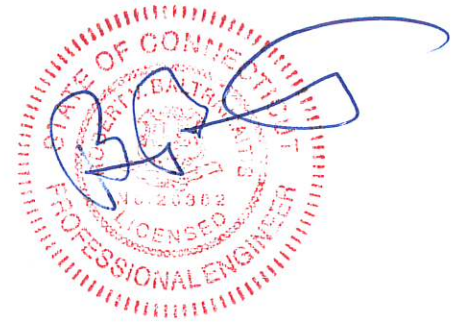


RECEIVED
10.25.2021
East Hampton
Land Use Office

Robert V. Baltramaitis, P.E.
27 Tammy Hill Road
Wallingford, Connecticut 06492
(203) 915-8301
baltro@aol.com



STORM WATER ANALYSIS
GLOBAL SELF-STORAGE
October 20, 2021

The existing property at 265 West High Street (State Route 66) is 4.7 acres in size and located on the south side of West High Street just east of Long Hill Road in East Hampton. It has been the home of Sportsplex on 66, an indoor recreational facility. The site has a single building of approximately 38,300 square feet with approximate exterior dimensions of 132' by 290'. The site is served by a single driveway to accommodate ingress and egress traffic. The east side of the site provides on-site parking with a combination of asphalt and compacted road millings. A narrow paved drive extends around the north side of the building to provide access to the northwest corner.

The majority of the developed site lies within a 'C' commercial district. An undeveloped portion of the property to the west lies within an R-2 zoning district and is adjacent to a recently approved residential subdivision known as Long Hill Estates. A wetland system is present along the west side of the property in the form of an intermittent watercourse conveying storm flows from the upgradient Charles Mary Drive neighborhood. It enters the site from the south and extends northwesterly ultimately draining to a culvert under Long Hill Road. Other wetlands were located off the site along the roadway frontage and convey flows from a 42" diameter corrugated metal pipe also draining to the aforementioned culvert. The wetland soils are classified as a Leicester poorly drained course loamy sand which are typically found in depressions on glacial till uplands. The wetland area is wooded with mature trees and shrubs and the intermittent watercourse is stable with a rock and stone lined base and side slopes. See separate report by Mr. James Sipperly, Certified Soil Scientist dated October 19, 2021.

The applicant proposes to convert the existing high-ceiling building space to two stories of indoor climate controlled self-storage space. The existing floor elevation of 314.7 will be maintained for first floor storage units. A second floor will be constructed within the building at elevation 326.7. Access to the second floor is proposed from the west side of the building where the existing elevations are highest against the building at approximately elevation 320.0 to more easily accommodate access. As depicted on the site plans, revised through October 17, 2021, the driveway and parking area on the north and west sides of the building will be expanded to provide sufficient vehicular access and maneuverability for second floor access. After an initial discussion with the Town of East Hampton Inland Wetlands Commission on September 29, 2021, the extent of these improvements and the associated grading have been minimized to provide a larger undisturbed buffer to the wetlands. Additionally, the existing roadside swale along Long Hill Road that was previously proposed to be encapsulated (piped) will remain an open channel, but reconfigured and stabilized with riprap lining.

An on-site detention basin is provided to fully mitigate the proposed project impacts. Hydraflow Hydrographs® (HH) software was used to generate computer models of the pre- and post-development scenarios. HH utilizes the methodologies set forth in the Technical Release No. 55 (TR-55) and Technical Release No. 20 (TR-20) computer model, originally developed by the Soil

Conservation Service (SCS) now called the Natural Resources Conservation Service (NRCS) as well as Rational and Modified Rational Methods. The HH software predicts runoff rates based upon several factors including land use, hydrologic soil type, vegetative cover, watershed area, time of concentration rainfall data and the attenuation effects due to ponds and structures.

The following runoff curve numbers (CN) were used to develop models for the existing and post-development conditions based on existing land coverage and the underlying soils, as identified in the Soil Survey of New London County, Connecticut. The following runoff coefficients were used based on the hydrologic classification of area soils which are of hydrologic class 'C'.

