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PRELIMINARY STORM WATER MANAGEMENT PLAN
BAYSIDE DEVELOPMENT – BUILDINGS B&C

Prepared For:

RINKA+, Inc.

756 North Milwaukee Street, Suite 250

Milwaukee, WI 53202

Prepared By:

Kapur & Associates, Inc.

7711 North Port Washington Road

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OCTOBER, 2022

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1.0 Project Contacts

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2.0 Project Location and Description

The project site is located over several parcels in Village of Bayside, Milwaukee County, Wisconsin. The parcels are located in part of the SE ¼ of the SW ¼ and the SW ¼ of the SE ¼ of Section 5, Township 8 North, Range 22 East, in the Village of Bayside, Milwaukee County, Wisconsin.
Refer to the Plat of Survey of the Plan Set in Appendix F for the exact legal description and figure SWMP-1 in Appendix E for an aerial photo of the existing subject site and SWMP limits.

The project area of the Building B & C Portions of the Bayside Development is approximately 7.95 acres (346,263 sq.ft.). This project is part of a larger development plan called the "Bayside Development". The existing project site is a developed site consisting of existing buildings, asphalt parking lots, asphalt drive lanes, concrete sidewalks, and landscaping.

The proposed project improvements include mass grading, asphalt parking lots, asphalt drive lanes, concrete walkways, utility improvements, and the construction of onsite stormwater management in the form of native landscaping, permeable pavers, and a storm trap underground detention system.

3.0 Soil Information

Geotechnical exploration of the site was conducted by CGC, Inc. The purpose of the exploration was to provide information and geotechnical engineering recommendations about subsurface soil conditions, groundwater conditions, site preparation and earthwork, excavation considerations, pavement design and construction, frost conditions, and stormwater considerations.

A total of nine (9) standard penetration test (SPT) borings were drilled at the site. All nine (9) borings were conducted under the edges of proposed Building C. The complete geotechnical report is provided in Appendix A of this report. The USDA soil types located on this site are shown on the Hydrologic Soil Group (HSG) Map in Appendix A. As shown on the HSG Map, most of the soils on site can be classified as Kewaunee silt loams. These soils are characterized as hydrologic soil classification group "C". Therefore, a soil type of C was assumed for all storm water analyzes provided in this report.

4.0 Hydrology

Hydrologic conditions were modeled using HydroCAD, which is based on TR-55 methodology. Four storm events were analyzed based on the 1-year, 2-year, 10-year, and 100-year recurrence intervals with rainfall amounts of 2.33, 2.63, 3.74, and 6.20 inches per 24 hours, respectively. Rainfall amounts for the selected 24-hour storm events were based on the rainfall values contained in NOAA Atlas 14 for

Milwaukee, Wisconsin. Per Wisconsin DNR Modeling Post-Construction Storm Water Management Treatment, an MSE 3 rainfall distribution was used in the HydroCAD modeling.

Existing and proposed watershed locations and characteristics are provided in Figures SWMP-2 through SWMP-5 in Appendix E. The SWMP limits include all locations of land disturbance and any offsite drainage to the proposed stormwater devices. The SWMP limits were then divided into sub-watersheds based on the areas of captured and uncaptured runoff. Weighted Runoff Curve Numbers (CN) for all existing and proposed watersheds were computed dependent upon the area, soil type, and ground cover. The time of concentration (T_c) for each watershed was determined by selecting the longest runoff flow path (with regards to time, not necessarily distance) within the watershed basin to the point of interest. The T_c values were calculated based on a combination of sheet flow, shallow concentrated flow, and pipe flow with a 6-minute minimum Tc set as the default.

5.0 Storm Water Performance Standards

The post-construction storm water management plan shall comply with Village of Bayside Code of Ordinance Chapter 107 Article III- Storm Water Management, and the DNR requirements of Chapter 151.21 through NR 151.128.

Peak Discharge Control:
Per Village of Bayside Code of Ordinances, Chapter 107 Article III- Stormwater Management, Section 107-49(a)(2), discharge quality standards shall apply to any land development activity which disturbs one or more acres. Per Section 107-50(c), The peak flow discharge rates of stormwater runoff under the post-development conditions shall be controlled and reduced as follows:

a) 100-year post-development peak runoff discharge rate shall not exceed the lesser of the following:
    a. One-half cubic feet per second per acre (0.5 cfs/acre)
    b. Maximum hydraulic capacity of existing downstream conveyance, drainage, or storage facilities; or
    c. The pre-development discharge rate;
b) Two-year post-development peak discharge shall not exceed 0.15 cfs per acre or pre-development discharge rate, whichever is the lesser.

Water Quality/TSS Removal:
Per Village of Bayside Code of Ordinances, Chapter 107 Article III- Stormwater Management, Section 107-50(d), for redevelopment, by design, reduce to the maximum extent practicable, the total suspended solids load by 40 percent, based on the average annual rainfall, as compared to no runoff management controls.

Infiltration:
Per Village of Bayside Code of Ordinance Chapter 107 Article III- Storm Water Management, Section 107-50(f), BMPs shall be designed, installed, and maintained to infiltrate runoff to the maximum extent practicable. Per section 107-50(h)(1), "Areas where the infiltration rate of the soil is less than 0.6 inches/hour measured at the site," are exempt from infiltration requirements. Based on the borings conducted by CGC, Inc., the soils on the site contain clays and have low infiltration rates. Therefore, this project is exempt from the Village of Bayside infiltration standards.

6.0 Pre-Development Site Conditions

The area enclosed by the SWMP limits totals 7.95 acres (346,263 sq. ft.). The pre-developed conditions within the SWMP limits consist of eastern portion of the site which will be developed and a western portion that will remain undisturbed. Refer to Figures SWMP-2 and SWMP-4 in Appendix E for

additional information. Figure SWMP-2 shows the pre-developed site conditions and Figure SWMP-4 provides information on the pre-developed drainage conditions for the storm water management area.

Refer to Table 1 for a summary of the pre-developed site conditions for the project area. Refer to Appendix B for the pre-developed HydroCAD report.

Table 1 – Pre-Developed Watershed Data Summary

Project Name: Bayside Development	**Parcel Size:** X.XX acres	**Project Type:** Commercial Development
Number of Runoff Discharge Points: 1	**Watershed (Ultimate Discharge):** Milwaukee River South	
Project Watershed Area (including off-site runoff traveling through project area): 7.95 acres		
Public Land Survey Location: SE ¼ of the SW ¼ and the SW ¼ of the SE ¼ of Section 5, Township 8 North, Range 22 East, in the Village of Bayside, Milwaukee County, Wisconsin.		

Summary Data Elements	E1 Existing Building C Area	E2 Existing Building B Area
Watershed Area *(see SWMP-2 in Appendix E)*	5.77 acres	2.18 acres
Land Uses **(Acres of Each)**	0.41 Roofs 2.65 Pavement 0.23 Sidewalks 2.48 Grass	0.53 Roofs 1.27 Pavement 0.03 Sidewalks 0.35 Grass
Weighted Runoff Curve Numbers	88	94
Time of Concentration (Tc) *(see SWMP-4 in Appendix E)*	6 minutes	6 minutes
1-year/24-hour Peak Flow *(see Appendix B)*	13.25 cfs	6.59 cfs
2-year/24-hour Peak Flow *(See Appendix B)*	15.91 cfs	7.62 cfs
10-year/24-hour Peak Flow *(See Appendix B)*	25.95 cfs	11.41 cfs
100-year/24-hour Peak Flow *(see Appendix B)*	48.34 cfs	19.67 cfs

7.0 Post-Development Site Conditions

As previously discussed, the area enclosed by the SWMP limits totals 7.95 acres (346,263 sq. ft.). The post-developed site includes the construction of two new buildings, parking lots, drive lanes and sidewalks. and grass restoration with various landscaping. Refer to Figures SWMP-3, and SWMP-5 in Appendix E for additional information. The proposed site development will result in an increase in impervious area of approximately 0.65 acres (28,363 sq. ft.).

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Refer to Table 2 for a summary of the post-development conditions of the watershed for the project area. Refer to Appendix C for the post-development HydroCAD report.

Table 2 – Post-Developed Watershed Data Summary

Project Name: Bayside Development	**Parcel Size:** X.XX acres	**Project Type:** Commercial Development
Number of Runoff Discharge Points: 1		**Watershed (Ultimate Discharge):** Milwaukee River South
Project Watershed Area (including off-site runoff traveling through project area): 7.95 acres		
Public Land Survey Location: SE ¼ of the SW ¼ and the SW ¼ of the SE ¼ of Section 5, Township 8 North, Range 22 East, in the Village of Bayside, Milwaukee County, Wisconsin.		

Summary Data Elements	P1 Captured to North Permeable Pavers	P2 Captured to West Permeable Pavers	P3 Captured to South Permeable Pavers	P4 Captured to East Permeable Pavers	P5 Captured to SS	P6 Southwest Area
Watershed Area *(see SWMP-5 in Appendix E)*	0.66 acres	1.11 acres	0.57 acres	0.43 acres	2.99 acres	2.1 acres
Land Uses (Acres of Each)	0.33 Pavement 0.18 Sidewalks 0.15 Grass	0.75 Pavement 0.14 Sidewalks 0.22 Grass	0.34 Pavement 0.15 Sidewalks 0.08 Grass	0.26 Pavement 0.14 Sidewalks 0.03 Grass	0.81 Roof 0.67 Pavement 0.16 Sidewalks 1.35 Grass	2.18 CN 95
Weighted Runoff Curve Numbers	93	93	95	96	87	95
Time of Concentration (Tc) *(see SWMP-5 in Appendix E)*	6.0 minutes	6 minutes	6 minutes	6 minutes	6 minutes	6 minutes
1-year/24-hour Peak Flow *(see Appendix C)*	1.91 cfs	3.23 cfs	1.80 cfs	1.39 cfs	6.52 cfs	6.84 cfs
2-year/24-hour Peak Flow *(See Appendix C)*	2.22 cfs	3.76 cfs	2.07 cfs	1.59 cfs	7.89 cfs	7.86 cfs
10-year/24-hour Peak Flow *(See Appendix C)*	3.37 cfs	5.70 cfs	3.06 cfs	2.32 cfs	13.07 cfs	11.62 cfs
100-year/24-hour Peak Flow *(see Appendix C)*	5.88 cfs	9.94 cfs	5.22 cfs	3.93 cfs	24.70 cfs	19.84 cfs

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8.0 Post-Development Summary

To best manage storm water runoff from the post-developed site, permeable pavers will be utilized to improve water quality and a subsurface storage system to reduce peak discharge. The permeable pavers and subsurface storage system will treat storm water runoff from site and discharge it at a controlled rate to meet the quantity, and quality requirements set by the WDNR and Village of Bayside Code of Ordinances.

Total Storm Water Flows/Peak Discharge Requirements

Table 3 summarizes the proposed outflow rate of the post-developed site versus pre-developed conditions.

Table 3 – Total Storm Water Flow Leaving Site
(See Hydrographs in Appendices B & C)

Design Storm	Pre-Developed Peak Discharge Rate	Post-Development Peak Discharge Rate
1-yr/24-hour	19.83 cfs	**1.09 cfs**
2-yr/24-hour	23.53 cfs	**1.18 cfs**
10-yr/24-hour	37.36 cfs	**1.48 cfs**
100-yr/24-hour	68.01 cfs	**3.73 cfs**

As detailed in Table 3, the post-development peak discharge rates for the 1-, 2-, 10- and 100-year storm events are less than the existing peak discharge rates of the 1-, 2-, 10- and 100-year storm events. **Therefore, this site meets the peak discharge requirements of the Village of Bayside Code of Ordinances and DNR requirements of Chapter 151.21 through NR 151.128.**

Table 4 – Total Storm Water Flow Leaving Site
(See Hydrographs in Appendices B & C)

Design Storm	Required Unit Release	Post-Development Peak Discharge Rate
2-yr/24-hour	1.19 cfs	**1.18 cfs**
100-yr/24-hour	3.98 cfs	**3.73 cfs**

As detailed in Table 4, the post development peak discharge rates are less than the required unit release rates for the 2- and 100-year storm events.
Therefore, this site meets the peak discharge requirements of the Village of Bayside Code of Ordinances and DNR requirements of Chapter 151.21 through NR 151.128.

Total Suspended Solids/Water Quality Requirements

Table 5 – WinSLAMM Model Output Results (See Model Output Attachment in Appendix D)	
Required TSS Reduction	**Modeled TSS Reduction**
40%	54.07%

Based on the WinSLAMM analysis, the post-developed site reduces TSS by 54.07% exceeding the required reduction of 40% TSS removal. **Therefore, the site meets the water quality requirements of DNR requirements of Chapter 151.21 through NR 151.128.**

Appendix A

CGC Inc. Geotechnical Exploration

Web Soil Survey Report

Depth to Water Table

CGC, Inc.
Construction • Geotechnical
Consulting Engineering/Testing

August 30, 2022
CM22149

Mr. Scott Yauck
Bayside Development Partners II, LLC
c/o Cobalt Partners, LLC
400 North Broadway, Suite 100
Milwaukee, WI 53202

Re: Geotechnical Exploration Report
Proposed Multi-Family Building C Development
8907 N. Port Washington Road
Bayside, Wisconsin

Dear Mr. Yauck:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the subsurface exploration program for the above-referenced project. The purpose of this program was to evaluate the subsurface conditions within the proposed construction area and to provide geotechnical recommendations regarding site preparation, foundation, floor slab, below-grade wall, retaining wall and pavement design/construction. A determination of the site class for seismic design is also included, along with a discussion of the on-site stormwater infiltration potential. We are providing you an electronic copy of this report and can provide paper copies upon request. An electronic copy of the report has also been forwarded to Mr. Bill Ohm of your office.

PROJECT AND SITE DESCRIPTION

We understand that a new multi-family/residential development is proposed at 8907 N. Port Washington Road in Bayside, Wisconsin. The proposed development will include adjoining portions of five separate properties. These properties include 777 W. Glencoe Place, 707 W. Glencoe Place, 601 W. Glencoe Place, and the northern portions of 500 W. and 600 W. Brown Deer Road. Based upon review of aerial imagery available on Milwaukee County GIS, former structures once occupied the 601, 707 and 777 West Glencoe Place properties. It is our understanding the structure at 601 W. Glencoe Place contained a basement level and was demolished 20+ years ago. The structure at 777 W. Glencoe Place was demolished in 2021/2022 and the resulting basement level was backfilled in an engineered manner and CGC performed field density testing during this operation. The building at 707 W. Glencoe Place was a slab on grade structure (i.e., no basement level) and was reportedly demolished around 2020. The floor slab and foundation elements were reportedly removed as part of the demolition operation, but no testing was performed during the backfilling of the resulting excavations. At the time of this report, no further details regarding the vertical and lateral extent of the basement level for the former building at 601 W. Glencoe Place property were available, or the full scope of the demolition completed. This former structure appears on aerial images dated between 1975 and 2010. The existing pavements at the adjoining parcels are planned to be removed to accommodate the new development.

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The proposed structure will consist of a 5-story above grade building measuring 37,450 sq ft in plan area, which will be situated over one level of below-grade parking throughout the entire building footprint. The below grade walls and floor level will be of concrete/masonry construction, with the ground level floor (level 1) and the ground floor roof (level 2) consisting of precast concrete elements or cast-in-place, post-tensioned decks. The ground floor elevation is planned to be established at EL 695. The below grade level is anticipated to be about 12 ft below the ground floor elevation, at about EL 683. The ground level will house the Village library, while the remaining above grade levels will be utilized for residential housing units and will be of wood frame construction.

Based upon past experience with similar structures, maximum column loads are expected to be on the order of 500 kips, with maximum wall loads expected to be on the order of 9 to 10 klf. In most cases, footing grade for the below grade level is generally expected to be about 2.5 to 3 ft below parking level slab grade. However, basement elevator pit footings and frost depth footings at the below grade entry drive at the northwest corner of the structure will likely be about 4 to 5 ft below parking level slab grade.

The development will also include new asphaltic surface parking and drive lanes surrounding the building. Some of the pavement will be designed as permeable pavement for stormwater management purposes. The main access drive to the development will connect with existing Port Washington Road at the northeast corner of the site.

Retaining walls will likely be included along both sides of the entry drive leading down into the below grade parking level at the northwest building corner. The type of retaining wall proposed is not indicated. It is expected to be up to about 12 ft in height.

Stormwater management for the development is planned to consist of the above-mentioned permeable pavements, as well as several bio-swale areas along the north side of the site. An underground detention chamber will also be included on the east side of the site with a bottom elevation of EL 682.

The site is flat and relatively level. Site grades generally range from about EL 690 at the northeast corner to about EL 694 ft on the west side of the site. Based upon existing and proposed grades, the site will generally require cuts and fills of up to about 2 ft achieve the planned site surface grades. However, excavation of about 10 to 11 ft below existing grades will be required within the building footprint to reach the proposed below-grade level.

SUBSURFACE CONDITIONS

Subsurface conditions on site were explored by drilling a total of nine (9) Standard Penetration Test (SPT) borings. The borings were extended to planned depths of 35 to 45 ft below existing site grades. The borings were performed at locations selected by CGC and the structural engineer. They were located in the field by CGC. The borings were drilled on July 21 and 22, and August 2, 3 and

4, 2022, by J&J Soil Testing, Ltd. (under subcontract to CGC) using a truck-mounted CME-45 rotary drill rig equipped with hollow-stem augers and a hammer actuated by a rope/cathead winch combination for SPT sampling. The specific procedures used for drilling and sampling are described in Appendix A. The approximate soil boring locations are shown in plan on the Soil Boring Location Map attached in Appendix B. The ground surface elevations were determined by CGC's drilling subcontractor referencing the west flange bolt on the hydrant at the southwest corner of the 601 W. Glencoe Place property as a temporary benchmark, with a reference elevation of EL 694.65 ft. They should be considered accurate to within a foot.

The subsurface profiles at the boring locations were fairly consistent across the area explored. A generalized profile can be described by the following strata (in descending order):

- The surface of the site contained about 1 to 12 in. (most commonly in the range of 4 to 7 in.) of ***dark brown clayey topsoil fill.*** The surface materials were underlain by;

- About 1 to 7.5 ft of ***fill consisting of brown to dark brown lean clay with occasional intermixed rubble***, with the thickest fill deposit noted at Boring 5. The fills are underlain by;

- Predominantly ***very stiff to hard, natural brown slightly mottled lean clay,*** with little sand and trace gravel content, extending to depths of about 10.5 to 13 ft below the existing site grades. *Occasional wet sand seams were encountered within this stratum.* This upper natural clay layer is underlain by;

- ***Medium stiff/stiff to very stiff grayish brown lean clay*** which generally extends to the termination depths of the borings. *This stratum generally contained scattered wet pockets at various depths.*

Exceptions to the above-described conditions were noted as follows:

- Fill soils were not apparent below the surface topsoil within Boring 4 prior to encountering the natural clay soils.

- Dense gray brown silty fine sand was encountered within Boring 9 beginning at a depth of about 42.5 ft below the ground surface and extending to the boring termination depth.

Natural moisture contents of representative clay samples measured in our laboratory ranged from 13.0% to 21.3%, indicating moist to very moist conditions. Based on natural moisture contents, pocket penetrometer readings (q_p; an estimate of the unconfined compressive strength of cohesive soils) and SPT blow counts (N-values), the medium stiff cohesive soils typically present in the subsoil profile below a depth about 10.5 ft should generally be considered slightly compressible.

Groundwater was generally not encountered in the borings during or upon completion of drilling, with the exception of an apparent perched groundwater condition encountered within the upper fill or

interbedded sand seams at depths ranging from about 3 to 6.5 ft below existing site grades at Borings 5, 6 and 9, which corresponds to approximately EL 686.0 to 689.5 ft. The site's subsurface profile overall appears to be subject to the development of shallow perched zones within the upper fill deposit and within more permeable sand/silt seams and layers interbedded within the predominant low permeability clay soils. Groundwater levels are expected to fluctuate with seasonal variations in precipitation, infiltration, evapotranspiration, and other factors.

A more detailed description of the site soil and groundwater conditions is presented on the Soil Boring Logs attached in Appendix B.

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations and design considerations discussed below and based on the subsurface exploration, it is our opinion that the site is suitable for the proposed construction following proper site preparation, and that the structure can be supported by conventional spread footing foundations bearing on suitable native soils.

Note that the soils anticipated at the planned footing and floor slab elevations will be extremely sensitive to exposure to moisture and construction disturbances and will contain occasional wet sand seams and wet pockets. Subgrade protection/stabilization will be required during excavations for footings and the floor slab. Some dewatering may also be required due to the presence of shallow perched zones that may be intercepted within the basement excavation. Additionally, some undercutting of footing subgrades is also expected to be necessary in areas to reach suitable bearing strength soils for foundation support.

Stabilization and/or removal and replacement of soft/loose soils pre-existing fill soils may be required for subgrade preparation during general site grading activities. The degree of remediation required will be dependent on the planned bearing grades in relation to the existing fill soils. Remediation efforts will also be somewhat dependent upon weather conditions at the time of construction. Performing earthwork activities on this site during warmer/dryer periods will be beneficial.

Our recommendations for site preparation, foundation, floor slab, below-grade wall, retaining wall and pavement design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

1. Site Preparation

We recommend that topsoil and pavements be stripped at least 10 ft beyond the proposed construction areas, including areas requiring fill beyond the proposed building footprint and pavement limits. The topsoil can be stockpiled on-site and later re-used as fill in landscaped areas. As mentioned earlier, topsoil was most commonly encountered in the range of about 4 to 7 in. thick

at the soil boring locations. However, it was encountered as thin as about 1 inch and as thick as about 12 inches. Therefore, variable thicknesses should be expected between and beyond boring locations.

Areas of unsuitable backfill material may be encountered within existing utility trenches and adjacent to any former basement or below grade excavation areas, which will require removal. The areas, including basements (if any), must then be properly backfilled with engineered granular backfill compacted to a minimum of 95% compaction (ASTM D1557). Prior to the backfilling, the areas must be observed by CGC to evaluate the suitability of the subgrade for subsequent support of the new pavements, utilities, or other planned structures.

We recommend that existing utility lines (if any) that pass through the footprint of the planned building be removed and rerouted outside the building area in conjunction with initial site preparation activities. The resultant trenches from removal of former utilities should subsequently be backfilled with suitable compacted granular soils, unless excavation for the proposed basement level will extend back through these zones.

After the above-described stripping and removal operations are completed at the surface of the site, the exposed soils are expected to predominantly consist of fine-grained cohesive fill soils based upon the borings performed. Overall, the fill soils exhibited variable strength and composition with areas of intermixed rubble and possible zones of more concentrated rubble. These soils were in very moist to wet conditions in areas. As such, areas of instability may be encountered on this site, should the surficial fill deposits encountered in the borings extend beyond the planned building footprint. In areas remaining at-grade or requiring fill, we recommend that cohesive soils be statically recompacted (i.e., without vibration) and subsequently proof-rolled with a piece of heavy rubber-tired construction equipment, such as a loaded tri-axle dump truck, to check for soft/yielding areas. Where unstable areas are encountered, an initial attempt should be made to aerate and densify the subgrade by recompaction where natural moisture contents are at appropriate levels (i.e., on the dry side of optimum moisture content). *However, drying and recompacting is highly weather dependent and could require multiple cycles of drying and recompacting to create an adequate stable subgrade. This will also be dependent on the depth of unstable soils present in the various areas of the site. Thick zones of unstable soils will likely not benefit from surficial drying/recompacting.* If the above procedure is ineffective or infeasible, unstable soils should be undercut and replaced with suitable granular backfill compacted to at least 95% compaction based on modified Proctor methods (ASTM D1557) in accordance with our Recommended Compacted Fill Specifications presented in Appendix D. Alternatively, 3-in. dense graded base (DGB) that is placed in loose 10-in. lifts and compacted until deflection ceases can be used to restore grades in undercut areas. In some cases, it may be necessary to perform limited undercutting (on the order of 1.5 to 2± ft) and compact a layer of coarse crushed aggregate stabilizing material, such as an imported 3-in. breaker rock or Select Crushed (WisDOT Section 312) material, into the subgrade to create stability. A relatively firm, non-yielding subgrade should be established prior to proceeding with fill placement. Incorporation of a woven geotextile fabric (e.g., Mirafi 600X or equivalent) and/or appropriately specified biaxial geogrids may need to be incorporated over undercut and/or disturbed

subgrades, prior to stone placement, should instability concerns arise. Granular subgrades (if encountered) should be thoroughly recompacted with a vibratory smooth-drum roller, and zones that remain loose after recompaction should be undercut and replaced as described above. The proof-rolling, and any undercutting and stabilizing activities, should be monitored and documented by a representative of CGC and should be performed during dry weather conditions. Areas subsequently receiving fill should be checked for their pavement support suitability prior to fill placement.

Once a firm and stable subgrade is achieved, fill placement (where required) to establish pavement area subgrades throughout the development site can then proceed. To the extent possible, the use of granular soils (i.e., sands/gravels) as structural fill within pavement areas is preferred because these soils are relatively easy to place and compact in most weather conditions compared to clay/silt soils. The use of the on-site materials in structural areas will require close observation on a regular basis during fill placement including the monitoring of moisture contents, compaction levels, and the overall stability of the prepared fill subgrade. Significant moisture conditioning (drying) of these materials should be anticipated to achieve desired compaction levels, due to existing moisture conditions within the on-site soils, which could delay construction progress. Moisture conditioning by discing and drying (aeration) will likely be required to achieve desired compaction levels, which is highly weather-dependent (i.e., dry, warm and windy conditions). Additional difficulty should be anticipated if fill placement proceeds during wet periods of the year. We recommend that fills placed within designated structural areas on the site be compacted to 95 percent of modified Proctor (ASTM D1557). Field density tests should be taken by CGC staff during fill placement to document the adequacy of the compactive effort.

Based on the depth of the below grade level below existing site grades and the findings at Boring 5 (i.e., 8 ft of fill in suspected former basement area), it is anticipated that the base of the building excavation will bypass and/or extend below the former basement floor and/or footing grades. However, to minimize the potential for differing site conditions to occur during construction, we recommend that any archived files available for the former building be researched to confirm the depth and lateral extent of the former basement footprint. We also recommend that an exploratory test pit program be completed in advance of construction to allow an evaluation of the existing backfill materials to be made between the fairly widely-spaced borings completed for this exploration. Based upon the findings at Boring 5, the backfill materials appear to contain considerable construction-related debris that may require off-site disposal.

2. Foundation Design

In our opinion, the proposed building can be supported on reinforced concrete spread footing foundations bearing on the stiff to hard natural lean clay that is generally anticipated at the planned foundation bearing grades. *However, the basement excavation is expected to extend below perched groundwater zones in areas, so some dewatering will likely be required (at least on an isolated basis). Additionally, due to the generally higher moisture conditions present on this site and the sensitivity of the fine-grained clay soils to strength loss when disturbed, it is recommended that subgrade protection with a thin 4± inch thick lean mix concrete "mud mat" be provided as necessary*

for footing subgrades, immediately upon excavation, particularly if footing concrete placement does not proceed the same day of excavation. Accordingly, the following parameters should be used for foundation design:

- **Maximum net allowable bearing pressure:**
  -- Footings bearing upon stiff to hard natural lean clay: 4,000 psf

- **Minimum foundation widths:**
  -- Continuous wall footings: 18 in.
  -- Column pad footings: 30 in.

- **Minimum footing depths:**
  -- Exterior/perimeter footings: 4 ft
  -- Interior footings: no minimum requirement

- **Seismic Site Class:**
  In our opinion, the average soil properties in the upper 100 ft of the site (based on cohesive soils exhibiting undrained shear strengths greater than 2,000 psf on average) can be characterized as a very dense soil profile. This characterization would place the site in ***Class C*** for seismic design according to International Building Code (see Table 1613.5.2).

Undercutting below footings will be required where native clays with pocket penetrometer readings (an estimate of the unconfined compressive strength of cohesive soils) of less than 1.5 tsf are encountered at or slightly below footing grade (such as possibly at/near the locations of Borings 6 and 9 where somewhat weaker clays were encountered at/near the estimated bearing grade). Additionally, undercutting may also be necessary where adequate dewatering is not achieved, and where excavations encroach upon or extend below groundwater/perched levels. *Note that wet sand seams and scattered wet pockets were encountered within the anticipated range of bearing depths. Such materials will likely need to be undercut to reach suitable bearing soils. Based upon the borings performed, depths of undercutting below the estimated bearing grade where softer/wetter zones are encountered are generally expected to be about 1 to 2 ft or less.*

Where undercutting is required, and considering the general recommendation for placement of a lean mix concrete mud mat to protect footing subgrades from disturbance, structural lean-mixed concrete (having minimum 28-day compressive strength of 500 psi) can also be used to restore footing grade. Where lean mix concrete is used, the width of the undercut excavation should be a minimum of 6 in. wider than the footing width. Timeliness of excavation, subgrade approval and replacement will be critical. Careful coordination between the contractor and CGC will be essential where groundwater is present. If workers need to enter the excavation, the excavation should be sloped in accordance with OSHA guidelines. Effective dewatering measures will need to be in-place, as necessary, if lean-mixed concrete is utilized.

Groundwater will likely be encountered in some footing excavations as the overall basement is expected to intercept some wetter seams and pockets, as well as some shallow perched zones. Pumping from filtered sump pits (for drawdowns of less than about 1 to 2 ft) to remove the water and/or for placement of the recommended mud mat layer immediately after excavation to minimize subgrade disturbance should be anticipated. Dewatering means and methods are the responsibility of the contractor. *If desired, supplemental exploration in the form of test pits can be performed in the proposed building area, in the presence of appropriate contractors, to further assess soil and groundwater conditions, so that appropriate preparations can be established for the project.*

CGC should be present during footing excavations to check whether subgrades are satisfactory for the design bearing pressure and to advise on corrective measures, where necessary. We recommend using a smooth-edged backhoe bucket for footing excavations to minimize disturbance to the bearing soils. Soils potentially susceptible to disturbance should be hand trimmed or stabilized, as appropriate. Provided the foundation design/construction recommendations discussed above are followed, we estimate that total and differential settlements should be on the order of 1.0 and 0.5 in., respectively.

3. Floor Slab

Based upon the planned lower-level floor elevation, floor slab subgrades are anticipated to consist of natural lean clay soils. These soils will be extremely sensitive to exposure to moisture and construction disturbance, and every effort should be made to minimize repeated traffic across exposed subgrades during construction. Placement of a coarse crushed stone working mat (such as WisDOT Section 312 Select Crushed material), in conjunction with a Subgrade Aggregate Separation (SAS) fabric can be performed to limit the potential for disturbance to sensitive subgrades. The thickness of this layer would generally be recommended to be on the order of 12 to 18 inches to provide adequate protection, but will be dependent on the conditions observed during construction, and the degree of trafficking expected to occur within the below grade excavation by rubber-tired construction equipment.

In our opinion, the below-grade level slab for the building can be supported on the natural clay soils, and a subgrade modulus of 125 pci may be used for slab design. Prior to slab construction the subgrades should be observed and evaluated to identify soils that may become disturbed or loosened during construction activities. Soft, loose or disturbed soils should be removed and replaced with suitable granular fill such as well-compacted 3-in. DGB prior to placement of the planned stone base course. To serve as a capillary break below floor slab, the final 4 to 6 in. of soil placed below the slab should consist of well-graded sand or gravel with no more than 5% by weight passing a No. 200 U.S. standard sieve. Fill and drainage course materials required to prepare floor slab subgrades should be placed in accordance with the guidelines presented in Appendix D. If clean crushed stone is used as a drainage course material, these materials should be densified until no deflection or settlement is observed under compaction equipment. The design subgrade modulus is based on a firm and stable, undisturbed subgrade, such that non-yielding conditions are developed. The slabs

should be structurally separate from foundations and have construction joints and reinforcement for crack control.

4. Below-Grade Walls

We anticipate that the below-grade walls for the structure will be supported by the lower-level slab and upper-level framing. Therefore, *at-rest* lateral earth pressures should be used during design. To minimize the buildup of such pressures, high-quality backfill should be placed within 4 to 6 ft of the walls. We recommend that a perimeter drainage system be installed to intercept potential surface water infiltration and that the granular backfill be continuously connected to the drainage system and discharged to multiple sumps sufficiently spaced throughout the below grade level footprint. It should be expected that the sumps will operate more frequently during periods of heavy precipitation and during wetter periods such as spring and fall. The granular backfill should be well-graded sand or gravel having no more than 12 percent passing the No. 200 U.S. standard sieve. To impede the inflow of surface moisture, the final 2 ft of backfill along exterior walls in unpaved areas should consist of a clayey fill cap. The clayey cap (or pavement) should be graded to promote positive drainage away from the walls. Recommended perimeter drain details are presented in Appendix E.

Before placing the wall backfill, the exterior walls should be *damp-proofed* with spray-applied or mopped-on rubber or bituminous sealer. Compaction of the backfill within 4 to 6 ft of the walls should be performed with lightweight equipment to avoid the development of excessive lateral earth pressures. The backfill should be compacted to a minimum of 93 percent modified Proctor following Appendix D guidelines. If footings (e.g., for stoops or piers) will be supported on the backfill, 95 percent compaction is recommended. Lower-level walls constructed in accordance with the above recommendations may be designed for an equivalent fluid pressure of 55 psf per ft of depth, assuming a fully drained condition is maintained. Additionally, the wall design should also account for surcharge effects that could be applied during or after construction.

Note that if stormwater management basins will be located in close proximity to the building, additional water may be collected in the perimeter drain system. Therefore, in such instances we recommend that the below-grade wall perimeter drain system be designed to accommodate additional water volume from stormwater events.

5. Elevator Pit Walls

We anticipate that the elevator pit walls will be laterally supported by the base slabs, first floor slabs and/or other structural means. Therefore, *at-rest* lateral earth pressures should be used for design of these walls. To reduce the buildup of such pressures, high-quality fill/backfill should be placed within 4 to 6 ft of the walls, consisting of well-graded sand or gravel and/or crushed stone materials having no more than 12% by weight passing the No. 200 U.S. standard sieve (i.e., USCS designations SP, SP-SM). Soils containing cobbles/boulders should not be used in direct contact with elevator pit or other retaining walls.

Compaction of the fill/backfill within 3 to 5 ft of the walls should be performed with lightweight equipment to avoid the development of excessive lateral earth pressures. The fill and wall backfill should be compacted to a minimum of 95% modified Proctor following Appendix D guidelines. It is understood that below grade drainage systems are typically not implemented for elevator pits. Therefore, the walls must be designed to account for the development of both lateral earth and hydraulic pressures, as well as any surcharge loads that could be applied during or after construction. Walls that are restrained from rotating and constructed in accordance with the above recommendations may be designed for an equivalent fluid pressure of 85 psf per ft of depth based upon an undrained condition.

Elevator pits will likely become fully submerged due to seeping water accumulating over time within the backfill. Therefore, seepage and uplift must be considered in the design. For design purposes, we recommend high groundwater be assumed at the elevation of the floor for the below grade level. Due to the potential for long-term accumulation of water within the elevator pit excavations, we recommend wrapping the elevator pits in geomembrane to create a watertight structure ("bath tub"). Waterstops should be provided along construction joints for the elevator pits to minimize seepage.

It is recommended that elevator pits be designed to resist full hydrostatic uplift forces from below, based upon a high groundwater level matching the elevation of the floor for the below grade level. Base slabs must be structurally designed to resist these buoyant forces. Additionally, if buoyancy forces below the pits are not balanced by the dead weight of the structure, additional resistance can be obtained by extending the base slabs beyond the perimeter of the structures. Provided a granular backfill is used, the weight of the soil above the horizontal extension of the base slabs may be included in uplift resistance. A submerged/buoyant unit weight of 58 pcf may be used for granular backfill below the water level. To reduce uplift forces, the provision of a subdrainage and sump system on the exterior of the structures, interfaced with free-draining granular backfill, could be employed to maintain the groundwater below the level of the structure as necessary. A suitable anchorage system could also be considered to anchor the structures and resist buoyant forces.

6. Site Retaining Walls

Retaining walls are planned along both sides of the entry drive that will lead down to the entrance into the underground parking at the northwest corner of the building as previously described in the Project and Site Description section of this report. Although design details are unknown at this time, it is likely that these walls will not be laterally restrained from rotating. Therefore, these walls can be designed for *active* earth pressures behind the walls and *passive* pressures in front of the walls. Lateral earth pressures behind the retaining walls can be reduced by backfilling with granular materials containing less than 12% passing the No. 200 U.S. standard sieve, as described in the preceding section. In addition, weepholes should be placed near the base of the walls on 10-ft centers to provide drainage of the wall backfill. The weepholes should be hydraulically connected with the granular backfill and should be protected with a non-woven geotextile fabric to minimize soil loss through the weepholes. The wall designer may have other and/or additional drainage requirements, based upon the type of wall that is planned.

Retaining walls constructed in accordance with the above recommendations may be designed for an *active* equivalent fluid pressure of 35 psf per ft of depth based upon level backfill behind the walls and maintaining a fully-drained condition. *Passive* pressures are expected to be on the order of 200 psf per ft of depth. The passive pressure value includes a safety factor of 2 to prevent excessive wall deflection. The retaining wall design should also take into account surcharge effects which could be applied during or after construction.

7. Pavement Design

We anticipate that the pavement design will be controlled by the clayey soils that were predominant in the near surface profile within the borings performed on this site. Subgrades should be prepared as described in the Site Preparation section of this report, with recompaction/proof-rolling completed prior to base course and asphalt placement. After final site grading, the subgrade soils should be proof-rolled/compacted as described in the Site Preparation section of this report. Soft/yielding areas should be undercut/removed and replaced with 3-in. dense graded base placed/compacted to re-establish grade to a firm and stable condition after undercutting.

For the main driveways that will circulate the building, we have assumed a traffic load of less than five 18-kip equivalent single axle load (ESAL) per day and Traffic Class II according to Wisconsin Asphalt Pavement Association (WAPA) recommendations. Less-traveled driveways and parking areas may potentially fall under Traffic Class I according to WAPA recommendations, assuming less than one ESAL per day. The pavement sections summarized in Table 1 below were selected assuming a Soil Support Value "SSV" of about 3.8 for a firm or adequately stabilized cohesive soil subgrade and a design life of 20 years.

TABLE 1
Recommended Pavement Sections

Material	Thicknesses (in.)		WDOT Specification [1]
	Traffic Class I (Light Duty)	Traffic Class II (Medium Duty)	
Bituminous Upper Layer [2,3]	1.5	1.75	Section 460, Table 460-1, 9.5 mm
Bituminous Lower Layer [2,3]	2.0	2.25	Section 460. Table 460-1, 12.5 mm
Dense Graded Base Course [2,4]	9.0	10.0	Sections 301 and 305, 3 in. and 1¼ in.
Total Thickness	**12.5**	**14.0**	

Notes:

1. Wisconsin DOT *Standard Specifications for Highway and Structure Construction*, latest edition, including supplemental specifications, but excluding limitations in Section 460.3.2 relating layer thickness to aggregate size.

2. Compaction requirements:
   - Bituminous concrete: Refer to Section 460.3.3.1, Table 460-3.
   - Base course: 95% modified Proctor (ASTM D1557); also refer to Section 301.3.4.2, Standard Compaction.

3. Mixture Type LT or equivalent asphaltic pavement is recommended. Refer to Section 460, Table 460-2 of the *Standard Specifications*.

4. The upper 4 in. should consist of 1¼-in. DGB; the bottom part of the layer can consist of 3-in. DGB.

Note that if traffic volumes are greater than those assumed, CGC should be allowed to review the recommended pavement section and adjust it accordingly. The pavement design assumes a stable/non-yielding subgrade which will be evaluated using proof-rolling techniques and that regular maintenance will occur during the life of the pavement to seal cracks, etc. Alternative pavement designs may prove acceptable and should be reviewed by CGC. If there is a delay between subgrade preparation and placing the base course, the subgrade should be recompacted.

Where concrete pavement may be used, such as in pavement areas subjected to concentrated wheel loads (e.g., dumpster pads, etc.), we recommend that the concrete be at least 6 in. thick, contain mesh reinforcement for crack control, and be underlain by a minimum 6-in. of well-graded granular soils. It is recommended that the edges of these pads be thickened to 12 in. to minimize cracking. A subgrade modulus of 125 pci should be used for concrete pavement design founded on recompacted/stable soils.

It is recommended underdrains be placed within the subgrade, just below the granular base, to help reduce the potential for trapping water within the aggregate base layer. At a minimum, this should consist of installing radial finger drains extending outward, from each interior catch basin for about 15 to 20 feet. In addition, drain tiles should extend along curb lines, 15 to 20 feet up the slope from curb inlets. Drain tile should be connected to the storm sewer manhole structures, catch basins, curb inlet basins, or other appropriate outlets. They could also be daylighted, if grades allow, to an appropriate area of the site. The drain tile should be at least 4 inches in diameter and consist of perforated PVC pipe placed beneath the base layer (or stabilizing layer if included), extending at least 8 inches into the subgrade. The pipe should be surrounded by 1-inch size clean stone, with the pipe and stone being wrapped with a non-woven filter fabric to reduce the potential of soils from migrating into and obstructing the pipe. It is also recommended that roof drains be connected to the stormwater collection system to minimize the potential for this water to enter the base and subgrade.

8. Stormwater Design Considerations

a. Infiltration Considerations

Bioswale areas are planned adjacent to the north side of the proposed building. The soils encountered within the adjacent borings (Borings 1-3) were therefore classified in accordance with the USDA Textural Soil Classification System for estimating the soil infiltration characteristics. The soils encountered generally consist of clays, with an overlying fill layer consisting of loamy sand, sandy clay loam and silty clay loam at these borings. Based on the conditions encountered, it is our opinion that the soils are considered to have a very limited capacity for infiltration of stormwater through the use of infiltration devices. Additionally, indicators of seasonal high groundwater or periodic seasonally saturated zones were encountered at shallow depth below the ground surface in these borings, which is a limiting factor for infiltration. NR-151 guidelines indicate infiltration rates shall be based on the least permeable soil horizon within 5 feet of the bottom elevation of the proposed infiltration system. Therefore, based on the soil classifications at the boring locations, the groundwater conditions, and guidelines in the current Wisconsin DNR *Technical Standard* 1002, the site may be eligible for *exemption* under Chapter NR 151 Wis. Adm. Code guidelines, in our opinion.

Should infiltration be performed at the site, the following parameters should be considered for design of infiltration features, based upon the soil classifications within the stormwater area borings:

Infiltration Potential: The following infiltration parameters were estimated using Table 2 of the WDNR Conservation Practice Standard 1002, *Site Evaluation for Storm Water Infiltration*. The estimated infiltration rates are as follows:

- Silty Clay Loam (SICL) 0.04 in./hr
- Clay (C) 0.07 in./hr
- Sandy Clay Loam (SCL) 0.11 in./hr
- Loamy Sand (LS) 1.63 in./hr

Note that the infiltration rates should be considered approximate since they are merely based on soil texture and do not account for in-place soil density and other factors, which will affect the infiltration rate. In addition, infiltration rates within fill soils should be considered very approximate due to the inherent variability within fill deposits. We recommend that the soils at and several feet below the bottom of stormwater management systems be checked by a geotechnical engineer or certified soil tester *in conjunction with the basin designer* to document that the soils are appropriate for the design infiltration rate or recommend remedial measures, if necessary. *Some variability in the soil conditions should be expected across the site (especially within the upper fill deposit) and within the stormwater management devices that could result in a wide range of infiltration rates. However, the underlying native clay soils appear to be much more consistent within the borings performed.*

Groundwater: Groundwater is considered to be a limiting factor for infiltration. Seasonal high groundwater/seasonally saturated zones at Borings 1-3 was considered to be the ground surface per SPS 385.30(2)(b)2, corresponding to EL 691.8 to 693.1. These depths/elevations at each boring location are indicated on the Soil and Site Evaluation – Storm form attached in Appendix F.

Bedrock: Bedrock is considered to be a limiting factor for infiltration. Bedrock was not encountered and is considered to be below the depths of the borings performed.

During construction of the proposed building and related site work, appropriate erosion control measures should be provided to prevent eroded soil from contaminating potential infiltration areas. Where appropriate, basin design should include pretreatment to remove fine-grained soils (silt/clay) from stormwater prior to entering the infiltration area(s). Additionally, a regular maintenance plan should be developed to remove silt/clay soils that may accumulate in the bottom of the basins over time. Failure to adequately control fine-grained soils from entering the infiltration area(s) or failure to regularly remove fine-grained soils that accumulate at the base of the basins will likely cause the basin to fail. Refer to WDNR Conservation Practice Standard 1002 and NR 151 for additional information.

The Soil and Site Evaluation-Storm form prepared by the Certified Soil Tester per USDA procedures is presented in Appendix F.

b. Detention Pond Considerations

Based on the borings performed, stormwater management basins on this site may be designed as wet detention ponds with clay liners. Some of the lean clay soils encountered within the borings may be suitable for use as basin liner materials. Clay liner materials should be compacted to a minimum of 90 percent of the maximum dry density as determined by modified Proctor (ASTM D1557). The on-site lean clays (classified as "CL") appear suitable for re-use as liner quality material during liner construction; however, additional soil testing would be necessary to confirm their suitability. The moisture content of the cohesive soils at the time of compaction within basins should be within about 3 percent above the optimum moisture content. In general, fill placement/compaction should proceed in general accordance with our Recommended Compacted Fill Specifications presented in Appendix D.

Excavation necessary to accommodate the installation of clay liners, may extend to or below the level of groundwater or perched zones, depending on location and design depths. As such, dewatering may be required to facilitate excavation of basins and clay liners. As previously discussed, it is generally recommended that dewatering be performed to a depth of at least 2 ft below the depth of excavation to aid with subgrade stability. Dewatering means and methods are the responsibility of the contractor.

The liner soils must be sufficient to resist lateral earth and water pressure, as well as outward migration that may occur, possibly through tension or shrinkage type cracks. Where it is necessary to raise grades around basins, the fill soils must consist of clay soils that have relatively low permeabilities when properly placed and compacted.

CONSTRUCTION CONSIDERATIONS

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil related difficulties which could be encountered on the site are discussed below:

- Due to the sensitive nature of the on-site soils, we recommend that final site grading activities be completed during dry weather, if possible. Construction traffic should be avoided on prepared subgrades to minimize potential disturbance.

- Contingencies in the project budget for subgrade stabilization with coarse aggregate or other means in pavement and lower-level slab areas should be increased if the project schedule requires that work proceed during adverse weather conditions.

- Earthwork construction during the early spring or late fall could be complicated as a result of wet weather and freezing temperatures. During cold weather, exposed subgrades should be protected from freezing before and after footing construction. Fill should never be placed while frozen or on frozen ground.

- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards. We generally anticipate that excavation sidewalls can be sloped back according to OSHA requirements. The soils encountered in the borings consist primarily of medium stiff/stiff to hard clays with a few zones of medium dense granular soils. Where excavation occurs exclusively in OSHA "Type B" soils, such as at least stiff clay (denoted CL on the boring logs), slopes of 1.0H:1.0V are expected to be at least temporarily stable. However, where excavations extend into OSHA Type C soils, such as sand, slopes of 1.5H:1.0V are expected to be at least temporarily stable. Note that flatter side slopes may be required where perched or seeping water is present that destabilizes the side slopes. *The appropriate excavation side slopes should be determined by a competent person completing the earthwork in accordance with OSHA slope guidelines.*

- Based on observations made during the field exploration, some groundwater infiltration into shallow excavations is expected depending on location and design elevations. We anticipate that any water accumulating at the base of the excavations as a result of precipitation or minor seepage could be removed satisfactorily using pumps operating from filtered sump pits. However, if water bearing granular soil layers are encountered, or for excavations that will need to extend below the groundwater, more specialized and

comprehensive dewatering techniques will be required. The means and methods of suitable dewatering will be the responsibility of the contractor.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the foundation, floor slab and pavement subgrades will be largely determined by the level of care exercised during site development. To check that earthwork and foundation construction proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

- Topsoil stripping/removal and subgrade proof-rolling within the construction areas;
- Fill/backfill placement and compaction;
- Foundation excavation/subgrade preparation; and
- Concrete placement.

* * * * *

It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,
CGC, Inc.

Ted A. Cera, P.E.
Senior Consulting Professional

Jeff P. Simkowski, P.E.
Senior Consulting Professional

Encl: Appendix A - Field Exploration
Appendix B - Soil Boring Location Map
Logs of Test Borings (9)
Log of Test Boring-General Notes
Unified Soil Classification System
Appendix C - Document Qualifications
Appendix D - Recommended Compacted Fill Specifications
Appendix E - Typical Perimeter Drain Details
Appendix F - Soil and Site Evaluation – Storm Form

cc: Mr. Bill Ohm/Cobalt Partners, LLC

APPENDIX A

FIELD EXPLORATION

CGC, Inc.

APPENDIX A

FIELD EXPLORATION

Subsurface conditions on site were explored by drilling a total of nine (9) Standard Penetration Test (SPT) borings. The borings were extended to planned depths of 35 to 45 ft below existing site grades. The borings were performed at locations selected by CGC and the structural engineer. They were located in the field by CGC. The borings were drilled on July 21 and 22, and August 2, 3 and 4, 2022, by J&J Soil Testing, Ltd. (under subcontract to CGC) using a truck-mounted CME-45 rotary drill rig equipped with hollow-stem augers and a hammer actuated by a rope/cathead winch combination for SPT sampling. The approximate soil boring locations are shown in plan on the Soil Boring Location Exhibit attached in Appendix B. The ground surface elevations were determined by CGC's drilling subcontractor referencing the west flange bolt on the hydrant at the southwest corner of the 601 W. Glencoe Place property as a temporary benchmark, with a reference elevation of EL 694.65 ft. They should be considered accurate to within a foot.

In each boring, soil samples were obtained at 2.5-to-5-foot intervals to a depth of 10 ft, then 2.5-ft intervals to 20 ft, and at 5-ft intervals thereafter to the boring termination depths. The soil samples were obtained in general accordance with specifications for standard penetration testing, ASTM D1586. The specific procedures used for drilling and sampling are described below.

1. Boring Procedures between Samples

   The boring is extended downward, between samples, by a hollow-stem auger.

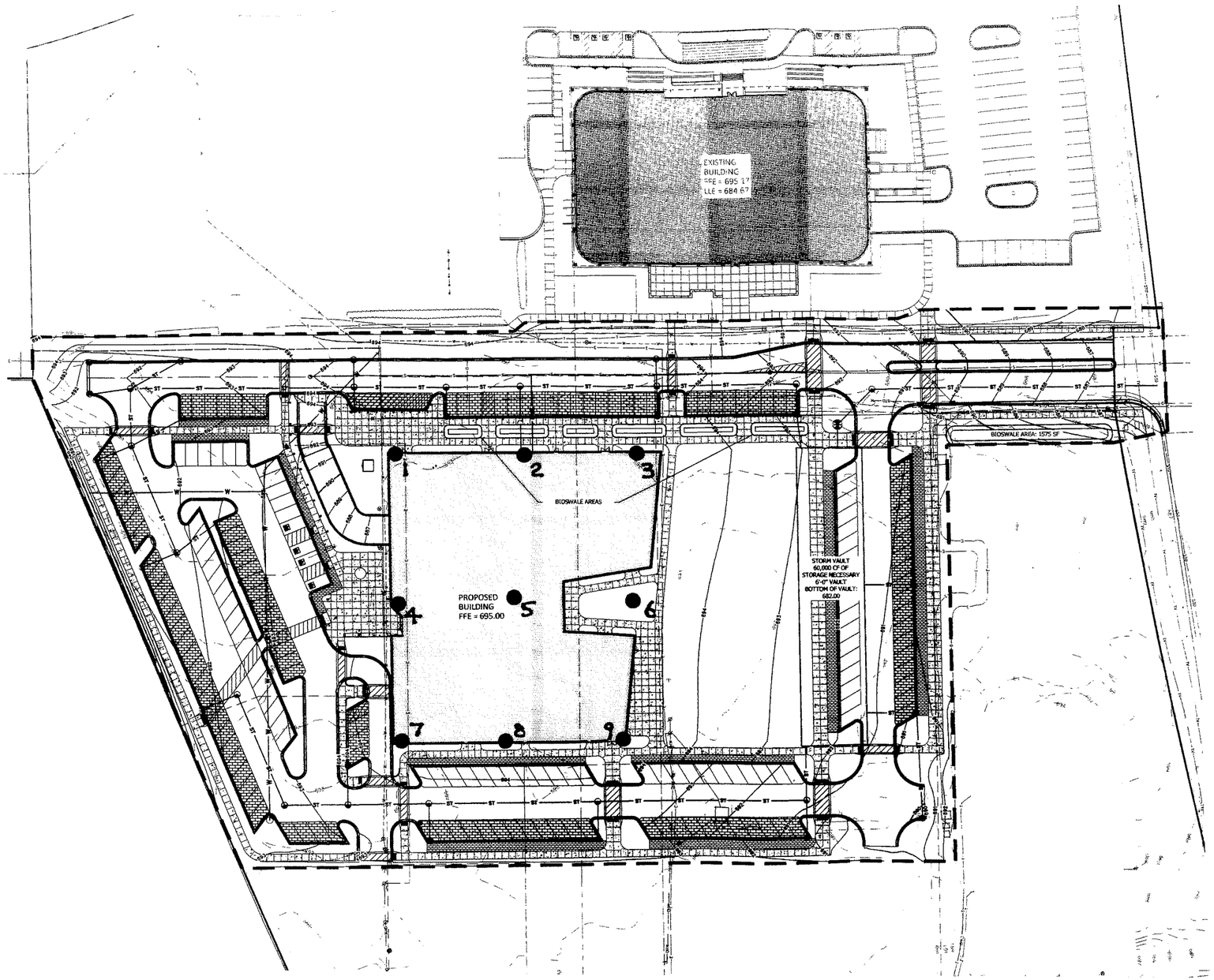
2. Standard Penetration Test and Split-Barrel Sampling of Soils
   (ASTM Designation: D 1586)

   This method consists of driving a 2-inch outside diameter split-barrel sampler using a 140-pound weight falling freely through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven 12 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the log of borings and is known as the Standard Penetration Resistance.

During the field exploration, the driller visually classified the soil and prepared a field log. *Field screening of the soil samples for possible environmental contaminants was not conducted by the drillers as these services were not part of CGC's work scope.* Water level observations were made in each boring during drilling and are shown at the bottom of each boring log. Upon completion of drilling, the borings were backfilled with bentonite to satisfy WDNR regulations, and the soil samples were delivered to our laboratory for visual classification and laboratory testing. The soils were visually classified by a geotechnical engineer using the Unified Soil Classification System (USCS). Soil samples within Borings 1-3 along the north edge of the building, adjacent to proposed bioswale areas, were additionally classified by a certified soil tester (CST) using the United States Department of Agriculture (USDA) classification system. The final logs prepared by the engineer/CST and a description of the Unified Soil Classification System are presented in Appendix B and the Soil and Site Evaluation – Storm Form is enclosed in Appendix F.

APPENDIX B

SOIL BORING LOCATION MAP
LOGS OF TEST BORINGS (9)
LOG OF TEST BORING-GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM



Legend

● Denotes Approximate Soil Boring Location and Number

Notes

1. Soil borings were conducted by J&J Soil Testing, Ltd. (under subcontract to CGC, Inc.) between July 26 and August 4, 2022.
2. Base map is an excerpt of the Overall Site Grading Plan (dated 8/5/22) provided by Kapur & Associates, Inc.

Scale: 0 15 30 60

Drawn: --	Approved: JPS	Date: 8/18/22	**CM22149**	**CGC, Inc.**	**SOIL BORING LOCATION MAP** **Bayside Multi-Family Building C** **Bayside, Wisconsin**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **1**
Surface Elevation (ft) **693.1**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 12" Dark Brown Clayey Topsoil					
1A/B	■	18	M	14		FILL: Brown Fine to Coarse Sand, Little Silt and Gravel	(4.5+)				
2	■	18	M	25	5	Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(4.5+)				
3	■	18	M	24			(4.5+)	17.5			
4	■	18	M	23	10		(4.5+)				
5	■	18	M	18		Very Stiff to Hard, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(3.5-4.0)	18.4			
6	■	18	M	16	15		(4.0-4.5+)				
7	■	18	M	18			(2.75-3.0)				
8	■	18	M	14	20	A few scattered wet pockets noted between 18 and 35 ft.	(3.5-4.0)				
9	■	18	M	14	25		(2.25-3.5)				
10	■	18	M	18	30		(3.75-4.25)				
11	■	18	M	18	35		(2.25-4.25)				
12	■	18	M	22	40		(3.0-4.5)				
13	■	18	M	19	45		(2.25-2.75)				
						End of Boring at 45 ft Backfilled with Bentonite Chips					
					50	Note: Boring was drilled 4.5 ft east of staked location due to conflict with water main.					

