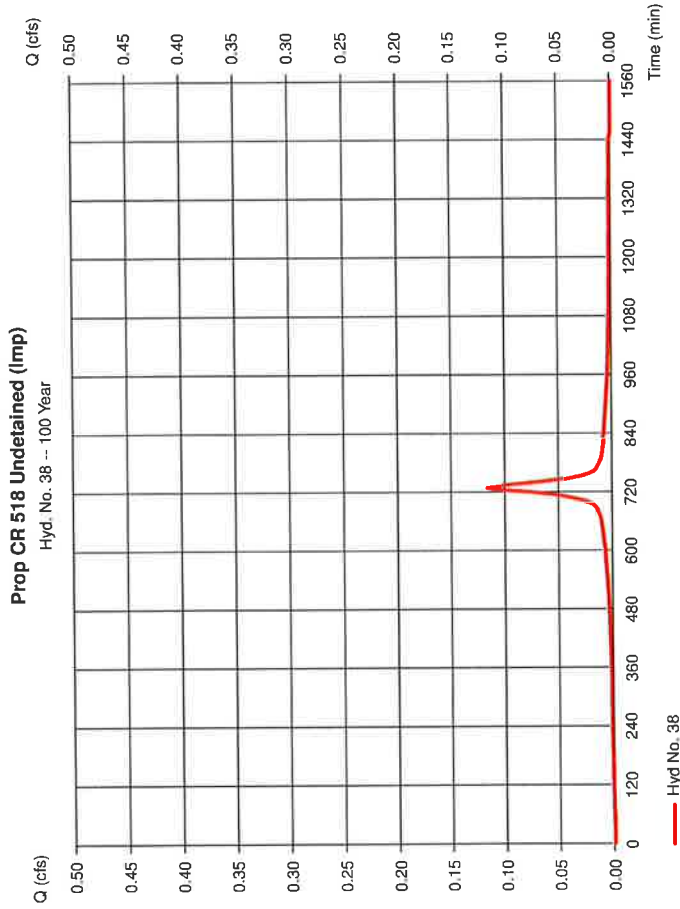
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 38

Prop CR 518 Undetained (Imp)

Hydrograph type	=	SCS Runoff	
Storm frequency	=	100 yrs	
Time interval	=	5 min	
Drainage area	=	0.020 ac	
Basin Slope	=	0.0 %	
Tc method	=	USER	
Total precip.	=	8.21 in	
Storm duration	=	24 hrs	
Peak discharge	=	0.117 cfs	
Time to peak	=	730 min	
Hyd. volume	=	542 cuft	
Curve number	=	98	
Hydraulic length	=	0 ft	
Time of conc. (Tc)	=	10.00 min	
Distribution	=	Type III	
Shape factor	=	484	



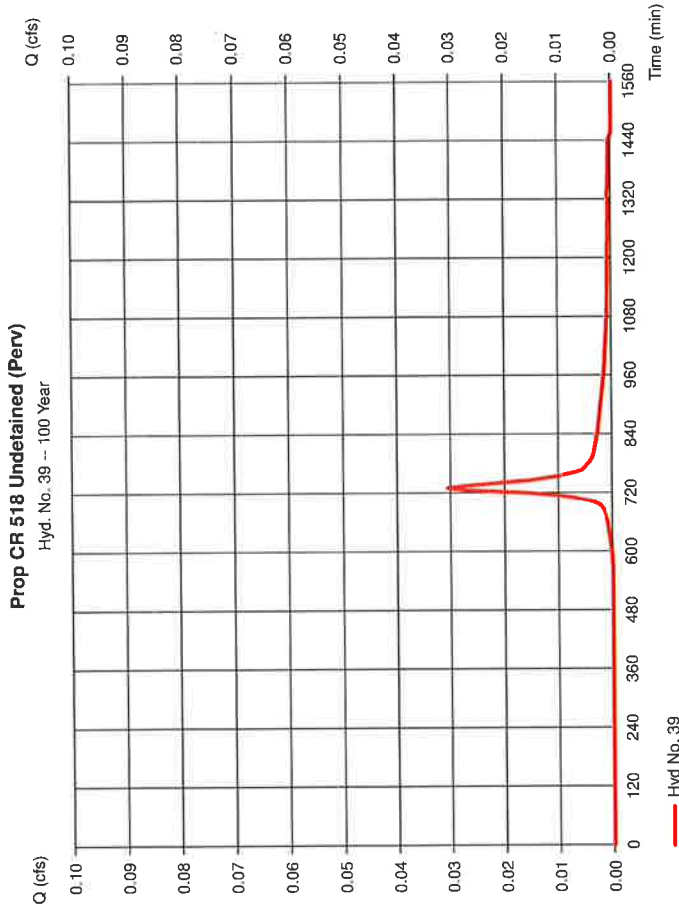
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 39

Prop CR 518 Undetained (Perv)

Hydrograph type	=	SCS Runoff	
Storm frequency	=	100 yrs	
Time interval	=	5 min	
Drainage area	=	0.010 ac	
Basin Slope	=	0.0 %	
Tc method	=	USER	
Total precip.	=	8.21 in	
Storm duration	=	24 hrs	
Peak discharge	=	0.031 cfs	
Time to peak	=	730 min	
Hyd. volume	=	123 cuft	
Curve number	=	61	
Hydraulic length	=	0 ft	
Time of conc. (Tc)	=	10.00 min	
Distribution	=	Type III	
Shape factor	=	484	



Hydrograph Report

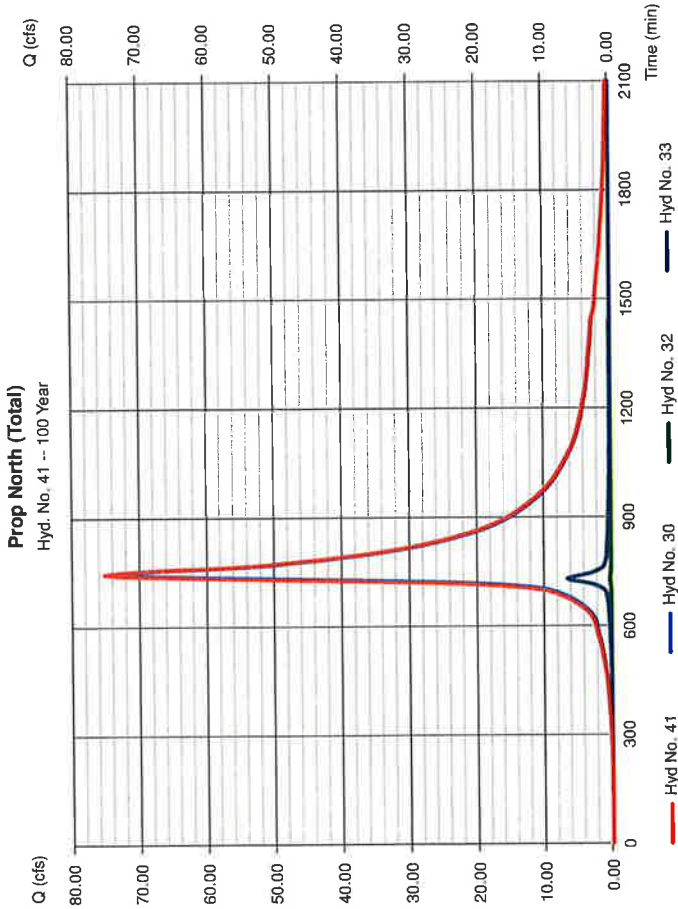
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 41

Prop North (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 30, 32, 33

Peak discharge = 75.30 cfs
Time to peak = 745 min
Hyd. volume = 723,391 cuft
Contrib. drain. area = 1,370 ac



Hydrograph Report

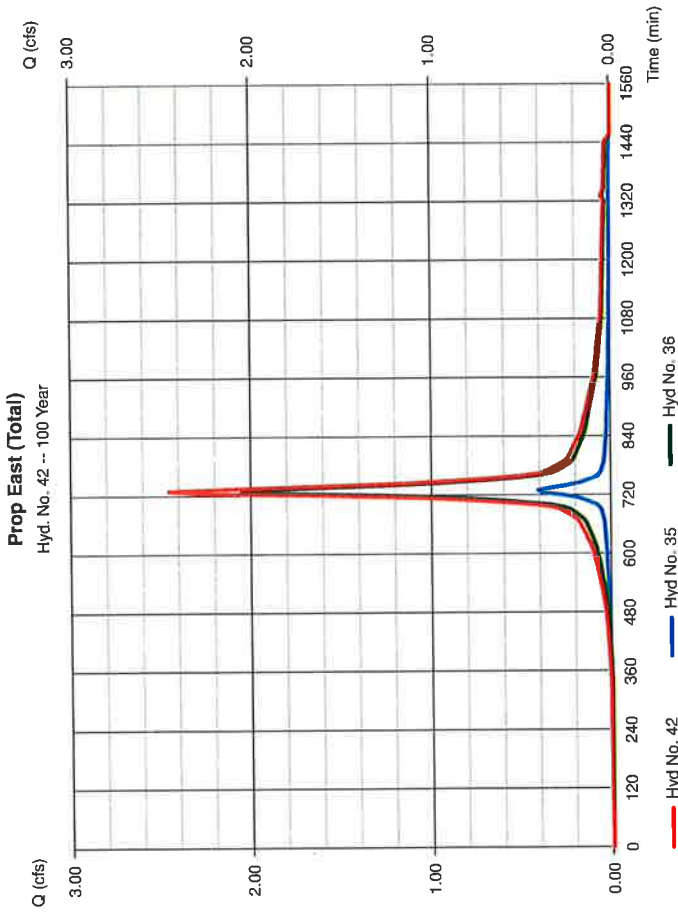
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 42

Prop East (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 35, 36

Peak discharge = 2,458 cfs
Time to peak = 730 min
Hyd. volume = 10,220 cuft
Contrib. drain. area = 0,490 ac



Hydrograph Report

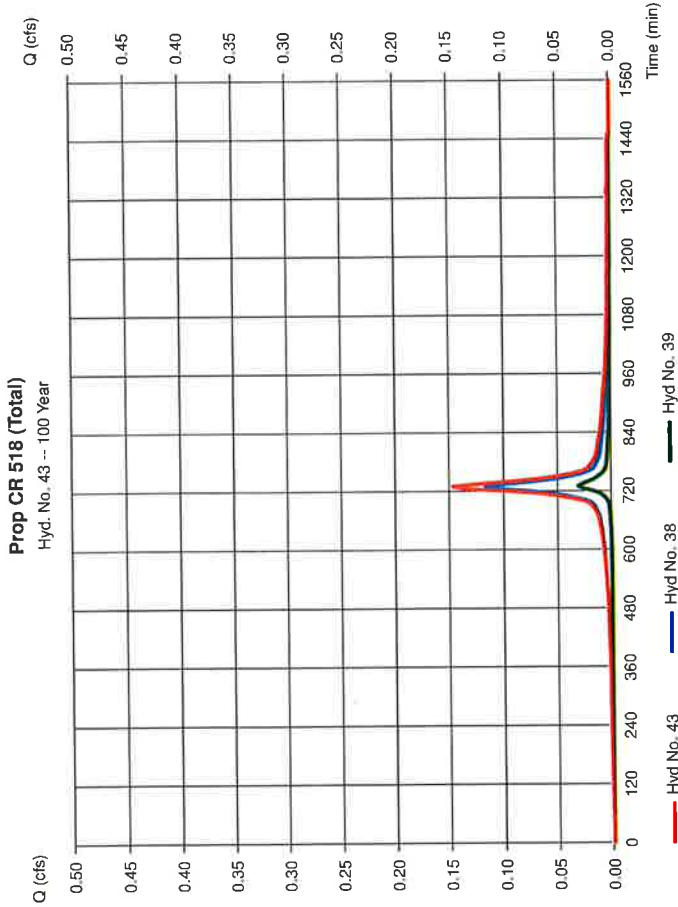
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 43

Prop CR 518 (Total)

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 38, 39

Peak discharge = 0.147 cfs
Time to peak = 730 min
Hyd. volume = 665 cuft
Contrib. drain. area = 0.030 ac



Hydrograph Report

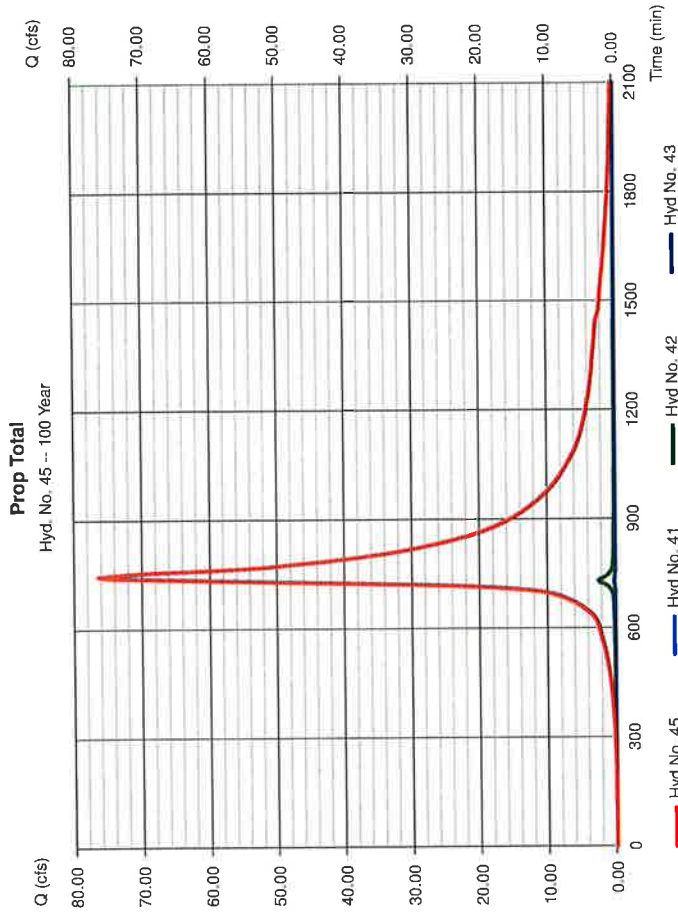
Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 45

Prop Total

Hydrograph type = Combine
Storm frequency = 100 yrs
Time interval = 5 min
Inflow hyds. = 41, 42, 43

Peak discharge = 76.49 cfs
Time to peak = 745 min
Hyd. volume = 734,277 cuft
Contrib. drain. area = 0.000 ac



Hydraflow Rainfall Report

Hydraflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)				
	B	D	E	(N/A)	
1	39.0824	9.5000	0.8528	-----	
2	45.6943	10.7000	0.8185	-----	
3	0.0000	0.0000	0.0000	-----	
5	98.7061	14.8000	0.9304	-----	
10	249.7597	21.8001	1.0961	-----	
25	115.7547	14.9000	0.8980	-----	
50	7.3699	0.1000	0.2544	-----	
100	403.8513	25.1001	1.1108	-----	

File name: TRENTON.lbf

$$\text{Intensity} = B / (Tc + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)										
	5 min	10	15	20	25	30	35	40	45	50	60
1	4.00	3.10	2.55	2.18	1.91	1.70	1.54	1.40	1.29	1.20	1.05
2	4.80	3.83	3.21	2.77	2.45	2.20	2.00	1.84	1.70	1.59	1.40
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.80
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.00
25	7.89	6.45	5.47	4.76	4.23	3.80	3.46	3.17	2.93	2.73	2.40
50	4.87	4.09	3.69	3.44	3.25	3.10	2.98	2.88	2.80	2.72	2.66
100	9.20	7.76	6.69	5.87	5.22	4.70	4.27	3.91	3.60	3.33	2.90

To = time in minutes. Values may exceed 60.

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.34	0.00	4.25	5.01	6.15	7.13	8.21
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Precip. file name: Somerset County NRCS.pcp

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DEEPER BASIN FILE.gpw

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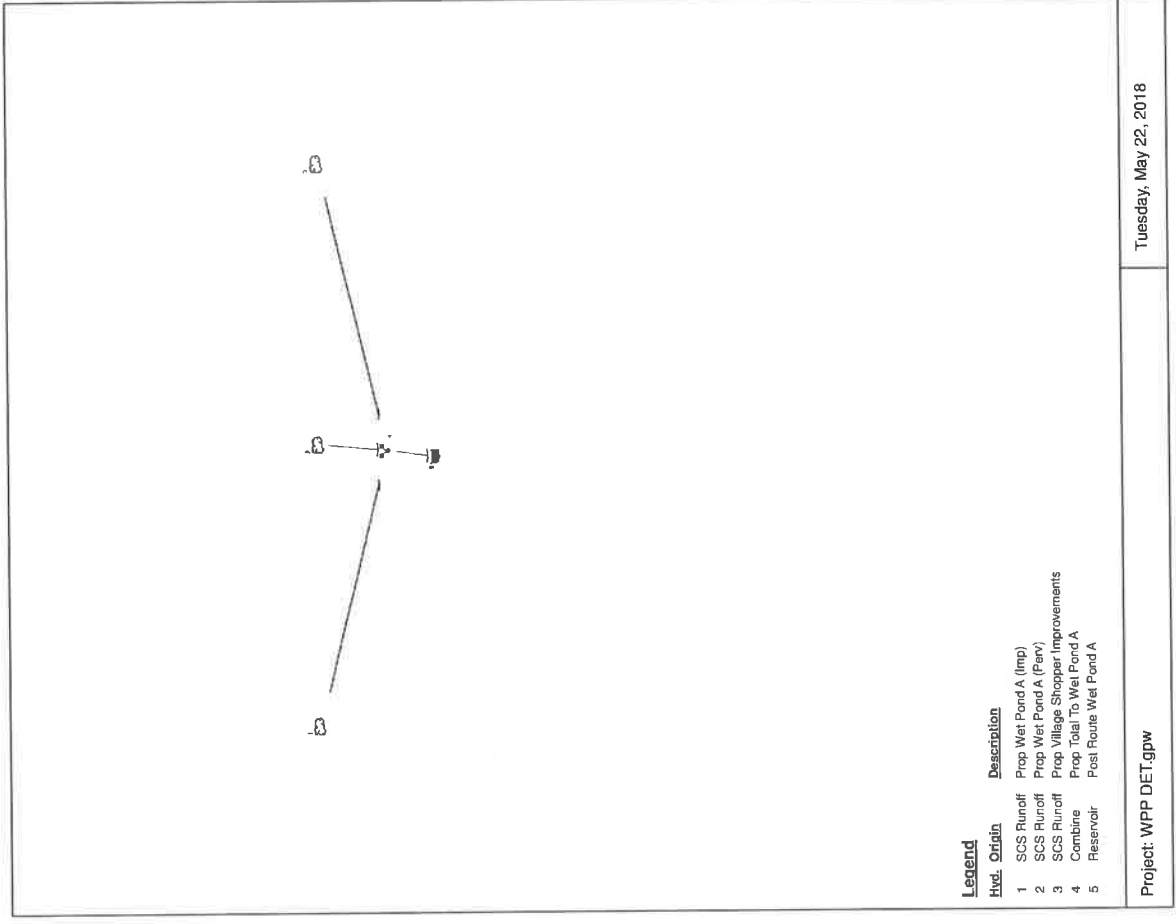
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IDF Report 111

**HYDROGRAPH SUMMARY REPORTS: WATER
QUALITY STORM (DETENTION TIME)**

[illegible]

Hydrograph Summary Report

Hydratflow Hydrographs by Intellisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	29.48	5	70	46,808	1	109.32	46,881	Prop Wet Pond A (Imp)
2	SCS Runoff	1.408	5	80	3,398	1	109.32	46,881	Prop Wet Pond A (Per)
3	SCS Runoff	1.680	5	70	2,637	1	109.32	46,881	Prop Village Stopper Improvements
4	Combine	31.74	5	70	52,844	1, 2, 3	109.32	46,881	Prop Total To Wet Pond A
5	Reservoir	1.904	5	120	52,608	4	109.32	46,881	Post Route Wet Pond A
WPP DET.gpw									Return Period: 1 Year
									Tuesday, May 22, 2018

Hydrograph Report

Hydratflow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018	
Hyd. No. 1	
Prop Wet Pond A (Imp)	
Hydrograph type	= SCS Runoff
Storm frequency	= 1 yrs
Time interval	= 5 min
Drainage area	= 13.300 ac
Basin Slope	= 0.0 %
Tc method	= USER
Total precip.	= 1.25 in
Storm duration	= Water Quality Storm.cds
Peak discharge	= 29.48 cfs
Time to peak	= 1.17 hrs
Hyd. volume	= 46,808 cuft
Curve number	= 98
Hydraulic length	= 0 ft
Time of conc. (Tc)	= 10.0 min
Distribution	= Custom
Shape factor	= 484

[Prints values >= 1.00% of Qp]

Hydrograph Discharge Table

Time -- Outflow

(hrs cfs)

0.50	0.526
0.58	1.225
0.67	2.004
0.75	2.554
0.83	3.636
0.92	6.226
1.00	14.27
1.08	26.23
1.17	29.48 <<
1.25	22.55
1.33	13.39
1.42	7.182
1.50	5.378
1.58	4.637
1.67	4.151
1.75	3.841
1.83	3.197
1.92	2.217
2.00	1.560
2.08	0.982
2.17	0.490

...End

Precipitation Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 1

Prop Wet Pond A (Imp)
Storm Frequency = 1 yrs
Total precip. = 1.2500 in
Storm duration = Water Quality Storm.cds
Time interval = 5 min
Distribution = Custom

Rainfall Distribution Table

Time -- Precip. (hrs in)	
0.00	0.0000
0.08	0.0083
0.17	0.0084
0.25	0.0084
0.33	0.0250
0.42	0.0250
0.50	0.0250
0.58	0.0375
0.67	0.0288
0.75	0.0337
0.83	0.0583
0.92	0.1000
1.00	0.2668
1.08	0.2668
1.17	0.1000
1.25	0.0582
1.33	0.0340
1.42	0.0330
1.50	0.0330
1.58	0.0250
1.67	0.0250
1.75	0.0250
1.83	0.0084
1.92	0.0084
2.00	0.0082
2.08	0.0000

...End

Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 2

Prop Wet Pond A (Perv)
Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Time interval = 5 min
Drainage area = 17.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 1.25 in
Storm duration = Water Quality Storm.cds
Peak discharge = 1.408 cfs
Time to peak = 1.33 hrs
Hyd. volume = 3,398 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.0 min
Distribution = Custom
Shape factor = 484

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	
1.08	0.091
1.17	0.574
1.25	1.214
1.33	1.408 <<
1.42	1.305
1.50	1.153
1.58	1.089
1.67	1.037
1.75	1.015
1.83	0.879
1.92	0.626
2.00	0.453
2.08	0.290
2.17	0.145
2.25	0.048

...End

Precipitation Report

Hydrow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 2

Prop Wet Pond A (Perv)
Storm Frequency = 1 yrs
Storm duration = 1.2500 in
Storm distribution = Water Quality Storm.cds
Time interval = 5 min
Distribution = Custom

Rainfall Distribution Table

Time -- Precip. (hrs in)	
0.00	0.0000
0.08	0.0083
0.17	0.0084
0.25	0.0084
0.33	0.0250
0.42	0.0250
0.50	0.0250
0.58	0.0375
0.67	0.0288
0.75	0.0337
0.83	0.0583
0.92	0.1000
1.00	0.2668
1.08	0.2668
1.17	0.1000
1.25	0.0582
1.33	0.0340
1.42	0.0330
1.50	0.0330
1.58	0.0250
1.67	0.0250
1.75	0.0250
1.83	0.0084
1.92	0.0084
2.00	0.0082
2.08	0.0000
...End	

Hydrograph Report

Hydrow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 3

Prop Village Shopper Improvements
Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Time interval = 5 min
Drainage area = 1.900 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 1.25 in
Storm duration = Water Quality Storm.cds
Peak discharge = 1.680 cfs
Time to peak = 1.17 hrs
Hyd. volume = 2.637 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.0 min
Distribution = Custom
Shape factor = 484

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)	
0.92	0.021
1.00	0.332
1.08	1.129
1.17	1.680 <<
1.25	1.509
1.33	1.044
1.42	0.616
1.50	0.478
1.58	0.421
1.67	0.382
1.75	0.359
1.83	0.301
1.92	0.210
2.00	0.149
2.08	0.094
2.17	0.047
...End	

(Printed values >= 1.00% of Cdp.)

Precipitation Report

Hyd. No. 3		
Prop Village Shopper Improvements		
Storm Frequency	= 1 yrs	Time interval
Total precip.	= 1.2500 in	Distribution
Storm duration	= Water Quality Storm.cds	
		= 5 min
		= Custom

Rainfall Distribution Table

Time -- Precip. (hrs in)	Time -- Precip. (hrs in)
0.00 0.0000	0.00 0.0000
0.08 0.0083	0.08 0.0083
0.17 0.0084	0.17 0.0084
0.25 0.0084	0.25 0.0084
0.33 0.0250	0.33 0.0250
0.42 0.0250	0.42 0.0250
0.50 0.0250	0.50 0.0250
0.58 0.0375	0.58 0.0375
0.67 0.0288	0.67 0.0288
0.75 0.0337	0.75 0.0337
0.83 0.0583	0.83 0.0583
0.92 0.1000	0.92 0.1000
1.00 0.2668	1.00 0.2668
1.08 0.2668	1.08 0.2668
1.17 0.1000	1.17 0.1000
1.25 0.0582	1.25 0.0582
1.33 0.0340	1.33 0.0340
1.42 0.0330	1.42 0.0330
1.50 0.0330	1.50 0.0330
1.58 0.0250	1.58 0.0250
1.67 0.0250	1.67 0.0250
1.75 0.0250	1.75 0.0250
1.83 0.0084	1.83 0.0084
1.92 0.0084	1.92 0.0084
2.00 0.0082	2.00 0.0082
2.08 0.0000	2.08 0.0000
...End	

Hydrograph Report

Hyd. No. 4		
Prop Total To Wet Pond A		
Hydrograph type	= Combine	Peak discharge
Storm frequency	= 1 yrs	Time to peak
Time interval	= 5 min	Hyd. volume
Inflow hyds.	= 1, 2, 3	Contrib. drain. area
		= 32.360 ac
		= 31.74 cfs
		= 1.17 hrs
		= 52.844 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 3 = (cfs)	Outflow (cfs)
0.50	0.526	0.000	0.000	0.526
0.58	1.225	0.000	0.000	1.225
0.67	2.004	0.000	0.000	2.004
0.75	2.554	0.000	0.000	2.554
0.83	3.636	0.000	0.000	3.636
0.92	6.226	0.000	0.021	6.247
1.00	14.27	0.000	0.332	14.61
1.08	26.23	0.091	1.129	27.45
1.17	29.48 <<	0.574	1.680 <<	31.74 <<
1.25	22.55	1.214	1.509	25.27
1.33	13.39	1.408 <<	1.044	15.84
1.42	7.182	1.305	0.616	9.103
1.50	5.378	1.153	0.478	7.009
1.58	4.637	1.089	0.421	6.146
1.67	4.151	1.037	0.382	5.571
1.75	3.841	1.015	0.359	5.215
1.83	3.197	0.879	0.301	4.377
1.92	2.217	0.626	0.210	3.054
2.00	1.560	0.453	0.149	2.162
2.08	0.982	0.290	0.094	1.367
2.17	0.490	0.145	0.047	0.682
...End				

(Printed values >= 1.00% of Q₀)

Hydrograph Report

Hydrowl Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

Hyd. No. 5

Post Route Wet Pond A

Hydrograph type = Reservoir
Storm frequency = 1 yrs
Time interval = 5 min
Inflow hyd. No. = 4 - Prop Total To Wet Pond A
Max. Elevation = 109.32 ft

Peak discharge = 1,904 cfs
Time to peak = 2.00 hrs
Hyd. volume = 52,608 cuft
Reservoir name = Wet Pond A
Max. Storage = 46,881 cuft

Storage indication method used.

