

Stormwater Management Report

38th & Chicago

Phase 1

24X.136.243.000



Prepared for
Minnehaha Creek Watershed District



Real People. Real Solutions.

Prepared by
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April 20th, 2026

Revision 3

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a Registered Professional Engineer under the laws of the State of Minnesota.

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1 Project Scope

The City of Minneapolis (City) is proposing a 0.37-mile common development, linear road reconstruction project at East 38th Street and Chicago Avenue bound by Park Avenue S and 10th Avenue along E 38th Street and E 37th Street and E 39th Street along Chicago Avenue. Proposed improvements include intersection redesign with a traffic circle, pedestrian and bicyclist safety, bike lane addition, urban greening, and utility improvements which will be implemented in two phases. Phase 1 plans to construct the east and south legs of the intersection beginning in late spring 2026, while Phase 2 will construct the intersection's traffic circle at 38th and Chicago, connected entrance/exits to the traffic circle, and the west and north leg of the intersection in 2027.

Approximately 72% of the project area is in Minnehaha Creek Watershed District (MCWD) regulatory boundary and approximately 28% of the project is in the Mississippi Watershed Management Organization (MWMO) regulatory boundary. The centerline of 38th Street west of Chicago Avenue, and the centerline on Chicago Avenue south of 38th Street represent the regulatory boundary. All stormwater runoff from the project area is captured by City storm sewer and discharges into MCWD. In other words, while the project crosses both jurisdictional boundaries, the entire project is within MCWD's hydrologic boundary.

The entire project will disturb 4.4 acres, 3.2 acres of which are in MCWD, triggering the City of Minneapolis's Chapter 54 stormwater ordinance and the MCWD's stormwater management, and erosion and sediment control permits. This report focuses on Phase 1 of the project which disturbs 1.7 acres, 1.3 acres in MCWD. The following regulatory requirements apply within MCWD.

- Volume and Phosphorus Control
 - 0.5 inches times the area of the new or reconstructed impervious surface.
 - If the required volume reduction cannot be provided within existing right-of-way (ROW), the permittee must make a reasonable attempt to obtain additional right-of-way, easement or other permission to site the required volume. Volume reduction is not required to the extent it cannot be provided cost-effectively. If volume reduction is not fully met, equivalent phosphorus control must be provided to the extent feasible.
- Rate Control: No increase in the peak runoff rate from the site for design storm events.
- Flood Separation: There must be two feet of vertical separation between the 100-year high water elevation (HWL) of a stormwater practice and the low opening of any structure, unless the structure opening is hydraulically disconnected from the practice.

The project's existing landscape index is low as there are minimal boulevards or landscaping within the project area. A few boulevards are located on Chicago Ave's southern leg and along the cross streets. There are no wetlands, waterbodies, or associated floodplains on site.

2 Existing Conditions

E 38th Street & Chicago Avenue is a dynamic intersection including zones of urban neighborhood, corridor mixed use, and commercial land uses along the project area. The overall project area (Phases 1 and 2) is primarily impervious due to the typical street composition of a two-lane road

(one lane each in each direction) with street parking backed by sidewalk on both sides of the street. The sidewalk stretches to the edge of the right of way (ROW) which limits boulevard space. Curb and gutter line the edge of the street, directing stormwater into the city's existing storm sewer network. Given that 38th and Chicago is the high point of the subwatershed, all runoff drains away from the intersection. The intersections downstream of the high point each have storm sewer to capture runoff. Therefore, there is no trunk storm sewer within the project limits, no storm sewer networks enter the project limits, and no off-street run-on enters the project corridor.

Site soils throughout the corridor are classified as "Brown Sand" and/or "Brown Sand with Gravel" via soil borings but no infiltration tests have been collected to date. The project is not located within a drinking water supply management area (DWSMA).

See Figure 1 for the project area map that illustrates the watershed management organization jurisdictions, drainage areas, and proposed road geometries.

2.1 Drainage Summary

The intersection of E 38th Street & Chicago Avenue is the project's high point and all four legs slope away. The cross streets along E 38th Street also flow away from their respective intersections. As such, no stormwater runs onto the project corridor. Runoff is directed into the city's storm sewer system via curb and gutter, which will ultimately discharge into the project's receiving waters, Lake Hiawatha. Note in Phase 2, the western leg's stormwater runoff is directed into the existing storm sewer that discharges into a regional stormwater pond along E 37th St to the north of the project site. The pond overflows into the storm sewer network before ultimately discharging into Lake Hiawatha. Aside from the regional pond at 37th St, there are no additional existing stormwater treatment facilities downstream of the project area.

2.2 Project Constraints

The project's ability to provide additional or larger stormwater management best management practice (BMP) facilities is constrained by the following site limitations, as shown in Figures 2-3:

- Limited Boulevard Space

Boulevards less than approximately 5 feet wide or boulevards adjacent to on-street parking cannot accommodate surface graded green stormwater infrastructure (GSI) facilities deeper than 4" to 6" and/or that require surface pretreatment curb cut inlets. Under these conditions, basin grades cannot be designed to retain runoff or be graded down to the curb-cut while meeting city/ state aid safety standards. Boulevards on the south leg, with the exception of the bump outs near the 39th Street intersection are 5' wide, adjacent to parking, and contain water main and services. Boulevard space on the east leg is also limited to just the east half of the leg, is approximately 6 feet wide and contains trunk water main. These conditions eliminate opportunities to construct surface GSI.

- Utility Conflicts

- Water Main & Services: Water main and services lines require a 10-foot horizontal buffer from infiltration practices. No part of an infiltration basin, including non-ponding areas, would be allowed within the buffer. Additionally, water mains require 8 feet of cover from the bottom of the pipe to the ground surface, further limiting grading flexibility. The east and south legs include watermain and numerous water services that cross boulevard.

- Traffic Signal Infrastructure: Signal-related infrastructure, including hand-holes and controller equipment, require concrete utility pads typically located within boulevards areas near intersections. These installations reduce the available space for infiltration basins.
- Small Drainage Areas

The project is located at a high point, at the intersection of Chicago Avenue and East 38th Street, and the adjacent cross streets. As a result, upstream drainage areas near the high point are small and provide limited runoff volume and treatment opportunity. Therefore, GSI facilities were prioritized in downstream sections of the drainage area where feasible.

The City prioritizes underground stormwater management facilities in areas that provide regional treatment. Since the intersection of Chicago Avenue and East 38th Street is the regional high point, and the storm sewer system in the project only serves the project area, the project corridor is not a preferred location for regional facilities. The City limits underground storage opportunities to larger drainage areas to reduce operations and maintenance burdens and maximize cost effectiveness.

- Sidewalk vs Curb Elevation

When the sidewalk is elevated above the top of curb adjacent to GSI facilities, the width of the boulevard must be wider to accommodate safety offsets and grading. This limits the potential water quality volume in the facility, and in some cases, may eliminate any volume potential. For instance, a sidewalk elevation approximately 0.5 feet above the back of curb would require an additional 2 feet of boulevard width to construct a basin with equivalent storage volume. See Appendix D for basin cross sections and details.

3 Proposed Conditions

The proposed project incorporates space within the public ROW for community use while maintaining access and parking for residents and businesses. The project also includes transit and pedestrian improvements, utility improvements, construction of memorials on all four legs, and streetscaping through the addition of trees and native plants to the site.

Tables 1 through 3 summarize the impervious areas within the construction limit for Phase 1, Phase 2, and the overall project. Phase 2 will reconstruct the intersection of E 38th Street and Chicago Avenue, as well as portions of the east and south legs immediately adjacent to the intersection. Both phases result in a reduction in impervious area. Note that Phase 2 is in preliminary design and is subject to change during the final design. Phase 2 will be coordinated with MCWD when design begins and this permit will be modified accordingly.

Table 1. Summary of Phase 1 Impervious Areas

Phase 1 Area Description	Unit	MCWD
Existing Impervious	Sq-Ft	54,667
Reconstructed Impervious	Sq-Ft	47,829
New Impervious	Sq-Ft	72
Total Proposed Impervious	Sq-Ft	47,901
Net Change in Impervious	Sq-Ft	-6,766

Table 2. Summary of Phase 2 Estimated Impervious Areas

Phase 2 Area Description	Unit	MCWD
Existing Impervious	Sq-Ft	86,772
Reconstructed Impervious	Sq-Ft	81,540
New Impervious	Sq-Ft	0
Total Proposed Impervious	Sq-Ft	75,666
Net Change in Impervious	Sq-Ft	-11,106

Table 3. Summary of Total Project Estimated Impervious Areas

Total Project Area Description	Unit	MCWD
Existing Impervious	Sq-Ft	141,439
Reconstructed Impervious	Sq-Ft	123,495
New Impervious	Sq-Ft	72
Total Proposed Impervious	Sq-Ft	123,567
Net Change in Impervious	Sq-Ft	-17,872

Under the current preliminary layout, two sections of Phase 2’s impervious area will be treated by Phase 1’s stormwater management design. Since the intersection and the adjacent area will be constructed during Phase 2 and the intersection is at a high point, the area adjacent to the intersection will drain into Phase 1 project area. Therefore, the Phase 2 impervious area draining to Phase 1 will be included in the stormwater volume control and water quality calculations for Phase 1. See Table 4 for the total impervious area being treated by Phase 1.

Table 4. Summary of Phase 1 Treatment Areas

Phase 1 Impervious Treatment Area	Unit	Entire Project	Phase 1	Phase 2
East Leg Impervious Area	Sq-Ft	36,984	31,146	5,838
South Leg Impervious Area	Sq-Ft	24,994	17,288	7,706
Total Phase 1 Impervious Treatment Area	Sq-Ft	61,978	48,388	13,590

The boulevard space includes green infrastructure (GI) to promote infiltration, increase density of native plants, and maximize stormwater treatment. The following GSI facilities have been prioritized by the City.

- **Graded Surface Basins**
Surface features where runoff from the street discharge into the basins via curb cut. Pre-treatment facilities are implemented at the curb cut to capture sediment before it enters the basin. Treatment volume is provided by the open volume of the basin up to the curb cut or overflow. Surface facilities can be either infiltration or filtration basins depending on its proximity to water main. The west side of the south leg must be a filtration facility. While the filtration basin is not in the MCWD regulatory boundary, it is within the hydrologic boundary.

3.1 Stormwater Alternatives Sequencing

Alternative GSI facilities have been analyzed for their feasibility to meet MCWD’s stormwater permit and the City of Minneapolis’s Chapter 54 ordinance with consideration of constructability, cost effectiveness, and material lead time. See Appendix C for a cost comparison between alternative facility types. The following GSI facilities and methods for Stormwater Management Alternatives Sequencing are listed below:

- **Street Parking**

To support urban greening and stormwater management, street parking has been reduced to increase boulevard green space. Parking stalls on the east side of the south leg have been removed to increase the water quality volume in the GSI. This approach also reduces the total impervious area within the project. Parking on the west side of the south leg cannot be reduced because of the space needed for the mass transit station just south of 38th Street. There are no parking spaces on the east leg.
- **Off-Site Treatment**

Additional treatment outside of MCWD’s legal boundary was explored as there are areas outside of the MCWD’s legal boundary that ultimately drain into MCWD’s jurisdiction. For Phase 1, the west side of Chicago Ave, south of E 38th St, storm sewer will route stormwater runoff to MCWD and ultimately discharge to Lake Hiawatha. There is a proposed filtration basin that will treat the west side of the leg, which provide off-site treatment for the project. The off-site BMP opportunities are limited by the existing watermain location and limited boulevard space.

Off-site run-on is also considered for treatment potential as there are residential properties that are unlikely to have a BMP installed which drain to the proposed GSI facilities.
- **Relocate Water Main**

The east leg includes trunk watermain on the south side of the street in the 6.3’ boulevard, and the south leg includes trunk watermain on the west side in the 5’ boulevard and the downstream boulevard bump out. The City’s watermain policy does not allow for infiltration within 10’ laterally of the watermain and requires a minimum of 8’ of cover from the pipe invert to the ground surface. This significantly or completely limits use of the boulevard unless the GSI is converted to filtration or the watermain is moved. Moving the water main was considered to enhance surface GSI and infiltration potential but significantly inflates the GSI construction costs.

Estimated Construction Cost: \$350,000 on top of GSI construction cost.
- **Stormwater Planter Box**

In narrow boulevard areas, surface GSI volume could be expanded through integration of vertical sidewalls. Planter boxes adjacent to trails and back of curb impact pedestrian and vehicular safety without ample reaction space (typically minimum 2’). Additional State Aid safety requirements also exist. As such, railings or short walls would be required for additional public safety.

For the 5’ boulevards adjacent to street parking areas, the minimum 2’ safety reaction on the trail and back of curb reduces the planter box width to 1’, which is not cost effective relative to the available BMP volume nor maintainable—it would need a minimum of a 3 to 4 foot width to allow maintenance staff to get into the device and maintain the vegetation.

Furthermore, in areas with watermain, planter box filtration basins would reduce the cover over the watermain to less than the City's 8' minimum standard.

Estimated Construction Cost: \$361,000

- Rock Trenches

The City has considered use of rock trenches, or tree trenches, in narrow boulevards where traditional surface GSI is not constructable, or where water quality volumes could be enhanced. Several cross sections have been developed including variable trench construction side slopes and options to extend the rock storage and filter sections under the sidewalk. Refer to Figure 4 for the rock trench cross section options considered.

- In sandy soils, the Minnesota Stormwater Manual recommends trench side slopes of 1.5:1 (H:V). This eliminates the filter section and is considered not constructable for 5' to 6.3' boulevards on the project.
- Steeper construction trench side slopes (i.e. 0.5:1) were considered, but construction and future maintenance of these trenches puts the subgrade, curb and gutter, and pedestrian facilities at risk of slope failure when excavated.
- The City has considered rock storage and filtration sections under pedestrian facilities. Below grade filtration features require complete excavation and replacement of rock storage and filtration materials to restore their treatment capacities when maintenance is required. Previous experience within the City has found that BMP maintenance occurs more frequently than required sidewalk maintenance, which substantially inflates the operations and maintenance costs due to repeated sidewalk reconstruction.

- Underground Infiltration Practices

Storm sewer within the project corridor could be diverted to enhance corridor treatment capacity. However, since the intersection of 38th St and Chicago Ave is the high point, the overall regional drainage area is limited to the project footprint only. No offsite drainage is routed through the project that could be utilized for regional treatment. The City's preference for underground stormwater practices is to target larger regional opportunities to maximize the treatment benefit for the elevated construction and long-term maintenance cost.

Estimated Construction Cost: \$600,000

- Hydrodynamic Separator (HDS) Structure

HDS units are helpful for removing gross solids and larger suspended solids, but not for dissolved or fine particles and nutrients, like phosphorous. MCWD does not credit HDS for water quality compliance, and so HDS were not considered as a primary treatment device given the maintenance needs and higher cost for the size of the drainage areas. HDS structures could be considered for additional solids capture or as pretreatment for GSI or underground facilities.

- Regional Stormwater Management

An assessment of downstream regional facilities was performed. There are no additional regional facilities within the contributing drainage area downstream of the project area outside of the 37th Street facility previously described.

The existing drainage patterns will be preserved as only minor adjustments to catch basin and manhole placement will be implemented to adjust to the new road geometries. Therefore, the project discharge locations and its' receiving waters will not change from the existing conditions.

3.2 Operations and Maintenance Cost Assessment

Operations and maintenance (O&M) costs can be a significant factor when assessing the cost effectiveness of BMPs. While some facilities have life cycles of 30 years or more, sensitive BMPs like surface GSI require more frequent maintenance and may require full replacement of plant or filtration material much sooner than once every 30 years. Two sources of information were referenced to quantify operations and maintenance costs.

- [International Stormwater BMP Database](#)
 - The International Stormwater BMP Database is a repository of BMP data including field studies and other related web tools. Many of the BMPs in the database are from Minnesota.
- [Stormwater BMP Inspection and Maintenance Resource Guide](#)
 - The University of Minnesota and Minnesota Department of Transportation partnered to produce the Resource Guide in June of 2024. The guide synthesizes decades of research and data collected related to stormwater maintenance and includes additional cost information.

The following information is summarized from these references.

- Bioretention: Median - ~\$2,000/year (range ~\$250 - \$3,500)
 - Surface GSI type will impact (O&M). Traditional surface GSI will fall within the lower end of the range of maintenance costs while planter boxes will fall on the higher end of the range.
- Filtration: Median \$2,200/year (range \$1,800 - \$4,700)
 - For this project, filtration practices are infeasible. If they were feasible, the filtration practice would be entirely below grade, which will push the O&M costs to the higher end of the range.
 - To physically construct and maximize treatment volume potential, the rock storage and filter would need to be extended under the sidewalk. The City has phased this approach out of their preferred GSI alternatives. Replacement of the sidewalk well ahead of its effective life cycle would be required to restore the water quality volume and/or filtration section, which significantly inflates the O&M costs.
- Underground Sedimentation: Median \$4,500/year (range \$1,300 to \$6,700)
 - For this project, the underground storage facility would also be an infiltration practice. Since maintenance of the infiltration surface would require equipment above and beyond a simple vacuum truck, it is assumed that underground infiltration would fall on the high end of the range.
 - Substantial pretreatment is required for underground infiltration, which also requires more frequent maintenance given the sensitivity of the underground facility. According to the O&M Resource Guide, Oil/grit separation pretreatment

structures require an additional \$1,800/year (range \$1,200 to \$2,500). More frequent maintenance would be expected for an underground facility and assumed to be at the high end of the range.

The above information was considered when determining if GSI could be implemented to the maximum extent practicable, as long term O&M costs and staff availability to complete the required maintenance can significantly influence the long-term viability of a GIS facility.

3.3 Stormwater Management Summary

Stormwater management requirements will follow Minneapolis’s Chapter 54 Ordinance and Linear Guide, and MCWD’s stormwater rules. Phase 1 of the project proposes two infiltration basins: one along the east leg and one along the south leg. The east leg basin is located on the north side of the roadway, adjacent to the intersection of E 10th Avenue and 38th Street and is designed to treat runoff from the entire north half of the block. The south-leg basin is located at the start of the bump-out on the east side of the roadway and is constrained by conflicts with an existing water main. The basin is designed to collect water from most of the block.

Phase 1 of the project meets MCWD rate control standard; however, it is unable to fully meet the water quality and volume control standards with the proposed surface GSI facilities alone. Based on project constraints, two surface infiltration basins represent the maximum extent of stormwater treatment feasible for Phase 1 of the project while remaining consistent with MCWD requirements and City guidance.

3.3.1 Volume Control

MCWD requires the project to treat 0.5 inches over the new or reconstructed impervious surface. Phase 1 includes 61,118 sq-ft of new and reconstructed impervious area which results in a required volume control (V.C.) of 2,547 cu-ft. Two infiltration basins are proposed in Phase 1 to provide volume control, summarized in Table 5 and Appendix A.

Table 5. Volume Control Analysis Results

Receiving Waterbody	BMP name	New or reconstructed impervious area (SF)	Impervious percentage routed to GSI device per Leg (%)	0.5 inches of runoff from new and reconstructed impervious area (CF)	Provided treatment volume (CF)
Lake Hiawatha	East: NE	6,817	18%	284	186
	South: NE	18,669	75%	784	505
Phase 1 Total		61,693	41%	2,582	691
Excess/(Short) V.C					(1,856)

Phase 1 does not fully meet MCWD’s volume control standard due to project constraints. Volume control has been provided to the maximum extent practicable given the site conditions and utility limitations. Since volume control is not fully met, MCWD stormwater management rule 3.d. states equivalent phosphorous must be provided to the extent

feasible. Under MCWD standards, phosphorous control is calculated to meet the pounds of phosphorous removed from a hypothetical best management practice (BMP) treat from 0.5" over the impervious to the extent feasible. To evaluate the extent of treatment provided for this requirement across Phase 1, the proposed conditions and five additional models were assessed in MIDS for total phosphorous:

- Existing Conditions
- Proposed Conditions: No best management practices (BMPs)
- Proposed Conditions/Hypothetical Model: One BMP equivalent to the required V.C.
- Proposed Conditions: Including off-site drainage into BMPs
- Proposed Conditions: Off-site treatment

The single BMP model is assuming that all proposed impervious surfaces will be routed to an appropriately sized BMP which was designed to be a boulevard infiltration basin with the following parameters:

- Boulevard Width: 7 feet,
- Basin Depth: 1 foot, and
- Side Slopes: 3:1 (H:V) on all sides

The hypothetical, single BMP model establishes the baseline pollutant removal performance that the proposed condition—with planned GSI practices—is expected to provide to the extent feasible. Off-Site treatment potential was evaluated by incorporating run-on from residential properties adjacent to the site into both the existing and proposed model drainage areas. The Proposed Off-Site models assessed any off-site BMPs implemented within the project area that provided treatment for off-site stormwater, including runoff originating from the adjacent residential properties. A summary of TP loading results for each modeling scenario is provided in Table 6 and Appendix E.

Table 6. Phase 1 Project TP Analysis Results

Model Name	TP Load (lbs)	TP Removed by BMPs (lbs)	TP Removed From EX (lbs)	% of Hypothetical Model Achieved
Hypothetical Model Goal	2.61	1.94		
Phosphorous Credit Calculations				
Existing Conditions (EX)	2.85	0.00		
Proposed: No BMPs	2.61	0.00	0.24	12%
Proposed On-Site BMP	2.61	0.70	0.94	48%
Proposed On-Site BMP with Off-Site	3.31	0.88	1.04	54%
Proposed Off-Site BMP	1.24	0.15	Off-Site	8%
Total Proposed TP Removal	-	1.03	1.27	65%

While the proposed design is not expected to meet the hypothetical model TP removal target, the design incorporates TP reduction measures to the maximum feasible extent practicable. Given the site constraints, hydraulic conditions, and constructability conditions, no additional BMPs are anticipated to provide further TP removal. As such, the

proposed design represents the highest achievable level of TP control feasible for the project.

3.3.2 Rate Control

There is a 0.4-acre net decrease in the project impervious area, as shown in Table 1, and the existing drainage pattern will be preserved. Hydraulic modeling was generated to illustrate compliance with MCWD’s rate control rule which is detailed in Table 7 and Appendix E. Note that MnDot requires a minimum time of concentration (TOC) of 7 minutes, which is used on any drainage area that is 1 acre or less in the model.

Table 7. Summary of Rate Control

Outfall Location	Unit	Existing Conditions			Proposed Conditions		
		2-yr	10-yr	100-yr	2-yr	10-yr	100-yr
East Leg	CFS	6.8	10.2	18.6	6.4	9.6	17.7
South Leg	CFS	12.7	19.2	35.0	12.1	18.2	33.7
West Leg (Prelim)	CFS	1.5	2.3	4.0	1.4	2.1	3.8
North Leg (Prelim)	CFS	5.3	8.1	14.2	4.6	7.0	12.5
Total Rate Control	Sq-Ft	26.3	39.7	71.8	24.4	36.9	67.5

3.3.3 Flood Separation

MCWD requires 2 feet of vertical separation between the HWL of the infiltration basins and the low opening of the adjacent structures. While this standard is reasonable in areas with meaningful elevation relief, it becomes functionally unachievable in the City of Minneapolis where the topography is fairly flat and the vertical distance between streets and home openings is limited.

The separation requirement does not reflect how stormwater behaves within the project corridor. Streets, boulevards, and storm sewer systems sit lower than the structures they protect, flooding long before water could ever rise to a building’s low opening. Even under extreme rainfall conditions, stormwater would have to flood large areas of the neighborhood before it reaches the adjacent structure’s low opening, as shown in Figure 2-3. When there is only a few feet of separation between the street and low opening throughout the city, the elevation requirement simply cannot be supported by the physical environment.

Note that the low floor opening is estimated based on county LiDAR as the survey stayed within the ROW. All three basins modeled HWL remain within the ROW. See the following description of the freeboard requirement limitations at each location described below, and Figures 4-5 for spot elevations, slopes, and HWL near each basin.

- E 38th St – NE Basin

Modeled HWL: 855.07 ft

Estimate Low floor opening:

- Front Door: 856.67 ft +1.5 ft = 857.17 ft
- Window Well: 857.31 ft + 8.25 in = 858.00 ft

Freeboard Requirement: 857.07 ft

Nearest CB Rim Elevation: 854.80 ft

This basin meets the 2 ft of freeboard requirement, with the low floor opening being 2.1 ft above the modeled HWL. The HWL 855.07 will remain within the ROW as the property has an estimated 1.25 ft retaining wall with a top elevation of 856.19 which directs the runoff, with the sidewalk slope, to the street on both 38th St and 10th Ave and ultimately flow north down 10th Ave. See sketch of drainage below.

922 County Rd 38 Residence Low Opening & Runoff Pattern



▪ Chicago Ave – SE Basin

Modeled HWL:

- Upper Cell: 853.83 ft
- Lower Cell: 853.10 ft

Estimate Low floor opening: 855.18 ft

Freeboard Requirement:

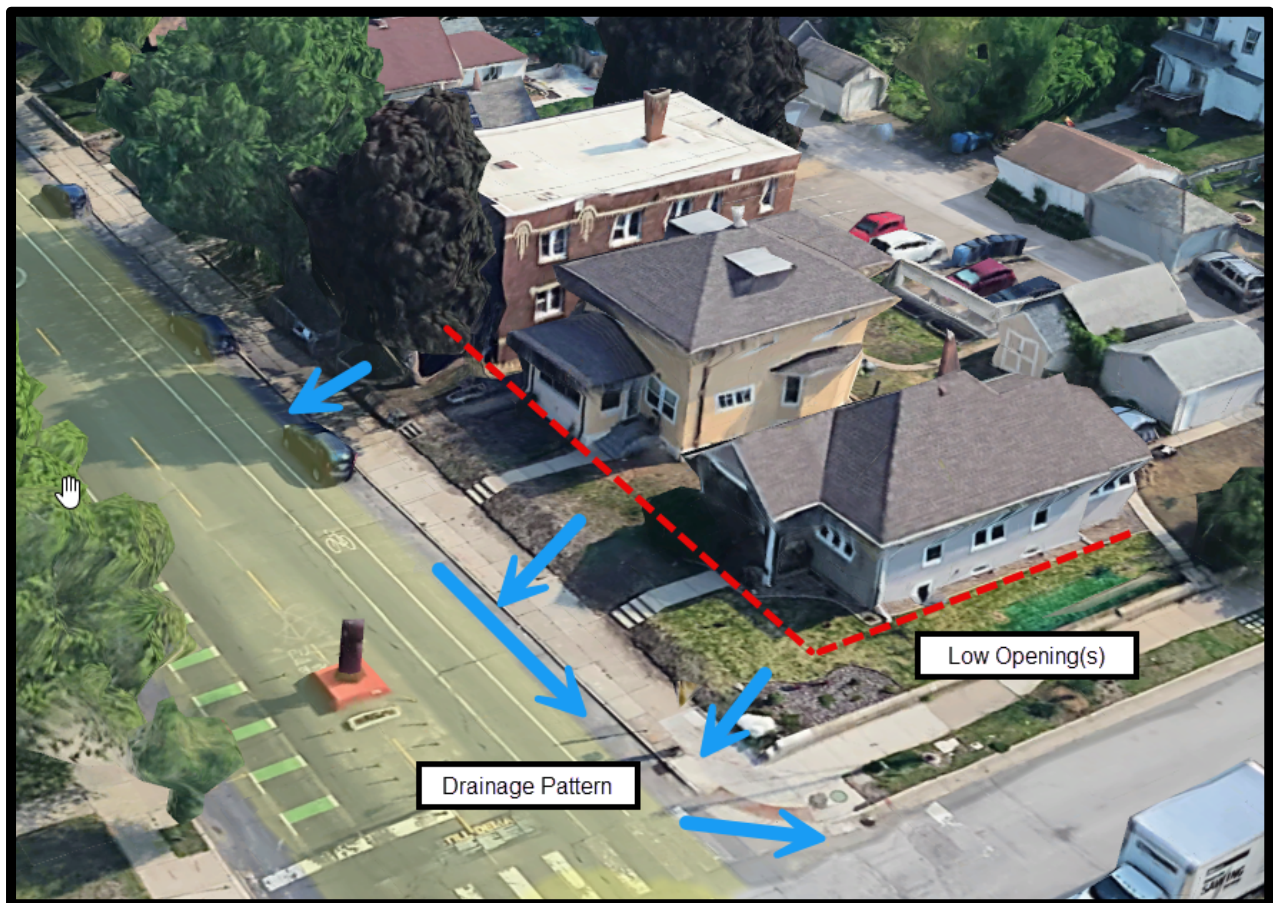
- Upper Cell: 855.83 ft
- Lower Cell: 855.10 ft

Nearest CB Rim Elevation: 852.67 ft

The SE basin's HWL is confined within the public ROW and remains hydraulically disconnected from the adjacent residences. The properties are elevated approximately 1.5 ft above project due to a raised front walk, while existing grades slope away from the homes towards the street, directing runoff to the road. Additionally, the basin will overflow into the catch basin downstream with a rim elevation of 852.67 ft—lower than the basin's 852.90 outlet—ensuring stormwater is intercepted and conveyed within the roadway system prior to any potential encroachment towards private property. Collectively, these conditions prove that the properties are hydraulically disconnected from the basin and are not subjected to flooding under model conditions.

The basin's lower cell meets freeboard requirements.

Chicago Ave (East Side) Residence Low Opening & Runoff Pattern



- Chicago Ave – SW Basin
Modeled HWL: 853.47 ft
Estimate Low floor opening: 853.61 ft
Freeboard Requirement: 855.47
Nearest CB Elevation: 852.71 ft

The SW basin's HWL of 853.47 is contained within the ROW and is hydraulically disconnected from the adjacent properties. The properties have a small front-yard berm, with a control point elevation of 853.74 which prevents any potential flooding that exceeds the ROW from encroaching to the property's low floor elevation, while the existing grade slopes away from the home towards the street, directing runoff to the road. In addition, the nearest catch basin rim elevation of 852.71 is lower than the modeled HWL, providing interception and conveyance of runoff within the roadway system prior to any potential overland spread towards the property. These conditions collectively demonstrate that the properties are hydraulically disconnected from the basin and are not susceptible to flooding under modeled conditions.

Chicago Ave (West Side) Residence Low Opening & Runoff Pattern



An additional topographic assessment was complete to show regional drainage features. Since 38th and Chicago are a regional high point and all stormwater runoff drains away from the intersection, the first blocks (that is, Chicago north and south, and 38th east and west) are also topographically high. Refer to Figure 2-4. There is no low point within the project area that could accumulate flow. Adjacent to the project, there are several low points that accumulate regional runoff. Phelps Field to the southwest, 40th and Elliot to the southeast, 37th and Columbus to the northwest (regional stormwater basin) and various intermediate low points along 37th to the northeast. The Metropolitan Council's Localized Flood Map Screening Tool ([tutorial document](#)) further reinforces the flood potential in these low areas. Essentially, low areas within a LiDAR DEM are filled and the potential depth of flow accumulation is symbolized. This is not a detailed modeling exercise, but rather a flood potential assessment. Qualitatively, it is likely that water will

simply bounce out of the stormwater basins into the curblin and leverage both the storm sewer and street capacity to convey excess volume to the low area, where additional infrastructure can store water and manage peak discharges.

3.3.4 Infiltration Assessment

The geotechnical report classifies the site soils throughout the corridor as “Brown Sand” and/or “Brown Sand with Gravel” based on the soil borings. Borings, taken to a depth of 15 feet, were taken in or near the boulevards of both proposed GSI facilities, identified as P2 for the east leg and J3 for the south leg basin. Brown sands with gravel are classified as Soil Hydrology Group A with a 0.8 to 1.0+ inches per hour infiltration rate.

The proposed infiltration basin on the east leg is graded down approximately 1.5 feet below the existing surface, which would place the bottom of basin and the amended soil entirely within the upper layer of brown sand beneath the existing pavement. The south leg bottom of basin will be in the clay layer noted in the J3 boring log. The remaining 2 ft of the clay soil will be excavated and replaced with filter topsoil borrow to allow for infiltration into the native soil layer.

Boring for the east basin was taken within the proposed GSI boulevard indicates a 4-foot layer of brown sand above light brown silty sand with a trace of gravel. The south basin’s boring was taken adjacent to the proposed basin and shows a 4-foot layer of dark brown sand with gravel and clay, underlain by brown sand with gravel for the remainder of the boring depth. Refer to Appendix B for soil borings.

While the soil borings and Minneapolis’s historical documented sandy soils indicate generally favorable infiltration potential, site-specific infiltration testing is recommended to confirm infiltration rates and suitability for infiltration design. The project is known to be sensitive to on-site work due to the site’s cultural significance.

3.4 Design Changes Post-Submittal

Since the previous submittal, the project design has been refined to address site conditions and stakeholder input. However, the design changes did not largely affect the project’s compliance with the MCWD’s permit requirements. The following changes were made since the last submittal on April 1st, 2026:

- Project Area Reduction
The project area on the north side of Elliot Avenue was reduced in response to a residential complaint regarding the extent of the proposed bump-out; this resulted in a reduction to both the bump-out and the project length on the north side of Elliot Avenue. The reduction in project area reduced the reconstructed impervious and thus reduced V.C. requirement by 35 cu-ft, which does not impact the project’s compliance—it is still under MPE.
- Raised Crosswalks at Intersections
The city implemented raised crosswalks on the south side of Elliot Avenue and on both sides of E 39th Street, resulting in small, localized increases in impervious surface. The impervious increases were in untreated drainage areas, so phosphorous removal remained unchanged and did not impact the compliance in

rate control—the project still meets MCWD’s requirements. There were some updates to the drainage areas along Chicago Ave.

- Updated NE Basin grade on Chicago Ave

Sidewalk elevation changed on the east side of Chicago Ave, from the intersection of E 39th St and a few hundred feet for ADA compliance, which impacted the NE basin’s grade. The basin, which is split into two cells by a berm, had a decrease in volume for the upper cell and an increase in volume for the lower cell. This led to an overall decrease in TP removal and a minimal increase in rate control, but the project remains in compliance with the rate control requirements.

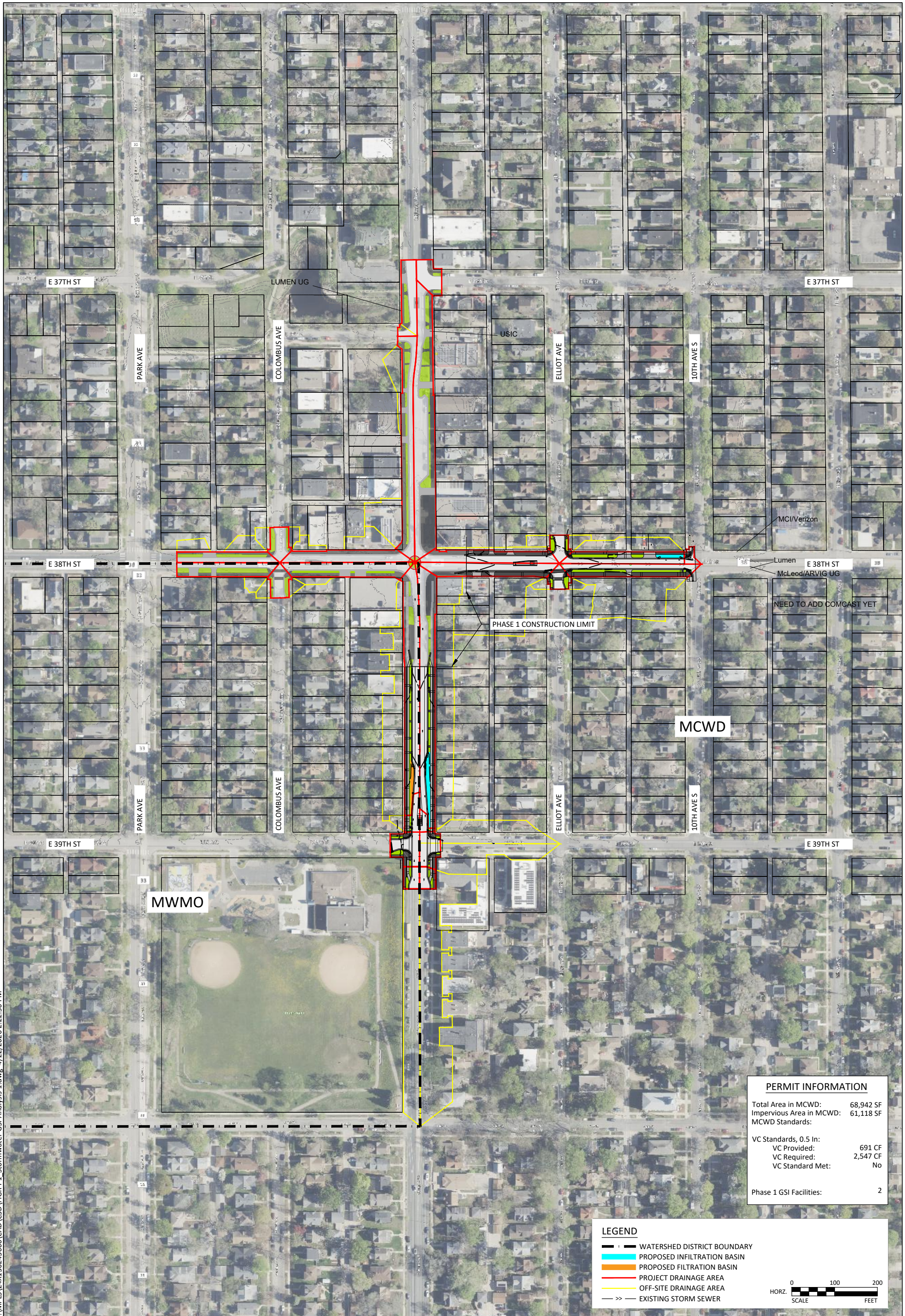
Please contact me if you have any questions or need additional information at 651.724.0404 or Timothy.Olson@bolton-menk.com.

Sincerely,

Bolton & Menk, Inc.

A handwritten signature in black ink that reads "Timothy J. Olson". The signature is written in a cursive, flowing style.

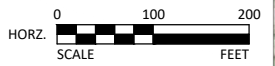
Timothy J. Olson, PE, CFM
Water Resource Project Manager

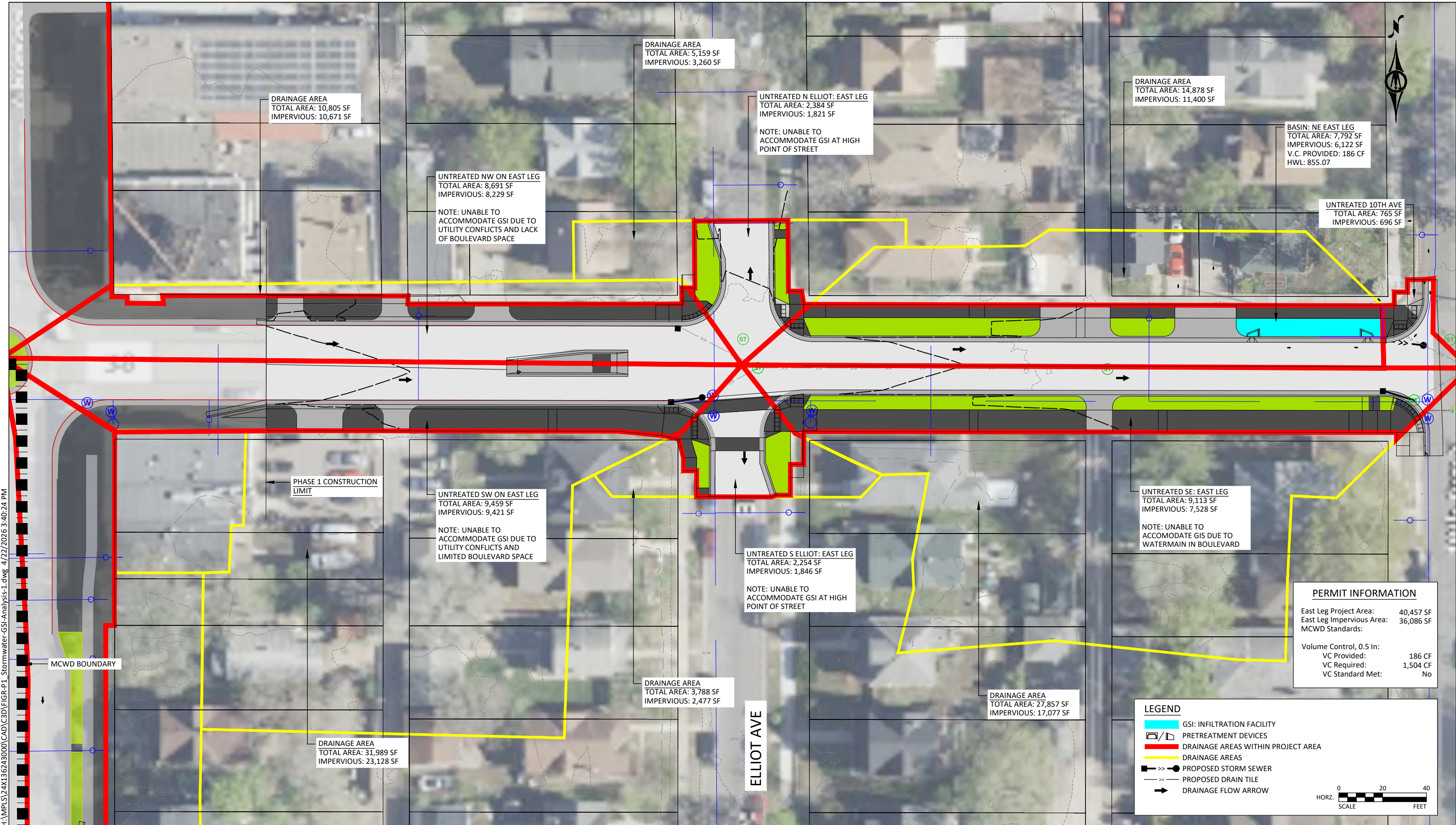


PERMIT INFORMATION	
Total Area in MCWD:	68,942 SF
Impervious Area in MCWD:	61,118 SF
MCWD Standards:	
VC Standards, 0.5 In:	
VC Provided:	691 CF
VC Required:	2,547 CF
VC Standard Met:	No
Phase 1 GSI Facilities:	2

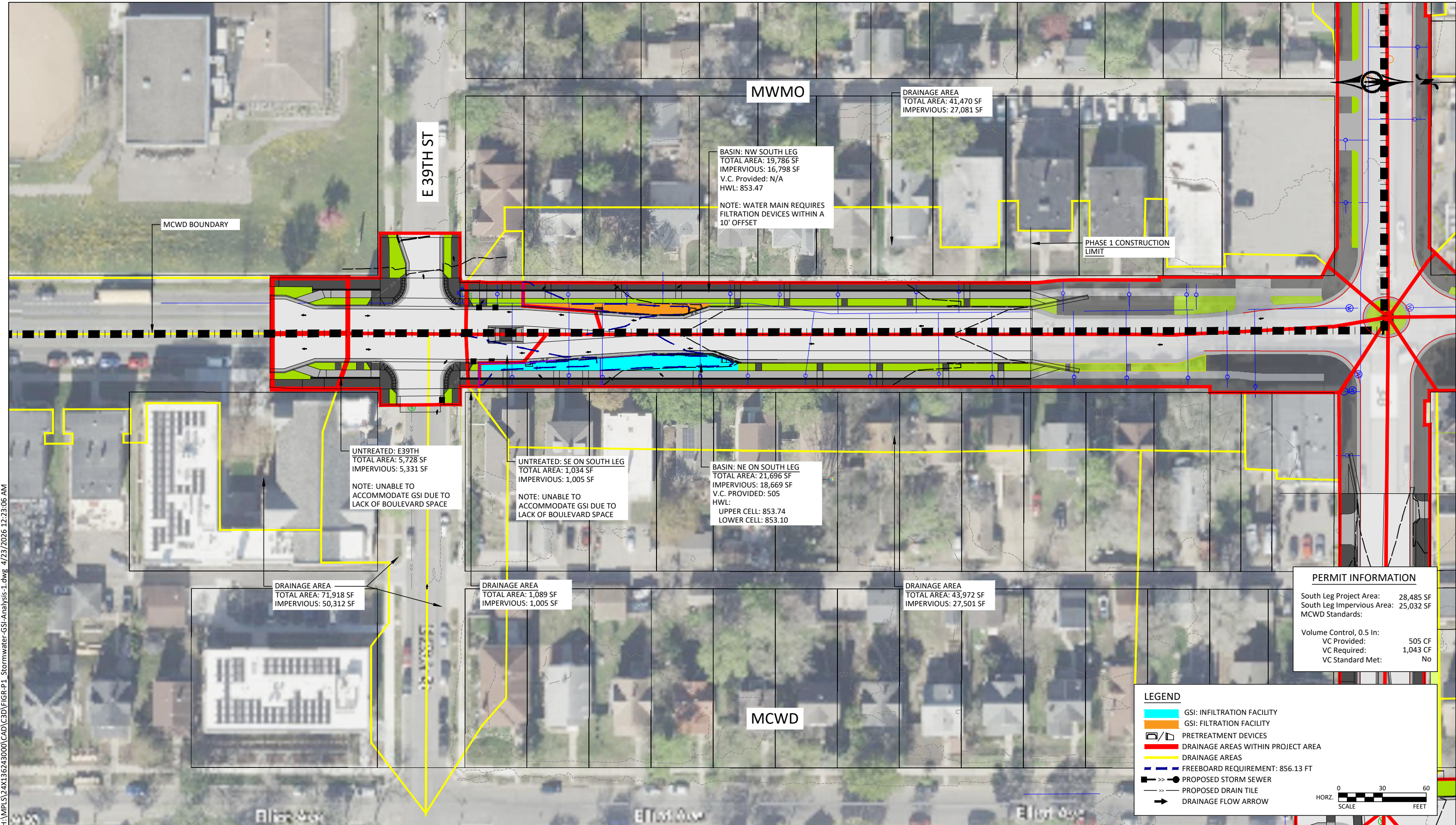
LEGEND

- WATERSHED DISTRICT BOUNDARY
- PROPOSED INFILTRATION BASIN
- PROPOSED FILTRATION BASIN
- PROJECT DRAINAGE AREA
- OFF-SITE DRAINAGE AREA
- EXISTING STORM SEWER





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MWMO

DRAINAGE AREA
TOTAL AREA: 41,470 SF
IMPERVIOUS: 27,081 SF

BASIN: NW SOUTH LEG
TOTAL AREA: 19,786 SF
IMPERVIOUS: 16,798 SF
V.C. Provided: N/A
HWL: 853.47

NOTE: WATER MAIN REQUIRES
FILTRATION DEVICES WITHIN A
10' OFFSET

PHASE 1 CONSTRUCTION
LIMIT

MCWD BOUNDARY

E 39TH ST

UNTREATED: E39TH
TOTAL AREA: 5,728 SF
IMPERVIOUS: 5,331 SF

NOTE: UNABLE TO
ACCOMMODATE GSI DUE TO
LACK OF BOULEVARD SPACE

UNTREATED: SE ON SOUTH LEG
TOTAL AREA: 1,034 SF
IMPERVIOUS: 1,005 SF

NOTE: UNABLE TO
ACCOMMODATE GSI DUE TO
LACK OF BOULEVARD SPACE

BASIN: NE ON SOUTH LEG
TOTAL AREA: 21,696 SF
IMPERVIOUS: 18,669 SF
V.C. PROVIDED: 505
HWL:
UPPER CELL: 853.74
LOWER CELL: 853.10

DRAINAGE AREA
TOTAL AREA: 71,918 SF
IMPERVIOUS: 50,312 SF

DRAINAGE AREA
TOTAL AREA: 1,089 SF
IMPERVIOUS: 1,005 SF

DRAINAGE AREA
TOTAL AREA: 43,972 SF
IMPERVIOUS: 27,501 SF

PERMIT INFORMATION

South Leg Project Area:	28,485 SF
South Leg Impervious Area:	25,032 SF
MCWD Standards:	
Volume Control, 0.5 In:	
VC Provided:	505 CF
VC Required:	1,043 CF
VC Standard Met:	No

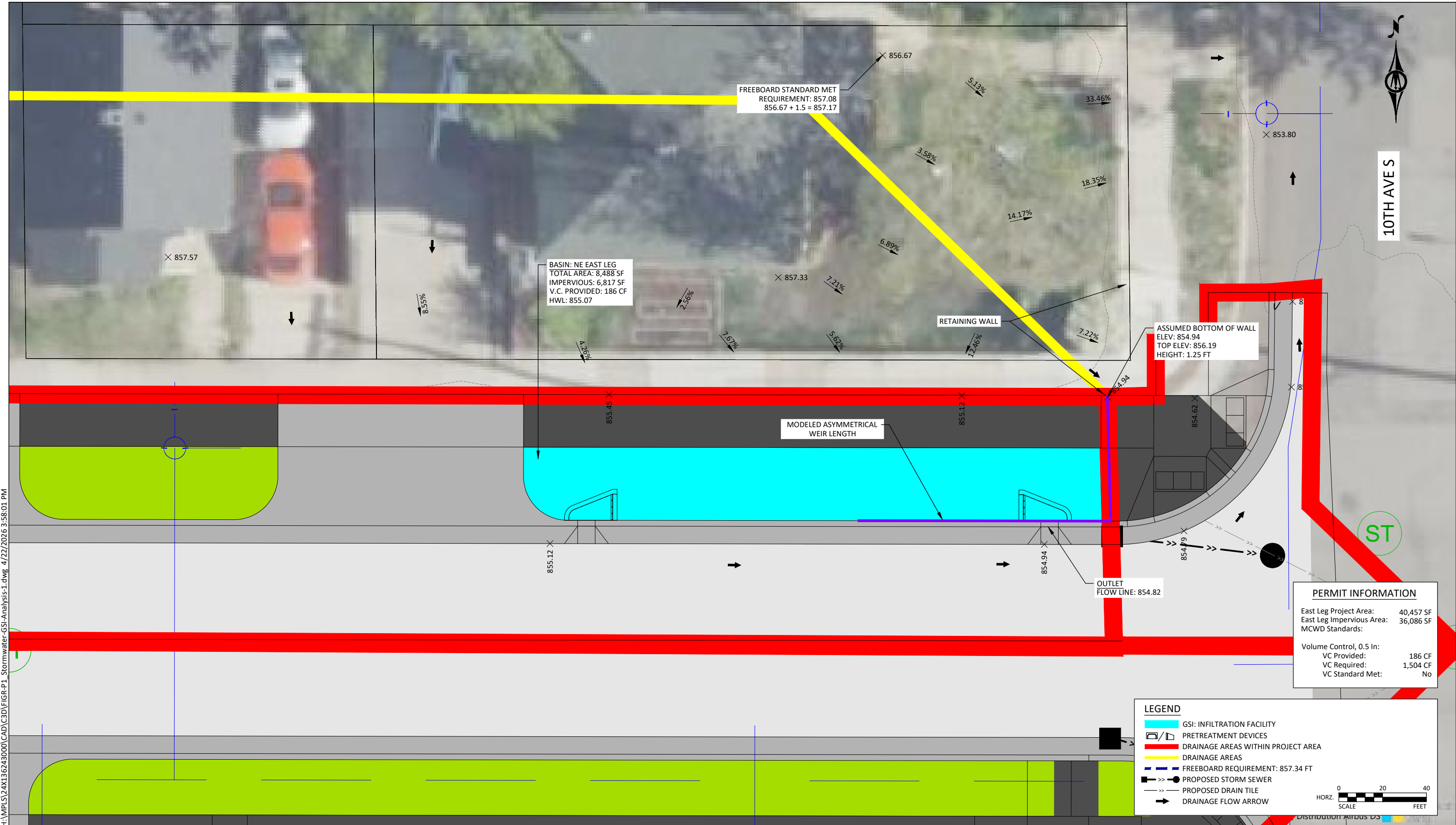
MCWD

LEGEND

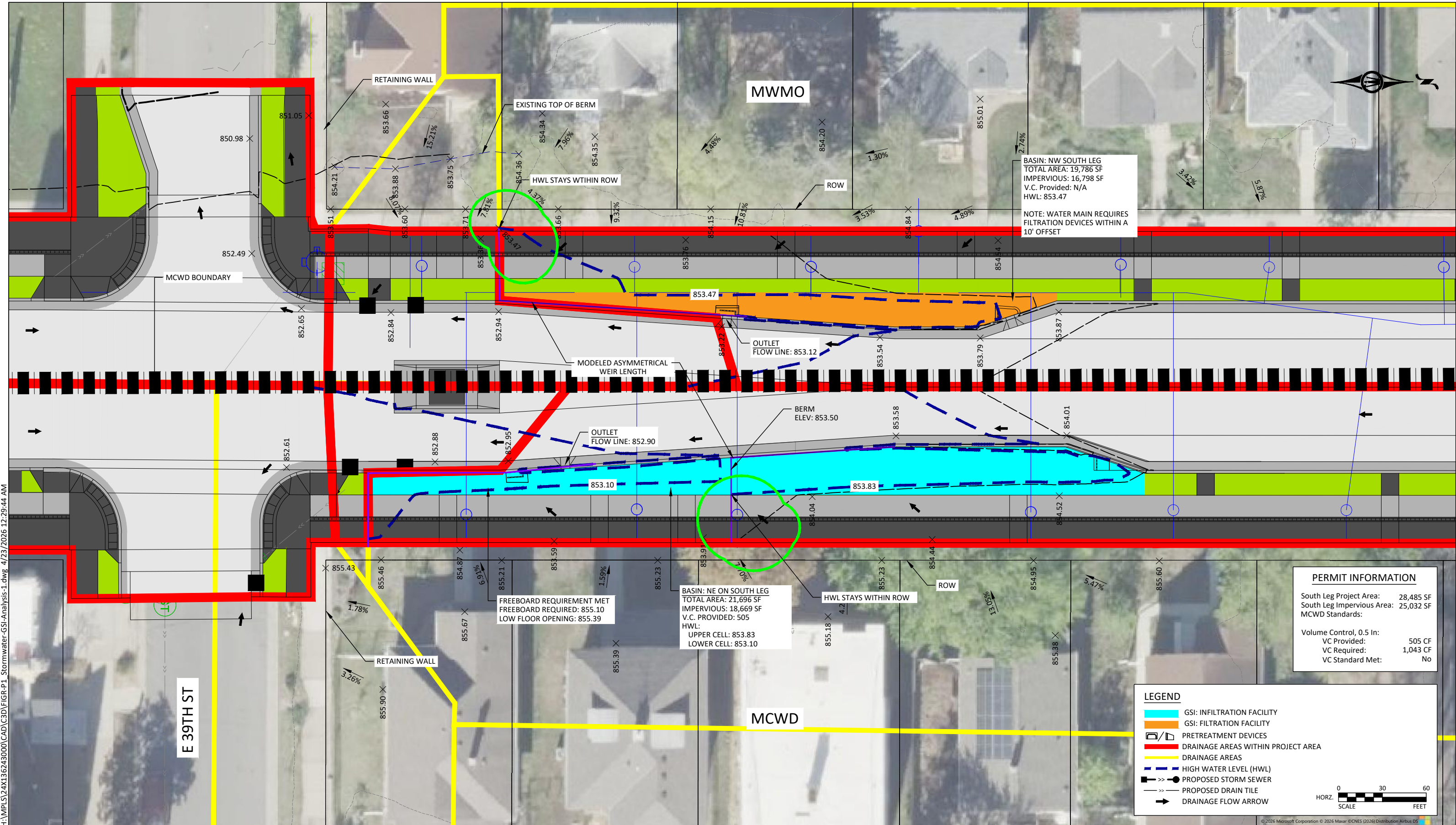
- GSI: INFILTRATION FACILITY
- GSI: FILTRATION FACILITY
- PRETREATMENT DEVICES
- DRAINAGE AREAS WITHIN PROJECT AREA
- DRAINAGE AREAS
- FREEBOARD REQUIREMENT: 856.13 FT
- PROPOSED STORM SEWER
- PROPOSED DRAIN TILE
- DRAINAGE FLOW ARROW