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **8/2/22** End **8/2/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **2**
Surface Elevation (ft) **692.6**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 1" Dark Brown Clayey Topsoil					
						FILL: Brown Lean Clay, Little Rubble (Concrete Pieces and Gravel)					
1A/B	■	13	M	15			(4.5+)	15.3			
					5	Very Stiff to Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)					
2	■	18	M	23			(4.5+)				
					10						
3	■	18	M	16			(3.0-4.0)				
						Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)					
4	■	18	M	13			(2.5-2.75)	16.1			
					15						
5	■	18	M	9		A few scattered wet pockets noted between 14 and 24 ft.	(1.75-2.25)				
6	■	18	M	10			(3.0-3.25)				
					20						
7	■	18	M	10			(1.25-1.75)				
					25						
8	■	18	M	19			(2.75-3.5)				
					30						
9	■	18	M	18			(2.0-2.5)				
					35						
10	■	18	M	17			(3.5-3.75)				
					40	End of Boring at 40 ft Backfilled with Bentonite Chips					
					45						
					50						

WATER LEVEL OBSERVATIONS

While Drilling ▽	**NW**	Upon Completion of Drilling		**NW**
Time After Drilling				**18 hrs**
Depth to Water				**NW** ▼
Depth to Cave in				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **7/21/22** End **7/21/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **3**
Surface Elevation (ft) **691.8**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 4" Dark Brown Clayey Topsoil					
1	■	18	M	17		FILL: Brown to Dark Brown Lean Clay	(4.5+)				
2	■	18	M	21	5	Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(4.5+)	15.7			
3	■	18	M	24			(4.5+)				
4	■	18	M	23	10		(4.5+)				
5	■	18	M	18		Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(3.75-4.0)	17.7			
6	■	18	M	16	15		(2.75-3.0)				
7	■	18	M	13			(2.75-3.0)				
8	■	18	M	12	20		(3.0-3.25)				
9	■	18	M	17	25	Some wet pockets noted between 23 and 25 ft.	(2.25-3.0)				
10	■	18	M	13	30		(1.75-2.0)				
11	■	18	M	20	35		(3.25)				
12	■	18	M	16	40		(3.0-3.5)				
13	■	18	M	24	45		(3.5-4.0)				
						End of Boring at 45 ft Backfilled with Bentonite Chips					
					50	Note: Boring was drilled 7 ft west of staked location due to conflict with electric line.					

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **7/22/22** End **7/22/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

LOG OF TEST BORING

CGC Inc.

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **4**
Surface Elevation (ft) **692.4**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 4" Dark Brown Clayey Topsoil					
						Very Stiff to Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)					
1	■	18	M	22	5		(4.0-4.5+)				
2	■	18	M	22			(3.75-4.5+)				
					10						
3	■	18	VM	13		Medium Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(2.0-2.75)	20.7			
4	■	18	M	14			(3.0-3.5)				
					15	Few to many wet pockets noted between 12 and 24 ft.					
5A/B	■	15	M	8			(0.75-1.25)				
6	■	18	M	10	20		(2.25-2.75)				
7	■	18	M	11			(1.25-2.0)				
					25						
8	■	18	M	16			(3.75-4.0)				
					30						
9	■	18	M	17			(3.5)				
					35						
10	■	18	M	21			(3.5-4.0)				
					40	End of Boring at 40 ft Backfilled with Bentonite Chips					
						Note: Boring was drilled 5 ft east of staked location due to conflict with water main.					
					45						
					50						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **8/3/22** End **8/4/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **5**
Surface Elevation (ft) **692.6**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 7.5" Dark Brown Clayey Topsoil					
1	■	12	M	22		FILL: Rubble (Mixture of Concrete Pieces, Gravel and Soil)					
2	■	10	W/M/W	1	5	FILL: Brown Sandy Silty Clay, Little Fine to Coarse Gravel		20.0			
3	■	14	W	22		FILL: Rubble (Mixture of Concrete Pieces, Gravel and Soil)					
4	■	18	M	18	10	Very Stiff, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(3.5-4.0)				
5	■	18	M	19		Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(3.25-3.5)				
6	■	18	M	14	15		(2.25-3.0)	19.6			
7	■	18	M	13			(2.5-3.0)				
8	■	18	M	14	20		(1.5-2.5)				
9	■	18	M	12	25		(1.75-2.25)				
10	■	18	M	11	30		(1.75-2.0)				
11	■	18	M	14	35		(1.5-2.25)				
12	■	18	M	19	40		(2.5-3.25)				
13	■	18	M	26	45		(3.0-3.25)				
						End of Boring at 45 ft Backfilled with Bentonite Chips					
					50						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **3.5'±** Upon Completion of Drilling **4.0'**
Time After Drilling **(perched)**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **7/21/22** End **7/21/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **6**
Surface Elevation (ft) **692.5**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 6" Dark Brown Clayey Topsoil					
						FILL: Brown Lean Clay, Little Rubble (Concrete Pieces and Gravel)					
1	■	18	M	24			(3.75-4.5+)				
					5	Stiff to Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)					
2	■	18	M	18			(3.0-3.75)				
					10						
3	■	18	M/W	15		One thin wet fine to medium sand seam noted at 12 ft.	(2.0-2.25)	20.3			
4	■	18	VM	9		Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(1.5-2.5)	21.3			
					15						
5	■	18	M	9			(1.75-2.0)				
6	■	18	M	9			(1.5-1.75)				
					20						
7	■	18	M	13			(2.25-2.5)				
					25						
8	■	18	M	13			(2.25-2.5)				
					30						
9	■	18	M	23			(3.75-4.0)				
					35	End of Boring at 35 ft Backfilled with Bentonite Chips					
					40	Note: Boring was drilled 3 ft west of staked location due to conflict with electric line.					
					45						
					50						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **3.0'±** Upon Completion of Drilling **NW**
Time After Drilling **(perched)**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **8/4/22** End **8/4/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **7**
Surface Elevation (ft) **692.1**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE No.	TYPE	Rec (in.)	Moist	N	Depth (ft)	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 4" Dark Brown Clayey Topsoil					
1A/B	■	15	M	10		FILL: Brown Mottled Lean Clay, Few Fine to Coarse Sand Layers	(3.75-4.5+)	14.3			
2	■	18	M	21	5	Very Stiff to Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(4.5+)				
3	■	18	M	26			(4.5+)				
4	■	18	M	20	10		(4.0-4.5+)				
5	■	18	VM	12		Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(2.25-2.5)	20.1			
6	■	18	M	11	15		(1.75-3.0)				
7	■	18	M	13		A few wet pockets noted between 16 and 20 ft.	(3.25-4.0)				
8	■	18	M	13	20		(2.75-3.5)				
9	■	18	M	11	25		(1.0-1.5)				
10	■	18	M	14	30		(2.75-3.0)				
11	■	18	M	12	35		(2.0-3.5)				
12	■	18	M	16	40		(1.75-2.5)				
13	■	18	M	17	45		(2.75-3.5)				
						End of Boring at 45 ft Backfilled with Bentonite Chips					
					50	Note: Boring was offset 6 ft east of staked location due to conflict with water main.					

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **8/2/22** End **8/3/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **8**
Surface Elevation (ft) **692.6**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 3" Dark Brown Clayey Topsoil					
						FILL: Brown to Dark Brown Lean Clay					
1	■	18	M	27		Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(4.5+)				
					5						
2	■	18	M	23			(4.5+)				
					10						
3	■	18	M	21		Stiff to Very Stiff, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(3.5)				
4	■	18	M	14			(2.5-3.25)	18.7			
					15						
5	■	18	M	12			(2.25-3.0)				
6	■	18	M	11		Some wet pockets noted at 19 ft.	(1.25-2.5)				
					20						
7	■	18	M	17			(3.5-4.25)				
					25						
8	■	18	M	22			(3.5-4.0)				
					30						
9	■	18	M	27			(3.5-4.0)				
					35						
10	■	18	M	19			(3.5-3.75)				
					40	End of Boring at 40 ft Backfilled with Bentonite Chips					
					45						
					50						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **NW** Upon Completion of Drilling **NW**
Time After Drilling
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **7/22/22** End **7/22/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC Inc.

LOG OF TEST BORING

Project **Bayside Multi-Family Building C**
West Glencoe Place
Location **Bayside, Wisconsin**

Boring No. **9**
Surface Elevation (ft) **692.5**
Job No. **CM22149**
Sheet **1** of **1**

336 S. Curtis Rd, West Allis, WI 53214 (414) 443-2000, FAX (414) 443-2099

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LOI
						FILL: 7" Dark Brown Clayey Topsoil					
1		0	M	9		FILL: Brown to Dark Brown Lean Clay		19.3			
2		18	M	22	5	Very Stiff to Hard, Brown Slightly Mottled Lean CLAY; Little Fine Sand, Trace Gravel (CL)	(4.5+)				
3		18	M/W/M	23		One thin wet fine to medium sand seam at 7 ft.	(4.5+)	13.0			
4		18	M	18	10		(3.5-4.5+)				
5A/B		14	M	15		Stiff to Hard, Grayish Brown Lean CLAY; Trace Sand and Gravel (CL)	(1.25-1.75)	15.4			
6		18	M	13	15	Drove a stone at 11.5 ft -- poor recovery.	(2.75-3.25)				
7		18	M	14			(3.0-3.5)				
8		18	M	14	20		(3.25-3.5)				
9		18	M	18	25		(3.25-3.5)				
10		18	M	19	30		(3.0-3.75)				
11		18	M	16	35		(3.5)				
12		18	M	21	40		(4.25)				
13		18	M	44	45	Dense, Gray Brown Silty Fine SAND (SM)					
						End of Boring at 45 ft Backfilled with Bentonite Chips					
					50						

WATER LEVEL OBSERVATIONS

While Drilling ▽ **6.5'** Upon Completion of Drilling **NW**
Time After Drilling **(perched)**
Depth to Water ▼
Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start **8/2/22** End **8/2/22**
Driller **J&J** Chief **JP** Rig **CME-45**
Logger **JP** Editor **JPS**
Drill Method **2.25" HSA**

CGC, Inc.

LOG OF TEST BORING

General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	¾" to 3"	¾" to 3"
Fine	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 to mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term	"N" Value
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace	0% - 5%
Little	5% - 12%
Some	12% - 35%
And	35% - 50%

Consistency

Term	q_u-tons/sq. ft
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4 – 12%
Sedimentary Peat	12% - 50%
Fibrous and Woody Peat	More than 50%

Plasticity

Term	Plastic Index
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

CS – Continuous Sampling
RC – Rock Coring: Size AW, BW, NW, 2"W
RQD – Rock Quality Designation
RB – Rock Bit/Roller Bit
FT – Fish Tail
DC – Drove Casing
C – Casing: Size 2 ½", NW, 4", HW
CW – Clear Water
DM – Drilling Mud
HSA – Hollow Stem Auger
FA – Flight Auger
HA – Hand Auger
COA – Clean-Out Auger
SS - 2" Dia. Split-Barrel Sample
2ST – 2" Dia. Thin-Walled Tube Sample
3ST – 3" Dia. Thin-Walled Tube Sample
PT – 3" Dia. Piston Tube Sample
AS – Auger Sample
WS – Wash Sample
PTS – Peat Sample
PS – Pitcher Sample
NR – No Recovery
S – Sounding
PMT – Borehole Pressuremeter Test
VS – Vane Shear Test
WPT – Water Pressure Test

Laboratory Tests

q_a – Penetrometer Reading, tons/sq ft
q_a – Unconfined Strength, tons/sq ft
W – Moisture Content, %
LL – Liquid Limit, %
PL – Plastic Limit, %
SL – Shrinkage Limit, %
LI – Loss on Ignition
D – Dry Unit Weight, lbs/cu ft
pH – Measure of Soil Alkalinity or Acidity
FS – Free Swell, %

Water Level Measurement

▽ - Water Level at Time Shown
NW – No Water Encountered
WD – While Drilling
BCR – Before Casing Removal
ACR – After Casing Removal
CW – Cave and Wet
CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

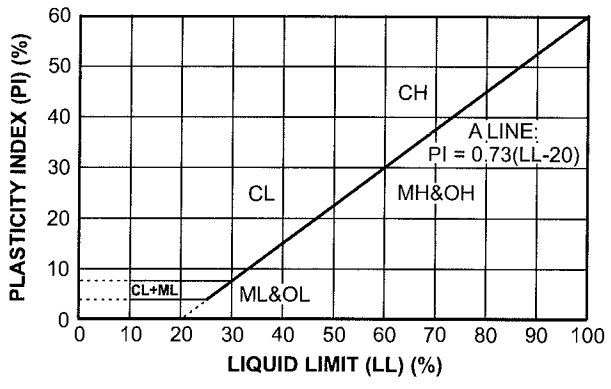
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



APPENDIX C

DOCUMENT QUALIFICATIONS

APPENDIX C
DOCUMENT QUALIFICATIONS

I. GENERAL RECOMMENDATIONS/LIMITATIONS

CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

II. IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes. While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

READ THE FULL REPORT

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *CGC cannot accept responsibility or liability for problems that occur because our reports do not consider developments of which we were not informed.*

SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINION

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ - sometimes significantly - from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most

effective method of managing the risks associated with unanticipated conditions.

A REPORT'S RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the confirmation-dependent recommendations included in your report. *Those confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's confirmation-dependent recommendations if we do not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical engineering report. Confront that risk by having CGC participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

DO NOT REDRAW THE ENGINEER'S LOGS

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

GIVE CONSTRUCTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

READ RESPONSIBILITY PROVISIONS CLOSELY

Some clients, design professionals, and constructors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

ENVIRONMENTAL CONCERNS ARE NOT COVERED

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

OBTAIN PROFESSIONAL ASSISTANCE TO DEAL WITH MOLD

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Membership in the Geotechnical Business Council (GBC) of Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of GBC, for more information.

Modified and reprinted with permission from:

Geotechnical Business Council
of the Geoprofessional Business Association
8811 Colesville Road, Suite G 106
Silver Spring, MD 20910

APPENDIX D

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX D

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at a moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

Table 1
Gradation of Special Fill Materials

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55			
No. 40			5-20	8-28	10-35	75 (2)		
No. 100						15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:

1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction.*
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

Table 2
Compaction Guidelines

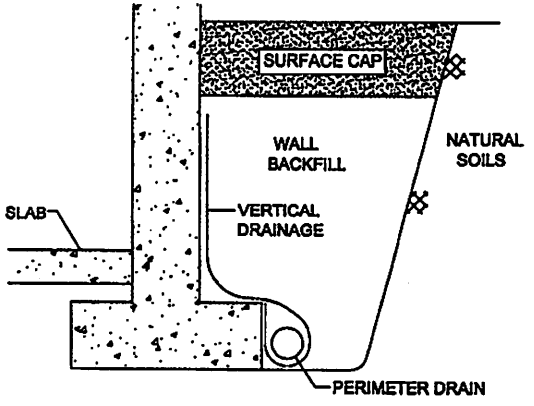
Area	Percent Compaction (1)	
	Clay/Silt	Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

Notes:

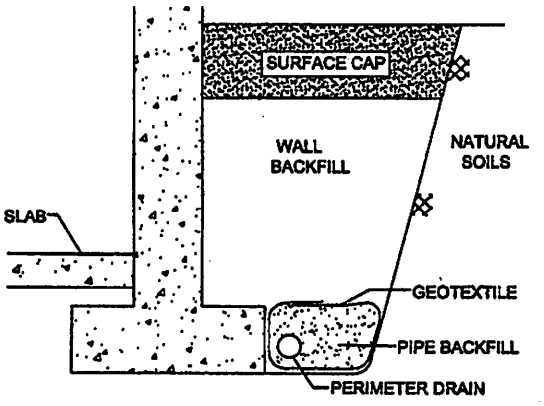
1. Based on Modified Proctor Dry Density (ASTM D 1557)

APPENDIX E

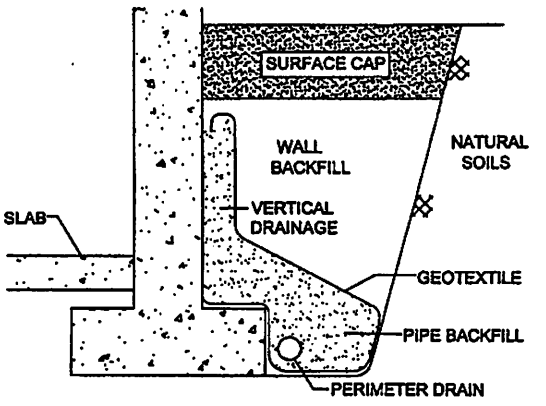
TYPICAL PERIMETER DRAIN DETAILS



ALTERNATE NO. 1



ALTERNATE NO. 2



ALTERNATE NO. 3

DRAINAGE SYSTEM COMPONENTS

Component	Alternate No. 1	Alternate No. 2	Alternate No. 3
Surface Cap	1 to 2 ft of clayey soils. Minimum 1 ft thick if overlain by pavement	Refer to Alternate No. 1	Refer to Alternate No. 1
Vertical Drainage	3-dimensional drainage geocomposite hydraulically connected to perimeter drain.	Relatively free-draining granular soils with P200 (% fines) ≤12%.	Minimum 6-in. wide zone of free-draining granular soils with P200 ≤ 5% hydraulically connected to perimeter drain. Provide geotextile as required (see note 10.
Perimeter Drain	Perforated pipe encapsulated in geocomposite.	Perforated pipe surrounded by free-draining granular pipe backfill with P200 ≤ 5%. Provide geotextile as required (See Note 10).	Refer to Alternate No. 2
Wall Backfill	Excavation spoils or imported materials (granular soils preferred).	Relatively free-draining granular soils with P200 ≤ 12%.	Refer to Alternate No. 1

CGC, Inc.

Typical Perimeter Drain Detail

General Notes

1. This system's primary function is to intercept infiltrating surface water. These alternates are not appropriate for use in situations of high groundwater (i.e., cases where the water table approaches floor slab elevation).

2. Grade surface cap to slope away from structure.

3. Exterior surface of walls below grade should be damp-proofed.

4. A plastic vapor barrier should be installed below the slab.

5. Recommended types of drain pipes:

Specification	Description
ASTM D2729	Polyvinyl Chloride (PVC) Drain Pipe
ASTM F405	Corrugated Polyethylene Drain Pipe
ASTM D2852	Styrene-Rubber Plastic Drain Pipe
AASHTO M1366	Corrugated Metal Underdrain Pipe

6. Minimum slope of drain pipes should be 2 in. per 100 lin ft.

7. Place drain pipe below basement floor level and orient the perforations toward the bottom.

8. Clean-outs should be provided to service the pipe.

9. Collected field water should be discharged to a sump, storm sewer or drainage field.

10. The geotextile for Alternative Nos. 2 and 3 may be eliminated if filter requirements are satisfied between the wall and pipe backfill, as well as between backfill materials and natural soils.

11. Pipe backfill materials should satisfy filter requirements for the slot width or hole diameter of the perforated pipe.

12. Care should be taken during backfilling not to damage the integrity of the system. For compaction requirements, refer to geotechnical report.

13. Pipe, geotextile, and geocomposite should be installed according to manufacturer specifications.

CGC, Inc.

Typical Perimeter Drain Detail
General Notes

APPENDIX F

SOIL AND SITE EVALUATION – STORM FORM

Wisconsin Department of Commerce
Division of Safety and Buildings

SOIL AND SITE EVALUATION - STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s.15.04 (1) (m)).

County	Milwaukee
Parcel I.D.	229985002
Review by	**Date**

Property Owner		**Property Location**	**601 W. Glencoe Place**
Bayside Development Partners II, LLC		**Govt. Lot**	
Property Owner's Mailing Address		**Lot #** / **Block #**	**Subd. Name or CSM#**
8907 N. Port Washington Road			
City / **State** / **Zip Code** / **Phone Number**		[ ] City [X] Village [ ] Town	**Nearest Road**
Bayside / WI / 53217		Bayside	West Glencoe Place

Drainage area: _____ [ ] sq. ft. [ ] acres

Test Site Suitable for (check all that apply) [ ] Site not suitable

[ ] Bioretention [ ] Subsurface Dispersal System

[ ] Reuse [ ] Irrigation [ ] Other _____

Hydraulic Application Test Method

[X] Morphological Evaluation

[ ] Double-Ring Infiltrometer

[ ] Other (Specify)_____

Soil Moisture

Date of soil borings:

USDA-NRCS WETS Value:

[ ] Dry = 1

[ ] Normal = 2

[ ] Wet = 3

1 **Obs. #** [X] Boring [ ] Pit **Ground Surface Elev.** 693.1 ft **Elevation of limiting factor** 693.1 ft

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.*	% Fines*	Hydraulic App. Rate Inches/Hr
1	0-12	Topsoil (Not Sampled)**			-	-	-	-	-	-
2	12-24	10YR 4/4	-	LS**	0,sg	mfr	g	<15	15-20	1.63
3	24-126	7.5YR 5/4	c,2,d spots 7.5YR 8/1	C	1,sbk,f	mvfi	g	<5	85-90	0.07
4	126-372	7.5YR 4/3	-	C	0,m	mvfi	g	<5	85-90	0.07
5	372-540	7.5YR 5/3	-	C	0,m	mvfi	g	<5	85-90	0.07

Comments: *based on visual observation **fill deposit (infiltration rates should be considered very approximate within fill deposits)

2 **Obs. #** [X] Boring [ ] Pit **Ground Surface Elev.** 692.6 ft **Elevation of limiting factor** 692.6 ft

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.*	% Fines*	Hydraulic App. Rate Inches/Hr
1	0-3	Topsoil (Not Sampled)**			-	-	-	-	-	-
2	3-54	7.5YR 5/4	-	SCL**	0,m	mfi	g	<15	40-50	0.11
3	54-84	7.5YR 5/4	c,2,d spots 7.5YR 8/1	C	1,sbk,f	mvfi	g	<5	85-90	0.07
4	84-186	7.5YR 4/4	-	C	1,sbk,f	mvfi	g	<5	85-90	0.07
5	186-480	7.5YR 4/3	-	C	0,m	mvfi	g	<5	85-90	0.07

Comments: *based on visual observation **fill deposit (infiltration rates should be considered very approximate within fill deposits)

CST/PSS Name (Please Print)	**Signature**	**CST Number**
Paul J. Giese, CST	Paul J. Giese	SP-030800004
Address	**Date Evaluation Conducted**	**Telephone Number**
336 S. Curtis Road, West Allis, WI 53214	8/26/22	(414) 443-2000

Property Owner Bayside Development Partners II, LLC Parcel ID# 229985002 Page 2 of 2

3 Obs. # [X] Boring [ ] Pit Ground Surface Elev. 691.8 ft Elevation of limiting factor 691.8 ft

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.*	% Fines*	Hydraulic App. Rate Inches/Hr
1	0-3	Topsoil (Not Sampled)**			-	-	-	-	-	-
2	3-18	7.5YR 4/4 & 10YR 4/4	-	SiCL**	0,m	mvfi	g	<10	80-90	0.04
3	18-96	7.5YR 5/4	c,1,d 7.5YR 8/1 streaks	C	2,sbk,f	mvfi	g	<5	85-90	0.07
4	96-126	7.5YR 5/3	f,1,f 7.5YR 8/1 streaks	C	1,sbk,f	mvfi	g	<5	85-90	0.07
5	126-384	7.5YR 5/2	-	C	0,m	mvfi	g	<5	85-90	0.07
6	384-540	7.5YR 5/3	-	C	0,m	mvfi	g	<5	85-90	0.07

Comments: *based on visual observation **fill deposit (infiltration rates should be considered very approximate within fill deposits)

Obs. # [ ] Boring [ ] Pit Ground Surface Elev. _____ ft Elevation of limiting factor _____ ft

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.*	% Fines*	Hydraulic App. Rate Inches/Hr

Comments: *based on visual observation

Obs. # [ ] Boring [ ] Pit Ground Surface Elev. _____ ft Elevation of limiting factor _____ ft

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	% Fines	Hydraulic App. Rate Inches/Hr

Comments:

Hydrologic Soil Group—Milwaukee and Waukesha Counties, Wisconsin
(Bayside)

Map Scale: 1:3,360 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 17, Sep 10, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 20, 2020—Jul 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
KnB	Kewaunee silt loam, 2 to 6 percent slopes	C	26.1	87.8%
Lu	Loamy land	D	0.6	2.2%
MaA	Manawa silt loam, 0 to 3 percent slopes	D	3.0	10.1%
Totals for Area of Interest			**29.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Water Table—Milwaukee and Waukesha Counties, Wisconsin
(Bayside)

Map Scale: 1:3,360 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

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The soil surveys that comprise your AOI were mapped at 1:15,800.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Date(s) aerial images were photographed: May 20, 2020—Jul 1, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
KnB	Kewaunee silt loam, 2 to 6 percent slopes	>200	26.1	87.8%
Lu	Loamy land	107	0.6	2.2%
MaA	Manawa silt loam, 0 to 3 percent slopes	15	3.0	10.1%
Totals for Area of Interest			**29.8**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

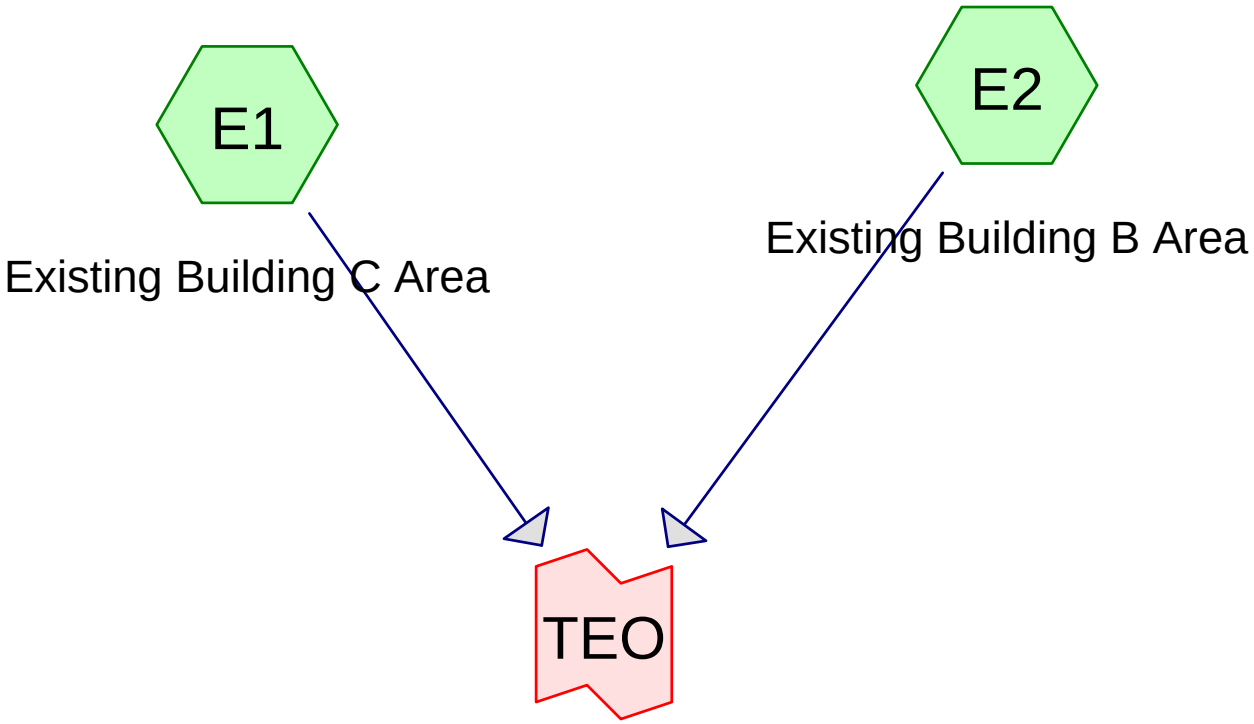
Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Appendix B

HydroCAD Analysis – Pre-Development Conditions



Total Existing Outfall

2- year: 0.15 cfs/acre =
7.95 X 0.15 = 1.19 cfs

100- year = 0.50
cfs/acre = 7.95 X 0.50 =
3.98 cfs

Subcat Reach Pond Link

Routing Diagram for 210709_HydroCAD_BLDG B & BLDG C
Prepared by Kapur& Associates, Inc., Printed 10/18/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-year	MSE 24-hr	3	Default	24.00	1	2.33	2
2	2-year	MSE 24-hr	3	Default	24.00	1	2.63	2
3	10-year	MSE 24-hr	3	Default	24.00	1	3.74	2
4	100-year	MSE 24-hr	3	Default	24.00	1	6.20	2

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
123,175	74	>75% Grass cover, Good, HSG C (E1, E2)
171,152	98	Paved parking, HSG C (E1, E2)
40,832	98	Roofs, HSG C (E1, E2)
9,867	98	Sidewalks, HSG C (E1)
1,237	98	Unconnected pavement, HSG C (E2)
346,263	**89**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
346,263	HSG C	E1, E2
0	HSG D	
0	Other	
346,263		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	123,175	0	0	123,175	>75% Grass cover, Good	
0	0	171,152	0	0	171,152	Paved parking	
0	0	40,832	0	0	40,832	Roofs	
0	0	9,867	0	0	9,867	Sidewalks	
0	0	1,237	0	0	1,237	Unconnected pavement	
0	**0**	**346,263**	**0**	**0**	**346,263**	**TOTAL AREA**	

Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing Building C Runoff Area=251,263 sf 57.03% Impervious Runoff Depth=1.24"
Tc=6.0 min CN=88 Runoff=13.25 cfs 25,905 cf

Subcatchment E2: Existing Building B Area Runoff Area=95,000 sf 83.99% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=94 Runoff=6.59 cfs 13,517 cf

Link TEO: Total Existing Outfall Inflow=19.83 cfs 39,423 cf
Primary=19.83 cfs 39,423 cf

Total Runoff Area = 346,263 sf Runoff Volume = 39,423 cf Average Runoff Depth = 1.37"
35.57% Pervious = 123,175 sf 64.43% Impervious = 223,088 sf

Summary for Subcatchment E1: Existing Building C Area

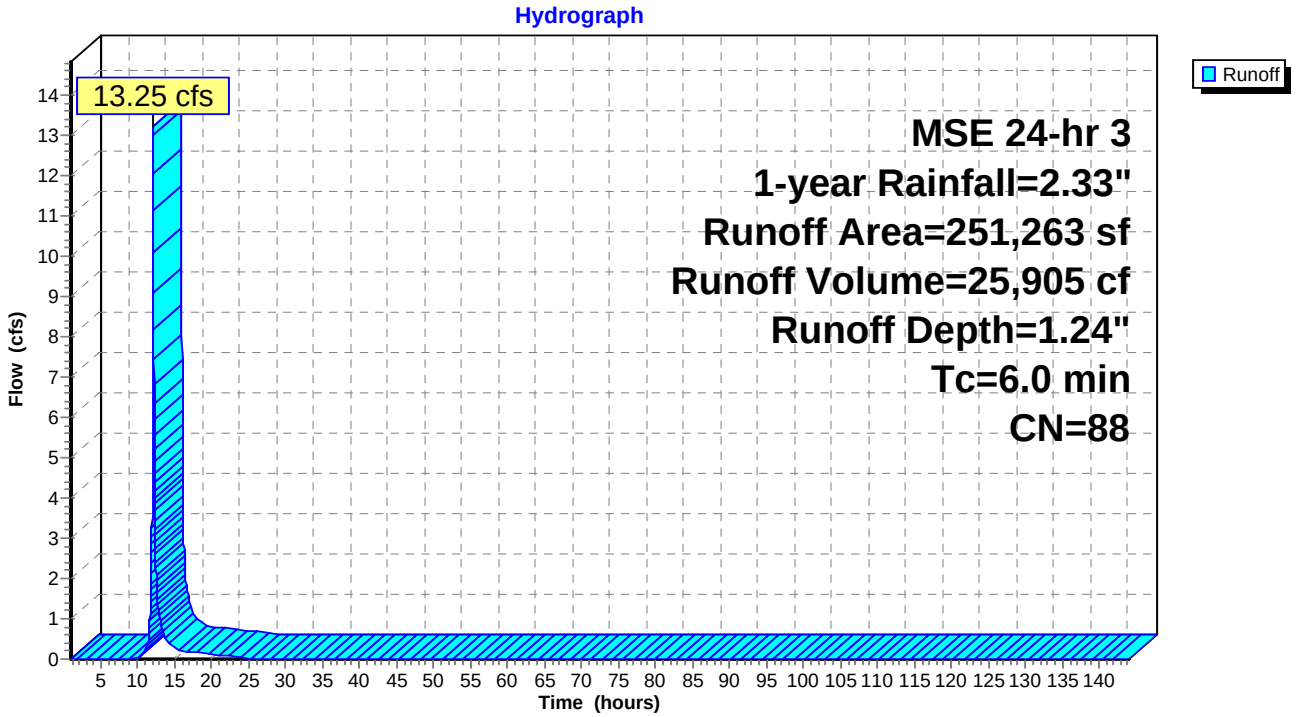
Runoff = 13.25 cfs @ 12.13 hrs, Volume= 25,905 cf, Depth= 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
	17,812	98	Roofs, HSG C
	115,618	98	Paved parking, HSG C
*	9,867	98	Sidewalks, HSG C
	107,966	74	>75% Grass cover, Good, HSG C
	251,263	88	Weighted Average
	107,966		42.97% Pervious Area
	143,297		57.03% Impervious Area

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

Subcatchment E1: Existing Building C Area



Summary for Subcatchment E2: Existing Building B Area

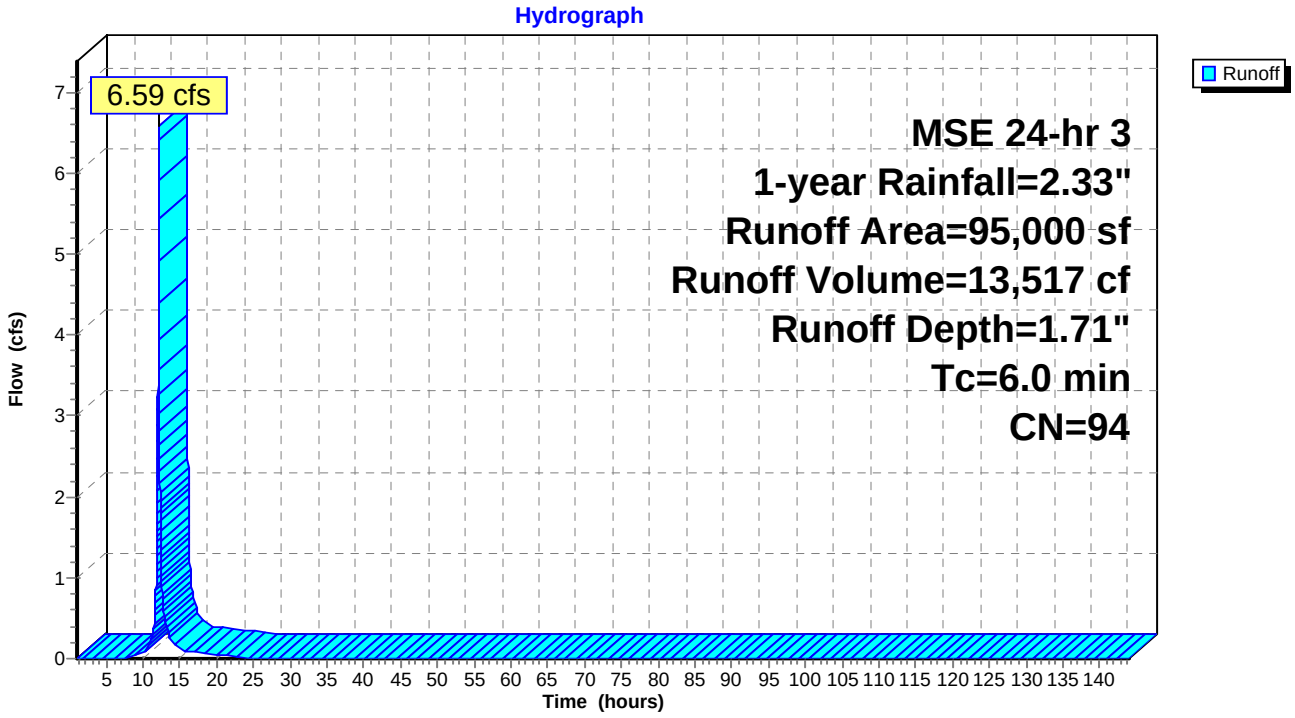
Runoff = 6.59 cfs @ 12.13 hrs, Volume= 13,517 cf, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

Area (sf)	CN	Description
23,020	98	Roofs, HSG C
55,534	98	Paved parking, HSG C
1,237	98	Unconnected pavement, HSG C
15,209	74	>75% Grass cover, Good, HSG C
95,000	94	Weighted Average
15,209		16.01% Pervious Area
79,791		83.99% Impervious Area
1,237		1.55% Unconnected

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

Subcatchment E2: Existing Building B Area

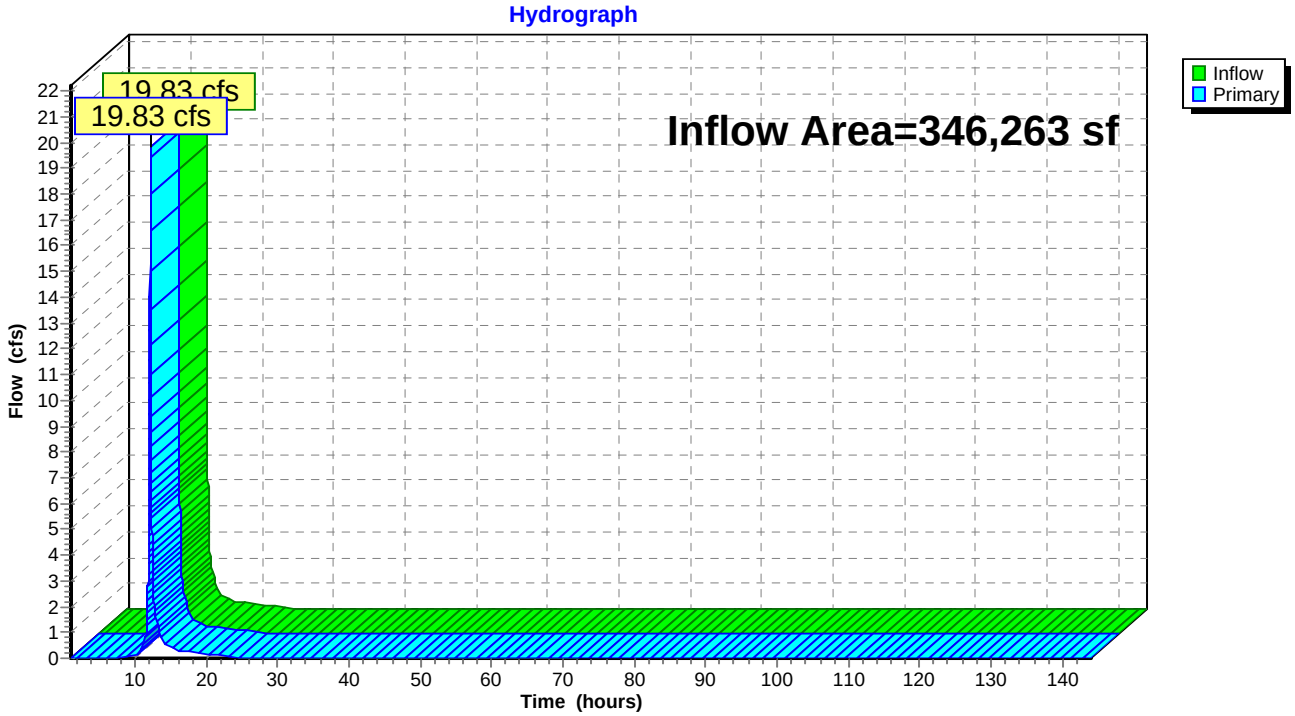


Summary for Link TEO: Total Existing Outfall

Inflow Area = 346,263 sf, 64.43% Impervious, Inflow Depth = 1.37" for 1-year event
Inflow = 19.83 cfs @ 12.13 hrs, Volume= 39,423 cf
Primary = 19.83 cfs @ 12.13 hrs, Volume= 39,423 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TEO: Total Existing Outfall



Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing Building C Runoff Area=251,263 sf 57.03% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=88 Runoff=15.91 cfs 31,269 cf

Subcatchment E2: Existing Building B Area Runoff Area=95,000 sf 83.99% Impervious Runoff Depth=1.99"
Tc=6.0 min CN=94 Runoff=7.62 cfs 15,784 cf

Link TEO: Total Existing Outfall Inflow=23.53 cfs 47,053 cf
Primary=23.53 cfs 47,053 cf

Total Runoff Area = 346,263 sf Runoff Volume = 47,053 cf Average Runoff Depth = 1.63"
35.57% Pervious = 123,175 sf 64.43% Impervious = 223,088 sf

Summary for Subcatchment E1: Existing Building C Area

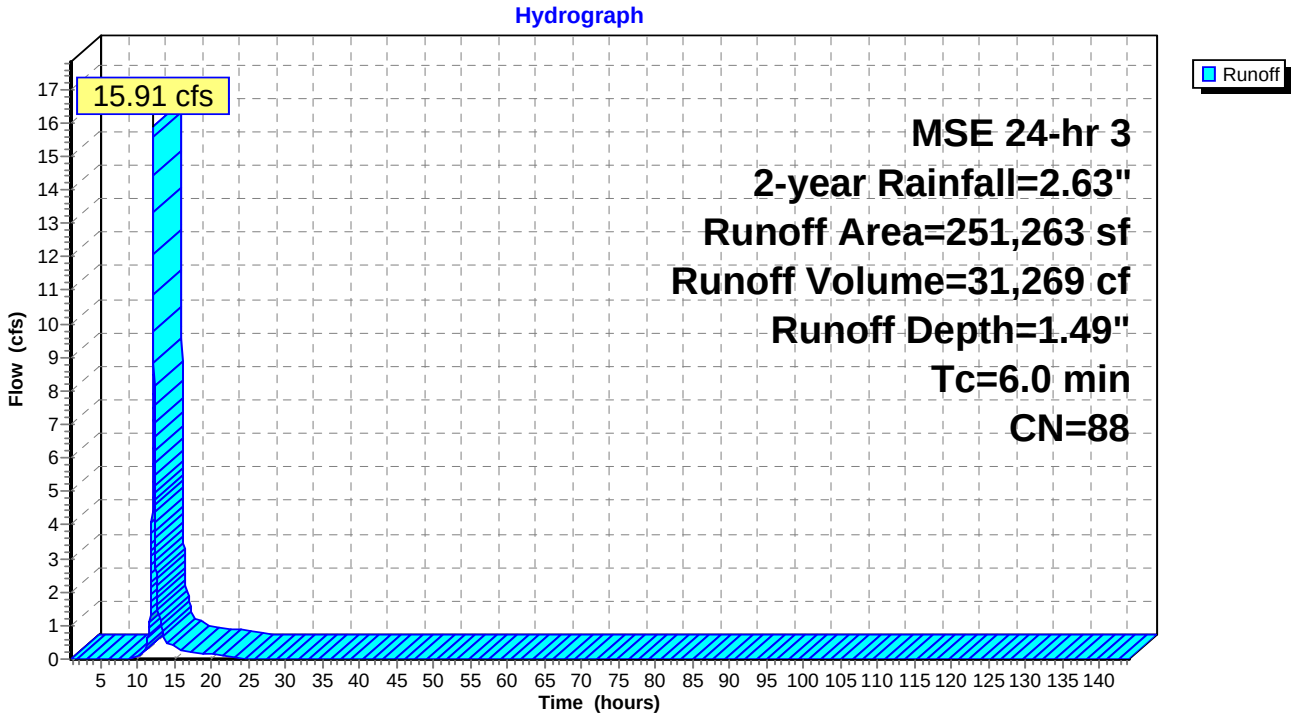
Runoff = 15.91 cfs @ 12.13 hrs, Volume= 31,269 cf, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
	17,812	98	Roofs, HSG C
	115,618	98	Paved parking, HSG C
*	9,867	98	Sidewalks, HSG C
	107,966	74	>75% Grass cover, Good, HSG C
	251,263	88	Weighted Average
	107,966		42.97% Pervious Area
	143,297		57.03% Impervious Area

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

Subcatchment E1: Existing Building C Area



Summary for Subcatchment E2: Existing Building B Area

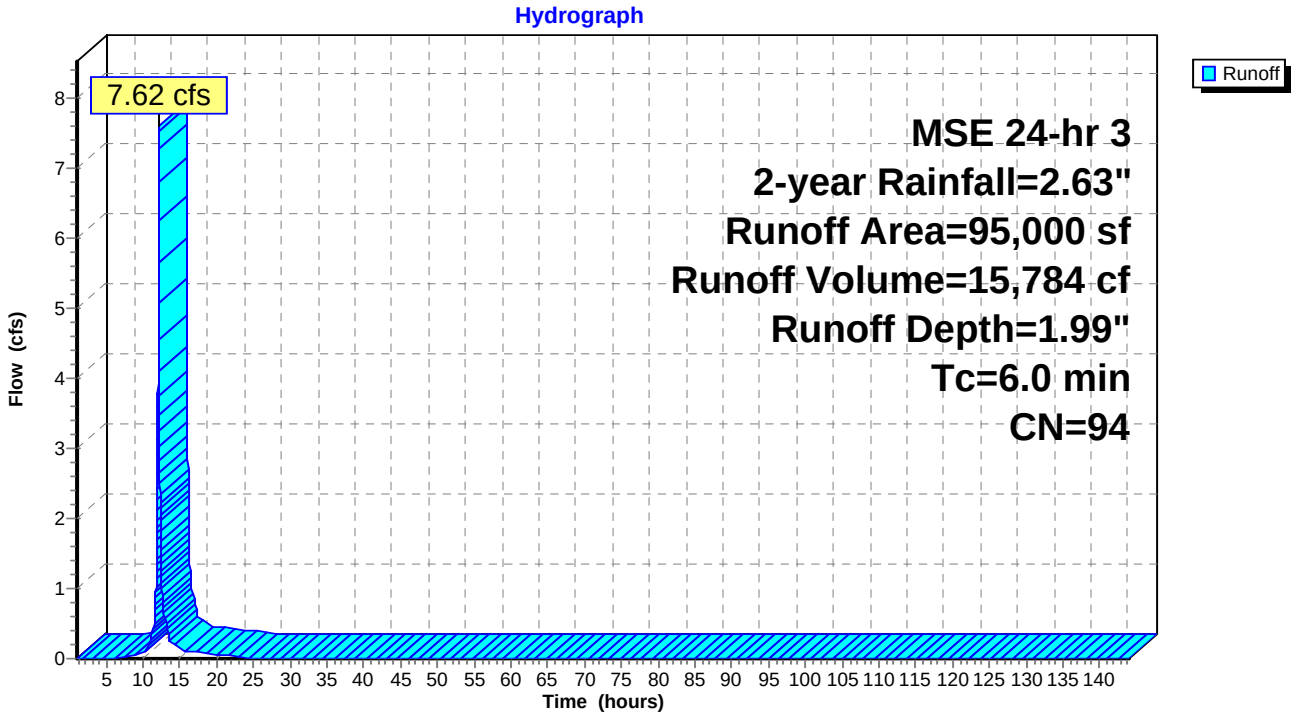
Runoff = 7.62 cfs @ 12.13 hrs, Volume= 15,784 cf, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

Area (sf)	CN	Description
23,020	98	Roofs, HSG C
55,534	98	Paved parking, HSG C
1,237	98	Unconnected pavement, HSG C
15,209	74	>75% Grass cover, Good, HSG C
95,000	94	Weighted Average
15,209		16.01% Pervious Area
79,791		83.99% Impervious Area
1,237		1.55% Unconnected

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

Subcatchment E2: Existing Building B Area

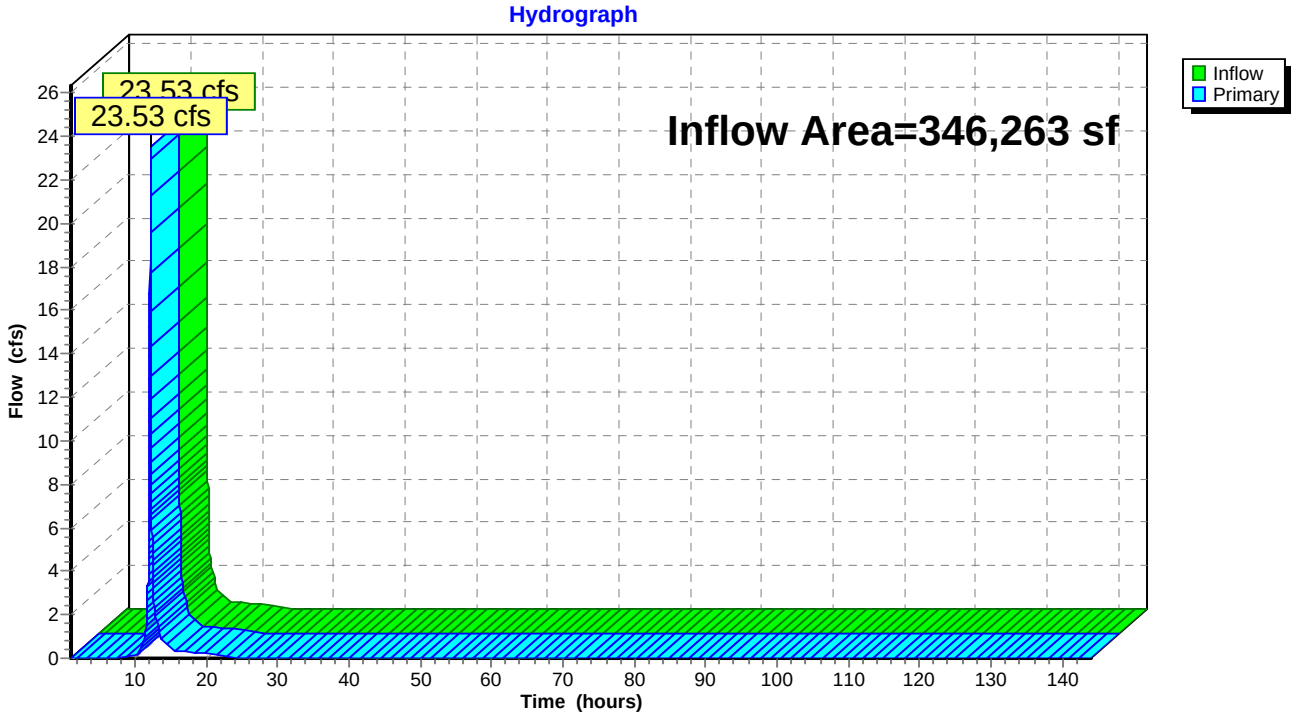


Summary for Link TEO: Total Existing Outfall

Inflow Area = 346,263 sf, 64.43% Impervious, Inflow Depth = 1.63" for 2-year event
Inflow = 23.53 cfs @ 12.13 hrs, Volume= 47,053 cf
Primary = 23.53 cfs @ 12.13 hrs, Volume= 47,053 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TEO: Total Existing Outfall



Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing Building C Runoff Area=251,263 sf 57.03% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=88 Runoff=25.95 cfs 52,107 cf

Subcatchment E2: Existing Building B Area Runoff Area=95,000 sf 83.99% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=94 Runoff=11.41 cfs 24,303 cf

Link TEO: Total Existing Outfall Inflow=37.36 cfs 76,410 cf
Primary=37.36 cfs 76,410 cf

Total Runoff Area = 346,263 sf Runoff Volume = 76,410 cf Average Runoff Depth = 2.65"
35.57% Pervious = 123,175 sf 64.43% Impervious = 223,088 sf

Summary for Subcatchment E1: Existing Building C Area

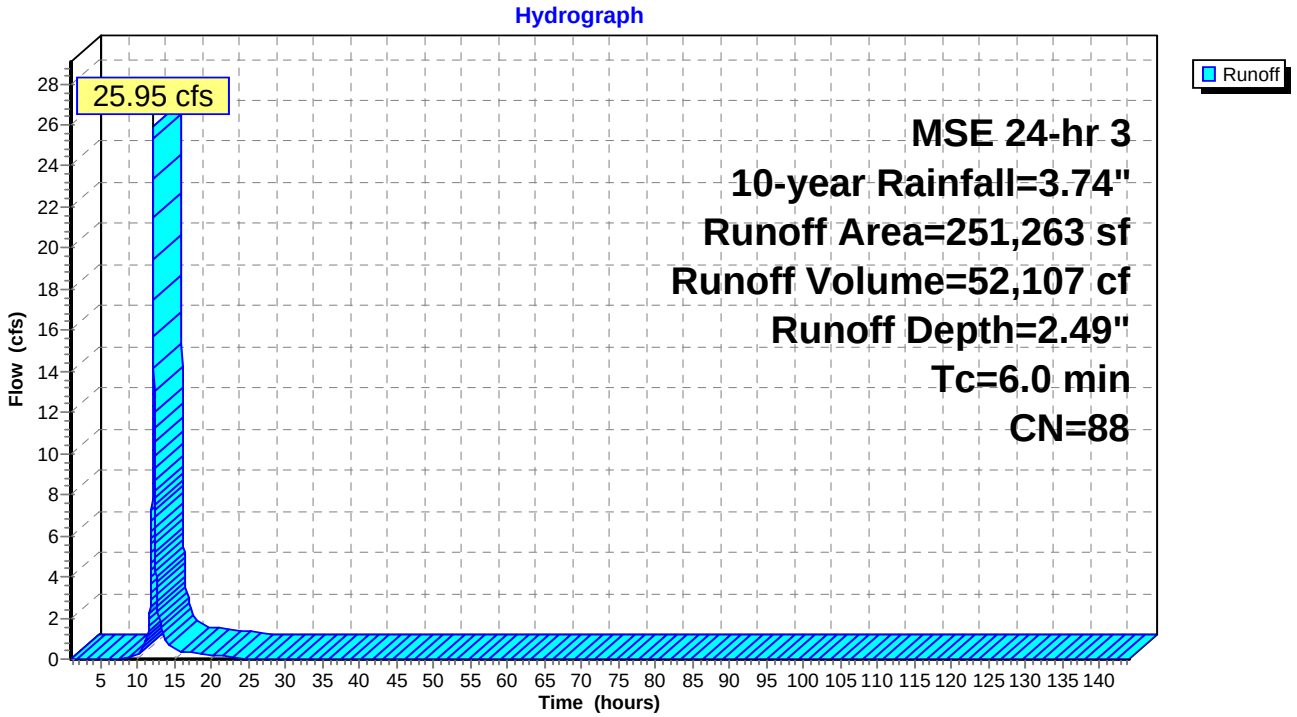
Runoff = 25.95 cfs @ 12.13 hrs, Volume= 52,107 cf, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
	17,812	98	Roofs, HSG C
	115,618	98	Paved parking, HSG C
*	9,867	98	Sidewalks, HSG C
	107,966	74	>75% Grass cover, Good, HSG C
	251,263	88	Weighted Average
	107,966		42.97% Pervious Area
	143,297		57.03% Impervious Area