Hydrograph Discharge Table

(Printed values >= 1.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
0.92	6.247	108.57	53.81	0.025								0.025
1.00	14.61	108.63	53.81	0.073								0.073
1.08	27.45	108.74	53.81	0.232								0.232
1.17	31.74 <<	108.90	53.81	0.593								0.593
1.25	25.27	109.04	53.81	1.036								1.036
1.33	15.84	109.14	53.81	1.352								1.352
1.42	9.103	109.19	53.81	1.530								1.530
1.50	7.009	109.23	53.81	1.631								1.631
1.58	6.146	109.25	53.81	1.708								1.708
1.67	5.571	109.27	53.81	1.772								1.772
1.75	5.215	109.29	53.81	1.828								1.828
1.83	4.377	109.30	53.81	1.872								1.872
1.92	3.054	109.31	53.81	1.895								1.895
2.00	2.162	109.32 <<	53.81	1.904								1.904 <<
2.08	1.367	109.31	53.81	1.903								1.903
2.17	0.682	109.31	53.81	1.891								1.891
2.25	0.227	109.30	53.81	1.873								1.873
2.33	0.000	109.29	53.81	1.848								1.848
2.42	0.000	109.29	53.81	1.819								1.819
2.50	0.000	109.28	53.81	1.791								1.791
2.58	0.000	109.27	53.81	1.764								1.764
2.67	0.000	109.26	53.81	1.736								1.736
2.75	0.000	109.25	53.81	1.709								1.709
2.83	0.000	109.24	53.81	1.683								1.683
2.92	0.000	109.24	53.81	1.657								1.657
3.00	0.000	109.23	53.81	1.631								1.631
3.08	0.000	109.22	53.81	1.606								1.606
3.17	0.000	109.21	53.81	1.581								1.581
3.25	0.000	109.20	53.81	1.557								1.557
3.33	0.000	109.19	53.81	1.532								1.532
3.42	0.000	109.19	53.81	1.508								1.508
3.50	0.000	109.18	53.81	1.484								1.484
3.58	0.000	109.17	53.81	1.460								1.460
3.67	0.000	109.17	53.81	1.437								1.437
3.75	0.000	109.16	53.81	1.414								1.414
3.83	0.000	109.15	53.81	1.391								1.391
3.92	0.000	109.14	53.81	1.369								1.369
4.00	0.000	109.14	53.81	1.347								1.347
4.08	0.000	109.13	53.81	1.326								1.326
4.17	0.000	109.13	53.81	1.304								1.304
4.25	0.000	109.12	53.81	1.284								1.284
4.33	0.000	109.11	53.81	1.263								1.263

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Post Route Wet Pond A

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
4.42	0.000	109.11	53.81	1.243								1.243
4.50	0.000	109.10	53.81	1.223								1.223
4.58	0.000	109.09	53.81	1.203								1.203
4.67	0.000	109.09	53.81	1.184								1.183
4.75	0.000	109.08	53.81	1.164								1.164
4.83	0.000	109.08	53.81	1.145								1.145
4.92	0.000	109.07	53.81	1.127								1.127
5.00	0.000	109.07	53.81	1.108								1.108
5.08	0.000	109.06	53.81	1.090								1.090
5.17	0.000	109.05	53.81	1.072								1.072
5.25	0.000	109.05	53.81	1.055								1.055
5.33	0.000	109.04	53.81	1.038								1.038
5.42	0.000	109.04	53.81	1.021								1.021
5.50	0.000	109.03	53.81	1.004								1.004
5.58	0.000	109.03	53.81	0.988								0.988
5.67	0.000	109.02	53.81	0.972								0.972
5.75	0.000	109.02	53.81	0.956								0.956
5.83	0.000	109.02	53.81	0.940								0.940
5.92	0.000	109.01	53.81	0.925								0.925
6.00	0.000	109.01	53.81	0.910								0.910
6.08	0.000	109.00	53.81	0.895								0.895
6.17	0.000	109.00	53.81	0.880								0.880
6.25	0.000	108.99	53.81	0.866								0.866
6.33	0.000	108.99	53.81	0.852								0.852
6.42	0.000	108.98	53.81	0.838								0.838
6.50	0.000	108.98	53.81	0.825								0.825
6.58	0.000	108.97	53.81	0.811								0.811
6.67	0.000	108.97	53.81	0.798								0.798
6.75	0.000	108.97	53.81	0.785								0.785
6.83	0.000	108.96	53.81	0.772								0.772
6.92	0.000	108.96	53.81	0.760								0.760
7.00	0.000	108.95	53.81	0.748								0.748
7.08	0.000	108.95	53.81	0.736								0.736
7.17	0.000	108.95	53.81	0.725								0.725
7.25	0.000	108.94	53.81	0.714								0.714
7.33	0.000	108.94	53.81	0.703								0.703
7.42	0.000	108.93	53.81	0.692								0.692
7.50	0.000	108.93	53.81	0.682								0.682
7.58	0.000	108.93	53.81	0.671								0.671
7.67	0.000	108.92	53.81	0.661								0.661
7.75	0.000	108.92	53.81	0.651								0.651
7.83	0.000	108.92	53.81	0.641								0.641
7.92	0.000	108.91	53.81	0.631								0.631
8.00	0.000	108.91	53.81	0.622								0.622
8.08	0.000	108.91	53.81	0.612								0.612
8.17	0.000	108.90	53.81	0.603								0.603
8.25	0.000	108.90	53.81	0.594								0.594
8.33	0.000	108.90	53.81	0.586								0.586
8.42	0.000	108.89	53.81	0.578								0.578
8.50	0.000	108.89	53.81	0.570								0.570
8.58	0.000	108.89	53.81	0.562								0.562
8.67	0.000	108.88	53.81	0.554								0.554
8.75	0.000	108.88	53.81	0.547								0.547
8.83	0.000	108.87	53.81	0.539								0.539
8.92	0.000	108.87	53.81	0.532								0.532
9.00	0.000	108.87	53.81	0.524								0.524

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Post Route Wet Pond A

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
18.42	0.000	108.69	53.81	0.156								0.156
18.50	0.000	108.69	53.81	0.155								0.155
18.58	0.000	108.69	53.81	0.154								0.154
18.67	0.000	108.69	53.81	0.153								0.153
18.75	0.000	108.69	53.81	0.152								0.152
18.83	0.000	108.69	53.81	0.151								0.151
18.92	0.000	108.69	53.81	0.150								0.150
19.00	0.000	108.69	53.81	0.149								0.149
19.08	0.000	108.69	53.81	0.148								0.148
19.17	0.000	108.69	53.81	0.147								0.147
19.25	0.000	108.69	53.81	0.146								0.146
19.33	0.000	108.69	53.81	0.144								0.144
19.42	0.000	108.69	53.81	0.143								0.143
19.50	0.000	108.68	53.81	0.142								0.142
19.58	0.000	108.68	53.81	0.141								0.141
19.67	0.000	108.68	53.81	0.140								0.140
19.75	0.000	108.68	53.81	0.139								0.139
19.83	0.000	108.68	53.81	0.138								0.138
19.92	0.000	108.68	53.81	0.137								0.137
20.00	0.000	108.68	53.81	0.136								0.136
20.08	0.000	108.68	53.81	0.135								0.135
20.17	0.000	108.68	53.81	0.134								0.134
20.25	0.000	108.68	53.81	0.133								0.133
20.33	0.000	108.68	53.81	0.132								0.132
20.42	0.000	108.68	53.81	0.131								0.131
20.50	0.000	108.68	53.81	0.130								0.130
20.58	0.000	108.67	53.81	0.129								0.129
20.67	0.000	108.67	53.81	0.128								0.128
20.75	0.000	108.67	53.81	0.127								0.127
20.83	0.000	108.67	53.81	0.126								0.126
20.92	0.000	108.67	53.81	0.125								0.125
21.00	0.000	108.67	53.81	0.125								0.125
21.08	0.000	108.67	53.81	0.124								0.124
21.17	0.000	108.67	53.81	0.123								0.123
21.25	0.000	108.67	53.81	0.122								0.122
21.33	0.000	108.67	53.81	0.121								0.121
21.42	0.000	108.67	53.81	0.120								0.120
21.50	0.000	108.67	53.81	0.119								0.119
21.58	0.000	108.67	53.81	0.119								0.119
21.67	0.000	108.67	53.81	0.118								0.118
21.75	0.000	108.67	53.81	0.117								0.117
21.83	0.000	108.66	53.81	0.116								0.116
21.92	0.000	108.66	53.81	0.115								0.115
22.00	0.000	108.66	53.81	0.114								0.114
22.08	0.000	108.66	53.81	0.114								0.114
22.17	0.000	108.66	53.81	0.114								0.114
22.25	0.000	108.66	53.81	0.112								0.112
22.33	0.000	108.66	53.81	0.112								0.112
22.42	0.000	108.66	53.81	0.110								0.110
22.50	0.000	108.66	53.81	0.110								0.110
22.58	0.000	108.66	53.81	0.109								0.109
22.67	0.000	108.66	53.81	0.108								0.108
22.75	0.000	108.66	53.81	0.107								0.107
22.83	0.000	108.66	53.81	0.107								0.107
22.92	0.000	108.66	53.81	0.106								0.106
23.00	0.000	108.66	53.81	0.106								0.106

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Post Route Wet Pond A

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
23.08	0.000	108.66	53.81	0.105								0.105
23.17	0.000	108.66	53.81	0.104								0.104
23.25	0.000	108.65	53.81	0.104								0.104
23.33	0.000	108.65	53.81	0.103								0.103
23.42	0.000	108.65	53.81	0.102								0.102
23.50	0.000	108.65	53.81	0.101								0.101
23.58	0.000	108.65	53.81	0.101								0.101
23.67	0.000	108.65	53.81	0.100								0.100
23.75	0.000	108.65	53.81	0.099								0.099
23.83	0.000	108.65	53.81	0.099								0.099
23.92	0.000	108.65	53.81	0.097								0.097
24.00	0.000	108.65	53.81	0.097								0.097
24.08	0.000	108.65	53.81	0.096								0.096
24.17	0.000	108.65	53.81	0.096								0.096
24.25	0.000	108.65	53.81	0.095								0.095
24.33	0.000	108.65	53.81	0.094								0.094
24.42	0.000	108.65	53.81	0.094								0.094
24.50	0.000	108.65	53.81	0.093								0.093
24.58	0.000	108.65	53.81	0.093								0.093
24.67	0.000	108.65	53.81	0.092								0.092
24.75	0.000	108.65	53.81	0.092								0.092
24.83	0.000	108.64	53.81	0.091								0.091
24.92	0.000	108.64	53.81	0.091								0.091
25.00	0.000	108.64	53.81	0.090								0.090
25.08	0.000	108.64	53.81	0.090								0.090
25.17	0.000	108.64	53.81	0.089								0.089
25.25	0.000	108.64	53.81	0.088								0.088
25.33	0.000	108.64	53.81	0.088								0.088
25.42	0.000	108.64	53.81	0.087								0.087
25.50	0.000	108.64	53.81	0.087								0.087
25.58	0.000	108.64	53.81	0.086								0.086
25.67	0.000	108.64	53.81	0.086								0.086
25.75	0.000	108.64	53.81	0.085								0.085
25.83	0.000	108.64	53.81	0.085								0.085
25.92	0.000	108.64	53.81	0.084								0.084
26.00	0.000	108.64	53.81	0.084								0.084
26.08	0.000	108.64	53.81	0.083								0.083
26.17	0.000	108.64	53.81	0.083								0.083
26.25	0.000	108.64	53.81	0.082								0.082
26.33	0.000	108.64	53.81	0.082								0.082
26.42	0.000	108.64	53.81	0.081								0.081
26.50	0.000	108.63	53.81	0.081								0.081
26.58	0.000	108.63	53.81	0.080								0.080
26.67	0.000	108.63	53.81	0.080								0.080
26.75	0.000	108.63	53.81	0.079								0.079
26.83	0.000	108.63	53.81	0.079								0.079
26.92	0.000	108.63	53.81	0.078								0.078
27.00	0.000	108.63	53.81	0.078								0.078
27.08	0.000	108.63	53.81	0.077								0.077
27.17	0.000	108.63	53.81	0.077								0.077
27.25	0.000	108.63	53.81	0.076								0.076
27.33	0.000	108.63	53.81	0.076								0.076
27.42	0.000	108.63	53.81	0.075								0.075
27.50	0.000	108.63	53.81	0.075								0.075
27.58	0.000	108.63	53.81	0.075								0.075
27.67	0.000	108.63	53.81	0.075								0.075

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PIRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
27.75	0.000	108.63	53.81	0.074								0.074
27.83	0.000	108.63	53.81	0.074								0.074
27.92	0.000	108.63	53.81	0.073								0.073
28.00	0.000	108.63	53.81	0.073								0.073
28.08	0.000	108.63	53.81	0.073								0.073
28.17	0.000	108.63	53.81	0.072								0.072
28.25	0.000	108.63	53.81	0.072								0.072
28.33	0.000	108.63	53.81	0.071								0.071
28.42	0.000	108.63	53.81	0.071								0.070
28.50	0.000	108.63	53.81	0.070								0.070
28.58	0.000	108.63	53.81	0.070								0.069
28.67	0.000	108.62	53.81	0.069								0.069
28.75	0.000	108.62	53.81	0.069								0.068
28.83	0.000	108.62	53.81	0.068								0.068
28.92	0.000	108.62	53.81	0.068								0.067
29.00	0.000	108.62	53.81	0.067								0.067
29.08	0.000	108.62	53.81	0.067								0.066
29.17	0.000	108.62	53.81	0.067								0.066
29.25	0.000	108.62	53.81	0.066								0.065
29.33	0.000	108.62	53.81	0.066								0.065
29.42	0.000	108.62	53.81	0.065								0.064
29.50	0.000	108.62	53.81	0.065								0.064
29.58	0.000	108.62	53.81	0.064								0.063
29.67	0.000	108.62	53.81	0.064								0.063
29.75	0.000	108.62	53.81	0.064								0.063
29.83	0.000	108.62	53.81	0.064								0.062
29.92	0.000	108.62	53.81	0.063								0.062
30.00	0.000	108.62	53.81	0.063								0.061
30.08	0.000	108.62	53.81	0.063								0.061
30.17	0.000	108.62	53.81	0.062								0.061
30.25	0.000	108.62	53.81	0.062								0.060
30.33	0.000	108.62	53.81	0.061								0.060
30.42	0.000	108.62	53.81	0.061								0.059
30.50	0.000	108.62	53.81	0.061								0.059
30.58	0.000	108.62	53.81	0.060								0.057
30.67	0.000	108.62	53.81	0.060								0.056
30.75	0.000	108.62	53.81	0.060								0.056
30.83	0.000	108.62	53.81	0.059								0.058
30.92	0.000	108.62	53.81	0.059								0.058
31.00	0.000	108.62	53.81	0.059								0.058
31.08	0.000	108.61	53.81	0.058								0.057
31.17	0.000	108.61	53.81	0.058								0.057
31.25	0.000	108.61	53.81	0.057								0.056
31.33	0.000	108.61	53.81	0.057								0.056
31.42	0.000	108.61	53.81	0.056								0.055
31.50	0.000	108.61	53.81	0.056								0.055
31.58	0.000	108.61	53.81	0.056								0.055
31.67	0.000	108.61	53.81	0.055								0.055
31.75	0.000	108.61	53.81	0.055								0.054
31.83	0.000	108.61	53.81	0.055								0.054
31.92	0.000	108.61	53.81	0.055								0.054
32.00	0.000	108.61	53.81	0.055								0.054
32.08	0.000	108.61	53.81	0.054								0.054
32.17	0.000	108.61	53.81	0.054								0.054
32.25	0.000	108.61	53.81	0.054								0.054
32.33	0.000	108.61	53.81	0.054								0.054

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PIRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
32.42	0.000	108.61	53.81	0.053								0.053
32.50	0.000	108.61	53.81	0.053								0.053
32.58	0.000	108.61	53.81	0.053								0.053
32.67	0.000	108.61	53.81	0.052								0.052
32.75	0.000	108.61	53.81	0.052								0.052
32.83	0.000	108.61	53.81	0.052								0.052
32.92	0.000	108.61	53.81	0.051								0.051
33.00	0.000	108.61	53.81	0.051								0.051
33.08	0.000	108.61	53.81	0.050								0.050
33.17	0.000	108.61	53.81	0.050								0.050
33.25	0.000	108.61	53.81	0.050								0.050
33.33	0.000	108.61	53.81	0.050								0.049
33.42	0.000	108.61	53.81	0.049								0.049
33.50	0.000	108.61	53.81	0.049								0.049
33.58	0.000	108.61	53.81	0.048								0.048
33.67	0.000	108.61	53.81	0.048								0.048
33.75	0.000	108.61	53.81	0.048								0.048
33.83	0.000	108.61	53.81	0.048								0.047
33.92	0.000	108.60	53.81	0.048								0.047
34.00	0.000	108.60	53.81	0.047								0.047
34.08	0.000	108.60	53.81	0.047								0.046
34.17	0.000	108.60	53.81	0.046								0.046
34.25	0.000	108.60	53.81	0.046								0.046
34.33	0.000	108.60	53.81	0.046								0.045
34.42	0.000	108.60	53.81	0.046								0.045
34.50	0.000	108.60	53.81	0.045								0.045
34.58	0.000	108.60	53.81	0.045								0.045
34.67	0.000	108.60	53.81	0.045								0.045
34.75	0.000	108.60	53.81	0.045								0.045
34.83	0.000	108.60	53.81	0.044								0.044
34.92	0.000	108.60	53.81	0.044								0.044
35.00	0.000	108.60	53.81	0.044								0.044
35.08	0.000	108.60	53.81	0.044								0.043
35.17	0.000	108.60	53.81	0.043								0.043
35.25	0.000	108.60	53.81	0.043								0.043
35.33	0.000	108.60	53.81	0.043								0.043
35.42	0.000	108.60	53.81	0.042								0.042
35.50	0.000	108.60	53.81	0.042								0.042
35.58	0.000	108.60	53.81	0.042								0.042
35.67	0.000	108.60	53.81	0.042								0.042
35.75	0.000	108.60	53.81	0.042								0.042
35.83	0.000	108.60	53.81	0.042								0.042
35.92	0.000	108.60	53.81	0.042								0.042
36.00	0.000	108.60	53.81	0.041								0.041
36.08	0.000	108.60	53.81	0.041								0.041
36.17	0.000	108.60	53.81	0.041								0.041
36.25	0.000	108.60	53.81	0.041								0.041
36.33	0.000	108.60	53.81	0.041								0.041
36.42	0.000	108.60	53.81	0.041								0.041
36.50	0.000	108.60	53.81	0.041								0.041
36.58	0.000	108.60	53.81	0.041								0.040
36.67	0.000	108.60	53.81	0.040								0.040
36.75	0.000	108.60	53.81	0.040								0.040
36.83	0.000	108.60	53.81	0.040								0.040
36.92	0.000	108.60	53.81	0.040								0.040
37.00	0.000	108.60	53.81	0.040								0.040

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Post Route Wet Pond A

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PIRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
37.08	0.000	108.60	53.81	0.040								0.040
37.17	0.000	108.60	53.81	0.040								0.040
37.25	0.000	108.60	53.81	0.040								0.040
37.33	0.000	108.60	53.81	0.040								0.040
37.42	0.000	108.60	53.81	0.039								0.039
37.50	0.000	108.59	53.81	0.039								0.039
37.58	0.000	108.59	53.81	0.039								0.039
37.67	0.000	108.59	53.81	0.039								0.039
37.75	0.000	108.59	53.81	0.039								0.039
37.83	0.000	108.59	53.81	0.039								0.039
37.92	0.000	108.59	53.81	0.039								0.039
38.00	0.000	108.59	53.81	0.038								0.038
38.08	0.000	108.59	53.81	0.038								0.038
38.17	0.000	108.59	53.81	0.038								0.038
38.25	0.000	108.59	53.81	0.038								0.038
38.33	0.000	108.59	53.81	0.038								0.038
38.42	0.000	108.59	53.81	0.038								0.038
38.50	0.000	108.59	53.81	0.038								0.038
38.58	0.000	108.59	53.81	0.038								0.038
38.67	0.000	108.59	53.81	0.037								0.037
38.75	0.000	108.59	53.81	0.037								0.037
38.83	0.000	108.59	53.81	0.037								0.037
38.92	0.000	108.59	53.81	0.037								0.037
39.00	0.000	108.59	53.81	0.037								0.037
39.08	0.000	108.59	53.81	0.037								0.037
39.17	0.000	108.59	53.81	0.037								0.037
39.25	0.000	108.59	53.81	0.037								0.037
39.33	0.000	108.59	53.81	0.036								0.036
39.42	0.000	108.59	53.81	0.036								0.036
39.50	0.000	108.59	53.81	0.036								0.036
39.58	0.000	108.59	53.81	0.036								0.036
39.67	0.000	108.59	53.81	0.036								0.036
39.75	0.000	108.59	53.81	0.036								0.036
39.83	0.000	108.59	53.81	0.036								0.036
39.92	0.000	108.59	53.81	0.036								0.036
40.00	0.000	108.59	53.81	0.036								0.036
40.08	0.000	108.59	53.81	0.035								0.035
40.17	0.000	108.59	53.81	0.035								0.035
40.25	0.000	108.59	53.81	0.035								0.035
40.33	0.000	108.59	53.81	0.035								0.035
40.42	0.000	108.59	53.81	0.035								0.035
40.50	0.000	108.59	53.81	0.035								0.035
40.58	0.000	108.59	53.81	0.035								0.035
40.67	0.000	108.59	53.81	0.035								0.035
40.75	0.000	108.59	53.81	0.034								0.034
40.83	0.000	108.59	53.81	0.034								0.034
40.92	0.000	108.59	53.81	0.034								0.034
41.00	0.000	108.59	53.81	0.034								0.034
41.08	0.000	108.59	53.81	0.034								0.034
41.17	0.000	108.59	53.81	0.034								0.034
41.25	0.000	108.59	53.81	0.034								0.034
41.33	0.000	108.59	53.81	0.034								0.034
41.42	0.000	108.59	53.81	0.034								0.034
41.50	0.000	108.59	53.81	0.034								0.034
41.58	0.000	108.59	53.81	0.033								0.033
41.67	0.000	108.59	53.81	0.033								0.033

Continues on next page...

Post Route Wet Pond A

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PIRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
41.75	0.000	108.59	53.81	0.033								0.033
41.83	0.000	108.58	53.81	0.033								0.033
41.92	0.000	108.58	53.81	0.033								0.033
42.00	0.000	108.58	53.81	0.033								0.033
42.08	0.000	108.58	53.81	0.033								0.033
42.17	0.000	108.58	53.81	0.033								0.033
42.25	0.000	108.58	53.81	0.032								0.032
42.33	0.000	108.58	53.81	0.032								0.032
42.42	0.000	108.58	53.81	0.032								0.032
42.50	0.000	108.58	53.81	0.032								0.032
42.58	0.000	108.58	53.81	0.032								0.032
42.67	0.000	108.58	53.81	0.032								0.032
42.75	0.000	108.58	53.81	0.032								0.032
42.83	0.000	108.58	53.81	0.032								0.032
42.92	0.000	108.58	53.81	0.032								0.032
43.00	0.000	108.58	53.81	0.031								0.031
43.08	0.000	108.58	53.81	0.031								0.031
43.17	0.000	108.58	53.81	0.031								0.031
43.25	0.000	108.58	53.81	0.031								0.031
43.33	0.000	108.58	53.81	0.031								0.031
43.42	0.000	108.58	53.81	0.031								0.031
43.50	0.000	108.58	53.81	0.031								0.031
43.58	0.000	108.58	53.81	0.031								0.031
43.67	0.000	108.58	53.81	0.031								0.031
43.75	0.000	108.58	53.81	0.031								0.031
43.83	0.000	108.58	53.81	0.030								0.030
43.92	0.000	108.58	53.81	0.030								0.030
44.00	0.000	108.58	53.81	0.030								0.030
44.08	0.000	108.58	53.81	0.030								0.030
44.17	0.000	108.58	53.81	0.030								0.030
44.25	0.000	108.58	53.81	0.030								0.030
44.33	0.000	108.58	53.81	0.030								0.030
44.42	0.000	108.58	53.81	0.030								0.030
44.50	0.000	108.58	53.81	0.030								0.030
44.58	0.000	108.58	53.81	0.030								0.030
44.67	0.000	108.58	53.81	0.030								0.030
44.75	0.000	108.58	53.81	0.029								0.029
44.83	0.000	108.58	53.81	0.029								0.029
44.92	0.000	108.58	53.81	0.029								0.029
45.00	0.000	108.58	53.81	0.029								0.029
45.08	0.000	108.58	53.81	0.029								0.029
45.17	0.000	108.58	53.81	0.029								0.029
45.25	0.000	108.58	53.81	0.029								0.029
45.33	0.000	108.58	53.81	0.029								0.029
45.42	0.000	108.58	53.81	0.029								0.029
45.50	0.000	108.58	53.81	0.028								0.028
45.58	0.000	108.58	53.81	0.028								0.028
45.67	0.000	108.58	53.81	0.028								0.028
45.75	0.000	108.58	53.81	0.028								0.028
45.83	0.000	108.58	53.81	0.028								0.028
45.92	0.000	108.58	53.81	0.028								0.028
46.00	0.000	108.58	53.81	0.028								0.028
46.08	0.000	108.58	53.81	0.028								0.028
46.17	0.000	108.58	53.81	0.028								0.028
46.25	0.000	108.58	53.81	0.028								0.028
46.33	0.000	108.58	53.81	0.028								0.028

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PIRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
46.42	0.000	108.58	53.81	0.028								0.028
46.50	0.000	108.58	53.81	0.027								0.027
46.58	0.000	108.58	53.81	0.027								0.027
46.67	0.000	108.58	53.81	0.027								0.027
46.75	0.000	108.58	53.81	0.027								0.027
46.83	0.000	108.58	53.81	0.027								0.027
46.92	0.000	108.57	53.81	0.027								0.027
47.00	0.000	108.57	53.81	0.027								0.027
47.08	0.000	108.57	53.81	0.027								0.027
47.17	0.000	108.57	53.81	0.027								0.027
47.25	0.000	108.57	53.81	0.027								0.027
47.33	0.000	108.57	53.81	0.026								0.026
47.42	0.000	108.57	53.81	0.026								0.026
47.50	0.000	108.57	53.81	0.026								0.026
47.58	0.000	108.57	53.81	0.026								0.026
47.67	0.000	108.57	53.81	0.026								0.026
47.75	0.000	108.57	53.81	0.026								0.026
47.83	0.000	108.57	53.81	0.026								0.026
47.92	0.000	108.57	53.81	0.026								0.026
48.00	0.000	108.57	53.81	0.026								0.026
48.08	0.000	108.57	53.81	0.026								0.026
48.17	0.000	108.57	53.81	0.026								0.026
48.25	0.000	108.57	53.81	0.026								0.026
48.33	0.000	108.57	53.81	0.025								0.025
48.42	0.000	108.57	53.81	0.025								0.025
48.50	0.000	108.57	53.81	0.025								0.025
48.58	0.000	108.57	53.81	0.025								0.025
48.67	0.000	108.57	53.81	0.025								0.025
48.75	0.000	108.57	53.81	0.025								0.025
48.83	0.000	108.57	53.81	0.025								0.025
48.92	0.000	108.57	53.81	0.025								0.025
49.00	0.000	108.57	53.81	0.025								0.025
49.08	0.000	108.57	53.81	0.025								0.025
49.17	0.000	108.57	53.81	0.025								0.025
49.25	0.000	108.57	53.81	0.025								0.025
49.33	0.000	108.57	53.81	0.024								0.024
49.42	0.000	108.57	53.81	0.024								0.024
49.50	0.000	108.57	53.81	0.024								0.024
49.58	0.000	108.57	53.81	0.024								0.024
49.67	0.000	108.57	53.81	0.024								0.024
49.75	0.000	108.57	53.81	0.024								0.024
49.83	0.000	108.57	53.81	0.024								0.024
49.92	0.000	108.57	53.81	0.024								0.024
50.00	0.000	108.57	53.81	0.024								0.024
50.08	0.000	108.57	53.81	0.024								0.024
50.17	0.000	108.57	53.81	0.024								0.024
50.25	0.000	108.57	53.81	0.024								0.024
50.33	0.000	108.57	53.81	0.023								0.023
50.42	0.000	108.57	53.81	0.023								0.023
50.50	0.000	108.57	53.81	0.023								0.023
50.58	0.000	108.57	53.81	0.023								0.023
50.67	0.000	108.57	53.81	0.023								0.023
50.75	0.000	108.57	53.81	0.023								0.023
50.83	0.000	108.57	53.81	0.023								0.023
50.92	0.000	108.57	53.81	0.023								0.023
51.00	0.000	108.57	53.81	0.023								0.023

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PIRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
51.08	0.000	108.57	53.81	0.023								0.023
51.17	0.000	108.57	53.81	0.023								0.023
51.25	0.000	108.57	53.81	0.023								0.023
51.33	0.000	108.57	53.81	0.023								0.023
51.42	0.000	108.57	53.81	0.023								0.023
51.50	0.000	108.57	53.81	0.022								0.022
51.58	0.000	108.57	53.81	0.022								0.022
51.67	0.000	108.57	53.81	0.022								0.022
51.75	0.000	108.57	53.81	0.022								0.022
51.83	0.000	108.57	53.81	0.022								0.022
51.92	0.000	108.57	53.81	0.022								0.022
52.00	0.000	108.57	53.81	0.022								0.022
52.08	0.000	108.57	53.81	0.022								0.022
52.17	0.000	108.57	53.81	0.022								0.022
52.25	0.000	108.57	53.81	0.022								0.022
52.33	0.000	108.57	53.81	0.022								0.022
52.42	0.000	108.57	53.81	0.022								0.022
52.50	0.000	108.57	53.81	0.022								0.022
52.58	0.000	108.57	53.81	0.021								0.021
52.67	0.000	108.57	53.81	0.021								0.021
52.75	0.000	108.57	53.81	0.021								0.021
52.83	0.000	108.57	53.81	0.021								0.021
52.92	0.000	108.57	53.81	0.021								0.021
53.00	0.000	108.57	53.81	0.021								0.021
53.08	0.000	108.57	53.81	0.021								0.021
53.17	0.000	108.57	53.81	0.021								0.021
53.25	0.000	108.57	53.81	0.021								0.021
53.33	0.000	108.56	53.81	0.021								0.021
53.42	0.000	108.56	53.81	0.021								0.021
53.50	0.000	108.56	53.81	0.021								0.021
53.58	0.000	108.56	53.81	0.021								0.021
53.67	0.000	108.56	53.81	0.021								0.021
53.75	0.000	108.56	53.81	0.021								0.021
53.83	0.000	108.56	53.81	0.020								0.020
53.92	0.000	108.56	53.81	0.020								0.020
54.00	0.000	108.56	53.81	0.020								0.020
54.08	0.000	108.56	53.81	0.020								0.020
54.17	0.000	108.56	53.81	0.020								0.020
54.25	0.000	108.56	53.81	0.020								0.020
54.33	0.000	108.56	53.81	0.020								0.020
54.42	0.000	108.56	53.81	0.020								0.020
54.50	0.000	108.56	53.81	0.020								0.020
54.58	0.000	108.56	53.81	0.020								0.020
54.67	0.000	108.56	53.81	0.020								0.020
54.75	0.000	108.56	53.81	0.020								0.020
54.83	0.000	108.56	53.81	0.020								0.020
54.92	0.000	108.56	53.81	0.020								0.020
55.00	0.000	108.56	53.81	0.020								0.020
55.08	0.000	108.56	53.81	0.019								0.019
55.17	0.000	108.56	53.81	0.019								0.019
55.25	0.000	108.56	53.81	0.019								0.019
55.33	0.000	108.56	53.81	0.019								0.019
55.42	0.000	108.56	53.81	0.019								0.019
55.50	0.000	108.56	53.81	0.019								0.019
55.58	0.000	108.56	53.81	0.019								0.019
55.67	0.000	108.56	53.81	0.019								0.019