HORZ. SCALE: 0 30 60 FEET

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PERMIT INFORMATION

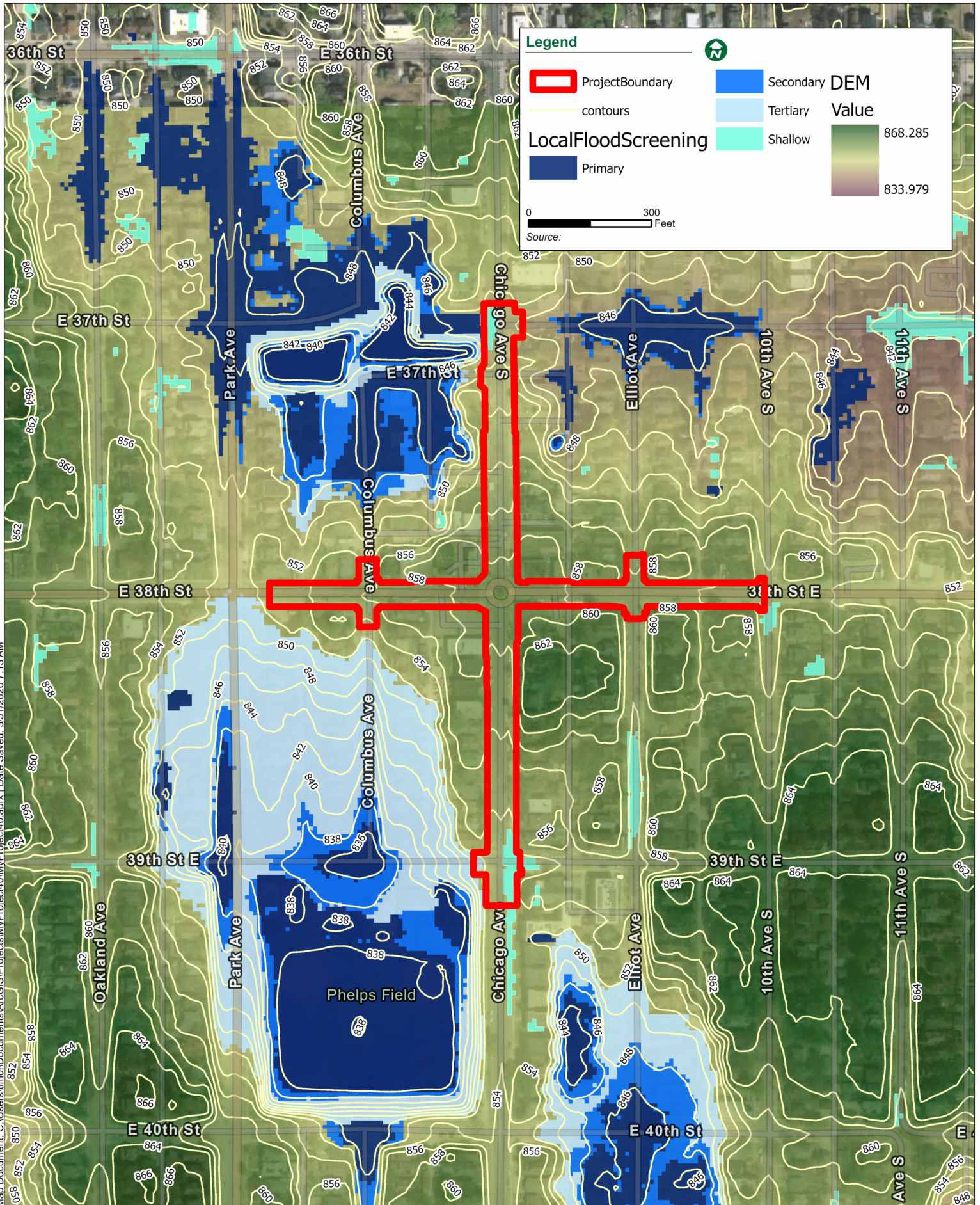
South Leg Project Area:	28,485 SF
South Leg Impervious Area:	25,032 SF
MCWD Standards:	
Volume Control, 0.5 In:	
VC Provided:	505 CF
VC Required:	1,043 CF
VC Standard Met:	No

LEGEND

- GSI: INFILTRATION FACILITY
- GSI: FILTRATION FACILITY
- PRETREATMENT DEVICES
- DRAINAGE AREAS WITHIN PROJECT AREA
- DRAINAGE AREAS
- HIGH WATER LEVEL (HWL)
- PROPOSED STORM SEWER
- PROPOSED DRAIN TILE
- DRAINAGE FLOW ARROW

HORZ. SCALE: 0 30 60 FEET

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Map Document: C:\Users\lironi\Documents\ArcGIS\Projects\MM\Project40\MM\Project40.aprx | Date Saved: 3/31/2026 7:13 AM

Appendix A - Water Quality Analysis

Instructions
Instructions (All Sheets): Input data into non-filled cells. Do not touch filled cells, they are calculations
Note: Column P is drawdown time, unhide to track

BMP Limitation Notes
BMP Vol.: If the WQV is larger than volume provided by BMP, the BMP volume is used.
Area Imp. WQV: If BMP vol. is greater than required WQV, but less than the required WQV, only take credit for what the watershed can produce
Area Imp. -Max Allowable WQV: If BMP vol. is larger than the Max Allowable WQV, can only take credit up to the max allowable WQV

Project Impervious Area	Sq. Ft	Acres
New Impervious	285	0.01
Reconstructed Area	61,693	1.42
Required Treatment Area	61,978	1.42
Diconnected Impervious		0.0
Trail Infiltration		0.0
Impervious Removed		0.0

VOLUME CONTROL: Surface Basins											
Stormwater BMP ID	GSI TYPE	Drainage Area Information			Stormwater BMP Information						
		Imper. Area SF	Required VC CF	Max. Allow VC CF	Infiltration I/F	Basin Volume CF	Req. Imperv. Treatment Area SF	Equivalent Rain Depth IN	Required VC CF	Max Allow VC CF	Required BMP Limitation
East: NE Basin	IB	6,817	284	284	I	186	4,471	0.33	186	186	BMP Vol.
South: NE Basin	IB	18,820	784	784	I	505	12,120	0.32	505	505	BMP Vol.
		25,637	1,068	1,068			16,591	0.32	691	691	

BMP V. Needed
98
279

*Rain Depth- the depth of rain of the impervious surface that GSI are able to treat with their current drainage/ impervious area

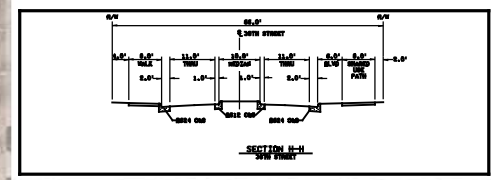
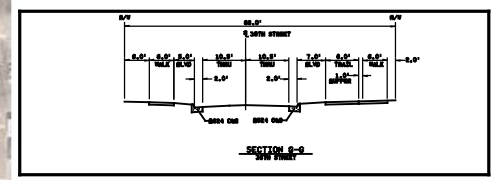
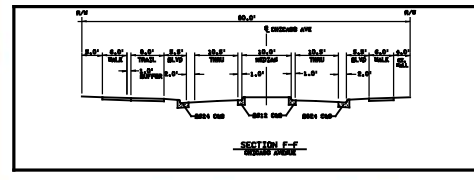
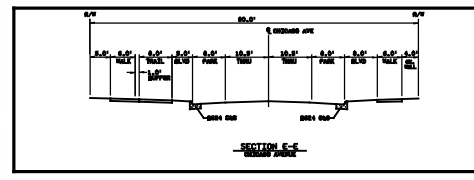
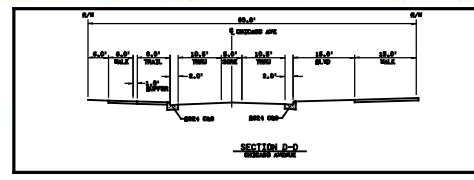
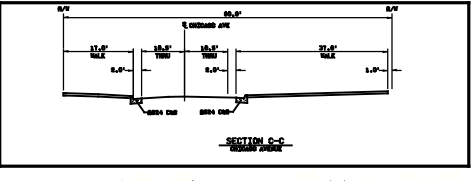
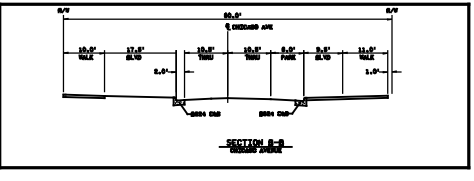
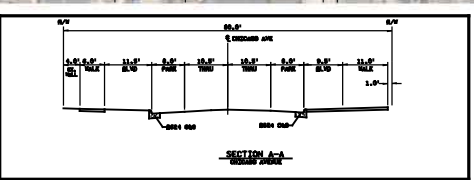
Permit Requirements	Units
VC Depth	0.50 In
TP Removal Factor	1.00 -
VC	2,582 Cu-Ft
Max Allowed WQV Depth	0.50 In

Required VC Results	Units
BMPs Volume	691 Cu-Ft
Tree Trench Volume	Cu-Ft
Total Volume	691 Cu-Ft
Met Requirements?	Short
Short/Excess Volume	(1,891) Cu-Ft
Imperv. Treated Area	16,591 Sq-Ft
Short/Excess Treat. Area	(45,387) Sq-Ft
	(1.04) Ac

Max Allowable Treated Area Results	Units
BMPs Volume	691 Cu-Ft
Tree Trench Volume	Cu-Ft
Total Volume	691 Cu-Ft
Max Met Requirements?	Short
Short/Excess Treatment	(1,891) Cu-Ft
Max Allowable Treat. Area	16,591 Sq-Ft
Short/Excess Treat. Area	(45,387) Sq-Ft
	(1.04) Ac

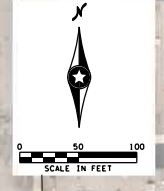
18" existing pipe
12" existing pipe

Appendix B - Geotechnical Analysis



LEGEND

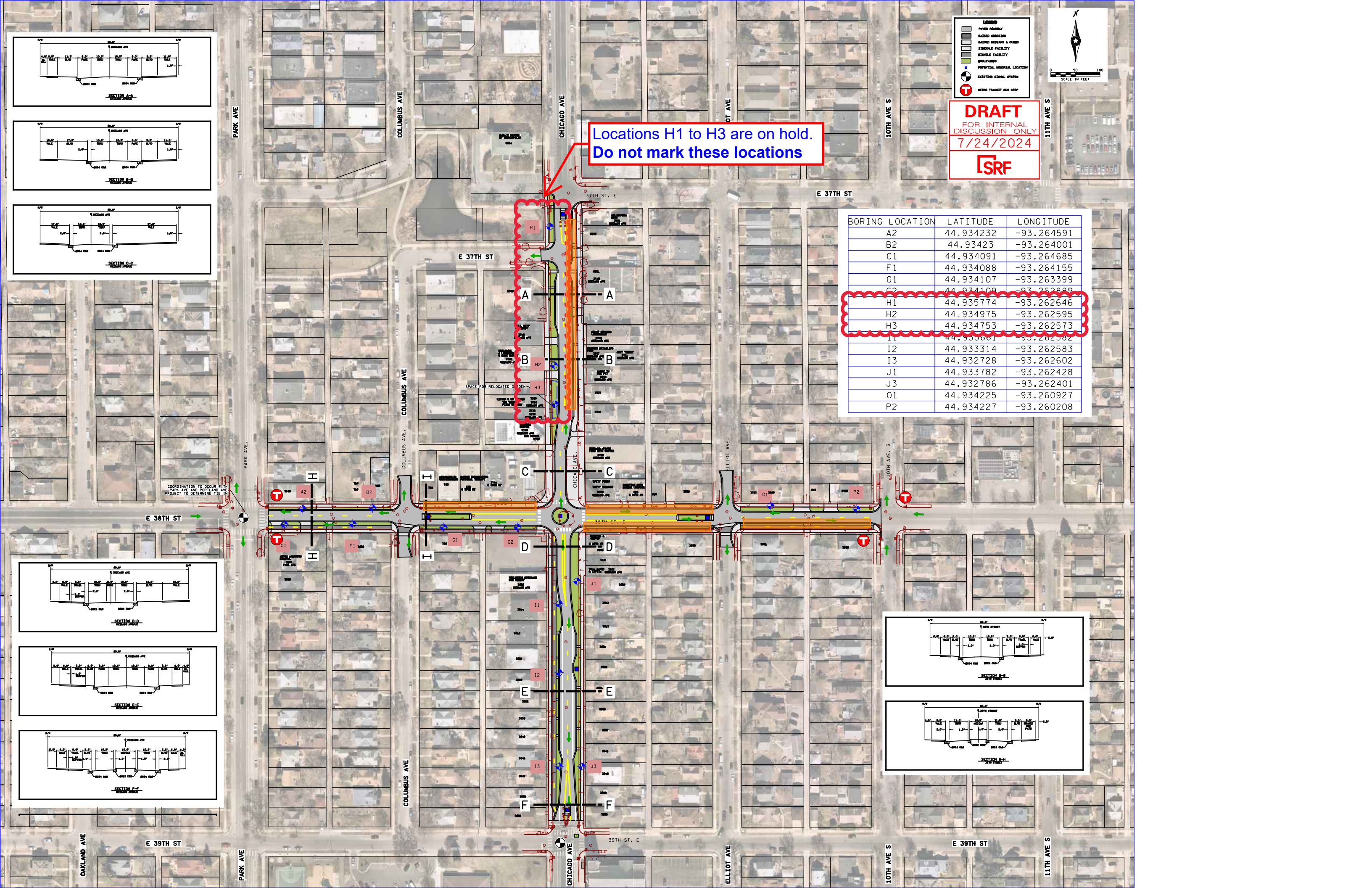
- PAVED HIGHWAY
- PAVED SIDEWALK
- BASED SIDEWALK & CURB
- STORAGE FACILITY
- BIKEWAY FACILITY
- BIKEWAYS
- POTENTIAL MEDICAL LOCATION
- EXISTING SIGNAL SYSTEM
- METRO TRANSIT BUS STOP



DRAFT
FOR INTERNAL DISCUSSION ONLY
7/24/2024
CSRF

Locations H1 to H3 are on hold.
Do not mark these locations

BORING LOCATION	LATITUDE	LONGITUDE
A2	44.934232	-93.264591
B2	44.93423	-93.264001
C1	44.934091	-93.264685
F1	44.934088	-93.264155
G1	44.934107	-93.263399
G2	44.934109	-93.262899
H1	44.935774	-93.262646
H2	44.934975	-93.262595
H3	44.934753	-93.262573
I1	44.933661	-93.262582
I2	44.933314	-93.262583
I3	44.932728	-93.262602
J1	44.933782	-93.262428
J3	44.932786	-93.262401
O1	44.934225	-93.260927
P2	44.934227	-93.260208



COORDINATION TO OCCUR WITH PARK AVE AND PORTLAND AVE PROJECT TO DETERMINE TIE-INS

SPACE FOR RELOCATED GARDEN



City of Minneapolis Engineering Laboratory
 1901 E 26th Street
 Minneapolis, MN 55404-4028



Technician: MWS **Date: 8/28/2024**

Project: 38th St & Chicago Ave **Borings: P2**

Location: 38th St **Strata: 0 - 15.0 '**

Depth (FT)	Description of Materials:	Notes/Additional Information:
1'	Asphalt / Concrete	Comments: Asphalt core is approximately 5.0" and concrete core is 8.0" with a combined height total of 13.0"
2'	Brown Sand	
3'		
4'		
5'		
6'	Light brown silty sand w/ trace gravel	
7'		
8'		
9'		
10'		
11'		
12'		
13'		
14'		
15'		



City of Minneapolis Engineering Laboratory
 1901 E 26th Street
 Minneapolis, MN 55404-4028



Technician: MWS **Date: 8/28/2024**

Project: 38th St & Chicago Ave **Borings: J3**

Location: Chicago Ave **Strata: 0 - 15.0 '**

Depth (FT)	Description of Materials:	Notes/Additional Information:
1'	Asphalt Core	Comments: Asphalt core is 6.0". Concrete core was unrecoverable
	Unrecovered concrete core	
2'	Dark brown sand w/ gravel & clay	
3'		
4'		
5'		
6'	Brown sand w/ gravel	
7'		
8'		
9'		
10'		
11'		
12'		
13'		
14'		
15'		

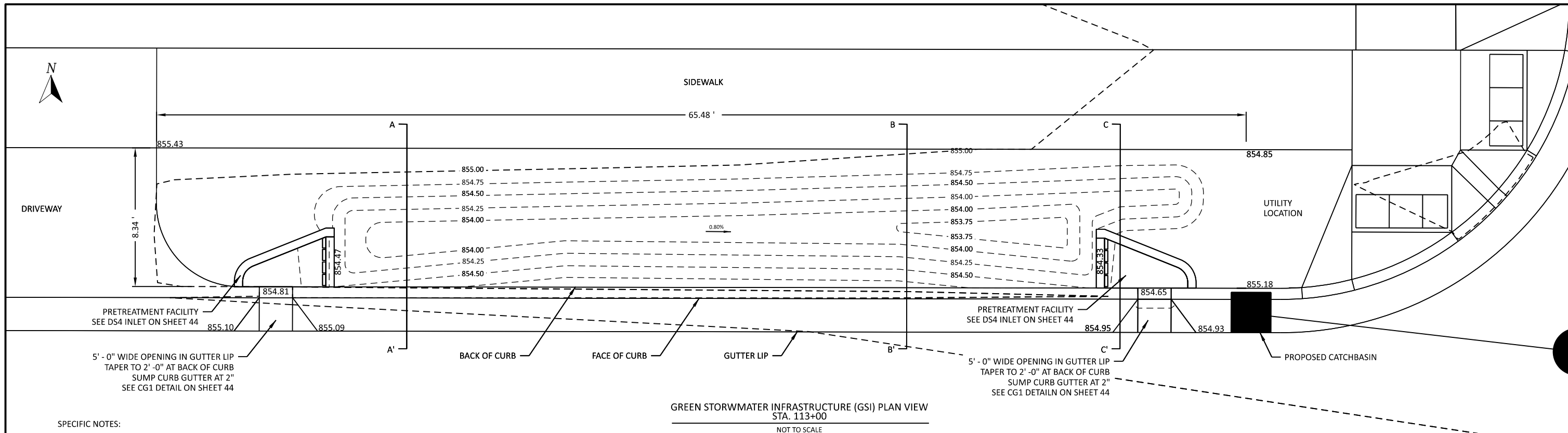
Appendix C – Cost Estimate

Alternative Options		TSS Removed %	GSI Total Cost \$	Cost per LBS of TSS Removed
1	Surface GSI Only	31%	\$ 128,400	\$ 196
2	Surface GSI + Trench	44%	\$ 218,900	\$ 240
3	Surface GSI with moved WM	42%	\$ 462,600	\$ 530
4	Planter Box GSI Only	42%	\$ 361,100	\$ 420
5	Planter Box GSI + Trench	50%	\$ 447,100	\$ 430
6	Planter Box GSI with moved WM	58%	\$ 730,100	\$ 600
7	Underground Systems	72%	\$ 597,400	\$ 399

Cost Estimate Assessment of BMP Type for Water Quality Performance

While TSS is not a part of this submittal, the same Water Quality cost scale per BMP type exists for Total Phosphorous (TP). The TP costs are significantly inflated given the low accumulation and removal of Phosphorous.

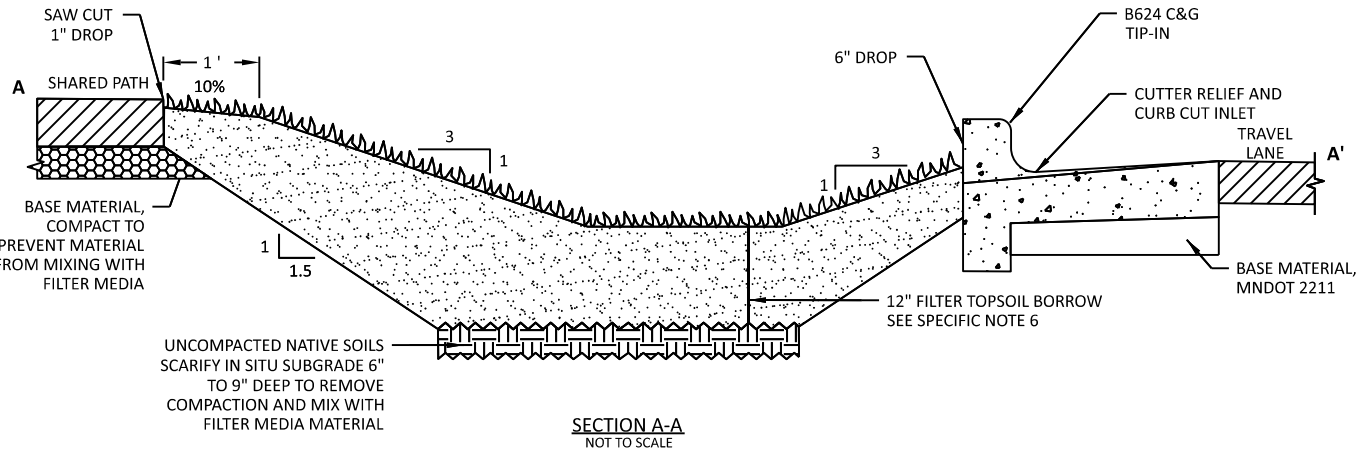
Appendix D – Construction Documents and Plan Sheets



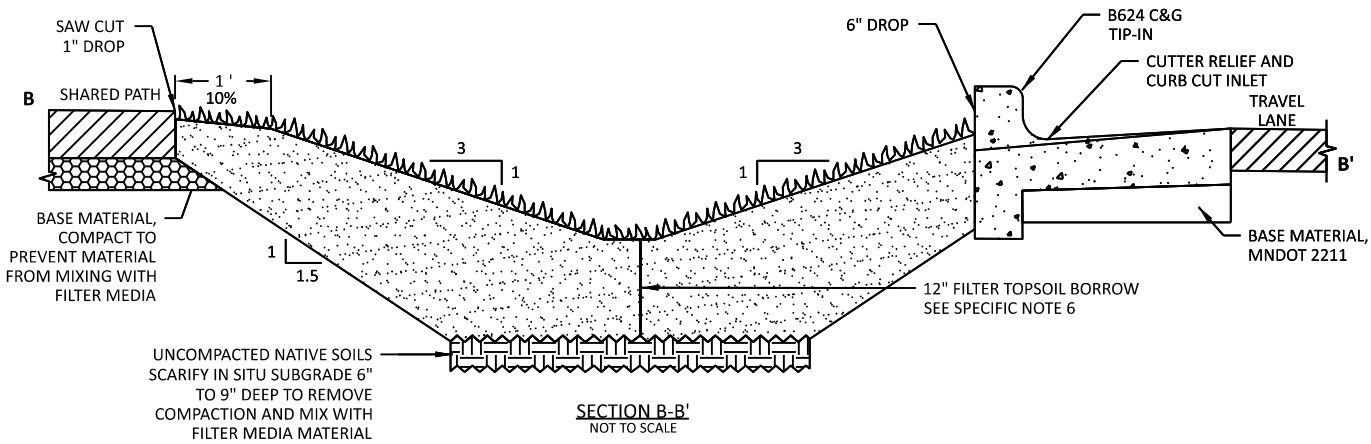
GREEN STORMWATER INFRASTRUCTURE (GSI) PLAN VIEW
STA. 113+00
NOT TO SCALE

SPECIFIC NOTES:

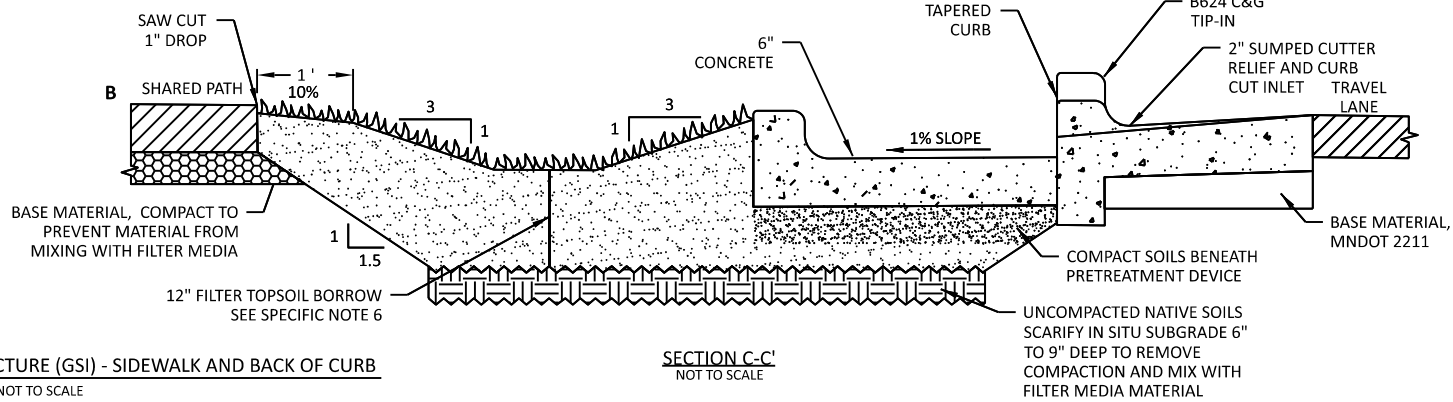
1. PRETREATMENT DEVICES SHALL BE DS4 INLET, AS SHOWN ON SHEET 44.
2. BASIN SIDE SLOPES SHALL HAVE A MAXIMUM SLOPE OF 3:1 (H:V).
3. BASIN SIDESLOPES ADJACENT TO SHARED PATH SHALL INCLUDE A 1 FT SAFETY BENCH AT A 10% SLOPE.
4. PROVIDE A 1" DROP ALONG SIDEWALK AND DRIVEWAY TO TO THE TOP OF BASIN.
5. MAX DROP OF 6" FROM THE TOP OF CURB TO BASIN WITH THE EXCEPTION AT PRETREATMENT LOCATION WHERE THE MAX DROP IS 10". GRADUALLY FEATHER BASIN GRADE TO A 6" BELOW THE TOP OF CURB WITHIN 10 FT OF THE PRETREATMENT.
6. FILTER MEDIA SHALL BE MN STORMWATER MANUAL BIOFILTRATION MIX C (85 TO 88% BY VOLUME SAND, 8 TO 12% FINES BY VOLUME, AND 3 TO 5% ORGANIC MATTER BY VOLUME) OR AN EQUIVALENT MIXTURE.
7. COMPACT SOILS BELOW PRETREATMENT FACILITIES. DO NOT PLACE CLASS V OR FABRIC BELOW INLET.
8. SEE LANDSCAPING PLAN FOR PLANTINGS AND TURF ESTABLISHMENT IN BASIN.



SECTION A-A
NOT TO SCALE



SECTION B-B'
NOT TO SCALE



SECTION C-C'
NOT TO SCALE

GREEN STORMWATER INFRASTRUCTURE (GSI) - SIDEWALK AND BACK OF CURB
NOT TO SCALE

DATE PRINTED = 4/10/2026 11:22:16 AM
FILE NAME = FILE NAME.dgn

NO.	DATE	DRW	CKD	APP	REVISION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DRAFT COPY
KYRA OLIVER
LIC. NO. _____
DATE _____

BOLTON & MENK
111 Washington Ave S Unit 650
Minneapolis, MN 55401
Phone: (612) 416-0220
Email: Minneapolis@bolton-menk.com
Website: www.bolton-menk.com

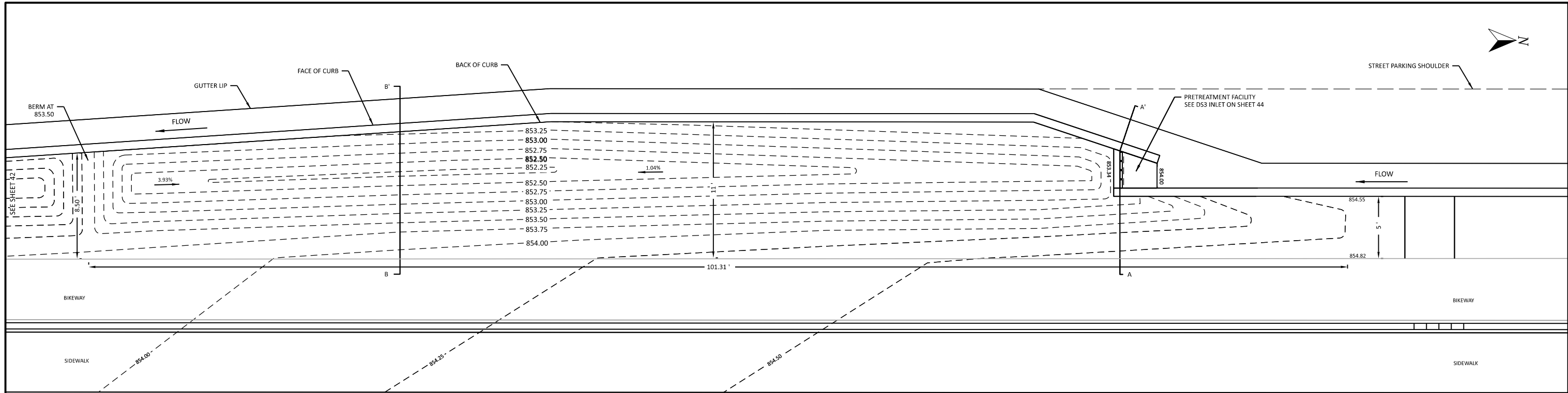
GREEN INFRASTRUCTURE DETAILS

Minneapolis
Public Works

DRW: _____ DATE: _____
CHK: _____ DATE: _____
APP: _____ DATE: _____

38TH AND CHICAGO RECONSTRUCTION

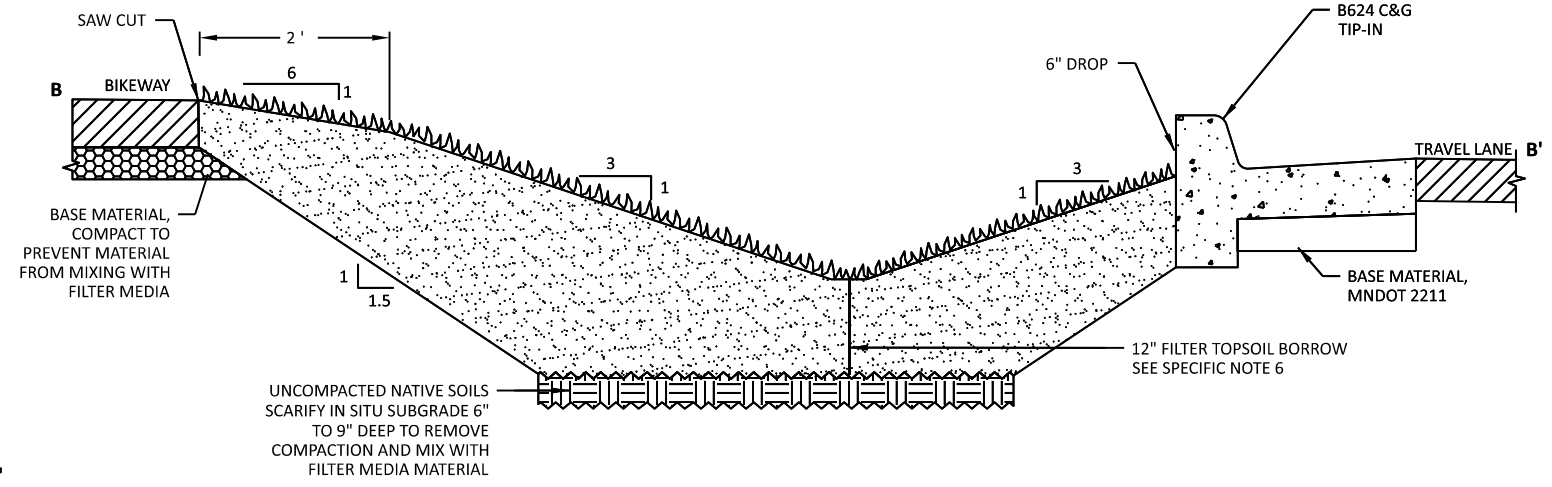
SAP 141-165-035 / 141-253-011
LP 10030



GREEN STORMWATER INFRASTRUCTURE (GSI) PLAN VIEW
STA. 102+00
NOT TO SCALE

SPECIFIC NOTES:

1. PRETREATMENT DEVICE SHALL BE DS3 INLET, AS SHOWN ON SHEET 44.
2. BASIN SIDE SLOPES SHALL HAVE A MAXIMUM SLOPE OF 3:1 (H:V).
3. BASIN SIDE SLOPES ADJACENT TO BIKEWAY SHALL INCLUDE A 2 FT SAFETY BENCH AT A 6:1 (H:V) SLOPE.
4. GRADES SHALL BE FLUSH TO THE EDGE OF BIKEWAY.
5. MAX DROP OF 6" FROM THE TOP OF CURB TO BASIN WITH THE EXCEPTION AT PRETREATMENT LOCATION WHERE THE MAX DROP IS 10". GRADUALLY FEATHER BASIN GRADE TO A 6" BELOW THE TOP OF CURB WITHIN 10 FT OF THE PRETREATMENT.
6. FILTER MEDIA SHALL BE MN STORMWATER MANUAL BIOFILTRATION MIX C (85 TO 88% BY VOLUME SAND, 8 TO 12% FINES BY VOLUME, AND 3 TO 5% ORGANIC MATTER BY VOLUME) OR AN EQUIVALENT MIXTURE.
7. COMPACT SOILS BELOW PRETREATMENT FACILITIES. DO NOT PLACE CLASS V OR FABRIC BELOW INLET.
8. APPROXIMATELY 2 FT OF SOIL BELOW THE BASIN'S AMENDED SOILS SHALL BE OVER EXCAVATED AND REPLACED WITH AMENDED SOILS AT A VERTICAL SLOPE TO REACH THE DESIGN INFILTRATION RATE OF 0.8 INCHES/HOUR.
9. SEE LANDSCAPING PLAN FOR PLANTINGS AND TURF ESTABLISHMENT IN BASIN.



GREEN STORMWATER INFRASTRUCTURE (GSI) - STATE AID BIKEWAY AND BACK OF CURB
NOT TO SCALE

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FILE NAME = FILE NAME.dgn

NO.	DATE	DRW	CKD	APP	REVISION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DRAFT COPY
KYRA OLIVER
LIC. NO. _____
DATE _____

BOLTON & MENK
111 Washington Ave S, Unit 650
Minneapolis, MN 55401
Phone: (612) 416-0220
Email: Minneapolis@bolton-menk.com
Website: www.bolton-menk.com

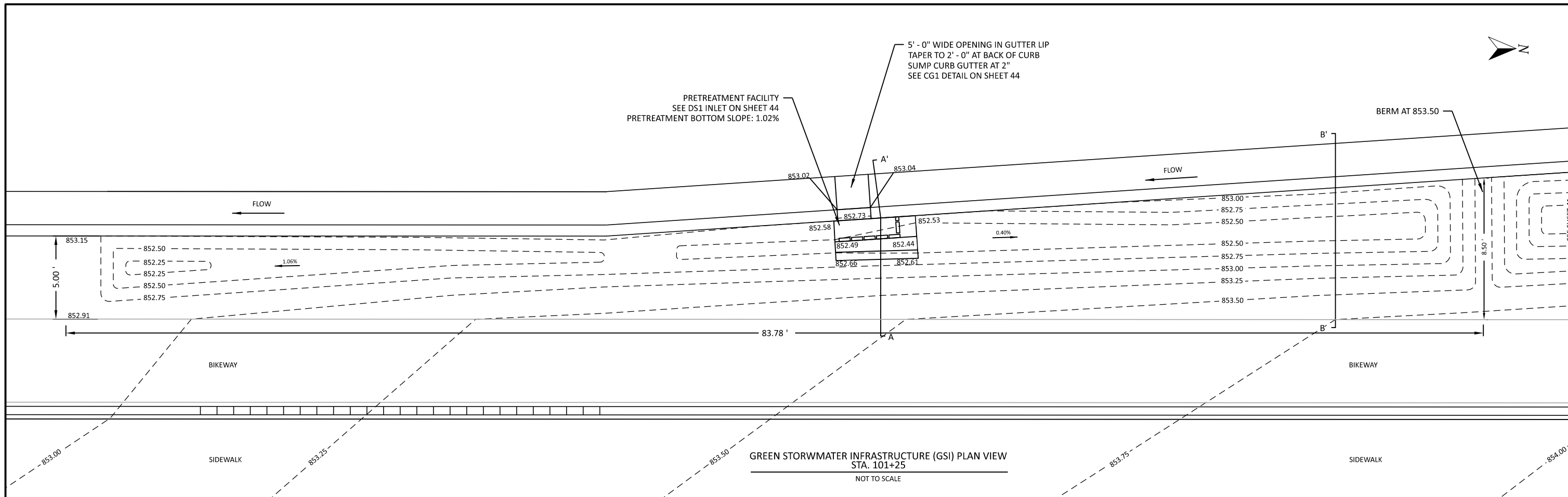
GREEN INFRASTRUCTURE DETAILS

Minneapolis
Public Works

DRW:	DATE:
CHK:	DATE:
APP:	DATE:

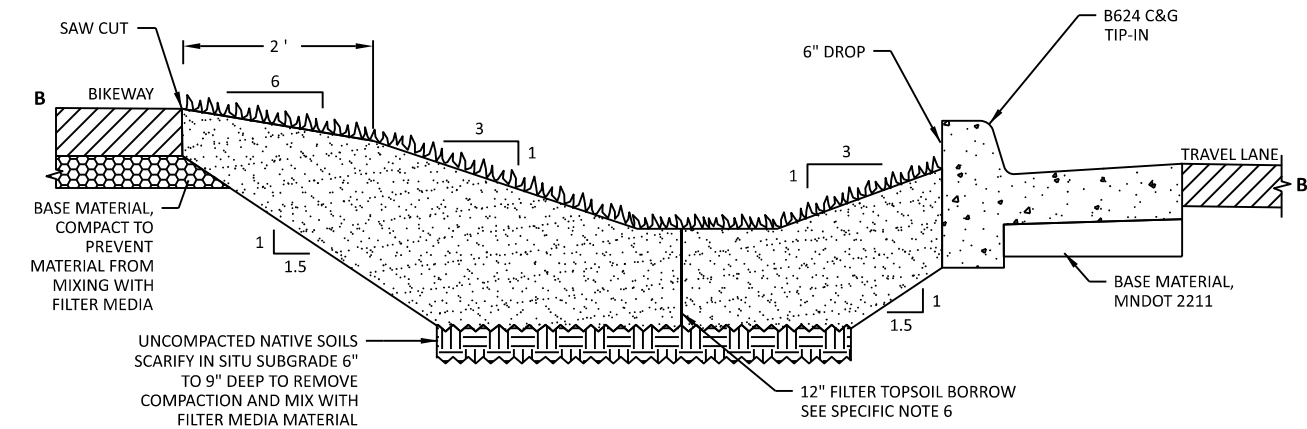
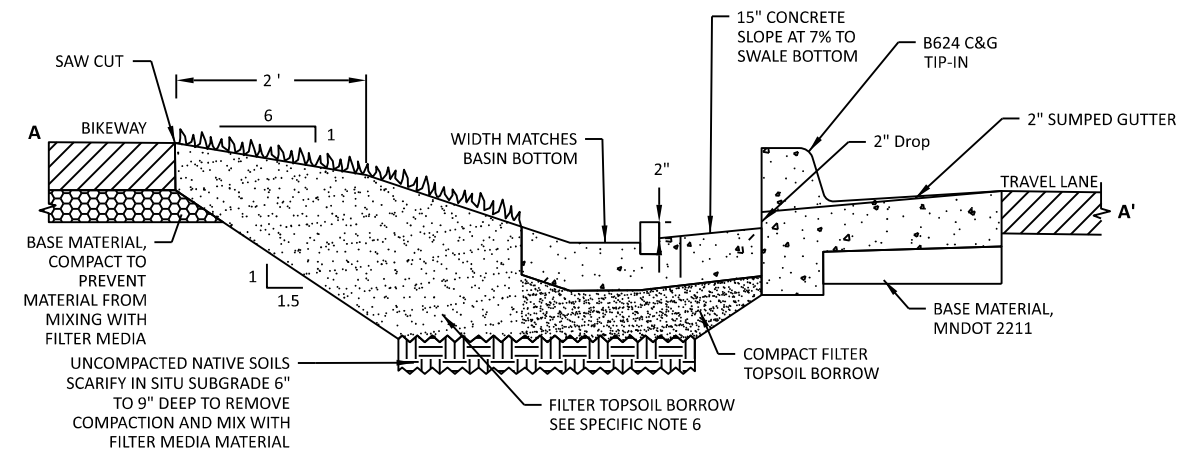
38TH AND CHICAGO RECONSTRUCTION

SAP 141-165-035 / 141-253-011
LP 10030



SPECIFIC NOTES:

1. PRETREATMENT DEVICE SHALL BE DS1 INLET, AS SHOWN ON SHEET 44.
2. BASIN SIDE SLOPES SHALL HAVE A MAXIMUM SLOPE OF 3:1 (H:V).
3. BASIN SIDE SLOPES ADJACENT TO BIKEWAY SHALL INCLUDE A 2 FT SAFETY BENCH AT A 6:1 (H:V) SLOPE.
4. GRADES SHALL BE FLUSH TO THE EDGE OF BIKEWAY.
5. MAX DROP OF 6" FROM THE TOP OF CURB TO BASIN WITH THE EXCEPTION AT PRETREATMENT LOCATION WHERE THE MAX DROP IS 10". GRADUALLY FEATHER BASIN GRADE TO A 6" BELOW THE TOP OF CURB WITHIN 10 FT OF THE PRETREATMENT.
6. FILTER MEDIA SHALL BE MN STORMWATER MANUAL BIOFILTRATION MIX C (85 TO 88% BY VOLUME SAND, 8 TO 12% FINES BY VOLUME, AND 3 TO 5% ORGANIC MATTER BY VOLUME) OR AN EQUIVALENT MIXTURE.
7. COMPACT SOILS BELOW PRETREATMENT FACILITIES. DO NOT PLACE CLASS V OR FABRIC BELOW INLET.
8. APPROXIMATELY 2 FT OF SOIL BELOW THE BASIN'S AMENDED SOILS SHALL BE OVER EXCAVATED AND REPLACED WITH AMENDED SOILS AT A VERTICAL SLOPE TO REACH THE DESIGN INFILTRATION RATE OF 0.8 INCHES/HOUR.
9. SEE LANDSCAPING PLAN FOR PLANTINGS AND TURF ESTABLISHMENT IN BASIN.



GREEN STORMWATER INFRASTRUCTURE (GSI) - STATE AID BIKEWAY AND BACK OF CURB
NOT TO SCALE

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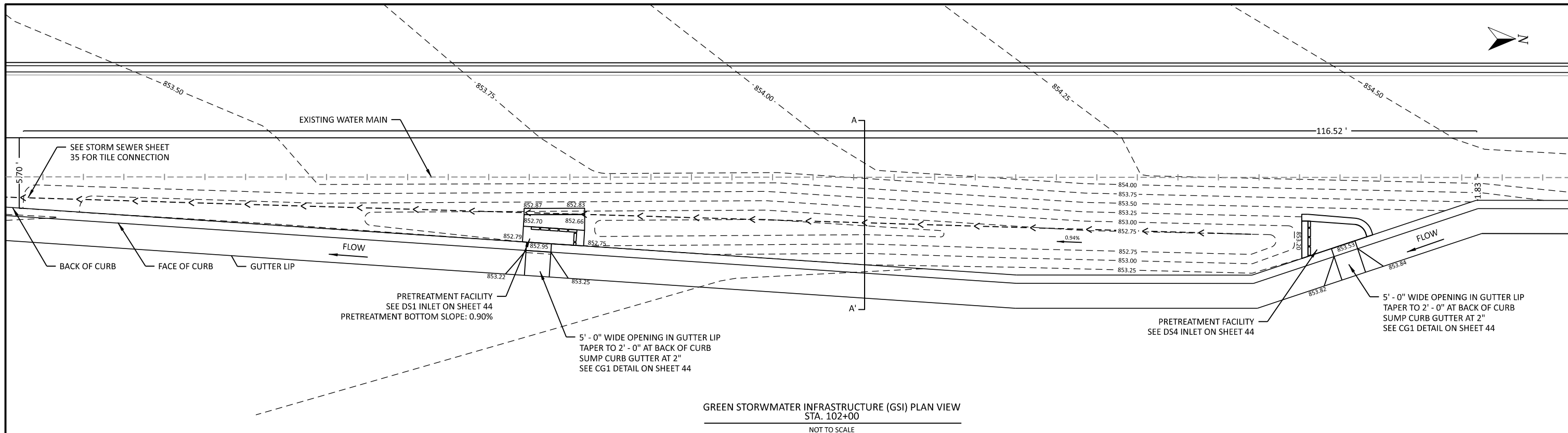
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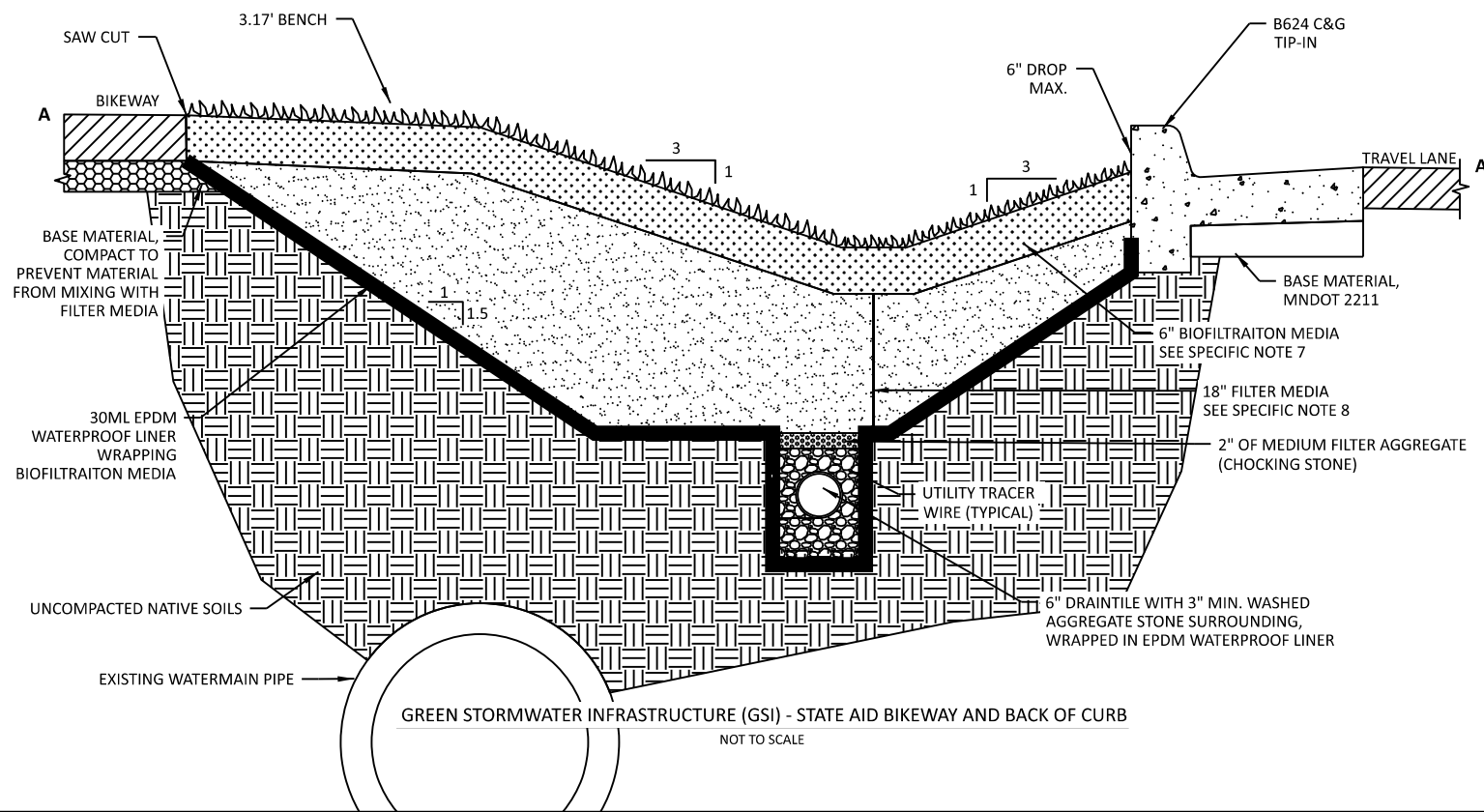
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KYRA OLIVER
LIC. NO. _____
DATE _____

BOLTON & MENK
111 Washington Ave S, Unit 650
Minneapolis, MN 55401
Phone: (612) 416-0220
Email: minneapolis@bolton-menk.com
Website: www.bolton-menk.com

GREEN INFRASTRUCTURE DETAILS		38TH AND CHICAGO RECONSTRUCTION	
DRW:	DATE:	SAP 141-165-035 / 141-253-011	
CHK:	DATE:	LP 10030	
APP:	DATE:		



GREEN STORMWATER INFRASTRUCTURE (GSI) PLAN VIEW
STA. 102+00
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SPECIFIC NOTES:

1. PRETREATMENT DEVICES SHALL BE DS1 AND DS4, AS SHOWN ON SHEET 44.
2. BASIN SIDE SLOPES SHALL HAVE A MAXIMUM SLOPE OF 3:1 (H:V).
3. BASIN SIDE SLOPES ADJACENT TO BIKEWAY SHALL INCLUDE A 2 FT SAFETY BENCH AT A 6:1 (H:V) SLOPE.
4. GRADES SHALL BE FLUSH TO THE EDGE OF BIKEWAY.
5. MAX DROP OF 6" FROM THE TOP OF CURB TO BASIN WITH THE EXCEPTION AT PRETREATMENT LOCATION WHERE THE MAX DROP IS 10". GRADUALLY FEATHER BASIN GRADE TO A 6" BELOW THE TOP OF CURB WITHIN 10 FT OF THE PRETREATMENT.
6. FINISHED GRADE OF BASIN SHALL MAINTAIN AT LEAST 8 FT OF COVER OVER INVERT OF EXISTING WATER MAIN.
7. BIOFILTRATION MEDIA SHALL BE MN STORMWATER MANUAL BIOFILTRATION MIX C (85 TO 88% BY VOLUME SAND, 8 TO 12% FINES BY VOLUME, AND 3 TO 5% ORGANIC MATTER BY VOLUME) OR AN EQUIVALENT MIXTURE.
8. FILTER MEDIA SHALL BE CLEAN SAND, FA-1 GRADATION OR AN APPROVED EQUIVALENT.
9. MEDIUM FILTER AGGREGATE TO BE MNDOT MIX.
10. COMPACT SOILS BELOW PRETREATMENT FACILITIES. DO NOT PLACE CLASS V OR FABRIC BELOW INLET.
11. UNDERDRAINS SHALL BE INSTALLED AT A MINIMUM SLOPE OF 0.5 PERCENT.
12. UNDERDRAIN PIPES SHALL HAVE A MIN. OF 3 IN OF WASHED AGGREGATE STONE ON EACH SIDE OF THE PIPE.
13. SOLID SECTIONS OF NON-PERFORATED PVC PIPE AND WATERTIGHT JOINTS SHALL BE USED WHEN A UNDERDRAIN MAKES A CONNECTION TO A DRAINTILE STRUCTURE.
14. SEE LANDSCAPING PLAN FOR PLANTINGS AND TURF ESTABLISHMENT IN BASIN.