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

Subcatchment E1: Existing Building C Area



Summary for Subcatchment E2: Existing Building B Area

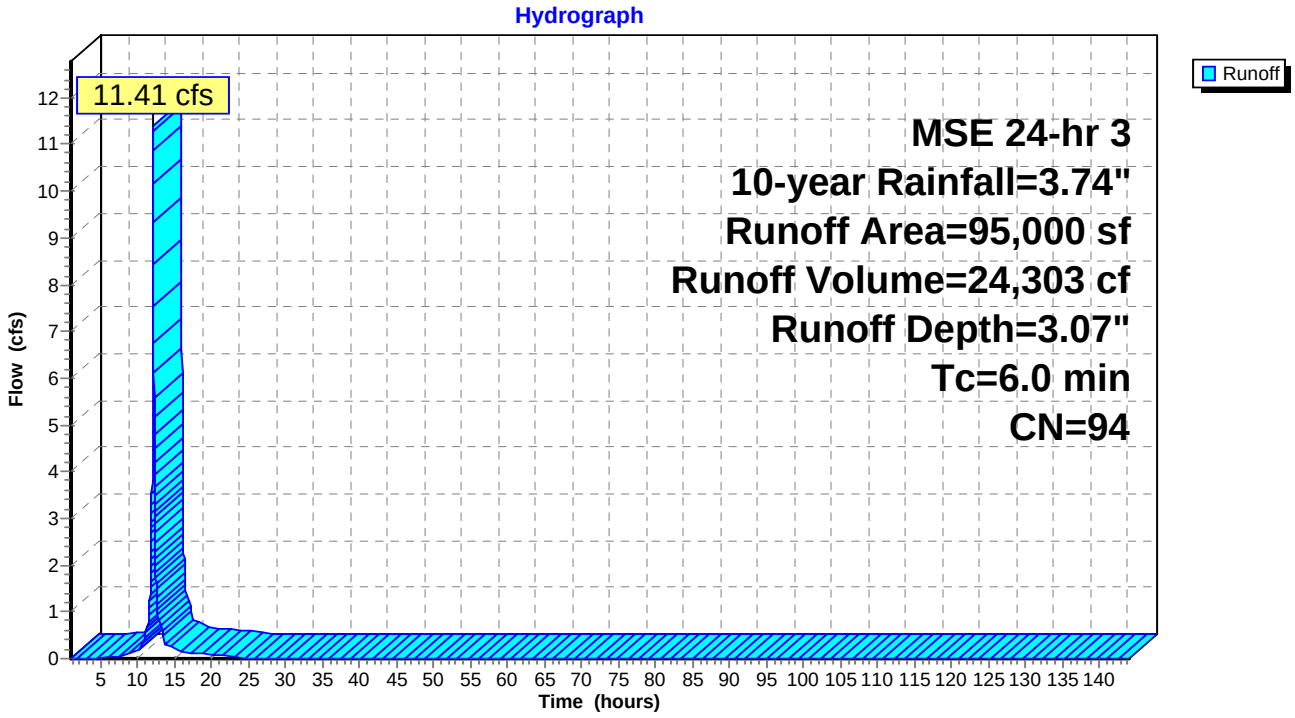
Runoff = 11.41 cfs @ 12.13 hrs, Volume= 24,303 cf, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

Area (sf)	CN	Description
23,020	98	Roofs, HSG C
55,534	98	Paved parking, HSG C
1,237	98	Unconnected pavement, HSG C
15,209	74	>75% Grass cover, Good, HSG C
95,000	94	Weighted Average
15,209		16.01% Pervious Area
79,791		83.99% Impervious Area
1,237		1.55% Unconnected

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

Subcatchment E2: Existing Building B Area

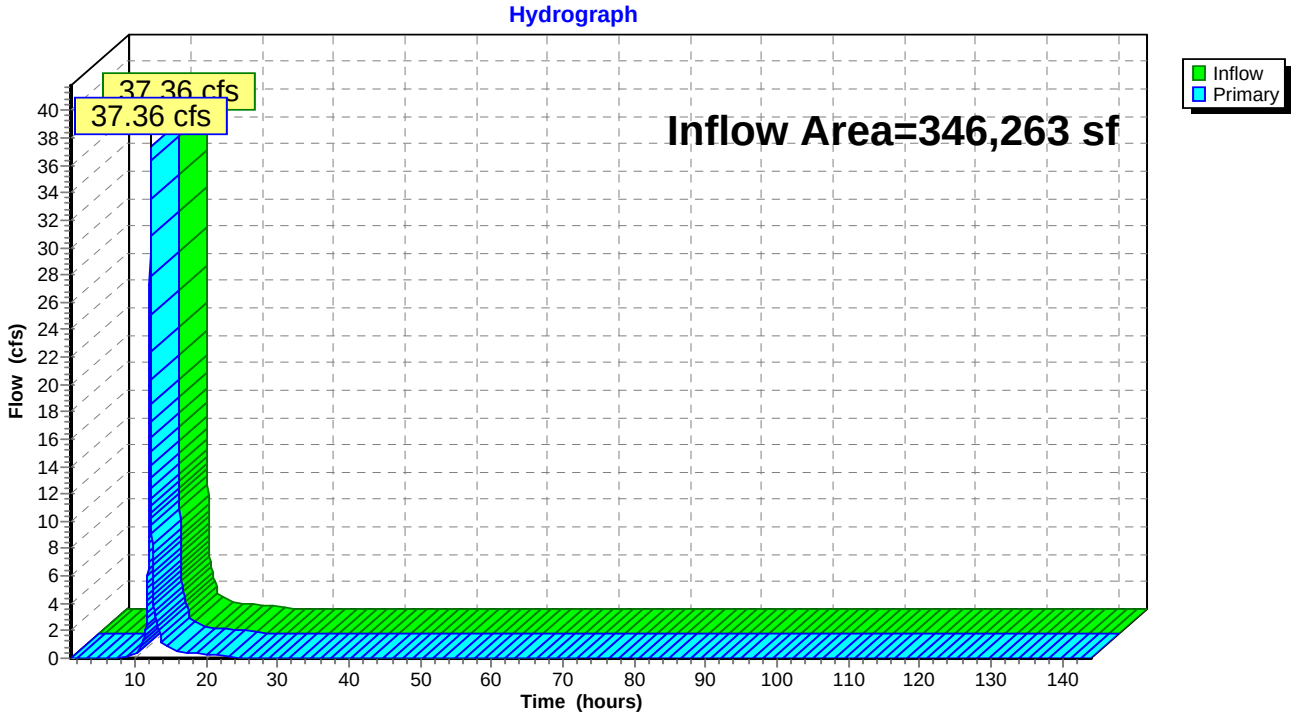


Summary for Link TEO: Total Existing Outfall

Inflow Area = 346,263 sf, 64.43% Impervious, Inflow Depth = 2.65" for 10-year event
Inflow = 37.36 cfs @ 12.13 hrs, Volume= 76,410 cf
Primary = 37.36 cfs @ 12.13 hrs, Volume= 76,410 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TEO: Total Existing Outfall



Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1: Existing Building C Runoff Area=251,263 sf 57.03% Impervious Runoff Depth=4.82"
Tc=6.0 min CN=88 Runoff=48.34 cfs 100,896 cf

Subcatchment E2: Existing Building B Area Runoff Area=95,000 sf 83.99% Impervious Runoff Depth=5.49"
Tc=6.0 min CN=94 Runoff=19.67 cfs 43,500 cf

Link TEO: Total Existing Outfall Inflow=68.01 cfs 144,396 cf
Primary=68.01 cfs 144,396 cf

Total Runoff Area = 346,263 sf Runoff Volume = 144,396 cf Average Runoff Depth = 5.00"
35.57% Pervious = 123,175 sf 64.43% Impervious = 223,088 sf

Summary for Subcatchment E1: Existing Building C Area

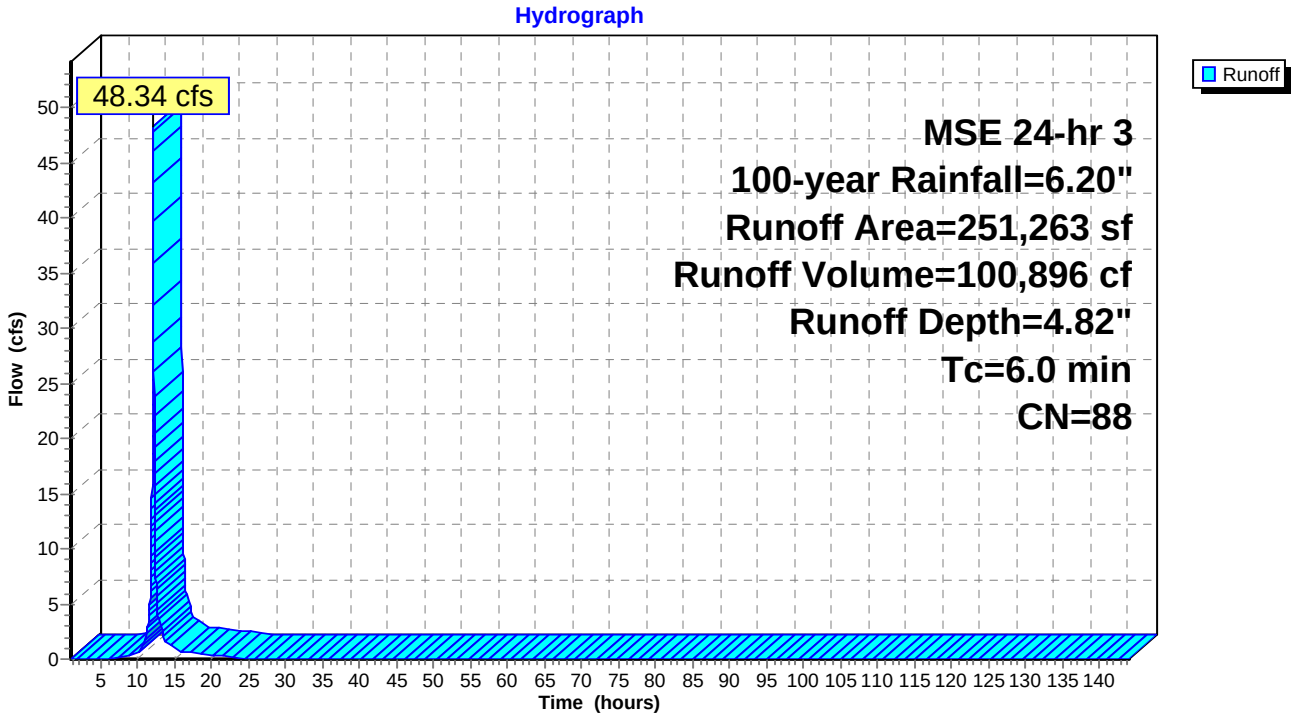
Runoff = 48.34 cfs @ 12.13 hrs, Volume= 100,896 cf, Depth= 4.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
	17,812	98	Roofs, HSG C
	115,618	98	Paved parking, HSG C
*	9,867	98	Sidewalks, HSG C
	107,966	74	>75% Grass cover, Good, HSG C
	251,263	88	Weighted Average
	107,966		42.97% Pervious Area
	143,297		57.03% Impervious Area

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

Subcatchment E1: Existing Building C Area



Summary for Subcatchment E2: Existing Building B Area

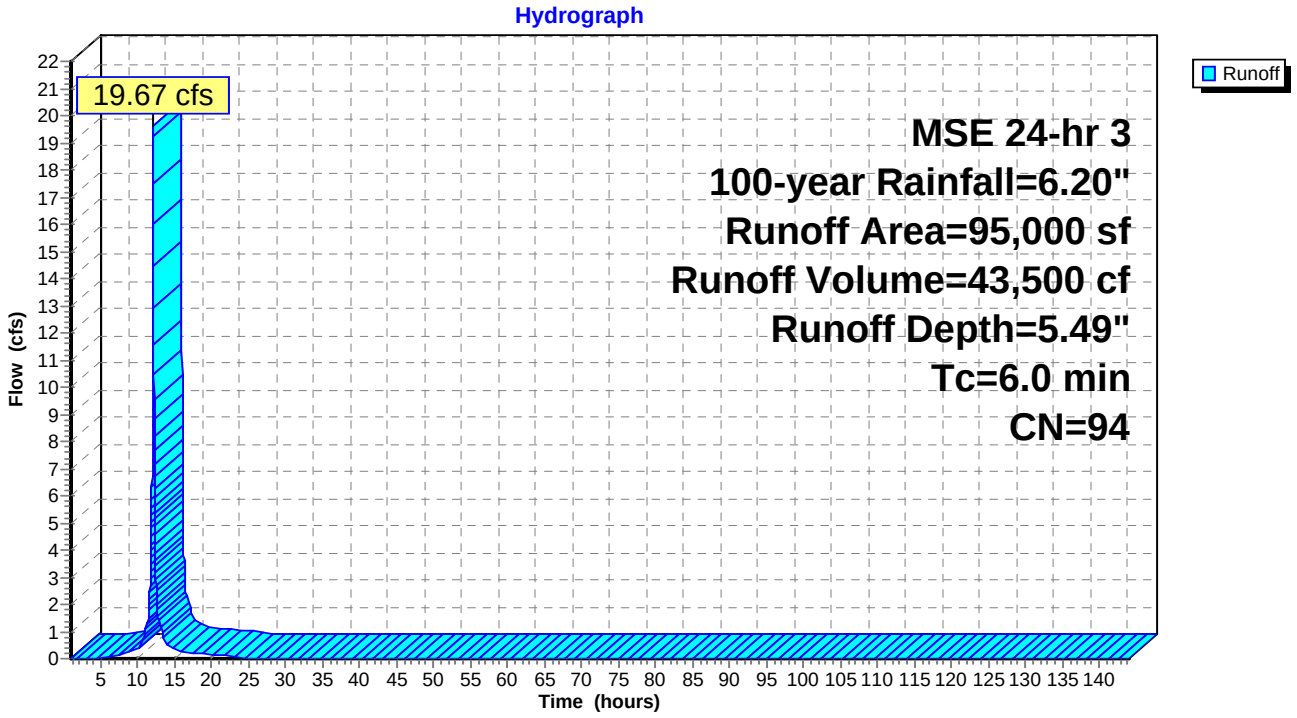
Runoff = 19.67 cfs @ 12.13 hrs, Volume= 43,500 cf, Depth= 5.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

Area (sf)	CN	Description
23,020	98	Roofs, HSG C
55,534	98	Paved parking, HSG C
1,237	98	Unconnected pavement, HSG C
15,209	74	>75% Grass cover, Good, HSG C
95,000	94	Weighted Average
15,209		16.01% Pervious Area
79,791		83.99% Impervious Area
1,237		1.55% Unconnected

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

Subcatchment E2: Existing Building B Area

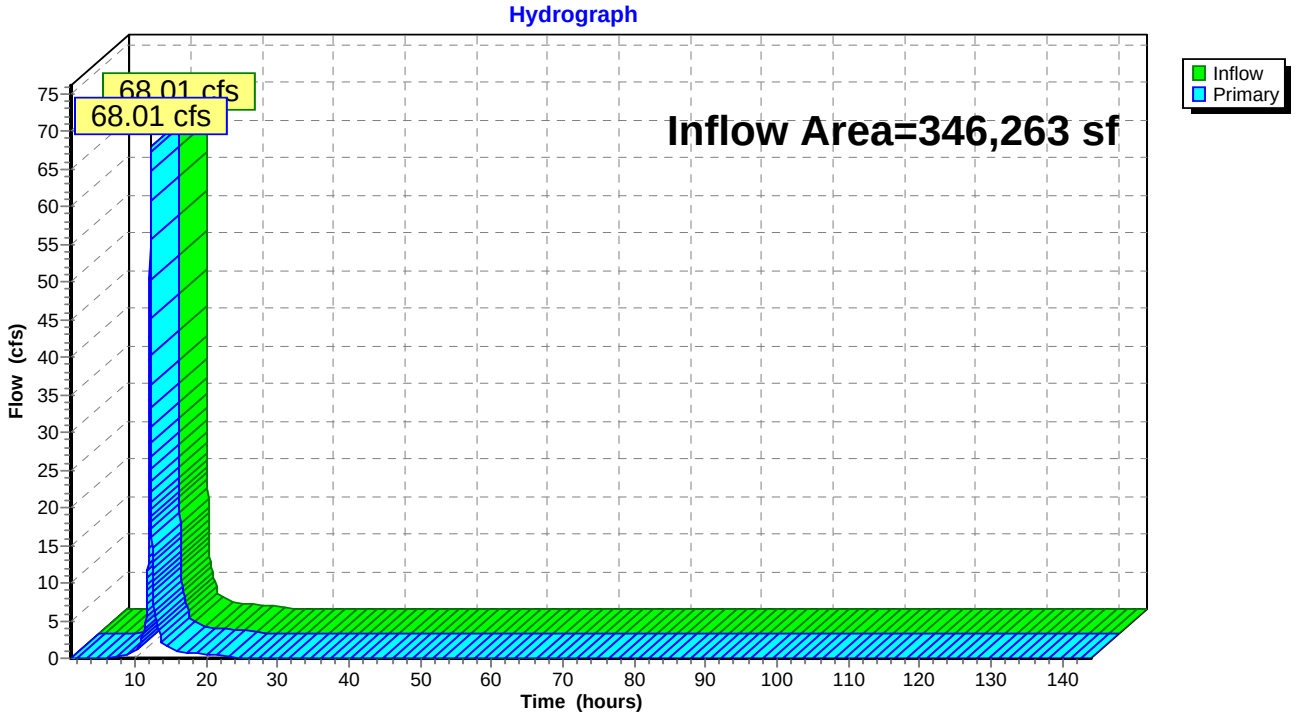


Summary for Link TEO: Total Existing Outfall

Inflow Area = 346,263 sf, 64.43% Impervious, Inflow Depth = 5.00" for 100-year event
Inflow = 68.01 cfs @ 12.13 hrs, Volume= 144,396 cf
Primary = 68.01 cfs @ 12.13 hrs, Volume= 144,396 cf, Atten= 0%, Lag= 0.0 min

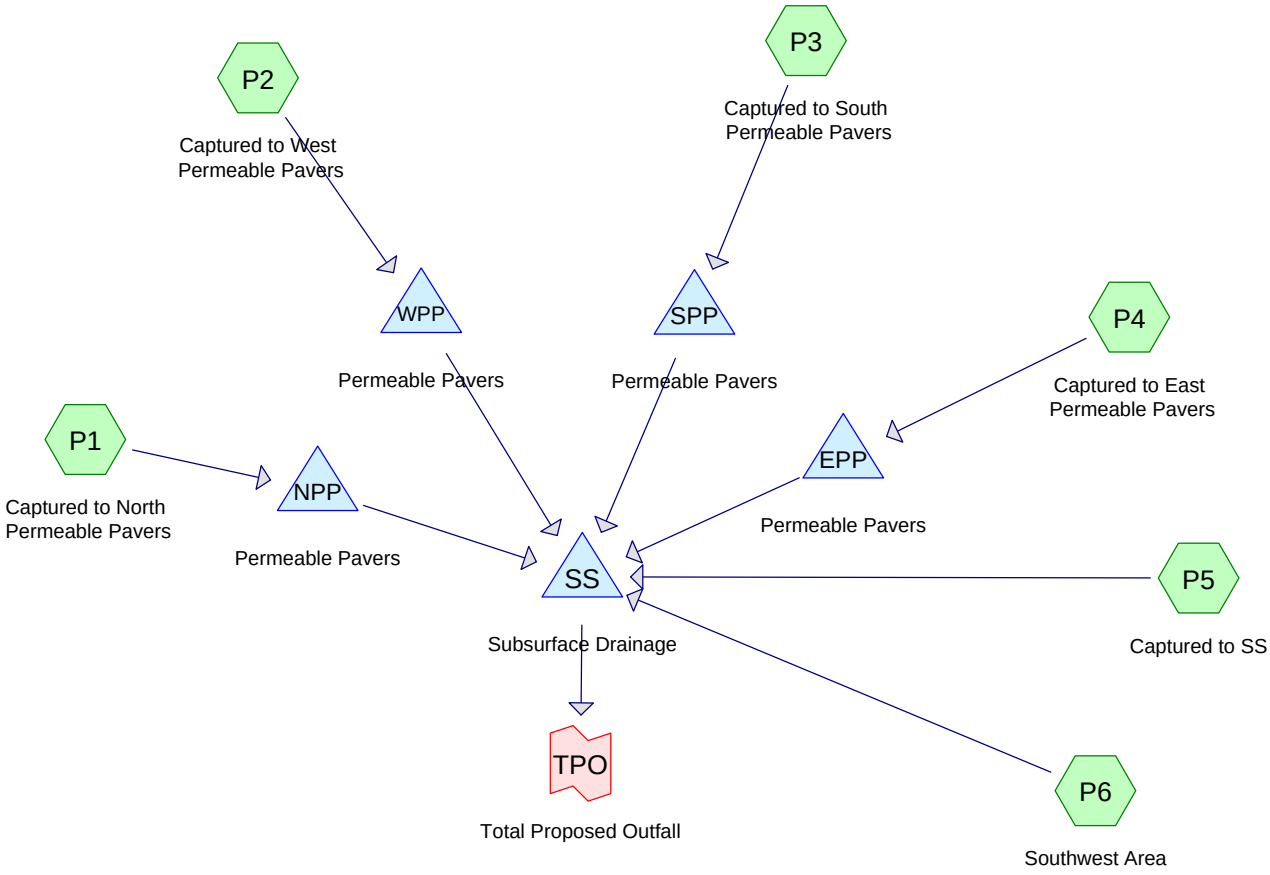
Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TEO: Total Existing Outfall



Appendix C

HydroCAD Analysis – Post-Development Conditions



2- year = 1.18 cfs

100- year = 3.73 cfs

Subcat Reach Pond Link

Routing Diagram for 210709_HydroCAD_BLDG B & BLDG C
Prepared by Kapur& Associates, Inc., Printed 10/18/2022

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-year	MSE 24-hr	3	Default	24.00	1	2.33	2
2	2-year	MSE 24-hr	3	Default	24.00	1	2.63	2
3	10-year	MSE 24-hr	3	Default	24.00	1	3.74	2
4	100-year	MSE 24-hr	3	Default	24.00	1	6.20	2

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
95,000	95	(P6)
79,603	74	>75% Grass cover, Good, HSG C (P1, P2, P3, P4, P5)
102,436	98	Paved parking, HSG C (P1, P2, P3, P4, P5)
35,294	98	Roofs, HSG C (P5)
33,930	98	Sidewalks, HSG C (P1, P2, P3, P4, P5)
346,263	**92**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
251,263	HSG C	P1, P2, P3, P4, P5
0	HSG D	
95,000	Other	P6
346,263		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	0	0	95,000	95,000		
0	0	79,603	0	0	79,603	>75% Grass cover, Good	
0	0	102,436	0	0	102,436	Paved parking	
0	0	35,294	0	0	35,294	Roofs	
0	0	33,930	0	0	33,930	Sidewalks	
0	**0**	**251,263**	**0**	**95,000**	**346,263**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	EPP	689.00	688.90	10.0	0.0100	0.013	12.0	0.0	0.0
2	NPP	689.00	688.90	10.0	0.0100	0.013	12.0	0.0	0.0
3	SPP	689.00	688.90	10.0	0.0100	0.013	12.0	0.0	0.0
4	SS	683.00	682.90	10.0	0.0100	0.013	12.0	0.0	0.0
5	WPP	689.00	688.90	10.0	0.0100	0.013	12.0	0.0	0.0

Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Captured to North Runoff Area=28,669 sf 77.74% Impervious Runoff Depth=1.62"
Tc=6.0 min CN=93 Runoff=1.91 cfs 3,870 cf

Subcatchment P2: Captured to West Runoff Area=48,470 sf 80.32% Impervious Runoff Depth=1.62"
Tc=6.0 min CN=93 Runoff=3.23 cfs 6,543 cf

Subcatchment P3: Captured to South Runoff Area=25,018 sf 86.77% Impervious Runoff Depth=1.80"
Tc=6.0 min CN=95 Runoff=1.80 cfs 3,751 cf

Subcatchment P4: Captured to East Runoff Area=18,670 sf 92.15% Impervious Runoff Depth=1.90"
Tc=6.0 min CN=96 Runoff=1.39 cfs 2,949 cf

Subcatchment P5: Captured to SS Runoff Area=130,436 sf 54.84% Impervious Runoff Depth=1.17"
Tc=6.0 min CN=87 Runoff=6.52 cfs 12,720 cf

Subcatchment P6: Southwest Area Runoff Area=95,000 sf 0.00% Impervious Runoff Depth=1.80"
Tc=6.0 min CN=95 Runoff=6.84 cfs 14,243 cf

Pond EPP: Permeable Pavers Peak Elev=690.48' Storage=707 cf Inflow=1.39 cfs 2,949 cf
Outflow=0.48 cfs 2,949 cf

Pond NPP: Permeable Pavers Peak Elev=690.04' Storage=1,315 cf Inflow=1.91 cfs 3,870 cf
Outflow=0.39 cfs 3,870 cf

Pond SPP: Permeable Pavers Peak Elev=690.36' Storage=1,117 cf Inflow=1.80 cfs 3,751 cf
Outflow=0.46 cfs 3,751 cf

Pond SS: Subsurface Drainage Peak Elev=685.24' Storage=23,259 cf Inflow=14.88 cfs 44,076 cf
Outflow=1.09 cfs 44,077 cf

Pond WPP: Permeable Pavers Peak Elev=690.50' Storage=2,633 cf Inflow=3.23 cfs 6,543 cf
Outflow=0.48 cfs 6,543 cf

Link TPO: Total Proposed Outfall Inflow=1.09 cfs 44,077 cf
Primary=1.09 cfs 44,077 cf

Total Runoff Area = 346,263 sf Runoff Volume = 44,076 cf Average Runoff Depth = 1.53"
50.42% Pervious = 174,603 sf 49.58% Impervious = 171,660 sf

Summary for Subcatchment P1: Captured to North Permeable Pavers

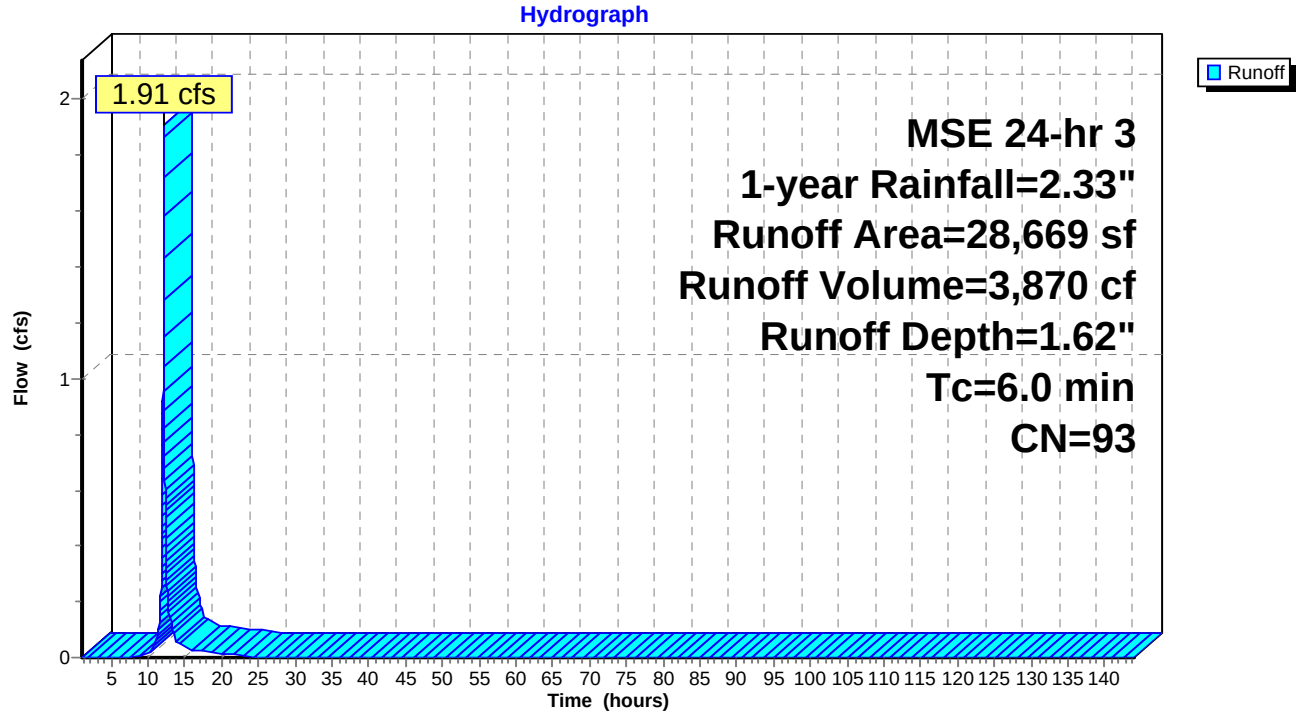
Runoff = 1.91 cfs @ 12.13 hrs, Volume= 3,870 cf, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
	14,228	98	Paved parking, HSG C
*	8,058	98	Sidewalks, HSG C
	6,383	74	>75% Grass cover, Good, HSG C
	28,669	93	Weighted Average
	6,383		22.26% Pervious Area
	22,286		77.74% Impervious Area

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

Subcatchment P1: Captured to North Permeable Pavers



Summary for Subcatchment P2: Captured to West Permeable Pavers

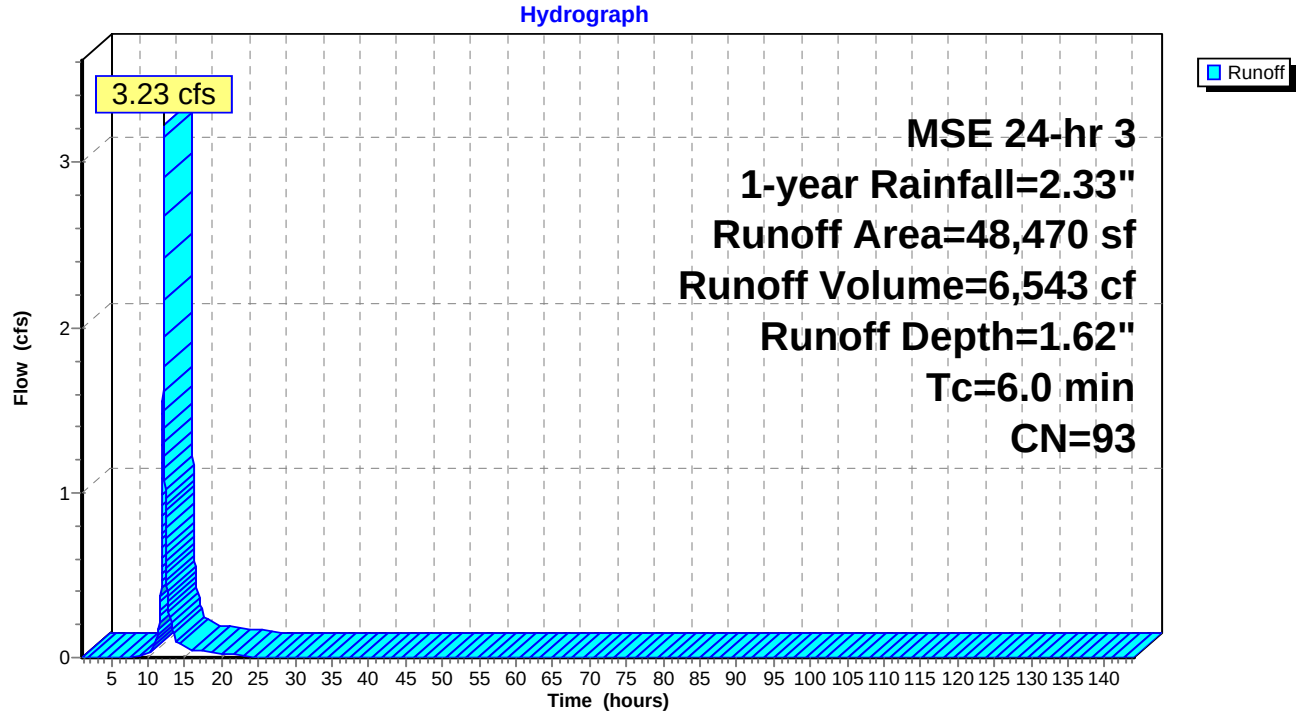
Runoff = 3.23 cfs @ 12.13 hrs, Volume= 6,543 cf, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
	32,775	98	Paved parking, HSG C
*	6,155	98	Sidewalks, HSG C
	9,540	74	>75% Grass cover, Good, HSG C
	48,470	93	Weighted Average
	9,540		19.68% Pervious Area
	38,930		80.32% Impervious Area

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

Subcatchment P2: Captured to West Permeable Pavers



Summary for Subcatchment P3: Captured to South Permeable Pavers

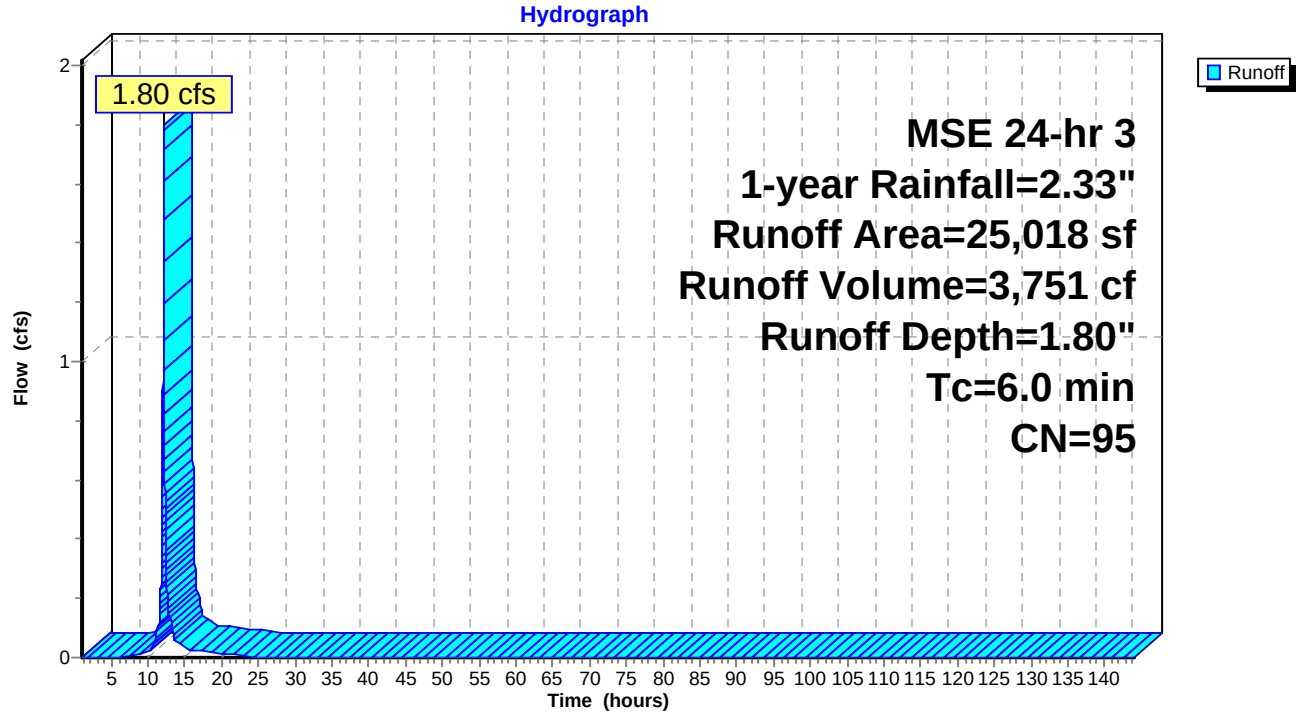
Runoff = 1.80 cfs @ 12.13 hrs, Volume= 3,751 cf, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
	14,987	98	Paved parking, HSG C
*	6,721	98	Sidewalks, HSG C
	3,310	74	>75% Grass cover, Good, HSG C
	25,018	95	Weighted Average
	3,310		13.23% Pervious Area
	21,708		86.77% Impervious Area

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

Subcatchment P3: Captured to South Permeable Pavers



Summary for Subcatchment P4: Captured to East Permeable Pavers

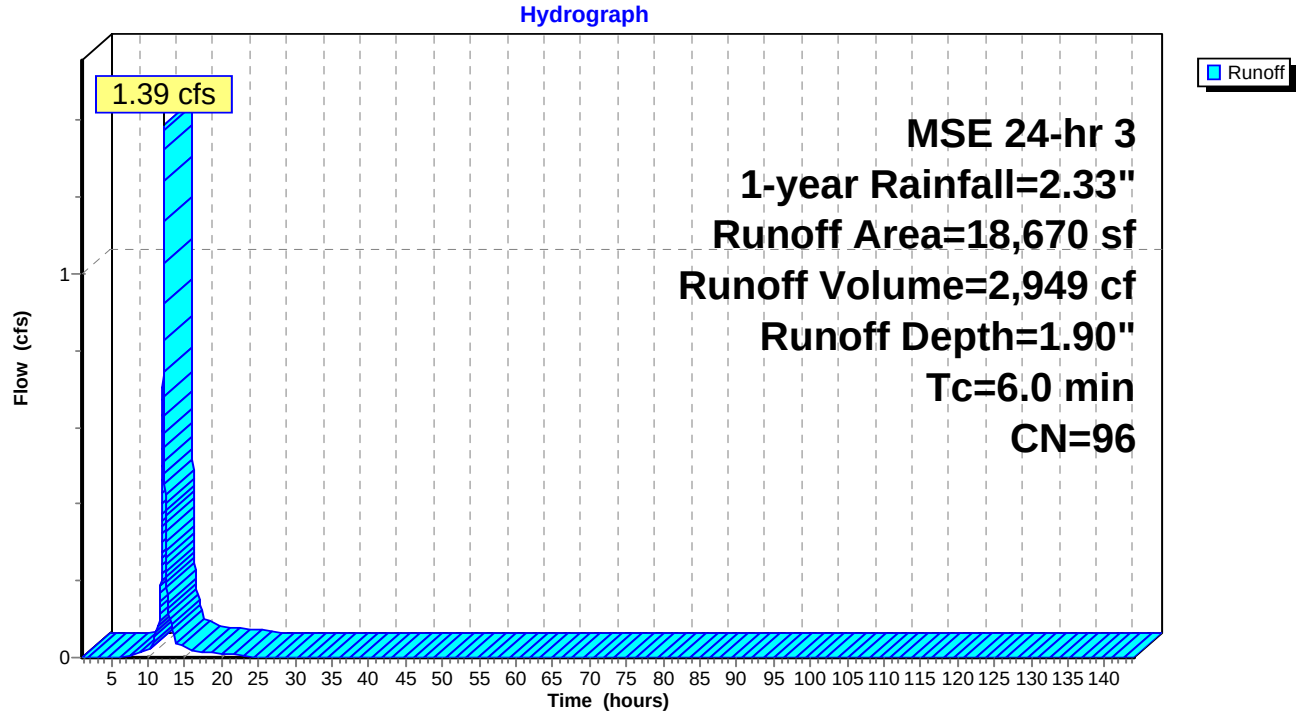
Runoff = 1.39 cfs @ 12.13 hrs, Volume= 2,949 cf, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
	11,383	98	Paved parking, HSG C
*	5,821	98	Sidewalks, HSG C
	1,466	74	>75% Grass cover, Good, HSG C
	18,670	96	Weighted Average
	1,466		7.85% Pervious Area
	17,204		92.15% Impervious Area

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

Subcatchment P4: Captured to East Permeable Pavers



Summary for Subcatchment P5: Captured to SS

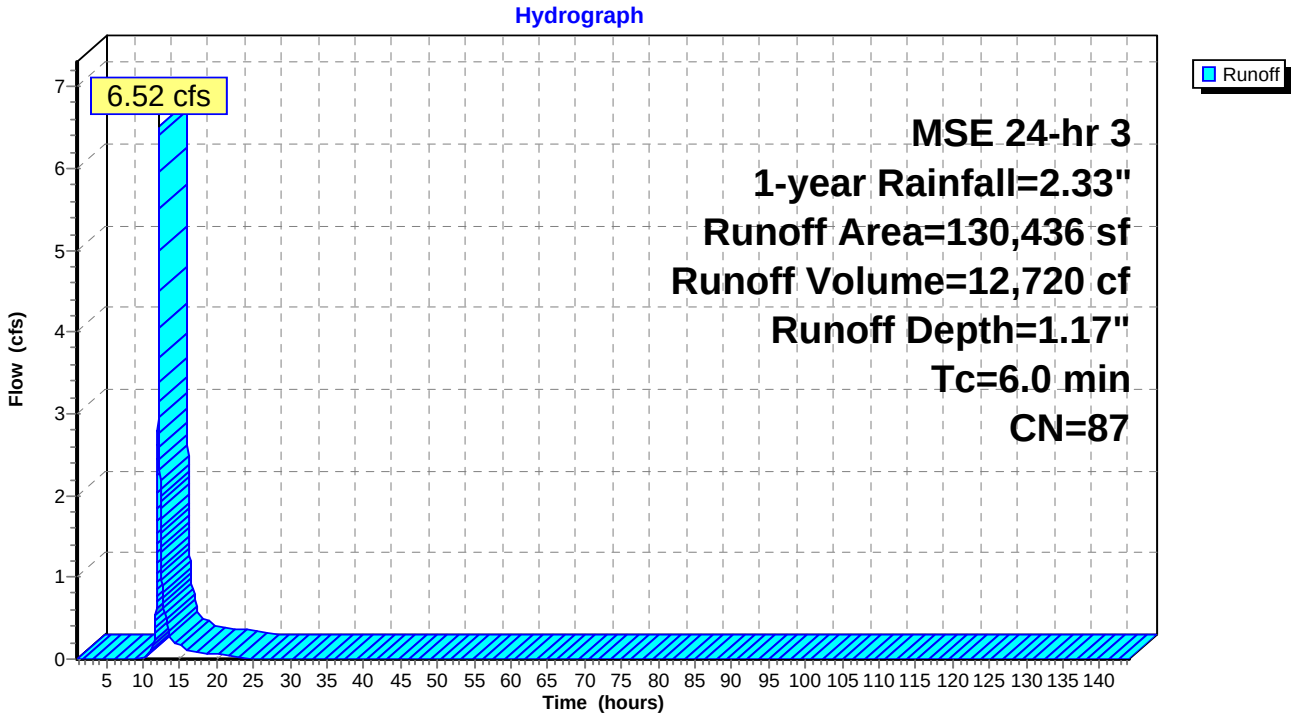
Runoff = 6.52 cfs @ 12.13 hrs, Volume= 12,720 cf, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
	35,294	98	Roofs, HSG C
	29,063	98	Paved parking, HSG C
*	7,175	98	Sidewalks, HSG C
	58,904	74	>75% Grass cover, Good, HSG C
	130,436	87	Weighted Average
	58,904		45.16% Pervious Area
	71,532		54.84% Impervious Area

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

Subcatchment P5: Captured to SS



Summary for Subcatchment P6: Southwest Area

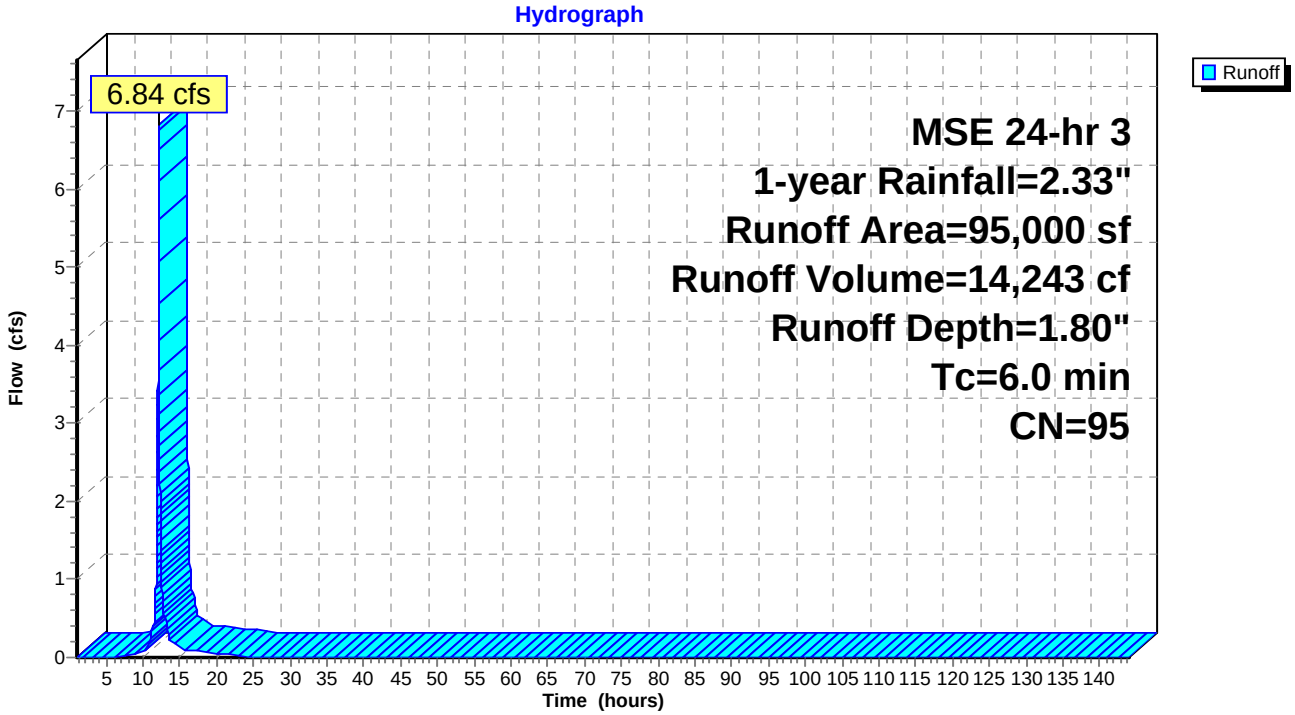
Runoff = 6.84 cfs @ 12.13 hrs, Volume= 14,243 cf, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1-year Rainfall=2.33"

	Area (sf)	CN	Description
*	95,000	95	
	95,000		100.00% Pervious Area

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

Subcatchment P6: Southwest Area



Summary for Pond EPP: Permeable Pavers

Inflow Area = 18,670 sf, 92.15% Impervious, Inflow Depth = 1.90" for 1-year event
Inflow = 1.39 cfs @ 12.13 hrs, Volume= 2,949 cf
Outflow = 0.48 cfs @ 12.27 hrs, Volume= 2,949 cf, Atten= 65%, Lag= 8.4 min
Primary = 0.48 cfs @ 12.27 hrs, Volume= 2,949 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.48' @ 12.27 hrs Surf.Area= 5,823 sf Storage= 707 cf

Plug-Flow detention time= 12.8 min calculated for 2,949 cf (100% of inflow)
Center-of-Mass det. time= 12.6 min (785.0 - 772.4)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	495 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 1,665 cf Overall - 17 cf Embedded = 1,648 cf x 30.0% Voids
#2	690.16'	160 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 485 cf Overall x 33.0% Voids
#3	690.41'	82 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 330 cf Overall x 25.0% Voids
#4	690.58'	1,941 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	17 cf	**4.0" Round 4" DT** Inside #1 L= 190.0'
		2,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	190	0	0
689.33	190	63	63
689.34	1,941	11	73
690.16	1,941	1,592	1,665

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	1,941	0	0
690.41	1,941	485	485

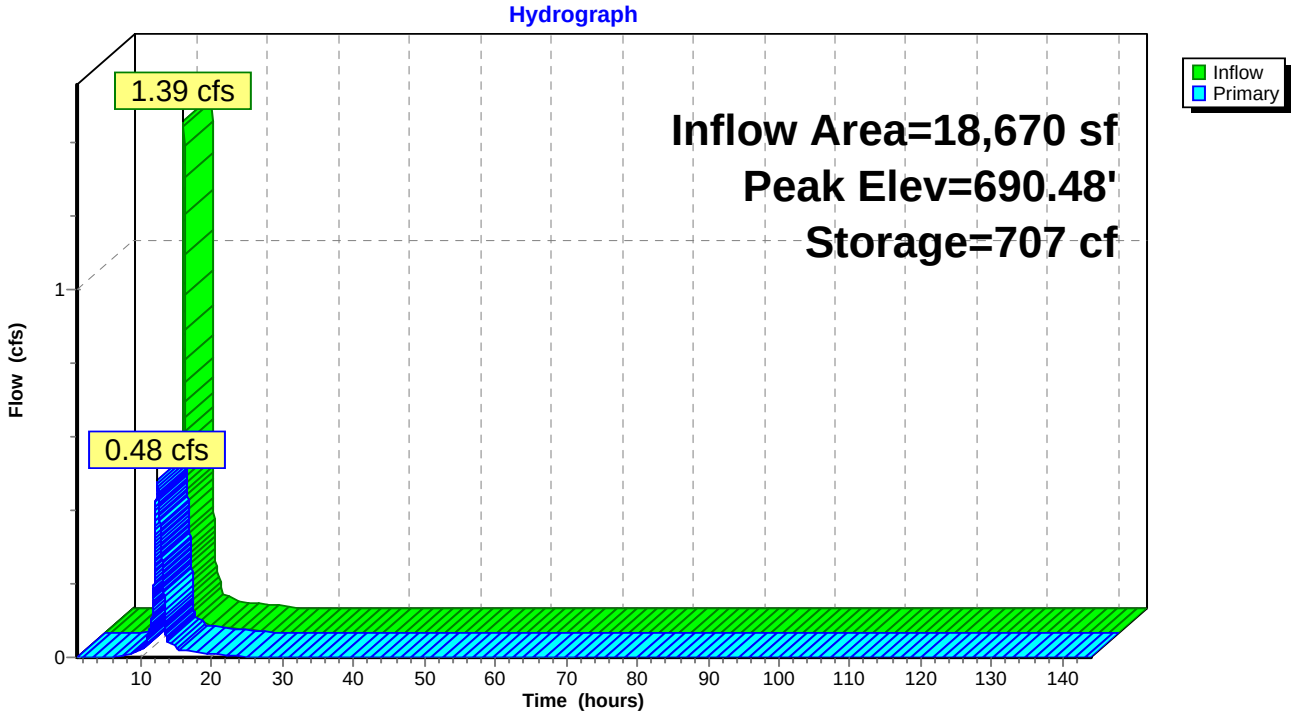
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	1,941	0	0
690.58	1,941	330	330

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	1,941	0	0
691.58	1,941	1,941	1,941

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.48 cfs @ 12.27 hrs HW=690.48' TW=684.57' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.48 cfs of 3.57 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.48 cfs @ 5.52 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond EPP: Permeable Pavers



Summary for Pond NPP: Permeable Pavers

Inflow Area = 28,669 sf, 77.74% Impervious, Inflow Depth = 1.62" for 1-year event
Inflow = 1.91 cfs @ 12.13 hrs, Volume= 3,870 cf
Outflow = 0.39 cfs @ 12.40 hrs, Volume= 3,870 cf, Atten= 79%, Lag= 16.0 min
Primary = 0.39 cfs @ 12.40 hrs, Volume= 3,870 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.04' @ 12.40 hrs Surf.Area= 5,940 sf Storage= 1,315 cf

Plug-Flow detention time= 31.2 min calculated for 3,870 cf (100% of inflow)
Center-of-Mass det. time= 31.1 min (818.2 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,500 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 5,034 cf Overall - 35 cf Embedded = 5,000 cf x 30.0% Voids
#2	690.16'	490 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,485 cf Overall x 33.0% Voids
#3	690.41'	252 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,010 cf Overall x 25.0% Voids
#4	690.58'	5,940 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	35 cf	**4.0" Round 4" DT** Inside #1 L= 400.0'
		8,217 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	400	0	0
689.33	400	132	132
689.34	5,940	32	164
690.16	5,940	4,871	5,034

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	5,940	0	0
690.41	5,940	1,485	1,485

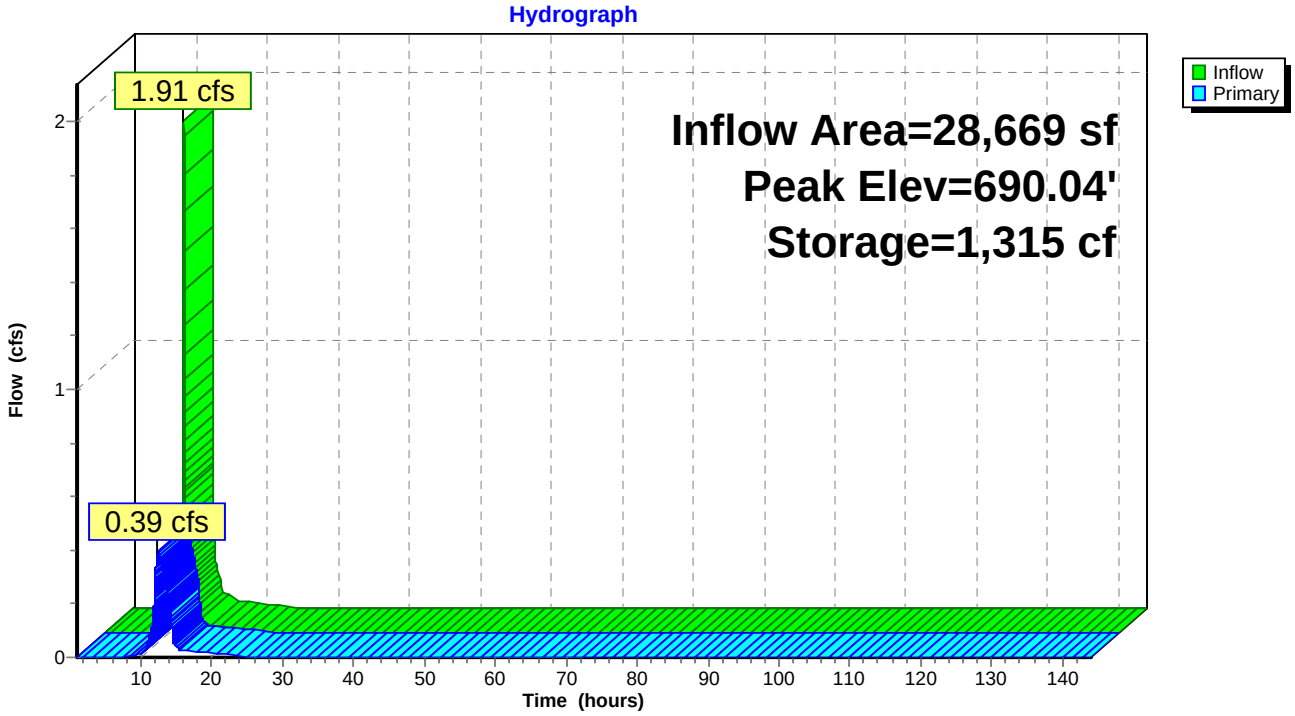
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	5,940	0	0
690.58	5,940	1,010	1,010

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	5,940	0	0
691.58	5,940	5,940	5,940

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.39 cfs @ 12.40 hrs HW=690.04' TW=684.73' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.39 cfs of 2.39 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.39 cfs @ 4.49 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond NPP: Permeable Pavers



Summary for Pond SPP: Permeable Pavers

Inflow Area = 25,018 sf, 86.77% Impervious, Inflow Depth = 1.80" for 1-year event
Inflow = 1.80 cfs @ 12.13 hrs, Volume= 3,751 cf
Outflow = 0.46 cfs @ 12.34 hrs, Volume= 3,751 cf, Atten= 74%, Lag= 12.4 min
Primary = 0.46 cfs @ 12.34 hrs, Volume= 3,751 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.36' @ 12.34 hrs Surf.Area= 6,854 sf Storage= 1,117 cf

Plug-Flow detention time= 21.0 min calculated for 3,751 cf (100% of inflow)
Center-of-Mass det. time= 21.0 min (799.0 - 777.9)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	866 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 2,908 cf Overall - 21 cf Embedded = 2,887 cf x 30.0% Voids
#2	690.16'	283 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 857 cf Overall x 33.0% Voids
#3	690.41'	146 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 583 cf Overall x 25.0% Voids
#4	690.58'	3,427 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	21 cf	**4.0" Round 4" DT** Inside #1 L= 240.0'
		4,742 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	240	0	0
689.33	240	79	79
689.34	3,427	18	98
690.16	3,427	2,810	2,908

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	3,427	0	0
690.41	3,427	857	857

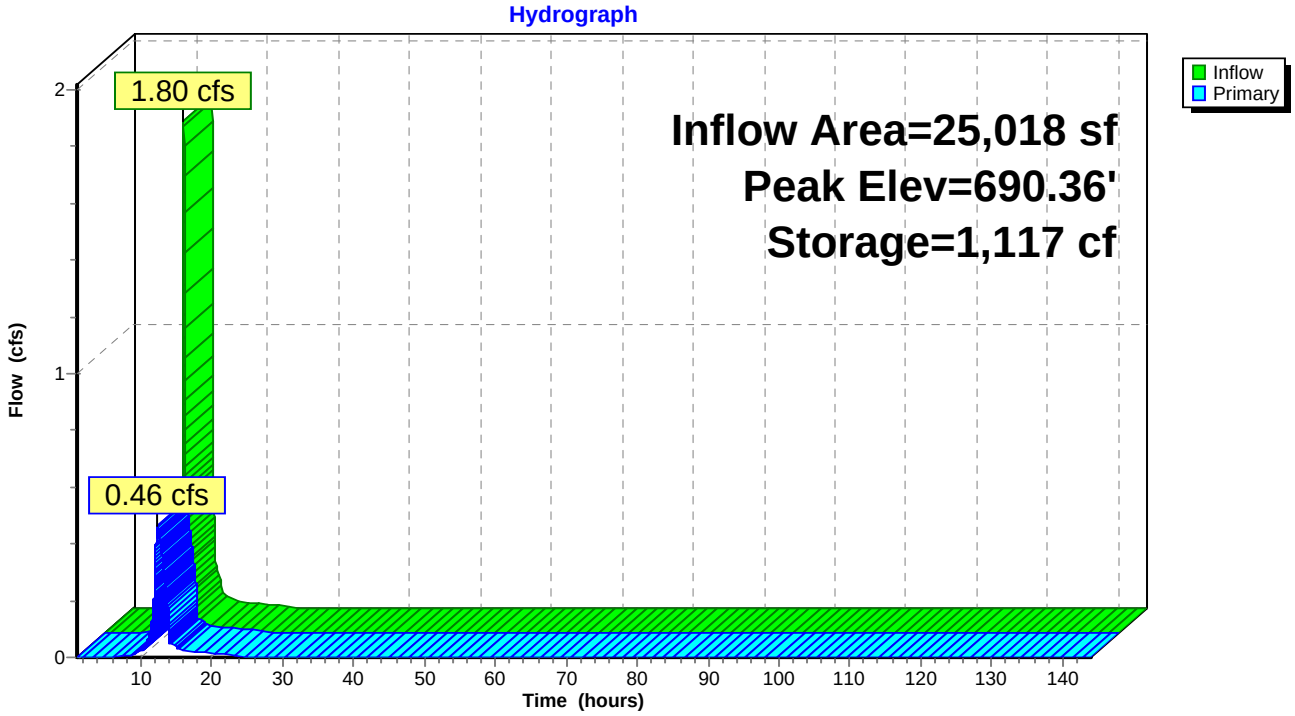
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	3,427	0	0
690.58	3,427	583	583