<u>Land Cover</u>	<u>CN</u>
Roofs	98
Pavements	98
Grass	74
Woods	70

The times-of-concentration (Tc) were determined for both the pre- and post-development conditions using accepted practices that consider the characteristic of the watershed, its slope and travel length; a minimum time-of-concentration (Tc) of 5 minutes was utilized. Rainfall data was taken from NOAA 14 published rainfall values; the associated 24-hour rainfall totals utilized are 3.34", 5.13", 6.25" and 7.97" for the 2-, 10-, 25- and 100-year storms, respectively, for the specific site location in Middlesex County.

To mitigate peak flow impacts, an on-site detention basin is proposed to hold back the storm water volume and meter out flows. The detention basin has been designed with a rain garden bottom including a specified soil mix and planting design to promote storm water quality. The basin bottom will be established at elevation 300.0. The top of berm will be at 304.5 with a 10' wide emergency spillway at elevation 304.0. Flows will be metered via a 4" diameter orifice with an invert elevation set at the basin bottom.

The following table summarizes the existing, proposed and proposed w/ detention basin flows for the 2-, 10-, 25-, 50- and 100-year storm events:

Condition	Design Storm				
	2-Year	10-Year	25-Year	50-Year	100-Year
Existing	0.9 cfs	2.6 cfs	3.1 cfs	3.5 cfs	3.7 cfs
Proposed	1.4 cfs	3.3 cfs	3.9 cfs	4.3 cfs	4.4 cfs
Proposed (w/ Detention)	0.6 cfs	1.1 cfs	1.2 cfs	1.3 cfs	1.4 cfs

As demonstrated by the calculations and the summary table above, the proposed detention basin will not only reduce, but actually decrease the peak flows from the proposed development in all storm events. The rain garden/ detention basin provides sufficient volume to capture and hold the

anticipated 100-year storm event. During this storm, the water surface elevation will reach 303.2', which is 0.8' below the emergency spillway and 1.3' below the top of berm, providing adequate freeboard.

Existing, Proposed and Proposed w/ Detention hydrographs including the pond (detention basin) report for the 100-year storm event are contained in the attachments. Summary sheets for the smaller storms are also provided for the 2-, 10-, and 25-, and 50-year storms.

RAIN GARDEN MAINTENANCE SCHEDULE

The maintenance of the raingarden/ detention basin will be the perpetual responsibility of the property owner. It is suggested that this maintenance requirement be filed on the East Hampton Land Records and run with the land. The following maintenance is suggested:

Before/ After Significant Rainfall

- Check and clean storm drain inlets discharging to raingarden;
- Remove any trash/ debris from raingarden;
- Check and clean outlet control structure

Semi-Annually

- Remove sediment/ debris from areas draining to raingarden;
- Check for erosion and repair ruts/ rills on berms;
- Trim dead/ dying vegetation;
- Remove weeds and invasive vegetation;
- Remove debris from raingarden;
- Replace dead/ dying plants
- Perimeter mowing – avoid clipping discharge into raingarden

Annually

- Remove accumulated sediment/ debris from basin
- Check mulch layer; add as necessary to maintain 3-4" thickness

Roadside Swale

An existing intermittent watercourse along the site frontage shows signs of erosion and soil loss and has nearly vertical banks. It is proposed to reconstruct the swale to have a uniform cross-section including a 4' bottom width, 2' depth and stable 1.5:1 side slopes, all armored with intermediate riprap. The total temporary disturbance is 4,300 square feet of wetlands to re-grade, install rip rap to stabilize the banks and provide a stable and firm channel bottom.

Calculations were performed to determine the proposed swale configuration. While the ConnDOT Drainage Manual only requires roadside swales to be designed for a 10-year storm, the proposed configuration is adequate for the 100-year storm. Based on the contributing watershed, the anticipated 10-year flow is 40.5 cfs and the flow depth is 0.8' providing 1.2' of freeboard to the top of swale. The 100-year flow is 61.2 cfs and the flow depth is 1.25', still within the channel banks.