...End

Pond Report

Hydralow Hydrographs by Intelsolve v9.1

Tuesday, May 22, 2018

Pond No. 2 - Wet Pond A

Pond Data

Contours - User-defined contour areas. Contic method used for volume calculation. Beginning Elevation = 108.50 ft

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	108.50	52,887	0	0
0.50	109.00	57,988	27,709	27,709
1.00	110.00	63,672	60,802	88,511
1.50	111.00	69,577	66,596	155,107
2.00	112.00	74,968	72,248	227,354
2.50	113.00	80,539	80,539	307,893
3.00	113.50	86,260	86,260	394,153
3.50	114.00	92,181	92,181	486,334
4.00	114.50	98,360	98,360	584,694
4.50	115.00	104,859	104,859	689,553
5.00	115.50	111,630	111,630	801,183

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	108.50	52,887	0	0
0.50	109.00	57,988	27,709	27,709
1.00	110.00	63,672	60,802	88,511
1.50	111.00	69,577	66,596	155,107
2.00	112.00	74,968	72,248	227,354
2.50	113.00	80,539	80,539	307,893
3.00	113.50	86,260	86,260	394,153
3.50	114.00	92,181	92,181	486,334
4.00	114.50	98,360	98,360	584,694
4.50	115.00	104,859	104,859	689,553
5.00	115.50	111,630	111,630	801,183

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrRsr]	[A]	[B]	[C]	[D]
Rise (in)	= 36.00	11.00	0.00	0.00	Crest Len (ft)	= 3.25	25.00	Inactive
Span (in)	= 36.00	11.00	0.00	0.00	Crest El. (ft)	= 109.50	112.15	0.00
No. Barrels	= 1	1	0	0	Weir Coeff.	= 3.33	3.33	3.33
Invert El. (ft)	= 104.50	108.50	0.00	0.00	Weir Type	= Rect	Rect	---
Length (ft)	= 406.00	0.00	0.00	0.00	Multi-Stage	= Yes	Yes	No
Slope (%)	= 1.43	0.00	0.00	n/a				
N-Value	= .013	.013	.013	n/a				
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfl. (in/hr)	= 0.000 (by Wet area)		
Multi-Stage	= n/a	Yes	No	No	TW Elev. (ft)	= 0.00		

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir flasks checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfl cfs	User cfs	Total cfs
0.00	0	108.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	2,771	108.55	53.81 ic	0.01 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.10	5,542	108.60	53.81 ic	0.04 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
0.15	8,313	108.65	53.81 ic	0.10 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
0.20	11,083	108.70	53.81 ic	0.16 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16
0.25	13,854	108.75	53.81 ic	0.25 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
0.30	16,625	108.80	53.81 ic	0.36 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36
0.35	19,396	108.85	53.81 ic	0.47 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47
0.40	22,167	108.90	53.81 ic	0.58 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58
0.45	24,938	108.95	53.81 ic	0.74 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74
0.50	27,709	109.00	53.81 ic	0.89 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89
0.55	30,480	109.05	53.81 ic	1.05 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05
0.60	33,251	109.10	53.81 ic	1.22 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22
0.65	36,022	109.15	53.81 ic	1.39 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39
0.70	38,793	109.20	53.81 ic	1.55 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.55
0.75	41,564	109.25	53.81 ic	1.72 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72
0.80	44,335	109.30	53.81 ic	1.88 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88
0.85	47,106	109.35	53.81 ic	2.05 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05
0.90	49,877	109.40	53.81 ic	2.21 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21
0.95	52,648	109.45	53.81 ic	2.38 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.38
1.00	55,419	109.50	53.81 ic	2.55 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
1.05	58,190	109.55	53.81 ic	2.71 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.71
1.10	60,961	109.60	53.81 ic	2.88 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.88
1.15	63,732	109.65	53.81 ic	3.04 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.04
1.20	66,503	109.70	53.81 ic	3.21 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.21
1.25	69,274	109.75	53.81 ic	3.37 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.37
1.30	72,045	109.80	53.81 ic	3.54 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.54
1.35	74,816	109.85	53.81 ic	3.70 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70
1.40	77,587	109.90	53.81 ic	3.87 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.87
1.45	80,358	109.95	53.81 ic	4.03 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.03
1.50	83,129	110.00	53.81 ic	4.20 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.20
1.55	85,900	110.05	53.81 ic	4.36 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.36
1.60	88,671	110.10	53.81 ic	4.53 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.53
1.65	91,442	110.15	53.81 ic	4.69 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.69
1.70	94,213	110.20	53.81 ic	4.86 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.86
1.75	96,984	110.25	53.81 ic	5.02 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.02
1.80	99,755	110.30	53.81 ic	5.19 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.19
1.85	102,526	110.35	53.81 ic	5.35 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.35
1.90	105,297	110.40	53.81 ic	5.52 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.52
1.95	108,068	110.45	53.81 ic	5.68 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.68
2.00	110,839	110.50	53.81 ic	5.85 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.85
2.05	113,610	110.55	53.81 ic	6.01 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.01
2.10	116,381	110.60	53.81 ic	6.18 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.18
2.15	119,152	110.65	53.81 ic	6.34 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.34
2.20	121,923	110.70	53.81 ic	6.51 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.51
2.25	124,694	110.75	53.81 ic	6.67 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.67
2.30	127,465	110.80	53.81 ic	6.84 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.84
2.35	130,236	110.85	53.81 ic	7.00 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00
2.40	133,007	110.90	53.81 ic	7.17 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.17
2.45	135,778	110.95	53.81 ic	7.33 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.33
2.50	138,549	111.00	53.81 ic	7.50 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.50
2.55	141,320	111.05	53.81 ic	7.66 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.66
2.60	144,091	111.10	53.81 ic	7.83 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.83
2.65	146,862	111.15	53.81 ic	8.00 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
2.70	149,633	111.20	53.81 ic	8.16 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.16
2.75	152,404	111.25	53.81 ic	8.33 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33
2.80	155,175	111.30	53.81 ic	8.50 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.50
2.85	157,946	111.35	53.81 ic	8.66 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.66
2.90	160,717	111.40	53.81 ic	8.83 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.83
2.95	163,488	111.45	53.81 ic	9.00 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00
3.00	166,259	111.50	53.81 ic	9.16 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.16
3.05	169,030	111.55	53.81 ic	9.33 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.33
3.10	171,801	111.60	53.81 ic	9.50 ic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.50

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Hydraflow Rainfall Report

Hydraflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

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WPP DETgww

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Tuesday, May 22, 2018

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Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHIA)				
	B	D	E	N/A	
1	39.0824	9.5000	0.8528		
2	45.6943	10.7000	0.8185		
3	0.0000	0.0000	0.0000		
5	99.7061	14.9000	0.9304		
10	249.7597	21.8001	1.0961		
25	115.7547	14.9000	0.8980		
50	7.3699	0.1000	0.2544		
100	403.8513	25.1001	1.1108		

File name: TRENTON.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)										
	5 min	10	15	20	25	30	35	40	45	50	60
1	4.00	3.10	2.55	2.18	1.91	1.70	1.54	1.40	1.29	1.20	1.05
2	4.80	3.83	3.21	2.77	2.45	2.20	2.00	1.84	1.70	1.59	1.40
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.80
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.00
25	7.89	6.45	5.47	4.76	4.23	3.80	3.46	3.17	2.93	2.73	2.40
50	4.87	4.09	3.69	3.44	3.25	3.10	2.98	2.88	2.80	2.72	2.60
100	9.20	7.76	6.69	5.87	5.22	4.70	4.27	3.91	3.60	3.33	2.90

Tc = time in minutes. Values may exceed 60.

Precip. file name: Somerset County NRCS.ppt											
Rainfall Precipitation Table (in)											
Storm Distribution	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr			
SCS 24-hour	0.00	3.34	0.00	4.25	5.01	6.15	7.13	8.21			
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Custom	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

**HYDROGRAPH SUMMARY REPORTS: WATER
QUALITY STORM (PERMANENT POOL)**

Hydrograph Summary Report

Hydroflow Hydrographs by Inlitsolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total storage used (cuft)	Hydrograph description
1	SCS Runoff	29.48	5	70	46,808	Hyd 1	106.97	52,844	Prop Wet Pond A (Imp)
2	SCS Runoff	1,408	5	80	3,398	Hyd 2	106.97	52,844	Prop Wet Pond A (Per)
3	SCS Runoff	1,680	5	70	2,637	Hyd 3	106.97	52,844	Prop Village Shopper Improvements
4	Combine	31.74	5	70	52,844	1, 2, 3	106.97	52,844	Prop Total To Wet Pond A
5	Reservoir	0.000	5	n/a	0	4	106.97	52,844	Post Route Wet Pond A
Permanent Pool.gpw									Return Period: 1 Year
									Tuesday, May 22, 2018

Hydrograph Report

Hydroflow Hydrographs by Inlitsolve v9.1

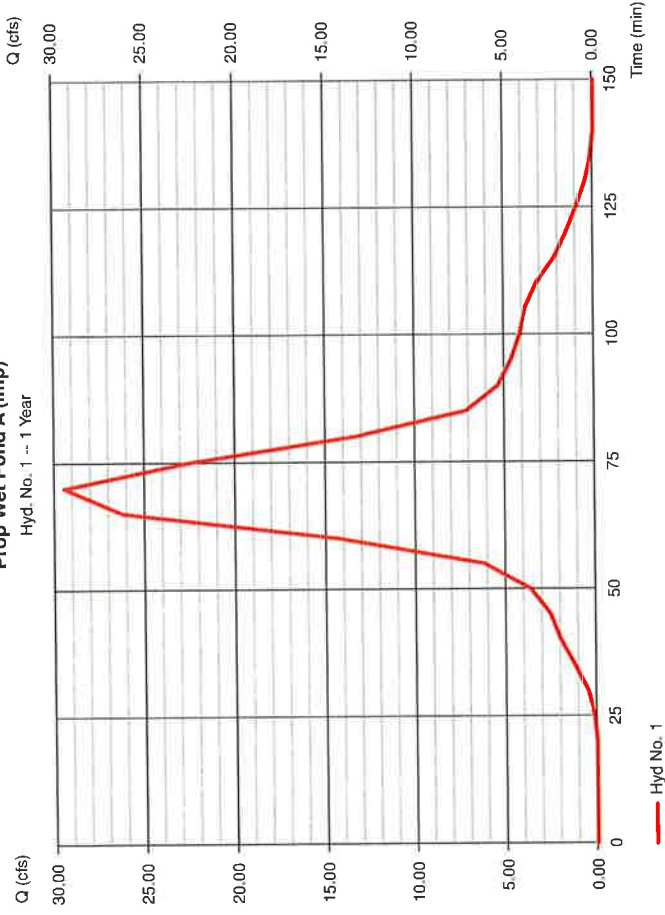
Hyd. No. 1

Prop Wet Pond A (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 29.48 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 46,808 cuft
Drainage area	= 13.300 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 484

Prop Wet Pond A (Imp)

Hyd. No. 1 -- 1 Year

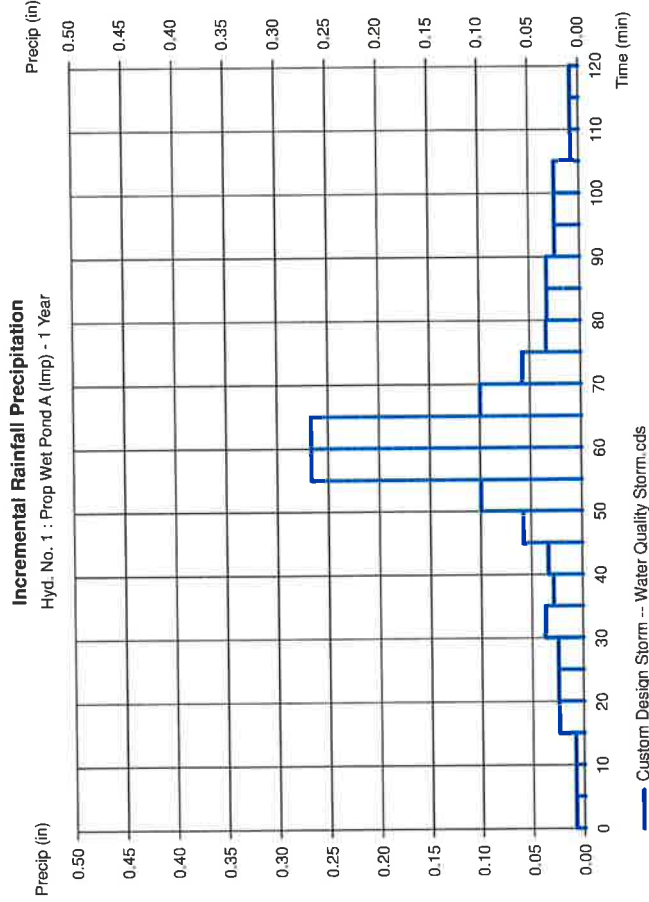


Precipitation Report

Hydralflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 1

Prop Wet Pond A (Imp)		
Storm Frequency	= 1 yrs	
Total precip.	= 1.2500 in	
Storm duration	= Water Quality Storm.cds	
Time interval		
Distribution	= 5 min	
= Custom		

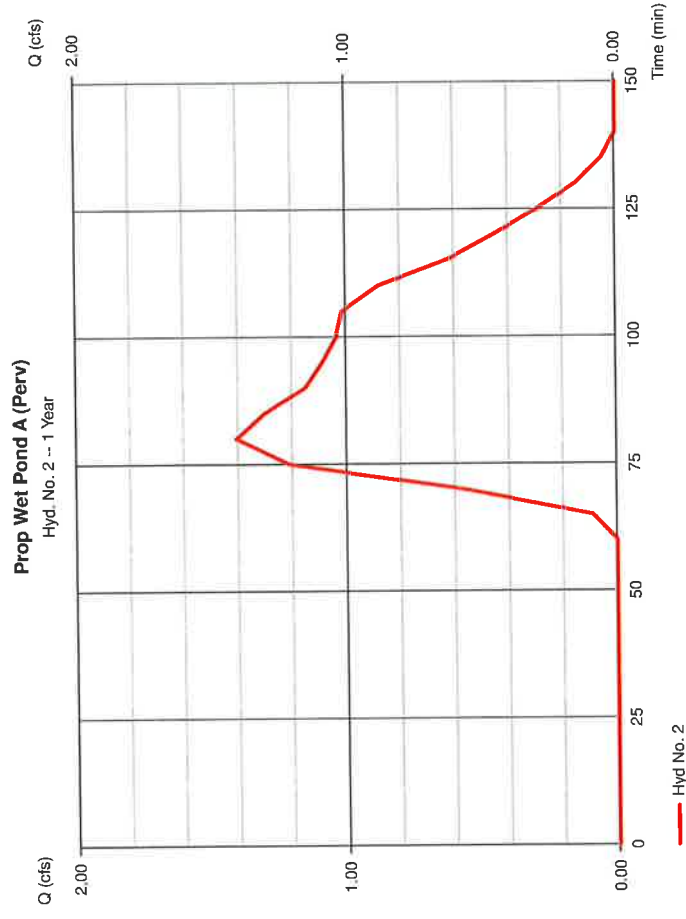


Hydrograph Report

Hydralflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 2

Prop Wet Pond A (Perv)		
Hydrograph type	= SCS Runoff	
Storm frequency	= 1 yrs	
Time interval	= 5 min	
Drainage area	= 17.160 ac	
Basin Slope	= 0.0 %	
Tc method	= USER	
Total precip.	= 1.25 in	
Storm duration	= Water Quality Storm.cds	
Peak discharge		
Time to peak	= 1,408 cfs	
Hyd. volume	= 80 min	
Curve number	= 3,398 cuft	
Hydraulic length	= 73	
Time of conc. (Tc)	= 0 ft	
Distribution	= 10.00 min	
Shape factor	= Custom	
	= 484	



Precipitation Report

Hyd. No. 2

Prop Wet Pond A (Perv)
Storm Frequency = 1 yrs
Total precip. = 1.2500 in
Storm duration = Water Quality Storm.cds

Time interval = 5 min
Distribution = Custom

Hydrograph Report

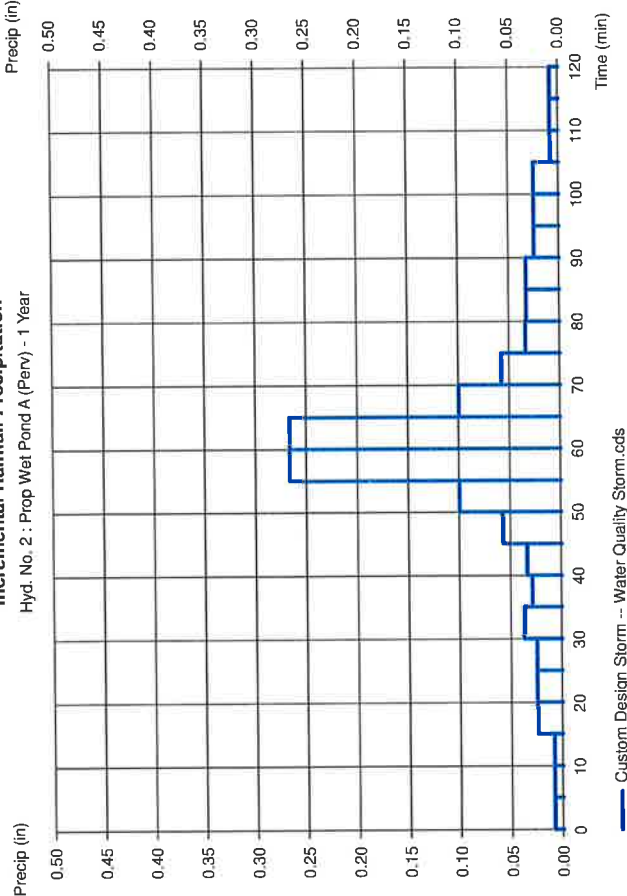
Hyd. No. 3

Prop Village Shopper Improvements

Hydrograph type	= SCS Runoff	Peak discharge	= 1.680 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 2,637 cuft
Drainage area	= 1.900 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 484

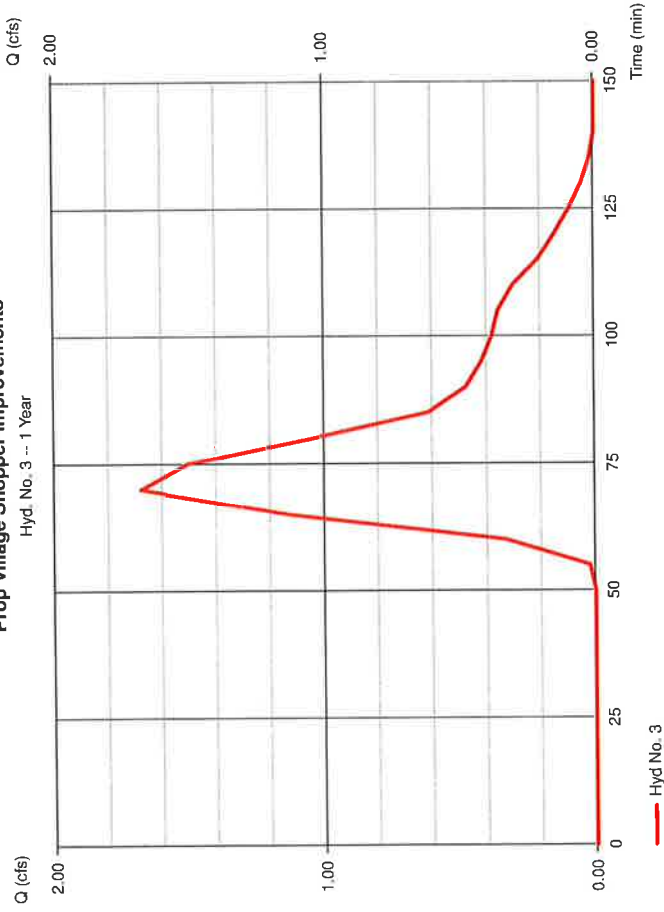
Incremental Rainfall Precipitation

Hyd. No. 2 : Prop Wet Pond A (Perv) - 1 Year



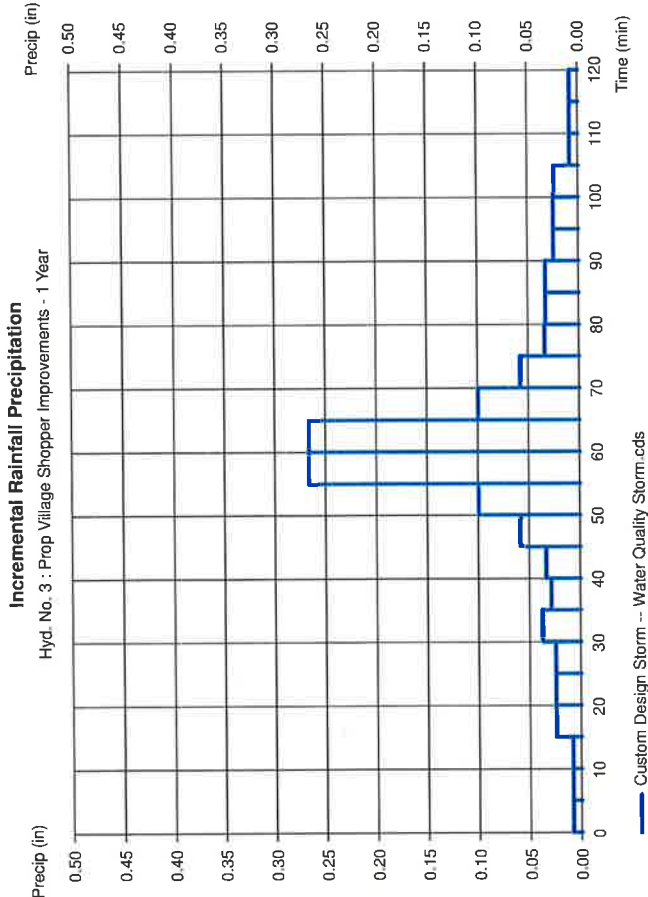
Prop Village Shopper Improvements

Hyd. No. 3 -- 1 Year



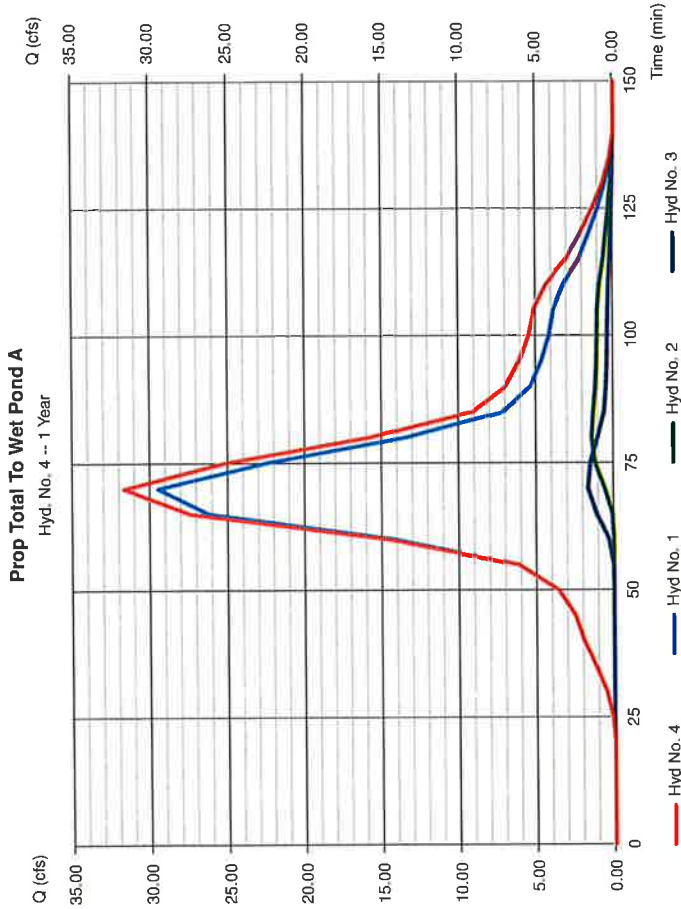
Precipitation Report

Hydralflow Hydrographs by Intellisolve v9.1		Tuesday, May 22, 2018	
Hyd. No. 3			
Prop Village Shopper Improvements			
Storm Frequency	= 1 yrs	Time interval	= 5 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds		



Hydrograph Report

Hydralflow Hydrographs by Intellisolve v9.1		Tuesday, May 22, 2018	
Hyd. No. 4			
Prop Total To Wet Pond A			
Hydrograph type	= Combine	Peak discharge	= 31.74 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 52.844 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 32.360 ac



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 5

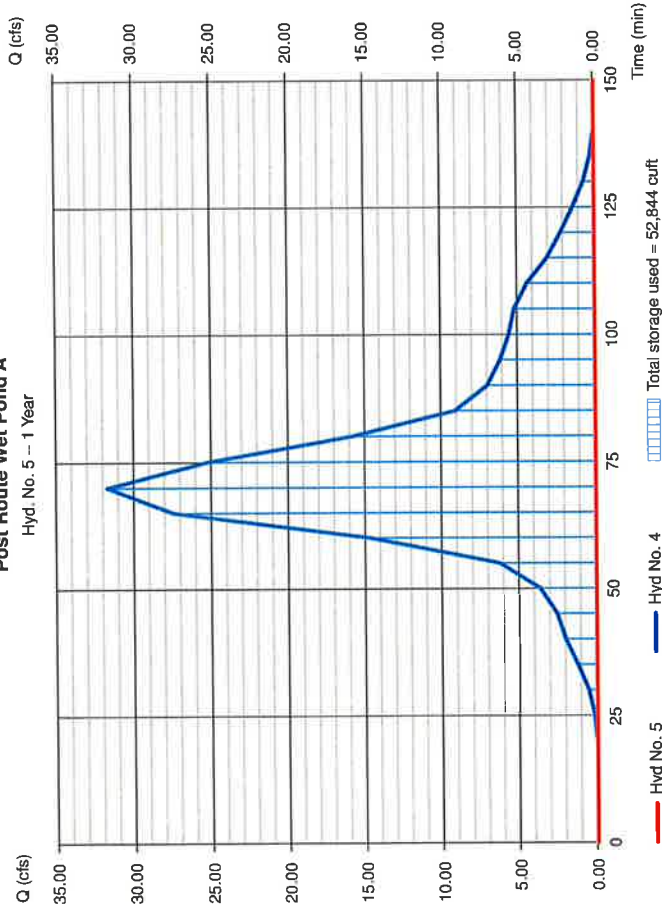
Post Route Wet Pond A

Hydrograph type = Reservoir
Storm frequency = 1 yrs
Time interval = 5 min
Inflow hyd. No. = 4 - Prop Total To Wet Pond A
Reservoir name = Permanent Pool A

Peak discharge = 0.000 cfs
Time to peak = n/a
Hyd. volume = 0 cuft
Max. Elevation = 106.97 ft
Max. Storage = 52,844 cuft

Storage Indication method used.