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	3,427	0	0
691.58	3,427	3,427	3,427

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.46 cfs @ 12.34 hrs HW=690.36' TW=684.67' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.46 cfs of 3.18 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.46 cfs @ 5.27 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond SPP: Permeable Pavers



Summary for Pond SS: Subsurface Drainage

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 1.53" for 1-year event
Inflow = 14.88 cfs @ 12.13 hrs, Volume= 44,076 cf
Outflow = 1.09 cfs @ 13.95 hrs, Volume= 44,077 cf, Atten= 93%, Lag= 109.1 min
Primary = 1.09 cfs @ 13.95 hrs, Volume= 44,077 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 685.24' @ 13.95 hrs Surf.Area= 14,992 sf Storage= 23,259 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 239.2 min (1,040.6 - 801.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	683.00'	0 cf	**89.63'W x 167.27'L x 8.00'H Field A** 119,933 cf Overall - 119,933 cf Embedded = 0 cf x 40.0% Voids
#2A	683.00'	93,825 cf	**StormTrap ST2 DoubleTrap 7-0** x 90 Inside #1 Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf 90 Chambers in 9 Rows 76.31' x 153.96' Core + 6.66' Border = 89.63' x 167.27' System
		93,825 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	683.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.00' / 682.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	683.00'	**5.4" Vert. 5" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	689.60'	**6.0' long Spillway** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.09 cfs @ 13.95 hrs HW=685.24' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.09 cfs of 4.98 cfs potential flow)
↑**2=5" Orifice** (Orifice Controls 1.09 cfs @ 6.83 fps)
3=Spillway (Controls 0.00 cfs)

Pond SS: Subsurface Drainage - Chamber Wizard Field A

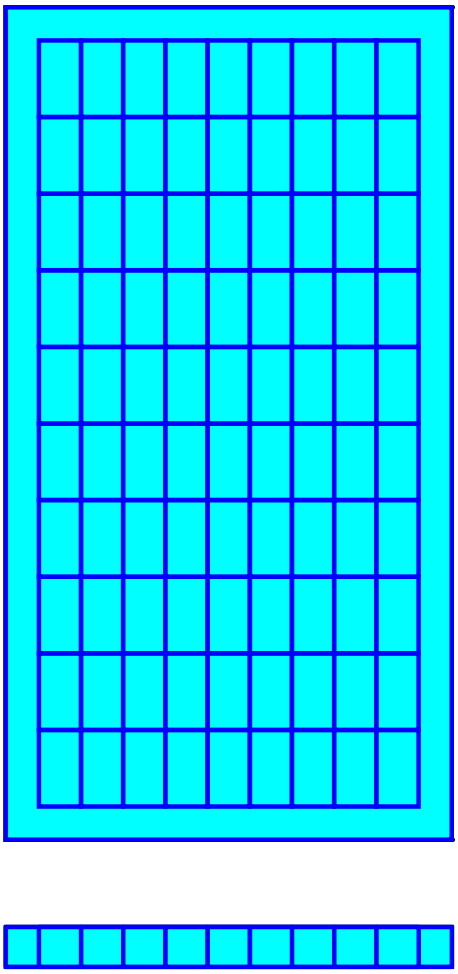
Chamber Model = StormTrap ST2 DoubleTrap 7-0 (StormTrap ST2 DoubleTrap® Type II+IV)
Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf
Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf

10 Chambers/Row x 15.40' Long = 153.96' Row Length +79.9" Border x 2 = 167.27' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
96.0" Chamber Height = 8.00' Field Height

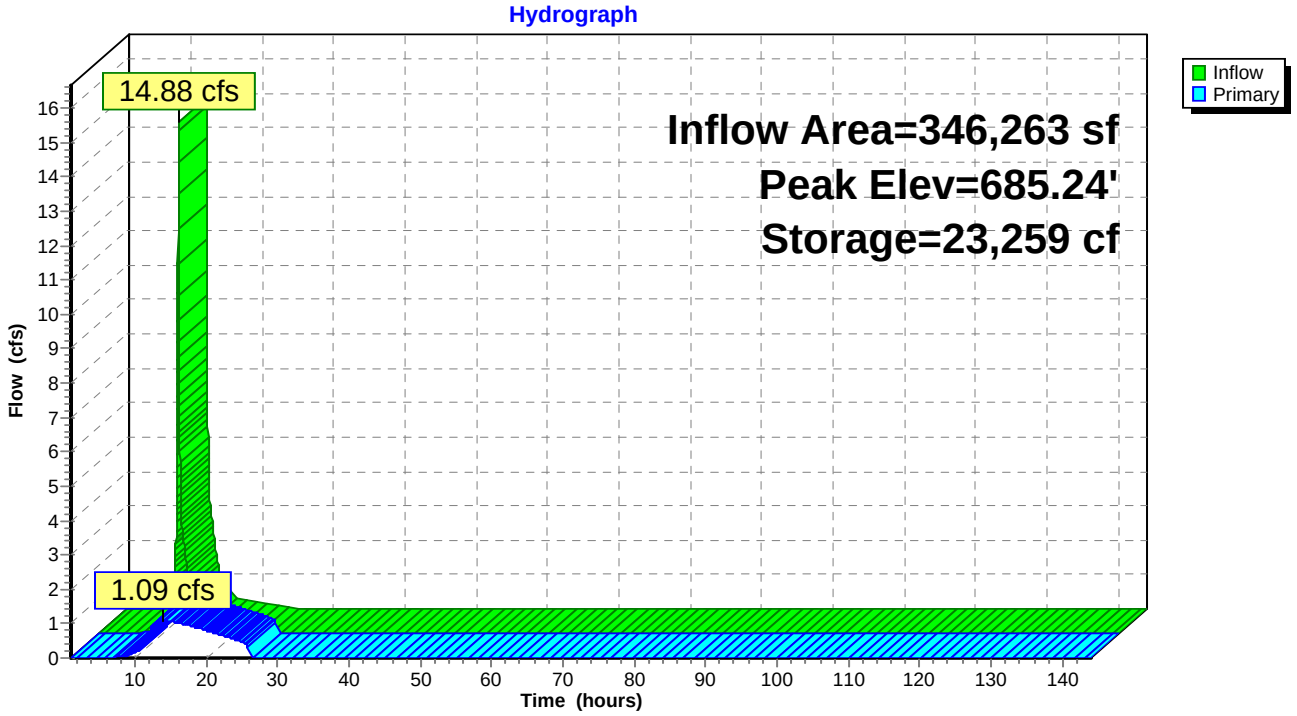
90 Chambers x 824.3 cf + 19,641.3 cf Border = 93,825.0 cf Chamber Storage
90 Chambers x 1,044.4 cf + 25,941.6 cf Border = 119,933.2 cf Displacement

Chamber Storage = 93,825.0 cf = 2.154 af
Overall Storage Efficiency = 78.2%
Overall System Size = 167.27' x 89.63' x 8.00'

90 Chambers (plus border)
4,442.0 cy Field



Pond SS: Subsurface Drainage



Summary for Pond WPP: Permeable Pavers

Inflow Area = 48,470 sf, 80.32% Impervious, Inflow Depth = 1.62" for 1-year event
Inflow = 3.23 cfs @ 12.13 hrs, Volume= 6,543 cf
Outflow = 0.48 cfs @ 12.50 hrs, Volume= 6,543 cf, Atten= 85%, Lag= 22.1 min
Primary = 0.48 cfs @ 12.50 hrs, Volume= 6,543 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.50' @ 12.50 hrs Surf.Area= 21,786 sf Storage= 2,633 cf

Plug-Flow detention time= 52.3 min calculated for 6,543 cf (100% of inflow)
Center-of-Mass det. time= 52.4 min (839.5 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,835 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 6,159 cf Overall - 44 cf Embedded = 6,115 cf x 30.0% Voids
#2	690.16'	599 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,816 cf Overall x 33.0% Voids
#3	690.41'	309 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,235 cf Overall x 25.0% Voids
#4	690.58'	7,262 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	44 cf	**4.0" Round 4" DT** Inside #1 L= 500.0'
		10,048 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	500	0	0
689.33	500	165	165
689.34	7,262	39	204
690.16	7,262	5,955	6,159

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	7,262	0	0
690.41	7,262	1,816	1,816

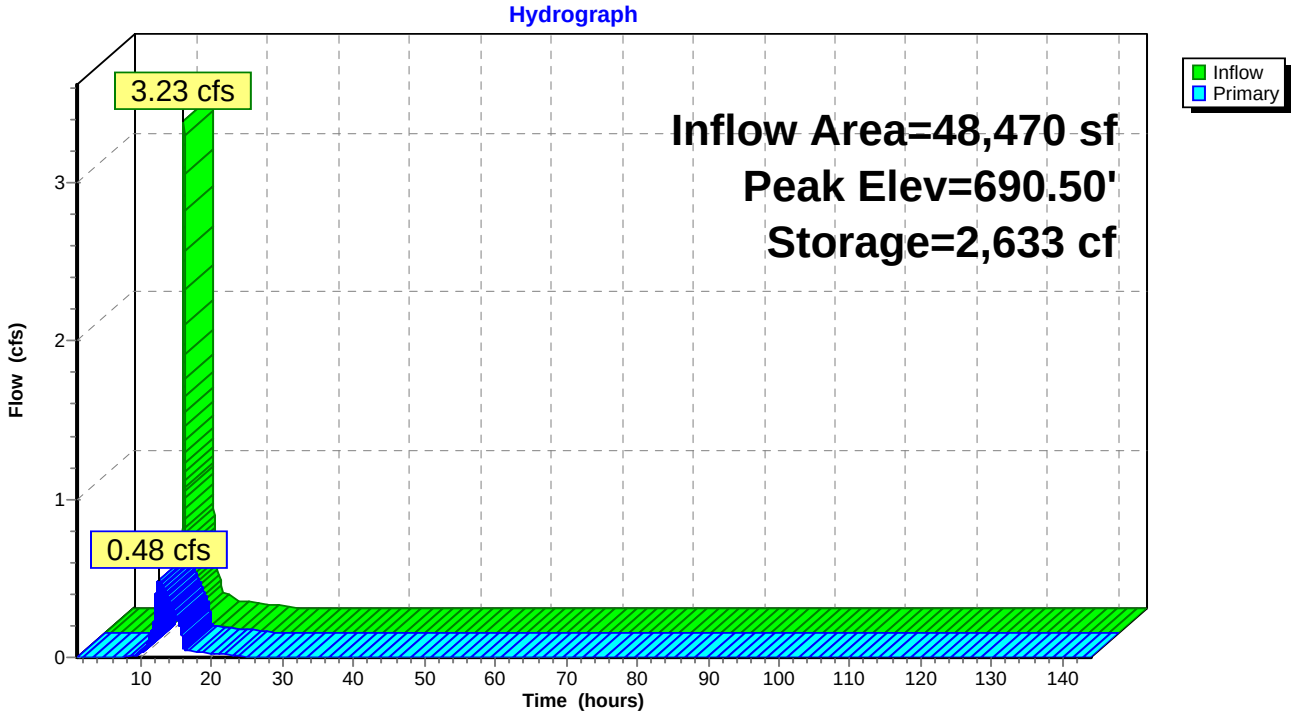
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	7,262	0	0
690.58	7,262	1,235	1,235

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	7,262	0	0
691.58	7,262	7,262	7,262

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.48 cfs @ 12.50 hrs HW=690.50' TW=684.82' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.48 cfs of 3.61 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.48 cfs @ 5.55 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond WPP: Permeable Pavers

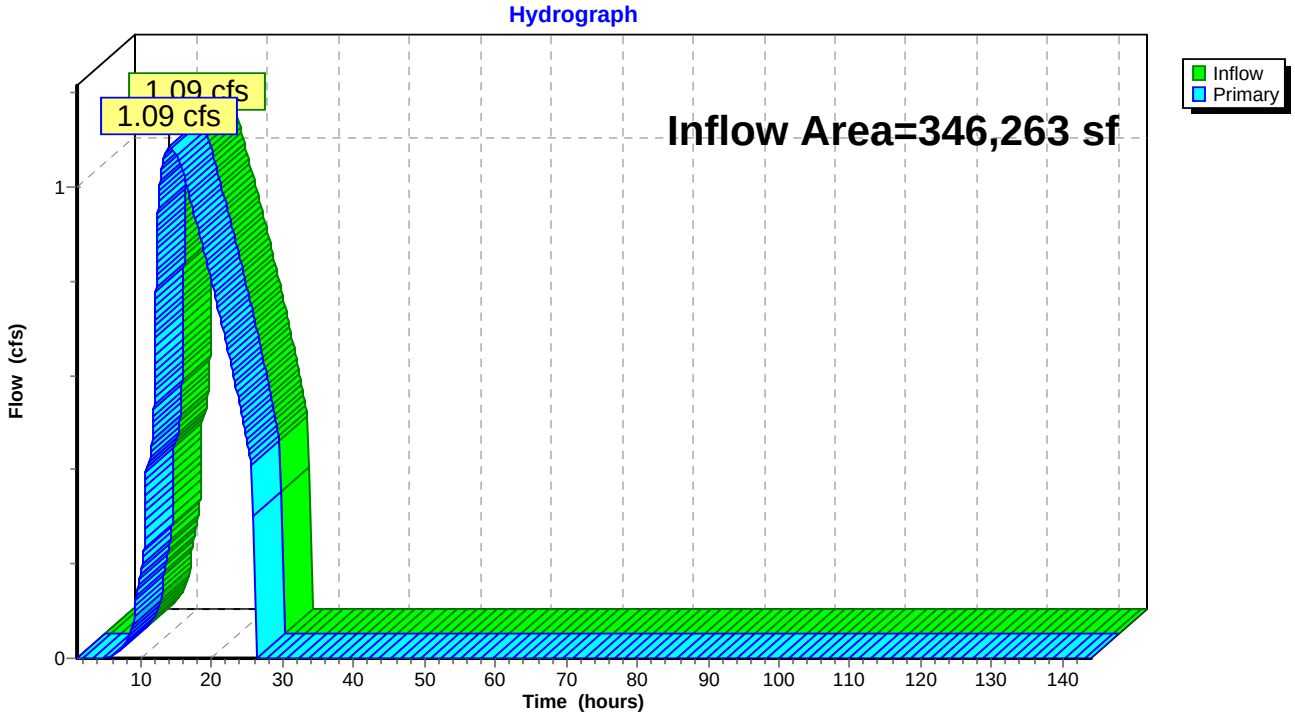


Summary for Link TPO: Total Proposed Outfall

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 1.53" for 1-year event
Inflow = 1.09 cfs @ 13.95 hrs, Volume= 44,077 cf
Primary = 1.09 cfs @ 13.95 hrs, Volume= 44,077 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TPO: Total Proposed Outfall



Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Captured to North Runoff Area=28,669 sf 77.74% Impervious Runoff Depth=1.90"
Tc=6.0 min CN=93 Runoff=2.22 cfs 4,544 cf

Subcatchment P2: Captured to West Runoff Area=48,470 sf 80.32% Impervious Runoff Depth=1.90"
Tc=6.0 min CN=93 Runoff=3.76 cfs 7,683 cf

Subcatchment P3: Captured to South Runoff Area=25,018 sf 86.77% Impervious Runoff Depth=2.09"
Tc=6.0 min CN=95 Runoff=2.07 cfs 4,356 cf

Subcatchment P4: Captured to East Runoff Area=18,670 sf 92.15% Impervious Runoff Depth=2.19"
Tc=6.0 min CN=96 Runoff=1.59 cfs 3,405 cf

Subcatchment P5: Captured to SS Runoff Area=130,436 sf 54.84% Impervious Runoff Depth=1.42"
Tc=6.0 min CN=87 Runoff=7.89 cfs 15,441 cf

Subcatchment P6: Southwest Area Runoff Area=95,000 sf 0.00% Impervious Runoff Depth=2.09"
Tc=6.0 min CN=95 Runoff=7.86 cfs 16,540 cf

Pond EPP: Permeable Pavers Peak Elev=690.63' Storage=856 cf Inflow=1.59 cfs 3,405 cf
Outflow=0.51 cfs 3,405 cf

Pond NPP: Permeable Pavers Peak Elev=690.20' Storage=1,606 cf Inflow=2.22 cfs 4,544 cf
Outflow=0.43 cfs 4,544 cf

Pond SPP: Permeable Pavers Peak Elev=690.59' Storage=1,348 cf Inflow=2.07 cfs 4,356 cf
Outflow=0.50 cfs 4,356 cf

Pond SS: Subsurface Drainage Peak Elev=685.59' Storage=28,021 cf Inflow=17.40 cfs 51,968 cf
Outflow=1.18 cfs 51,974 cf

Pond WPP: Permeable Pavers Peak Elev=690.64' Storage=3,207 cf Inflow=3.76 cfs 7,683 cf
Outflow=0.51 cfs 7,683 cf

Link TPO: Total Proposed Outfall Inflow=1.18 cfs 51,974 cf
Primary=1.18 cfs 51,974 cf

Total Runoff Area = 346,263 sf Runoff Volume = 51,968 cf Average Runoff Depth = 1.80"
50.42% Pervious = 174,603 sf 49.58% Impervious = 171,660 sf

Summary for Subcatchment P1: Captured to North Permeable Pavers

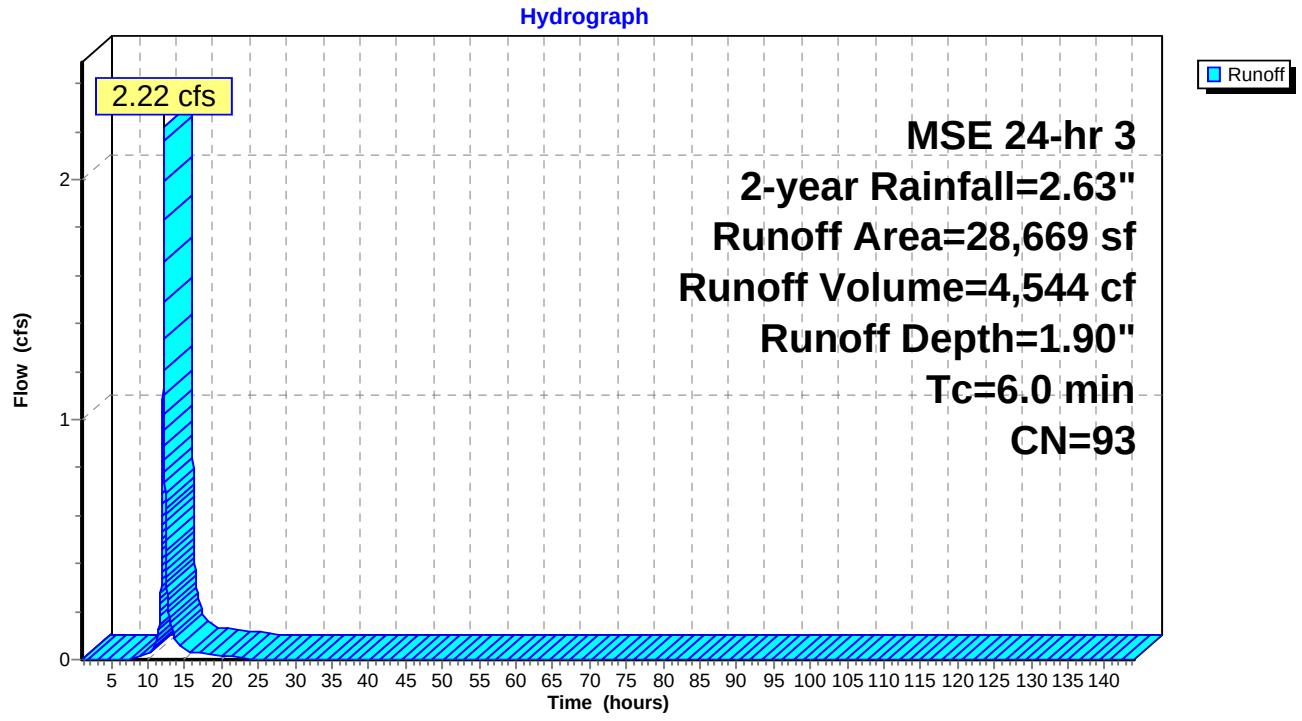
Runoff = 2.22 cfs @ 12.13 hrs, Volume= 4,544 cf, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
	14,228	98	Paved parking, HSG C
*	8,058	98	Sidewalks, HSG C
	6,383	74	>75% Grass cover, Good, HSG C
	28,669	93	Weighted Average
	6,383		22.26% Pervious Area
	22,286		77.74% Impervious Area

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

Subcatchment P1: Captured to North Permeable Pavers



Summary for Subcatchment P2: Captured to West Permeable Pavers

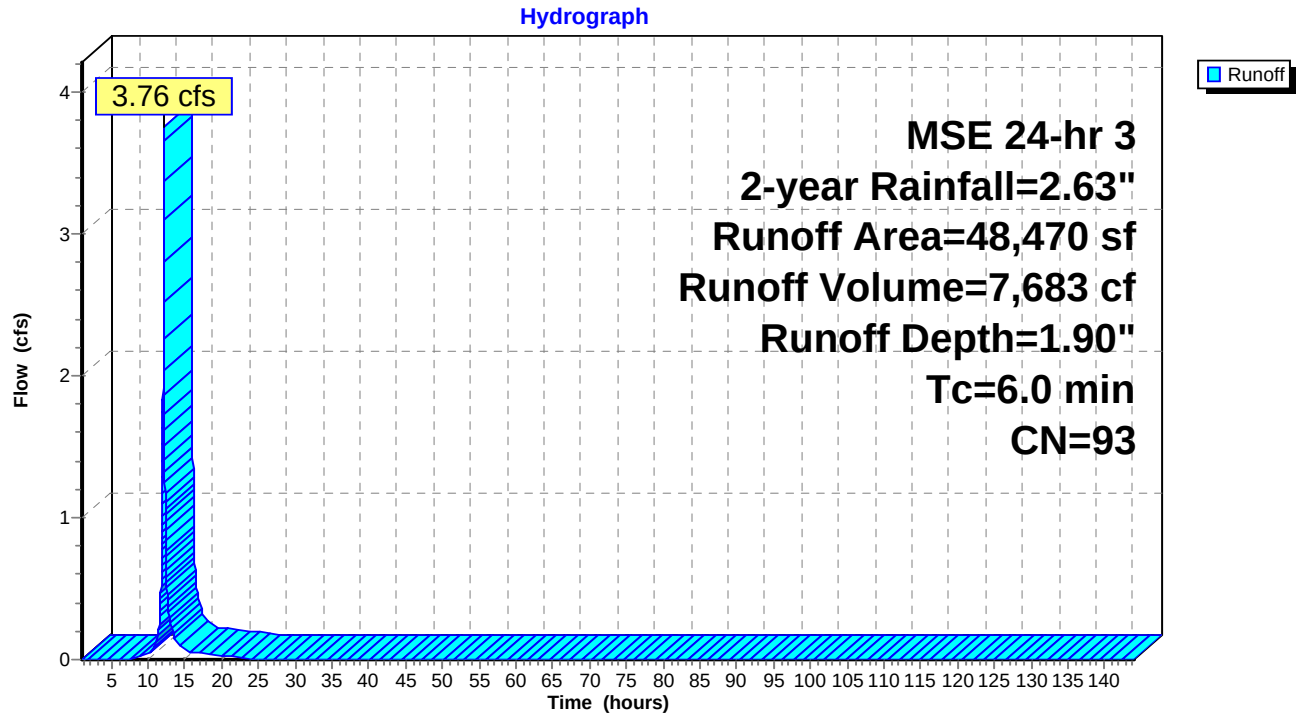
Runoff = 3.76 cfs @ 12.13 hrs, Volume= 7,683 cf, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
	32,775	98	Paved parking, HSG C
*	6,155	98	Sidewalks, HSG C
	9,540	74	>75% Grass cover, Good, HSG C
	48,470	93	Weighted Average
	9,540		19.68% Pervious Area
	38,930		80.32% Impervious Area

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

Subcatchment P2: Captured to West Permeable Pavers



Summary for Subcatchment P3: Captured to South Permeable Pavers

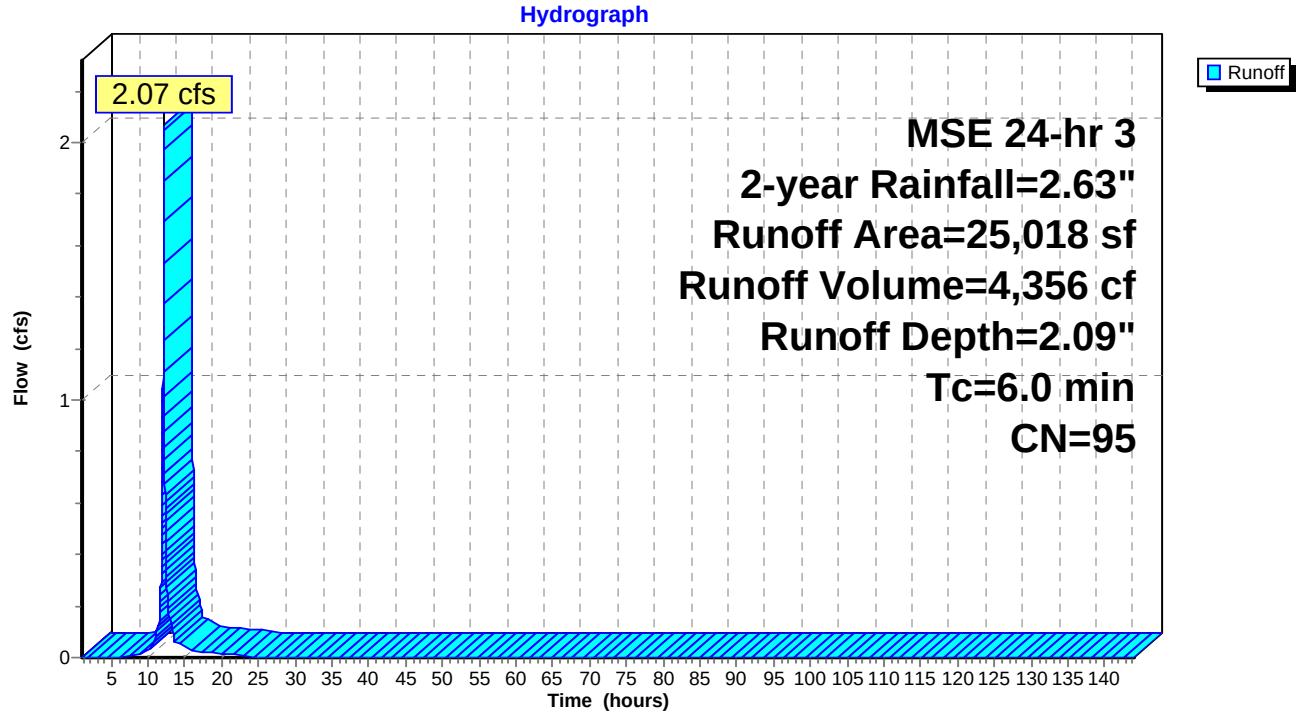
Runoff = 2.07 cfs @ 12.13 hrs, Volume= 4,356 cf, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
	14,987	98	Paved parking, HSG C
*	6,721	98	Sidewalks, HSG C
	3,310	74	>75% Grass cover, Good, HSG C
	25,018	95	Weighted Average
	3,310		13.23% Pervious Area
	21,708		86.77% Impervious Area

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

Subcatchment P3: Captured to South Permeable Pavers



Summary for Subcatchment P4: Captured to East Permeable Pavers

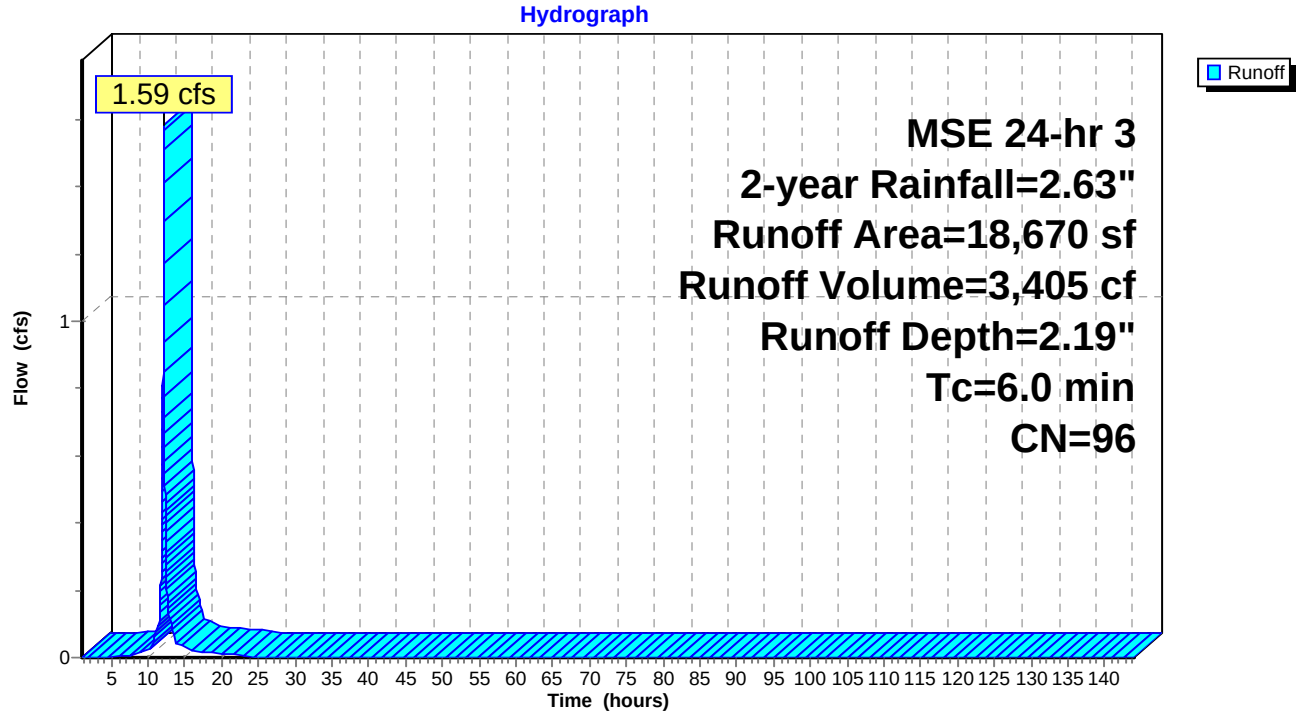
Runoff = 1.59 cfs @ 12.13 hrs, Volume= 3,405 cf, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
	11,383	98	Paved parking, HSG C
*	5,821	98	Sidewalks, HSG C
	1,466	74	>75% Grass cover, Good, HSG C
	18,670	96	Weighted Average
	1,466		7.85% Pervious Area
	17,204		92.15% Impervious Area

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

Subcatchment P4: Captured to East Permeable Pavers



Summary for Subcatchment P5: Captured to SS

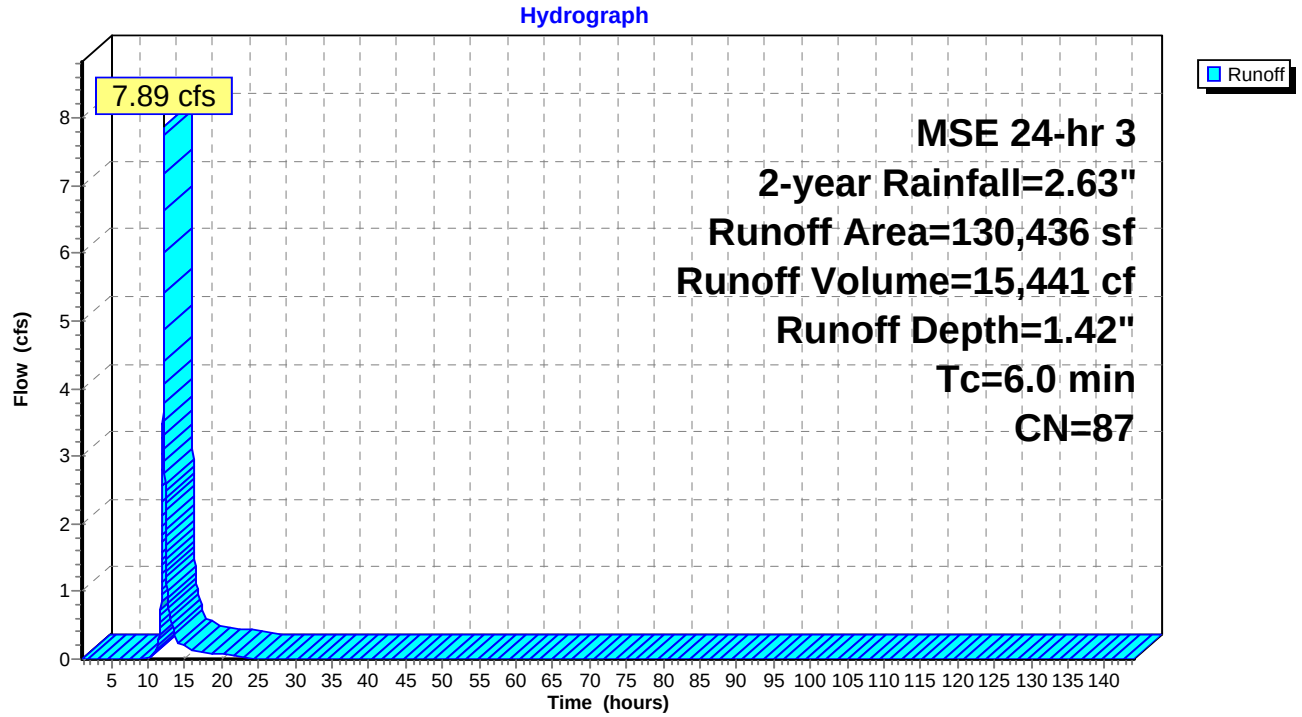
Runoff = 7.89 cfs @ 12.13 hrs, Volume= 15,441 cf, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
	35,294	98	Roofs, HSG C
	29,063	98	Paved parking, HSG C
*	7,175	98	Sidewalks, HSG C
	58,904	74	>75% Grass cover, Good, HSG C
	130,436	87	Weighted Average
	58,904		45.16% Pervious Area
	71,532		54.84% Impervious Area

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

Subcatchment P5: Captured to SS



Summary for Subcatchment P6: Southwest Area

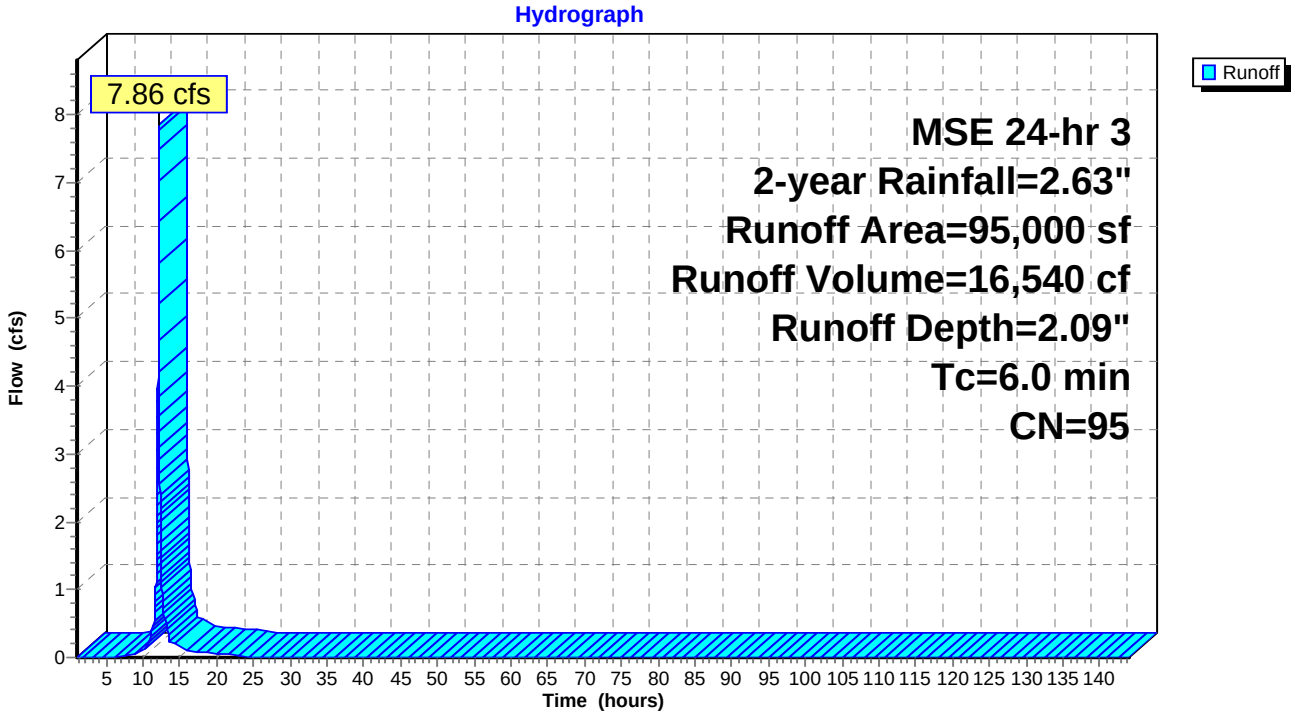
Runoff = 7.86 cfs @ 12.13 hrs, Volume= 16,540 cf, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2-year Rainfall=2.63"

	Area (sf)	CN	Description
*	95,000	95	
	95,000		100.00% Pervious Area

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

Subcatchment P6: Southwest Area



Summary for Pond EPP: Permeable Pavers

Inflow Area = 18,670 sf, 92.15% Impervious, Inflow Depth = 2.19" for 2-year event
Inflow = 1.59 cfs @ 12.13 hrs, Volume= 3,405 cf
Outflow = 0.51 cfs @ 12.28 hrs, Volume= 3,405 cf, Atten= 68%, Lag= 9.1 min
Primary = 0.51 cfs @ 12.28 hrs, Volume= 3,405 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.63' @ 12.28 hrs Surf.Area= 7,764 sf Storage= 856 cf

Plug-Flow detention time= 14.1 min calculated for 3,405 cf (100% of inflow)
Center-of-Mass det. time= 13.9 min (783.5 - 769.6)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	495 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 1,665 cf Overall - 17 cf Embedded = 1,648 cf x 30.0% Voids
#2	690.16'	160 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 485 cf Overall x 33.0% Voids
#3	690.41'	82 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 330 cf Overall x 25.0% Voids
#4	690.58'	1,941 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	17 cf	**4.0" Round 4" DT** Inside #1 L= 190.0'
		2,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	190	0	0
689.33	190	63	63
689.34	1,941	11	73
690.16	1,941	1,592	1,665

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	1,941	0	0
690.41	1,941	485	485

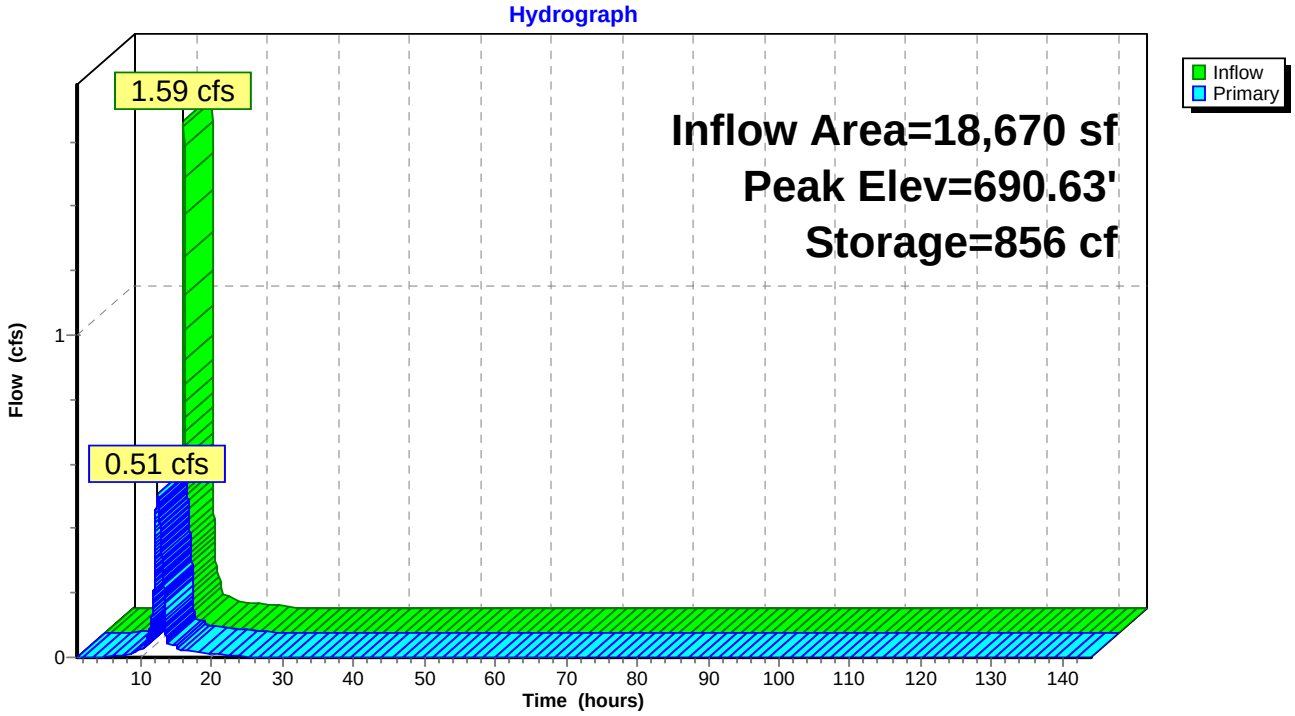
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	1,941	0	0
690.58	1,941	330	330

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	1,941	0	0
691.58	1,941	1,941	1,941

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.51 cfs @ 12.28 hrs HW=690.63' TW=684.82' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.51 cfs of 4.01 cfs potential flow)
- **2=4" Draintile** (Orifice Controls 0.51 cfs @ 5.83 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond EPP: Permeable Pavers



Summary for Pond NPP: Permeable Pavers

Inflow Area = 28,669 sf, 77.74% Impervious, Inflow Depth = 1.90" for 2-year event
Inflow = 2.22 cfs @ 12.13 hrs, Volume= 4,544 cf
Outflow = 0.43 cfs @ 12.42 hrs, Volume= 4,544 cf, Atten= 81%, Lag= 17.1 min
Primary = 0.43 cfs @ 12.42 hrs, Volume= 4,544 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.20' @ 12.42 hrs Surf.Area= 11,880 sf Storage= 1,606 cf

Plug-Flow detention time= 34.7 min calculated for 4,544 cf (100% of inflow)
Center-of-Mass det. time= 34.7 min (818.7 - 783.9)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,500 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 5,034 cf Overall - 35 cf Embedded = 5,000 cf x 30.0% Voids
#2	690.16'	490 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,485 cf Overall x 33.0% Voids
#3	690.41'	252 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,010 cf Overall x 25.0% Voids
#4	690.58'	5,940 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	35 cf	**4.0" Round 4" DT** Inside #1 L= 400.0'
		8,217 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	400	0	0
689.33	400	132	132
689.34	5,940	32	164
690.16	5,940	4,871	5,034

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	5,940	0	0
690.41	5,940	1,485	1,485

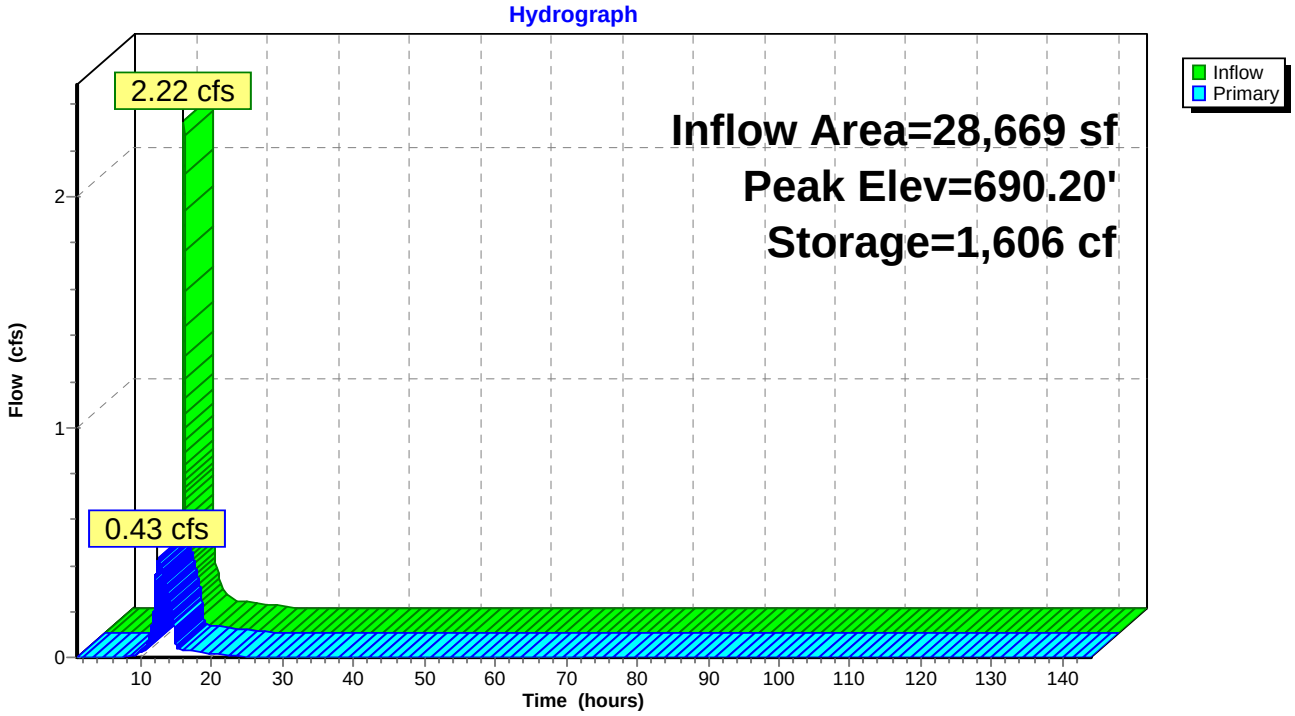
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	5,940	0	0
690.58	5,940	1,010	1,010

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	5,940	0	0
691.58	5,940	5,940	5,940

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.43 cfs @ 12.42 hrs HW=690.20' TW=685.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.43 cfs of 2.85 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.43 cfs @ 4.89 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond NPP: Permeable Pavers



Summary for Pond SPP: Permeable Pavers

Inflow Area = 25,018 sf, 86.77% Impervious, Inflow Depth = 2.09" for 2-year event
Inflow = 2.07 cfs @ 12.13 hrs, Volume= 4,356 cf
Outflow = 0.50 cfs @ 12.35 hrs, Volume= 4,356 cf, Atten= 76%, Lag= 13.2 min
Primary = 0.50 cfs @ 12.35 hrs, Volume= 4,356 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.59' @ 12.35 hrs Surf.Area= 13,708 sf Storage= 1,348 cf

Plug-Flow detention time= 23.3 min calculated for 4,355 cf (100% of inflow)
Center-of-Mass det. time= 23.3 min (798.3 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	866 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 2,908 cf Overall - 21 cf Embedded = 2,887 cf x 30.0% Voids
#2	690.16'	283 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 857 cf Overall x 33.0% Voids
#3	690.41'	146 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 583 cf Overall x 25.0% Voids
#4	690.58'	3,427 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	21 cf	**4.0" Round 4" DT** Inside #1 L= 240.0'
		4,742 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	240	0	0
689.33	240	79	79
689.34	3,427	18	98
690.16	3,427	2,810	2,908

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	3,427	0	0
690.41	3,427	857	857

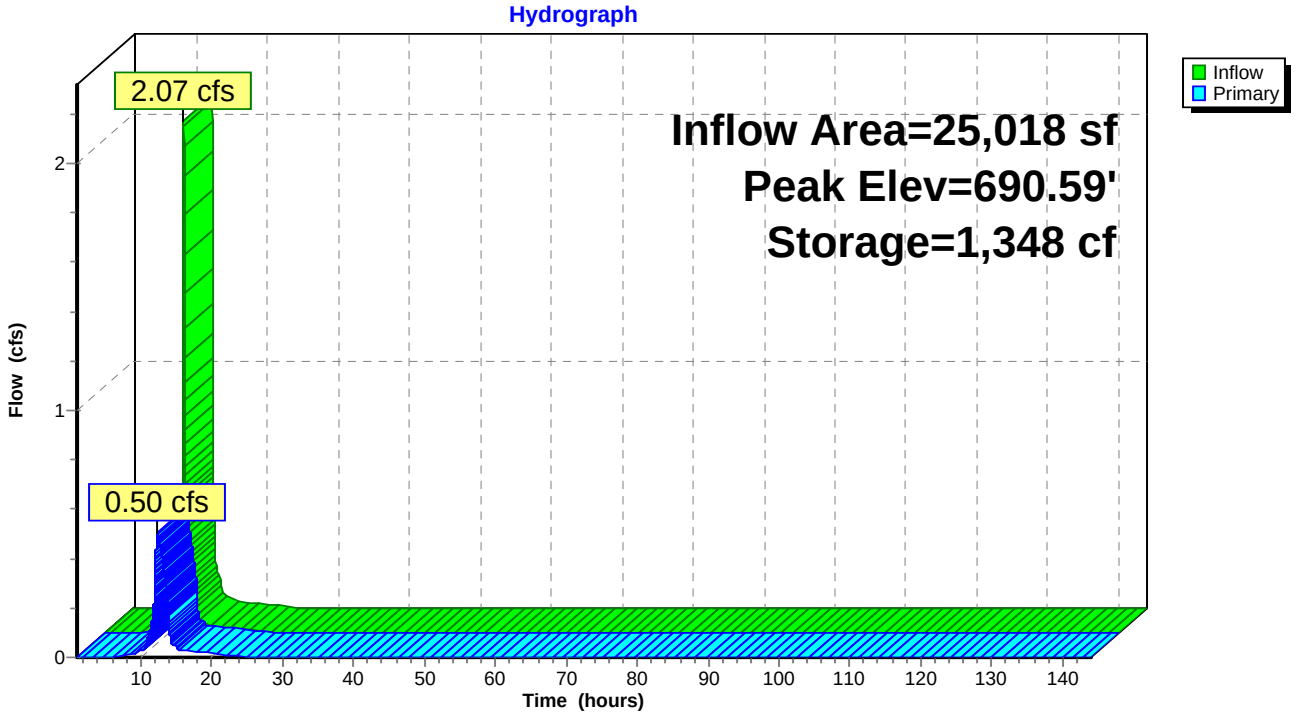
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	3,427	0	0
690.58	3,427	583	583

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	3,427	0	0
691.58	3,427	3,427	3,427

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.50 cfs @ 12.35 hrs HW=690.59' TW=684.92' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.50 cfs of 3.89 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.50 cfs @ 5.74 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond SPP: Permeable Pavers



Summary for Pond SS: Subsurface Drainage

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 1.80" for 2-year event
Inflow = 17.40 cfs @ 12.13 hrs, Volume= 51,968 cf
Outflow = 1.18 cfs @ 14.16 hrs, Volume= 51,974 cf, Atten= 93%, Lag= 121.6 min
Primary = 1.18 cfs @ 14.16 hrs, Volume= 51,974 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 685.59' @ 14.16 hrs Surf.Area= 14,992 sf Storage= 28,021 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 269.1 min (1,069.0 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	683.00'	0 cf	**89.63'W x 167.27'L x 8.00'H Field A** 119,933 cf Overall - 119,933 cf Embedded = 0 cf x 40.0% Voids
#2A	683.00'	93,825 cf	**StormTrap ST2 DoubleTrap 7-0** x 90 Inside #1 Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf 90 Chambers in 9 Rows 76.31' x 153.96' Core + 6.66' Border = 89.63' x 167.27' System
		93,825 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	683.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.00' / 682.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	683.00'	**5.4" Vert. 5" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	689.60'	**6.0' long Spillway** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.18 cfs @ 14.16 hrs HW=685.59' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 1.18 cfs of 5.47 cfs potential flow)
↑**2=5" Orifice** (Orifice Controls 1.18 cfs @ 7.41 fps)
3=Spillway (Controls 0.00 cfs)

Pond SS: Subsurface Drainage - Chamber Wizard Field A

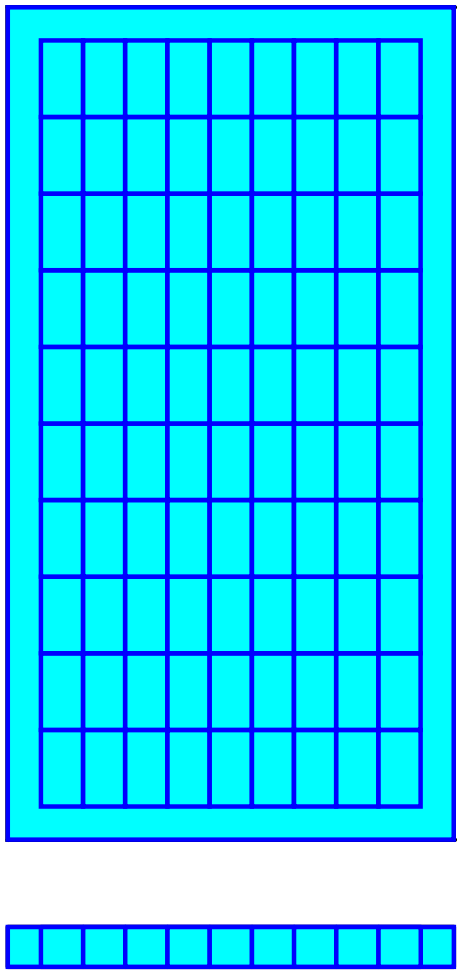
Chamber Model = StormTrap ST2 DoubleTrap 7-0 (StormTrap ST2 DoubleTrap® Type II+IV)
Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf
Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf

10 Chambers/Row x 15.40' Long = 153.96' Row Length +79.9" Border x 2 = 167.27' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
96.0" Chamber Height = 8.00' Field Height

