STORMWATER MANAGEMENT REPORT FOR

NOTRE DAME HIGH SCHOOL
SYNTHETIC TURF FIELD IMPROVEMENTS
BLOCK 1301, LOTS 34.02

TOWNSHIP OF LAWRENCE, COUNTY OF MERCER, STATE OF NEW JERSEY

Prepared For: Notre Dame High School
Diocese of Trenton
601 Lawrence Road
Lawrence, New Jersey 08648

Prepared By: SUBURBAN CONSULTING ENGINEERS, INC.
2430 Highway 34, Building A
Wall, New Jersey 08736

File No.: SCE-R12075.011

JULY 2021

STATE OF NEW JERSEY
ROBERT C. GREGORIA
No. 24GE03365600
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ROBERT GREGORIA, P.E. — **07/26/2021**
NJPE LICENSE #24GE03365600 — **DATE**

STATE OF NEW JERSEY
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PROFESSIONAL ENGINEER

DAREN J. PHIL, P.E. — **07/26/2021**
NJPE LICENSE #24GE03619100 — **DATE**

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APPENDICES

1.0 SUMMARY

The project site is the Notre Dame High School located at 601 Lawrence Road, Township of Lawrence, County of Mercer, State of New Jersey. The property consists of approximately 92 acres and is identified as Block 1301, Lot 34.02 on the tax map of the Township of Lawrence. This project proposes the construction of one (1) synthetic turf athletic field on an existing natural grass field. **SUBURBAN CONSULTING ENGINEERS, INC**. (SCE) analyzed the site plan and designed drainage improvements to address the requirements of the Soil Erosion and Sediment Control Standards for New Jersey (latest edition) and New Jersey Department of Environmental Protection (NJDEP) Stormwater Management Rules (SWM) NJAC 7:8.

2.0 DESIGN REGULATIONS

2.1 NJDEP Stormwater Management Regulations (SWM)

In accordance with the NJDEP Stormwater Management Rules (SWM) N.J.A.C. 7:8, this project meets the minimum criteria to be considered a "Major Development." Since this project is a major development, it must meet four (4) components of the NJDEP SWM rules with regard to design and performance standards for stormwater management measures:

- Erosion Control
- Groundwater Recharge
- Stormwater Management Runoff Quantity
- Stormwater Management Runoff Quality

2.2 Township of Lawrence

Per the requirements of the Township of Lawrence Ordinances, the project must demonstrate compliance with the NJDEP SWM Regulations and the Soil Erosion and Sediment Control Standards for New Jersey.

2.3 Soil Erosion and Sediment Control

The project is also required to comply with the Soil Erosion and Sediment Control Standards for New Jersey. These standards outline specific requirements for minimizing soil erosion both during and after construction is complete. The project will disturb more than 5,000 square feet; therefore, the project will need to be certified by the Mercer County Soil Conservation District (MCSCD). Additionally, the project disturbs more than one (1) acre; therefore, a NJDEP Request for Authorization (RFA) is also required.

3.0 DESIGN METHODOLOGY

SCE used Hydraflow Hydrographs version 10.4 by Autodesk, Inc. to develop stormwater runoff rates and hydrograph volumes for the 2-year, 10-year and 100-year storm events based on the Modified Rational Method in accordance with NJDEP stormwater management regulations. For existing and proposed conditions, SCE used the TR-55 method to calculate the time of concentration (Tc) and obtained a Tc of eighteen (18) minutes for existing conditions and twenty (20) minutes for proposed conditions. The time of concentration calculations were included in the hydrographs analysis reports for all the Sub Areas. IDF curves and rainfall data were obtained using the National Oceanic and Atmospheric Administration (NOAA) data of Newark Airport.

According to the NRCS Web Soil Survey, the onsite soils are as follows:

- DohgB – Downer fine sandy loam, gravelly clay loam substratum, zero percent to five percent (0% to 5%) slopes
- MBYB – Mattapex and bertie loams, zero percent to five percent (0% to 5%) slopes

See Appendix B for the complete soils report.

SCE sized stormwater conveyance piping using the Modified Rational Method for calculating peak rates of stormwater runoff during a 25-year storm event.

4.0 CONSTRUCTION

4.1 Existing Condition

The proposed site is located at Notre Dame High School. The property currently contains a natural grass athletic field. A portion of the stormwater on the existing site drains into existing catch basins located on the high point of the field. However, the majority of the field sheet flows to the existing E-inlets located at the low point in a swale that is adjacent to the field. The existing catch basins are connected to the existing E-inlets by a four-inch PVC pipe. Any water that does not enter the catch basins will infiltrate into the soil.

For the purposes of modeling the existing conditions, one (1) drainage area was analyzed within the bounds of the project's disturbance which totals about 2.28 acres. A summary of the existing drainage areas is offered in Table 4.1 below.

Based on boring information provided by Johnson Soils Company, evidence of groundwater was not detected to the depth of the test pits, which was 8 feet. Therefore, groundwater will not conflict with the proposed drainage system.

SCE used the required Peak Runoff Reductions to determine the allowable flow leaving the site for the 2-year, 10-year, and 100-year storm based on the actual limits of disturbance.

4.2 Developed Condition

The current application proposes the construction of a synthetic turf athletic field. For the purpose of modeling the proposed conditions, one (1) drainage area was analyzed within the bounds of the project's disturbance.

It is to be noted that synthetic turf fields are considered porous by the NJDEP.

The site will have one (1) drainage area that will tie into the existing E-inlet at the south side of the field. Six-inches of stone will be installed below synthetic turf areas and twelve-inches of stone will be installed below synthetic turf areas that are above the proposed twelve-inch piping. The twelve-inch piping will tie into two (2) drain basins, one(1) of which will act as an outlet control structure. The drain basin (outlet control structure) will consist of a five-inch orifice plate over the invert out twelve-inch pipe to restrict the flow of the stormwater. The existing three (3) catch basins and four-inch piping within the field will be removed. Inline drains will be installed outside of the field in order to keep the remaining four-inch piping.

A summary of the proposed drainage areas is offered in Table 4.1 below.

Table 4.1

DRAINAGE AREA	Existing		Proposed	
	C	Area (AC)	C	Area (AC)
Pervious	0.30	2.28	0.30	2.28
Impervious	0.90	0.00	0.90	0.00
Composite	**0.30**	**2.28**	**0.30**	**2.28**
TOTAL DRAINAGE AREA		**2.28**		**2.28**

5.0 DESIGN RESULTS

5.1 Stormwater Quantity

Since the project is a major development, discharge from the site for these areas is required to meet the reduction requirements of fifty percent (50%) for the 2-year storm event, twenty-five percent (25%) for the 10-year storm event, and twenty percent (20%) for the 100-year storm event. Calculations for the drainage improvement can be found in Appendix C.

A summary of the project's requirements and proposed outflow for the site is provided in the table below:

Table 5.1

STORM EVENT	FLOWS TO PQ (CFS)		
	EXISTING	ALLOWABLE	PROPOSED
2-YR	2.062	1.031	0.914
10-YR	2.833	2.125	1.098
100-YR	3.373	2.698	1.369

5.2 Water Quality

Per the NJDEP SWM Regulations, when converting non-impervious surfaces into impervious surfaces, impervious areas must be treated for eighty percent (80%) TSS Removal. The project is not proposing the conversion of non-impervious surfaces into impervious surfaces. Additionally, no driving surfaces are being proposed; therefore, water quality measures are not required.

5.3 Groundwater Recharge

The project is located in the State Planning Area 1 (Metropolitan) area. Per NJDEP SWM regulations, the groundwater recharge measures are not required.

6.0 MAINTENANCE

A separate stormwater maintenance manual is provided under separate cover.

7.0 STORMWATER CONVEYANCE SYSTEM

The Rational Method was used for the design of the drainage conveyance system. All proposed piping is required to and designed to convey the 25-year storm event without surcharge above any grate elevation.

8.0 SOIL EROSION

Since this project will disturb more than 5,000 square feet, a soil erosion plan certification from the MCSCD is required.

The plans depict the location and details for the following erosion controls:

- Stabilized construction entrance to reduce the tracking or flowing of sediment onto paved roadway or other impervious surfaces.
- Storm sewer inlet protection to intercept and retain sediment, thus preventing the entrance of sediment into a storm sewer system.
- Temporary stockpile for the stripping of topsoil for subsequent export from the project site.
- Silt fence to prevent sediment from leaving the site.

Additionally, in accordance with Chapter 21 of the Standards for Soil Erosion and Sediment Control, the project must protect and maintain the stability and integrity of natural resources on downstream or off-site property due to changes in the rate and volume of stormwater runoff associated with construction activities and land development.

9.0 LOW IMPACT DEVELOPMENT

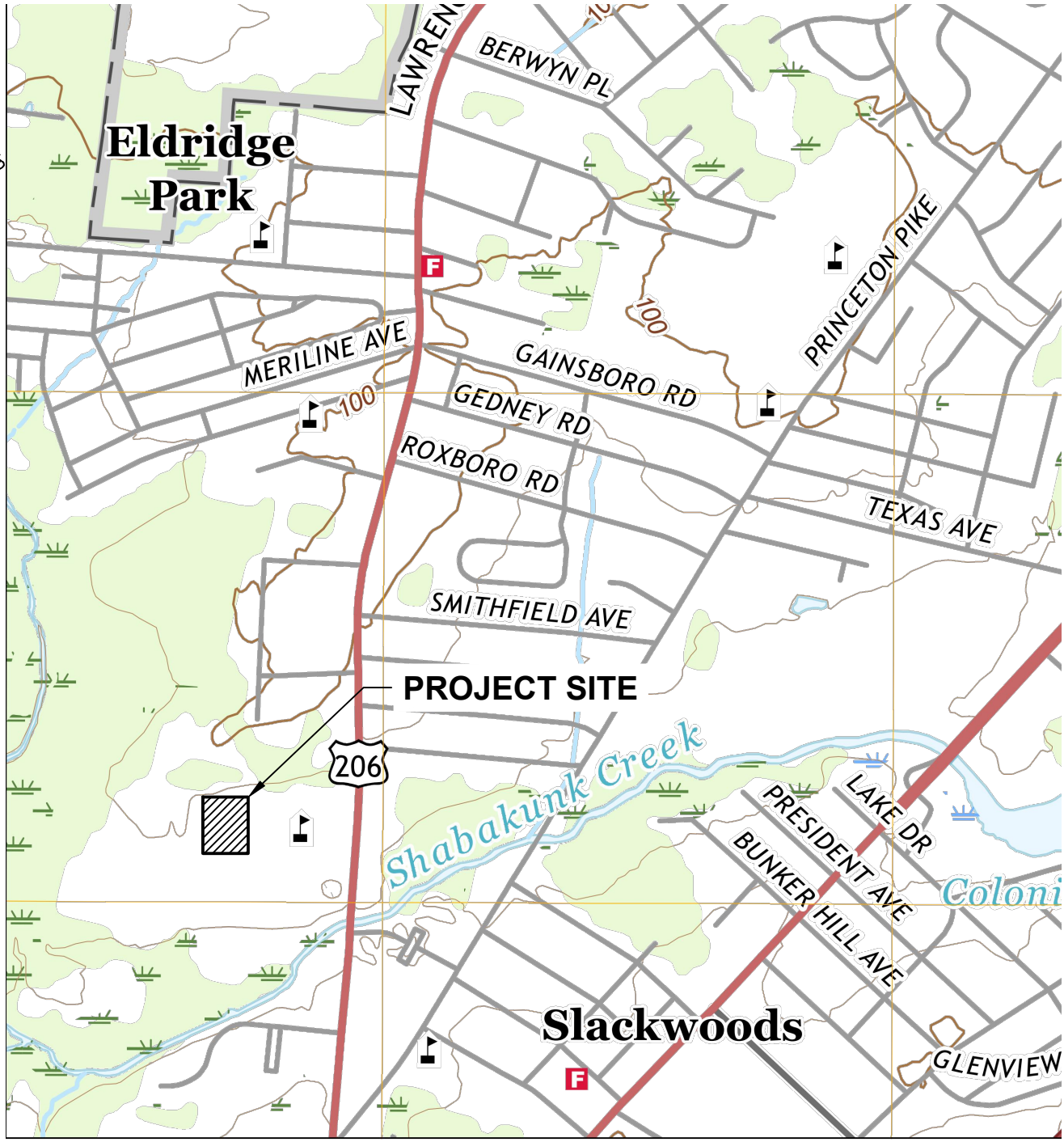
SCE incorporated nonstructural SWM strategies into our project design. The number of inlets and amount of hard piping were minimized acting as a source control to limit the amount of trash and debris that can get into the stormwater system.