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.02

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	SCS Runoff	-----	-----	10.35	-----	-----	40.55	50.75	57.68	61.24	Area to 42 CMP
2	SCS Runoff	-----	-----	0.887	-----	-----	2.619	3.162	3.525	3.710	EXISTING
3	SCS Runoff	-----	-----	1.447	-----	-----	3.337	3.896	4.265	4.453	PROPOSED
4	Reservoir	3	-----	0.614	-----	-----	1.143	1.250	1.318	1.352	Det Basin Outflow

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.02

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	10.35	2	752	70,855	---	300.4	----	Area to 42 CMP
2	SCS Runoff	0.887	2	724	2,723	---	----	----	EXISTING
3	SCS Runoff	1.447	2	724	4,330	---	----	----	PROPOSED
4	Reservoir	0.614	2	732	1,911	3	301.68	1,412	Det Basin Outflow
SW Model.gpw					Return Period: 2 Year			Friday, Oct 22, 2021	

Hydrograph Summary Report

Hydraflow Hydrographs by Intellisolve v9.02

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description	
1	SCS Runoff	40.55	2	748	246,197	---	300.85	-----	Area to 42 CMP	
2	SCS Runoff	2.619	2	724	7,834	---	-----	-----	EXISTING	
3	SCS Runoff	3.337	2	724	10,280	---	-----	-----	PROPOSED	
4	Reservoir	1.143	2	738	6,832	3	302.71	2,915	Det Basin Outflow	
SW Model.gpw					Return Period: 10 Year			Friday, Oct 22, 2021		

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.02

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description	
1	SCS Runoff	50.75	2	748	306,133	---	301.10	----	Area to 42 CMP	
2	SCS Runoff	3.162	2	724	9,486	---	----	----	EXISTING	
3	SCS Runoff	3.896	2	724	12,103	---	----	----	PROPOSED	
4	Reservoir	1.250	2	738	8,437	3	303.00	3,408	Det Basin Outflow	
SW Model.gpw					Return Period: 25 Year			Friday, Oct 22, 2021		

Hydrograph Summary Report

Hydraflow Hydrographs by Intellsolve v9.02

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	57.68	2	748	347,126	---	301.20	-----	Area to 42 CMP
2	SCS Runoff	3.525	2	724	10,602	---	-----	-----	EXISTING
3	SCS Runoff	4.265	2	724	13,320	---	-----	-----	PROPOSED
4	Reservoir	1.318	2	740	9,523	3	303.20	3,747	Det Basin Outflow
SW Model.gpw					Return Period: 50 Year			Friday, Oct 22, 2021	

Hydrograph Summary Report

Hydraflow Hydrographs by Intellsolve v9.02

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	61.24	2	748	368,313	---	306.25	-----	Area to 42 CMP
2	SCS Runoff	3.710	2	724	11,174	---	-----	-----	EXISTING
3	SCS Runoff	4.453	2	724	13,941	---	-----	-----	PROPOSED
4	Reservoir	1.352	2	740	10,082	3	303.30	3,923	Det Basin Outflow
SW Model.gpw					Return Period: 100 Year			Friday, Oct 22, 2021	