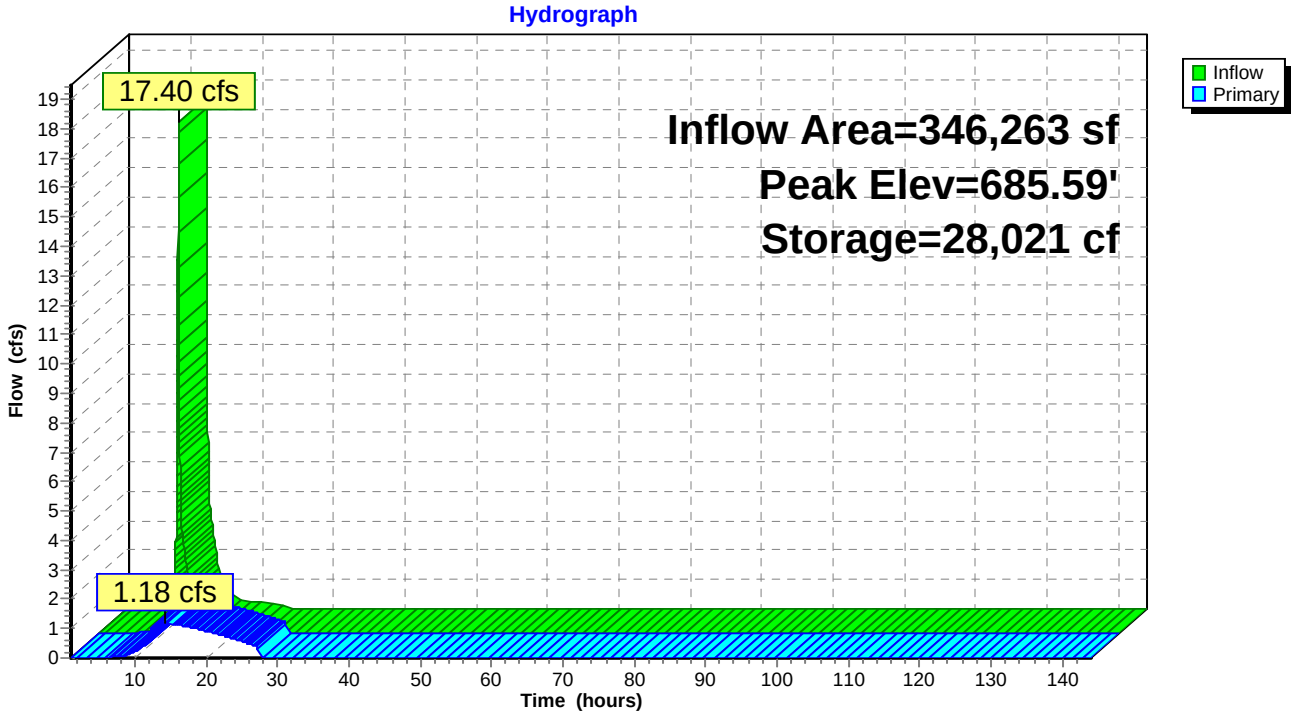
90 Chambers x 824.3 cf + 19,641.3 cf Border = 93,825.0 cf Chamber Storage
90 Chambers x 1,044.4 cf + 25,941.6 cf Border = 119,933.2 cf Displacement

Chamber Storage = 93,825.0 cf = 2.154 af
Overall Storage Efficiency = 78.2%
Overall System Size = 167.27' x 89.63' x 8.00'

90 Chambers (plus border)
4,442.0 cy Field



Pond SS: Subsurface Drainage



Summary for Pond WPP: Permeable Pavers

Inflow Area = 48,470 sf, 80.32% Impervious, Inflow Depth = 1.90" for 2-year event
Inflow = 3.76 cfs @ 12.13 hrs, Volume= 7,683 cf
Outflow = 0.51 cfs @ 12.54 hrs, Volume= 7,683 cf, Atten= 86%, Lag= 24.3 min
Primary = 0.51 cfs @ 12.54 hrs, Volume= 7,683 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.64' @ 12.54 hrs Surf.Area= 29,048 sf Storage= 3,207 cf

Plug-Flow detention time= 59.1 min calculated for 7,682 cf (100% of inflow)
Center-of-Mass det. time= 59.2 min (843.1 - 783.9)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,835 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 6,159 cf Overall - 44 cf Embedded = 6,115 cf x 30.0% Voids
#2	690.16'	599 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,816 cf Overall x 33.0% Voids
#3	690.41'	309 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,235 cf Overall x 25.0% Voids
#4	690.58'	7,262 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	44 cf	**4.0" Round 4" DT** Inside #1 L= 500.0'
		10,048 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	500	0	0
689.33	500	165	165
689.34	7,262	39	204
690.16	7,262	5,955	6,159

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	7,262	0	0
690.41	7,262	1,816	1,816

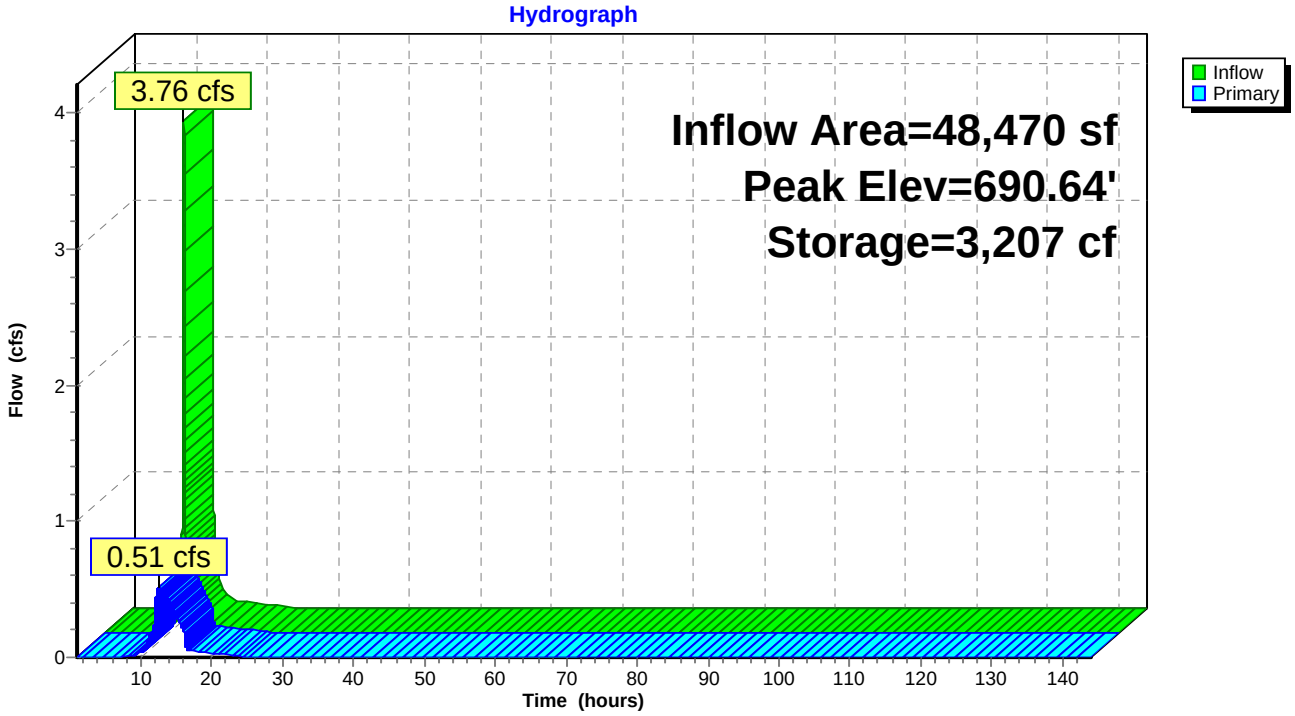
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	7,262	0	0
690.58	7,262	1,235	1,235

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	7,262	0	0
691.58	7,262	7,262	7,262

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.51 cfs @ 12.54 hrs HW=690.64' TW=685.11' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.51 cfs of 4.02 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.51 cfs @ 5.84 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond WPP: Permeable Pavers

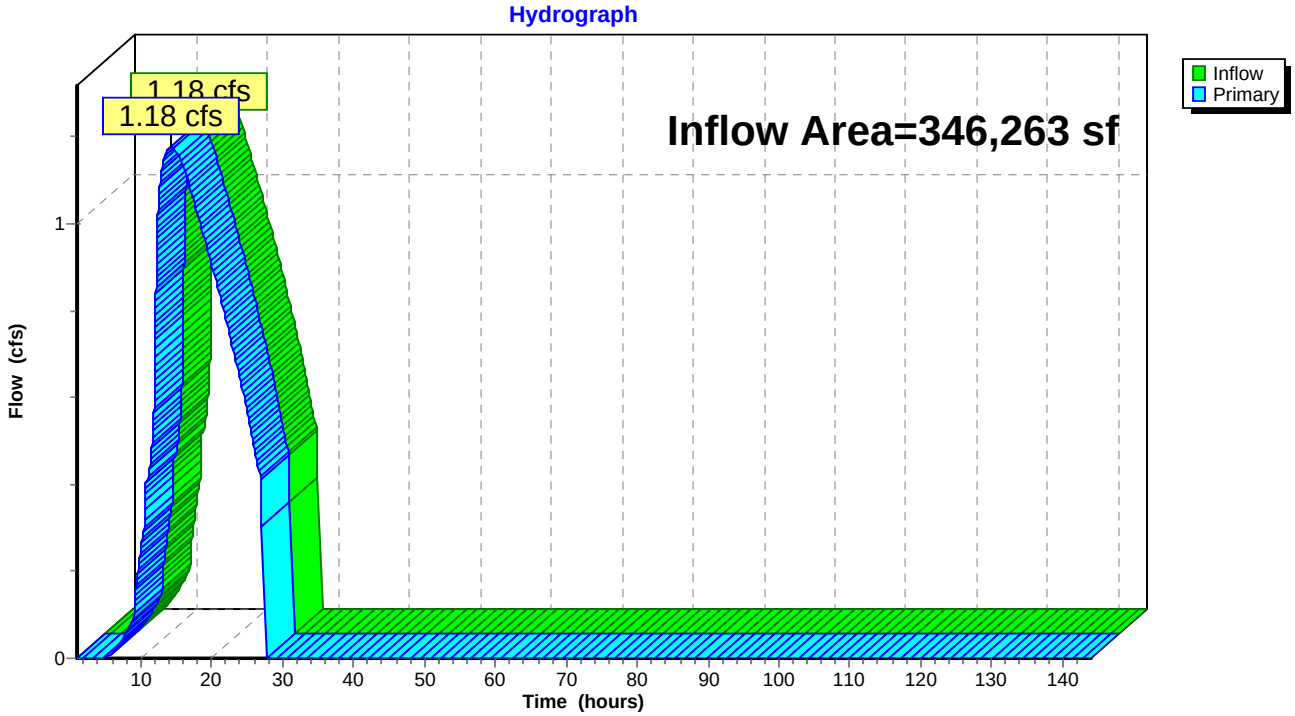


Summary for Link TPO: Total Proposed Outfall

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 1.80" for 2-year event
Inflow = 1.18 cfs @ 14.16 hrs, Volume= 51,974 cf
Primary = 1.18 cfs @ 14.16 hrs, Volume= 51,974 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TPO: Total Proposed Outfall



Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Captured to North Runoff Area=28,669 sf 77.74% Impervious Runoff Depth=2.97"
Tc=6.0 min CN=93 Runoff=3.37 cfs 7,089 cf

Subcatchment P2: Captured to West Runoff Area=48,470 sf 80.32% Impervious Runoff Depth=2.97"
Tc=6.0 min CN=93 Runoff=5.70 cfs 11,985 cf

Subcatchment P3: Captured to South Runoff Area=25,018 sf 86.77% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=95 Runoff=3.06 cfs 6,619 cf

Subcatchment P4: Captured to East Runoff Area=18,670 sf 92.15% Impervious Runoff Depth=3.28"
Tc=6.0 min CN=96 Runoff=2.32 cfs 5,107 cf

Subcatchment P5: Captured to SS Runoff Area=130,436 sf 54.84% Impervious Runoff Depth=2.40"
Tc=6.0 min CN=87 Runoff=13.07 cfs 26,080 cf

Subcatchment P6: Southwest Area Runoff Area=95,000 sf 0.00% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=95 Runoff=11.62 cfs 25,135 cf

Pond EPP: Permeable Pavers Peak Elev=690.96' Storage=1,487 cf Inflow=2.32 cfs 5,107 cf
Outflow=0.56 cfs 5,107 cf

Pond NPP: Permeable Pavers Peak Elev=690.66' Storage=2,782 cf Inflow=3.37 cfs 7,089 cf
Outflow=0.51 cfs 7,089 cf

Pond SPP: Permeable Pavers Peak Elev=690.88' Storage=2,329 cf Inflow=3.06 cfs 6,619 cf
Outflow=0.55 cfs 6,619 cf

Pond SS: Subsurface Drainage Peak Elev=686.96' Storage=46,338 cf Inflow=26.68 cfs 82,016 cf
Outflow=1.48 cfs 82,021 cf

Pond WPP: Permeable Pavers Peak Elev=690.96' Storage=5,571 cf Inflow=5.70 cfs 11,985 cf
Outflow=0.56 cfs 11,985 cf

Link TPO: Total Proposed Outfall Inflow=1.48 cfs 82,021 cf
Primary=1.48 cfs 82,021 cf

Total Runoff Area = 346,263 sf Runoff Volume = 82,016 cf Average Runoff Depth = 2.84"
50.42% Pervious = 174,603 sf 49.58% Impervious = 171,660 sf

Summary for Subcatchment P1: Captured to North Permeable Pavers

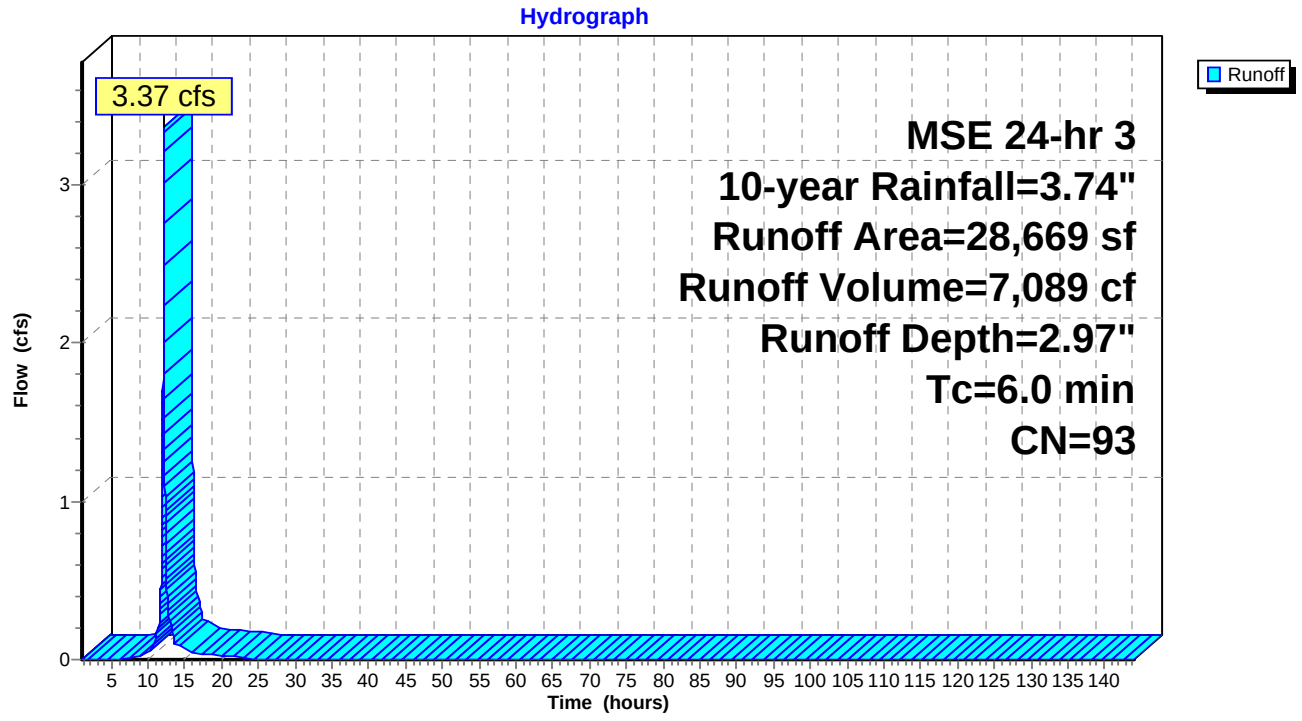
Runoff = 3.37 cfs @ 12.13 hrs, Volume= 7,089 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
	14,228	98	Paved parking, HSG C
*	8,058	98	Sidewalks, HSG C
	6,383	74	>75% Grass cover, Good, HSG C
	28,669	93	Weighted Average
	6,383		22.26% Pervious Area
	22,286		77.74% Impervious Area

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

Subcatchment P1: Captured to North Permeable Pavers



Summary for Subcatchment P2: Captured to West Permeable Pavers

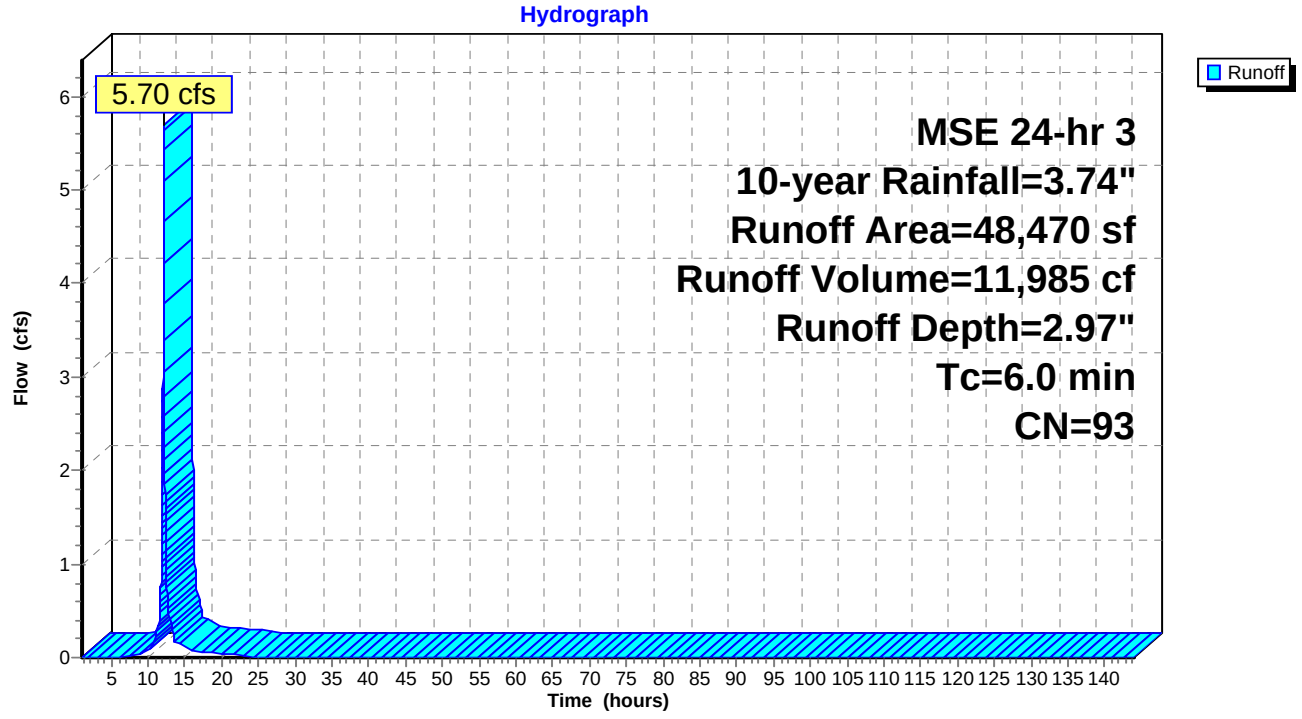
Runoff = 5.70 cfs @ 12.13 hrs, Volume= 11,985 cf, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
	32,775	98	Paved parking, HSG C
*	6,155	98	Sidewalks, HSG C
	9,540	74	>75% Grass cover, Good, HSG C
	48,470	93	Weighted Average
	9,540		19.68% Pervious Area
	38,930		80.32% Impervious Area

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

Subcatchment P2: Captured to West Permeable Pavers



Summary for Subcatchment P3: Captured to South Permeable Pavers

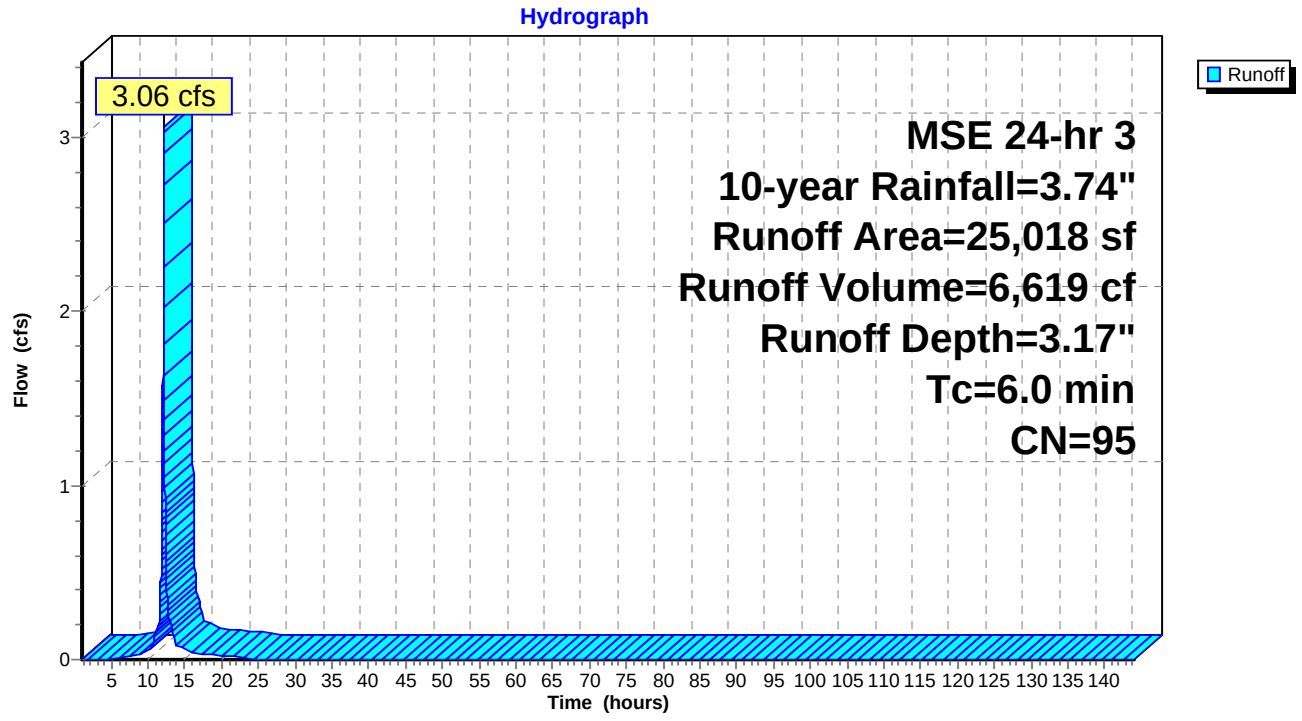
Runoff = 3.06 cfs @ 12.13 hrs, Volume= 6,619 cf, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
	14,987	98	Paved parking, HSG C
*	6,721	98	Sidewalks, HSG C
	3,310	74	>75% Grass cover, Good, HSG C
	25,018	95	Weighted Average
	3,310		13.23% Pervious Area
	21,708		86.77% Impervious Area

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

Subcatchment P3: Captured to South Permeable Pavers



Summary for Subcatchment P4: Captured to East Permeable Pavers

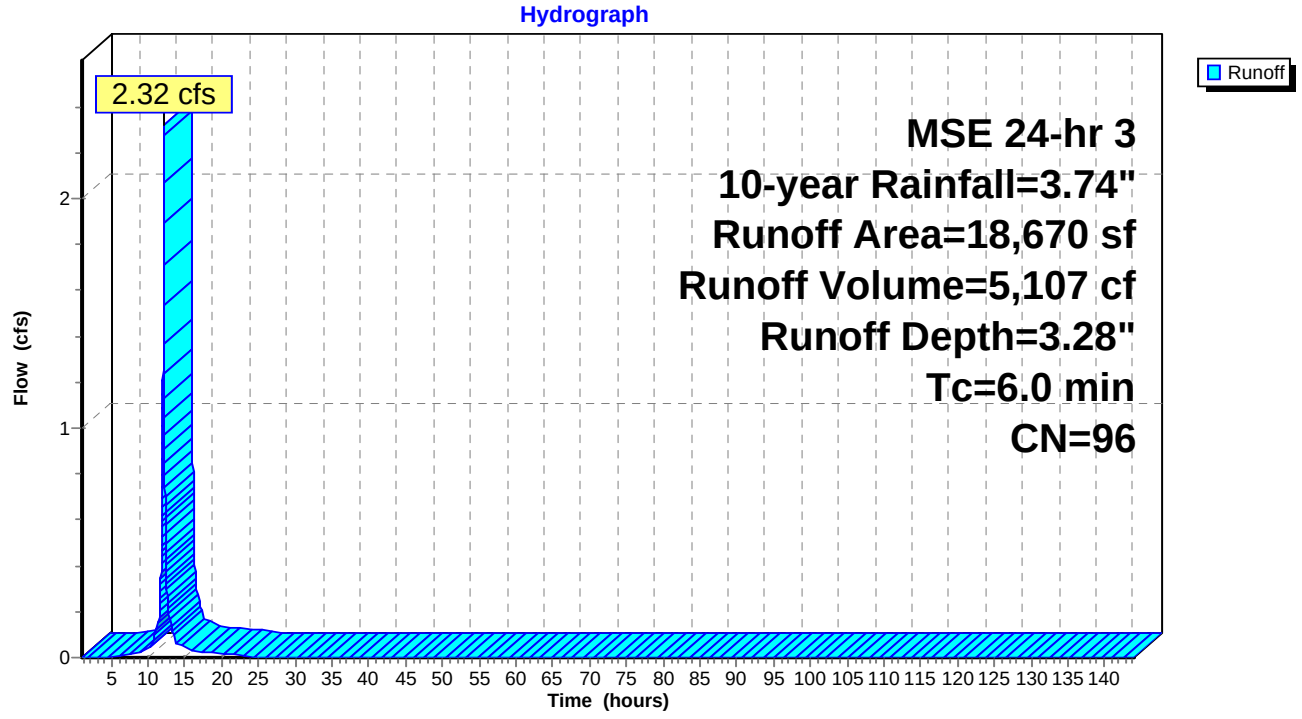
Runoff = 2.32 cfs @ 12.13 hrs, Volume= 5,107 cf, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
	11,383	98	Paved parking, HSG C
*	5,821	98	Sidewalks, HSG C
	1,466	74	>75% Grass cover, Good, HSG C
	18,670	96	Weighted Average
	1,466		7.85% Pervious Area
	17,204		92.15% Impervious Area

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

Subcatchment P4: Captured to East Permeable Pavers



Summary for Subcatchment P5: Captured to SS

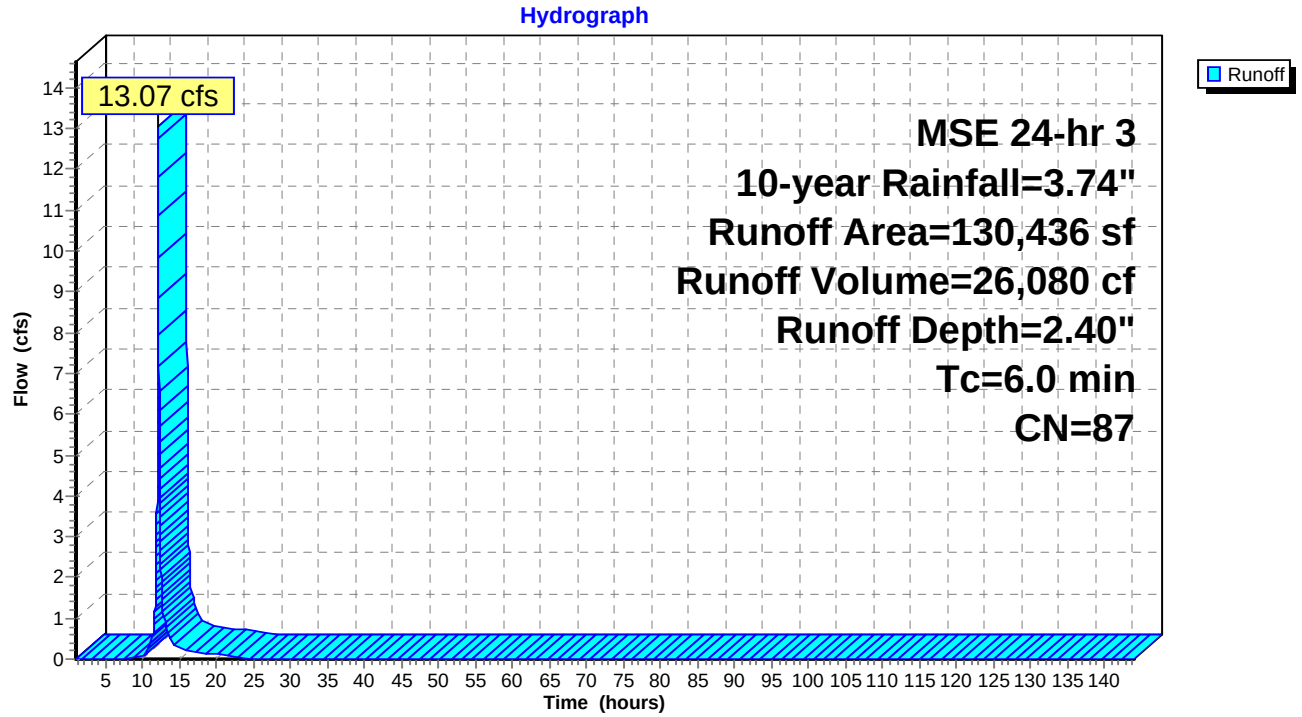
Runoff = 13.07 cfs @ 12.13 hrs, Volume= 26,080 cf, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
	35,294	98	Roofs, HSG C
	29,063	98	Paved parking, HSG C
*	7,175	98	Sidewalks, HSG C
	58,904	74	>75% Grass cover, Good, HSG C
	130,436	87	Weighted Average
	58,904		45.16% Pervious Area
	71,532		54.84% Impervious Area

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

Subcatchment P5: Captured to SS



Summary for Subcatchment P6: Southwest Area

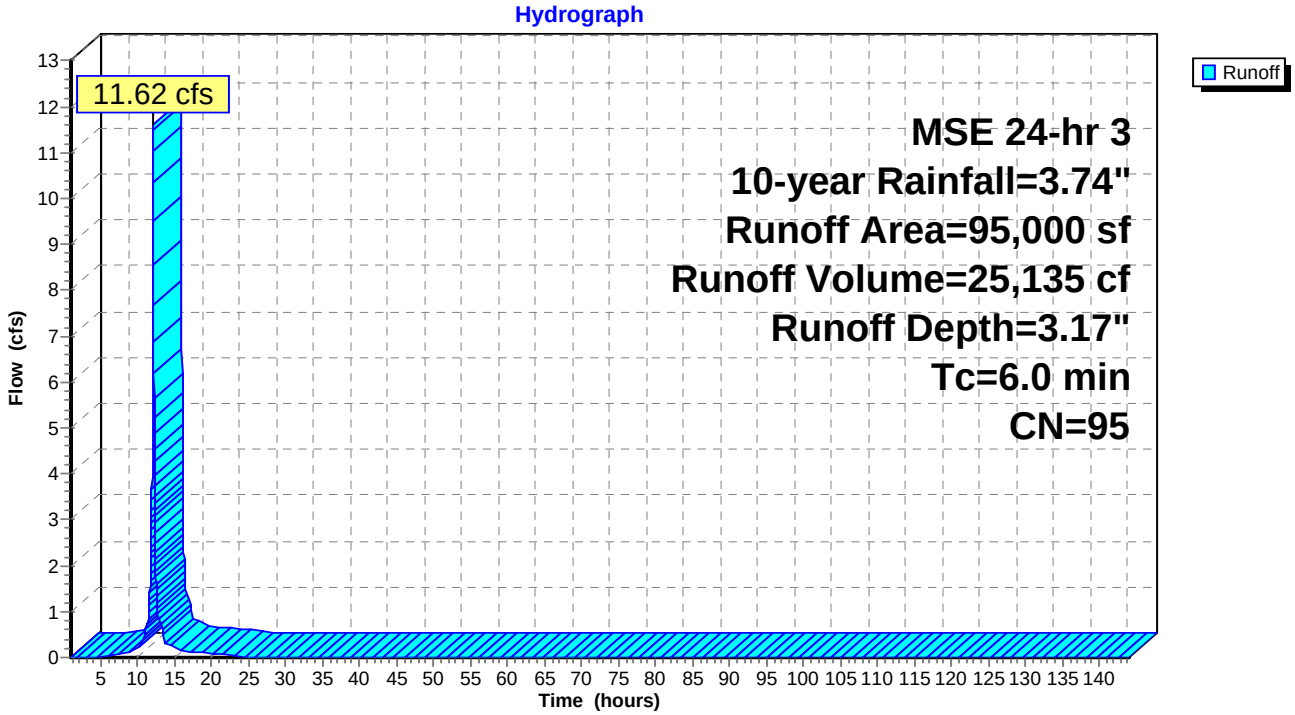
Runoff = 11.62 cfs @ 12.13 hrs, Volume= 25,135 cf, Depth= 3.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10-year Rainfall=3.74"

	Area (sf)	CN	Description
*	95,000	95	
	95,000		100.00% Pervious Area

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

Subcatchment P6: Southwest Area



Summary for Pond EPP: Permeable Pavers

Inflow Area = 18,670 sf, 92.15% Impervious, Inflow Depth = 3.28" for 10-year event
Inflow = 2.32 cfs @ 12.13 hrs, Volume= 5,107 cf
Outflow = 0.56 cfs @ 12.34 hrs, Volume= 5,107 cf, Atten= 76%, Lag= 12.9 min
Primary = 0.56 cfs @ 12.34 hrs, Volume= 5,107 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.96' @ 12.34 hrs Surf.Area= 7,764 sf Storage= 1,487 cf

Plug-Flow detention time= 20.1 min calculated for 5,107 cf (100% of inflow)
Center-of-Mass det. time= 20.1 min (782.2 - 762.1)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	495 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 1,665 cf Overall - 17 cf Embedded = 1,648 cf x 30.0% Voids
#2	690.16'	160 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 485 cf Overall x 33.0% Voids
#3	690.41'	82 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 330 cf Overall x 25.0% Voids
#4	690.58'	1,941 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	17 cf	**4.0" Round 4" DT** Inside #1 L= 190.0'
		2,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	190	0	0
689.33	190	63	63
689.34	1,941	11	73
690.16	1,941	1,592	1,665

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	1,941	0	0
690.41	1,941	485	485

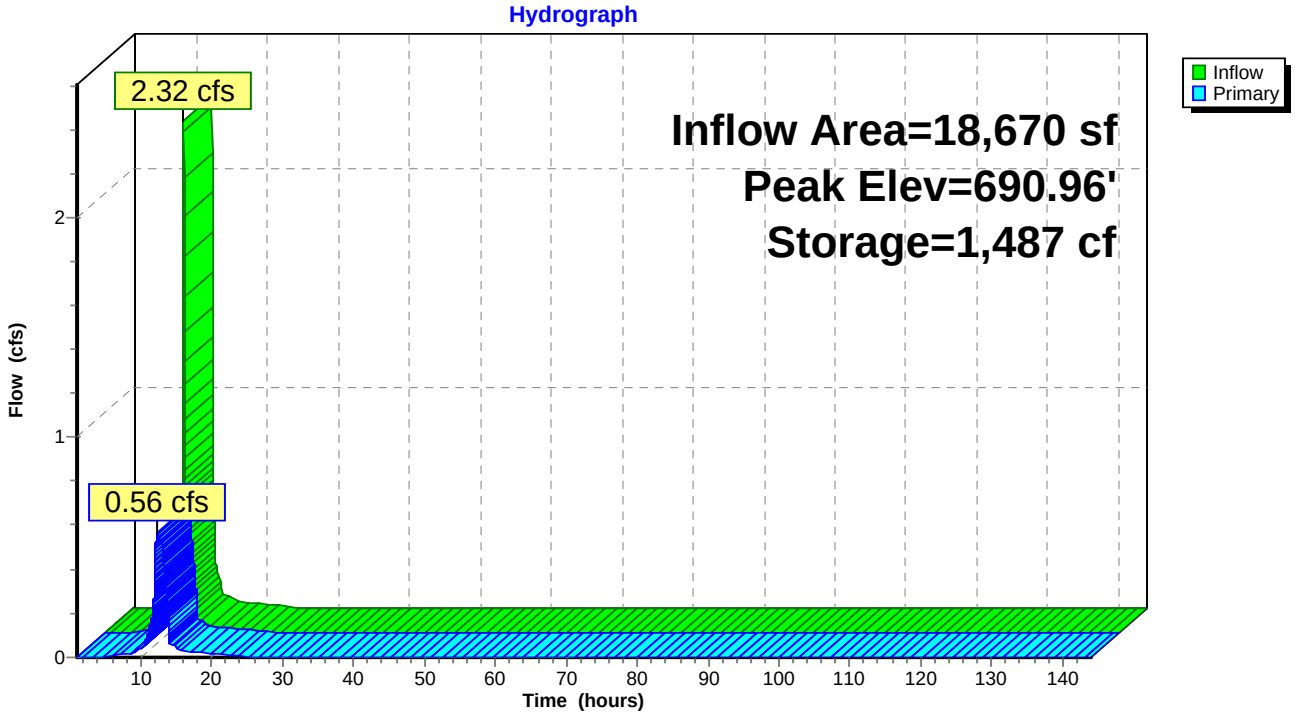
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	1,941	0	0
690.58	1,941	330	330

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	1,941	0	0
691.58	1,941	1,941	1,941

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.56 cfs @ 12.34 hrs HW=690.96' TW=685.84' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.56 cfs of 4.57 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.56 cfs @ 6.44 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond EPP: Permeable Pavers



Summary for Pond NPP: Permeable Pavers

Inflow Area = 28,669 sf, 77.74% Impervious, Inflow Depth = 2.97" for 10-year event
Inflow = 3.37 cfs @ 12.13 hrs, Volume= 7,089 cf
Outflow = 0.51 cfs @ 12.48 hrs, Volume= 7,089 cf, Atten= 85%, Lag= 21.2 min
Primary = 0.51 cfs @ 12.48 hrs, Volume= 7,089 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.66' @ 12.48 hrs Surf.Area= 23,760 sf Storage= 2,782 cf

Plug-Flow detention time= 48.2 min calculated for 7,088 cf (100% of inflow)
Center-of-Mass det. time= 48.3 min (823.4 - 775.1)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,500 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 5,034 cf Overall - 35 cf Embedded = 5,000 cf x 30.0% Voids
#2	690.16'	490 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,485 cf Overall x 33.0% Voids
#3	690.41'	252 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,010 cf Overall x 25.0% Voids
#4	690.58'	5,940 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	35 cf	**4.0" Round 4" DT** Inside #1 L= 400.0'
		8,217 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	400	0	0
689.33	400	132	132
689.34	5,940	32	164
690.16	5,940	4,871	5,034

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	5,940	0	0
690.41	5,940	1,485	1,485

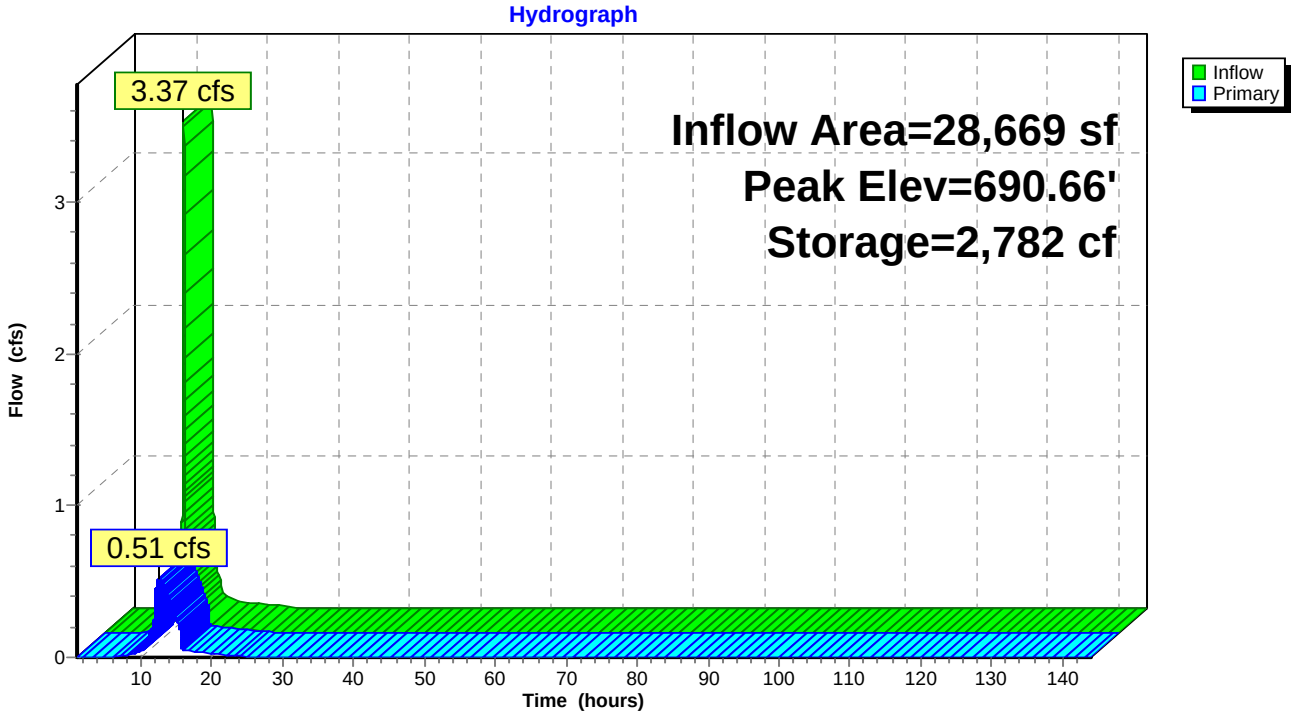
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	5,940	0	0
690.58	5,940	1,010	1,010

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	5,940	0	0
691.58	5,940	5,940	5,940

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.51 cfs @ 12.48 hrs HW=690.66' TW=686.05' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.51 cfs of 4.08 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.51 cfs @ 5.89 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond NPP: Permeable Pavers



Summary for Pond SPP: Permeable Pavers

Inflow Area = 25,018 sf, 86.77% Impervious, Inflow Depth = 3.17" for 10-year event
Inflow = 3.06 cfs @ 12.13 hrs, Volume= 6,619 cf
Outflow = 0.55 cfs @ 12.43 hrs, Volume= 6,619 cf, Atten= 82%, Lag= 17.9 min
Primary = 0.55 cfs @ 12.43 hrs, Volume= 6,619 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.88' @ 12.43 hrs Surf.Area= 13,708 sf Storage= 2,329 cf

Plug-Flow detention time= 34.3 min calculated for 6,619 cf (100% of inflow)
Center-of-Mass det. time= 34.1 min (801.1 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	866 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 2,908 cf Overall - 21 cf Embedded = 2,887 cf x 30.0% Voids
#2	690.16'	283 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 857 cf Overall x 33.0% Voids
#3	690.41'	146 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 583 cf Overall x 25.0% Voids
#4	690.58'	3,427 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	21 cf	**4.0" Round 4" DT** Inside #1 L= 240.0'
		4,742 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	240	0	0
689.33	240	79	79
689.34	3,427	18	98
690.16	3,427	2,810	2,908

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	3,427	0	0
690.41	3,427	857	857

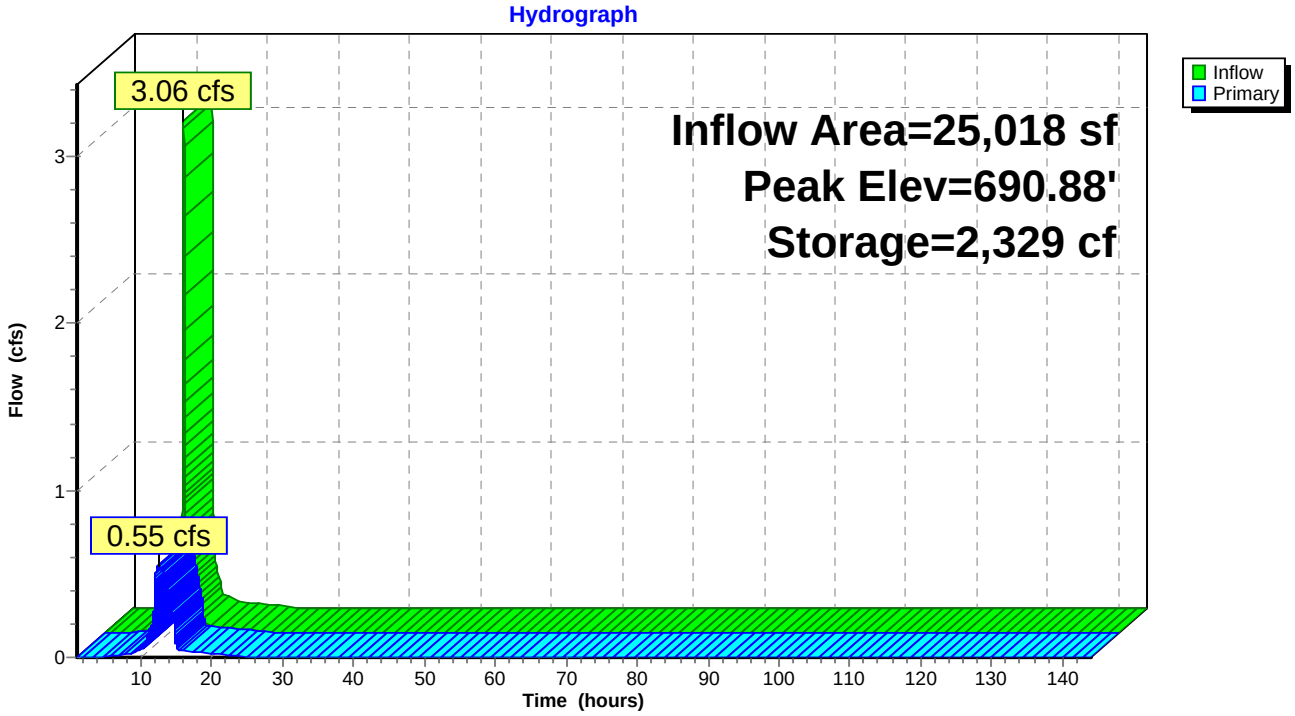
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	3,427	0	0
690.58	3,427	583	583

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	3,427	0	0
691.58	3,427	3,427	3,427

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.55 cfs @ 12.43 hrs HW=690.88' TW=685.98' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.55 cfs of 4.44 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.55 cfs @ 6.29 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond SPP: Permeable Pavers



Summary for Pond SS: Subsurface Drainage

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 2.84" for 10-year event
Inflow = 26.68 cfs @ 12.13 hrs, Volume= 82,016 cf
Outflow = 1.48 cfs @ 15.00 hrs, Volume= 82,021 cf, Atten= 94%, Lag= 172.0 min
Primary = 1.48 cfs @ 15.00 hrs, Volume= 82,021 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 686.96' @ 15.00 hrs Surf.Area= 14,992 sf Storage= 46,338 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 362.7 min (1,160.9 - 798.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	683.00'	0 cf	**89.63'W x 167.27'L x 8.00'H Field A** 119,933 cf Overall - 119,933 cf Embedded = 0 cf x 40.0% Voids
#2A	683.00'	93,825 cf	**StormTrap ST2 DoubleTrap 7-0** x 90 Inside #1 Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf 90 Chambers in 9 Rows 76.31' x 153.96' Core + 6.66' Border = 89.63' x 167.27' System
		93,825 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	683.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.00' / 682.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	683.00'	**5.4" Vert. 5" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	689.60'	**6.0' long Spillway** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=1.48 cfs @ 15.00 hrs HW=686.96' TW=0.00' (Dynamic Tailwater)
↑└─**1=Culvert** (Passes 1.48 cfs of 7.03 cfs potential flow)
↑ └─**2=5" Orifice** (Orifice Controls 1.48 cfs @ 9.30 fps)
└─**3=Spillway** (Controls 0.00 cfs)

Pond SS: Subsurface Drainage - Chamber Wizard Field A

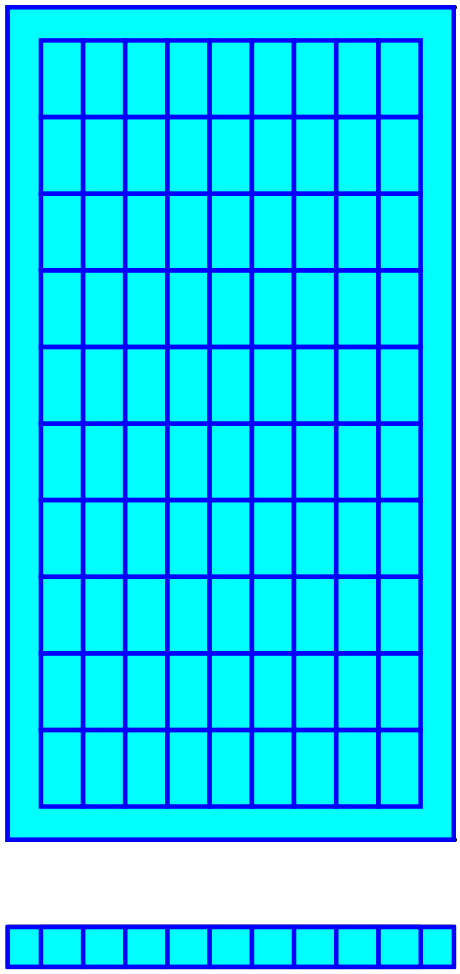
Chamber Model = StormTrap ST2 DoubleTrap 7-0 (StormTrap ST2 DoubleTrap® Type II+IV)
Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf
Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf

10 Chambers/Row x 15.40' Long = 153.96' Row Length +79.9" Border x 2 = 167.27' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
96.0" Chamber Height = 8.00' Field Height

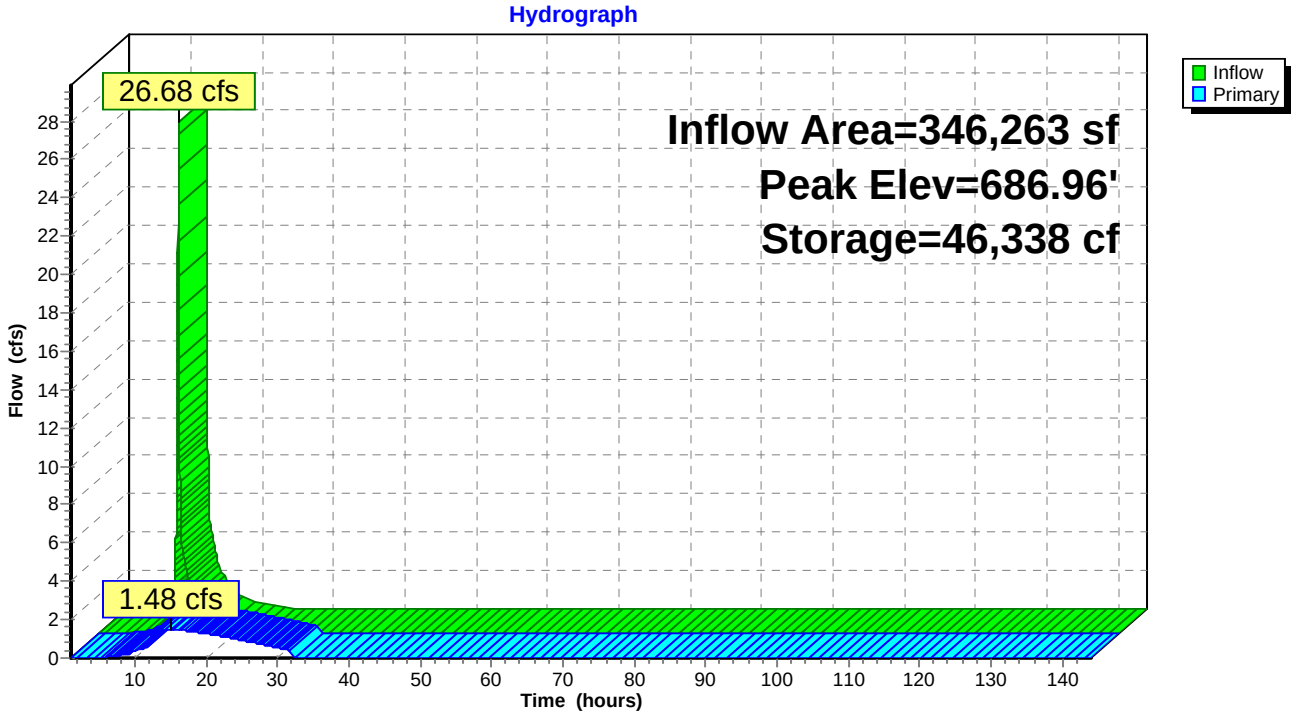
90 Chambers x 824.3 cf + 19,641.3 cf Border = 93,825.0 cf Chamber Storage
90 Chambers x 1,044.4 cf + 25,941.6 cf Border = 119,933.2 cf Displacement

Chamber Storage = 93,825.0 cf = 2.154 af
Overall Storage Efficiency = 78.2%
Overall System Size = 167.27' x 89.63' x 8.00'

90 Chambers (plus border)
4,442.0 cy Field



Pond SS: Subsurface Drainage



Summary for Pond WPP: Permeable Pavers

Inflow Area = 48,470 sf, 80.32% Impervious, Inflow Depth = 2.97" for 10-year event
Inflow = 5.70 cfs @ 12.13 hrs, Volume= 11,985 cf
Outflow = 0.56 cfs @ 12.61 hrs, Volume= 11,985 cf, Atten= 90%, Lag= 29.1 min
Primary = 0.56 cfs @ 12.61 hrs, Volume= 11,985 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 690.96' @ 12.61 hrs Surf.Area= 29,048 sf Storage= 5,571 cf

Plug-Flow detention time= 90.3 min calculated for 11,984 cf (100% of inflow)
Center-of-Mass det. time= 90.4 min (865.5 - 775.1)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,835 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 6,159 cf Overall - 44 cf Embedded = 6,115 cf x 30.0% Voids
#2	690.16'	599 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,816 cf Overall x 33.0% Voids
#3	690.41'	309 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,235 cf Overall x 25.0% Voids
#4	690.58'	7,262 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	44 cf	**4.0" Round 4" DT** Inside #1 L= 500.0'
		10,048 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	500	0	0
689.33	500	165	165
689.34	7,262	39	204
690.16	7,262	5,955	6,159

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	7,262	0	0
690.41	7,262	1,816	1,816

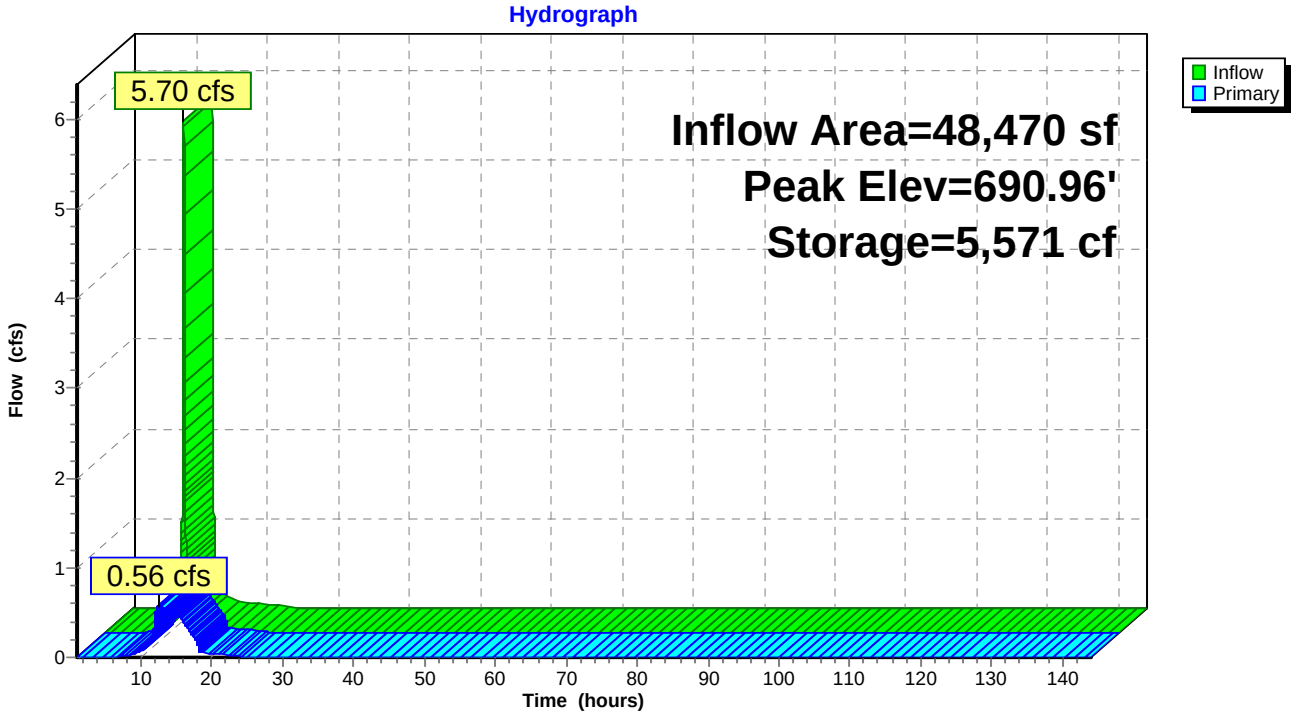
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	7,262	0	0
690.58	7,262	1,235	1,235