11.0 CONCLUSION

This drainage system is designed using current design standards and best management practices to support compliance with applicable regulations. SCE designed the project areas that are being negatively disturbed to meet the stormwater quantity requirements.

Appendix A

USGS Map



NOTE:
THIS MAP IS COMPRISED OF THE USGS QUADRANGLE MAP FOR PRINCETON, NEW JERSEY.

1000 0 1000 2000

SCALE: 1"=1000'

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EXCELLENCE ♦ ECONOMY ♦ ENVIRONMENT

USGS MAP

DRAWN BY:	CHECKED BY:	SCALE	DATE:	PROJECT NO.
AAG	RCG	1"=1000'	05/24/2021	SCE-12075.011

Appendix B

Geotechnical Engineering Report

JOHNSON SOILS COMPANY

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May 20, 2021

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Attn: Robert C. Gregoria

Re: Geotechnical Engineering Report
Proposed Synthetic Turf Field
Notre Dame High School
Block-1301, Lot-34.02
Lawrence Township, NJ
SCE-R12075.011
JSC Job # 21-226

Johnson Soils Company, Inc. (JSC) submits this report to **SUBURBAN CONSULTING ENGINEERS, INC.** as per our proposal dated November 20, 2020. It includes JSC's findings, conclusions and recommendations related to the construction of the proposed synthetic turf field.

The site is an existing athletic field located in Lawrence, New Jersey. The property is located on the north-east side of the Shabakunk creeks and west side of the Lawrenceville road in Lawrence Township, New Jersey. The existing and proposed features are shown on the plan entitled "Boring Location Plan," which was provided by **SUBURBAN CONSULTING ENGINEERS, INC.**

INVESTIGATION

Two (2) borings were completed on May 13, 2021. The borings were advanced using truck-mounted drilling equipment by our sub-contractor, RV Drilling, Inc., in accordance with the procedures of the Standard Penetration Test (ASTM-1586). For this test, a standard split barrel sampler, which is two (2) inches outside diameter and one and three eighth (1 3/8) inches inside diameter, is advanced into the soil using a one hundred forty (140) pound weight hammer falling thirty (30) inches. Standard Penetration Tests were taken continuously from zero (0) to twelve (12) feet and at five (5) feet intervals thereafter till refusal.

Two (2) test pits were dug on May 14, 2021 with an excavator and operator by our sub-contractor Mikula contracting and directed by JSC personnel.

The boring and test pit location plan and record sheet for each boring are attached to this report.

FINDINGS

The explorations for this study indicate that the site is underlain by relatively uniform subsurface conditions. The strata are listed below in the order of increasing depth. Detailed descriptions of the subsurface conditions are shown on the individual Logs of Borings, Plates 3A through 3B.

1. Topsoil: A layer of Topsoil was encountered from the surface in Borings 1 and 2 to depths ranging from four to eight (4-8) inches below the existing surface grade.

2. Silty Sand (SM): A layer of Silty Sand was encountered below the Topsoil in Boring 1 and below the poorly-graded Sand in Boring 2 to depths ranging from ten to twenty six feet ten inches (10'-26'10") below the existing surface grade.

3. Poorly-graded Sand (SP): A layer of poorly-graded sand was encountered below the topsoil in Boring 2 to a depth of seven (7) feet below the existing surface grade.

4. Well-graded Sand (SW): A layer of Well-graded Sand was encountered below the Silty Sand in Boring 2 to a depth of twenty two (22) feet below the existing surface grade.

5. Silt (ML): A layer of Silt was encountered below the well-graded Sand in Boring 2 to a depth of thirty four feet two inches (34'2") below the existing surface grade.

Borings 1 & 2 encountered refusal at 26'10' & 34'2" respectively below the existing surface grade. The refusal depth is defined as the depth where no further penetration can be achieved with earth drilling and sampling procedures. Rock core drilling would be necessary to define whether the refusal depth is cobble, boulders or bedrock.

No ground water was observed in Borings 1 and 2 at the time of the investigation. It should be noted that the water level conditions may fluctuate due to variations in seasons, rainfall, temperature and other factors.

Following are the percolation rates of the two (2) tested samples:

1. Test Pit 1 at 8' is 10.0 in/hr
2. Test Pit 2 at 8' is 11.0 in/hr

GENERAL SITE GEOLOGY

This site sits in the Princeton quadrangle, in west-central New Jersey. The topography ranged from about 400 feet to 80 feet, the highest elevation being Mount Rose. The southeastern part of the quadrangle has un-lithified sediment underlying the general landscape morphology for up to 100 feet. The surficial materials include several generations of alluvial deposits and weathered bedrock materials.

The bedrock is made up of the Stockton Formation. It is made up of an interbedded sequence of gray, grayish-brown, or slightly reddish-brown, medium-to-fine grained, thin to thick bedded, poorly sorted to clast-imbricated conglomerate, planar to through cross-bedded and ripple cross-laminated arkosic sandstone and reddish-brown clayey fine-grained, sandstone, siltstone and mudstone.

The bottom layer of surficial geology is made up weathered mudstone and sandstone, it's poorly sorted, non-stratified to weakly stratified material consisting of some to many angular to sub-angular chips of red to gray mudstone in reddish brown, red, reddish yellow and yellow silt clay to clayey silt. Above this is a layer of the Bridgeton Formation, this is composed of sand and pebble gravel, minor cobble gravel, silt and clay. This is well-sorted and stratified. It's yellow, reddish yellow and light gray. The sand is mainly quartz with some weathered feldspar. The gravel is mainly quartz and quartzite with some chert, ironstone and decomposed sandstone and mudstone.

COMMENTS AND CONCLUSIONS

The proposed synthetic turf field should have all the existing Topsoil removed and replace with compacted, controlled Fill on top of the dense Silty Sand or poorly-graded Sand.

All excavations should be verified by a qualified geotechnical engineer at the time of the excavation to confirm the depth to suitable bearing material.

Please see the recommendations section for additional information.

In the instance where groundwater or surface runoff that may enter the proposed excavations, this may be effectively controlled by sump pits placed within or adjacent to the proposed excavations. It should be noted that the water level conditions may fluctuate due to variations in rainfall, temperature and other factors at the time of construction.

RECOMMENDATIONS

The following construction recommendations are offered:

1. Remove ALL Topsoil from underneath the proposed turf subgrade area. Estimated depths range from four to eight (4-8) inches from the existing surface grade.

2. Proof roll all existing on-site soils (after removal of all Topsoil) with a minimum of four (4) passes of heavy vibratory compactor with a minimum static drum weight of 12,000 pounds or equal. Any areas observed to be soft or unstable should be removed and replaced with controlled Fill (see recommendation #4) and inspected by a geotechnical engineer licensed in the State of New Jersey.

3. Where additional Fill is required to establish turf subgrades, controlled Fill should be used (see recommendation #4).

4. Types of Controlled FILL:
    a. The existing Topsoil is **unsuitable** for use as backfill.
    b. Existing Poorly-Graded Sand or Silty Sand can be reused as backfill or controlled fill when placed within +/-2% of optimum moisture content and approved by the geotechnical engineer at the time of use.
    c. Other Controlled Fill Options:
        i. Crushed Stone at ¾" or 1 ½" size with no fines.
        ii. Sand and Gravel with less than 20% passing the #200 sieve.
        iii. Quarry Process Stone (QP) with less than 20% passing the #200 sieve.

5. Use the following design parameters for any proposed buildings or lighting structures:

To use in the area of **Boring 1**

Depth Range (feet below grade)	**Footing Bearing Capacity (psf*)**	**Shaft Bearing Capacity (psf*)**	**Shaft Lateral Resistance (psf* per foot of depth)**
0-6" (Topsoil)	0	0	0
6"-10' (SM)	2,500	2,500	250
10'-26'10" (SM)	4,000	4,000	4,000

- Psf – pounds per square foot

To use in the area of **Boring 2**

Depth Range (feet below grade)	**Footing Bearing Capacity (psf*)**	**Shaft Bearing Capacity (psf*)**	**Shaft Lateral Resistance (psf* per foot of depth)**
0-6" (Topsoil)	0	0	0
6"-7' (SP)	2,500	2,500	250
7'-10' (SM)	3,000	3,000	300
10'-20' (SW)	3,500	3,500	350
22'-34'2" (ML)	4,000	4,000	400

- Psf – pounds per square foot

6. The minimum footing and shaft depth is to be three feet six inches (3'6") below the existing grade for frost protection.

7. The Seismic Site Class is 'C' in terms of the International Building Code, New Jersey Edition, for seismic design considerations. Also the profile is considered not to be susceptible to liquefaction.

   a. $S_s = 0.225$ g
   b. $S_1 = 0.064$ g
   c. $S_{MS} = 0.269$ g
   d. $S_{M1} = 0.109$ g
   e. $S_{DS} = 0.18$ g
   f. $S_{D1} = 0.073$ g

8. Soil Classification "C" as per OSHA 1926 Subpart P App A with maximum allowable slopes (H:V) of 1 ½:1 as per OSHA 1926 Subpart P App B Table B-1.
   a. This is for short term maximum allowable slopes less than 12 feet.
   b. Sloping or benching for excavations greater than 20 feet deep shall be designed by a Professional Engineer licensed in the State of New Jersey.