Post Route Wet Pond A
Hyd. No. 5 - 1 Year



Pond Report

Hydralow Hydrographs by Intellisolve v9.1

Tuesday, May 22, 2018

Pond No. 6 - Permanent Pool A

Pond Data

Contours - User-defined contour areas. Conto method used for volume calculation. Beginning Elevation = 105.50 ft

Stage / Storage Table	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
Stage (ft)				
0.00	105.50	32,126	0	0
0.50	106.00	34,760	16,716	16,716
1.00	107.00	38,954	37,323	54,039
1.50	108.00	47,263	45,553	99,592
2.00	108.50	52,057	25,024	124,616

Culvert / Orifice Structures

Stage / Storage / Discharge Table	Elevation	Civ A	Civ B	Civ C	PrfRar	Wr A	Wr B	Wr C	Wr D	Exfil	User	Total
Stage												
0.00	105.50	---	---	---	---	---	---	---	---	---	---	0.00
0.05	105.55	---	---	---	---	---	---	---	---	---	---	0.00
0.10	105.60	---	---	---	---	---	---	---	---	---	---	0.00
0.15	105.65	---	---	---	---	---	---	---	---	---	---	0.00
0.20	105.70	---	---	---	---	---	---	---	---	---	---	0.00
0.25	105.75	---	---	---	---	---	---	---	---	---	---	0.00
0.30	105.80	---	---	---	---	---	---	---	---	---	---	0.00
0.35	105.85	---	---	---	---	---	---	---	---	---	---	0.00
0.40	105.90	---	---	---	---	---	---	---	---	---	---	0.00
0.45	105.95	---	---	---	---	---	---	---	---	---	---	0.00
0.50	106.00	---	---	---	---	---	---	---	---	---	---	0.00
0.55	106.05	---	---	---	---	---	---	---	---	---	---	0.00
0.60	106.10	---	---	---	---	---	---	---	---	---	---	0.00
0.65	106.15	---	---	---	---	---	---	---	---	---	---	0.00
0.70	106.20	---	---	---	---	---	---	---	---	---	---	0.00
0.75	106.25	---	---	---	---	---	---	---	---	---	---	0.00
0.80	106.30	---	---	---	---	---	---	---	---	---	---	0.00
0.85	106.35	---	---	---	---	---	---	---	---	---	---	0.00
0.90	106.40	---	---	---	---	---	---	---	---	---	---	0.00
0.95	106.45	---	---	---	---	---	---	---	---	---	---	0.00
1.00	106.50	---	---	---	---	---	---	---	---	---	---	0.00
1.05	106.55	---	---	---	---	---	---	---	---	---	---	0.00
1.10	106.60	---	---	---	---	---	---	---	---	---	---	0.00
1.15	106.65	---	---	---	---	---	---	---	---	---	---	0.00
1.20	106.70	---	---	---	---	---	---	---	---	---	---	0.00
1.25	106.75	---	---	---	---	---	---	---	---	---	---	0.00
1.30	106.80	---	---	---	---	---	---	---	---	---	---	0.00
1.35	106.85	---	---	---	---	---	---	---	---	---	---	0.00
1.40	106.90	---	---	---	---	---	---	---	---	---	---	0.00
1.45	106.95	---	---	---	---	---	---	---	---	---	---	0.00
1.50	107.00	---	---	---	---	---	---	---	---	---	---	0.00
1.55	107.05	---	---	---	---	---	---	---	---	---	---	0.00
1.60	107.10	---	---	---	---	---	---	---	---	---	---	0.00
1.65	107.15	---	---	---	---	---	---	---	---	---	---	0.00
1.70	107.20	---	---	---	---	---	---	---	---	---	---	0.00
1.75	107.25	---	---	---	---	---	---	---	---	---	---	0.00
1.80	107.30	---	---	---	---	---	---	---	---	---	---	0.00
1.85	107.35	---	---	---	---	---	---	---	---	---	---	0.00
1.90	107.40	---	---	---	---	---	---	---	---	---	---	0.00
1.95	107.45	---	---	---	---	---	---	---	---	---	---	0.00
2.00	107.50	---	---	---	---	---	---	---	---	---	---	0.00
2.05	107.55	---	---	---	---	---	---	---	---	---	---	0.00
2.10	107.60	---	---	---	---	---	---	---	---	---	---	0.00
2.15	107.65	---	---	---	---	---	---	---	---	---	---	0.00
2.20	107.70	---	---	---	---	---	---	---	---	---	---	0.00
2.25	107.75	---	---	---	---	---	---	---	---	---	---	0.00
2.30	107.80	---	---	---	---	---	---	---	---	---	---	0.00
2.35	107.85	---	---	---	---	---	---	---	---	---	---	0.00
2.40	107.90	---	---	---	---	---	---	---	---	---	---	0.00
2.45	107.95	---	---	---	---	---	---	---	---	---	---	0.00
2.50	108.00	---	---	---	---	---	---	---	---	---	---	0.00
2.55	108.05	---	---	---	---	---	---	---	---	---	---	0.00
2.60	108.10	---	---	---	---	---	---	---	---	---	---	0.00
2.65	108.15	---	---	---	---	---	---	---	---	---	---	0.00
2.70	108.20	---	---	---	---	---	---	---	---	---	---	0.00
2.75	108.25	---	---	---	---	---	---	---	---	---	---	0.00
2.80	108.30	---	---	---	---	---	---	---	---	---	---	0.00
2.85	108.35	---	---	---	---	---	---	---	---	---	---	0.00
2.90	108.40	---	---	---	---	---	---	---	---	---	---	0.00

Continues on next page

Permanent Pool A

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfBar cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.95	120,114	108.45	---	---	---	---	---	---	---	---	---	---	0.00
3.00	122,616	108.50	---	---	---	---	---	---	---	---	---	---	0.00

---End

Hydraflow Rainfall Report

Hydraflow Hydrographs by Intelliscave v9.1

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)				
	B	D	E	(N/A)	
1	39.0824	9.5000	0.8528	-----	
2	45.6943	10.7000	0.8185	-----	
3	0.0000	0.0000	0.0000	-----	
5	99.7061	14.9000	0.9304	-----	
10	249.7597	21.8001	1.0961	-----	
25	115.7547	14.9000	0.8980	-----	
50	7.3699	0.1000	0.2544	-----	
100	403.8513	25.1001	1.1108	-----	

File name: TRENTON.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)										
	5 min	10	15	20	25	30	35	40	45	50	60
1	4.00	3.10	2.55	2.18	1.91	1.70	1.54	1.40	1.29	1.20	1.05
2	4.80	3.83	3.21	2.77	2.45	2.20	2.00	1.84	1.70	1.59	1.40
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.80
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.00
25	7.89	6.45	5.47	4.76	4.23	3.80	3.46	3.17	2.93	2.73	2.40
50	4.87	4.09	3.69	3.44	3.25	3.10	2.98	2.88	2.80	2.72	2.60
100	9.20	7.76	6.69	5.87	5.22	4.70	4.27	3.91	3.60	3.33	2.90

Tc = time in minutes. Values may exceed 60.

Precip. file name: Somerset County NRCS.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.34	0.00	4.25	5.01	6.15	7.13	8.21
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hydraflow Table of Contents

Permanent Pool.gpw

Hydraflow Hydrographs by Intelsolve v8.1

Tuesday, May 22, 2018

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**WET POND
TSS REMOVAL CALCULATIONS**

Wet Pond TSS Removal Calculations

The New Jersey Best Management Practices Manual (Figure 9.11-2) was utilized to calculate the TSS Removal Rates for Wet Ponds. In order to determine the TSS Removal Rate for a Wet Pond utilizing Figure 9.11-2, the Ratio of Permanent Pool Volume to Stormwater Quality Storm Runoff Volume and the Detention Time must be calculated.

Wet Pond A

Ratio of Permanent Pool Volume to Stormwater Quality Storm Runoff Volume Calculation

Permanent Pool Volume = 122,616 CF

Stormwater Quality Storm Runoff Volume = 52,844 CF

Ratio of Permanent Pool Volume to Stormwater Quality Storm Runoff Volume = greater than 2.3:1

Detention Time Calculation (Please refer to Hydrograph Summary Reports Water Quality Storm (Detention Time) Appendix)

Stormwater Quality Storm Runoff Volume = 52,844 CF

10% of Stormwater Quality Storm Runoff Volume = 5,284 CF

Basin Water Surface Elevation at maximum Stormwater Quality Storm Runoff Volume = 109.32 FT
(2.00 Hours)

Basin Water Surface Elevation at 10% of maximum Stormwater Quality Storm Runoff Volume =
108.69 FT (19.42 Hours)

Detention Time = 17.42 Hours

TSS Removal Calculations Utilizing Figure 9.11-2 of the NJBMP

As shown on the enclosed Figure 9.11-2, Wet Pond A provides a TSS Removal Rate of 82%.

TSS Removal Rate of Wet Pond Systems

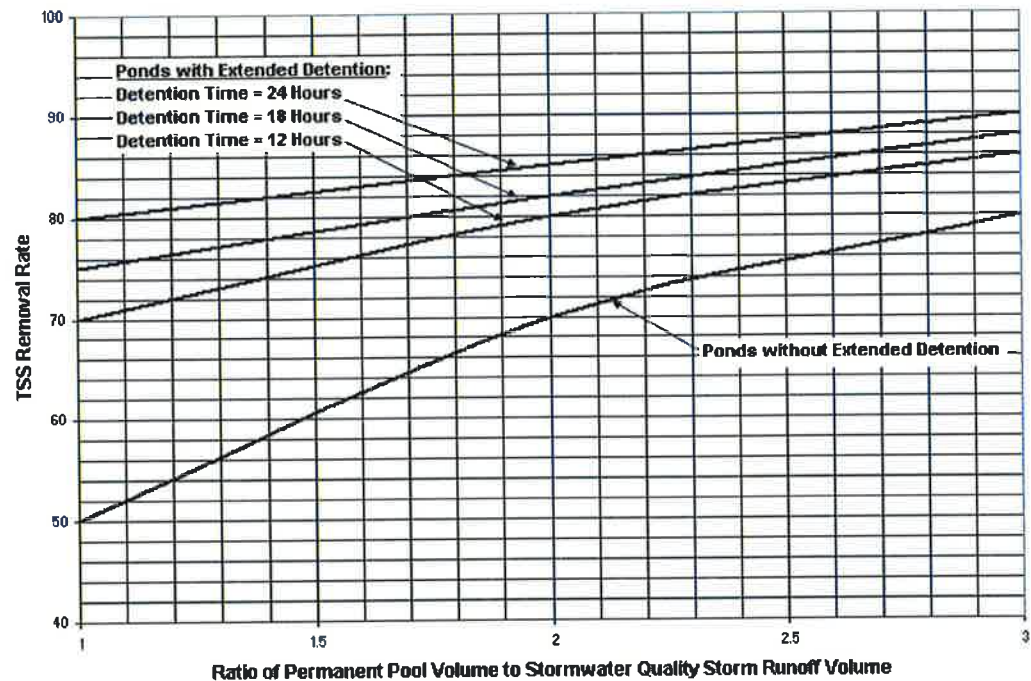
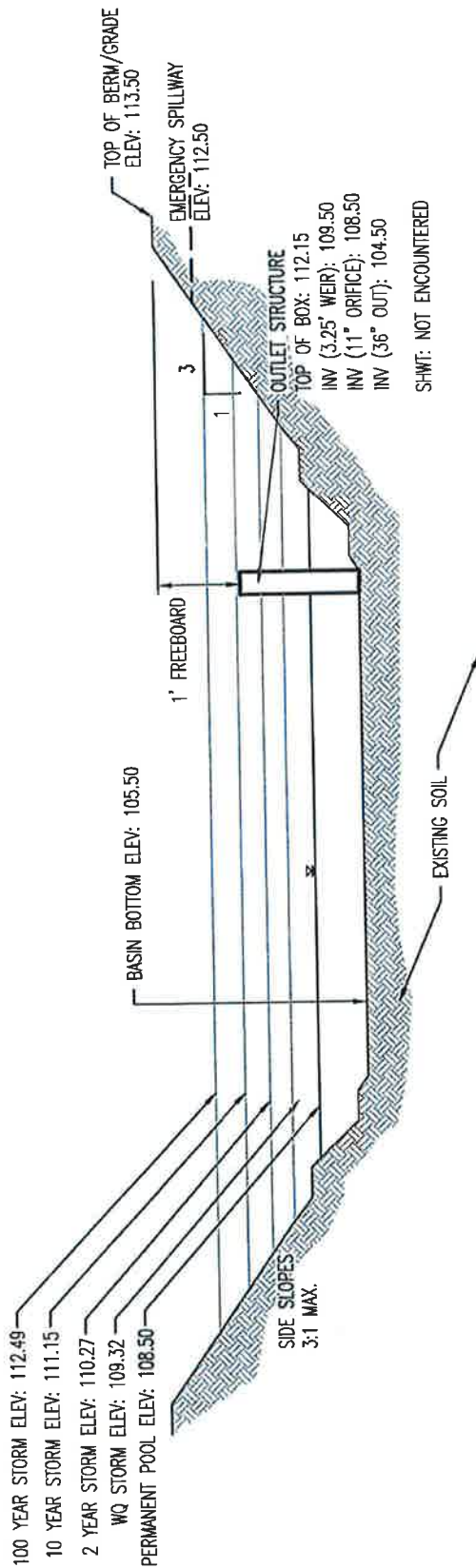


Figure 9.11-2

**ABOVEGROUND WET POND
SCHEMATIC DETAILS**



CROSS-SECTION A-A

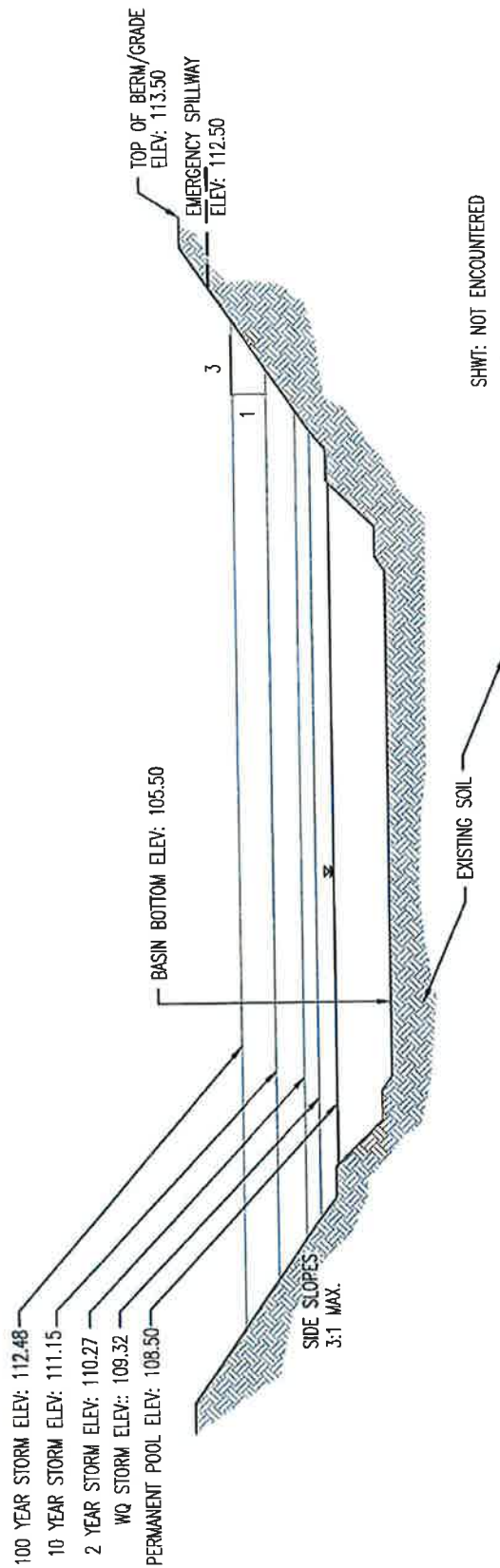
NOTE: WET POND BASIN BERM TO HAVE CLAYCORE AS SHOWN ON THE WET POND BASIN BERM W/ CLAYCORE DETAIL.

WET POND BASIN A1 DETAIL

NOT TO SCALE



790 Newtown Yardley Road - Suite 425 - Newtown, PA 18940
T: 267.685.0276 - F: 267.685.0361
www.dynamiceng.com



CROSS-SECTION A-A

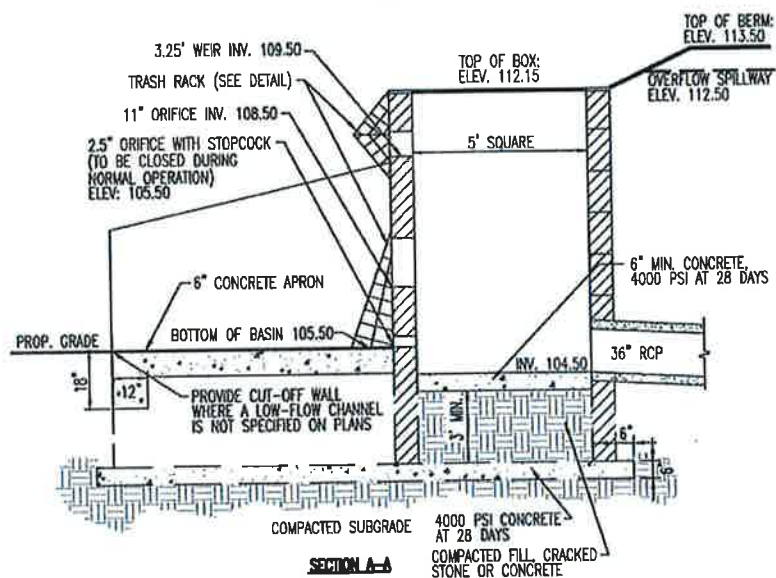
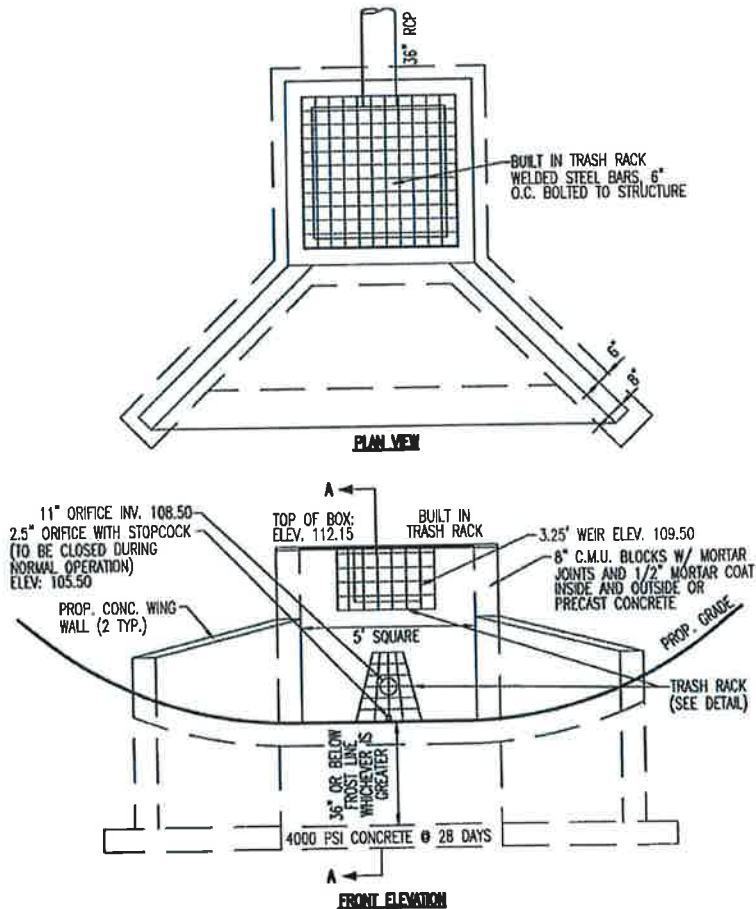
NOTE: WET POND BASIN BERM TO HAVE CLAYCORE AS SHOWN ON THE WET POND BASIN BERM W/ CLAYCORE DETAIL.

WET POND BASIN A2 DETAIL

NOT TO SCALE



790 Newtown Yardley Road - Suite 425 - Newtown, PA 18940
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www.dynamiceng.com



OUTLET CONTROL STRUCTURE 'A' DETAIL

NOT TO SCALE



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www.dynamiceng.com

EMERGENCY SPILLWAY CALCULATIONS



Overflow Spillway Calculations

Project:
Job #: 0043-14-015
Location: Montgomery Township, Somerset County
Computed By: MSA
Checked By: JSH
Date: 4/3/18

Wet Pond A

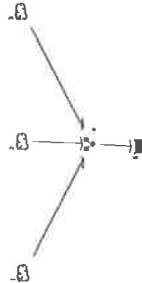
To Size Spillway:

- Assume complete blockage of the outlet control structure and no infiltration
- Route 2 & 10 year storm through basin assuming that the basin is filled with water up to the Emergency Spillway Elevation

	2 Year	10 Year	150% of 100 Year
Spillway Width (ft.)	400.00	400.00	400.00
Spillway Elevation (ft.)	112.50	112.50	112.50
Flow through Spillway (Q) (cfs)	46.810	84.800	260.900
Water Surface Elevation (ft)	112.61	112.66	112.84
Depth of Flow (ft)	0.11	0.16	0.34
Area of Flow (A) (sf)*	44.01	64.03	136.12

Velocity (V) = Q / A (ft/sec) 1.06 1.32 1.92

** V = < 2.0 FPS ** Stability Achieved



Legend

Hwy.	Origin	Description
1	SCS Runoff	Prop Wet Pond A (Imp)
2	SCS Runoff	Prop Wet Pond A (Peri)
3	SCS Runoff	Prop Village Shopper Improvements
4	Combine	Prop Total To Wet Pond A
5	Reservoir	Post Route Wet Pond A

Project: ES.qpw

Tuesday, May 22, 2018

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)							Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	
1	SCS Runoff	1	31.28	47.23	116.70	Prop Wet Pond A (Imp)				
2	SCS Runoff	1	15.01	33.48	126.14	Prop Wet Pond A (Perv)				
3	SCS Runoff	1	3,431	5,818	16.10	Prop Villages Stopper Improvements				
4	Combine	1, 2, 3	48,772	86,552	258.93	Prop Total To Wet Pond A				
5	Reservoir	4	48.81	84.80	280.90	Post Route Wet Pond A				

Proj. file: ES.gpw

Tuesday, May 22, 2018

Hydrograph Summary Report

Hydratflow Hydrographs by Intellisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total storage used (cuft)	Hydrograph description
1	SCS Runoff	31.28	5	730	140,627	-----	-----	-----	Prop Wet Pond A (imp)
2	SCS Runoff	15.01	5	730	62,686	-----	-----	-----	Prop Wet Pond A (Perf)
3	SCS Runoff	3.431	5	730	13,728	-----	-----	-----	Prop Village Shopper Improvements
4	Combine	48.72	5	730	217,042	1, 2, 3	-----	-----	Prop Total To Wet Pond A
5	Reservoir	48.81	5	730	217,042	4	112.61	9,240	Post Route Wet Pond A
							Return Period: 2 Year		
ES.gpw							Tuesday, May 22, 2018		

Hydrograph Report

Hydratflow Hydrographs by Intellisolve v9.1

Hyd. No. 1

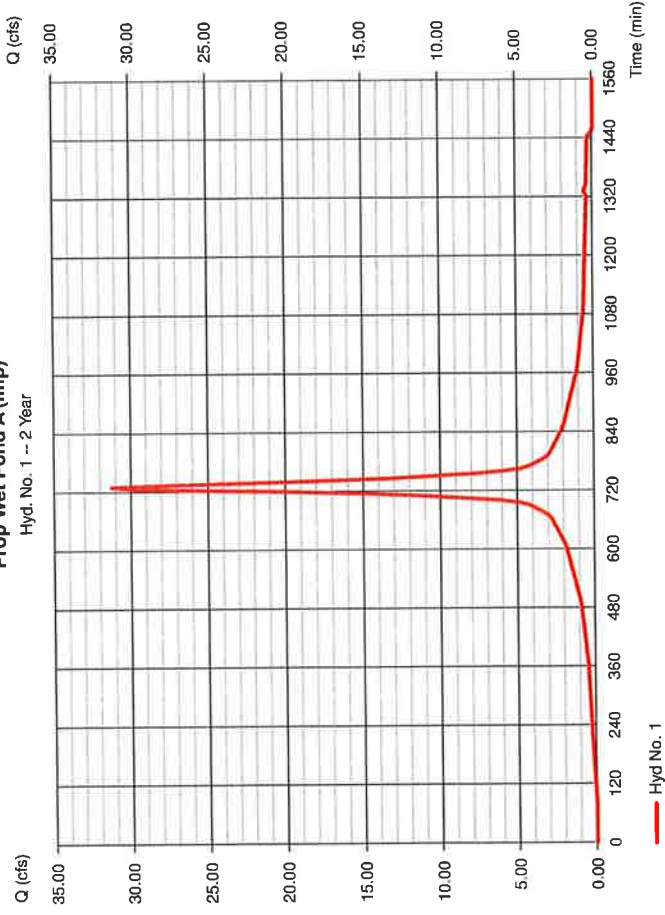
Prop Wet Pond A (imp)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 13.300 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 31.28 cfs
Time to peak = 730 min
Hyd. volume = 140,627 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Wet Pond A (imp)

Hyd. No. 1 -- 2 Year



Hydrograph Report

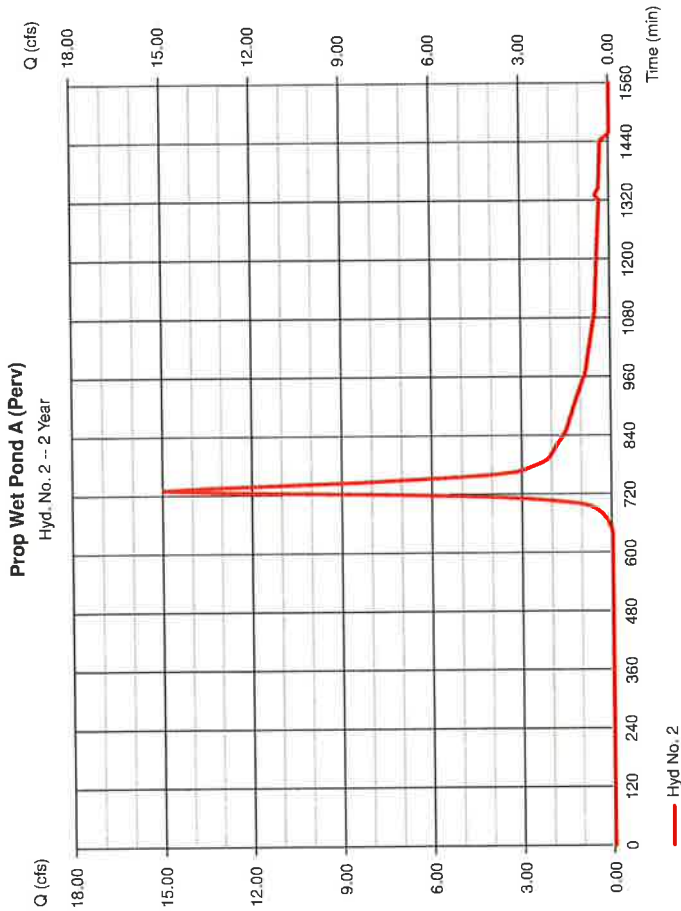
Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 2

Prop Wet Pond A (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 17.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 15.01 cfs
Time to peak = 730 min
Hyd. volume = 62,686 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

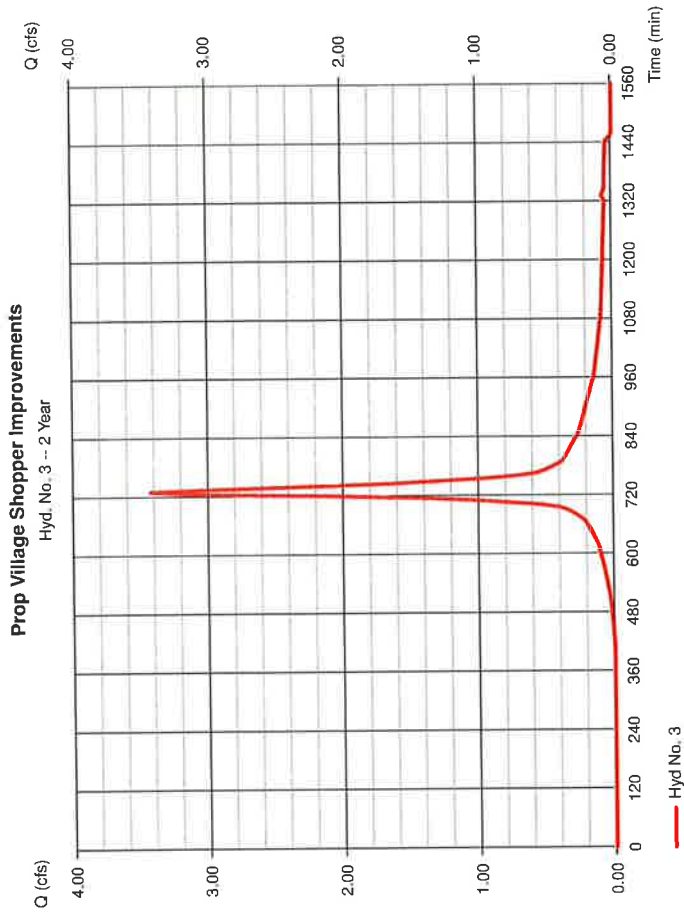
Hydroflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 3

Prop Village Shopper Improvements

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Time interval = 5 min
Drainage area = 1.900 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.34 in
Storm duration = 24 hrs

Peak discharge = 3.431 cfs
Time to peak = 730 min
Hyd. volume = 13,729 cuft
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

Hydrflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 4

Prop Total To Wet Pond A

Hydrograph type	= Combine	Peak discharge	= 49.72 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 217,042 cuft
Inflow hyds.	= 1, 2, 3	Contrib. drain. area	= 32.360 ac

Hydrograph Report

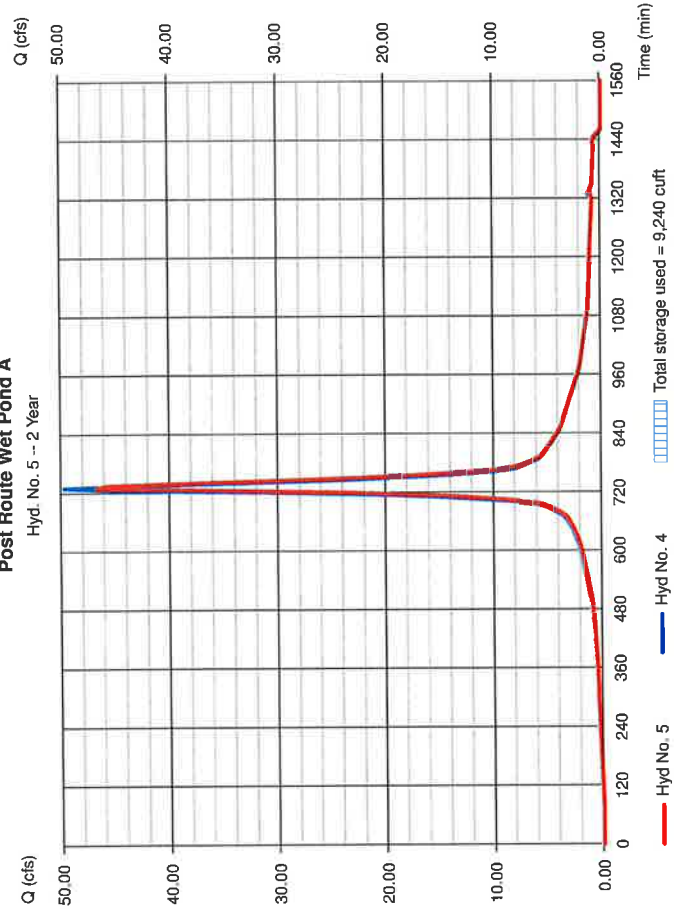
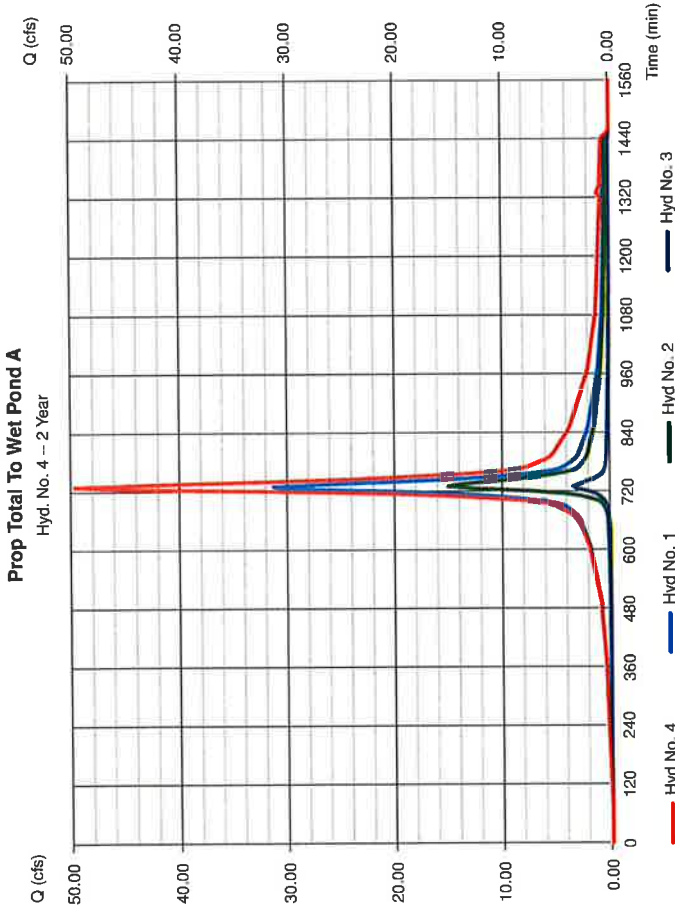
Hydrflow Hydrographs by Intellisolve v9.1 Tuesday, May 22, 2018