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	7,262	0	0
691.58	7,262	7,262	7,262

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.56 cfs @ 12.61 hrs HW=690.96' TW=686.20' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.56 cfs of 4.57 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.56 cfs @ 6.45 fps)
- **3=Curb Spillpoint** (Controls 0.00 cfs)

Pond WPP: Permeable Pavers

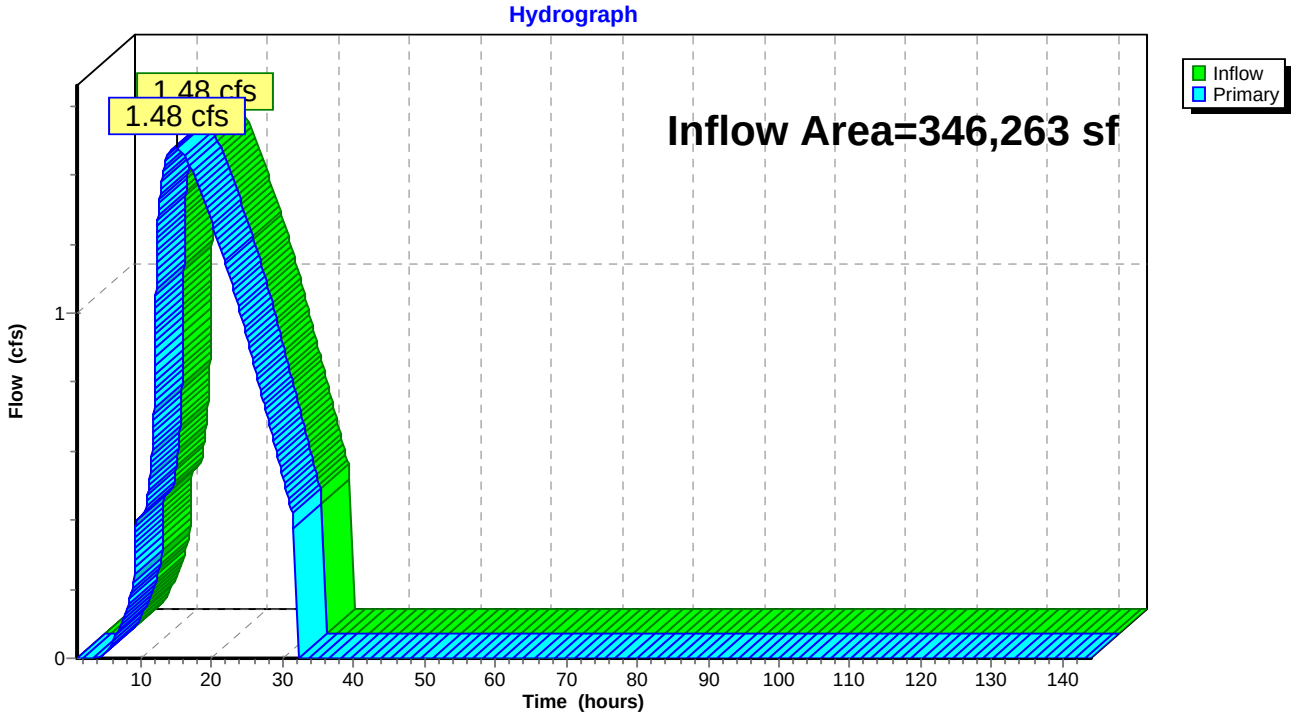


Summary for Link TPO: Total Proposed Outfall

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 2.84" for 10-year event
Inflow = 1.48 cfs @ 15.00 hrs, Volume= 82,021 cf
Primary = 1.48 cfs @ 15.00 hrs, Volume= 82,021 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

Link TPO: Total Proposed Outfall



Time span=1.00-144.00 hrs, dt=0.01 hrs, 14301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P1: Captured to North Runoff Area=28,669 sf 77.74% Impervious Runoff Depth=5.38"
Tc=6.0 min CN=93 Runoff=5.88 cfs 12,853 cf

Subcatchment P2: Captured to West Runoff Area=48,470 sf 80.32% Impervious Runoff Depth=5.38"
Tc=6.0 min CN=93 Runoff=9.94 cfs 21,731 cf

Subcatchment P3: Captured to South Runoff Area=25,018 sf 86.77% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=95 Runoff=5.22 cfs 11,696 cf

Subcatchment P4: Captured to East Runoff Area=18,670 sf 92.15% Impervious Runoff Depth=5.73"
Tc=6.0 min CN=96 Runoff=3.93 cfs 8,910 cf

Subcatchment P5: Captured to SS Runoff Area=130,436 sf 54.84% Impervious Runoff Depth=4.71"
Tc=6.0 min CN=87 Runoff=24.70 cfs 51,183 cf

Subcatchment P6: Southwest Area Runoff Area=95,000 sf 0.00% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=95 Runoff=19.84 cfs 44,415 cf

Pond EPP: Permeable Pavers Peak Elev=691.28' Storage=2,109 cf Inflow=3.93 cfs 8,910 cf
Outflow=3.08 cfs 8,910 cf

Pond NPP: Permeable Pavers Peak Elev=691.14' Storage=5,580 cf Inflow=5.88 cfs 12,853 cf
Outflow=0.96 cfs 12,853 cf

Pond SPP: Permeable Pavers Peak Elev=691.26' Storage=3,655 cf Inflow=5.22 cfs 11,696 cf
Outflow=2.80 cfs 11,696 cf

Pond SS: Subsurface Drainage Peak Elev=689.80' Storage=84,455 cf Inflow=49.18 cfs 150,788 cf
Outflow=3.73 cfs 150,790 cf

Pond WPP: Permeable Pavers Peak Elev=691.34' Storage=8,299 cf Inflow=9.94 cfs 21,731 cf
Outflow=4.36 cfs 21,731 cf

Link TPO: Total Proposed Outfall Inflow=3.73 cfs 150,790 cf
Primary=3.73 cfs 150,790 cf

Total Runoff Area = 346,263 sf Runoff Volume = 150,788 cf Average Runoff Depth = 5.23"
50.42% Pervious = 174,603 sf 49.58% Impervious = 171,660 sf

Summary for Subcatchment P1: Captured to North Permeable Pavers

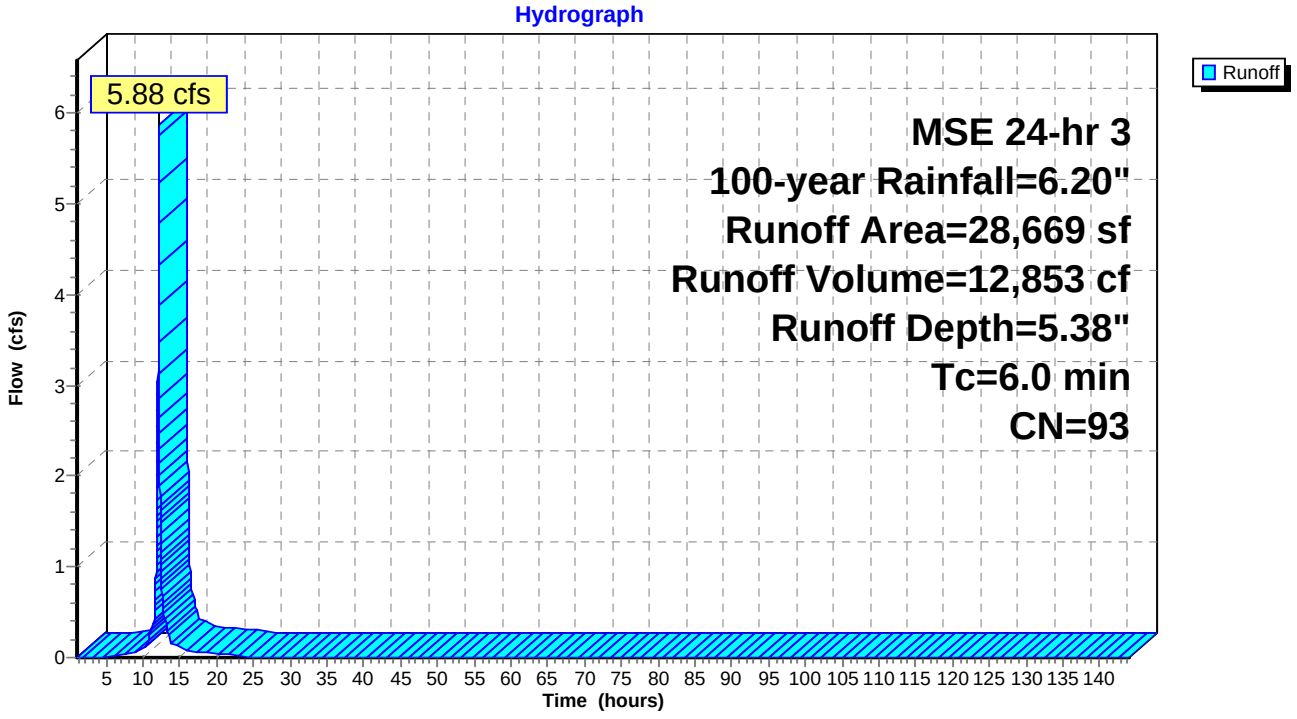
Runoff = 5.88 cfs @ 12.13 hrs, Volume= 12,853 cf, Depth= 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
	14,228	98	Paved parking, HSG C
*	8,058	98	Sidewalks, HSG C
	6,383	74	>75% Grass cover, Good, HSG C
	28,669	93	Weighted Average
	6,383		22.26% Pervious Area
	22,286		77.74% Impervious Area

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

Subcatchment P1: Captured to North Permeable Pavers



Summary for Subcatchment P2: Captured to West Permeable Pavers

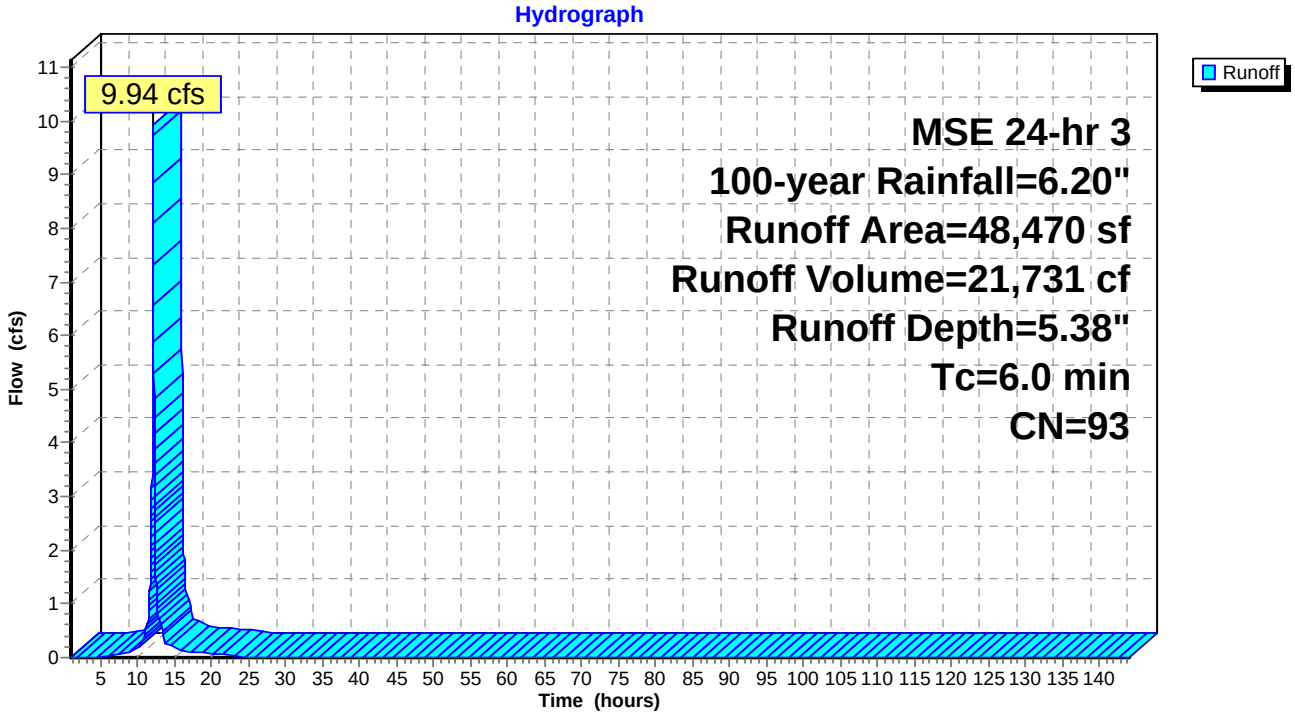
Runoff = 9.94 cfs @ 12.13 hrs, Volume= 21,731 cf, Depth= 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
	32,775	98	Paved parking, HSG C
*	6,155	98	Sidewalks, HSG C
	9,540	74	>75% Grass cover, Good, HSG C
	48,470	93	Weighted Average
	9,540		19.68% Pervious Area
	38,930		80.32% Impervious Area

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

Subcatchment P2: Captured to West Permeable Pavers



Summary for Subcatchment P3: Captured to South Permeable Pavers

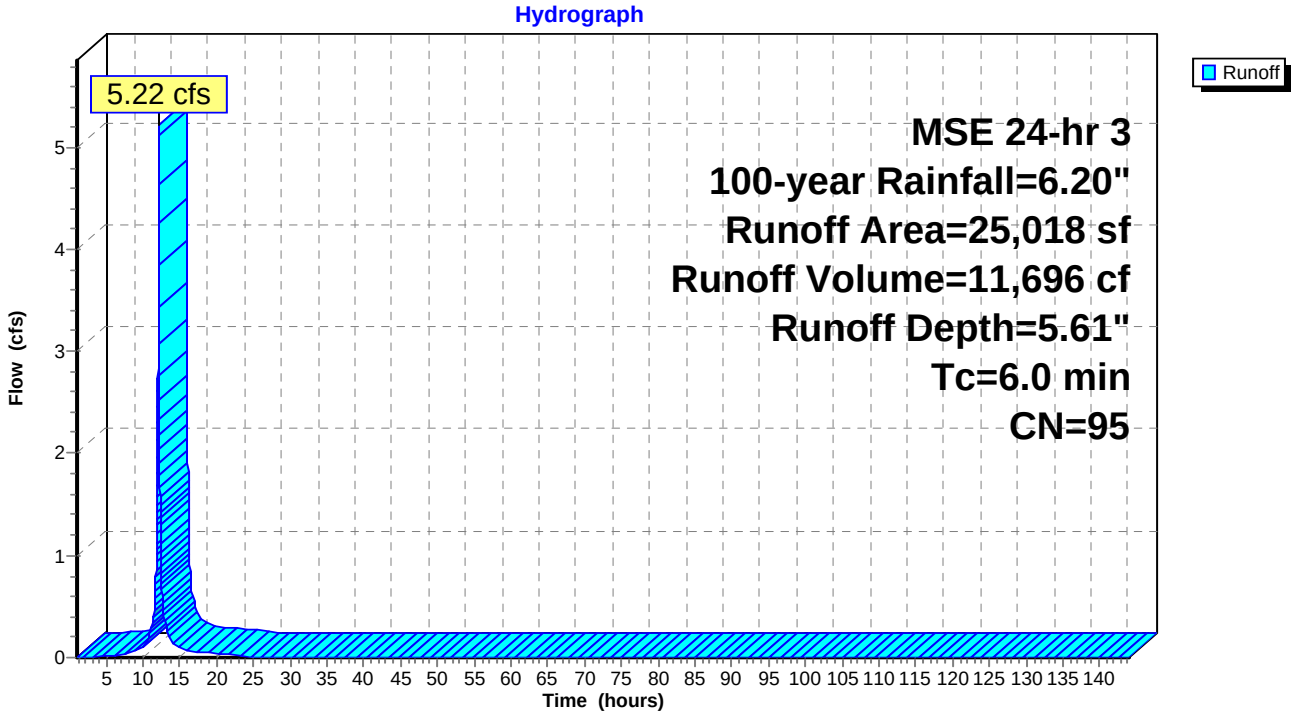
Runoff = 5.22 cfs @ 12.13 hrs, Volume= 11,696 cf, Depth= 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
	14,987	98	Paved parking, HSG C
*	6,721	98	Sidewalks, HSG C
	3,310	74	>75% Grass cover, Good, HSG C
	25,018	95	Weighted Average
	3,310		13.23% Pervious Area
	21,708		86.77% Impervious Area

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

Subcatchment P3: Captured to South Permeable Pavers



Summary for Subcatchment P4: Captured to East Permeable Pavers

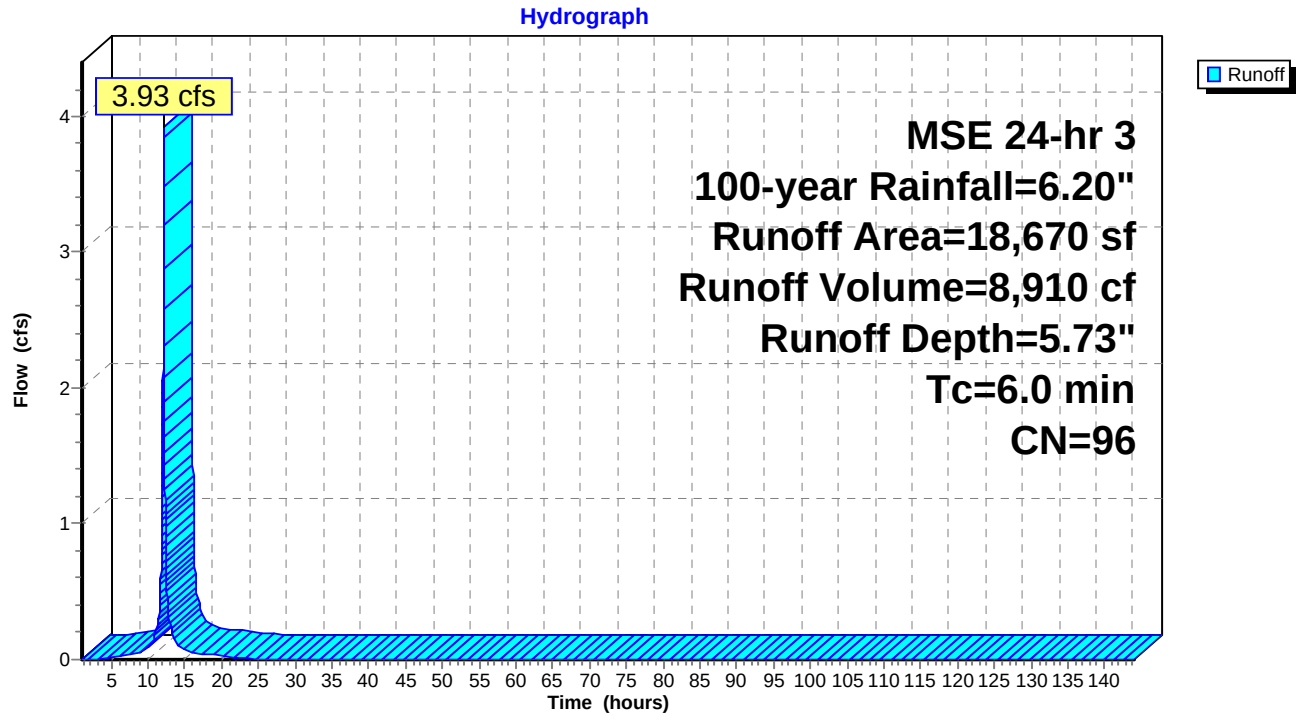
Runoff = 3.93 cfs @ 12.13 hrs, Volume= 8,910 cf, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
	11,383	98	Paved parking, HSG C
*	5,821	98	Sidewalks, HSG C
	1,466	74	>75% Grass cover, Good, HSG C
	18,670	96	Weighted Average
	1,466		7.85% Pervious Area
	17,204		92.15% Impervious Area

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

Subcatchment P4: Captured to East Permeable Pavers



Summary for Subcatchment P5: Captured to SS

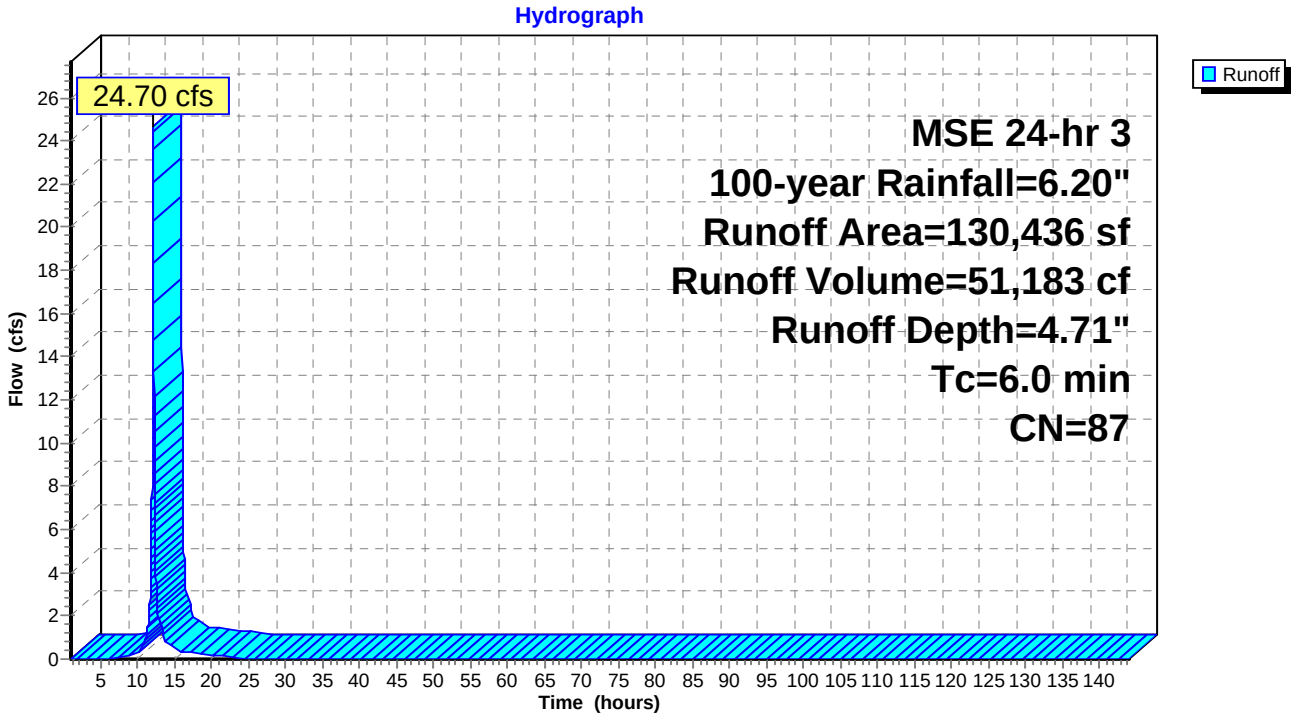
Runoff = 24.70 cfs @ 12.13 hrs, Volume= 51,183 cf, Depth= 4.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
	35,294	98	Roofs, HSG C
	29,063	98	Paved parking, HSG C
*	7,175	98	Sidewalks, HSG C
	58,904	74	>75% Grass cover, Good, HSG C
	130,436	87	Weighted Average
	58,904		45.16% Pervious Area
	71,532		54.84% Impervious Area

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

Subcatchment P5: Captured to SS



Summary for Subcatchment P6: Southwest Area

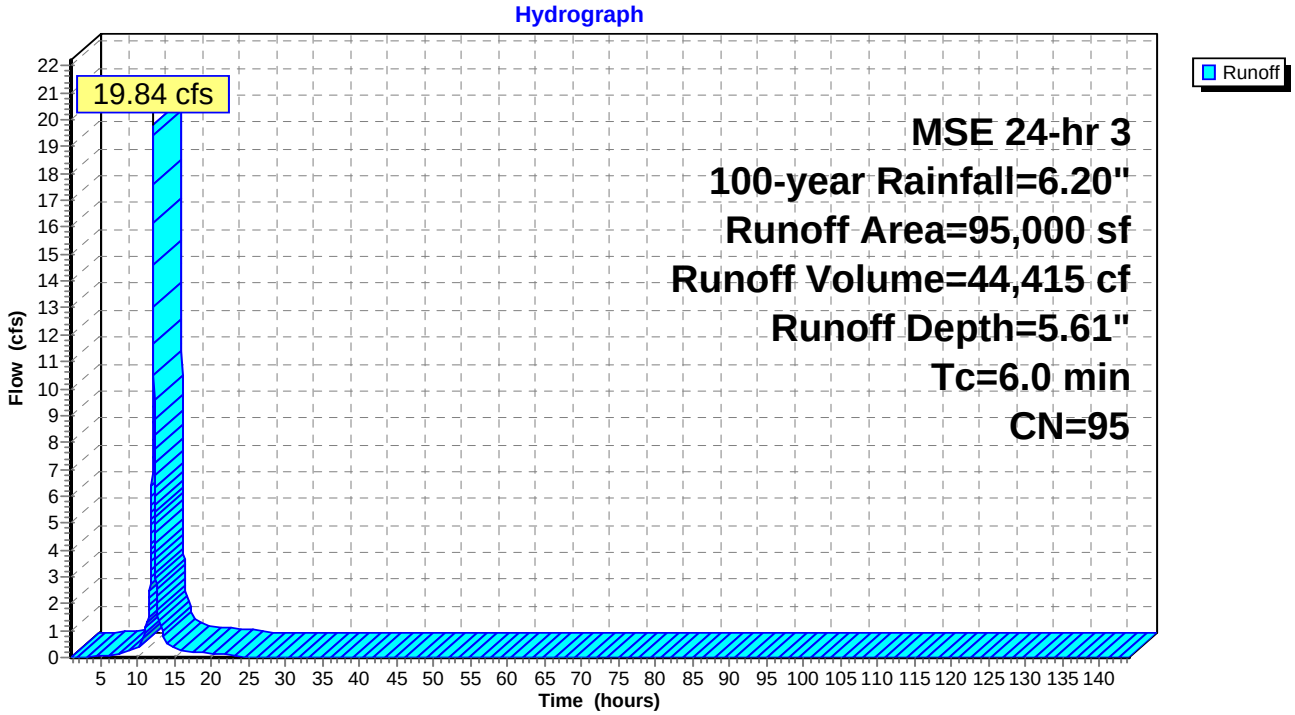
Runoff = 19.84 cfs @ 12.13 hrs, Volume= 44,415 cf, Depth= 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-year Rainfall=6.20"

	Area (sf)	CN	Description
*	95,000	95	
	95,000		100.00% Pervious Area

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

Subcatchment P6: Southwest Area



Summary for Pond EPP: Permeable Pavers

Inflow Area = 18,670 sf, 92.15% Impervious, Inflow Depth = 5.73" for 100-year event
Inflow = 3.93 cfs @ 12.13 hrs, Volume= 8,910 cf
Outflow = 3.08 cfs @ 12.17 hrs, Volume= 8,910 cf, Atten= 21%, Lag= 2.7 min
Primary = 3.08 cfs @ 12.17 hrs, Volume= 8,910 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 691.28' @ 12.17 hrs Surf.Area= 7,764 sf Storage= 2,109 cf

Plug-Flow detention time= 26.5 min calculated for 8,910 cf (100% of inflow)
Center-of-Mass det. time= 26.3 min (779.0 - 752.7)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	495 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 1,665 cf Overall - 17 cf Embedded = 1,648 cf x 30.0% Voids
#2	690.16'	160 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 485 cf Overall x 33.0% Voids
#3	690.41'	82 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 330 cf Overall x 25.0% Voids
#4	690.58'	1,941 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	17 cf	**4.0" Round 4" DT** Inside #1 L= 190.0'
		2,695 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	190	0	0
689.33	190	63	63
689.34	1,941	11	73
690.16	1,941	1,592	1,665

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	1,941	0	0
690.41	1,941	485	485

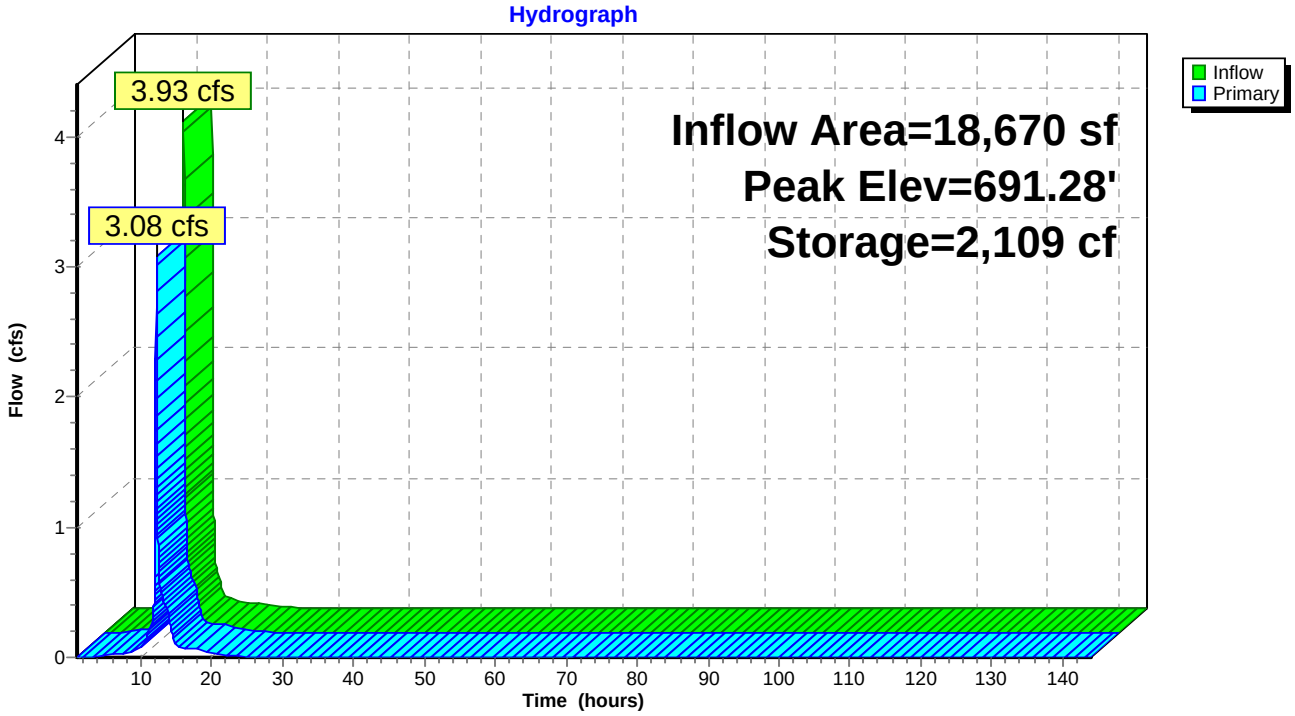
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	1,941	0	0
690.58	1,941	330	330

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	1,941	0	0
691.58	1,941	1,941	1,941

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.07 cfs @ 12.17 hrs HW=691.28' TW=687.21' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.61 cfs of 5.04 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.61 cfs @ 7.00 fps)
- **3=Curb Spillpoint** (Weir Controls 2.46 cfs @ 1.24 fps)

Pond EPP: Permeable Pavers



Summary for Pond NPP: Permeable Pavers

Inflow Area = 28,669 sf, 77.74% Impervious, Inflow Depth = 5.38" for 100-year event
Inflow = 5.88 cfs @ 12.13 hrs, Volume= 12,853 cf
Outflow = 0.96 cfs @ 12.46 hrs, Volume= 12,853 cf, Atten= 84%, Lag= 19.8 min
Primary = 0.96 cfs @ 12.46 hrs, Volume= 12,853 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 691.14' @ 12.46 hrs Surf.Area= 23,760 sf Storage= 5,580 cf

Plug-Flow detention time= 93.9 min calculated for 12,853 cf (100% of inflow)
Center-of-Mass det. time= 93.7 min (857.5 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,500 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 5,034 cf Overall - 35 cf Embedded = 5,000 cf x 30.0% Voids
#2	690.16'	490 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,485 cf Overall x 33.0% Voids
#3	690.41'	252 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,010 cf Overall x 25.0% Voids
#4	690.58'	5,940 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	35 cf	**4.0" Round 4" DT** Inside #1 L= 400.0'
		8,217 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	400	0	0
689.33	400	132	132
689.34	5,940	32	164
690.16	5,940	4,871	5,034

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	5,940	0	0
690.41	5,940	1,485	1,485

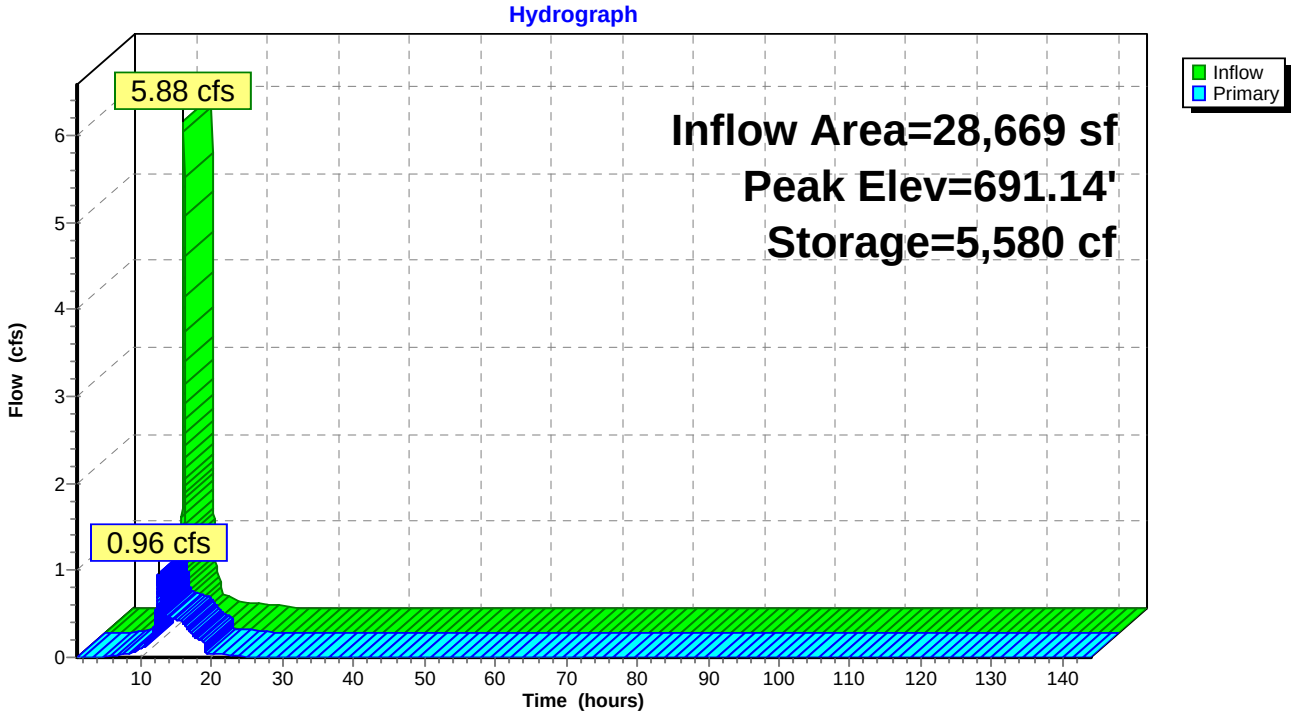
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	5,940	0	0
690.58	5,940	1,010	1,010

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	5,940	0	0
691.58	5,940	5,940	5,940

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.96 cfs @ 12.46 hrs HW=691.14' TW=688.79' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.59 cfs of 4.84 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.59 cfs @ 6.76 fps)
- **3=Curb Spillpoint** (Weir Controls 0.37 cfs @ 0.66 fps)

Pond NPP: Permeable Pavers



Summary for Pond SPP: Permeable Pavers

Inflow Area = 25,018 sf, 86.77% Impervious, Inflow Depth = 5.61" for 100-year event
Inflow = 5.22 cfs @ 12.13 hrs, Volume= 11,696 cf
Outflow = 2.80 cfs @ 12.21 hrs, Volume= 11,696 cf, Atten= 46%, Lag= 4.9 min
Primary = 2.80 cfs @ 12.21 hrs, Volume= 11,696 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 691.26' @ 12.21 hrs Surf.Area= 13,708 sf Storage= 3,655 cf

Plug-Flow detention time= 46.4 min calculated for 11,696 cf (100% of inflow)
Center-of-Mass det. time= 46.4 min (803.3 - 756.8)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	866 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 2,908 cf Overall - 21 cf Embedded = 2,887 cf x 30.0% Voids
#2	690.16'	283 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 857 cf Overall x 33.0% Voids
#3	690.41'	146 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 583 cf Overall x 25.0% Voids
#4	690.58'	3,427 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	21 cf	**4.0" Round 4" DT** Inside #1 L= 240.0'
		4,742 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	240	0	0
689.33	240	79	79
689.34	3,427	18	98
690.16	3,427	2,810	2,908

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	3,427	0	0
690.41	3,427	857	857

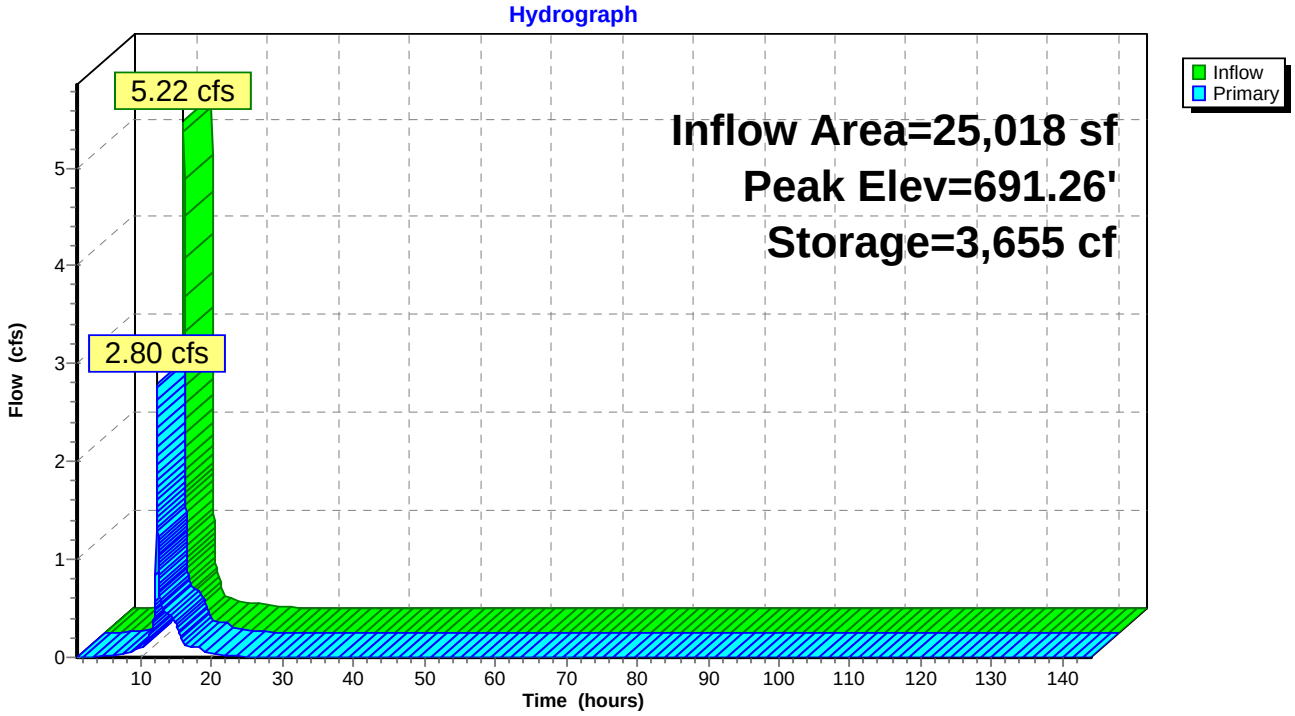
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	3,427	0	0
690.58	3,427	583	583

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	3,427	0	0
691.58	3,427	3,427	3,427

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.80 cfs @ 12.21 hrs HW=691.26' TW=687.57' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.61 cfs of 5.02 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.61 cfs @ 6.97 fps)
- **3=Curb Spillpoint** (Weir Controls 2.19 cfs @ 1.20 fps)

Pond SPP: Permeable Pavers



Summary for Pond SS: Subsurface Drainage

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 5.23" for 100-year event
Inflow = 49.18 cfs @ 12.14 hrs, Volume= 150,788 cf
Outflow = 3.73 cfs @ 13.51 hrs, Volume= 150,790 cf, Atten= 92%, Lag= 81.8 min
Primary = 3.73 cfs @ 13.51 hrs, Volume= 150,790 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 689.80' @ 13.51 hrs Surf.Area= 14,992 sf Storage= 84,455 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 478.3 min (1,270.8 - 792.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	683.00'	0 cf	**89.63'W x 167.27'L x 8.00'H Field A** 119,933 cf Overall - 119,933 cf Embedded = 0 cf x 40.0% Voids
#2A	683.00'	93,825 cf	**StormTrap ST2 DoubleTrap 7-0** x 90 Inside #1 Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf 90 Chambers in 9 Rows 76.31' x 153.96' Core + 6.66' Border = 89.63' x 167.27' System
		93,825 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	683.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 683.00' / 682.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	683.00'	**5.4" Vert. 5" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	689.60'	**6.0' long Spillway** Cv= 2.62 (C= 3.28)

Primary OutFlow Max=3.73 cfs @ 13.51 hrs HW=689.80' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 3.73 cfs of 9.49 cfs potential flow)
↑**2=5" Orifice** (Orifice Controls 1.96 cfs @ 12.35 fps)
3=Spillway (Weir Controls 1.77 cfs @ 1.47 fps)

Pond SS: Subsurface Drainage - Chamber Wizard Field A

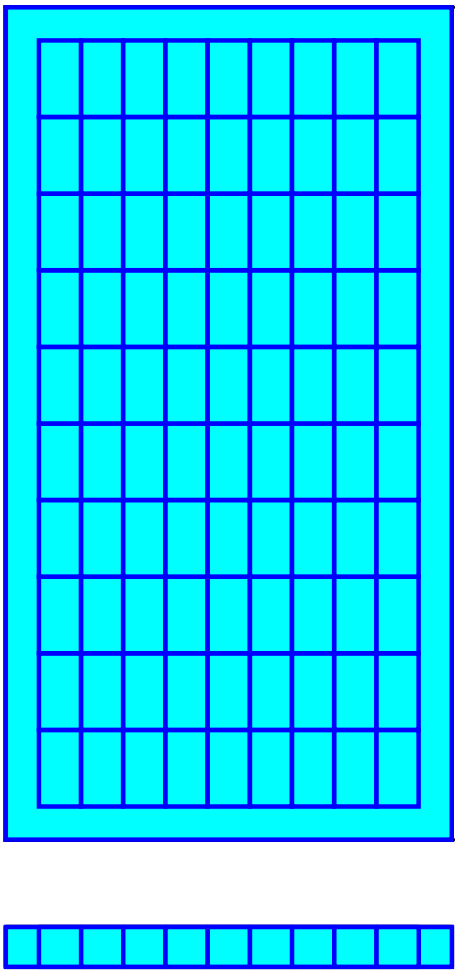
Chamber Model = StormTrap ST2 DoubleTrap 7-0 (StormTrap ST2 DoubleTrap® Type II+IV)
Inside= 101.7"W x 84.0"H => 53.54 sf x 15.40'L = 824.3 cf
Outside= 101.7"W x 96.0"H => 67.83 sf x 15.40'L = 1,044.4 cf

10 Chambers/Row x 15.40' Long = 153.96' Row Length +79.9" Border x 2 = 167.27' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
96.0" Chamber Height = 8.00' Field Height

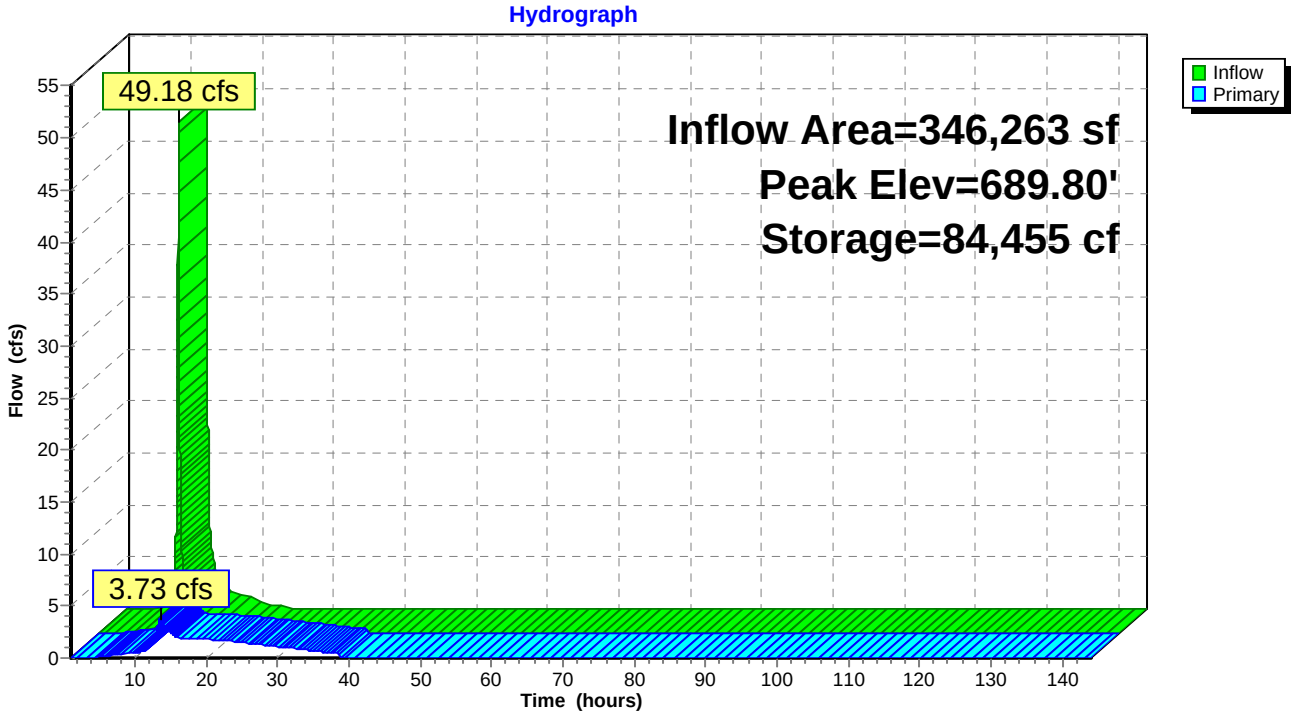
90 Chambers x 824.3 cf + 19,641.3 cf Border = 93,825.0 cf Chamber Storage
90 Chambers x 1,044.4 cf + 25,941.6 cf Border = 119,933.2 cf Displacement

Chamber Storage = 93,825.0 cf = 2.154 af
Overall Storage Efficiency = 78.2%
Overall System Size = 167.27' x 89.63' x 8.00'

90 Chambers (plus border)
4,442.0 cy Field



Pond SS: Subsurface Drainage



Summary for Pond WPP: Permeable Pavers

Inflow Area = 48,470 sf, 80.32% Impervious, Inflow Depth = 5.38" for 100-year event
Inflow = 9.94 cfs @ 12.13 hrs, Volume= 21,731 cf
Outflow = 4.36 cfs @ 12.23 hrs, Volume= 21,731 cf, Atten= 56%, Lag= 6.3 min
Primary = 4.36 cfs @ 12.23 hrs, Volume= 21,731 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs
Peak Elev= 691.34' @ 12.23 hrs Surf.Area= 29,048 sf Storage= 8,299 cf

Plug-Flow detention time= 94.2 min calculated for 21,731 cf (100% of inflow)
Center-of-Mass det. time= 94.0 min (857.8 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	689.00'	1,835 cf	**Aggregate Base (Prismatic)**Listed below (Recalc) 6,159 cf Overall - 44 cf Embedded = 6,115 cf x 30.0% Voids
#2	690.16'	599 cf	**Aggregate Bedding (Prismatic)**Listed below (Recalc) 1,816 cf Overall x 33.0% Voids
#3	690.41'	309 cf	**Pavement Thickness (Prismatic)**Listed below (Recalc) 1,235 cf Overall x 25.0% Voids
#4	690.58'	7,262 cf	**Open Storage (Prismatic)**Listed below (Recalc)
#5	689.00'	44 cf	**4.0" Round 4" DT** Inside #1 L= 500.0'
		10,048 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
689.00	500	0	0
689.33	500	165	165
689.34	7,262	39	204
690.16	7,262	5,955	6,159

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.16	7,262	0	0
690.41	7,262	1,816	1,816

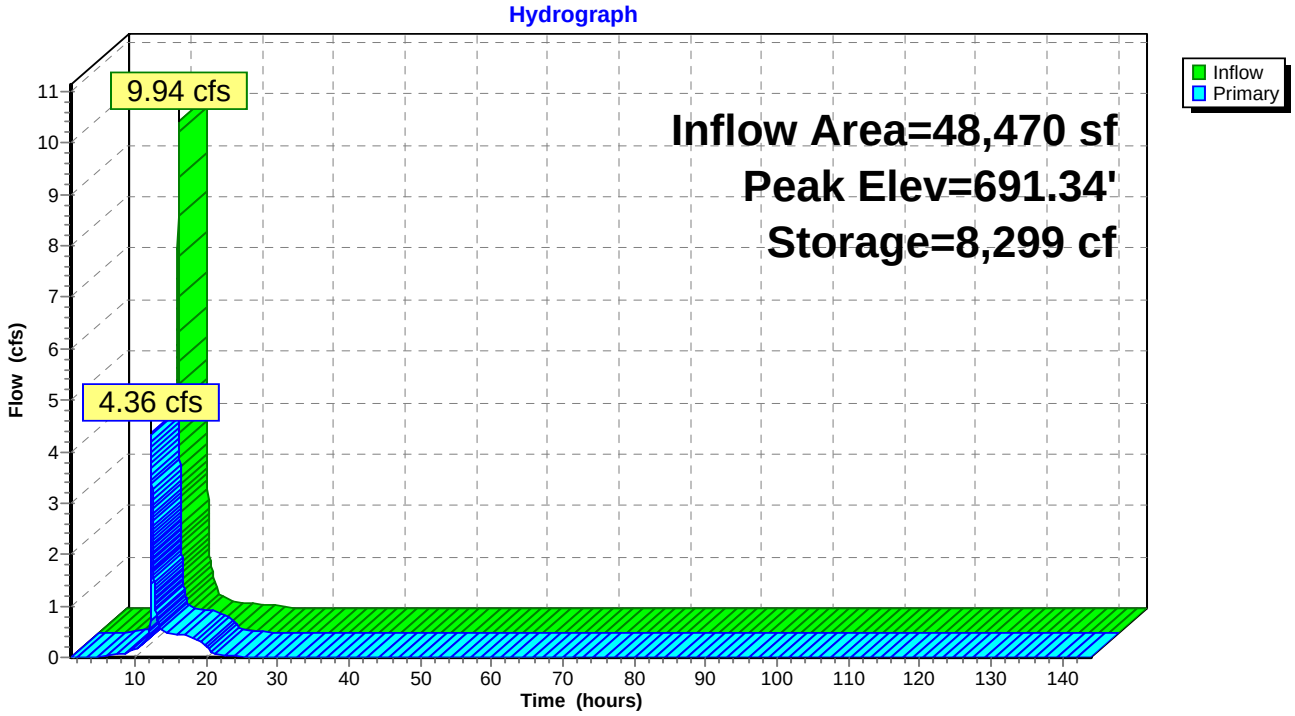
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.41	7,262	0	0
690.58	7,262	1,235	1,235

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
690.58	7,262	0	0
691.58	7,262	7,262	7,262

Device	Routing	Invert	Outlet Devices
#1	Primary	689.00'	**12.0" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.00' / 688.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	689.00'	**4.0" Vert. 4" Draintile** C= 0.600 Limited to weir flow at low heads
#3	Primary	691.08'	**10.0' long x 0.5' breadth Curb Spillpoint** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.36 cfs @ 12.23 hrs HW=691.34' TW=687.76' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.62 cfs of 5.13 cfs potential flow)
  - **2=4" Draintile** (Orifice Controls 0.62 cfs @ 7.10 fps)
- **3=Curb Spillpoint** (Weir Controls 3.74 cfs @ 1.44 fps)

Pond WPP: Permeable Pavers

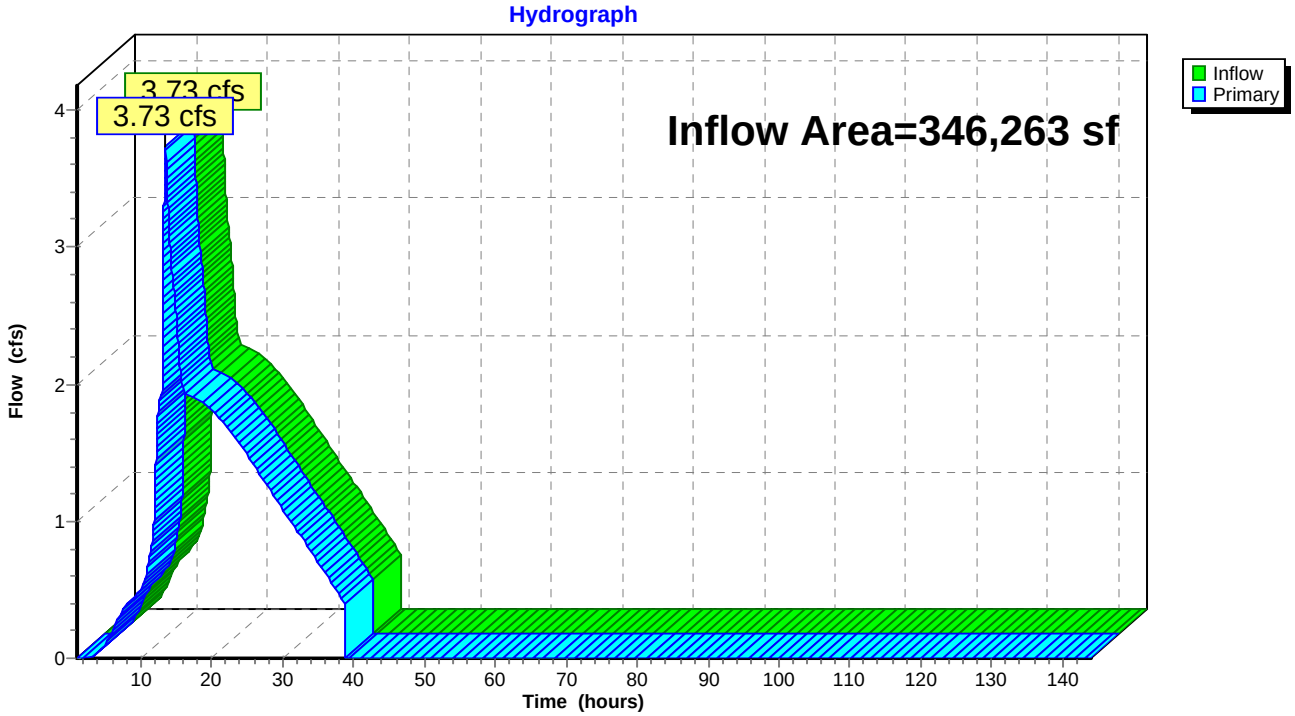


Summary for Link TPO: Total Proposed Outfall

Inflow Area = 346,263 sf, 49.58% Impervious, Inflow Depth = 5.23" for 100-year event
Inflow = 3.73 cfs @ 13.51 hrs, Volume= 150,790 cf
Primary = 3.73 cfs @ 13.51 hrs, Volume= 150,790 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