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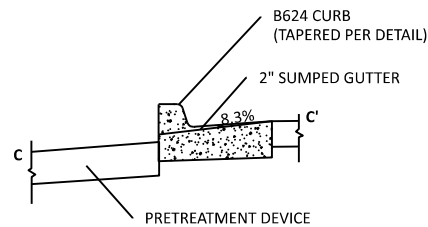
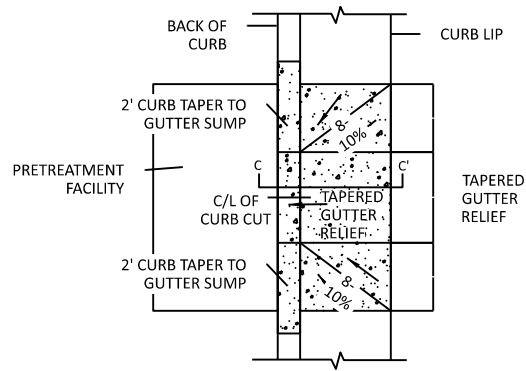
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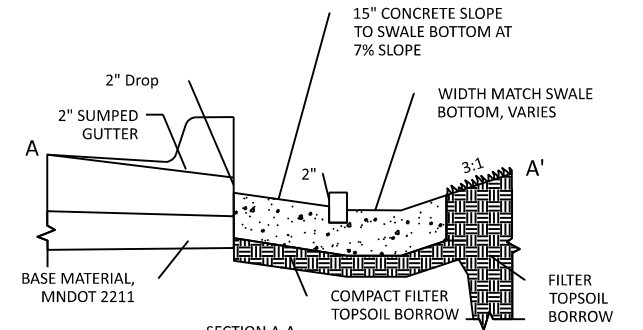
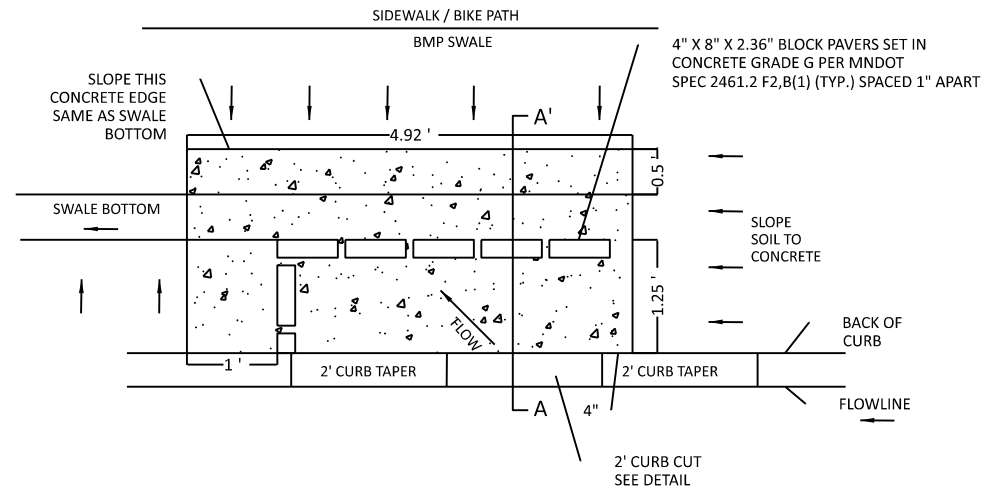
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GREEN INFRASTRUCTURE DETAILS		38TH AND CHICAGO RECONSTRUCTION		43 OF 96
DRW:	DATE:	SAP 141-165-035 / 141-253-011		
CHK:	DATE:	LP 10030		
APP:	DATE:			

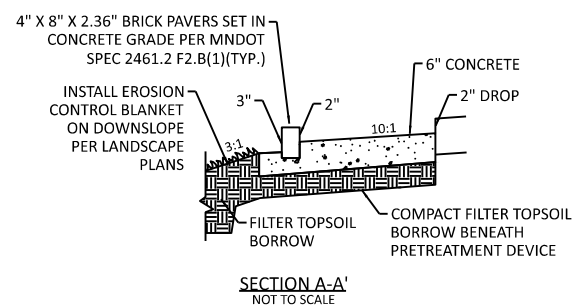
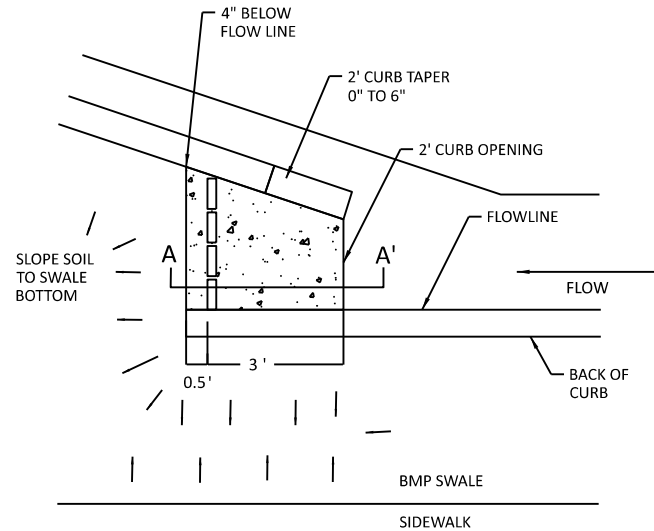
Minneapolis
Public Works



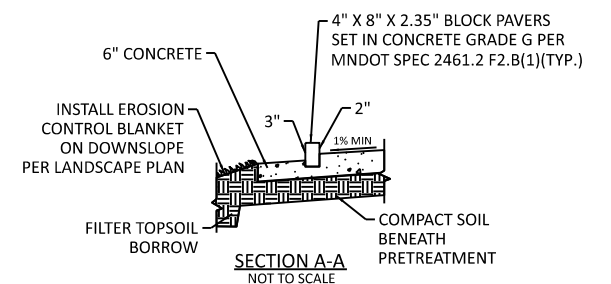
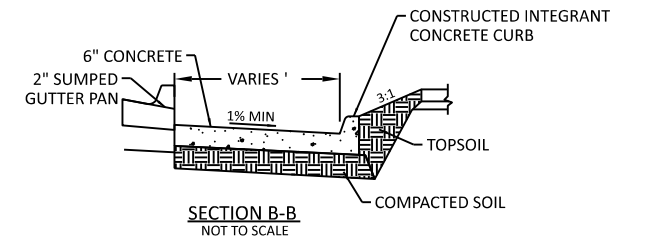
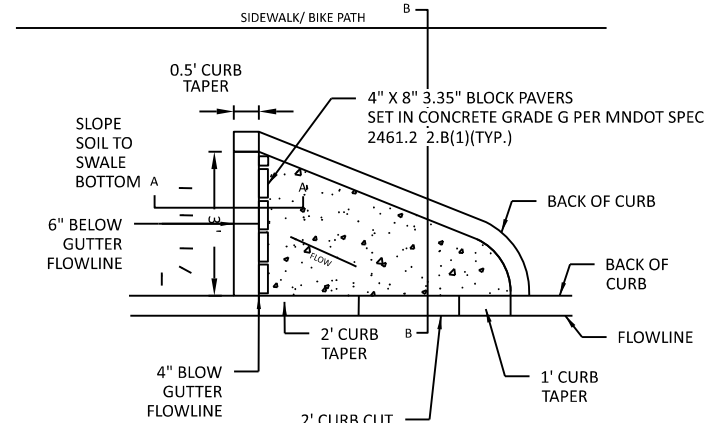
CONCRETE CURB AND GUTTER DESIGN SPECIAL 1 (CG1)
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CONCRETE SLOPE PAVING DESIGN SPECIAL 1 (DS1)
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CONCRETE SLOPE PAVING DESIGN SPECIAL 3 (DS3)
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CONCRETE SLOPE PAVING DESIGN SPECIAL 4 (DS4)
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SHEET TITLE

DRW:	DATE:
CHK:	DATE:
APP:	DATE:

PROJECT NAME

SAP 141-165-035 / 141-253-011
LP 10030

44
OF
96

Appendix E - Hydrologic and Hydraulic Modeling

Project Information

Calculator Version: Version 4: July 2020
Project Name: 38th and Chicago
User Name / Company Name: BMI
Date: 4.22.2026
Project Description: One Hypothetical BMP sized large enough for the required Water Quality Volume.
Construction Permit?: Yes

Site Information

Retention Requirement (inches): 0.5
Site's Zip Code: 55401
Annual Rainfall (inches): 31.4
Phosphorus EMC (mg/l): 0.3
TSS EMC (mg/l): 54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.18				0.18
				Impervious Area (acres)	1.4
				Total Area (acres)	1.58

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.18				0.18
				Impervious Area (acres)	1.4
				Total Area (acres)	1.58

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	2541	ft ³
Volume removed by BMPs towards performance goal:	2388	ft ³
Percent volume removed towards performance goal	94	%

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	3.1957	acre-ft
Annual runoff volume removed by BMPs:	2.3731	acre-ft
Percent annual runoff volume removed:	74	%

Post development annual particulate P load:	1.4342	lbs
Annual particulate P removed by BMPs:	1.065	lbs
Post development annual dissolved P load:	1.174	lbs
Annual dissolved P removed by BMPs:	0.871	lbs
Total P removed by BMPs	1.936	lbs
Percent annual total phosphorus removed:	74	%

Post development annual TSS load:	473.7	lbs
Annual TSS removed by BMPs:	351.8	lbs
Percent annual TSS removed:	74	%

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft ³)	Volume Recieved (ft ³)	Volume Retained (ft ³)	Volume Outflow (ft ³)	Percent Retained (%)
Hypothetical BMP	2388	2541	2388	152	94

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
Hypothetical BMP	3.1957	0	2.3731	0.8226	74

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Hypothetical BMP	1.4342	0	1.065	0.3692	74

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Hypothetical BMP	1.1735	0	0.8714	0.3021	74

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Hypothetical BMP	2.6077	0	1.9364	0.6713	74

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Hypothetical BMP	473.74	0	351.79	121.95	74

BMP Schematic

Project Information

Calculator Version: Version 4: July 2020
Project Name: 38th/Chicago
User Name / Company Name: BMI
Date: 4.22.2026
Project Description: Existing Conditions Phase 1 areas - east and south legs in MWMO.
Construction Permit?: Yes

Site Information

Retention Requirement (inches): 0.5
Site's Zip Code: 55401
Annual Rainfall (inches): 31.4
Phosphorus EMC (mg/l): 0.3
TSS EMC (mg/l): 54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.02				0.02
				Impervious Area (acres)	1.56
				Total Area (acres)	1.58

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed					0
				Impervious Area (acres)	
				Total Area (acres)	0

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	2831	ft ³
Volume removed by BMPs towards performance goal:		ft ³
Percent volume removed towards performance goal		%

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	3.4972	acre-ft
Annual runoff volume removed by BMPs:		acre-ft
Percent annual runoff volume removed:		%

Post development annual particulate P load:	1.5695	lbs
Annual particulate P removed by BMPs:		lbs
Post development annual dissolved P load:	1.284	lbs
Annual dissolved P removed by BMPs:	0	lbs
Total P removed by BMPs	0	lbs
Percent annual total phosphorus removed:		%

Post development annual TSS load:	518.4	lbs
Annual TSS removed by BMPs:		lbs
Percent annual TSS removed:		%

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft ³)	Volume Received (ft ³)	Volume Retained (ft ³)	Volume Outflow (ft ³)	Percent Retained (%)

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
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Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
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TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
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BMP Schematic

Project Information

Calculator Version: Version 4: July 2020
 Project Name: 38th-Chicago
 User Name / Company Name: Botlon & Menk Inc
 Date: 3-30-2026
 Project Description: Offsite area BMP - South: SW Leg additional treatment capacity provided by the filtration basin
 Construction Permit?: Yes

Site Information

Retention Requirement (inches): 0.5
 Site's Zip Code: 55407
 Annual Rainfall (inches): 31.5
 Phosphorus EMC (mg/l): 0.3
 TSS EMC (mg/l): 54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.33				0.33
				Impervious Area (acres)	0.622
				Total Area (acres)	0.952

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.33				0.33
				Impervious Area (acres)	0.622
				Total Area (acres)	0.952

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	1129	ft ³
Volume removed by BMPs towards performance goal:	1	ft ³
Percent volume removed towards performance goal	0	%

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	1.5129	acre-ft
Annual runoff volume removed by BMPs:	0.0021	acre-ft
Percent annual runoff volume removed:	0	%

Post development annual particulate P load:	0.679	lbs
Annual particulate P removed by BMPs:	0.12	lbs
Post development annual dissolved P load:	0.556	lbs
Annual dissolved P removed by BMPs:	0.025	lbs
Total P removed by BMPs	0.145	lbs
Percent annual total phosphorus removed:	12	%

Post development annual TSS load:	224.3	lbs
Annual TSS removed by BMPs:	39.5	lbs
Percent annual TSS removed:	18	%

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft ³)	Volume Recieved (ft ³)	Volume Retained (ft ³)	Volume Outflow (ft ³)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	1	1129	1	1128	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	1.5129	0	0.0021	1.5108	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	0.679	0	0.1195	0.5595	18

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	0.5556	0	0.024574	0.531	4

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	1.2346	0	0.144074	1.0905	11

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	224.28	0	39.49	184.79	18

BMP Schematic

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	38th/Chicago
User Name / Company Name:	BMI
Date:	4.22.2026
Project Description:	Proposed Conditions with Proposed GSI
Construction Permit?:	Yes

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55401
Annual Rainfall (inches):	31.4
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.18				0.18
				Impervious Area (acres)	1.4
				Total Area (acres)	1.58

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.11				0.11
				Impervious Area (acres)	0.57
				Total Area (acres)	0.68

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	5590	ft ³
Volume removed by BMPs towards performance goal:	672	ft ³
Percent volume removed towards performance goal	12	%

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	3.1957	acre-ft
Annual runoff volume removed by BMPs:	0.8552	acre-ft
Percent annual runoff volume removed:	27	%

Post development annual particulate P load:	1.4342	lbs
Annual particulate P removed by BMPs:	0.384	lbs
Post development annual dissolved P load:	1.174	lbs
Annual dissolved P removed by BMPs:	0.314	lbs
Total P removed by BMPs	0.698	lbs
Percent annual total phosphorus removed:	27	%

Post development annual TSS load:	473.7	lbs
Annual TSS removed by BMPs:	126.8	lbs
Percent annual TSS removed:	27	%

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft ³)	Volume Received (ft ³)	Volume Retained (ft ³)	Volume Outflow (ft ³)	Percent Retained (%)
East Leg - North	192	559	192	367	34
South Leg - East	362	1717	362	1355	21
South Leg: East 2nd Cell	118	1355	118	1237	9

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
East Leg - North	0.3273	0	0.22	0.1073	67
South Leg - East	0.9867	0	0.5062	0.4805	51
South Leg: East 2nd Cell	0	0.4806	0.129	0.3516	27

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	0.1469	0	0.0987	0.0482	67
South Leg - East	0.4429	0	0.2272	0.2157	51
South Leg: East 2nd Cell	0	0.2157	0.0579	0.1578	27

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	0.1202	0	0.0808	0.0394	67
South Leg - East	0.3623	0	0.1859	0.1764	51
South Leg: East 2nd Cell	0	0.1764	0.0474	0.129	27

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	0.2671	0	0.1795	0.0876	67
South Leg - East	0.8052	0	0.4131	0.3921	51
South Leg: East 2nd Cell	0	0.3921	0.1053	0.2868	27

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	48.53	0	32.61	15.92	67
South Leg - East	146.28	0	75.04	71.24	51
South Leg: East 2nd Cell	0	71.24	19.12	52.12	27

BMP Schematic



East Leg - North



South Leg - East



South Leg: East 2nd Cell

Project Information

Calculator Version: Version 4: July 2020
 Project Name: 38th/Chicago
 User Name / Company Name: BMI
 Date: 4.22.2026
 Project Description: Proposed Conditions with Proposed GSI with offsite residential runoff to the BMPs. See Figure 2-3 for total drainage and impervious (on and off-site) going to the two infiltration basins.
 The full drainage area is only considered for the areas draining to BMPs, the rest are project only as no other area provides treatment to offsite.
 Construction Permit?: Yes

Site Information

Retention Requirement (inches): 1.1
 Site's Zip Code: 55401
 Annual Rainfall (inches): 31.4
 Phosphorus EMC (mg/l): 0.3
 TSS EMC (mg/l): 54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.53				0.53
			Impervious Area (acres)		1.73
			Total Area (acres)		2.26

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.46				0.46
			Impervious Area (acres)		0.89
			Total Area (acres)		1.35

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	6908	ft ³
Volume removed by BMPs towards performance goal:	672	ft ³
Percent volume removed towards performance goal	10	%

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	4.0577	acre-ft
Annual runoff volume removed by BMPs:	1.0745	acre-ft
Percent annual runoff volume removed:	26	%

Post development annual particulate P load:	1.8211	lbs
Annual particulate P removed by BMPs:	0.482	lbs
Post development annual dissolved P load:	1.49	lbs
Annual dissolved P removed by BMPs:	0.394	lbs
Total P removed by BMPs	0.876	lbs
Percent annual total phosphorus removed:	26	%

Post development annual TSS load:	601.5	lbs
Annual TSS removed by BMPs:	159.3	lbs
Percent annual TSS removed:	26	%

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft ³)	Volume Recieved (ft ³)	Volume Retained (ft ³)	Volume Outflow (ft ³)	Percent Retained (%)
East Leg - North	192	1038	192	847	18
South Leg - East	362	2516	362	2154	14
South Leg: East 2nd Cell	118	2154	118	2035	5

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
East Leg - North	0.6099	0	0.2873	0.3226	47
South Leg - East	1.5437	0	0.6107	0.933	40
South Leg: East 2nd Cell	0	0.933	0.1764	0.7566	19

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	0.2737	0	0.1289	0.1448	47
South Leg - East	0.6928	0	0.2741	0.4187	40
South Leg: East 2nd Cell	0	0.4187	0.0792	0.3395	19

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	0.224	0	0.1055	0.1185	47
South Leg - East	0.5668	0	0.2242	0.3426	40
South Leg: East 2nd Cell	0	0.3426	0.0648	0.2778	19

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	0.4977	0	0.2344	0.2633	47
South Leg - East	1.2596	0	0.4983	0.7613	40
South Leg: East 2nd Cell	0	0.7613	0.144	0.6173	19

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
East Leg - North	90.42	0	42.6	47.82	47
South Leg - East	228.84	0	90.53	138.31	40
South Leg: East 2nd Cell	0	138.31	26.16	112.15	19

BMP Schematic



East Leg - North



South Leg - East



South Leg: East 2nd Cell

Project Information

Calculator Version: Version 4: July 2020
 Project Name: 38th-Chicago
 User Name / Company Name: Botlon & Menk Inc
 Date: 3-30-2026
 Project Description: Offsite area BMP - South: SW Leg additional treatment capacity provided by the filtration basin
 Construction Permit?: Yes

Site Information

Retention Requirement (inches): 0.5
 Site's Zip Code: 55407
 Annual Rainfall (inches): 31.5
 Phosphorus EMC (mg/l): 0.3
 TSS EMC (mg/l): 54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.33				0.33
				Impervious Area (acres)	0.622
				Total Area (acres)	0.952

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.33				0.33
				Impervious Area (acres)	0.622
				Total Area (acres)	0.952

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	1129	ft ³
Volume removed by BMPs towards performance goal:	1	ft ³
Percent volume removed towards performance goal	0	%

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	1.5129	acre-ft
Annual runoff volume removed by BMPs:	0.0021	acre-ft
Percent annual runoff volume removed:	0	%

Post development annual particulate P load:	0.679	lbs
Annual particulate P removed by BMPs:	0.12	lbs
Post development annual dissolved P load:	0.556	lbs
Annual dissolved P removed by BMPs:	0.025	lbs
Total P removed by BMPs	0.145	lbs
Percent annual total phosphorus removed:	12	%

Post development annual TSS load:	224.3	lbs
Annual TSS removed by BMPs:	39.5	lbs
Percent annual TSS removed:	18	%

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft ³)	Volume Recieved (ft ³)	Volume Retained (ft ³)	Volume Outflow (ft ³)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	1	1129	1	1128	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	1.5129	0	0.0021	1.5108	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	0.679	0	0.1195	0.5595	18

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	0.5556	0	0.024574	0.531	4

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	1.2346	0	0.144074	1.0905	11

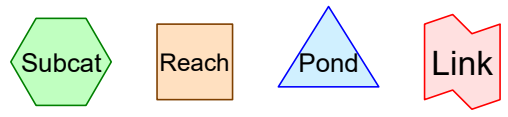
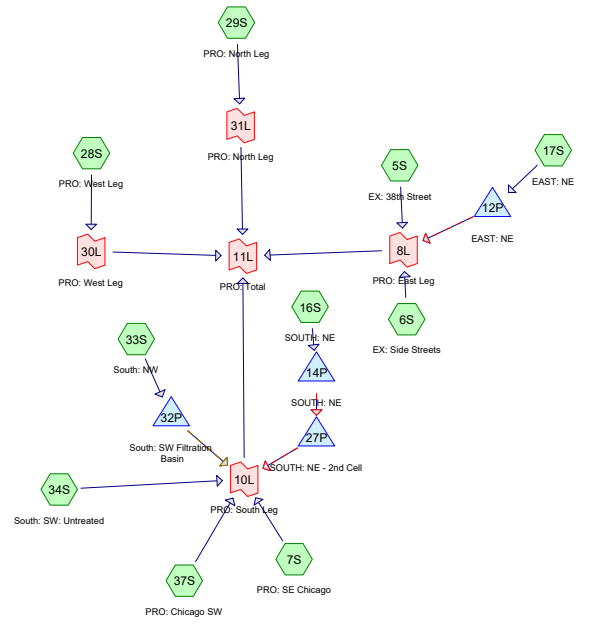
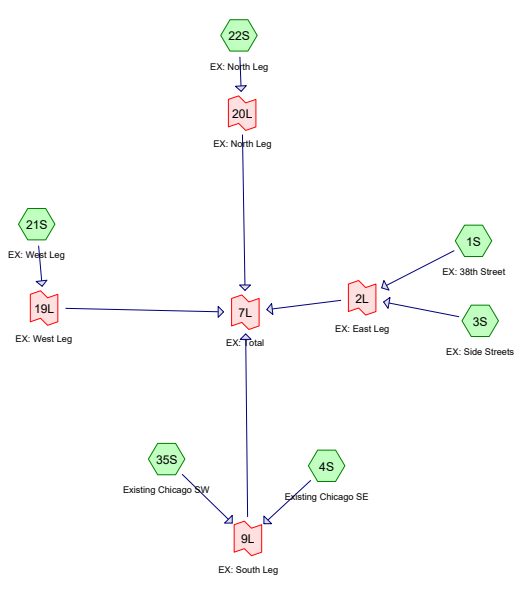
TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
0 - Bioretention basin (with underdrain)	224.28	0	39.49	184.79	18

BMP Schematic



0 - Bioretention basin (with underdrain)



Routing Diagram for 136243_Phase_1_RateControl_90%_WEIR
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	MSE 24-hr	3	Default	24.00	1	2.85	2
2	10-yr	MSE 24-hr	3	Default	24.00	1	4.27	2
3	100-yr	MSE 24-hr	3	Default	24.00	1	7.50	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.191	39	(22S, 29S)
0.236	98	Off Site: Impervious (33S)
0.007	98	Off Site: Impervious Area (34S)
0.262	39	Off Site: Pervious (33S)
0.014	39	Off Site: Pervious Area (34S)
3.318	98	Off-Site: Impervious (1S, 3S, 4S, 5S, 6S, 7S, 16S, 17S)
0.309	39	Off-Site: Pervious (16S)
3.040	39	Off-Site: Pervious (1S, 3S, 4S, 5S, 6S, 7S, 17S)
0.655	98	Offsite Impervious (35S)
0.342	39	Offsite Pervious (35S)
0.724	98	Onsite Impervious (35S, 37S)
0.037	39	Onsite Pervious (35S, 37S)
0.009	39	Project Area: >75% Grass cover, Good, HSG A (7S)
1.957	98	Project Area: Impervious (3S, 4S, 6S, 7S, 16S, 17S, 33S)
0.059	98	Project Area: Impervious Area (34S)
1.428	98	Project Area: Impervious (1S, 5S)
0.069	39	Project Area: Pervious (16S)
0.002	39	Project Area: Pervious (4S)
0.107	39	Project Area: Pervious (17S, 33S)
0.058	39	Project Area: Pervious A Soils (3S, 6S)
0.003	39	Project Area: Pervious Area (34S)
0.036	39	Project Area: Pervious A Soils (5S)
2.457	98	Project Impervious (22S, 29S)
0.715	98	Project Impervious (21S, 28S)
0.060	39	Project Pervious (21S, 28S)
0.412	98	offsite impervious (37S)
0.066	39	offsite pervious (37S)
16.572	82	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.009	HSG A	7S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
16.563	Other	1S, 3S, 4S, 5S, 6S, 7S, 16S, 17S, 21S, 22S, 28S, 29S, 33S, 34S, 35S, 37S
16.572		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcat Number
0.000	0.000	0.000	0.000	0.191	0.191		
0.000	0.000	0.000	0.000	0.236	0.236	Off Site: Impervious	
0.000	0.000	0.000	0.000	0.007	0.007	Off Site: Impervious Area	
0.000	0.000	0.000	0.000	0.262	0.262	Off Site: Pervious	
0.000	0.000	0.000	0.000	0.014	0.014	Off Site: Pervious Area	
0.000	0.000	0.000	0.000	3.318	3.318	Off-Site: Impervious	
0.000	0.000	0.000	0.000	0.309	0.309	Off-Site: Pervious	
0.000	0.000	0.000	0.000	3.040	3.040	Off-Site: Pervious	
0.000	0.000	0.000	0.000	0.655	0.655	Offsite Impervious	
0.000	0.000	0.000	0.000	0.342	0.342	Offsite Pervious	
0.000	0.000	0.000	0.000	0.724	0.724	Onsite Impervious	
0.000	0.000	0.000	0.000	0.037	0.037	Onsite Pervious	
0.009	0.000	0.000	0.000	0.000	0.009	Project Area: >75% Grass cover, Good	
0.000	0.000	0.000	0.000	1.957	1.957	Project Area: Impervious	
0.000	0.000	0.000	0.000	0.059	0.059	Project Area: Impervious Area	
0.000	0.000	0.000	0.000	1.428	1.428	Project Area: Impervious	
0.000	0.000	0.000	0.000	0.069	0.069	Project Area: Pervious	
0.000	0.000	0.000	0.000	0.002	0.002	Project Area: Pervious	
0.000	0.000	0.000	0.000	0.107	0.107	Project Area: Pervious	
0.000	0.000	0.000	0.000	0.058	0.058	Project Area: Pervious A Soils	
0.000	0.000	0.000	0.000	0.003	0.003	Project Area: Pervious Area	
0.000	0.000	0.000	0.000	0.036	0.036	Project Area: Pervious A Soils	
0.000	0.000	0.000	0.000	2.457	2.457	Project Impervious	
0.000	0.000	0.000	0.000	0.715	0.715	Project Impervious	
0.000	0.000	0.000	0.000	0.060	0.060	Project Pervious	
0.000	0.000	0.000	0.000	0.412	0.412	offsite impervious	
0.000	0.000	0.000	0.000	0.066	0.066	offsite pervious	
0.009	0.000	0.000	0.000	16.563	16.572	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	32P	849.58	849.50	92.9	0.0009	0.010	0.0	6.0	0.0	
2	32P	850.91	850.55	100.0	0.0036	0.013	0.0	12.0	0.0	

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX: 38th Street	Runoff Area=1.985 ac 76.22% Impervious Runoff Depth=2.00" Tc=7.0 min CN=WQ Runoff=6.12 cfs 0.330 af
Subcatchment3S: EX: Side Streets	Runoff Area=0.306 ac 61.11% Impervious Runoff Depth=1.60" Tc=7.0 min CN=WQ Runoff=0.76 cfs 0.041 af
Subcatchment4S: Existing Chicago SE	Runoff Area=115,419 sf 57.96% Impervious Runoff Depth=1.52" Flow Length=592' Tc=7.0 min CN=WQ Runoff=6.21 cfs 0.335 af
Subcatchment5S: EX: 38th Street	Runoff Area=71,376 sf 72.20% Impervious Runoff Depth=1.89" Tc=7.0 min CN=WQ Runoff=4.79 cfs 0.258 af
Subcatchment6S: EX: Side Streets	Runoff Area=0.306 ac 57.84% Impervious Runoff Depth=1.51" Tc=7.0 min CN=WQ Runoff=0.72 cfs 0.039 af
Subcatchment7S: PRO: SE Chicago	Runoff Area=71,447 sf 50.44% Impervious Runoff Depth=1.32" Flow Length=594' Tc=7.0 min CN=WQ Runoff=3.35 cfs 0.181 af
Subcatchment16S: SOUTH: NE	Runoff Area=1.010 ac 62.57% Impervious Runoff Depth=1.64" Flow Length=592' Tc=7.0 min CN=WQ Runoff=2.56 cfs 0.138 af
Subcatchment17S: EAST: NE	Runoff Area=0.342 ac 76.61% Impervious Runoff Depth=2.01" Tc=7.0 min CN=WQ Runoff=1.06 cfs 0.057 af
Subcatchment21S: EX: West Leg	Runoff Area=16,876 sf 95.86% Impervious Runoff Depth=2.51" Tc=7.0 min CN=WQ Runoff=1.50 cfs 0.081 af
Subcatchment22S: EX: North Leg	Runoff Area=57,674 sf 99.47% Impervious Runoff Depth=2.61" Tc=7.0 min CN=WQ Runoff=5.33 cfs 0.287 af
Subcatchment28S: PRO: West Leg	Runoff Area=16,876 sf 88.61% Impervious Runoff Depth=2.32" Tc=7.0 min CN=WQ Runoff=1.39 cfs 0.075 af
Subcatchment29S: PRO: North Leg	Runoff Area=57,674 sf 86.09% Impervious Runoff Depth=2.25" Tc=7.0 min CN=WQ Runoff=4.61 cfs 0.249 af
Subcatchment33S: South: NW	Runoff Area=0.953 ac 65.27% Impervious Runoff Depth=1.71" Tc=7.0 min CN=WQ Runoff=2.52 cfs 0.136 af
Subcatchment34S: South: SW: Untreated	Runoff Area=3,614 sf 79.52% Impervious Runoff Depth=2.08" Tc=7.0 min CN=WQ Runoff=0.27 cfs 0.014 af
Subcatchment35S: Existing Chicago SW	Runoff Area=71,244 sf 77.89% Impervious Runoff Depth=2.04" Tc=7.0 min CN=WQ Runoff=5.15 cfs 0.278 af
Subcatchment37S: PRO: Chicago SW	Runoff Area=26,160 sf 86.17% Impervious Runoff Depth=2.26" Tc=7.0 min CN=WQ Runoff=2.09 cfs 0.113 af

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Pond 12P: EAST: NE Peak Elev=854.97' Storage=246 cf Inflow=1.06 cfs 0.057 af
Discarded=0.01 cfs 0.013 af Primary=1.05 cfs 0.044 af Outflow=1.05 cfs 0.057 af

Pond 14P: SOUTH: NE Peak Elev=853.71' Storage=461 cf Inflow=2.56 cfs 0.138 af
Discarded=0.01 cfs 0.023 af Primary=2.54 cfs 0.115 af Outflow=2.55 cfs 0.138 af

Pond 27P: SOUTH: NE - 2nd Cell Peak Elev=853.00' Storage=111 cf Inflow=2.54 cfs 0.115 af
Discarded=0.00 cfs 0.006 af Primary=2.53 cfs 0.110 af Outflow=2.54 cfs 0.115 af

Pond 32P: South: SW Filtration Basin Peak Elev=853.38' Storage=333 cf Inflow=2.52 cfs 0.136 af
Primary=2.50 cfs 0.122 af Secondary=0.01 cfs 0.012 af Outflow=2.51 cfs 0.134 af

Link 2L: EX: East Leg Inflow=6.88 cfs 0.371 af
Primary=6.88 cfs 0.371 af

Link 7L: EX: Total Inflow=25.07 cfs 1.353 af
Primary=25.07 cfs 1.353 af

Link 8L: PRO: East Leg Inflow=6.54 cfs 0.341 af
Primary=6.54 cfs 0.341 af

Link 9L: EX: South Leg Inflow=11.37 cfs 0.613 af
Primary=11.37 cfs 0.613 af

Link 10L: PRO: South Leg Inflow=10.74 cfs 0.551 af
Primary=10.74 cfs 0.551 af

Link 11L: PRO: Total Inflow=23.28 cfs 1.216 af
Primary=23.28 cfs 1.216 af

Link 19L: EX: West Leg Inflow=1.50 cfs 0.081 af
Primary=1.50 cfs 0.081 af

Link 20L: EX: North Leg Inflow=5.33 cfs 0.287 af
Primary=5.33 cfs 0.287 af

Link 30L: PRO: West Leg Inflow=1.39 cfs 0.075 af
Primary=1.39 cfs 0.075 af

Link 31L: PRO: North Leg Inflow=4.61 cfs 0.249 af
Primary=4.61 cfs 0.249 af

Total Runoff Area = 16.572 ac Runoff Volume = 2.612 af Average Runoff Depth = 1.89"
27.78% Pervious = 4.604 ac 72.22% Impervious = 11.968 ac

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Summary for Subcatchment 1S: EX: 38th Street

Runoff = 6.12 cfs @ 12.14 hrs, Volume= 0.330 af, Depth= 2.00"

Routed to Link 2L : EX: East Leg

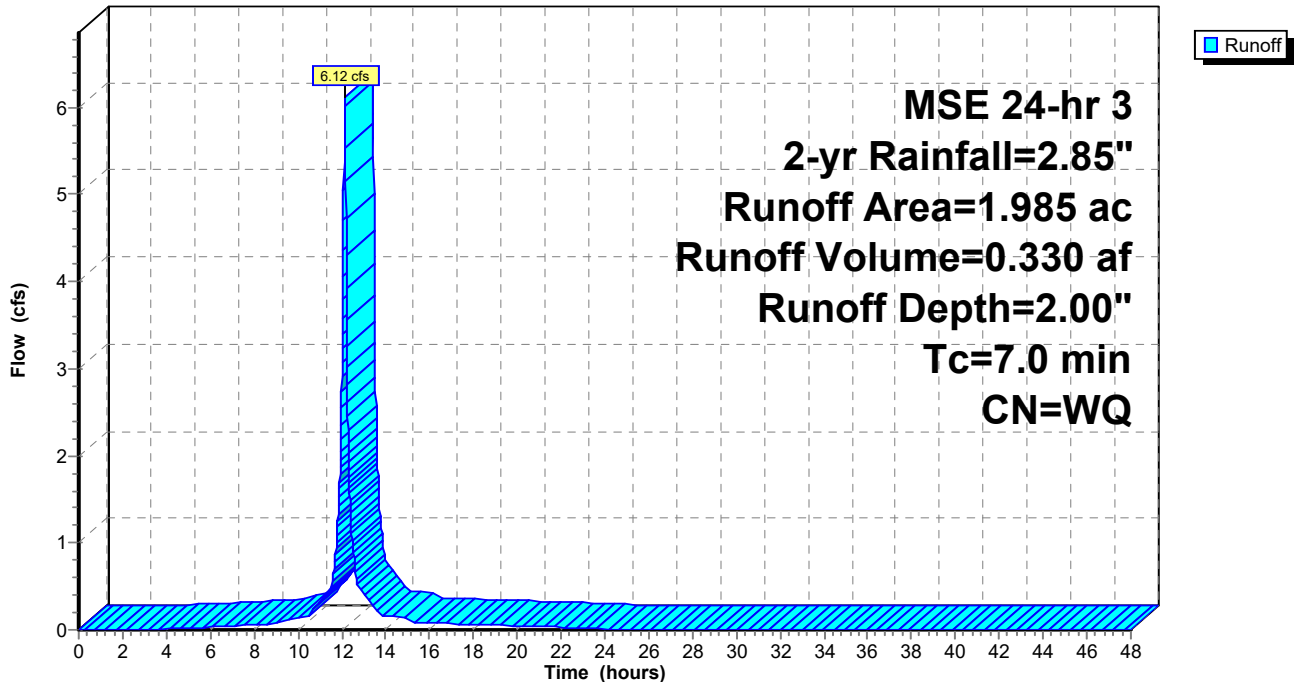
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-yr Rainfall=2.85"

Area (ac)	CN	Description
* 0.821	98	Project Area: Impervoius
* 0.000	39	Project Area: Pervious A soils
* 0.692	98	Off-Site: Impervious
* 0.472	39	Off-Site: Pervious
1.985		Weighted Average
0.472		23.78% Pervious Area
1.513		76.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 1S: EX: 38th Street

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 3S: EX: Side Streets

Runoff = 0.76 cfs @ 12.14 hrs, Volume= 0.041 af, Depth= 1.60"
 Routed to Link 2L : EX: East Leg

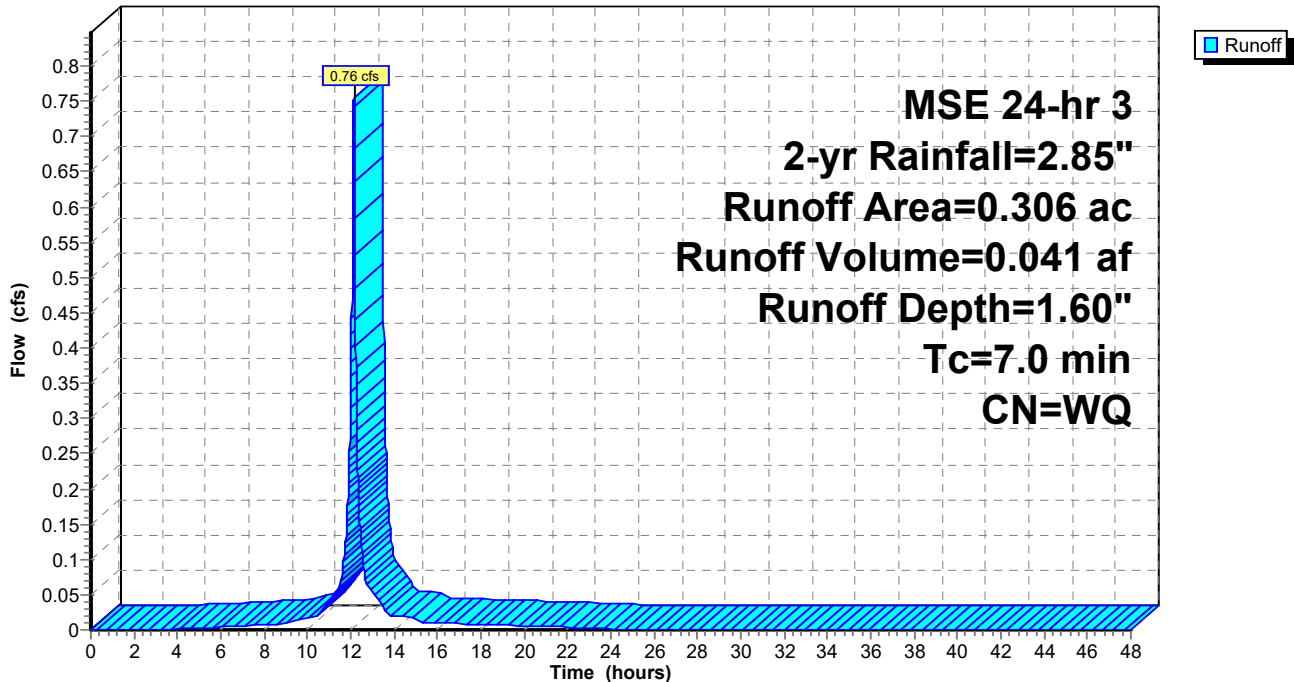
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

Area (ac)	CN	Description
* 0.111	98	Project Area: Impervious
* 0.024	39	Project Area: Pervious A Soils
* 0.076	98	Off-Site: Impervious
* 0.095	39	Off-Site: Pervious
0.306		Weighted Average
0.119		38.89% Pervious Area
0.187		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 3S: EX: Side Streets

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 4S: Existing Chicago SE

Runoff = 6.21 cfs @ 12.14 hrs, Volume= 0.335 af, Depth= 1.52"

Routed to Link 9L : EX: South Leg

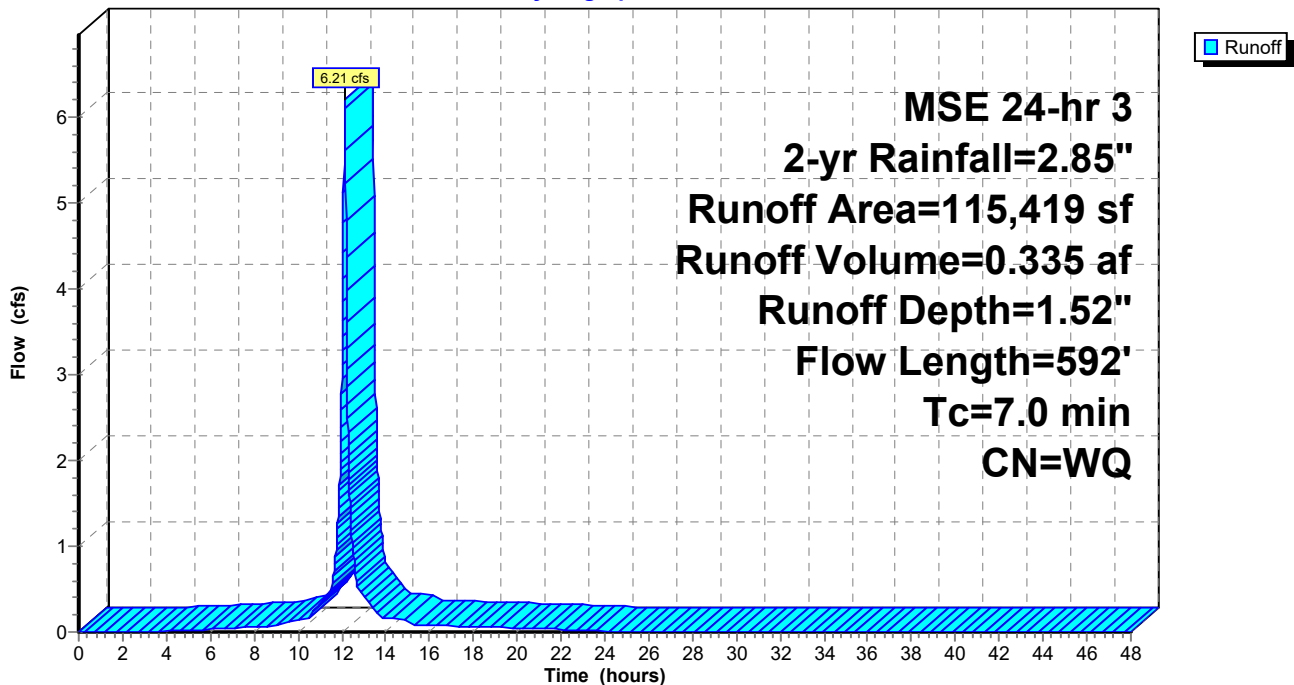
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	28,194	98	Project Area: Impervious
*	72	39	Project Area: Pervious
*	38,701	98	Off-Site: Impervious
*	48,452	39	Off-Site: Pervious
115,419			Weighted Average
48,524			42.04% Pervious Area
66,895			57.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.7	417	0.0099	10.07	100.72	Channel Flow, Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013
6.5	592	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 4S: Existing Chicago SE

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 5S: EX: 38th Street

Runoff = 4.79 cfs @ 12.14 hrs, Volume= 0.258 af, Depth= 1.89"

Routed to Link 8L : PRO: East Leg

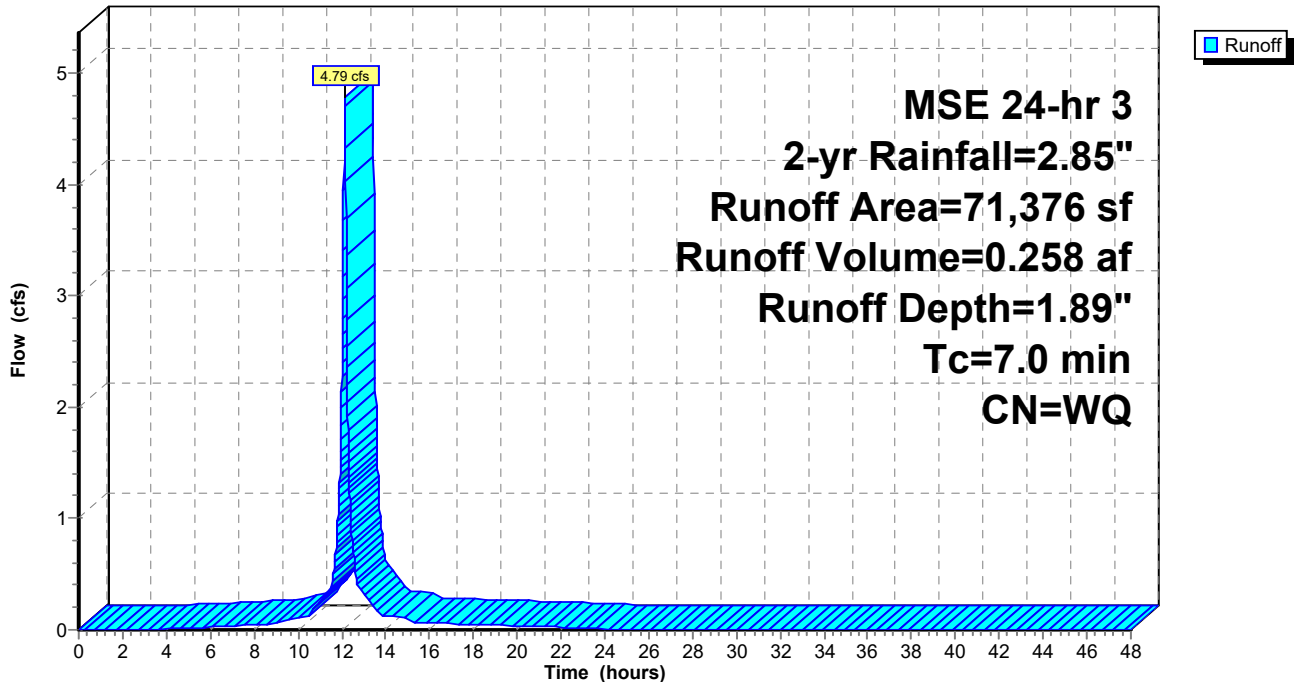
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	26,440	98	Project Area: Impervious
*	1,550	39	Project Area: Pervious A Soils
*	25,091	98	Off-Site: Impervious
*	18,295	39	Off-Site: Pervious
			Weighted Average
	71,376		
	19,845		27.80% Pervious Area
	51,531		72.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 5S: EX: 38th Street

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 6S: EX: Side Streets

Runoff = 0.72 cfs @ 12.14 hrs, Volume= 0.039 af, Depth= 1.51"

Routed to Link 8L : PRO: East Leg

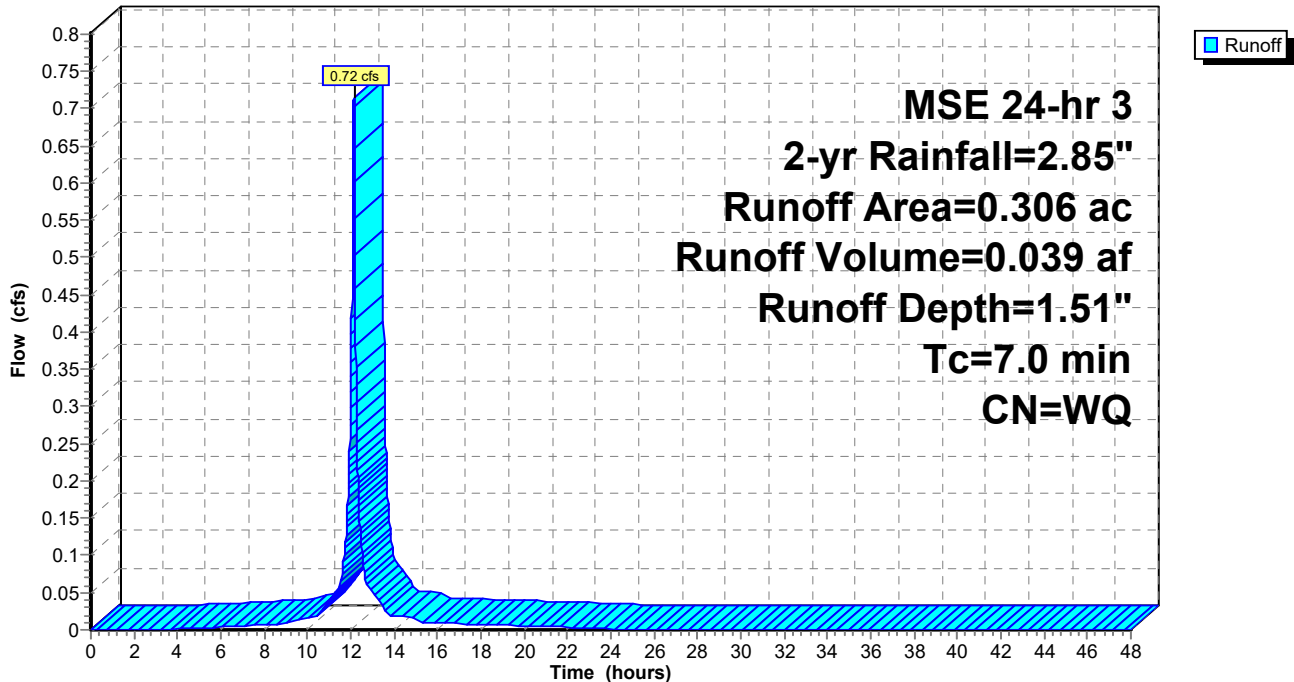
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-yr Rainfall=2.85"

Area (ac)	CN	Description
* 0.101	98	Project Area: Impervious
* 0.034	39	Project Area: Pervious A Soils
* 0.076	98	Off-Site: Impervious
* 0.095	39	Off-Site: Pervious
0.306		Weighted Average
0.129		42.16% Pervious Area
0.177		57.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 6S: EX: Side Streets

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 7S: PRO: SE Chicago

Area on Chicago Southeast and small untreated SE area north of W39th

Runoff = 3.35 cfs @ 12.14 hrs, Volume= 0.181 af, Depth= 1.32"
 Routed to Link 10L : PRO: South Leg

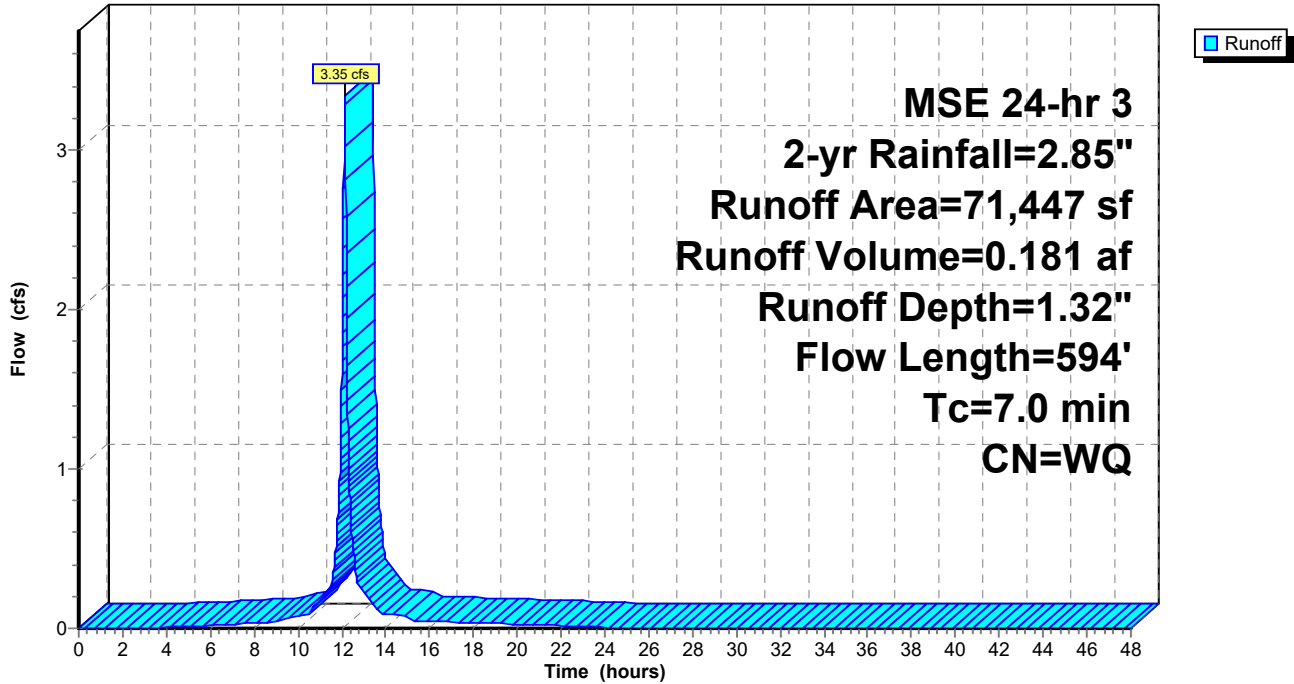
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

Area (sf)	CN	Description
* 6,171	98	Project Area: Impervious
* 399	39	Project Area: >75% Grass cover, Good, HSG A
* 29,869	98	Off-Site: Impervious
* 35,008	39	Off-Site: Pervious
71,447		Weighted Average
35,407		49.56% Pervious Area
36,040		50.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
0.7	419	0.0099	10.07	100.72	Channel Flow, Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013
6.5	594	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 7S: PRO: SE Chicago

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 16S: SOUTH: NE

Runoff = 2.56 cfs @ 12.14 hrs, Volume= 0.138 af, Depth= 1.64"
 Routed to Pond 14P : SOUTH: NE

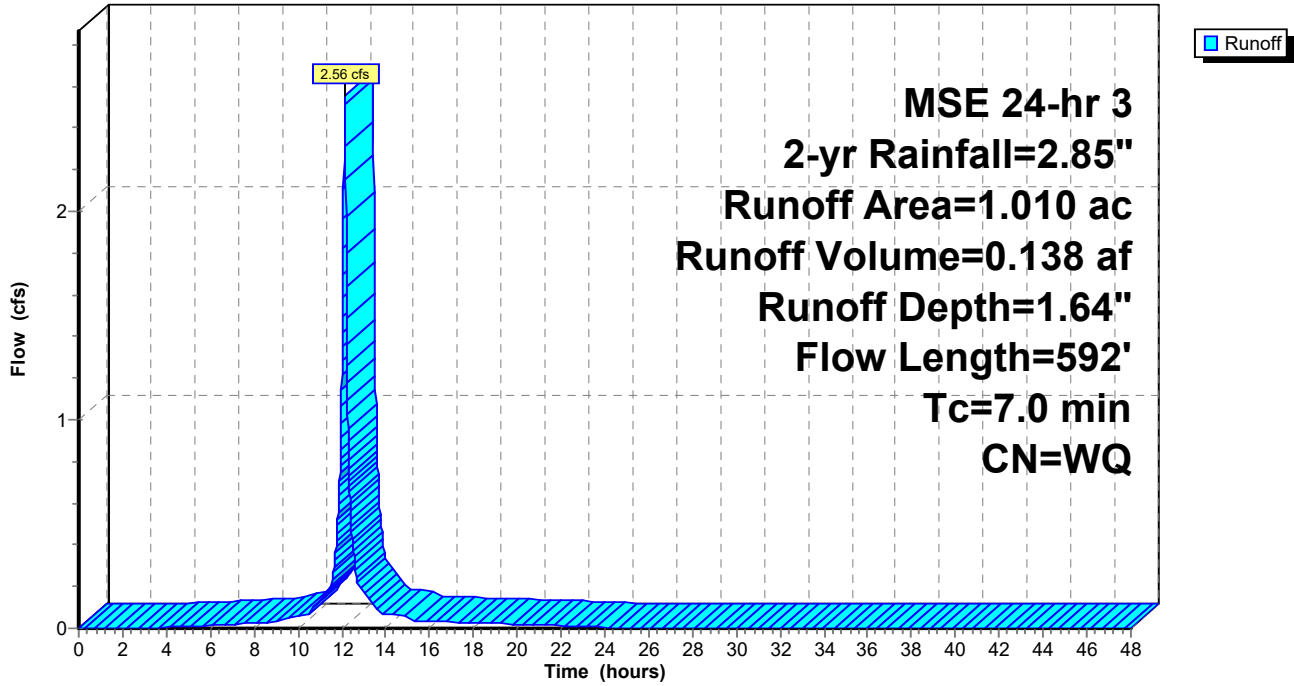
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

Area (ac)	CN	Description
* 0.429	98	Project Area: Impervious
* 0.069	39	Project Area: Perivous
* 0.203	98	Off-Site: Impervious
* 0.309	39	Off-Site: Perivous
1.010		Weighted Average
0.378		37.43% Pervious Area
0.632		62.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, SHeetflow Front Yard Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, Gutter Flow Paved Kv= 20.3 fps
0.7	417	0.0099	10.07	100.72	Channel Flow, Channel Flow Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013 Asphalt, smooth
6.5	592	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 16S: SOUTH: NE

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 17S: EAST: NE

Runoff = 1.06 cfs @ 12.14 hrs, Volume= 0.057 af, Depth= 2.01"
 Routed to Pond 12P : EAST: NE

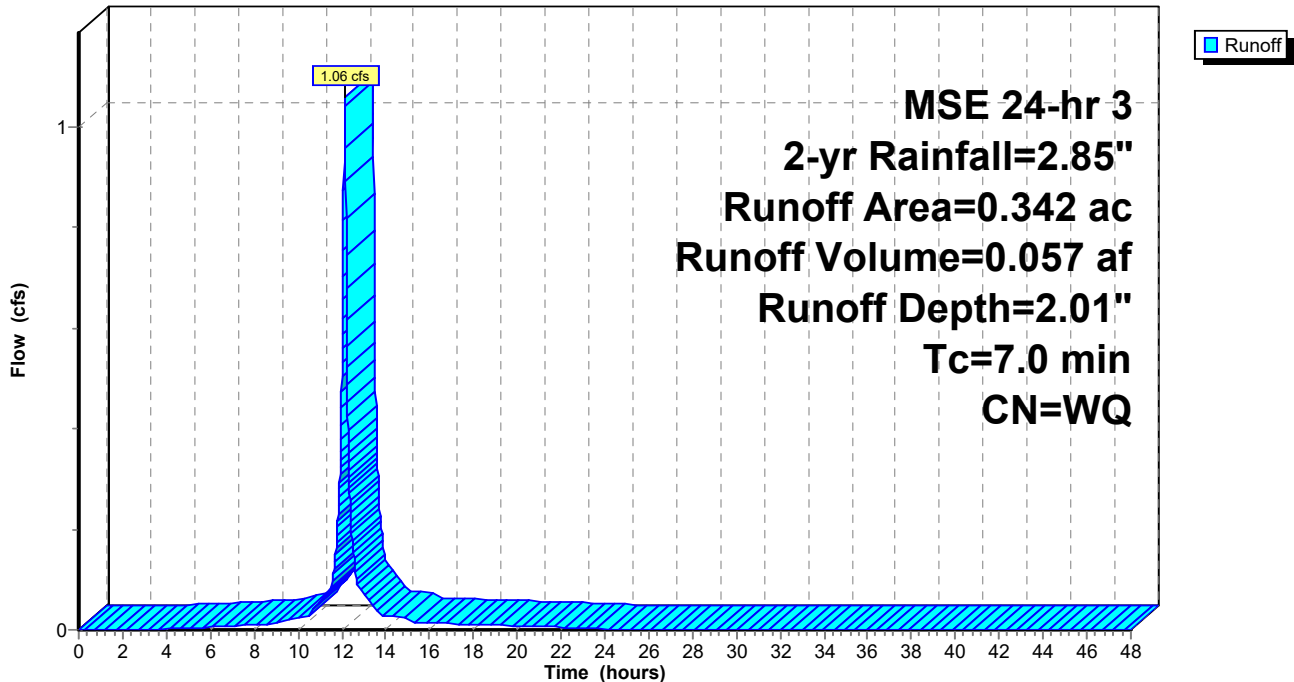
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

Area (ac)	CN	Description
* 0.141	98	Project Area: Impervious
* 0.038	39	Project Area: Pervious
* 0.121	98	Off-Site: Impervious
* 0.042	39	Off-Site: Pervious
0.342		Weighted Average
0.080		23.39% Pervious Area
0.262		76.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 17S: EAST: NE

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 21S: EX: West Leg

Runoff = 1.50 cfs @ 12.14 hrs, Volume= 0.081 af, Depth= 2.51"
 Routed to Link 19L : EX: West Leg

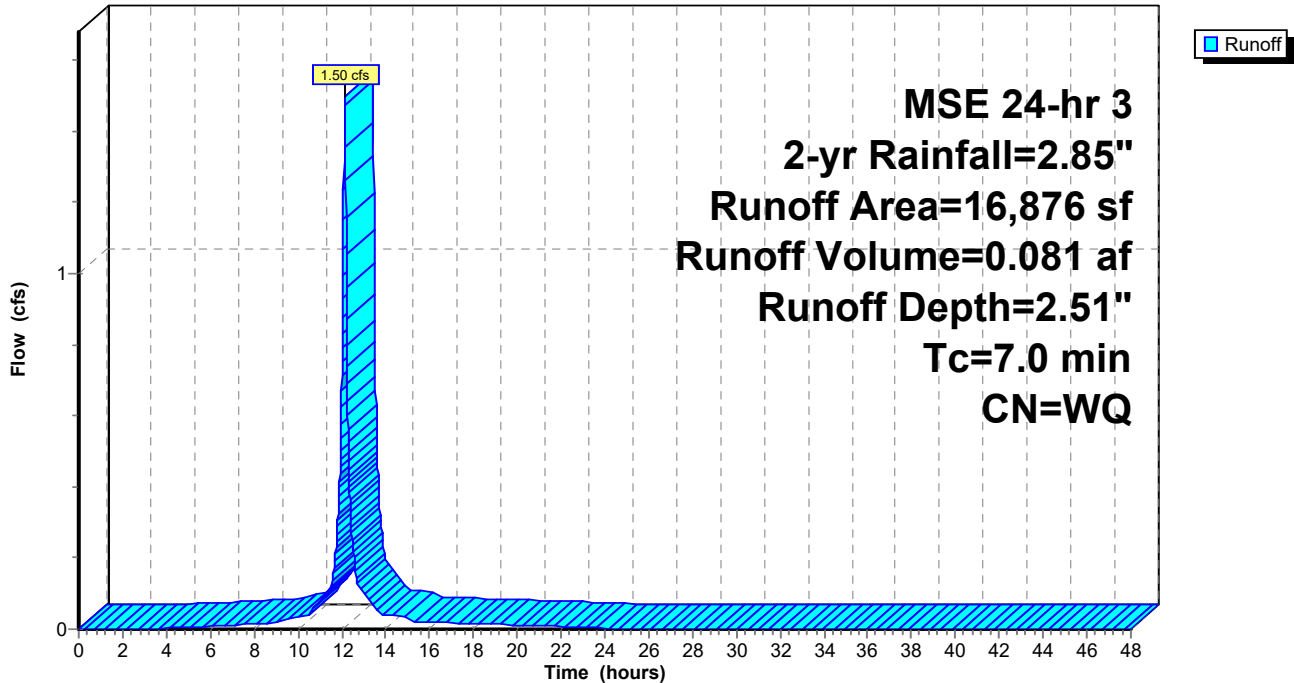
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	16,178	98	Project Impervoius
*	698	39	Project Pervious
	16,876		Weighted Average
	698		4.14% Pervious Area
	16,178		95.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 21S: EX: West Leg

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 22S: EX: North Leg

Runoff = 5.33 cfs @ 12.14 hrs, Volume= 0.287 af, Depth= 2.61"