9. The project geotechnical engineer should review the final shaft design, plans and specifications and observe their installation.

10. Controlled and Compacted Fill Requirements:
    a. A geotechnical engineer licensed in the state of New Jersey to inspect all earthwork operations.
    b. The contractor and/or owner shall notify the geotechnical engineer in writing a minimum of five (5) days prior to the start of all work on the project. The notification shall include all sources of Fill, equipment to be used, the estimated dates of the work and the proposed onsite supervisor.
    c. All misc. Fill, Topsoil and Peat and Organic Silt shall be graded prior to the start of all earthwork operations.

d. All Fill areas shall be proof rolled prior to the placement of any new Fill. All proof rolling shall be performed in the presence of the geotechnical engineer. If soft areas are found during the proof rolling process, the area shall be removed and replaced with compacted, controlled Fill as per the direction of the geotechnical engineer.

e. Any proposed Fill area shall be leveled before placement of any Fill. The area shall be free from ruts, hummocks or other uneven surfaces that would prevent uniform compaction.

f. Use any of the material stated in the types of controlled Fill section or other material approved by the geotechnical engineer.

g. A fifty pound (50-lb) bag of material shall be submitted to the geotechnical engineer for approval and testing a minimum of five (5) days prior to the start of work. No Fill material shall be placed until the geotechnical engineer has approved the material for use in the project.

h. All controlled Fill should be placed in horizontal layers of eight to twelve (8-12) inches in loose thickness and be uniformly compacted to achieve a density of at least ninety-five (95) percent of the maximum dry density as determined by in the laboratory when tested in accordance with the most recent ASTM D1557 Standard.

i. Backfill within confined areas should be placed in layers of six to eight (6-8) inches in loose thickness and compacted to the same 95% of maximum dry density using portable compaction equipment.

j. No Fill material shall be placed, spread or compacted when the ground or Fill is frozen, thawing or during unfavorable weather conditions. When work is interrupted by heavy rain or frost, operations shall not be resumed unless the moisture content and density of the Fill are acceptable to the geotechnical engineer.

k. A sufficient number of passes shall be approved by the geotechnical engineer in order to achieve the acceptable specified density above. A minimum of three (3) passes of the approved compactor shall be required over all areas of each lift.

l. Field density tests shall be made by the geotechnical engineer to determine the in-place field density in each layer placed. No Fill shall be placed over any layer that has not been previously approved by the geotechnical engineer. Should any of the tests find insufficient density, then additional compaction will be required until the required density is obtained.

11. The following construction tasks should be inspected by a geotechnical engineer using appropriate laboratory and field testing support:

    a. Removal of all Topsoil & Misc. Fill.

    b. Proof rolling of existing on-site soils.

    c. All controlled Fill to be used for replacement shall be pre-approved by the geotechnical engineer.

    d. Replacement and compaction of controlled Fill.

The recommendations above are based on the data obtained from soil borings performed at the indicated specific locations and from other identified information. This report does not reflect any variations which may occur across the site apart from the borings. The nature and extent of such variations may not become evident until construction. If variations appear evident, it will be necessary to re-evaluate the recommendations of this report. Supplemental recommendations may be required upon the finalization of the construction plans or changes to the proposed structure location and/or use.

This report has been prepared for the specific application to the project noted. In the event that there are changes in the nature, design or locations of the proposed structures, the conclusions and recommendations contained herein are not valid unless the changes are reviewed and the recommendations modified in writing by JSC.

JSC assumes that a qualified contractor will be employed to perform all required construction activities and that the contractor will be cognizant that all excavations are performed in accordance with all applicable codes and in good building practice. Contractor shall be aware of avoiding damage to all adjacent properties.

The exploration and analysis of the foundation conditions described herein are considered suitable to form a practical basis for the foundation design.

The information and opinions rendered in our report are exclusively for use by **SUBURBAN CONSULTING ENGINEERS, INC.** and JSC will not distribute or publish this report without written consent except as required by law or court order. The information and opinions expressed in this report are given in response to a limited assignment and should be considered and implemented only in light of that assignment. The services provided by JSC in completing this project were consistent with normal standards of engineering profession. No warranty, expressed or implied, is made.

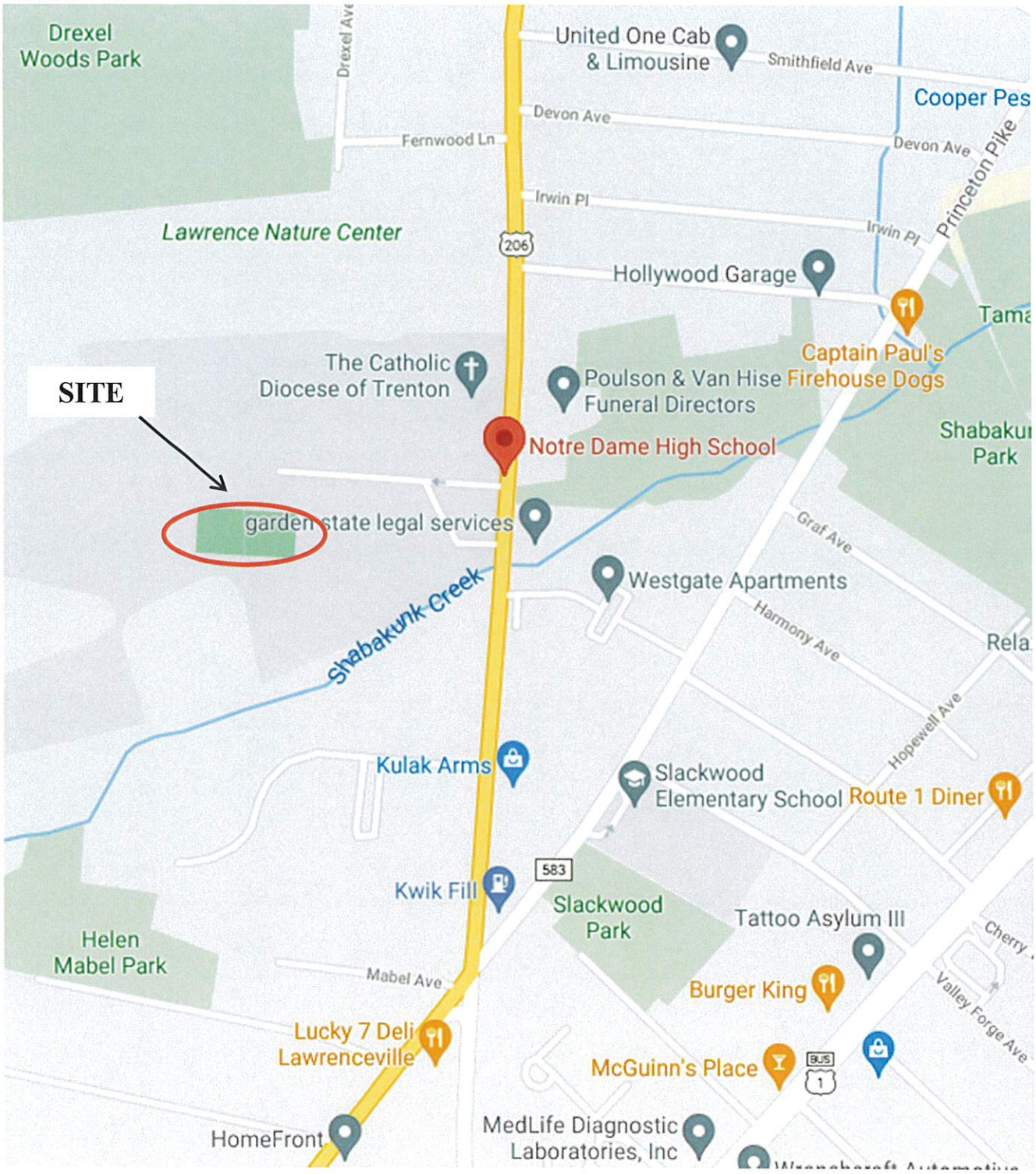
The following Plates are attached to this report:

Plate 1-	Site Location Maps
Plate 2-	Boring Location Plans
Plates 3A through 3B -	Logs of Borings
Plate 4-	Unified Soil Classification System
Plate 5 -	Log of Test Pits