Hyd. No. 5

Post Route Wet Pond A

Hydrograph type	= Reservoir	Peak discharge	= 46.81 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 217,042 cuft
Inflow hyd. No.	= 4 - Prop Total To Wet Pond A	Max. Elevation	= 112.61 ft
Reservoir name	= Wet Pond A	Max. Storage	= 9,240 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intellisolve v9.1

Pond No. 2 - Wet Pond A

Pond Data

Contour: User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 112.50 ft

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 112.50 ft

Stage / Storage Table			
Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)
0.00	112.50	80,613	0
1.00	113.50	93,760	87,095
			0
			87,095

Culvert / Orifice Structures

	[A]	[B]	[C]	[pHResr]	[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00	Crest Len (ft)	= 400.00	Inactive	Inactive
Span (in)	= 0.00	0.00	0.00	0.00	Crest El.	= 112.50	0.00	0.00
No. Barrels	= 0	0	0	0	Wair Coeff.	= 3.33	3.33	3.33
Invert El. (ft)	= 0.00	0.00	0.00	0.00	Wair Type	= Ract	---	---
Length (ft)	= 0.00	0.00	0.00	0.00	Multi-Stage	= No	No	No
Length (ft)	= 0.00	0.00	0.00	0.00				
Slope (%)	= 0.00	0.00	0.00	n/a				
N-Value	= .013	.013	.013	n/a				
Orifice Coeff.	= 0.60	0.60	0.60	0.60	Exfil.(m/hr)	= 0.000 (by Wair area)		
Multi-Stage	= n/a	No	No	No	TW Elev. (ft)	= 0.00		

..... 0, 1, 2, 3, 4, 5, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240, 245, 250, 255, 260, 265, 270, 275, 280, 285, 290, 295, 300, 305, 310, 315, 320, 325, 330, 335, 340, 345, 350, 355, 360, 365, 370, 375, 380, 385, 390, 395, 400, 405, 410, 415, 420, 425, 430, 435, 440, 445, 450, 455, 460, 465, 470, 475, 480, 485, 490, 495, 500, 505, 510, 515, 520, 525, 530, 535, 540, 545, 550, 555, 560, 565, 570, 575, 580, 585, 590, 595, 600, 605, 610, 615, 620, 625, 630, 635, 640, 645, 650, 655, 660, 665, 670, 675, 680, 685, 690, 695, 700, 705, 710, 715, 720, 725, 730, 735, 740, 745, 750, 755, 760, 765, 770, 775, 780, 785, 790, 795, 800, 805, 810, 815, 820, 825, 830, 835, 840, 845, 850, 855, 860, 865, 870, 875, 880, 885, 890, 895, 900, 905, 910, 915, 920, 925, 930, 935, 940, 945, 950, 955, 960, 965, 970, 975, 980, 985, 990, 995, 1000, 1005, 1010, 1015, 1020, 1025, 1030, 1035, 1040, 1045, 1050, 1055, 1060, 1065, 1070, 1075, 1080, 1085, 1090, 1095, 1100, 1105, 1110, 1115, 1120, 1125, 1130, 1135, 1140, 1145, 1150, 1155, 1160, 1165, 1170, 1175, 1180, 1185, 1190, 1195, 1200, 1205, 1210, 1215, 1220, 1225, 1230, 1235, 1240, 1245, 1250, 1255, 1260, 1265, 1270, 1275, 1280, 1285, 1290, 1295, 1300, 1305, 1310, 1315, 1320, 1325, 1330, 1335, 1340, 1345, 1350, 1355, 1360, 1365, 1370, 1375, 1380, 1385, 1390, 1395, 1400, 1405, 1410, 1415, 1420, 1425, 1430, 1435, 1440, 1445, 1450, 1455, 1460, 1465, 1470, 1475, 1480, 1485, 1490, 1495, 1500, 1505, 1510, 1515, 1520, 1525, 1530, 1535, 1540, 1545, 1550, 1555, 1560, 1565, 1570, 1575, 1580, 1585, 1590, 1595, 1600, 1605, 1610, 1615, 1620, 1625, 1630, 1635, 1640, 1645, 1650, 1655, 1660, 1665, 1670, 1675, 1680, 1685, 1690, 1695, 1700, 1705, 1710, 1715, 1720, 1725, 1730, 1735, 1740, 1745, 1750, 1755, 1760, 1765, 1770, 1775, 1780, 1785, 1790, 1795, 1800, 1805, 1810, 1815, 1820, 1825, 1830, 1835, 1840, 1845, 1850, 1855, 1860, 1865, 1870, 1875, 1880, 1885, 1890, 1895, 1900, 1905, 1910, 1915, 1920, 1925, 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030, 2035, 2040, 2045, 2050, 2055, 2060, 2065, 2070, 2075, 2080, 2085, 2090, 2095, 2100, 2105, 2110, 2115, 2120, 2125, 2130, 2135, 2140, 2145, 2150, 2155, 2160, 2165, 2170, 2175, 2180, 2185, 2190, 2195, 2200, 2205, 2210, 2215, 2220, 2225, 2230, 2235, 2240, 2245, 2250, 2255, 2260, 2265, 2270, 2275, 2280, 2285, 2290, 2295, 2300, 2305, 2310, 2315, 2320, 2325, 2330, 2335, 2340, 2345, 2350, 2355, 2360, 2365, 2370, 2375, 2380, 2385, 2390, 2395, 2400, 2405, 2410, 2415, 2420, 2425, 2430, 2435, 2440, 2445, 2450, 2455, 2460, 2465, 2470, 2475, 2480, 2485, 2490, 2495, 2500, 2505, 2510, 2515, 2520, 2525, 2530, 2535, 2540, 2545, 2550, 2555, 2560, 2565, 2570, 2575, 2580, 2585, 2590, 2595, 2600, 2605, 2610, 2615, 2620, 2625, 2630, 2635, 2640, 2645, 2650, 2655, 2660, 2665, 2670, 2675, 2680, 2685, 2690, 2695, 2700, 2705, 2710, 2715, 2720, 2725, 2730, 2735, 2740, 2745, 2750, 2755, 2760, 2765, 2770, 2775, 2780, 2785, 2790, 2795, 2800, 2805, 2810, 2815, 2820, 2825, 2830, 2835, 2840, 2845, 2850, 2855, 2860, 2865, 2870, 2875, 2880, 2885, 2890, 2895, 2900, 2905, 2910, 2915, 2920, 2925, 2930, 2935, 2940, 2945, 2950, 2955, 2960, 2965, 2970, 2975, 2980, 2985, 2990, 2995, 3000, 3005, 3010, 3015, 3020, 3025, 3030, 3035, 3040, 3045, 3050, 3055, 3060, 3065, 3070, 3075, 3080, 3085, 3090, 3095, 3100, 3105, 3110, 3115, 3120, 3125, 3130, 3135, 3140, 3145, 3150, 3155, 3160, 3165, 3170, 3175, 3180, 3185, 3190, 3195, 3200, 3205, 3210, 3215, 3220, 3225, 3230, 3235, 3240, 3245, 3250, 3255, 3260, 3265, 3270, 3275, 3280, 3285, 3290, 3295, 3300, 3305, 3310, 3315, 3320, 3325, 3330, 3335, 3340, 3345, 3350, 3355, 3360, 3365, 3370, 3375, 3380, 3385, 3390, 3395, 3400, 3405, 3410, 3415, 3420, 3425, 3430, 3435, 3440, 3445, 3450, 3455, 3460, 3465, 3470, 3475, 3480, 3485, 3490, 3495, 3500, 3505, 3510, 3515, 3520, 3525, 3530, 3535, 3540, 3545, 3550, 3555, 3560, 3565, 3570, 3575, 3580, 3585, 35

Stage / Storage / Discharge Table													
Stage ft	Storage cu ft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrRr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	112.50	----	----	----	----	0.00	----	----	----	----	----	0.00
0.10	8,710	112.60	----	----	----	----	112.60	----	----	----	----	----	42.12
0.20	17,419	112.70	----	----	----	----	119.14	----	----	----	----	----	119.14
0.30	26,129	112.80	----	----	----	----	218.87	----	----	----	----	----	218.87
0.40	34,838	112.90	----	----	----	----	336.97	----	----	----	----	----	336.97
0.50	43,548	113.00	----	----	----	----	470.93	----	----	----	----	----	470.93
0.60	52,257	113.10	----	----	----	----	619.96	----	----	----	----	----	619.96
0.70	60,967	113.20	----	----	----	----	783.11	----	----	----	----	----	780.10
0.80	69,676	113.30	----	----	----	----	953.11	----	----	----	----	----	953.11
0.90	78,386	113.40	----	----	----	----	1137.28	----	----	----	----	----	1137.28
1.00	87,095	113.50	----	----	----	----	1332.00	----	----	----	----	----	1332.00

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	47.23	5	730	216,040	1	112.66	13,536	Prop Wet Pond A (Imp)
2	SCS Runoff	33.48	5	730	133,631	2	112.66		Prop Wet Pond A (Perv)
3	SCS Runoff	5.818	5	730	23,784	3	112.66		Prop Village Shopper Improvements
4	Combine	86.52	5	730	373,455	1, 2, 3	112.66		Prop Total To Wet Pond A
5	Reservoir	84.80	5	730	373,455	4	112.66	13,536	Post Route Wet Pond A
ES.gpw		Return Period: 10 Year				Tuesday, May 22, 2018			

Hydrograph Report

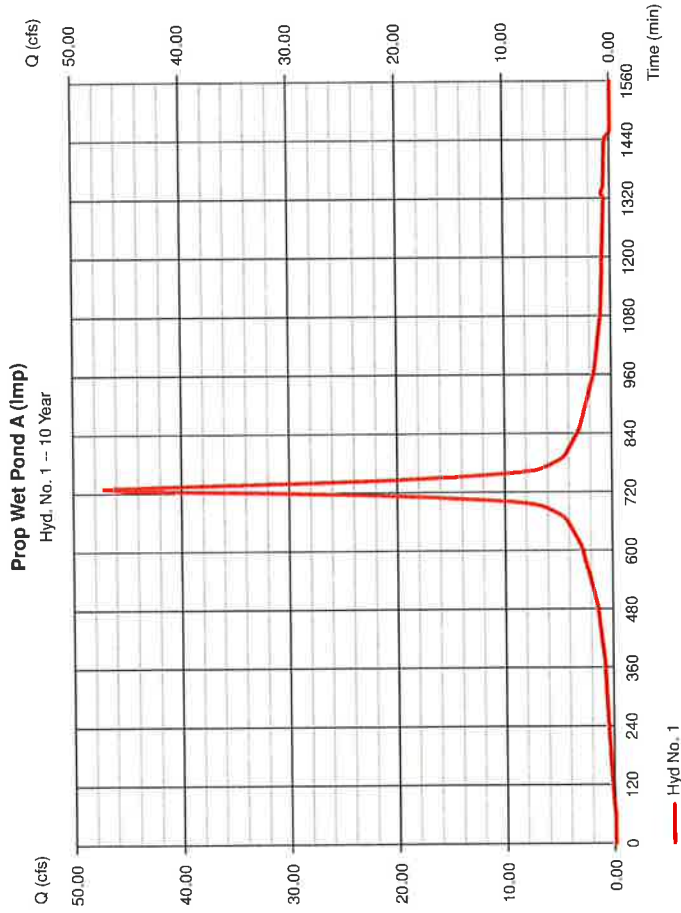
Hydroflow Hydrographs by InletSolve v9.1
Tuesday, May 22, 2018

Hyd. No. 1

Prop Wet Pond A (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 13,300 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 47.23 cfs
Time to peak = 730 min
Hyd. volume = 216,040 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



Hydrograph Report

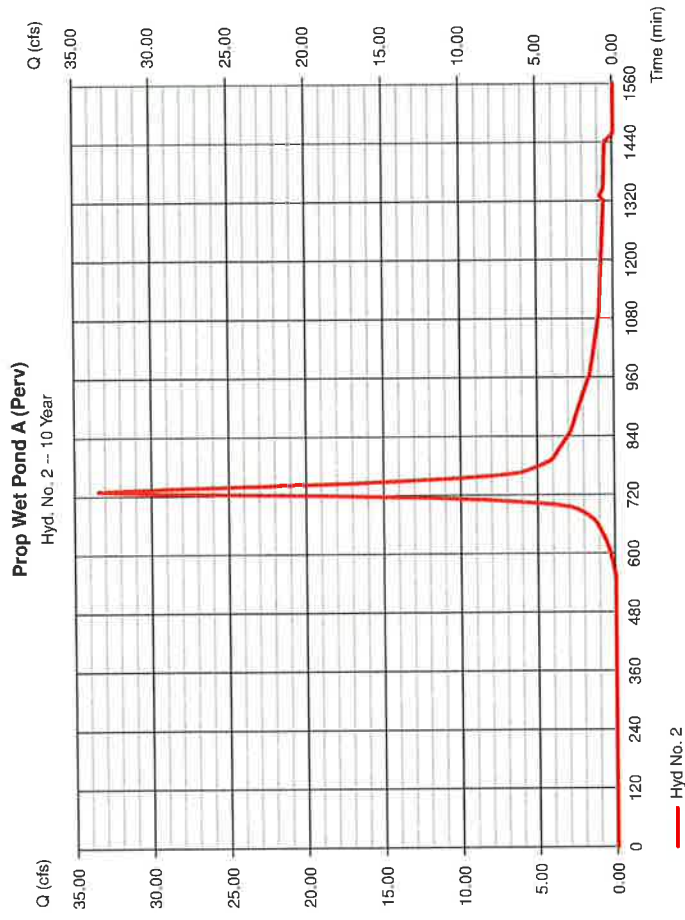
Hydroflow Hydrographs by InletSolve v9.1
Tuesday, May 22, 2018

Hyd. No. 2

Prop Wet Pond A (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Time interval = 5 min
Drainage area = 17,160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.01 in
Storm duration = 24 hrs

Peak discharge = 33.48 cfs
Time to peak = 730 min
Hyd. volume = 133,631 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484



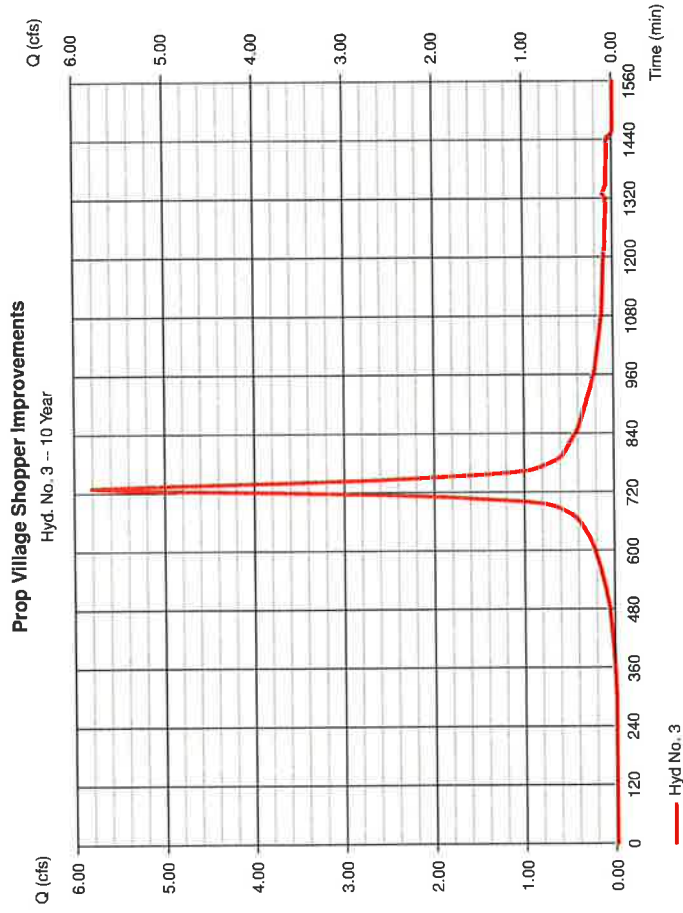
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 3

Prop Village Shopper Improvements

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.818 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	23,784 cuft
Drainage area	=	1,900 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.01 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



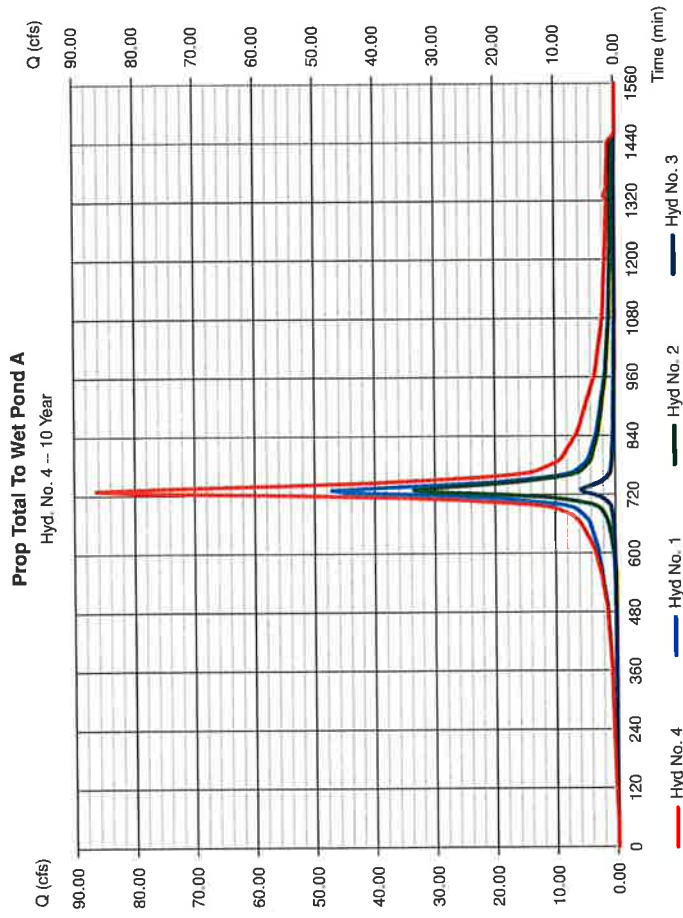
Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

Hyd. No. 4

Prop Total To Wet Pond A

Hydrograph type	=	Combine	Peak discharge	=	86.52 cfs
Storm frequency	=	10 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	373,455 cuft
Inflow hyds.	=	1, 2, 3	Contrib. drain. area	=	32,360 ac



Hydrograph Report

Hydroflow Hydrographs by Intalsolve v8.1

Tuesday, May 22, 2018

Hyd. No. 5

Post Route Wet Pond A

Hydrograph type = Reservoir

Storm frequency = 10 yrs

Time interval = 5 min

Inflow hyd. No. = 4 - Prop Total To Wet Pond A

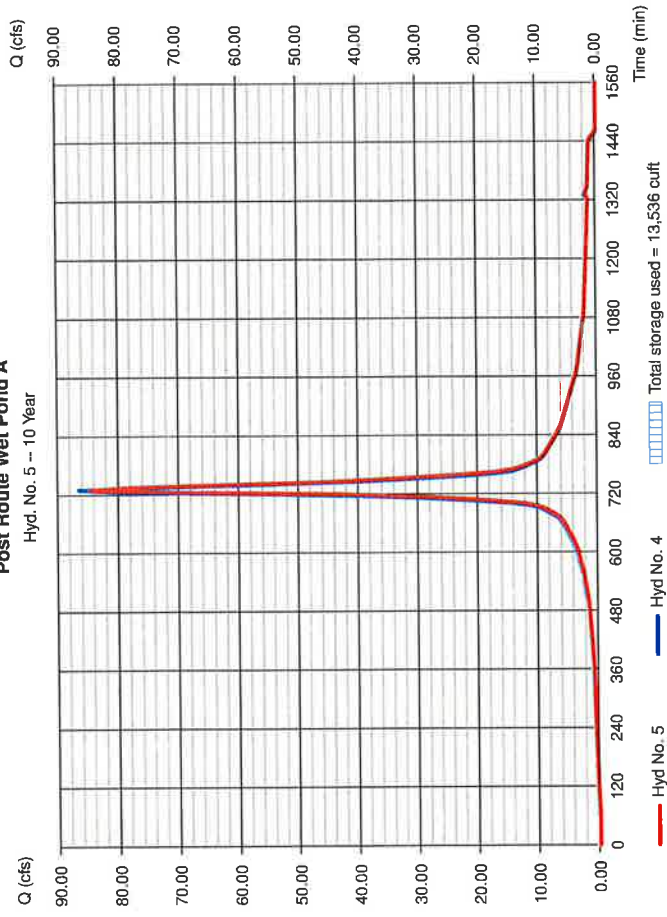
Reservoir name = Wet Pond A

Peak discharge = 84.80 cfs
Time to peak = 730 min
Hyd. volume = 373,455 cuft
Max. Elevation = 112.66 ft
Max. Storage = 13,536 cuft

Storage indication method used.

Post Route Wet Pond A

Hyd. No. 5 -- 10 Year



Hydrograph Summary Report

Hydroflow Hydrographs by Intalsolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total storage used (cuft)	Hydrograph description
1	SCS Runoff	116.70	5	730	546,689				Prop Wet Pond A (Imp)
2	SCS Runoff	126.14	5	730	512,555				Prop Wet Pond A (Perv)
3	SCS Runoff	16.10	5	730	69,976				Prop Village Shopper Improvements
4	Combine	258.93	5	730	1,129,220	1, 2, 3			Prop Total To Wet Pond A
5	Reservoir	280.90	5	730	1,129,220	4	112.84	29,228	Post Route Wet Pond A

ES.gpw

Return Period: 100 Year

Tuesday, May 22, 2018

Hydrograph Report

Hydroflow Hydrographs by Intellisolve v8.1
Tuesday, May 22, 2018

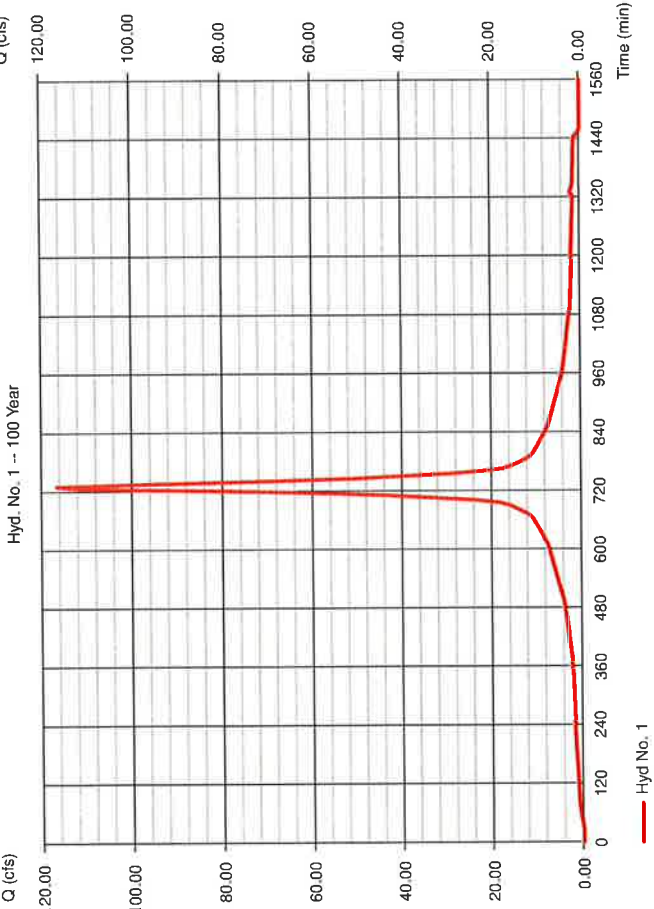
Hyd. No. 1

Prop Wet Pond A (Imp)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 13.300 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 12.32 in
Storm duration = 24 hrs

Peak discharge = 116.70 cfs
Time to peak = 730 min
Hyd. volume = 546,689 cuft
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Wet Pond A (Imp)



Hydrograph Report

Hydroflow Hydrographs by Intellisolve v9.1
Tuesday, May 22, 2018

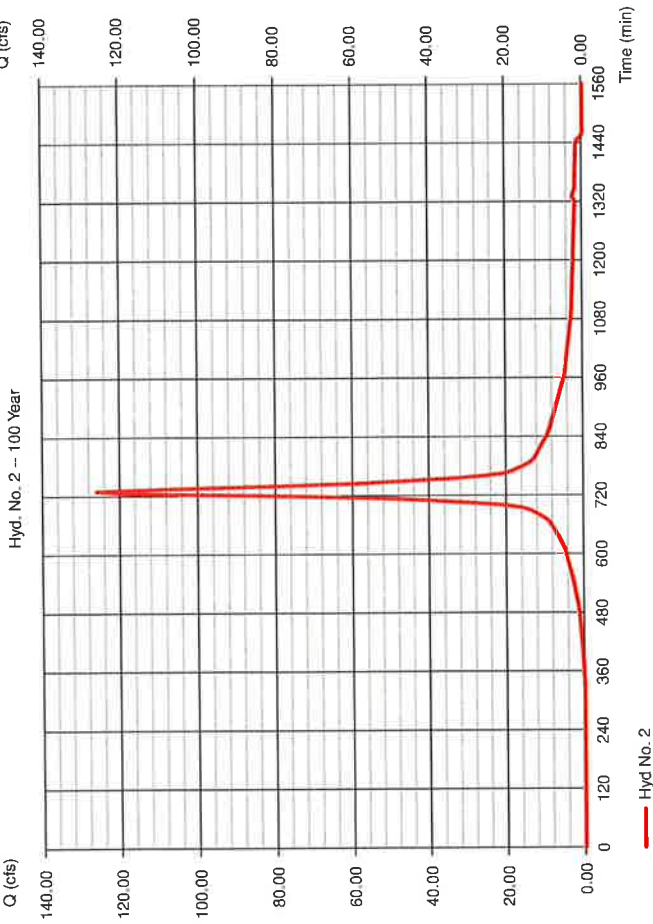
Hyd. No. 2

Prop Wet Pond A (Perv)

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 5 min
Drainage area = 17.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 12.32 in
Storm duration = 24 hrs

Peak discharge = 126.14 cfs
Time to peak = 730 min
Hyd. volume = 512,555 cuft
Curve number = 73
Hydraulic length = 0 ft
Time of conc. (Tc) = 10.00 min
Distribution = Type III
Shape factor = 484

Prop Wet Pond A (Perv)



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1

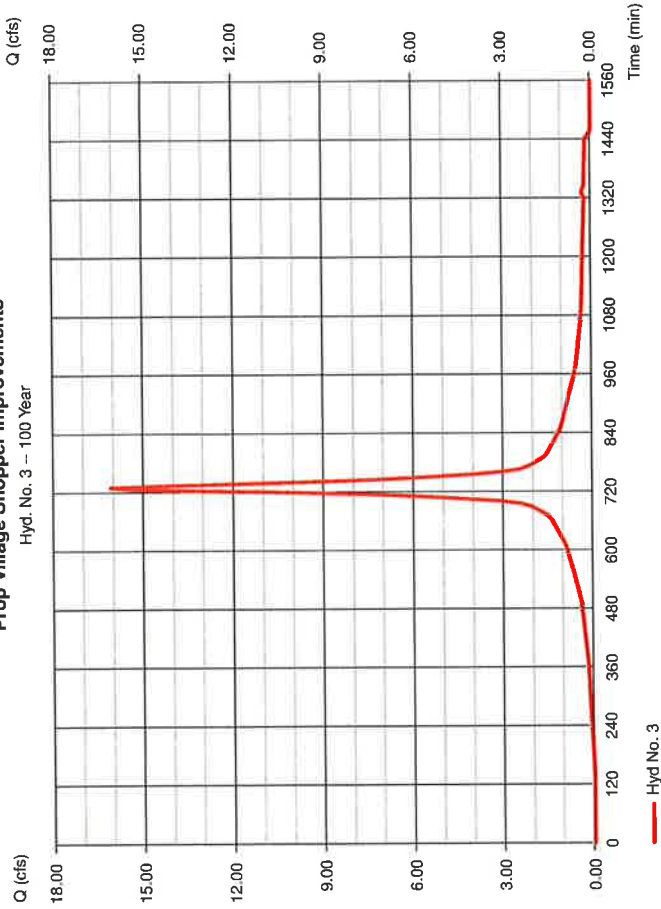
Tuesday, May 22, 2018

Hyd. No. 3

Prop Village Shopper Improvements

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.10 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	69,976 cuft
Drainage area	=	1,900 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	12.32 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Prop Village Shopper Improvements