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

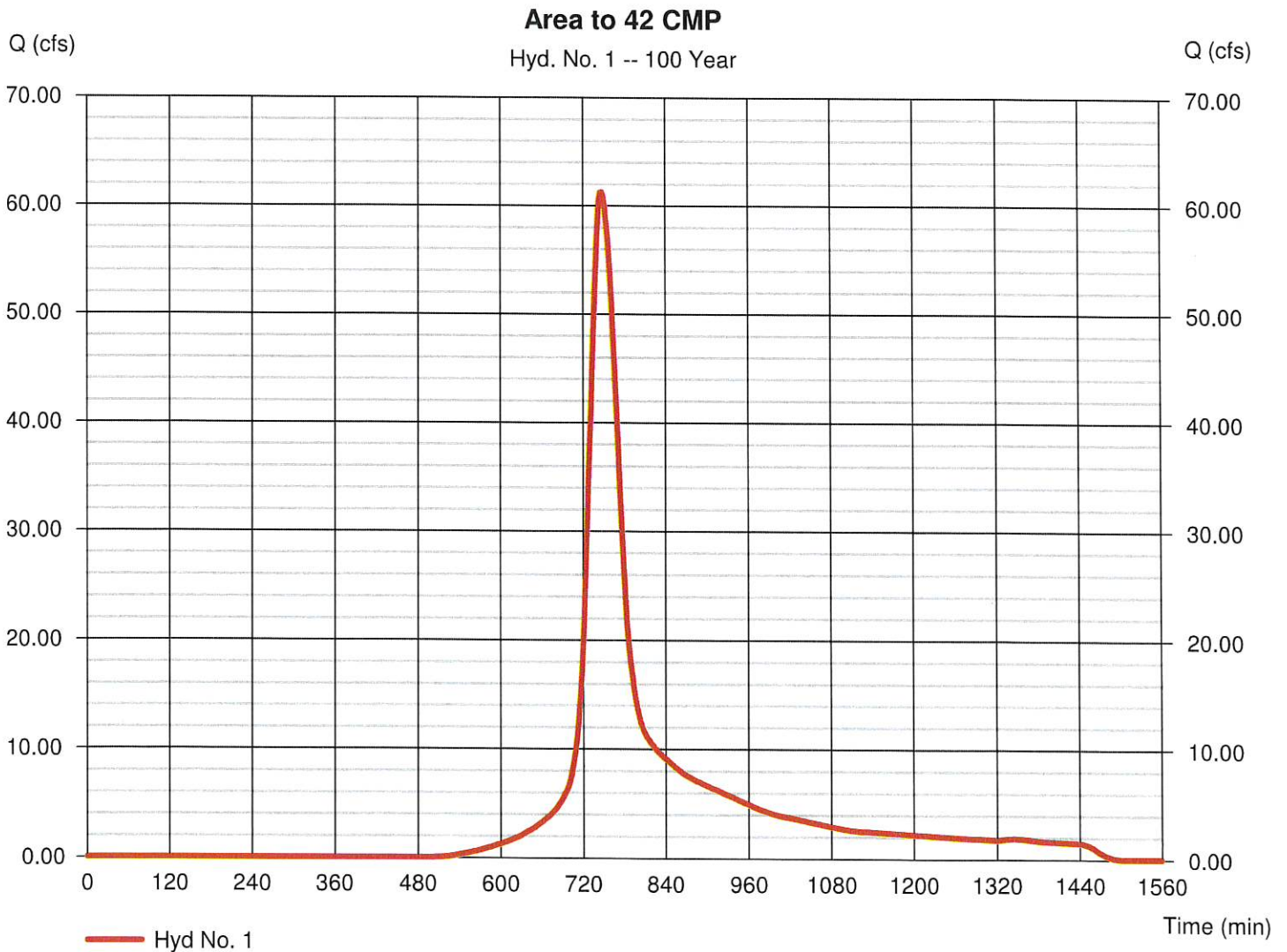
Friday, Oct 22, 2021

Hyd. No. 1

Area to 42 CMP

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 2 min
 Drainage area = 24.100 ac
 Basin Slope = 6.0 %
 Tc method = LAG
 Total precip. = 7.97 in
 Storm duration = 24 hrs

Peak discharge = 61.24 cfs
 Time to peak = 748 min
 Hyd. volume = 368,313 cuft
 Curve number = 68
 Hydraulic length = 2560 ft
 Time of conc. (Tc) = 38.82 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Friday, Oct 22, 2021