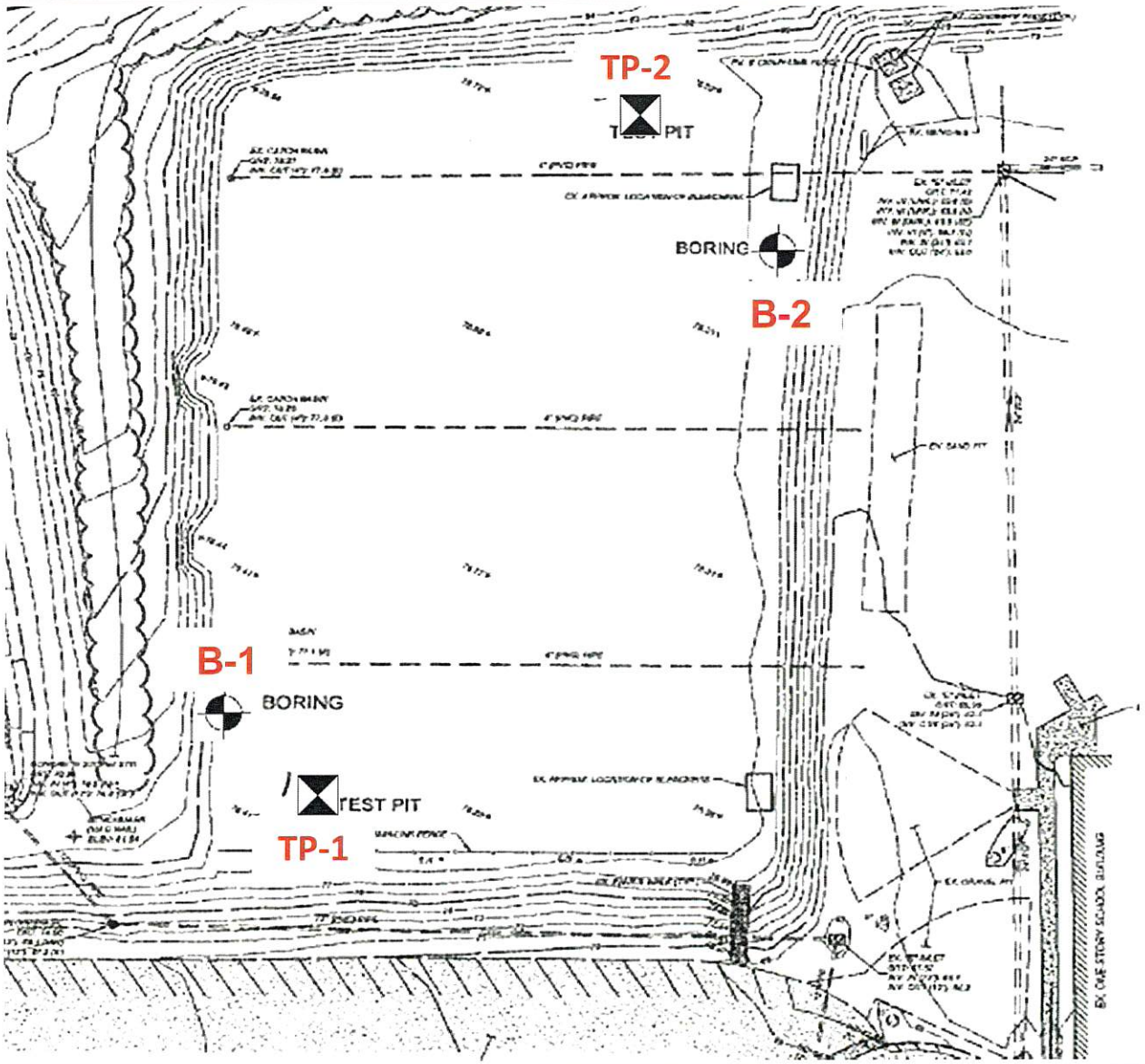
Very truly yours,
JOHNSON SOILS COMPANY

Lisa V. Mahle-Greco, P.E.
Engineering Manager
NJ Lic. No. 43197

M. Alam



JOHNSON SOILS COMPANY	**Site Location Plan**	JSC #21-226
	Notre Dame High School Turf Field Lawrence Township, NJ	PLATE 1



Scale: N.T.S.

JOHNSON SOILS COMPANY

Boring & Test Pit Location Plan	JSC #21-226
Notre Dame High School Turf Field Lawrence Township, NJ	PLATE 2

JOHNSON SOILS COMPANY

LOG OF BORING
B-1

Sheet 1 of 1
JSC #21-226
Completed: 5/13/2021
Water Level : Dry.

Depth (Feet)	Sample #	Depth (Feet)	Sample/Spoon Blows/6"	Symbol USCS	Depth	Description
0	1	0-2	2-3-5-8		0-6"	Topsoil.
-					6"-12'	Brown fine to medium Sand, little Silt & Gravel. (moist, medium dense)
-	2	2-4	7-7-7-7			
-						
-	3	4-6	7-7-8-8			
5						
-	4	6-8	5-6-7-9			
-						
-	5	8-10	11-19-19-18			
-						
10	6	10-12	24-32-25-22			
-						
-					12'-26'10"	Brown fine to medium Sand, some Gravel, little Silt. (wet, dense)
-				SM		
-						
15	7	15-17	22-24-17-24			
-						
-						
-						
20	8	20-22	22-25-45-59			-grading to very dense@20'
-						
-						
-						
25	9	25-27	29-32-62-100/4"			
-						
-						
-						
-						
30						
-						
-						
-						
-						
35						

Remarks: Boring B-1 Refusal @ 26'10" on 5/13/2021

Client: Suburban Consulting Engineers, Inc.

Site: Notre Dame High School
Lawrence Township, NJ

Driller: RV Drilling

[X] Hollow Stem Auger

[ ] Portable

[ ] Mud Rotary

PLATE 3A

JOHNSON SOILS COMPANY

LOG OF BORING
B-2

Sheet 1 of 1
JSC #21-226
Completed: 5/13/2021
Water Level : Dry.

Depth (Feet)	Sample #	Depth (Feet)	Sample/Spoon Blows/6"	Symbol USCS	Depth	Description
0	1	0-2	1-3-5-6		0-6"	Topsoil.
-				SP	6"-7'	Gray-brown fine Sand and Silt. (moist, loose)
-	2	2-4	5-5-4-5			
-						-grading to medium dense@4'
-	3	4-6	5-6-8-9			
5						
-	4	6-8	10-4-4-5			
-				SM	7'-10'	Brown fine to medium Sand, little Silt. (moist, medium dense)
-	5	8-10	6-8-8-10			
-						
10	6	10-12	6-6-6-7	SW	10'-22'	Light brown fine to coarse Sand, trace Silt & Gravel. (moist, medium dense)
-						
-						
-						
15	7	15-17	9-10-10-9			
-						
-						
-						
20	8	20-22	16-28-33-55			-grading to very dense@20'
-						
-						
-						
-						
25	9	25-27	14-16-18-24	ML	22'-34'2"	Gray-brown Silt, little fine Sand & decomposed Shale. (wet, Hard)
-						
-						
-						
30	10	30-32	41-52-61-84			
-						
-						
-	11	33-35	71-92-100/2"			
-						
35						

Remarks: Boring B-2 Refusal @ 34'2" on 5/13/2021

Client: Suburban Consulting Engineers, Inc.

Site: Notre Dame High School
Lawrence Township, NJ

Driller: RV Drilling

X	Hollow Stem Auger
	Portable
	Mud Rotary

PLATE 3B

JOHNSON SOILS COMPANY

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Email: johnsonsoils@gmail.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COURSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO 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 (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COURSE FRACTION PASSING NO.4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY-SANDS LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% 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 OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDS CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADUATION*

% FINER BY WEIGHT

TRACE.....0% TO 10%
LITTLE.....10% TO 20%
SOME.....20% TO 35%
AND.....35% TO 50%

VALUES ARE FROM LABORATORY OR FIELD TEST DATA WHERE APPLICABLE WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

COMPACTNESS*
SAND AND/OR GRAVEL

RELATIVE DENSITY

LOOSE.....0% TO 40%
MEDIUM DENSE.....40% TO 70%
DENSE.....70% TO 90%
VERY DENSE.....90% TO 100%

CONSISTENCY*
CLAY AND/OR SILT

RANGE OF SHEARING STRENGTH
IN POUND PER SQUARE FOOT

VERY SOFT.....LESS THAN 250
SOFT..... 250 TO 500
MEDIUM.....500 TO 1000
STIFF.....1000 TO 2000
VERY STIFF.....2000 TO 4000
HARD.....GREATER THAN 4000

PLATE -4

Suburban Consulting Engineers, Inc.
Notre Dame High School
Lawrence Township, NJ

Date: May 14, 2021
Inspected by: J O'D
JSC Job # 21-226

Log of Test Pits

TP-1

0" - 4"	Topsoil & Grass.
4" – 5'	Brown-Gray fine Sand & Silt. (SM-ML)
5' – 9'	Brown fine to medium Sand, some Silt, little Gravel. (SM)

No Water

No S.H.W.T

TP-2

0" - 8"	Topsoil & Grass.
8" – 9'	Brown fine to medium Sand, some Silt, little Gravel. (SM)

No Water

No S.H.W.T

Appendix C

Hydraflow Report

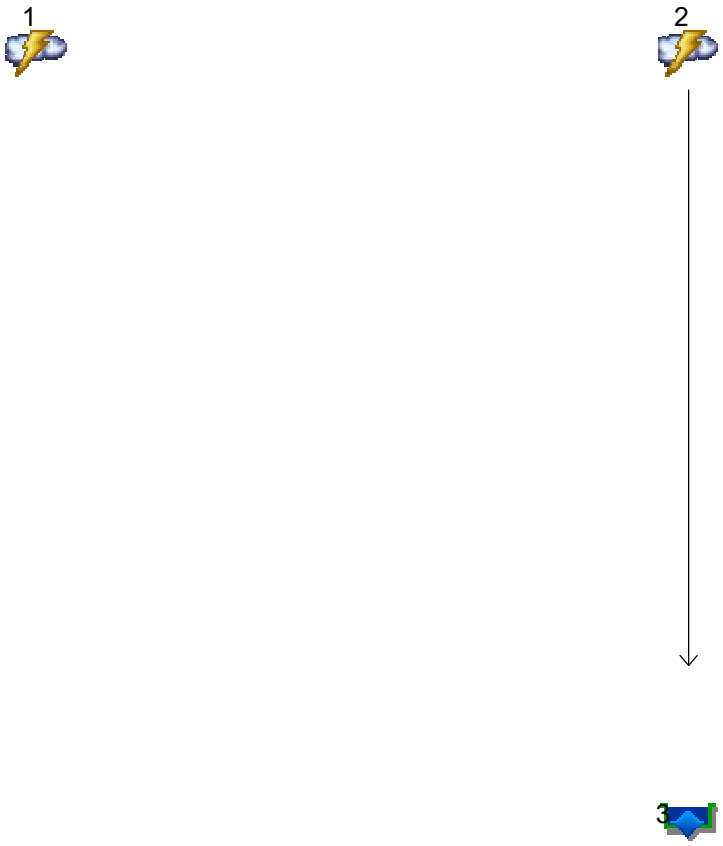
Hydraflow Table of Contents

Drainage Design.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Monday, 07 / 26 / 2021

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Mod. Rational	Existing Conditions
2	Mod. Rational	Proposed Conditions
3	Reservoir	<no description>

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Mod. Rational	------	-------	2.062	-------	-------	2.833	-------	-------	3.373	Existing Conditions
2	Mod. Rational	------	-------	1.951	-------	-------	2.692	-------	-------	3.208	Proposed Conditions
3	Reservoir	2	-------	0.914	-------	-------	1.098	-------	-------	1.369	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	2.062	1	18	2,227	------	------	------	Existing Conditions
2	Mod. Rational	1.951	1	20	2,342	------	------	------	Proposed Conditions
3	Reservoir	0.914	1	31	2,286	2	72.15	1,038	<no description>

Hydrograph Report

Hyd. No. 1

Existing Conditions

Hydrograph type	= Mod. Rational	Peak discharge	= 2.062 cfs
Storm frequency	= 2 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 2,227 cuft
Drainage area	= 2.280 ac	Runoff coeff.	= 0.3
Intensity	= 3.015 in/hr	Tc by TR55	= 18.00 min
IDF Curve	= Lawrence.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No. 1

Existing Conditions

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.150		0.150		
Flow length (ft)	= 113.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.32		0.00		0.00		
Land slope (%)	= 0.57		0.00		0.00		
Travel Time (min)	**= 17.53**	**+**	**0.00**	**+**	**0.00**	**=**	**17.53**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=0.00						
			0.00				
					0.00		
Flow length (ft)	({0})0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 18.00 min