Hydrograph Report

Hydralow Hydrographs by Intellisolve v9.1

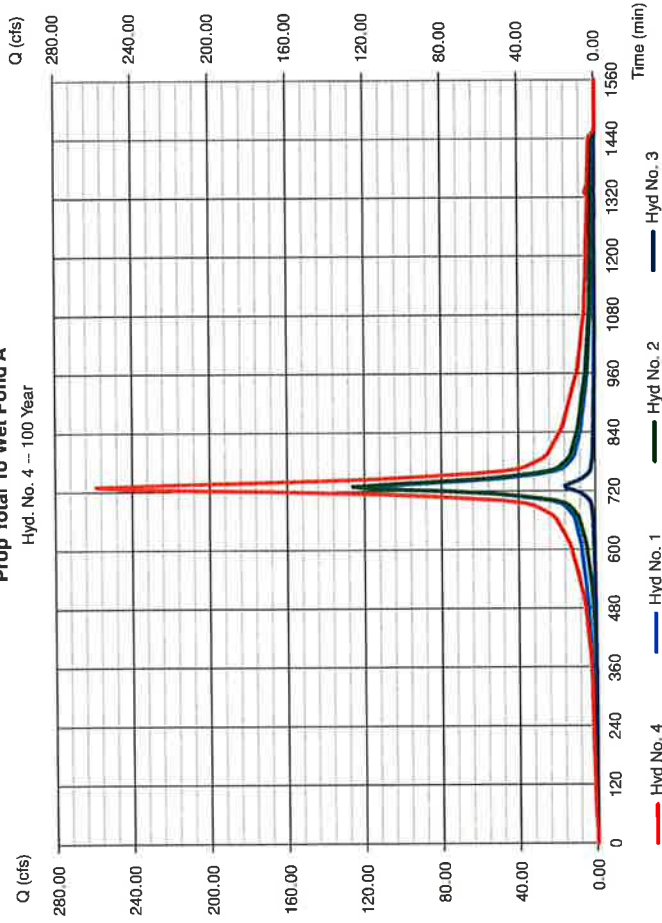
Tuesday, May 22, 2018

Hyd. No. 4

Prop Total To Wet Pond A

Hydrograph type	=	Combine	Peak discharge	=	258.93 cfs
Storm frequency	=	100 yrs	Time to peak	=	730 min
Time interval	=	5 min	Hyd. volume	=	1,129,220 cuft
Inflow hyds.	=	1, 2, 3	Contrib. drain. area	=	32.360 ac

Prop Total To Wet Pond A



Hydrograph Report

Hyd. No. 5

Post Route Wet Pond A

Hydrograph type = Reservoir

Storm frequency = 100 yrs

Time interval = 5 min

Inflow hyd. No. = 4 - Prop Total To Wet Pond A

Reservoir name = Wet Pond A

Peak discharge = 260.90 cfs

Time to peak = 730 min

Hyd. volume = 1,129,220 cuft

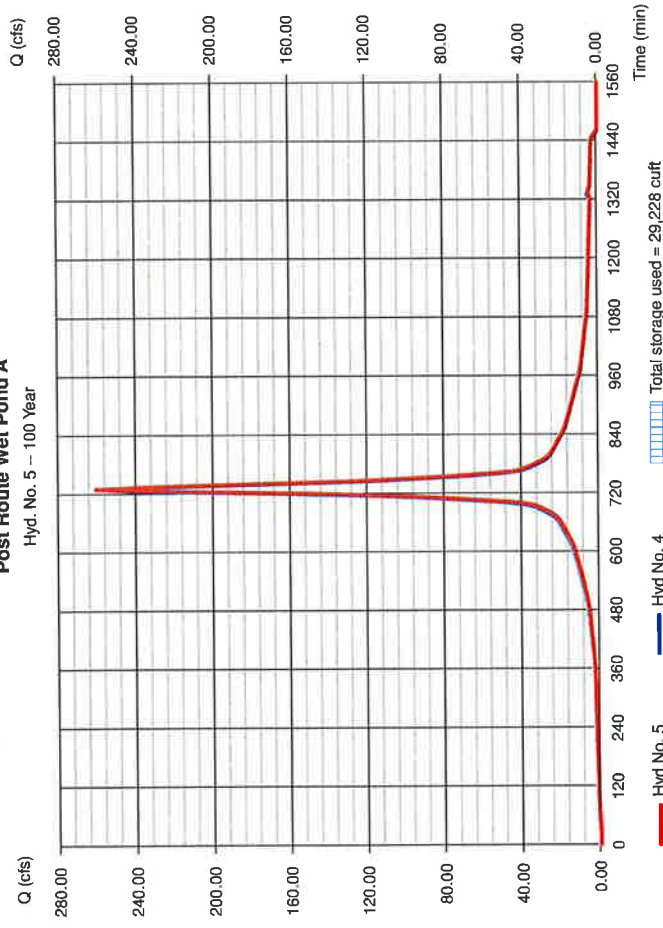
Max. Elevation = 112.84 ft

Max. Storage = 29,228 cuft

Storage Indication method used.

Post Route Wet Pond A

Hyd. No. 5 -- 100 Year



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)				
	B	D	E	(N/A)	
1	39.0824	9.5000	0.8528		
2	45.6943	10.7000	0.8195		
3	0.0000	0.0000	0.0000		
5	99.7061	14.8000	0.9304		
10	249.7597	21.8001	1.0961		
25	115.7547	14.9000	0.8980		
50	7.3699	0.1000	0.2544		
100	403.8513	25.1001	1.1108		

File name: TRENTON.lidf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.00	3.10	2.55	2.18	1.91	1.70	1.54	1.40	1.29	1.20	1.12	1.05
2	4.80	3.83	3.21	2.77	2.45	2.20	2.00	1.84	1.70	1.59	1.49	1.40
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.92	1.80
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.14	2.00
25	7.89	6.45	5.47	4.76	4.23	3.80	3.46	3.17	2.93	2.73	2.55	2.40
50	4.87	4.09	3.69	3.44	3.25	3.10	2.98	2.88	2.80	2.72	2.66	2.60
100	9.20	7.76	6.69	5.67	5.22	4.70	4.27	3.91	3.60	3.33	3.10	2.90

Tc = time in minutes. Values may exceed 60.

Precip. file name: Somerset County NRCS.pcp

Storm Distribution	Rainfall Precipitation Table (in)									
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr		
SCS 24-hour	0.00	3.34	0.00	4.25	5.01	6.15	7.13	12.32		
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

**GROUNDWATER RECHARGE CALCULATIONS
AND SPREADSHEET**

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
SOMERSET CO., MONTGOMERY TWP	46.0	1.50

Project Name:		Sharbell Kepner		
Description:		Residential Development		
Analysis Date:		01/12/18		

Post-Developed Conditions					
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	15.04	Open space	Udorthents	0.0	-
2	11.05	Impervious areas	Udorthents	0.0	-
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Total =	26.1				

Annual Recharge Requirements Calculation ↓	
% of Pre-Developed Annual Recharge to Preserve =	100%
Post-Development Annual Recharge Deficit= 0 (cubic feet)	
Recharge Efficiency Parameters Calculations (area averages)	
RWC= 0.00 (in)	DRWC= 0.00 (in)
ERWC = 0.00 (in)	EDRWC= 0.00 (in)

Pre-Developed Conditions					
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	2.67	Open space	Udorthents	0.0	-
2	21.41	Woods	Udorthents	0.0	-
3	2.01	Impervious areas	Udorthents	0.0	-
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Total =	26.1			0.0	-

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

**NSPS NON STRUCTURAL POINT STRATEGIES
SPREADSHEET**

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project: Sharbell Kepner - Planned Residential Development

Date: March 21, 2018

User:

Notes:

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 32.3 Acres

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:					
PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5
		100.0%			
Percent of Each Planning Area within Site:					100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space		2.3		2.7	5.0	38
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous		3.2		21.4	24.6	213
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious		0.8		2.0	2.8	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
HSG Subtotals (Acres):		0.0	6.3	0.0	26.1		32.3
HSG Subtotals (%):		0.0%	19.4%	0.0%	80.6%		100.0%
Total Area:							32.3
Total % Area:							100.0%

Points Subtotal:

251

Total Existing Site Points:

251

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space		2.3		8.7	11.0	72
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous		3.2		1.7	4.9	59
8	Woods - Planted				2.7	2.7	20
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water				1.3	1.3	10
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious		0.8		10.3	11.1	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious				1.4	1.4	6
HSG Subtotals (Acres):		0.0	6.3	0.0	26.1		32.3
HSG Subtotals (%):		0.0%	19.4%	0.0%	80.6%		100.0%
Points Subtotal:							167

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =
Total Unconnected Impervious Coverage with Small D/S Pervious =
Total Unconnected Impervious Coverage with Large D/S Pervious =
Total Site Impervious Coverage =
Effective Site Impervious Coverage =

34%	% of Site
0%	% of Site
4%	% of Site
39%	% of Site
36%	% of Site

Specify Source of Maximum Allowable Impervious Coverage:

Table (None or Table)

12%

Allowable Site Impervious Cover from Maximum Impervious Cover Table:
Note: See Maximum Impervious Cover Table Worksheet for Details

Points Subtotal:

0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =
Maximum Allowable Site Disturbance by Municipal Ordinance =

95%	% of Site
100%	% of Site

Points Subtotal:

2

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =
Length of Vegetated Runoff Conveyance System =
% of Total Runoff Conveyance System That is Vegetated =

7972	Feet
1850	Feet
23%	

Points Subtotal:

19

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =
Maximum Proposed Cluster Lot Size (Note: 1/4 Acre or Less) =
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =

100%	% of Site
0.500	Acres
0.180	Acres
30%	% of Clustered Site Portion

Points Subtotal:

42

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:
Percent of Proposed Lawn Areas to be Graded with Such Equipment:

Yes
100%

(Yes or No)
% of Lawn Areas

Points Subtotal:

21

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):

No
No
No

(Yes or No)
(Yes or No)
(Yes or No)

Points Subtotal:

0

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points:

251

Ratio of Proposed to Existing Site Points:

100%

Required Site Points Ratio:

100%

Nonstructural Point System Results:

Proposed Nonstructural Measures are Adequate

LOW IMPACT DEVELOPMENT CHECKLIST

LOW IMPACT DEVELOPMENT CHECKLIST

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development.

Municipality: Montgomery Township

County: Somerset Date: 4/17/18

Review board or agency: Montgomery Township Planning Board

Proposed land development name: Proposed Planned Residential Development

Lot(s): 28005 Block(s): 66

Project or application number: Preliminary and Final Major Subdivision & Site Plan

Applicant's name: Sharbell Building Company, LLC

Applicant's address: One Washington Boulevard
Robbinsville, NJ 08691

Telephone: 609-918-2400 Fax: 609-448-5472

Email address: mcannuli@sharbell.com

Designer's name: Dynamic Engineering Consultants, PC
Jeffrey S. Haberman, PE, PP

Designer's address: 1904 Main Street
Lake Como, NJ 07719

Telephone: (732) 974-0198 Fax: (732) 974-3521

Email address: jhaberman@dynamiccec.com

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

For additional information please see Section 6 of the Stormwater Management, Groundwater Recharge, and Water Quality Analysis, dated April 2018.

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

Stormwater Management Regulations N.J.A.C. 7:8, dated February 2, 2004

Do regulations include nonstructural requirements? Yes: X No:

If yes, briefly describe:

For additional information please see Section 6 of the Stormwater Management, Groundwater Recharge, and Water Quality Analysis, dated April 2018.

List LID-BMPs prohibited by local regulations: N/A

Pre-design meeting held: Yes: Date: No: X

Meeting held with:

Pre-design site walk held: Yes: Date: No: X

Site walk held with:

Other agencies with stormwater review jurisdiction:

Name: Township of Montgomery

Required approval: Preliminary and Final Major Subdivision & Site Plan

Name: Cape Atlantic Soil Conservation District

Required approval: Soil Erosion and Sediment Control Certification

Name: Delaware and Raritan Canal Commission

Required approval: Site Plan Approval

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

- A. Has an inventory of existing site vegetation been performed? Yes: X No:
If yes, was this inventory a factor in the site's layout and design? Yes: X No:

- B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: X No: If yes, specify % of site: 3.7%
Native ground cover? Yes: No: X If yes, specify % of site:
Vegetated buffers? Yes: X No: If yes, specify % of site: 1.6%

- C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: No: X If yes, specify % of site:
Native ground cover? Yes: No: X If yes, specify % of site:
Vegetated buffers? Yes: No: X If yes, specify % of site:

- D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: No: X
Reduce runoff pollutant loads through runoff treatment: Yes: No: X
Maintain groundwater recharge by preserving natural areas: Yes: No: X

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

- A. Have inventories of existing site soils and slopes been performed? Yes: X No:
- If yes, were these inventory a factor in the site's layout and design? Yes: X No:
- B. Does the development's design utilize any of the following nonstructural LIB-BMPs?
- Restrict permanent site disturbance by land owners? Yes: X No:
- If yes, how: Conservation easement for vegetated buffer at southerly portion of site
- Restrict temporary site disturbance during construction? Yes: X No:
- If yes, how: Silt fences and tree protection fence will be constructed to limit the construction activities to within the limit of disturbance area
- Consider soils and slopes in selecting disturbance limits? Yes: X No:
- If yes, how: The site development is designed to maintain existing drainage patterns.
- C. Specify percentage of site to be cleared: 95% Regraded: 95%
- D. Specify percentage of cleared areas done so for buildings: 17.46%
- For driveways and parking: 4.95% For roadways: 27.72%
- E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?
- Reducing the number of proposed dwellings.
- F. Specify site's hydrologic soil group (HSG) percentages:
- HSG A: HSG B: HSG C: HSG D: 100%

It is important to note that while the Somerset County Soil Survey indicates C and B Soils, extensive soil testing is currently underway to prove that on-site soils exhibit characteristics of HSG D soils. Percolation testing in accordance with the BMP Manual will be provided for justification.

- G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: _____ HSG C: _____ HSG D: 95%

- H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

None, as previously noted, extensive soil testing is currently underway to prove that on-site soils exhibit characteristics of HSG D soils. Percolation testing in accordance with the BMP Manual will be provided for justification. Therefore, it is assumed that groundwater recharge does not occur under existing conditions.

- I. Does the site include Karst topography? Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

3.3 Minimize Land Disturbance

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LIB-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 7.71% (total site) Proposed: 46.67% (total site)

B. Specify maximum site impervious coverage allowed by regulations: 80% - townhomes, 60% - condominium

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity	N/A	N/A
Residential access – medium intensity	N/A	N/A
Residential access – high intensity with parking	N/A	N/A
Residential access - high intensity without parking	N/A	N/A
Neighborhood	N/A	N/A
Minor collector -- low intensity without parking	N/A	N/A
Minor collector – with one parking lane	28 FT	28 FT
Minor collector – with two parking lanes	N/A	N/A
Minor collector – without parking	N/A	N/A
Major collector	N/A	N/A

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: 9' x 18' Regulations: 9' x 18'

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: Townhomes: 394 stalls (102 exterior, 292 in garages)
Condominium: 80 stalls (47 in garage beneath building) Regulations: Townhomes: 297 stalls
Condominium: 80 stalls

F. Specify percentage of total site impervious cover created by buildings: 17.64%

By driveways and parking: 9.0% By roadways: 20.03%

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

The proposed development provides for open space lots (29.5% of total subject parcel).

H. Specify percentage of total impervious area that will be unconnected:

Total site: 12.2% Buildings: 0% Driveways and parking: 12.2% Roads: 0%

I. Specify percentage of total impervious area that will be porous:

Total site: 0% Buildings: 0% Driveways and parking: 0% Roads: 0%

J. Specify percentage of building roof area that will be vegetated: 0%

K. Specify percentage of total parking area located beneath buildings: 59% *

* For condo lot

L. Specify percentage of total parking located within multi-level parking deck: 0%

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

- A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 77% Vegetated swale: 23% Natural channel: _____

Stormwater management facility: _____ Other: _____

Note: The total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

- B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

The existing site conditions is steeply sloped and the proposed development has been designed to maintain existing drainage patterns to the maximum extent feasible. Sheet flowing runoff from impervious surfaces through vegetated swales can create erosion problems.

- C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: None, overland flow slopes have already been reduced from the existing conditions.

Increase overland flow roughness: This has been accomplished the creation of dedicated open space areas and two wet ponds to capture the majority of the stormwater runoff from impervious surfaces on-site.

3.5 Preventive Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LIB-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: Trash Enclosure provided on site. Trash receptacles will be specified in recreational open space areas at a later date.

Specify the spacing between the trash receptacles: N/A

Compare trash receptacles proposed with those required by regulations:

Proposed:	<u>Trash Enclosure</u>	Regulations:	<u>Trash Enclosure for condo required</u>
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B. Pet Waste Stations

Specify the number of pet waste stations provided: 0

Specify the spacing between the pet waste stations: N/A

Compare pet waste stations proposed with those required by regulations:

Proposed:	<u>0</u>	Regulations:	<u>N/A</u>
-----------	----------	--------------	------------

C. Inlets, Trash Racks, and other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 100%

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping:	Proposed:	<u>At owner's discretion</u>	Regulations:	<u>Not specified</u>
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Litter collection:	Proposed:	<u>At owner's discretion</u>	Regulations:	<u>Not specified</u>
--------------------	-----------	------------------------------	--------------	----------------------

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

Wet pond basins are utilized to meet the required stormwater quantity and water quality requirements set forth by NJAC 7:8.

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: N/A Location: N/A

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7-8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.	X	
2	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.	X	
3	Maximize the protection of natural drainage features and vegetation.	X	
4	Minimize the decrease in the pre-construction time of concentration.	X	
5	Minimize land disturbance including clearing and grading.	X	
6	Minimize soil compaction.	X	
7	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.	X	
8	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.	X	
9	Provide preventative source controls.	X	

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

**STORMWATER COLLECTION SYSTEM
CALCULATIONS
(PIPE SIZING)**

Inlet Area Summary and Average Coefficient (C) Calculations

Project: Sharbell Montgomery
 Job #: 0043-14-015
 Location: Montgomery, Somerset County, NJ

Computed By: MSA
 Checked By: JSH
 Date: 8/20/2018

Drainage Area	Impervious Area (sf)	Coefficient (C) Used	Open Space (SF)	Coefficient (C) Used	Average Coefficient (C) Used	Total Area (SF)	Total Area (acres)
100	7036	0.95	24405	0.35	0.48	31441	0.72
101	2710	0.95	2966	0.35	0.64	5676	0.13
102	2716	0.95	867	0.35	0.80	3583	0.08
103	18238	0.95	46129	0.35	0.52	64367	1.48
105	20987	0.95	4739	0.35	0.84	25726	0.59
106	18913	0.95	6702	0.35	0.79	25615	0.59
107	14759	0.95	42601	0.35	0.50	57360	1.32
108	11579	0.95	43537	0.35	0.48	55116	1.27
110	23395	0.95	2725	0.35	0.89	26120	0.60
111A	7970	0.95	6107	0.35	0.69	14077	0.32
111	7822	0.95	7968	0.35	0.65	15790	0.36
112	6087	0.95	6512	0.35	0.64	12599	0.29
113	3493	0.95	3425	0.35	0.65	6918	0.16
114	3573	0.95	0	0.35	0.95	3573	0.08
115	3960	0.95	0	0.35	0.95	3960	0.09
116	6348	0.95	4542	0.35	0.70	10890	0.25
117	5919	0.95	3196	0.35	0.74	9115	0.21
117A	17666	0.95	35273	0.35	0.55	52939	1.22
118	5591	0.95	5248	0.35	0.66	10839	0.25
120	9897	0.95	6384	0.35	0.71	16281	0.37
120A	26617	0.95	20167	0.35	0.69	46784	1.07
200A	10905	0.95	27007	0.35	0.52	37912	0.87
200	3596	0.95	14482	0.35	0.47	18078	0.42
201	2109	0.95	3949.00	0.35	0.56	6058	0.14
202	10562	0.95	2676	0.35	0.83	13238	0.30
203	3825	0.95	9745	0.35	0.52	13570	0.31
203A	7835	0.95	11792	0.35	0.59	19627	0.45
204	3172	0.95	3505	0.35	0.64	6677	0.15
204A	9057	0.95	5419	0.35	0.73	14476	0.33
204B	2959	0.95	3298	0.35	0.63	6257	0.14
204C	2827	0.95	9722	0.35	0.49	12549	0.29
205	10579	0.95	6600	0.35	0.72	17179	0.39
206	11726	0.95	4639	0.35	0.78	16365	0.38
207	3839	0.95	10068	0.35	0.52	13907	0.32
208	2782	0.95	9680	0.35	0.48	12462	0.29
209	6484	0.95	8004	0.35	0.66	12488	0.29
210	4882	0.95	3011	0.35	0.72	7893	0.18
211	8959	0.95	7783	0.35	0.67	16742	0.38
Condo Roof West	10815	0.95	0	0.35	0.95	10815	0.25
213	2758	0.95	547	0.35	0.85	3305	0.08
214	7392	0.95	6103	0.35	0.68	13495	0.31
215	15990	0.95	7841	0.35	0.75	23831	0.55
216	9688	0.95	5469	0.35	0.73	15157	0.35
217	4181	0.95	4490	0.35	0.64	8671	0.20
Condo Roof East	12151	0.95	0	0.35	0.95	12151	0.28
300A	5944	0.95	5877	0.35	0.65	11821	0.27
300	3095	0.95	0	0.35	0.95	3095	0.07
302	4107	0.95	0	0.35	0.95	4107	0.09
303A	5471	0.95	14180	0.35	0.52	19651	0.45
304A	12208	0.95	45523	0.35	0.48	57731	1.33
304B	9343	0.95	33649	0.35	0.48	42992	0.99
306A	11117	0.95	2837	0.35	0.83	13954	0.32
306	11621	0.95	10334	0.35	0.67	21955	0.50
307	9283	0.95	11663	0.35	0.62	20946	0.48
308	6899	0.95	4301	0.35	0.72	11200	0.26
309	2809	0.95	0	0.35	0.95	2809	0.06
310	12937	0.95	16200	0.35	0.62	29137	0.67
312	15442	0.95	19047	0.35	0.62	34489	0.79
313	13329	0.95	20120	0.35	0.59	33449	0.77
314	4709	0.95	0	0.35	0.95	4709	0.11
315A	9466	0.95	3870	0.35	0.78	13336	0.31
315 **	6500	0.95	82764**	0.93	0.93	89264	2.05
316	5723	0.95	3366	0.35	0.93	9089	0.21

** Stormwater runoff from the Village Shopper redevelopment to the east of the subject parcel is routed to Manhole 315.



DYNAMIC ENGINEERING

Stormwater Collection System Calculations

Project: Sharbell Montgomery

Job #: 0043-14-015

Location: Montgomery, Somerset County

Design Storm: 25-year

Computed By: MSA

Checked By: JSH

Date: 8/20/2018

NOTES:

1) Design method used is Rational Method, unless otherwise noted.

2) Refer to Weighted Runoff Coefficient table for calculation of incremental areas and C values

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In.)	Length (Ft)	Man "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
100	101	0.72	0.48	0.35	0.35	10.00	0.20	10.00	6.80	2.38	2.38	15	113.0	0.013	0.0317	11.50	9.38
101	102	0.13	0.64	0.08	0.43	10.00	0.06	10.20	6.80	0.54	2.92	15	25.0	0.013	0.0192	8.95	7.30
102	MH 104	0.08	0.80	0.06	0.49	10.00	0.56	10.26	6.80	0.41	3.33	15	122.0	0.013	0.0332	11.77	9.60
103	MH 104	1.48	0.52	0.77	0.77	10.00	0.19	10.00	6.80	5.24	5.24	15	114.0	0.013	0.0350	12.08	9.85
MH 104	105	0.00	0.45	0.00	1.26	10.00	0.04	10.82	6.68	0.00	8.42	15	21.0	0.013	0.0291	11.02	8.98
105	106	0.59	0.84	0.50	1.76	10.00	0.06	10.86	6.68	3.34	11.76	18	28.0	0.010	0.0100	13.65	7.73
106	MH 109	0.59	0.79	0.47	2.23	10.00	0.19	10.92	6.68	3.14	14.90	24	101.0	0.013	0.0157	28.34	9.03
MH 109	110	0.00	0.95	0.00	2.23	10.00	0.17	11.11	6.56	0.00	14.63	24	90.0	0.013	0.0158	28.43	9.05
107	108	1.32	0.50	0.66	0.66	10.00	0.06	10.00	6.80	4.49	4.49	15	37.0	0.013	0.0350	12.08	9.85
108	110	1.27	0.48	0.61	1.27	10.00	0.30	10.06	6.80	4.15	8.64	15	180.0	0.013	0.0350	12.08	9.85
110	113	0.60	0.89	0.53	4.03	10.00	0.25	11.28	6.56	3.48	26.44	24	147.0	0.013	0.0190	31.18	9.93
111A	111	0.32	0.69	0.22	0.22	10.00	0.17	10.00	6.80	1.50	1.50	15	100.0	0.013	0.0350	12.08	9.85
111	112	0.36	0.65	0.23	0.45	10.00	0.19	10.17	6.80	1.56	3.06	15	113.0	0.013	0.0350	12.08	9.85
112	113	0.29	0.64	0.19	0.64	10.00	0.03	10.36	6.80	1.29	4.35	15	20.0	0.013	0.0350	12.08	9.85
113	114	0.16	0.65	0.10	4.77	10.00	0.06	11.53	6.44	0.64	30.72	30	34.0	0.013	0.0130	46.76	9.53
114	115	0.08	0.95	0.08	4.85	10.00	0.32	11.59	6.44	0.52	31.23	30	185.0	0.013	0.0130	46.76	9.53
115	120	0.09	0.95	0.09	4.94	10.00	0.37	11.91	6.44	0.58	31.81	30	212.0	0.013	0.0130	46.76	9.53
116	117	0.25	0.70	0.18	0.18	10.00	0.23	10.00	6.80	1.22	1.22	15	136.0	0.013	0.0350	12.08	9.85
117A	117	1.22	0.55	0.67	0.67	10.00	0.67	10.00	6.80	4.56	4.56	15	151.0	0.013	0.0050	4.57	3.73
117	118	0.21	0.74	0.16	1.01	10.00	0.17	10.67	6.68	1.07	6.75	15	103.0	0.013	0.0350	12.08	9.85
118	210	0.25	0.66	0.17	1.18	10.00	0.07	10.84	6.68	1.14	7.88	15	39.0	0.013	0.0350	12.08	9.85
200A	200	0.87	0.50	0.44	0.44	10.00	0.25	10.00	6.80	2.99	2.99	15	150.0	0.013	0.0350	12.08	9.85
200	201	0.42	0.47	0.20	0.64	10.00	0.19	10.25	6.80	1.36	4.35	15	112.0	0.013	0.0350	12.08	9.85
201	202	0.14	0.56	0.08	0.72	10.00	0.06	10.44	6.80	0.54	4.90	15	34.0	0.013	0.0350	12.08	9.85
202	203	0.30	0.83	0.25	0.97	10.00	0.38	10.50	6.68	1.67	6.48	15	223.0	0.013	0.0350	12.08	9.85
203A	203	0.45	0.59	0.27	0.27	10.00	0.04	10.00	6.80	1.84	1.84	15	20.0	0.013	0.0200	9.13	7.44
203	204C	0.31	0.52	0.16	1.40	10.00	0.31	10.88	6.68	1.07	9.35	15	183.0	0.013	0.0350	12.08	9.85
204A	204C	0.33	0.73	0.24	0.24	10.00	0.09	10.00	6.80	1.63	1.63	15	20.0	0.013	0.0050	4.57	3.73
204C	204	0.29	0.49	0.14	1.78	10.00	0.06	11.19	6.56	0.92	11.68	18	24.0	0.013	0.0130	11.97	6.78
204B	204	0.14	0.63	0.09	0.09	10.00	0.15	10.00	6.80	0.61	0.61	15	34.0	0.013	0.0050	4.57	3.73
204	208	0.15	0.66	0.10	1.97	10.00	0.20	11.25	6.56	0.66	12.92	18	110.0	0.013	0.0230	15.93	9.02
205	207	0.39	0.72	0.28	0.28	10.00	0.38	10.00	6.80	1.90	1.90	15	223.0	0.013	0.0350	12.08	9.85
206	207	0.38	0.78	0.30	0.30	10.00	0.04	10.00	6.80	2.04	2.04	15	20.0	0.013	0.0200	9.13	7.44
207	208	0.32	0.52	0.17	0.75	10.00	0.31	10.38	6.80	1.16	5.10	15	183.0	0.013	0.0350	12.08	9.85
208	209	0.29	0.48	0.14	2.86	10.00	0.05	11.45	6.56	0.92	18.76	24	20.0	0.013	0.0100	22.62	7.20
209	210	0.29	0.66	0.19	3.05	10.00	0.19	11.50	6.44	1.22	19.64	24	115.0	0.013	0.0190	31.18	9.93
210	211	0.18	0.72	0.13	4.36	10.00	0.06	11.69	6.44	0.84	28.08	30	34.0	0.013	0.0130	46.76	9.53
211	120	0.38	0.67	0.25	4.61	10.00	0.33	11.75	6.44	1.61	29.69	30	189.0	0.013	0.0130	46.76	9.53
120A	120	1.07	0.69	0.74	0.74	10.00	0.09	10.00	6.80	5.03	5.03	15	34.0	0.013	0.0150	7.91	6.45
120	FES 121	0.37	0.71	0.26	10.55	10.00	0.06	12.28	6.32	1.64	66.68	36	32.0	0.013	0.0100	66.69	9.44
213	219A	0.08	0.85	0.07	0.07	10.00	0.11	10.00	6.80	0.48	0.48	15	35.0	0.013	0.0100	6.46	5.27
214	215	0.31	0.68	0.21	0.21	10.00	0.33	10.00	6.80	1.43	1.43	15	195.0	0.013	0.0350	12.08	9.85
215	216	0.55	0.75	0.41	0.62	10.00	0.06	10.33	6.80	2.79	4.22	15	37.0	0.013	0.0350	12.08	9.85
216	217	0.35	0.73	0.26	0.88	10.00	0.06	10.39	6.80	1.77	5.98	15	34.0	0.013	0.0350	12.08	9.85
217	218	0.20	0.64	0.13	1.01	10.00	0.27	10.45	6.80	0.88	6.87	15	158.0	0.013	0.0350	12.08	9.85
300A	300	0.27	0.65	0.18	0.18	10.00	0.09	10.00	6.80	1.22	1.22	15	30.0	0.013	0.0100	6.46	5.27
300	301	0.07	0.95	0.07	0.25	10.00	1.31	10.09	6.80	0.48	1.70	15	293.0	0.013	0.0050	4.57	3.73
301	302	0.00	0.95	0.00	0.25	10.00	0.34	11.40	6.56	0.00	1.64	15	127.0	0.013	0.0137	7.56	6.16
302	MH 303	0.09	0.95	0.09	0.34	10.00	0.07	11.74	6.44	0.58	2.19	15	30.0	0.013	0.0190	8.90	7.26
303A	MH 303	0.45	0.52	0.23	0.23	10.00	0.07	10.00	6.80	1.56	1.56	15	43.0	0.013	0.0350	12.08	9.85
MH 303	309	0.00	0.95	0.00	0.57	10.00	0.30	11.81	6.44	0.00	3.67	15	132.0	0.013	0.0190	8.90	7.26
304A	MH 304	1.33	0.48	0.64	0.64	10.00	0.16	10.00	6.80	4.35	4.35	15	95.0	0.013	0.0350	12.08	9.85
304B	MH 304	0.99	0.48	0.48	0.48	10.00	0.52	10.00	6.80	3.26	3.26	15	116.0	0.013	0.0050	4.57	3.73
MH 304	MH 305	0.00	0.98	0.00	1.12	10.00	0.17	10.52	6.68	0.00	7.48	15	90.0	0.013	0.0267	10.55	8.60
MH 305	306	0.00	0.98	0.00	1.12	10.00	0.04	10.69	6.68	0.00	7.48	15	15.0	0.013	0.0150	7.91	6.45
306A	306	0.32	0.83	0.27	0.27	10.00	0.25	10.00	6.80	1.84	1.84	15	150.0	0.013	0.0350	12.08	9.85
306	307	0.50	0.67	0.34	1.73	10.00	0.36	10.73	6.68	2.27	11.56	15	212.0	0.013	0.0350	12.08	9.85
307	308	0.48	0.62	0.30	2.03	10.00	0.10	11.09	6.56	1.97	13.32	18	48.0	0.013	0.0200	14.85	8.41
308	309	0.26	0.72	0.19	2.22	10.00	0.05	11.19	6.56	1.25	14.56	18	38.0	0.013	0.0250	16.60	9.40
309	314	0.06	0.95	0.06	2.85	10.00	0.57	12.11	6.32	0.38	18.01	24	281.0	0.013	0.0130	25.79	8.21
310	MH 311	0.67	0.62	0.42	0.42	10.00	0.19	10.00	6.80	2.86	2.86	15	111.0	0.013	0.0350	12.08	9.85
MH 311	312	0.00	0.95	0.00	0.42	10.00	0.16	10.19	6.80	0.00	2.86	15	95.0	0.013	0.0350	12.08	9.85
312	313	0.79	0.62	0.49	0.91	10.00	0.07	10.35	6.80	3.33	6.19	15	39.0	0.013	0.0350	12.08	9.85</