Routed to Link 20L : EX: North Leg

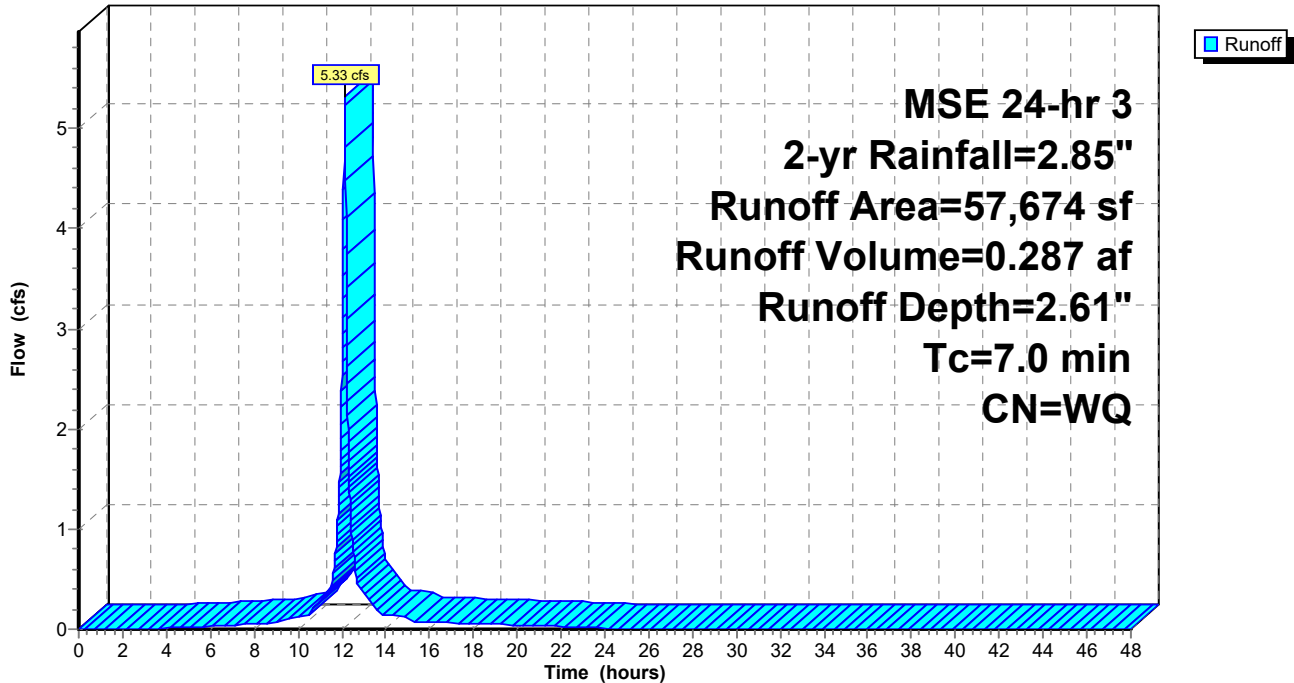
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	57,369	98	Project Impervious
*	305	39	
<hr/>			
	57,674		Weighted Average
	305		0.53% Pervious Area
	57,369		99.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 22S: EX: North Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 28S: PRO: West Leg

Runoff = 1.39 cfs @ 12.14 hrs, Volume= 0.075 af, Depth= 2.32"

Routed to Link 30L : PRO: West Leg

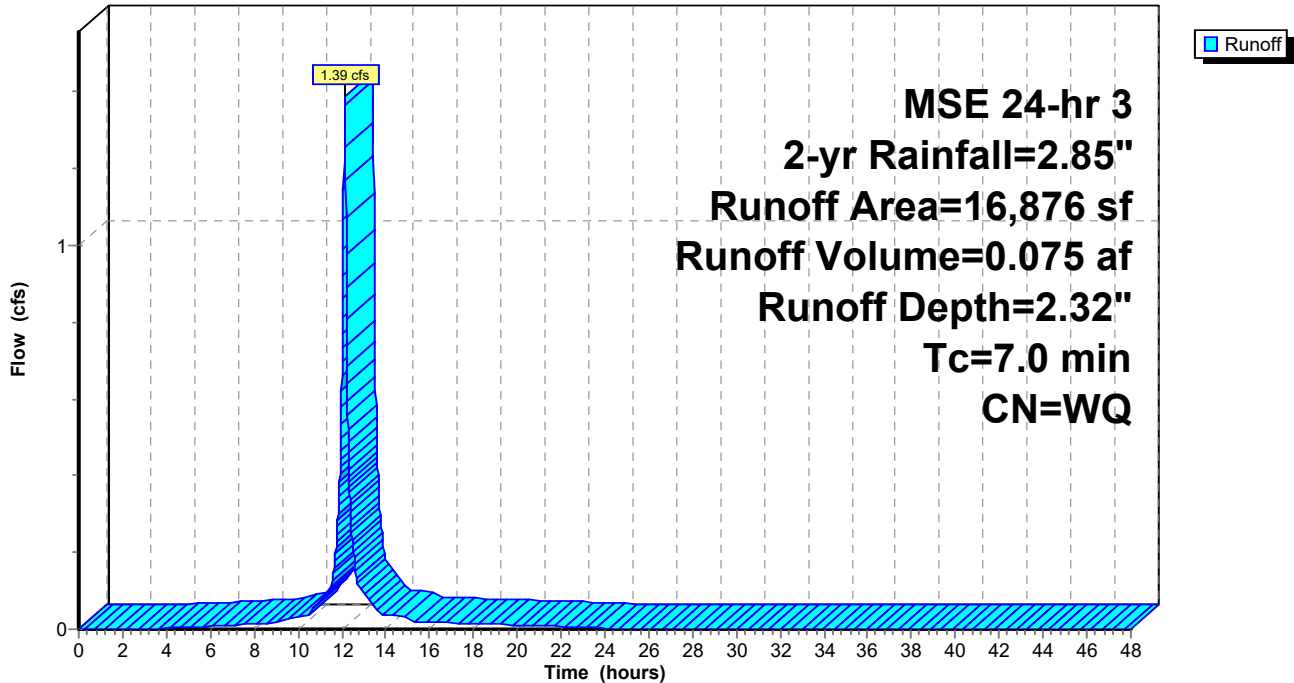
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	14,953	98	Project Impervoius
*	1,923	39	Project Pervious
	16,876		Weighted Average
	1,923		11.39% Pervious Area
	14,953		88.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 28S: PRO: West Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 29S: PRO: North Leg

Runoff = 4.61 cfs @ 12.14 hrs, Volume= 0.249 af, Depth= 2.25"

Routed to Link 31L : PRO: North Leg

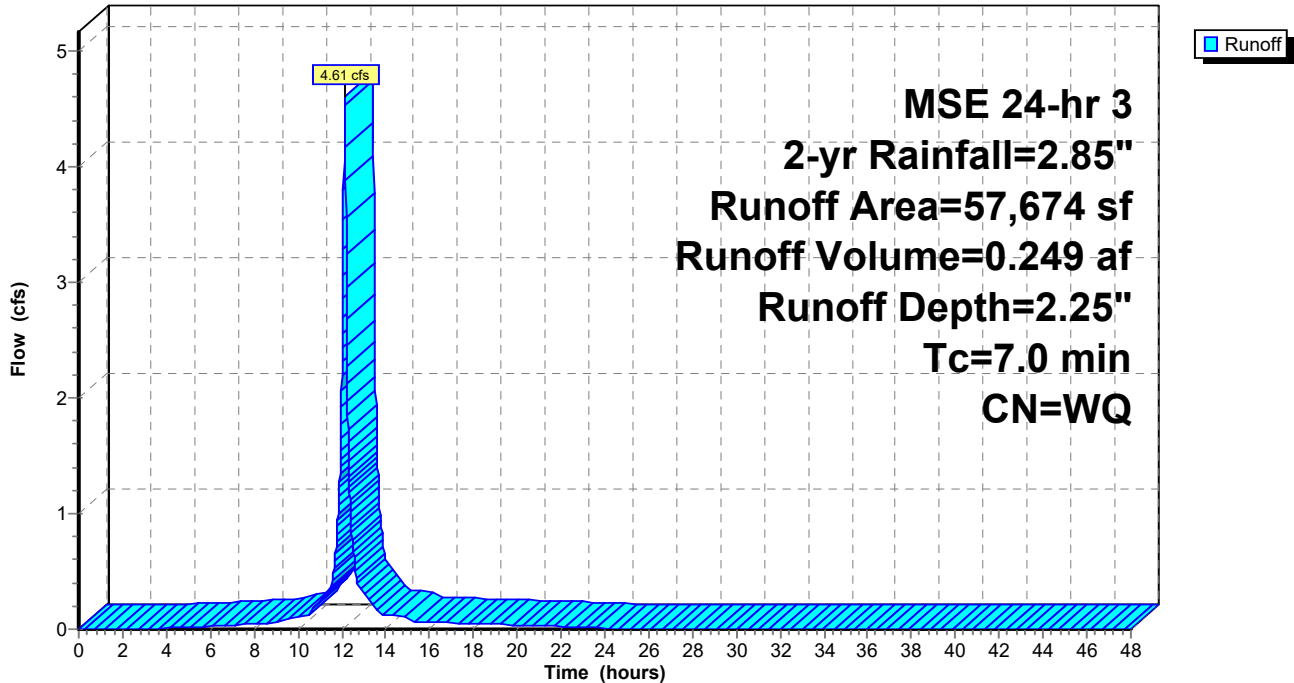
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	49,652	98	Project Impervious
*	8,022	39	
	57,674		Weighted Average
	8,022		13.91% Pervious Area
	49,652		86.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 29S: PRO: North Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 33S: South: NW

Runoff = 2.52 cfs @ 12.14 hrs, Volume= 0.136 af, Depth= 1.71"
 Routed to Pond 32P : South: SW Filtration Basin

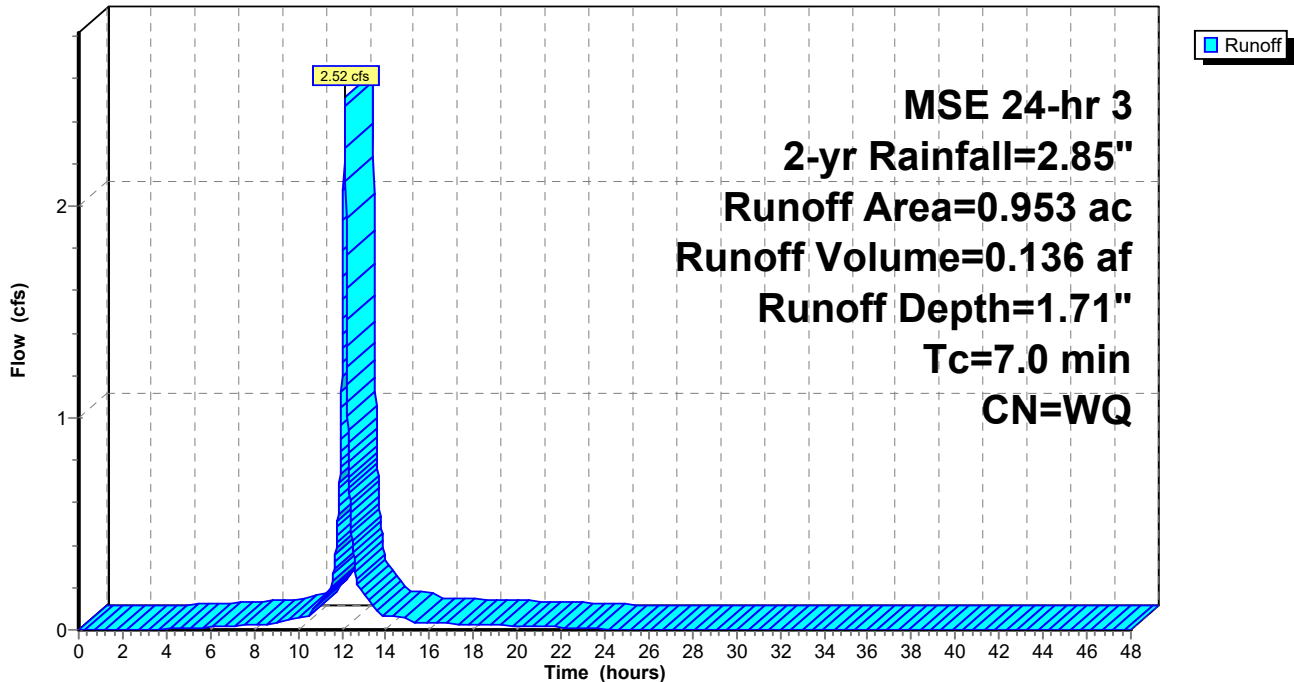
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

Area (ac)	CN	Description
* 0.386	98	Project Area: Impervious
* 0.069	39	Project Area: Pervious
* 0.236	98	Off Site: Impervious
* 0.262	39	Off Site: Pervious
0.953		Weighted Average
0.331		34.73% Pervious Area
0.622		65.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 33S: South: NW

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 34S: South: SW: Untreated

Small area south of pond and north of W39th street

Runoff = 0.27 cfs @ 12.14 hrs, Volume= 0.014 af, Depth= 2.08"
 Routed to Link 10L : PRO: South Leg

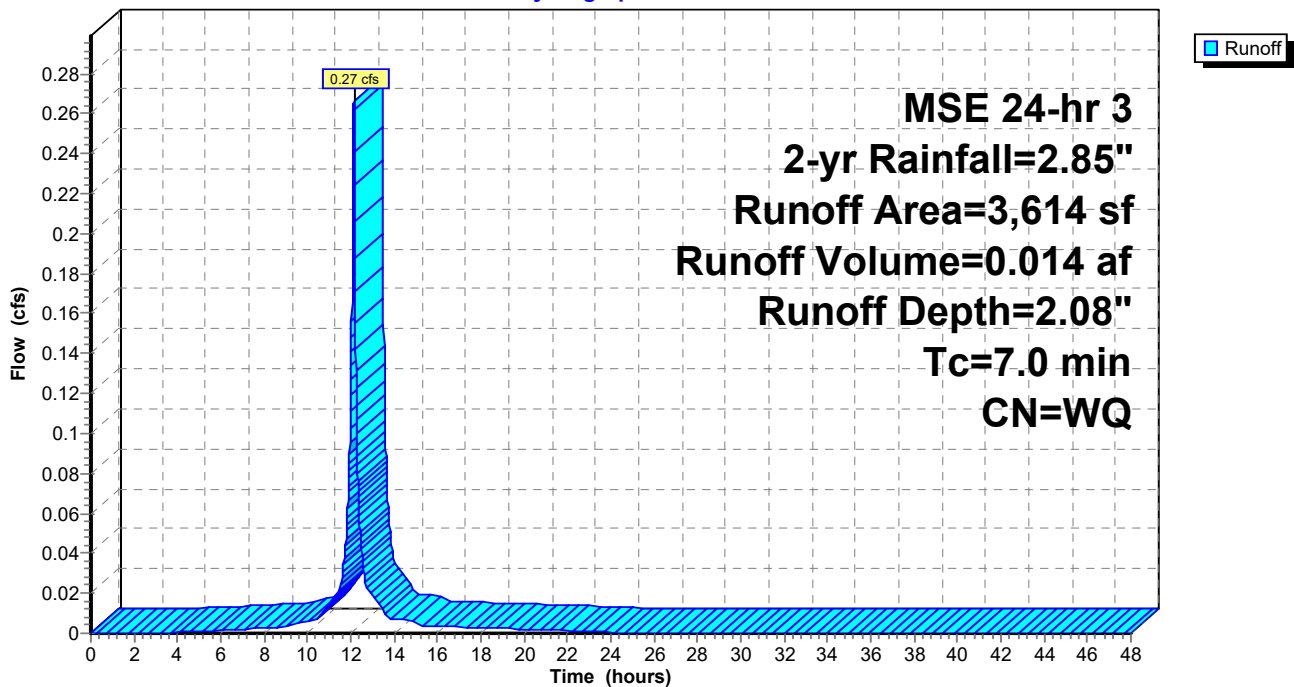
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	2,576	98	Project Area: Impervious Area
*	140	39	Project Area: Pervious Area
*	298	98	Off Site: Impervious Area
*	600	39	Off Site: Pervious Area
	3,614		Weighted Average
	740		20.48% Pervious Area
	2,874		79.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 34S: South: SW: Untreated

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 35S: Existing Chicago SW

all West side of Chicago, and south portion of MWMO drainage area

Runoff = 5.15 cfs @ 12.14 hrs, Volume= 0.278 af, Depth= 2.04"
 Routed to Link 9L : EX: South Leg

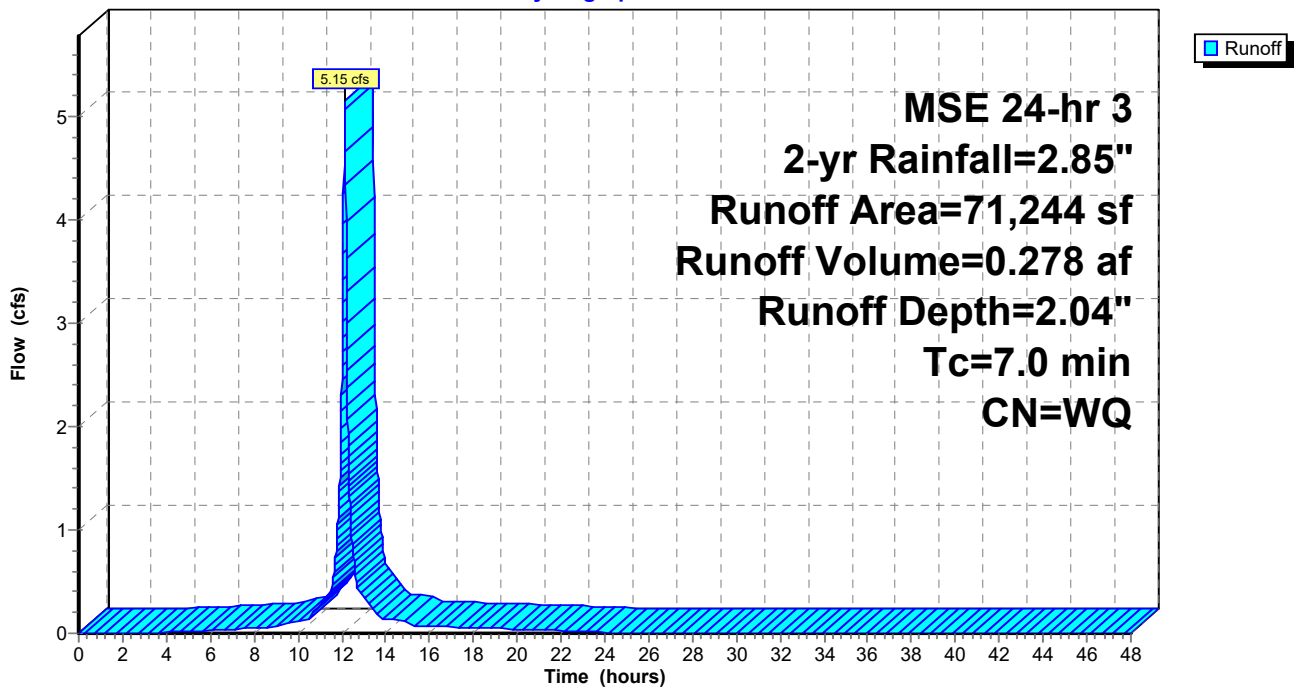
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	26,955	98	Onsite Impervious
*	875	39	Onsite Pervious
*	28,534	98	Offsite Impervious
*	14,880	39	Offsite Pervious
	71,244		Weighted Average
	15,755		22.11% Pervious Area
	55,489		77.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 35S: Existing Chicago SW

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Subcatchment 37S: PRO: Chicago SW

Rest of Southwest chicago area

Runoff = 2.09 cfs @ 12.14 hrs, Volume= 0.113 af, Depth= 2.26"
 Routed to Link 10L : PRO: South Leg

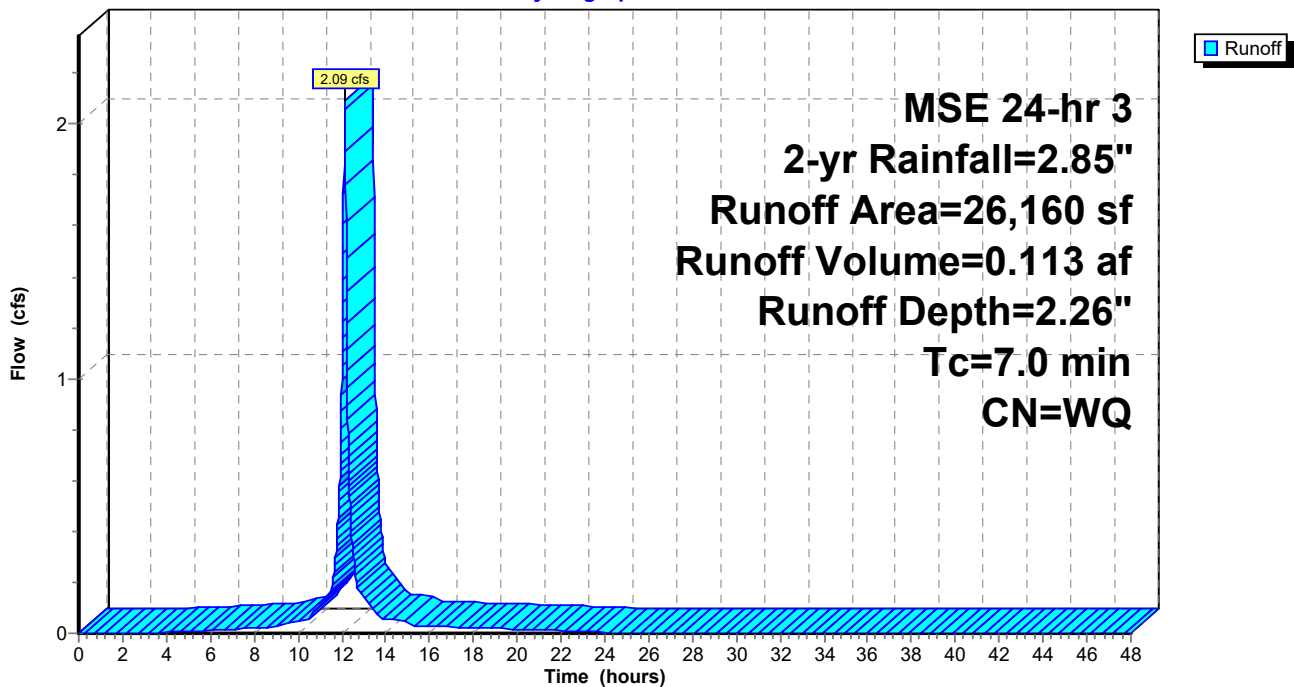
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 2-yr Rainfall=2.85"

	Area (sf)	CN	Description
*	4,590	98	Onsite Impervious
*	738	39	Onsite Pervious
*	17,951	98	offsite impervious
*	2,881	39	offsite pervious
	26,160		Weighted Average
	3,619		13.83% Pervious Area
	22,541		86.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 37S: PRO: Chicago SW

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Pond 12P: EAST: NE

Inflow Area = 0.342 ac, 76.61% Impervious, Inflow Depth = 2.01" for 2-yr event
 Inflow = 1.06 cfs @ 12.14 hrs, Volume= 0.057 af
 Outflow = 1.05 cfs @ 12.15 hrs, Volume= 0.057 af, Atten= 1%, Lag= 0.5 min
 Discarded = 0.01 cfs @ 12.15 hrs, Volume= 0.013 af
 Primary = 1.05 cfs @ 12.15 hrs, Volume= 0.044 af
 Routed to Link 8L : PRO: East Leg

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 854.97' @ 12.15 hrs Surf.Area= 433 sf Storage= 246 cf

Plug-Flow detention time= 91.1 min calculated for 0.057 af (100% of inflow)
 Center-of-Mass det. time= 91.1 min (845.8 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	853.75'	1,042 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
853.75	11	0	0
854.00	81	12	12
854.50	242	81	92
854.82	347	94	186
855.00	448	72	258
856.75	448	784	1,042

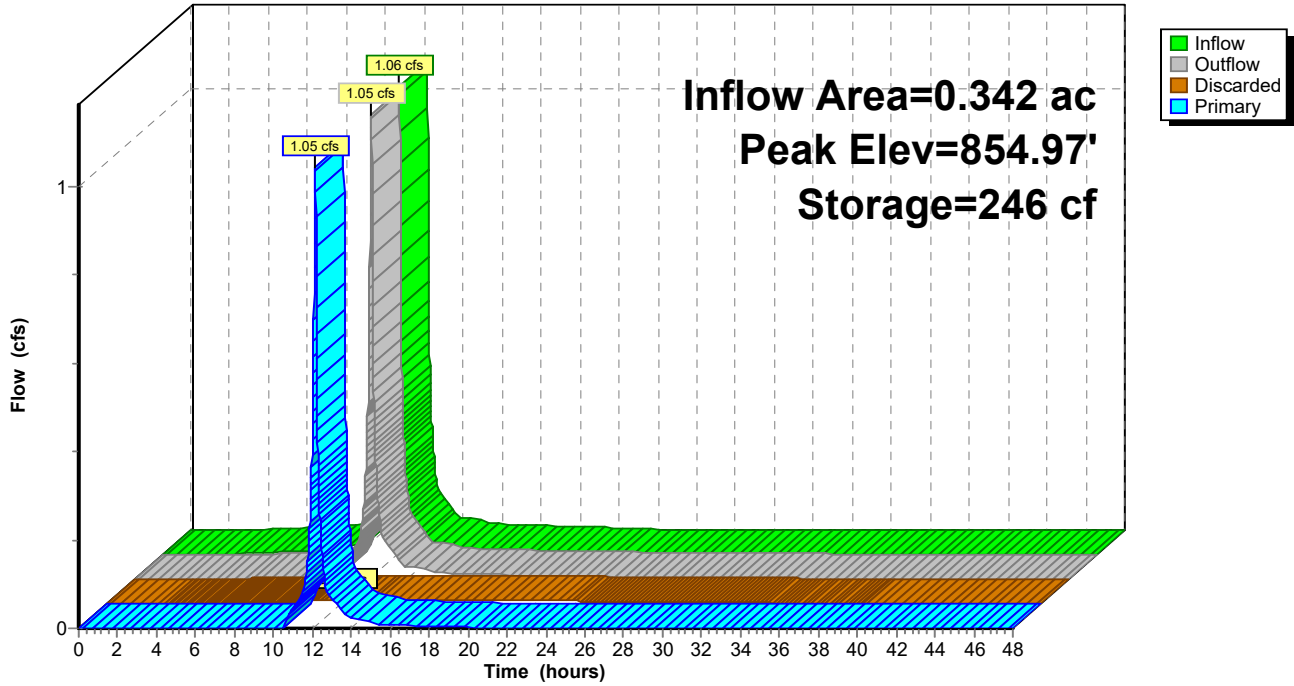
Device	Routing	Invert	Outlet Devices
#1	Discarded	853.75'	0.800 in/hr Exfiltration over Surface area
#2	Primary	854.82'	Asymmetrical Weir, C= 3.27
			Offset (feet) 0.00 17.55 19.55 21.55 22.55 26.03 34.36 40.36
			Elev. (feet) 855.53 855.33 854.82 854.82 855.31 855.30 854.85
			854.94 855.53

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=854.97' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.03 cfs @ 12.15 hrs HW=854.97' (Free Discharge)
 ↑2=**Asymmetrical Weir** (Weir Controls 1.03 cfs @ 0.71 fps)

Pond 12P: EAST: NE

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Pond 14P: SOUTH: NE

Inflow Area = 1.010 ac, 62.57% Impervious, Inflow Depth = 1.64" for 2-yr event
 Inflow = 2.56 cfs @ 12.14 hrs, Volume= 0.138 af
 Outflow = 2.55 cfs @ 12.14 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.3 min
 Discarded = 0.01 cfs @ 9.88 hrs, Volume= 0.023 af
 Primary = 2.54 cfs @ 12.14 hrs, Volume= 0.115 af
 Routed to Pond 27P : SOUTH: NE - 2nd Cell

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 853.71' @ 12.14 hrs Surf.Area= 568 sf Storage= 461 cf

Plug-Flow detention time= 76.4 min calculated for 0.138 af (100% of inflow)
 Center-of-Mass det. time= 76.4 min (831.1 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	852.25'	2,048 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
852.25	10	0	0
852.50	92	13	13
852.75	211	38	51
853.00	333	68	119
853.50	568	225	344
856.50	568	1,704	2,048

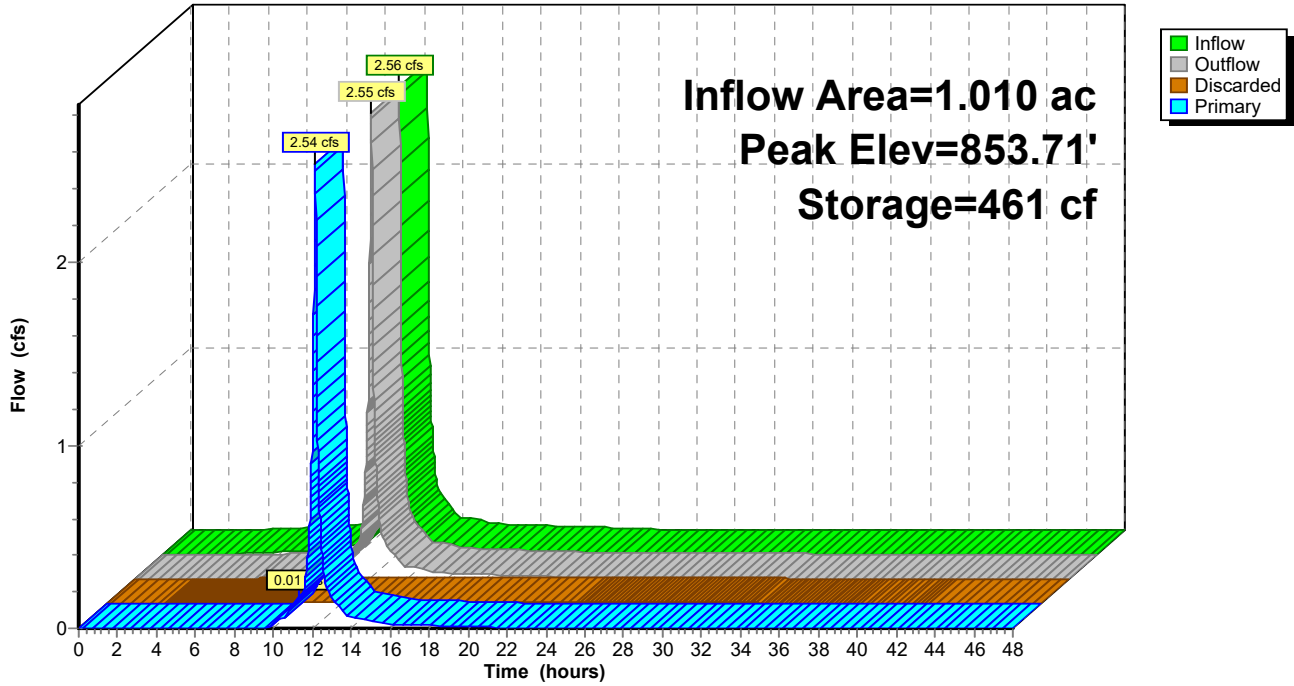
Device	Routing	Invert	Outlet Devices
#1	Discarded	852.25'	0.800 in/hr Exfiltration over Surface area
#2	Primary	853.50'	Asymmetrical Weir, C= 3.27
			Offset (feet) -2.14 0.00 37.51 37.52 44.13 46.03 56.86
			Elev. (feet) 853.99 853.96 853.62 853.50 853.50 853.84 853.99

Discarded OutFlow Max=0.01 cfs @ 9.88 hrs HW=853.50' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.49 cfs @ 12.14 hrs HW=853.71' (Free Discharge)
 ↑2=Asymmetrical Weir (Weir Controls 2.49 cfs @ 1.02 fps)

Pond 14P: SOUTH: NE

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 2-yr Rainfall=2.85"

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Summary for Pond 27P: SOUTH: NE - 2nd Cell

Inflow Area = 1.010 ac, 62.57% Impervious, Inflow Depth = 1.37" for 2-yr event
 Inflow = 2.54 cfs @ 12.14 hrs, Volume= 0.115 af
 Outflow = 2.54 cfs @ 12.15 hrs, Volume= 0.115 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.00 cfs @ 10.27 hrs, Volume= 0.006 af
 Primary = 2.53 cfs @ 12.15 hrs, Volume= 0.110 af
 Routed to Link 10L : PRO: South Leg

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 853.00' @ 12.15 hrs Surf.Area= 228 sf Storage= 111 cf

Plug-Flow detention time= 12.7 min calculated for 0.115 af (100% of inflow)
 Center-of-Mass det. time= 12.8 min (769.2 - 756.4)

Volume	Invert	Avail.Storage	Storage Description
#1	852.25'	738 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
852.25	3	0	0
852.50	100	13	13
852.75	228	41	54
855.75	228	684	738

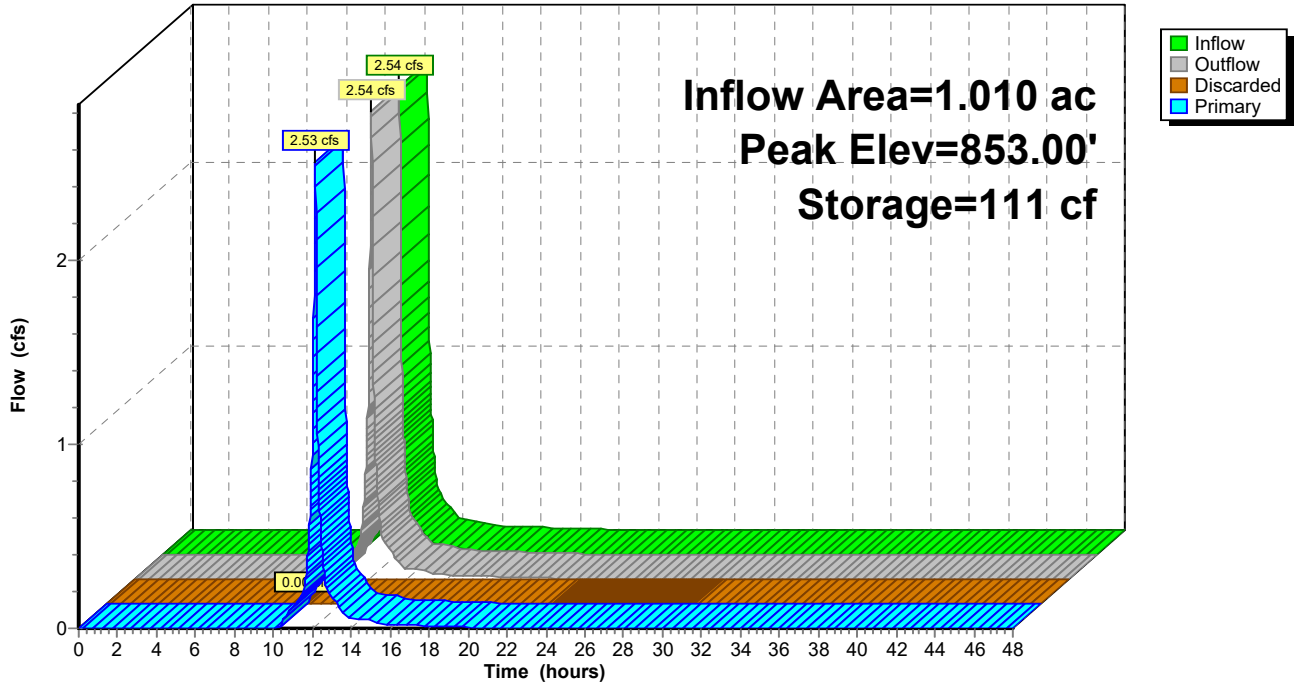
Device	Routing	Invert	Outlet Devices
#1	Discarded	852.25'	0.800 in/hr Exfiltration over Surface area
#2	Primary	852.81'	Asymmetrical Weir, C= 3.27
			Offset (feet) 0.00 2.22 4.22 6.22 8.22 20.05 50.44 55.44 61.27 62.83
			Elev. (feet) 853.44 853.43 852.90 852.90 853.39 853.33 852.81 852.91 853.07 853.44

Discarded OutFlow Max=0.00 cfs @ 10.27 hrs HW=852.75' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=2.49 cfs @ 12.15 hrs HW=853.00' (Free Discharge)
 ↑2=Asymmetrical Weir (Weir Controls 2.49 cfs @ 0.67 fps)

Pond 27P: SOUTH: NE - 2nd Cell

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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Primary OutFlow Max=2.48 cfs @ 12.14 hrs HW=853.38' (Free Discharge)

↳ **4=Asymmetrical Weir** (Weir Controls 2.48 cfs @ 0.71 fps)

Secondary OutFlow Max=0.01 cfs @ 12.14 hrs HW=853.38' (Free Discharge)

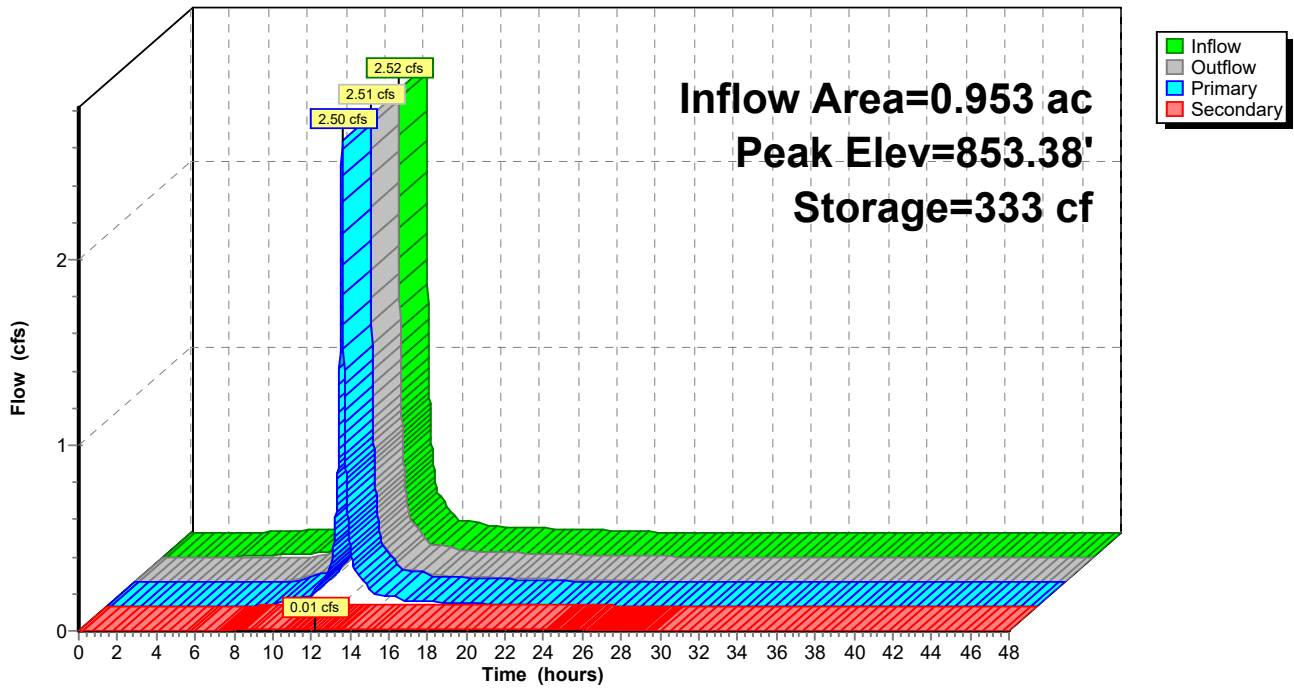
↳ **3=Pipe_out** (Passes 0.01 cfs of 3.96 cfs potential flow)

↳ **1=DrainTile** (Passes 0.01 cfs of 1.02 cfs potential flow)

↳ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 32P: South: SW Filtration Basin

Hydrograph



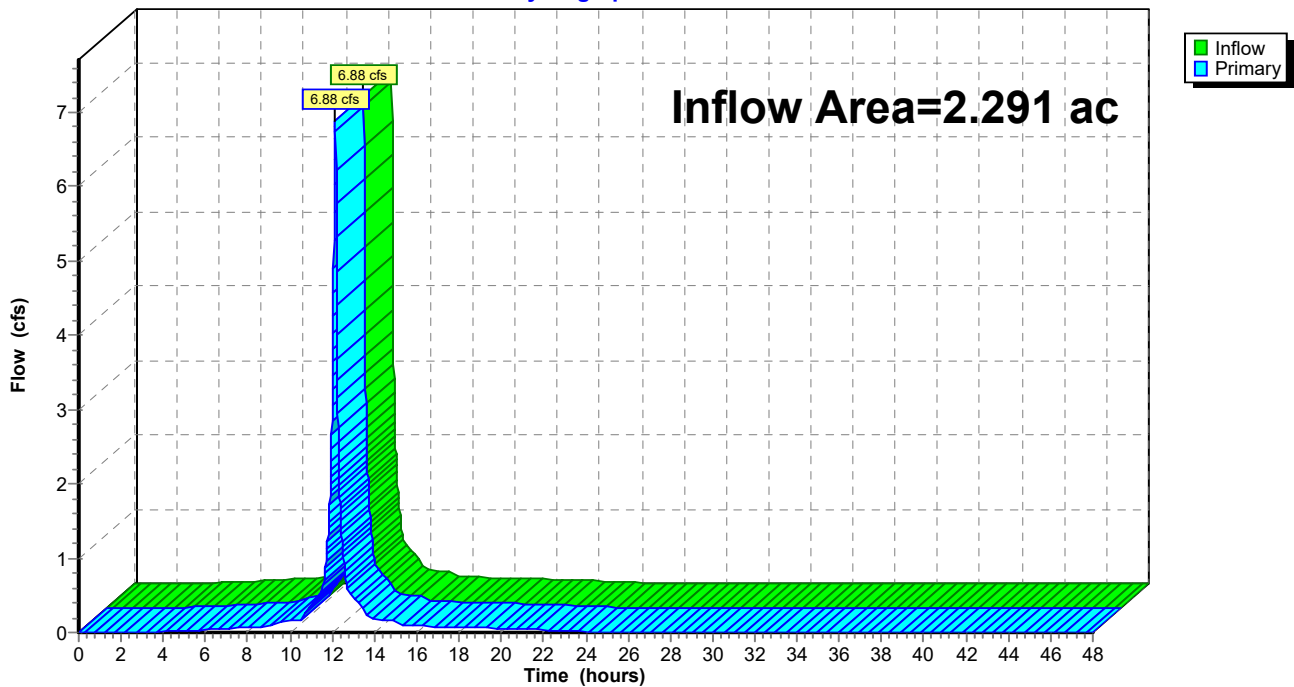
Summary for Link 2L: EX: East Leg

Inflow Area = 2.291 ac, 74.20% Impervious, Inflow Depth = 1.94" for 2-yr event
Inflow = 6.88 cfs @ 12.14 hrs, Volume= 0.371 af
Primary = 6.88 cfs @ 12.14 hrs, Volume= 0.371 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 2L: EX: East Leg

Hydrograph



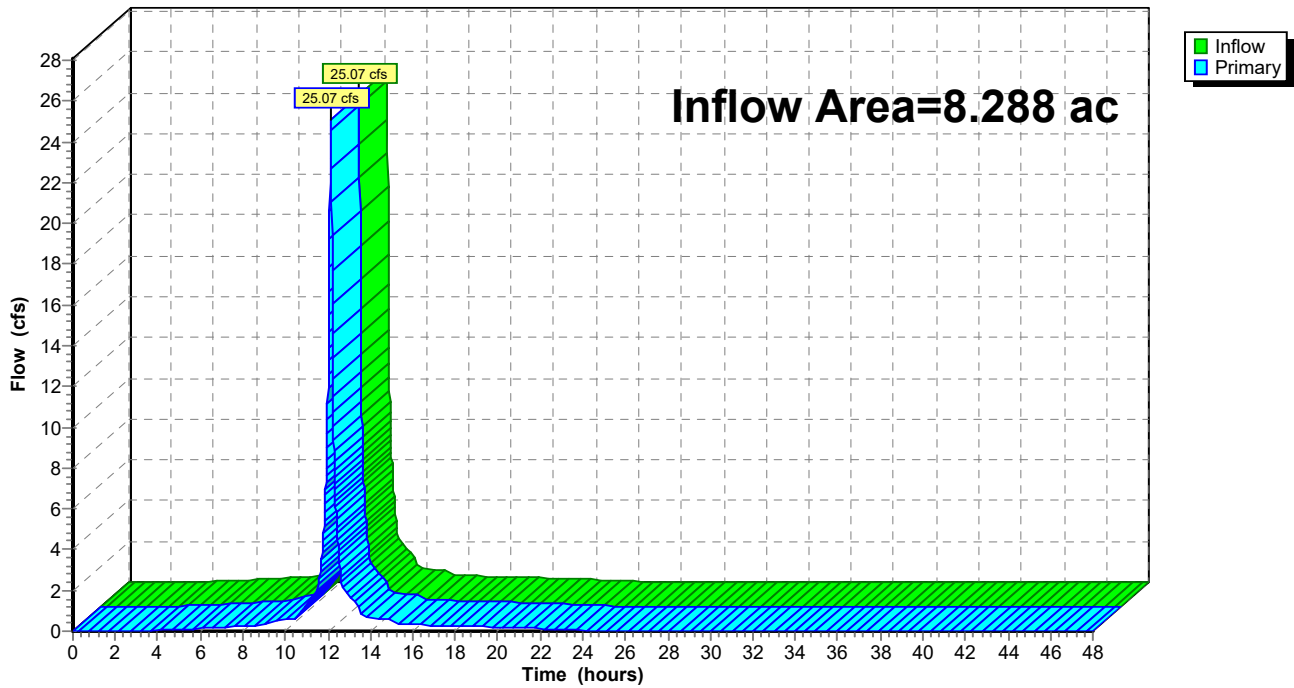
Summary for Link 7L: EX: Total

Inflow Area = 8.288 ac, 74.79% Impervious, Inflow Depth = 1.96" for 2-yr event
Inflow = 25.07 cfs @ 12.14 hrs, Volume= 1.353 af
Primary = 25.07 cfs @ 12.14 hrs, Volume= 1.353 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 7L: EX: Total

Hydrograph



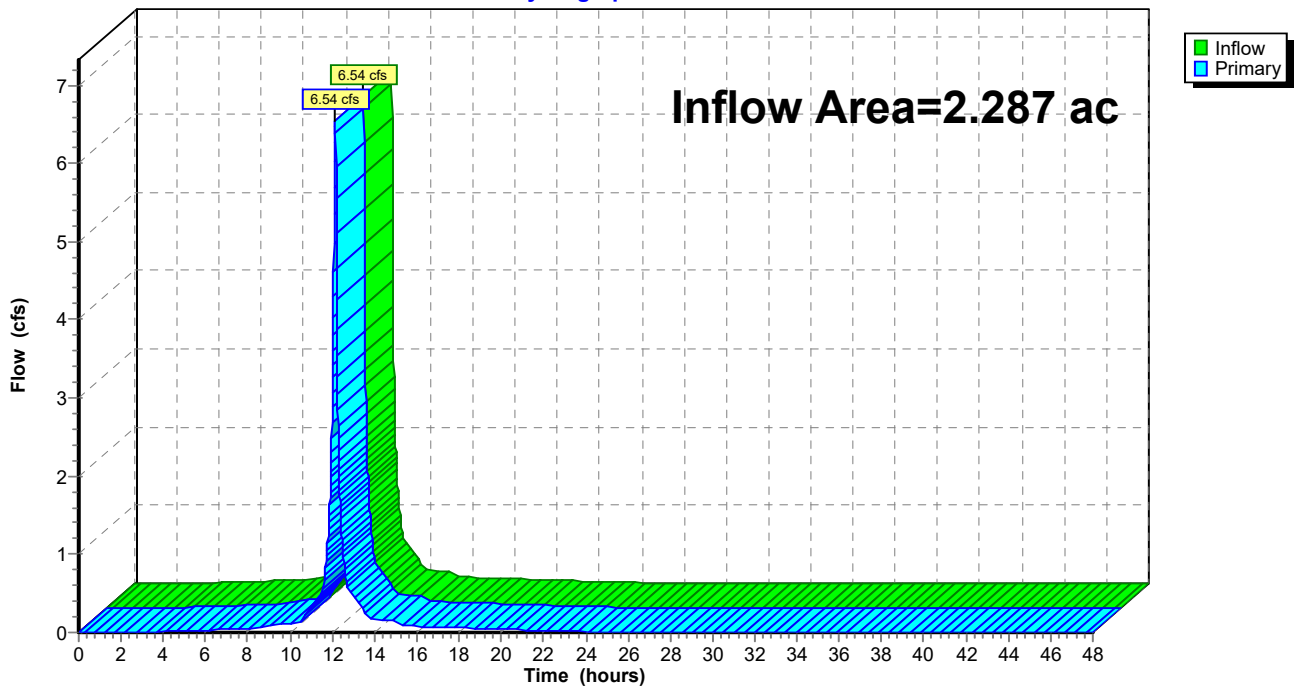
Summary for Link 8L: PRO: East Leg

Inflow Area = 2.287 ac, 70.94% Impervious, Inflow Depth = 1.79" for 2-yr event
Inflow = 6.54 cfs @ 12.14 hrs, Volume= 0.341 af
Primary = 6.54 cfs @ 12.14 hrs, Volume= 0.341 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 8L: PRO: East Leg

Hydrograph



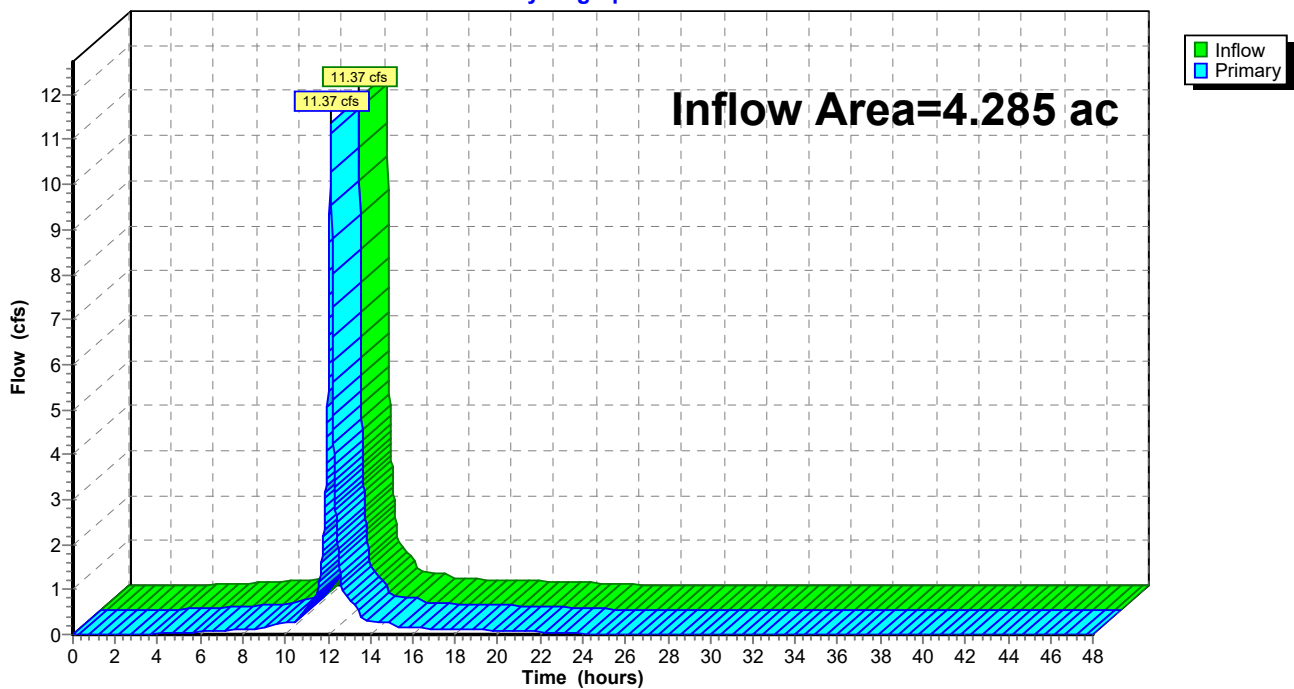
Summary for Link 9L: EX: South Leg

Inflow Area = 4.285 ac, 65.56% Impervious, Inflow Depth = 1.72" for 2-yr event
Inflow = 11.37 cfs @ 12.14 hrs, Volume= 0.613 af
Primary = 11.37 cfs @ 12.14 hrs, Volume= 0.613 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 9L: EX: South Leg

Hydrograph



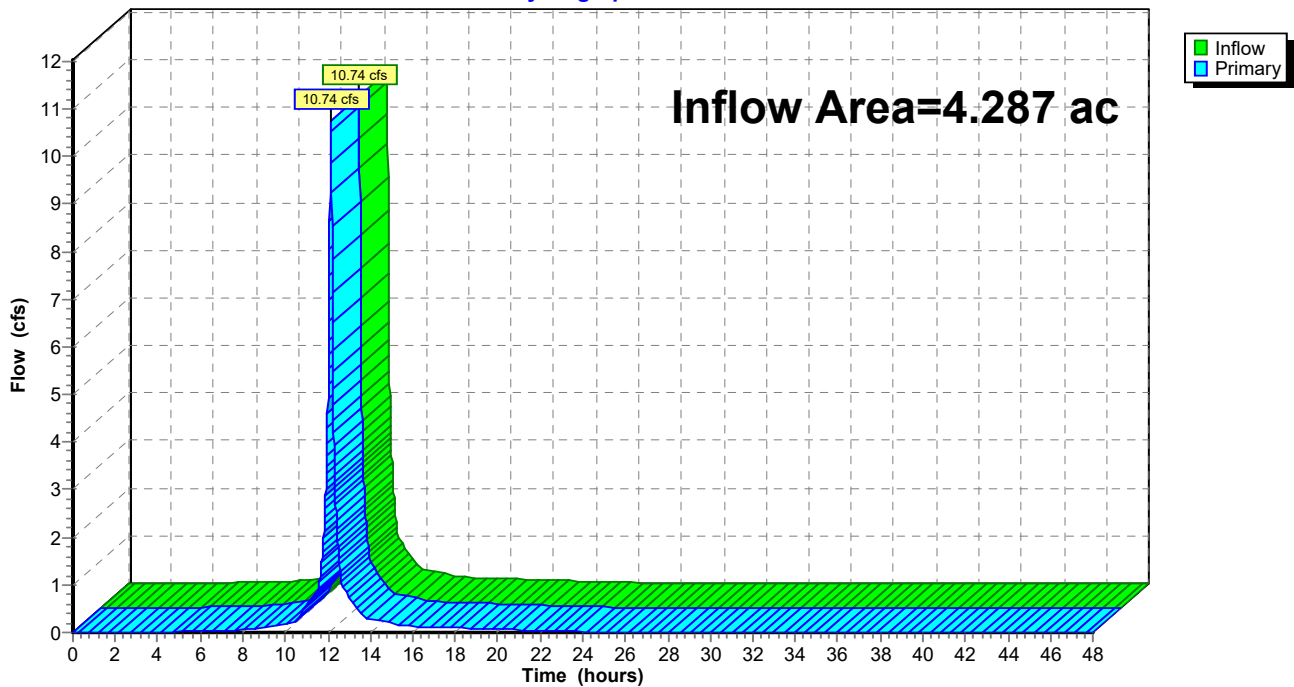
Summary for Link 10L: PRO: South Leg

Inflow Area = 4.287 ac, 62.16% Impervious, Inflow Depth = 1.54" for 2-yr event
Inflow = 10.74 cfs @ 12.14 hrs, Volume= 0.551 af
Primary = 10.74 cfs @ 12.14 hrs, Volume= 0.551 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 10L: PRO: South Leg

Hydrograph



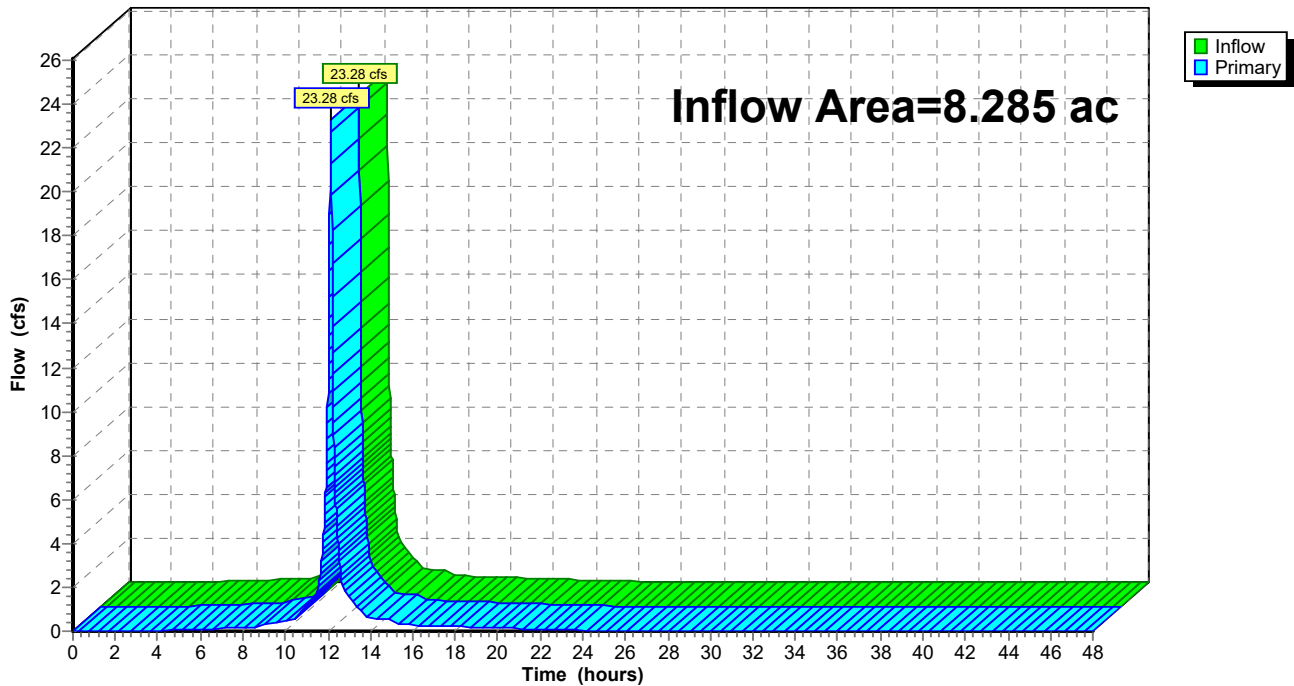
Summary for Link 11L: PRO: Total

Inflow Area = 8.285 ac, 69.65% Impervious, Inflow Depth = 1.76" for 2-yr event
Inflow = 23.28 cfs @ 12.14 hrs, Volume= 1.216 af
Primary = 23.28 cfs @ 12.14 hrs, Volume= 1.216 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 11L: PRO: Total