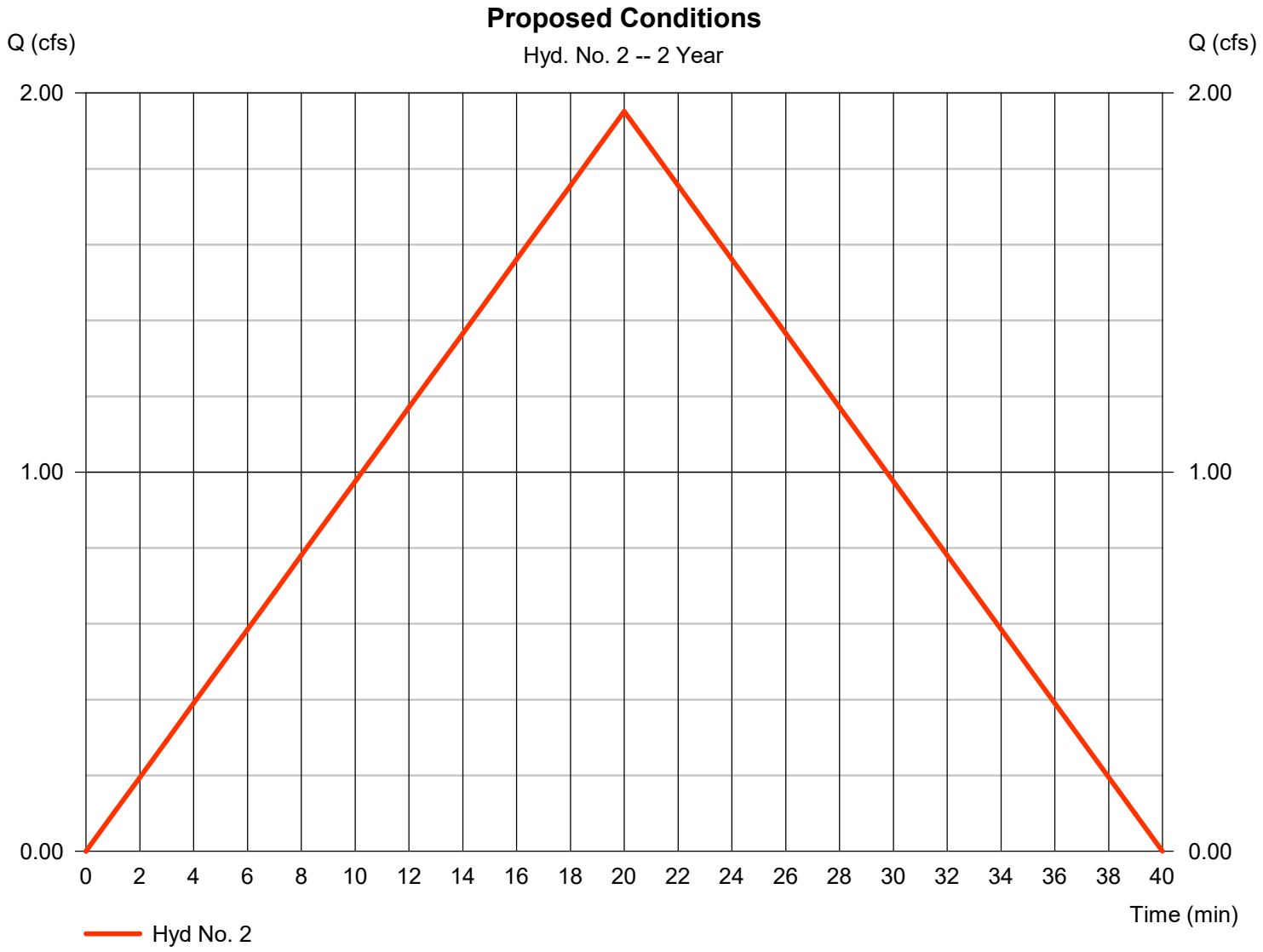
Hydrograph Report

Hyd. No. 2

Proposed Conditions

Hydrograph type	= Mod. Rational	Peak discharge	= 1.951 cfs
Storm frequency	= 2 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 2,342 cuft
Drainage area	= 2.280 ac	Runoff coeff.	= 0.3*
Intensity	= 2.853 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Lawrence.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(1.770 x 0.30) + (0.510 x 0.30)] / 2.280



TR55 Tc Worksheet

Hyd. No. 2

Proposed Conditions

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.150		0.011		0.011		
Flow length (ft)	= 150.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.32		0.00		0.00		
Land slope (%)	= 0.90		0.00		0.00		
Travel Time (min)	**= 18.31**	**+**	**0.00**	**+**	**0.00**	**=**	**18.31**
Shallow Concentrated Flow							
Flow length (ft)	= 71.00		0.00		0.00		
Watercourse slope (%)	= 0.90		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	=1.93		0.00		0.00		
Travel Time (min)	**= 0.61**	**+**	**0.00**	**+**	**0.00**	**=**	**0.61**
Channel Flow							
X sectional flow area (sqft)	= 3.14		0.79		0.00		
Wetted perimeter (ft)	= 6.28		3.14		0.00		
Channel slope (%)	= 0.50		1.10		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	=4.41						
			4.12				
					0.00		
Flow length (ft)	({0})336.0		22.0		0.0		
Travel Time (min)	**= 1.27**	**+**	**0.09**	**+**	**0.00**	**=**	**1.36**

Total Travel Time, Tc ..... 20.00 min

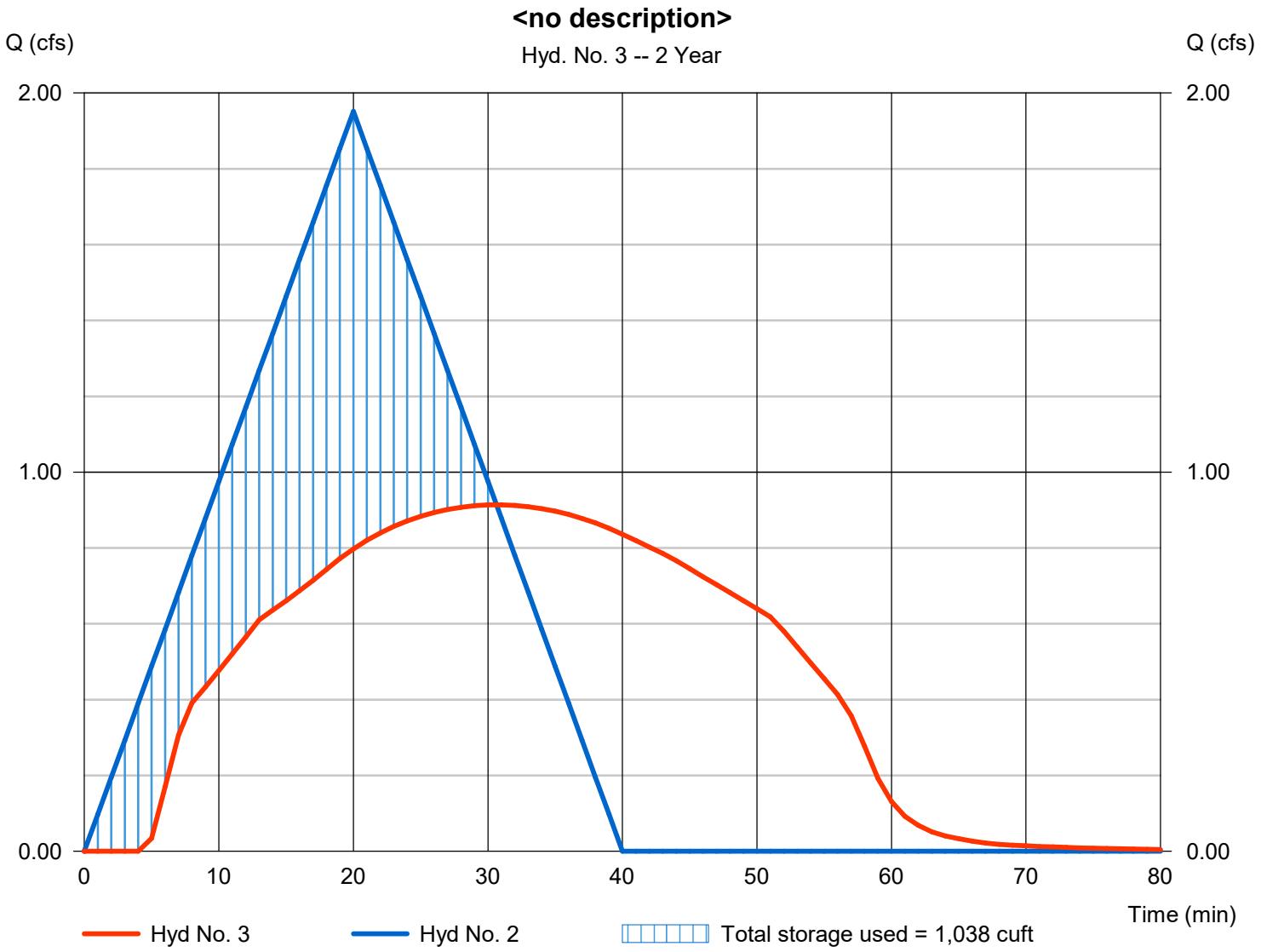
Hydrograph Report

Hyd. No. 3

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	0.914 cfs
Storm frequency	=	2 yrs	Time to peak	=	31 min
Time interval	=	1 min	Hyd. volume	=	2,286 cuft
Inflow hyd. No.	=	2 - Proposed Conditions	Max. Elevation	=	72.15 ft
Reservoir name	=	Piping	Max. Storage	=	1,038 cuft

Storage Indication method used.



Pond No. 1 - Piping

Pond Data

UG Chambers -Invert elev. = 70.00 ft, Rise x Span = 1.00 x 1.00 ft, Barrel Len = 557.00 ft, No. Barrels = 1, Slope = 0.50%, Headers = No
Encasement -Invert elev. = 69.50 ft, Width = 3.00 ft, Height = 2.50 ft, Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	69.50	n/a	0	0
0.53	70.03	n/a	59	59
1.06	70.56	n/a	84	143
1.59	71.09	n/a	164	306
2.11	71.61	n/a	323	630
2.64	72.14	n/a	406	1,036
3.17	72.67	n/a	372	1,408
3.70	73.20	n/a	370	1,778
4.23	73.73	n/a	379	2,157
4.76	74.26	n/a	354	2,511
5.28	74.79	n/a	353	2,865

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 5.00	0.00	0.00	0.00
Span (in)	= 5.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 70.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	69.50	0.00	---	---	---	---	---	---	---	---	---	0.000
0.53	59	70.03	0.00 ic	---	---	---	---	---	---	---	---	---	0.002
1.06	143	70.56	0.39 ic	---	---	---	---	---	---	---	---	---	0.388
1.59	306	71.09	0.61 ic	---	---	---	---	---	---	---	---	---	0.615
2.11	630	71.61	0.78 ic	---	---	---	---	---	---	---	---	---	0.778
2.64	1,036	72.14	0.91 ic	---	---	---	---	---	---	---	---	---	0.913
3.17	1,408	72.67	1.03 ic	---	---	---	---	---	---	---	---	---	1.030
3.70	1,778	73.20	1.14 ic	---	---	---	---	---	---	---	---	---	1.135
4.23	2,157	73.73	1.23 ic	---	---	---	---	---	---	---	---	---	1.232
4.76	2,511	74.26	1.32 ic	---	---	---	---	---	---	---	---	---	1.321
5.28	2,865	74.79	1.40 ic	---	---	---	---	---	---	---	---	---	1.404