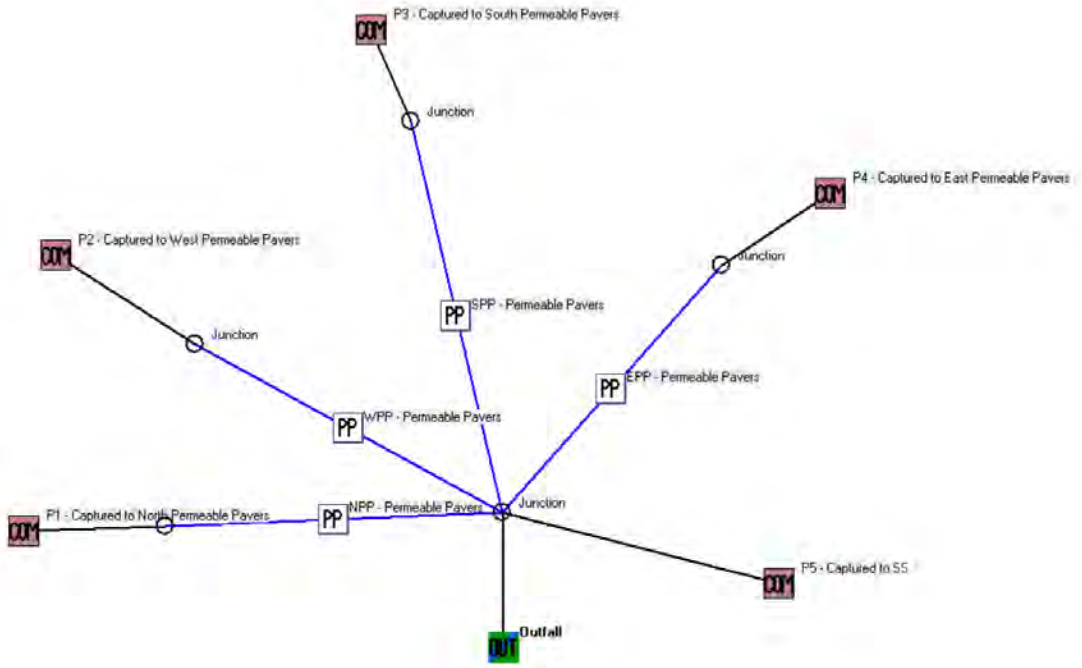
Link TPO: Total Proposed Outfall



Appendix D

SLAMM Analysis

Bayside Development (Building C) – SLAMM Analysis



Input Data:
Data file name: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\WinSLAMM\210709_WinSLAMM.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28

Date: 10-18-2022 Time: 11:44:08
Site information:

LU# 1 - Commercial: P1 - Captured to North Permeable Pavers Total area (ac): 0.660
13 - Paved Parking 1: 0.330 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.180 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.150 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Commercial: P2 - Captured to West Permeable Pavers Total area (ac): 1.110
13 - Paved Parking 1: 0.750 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.140 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.220 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Commercial: P3 - Captured to South Permeable Pavers Total area (ac): 0.570
13 - Paved Parking 1: 0.340 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.150 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.080 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Commercial: P4 - Captured to East Permeable Pavers Total area (ac): 0.430
13 - Paved Parking 1: 0.260 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.140 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 0.030 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 5 - Commercial: P5 - Captured to SS Total area (ac): 2.990
1 - Roofs 1: 0.810 ac. Flat Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.670 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
31 - Sidewalks 1: 0.160 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
45 - Large Landscaped Areas 1: 1.350 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1: Porous Pavement CP# 1 (DS) - WPP - Permeable Pavers
Porous pavement area (ac): 0.17
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 2
Porous pavement porosity: 0.25
Aggregate bedding thickness (in): 3
Aggregate bedding porosity: 0.33
Aggregate base reservoir thickness (in): 10
Aggregate base reservoir porosity: 0.3
Porous pavement surface area to aggregate base area ratio: 1

Underdrain diameter (in): 4
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.5
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.6
Porous pavement restorative cleaning frequency:
TSS concentration reduction percentage through underdrain: 0
Porous pavement particle size distribution file name: Not needed - calculated by program

Control Practice 2: Porous Pavement CP# 2 (DS) - NPP - Permeable Pavers
Porous pavement area (ac): 0.14
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 2
Porous pavement porosity: 0.25
Aggregate bedding thickness (in): 3
Aggregate bedding porosity: 0.33
Aggregate base reservoir thickness (in): 10
Aggregate base reservoir porosity: 0.3
Porous pavement surface area to aggregate base area ratio: 1
Underdrain diameter (in): 4
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.5
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.6
Porous pavement restorative cleaning frequency:
TSS concentration reduction percentage through underdrain: 0
Porous pavement particle size distribution file name: Not needed - calculated by program

Control Practice 3: Porous Pavement CP# 3 (DS) - SPP - Permeable Pavers
Porous pavement area (ac): 0.08
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 2
Porous pavement porosity: 0.25
Aggregate bedding thickness (in): 3
Aggregate bedding porosity: 0.33
Aggregate base reservoir thickness (in): 10

Aggregate base reservoir porosity: 0.3
Porous pavement surface area to aggregate base area ratio: 1
Underdrain diameter (in): 4
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.5
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.6
Porous pavement restorative cleaning frequency:
TSS concentration reduction percentage through underdrain: 0
Porous pavement particle size distribution file name: Not needed - calculated by program

Control Practice 4: Porous Pavement CP# 4 (DS) - EPP - Permeable Pavers
Porous pavement area (ac): 0.05
Inflow hydrograph peak to average flow ratio: 3.8
Porous pavement thickness (in): 2
Porous pavement porosity: 0.25
Aggregate bedding thickness (in): 3
Aggregate bedding porosity: 0.33
Aggregate base reservoir thickness (in): 10
Aggregate base reservoir porosity: 0.3
Porous pavement surface area to aggregate base area ratio: 1
Underdrain diameter (in): 4
Underdrain outlet invert elevation (inches above datum): 0
Number of underdrains: 1
Subgrade seepage rate (in/hr): 0.5
Use random number generation to account for uncertainty in seepage rate: 0
Subgrade seepage rate COV: 0
Surface pavement initial infiltration rate (in/hr): 100
Surface Pavement Percent Solids Removal Upon Cleaning: 50
Porous pavement surface clogging load (lbs/sf): 0.6
Porous pavement restorative cleaning frequency:
TSS concentration reduction percentage through underdrain: 0
Porous pavement particle size distribution file name: Not needed - calculated by program

Output Data:

SLAMM for Windows Version 10.4.1

Data file name: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\WinSLAMM\210709_WinSLAMM.mdb
Data file description:
Rain file name: C:\WinSLAMM Files\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 10-18-2022 Time of run: 11:45:42
Total Area Modeled (acres): 5.760
Years in Model Run: 0.99

	Runoff Volume	Percent Runoff Volume	Particulate Solids Conc	Particulate Solids Yield	Percent Particulate Solids Reduction
	(cu ft)		(mg/L)	(lbs)	
Total of all Land Uses without Controls:	315265	-	102.3	2014	-
Outfall Total with Controls:	229263	27.28%	64.64	925.1	54.07%
Annualized Total After Outfall Controls:	232447			938.0	

Appendix E

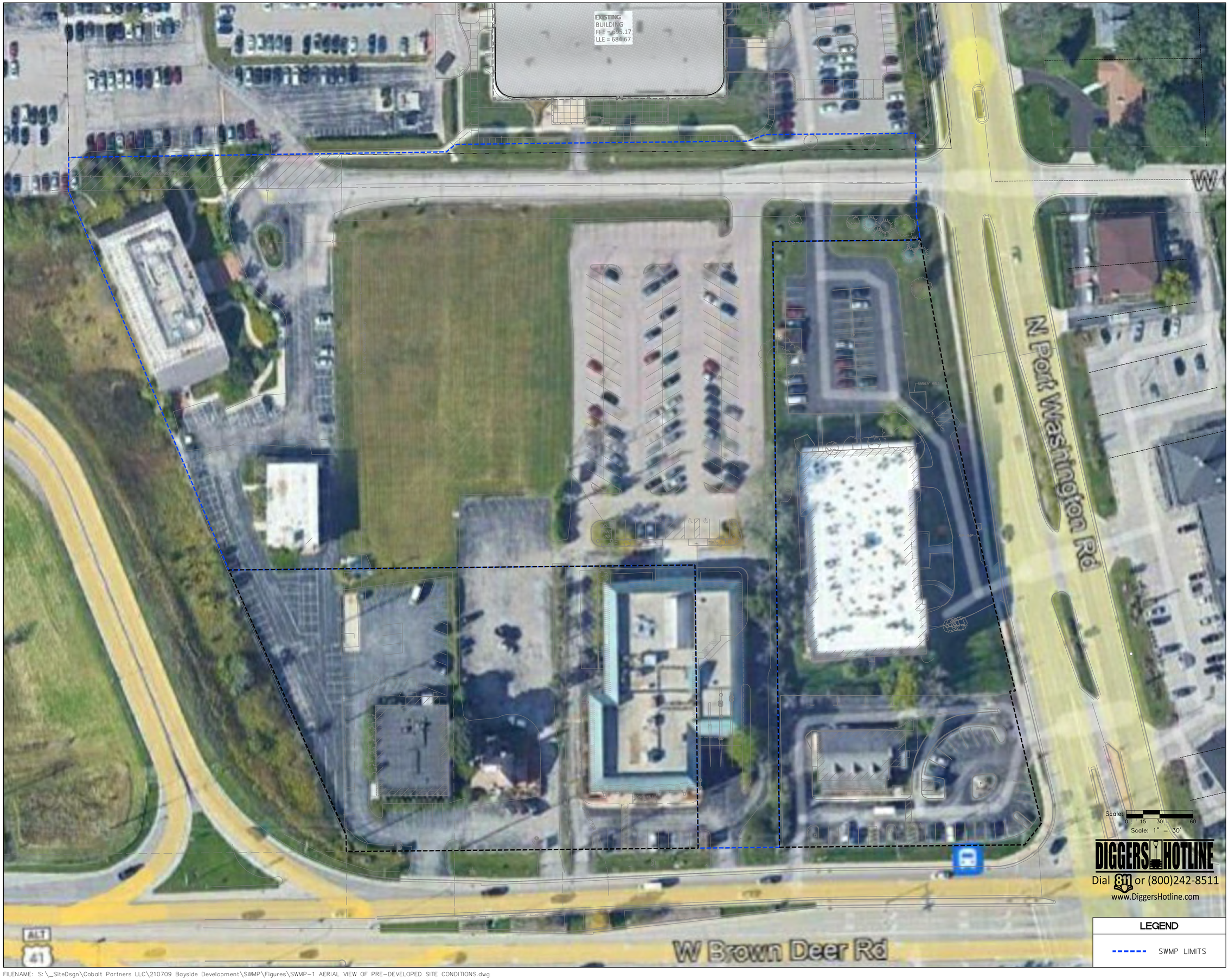
SWMP-1 **Aerial View of Pre-Developed Site Conditions**

SWMP-2 **Pre-Developed Site Conditions**

SWMP-3 **Post-Developed Site Conditions**

SWMP-4 **Pre-Developed Drainage Conditions**

SWMP-5 **Post-Developed Drainage Conditions**



kapur
7711 N. Port Washington Road
Milwaukee, Wisconsin 53217
kapurinc.com

PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

all in

SHEET:
AERIAL VIEW OF PRE-DEVELOPED SITE CONDITIONS

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
SWMP-1

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\Figures\SWMP-1 AERIAL VIEW OF PRE-DEVELOPED SITE CONDITIONS.dwg

LEGEND	
	SWMP LIMITS

EXISTING PERVIOUS VS. IMPERVIOUS AREAS

		SQUARE FEET	ACRES
AREA OF SUBJECT SITE (SWMP LIMITS)		xx SQUARE FEET	xx ACRES
IMPERVIOUS AREAS			
BUILDING / ALTERNATE BUILDING AREA		xx SQUARE FEET	xx ACRES
DRIVEWAY / ROADWAY AREA		xx SQUARE FEET	xx ACRES
SIDEWALK / PEDESTRIAN AREAS		xx SQUARE FEET	xx ACRES
TOTAL EXISTING IMPERVIOUS AREA		xx SQUARE FEET	xx ACRES
PERVIOUS AREAS			
TOTAL EXISTING PERVIOUS AREA		xx SQUARE FEET	xx ACRES

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Milwaukee, Wisconsin 53217
kapurinc.com

PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

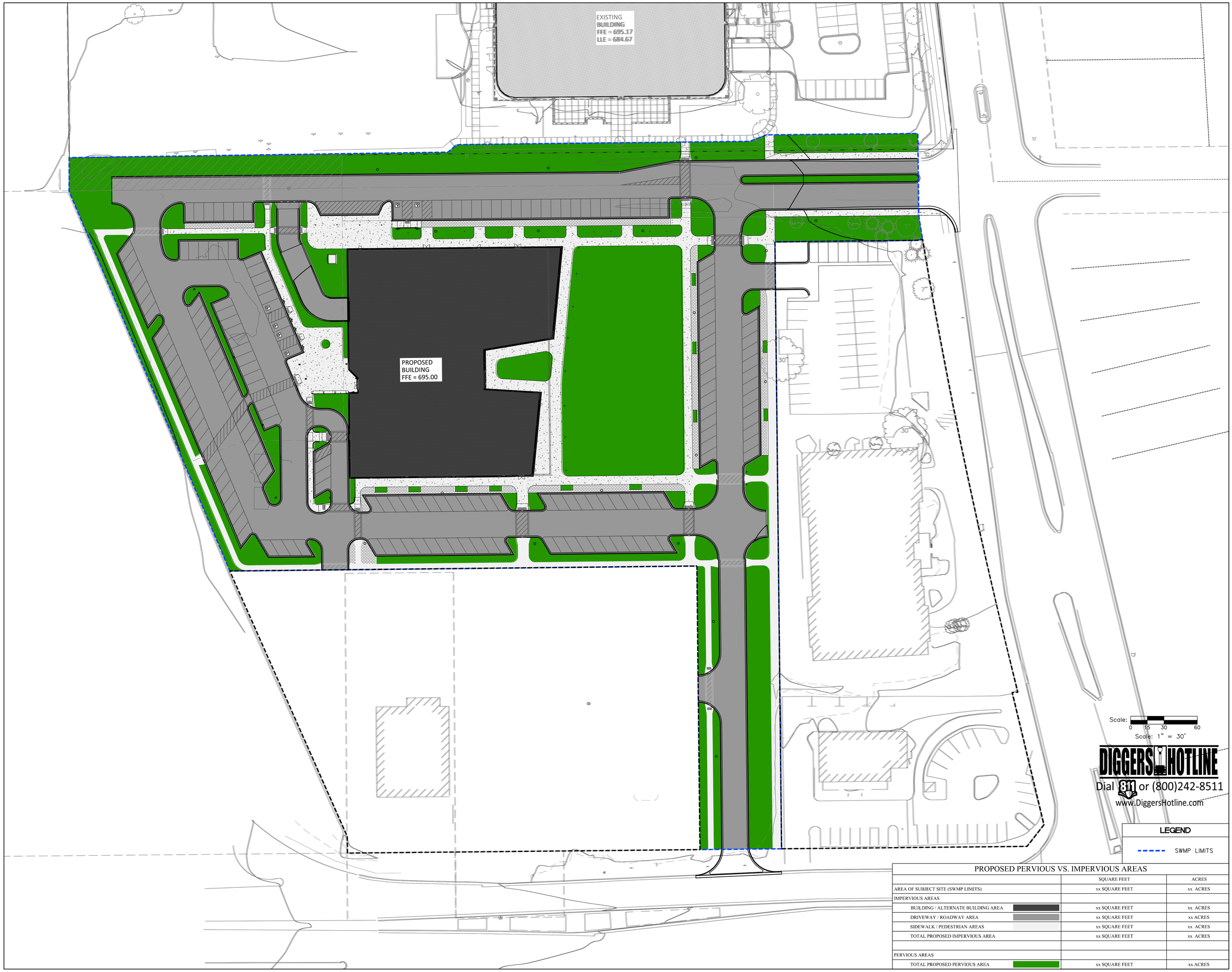
all in

SHEET:
PRE-DEVELOPED SITE CONDITIONS

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
SWMP-2

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\Figures\SWMP-2 PRE DEVELOPED SITE CONDITIONS.dwg



PROPOSED PERVIOUS VS. IMPERVIOUS AREAS		
	SQUARE FEET	ACRES
AREA OF SUBJECT SITE (SWMP LIMITS)	xx SQUARE FEET	xx ACRES
IMPERVIOUS AREAS		
BUILDING / ALTERNATE BUILDING AREA	xx SQUARE FEET	xx ACRES
DRIVEWAY / ROADWAY AREA	xx SQUARE FEET	xx ACRES
SIDEWALK / PEDESTRIAN AREAS	xx SQUARE FEET	xx ACRES
TOTAL PROPOSED IMPERVIOUS AREA	xx SQUARE FEET	xx ACRES
PERVIOUS AREAS		
TOTAL PROPOSED PERVIOUS AREA	xx SQUARE FEET	xx ACRES

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Milwaukee, Wisconsin 53217
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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

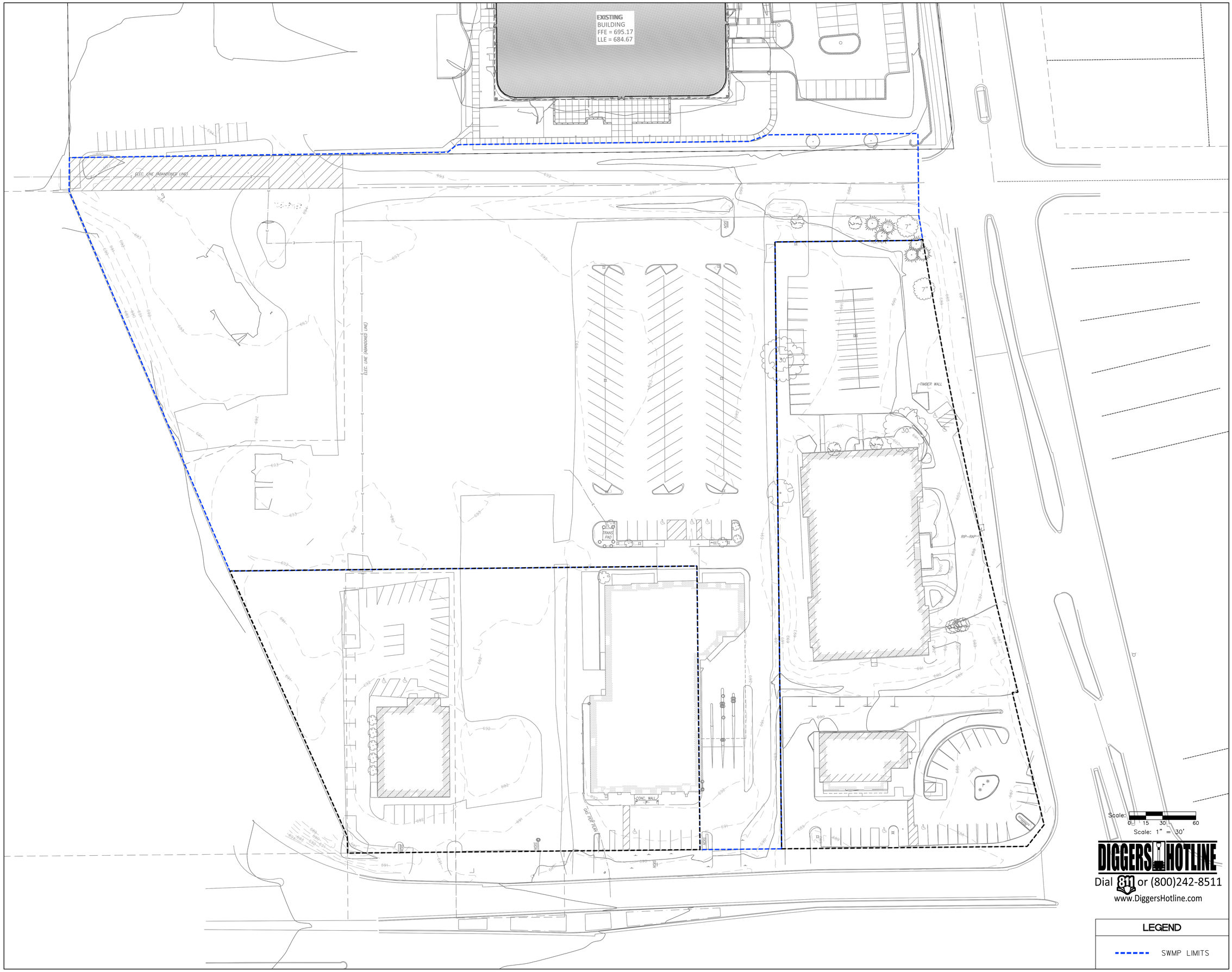
all in

SHEET:
POST DEVELOPED SITE CONDITIONS

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
SWMP-3

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\Figures\SWMP-3 POST DEVELOPED SITE CONDITIONS.dwg



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7711 N. Port Washington Road
Milwaukee, Wisconsin 53217
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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

all in

DIGGERS HOTLINE
Dial 811 or (800)242-8511
www.DiggersHotline.com

LEGEND
SWMP LIMITS

SHEET:
PRE-DEVELOPED SITE DRAINAGE CONDITIONS

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
SWMP-4

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\Figures\SWMP-4 PRE DEVELOPED SITE DRAINAGE CONDITIONS.dwg

EXISTING
BUILDING
FFE = 695.17
LLE = 684.67

PROPOSED
BUILDING
FFE = 695.00

1
3
4
5

Scale: 1" = 30'

DIGGERS HOTLINE
Dial 811 or (800)242-8511
www.DiggersHotline.com

LEGEND

SWMP LIMITS

kapur
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Milwaukee, Wisconsin 53217
kapurinc.com

PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

all in

SHEET:
POST DEVELOPED SITE DRAINAGE CONDITIONS

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
SWMP-5

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\SWMP\Figures\SWMP-5 POST DEVELOPED SITE DRAINAGE CONDITIONS.dwg

Appendix F

Civil Engineering Plan Set

PROPERTY EXHIBIT

PART OF THE SOUTHEAST 1/4 OF THE SOUTHWEST 1/4 AND THE SOUTHWEST 1/4 OF THE SOUTHEAST 1/4 OF SECTION 5, TOWN 8 NORTH, RANGE 22 EAST, IN THE VILLAGE OF BAYSIDE MILWAUKEE COUNTY, WISCONSIN.

JSD Professional Services, Inc.
Engineers • Surveyors • Planners

CREATE THE VISION TELL THE STORY

MADISON | MILWAUKEE
KENOSHA | APPLETON | WAUSAU

MILWAUKEE REGIONAL OFFICE
N238 W1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666

CLIENT:
COBALT PARTNERS, LLC

CLIENT ADDRESS:
**2078 N. MILWAUKEE STREET
MILWAUKEE, WI 53020**

PROJECT:
ONE NORTH

PROJECT LOCATION:
**VILLAGE OF BAYSIDE, WI
MILWAUKEE COUNTY**

PLAN MODIFICATIONS:

#	Date:	Description:
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Design/Drawn: DHS
Approved: TB

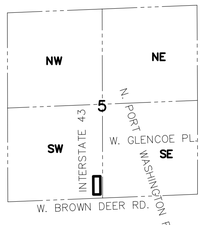
SHEET TITLE:
PROPERTY EXHIBIT

SHEET NUMBER:
1 OF 1

JSD PROJECT NO: 17-8314

ALTA/NSPS LAND TITLE SURVEY

PART OF THE SOUTHEAST 1/4 OF THE SOUTHWEST 1/4 OF SECTION 5, TOWN 8 NORTH, RANGE 22 EAST, IN THE VILLAGE OF BAYSIDE, MILWAUKEE COUNTY, WISCONSIN.



LOCATION SKETCH
SECTION 5, T8N, R21E, MILWAUKEE COUNTY

north

north

SCALE IN FEET

20' 0 20'

LEGEND

- CHISELED 'X' SET
- MAG NAIL SET
- 3/4" x 24" REBAR SET (1.50 LBS/LF)
- GOVERNMENT CORNER
- CHISELED 'X' FOUND
- 1" IRON PIPE FOUND
- 2" IRON PIPE FOUND
- IRON PIPE FOUND (SIZE NOTED)
- PK/MAG NAIL FOUND
- 1¼" REBAR FOUND
- ¾" REBAR FOUND
- REBAR FOUND (SIZE NOTED)
- CONTROL POINT
- BENCHMARK
- FINISHED FLOOR SHOT LOCATION
- BOLLARD
- SATELLITE DISH
- FLAG POLE
- MAIL BOX
- SIGN
- SANITARY MANHOLE
- CLEAN OUT
- VENT PIPE
- WATERMAIN OR GASMAIN VALVE
- WATER MANHOLE
- HYDRANT
- CURB STOP/SERVICE VALVE
- SPRINKLER VALVE BOX
- SPRINKLER HEAD
- WELL
- STORM MANHOLE
- ROUND CASTED INLET
- SQUARE CASTED INLET
- CURB INLET
- ENDWALL/END OF PIPE
- DOWNSPOUT
- GAS REGULATOR/METER
- MANHOLE – UNVERIFIED TYPE
- ELECTRIC MANHOLE
- ELECTRIC PEDESTAL
- ELECTRIC METER
- ELECTRIC TRANSFORMER
- AIR CONDITION UNIT
- LIGHT POLE
- POWER POLE W/GUY
- YARD LIGHT
- TRAFFIC SIGNAL
- PULL BOX
- SIGNAL CONTROLLER BOX
- VAULT
- TELEPHONE MANHOLE
- TELEPHONE PEDESTAL
- CABLE MANHOLE
- CABLE PEDESTAL
- DECIDUOUS TREE
- CONIFEROUS TREE
- BUSH
- STUMP
- MARSH
- HANDICAP PARKING

- PLAT BOUNDARY
- CHORD LINE
- CENTERLINE
- RIGHT-OF-WAY LINE
- SETBACK LINE
- SECTION LINE
- PLATTED LOT LINE
- EASEMENT LINE
- LANDSCAPE LIMITS
- FENCE LINE
- GUARD OR SAFETY RAIL
- STONE WALL
- EDGE OF PAVEMENT
- CONCRETE CURB & GUTTER
- EDGE OF GRAVEL
- SANITARY SEWER
- WATER LINE
- STORM SEWER
- STEAM LINE
- NATURAL GAS
- UNDERGROUND ELECTRIC
- FIBER OPTIC
- OVERHEAD TELEPHONE
- UNDERGROUND TELEPHONE
- OVERHEAD CABLE
- UNDERGROUND CABLE
- EDGE OF WOODS OR BRUSH
- 875 INDEX CONTOUR
- 874 INTERMEDIATE CONTOUR
- NAVIGABLE STREAM
- EDGE OF WATER
- +874.29 SPOT ELEVATION
- BITUMINOUS PAVEMENT
- RETAINING WALL
- CONCRETE PAVEMENT
- EDGE OF BITUMINOUS PAVEMENT STRIPING
- END OF FLAGGED UTILITIES
- ( ) DENOTES RECORD DATA DEPICTING THE SAME LINE ON THE GROUND AS RETRACED BY THIS SURVEY

NOTES

1. FIELD WORK PERFORMED BY JSD PROFESSIONAL SERVICES, INC. ON MAY 1–30, 2018.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO THE WISCONSIN STATE PLANE COORDINATE SYSTEM (SOUTH ZONE)(NAD 27), THE SOUTH LINE OF THE SOUTHEAST 1/4 HAVING A PUBLISHED BEARING OF N89°25'54"E .
3. ELEVATIONS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929. BENCHMARK IS A CONCRETE MONUMENT WITH BRASS CAP MARKING THE SOUTH 1/4 CORNER OF SECTION 5, T8N, R22E, ELEVATION = 690.99'
4. CONTOUR INTERVAL IS ONE FOOT.
5. SPOT ELEVATIONS IN CURBED AREAS REFERENCE THE PAVEMENT EDGE ELEVATIONS.
6. SUBSURFACE UTILITIES AND FEATURES SHOWN ON THIS MAP HAVE BEEN APPROXIMATED BY LOCATING SURFICIAL FEATURES AND APPURTENANCES, LOCATING DIGGERS HOTLINE FIELD MARKINGS AND BY REFERENCE TO UTILITY RECORDS AND MAPS. DIGGER'S HOTLINE TICKET NO'S. 20181724320, WITH A CLEAR DATE OF MAY 2, 2018.
7. UTILITY COMPANIES CONTACTED THRU DIGGERS HOTLINE:
   VILLAGE OF BAYSIDE
   WE ENERGIES
   MIDWEST FIBER NETWORKS
   TIME WARNER CABLE
   CITY OF MEQUON
   AT&T DISTRIBUTION
   LEVEL 3 COMMUNICATIONS
8. BEFORE EXCAVATION, APPROPRIATE UTILITY COMPANIES SHOULD BE CONTACTED. FOR EXACT LOCATION OF UNDERGROUND UTILITIES, CONTACT DIGGERS HOTLINE, AT 1.800.242.8511.
9. THE ACCURACY OF THE BENCHMARKS SHOWN ON THIS MAP SHALL BE VERIFIED BEFORE BEING UTILIZED. JSD PROFESSIONAL SERVICES, INC. DOES NOT WARRANT THE ACCURACY OF THESE BENCHMARKS.
10. PROPERTY ZONING IS UNAVAILABLE PER MILWAUKEE COUNTY INTERACTIVE MAPPING.
11. THIS PARCEL IS SUBJECT TO ALL EASEMENTS AND AGREEMENTS, BOTH RECORDED AND UNRECORDED.

NOTES CORRESPONDING TO TABLE A REQUIREMENTS:

ITEM 3 THE SUBJECT PROPERTY LIES IN ZONE X PER FEMA MAP NUMBER 55079C041E, WHICH HAS AN EFFECTIVE DATE OF SEPTEMBER 26, 2008.

ITEM 4 LANDS CONTAINING 24,996 SQUARE FEET OR 0.5738 ACRES

ITEM 6(a)(b) CURRENT ZONING CLASSIFICATION WAS NOT PROVIDED BY THE INSURER.

ITEM 9 THERE ARE 35 PARKING SPACES AND 2 HANDICAP SPACES FOR A TOTAL OF 37 PARKING SPACES.

ITEM 11 SOURCE INFORMATION FROM PLANS AND MARKING WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.iv. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE, IN WHICH CASE THE SURVEYOR SHALL NOTE ON THE PLAT OR MAP HOW THIS AFFECTED THE SURVEYOR'S ASSESSMENT OF THE LOCATION OF THE UTILITIES. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION AND/OR A PRIVATE UTILITY LOCATE REQUEST MAY BE NECESSARY.

ITEM 16 THERE IS NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS AT THE TIME OF THIS SURVEY.

ITEM 17 THERE ARE NO PROPOSED CHANGES IN THE STREET RIGHT-OF-WAY LINES PER VILLAGE OF BAYSIDE ENGINEERING DEPARTMENT. THERE IS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.

ITEM 18 THERE ARE NO MARKED WETLANDS ON THE PROPERTY

ITEM 19 THERE ARE NO OFFSITE EASEMENTS FOR THE SUBJECT PROPERTY.

NOTES CORRESPONDING TO SCHEDULE B–SECTION TWO EXCEPTIONS

(FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. 84339, COMMITMENT DATE DECEMBER 13, 2017 AT 8:00 A.M.)

10. EASEMENT(S), IF ANY, ARISING UNDER MILWAUKEE COUNTY FARM DRAIN NO. 10, DRAINAGE BOARD REPORT RECORDED SEPTEMBER 19, 1924, IN VOLUME 1048, PAGE 122, AS DOCUMENT NO. 1305937.
    AFFECTS PROPERTY BY LOCATION–GENERAL IN NATURE, NOTHING TO PLOT
11. UTILITY EASEMENT GRANTED TO THE MILWAUKEE ELECTRIC RAILWAY AND LIGHT COMPANY, BY AN INSTRUMENT RECORDED IN REEL/VOLUME 1133, IMAGE/PAGE 439, AS DOCUMENT NO. 1434105.
    AFFECTS PROPERTY BY LOCATION–POLES AND WIRES SHOWN
12. UTILITY EASEMENT GRANTED TO THE MILWAUKEE ELECTRIC RAILWAY AND LIGHT COMPANY, BY AN INSTRUMENT RECORDED IN REEL/VOLUME 1058, IMAGE/PAGE 578, AS DOCUMENT NO. 1434110.
    AFFECTS PROPERTY BY LOCATION–POLES AND WIRES SHOWN
13. UTILITY EASEMENT GRANTED TO WISCONSIN ELECTRIC POWER COMPANY AND WISCONSIN TELEPHONE COMPANY, BY AN INSTRUMENT RECORDED IN REEL/VOLUME 3495, IMAGE/PAGE 348, AS DOCUMENT NO. 3436868.
    AFFECTS PROPERTY AS PLOTTED HEREON

LEGAL DESCRIPTION (AS FURNISHED)

(FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT NO. 84339, COMMITMENT DATE DECEMBER 13, 2017 AT 8:00 A.M.)

THE WEST 98.405 FEET OF THE EAST 138.57 FEET OF THE SOUTH 314 FEET OF THE SOUTHWEST 1/4 OF SECTION 5, TOWNSHIP 8 NORTH, RANGE 22 EAST, IN THE VILLAGE OF BAYSIDE, COUNTY OF MILWAUKEE, STATE OF WISCONSIN, EXCEPTING THEREFROM THAT PORTION TAKEN FOR STREET PURPOSES.

FOR INFORMATIONAL PURPOSES ONLY

TAX PARCEL NUMBER: 023–9988–00

ADDRESS: 614 W. BROWN DEER RD.

LEGAL DESCRIPTION (AS SURVEYED)

PART OF THE SOUTHEAST 1/4 OF THE SOUTHWEST (1/4) OF SECTION 5, IN TOWN 8 NORTH, RANGE 22 EAST, IN THE VILLAGE OF BAYSIDE, MILWAUKEE COUNTY, WISCONSIN, WHICH IS BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF SAID 1/4 SECTION; THENCE N00°23'27"W ALONG THE EAST LINE OF SAID 1/4 SECTION 60.01' TO A POINT ON THE NORTH LINE OF WEST BROWN DEER ROAD; THENCE S89°27'06"W ALONG SAID NORTH LINE 40.16 FEET TO THE POINT OF BEGINNING OF LANDS TO BE DESCRIBED; THENCE CONTINUING S89°27'06"W 98.41 FEET; THENCE N00°23'23"W 254.00 FEET; THENCE N89°25'54"E 98.40 FEET; THENCE S00°23'27"E 254.03 FEET TO A POINT ON THE NORTH LINE OF SAID BROWN DEER ROAD BEING THE POINT OF BEGINNING.

SURVEYOR'S CERTIFICATE

TO:
- i) FIRST AMERICAN INSURANCE COMPANY,
- ii) 11301 NORTHPORT, LLC,
- iii) WISCONSIN TITLE SERVICE COMPANY, INC.,

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 1, 2, 3, 4, 5, 6, 7(a), 8, 9, 11, 16, 17 AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON

ANDREW W. WILKOWSKI S–3121
PROFESSIONAL LAND SURVEYOR

JUNE 15, 2018
DATE

WISCONSIN ANDREW W. WILKOWSKI S-3121 WATERTOWN WI LAND SURVEYOR

JSD Professional Services, Inc.
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KENOSHA | APPLETON | WAUSAU

MILWAUKEE REGIONAL OFFICE
N238 W1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666

CLIENT:

COBALT PARTNERS, LLC

CLIENT ADDRESS:

207 N. MILWAUKEE STREET
MILWAUKEE, WI 53202

PROJECT:

PROJECT 'X'

PROJECT LOCATION:

BAYSIDE, WI
MILWAUKEE COUNTY

TO OBTAIN LOCATIONS OF PARTICIPANT UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1–800–242–8511 TOLL FREE

WISCONSIN STATE STATUTE 182.0175(1974) REQUIRES MINIMUM THREE (3) WORK DAYS NOTICE BEFORE YOU EXCAVATE

"THE INFORMATION SHOWN ON THIS DRAWING CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THE CONTRACTOR'S OWN DETERMINATION AS TO THE EXACT TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO."

Design/Drawn:	DHS
Approved:	AWW

SHEET TITLE:

ALTA/NSPS LAND TITLE SURVEY

*MAP NO: D–**

SHEET NUMBER:

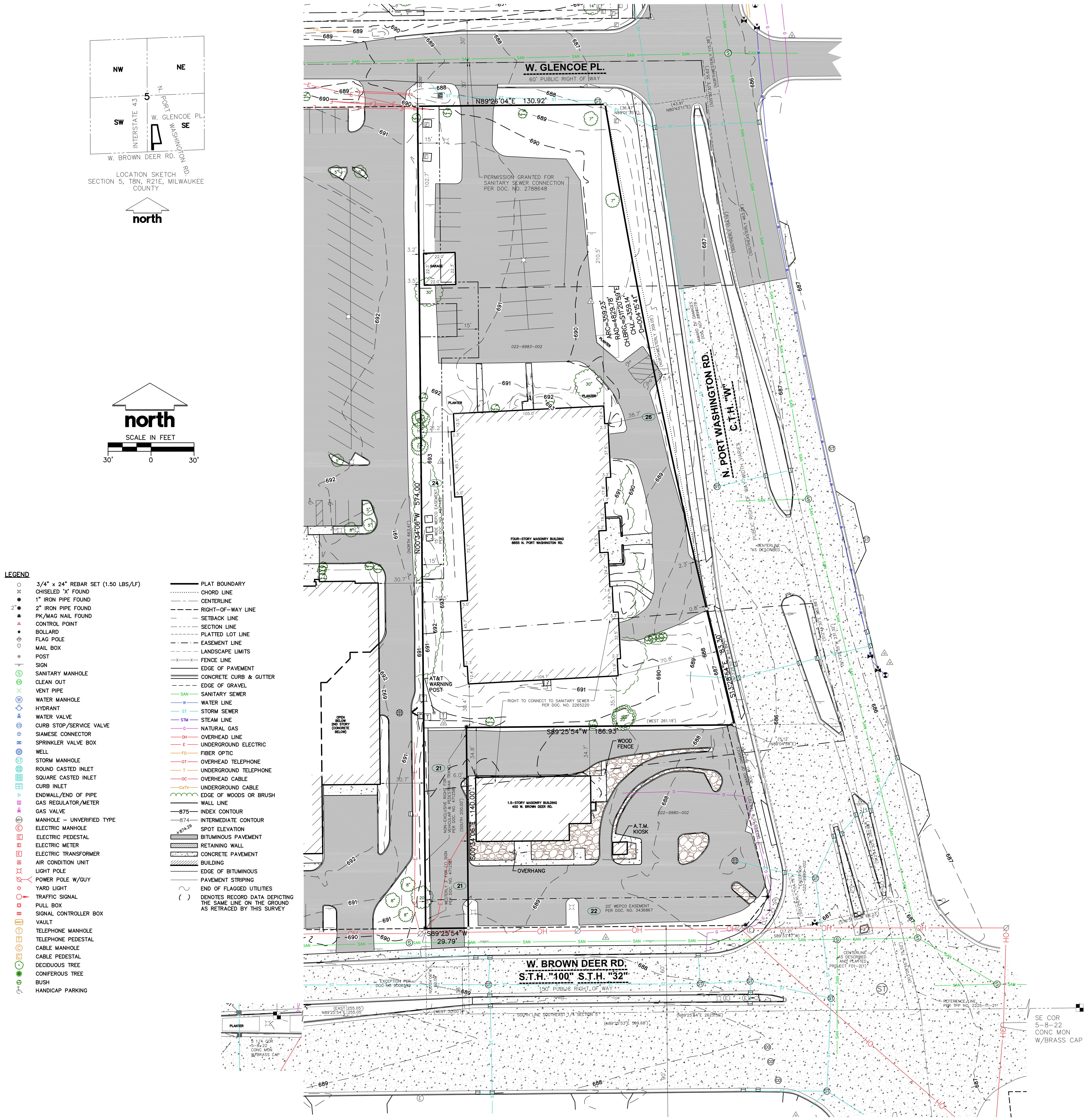
1 OF 1

JSD PROJECT NO: 17-8314

File: R:\2017\17831 4 Project X (Bayside WI)\DWG\17831 4 ALTA 614.dwg Layout: SHEET 1 User: dsponjar Plotted: Jun 15, 2018 – 11:52am Xref's:

ALTA/NSPS LAND TITLE SURVEY

PART OF THE SOUTHWEST 1/4 OF THE SOUTHEAST 1/4 OF SECTION 5, TOWN 8 NORTH, RANGE 22 EAST, IN THE VILLAGE OF BAYSIDE, MILWAUKEE COUNTY, WISCONSIN.



NOTES

1. FIELD WORK PERFORMED BY JSD PROFESSIONAL SERVICES, INC. ON MAY 1–30, 2018.
2. BEARINGS FOR THIS SURVEY AND MAP ARE REFERENCED TO THE WISCONSIN STATE PLANE COORDINATE SYSTEM (SOUTH ZONE)(NAD 27), THE SOUTH LINE OF THE SOUTHEAST 1/4 HAVING A PUBLISHED BEARING OF N89°25'54"E .
3. ELEVATIONS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929. BENCHMARK IS A CONCRETE MONUMENT WITH BRASS CAP MARKING THE SOUTH 1/4 CORNER OF SECTION 5, T8N, R22E, ELEVATION = 690.99'
4. CONTOUR INTERVAL IS ONE FOOT.
5. SPOT ELEVATIONS IN CURBED AREAS REFERENCE THE PAVEMENT EDGE ELEVATIONS.
6. SUBSURFACE UTILITIES AND FEATURES SHOWN ON THIS MAP HAVE BEEN APPROXIMATED BY LOCATING SURFICIAL FEATURES AND APPURTENANCES, LOCATING DIGGERS HOTLINE FIELD MARKINGS AND BY REFERENCE TO UTILITY RECORDS AND MAPS. DIGGER'S HOTLINE TICKET NO'S. 20181724320, WITH A CLEAR DATE OF MAY 2, 2018.
7. UTILITY COMPANIES CONTACTED THRU DIGGERS HOTLINE:
   - VILLAGE OF BAYSIDE
   - WE ENERGIES
   - MIDWEST FIBER NETWORKS
   - TIME WARNER CABLE
   - CITY OF MEQUON
   - AT&T DISTRIBUTION
   - LEVEL 3 COMMUNICATIONS
8. BEFORE EXCAVATION, APPROPRIATE UTILITY COMPANIES SHOULD BE CONTACTED. FOR EXACT LOCATION OF UNDERGROUND UTILITIES, CONTACT DIGGERS HOTLINE, AT 1.800.242.8511.
9. THE ACCURACY OF THE BENCHMARKS SHOWN ON THIS MAP SHALL BE VERIFIED BEFORE BEING UTILIZED. JSD PROFESSIONAL SERVICES, INC. DOES NOT WARRANT THE ACCURACY OF THESE BENCHMARKS.
10. PROPERTY IS ZONED 'G2–COMMERCIAL PER MILWAUKEE COUNTY INTERACTIVE MAPPING.
11. THIS PARCEL IS SUBJECT TO ALL EASEMENTS AND AGREEMENTS, BOTH RECORDED AND UNRECORDED.

NOTES CORRESPONDING TO TABLE A REQUIREMENTS:

ITEM 3 THE SUBJECT PROPERTY LIES IN ZONE X PER FEMA MAP NUMBER 55079C041E, WHICH HAS AN EFFECTIVE DATE OF SEPTEMBER 26, 2008.

ITEM 4 LANDS CONTAINING 78,253 OR 1.7964 ACRES

ITEM 6(a)(b) CURRENT ZONING CLASSIFICATION WAS NOT PROVIDED BY THE INSURER.

ITEM 9 THERE ARE 29 PARKING SPACES AND 2 HANDICAP SPACES FOR A TOTAL OF 31 PARKING SPACES.

ITEM 11 SOURCE INFORMATION FROM PLANS AND MARKING WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.iv. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE, IN WHICH CASE THE SURVEYOR SHALL NOTE ON THE PLAT OR MAP HOW THIS AFFECTED THE SURVEYOR'S ASSESSMENT OF THE LOCATION OF THE UTILITIES. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION AND/OR A PRIVATE UTILITY LOCATE REQUEST MAY BE NECESSARY.

ITEM 16 THERE IS NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS AT THE TIME OF THIS SURVEY.

ITEM 17 THERE ARE NO PROPOSED CHANGES IN THE STREET RIGHT–OF–WAY LINES PER VILLAGE OF BAYSIDE ENGINEERING DEPARTMENT. THERE IS NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.

ITEM 18 THERE ARE NO MARKED WETLANDS ON THE PROPERTY

ITEM 19 THERE ARE NO OFFSITE EASEMENTS FOR THE SUBJECT PROPERTY.

NOTES CORRESPONDING TO SCHEDULE B–SECTION TWO EXCEPTIONS

(CHICAGO TITLE INSURANCE COMPANY, COMMITMENT No.: 180C0140, COMMITMENT DATE: MARCH 19, 2018 AT 8:00 A.M.)

14. PUBLIC OR PRIVATE RIGHTS, IF ANY, IN SUCH PORTION OF THE PREMISES DESCRIBED IN SCHEDULE A HEREOF AS MAY BE LAID OUT, USED OR DEDICATED FOR STREET, HIGHWAY OR ALLEY PURPOSES.
    PUBLIC RIGHT OF WAYS SHOWN HEREON
15. UTILITY EASEMENT RECORDED ON APRIL 12, 1927 IN VOLUME 1200, PAGE 143, AS DOCUMENT NO. 1511130.
    MAY AFFECT PROPERTY–DESCRIPTION TOO VAGUE TO PLOT
16. UTILITY EASEMENT RECORDED ON MAY 29, 1926 IN VOLUME 1058, PAGE 577, AS DOCUMENT NO. 1434108.
    DOES NOT AFFECT PROPERTY–POLES AND WIRES ALONG S.T.H. 100 SHOWN
17. UTILITY EASEMENT RECORDED ON JUNE 20, 1931 IN VOLUME 1354, PAGE 292, AS DOCUMENT NO. 1854367.
    DOES NOT AFFECT PROPERTY–NOTHING TO PLOT
18. UTILITY EASEMENT RECORDED ON JUNE 20, 1931 IN VOLUME 1354, PAGE 291, AS DOCUMENT NO. 1854365.
    DOES NOT AFFECT PROPERTY–NOTHING TO PLOT
19. UTILITY EASEMENT RECORDED ON JUNE 20, 1931 IN VOLUME 1354, PAGE 291, AS DOCUMENT NO. 1854364, AND AMENDED BY A PARTIAL RELEASE OF EASEMENT RECORDED ON OCTOBER 2, 1972 IN REEL 679, IMAGE 1933, AS DOCUMENT NO. 4710537.
    DOES NOT AFFECT PROPERTY–NOTHING TO PLOT
20. UTILITY EASEMENT RECORDED ON MAY 29, 1926 IN VOLUME 1058, PAGE 576, AS DOCUMENT NO. 1434107, AND AMENDED BY A PARTIAL RELEASE OF EASEMENT RECORDED ON NOVEMBER 22, 1972 IN REEL 690, IMAGE 775, AS DOCUMENT NO. 4723180.
    AFFECTS PROPERTY BY LOCATION–UTILITIES IN PUBLIC RIGHT OF WAY ALONG HWY 100, NOTHING ELSE TO PLOT
21. EASEMENT AGREEMENT RECORDED ON OCTOBER 9, 1972 IN REEL 681, IMAGE 941, AS DOCUMENT NO. 4712581.
    AFFECTS PROPERTY AS PLOTTED HEREON
22. UTILITY EASEMENT RECORDED ON OCTOBER 13, 1955 IN VOLUME 3495 OF DEEDS, AT PAGE 346, AS DOCUMENT NO. 3436867.
    AFFECTS PROPERTY AS PLOTTED HEREON
23. AGREEMENT RECORDED ON JUNE 3, 1974 IN REEL 788, IMAGE 1411, AS DOCUMENT NO. 4844830.
    AFFECTS PROPERTY BY DESCRIPTION–NOT SURVEY RELATED, NOTHING TO PLOT
24. UTILITY EASEMENT RECORDED ON SEPTEMBER 19, 1974 IN REEL 811, IMAGE 447, AS DOCUMENT NO. 4871199.
    AFFECTS PROPERTY AS PLOTTED HEREON
25. RIGHTS OF THE PUBLIC IN SO MUCH OF THE SUBJECT PREMISES AS ARE AFFECTED BY ORDINANCE ADOPTED BY THE BOARD OF SUPERVISORS OF MILWAUKEE COUNTY ON JUNE 29, 1926, AND APPROVED BY THE VARIOUS TOWNS IN SAID COUNTY ESTABLISHING THE WIDTH OF NORTH PORT WASHINGTON ROAD AT 120 FEET, AND ORDAINING THAT SAID HIGHWAY BE WIDENED TO THE WIDTH SO ESTABLISHED: TOGETHER WITH RIGHTS OF THE PUBLIC IN THAT PORTION OF SAID PREMISES LYING WITHIN THE LIMITS OF SAID ROAD AND NOT AFFECTED BY SAID ORDINANCE. A NOTICE AND PLAT, ETC., IN SAID MATTER WAS FILED ON NOVEMBER 12, 1926, AS NO. 1410.
    HIGHWAY RIGHT OF WAY LINES AS PLOTTED HEREON
26. REVOCABLE OCCUPANCY PERMIT RECORDED ON JULY 1, 2005 AS DOCUMENT NO. 9041306.
    PAVEMENT ENCROACHMENTS AS PLOTTED HEREON

LEGAL DESCRIPTION (AS FURNISHED)

(CHICAGO TITLE INSURANCE COMPANY, COMMITMENT No.: 180C0140, COMMITMENT DATE: MARCH 19, 2018 AT 8:00 A.M.)

THAT PART OF THE SOUTHEAST ONE–QUARTER (1/4) OF SECTION FIVE (5), IN TOWNSHIP EIGHT (8) NORTH, RANGE TWENTY–TWO (22) EAST, IN THE VILLAGE OF BAYSIDE, COUNTY OF MILWAUKEE, STATE OF WISCONSIN, WHICH IS BOUNDED AND DESCRIBED AS FOLLOWS: COMMENCING AT A POINT 255.05 FEET DUE EAST OF THE SOUTHWEST CORNER OF SAID 1/4 SECTION, THENCE DUE NORTH ON A LINE WHICH IS AT RIGHT ANGLES TO THE SOUTH LINE OF SAID 1/4 SECTION 663.41 FEET TO A POINT IN THE CENTER LINE OF WEST GLENCOE PLACE AS NOW LAID OUT, THENCE SOUTH 89°58'15" EAST 199.53 FEET TO A POINT IN THE CENTER LINE OF NORTH PORT WASHINGTON ROAD, THENCE SOUTH 05°50'30" EAST 35.62 FEET TO A POINT OF A CURVE, THENCE SOUTHERLY 154.19 FEET ON AN ARC WHOSE CENTER IS TO THE EAST, WHOSE RADIUS IS 1280.34 FEET AND WHOSE CHORD BEARS SOUTH 09°17'30" EAST 154.10 FEET TO A POINT, THENCE SOUTH 12°44'30" EAST 282.88 FEET TO A POINT, THENCE DUE WEST 261.19 FEET TO A POINT, THENCE DUE SOUTH 200.00 FEET TO A POINT ON THE SOUTH LINE OF SAID 1/4 SECTION, THENCE DUE WEST 30.00 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THE SOUTHERLY 33.00 FEET AND THE NORTHERLY 30.00 FEET FOR STREET PURPOSES.

EXCEPTING THEREFROM THE LANDS CONVEYED TO MILWAUKEE COUNTY IN AN AWARD OF DAMAGES RECORDED ON DECEMBER 5, 2003, AS DOCUMENT NO. 8696078.

EXCEPTING THEREFROM THE LANDS CONVEYED TO THE STATE OF WISCONSIN, DEPARTMENT OF TRANSPORTATION IN A WARRANTY DEED RECORDED ON MAY 6, 2005, AS DOCUMENT NO. 9006599.

ADDRESS: 8855 NORTH PORT WASHINGTON ROAD

TAX KEY NO. 022–9983–002

NOTE: TAX KEY NUMBER AND ADDRESS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.

ADDRESS PER MILWAUKEE COUNTY IS 8989 NORTH PORT WASHINGTON ROAD.

LEGAL DESCRIPTION (AS SURVEYED)

PART OF THE SOUTHWEST 1/4 OF THE SOUTHEAST (1/4) OF SECTION 5, IN TOWN 8 NORTH, RANGE 22 EAST, IN THE VILLAGE OF BAYSIDE, MILWAUKEE COUNTY, WISCONSIN, WHICH IS BOUNDED AND DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF SAID 1/4 SECTION; THENCE N89°25'34"E ALONG THE SOUTH LINE OF SAID 1/4 SECTION 255.05 FEET; THENCE N00°34'06"E AT RIGHT ANGLE TO SAID SOUTH LINE 60.00 FEET TO A POINT ON THE NORTH LINE OF WEST BROWN DEER ROAD AND THE POINT OF BEGINNING OF LANDS TO BE DESCRIBED; THENCE CONTINUING N00°34'06"W 574.00 FEET TO A POINT ON THE SOUTH LINE OF WEST GLENCOE PLACE; THENCE N89°26'04"E ALONG SAID SOUTH LINE 130.92 FEET TO A POINT ON THE WEST LINE OF NORTH PORT WASHINGTON ROAD; THENCE SOUTHEASTERLY 359.23 FEET ALONG SAID WEST LINE AND ALONG THE ARC OF A CURVE TO THE LEFT WHOSE CENTER LIES TO THE NORTHEAST, WHOSE RADIUS IS 4829.78 FEET AND WHOSE CHORD BEARS S11°20'59"E 359.14 FEET; THENCE S13°28'54"E 83.30 FEET; THENCE S89°25'54" W 186.93 FEET; THENCE S00°34'06"E 140.00 FEET TO A POINT ON THE NORTH LINE OF SAID BROWN DEER ROAD, THENCE S89°25'54"W ALONG SAID NORTH LINE 29.79 FEET TO THE POINT OF BEGINNING.

SURVEYOR'S CERTIFICATE

TO:

i) CHICAGO TITLE INSURANCE COMPANY,
ii) WILLIAM E. La MACCHIA AND/OR HIS ASSIGNEE,
iii) WISCONSIN TITLE SERVICE COMPANY, INC.,
iv) PYRAMAX BANK

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 1, 2, 3, 4, 5, 6, 7(a), 8, 9, 11, 16, 17 AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON

ANDREW W. WILKOWSKI S–3121
PROFESSIONAL LAND SURVEYOR

JUNE 13, 2018
DATE

WISCONSIN — ANDREW W. WILKOWSKI S–3121 WATERTOWN WI — LAND SURVEYOR

JSD Professional Services, Inc.
Engineers • Surveyors • Planners

CREATE THE VISION TELL THE STORY

MADISON | MILWAUKEE
KENOSHA | APPLETON | WAUSAU

MILWAUKEE REGIONAL OFFICE
N238 W1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666

CLIENT:
COBALT PARTNERS, LLC

CLIENT ADDRESS:
207 N. MILWAUKEE STREET
MILWAUKEE, WI 53202

PROJECT:
PROJECT 'X'

PROJECT LOCATION:
BAYSIDE, WI
MILWAUKEE COUNTY

TO OBTAIN LOCATIONS OF PARTICIPANT UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1–800–242–8511 TOLL FREE

WISCONSIN STATE STATUTE 182.0175(1974) REQUIRES MINIMUM THREE (3) WORK DAYS NOTICE BEFORE YOU EXCAVATE

"THE INFORMATION SHOWN ON THIS DRAWING CONCERNING TYPE AND LOCATION OF UNDER– GROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THE CONTRACTOR'S OWN DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO."