Hydrograph



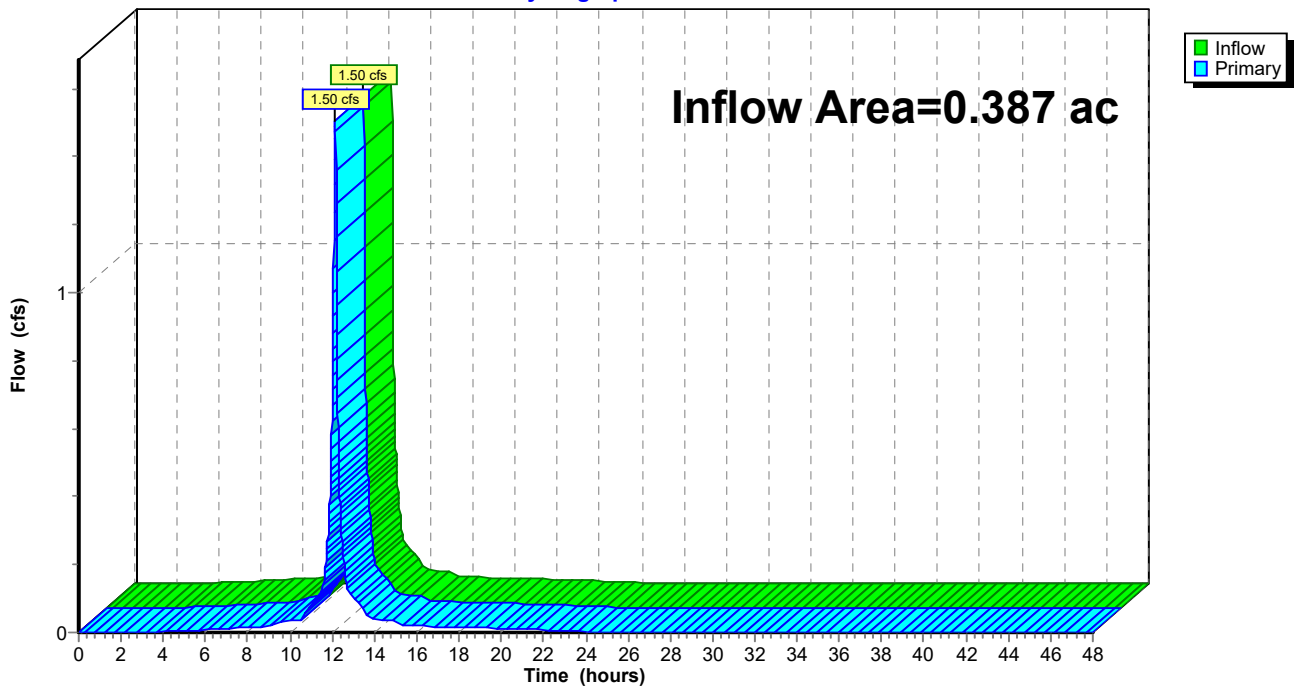
Summary for Link 19L: EX: West Leg

Inflow Area = 0.387 ac, 95.86% Impervious, Inflow Depth = 2.51" for 2-yr event
Inflow = 1.50 cfs @ 12.14 hrs, Volume= 0.081 af
Primary = 1.50 cfs @ 12.14 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 19L: EX: West Leg

Hydrograph



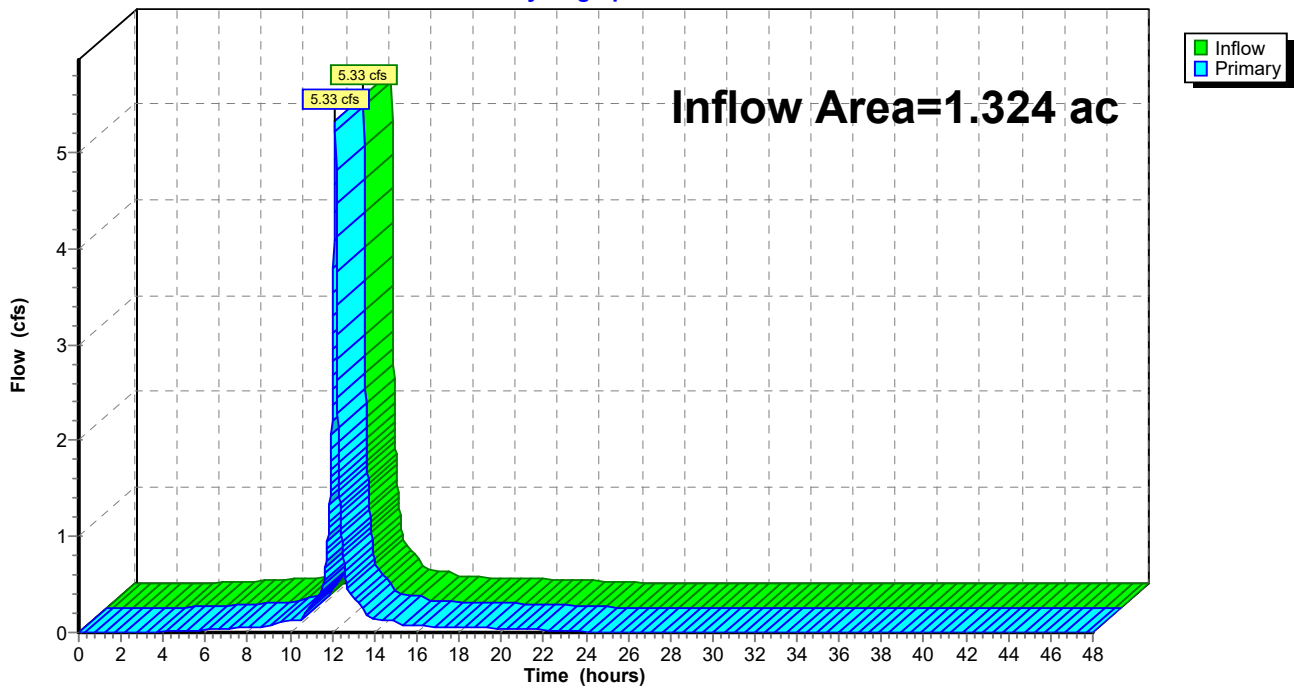
Summary for Link 20L: EX: North Leg

Inflow Area = 1.324 ac, 99.47% Impervious, Inflow Depth = 2.61" for 2-yr event
Inflow = 5.33 cfs @ 12.14 hrs, Volume= 0.287 af
Primary = 5.33 cfs @ 12.14 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 20L: EX: North Leg

Hydrograph



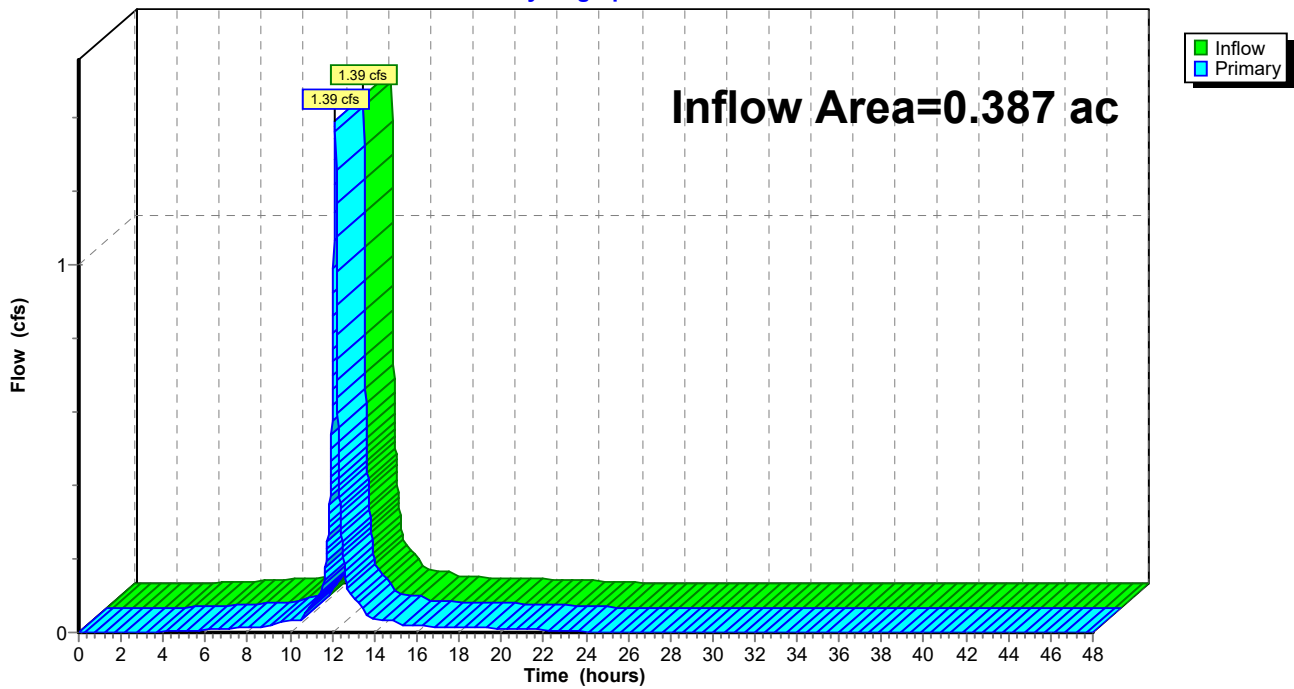
Summary for Link 30L: PRO: West Leg

Inflow Area = 0.387 ac, 88.61% Impervious, Inflow Depth = 2.32" for 2-yr event
Inflow = 1.39 cfs @ 12.14 hrs, Volume= 0.075 af
Primary = 1.39 cfs @ 12.14 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 30L: PRO: West Leg

Hydrograph



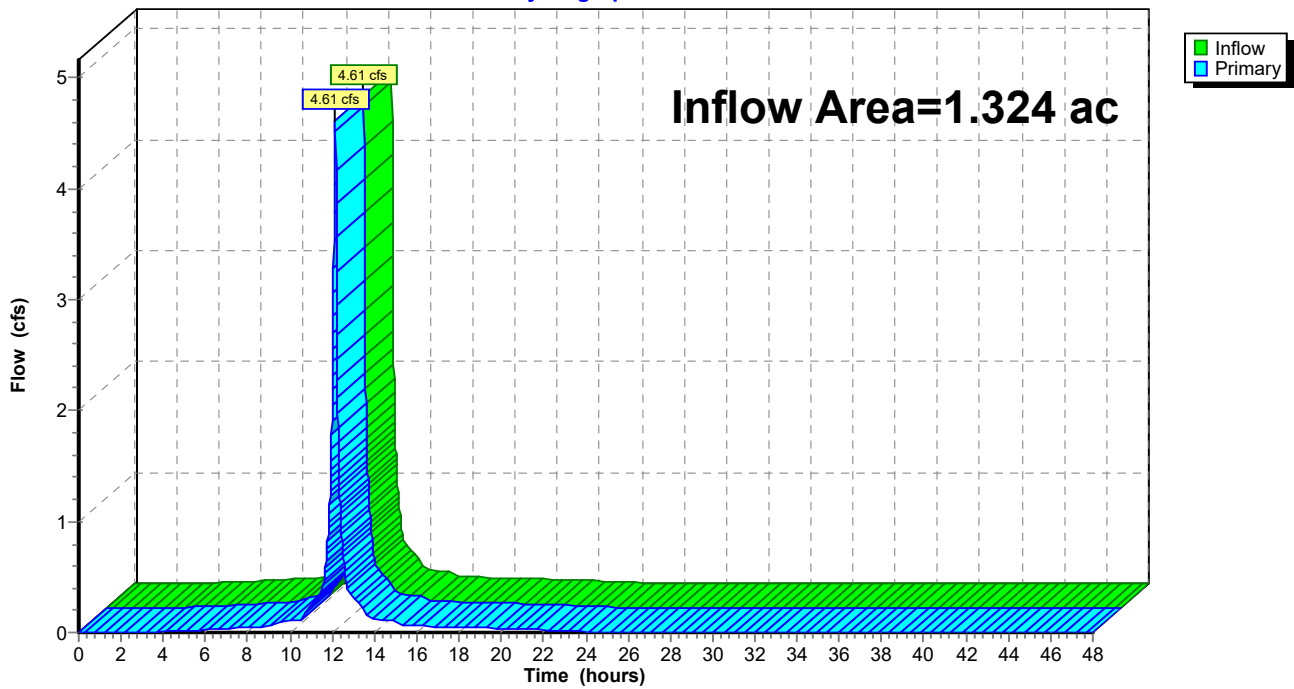
Summary for Link 31L: PRO: North Leg

Inflow Area = 1.324 ac, 86.09% Impervious, Inflow Depth = 2.25" for 2-yr event
Inflow = 4.61 cfs @ 12.14 hrs, Volume= 0.249 af
Primary = 4.61 cfs @ 12.14 hrs, Volume= 0.249 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 31L: PRO: North Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR*MSE 24-hr 3 10-yr Rainfall=4.27"*

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX: 38th Street	Runoff Area=1.985 ac 76.22% Impervious Runoff Depth=3.09" Tc=7.0 min CN=WQ Runoff=9.25 cfs 0.512 af
Subcatchment3S: EX: Side Streets	Runoff Area=0.306 ac 61.11% Impervious Runoff Depth=2.50" Tc=7.0 min CN=WQ Runoff=1.14 cfs 0.064 af
Subcatchment4S: Existing Chicago SE	Runoff Area=115,419 sf 57.96% Impervious Runoff Depth=2.37" Flow Length=592' Tc=7.0 min CN=WQ Runoff=9.38 cfs 0.524 af
Subcatchment5S: EX: 38th Street	Runoff Area=71,376 sf 72.20% Impervious Runoff Depth=2.93" Tc=7.0 min CN=WQ Runoff=7.23 cfs 0.401 af
Subcatchment6S: EX: Side Streets	Runoff Area=0.306 ac 57.84% Impervious Runoff Depth=2.37" Tc=7.0 min CN=WQ Runoff=1.08 cfs 0.060 af
Subcatchment7S: PRO: SE Chicago	Runoff Area=71,447 sf 50.44% Impervious Runoff Depth=2.07" Flow Length=594' Tc=7.0 min CN=WQ Runoff=5.06 cfs 0.283 af
Subcatchment16S: SOUTH: NE	Runoff Area=1.010 ac 62.57% Impervious Runoff Depth=2.55" Flow Length=592' Tc=7.0 min CN=WQ Runoff=3.86 cfs 0.215 af
Subcatchment17S: EAST: NE	Runoff Area=0.342 ac 76.61% Impervious Runoff Depth=3.11" Tc=7.0 min CN=WQ Runoff=1.60 cfs 0.089 af
Subcatchment21S: EX: West Leg	Runoff Area=16,876 sf 95.86% Impervious Runoff Depth=3.87" Tc=7.0 min CN=WQ Runoff=2.27 cfs 0.125 af
Subcatchment22S: EX: North Leg	Runoff Area=57,674 sf 99.47% Impervious Runoff Depth=4.01" Tc=7.0 min CN=WQ Runoff=8.05 cfs 0.443 af
Subcatchment28S: PRO: West Leg	Runoff Area=16,876 sf 88.61% Impervious Runoff Depth=3.58" Tc=7.0 min CN=WQ Runoff=2.10 cfs 0.116 af
Subcatchment29S: PRO: North Leg	Runoff Area=57,674 sf 86.09% Impervious Runoff Depth=3.48" Tc=7.0 min CN=WQ Runoff=6.97 cfs 0.384 af
Subcatchment33S: South: NW	Runoff Area=0.953 ac 65.27% Impervious Runoff Depth=2.66" Tc=7.0 min CN=WQ Runoff=3.80 cfs 0.211 af
Subcatchment34S: South: SW: Untreated	Runoff Area=3,614 sf 79.52% Impervious Runoff Depth=3.22" Tc=7.0 min CN=WQ Runoff=0.40 cfs 0.022 af
Subcatchment35S: Existing Chicago SW	Runoff Area=71,244 sf 77.89% Impervious Runoff Depth=3.16" Tc=7.0 min CN=WQ Runoff=7.78 cfs 0.431 af
Subcatchment37S: PRO: Chicago SW	Runoff Area=26,160 sf 86.17% Impervious Runoff Depth=3.49" Tc=7.0 min CN=WQ Runoff=3.16 cfs 0.175 af

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Pond 12P: EAST: NE	Peak Elev=855.00' Storage=260 cf Inflow=1.60 cfs 0.089 af Discarded=0.01 cfs 0.014 af Primary=1.59 cfs 0.075 af Outflow=1.59 cfs 0.089 af
Pond 14P: SOUTH: NE	Peak Elev=853.75' Storage=486 cf Inflow=3.86 cfs 0.215 af Discarded=0.01 cfs 0.024 af Primary=3.84 cfs 0.191 af Outflow=3.85 cfs 0.215 af
Pond 27P: SOUTH: NE - 2nd Cell	Peak Elev=853.04' Storage=119 cf Inflow=3.84 cfs 0.191 af Discarded=0.00 cfs 0.007 af Primary=3.84 cfs 0.184 af Outflow=3.84 cfs 0.191 af
Pond 32P: South: SW Filtration Basin	Peak Elev=853.41' Storage=345 cf Inflow=3.80 cfs 0.211 af Primary=3.79 cfs 0.196 af Secondary=0.01 cfs 0.013 af Outflow=3.80 cfs 0.209 af
Link 2L: EX: East Leg	Inflow=10.39 cfs 0.575 af Primary=10.39 cfs 0.575 af
Link 7L: EX: Total	Inflow=37.87 cfs 2.097 af Primary=37.87 cfs 2.097 af
Link 8L: PRO: East Leg	Inflow=9.89 cfs 0.536 af Primary=9.89 cfs 0.536 af
Link 9L: EX: South Leg	Inflow=17.17 cfs 0.954 af Primary=17.17 cfs 0.954 af
Link 10L: PRO: South Leg	Inflow=16.25 cfs 0.873 af Primary=16.25 cfs 0.873 af
Link 11L: PRO: Total	Inflow=35.20 cfs 1.909 af Primary=35.20 cfs 1.909 af
Link 19L: EX: West Leg	Inflow=2.27 cfs 0.125 af Primary=2.27 cfs 0.125 af
Link 20L: EX: North Leg	Inflow=8.05 cfs 0.443 af Primary=8.05 cfs 0.443 af
Link 30L: PRO: West Leg	Inflow=2.10 cfs 0.116 af Primary=2.10 cfs 0.116 af
Link 31L: PRO: North Leg	Inflow=6.97 cfs 0.384 af Primary=6.97 cfs 0.384 af

Total Runoff Area = 16.572 ac Runoff Volume = 4.054 af Average Runoff Depth = 2.94"
27.78% Pervious = 4.604 ac 72.22% Impervious = 11.968 ac

136243_Phase 1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 1S: EX: 38th Street

Runoff = 9.25 cfs @ 12.14 hrs, Volume= 0.512 af, Depth= 3.09"
 Routed to Link 2L : EX: East Leg

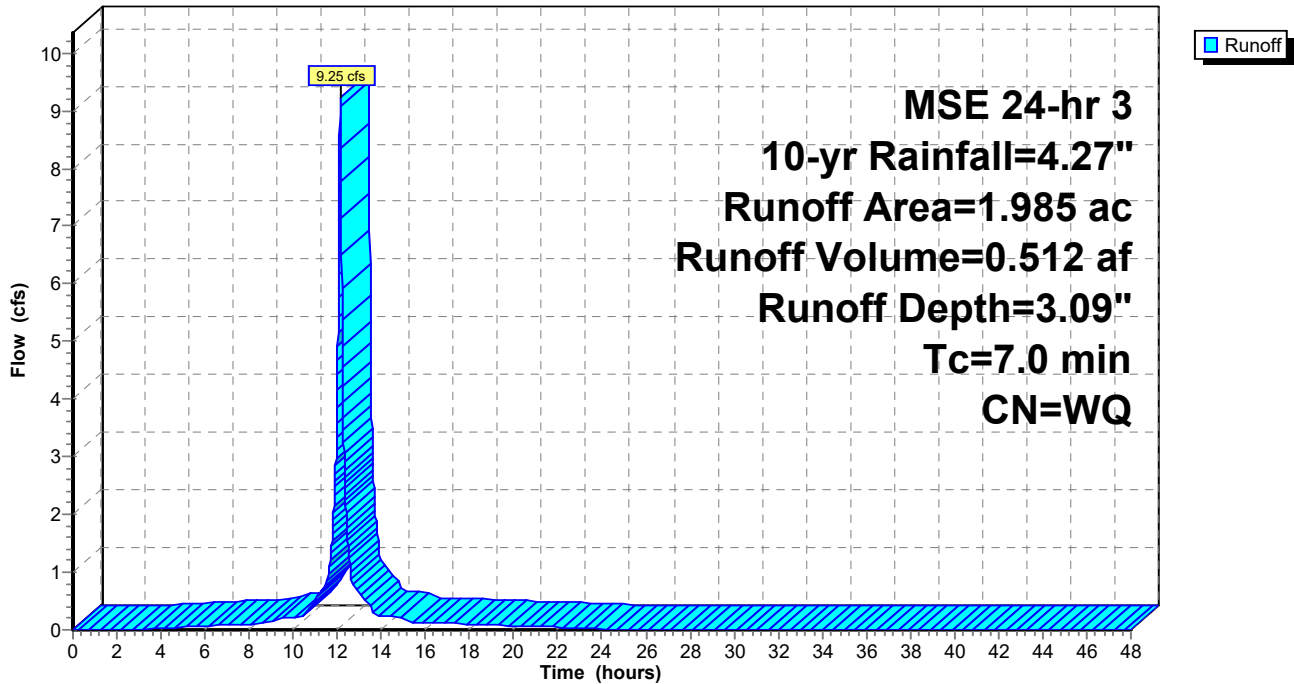
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (ac)	CN	Description
* 0.821	98	Project Area: Impervoius
* 0.000	39	Project Area: Pervious A soils
* 0.692	98	Off-Site: Impervious
* 0.472	39	Off-Site: Pervious
1.985		Weighted Average
0.472		23.78% Pervious Area
1.513		76.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 1S: EX: 38th Street

Hydrograph



Summary for Subcatchment 3S: EX: Side Streets

Runoff = 1.14 cfs @ 12.14 hrs, Volume= 0.064 af, Depth= 2.50"
 Routed to Link 2L : EX: East Leg

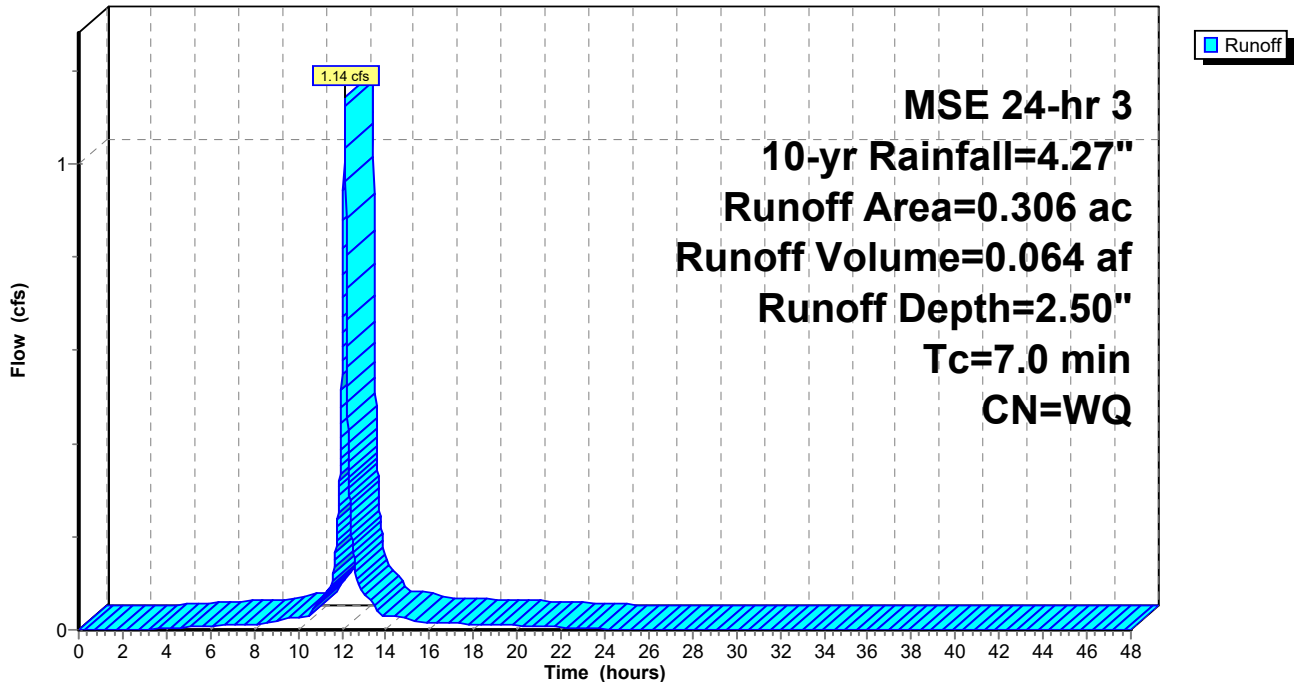
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (ac)	CN	Description
* 0.111	98	Project Area: Impervious
* 0.024	39	Project Area: Pervious A Soils
* 0.076	98	Off-Site: Impervious
* 0.095	39	Off-Site: Pervious
0.306		Weighted Average
0.119		38.89% Pervious Area
0.187		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 3S: EX: Side Streets

Hydrograph



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MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 4S: Existing Chicago SE

Runoff = 9.38 cfs @ 12.14 hrs, Volume= 0.524 af, Depth= 2.37"

Routed to Link 9L : EX: South Leg

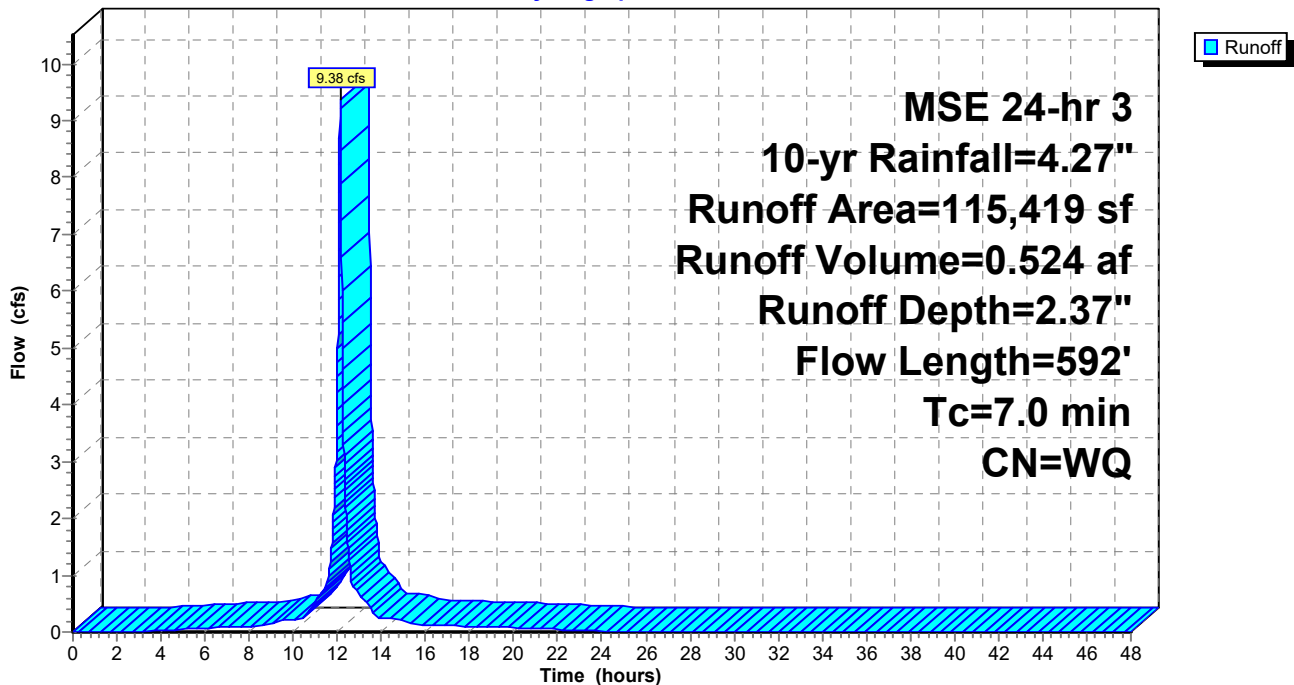
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	28,194	98	Project Area: Impervious
*	72	39	Project Area: Pervious
*	38,701	98	Off-Site: Impervious
*	48,452	39	Off-Site: Pervious
115,419			Weighted Average
48,524			42.04% Pervious Area
66,895			57.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.7	417	0.0099	10.07	100.72	Channel Flow, Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013
6.5	592	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 4S: Existing Chicago SE

Hydrograph



Summary for Subcatchment 5S: EX: 38th Street

Runoff = 7.23 cfs @ 12.14 hrs, Volume= 0.401 af, Depth= 2.93"
 Routed to Link 8L : PRO: East Leg

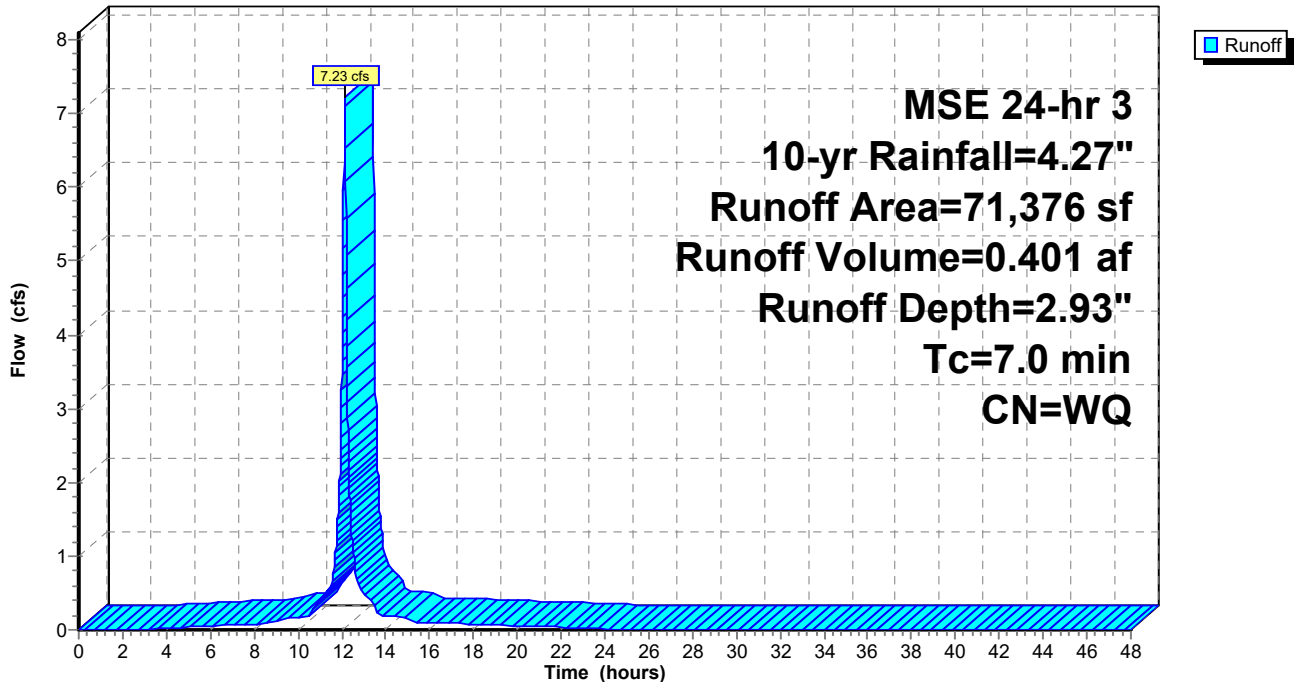
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	26,440	98	Project Area: Impervious
*	1,550	39	Project Area: Pervious A Soils
*	25,091	98	Off-Site: Impervious
*	18,295	39	Off-Site: Pervious
			Weighted Average
			27.80% Pervious Area
			72.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 5S: EX: 38th Street

Hydrograph



Summary for Subcatchment 6S: EX: Side Streets

Runoff = 1.08 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 2.37"
 Routed to Link 8L : PRO: East Leg

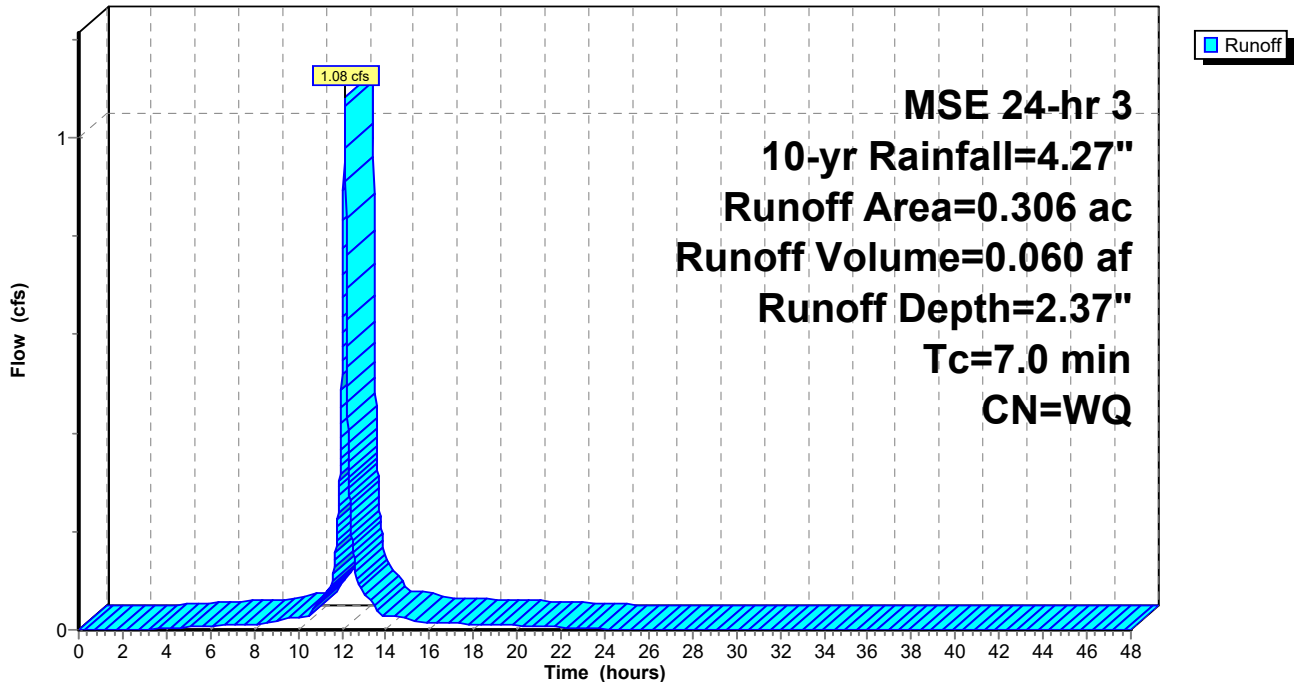
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (ac)	CN	Description
* 0.101	98	Project Area: Impervious
* 0.034	39	Project Area: Pervious A Soils
* 0.076	98	Off-Site: Impervious
* 0.095	39	Off-Site: Pervious
0.306		Weighted Average
0.129		42.16% Pervious Area
0.177		57.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 6S: EX: Side Streets

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 7S: PRO: SE Chicago

Area on Chicago Southeast and small untreated SE area north of W39th

Runoff = 5.06 cfs @ 12.14 hrs, Volume= 0.283 af, Depth= 2.07"
 Routed to Link 10L : PRO: South Leg

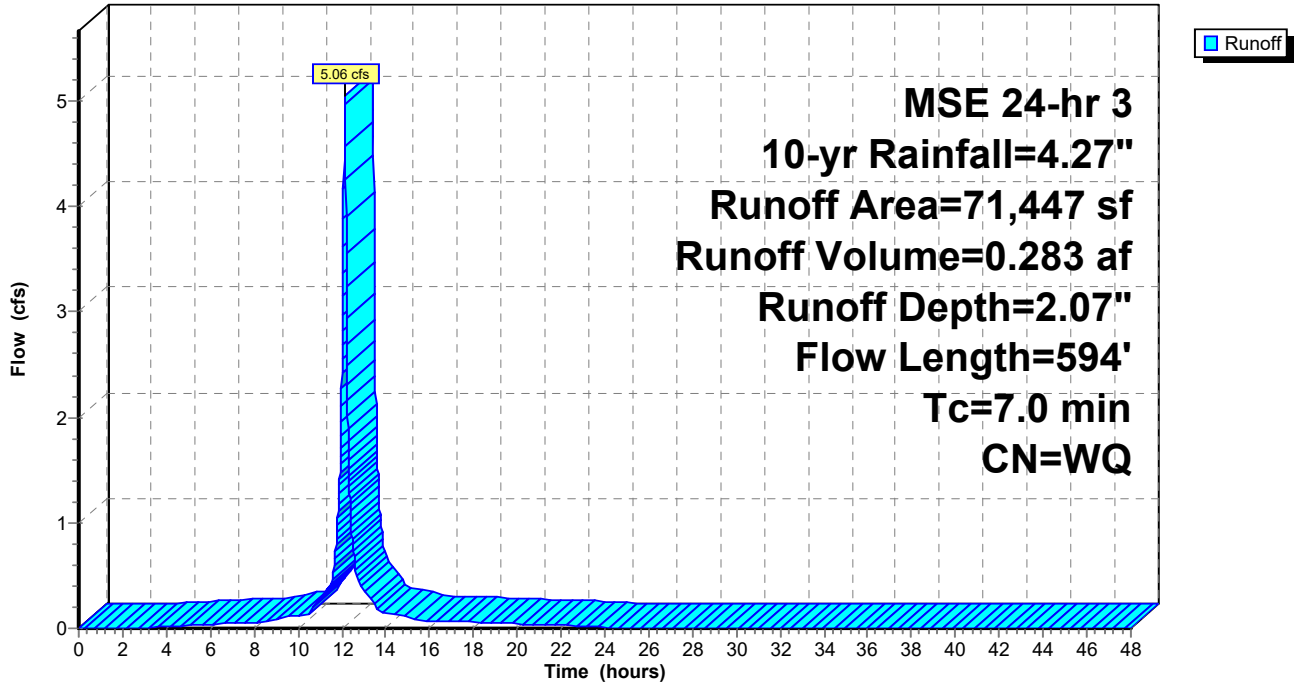
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (sf)	CN	Description
* 6,171	98	Project Area: Impervious
* 399	39	Project Area: >75% Grass cover, Good, HSG A
* 29,869	98	Off-Site: Impervious
* 35,008	39	Off-Site: Pervious
71,447		Weighted Average
35,407		49.56% Pervious Area
36,040		50.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
0.7	419	0.0099	10.07	100.72	Channel Flow, Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013
6.5	594	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 7S: PRO: SE Chicago

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 16S: SOUTH: NE

Runoff = 3.86 cfs @ 12.14 hrs, Volume= 0.215 af, Depth= 2.55"
 Routed to Pond 14P : SOUTH: NE

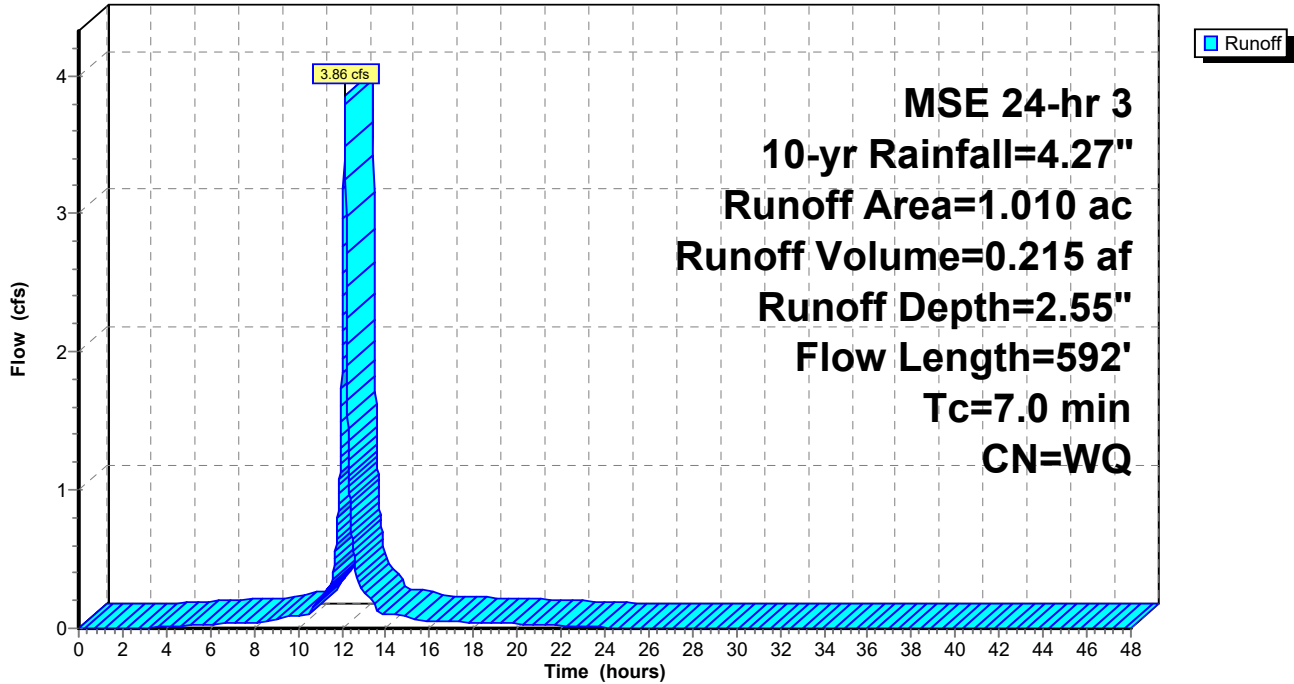
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (ac)	CN	Description
* 0.429	98	Project Area: Impervious
* 0.069	39	Project Area: Perivous
* 0.203	98	Off-Site: Impervious
* 0.309	39	Off-Site: Perivous
1.010		Weighted Average
0.378		37.43% Pervious Area
0.632		62.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, SHEETFLOW Front Yard Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, Gutter Flow Paved Kv= 20.3 fps
0.7	417	0.0099	10.07	100.72	Channel Flow, Channel Flow Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013 Asphalt, smooth
6.5	592	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 16S: SOUTH: NE

Hydrograph



Summary for Subcatchment 17S: EAST: NE

Runoff = 1.60 cfs @ 12.14 hrs, Volume= 0.089 af, Depth= 3.11"
 Routed to Pond 12P : EAST: NE

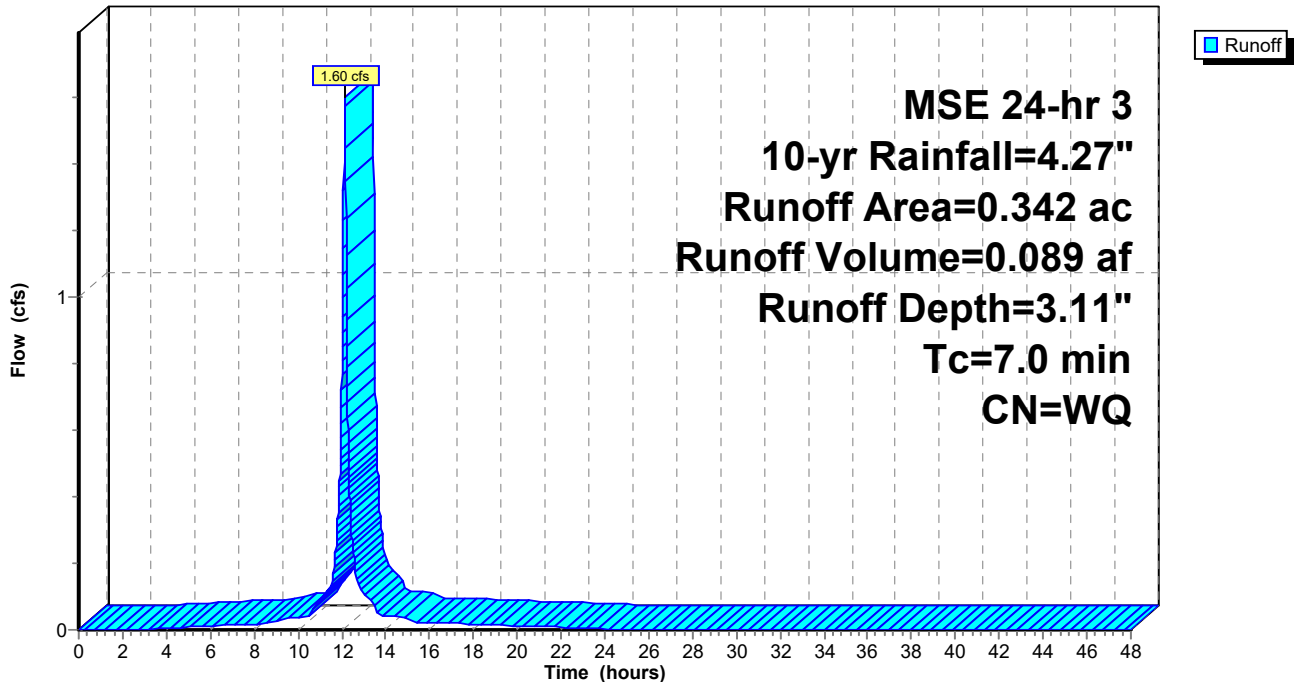
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (ac)	CN	Description
* 0.141	98	Project Area: Impervious
* 0.038	39	Project Area: Pervious
* 0.121	98	Off-Site: Impervious
* 0.042	39	Off-Site: Pervious
0.342		Weighted Average
0.080		23.39% Pervious Area
0.262		76.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 17S: EAST: NE

Hydrograph



Summary for Subcatchment 21S: EX: West Leg

Runoff = 2.27 cfs @ 12.14 hrs, Volume= 0.125 af, Depth= 3.87"
 Routed to Link 19L : EX: West Leg

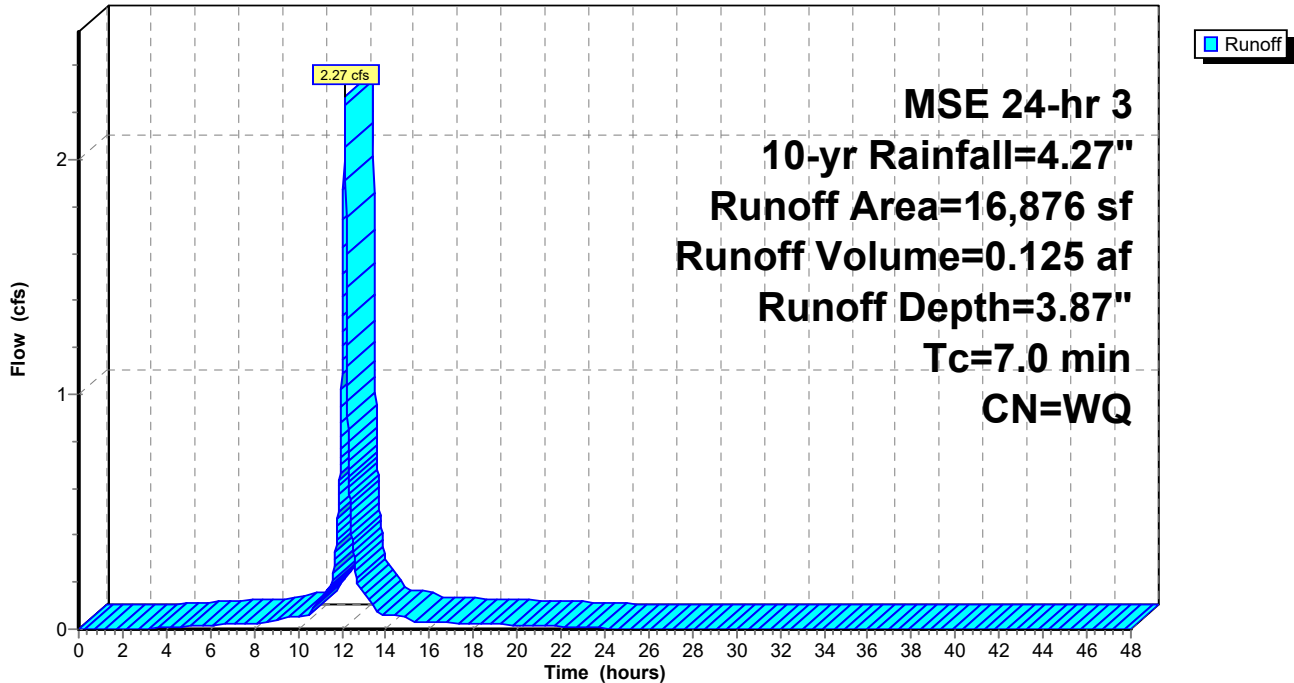
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	16,178	98	Project Impervoius
*	698	39	Project Pervious
	16,876		Weighted Average
	698		4.14% Pervious Area
	16,178		95.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 21S: EX: West Leg

Hydrograph



Summary for Subcatchment 22S: EX: North Leg

Runoff = 8.05 cfs @ 12.14 hrs, Volume= 0.443 af, Depth= 4.01"
 Routed to Link 20L : EX: North Leg

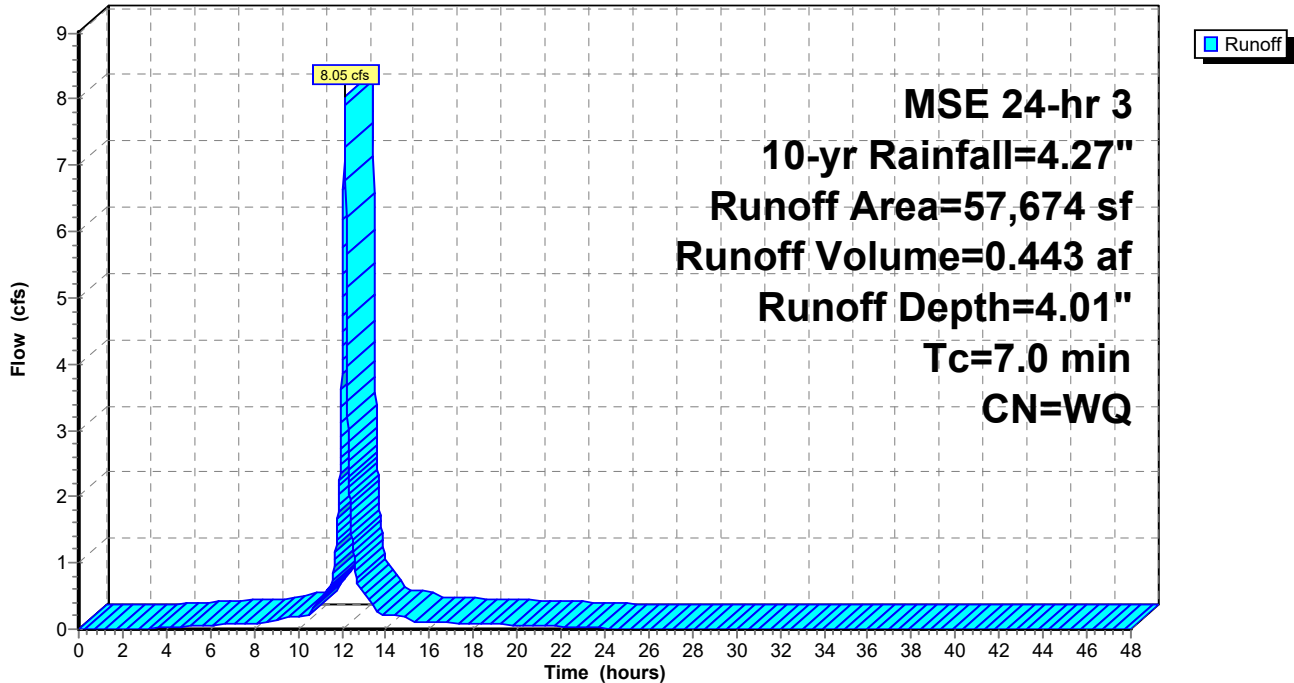
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	57,369	98	Project Impervious
*	305	39	
	57,674		Weighted Average
	305		0.53% Pervious Area
	57,369		99.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 22S: EX: North Leg

Hydrograph



Summary for Subcatchment 28S: PRO: West Leg

Runoff = 2.10 cfs @ 12.14 hrs, Volume= 0.116 af, Depth= 3.58"

Routed to Link 30L : PRO: West Leg

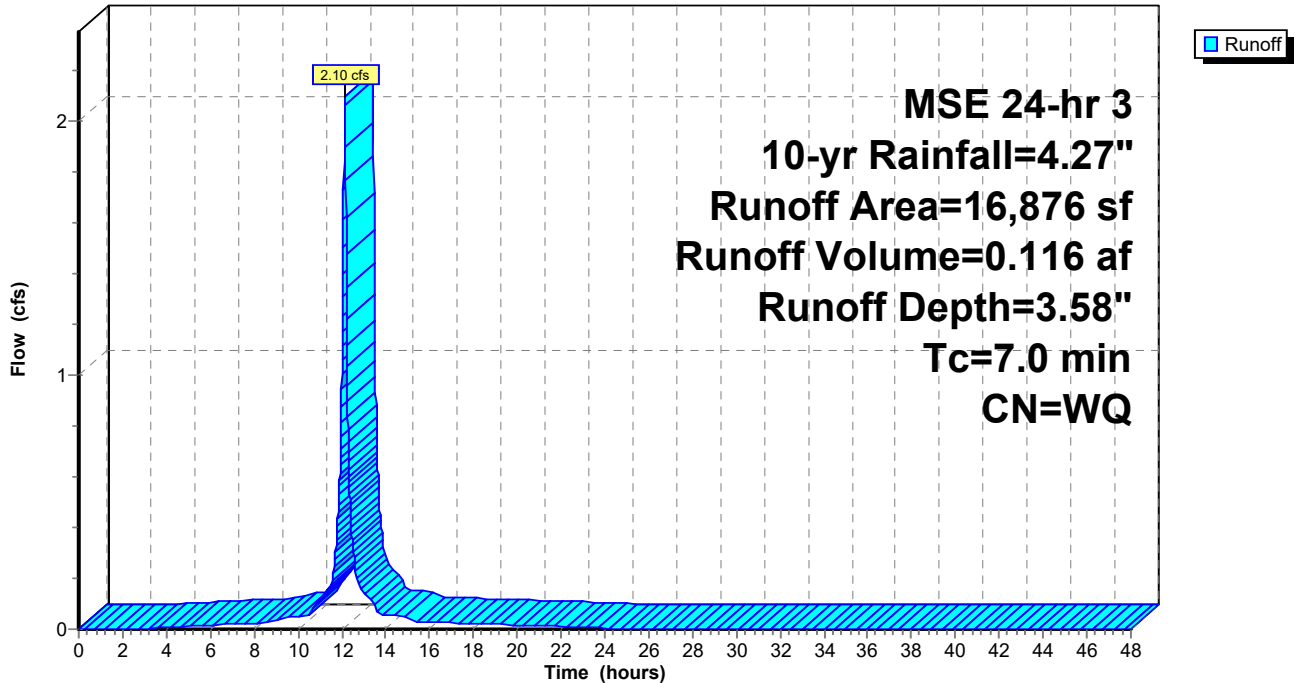
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	14,953	98	Project Impervoius
*	1,923	39	Project Pervious
	16,876		Weighted Average
	1,923		11.39% Pervious Area
	14,953		88.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 28S: PRO: West Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 29S: PRO: North Leg

Runoff = 6.97 cfs @ 12.14 hrs, Volume= 0.384 af, Depth= 3.48"