CONDUIT OUTLET PROTECTION CALCULATIONS

SCOUR HOLE DESIGN

Project: Sharbell Montgomery
 Job #: 0043-14-015
 Location: Montgomery, Somerset County, NJ
 Design Storm: 25 Yr
 Computed By: MSA
 Checked By: JSH
 Date: 8/20/2018

Discharge in Basin, Therefore Tailwater is greater than $0.5 \times D_o$

Discharge Point	FES 121	FES 221	FES 318	HW 402
Q (25-yr storm cfs)	66.68	8.37	40.49	40.95
Inside Height of Outlet Culvert, Do (in)	36	36	36	36
Inside Height of Outlet Culvert, Do (ft)	3.0	3.0	3.0	3.0
Tailwater (ft), Tw	4.770	4.770	4.770	0.500
Length of Apron, L (ft)	9.00	9.00	9.00	9.00
Width of Culvert, Wc(in)	36	36	36	36
Width of Culvert, Wc(ft)	3.0	3.0	3.0	3.0
Width of Apron, W(ft)	6.00	6.00	6.00	6.00
Where $Y = 1/2 Do$, Y(ft)	1.500	1.500	1.500	1.500
Median Stone Diameter, D50 (ft)	0.16	0.01	0.08	0.81
Where $Y = Do$, Y(ft)	3.000	3.000	3.000	3.000
Median Stone Diameter, D50 (ft)	0.11	0.01	0.05	0.53

Note: Use D50 of 6 inches minimum

Equations used:

$$L = 3 \times D_o$$

$$W = 2 \times W_o$$

$$\text{Where } Y = 1/2 Do$$

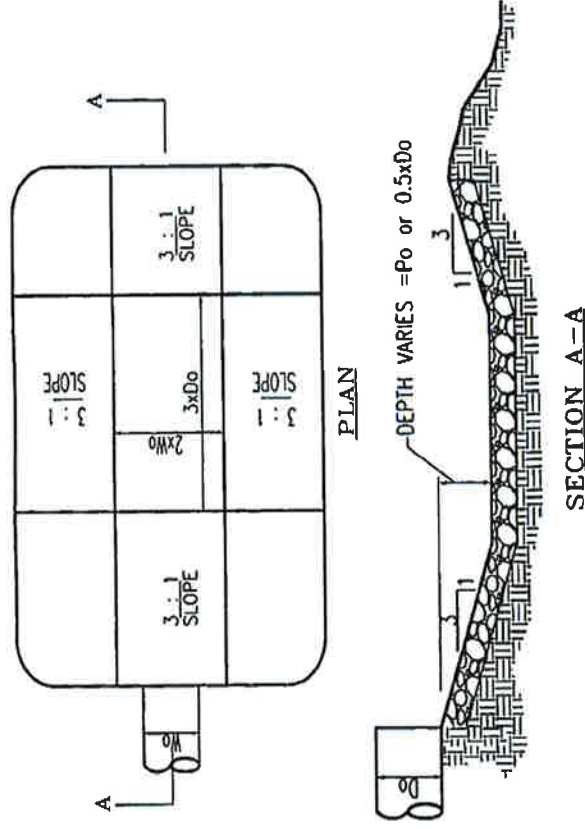
$$D50 = (0.0125 / Tw)^{1/3} (q \times 1.33)$$

$$\text{Where } Y = Do$$

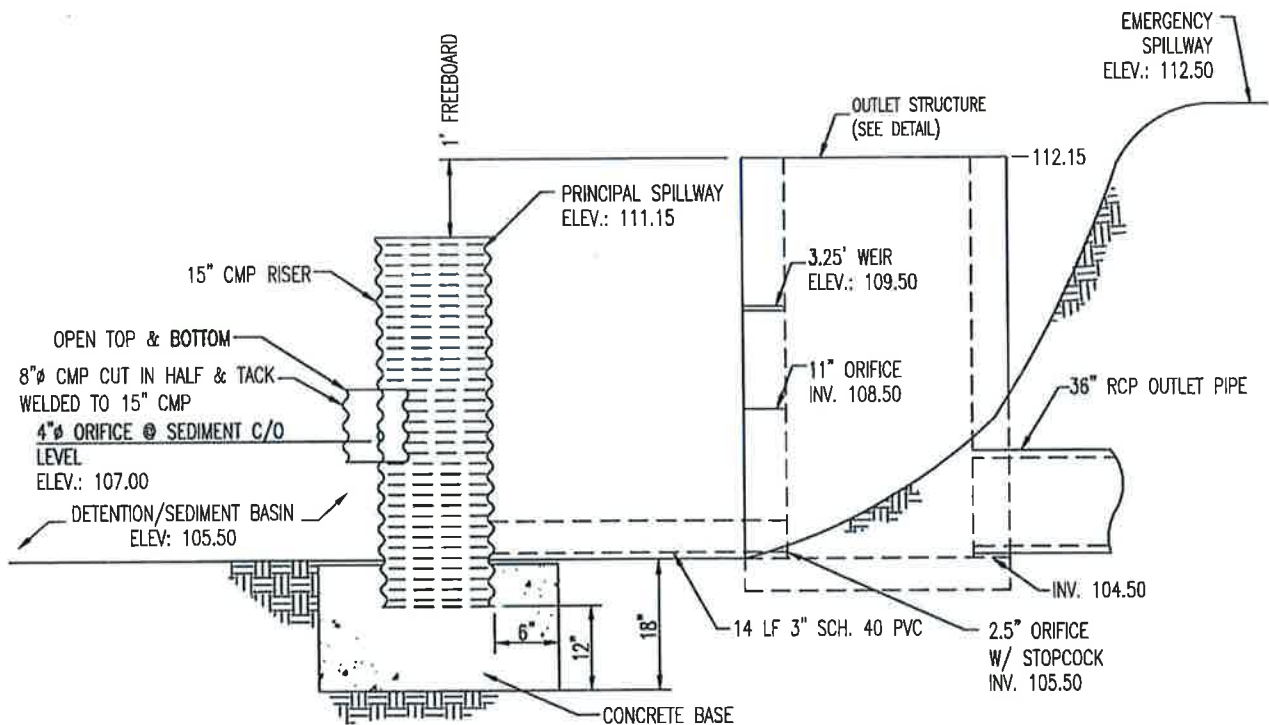
$$D50 = (0.0082 / Tw)^{1/3} (q \times 1.33)$$

Notes:

1. The use of scour holes shall comply with county or local ordinances which would restrict the use of such devices due to the possible problems with mosquito breeding.
2. No bends or curves at the intersection of the conduit and apron or scour hole will be permitted.
3. There shall be no over fall from the end of the apron to the receiving material.
4. The thickness of the riprap lining, filter, and quality shall meet the requirements in the Riprap Standard Section of the Standards for Soil Erosion Control in New Jersey.



**SEDIMENT STORAGE CAPACITY
CALCULATIONS AND RISER DETAIL FOR SCD**



- 1) THE TEMPORARY STANDPIPE RISERS SHALL BE INSTALLED IMMEDIATELY AFTER THE CONSTRUCTION OF THE POND AND REMAIN IN PLACE UNTIL ALL CONTRIBUTING DRAINAGE AREAS ARE STABILIZED, AND THEIR REMOVAL IS AUTHORIZED BY THE SOIL CONSERVATION DISTRICT.
- 2) ALL SEDIMENT BASINS SHALL BE CLEANED OUT AS REQUIRED.

TEMPORARY SEDIMENT RISER DETAIL

NOT TO SCALE



790 Newtown Yardley Road - Suite 425 - Newtown, PA 18940
T: 267.685.0276 - F: 267.685.0361
www.dynemicec.com



1904 Main Street, Lake Como, NJ 07719
732-974-0198

Date: 3/14/2018
Project: Kepner Residential
Project No: 0043-14-015

Calculated By: JSH
Checked By: JDS

Sediment Storage Capacity Calculations
Sediment Basin # **A**

TRAP EFFICIENCY METHOD:

Sediment type:

Trap efficiency value:

Curve used: (see Curve 26-1)

Ratio of capacity to annual inflow (C/I): (see Curve 26-1)

Average annual surface runoff (R): (see Figure 26-1)

Watershed area (A):

Average annual surface runoff, $I = \frac{R \times A}{12} =$

Total capacity, $C = I \times C/I =$

Silty clay loam

70%

Fine Grained Curve

0.0600

20.0 in

32.36 Ac.

53.93 Ac ft

3.24 Ac ft

SEDIMENT STORAGE CAPACITY METHOD:

1. DETERMINE VOLUME FOR SEDIMENT STORAGE USING METHOD 2

a. Determine drainage area, DA, and average annual erosion, A:

Drainage area, (DA):

Land use type:

Average annual erosion, (A):

$(DA) \times (A) =$

32.36 Ac.

Construction areas

50.0 ton/ac/yr

1,618 tons/yr

b. Determine delivery rate, DR:

Watershed area (A):

Sediment delivery ratio: (refer to Curve 26-2)

DR = (refer to Curve 26-2)

0.05 sq mi

Silty Clay

80%

c. Determine sediment density, γ :

Soil texture: (refer to Table 26-1) submerged, not aerated

$\gamma =$

Clay-silt mixture, aerated

60.0 lbs/cf

d. Determine the minimum volume for sediment storage for the planned life of the structure:

$V = (DA) (A) (DR) (TE) (1/\gamma) (2,000 \text{ lbs/ton}) (1/43,560 \text{ sf/ac}) =$

0.692 Ac ft

2. Determine the minimum volume for temporary floodway storage:

2-year, 24 hour Rainfall intensity:

Soil type:

Soil group:

CN:

Volume 2-yr design storm:

Total volume required (including sediment):

Somerset County

3.3 inches

Lansdowne

D

84

217,042 CF

4.983 Ac ft

5.674 Ac ft

DETERMINE THE LARGER VOLUME OF THE TWO METHODS:

TOTAL VOLUME REQUIRED:

5.674 Ac ft
or 247,180 CF

DEWATERING:

Trap efficiency value:

50%

Curve:

(refer to Curve 26-1)

Fine Grained Curve

Ratio of capacity to annual inflow, (C/I):

(refer to Curve 26-1)

0.023

Average annual surface runoff, (R):

(refer to Figure 26-1)

20.0 in

Watershed area, (A):

32.36 Ac.

Average annual surface runoff, $I = \frac{R \times A}{12} =$

53.93 Ac ft

Total capacity, $C = I \times C/I =$

1.24 Ac ft
or 54,035 CF

SEDIMENT BASIN BOTTOM ELEVATION:

105.50

ELEVATION OF SEDIMENT STORAGE:

107.00

THE TOTAL VOLUME FROM 105.50 to 107.00 :

1.24 Ac ft
or 54,079 CF

ELEVATION OF EMERGENCY SPILLWAY:

112.50

THE TOTAL VOLUME FROM 107.00 to 112.50 :

7.72 Ac ft
or 336,267 CF

TOTAL VOLUME OF THE SEDIMENTAL BASIN

8.96 Ac ft
or 390,346 CF

ELEVATION OF 4" DEWATERING ORIFICE:

107.00

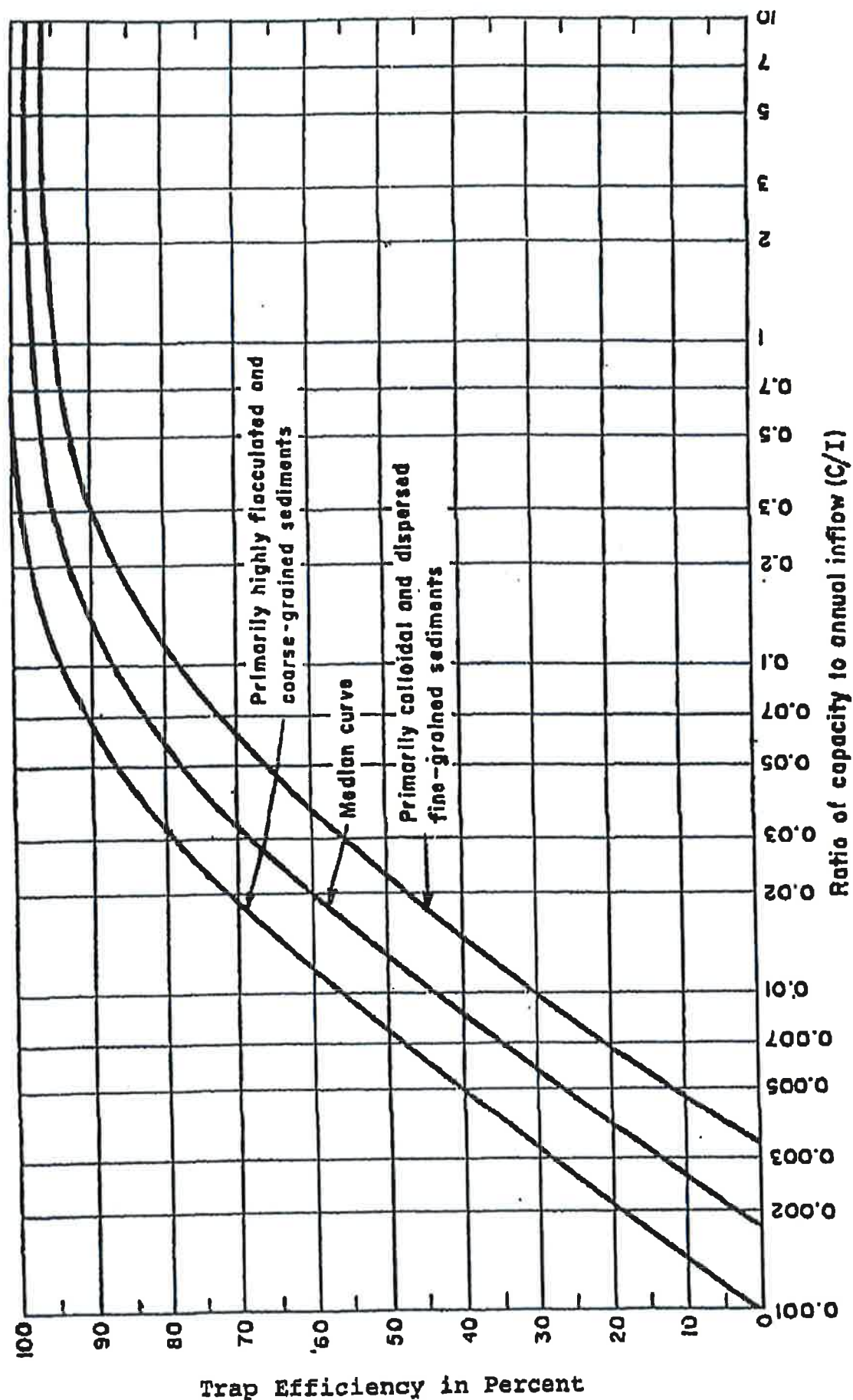
ELEVATION TOP OF RISER:

111.50

SEDIMENT BASIN # A

<u>ELEVATION</u>	<u>AREA (SF)</u>	<u>INCR. VOL. (CF)</u>	<u>TOTAL VOLUME (CF)</u>
105.50	32126		
106	34760	16722	16722
107	39954	37357	54079
108	47263	43609	97687
109	57988	52626	150313
110	63672	60830	211143
111	69577	66625	277767
112	74966	72272	350039
113	86260	80613	430652

CURVE 26-1



TRAP EFFICIENCY OF RESERVOIRS

Reference: Brune, Gunnar M., "Trap Efficiency of Reservoirs", Trans. AGU, Vol. 34, No. 3, pp 407-418, June 1953.

**MAJOR DEVELOPMENT STORMWATER
SUMMARY**

Attachment D – Major Development Stormwater Summary

General Information			
1. Project Name: Proposed Planned Residential Development			
2. Municipality: Township of Montgomery	County: Somerset	Block(s): 28005	Lot(s): 66
3. Site Location (State Plane Coordinates – NAD83):		E: 449,382	N: 572,864
4. Date of Final Approval for Construction by Municipality: TBD Date of Certificate of Occupancy: TBD			
5. Project Type (check all that apply): Residential ☒ Commercial ☐ Industrial ☐ Other (please specify) _____			
6. Soil Conservation District Project Number: TBD			
7. Did project require an NJDEP Land Use Permit? Yes ☒ No ☐ Land Use Permit #: 1813-17-0003.1			
8. Did project require the use of any mitigation measures? Yes ☐ No ☒ If yes, which standard was mitigated? N/A			

Site Design Specifications	
1. Area of Disturbance (acres): 25.75 AC	Area of Proposed Impervious (acres): 13.42
2. List all Hydrologic Soil Groups: B, D	
3. Please Identify the Amount of Each Best Management Practices (BMPs) Utilized in Design Below: Bioretention Systems _____ Constructed Wetlands _____ Dry Wells _____ Extended Detention Basins _____ Infiltration Basins _____ Combination Infiltration/Detention Basins _____ Manufactured Treatment Devices _____ Pervious Paving Systems _____ Sand Filters _____ Vegetative Filter Strips _____ Wet Ponds ☒ Grass Swales _____ Subsurface Gravel Wetlands _____ Other _____	

Storm Event Information			
Storm Event - Rainfall (inches and duration):	2 yr.: 3.34	10 yr.: 5.01	
	100 yr.: 8.21	WQDS: 1.25	
Runoff Computation Method: NRCS: Dimensionless Unit Hydrograph ☒ NRCS: Delmarva Unit Hydrograph ☐ Rational ☐ Modified Rational ☐ Other: _____			

Basin Specifications (answer all that apply)	
If more than one basin, attach multiple sheets	
1. Type of Basin: Wet Pond	Surface/Subsurface (select one): Surface ☒ Subsurface ☐
2. Owner (select one): ☐ Public ☒ Private: If so, Name: Sharbell Plainsboro, Inc. Phone number: (609) 918-2400	
3. Basin Construction Completion Date: Summer 2018	
4. Drain Down Time (hr.): <72 hrs	
5. Design Soil Permeability (in./hr.): <0.06 in/hr	
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): Not Encountered Date Obtained: Jan. 2018	
7. Groundwater Recharge Methodology (select one): 2 Year Difference ☒ NJGRS ☐ Other ☐ NA ☐	
8. Groundwater Mounding Analysis (select one): Yes ☐ No ☒ If, Yes Methodology Used:	
9. Maintenance Plan Submitted: Yes ☒ No ☐ Is the Basin Deed Restricted: Yes ☒ No ☐	

Comments:

Name of Person Filling Out This Form: Jeffrey S. Haberman, PE, PP

Signature: _____

Title: Professional Engineer - Dynamic Engineering Consultants, PC

Date: 4/2/2018

2/2/2018

Basin Specifications (answer all that apply)	
If more than one basin, attach multiple sheets	
1. Type of Basin:	Surface/Subsurface (select one): Surface ☐ Subsurface ☐
2. Owner (select one):	☐ Public ☐ Private: If so, Name: _____ Phone number: _____
3. Basin Construction Completion Date:	_____
4. Drain Down Time (hr.):	_____
5. Design Soil Permeability (in./hr.):	_____
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained: _____
7. Groundwater Recharge Methodology (select one):	2 Year Difference ☐ NJGRS ☐ Other ☐ NA ☐
8. Groundwater Mounding Analysis (select one):	Yes ☐ No ☐ If, Yes Methodology Used: _____
9. Maintenance Plan Submitted:	Yes ☐ No ☐ Is the Basin Deed Restricted: Yes ☐ No ☐

Basin Specifications (answer all that apply)	
If more than one basin, attach multiple sheets	
1. Type of Basin:	Surface/Subsurface (select one): Surface ☐ Subsurface ☐
2. Owner (select one):	☐ Public ☐ Private: If so, Name: _____ Phone number: _____
3. Basin Construction Completion Date:	_____
4. Drain Down Time (hr.):	_____
5. Design Soil Permeability (in./hr.):	_____
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained: _____
7. Groundwater Recharge Methodology (select one):	2 Year Difference ☐ NJGRS ☐ Other ☐ NA ☐
8. Groundwater Mounding Analysis (select one):	Yes ☐ No ☐ If, Yes Methodology Used: _____
9. Maintenance Plan Submitted:	Yes ☐ No ☐ Is the Basin Deed Restricted: Yes ☐ No ☐

Basin Specifications (answer all that apply)	
If more than one basin, attach multiple sheets	
1. Type of Basin:	Surface/Subsurface (select one): Surface ☐ Subsurface ☐
2. Owner (select one):	☐ Public ☐ Private: If so, Name: _____ Phone number: _____
3. Basin Construction Completion Date:	_____
4. Drain Down Time (hr.):	_____
5. Design Soil Permeability (in./hr.):	_____
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained: _____
7. Groundwater Recharge Methodology (select one):	2 Year Difference ☐ NJGRS ☐ Other ☐ NA ☐
8. Groundwater Mounding Analysis (select one):	Yes ☐ No ☐ If, Yes Methodology Used: _____
9. Maintenance Plan Submitted:	Yes ☐ No ☐ Is the Basin Deed Restricted: Yes ☐ No ☐

Name of Person Filling Out This Form: _____

Signature: _____

Title: _____

Date: _____

**STORMWATER TEST PIT MAP AND LOGS,
PREPARED BY DYNAMIC EARTH, LLC**

the soil profile pits consisted of the following generalized strata in order of increasing depth. The subsurface conditions encountered were generally consistent with the subsurface conditions encountered during the initial investigations.

5.1 Subsurface Soil Profile

The soil profile pits were performed within undeveloped areas and encountered approximately between two inches and six inches of topsoil at the surface. Beneath the surface cover, natural residual soils were encountered that consisted variably of loam, silt loam, sandy clay loam, clay loam, silty clay loam, silt and clay with variable amounts of channers, flagstones, and boulder-sized fragments. The percentage of coarse-grained material generally increased with depth. The residual soils were encountered to depths ranging between approximately six feet and 12.3 feet below the ground surface, corresponding to elevations ranging between 140.0 feet and 94.2 feet above msc. One soil profile pit location within the northern portion of the site (SPP-238) encountered refusal on apparent rock at a depth of approximately 9.8 feet below the ground surface, corresponding to an elevation of 94.2 feet above msc.

5.2 Seasonal High Groundwater and Soil Permeability

SEASONAL HIGH GROUNDWATER AND PERMEABILITY TEST SUMMARY						
Location	Approximate Surface Elevation (mse)	Estimated Seasonal High Groundwater		Tube Permeameter Test Results		
		Depth (Feet)	Elevation (mse)	Sample Depth (Inches)	Permeability (Inches/Hour)	
					Replicate A	Replicate B
SPP-201	147.0	NE	--	24	<0.06	<0.06
SPP-202	150.5	NE	--	36	<0.06	<0.06
SPP-203	152.0	NE	--	32	<0.06	<0.06
SPP-204	152.0	NE	--	36	<0.06	<0.06
SPP-205	150.0	NE	--	34	<0.06	0.94
SPP-206	146.0	NE	--	40	<0.06	<0.06
SPP-207	132.5	NE	--	36	<0.06	Disturbed Sample
SPP-208	145.5	NE	--	43	<0.06	<0.06
SPP-209	147.5	NE	--	45	<0.06	<0.06
SPP-210	148.0	NE	--	50	<0.06	<0.06
SPP-211	147.5	NE	--	60	<0.06	<0.06
SPP-212	144.5	NE	--	20	<0.06	<0.06

SEASONAL HIGH GROUNDWATER AND PERMEABILITY TEST SUMMARY						
Location	Approximate Surface Elevation (mse)	Estimated Seasonal High Groundwater		Tube Permeameter Test Results		
		Depth (Feet)	Elevation (mse)	Sample Depth (Inches)	Permeability (Inches/Hour)	
					Replicate A	Replicate B
SPP-213	147.0	NE	--	36	<0.06	<0.06
SPP-214	140.0	NE	--	48	0.9	0.98
SPP-215	129.5	NE	--	42	<0.06	<0.06
SPP-216	115.0	NE	--	28	<0.06	<0.06
SPP-217	118.5	NE	--	46	<0.06	<0.06
SPP-218	133.0	NE	--	48	<0.06	<0.06
SPP-219	131.5	NE	--	40	<0.06	<0.06
SPP-220	120.0	NE	--	56	<0.06	<0.06
				120	Disturbed Sample	1.96
SPP-221	117.0	NE	--	47	<0.06	<0.06
SPP-222	136.0	NE	--	46	<0.06	<0.06
SPP-223	142.5	NE	--	50	Disturbed Sample	
SPP-224	129.0	NE	--	54	<0.06	<0.06
SPP-225	135.0	NE	--	38	<0.06	<0.06
SPP-226	144.0	NE	--	40	<0.06	<0.06
SPP-227	142.0	NE	--	36	<0.06	<0.06
SPP-228	131.0	NE	--	37	<0.06	<0.06
SPP-229	139.5	NE	--	52	2.62	2.55
SPP-230	133.5	NE	--	48	<0.06	<0.06
SPP-231	123.0	NE	--	64	<0.06	<0.06
SPP-232	110.5	NE	--	32	<0.06	<0.06
SPP-233	109.5	NE	--	50	<0.06	<0.06
SPP-234	116.0	NE	--	66	<0.06	<0.06
				144	Disturbed Sample	
SPP-235	122.5	NE	--	40	<0.06	Disturbed Sample

SEASONAL HIGH GROUNDWATER AND PERMEABILITY TEST SUMMARY						
Location	Approximate Surface Elevation (mse)	Estimated Seasonal High Groundwater		Tube Permeameter Test Results		
		Depth (Feet)	Elevation (mse)	Sample Depth (Inches)	Permeability (Inches/Hour)	
					Replicate A	Replicate B
				102	<0.06	<0.06
SPP-236	125.5	NE	--	60	<0.06	<0.06
SPP-237	111.0	NE	--	40	<0.06	<0.06
				72	<0.06	<0.06
SPP-238	104.0	NE	--	24	<0.06	Disturbed Sample
SPP-239	113.0	NE	--	45	<0.06	<0.06
				85	Disturbed Sample	
SPP-240	111.5	NE	--	45	<0.06	<0.06
				80	Disturbed Sample	1.3
SPP-241	112.0	NE	--	40	<0.06	<0.06
SPP-242	108.0	NE	--	40	<0.06	<0.06
SPP-243	138.5	NE	--	60	<0.06	<0.06
SPP-244	142.5	NE	--	--	--	--
SPP-245	142.5	NE	--	--	--	--

6.0 CONCLUSION

The NJ Stormwater BMP Manual, on Page E-12, Table 1 presents a rubric for the determination of permeability rates for hydrologic soil groups based on the most restrictive layer encountered. Specifically, there are two general criteria – Restrictions at 20 to 40-inches or restrictions greater than 40-inches. Restrictions include (but are not limited to) abrupt textural boundary, fragipan, bedrock, dense material, or ortstein.