PLAN MODIFICATIONS:

#	Date:	Description:
1	09.07.17	X
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

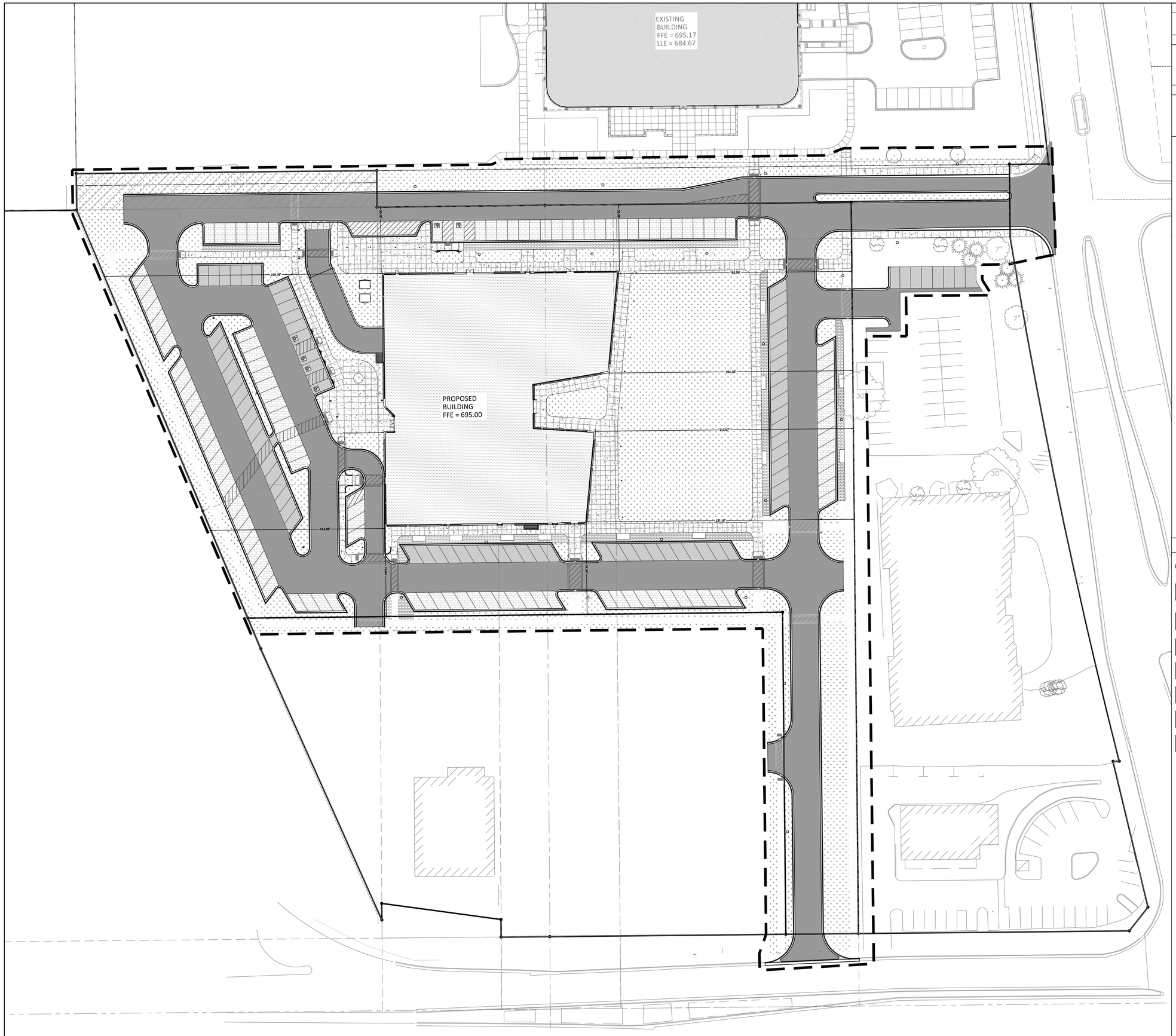
Design/Drawn: DHS
Approved: AWW

SHEET TITLE:
ALTA/NSPS LAND TITLE SURVEY

MAP NO: E–*

SHEET NUMBER:
1 OF 1

JSD PROJECT NO: 17-8314



ON SITE PARKING TOTALS:
ADA STALLS: 6 STALLS
OFF-STREET STALLS: 180 STALLS
SETBACK REQUIREMENTS
ZONING: PUD
FRONT YARD SETBACK: 0 FEET
SIDE YARD SETBACK: 0 FEET
REAR YARD SETBACK: 0 FEET
LANDSCAPE RATIO
TOTAL LOT AREA: 215,650 SF
LANDSCAPED AREA: 55,883 SF
PROPOSED LSR: 0.26
REQUIRED LSR: 0.15

Scale: 0 15 30 60
Scale: 1" = 30'

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KEY INDEX

- PROJECT LIMITS
- AREAS DISTURBED BY CONSTRUCTION (NOT SPECIFICALLY CALLED OUT ON THE LANDSCAPE PLANS) TO BE RESTORED WITH MINIMUM 4" TOPSOIL, SEED, FERTILIZER, AND MULCH (TYP). USE SALVAGED TOPSOIL OR IMPORT TOPSOIL IF REQUIRED.
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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

all in

SHEET:
OVERALL SITE LAYOUT PLAN

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
C102

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C102 – SITE LAYOUT PLAN.dwg

PROPOSED
BUILDING
FFE = 695.00

229.39'
55.16'
55.96'
192.59'
201.35'
213.07'
221.19'
144.58'
74.64'
74.64'

Scale: 0 10 20 40
Scale: 1" = 20'

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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:		
#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

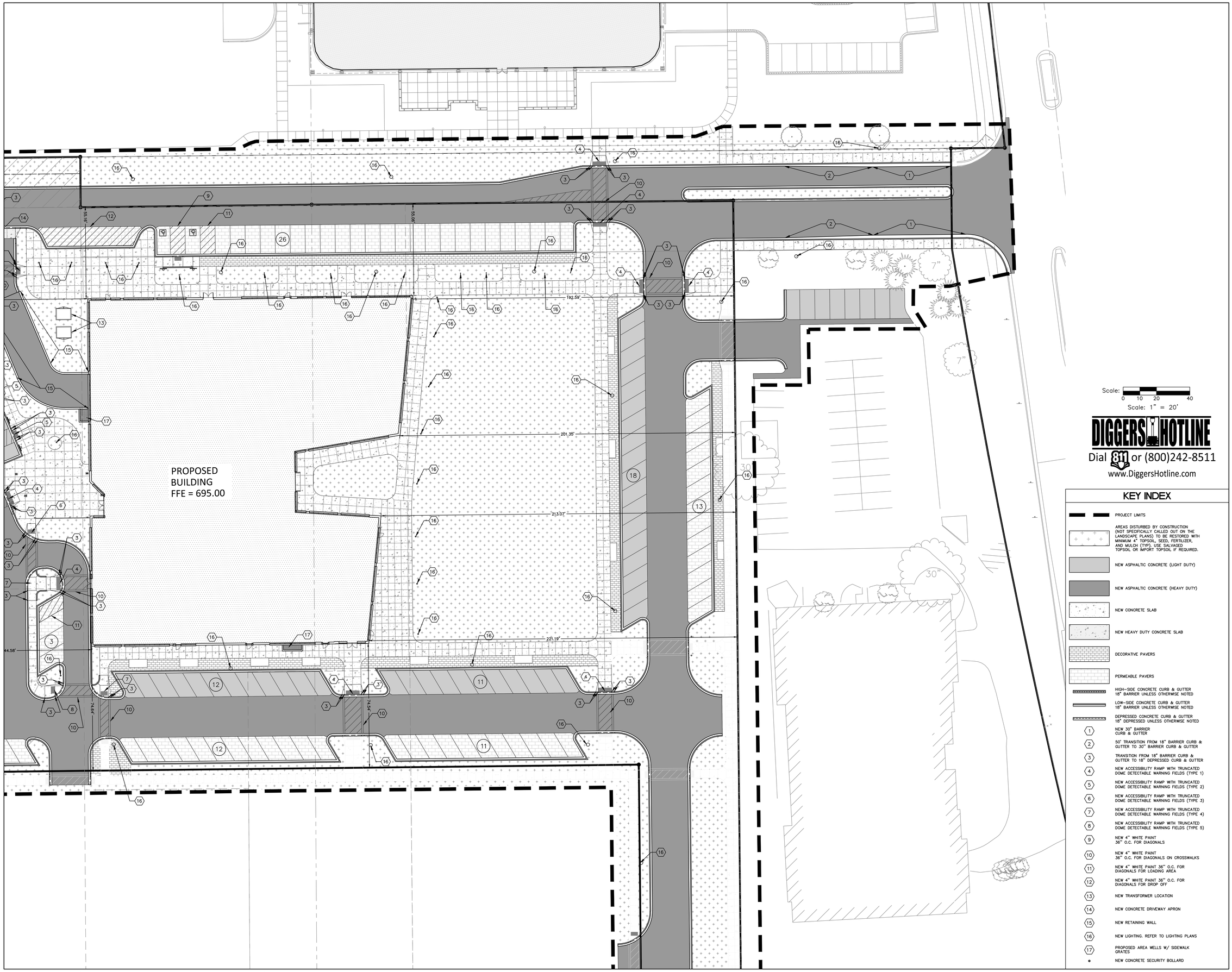
all in

SHEET:
SITE LAYOUT PLAN

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
C102A

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C102 – SITE LAYOUT PLAN.dwg



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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

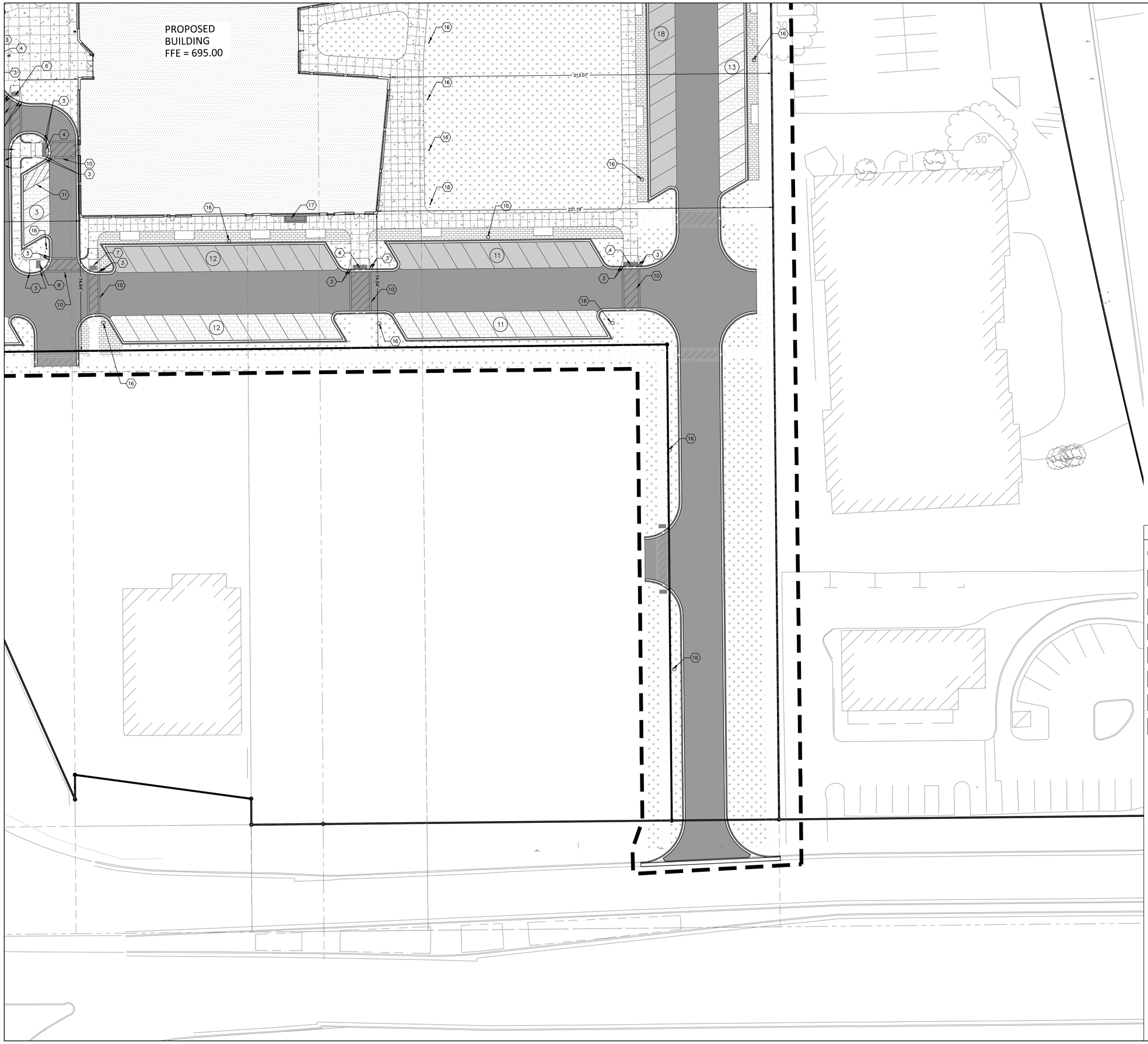
all in

SHEET:
SITE LAYOUT PLAN

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
C102B

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C102 – SITE LAYOUT PLAN.dwg



Scale: 0 10 20 40
Scale: 1" = 20'

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SITE LAYOUT PLAN

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SHEET NUMBER:
C102C

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C102 – SITE LAYOUT PLAN.dwg

EXISTING BUILDING
FFE = 695.17
LLE = 684.67

NATIVE LANDSCAPE

PROPOSED BUILDING
FFE = 695.00

STORM VAULT
93,825 CF OF STORAGE NECESSARY
7'-0" VAULT
BOTTOM OF VAULT: 683.50
TOP OF VAULT: 690.50
LOWEST GRADE OVER: 692.25

Scale: 0 15 30 60
Scale: 1" = 30'

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UTILITY NOTES

PROJECT LIMITS

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- RIP RAP — 27 C205
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- WATER MAIN VALVE
- STORM SEWER
- SAN — SANITARY SEWER
- W — WATER MAIN

kapur
7711 N. Port Washington Road
Milwaukee, Wisconsin 53217
kapurinc.com

PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

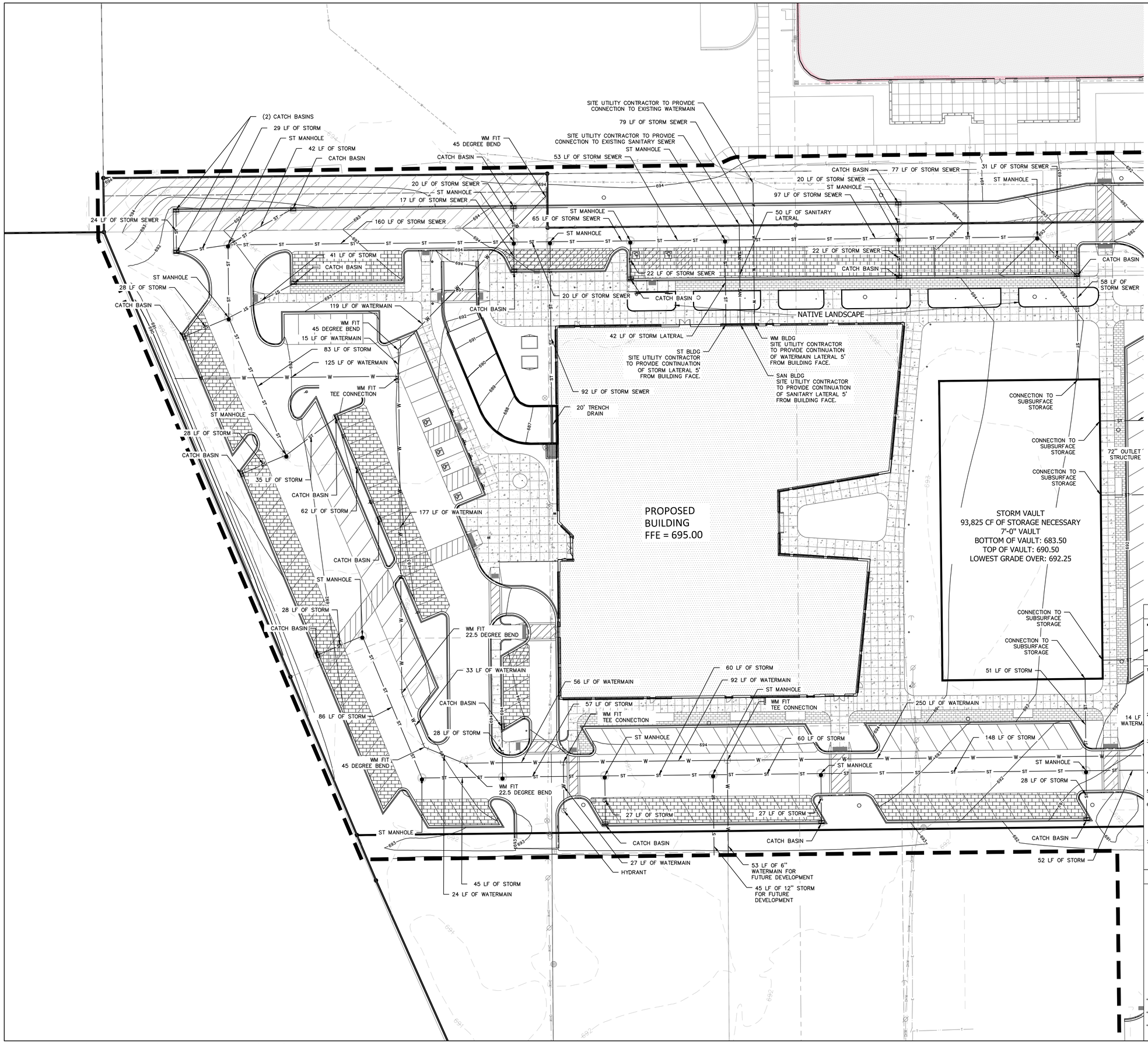
all in

SHEET:
OVERALL SITE UTILITY PLAN

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
C105

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C105 – SITE UTILITY PLAN.dwg



Scale: 0 10 20 40
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SHEET:
SITE UTILITY PLAN

PROJECT MANAGER:	DMJ
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DATE:	10.10.2022

SHEET NUMBER:
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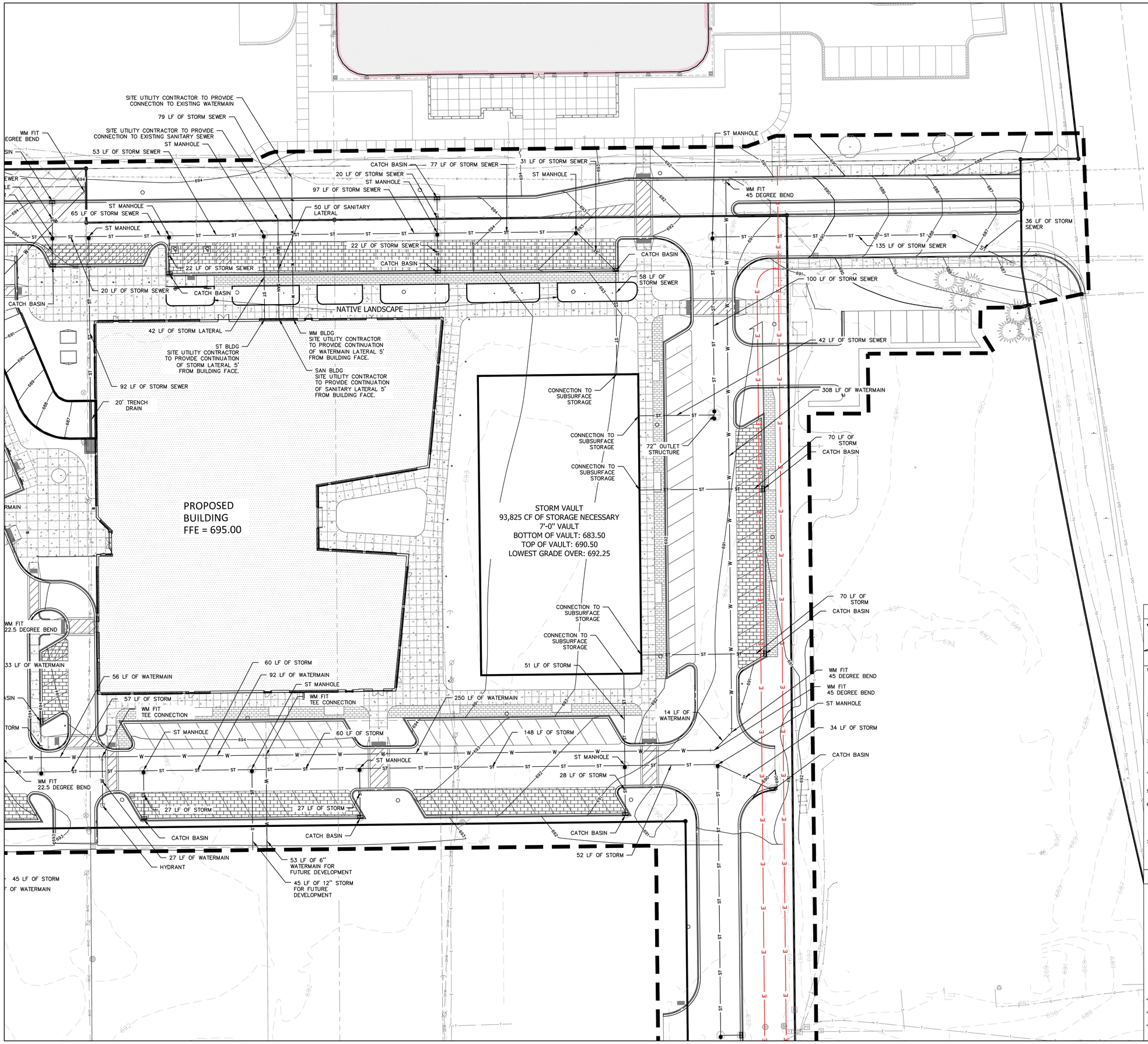

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- W — WATER MAIN

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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

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SHEET:
SITE UTILITY PLAN

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
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SHEET NUMBER:
C105B

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C105 – SITE UTILITY PLAN.dwg

PROPOSED
BUILDING
FFE = 695.00

STORM VAULT
93,825 CF OF STORAGE NECESSARY
7'-0" VAULT
BOTTOM OF VAULT: 683.50
TOP OF VAULT: 690.50
LOWEST GRADE OVER: 692.25

CONNECTION TO SUBSURFACE STORAGE
CONNECTION TO SUBSURFACE STORAGE
51 LF OF STORM
70 LF OF STORM
CATCH BASIN
WM FIT 45 DEGREE BEND
WM FIT 45 DEGREE BEND
ST MANHOLE
34 LF OF STORM
CATCH BASIN
14 LF OF WATERMAIN
250 LF OF WATERMAIN
148 LF OF STORM
ST MANHOLE
28 LF OF STORM
CATCH BASIN
52 LF OF STORM
EGREE BEND
OF WATERMAIN
56 LF OF WATERMAIN
60 LF OF STORM
92 LF OF WATERMAIN
ST MANHOLE
WM FIT TEE CONNECTION
57 LF OF STORM
WM FIT TEE CONNECTION
ST MANHOLE
60 LF OF STORM
ST MANHOLE
WM FIT 22.5 DEGREE BEND
27 LF OF STORM
27 LF OF STORM
CATCH BASIN
CATCH BASIN
27 LF OF WATERMAIN
HYDRANT
53 LF OF 6" WATERMAIN FOR FUTURE DEVELOPMENT
45 LF OF 12" STORM FOR FUTURE DEVELOPMENT
LF OF STORM
/ATERMAIN
UTILIZE EXISTING LATERAL FOR FUTURE DEVELOPMENT
SAN

Scale: 0 10 20 40
Scale: 1" = 20'

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BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

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REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

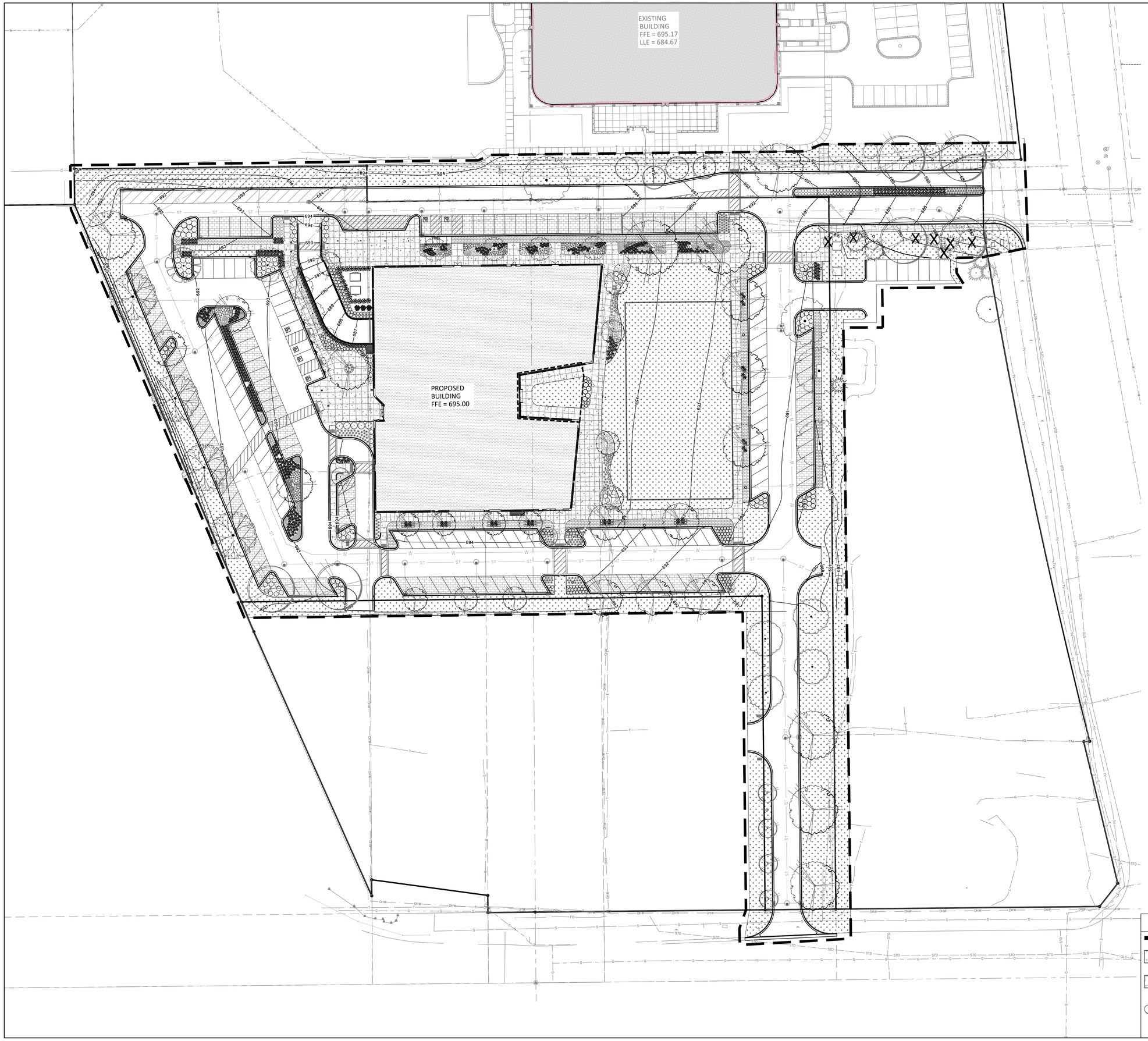
all in

SHEET:
SITE UTILITY PLAN

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
C105C

FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\C105 – SITE UTILITY PLAN.dwg



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Scale: 1" = 30'

DIGGERS HOTLINE
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HATCH LEGEND

- PROJECT LIMITS
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SHEET:
OVERALL SITE LANDSCAPE PLAN

PROJECT MANAGER:	DMJ
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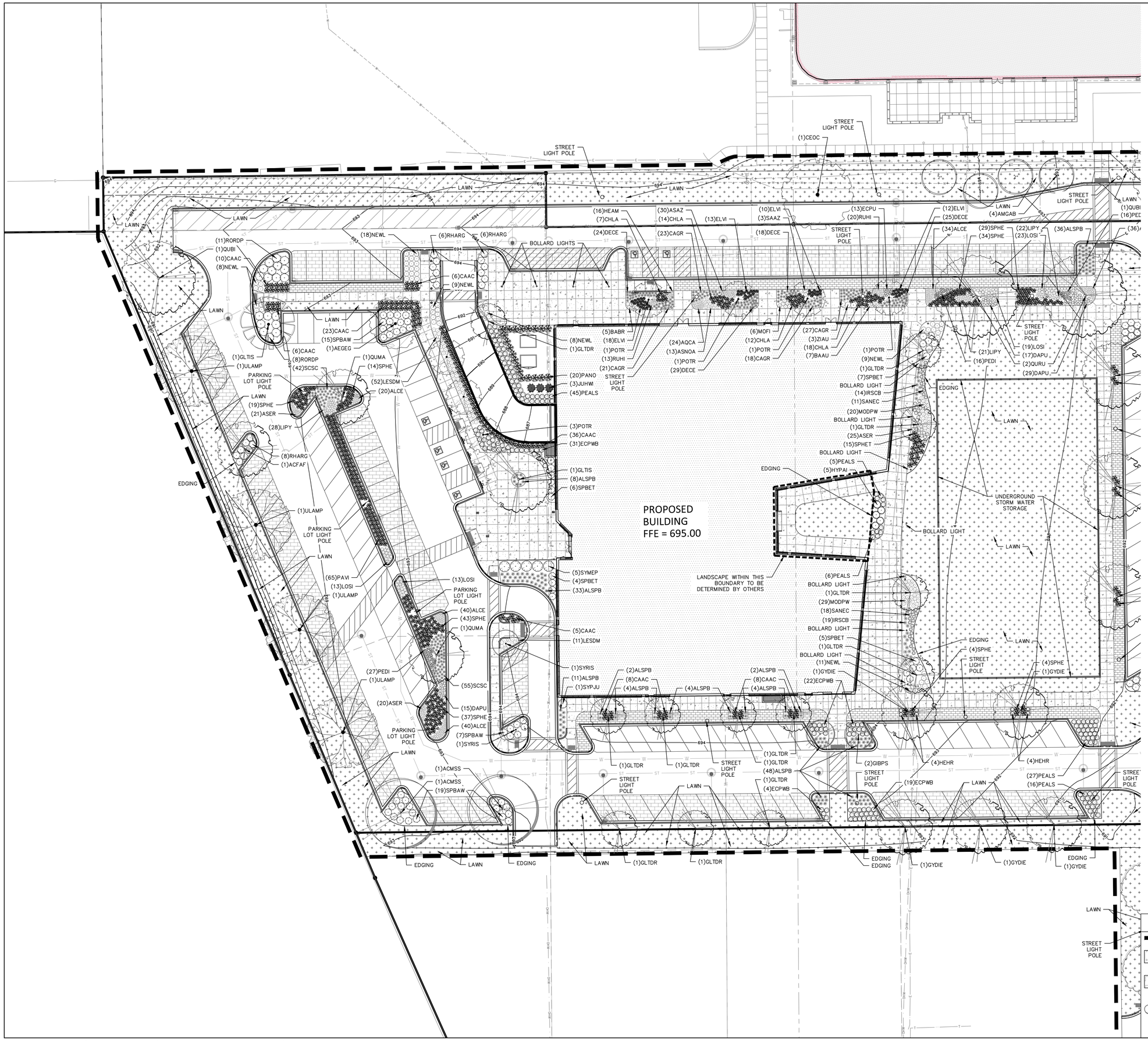
FILENAME: S:_SiteDsgn\Cobalt Partners LLC\210709 Bayside Development\Design\L101 – SITE LANDSCAPE PLAN.dwg



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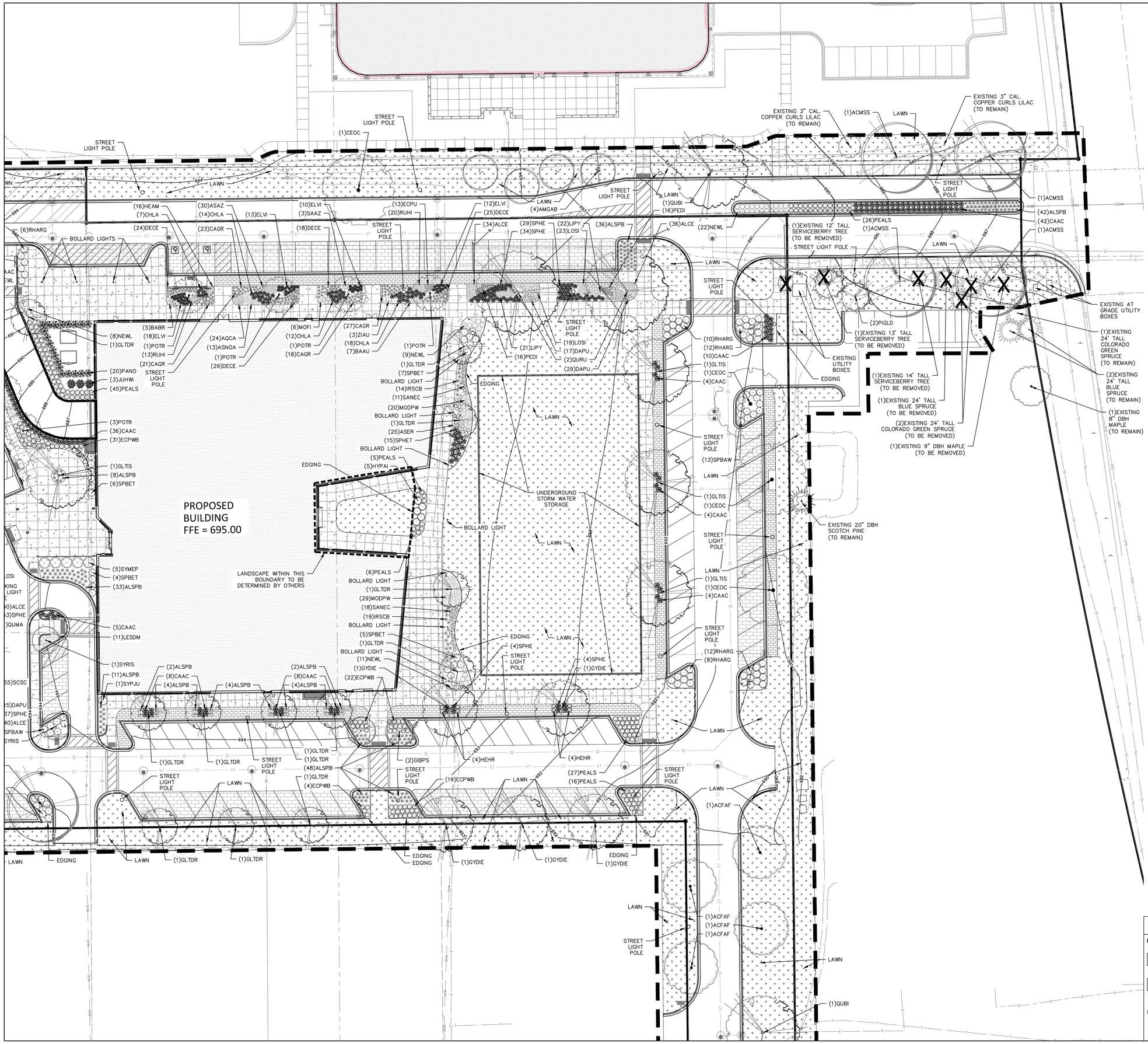

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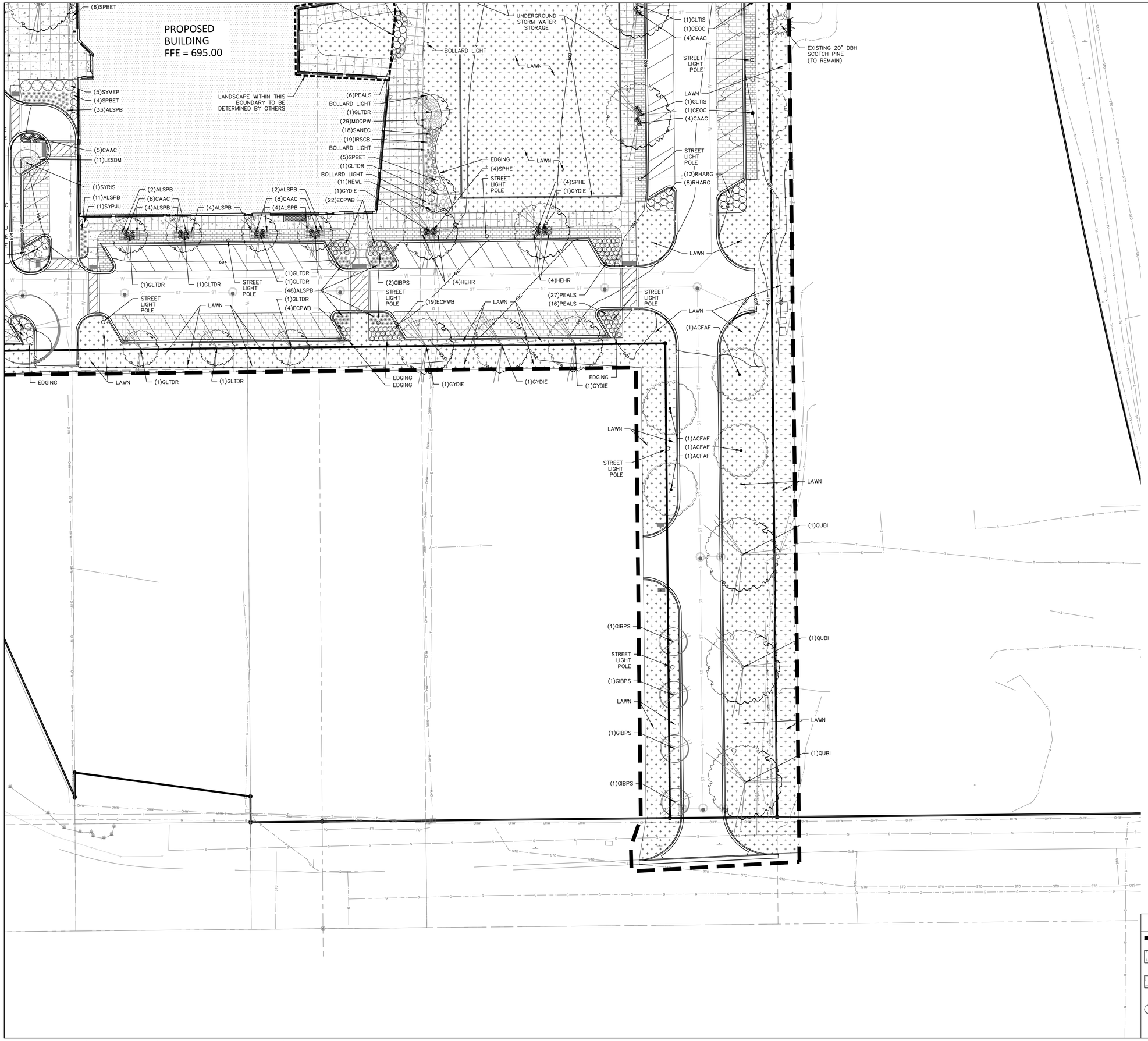

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Plant Schedule

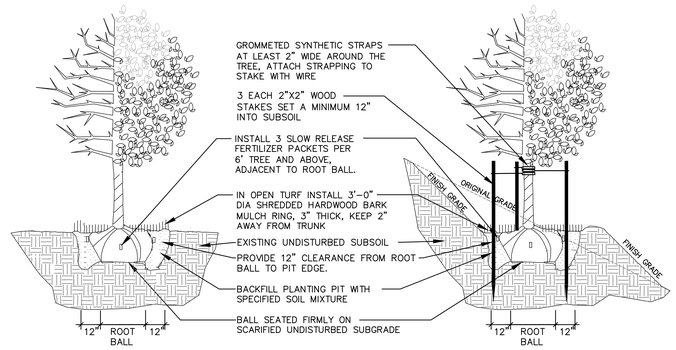
Code	Scientific Name	Common Name	Quantity	Spacing	Install Size	Mature Size (Height/Spread)
Canopy Trees: (Install in accordance with detail 3/L201)						
ACFAF	Acer x freemanii 'Autumn Fantasy'	Autumn Fantasy Maple	5	Per Plan	3" caliper B&B	50'/30'
ACMSS	Acer miyabei 'Morton'	State Street Miyabei Maple	6	Per Plan	3" caliper B&B	50'/40'
AEGEG	Aesculus glabra 'JN Select'	Early Glow Buckeye	1	Per Plan	3" caliper B&B	35'/35'
CEOC	Celtis occidentalis	Common Hackberry (Native)	4	Per Plan	3" caliper B&B	40'-60'/40'-60'
GIBPS	Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Ginkgo	6	Per Plan	3" caliper B&B	40'/15'
GLTDR	Gleditsia triacanthos 'Draves'	Street Keeper Honeylocust	12	Per Plan	3" caliper B&B	45'/20'
GLTIS	Gleditsia tricanthos 'Shademaster' PP1,515	Shademaster Honeylocust	5	Per Plan	3" caliper B&B	60'/35'
GYDIE	Gymnocladus dioicus 'Espresso	Espresso Kentucky Coffee Tree	5	Per Plan	3" caliper B&B	50'/35'
POTR	Populus tremeloides	Quaking Aspen (Native)	7	Per Plan	3" caliper B&B	40'-50'/20'-30'
QUBI	Quercus bicolor	Swamp White Oak (Native)	5	Per Plan	3" caliper B&B	50'/40'
QUMA	Quercus macrocarpa	Bur Oak	2	Per Plan	3" caliper B&B	70'-90'/60'-80'
QURU	Quercus rubra	Red Oak (Native)	2	Per Plan	3" caliper B&B	60'-75'/60'-75'
ULAMP	Ulmus americana 'Princeton'	Princeton Elm	4	Per Plan	3" caliper B&B	70'/50'
Ornamental Trees: (Install in accordance with detail 3/L201)						
AMGAB	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Serviceberry	4	Per Plan	8' multi-stem B&B	20'-25'/20'-25'
SYRIS	Syringa reticulata 'Ivory Silk'	Ivory Silk Japanese Tree Lilac	2	Per Plan	2.5" caliper B&B	25'/15'
Evergreen Trees: (Install in accordance with detail 4/L201)						
PIGLD	Picea glauca var. densata	Black Hills Spruce	2	Per Plan	6' tall B&B	25'-45'/15'-25'
Deciduous Shrubs: (Install in accordance with detail 5/L201)						
HYPAI	Hydrangea paniculata 'ILVOBO' PP22,782	Bobo Hydrangea	5	Per Plan	18" tall pot	3'/3'-4'
RHARG	Rhus aromatica 'Gro-Low'	Gro-Low Sumac	62	Per Plan	18" spread pot	2'-3'/6'-8'
RORDP	Rosa rugosa 'Dwarf Pavement'	Dwarf Pavement Rugosa Rose	19	Per Plan	15" tall pot	2'-3'/5'
SPBAW	Spirea x bumalda 'Anthony Waterer'	Anthony Waterer Spirea	54	Per Plan	18" tall pot	2'-3'/3'-4'
SPBET	Spirea betulifolia 'Tor'	Tor Birchleaf Spirea	22	Per Plan	18" tall pot	2'-3'/3'
SYMEP	Syringa meyeri 'Palibin'	Meyer Lilac (Dwarf Korean Lilac)	5	Per Plan	24" tall pot	4'-5'/5'-7'
SYPJU	Syringa patula 'JN Upright Select' PPAF	Violet Uprising Lilac	1	Per Plan	24" tall pot	4'-6'/4'-5'
Evergreen Shrubs: (Install in accordance with detail 5/L201)						
JUHWI	Juniperus horizontalis 'Wisconsin'	Wisconsin Juniper	3	Per Plan	18" spread pot	8"/5'+
Perennials: (Install in accordance with detail 6/L201)						
ALSPB	Allium x 'Summer Peek-a-Boo'	Summer Peek-a-Boo Globe Lily	196	Per Plan	#1 cont.	8"-12"/18"-24"
CAAC	Calamagrostis x acutiflora Karl Foerster	Karl Foerster Reed Grass	166	Per Plan	#1 cont.	5'-6'/18"-24"
ECPWB	Echinacea purpurea 'PowWow Wild Berry'	PowWow Wild Berry Coneflower	76	Per Plan	#1 cont.	18"-24"/12"-16"
HEHR	Hemerocallis 'Happy Returns'	Happy Returns Daylily	8	Per Plan	#1 cont.	12"-18"/16"-24"
IRSCB	Iris siberica 'Caesar's Brother'	Caesar's Brother Siberian Iris	33	Per Plan	#1 cont.	30"-36"/18"-24"
LESDM	Leucanthemum x superbum 'Daisy May' (Daisy Duke)	Daisy May Shasta Daisy	63	Per Plan	#1 cont.	12"-24"/12"-18"
MODPW	Monarda didyma 'Petite Wonder'	Petite Wonder Bee Balm	49	Per Plan	#1 cont.	9"-12"/12"-18"
NEWL	Nepeta x 'Walker's Low'	Walker's Low Catmint	75	Per Plan	#1 cont.	24"-36"/18"-36"
PANO	Panicum virgatum 'Northwinds'	Northwinds Switch Grass	20	Per Plan	#1 cont.	4'-5'/24"-30"
PEALS	Perovskia atriplicifolia 'Little Spire'	Little Spire Russian Sage	125	Per Plan	#1 cont.	24"-30"/18"-24"
SANEC	Salvia nemorosa 'Caradonna'	Caradonna Meadow Sage	29	Per Plan	#1 cont.	24"-30"/12"-18"
SPHET	Sporobolus heterolepis 'Tara'	Tara Prairie Dropseed	15	Per Plan	#1 cont.	18"-24"/18"-24"
Native Forbs and Grasses (Salt Tolerant - full sun): (Install in accordance with detail 6/L201)						
ALCE	Allium cernuum	Nodding Pink Onion	170	Per Plan	Half gallon	18"-24"/6"-8"
ASER	Aster ericoides	Heath Aster	46	Per Plan	Half gallon	18"-24"/12"-18"
DAPU	Dalea purpurea	Purple Prairie Clover	61	Per Plan	Half gallon	24"-36"/15"-18"
LIPY	Liatris pycnostachya	Prairie Blazingstar	71	Per Plan	Half gallon	3'-5'/12'-15"
LOSI	Lobelia siphilitica	Great Blue Lobelia	68	Per Plan	Half gallon	24"-36"/12"-18"
PAVI	Panicum virgatum	Switch Grass	65	Per Plan	Half gallon	4'-5'/24"-30"
PEDI	Penstemon digitalis	Foxglove Beard Tongue	59	Per Plan	Half gallon	30"-36"/12"-15"
SCSC	Schizachyrium scoparium	Little Bluestem	97	Per Plan	Half gallon	24"-48"/12"-18"
SPHE	Sporobolus heterolepis	Prairie Dropseed	184	Per Plan	Half gallon	30"-36"/12"-15"
Native Forbs and Grasses (Salt Tolerant - part shade/shade): (Install in accordance with detail 6/L201)						
ASNOA	Aster novae-angliae	New England Aster	13	18" o.c.	Half gallon	48"-60"/18"-24"
ASAZ	Aster azureus	Sky Blue Aster	30	12" o.c.	Half gallon	36"-48"/12"-18"
AQCA	Aquilegia canadensis	Wild Columbine	24	12" o.c.	Half gallon	24"-30"/12"-15"
BAAU	Baptisia australis	Blue False Indigo	7	18" o.c.	Half gallon	36"-48"/18"-24"
BABR	Baptisia bractea	Cream False Indigo	5	24" o.c.	Half gallon	24"-30"/24"-30"
CAGR	Carex grayii	Morning Star Sedge -or- Bur Sedge	107	18" o.c.	Half gallon	30"-36"/18"-24"
DECE	Deschampsia cespitosa	Tufted Hair Grass	78	18" o.c.	Half gallon	36"-48"/24"-36"
CHLA	Chasmanthium latifolium	Northern Sea Oats	51	24" o.c.	Half gallon	36"-48"/24"-36"
ECPU	Echinacea purpurea	Purple Coneflower	13	15" o.c.	Half gallon	36"-60"/15"-18"
ELVI	Elymus virginicus	Virginia Wild Rye	53	18" o.c.	Half gallon	24"-48"/18"-24"
HEAM	Heuchera americana	Alum Root	16	12" o.c.	Half gallon	12"-15"/12"-18"
MOFI	Monarda fistulosa	Bergamot	6	24" o.c.	Half gallon	36"-48"/24"-36"
RUHI	Rudbeckia hirta	Black-Eyed Susan	33	12" o.c.	Half gallon	36"-48"/12"-18"
SAAZ	Salvia azurea	Blue Sage	3	24" o.c.	Half gallon	36"-60"/24"-48"
ZIAU	Zizea aurea	Golden Alexanders	3	36" o.c.	Half gallon	24"-30"/36"-48"

NOTE: Plant quantities indicated in the plant schedule are for convenience only. Installation contractor is responsible for verifying plant count on the landscape plan. When discrepancies between the plant schedule, labels and the landscape plan occur, the quantity drawn on the landscape plan shall be the official quantity.

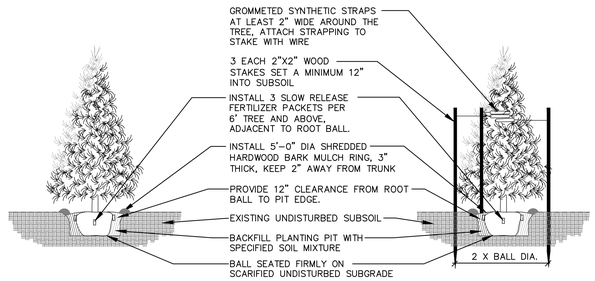
1 LANDSCAPE SCHEDULE
REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION

1. ALL PLANT MATERIAL SHALL BE OBTAINED FROM A NURSERY LOCATED IN ZONE 5, CONFORM TO APPLICABLE REQUIREMENTS OF THE CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, AND BOTANICAL NAMES SHALL BE ACCORDING TO THE CURRENT EDITION OF "STANDARDIZED PLANT NAMES PREPARED BY THE AMERICAN JOINT COMMITTEE ON HORTICULTURE NOMENCLATURE.
2. CONTRACTOR TO PROVIDE TO THE LANDSCAPE ARCHITECT SAMPLES OF ALL BARK AND MINERAL/STONE MULCHES, DECORATIVE GRAVELS, MAINTENANCE STRIP STONE, OR OTHER GROUND COVER MATERIALS FOR APPROVAL PRIOR TO INSTALLATION.
3. BARK MULCH TO BE FRESHLY ACQUIRED HARDWOOD SHREDDED BARK MULCH. NOT DOUBLE MILLED, EXCESSIVE DIRT AND DUST LIKE MATERIAL OR OLD MATERIAL IS NOT ACCEPTABLE.
4. LANDSCAPE EDGING TO BE ALUMINUM EDGING. REFER TO SPECIFICATION 32 93 00 PLANTS FOR ADDITIONAL INFORMATION.
5. ALL PLANTING AREAS TO RECEIVE A 3-INCH THICK LAYER OF HARDWOOD SHREDDED BARK MULCH OVER TYPAR WEED FABRIC WITH EDGING. EDGING TO BE INSTALLED BETWEEN DIFFERENT TYPES OF MULCHES, BETWEEN MULCHES AND TURF, AND/OR WHERE SPECIFICALLY NOTED ON THE PLAN. REFER TO SPECIFICATION 32 93 00 PLANTS FOR ADDITIONAL INFORMATION.
6. INSTALL SHOVEL CUT EDGE AROUND ALL INDIVIDUAL TREES AND SHRUBS IN LAWN AREAS AND ALONG PAVEMENT WHERE PLANTING AREAS ABUT TO PREVENT HARDWOOD SHREDDED BARK MULCH FROM SPILLING OUT OF PLANTING AREA.
7. CONTRACTOR RESPONSIBLE FOR MAINTENANCE OF PLANT MATERIAL FOR 90 DAYS FROM INSTALLATION, INCLUDING WATERING, WEEDING, ETC. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF SEEDED AREAS FOR 60 DAYS FROM INSTALLATION, INCLUDING WATERING, WEEDING, ETC. CONTRACTOR TO PROVIDE AND REVIEW MAINTENANCE INSTRUCTIONS WITH THE OWNER PRIOR TO THE COMPLETION OF THESE MAINTENANCE PERIODS. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
8. CLEANLY PRUNE AND REMOVE DAMAGED BRANCHES, DEAD WOOD, AND ROOTS IMMEDIATELY PRIOR TO PLANTING. DO NOT CUT LEADERS OR LEAVE "V" CROTCHES OR DOUBLE LEADERS UNLESS A MULTI-STEM TREE IS SPECIFIED.
9. REMOVE BURLAP, WIRE BASKET, ROPE, TWINE, AND ALL SYNTHETIC MATERIAL FROM THE ROOTS, TRUNK, OR CROWN OF PLANT.
10. REMOVE EXCESS SOIL ABOVE ROOT COLLAR.
11. PLANT TREES AND SHRUBS SO THAT THE ROOT COLLAR IS 2" ABOVE FINISHED GRADE OR SEVERAL INCHES ABOVE GRADE IF PLANT IS INSTALLED IN POOR SOILS.
12. PLANT TREES AND SHRUBS WITH SAME ORIENTATION AS WHEN HARVESTED FROM THE NURSERY OR TO SHOWCASE THE MOST AESTHETIC VIEW.
13. PLANT ALL TREES WITH THREE SLOW RELEASE FERTILIZER PACKETS, SPACED EQUIDISTANT AROUND THE EDGE OF THE ROOT BALL.
14. PLANT ALL SHRUBS WITH ONE SLOW RELEASE FERTILIZER PACKET, PLACED BELOW THE ROOTING SYSTEM.
15. WATER AND TAMP BACKFILL AND ROOTS OF ALL NEWLY SET PLANT MATERIAL SO THE SOIL AND ROOTS ARE THOROUGHLY SOAKED AND AIR POCKETS ARE REMOVED.
16. FOR INDIVIDUAL TREES & SHRUBS PLANTED IN TURF AREAS, PROVIDE CONTINUOUS 3" SOIL SAUCER TO CONTAIN WATER & MULCH (TREES ON SLOPES SHALL BE SAUCERED ON THE DOWNHILL SIDE)
17. INSTALL 3" THICK SHREDDED HARDWOOD BARK MULCH RING 3'-0" DIA. FOR DECIDUOUS TREES AND ALL INDIVIDUAL SHRUBS IN LAWN AREAS, 5'-0" DIA. FOR EVERGREEN TREES. KEEP MULCH 2" AWAY FROM TRUNKS.
18. STAKING - ONLY STAKE EVERGREEN TREES 5'-0" OR GREATER IN HEIGHT OR TREES THAT ARE UNABLE TO REMAIN UPRIGHT AFTER PLANTING. TREES WILL BECOME STRONGER FASTER WHEN THE TOP 2/3 OF THE TREE IS FREE TO SWAY. DO NOT ATTACH WIRE DIRECTLY TO TREES OR THROUGH HOSES - UTILIZE GROMMETED, SYNTHETIC STRAPS AT LEAST 2" WIDE AROUND THE TREE, ATTACH STRAPPING TO STAKE WITH WIRE. STAKE ONLY WHEN NECESSARY. STAKES SHOULD BE DRIVEN DEEPLY INTO THE GROUND TO PREVENT DISLODGING. CHECK AT LEAST EVERY THREE MONTHS FOR BINDING OR OTHER PROBLEMS. STAKES AND TIES SHOULD BE REMOVED SIX MONTHS TO ONE YEAR AFTER PLANTING.
19. LIGHT POLES AND BOLLARDS SHOWN ARE FOR REFERENCE ONLY. SEE OFFICIAL SITE LIGHTING PLAN FOR OFFICIAL LIGHT POLE LOCATIONS. SITE UTILITIES SHOWN ARE FOR REFERENCE ONLY. SEE OFFICIAL SITE CIVIL DRAWINGS FOR OFFICIAL SITE UTILITY LOCATIONS.
20. REFER TO SPECIFICATIONS 32 93 00 PLANTS AND 32 92 00 TURF AND GRASSES FOR ADDITIONAL INFORMATION.

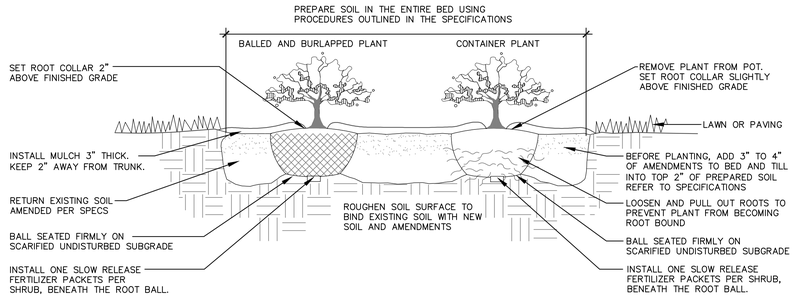
2 LANDSCAPE NOTES
REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION



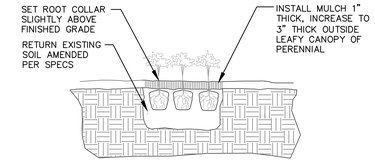
3 DECIDUOUS TREE PLANTING, STAKING, & PLANTING ON A SLOPE
N.T.S.



4 EVERGREEN TREE PLANTING & STAKING
N.T.S.



5 DECIDUOUS & EVERGREEN SHRUB PLANTING
N.T.S.



6 PERENNIAL PLANTING
N.T.S.

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PROJECT:
BAYSIDE DEVELOPMENT - MULTI-FAMILY BUILDING C

LOCATION:

CLIENT:

RELEASE:
SCHEMATIC DESIGN

REVISIONS:

#	DATE	DESCRIPTION

NORTH ARROW:

SEAL:

all in

SHEET:
SITE LANDSCAPE DETAILS

PROJECT MANAGER:	DMJ
PROJECT NUMBER:	210709.01
DATE:	10.10.2022

SHEET NUMBER:
L201