Routed to Link 31L : PRO: North Leg

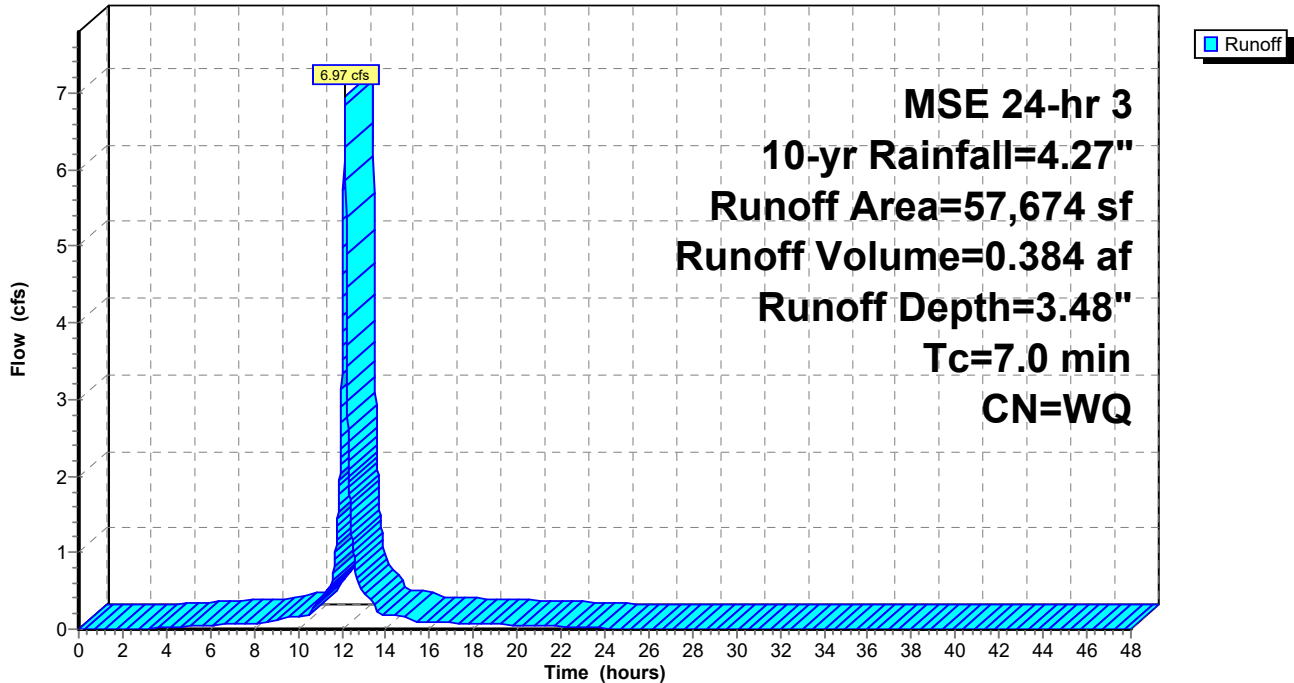
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	49,652	98	Project Impervious
*	8,022	39	
	57,674		Weighted Average
	8,022		13.91% Pervious Area
	49,652		86.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 29S: PRO: North Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 33S: South: NW

Runoff = 3.80 cfs @ 12.14 hrs, Volume= 0.211 af, Depth= 2.66"
 Routed to Pond 32P : South: SW Filtration Basin

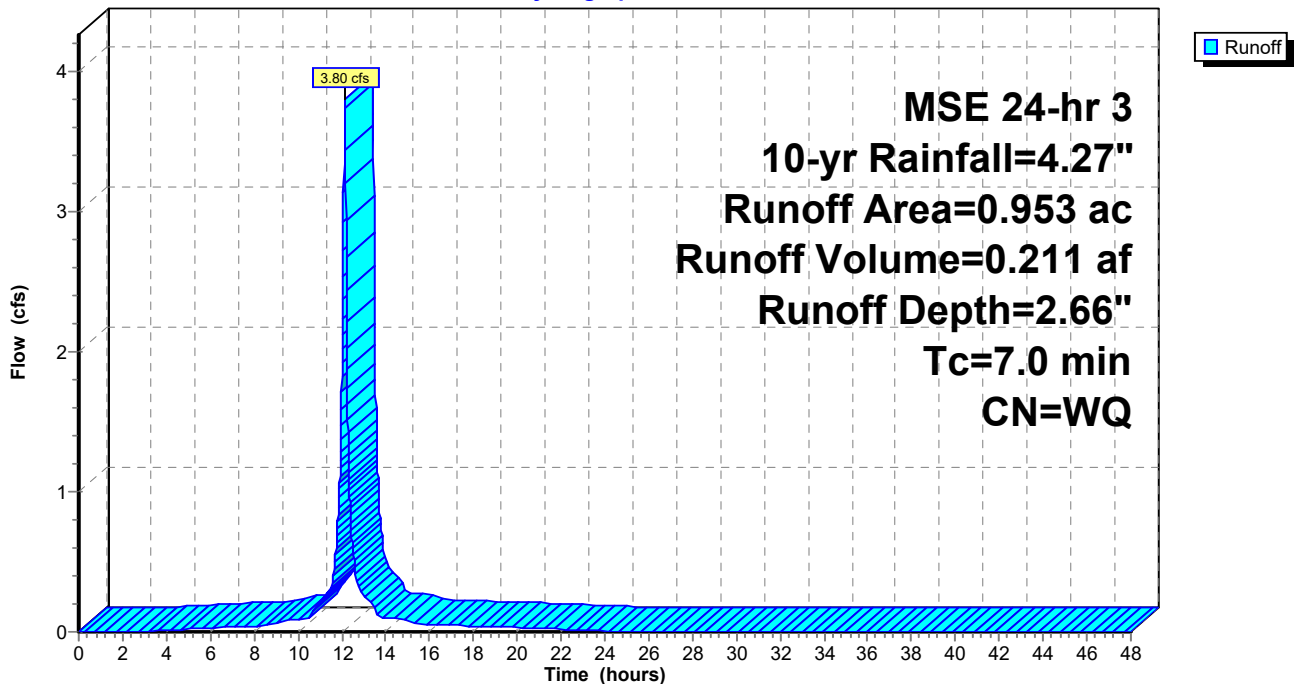
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

Area (ac)	CN	Description
* 0.386	98	Project Area: Impervious
* 0.069	39	Project Area: Pervious
* 0.236	98	Off Site: Impervious
* 0.262	39	Off Site: Pervious
0.953		Weighted Average
0.331		34.73% Pervious Area
0.622		65.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 33S: South: NW

Hydrograph



Summary for Subcatchment 34S: South: SW: Untreated

Small area south of pond and north of W39th street

Runoff = 0.40 cfs @ 12.14 hrs, Volume= 0.022 af, Depth= 3.22"
 Routed to Link 10L : PRO: South Leg

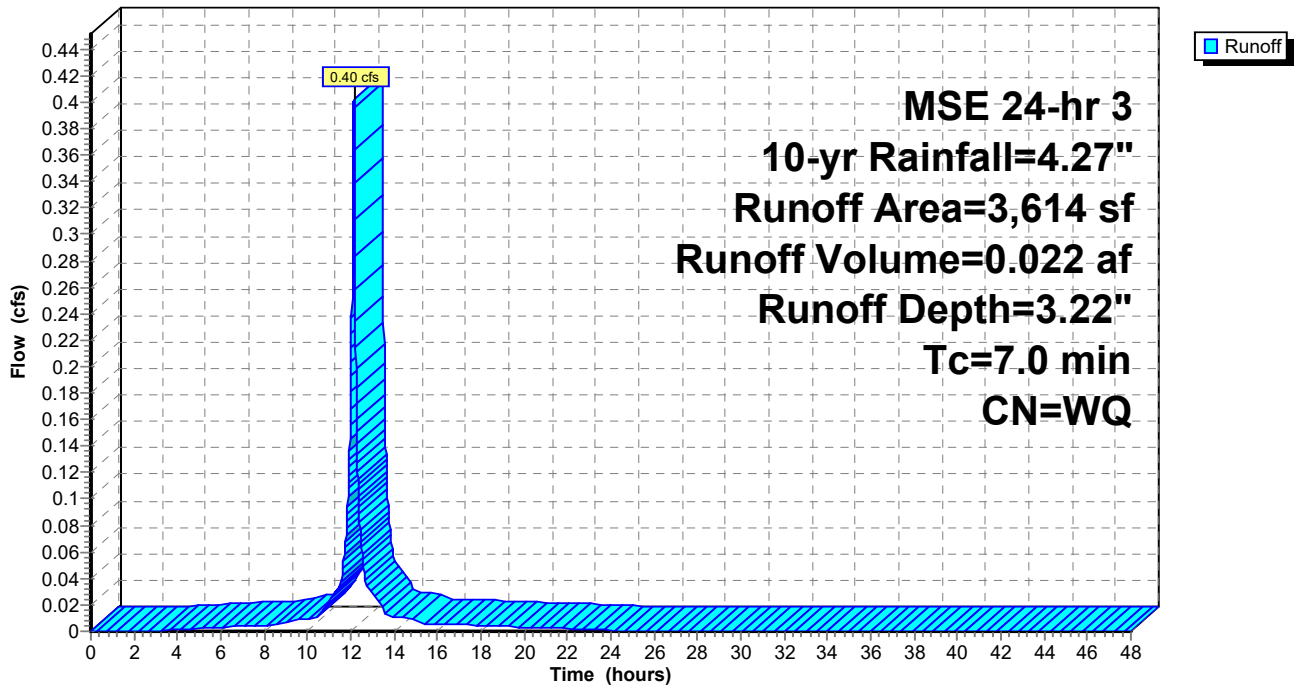
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	2,576	98	Project Area: Impervious Area
*	140	39	Project Area: Pervious Area
*	298	98	Off Site: Impervious Area
*	600	39	Off Site: Pervious Area
	3,614		Weighted Average
	740		20.48% Pervious Area
	2,874		79.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 34S: South: SW: Untreated

Hydrograph



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MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 35S: Existing Chicago SW

all West side of Chicago, and south portion of MWMO drainage area

Runoff = 7.78 cfs @ 12.14 hrs, Volume= 0.431 af, Depth= 3.16"
 Routed to Link 9L : EX: South Leg

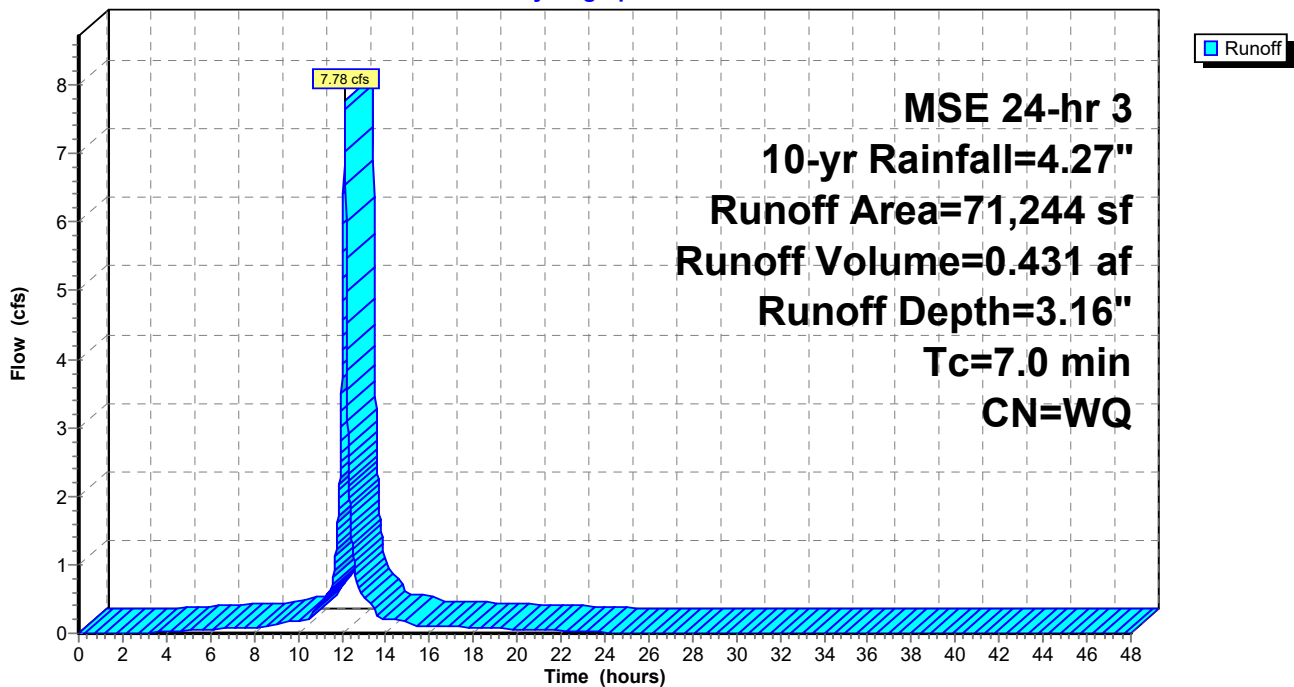
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	26,955	98	Onsite Impervious
*	875	39	Onsite Pervious
*	28,534	98	Offsite Impervious
*	14,880	39	Offsite Pervious
	71,244		Weighted Average
	15,755		22.11% Pervious Area
	55,489		77.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 35S: Existing Chicago SW

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Subcatchment 37S: PRO: Chicago SW

Rest of Southwest chicago area

Runoff = 3.16 cfs @ 12.14 hrs, Volume= 0.175 af, Depth= 3.49"
 Routed to Link 10L : PRO: South Leg

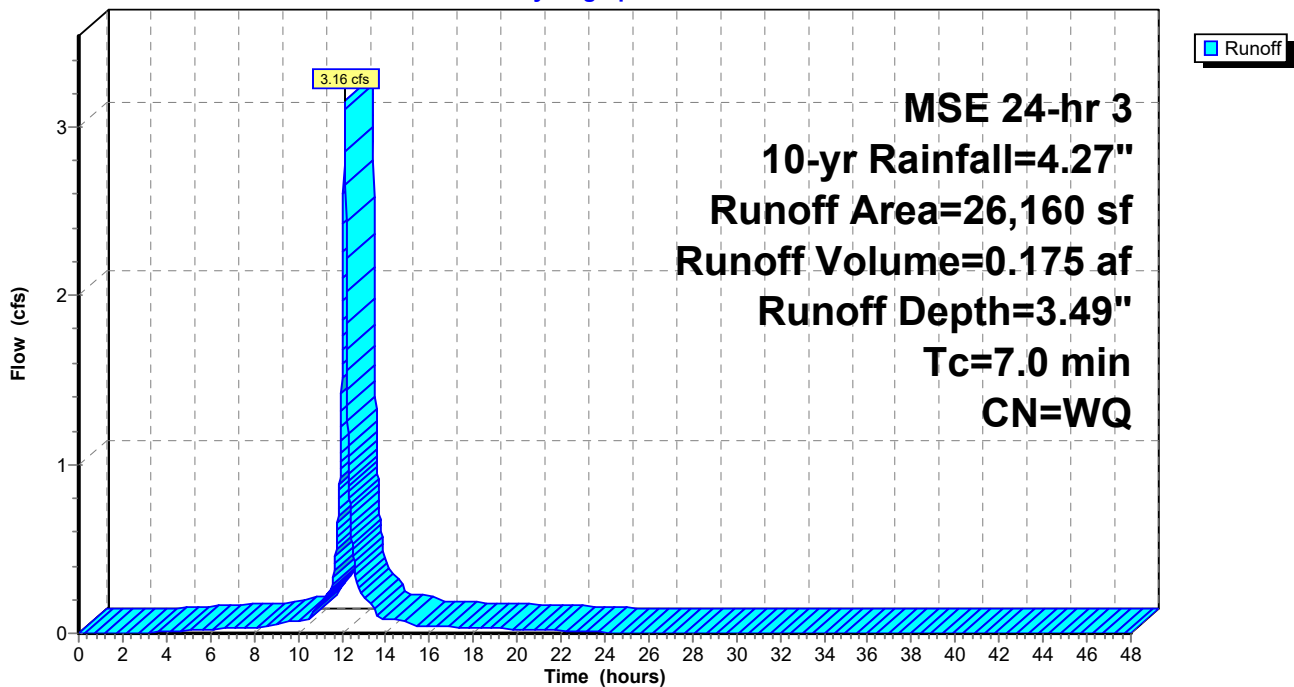
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 10-yr Rainfall=4.27"

	Area (sf)	CN	Description
*	4,590	98	Onsite Impervious
*	738	39	Onsite Pervious
*	17,951	98	offsite impervious
*	2,881	39	offsite pervious
	26,160		Weighted Average
	3,619		13.83% Pervious Area
	22,541		86.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 37S: PRO: Chicago SW

Hydrograph



Summary for Pond 12P: EAST: NE

Inflow Area = 0.342 ac, 76.61% Impervious, Inflow Depth = 3.11" for 10-yr event
 Inflow = 1.60 cfs @ 12.14 hrs, Volume= 0.089 af
 Outflow = 1.59 cfs @ 12.15 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.4 min
 Discarded = 0.01 cfs @ 12.13 hrs, Volume= 0.014 af
 Primary = 1.59 cfs @ 12.15 hrs, Volume= 0.075 af
 Routed to Link 8L : PRO: East Leg

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 855.00' @ 12.15 hrs Surf.Area= 448 sf Storage= 260 cf

Plug-Flow detention time= 66.1 min calculated for 0.089 af (100% of inflow)
 Center-of-Mass det. time= 66.3 min (816.1 - 749.8)

Volume	Invert	Avail.Storage	Storage Description
#1	853.75'	1,042 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
853.75	11	0	0
854.00	81	12	12
854.50	242	81	92
854.82	347	94	186
855.00	448	72	258
856.75	448	784	1,042

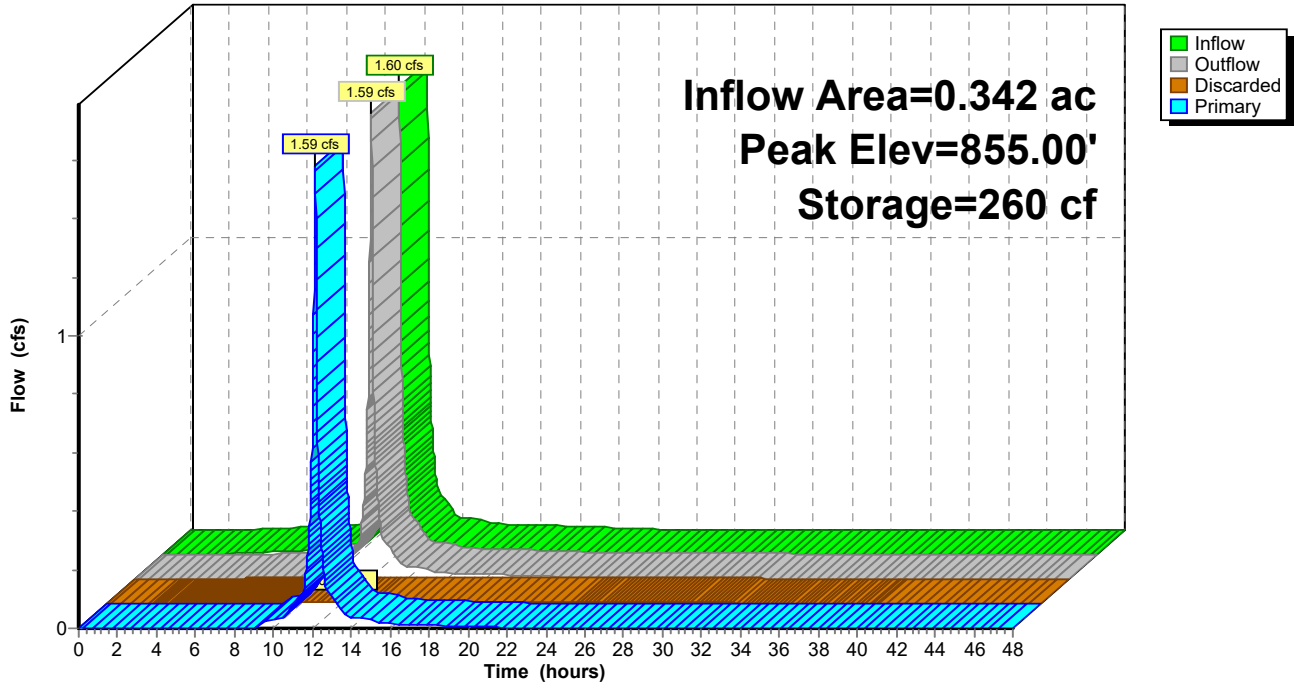
Device	Routing	Invert	Outlet Devices
#1	Discarded	853.75'	0.800 in/hr Exfiltration over Surface area
#2	Primary	854.82'	Asymmetrical Weir, C= 3.27
			Offset (feet) 0.00 17.55 19.55 21.55 22.55 26.03 34.36 40.36
			Elev. (feet) 855.53 855.33 854.82 854.82 855.31 855.30 854.85
			854.94 855.53

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=855.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.58 cfs @ 12.15 hrs HW=855.00' (Free Discharge)
 ↑2=**Asymmetrical Weir** (Weir Controls 1.58 cfs @ 0.82 fps)

Pond 12P: EAST: NE

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 10-yr Rainfall=4.27"

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Summary for Pond 14P: SOUTH: NE

Inflow Area = 1.010 ac, 62.57% Impervious, Inflow Depth = 2.55" for 10-yr event
 Inflow = 3.86 cfs @ 12.14 hrs, Volume= 0.215 af
 Outflow = 3.85 cfs @ 12.14 hrs, Volume= 0.215 af, Atten= 0%, Lag= 0.2 min
 Discarded = 0.01 cfs @ 8.19 hrs, Volume= 0.024 af
 Primary = 3.84 cfs @ 12.14 hrs, Volume= 0.191 af
 Routed to Pond 27P : SOUTH: NE - 2nd Cell

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 853.75' @ 12.14 hrs Surf.Area= 568 sf Storage= 486 cf

Plug-Flow detention time= 54.1 min calculated for 0.215 af (100% of inflow)
 Center-of-Mass det. time= 54.0 min (805.3 - 751.3)

Volume	Invert	Avail.Storage	Storage Description
#1	852.25'	2,048 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
852.25	10	0	0
852.50	92	13	13
852.75	211	38	51
853.00	333	68	119
853.50	568	225	344
856.50	568	1,704	2,048

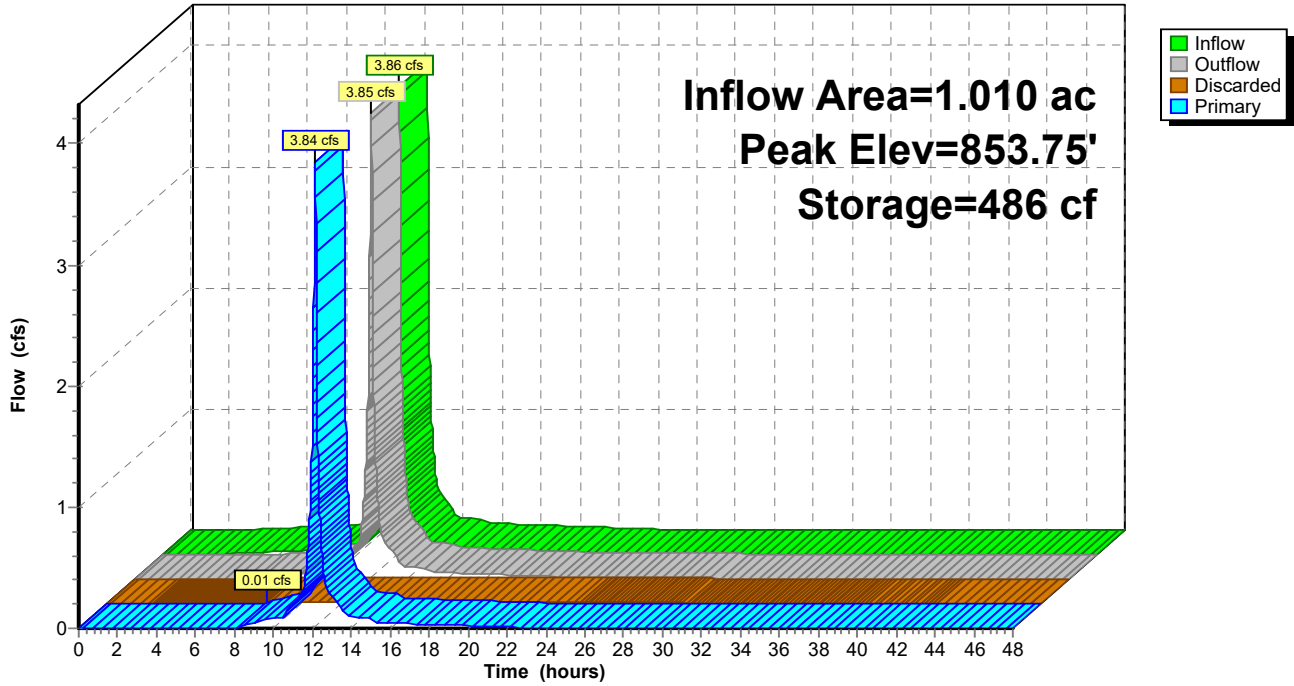
Device	Routing	Invert	Outlet Devices
#1	Discarded	852.25'	0.800 in/hr Exfiltration over Surface area
#2	Primary	853.50'	Asymmetrical Weir, C= 3.27
			Offset (feet) -2.14 0.00 37.51 37.52 44.13 46.03 56.86
			Elev. (feet) 853.99 853.96 853.62 853.50 853.50 853.84 853.99

Discarded OutFlow Max=0.01 cfs @ 8.19 hrs HW=853.50' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=3.79 cfs @ 12.14 hrs HW=853.75' (Free Discharge)
 ↑2=Asymmetrical Weir (Weir Controls 3.79 cfs @ 0.99 fps)

Pond 14P: SOUTH: NE

Hydrograph



Summary for Pond 27P: SOUTH: NE - 2nd Cell

Inflow Area = 1.010 ac, 62.57% Impervious, Inflow Depth = 2.27" for 10-yr event
 Inflow = 3.84 cfs @ 12.14 hrs, Volume= 0.191 af
 Outflow = 3.84 cfs @ 12.15 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.00 cfs @ 8.72 hrs, Volume= 0.007 af
 Primary = 3.84 cfs @ 12.15 hrs, Volume= 0.184 af
 Routed to Link 10L : PRO: South Leg

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 853.04' @ 12.15 hrs Surf.Area= 228 sf Storage= 119 cf

Plug-Flow detention time= 9.5 min calculated for 0.191 af (100% of inflow)
 Center-of-Mass det. time= 9.5 min (767.4 - 757.8)

Volume	Invert	Avail.Storage	Storage Description
#1	852.25'	738 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
852.25	3	0	0
852.50	100	13	13
852.75	228	41	54
855.75	228	684	738

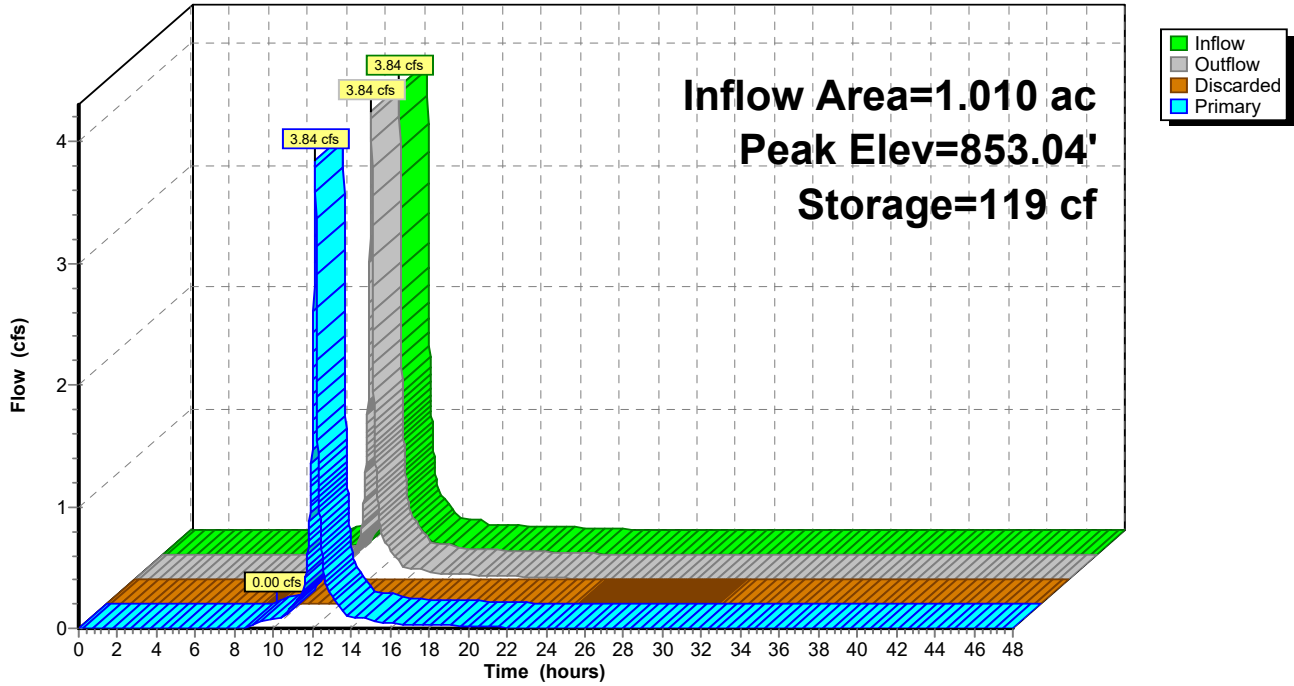
Device	Routing	Invert	Outlet Devices
#1	Discarded	852.25'	0.800 in/hr Exfiltration over Surface area
#2	Primary	852.81'	Asymmetrical Weir, C= 3.27
			Offset (feet) 0.00 2.22 4.22 6.22 8.22 20.05 50.44 55.44 61.27 62.83
			Elev. (feet) 853.44 853.43 852.90 852.90 853.39 853.33 852.81 852.91 853.07 853.44

Discarded OutFlow Max=0.00 cfs @ 8.72 hrs HW=852.75' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=3.79 cfs @ 12.15 hrs HW=853.04' (Free Discharge)
 ↑2=Asymmetrical Weir (Weir Controls 3.79 cfs @ 0.73 fps)

Pond 27P: SOUTH: NE - 2nd Cell

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

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Primary OutFlow Max=3.70 cfs @ 12.14 hrs HW=853.41' (Free Discharge)

↳ **4=Asymmetrical Weir** (Weir Controls 3.70 cfs @ 0.71 fps)

Secondary OutFlow Max=0.01 cfs @ 12.14 hrs HW=853.41' (Free Discharge)

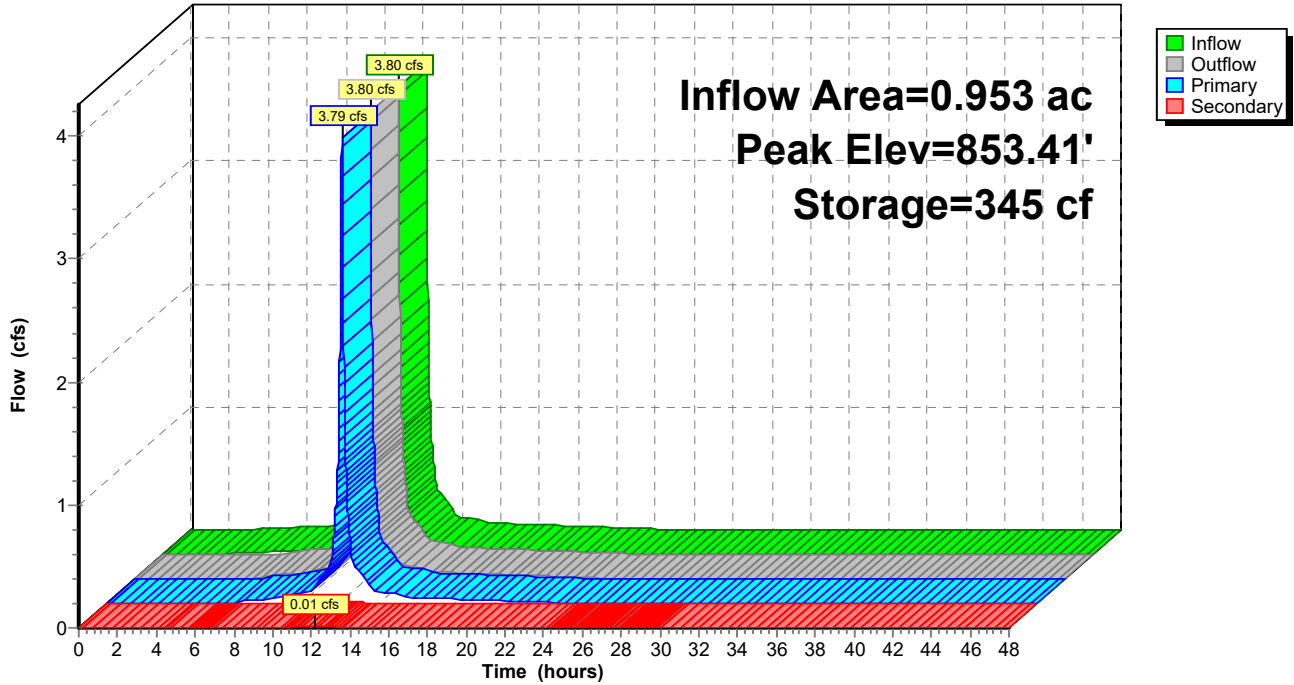
↳ **3=Pipe_out** (Passes 0.01 cfs of 3.99 cfs potential flow)

↳ **1=DrainTile** (Passes 0.01 cfs of 1.03 cfs potential flow)

↳ **2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 32P: South: SW Filtration Basin

Hydrograph



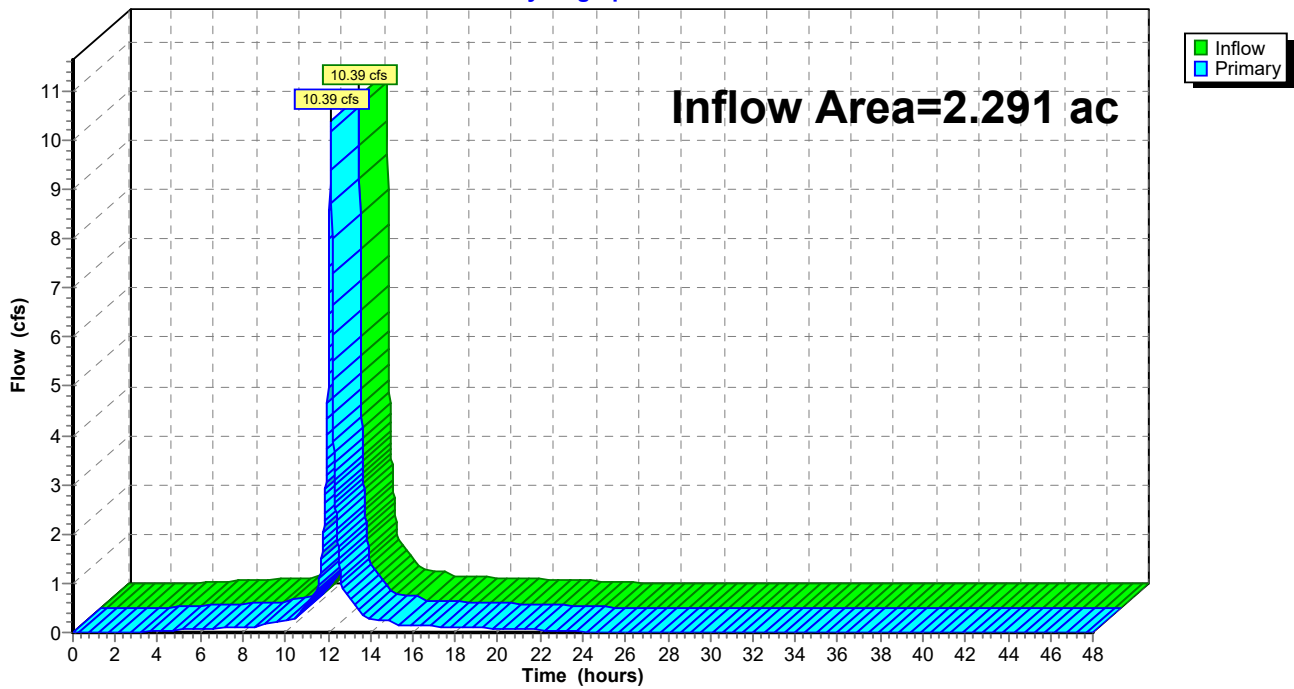
Summary for Link 2L: EX: East Leg

Inflow Area = 2.291 ac, 74.20% Impervious, Inflow Depth = 3.01" for 10-yr event
Inflow = 10.39 cfs @ 12.14 hrs, Volume= 0.575 af
Primary = 10.39 cfs @ 12.14 hrs, Volume= 0.575 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 2L: EX: East Leg

Hydrograph



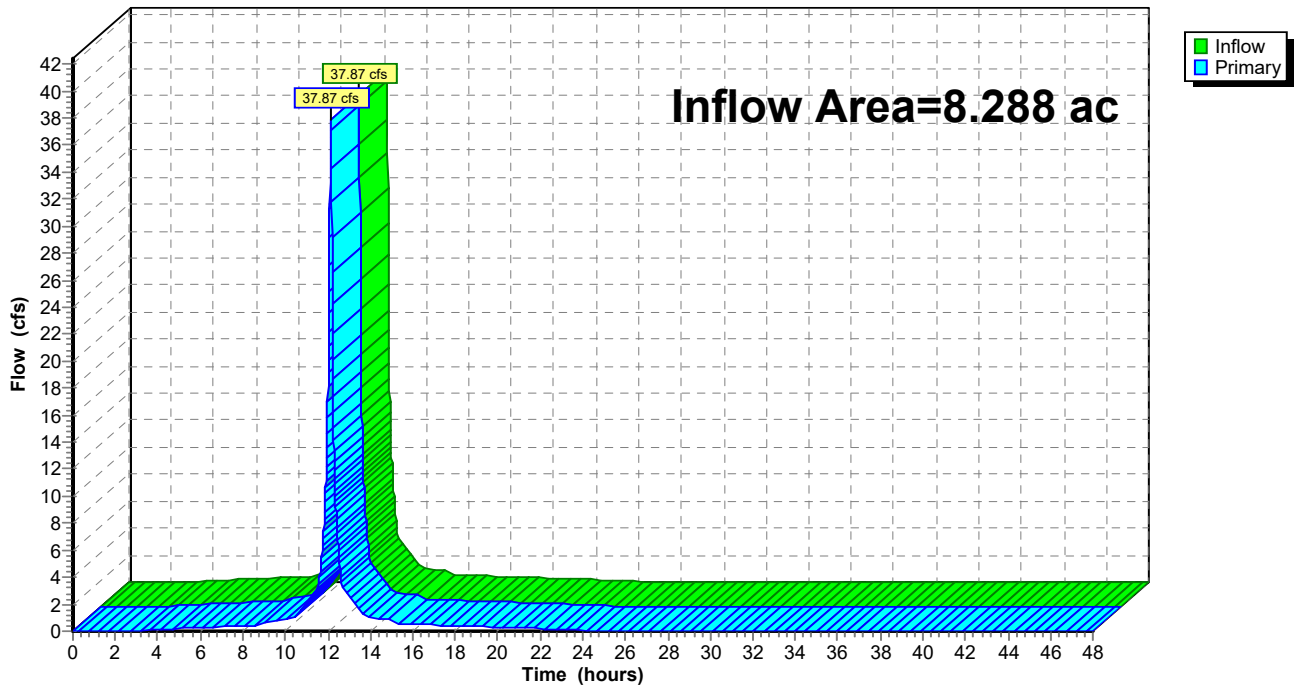
Summary for Link 7L: EX: Total

Inflow Area = 8.288 ac, 74.79% Impervious, Inflow Depth = 3.04" for 10-yr event
Inflow = 37.87 cfs @ 12.14 hrs, Volume= 2.097 af
Primary = 37.87 cfs @ 12.14 hrs, Volume= 2.097 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 7L: EX: Total

Hydrograph



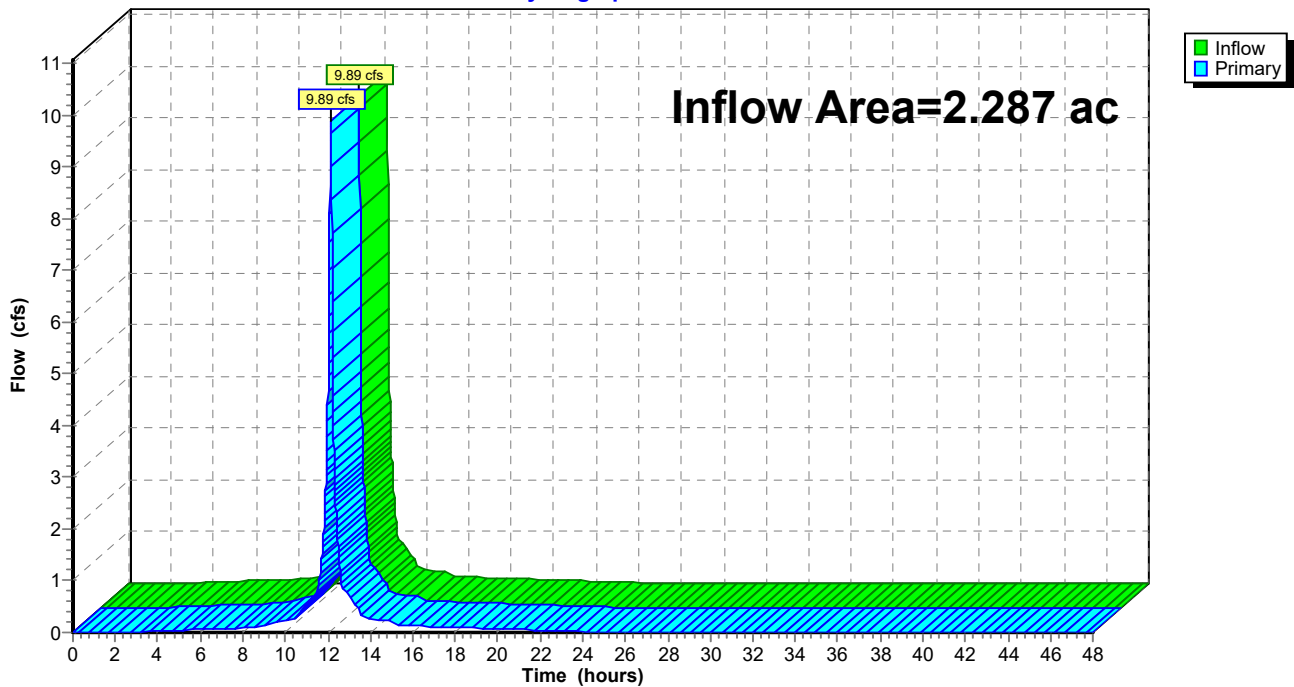
Summary for Link 8L: PRO: East Leg

Inflow Area = 2.287 ac, 70.94% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 9.89 cfs @ 12.14 hrs, Volume= 0.536 af
Primary = 9.89 cfs @ 12.14 hrs, Volume= 0.536 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 8L: PRO: East Leg

Hydrograph



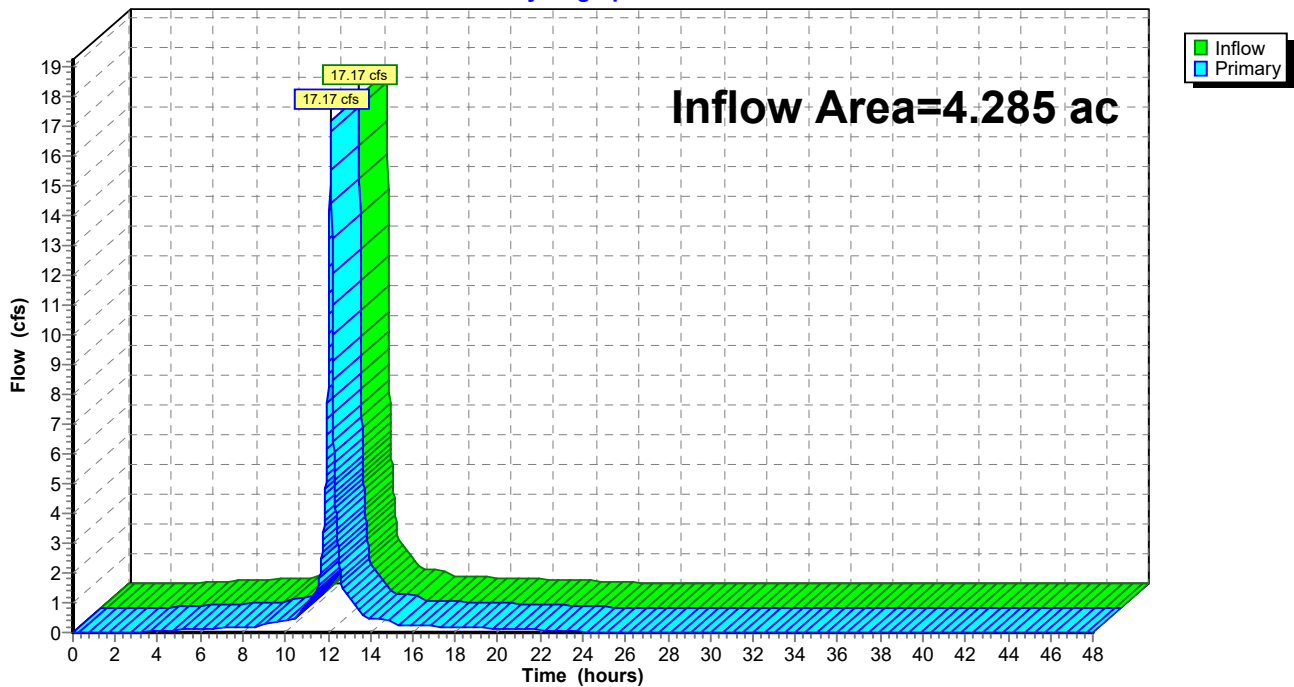
Summary for Link 9L: EX: South Leg

Inflow Area = 4.285 ac, 65.56% Impervious, Inflow Depth = 2.67" for 10-yr event
Inflow = 17.17 cfs @ 12.14 hrs, Volume= 0.954 af
Primary = 17.17 cfs @ 12.14 hrs, Volume= 0.954 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 9L: EX: South Leg

Hydrograph



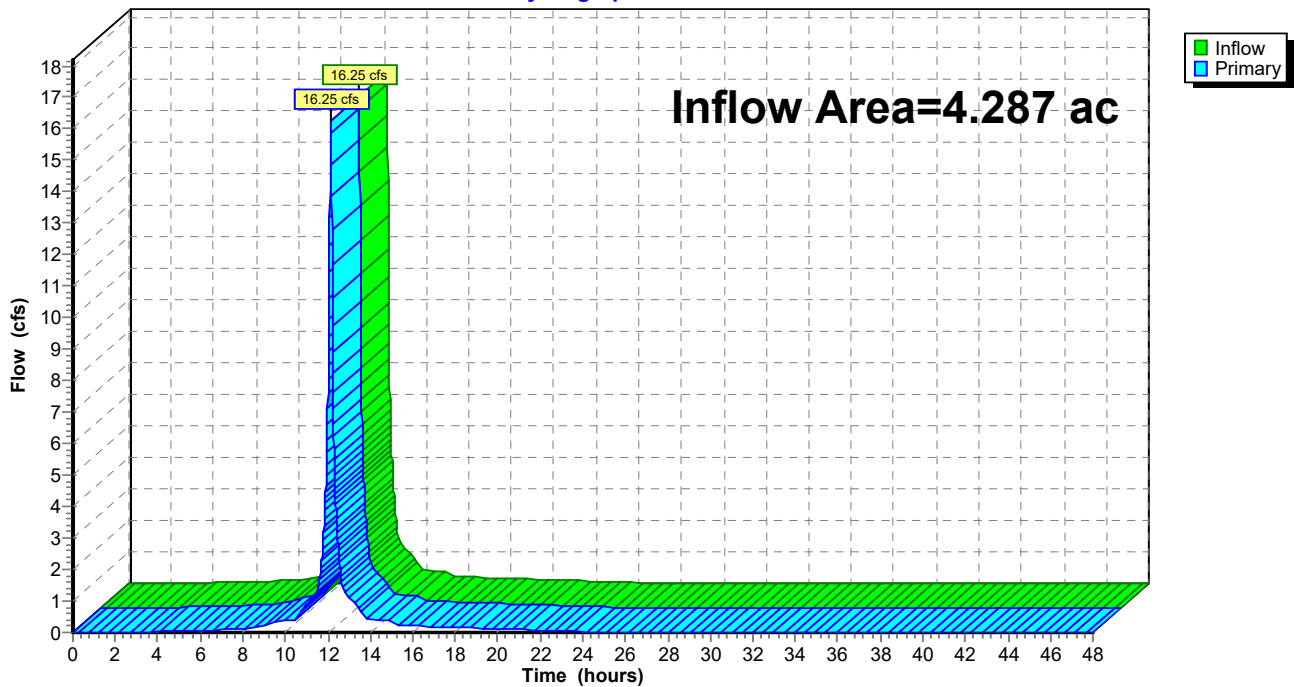
Summary for Link 10L: PRO: South Leg

Inflow Area = 4.287 ac, 62.16% Impervious, Inflow Depth = 2.45" for 10-yr event
Inflow = 16.25 cfs @ 12.14 hrs, Volume= 0.873 af
Primary = 16.25 cfs @ 12.14 hrs, Volume= 0.873 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 10L: PRO: South Leg

Hydrograph



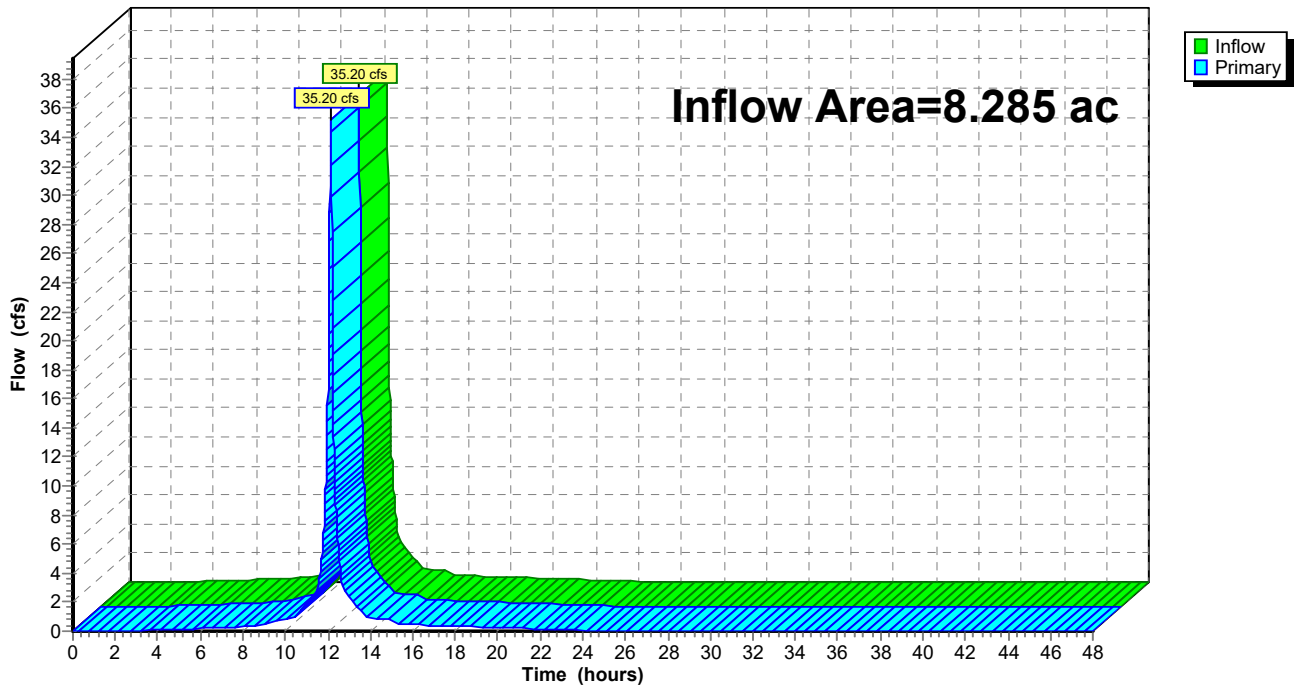
Summary for Link 11L: PRO: Total

Inflow Area = 8.285 ac, 69.65% Impervious, Inflow Depth = 2.77" for 10-yr event
Inflow = 35.20 cfs @ 12.14 hrs, Volume= 1.909 af
Primary = 35.20 cfs @ 12.14 hrs, Volume= 1.909 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 11L: PRO: Total

Hydrograph



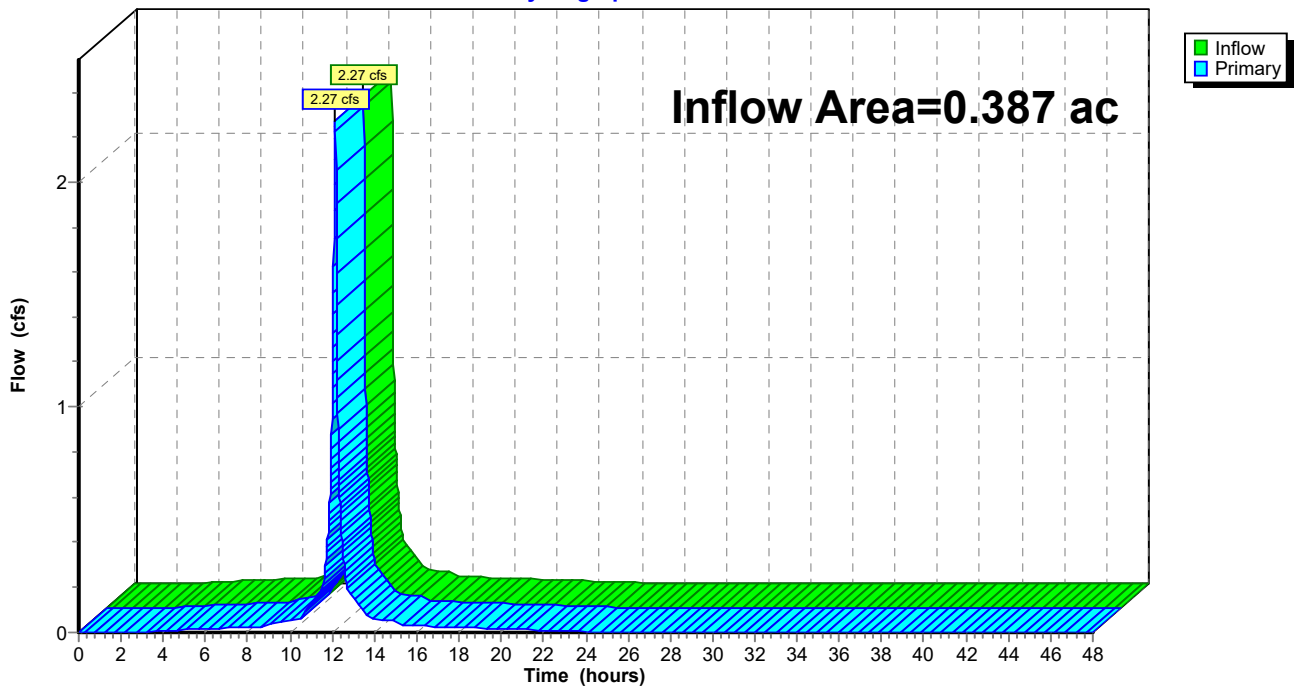
Summary for Link 19L: EX: West Leg

Inflow Area = 0.387 ac, 95.86% Impervious, Inflow Depth = 3.87" for 10-yr event
Inflow = 2.27 cfs @ 12.14 hrs, Volume= 0.125 af
Primary = 2.27 cfs @ 12.14 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 19L: EX: West Leg

Hydrograph



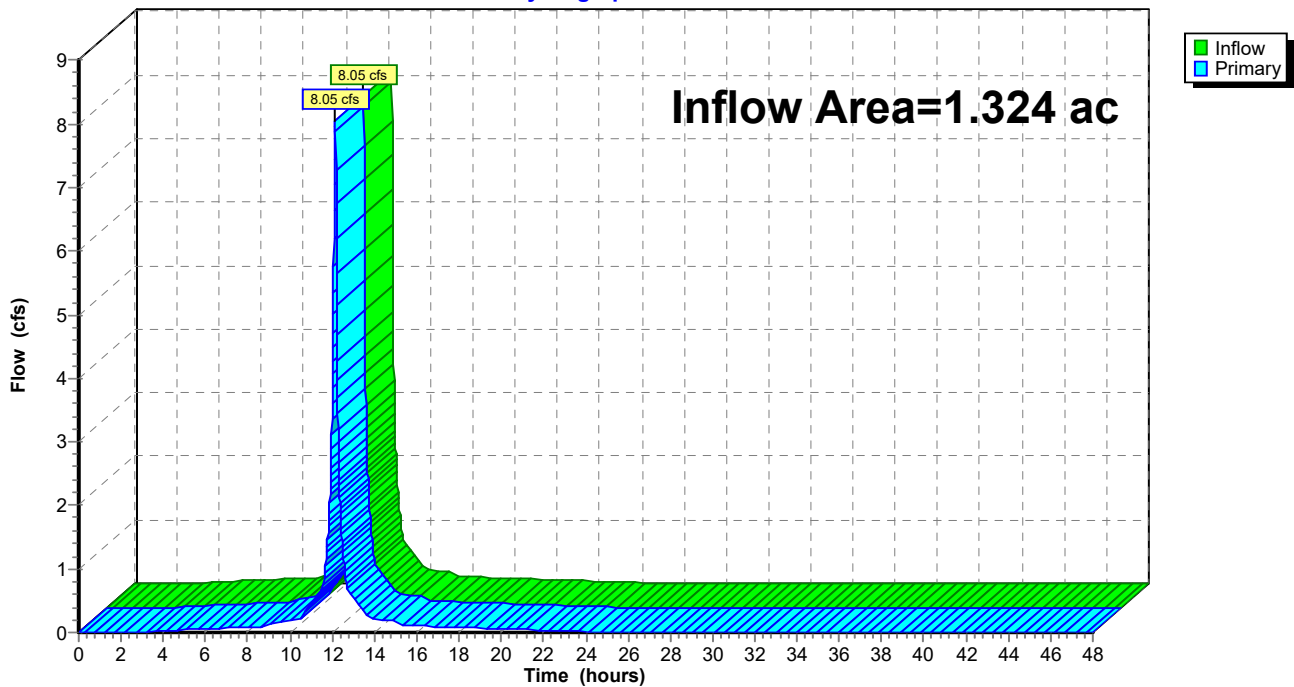
Summary for Link 20L: EX: North Leg

Inflow Area = 1.324 ac, 99.47% Impervious, Inflow Depth = 4.01" for 10-yr event
Inflow = 8.05 cfs @ 12.14 hrs, Volume= 0.443 af
Primary = 8.05 cfs @ 12.14 hrs, Volume= 0.443 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 20L: EX: North Leg