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	2.833	1	18	3,060	------	------	------	Existing Conditions
2	Mod. Rational	2.692	1	20	3,230	------	------	------	Proposed Conditions
3	Reservoir	1.098	1	32	3,174	2	73.01	1,642	<no description>

Hydrograph Report

Hyd. No. 1

Existing Conditions

Hydrograph type	= Mod. Rational	Peak discharge	= 2.833 cfs
Storm frequency	= 10 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 3,060 cuft
Drainage area	= 2.280 ac	Runoff coeff.	= 0.3
Intensity	= 4.142 in/hr	Tc by TR55	= 18.00 min
IDF Curve	= Lawrence.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

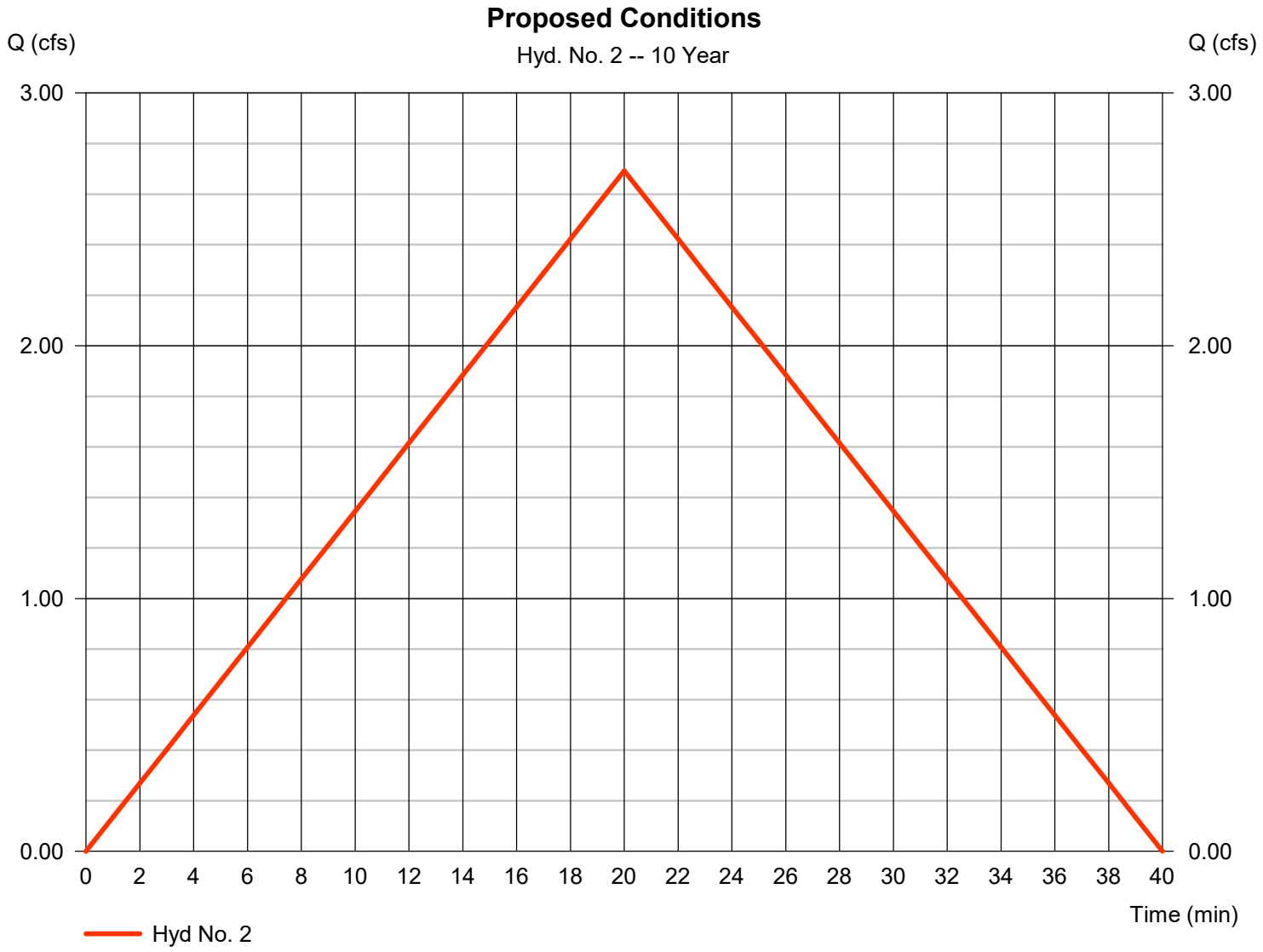
Hydrograph Report

Hyd. No. 2

Proposed Conditions

Hydrograph type	= Mod. Rational	Peak discharge	= 2.692 cfs
Storm frequency	= 10 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 3,230 cuft
Drainage area	= 2.280 ac	Runoff coeff.	= 0.3*
Intensity	= 3.936 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Lawrence.IDF	Storm duration	= 1.0 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(1.770 x 0.30) + (0.510 x 0.30)] / 2.280



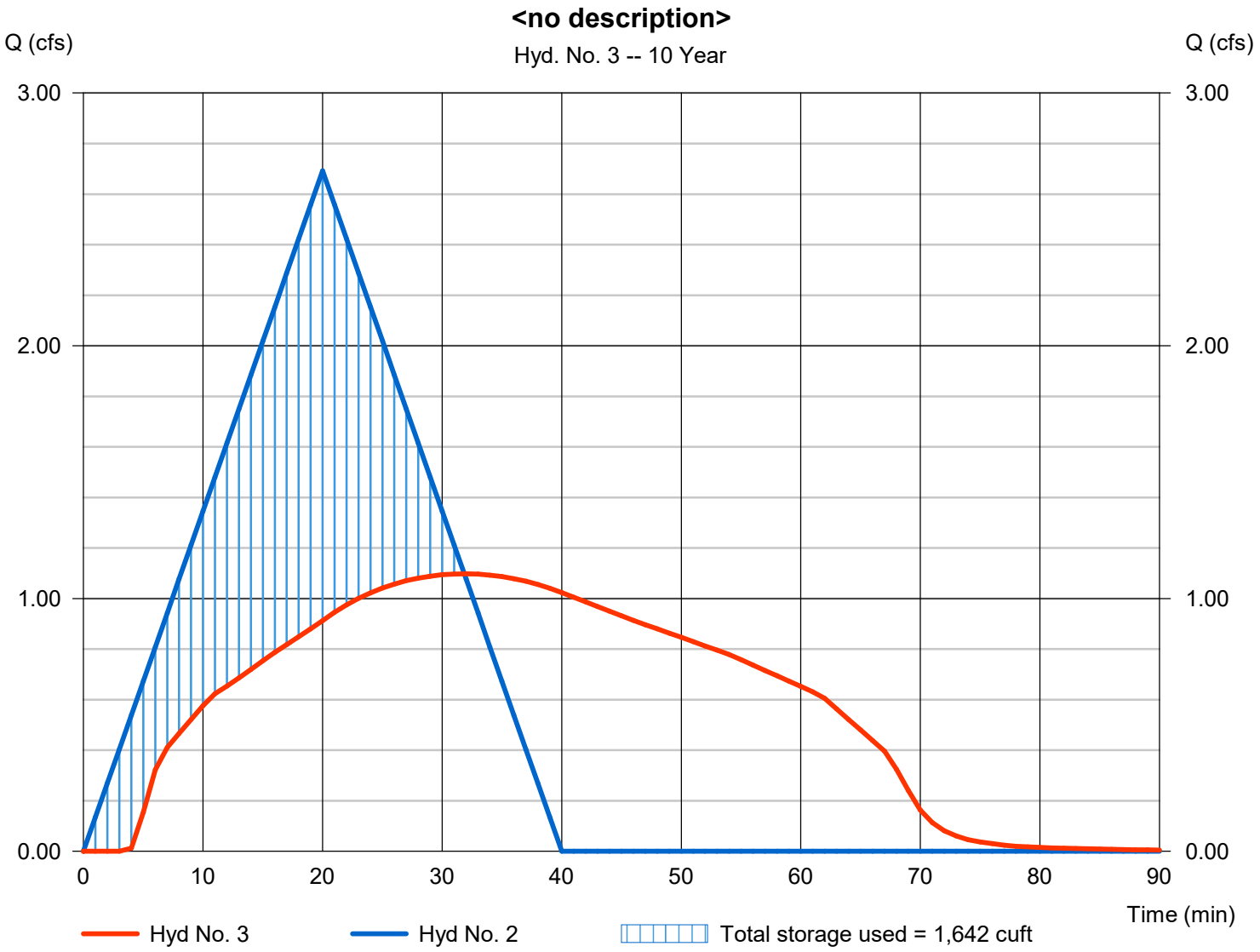
Hydrograph Report

Hyd. No. 3

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	1.098 cfs
Storm frequency	=	10 yrs	Time to peak	=	32 min
Time interval	=	1 min	Hyd. volume	=	3,174 cuft
Inflow hyd. No.	=	2 - Proposed Conditions	Max. Elevation	=	73.01 ft
Reservoir name	=	Piping	Max. Storage	=	1,642 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2021

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Mod. Rational	3.373	1	18	4,736	------	------	------	Existing Conditions
2	Mod. Rational	3.208	1	20	5,004	------	------	------	Proposed Conditions
3	Reservoir	1.369	1	37	4,948	2	74.56	2,713	<no description>

Hydrograph Report

Hyd. No. 1

Existing Conditions

Hydrograph type	= Mod. Rational	Peak discharge	= 3.373 cfs
Storm frequency	= 100 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 4,736 cuft
Drainage area	= 2.280 ac	Runoff coeff.	= 0.3
Intensity	= 4.932 in/hr	Tc by TR55	= 18.00 min
IDF Curve	= Lawrence.IDF	Storm duration	= 1.3 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