The field investigation, soil profile pit logs, and tube permeameter testing completed for this project reveal a restriction within the upper 40-inches of the soil profile consisting of low permeability, firm, fine-grained soils. The results of testing confirm a permeability rate of less than 0.14-in/hr consistent with hydrologic soil group (HSG) "D".

Records of Subsurface Exploration

SOIL PROFILE PIT LOG

Sail Profile Pit: SPP-201

Page 1 of 1

[illegible]

Additional Remarks: 6 inches of Topsoil

SOIL PROFILE PIT LOG

[illegible]

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP. 203

Page 1 of 1

[illegible]



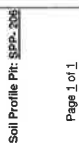
Soil Profile Pl: 999-204

[illegible]

Additional Remarks: 4 inches of top soil

SOIL PROFILE PIT LOG

[illegible]



Soil Profile Pit: SPP-205

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SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-2027

Page 1 of 1

Project: Proposed Site Improvements		Location: 17100 South Road, Montgomery Township, New Jersey		Project No.: 0043-14-011EC		Client: Shepherd Building Company, LLC		Groundwater Comments:	
Proposed Date: 10/10/18		Date Started: 10/10/18		Days: 10		ft: 10		ft: 10	
Termination Depth (ft): 12.0		Date Completed: 10/10/18		ft: 10		ft: 10		ft: 10	
Extension: SWM		Lagged by: A. Fazio		ft: 10		ft: 10		ft: 10	
Visual Observation: V		Contractor: Schneider		ft: 10		ft: 10		ft: 10	
Method: Case 80		ft: 10		ft: 10		ft: 10		ft: 10	
Soil Type:		Soil Type:		Soil Type:		Soil Type:		Soil Type:	
COARSE FRAGMENTS (%)		COARSE FRAGMENTS (%)		COARSE FRAGMENTS (%)		COARSE FRAGMENTS (%)		COARSE FRAGMENTS (%)	
CHANNERS		CHANNERS		CHANNERS		CHANNERS		CHANNERS	
FLAGSTONES		FLAGSTONES		FLAGSTONES		FLAGSTONES		FLAGSTONES	
STONES		STONES		STONES		STONES		STONES	
BOULDERS		BOULDERS		BOULDERS		BOULDERS		BOULDERS	
0 - 2		0 - 2		0 - 2		0 - 2		0 - 2	
Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)	
LOAM		LOAM		LOAM		LOAM		LOAM	
2 - 12		2 - 12		2 - 12		2 - 12		2 - 12	
Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)		Dark Brown (7.5YR 3/2)	
SANDY LOAM		SANDY LOAM		SANDY LOAM		SANDY LOAM		SANDY LOAM	
12 - 14		12 - 14		12 - 14		12 - 14		12 - 14	
Dusty Red (10R 5/3)		Dusty Red (10R 5/3)		Dusty Red (10R 5/3)		Dusty Red (10R 5/3)		Dusty Red (10R 5/3)	
CHANNERY		CHANNERY		CHANNERY		CHANNERY		CHANNERY	
SANDY CLAY LOAM		SANDY CLAY LOAM		SANDY CLAY LOAM		SANDY CLAY LOAM		SANDY CLAY LOAM	
64 - 144		64 - 144		64 - 144		64 - 144		64 - 144	
Dusty Red (10R 5/3)		Dusty Red (10R 5/3)		Dusty Red (10R 5/3)		Dusty Red (10R 5/3)		Dusty Red (10R 5/3)	
SANDY CLAY LOAM		SANDY CLAY LOAM		SANDY CLAY LOAM		SANDY CLAY LOAM		SANDY CLAY LOAM	
STRUCTURE		STRUCTURE		STRUCTURE		STRUCTURE		STRUCTURE	
Shape		Shape		Shape		Shape		Shape	
Grade		Grade		Grade		Grade		Grade	
Size		Size		Size		Size		Size	
WATER CONTENT		WATER CONTENT		WATER CONTENT		WATER CONTENT		WATER CONTENT	
Resistance to Rupture		Resistance to Rupture		Resistance to Rupture		Resistance to Rupture		Resistance to Rupture	
Stickiness		Stickiness		Stickiness		Stickiness		Stickiness	
Plasticity		Plasticity		Plasticity		Plasticity		Plasticity	
BOUNDARY		BOUNDARY		BOUNDARY		BOUNDARY		BOUNDARY	
Discontinuity		Discontinuity		Discontinuity		Discontinuity		Discontinuity	
Topography		Topography		Topography		Topography		Topography	
ROOTS		ROOTS		ROOTS		ROOTS		ROOTS	
Quantity		Quantity		Quantity		Quantity		Quantity	
Size		Size		Size		Size		Size	
Content		Content		Content		Content		Content	
Type		Type		Type		Type		Type	
Depth (ft)		Depth (ft)		Depth (ft)		Depth (ft)		Depth (ft)	
SAMPLING		SAMPLING		SAMPLING		SAMPLING		SAMPLING	
No.		No.		No.		No.		No.	
LAB RESULTS		LAB RESULTS		LAB RESULTS		LAB RESULTS		LAB RESULTS	

Additional Remarks: 2 inches of top soil

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-208

Page 1 of 1

[illegible]

Additional Remarks: 2 inches of top soil
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SOIL PROFILE PIT LOG

Soil Profile Pit: SPP. 209

Page 1 of 1

[illegible]

Additional Remarks: 2 inches of top soil		
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SOIL PROFILE PIT LOG

Page 1 of 1

[illegible]

SOIL PROFILE PIT LOG

[illegible]

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-212

Page 1 of 1

[illegible]

6" Topsoil



Soil Profile Pit: SPP. 213

[illegible]



Soil Profile Ph: SPP-214

Page 1 of 1

Project: Proposed Site Improvements													Project No.: 0853-14-1156C			Student Building Company, LLC		
Location: 17 Hoppers Road, Montgomery Township, New Jersey													Groundwater Comments					
Soil Classification: 14-1156C (14-1156C)																		
Soil Description: 14-1156C (14-1156C)																		
Soil Depth: 14-1156C (14-1156C)																		
Soil Type: 14-1156C (14-1156C)																		
Soil Color: 14-1156C (14-1156C)																		
Soil Texture: 14-1156C (14-1156C)																		
Soil Fragments (%): 14-1156C (14-1156C)																		
Soil Structure: 14-1156C (14-1156C)																		
Soil Consistency: 14-1156C (14-1156C)																		
Soil Plasticity: 14-1156C (14-1156C)																		
Soil Topography: 14-1156C (14-1156C)																		
Soil Roots: 14-1156C (14-1156C)																		
Soil Quantity: 14-1156C (14-1156C)																		
Soil Size: 14-1156C (14-1156C)																		
Soil Contaminant: 14-1156C (14-1156C)																		
Soil Sampling: 14-1156C (14-1156C)																		
Soil Lab Results: 14-1156C (14-1156C)																		
Soil Depth (ft): 14-1156C (14-1156C)																		
Soil Type: 14-1156C (14-1156C)																		
Soil Quantity: 14-1156C (14-1156C)																		
Soil Size: 14-1156C (14-1156C)																		
Soil Contaminant: 14-1156C (14-1156C)																		
Soil Sampling: 14-1156C (14-1156C)																		
Soil Lab Results: 14-1156C (14-1156C)																		
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Soil Contaminant: 14-1156C (14-1156C)																		
Soil Sampling: 14-1156C (14-1156C)																		
Soil Lab Results: 14-1156C (14-1156C)																		
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Soil Type: 14-1156C (14-1156C)																		
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Soil Contaminant: 14-1156C (14-1156C)																		
Soil Sampling: 14-1156C (14-1156C)																		
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Soil Quantity: 14-1156C (14-1156C)																		
Soil Size: 14-1156C (14-1156C)																		
Soil Contaminant: 14-1156C (14-1156C)																		
Soil Sampling: 14-1156C (14-1156C)																		
Soil Lab Results: 14-1156C (14-1156C																		

Additional Remarks:



Page 1 of 1

Additional Remarks: 2" Topsol

SOIL PROFILE PIT LOG

[illegible]

Additional Remarks: 2' Tressol

SOIL PROFILE PIT LOG

[illegible]



SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-218

Page 1 of 1

Project: Proposed Site Improvements		Project No.: 8043-144716/C		Client: Shortell Building Company, LLC		EL (Groundwater Comments)																
Termination Depth (ft): 12.0		Date Started: 11/15/18		Groundwater Data		Depth (ft)																
Prepared Location: SWM		Logged by: S. Hunt		Soils		NE																
Excavation Method: Visual Observation		Contractor: Case 80		Groundwater		NE																
Method:		Fig. Type:		Soils		NE																
COARSE FRAGMENTS (%)		STRUCTURE		CONSISTENCY		BOUNDARY		ROOTS		MOTTLES		SAMPLING		LAB RESULTS								
DEPTH (ft)	COLOR	SOIL TEXTURE	CHANNERS	FLAGSTONES	STONES	BOULDERS	Shape	Grade	Size	Resistance to Rupture	Stickiness	Plasticity	Ductileness	Topography	Quantity	Size	Contained	Type	Depth (ft)	No.		
0-8	Dark Brown (7.5YR 3/2)	LOAM	5	0	0	0	GRANULAR SPHERICAL	WEAK	MEDIUM	FRABLE	NONSTICKY	NONPLASTIC	CLEAR <2"	WAVY	NONE							
8-20	Brown (7.5YR 4/4)	SAND	<5	0	0	0	SINGLE GRAIN	STRUCTURELESS		LOOSE	NONSTICKY	NONPLASTIC	DIFFUSE >5"	IRREGULAR	NONE			BAG	12	S-1		
20-30	Dusky Red (10R 3/3)	LOAM	10	5	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	GRADUAL <5"	WAVY	NONE			BAG	24	S-2		
30-44	Dusky Red (10R 3/3)	FLAGGY LOAM	15	10	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	DIFFUSE >5"	IRREGULAR	NONE			BAG	36	S-3		
44-108	Dusky Red (10R 3/3)	VERY FLAGGY SILTY CLAY LOAM	20	25	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	DIFFUSE >5"	IRREGULAR	NONE			BAG TUBE	48	S-4 T-1	A = 0.8N IPI B = 0.6N IPI	
108-144	Dusky Red (10R 3/4)	LOAM	5	<5	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE			BAG	108	S-5		

Additional Remarks: 8" Topsoil



SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-219

Page 1 of 1

Project: Proposed Site Improvements										Project No.: 003-14419-C										Client: Board Building Company, LLC																																																																																																																																																																																													
Location: 17 Research Road, Montpelier, New Jersey										Date: 11/11/18										Depth: 10'																																																																																																																																																																																													
Proposed Location: 12.0 SWM										Date Completed: 11/11/18										Groundwater (meters):																																																																																																																																																																																													
Excavation Method: Visual Observation										Logged By: A. Fendle										Groundwater (meters):																																																																																																																																																																																													
Notes:										Contractor: Scholander										Groundwater (meters):																																																																																																																																																																																													
										Pit Type: Regional High Groundwater										Groundwater (meters):																																																																																																																																																																																													
DEPTH (ft)										SOIL TEXTURE										COARSE FRAGMENTS (%)										STRUCTURE										WATER CONTENT										CONSISTENCY										PLASTICITY										BOUNDARY										ROOTS										MOTTLING										SAMPLING										LAB RESULTS																																																																																																			
										COLOR										CHANNERS										FLAGSTONES										STONES										BOULDERS										SHAPE										GRADE										SIZE										RESISTANCE TO REGURGITATION										SLICKNESS										PLASTICITY										DISTANCE										TOPOGRAPHY										QUANTITY										SIZE										CONTENT										TYPE										DEPTH (ft)										NO.																			
0 - 2										Dark Brown (7.5R 3.2)										0										0										0										0										SUBANGULAR BLOCKY										WEAK										COARSE										FROZEN										NONSTICKY										NONPLASTIC										CLEAR <2.5"										SMOOTH										CM (20% MAX)										NONE																																																											
2 - 20										Brown (7.5 YR 4/4)										CHANNERS										FLAGSTONES										STONES										BOULDERS										SUBANGULAR BLOCKY										MODERATE										MEDIUM										MOIST										SLIGHTLY STICKY										NONPLASTIC										CLEAR <2.5"										SMOOTH										FEW (5% MAX)										NONE										BAG										10										S-1																													
20 - 40										Dusty Red (10R 3.2)										CHANNERS										FLAGSTONES										STONES										BOULDERS										ANGULAR BLOCKY										MODERATE										MEDIUM										MOIST										SLIGHTLY STICKY										SLIGHTLY PLASTIC										CLEAR <2.5"										SMOOTH										NONE										NONE										BAG										30										S-2																													
40 - 144										Dusty Red (10R 3.2)										CHANNERS										FLAGSTONES										STONES										BOULDERS										ANGULAR BLOCKY										MODERATE										FINE										MOIST										SLIGHTLY STICKY										NONPLASTIC										NONE										NONE										BAG										40										S-3 1-1										A = 0.05 ph B = 0.05 ph																																							

Additional Remarks: 8" Topsoil

SOIL PROFILE PIT LOG

[illegible]



Soil Profile Pit: SPP-221

5042-14-011EC

[illegible]

To avoid to 2 inches below the ground surface.



Soil Profile Pit: SPP-222

[illegible]

Additional Remarks:	Possible natural soil deposits to 25 feet below the ground surface.
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SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-223

Page 1 of 1

Project: Proposed Site Improvements		Project No.: 0043-14-01502		Client: Smartest Building Company, LLC		Grandmaster Comments																
Location: 142.5		Date Started: 1/11/18		Depth (ft):		EL (feet):																
Termination Depth (ft): 12.0		Date Completed: 1/11/18		NE		NE																
Proposed Location: SWM		Logged By: F. Van Cline		NE		NE																
Excavation: Visual Observation		Contractor: Schoeder		NE		NE																
Notes:		Big Type: Case M54		NE		NE																
Soil Texture		COARSE FRAGMENTS (%)		WATER CONTENT		STRUCTURE		CONSISTENCY		BOUNDARY		ROOTS		MOTTLING		SAMPLING		LAB RESULTS				
DEPTH (ft)	COLOR	CLAY LOAM	CHANNERS	FLAGSTONES	STONES	BOULDERS	Shapes	Grade	Size	Resistance to Penetration	Stickiness	Plasticity	Distinctness	Topography	ROOTS	Quantity	Size	Contrast	Type	Depth (ft)	No	LAB RESULTS
0 - 5	Dark Brown (7.5YR 3/2)	CLAY LOAM	5	0	0	0	GRANULAR SPHERICAL	WEAK	FINE	FRAGILE	NONSTICKY	NONPLASTIC	CLEAR < 2.5"	WAVY	NONE	NONE	NONE	BAG	3	S-1		
5 - 12	Reddish brown (5YR 5/4)	CLAY LOAM	10	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR < 2.5"	WAVY	FEW (5% MAX)	NONE	NONE	BAG TUBE	30	S-2	50	A = N/A B = N/A
12 - 14	Dark Brown (10YR 3/2)	CLAY LOAM	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE	NONE	NONE	BAG	72	S-3		

Additional Remarks: Possible natural soil deposits to 25 feet below the ground surface.



Soil Profile Pit: SPP-224

Project:	Proposed Site Improvements
Project No.:	6043-14-0116C
Client:	Stanfield Building Company, LLC

[illegible]



Soil Profile Pit: SPP-225

Project: Proposed Site Improvements										Project No.: 0003-14-0118C		Sheffield Building Company, LLC		Groundwater Comments																					
Location: 17 Henshaw Road, Montgomery Township, New Jersey										Depth (ft)		B1																							
Proposed Earth Retention System: 12.0' Deep (R) 375A Date Completed: 11/10/18 Logged by: P. Van Oyen Proposed Location: Souderton Contractor: Case 390 Visual Observation: 7 feet minimum										Groundwater Data		Plasticity		BOUNDARY		ROOTS		MOTTLING		SAMPLING		LAB RESULTS													
DEPTH (IN)		COLOR		SOIL TEXTURE		COARSE FRAGMENTS (%)				STRUCTURE		WATER CONTENT		CONSISTENCY		BOUNDARY		ROOTS		MOTTLING		SAMPLING		LAB RESULTS											
										Shape		Grade		Size		Resistance to Rupture		Thickness		Distinctness		Topography													
0 - 2		Dark Brown (7.5 YR 3/2)		LOAM		CHANNERS FLAGSTONES STONES BOULDERS				GRANULAR/SPHERICAL		WEAK		FINE		FROZEN		FRAGILE		NONSTICKY		NONPLASTIC		WAVY		FEW (5% MAX)		FINE		NONE					
2 - 38		Reddish brown (5 YR 5/4)		LOAM		CHANNERS FLAGSTONES STONES BOULDERS				SUBANGULAR BLOCKY		WEAK		FINE		MOIST		FIRM		SLIGHTLY STICKY		SLIGHTLY PLASTIC		WAVY		COMMON (25% MAX)		MEDIUM		NONE		BAG TUBE		S-1 T-1 A = 0.08 gph B = 0.38 gph	
38 - 78		Dark Brown (10 YR 3/3)		FLAGGY SILT LOAM		CHANNERS FLAGSTONES STONES BOULDERS				SUBANGULAR BLOCKY		WEAK		MEDIUM		MOIST		FIRM		SLIGHTLY STICKY		SLIGHTLY PLASTIC		SMOOTH		FEW (5% MAX)		FINE		NONE		BAG		S-2	
78 - 114		Dark Brown (10 YR 3/3)		FLAGGY SILT LOAM		CHANNERS FLAGSTONES STONES BOULDERS				SUBANGULAR BLOCKY		MODERATE		MEDIUM		MOIST		FIRM		SLIGHTLY STICKY		SLIGHTLY PLASTIC				NONE		NONE		BAG		128		S-3	

Additional Remarks: Topsoil to 2 inches below finished ground surface.

SOIL PROFILE PIT LOG

[illegible]

Additional Remarks: Topsoil to 2 inches below the ground surface.

SOIL PROFILE PIT LOG

[illegible]

Additional Remarks:	Toosol to 2 inches below the ground surface.
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Soil Profile Pit: SPP-223

[illegible]

Additional Remarks: Topsoil to 2 inches below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-228

Page 1 of 1

Project: Registered Site Investigation Location: 17 Van Dine Road, Montgomery Township, New Jersey Surface Elevation (ft): 133.5 Date Started: 11/01/18 Termination Depth (ft): 12.2 Date Completed: 11/01/18 Proposed Location: SWM Contractor: F. Van Dine Inspector: S. Schenker Notes: Visual Observation Method: 1 foot Rig Type: Case 560										Project No.: 0042-14-215-02 Client: Shearson Building Company, LLC S.A. (ft) Inch Groundwater Comments														
DEPTH (ft)		COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)			STRUCTURE			WATER CONTENT		CONSISTENCY		BOUNDARY		ROOTS	MOTTLING		SAMPLING		LAB RESULTS			
				CHANNERS	FLAGSTONES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Disturbance	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.	
0 - 2		Dark Brown (7.5YR 3/2)	LOAM	<5	0	0	0	GRANULAR/SPHERICAL	WEAK	FINE	FROZEN	FRABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	NONE		BAG	2	S-1		
2 - 24		Reddish Brown (5YR 5/4)	LOAM	15	<5	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	CMN (20% MAX)	NONE		BAG	20	S-2		
24 - 74		Dark Brown (10YR 3/3)	LOAM	8	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <3"	SMOOTH	FEW (5% MAX)	NONE		BAG	53	S-3 T-1		A = 2.62 ph B = 2.55 ph
74 - 106		Dark Brown (10YR 3/2)	FLAGGY	15	25	<5	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRABLE	NONSTICKY	NONPLASTIC			NONE	NONE		BAG	136	S-4		

Additional Remarks: Possible re-worked soils to 2 feet below the ground surface.



Soil Profile Pit: SPP-230

[illegible]

Additional Remarks:

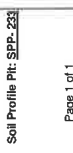
SOIL PROFILE PIT LOG

[illegible]

Additional Remarks:

SOIL PROFILE PIT LOG

[illegible]



Soil Profile Pit: SPP- 233

Project No.: 6043-14-0135C Shardell Building Company, LLC														
Client:														
Groundwater Data														
Depth														
D.														
Groundwater Comments														
LAB RESULTS														
SAMPLING														
Type														
No.														
MOTTLING														
Quantity														
Size														
Contrast														
ROOTS														
BOUNDARY														
Distinctness														
Topography														
Plasticity														
Consistency														
Stickiness														
Resistance to rupture														
WATER CONTENT														
Moisture														
STRUCTURE														
Shape														
Grade														
Size														
COARSE FRAGMENTS (%)														
CHANNERS														
FLAGSTONES														
STONES														
BOULDERS														
SOIL TEXTURE														
COLOR														
DEPTH (ft)														
0 - 7														
Dark Brown (10 YR 3/3)														
CLAY LOAM														
0														
0														
0														
0														
7 - 18														
Dark Brown (10 YR 3/3)														
CLAY LOAM														
10														
45														
0														
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0														
0														
18 - 72														
Dusky Red (10R 3/3)														
CLAY														
0														
0														
0														
0														
0														
72 - 144														
Dusky Red (10R 3/3)														
EXTREMELY FLAGGY														
25														
40														
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Additional Remarks:

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP. 235

Page 1 of 1

[illegible]

Additional Remarks:

SOIL PROFILE PIT LOG

[illegible]



Page 1 of 1

Additional Remarks: Apparent weathered rock between approximately 90 inches and 145 inches. Refusal on apparent rock at 145 inches below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-238

Page 1 of 1

Project No.: 2042-14-2118C														
Client: Starfield Building Company, LLC														
Groundwater Comments														
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SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-233

Page 1 of 1

Project: Proposed Site Improvements		Project No.: 6043-14-115C2		Client: Shantell Building Company, LLC		Groundwater Comments:																													
Location: 15000 S. 150th St., Burien, WA 98148		Date Started: 11/11/18		Depth (ft):		EL (feet):																													
Proposed Elevation (ft): 12.0		Date Completed: 11/11/18		NE		NE																													
Termination Depth (ft): SNM		Logged by: A. Fossz		NE		NE																													
Excavation Method: Visual Observation		Contractor: Schroeder		NE		NE																													
Visual Observation Method:		Case #0		NE		NE																													
Soil Type:		STRUCTURE		CONSISTENCY		BOUNDARY		ROOTS		MOTTLING		SAMPLING		LAB RESULTS																					
DEPTH (IN)		COLOR		SOIL TEXTURE		COARSE FRAGMENTS (%)		WATER CONTENT		Resistance to Rupture		Thickness		Plasticity		Distinctness		Topography		Quantity		Size		Convert		Type		Depth (in)		No.		LAB RESULTS			
0 - 1		Dark Brown (7.5YR 3/2)		SILT LOAM		CHANNERS FLAGSTONES STONES BOULDERS		SUBANGULAR BLOCKY		WEAK		COARSE		FROZEN		LOOSE		SLIGHTLY STICKY		NONPLASTIC		CLEAR < 5"		SMOOTH		NONE		MEDIUM		NONE		NONE		NONE	
1 - 16		Reddish brown (5YR 5/4)		LOAMY SAND		CHANNERS FLAGSTONES STONES BOULDERS		SUBANGULAR BLOCKY		WEAK		MEDIUM		MOIST		LOOSE		SLIGHTLY STICKY		NONPLASTIC		CLEAR < 5"		SMOOTH		NONE		MEDIUM		NONE		NONE		NONE	
16 - 75		Dark Brown (7.5YR 3/2)		SILTY CLAY LOAM		CHANNERS FLAGSTONES STONES BOULDERS		ANGULAR BLOCKY		MODERATE		MEDIUM		MOIST		FIRM		SLIGHTLY STICKY		SLIGHTLY PLASTIC		CLEAR < 5"		SMOOTH		NONE		NONE		NONE		NONE		NONE	
75 - 144		Dark Brown (7.5YR 3/2)		VERY FLAGGY SILTY CLAY LOAM		CHANNERS FLAGSTONES STONES BOULDERS		ANGULAR BLOCKY		MODERATE		FINE		MOIST		FIRM		SLIGHTLY STICKY		SLIGHTLY PLASTIC		CLEAR < 5"		SMOOTH		NONE		NONE		NONE		NONE		NONE	

Additional Remarks:

SOIL PROFILE PIT LOG

Project: Proposed Site Remediation Location: 17 Alameda Blvd., Montgomery Township, New Jersey									
Service Elevation (ft): 911.5 Termination Depth (ft): 12.0 Prepared Location: 17144 Visual Observation						Date Started: 8/11/18 A. Fisco Scheduler Capit 80			
Logged by: Contractor:									
Ring Type:									
Soil Type:									
Bathymetry:									
Groundwater Data						Depth (ft)			
Shape						Grade			
Size						Plasticity			
DISTINCTNESS						Topography			
ROOTS						Quantity			
Contrast						Type			
No.						LAB RESULTS			
Color						Soil Texture			
COARSE FRAGMENTS (%)						CHANNERS			
FLAGSTONES						STONES			
BOULDERS						0			
0 - 3						Dark Reddish Brown (2.5YR 3/4)			
LOAMY CLAY						0			
3 - 18						Dark Reddish Brown (2.5YR 3/3)			
SILTY CLAY LOAM						0			
18 - 30						Dark Brown (7.5YR 3/3)			
VERY FLAGGY SILTY CLAY LOAM						0			
80 - 144						Dark Brown (7.5YR 3/3)			
Additional Remarks:									



SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-241

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Project: Proposed Site Expansion with Location: 13.5 Miles South of Road, Montgomery Township, New Jersey Surface Elevation (ft): 112.0 Termination Depth (ft): 112.0 Proposed Location: SWM Method: Visual Observation										Project No.: 0642-14-4-111C Client: Shantel Building Company, LLC										Groundwater Comments									
Logged By: A. Forde Contractor: Shantel Building Company, LLC Fig. Type: Case 80										Date Started: 11/11/18 Date Completed: 11/11/18										Depth (ft): 0 - 8 8 - 16 16 - 24 24 - 32 32 - 40 40 - 48 48 - 56 56 - 64 64 - 72 72 - 80 80 - 88 88 - 96 96 - 104 104 - 112									
Soil Texture										Soil Texture										Soil Texture									
Color										Color										Color									
Grain Size										Grain Size										Grain Size									
Moisture										Moisture										Moisture									
Consistency										Consistency										Consistency									
Plasticity										Plasticity										Plasticity									
Boundary										Boundary										Boundary									
Roots										Roots										Roots									
Mottling										Mottling										Mottling									
Sampling										Sampling										Sampling									
Lab Results										Lab Results										Lab Results									

Additional Remarks:



SOIL PROFILE PIT LOG

Soil Profile Pit: SPE-242

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Project: Proposed Site Improvement Location: 17700 Old Rock Quarry Turnpike, New Jersey Surface Elevation (ft): 100.0 Date Started: 11/15/18 Termination Depth (ft): 12.0 Date Completed: 11/15/18 Proposed Location: SWM Excavation Method: Visual Observation Log Type: Case 50										Project No.: 0643-14-518-02 Client: Shantel Building Company, LLC Groundwater Counts										
DEPTH (ft)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)			STRUCTURE			WATER CONTENT	CONSISTENCY		BOUNDARY	ROOTS	MOTTLING		SAMPLING		LAB RESULTS		
			CHANNERS	FLAGSTONES	STONES	BOULDERS	Shape	Grade		Size	Resistance to Rupture			Stickiness	Plasticity	Distinctions	Topography		Quantity	Size
0 - 4	Dark Reddish (2.5YR 3/4)	SILT LOAM	8	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	FROZEN	LOOSE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MIN (20% MAX)	NONE			
4 - 18	Dark Reddish Brown (2.5YR 3/2)	CLAY LOAM	10	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	LOOSE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MIN (20% MAX)	NONE			
18 - 40	Dark Brown (2.5YR 3/2)	CLAY LOAM	5	0	0	0	ANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	NONE			
40 - 86	Dark Brown (2.5YR 3/2)	CLAY LOAM	0	0	0	0	ANGULAR BLOCKY	MODERATE	FINE	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE	NONE	BAG TUBE	40	S-3 1:1 A < 0.08 ph 15 < 0.06 DA
86 - 120	Dark Brown (2.5YR 3/2)	VERY CHANNERY	40	20	0	0	ANGULAR BLOCKY	MODERATE	FINE	MOIST	FRABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE	NONE	BAG	86	S-4
120 - 144	Dark Yellowish Brown (10YR 4/4)	VERY FLAGGY	30	30	0	0	ANGULAR BLOCKY	MODERATE	FINE	MOIST	FRABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE	NONE			

Additional Remarks:

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-243

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SOIL PROFILE PIT LOG

[illegible]

Project: Proposed Site Improvements										Project No.: 0042-144-0150C										Client: Sharbert Building Company, LLC										Groundwater Comments									
Location: Sharbert Road, Marion, Tennessee, Near Jersey										Depth: (ft)										BL (med)																			
Soils: Sharbert Road, Marion, Tennessee, Near Jersey										Date: 11/15/18																													
Termination Depth (ft): 12.0										Date Started: 11/15/18																													
Proposed Depth (ft): SWM										A. Field																													
Excavation: Visual Observation										Logged by: A. Field																													
Method: Visual Observation										Contractor: SCS																													
										Prop. Type: Ring Types																													
										COARSE FRAGMENTS (%)																													
										CHANNERS FLAGSTONES STONES BOULDERS																													
										0 0 0 0 0 0																													
										CHANNERS FLAGSTONES STONES BOULDERS																													
										5 0 0 0 0 0																													
										CHANNERS FLAGSTONES STONES BOULDERS																													
										5 10 0 0																													

DRAINAGE AREA MAPS