Hydrograph



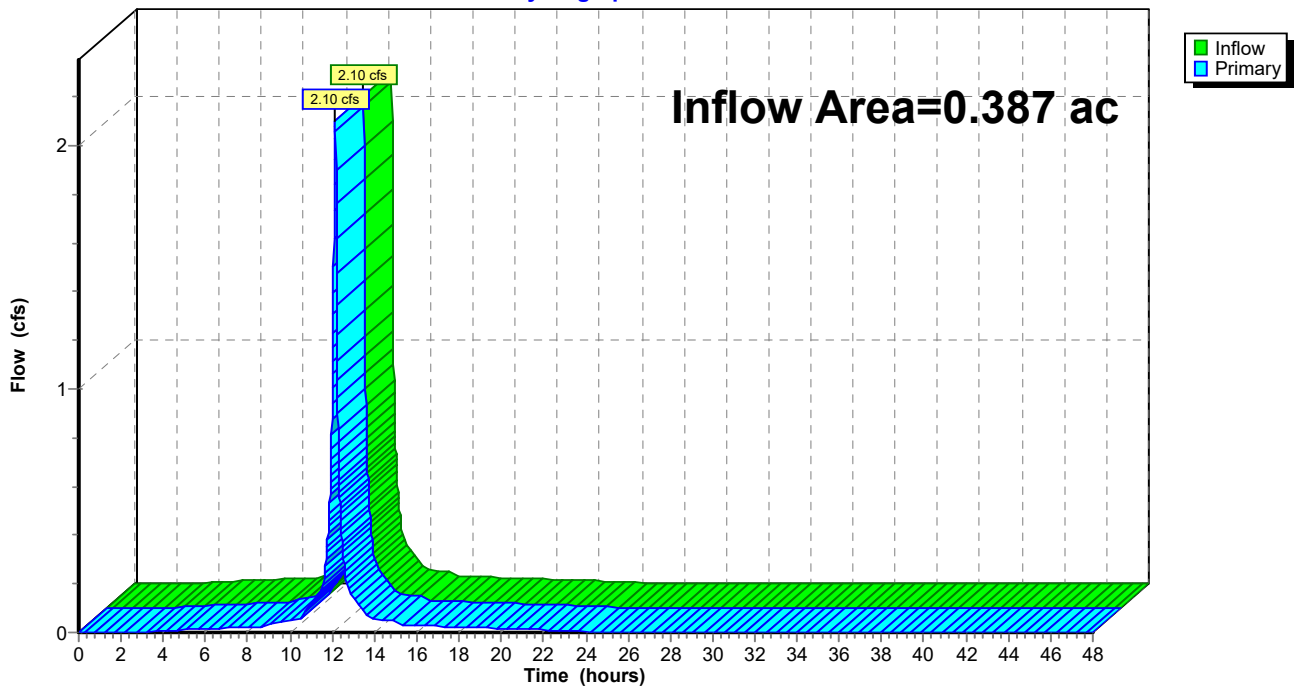
Summary for Link 30L: PRO: West Leg

Inflow Area = 0.387 ac, 88.61% Impervious, Inflow Depth = 3.58" for 10-yr event
Inflow = 2.10 cfs @ 12.14 hrs, Volume= 0.116 af
Primary = 2.10 cfs @ 12.14 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 30L: PRO: West Leg

Hydrograph



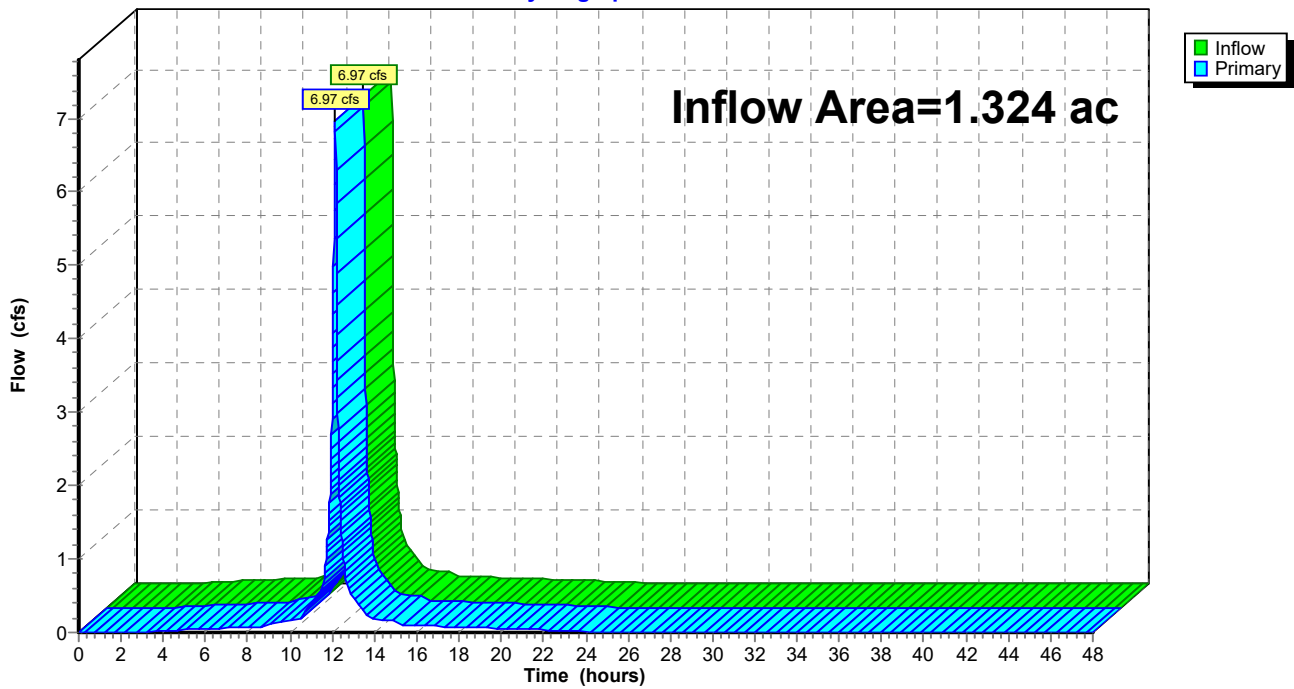
Summary for Link 31L: PRO: North Leg

Inflow Area = 1.324 ac, 86.09% Impervious, Inflow Depth = 3.48" for 10-yr event
Inflow = 6.97 cfs @ 12.14 hrs, Volume= 0.384 af
Primary = 6.97 cfs @ 12.14 hrs, Volume= 0.384 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 31L: PRO: North Leg

Hydrograph



136243_Phase_1_RateControl_90%_WEIR*MSE 24-hr 3 100-yr Rainfall=7.50"*

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX: 38th Street	Runoff Area=1.985 ac 76.22% Impervious Runoff Depth=5.76" Tc=7.0 min CN=WQ Runoff=16.83 cfs 0.953 af
Subcatchment3S: EX: Side Streets	Runoff Area=0.306 ac 61.11% Impervious Runoff Depth=4.81" Tc=7.0 min CN=WQ Runoff=2.15 cfs 0.123 af
Subcatchment4S: Existing Chicago SE	Runoff Area=115,419 sf 57.96% Impervious Runoff Depth=4.61" Flow Length=592' Tc=7.0 min CN=WQ Runoff=17.78 cfs 1.018 af
Subcatchment5S: EX: 38th Street	Runoff Area=71,376 sf 72.20% Impervious Runoff Depth=5.51" Tc=7.0 min CN=WQ Runoff=13.25 cfs 0.752 af
Subcatchment6S: EX: Side Streets	Runoff Area=0.306 ac 57.84% Impervious Runoff Depth=4.60" Tc=7.0 min CN=WQ Runoff=2.05 cfs 0.117 af
Subcatchment7S: PRO: SE Chicago	Runoff Area=71,447 sf 50.44% Impervious Runoff Depth=4.14" Flow Length=594' Tc=7.0 min CN=WQ Runoff=9.81 cfs 0.565 af
Subcatchment16S: SOUTH: NE	Runoff Area=1.010 ac 62.57% Impervious Runoff Depth=4.90" Flow Length=592' Tc=7.0 min CN=WQ Runoff=7.23 cfs 0.412 af
Subcatchment17S: EAST: NE	Runoff Area=0.342 ac 76.61% Impervious Runoff Depth=5.79" Tc=7.0 min CN=WQ Runoff=2.91 cfs 0.165 af
Subcatchment21S: EX: West Leg	Runoff Area=16,876 sf 95.86% Impervious Runoff Depth=7.00" Tc=7.0 min CN=WQ Runoff=4.02 cfs 0.226 af
Subcatchment22S: EX: North Leg	Runoff Area=57,674 sf 99.47% Impervious Runoff Depth=7.23" Tc=7.0 min CN=WQ Runoff=14.21 cfs 0.797 af
Subcatchment28S: PRO: West Leg	Runoff Area=16,876 sf 88.61% Impervious Runoff Depth=6.54" Tc=7.0 min CN=WQ Runoff=3.75 cfs 0.211 af
Subcatchment29S: PRO: North Leg	Runoff Area=57,674 sf 86.09% Impervious Runoff Depth=6.38" Tc=7.0 min CN=WQ Runoff=12.49 cfs 0.704 af
Subcatchment33S: South: NW	Runoff Area=0.953 ac 65.27% Impervious Runoff Depth=5.07" Tc=7.0 min CN=WQ Runoff=7.07 cfs 0.403 af
Subcatchment34S: South: SW: Untreated	Runoff Area=3,614 sf 79.52% Impervious Runoff Depth=5.97" Tc=7.0 min CN=WQ Runoff=0.73 cfs 0.041 af
Subcatchment35S: Existing Chicago SW	Runoff Area=71,244 sf 77.89% Impervious Runoff Depth=5.87" Tc=7.0 min CN=WQ Runoff=14.13 cfs 0.800 af
Subcatchment37S: PRO: Chicago SW	Runoff Area=26,160 sf 86.17% Impervious Runoff Depth=6.39" Tc=7.0 min CN=WQ Runoff=5.67 cfs 0.320 af

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MSE 24-hr 3 100-yr Rainfall=7.50"

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Pond 12P: EAST: NE	Peak Elev=855.06' Storage=286 cf Inflow=2.91 cfs 0.165 af Discarded=0.01 cfs 0.015 af Primary=2.90 cfs 0.149 af Outflow=2.90 cfs 0.165 af
Pond 14P: SOUTH: NE	Peak Elev=853.83' Storage=529 cf Inflow=7.23 cfs 0.412 af Discarded=0.01 cfs 0.026 af Primary=7.21 cfs 0.387 af Outflow=7.23 cfs 0.412 af
Pond 27P: SOUTH: NE - 2nd Cell	Peak Elev=853.10' Storage=135 cf Inflow=7.21 cfs 0.387 af Discarded=0.00 cfs 0.008 af Primary=7.21 cfs 0.379 af Outflow=7.21 cfs 0.387 af
Pond 32P: South: SW Filtration Basin	Peak Elev=853.47' Storage=368 cf Inflow=7.07 cfs 0.403 af Primary=7.06 cfs 0.386 af Secondary=0.01 cfs 0.014 af Outflow=7.06 cfs 0.401 af
Link 2L: EX: East Leg	Inflow=18.97 cfs 1.076 af Primary=18.97 cfs 1.076 af
Link 7L: EX: Total	Inflow=69.11 cfs 3.916 af Primary=69.11 cfs 3.916 af
Link 8L: PRO: East Leg	Inflow=18.19 cfs 1.019 af Primary=18.19 cfs 1.019 af
Link 9L: EX: South Leg	Inflow=31.90 cfs 1.817 af Primary=31.90 cfs 1.817 af
Link 10L: PRO: South Leg	Inflow=30.47 cfs 1.706 af Primary=30.47 cfs 1.706 af
Link 11L: PRO: Total	Inflow=64.90 cfs 3.640 af Primary=64.90 cfs 3.640 af
Link 19L: EX: West Leg	Inflow=4.02 cfs 0.226 af Primary=4.02 cfs 0.226 af
Link 20L: EX: North Leg	Inflow=14.21 cfs 0.797 af Primary=14.21 cfs 0.797 af
Link 30L: PRO: West Leg	Inflow=3.75 cfs 0.211 af Primary=3.75 cfs 0.211 af
Link 31L: PRO: North Leg	Inflow=12.49 cfs 0.704 af Primary=12.49 cfs 0.704 af

Total Runoff Area = 16.572 ac Runoff Volume = 7.608 af Average Runoff Depth = 5.51"
27.78% Pervious = 4.604 ac 72.22% Impervious = 11.968 ac

Summary for Subcatchment 1S: EX: 38th Street

Runoff = 16.83 cfs @ 12.14 hrs, Volume= 0.953 af, Depth= 5.76"
 Routed to Link 2L : EX: East Leg

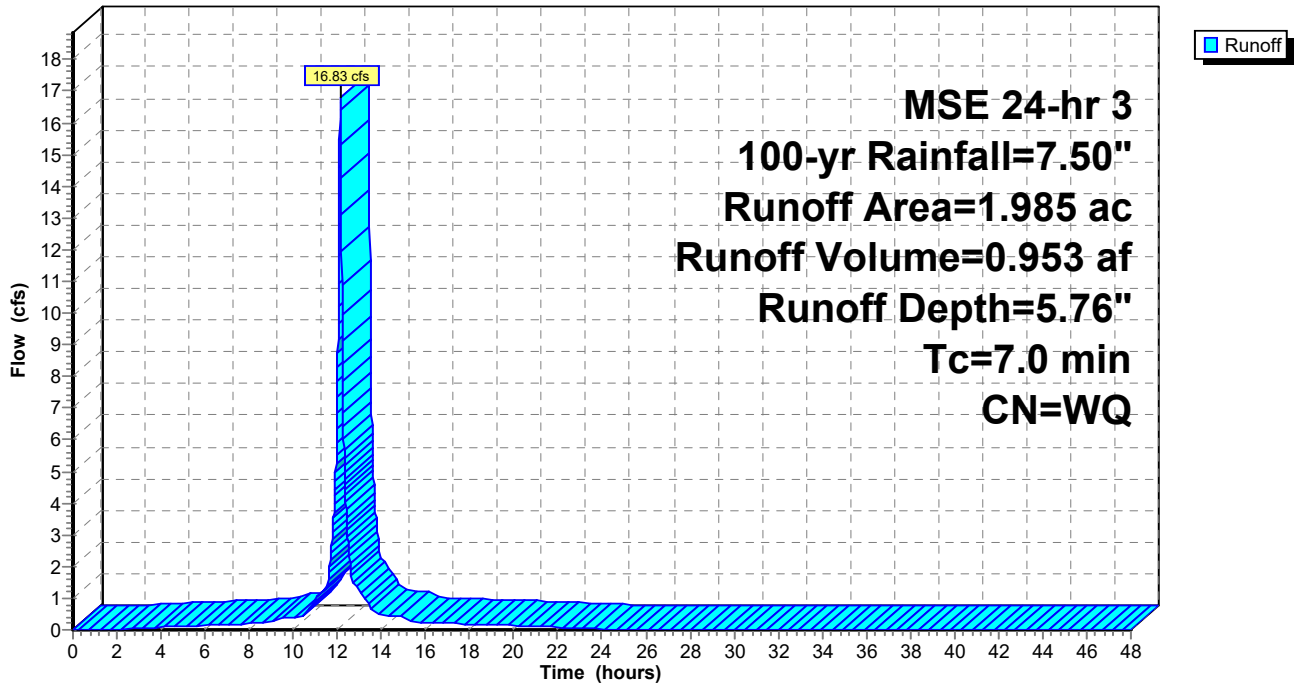
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (ac)	CN	Description
* 0.821	98	Project Area: Impervious
* 0.000	39	Project Area: Pervious A soils
* 0.692	98	Off-Site: Impervious
* 0.472	39	Off-Site: Pervious
1.985		Weighted Average
0.472		23.78% Pervious Area
1.513		76.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 1S: EX: 38th Street

Hydrograph



Summary for Subcatchment 3S: EX: Side Streets

Runoff = 2.15 cfs @ 12.14 hrs, Volume= 0.123 af, Depth= 4.81"
 Routed to Link 2L : EX: East Leg

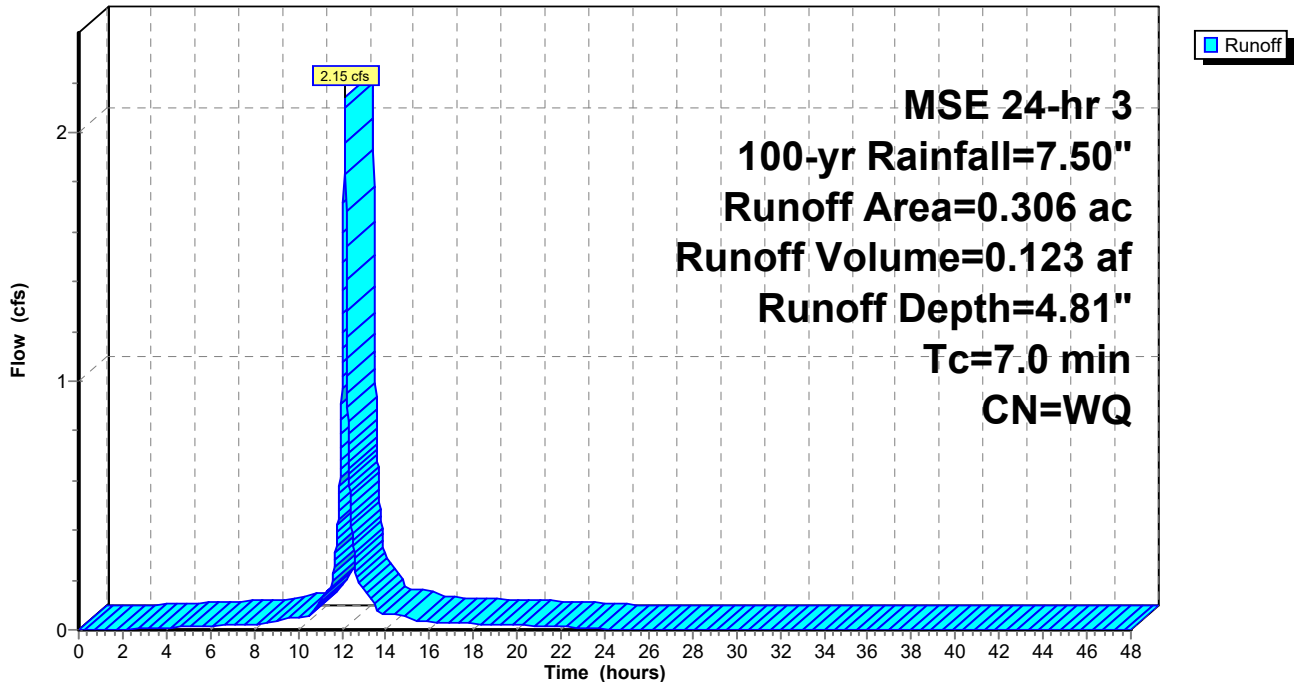
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (ac)	CN	Description
* 0.111	98	Project Area: Impervious
* 0.024	39	Project Area: Pervious A Soils
* 0.076	98	Off-Site: Impervious
* 0.095	39	Off-Site: Pervious
0.306		Weighted Average
0.119		38.89% Pervious Area
0.187		61.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 3S: EX: Side Streets

Hydrograph



Summary for Subcatchment 4S: Existing Chicago SE

Runoff = 17.78 cfs @ 12.14 hrs, Volume= 1.018 af, Depth= 4.61"
 Routed to Link 9L : EX: South Leg

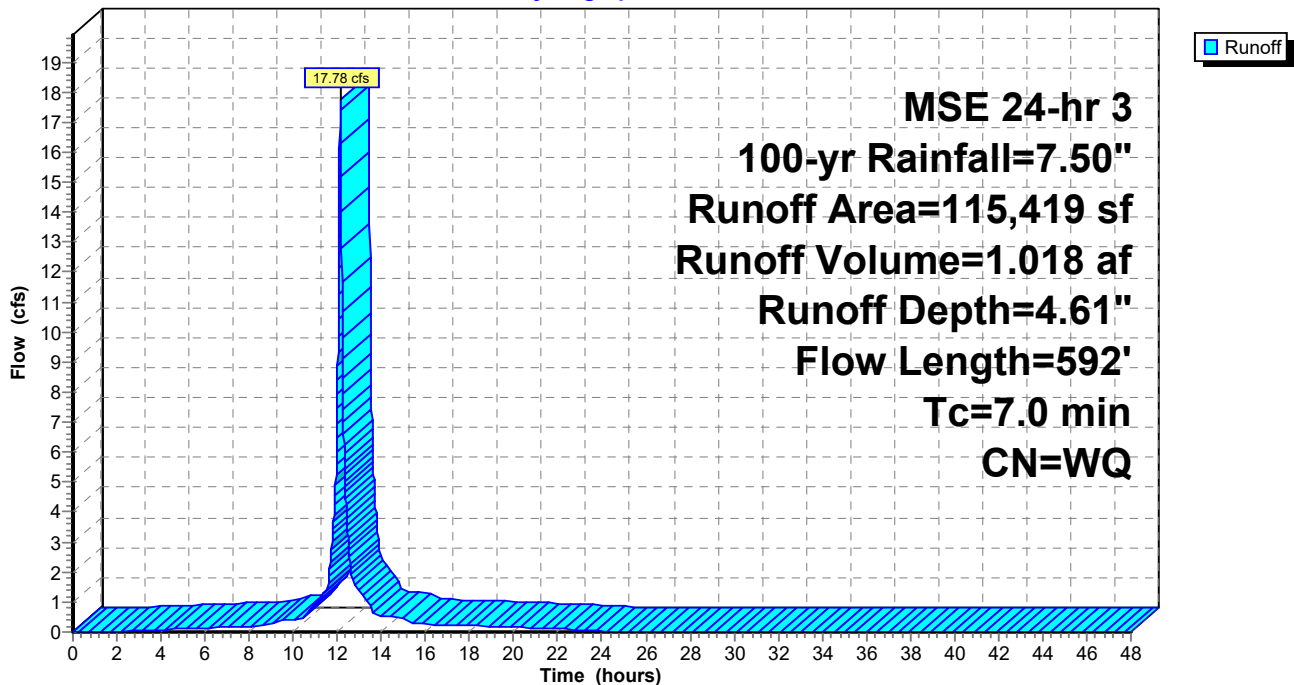
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (sf)	CN	Description
* 28,194	98	Project Area: Impervious
* 72	39	Project Area: Peroivus
* 38,701	98	Off-Site: Impervious
* 48,452	39	Off-Site: Pervious
115,419		Weighted Average
48,524		42.04% Pervious Area
66,895		57.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.7	417	0.0099	10.07	100.72	Channel Flow, Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013
6.5	592	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 4S: Existing Chicago SE

Hydrograph



Summary for Subcatchment 5S: EX: 38th Street

Runoff = 13.25 cfs @ 12.14 hrs, Volume= 0.752 af, Depth= 5.51"
 Routed to Link 8L : PRO: East Leg

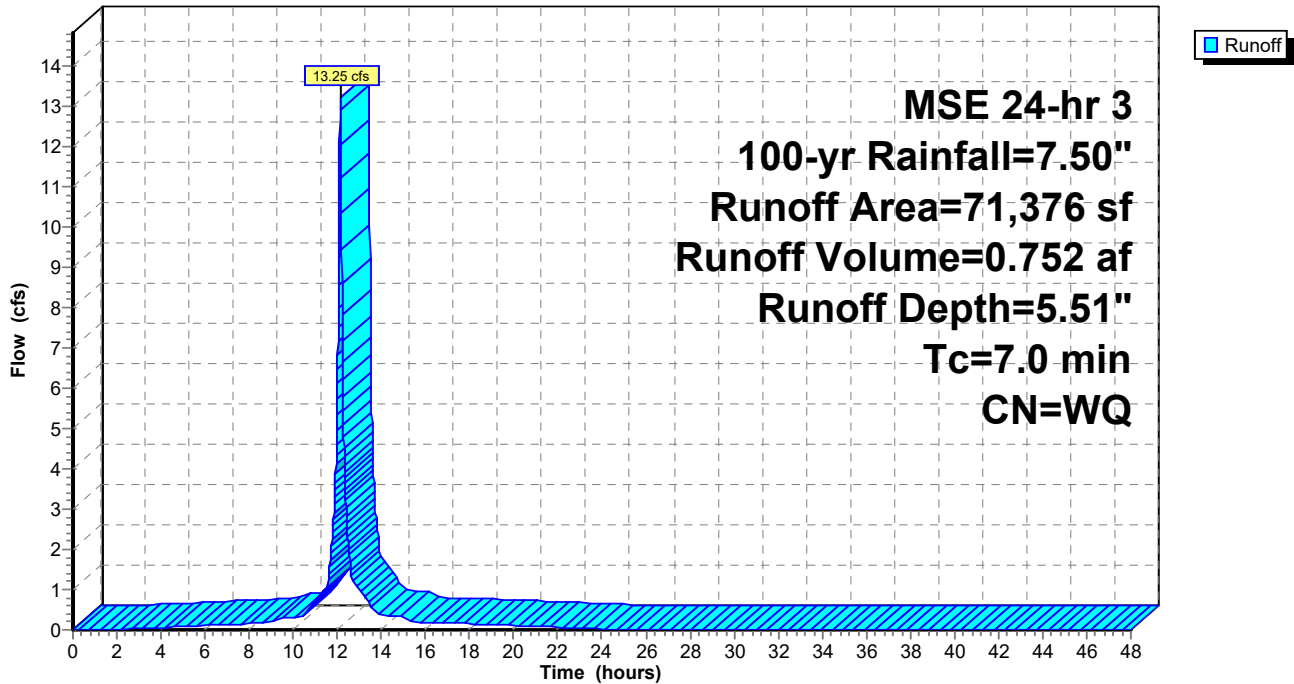
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	26,440	98	Project Area: Impervious
*	1,550	39	Project Area: Pervious A Soils
*	25,091	98	Off-Site: Impervious
*	18,295	39	Off-Site: Pervious
	71,376		Weighted Average
	19,845		27.80% Pervious Area
	51,531		72.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 5S: EX: 38th Street

Hydrograph



Summary for Subcatchment 6S: EX: Side Streets

Runoff = 2.05 cfs @ 12.14 hrs, Volume= 0.117 af, Depth= 4.60"
 Routed to Link 8L : PRO: East Leg

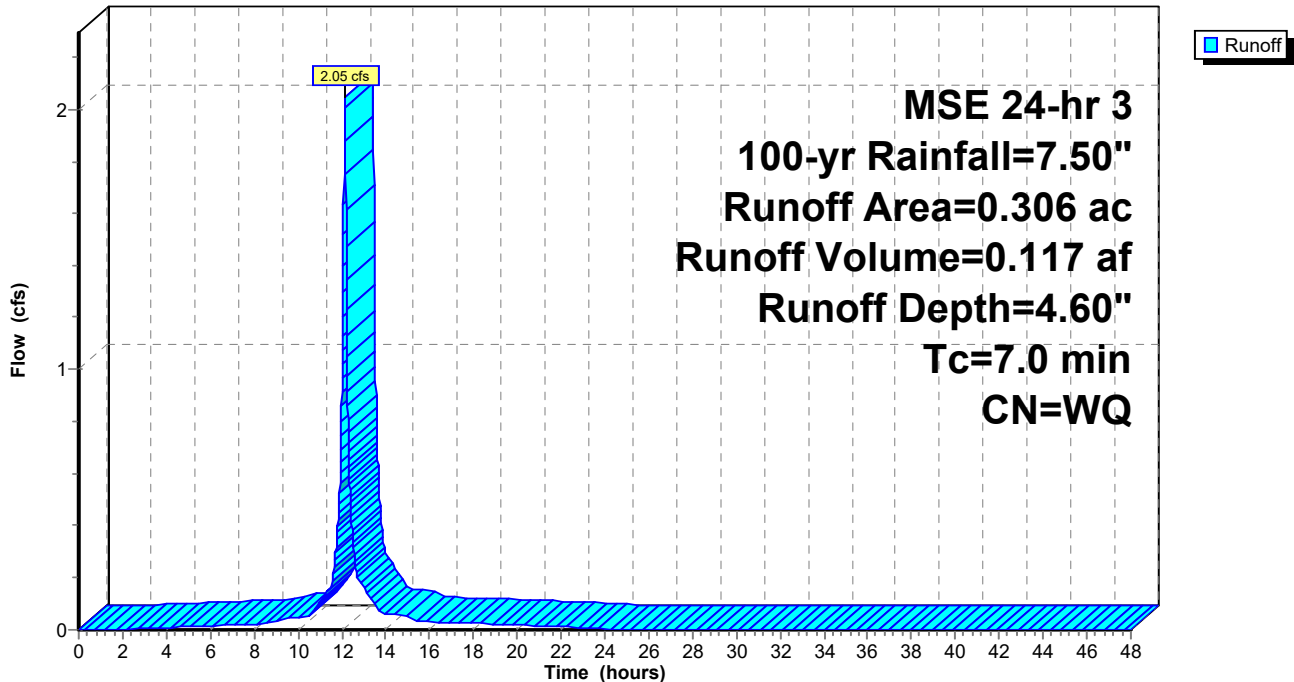
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (ac)	CN	Description
* 0.101	98	Project Area: Impervious
* 0.034	39	Project Area: Pervious A Soils
* 0.076	98	Off-Site: Impervious
* 0.095	39	Off-Site: Pervious
0.306		Weighted Average
0.129		42.16% Pervious Area
0.177		57.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 6S: EX: Side Streets

Hydrograph



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MSE 24-hr 3 100-yr Rainfall=7.50"

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Summary for Subcatchment 7S: PRO: SE Chicago

Area on Chicago Southeast and small untreated SE area north of W39th

Runoff = 9.81 cfs @ 12.14 hrs, Volume= 0.565 af, Depth= 4.14"
 Routed to Link 10L : PRO: South Leg

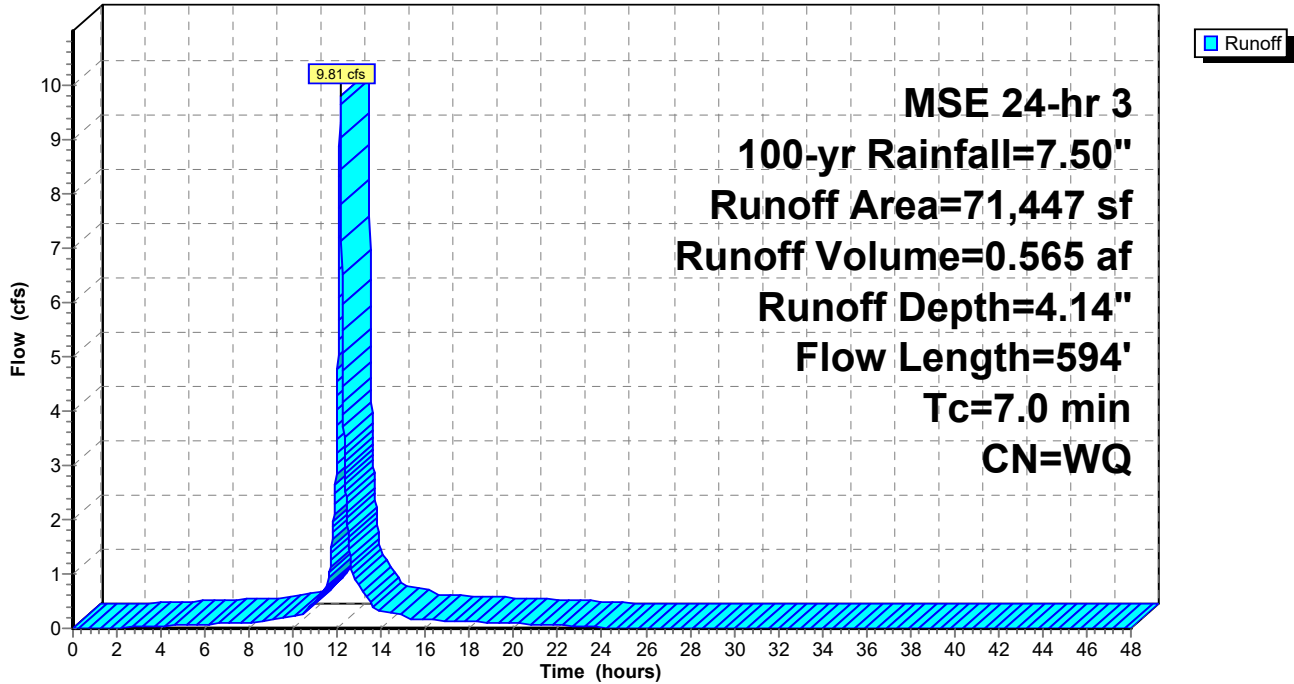
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (sf)	CN	Description
* 6,171	98	Project Area: Impervious
* 399	39	Project Area: >75% Grass cover, Good, HSG A
* 29,869	98	Off-Site: Impervious
* 35,008	39	Off-Site: Pervious
71,447		Weighted Average
35,407		49.56% Pervious Area
36,040		50.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, SCF Paved Kv= 20.3 fps
0.7	419	0.0099	10.07	100.72	Channel Flow, Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013
6.5	594	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 7S: PRO: SE Chicago

Hydrograph



Summary for Subcatchment 16S: SOUTH: NE

Runoff = 7.23 cfs @ 12.14 hrs, Volume= 0.412 af, Depth= 4.90"
 Routed to Pond 14P : SOUTH: NE

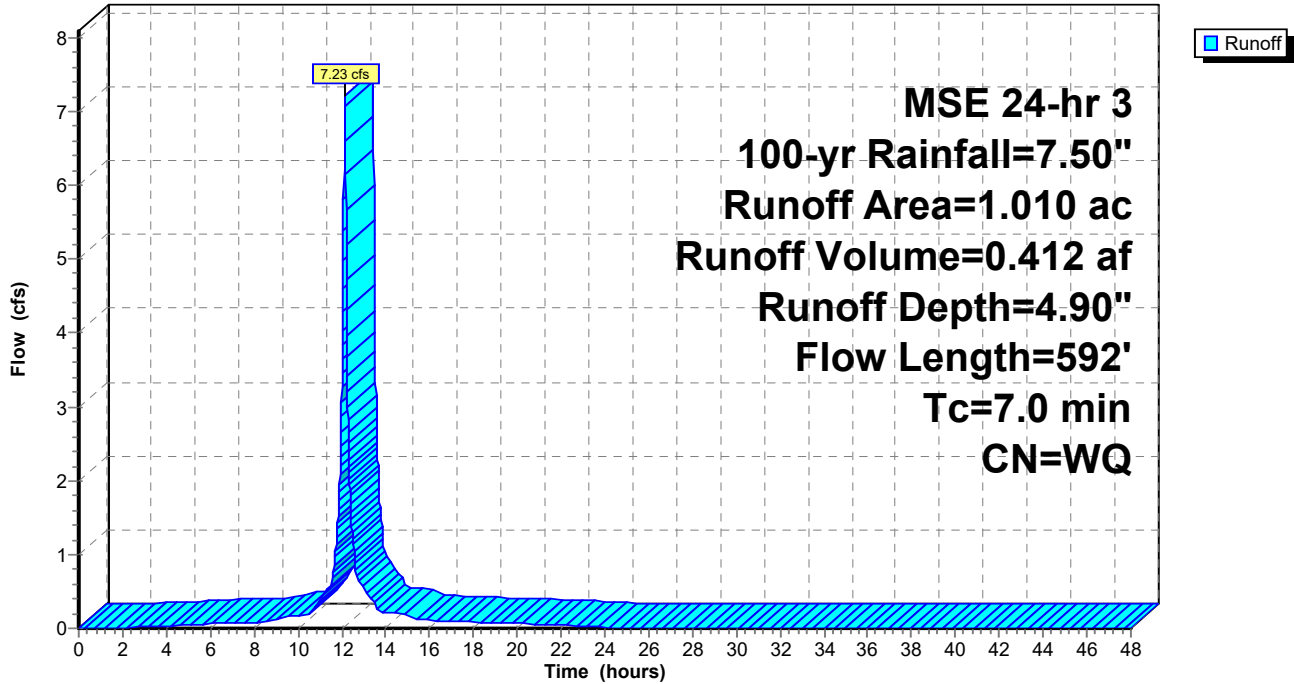
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (ac)	CN	Description
* 0.429	98	Project Area: Impervious
* 0.069	39	Project Area: Perivous
* 0.203	98	Off-Site: Impervious
* 0.309	39	Off-Site: Perivous
1.010		Weighted Average
0.378		37.43% Pervious Area
0.632		62.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	25	0.0100	0.09		Sheet Flow, SHeetflow Front Yard Grass: Short n= 0.150 P2= 2.81"
1.2	150	0.0099	2.02		Shallow Concentrated Flow, Gutter Flow Paved Kv= 20.3 fps
0.7	417	0.0099	10.07	100.72	Channel Flow, Channel Flow Area= 10.0 sf Perim= 12.0' r= 0.83' n= 0.013 Asphalt, smooth
6.5	592	Total, Increased to minimum Tc = 7.0 min			

Subcatchment 16S: SOUTH: NE

Hydrograph



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MSE 24-hr 3 100-yr Rainfall=7.50"

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Summary for Subcatchment 17S: EAST: NE

Runoff = 2.91 cfs @ 12.14 hrs, Volume= 0.165 af, Depth= 5.79"
Routed to Pond 12P : EAST: NE

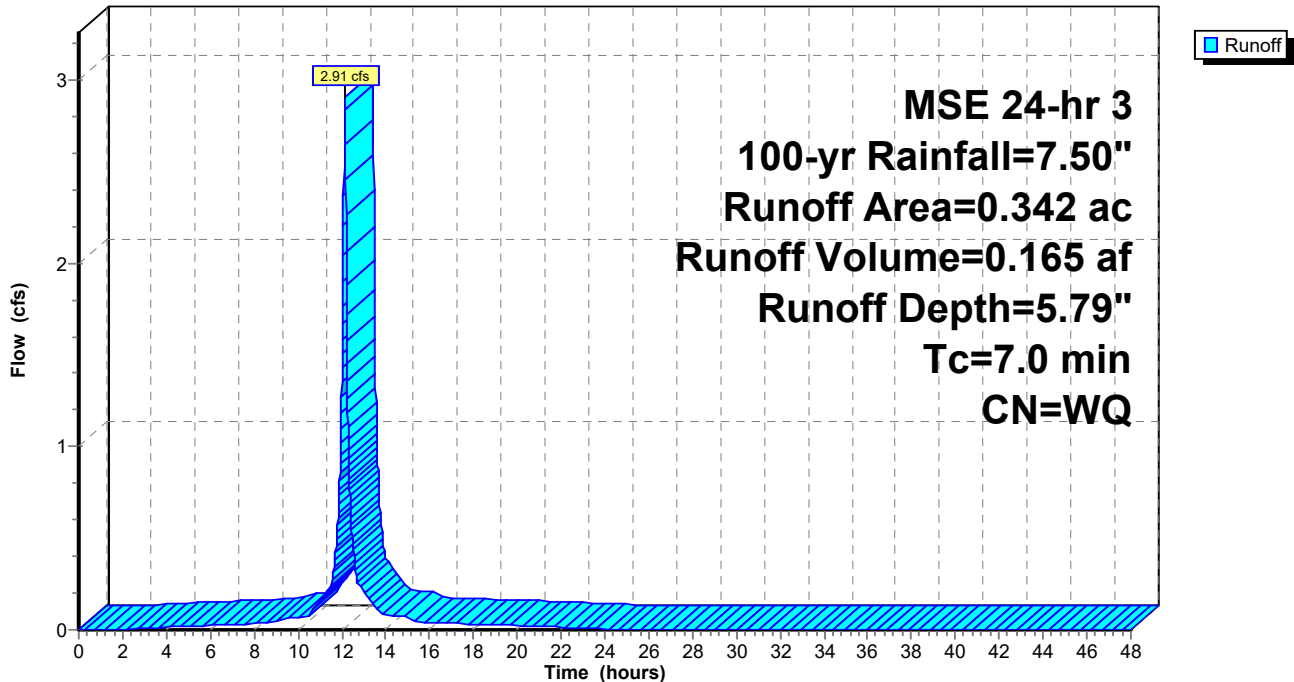
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-yr Rainfall=7.50"

Area (ac)	CN	Description
* 0.141	98	Project Area: Impervious
* 0.038	39	Project Area: Pervious
* 0.121	98	Off-Site: Impervious
* 0.042	39	Off-Site: Pervious
0.342		Weighted Average
0.080		23.39% Pervious Area
0.262		76.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 17S: EAST: NE

Hydrograph



Summary for Subcatchment 21S: EX: West Leg

Runoff = 4.02 cfs @ 12.14 hrs, Volume= 0.226 af, Depth= 7.00"
 Routed to Link 19L : EX: West Leg

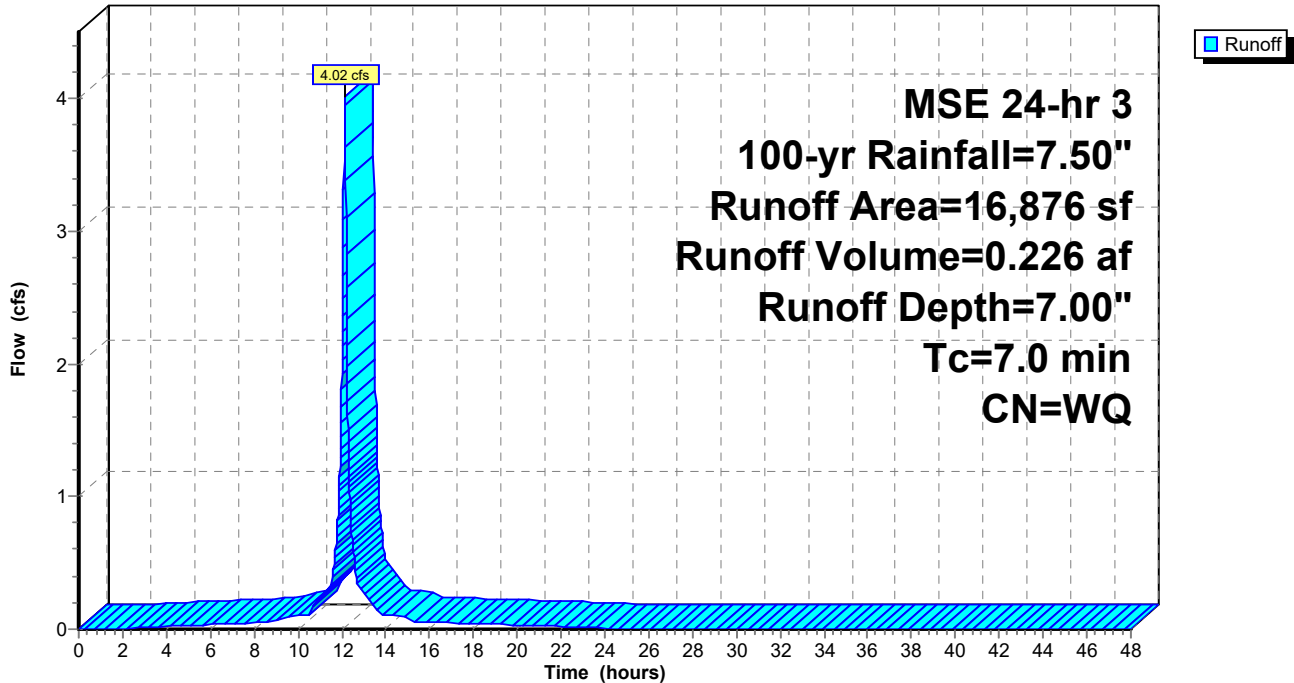
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (sf)	CN	Description
* 16,178	98	Project Impervoius
* 698	39	Project Pervious
16,876		Weighted Average
698		4.14% Pervious Area
16,178		95.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 21S: EX: West Leg

Hydrograph



Summary for Subcatchment 22S: EX: North Leg

Runoff = 14.21 cfs @ 12.14 hrs, Volume= 0.797 af, Depth= 7.23"
 Routed to Link 20L : EX: North Leg

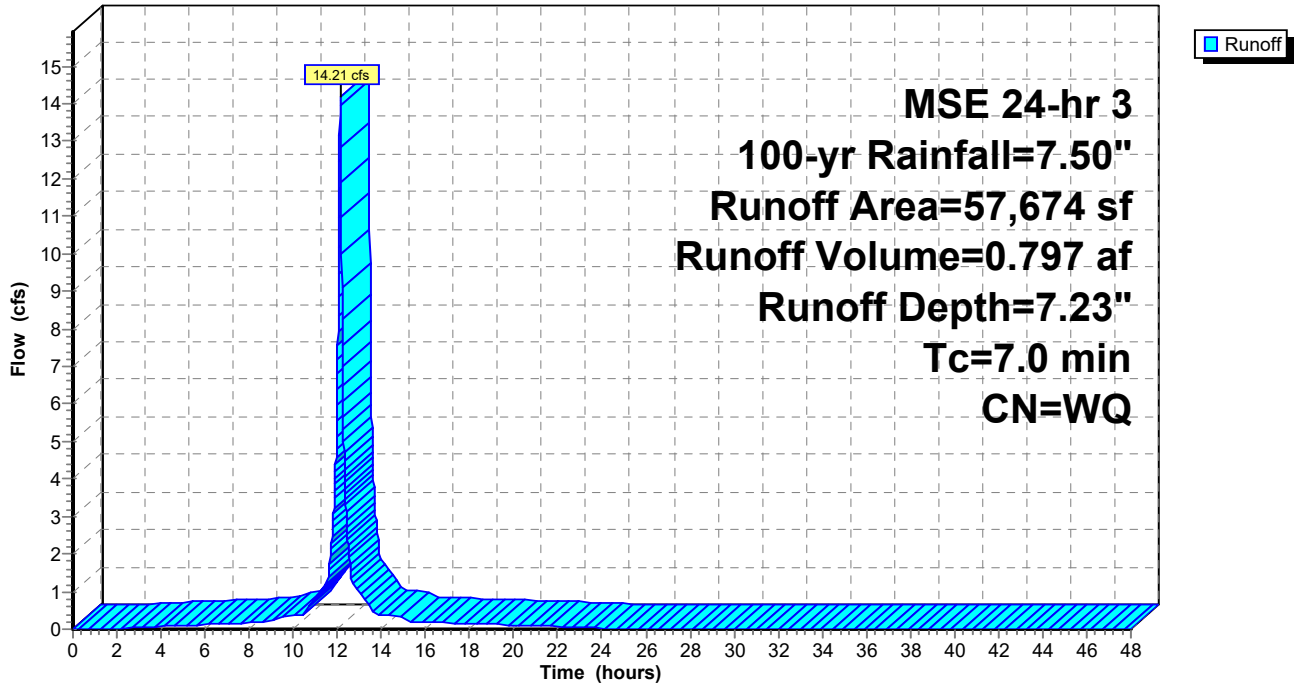
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	57,369	98	Project Impervious
*	305	39	
	57,674		Weighted Average
	305		0.53% Pervious Area
	57,369		99.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 22S: EX: North Leg

Hydrograph



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MSE 24-hr 3 100-yr Rainfall=7.50"

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Summary for Subcatchment 28S: PRO: West Leg

Runoff = 3.75 cfs @ 12.14 hrs, Volume= 0.211 af, Depth= 6.54"

Routed to Link 30L : PRO: West Leg

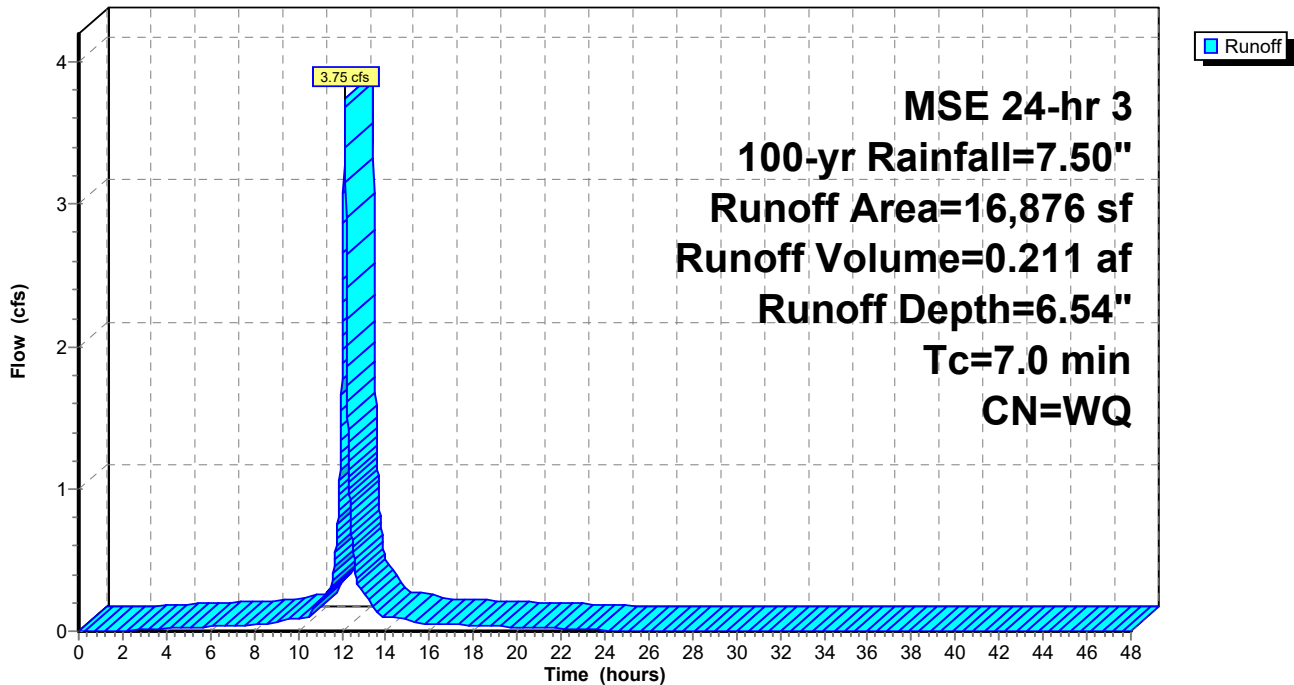
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	14,953	98	Project Impervoius
*	1,923	39	Project Pervious
	16,876		Weighted Average
	1,923		11.39% Pervious Area
	14,953		88.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 28S: PRO: West Leg

Hydrograph



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MSE 24-hr 3 100-yr Rainfall=7.50"

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Summary for Subcatchment 29S: PRO: North Leg

Runoff = 12.49 cfs @ 12.14 hrs, Volume= 0.704 af, Depth= 6.38"

Routed to Link 31L : PRO: North Leg

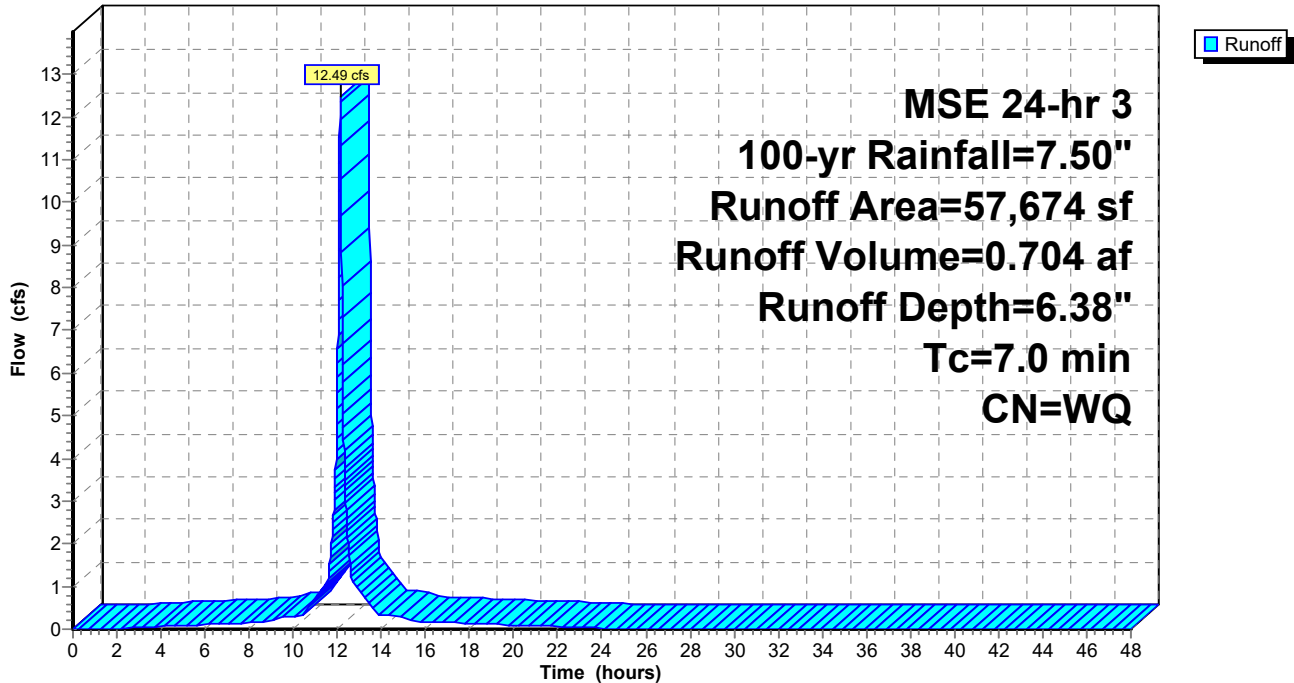
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	49,652	98	Project Impervious
*	8,022	39	
	57,674		Weighted Average
	8,022		13.91% Pervious Area
	49,652		86.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry,

Subcatchment 29S: PRO: North Leg

Hydrograph



Summary for Subcatchment 33S: South: NW

Runoff = 7.07 cfs @ 12.14 hrs, Volume= 0.403 af, Depth= 5.07"
 Routed to Pond 32P : South: SW Filtration Basin

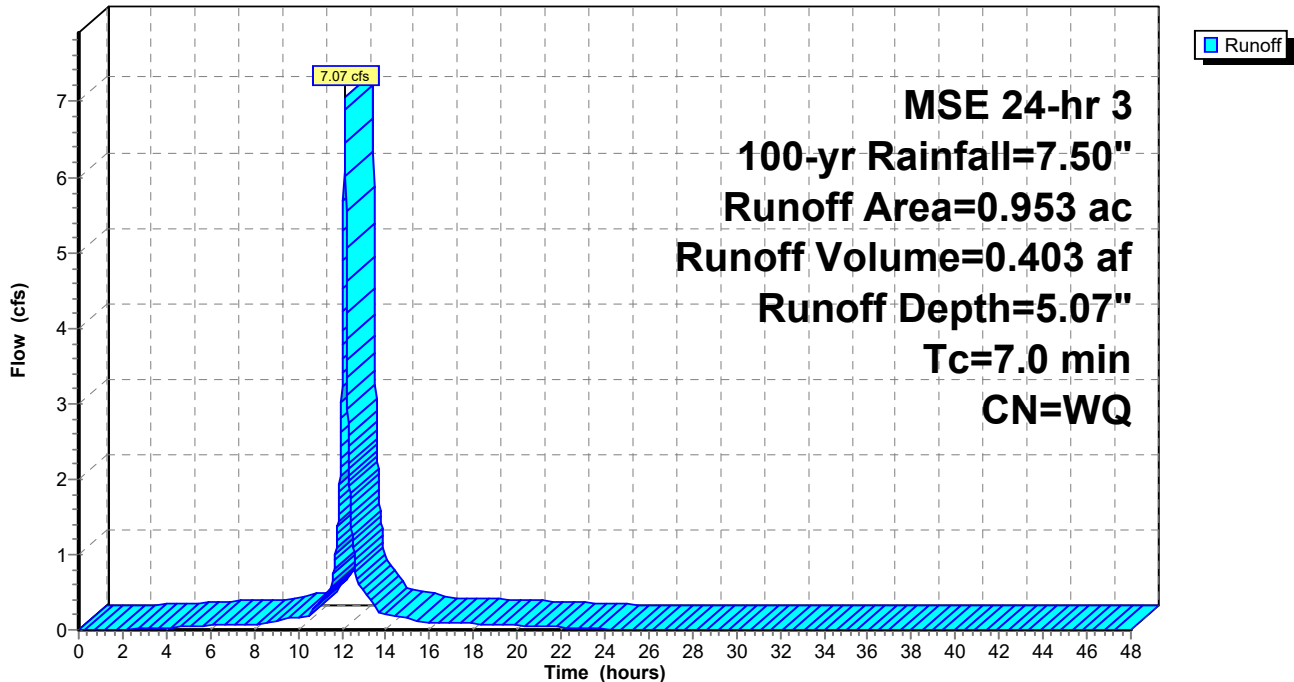
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