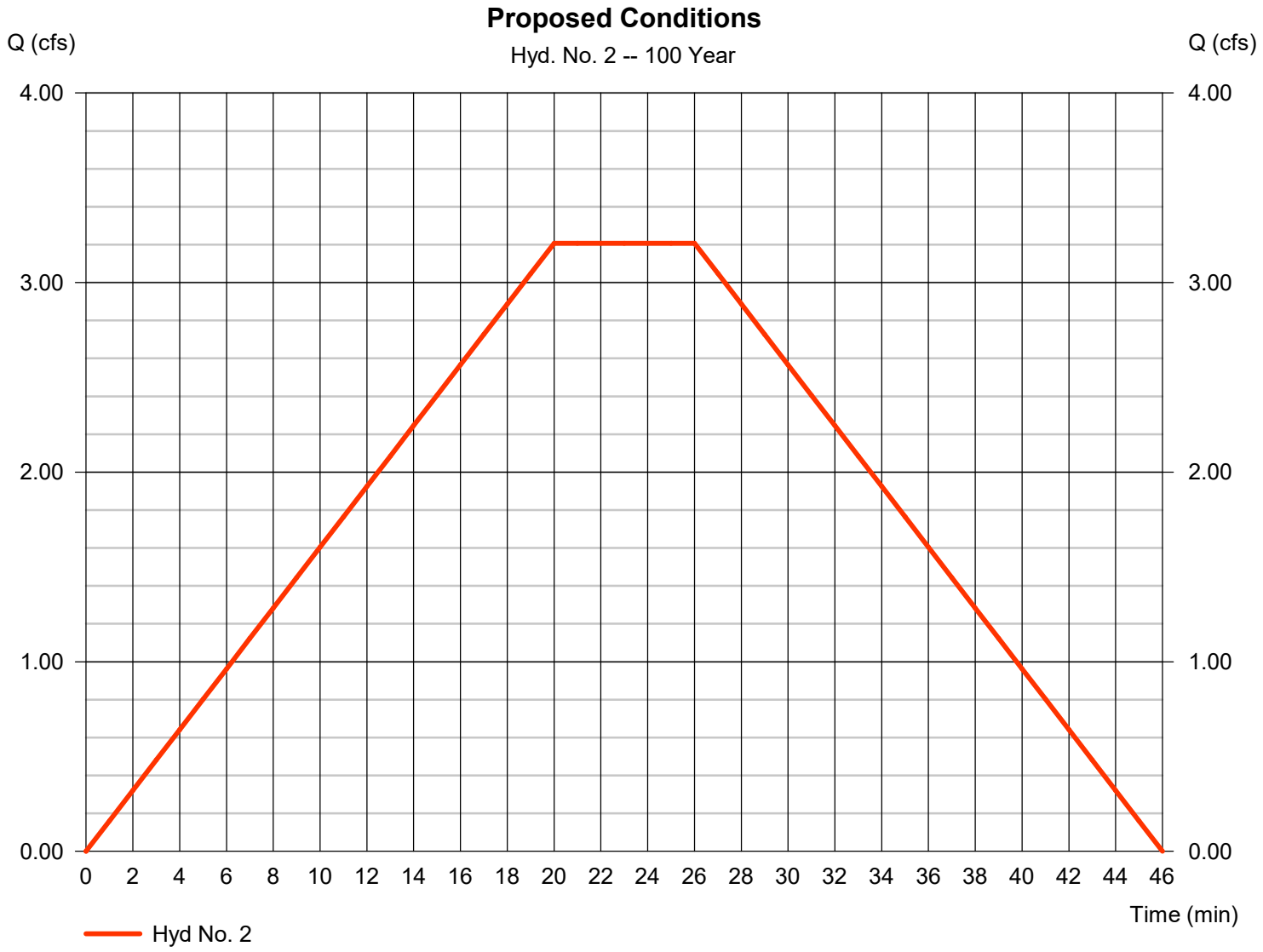
Hydrograph Report

Hyd. No. 2

Proposed Conditions

Hydrograph type	= Mod. Rational	Peak discharge	= 3.208 cfs
Storm frequency	= 100 yrs	Time to peak	= 20 min
Time interval	= 1 min	Hyd. volume	= 5,004 cuft
Drainage area	= 2.280 ac	Runoff coeff.	= 0.3*
Intensity	= 4.690 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Lawrence.IDF	Storm duration	= 1.3 x Tc
Target Q	=n/a	Est. Req'd Storage	=n/a

* Composite (Area/C) = [(1.770 x 0.30) + (0.510 x 0.30)] / 2.280



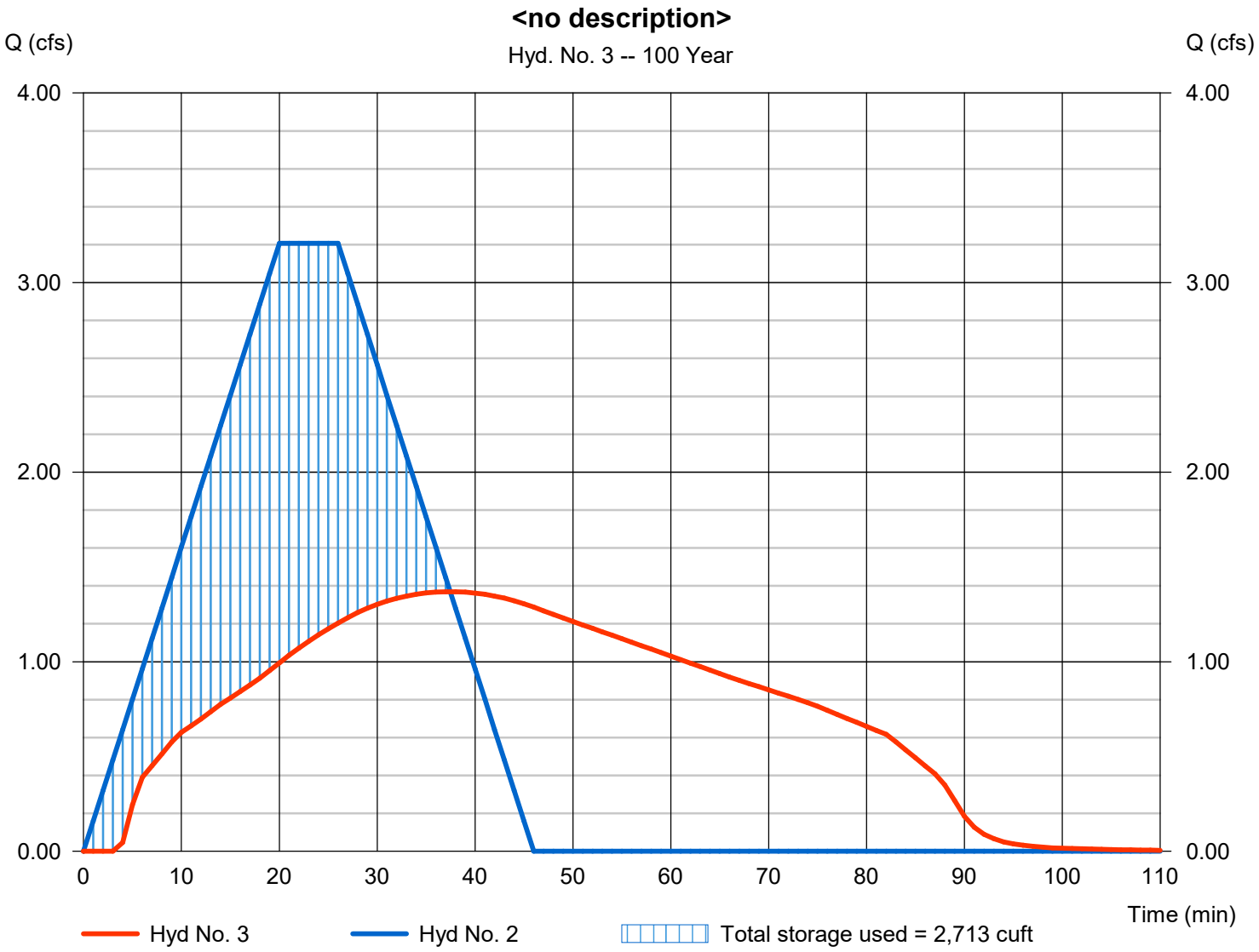
Hydrograph Report

Hyd. No. 3

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	1.369 cfs
Storm frequency	=	100 yrs	Time to peak	=	37 min
Time interval	=	1 min	Hyd. volume	=	4,948 cuft
Inflow hyd. No.	=	2 - Proposed Conditions	Max. Elevation	=	74.56 ft
Reservoir name	=	Piping	Max. Storage	=	2,713 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	59.9687	12.7000	0.8733	--------
3	0.0000	0.0000	0.0000	--------
5	0.0000	0.0000	0.0000	--------
10	65.8347	12.6000	0.8085	--------
25	0.0000	0.0000	0.0000	--------
50	0.0000	0.0000	0.0000	--------
100	48.4935	9.2000	0.6560	--------

File name: Lawrence.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	4.88	3.92	3.30	2.85	2.52	2.26	2.05	1.88	1.74	1.62	1.51	1.42
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	6.48	5.29	4.50	3.94	3.51	3.17	2.90	2.67	2.48	2.32	2.18	2.06
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	8.51	6.98	6.00	5.30	4.78	4.37	4.04	3.76	3.53	3.33	3.16	3.01

Tc = time in minutes. Values may exceed 60.

ip. file name: E:\SCE\Cedar Grove\11571 Cedar Grove\11571.011 424_430 Pompton Avenue\Design\Cedar Grove.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.32	0.00	0.00	4.99	0.00	0.00	8.18
SCS 6-Hr	0.00	2.38	0.00	0.00	3.52	0.00	0.00	5.55
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix D

Operation and Maintenance Manual

OPERATION AND MAINTENANCE MANUAL FOR

NOTRE DAME HIGH SCHOOL
SYNTHETIC TURF FIELD IMPROVEMENTS

BLOCK 1301, LOTS 34.02

TOWNSHIP OF LAWRENCE, COUNTY OF MERCER, STATE OF NEW JERSEY

Prepared For: **Notre Dame High School**
Diocese of Trenton
601 Lawrence Road
Lawrence, New Jersey 08648

Prepared By: **SUBURBAN CONSULTING ENGINEERS, INC.**
2430 Highway 34, Building A
Wall, New Jersey 08736

File No.: **SCE-R12075.011**

JULY 2021

ROBERT GREGORIA, PE **07/26/2021 DATE**
NJPE LICENSE #24GE03365600

DAREN J. PHIL, PE **07/26/2021 DATE**
NJPE LICENSE #24GE03619100

SUBURBAN CONSULTING ENGINEERS, INC.
2430 Highway 34, Building A, Wall, New Jersey 08736
732-282-1776; Fax 973-398-2121

OVERVIEW

This "Maintenance Plan for the Stormwater Management System" is prepared in conjunction with a proposed project and site plan entitled: "Notre Dame High School (601 Lawrence Road) Synthetic Turf Field Improvements, Block 1301, Lot 34.02 (Tax Map Township of Lawrence Sheet 13), Township of Lawrence, County of Mercer, State of New Jersey," prepared by **SUBURBAN CONSULTING ENGINEERS, INC.** This maintenance plan contains information to assist the Owner, Notre Dame High School, in the inspection and maintenance of the proposed components of the stormwater management at the proposed athletic field (Project Site). Proper maintenance of these facilities is critical in order to function under design conditions.

The Project Site currently contains an existing natural grass athletic field. The proposed improvements consist of constructing a synthetic turf athletic field, sports lighting, and drainage improvements. Improvements are provided to meet the New Jersey Department of Environmental Protection's stormwater regulations.