Area (ac)	CN	Description
* 0.386	98	Project Area: Impervious
* 0.069	39	Project Area: Pervious
* 0.236	98	Off Site: Impervious
* 0.262	39	Off Site: Pervious
0.953		Weighted Average
0.331		34.73% Pervious Area
0.622		65.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 33S: South: NW

Hydrograph



Summary for Subcatchment 34S: South: SW: Untreated

Small area south of pond and north of W39th street

Runoff = 0.73 cfs @ 12.14 hrs, Volume= 0.041 af, Depth= 5.97"
 Routed to Link 10L : PRO: South Leg

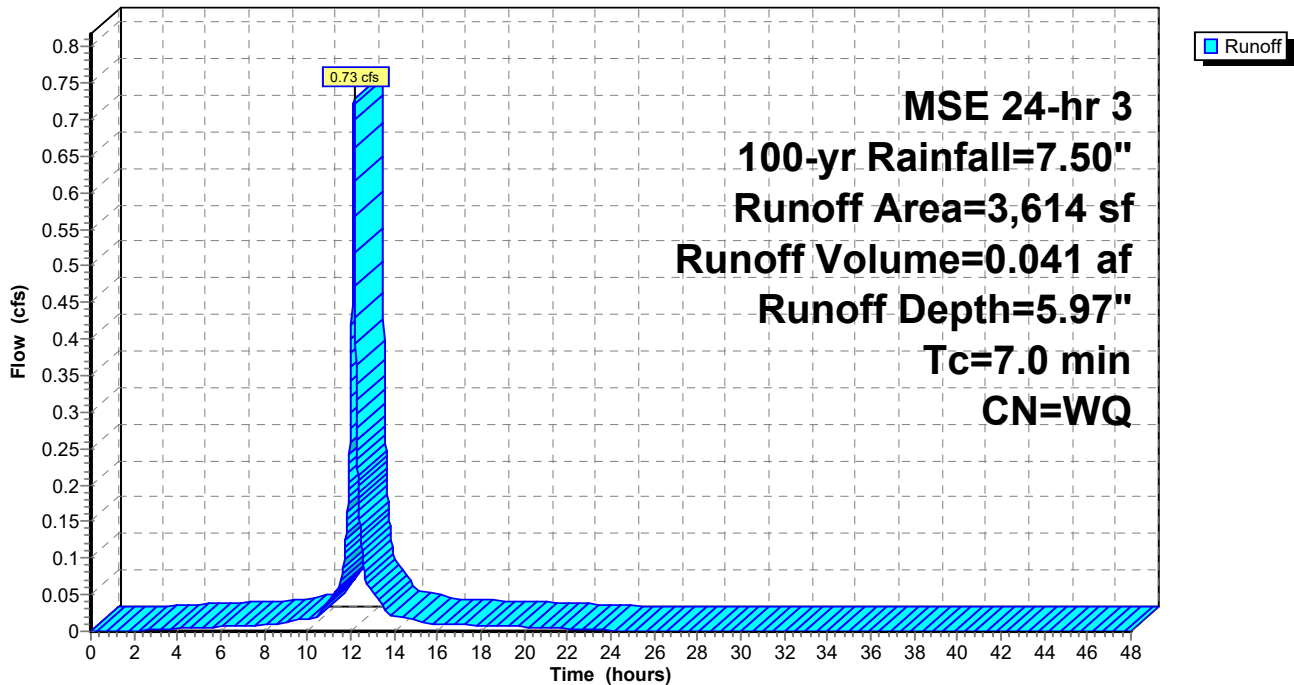
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	2,576	98	Project Area: Impervious Area
*	140	39	Project Area: Pervious Area
*	298	98	Off Site: Impervious Area
*	600	39	Off Site: Pervious Area
	3,614		Weighted Average
	740		20.48% Pervious Area
	2,874		79.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 34S: South: SW: Untreated

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 100-yr Rainfall=7.50"

Prepared by Bolton & Menk, Inc

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Summary for Subcatchment 35S: Existing Chicago SW

all West side of Chicago, and south portion of MWMO drainage area

Runoff = 14.13 cfs @ 12.14 hrs, Volume= 0.800 af, Depth= 5.87"
 Routed to Link 9L : EX: South Leg

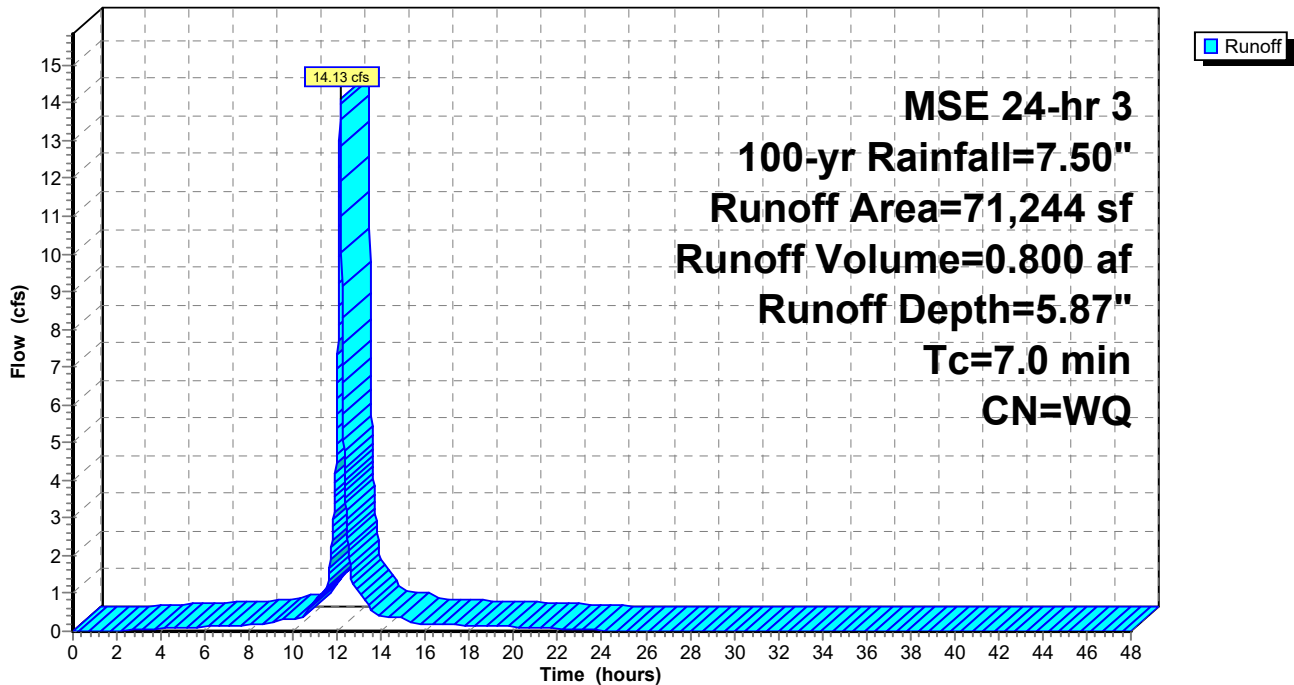
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	26,955	98	Onsite Impervious
*	875	39	Onsite Pervious
*	28,534	98	Offsite Impervious
*	14,880	39	Offsite Pervious
	71,244		Weighted Average
	15,755		22.11% Pervious Area
	55,489		77.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 35S: Existing Chicago SW

Hydrograph



136243_Phase_1_RateControl_90%_WEIR

MSE 24-hr 3 100-yr Rainfall=7.50"

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Summary for Subcatchment 37S: PRO: Chicago SW

Rest of Southwest chicago area

Runoff = 5.67 cfs @ 12.14 hrs, Volume= 0.320 af, Depth= 6.39"
 Routed to Link 10L : PRO: South Leg

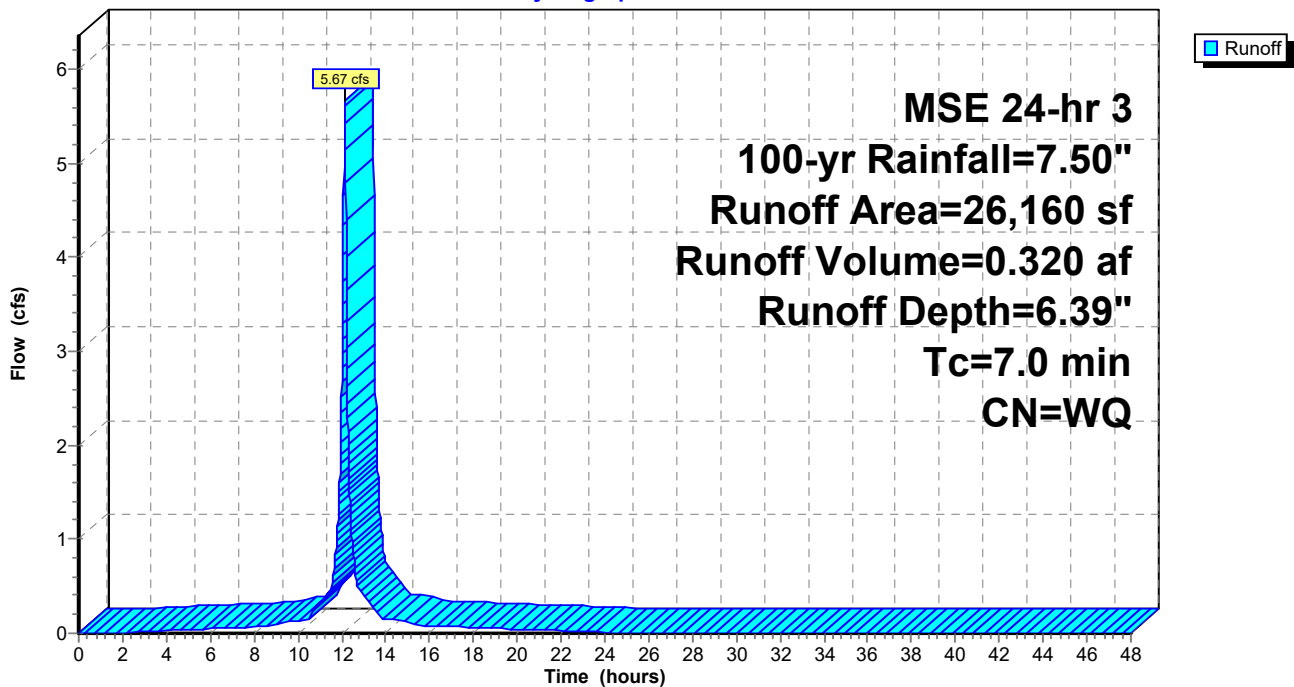
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 MSE 24-hr 3 100-yr Rainfall=7.50"

	Area (sf)	CN	Description
*	4,590	98	Onsite Impervious
*	738	39	Onsite Pervious
*	17,951	98	offsite impervious
*	2,881	39	offsite pervious
	26,160		Weighted Average
	3,619		13.83% Pervious Area
	22,541		86.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					Direct Entry, Min_TOC

Subcatchment 37S: PRO: Chicago SW

Hydrograph



Summary for Pond 12P: EAST: NE

Inflow Area = 0.342 ac, 76.61% Impervious, Inflow Depth = 5.79" for 100-yr event
 Inflow = 2.91 cfs @ 12.14 hrs, Volume= 0.165 af
 Outflow = 2.90 cfs @ 12.15 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.3 min
 Discarded = 0.01 cfs @ 12.03 hrs, Volume= 0.015 af
 Primary = 2.90 cfs @ 12.15 hrs, Volume= 0.149 af
 Routed to Link 8L : PRO: East Leg

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 855.06' @ 12.15 hrs Surf.Area= 448 sf Storage= 286 cf

Plug-Flow detention time= 40.3 min calculated for 0.165 af (100% of inflow)
 Center-of-Mass det. time= 40.3 min (786.7 - 746.4)

Volume	Invert	Avail.Storage	Storage Description
#1	853.75'	1,042 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
853.75	11	0	0
854.00	81	12	12
854.50	242	81	92
854.82	347	94	186
855.00	448	72	258
856.75	448	784	1,042

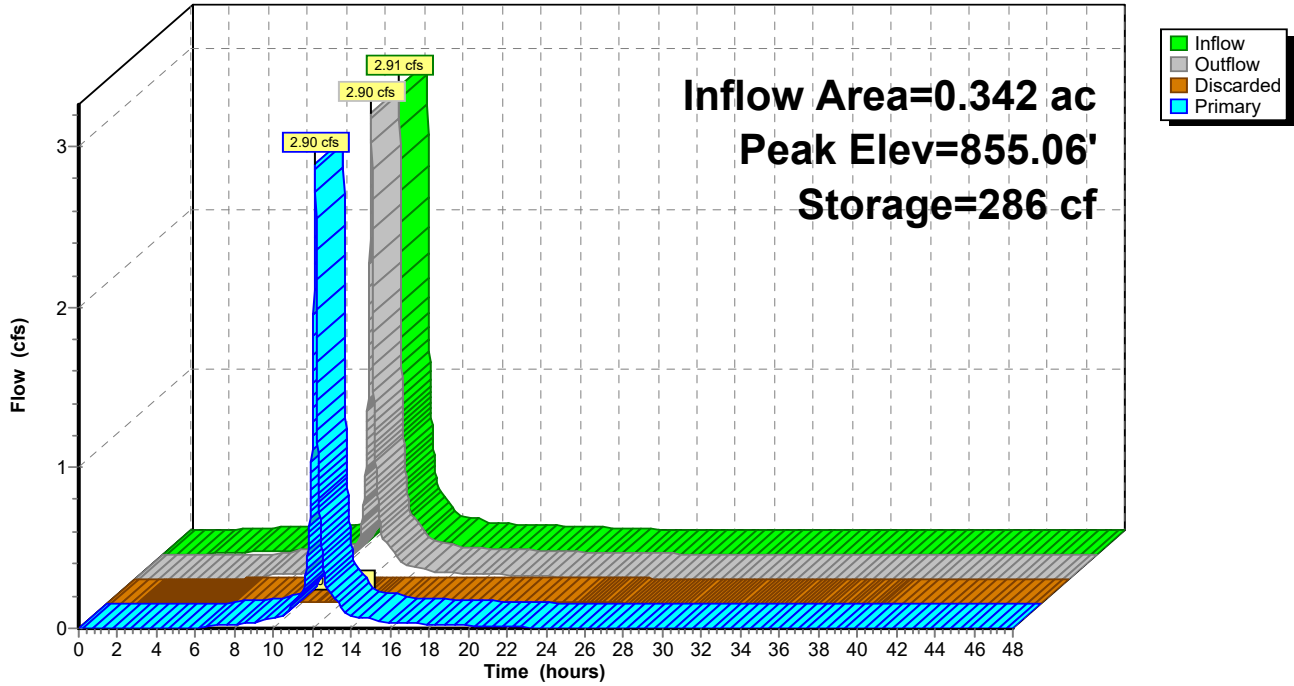
Device	Routing	Invert	Outlet Devices
#1	Discarded	853.75'	0.800 in/hr Exfiltration over Surface area
#2	Primary	854.82'	Asymmetrical Weir, C= 3.27
			Offset (feet) 0.00 17.55 19.55 21.55 22.55 26.03 34.36 40.36
			Elev. (feet) 855.53 855.33 854.82 854.82 855.31 855.30 854.85
			854.94 855.53

Discarded OutFlow Max=0.01 cfs @ 12.03 hrs HW=855.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=2.88 cfs @ 12.15 hrs HW=855.06' (Free Discharge)
 ↑2=**Asymmetrical Weir** (Weir Controls 2.88 cfs @ 0.97 fps)

Pond 12P: EAST: NE

Hydrograph



Summary for Pond 14P: SOUTH: NE

Inflow Area = 1.010 ac, 62.57% Impervious, Inflow Depth = 4.90" for 100-yr event
 Inflow = 7.23 cfs @ 12.14 hrs, Volume= 0.412 af
 Outflow = 7.23 cfs @ 12.14 hrs, Volume= 0.412 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.01 cfs @ 5.79 hrs, Volume= 0.026 af
 Primary = 7.21 cfs @ 12.14 hrs, Volume= 0.387 af
 Routed to Pond 27P : SOUTH: NE - 2nd Cell

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 853.83' @ 12.14 hrs Surf.Area= 568 sf Storage= 529 cf

Plug-Flow detention time= 30.7 min calculated for 0.412 af (100% of inflow)
 Center-of-Mass det. time= 30.9 min (781.9 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	852.25'	2,048 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
852.25	10	0	0
852.50	92	13	13
852.75	211	38	51
853.00	333	68	119
853.50	568	225	344
856.50	568	1,704	2,048

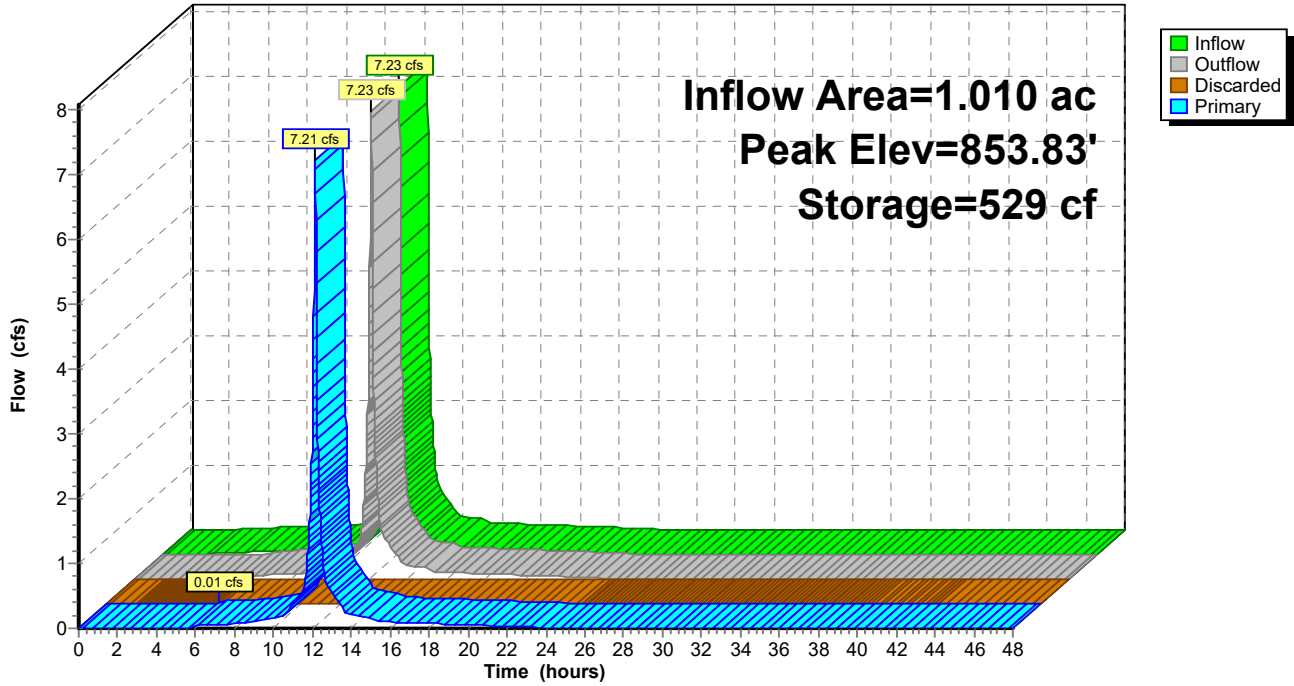
Device	Routing	Invert	Outlet Devices
#1	Discarded	852.25'	0.800 in/hr Exfiltration over Surface area
#2	Primary	853.50'	Asymmetrical Weir, C= 3.27
			Offset (feet) -2.14 0.00 37.51 37.52 44.13 46.03 56.86
			Elev. (feet) 853.99 853.96 853.62 853.50 853.50 853.84 853.99

Discarded OutFlow Max=0.01 cfs @ 5.79 hrs HW=853.50' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=7.18 cfs @ 12.14 hrs HW=853.82' (Free Discharge)
 ↑2=Asymmetrical Weir (Weir Controls 7.18 cfs @ 0.98 fps)

Pond 14P: SOUTH: NE

Hydrograph



Summary for Pond 27P: SOUTH: NE - 2nd Cell

Inflow Area = 1.010 ac, 62.57% Impervious, Inflow Depth = 4.60" for 100-yr event
 Inflow = 7.21 cfs @ 12.14 hrs, Volume= 0.387 af
 Outflow = 7.21 cfs @ 12.15 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.00 cfs @ 6.17 hrs, Volume= 0.008 af
 Primary = 7.21 cfs @ 12.15 hrs, Volume= 0.379 af
 Routed to Link 10L : PRO: South Leg

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 853.10' @ 12.15 hrs Surf.Area= 228 sf Storage= 135 cf

Plug-Flow detention time= 5.7 min calculated for 0.387 af (100% of inflow)
 Center-of-Mass det. time= 5.8 min (764.3 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1	852.25'	738 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
852.25	3	0	0
852.50	100	13	13
852.75	228	41	54
855.75	228	684	738

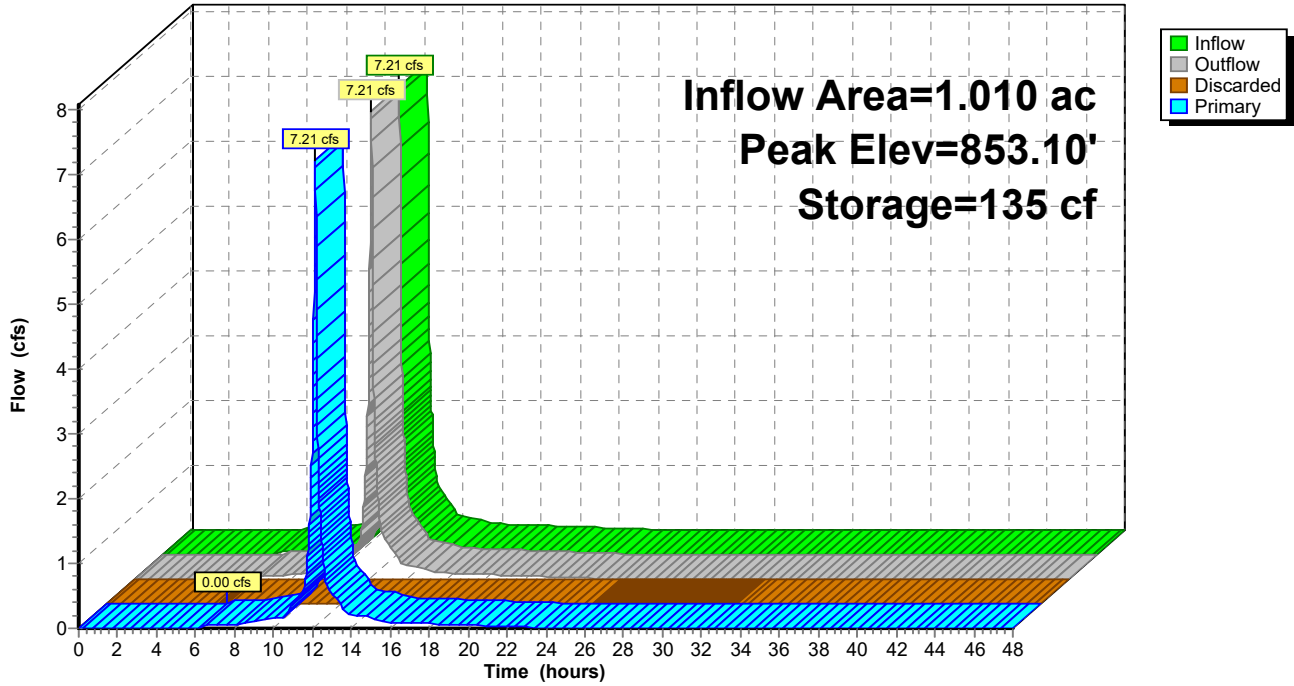
Device	Routing	Invert	Outlet Devices
#1	Discarded	852.25'	0.800 in/hr Exfiltration over Surface area
#2	Primary	852.81'	Asymmetrical Weir, C= 3.27
			Offset (feet) 0.00 2.22 4.22 6.22 8.22 20.05 50.44 55.44 61.27 62.83
			Elev. (feet) 853.44 853.43 852.90 852.90 853.39 853.33 852.81 852.91 853.07 853.44

Discarded OutFlow Max=0.00 cfs @ 6.17 hrs HW=852.75' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=7.15 cfs @ 12.15 hrs HW=853.10' (Free Discharge)
 ↑2=Asymmetrical Weir (Weir Controls 7.15 cfs @ 0.85 fps)

Pond 27P: SOUTH: NE - 2nd Cell

Hydrograph



Primary OutFlow Max=7.03 cfs @ 12.14 hrs HW=853.47' (Free Discharge)

↳4=Asymmetrical Weir (Weir Controls 7.03 cfs @ 0.79 fps)

Secondary OutFlow Max=0.01 cfs @ 12.14 hrs HW=853.47' (Free Discharge)

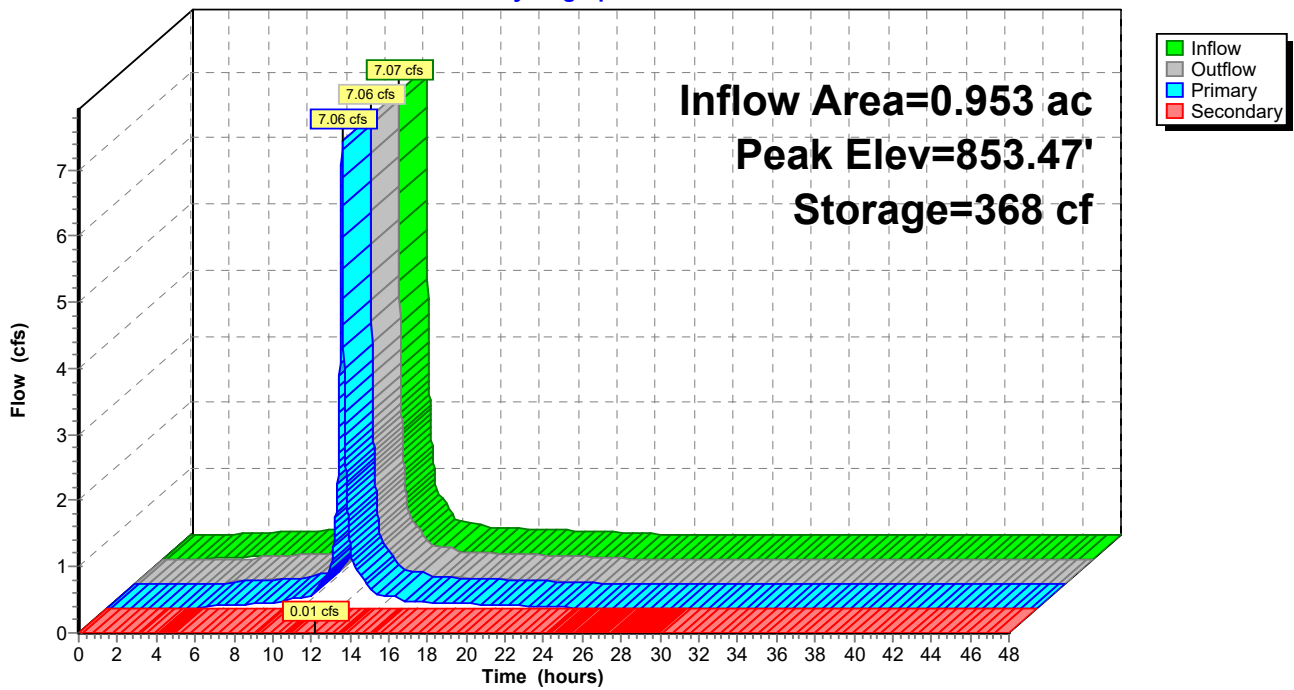
↳3=Pipe_out (Passes 0.01 cfs of 4.05 cfs potential flow)

↳1=DrainTile (Passes 0.01 cfs of 1.04 cfs potential flow)

↳2=Exfiltration (Exfiltration Controls 0.01 cfs)

Pond 32P: South: SW Filtration Basin

Hydrograph



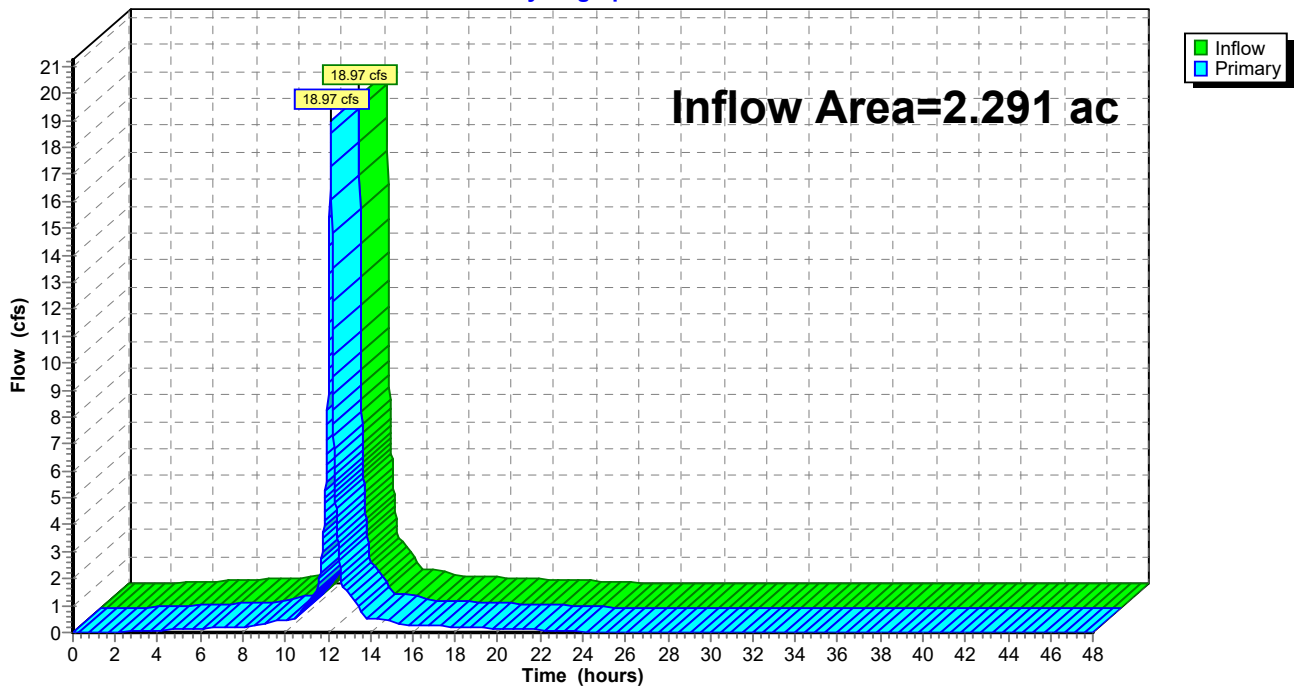
Summary for Link 2L: EX: East Leg

Inflow Area = 2.291 ac, 74.20% Impervious, Inflow Depth = 5.63" for 100-yr event
Inflow = 18.97 cfs @ 12.14 hrs, Volume= 1.076 af
Primary = 18.97 cfs @ 12.14 hrs, Volume= 1.076 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 2L: EX: East Leg

Hydrograph



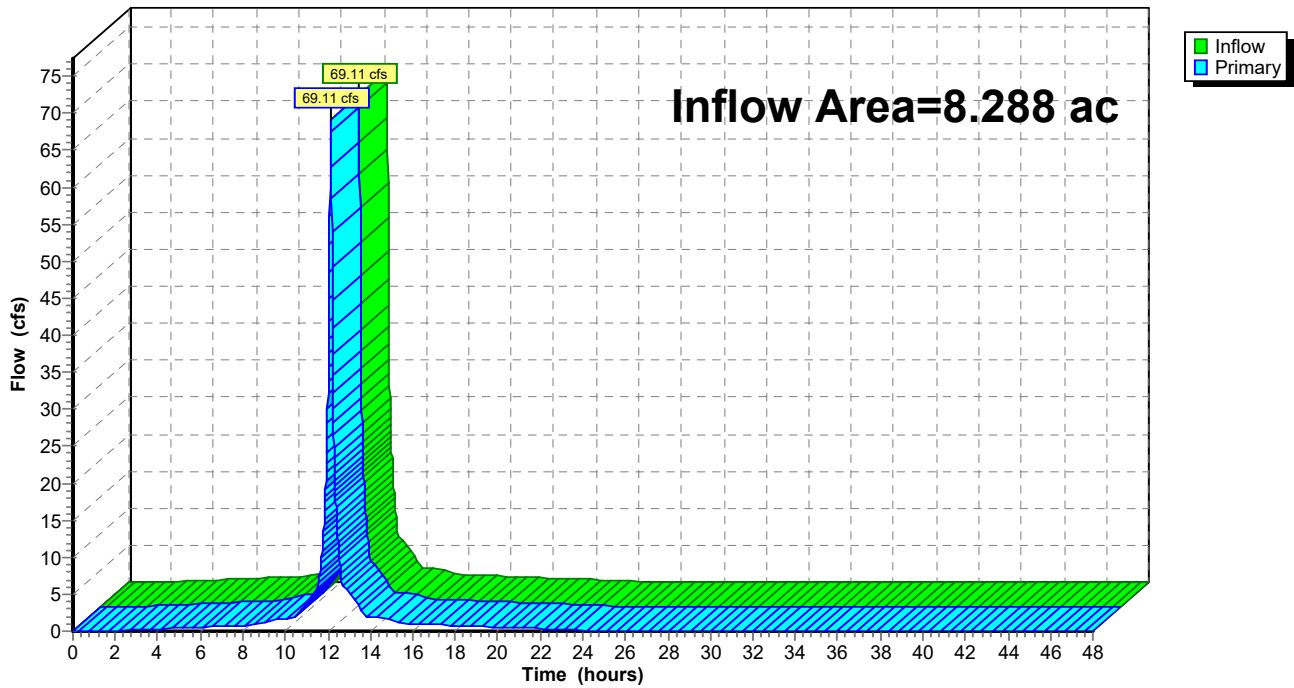
Summary for Link 7L: EX: Total

Inflow Area = 8.288 ac, 74.79% Impervious, Inflow Depth = 5.67" for 100-yr event
Inflow = 69.11 cfs @ 12.14 hrs, Volume= 3.916 af
Primary = 69.11 cfs @ 12.14 hrs, Volume= 3.916 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 7L: EX: Total

Hydrograph



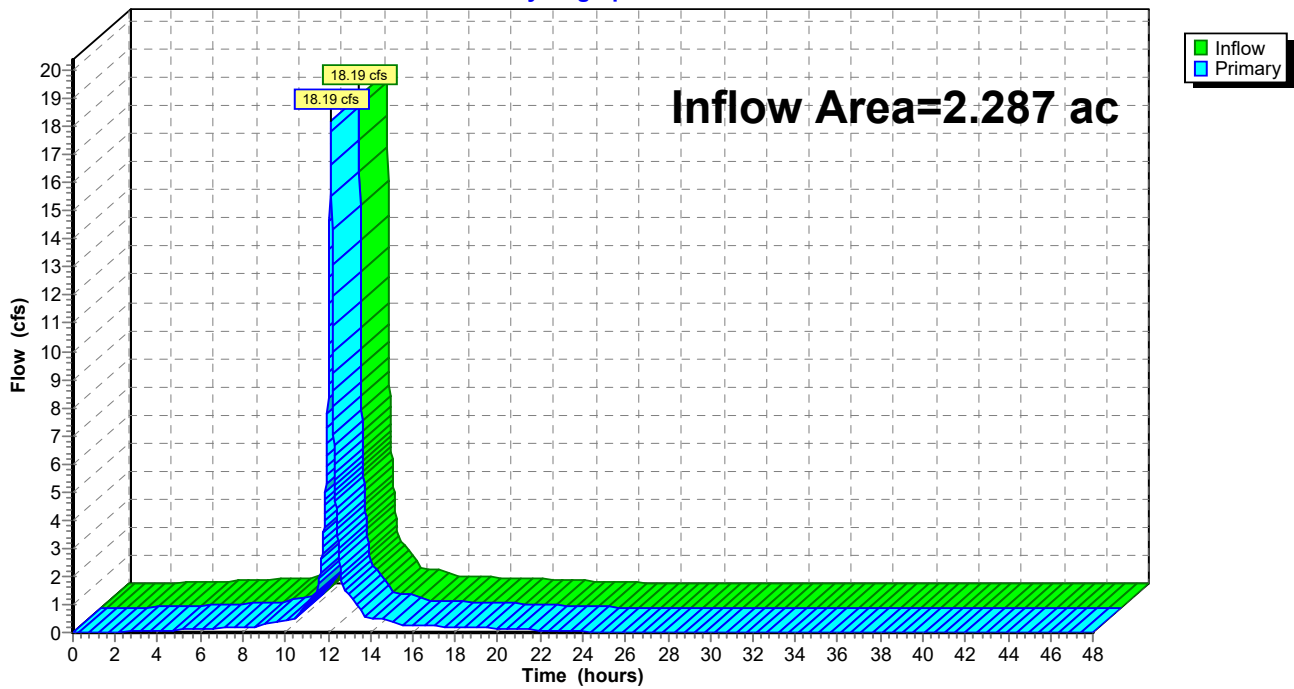
Summary for Link 8L: PRO: East Leg

Inflow Area = 2.287 ac, 70.94% Impervious, Inflow Depth = 5.35" for 100-yr event
Inflow = 18.19 cfs @ 12.14 hrs, Volume= 1.019 af
Primary = 18.19 cfs @ 12.14 hrs, Volume= 1.019 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 8L: PRO: East Leg

Hydrograph



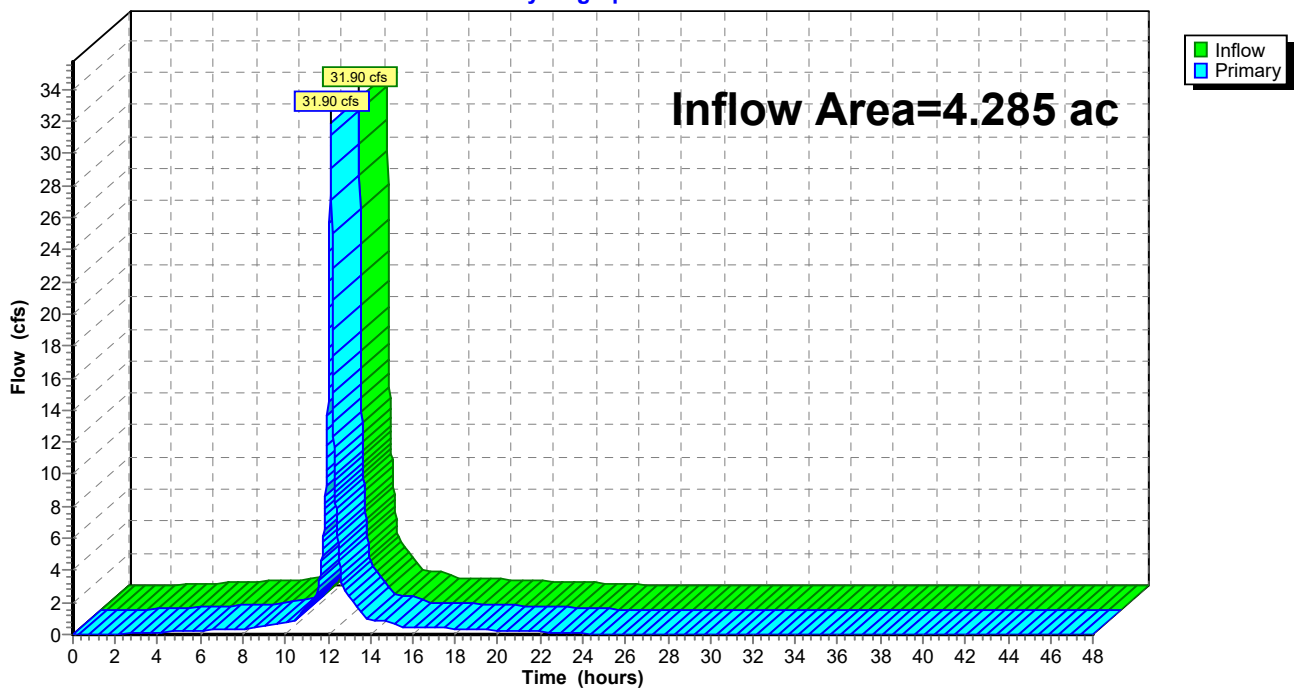
Summary for Link 9L: EX: South Leg

Inflow Area = 4.285 ac, 65.56% Impervious, Inflow Depth = 5.09" for 100-yr event
Inflow = 31.90 cfs @ 12.14 hrs, Volume= 1.817 af
Primary = 31.90 cfs @ 12.14 hrs, Volume= 1.817 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 9L: EX: South Leg

Hydrograph



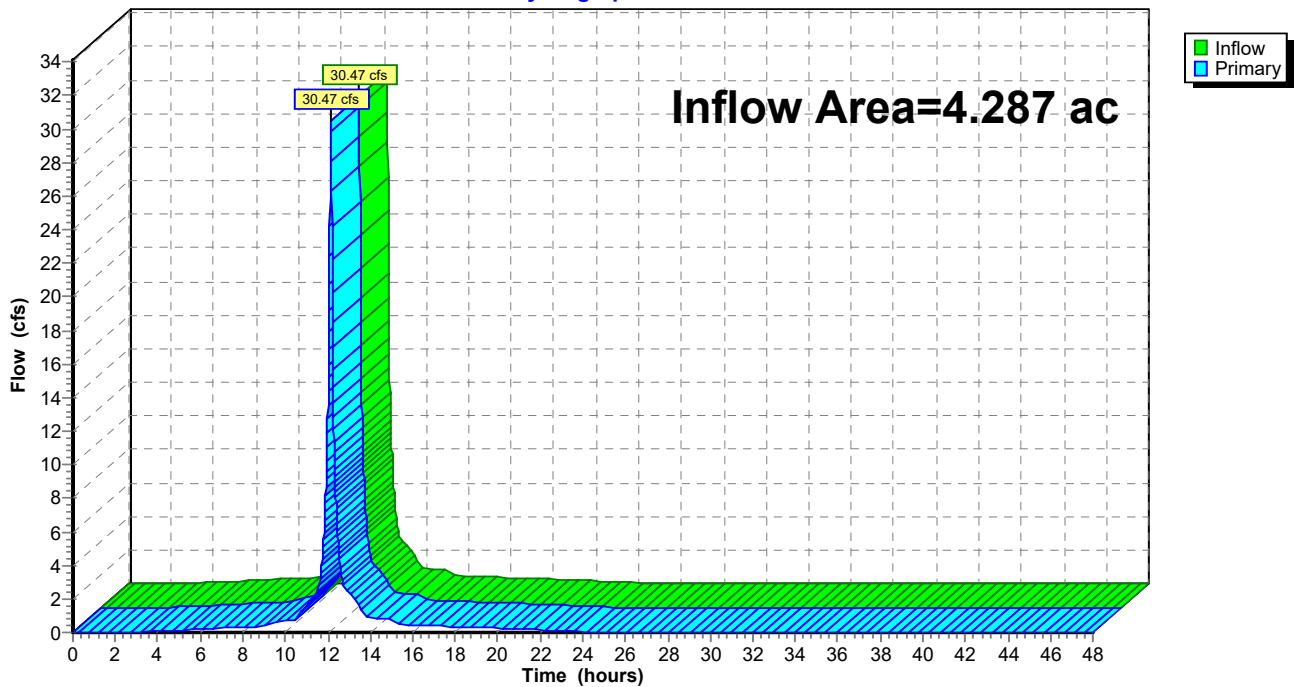
Summary for Link 10L: PRO: South Leg

Inflow Area = 4.287 ac, 62.16% Impervious, Inflow Depth = 4.78" for 100-yr event
Inflow = 30.47 cfs @ 12.14 hrs, Volume= 1.706 af
Primary = 30.47 cfs @ 12.14 hrs, Volume= 1.706 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 10L: PRO: South Leg

Hydrograph



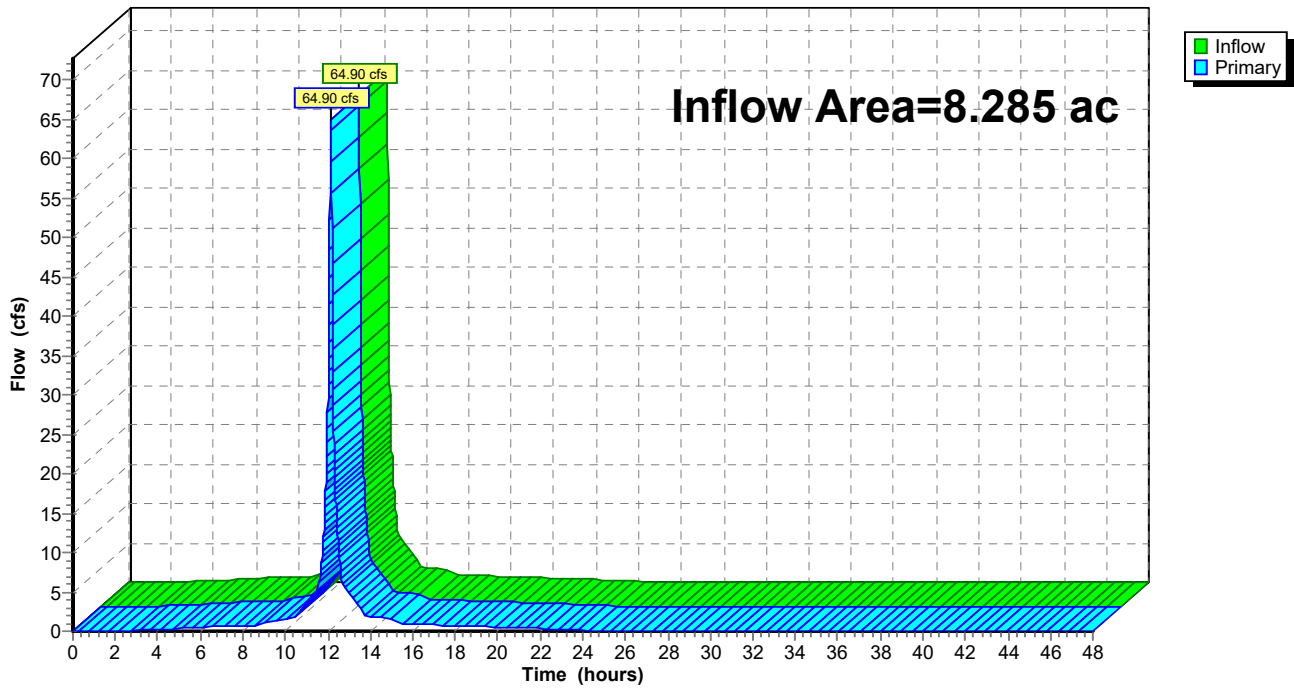
Summary for Link 11L: PRO: Total

Inflow Area = 8.285 ac, 69.65% Impervious, Inflow Depth = 5.27" for 100-yr event
Inflow = 64.90 cfs @ 12.14 hrs, Volume= 3.640 af
Primary = 64.90 cfs @ 12.14 hrs, Volume= 3.640 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 11L: PRO: Total

Hydrograph



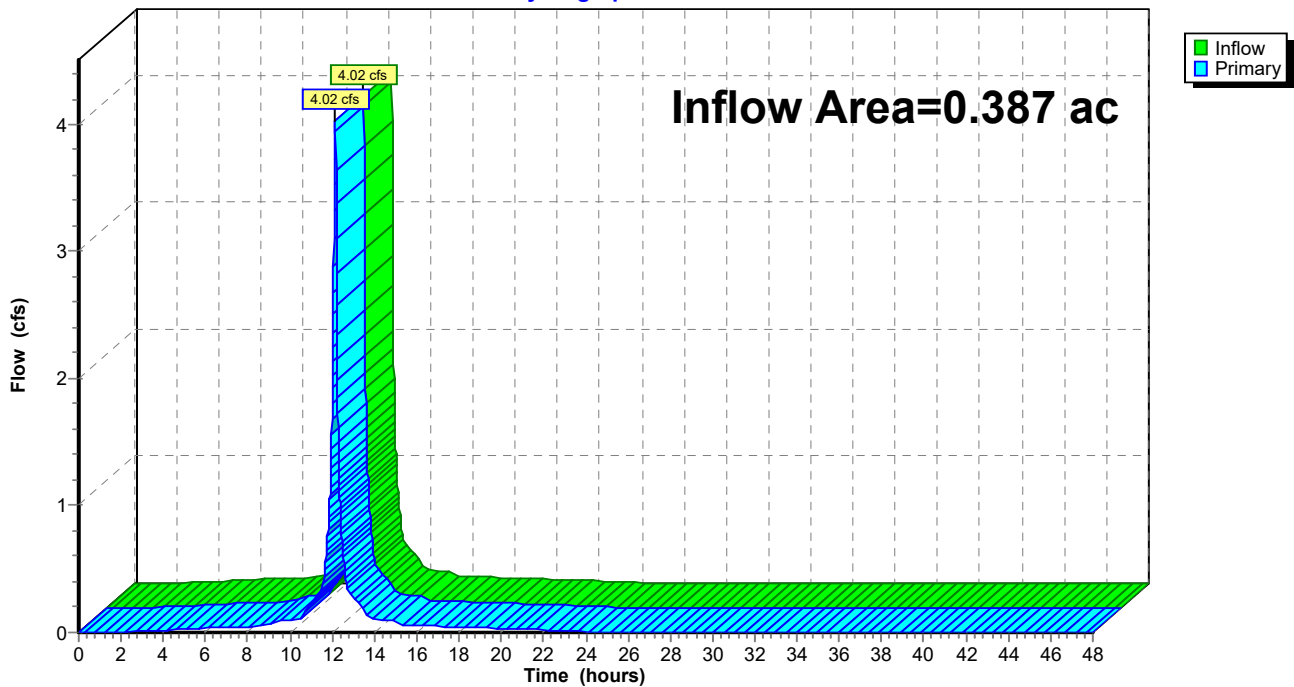
Summary for Link 19L: EX: West Leg

Inflow Area = 0.387 ac, 95.86% Impervious, Inflow Depth = 7.00" for 100-yr event
Inflow = 4.02 cfs @ 12.14 hrs, Volume= 0.226 af
Primary = 4.02 cfs @ 12.14 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 19L: EX: West Leg

Hydrograph



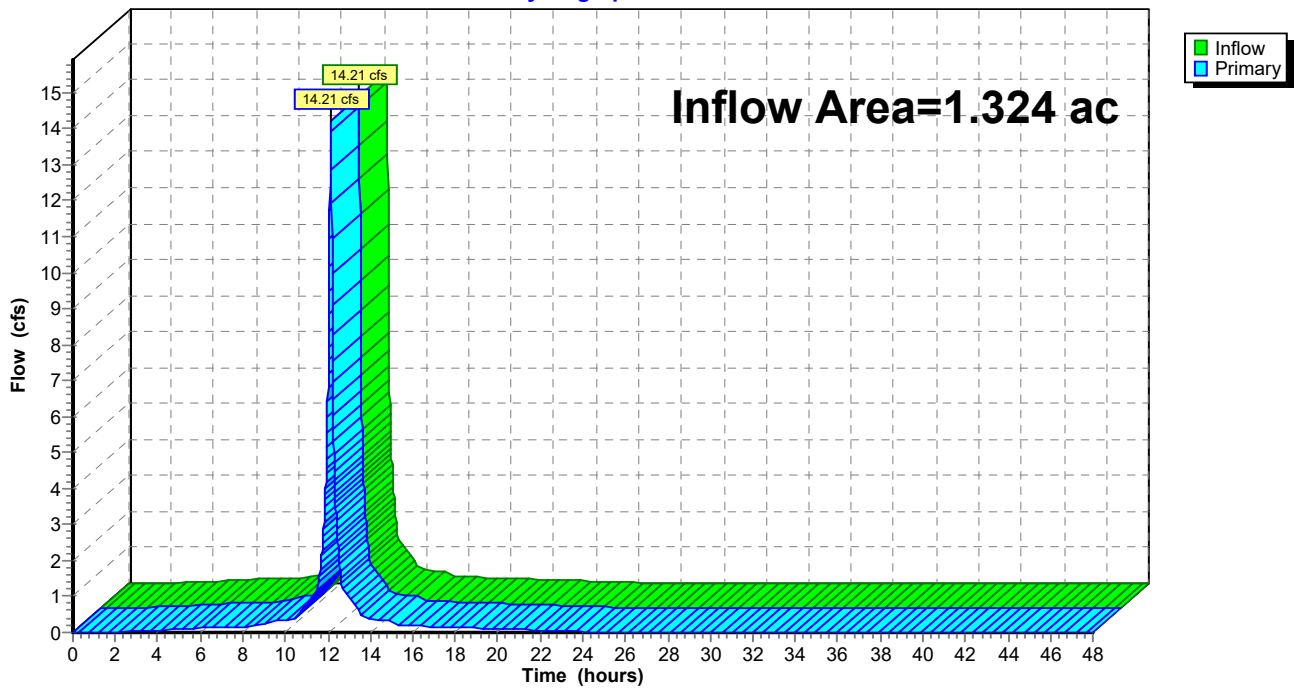
Summary for Link 20L: EX: North Leg

Inflow Area = 1.324 ac, 99.47% Impervious, Inflow Depth = 7.23" for 100-yr event
Inflow = 14.21 cfs @ 12.14 hrs, Volume= 0.797 af
Primary = 14.21 cfs @ 12.14 hrs, Volume= 0.797 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : EX: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 20L: EX: North Leg

Hydrograph



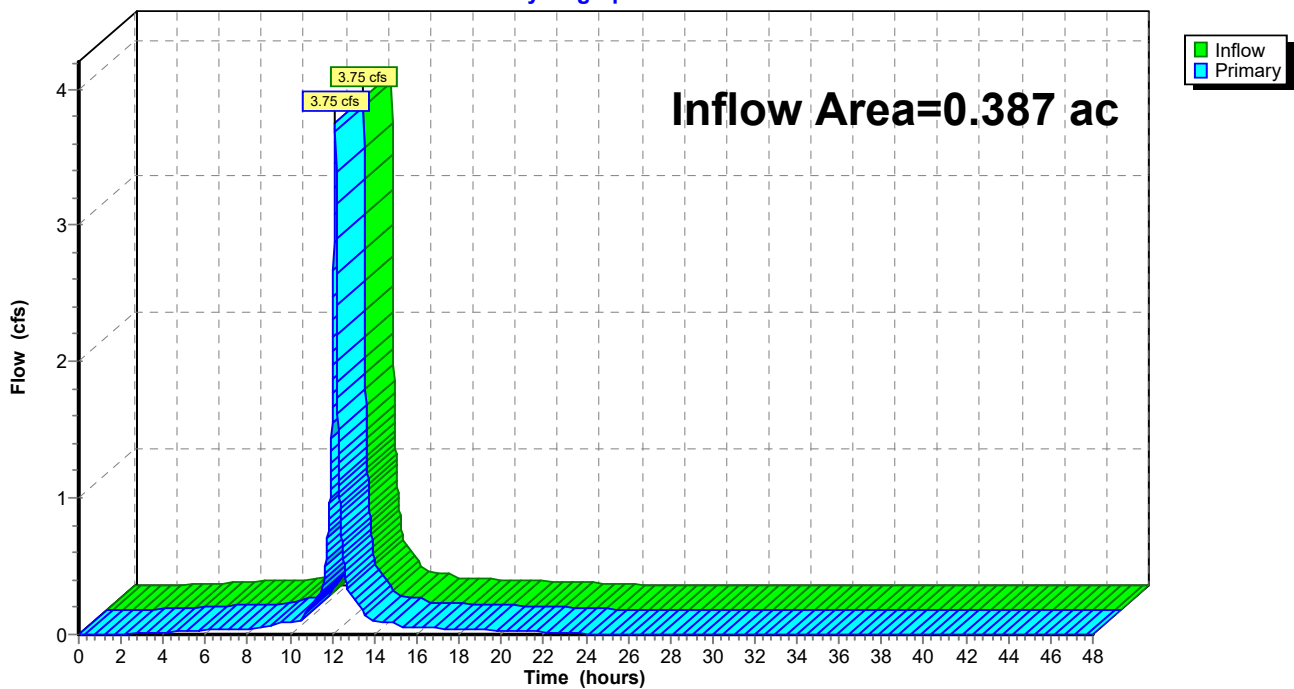
Summary for Link 30L: PRO: West Leg

Inflow Area = 0.387 ac, 88.61% Impervious, Inflow Depth = 6.54" for 100-yr event
Inflow = 3.75 cfs @ 12.14 hrs, Volume= 0.211 af
Primary = 3.75 cfs @ 12.14 hrs, Volume= 0.211 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 30L: PRO: West Leg

Hydrograph



Summary for Link 31L: PRO: North Leg

Inflow Area = 1.324 ac, 86.09% Impervious, Inflow Depth = 6.38" for 100-yr event
Inflow = 12.49 cfs @ 12.14 hrs, Volume= 0.704 af
Primary = 12.49 cfs @ 12.14 hrs, Volume= 0.704 af, Atten= 0%, Lag= 0.0 min
Routed to Link 11L : PRO: Total

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link 31L: PRO: North Leg

Hydrograph