The proposed improvements use a series of underground stormwater runoff collection pipes that will be tied to the existing E-inlet.

RESPONSIBLE PARTY

Name: **Notre Dame High School**

Address: **601 Lawrence Road, Lawrence Township, New Jersey 08648**

Telephone: **(609) 882-7900**

Notre Dame High School will be responsible for the inspection, maintenance and repair of the stormwater management system at the Site.

SUMMARY OF INSPECTION AND MAINTENANCE PROCEDURES, EQUIPMENT AND MATERIALS

Routine maintenance of the site stormwater management system is required in order to maintain the stormwater conveyance and control capabilities of the system. The following summarizes the recommended inspection and maintenance procedures for the stormwater management system at the site and the minimum equipment requirements to maintain and repair the various system components.

Inspection

Periodic inspections of the entire stormwater management system by Notre Dame High School personnel specifically assigned to this task, or a duly authorized representative of the School, should occur at a minimum frequency of once per month, with additional inspections after significant weather events (e.g., snow, ice, rain). The following areas/structures should be inspected, and their condition recorded ("good", "requires routine maintenance or repair", "requires urgent maintenance or repair"). This list is not meant to be all-inclusive and any additional areas of the stormwater management system identified by facility personnel that are not on this list should be included in the inspection routine. Additionally, a log of inspection dates shall be maintained.

Stormwater Management Facility Inspection Checklist

	Facility Item	Condition / Comment	✓ If Maint. Req'd
1.	**Inlet Structures**		
	Condition of Structures		
	Erosion (Around Structure and/or Pipes)		
	Trash and Debris		
	Sediment		
	Aesthetics		
	Other:		
2.	**Outlet Structure/Drain Basin**		
	Condition of Structure		
	Erosion (Around Structure and/or Outlet Pipe)		
	Trash and Debris		
	Sediment (In and Around)		
	Structural Components		
	Aesthetics		
	Other:		
3.	**Inline Drains**		
	Condition of Structure		
	Erosion (Around Structure and/or Outlet Pipe)		
	Trash and Debris		
	Sediment (In and Around)		
	Structural Components		
	Aesthetics		
	Other:		
4.	**Miscellaneous**		
	Effectiveness of Existing Maintenance Program (annual review required)		
	Potential Mosquito Habitats		

Maintenance Procedures, Equipment and Materials

Maintenance procedures for stormwater management systems generally fall into two (2) categories: preventive maintenance and corrective/emergency maintenance. Preventive maintenance procedures are those performed on a routine basis to insure the proper functioning of the stormwater management components. Corrective or emergency maintenance procedures are those performed due to deficiencies identified during periodic inspections, additional inspections after significant weather events or those identified and developing on an emergent basis. The equipment and materials required will vary depending on the type of work being performed. The following is a summary of preventive maintenance procedures that should be performed as required or as dictated by observations during the stormwater management inspection routine. Any fertilizers, herbicides and pesticides must be environmentally friendly. The following list is not meant to be all-inclusive and any additional areas of the stormwater management system identified by facility personnel that are not on this list should be included in the preventive maintenance routine. This maintenance procedures list should be reviewed each time the stormwater management system is inspected. A log of stormwater management system maintenance should be maintained detailing at a minimum the date of maintenance, type of maintenance performed and the individual or contractor performing the maintenance.

Maintenance Category		Equipment/Materials	Schedule
1.	**Preventive Maintenance**		
	Removal and Disposal of Trash and Debris (In and Around Contributing Drainage Areas, Piping and Catch Basins) – *NOTE: Disposal of waste material shall be in compliance with all applicable local, state, and federal regulations.*	Rakes Shovels Picks Wheel Barrows Loader or Backhoe as Required Trucks for Transporting Materials as required	
	Sediment Removal and Disposal (In and Around Contributing Drainage Areas, Piping and Catch Basins)	Rakes Shovels Picks Wheel Barrows Loader or Backhoe as Required Trucks for Transporting Materials as required	

Note: * - Fertilizer(s) (i.e. 12-0-12), herbicide(s) and pesticide(s) must be environmentally friendly.

	Maintenance Category	Equipment/Materials	Schedule
2.	**Corrective / Emergency Maintenance**		
	Structural Repairs (Inlets, Piping, Drain Basin, etc.)	Tools and Materials for Concrete Work (Mixers, Form Materials, Concrete Patching Materials, etc.) Welding Equipment Tools and Materials for Asphalt Work Tools and Material for Inlet Replacement	
	Snow and Ice Removal (Inlets, Drain Basin)	Shovels Picks Snow Blowers Vehicle Mounted Plows Backhoe / Loader Trucks for Transporting Materials as required	

Inspection/Maintenance Schedule

At a minimum inspections and/or maintenance of the above items should be scheduled as follows:

Facility component	Inspection Item(s)	Frequency
Structural Components (Inlets, Drain Basin, etc.)	Cracking, subsidence, spalling, erosion, and deterioration, trash and debris, sediment, mechanical components, aesthetics	Four (4) times annually and/or after every storm event exceeding one inch (1") of rainfall

Inspection/Maintenance Costs

Routine preventative maintenance of the system consists of inspecting the contributory area, turf, structures and the removal of sediment. The range of cost for these tasks is as follows:

Inspection	$100 each occurrence	to	$400 each occurrence
Trash & Debris Removal	$800 each occurrence	to	$2,400 each occurrence
Sediment Removal	$1,000.00 each occurrence	to	$3,000 each occurrence

Corrective maintenance costs associated with the systems are as follows:

Inlet Repair	$50.00 each occurrence	to	$750.00 each occurrence
Drain Basin Repair	$50.00 each occurrence	to	$2,000 each occurrence
Snow and Ice Removal	$100 each occurrence	to	$800 each occurrence

Appendix E

Drainage Area Maps

DESCRIPTION	NO.	DATE:	BY:	CHK:

REVISIONS

DRAWN BY: KRD 07/26/2021

CHECKED BY: RG 07/26/2021

CHECKED BY:

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NJ PROFESSIONAL ENGINEER
LICENSE NO. 24GE03365600
DATE: 07/26/2021

DAREN J. PHIL, PE
NJ PROFESSIONAL ENGINEER
LICENSE NO. 24GE03619100
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EXCELLENCE ♦ ECONOMY ♦ ENVIRONMENT

NOTRE DAME HIGH SCHOOL (601 LAWRENCE ROAD)
SYNTHETIC TURF FIELD IMPROVEMENTS
BLOCK 1301, LOT 34.02 (TAX MAP TOWNSHIP OF LAWRENCE SHEET 13)
TOWNSHIP OF LAWRENCE, COUNTY OF MERCER, STATE OF NEW JERSEY

EXISTING DRAINAGE AREA MAP

PROJECT NUMBER: SCE-12075.011

SCALE: 1"=20'

SHEET 1 OF 2

REVISION __

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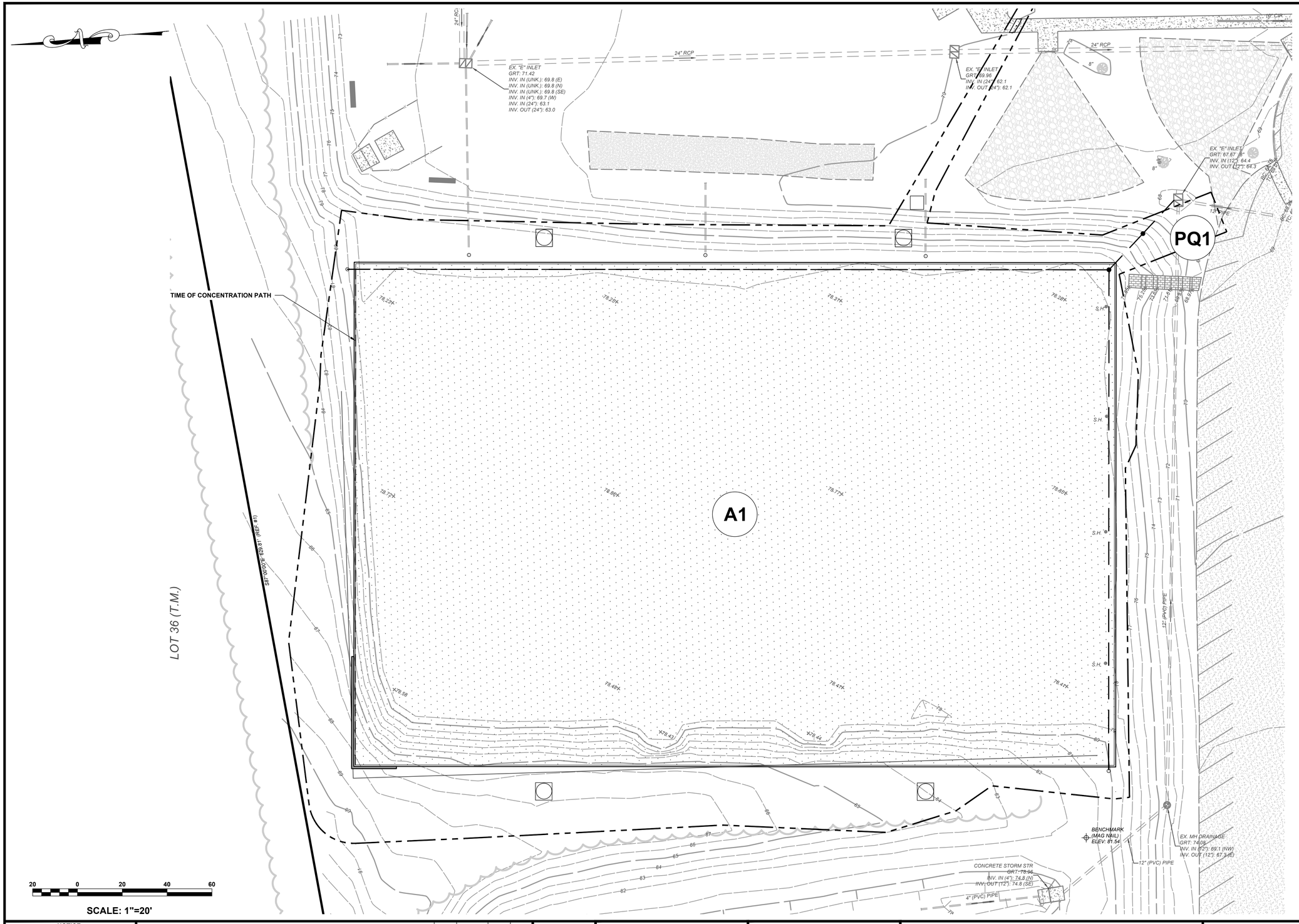

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DESCRIPTION	NO.	DATE:	BY:	CHK:
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PROPOSED DRAINAGE AREA MAP

PROJECT NUMBER: SCE-12075.011

SCALE: 1"=20'

SHEET 2 OF 2

REVISION -