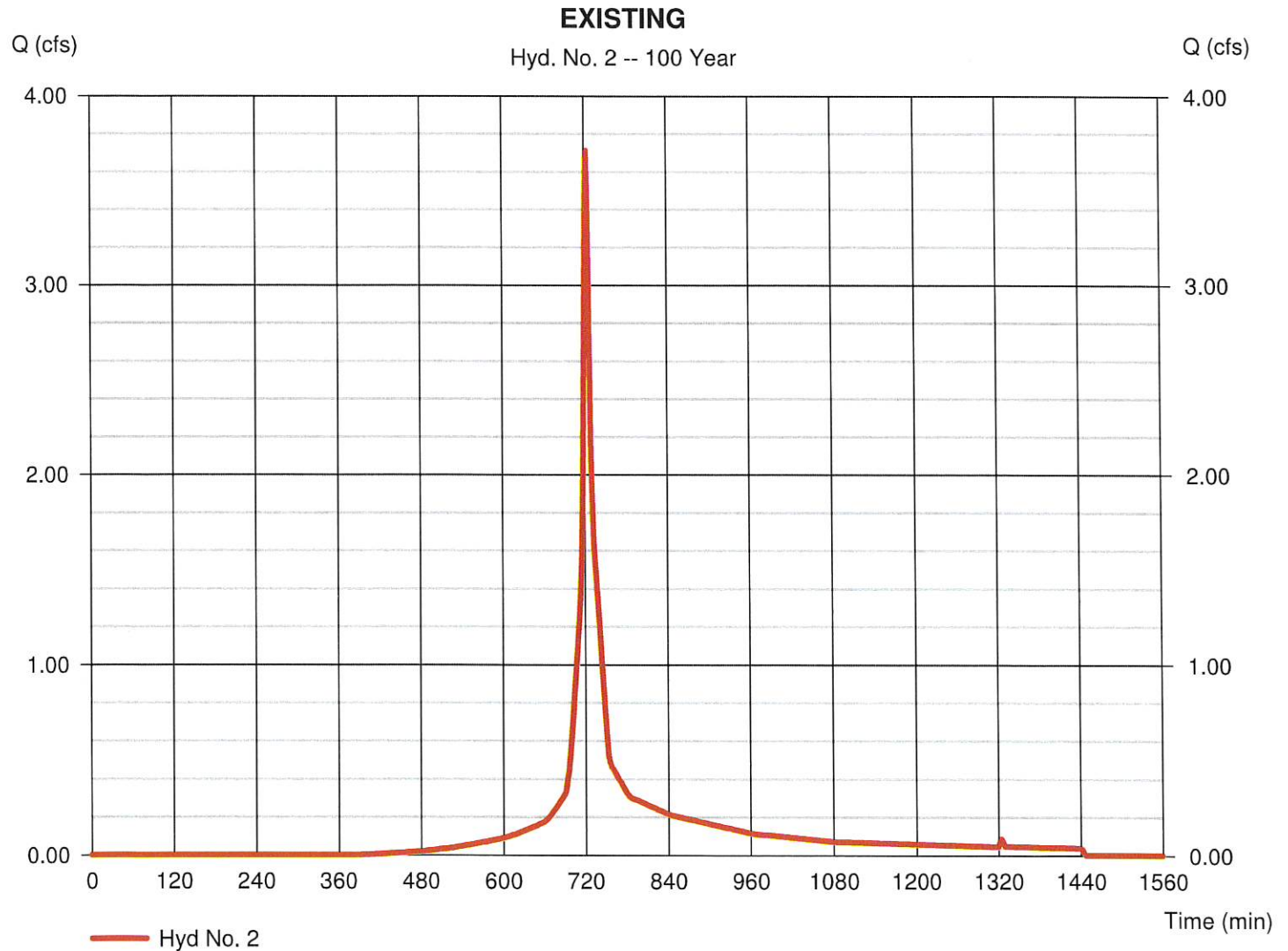
Hyd. No. 2

EXISTING

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 2 min
Drainage area = 0.640 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.97 in
Storm duration = 24 hrs

Peak discharge = 3.710 cfs
Time to peak = 724 min
Hyd. volume = 11,174 cuft
Curve number = 76*
Hydraulic length = 0 ft
Time of conc. (Tc) = 5.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = [(0.120 x 98) + (0.150 x 74) + (0.370 x 70)] / 0.640



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Friday, Oct 22, 2021

Hyd. No. 3

PROPOSED

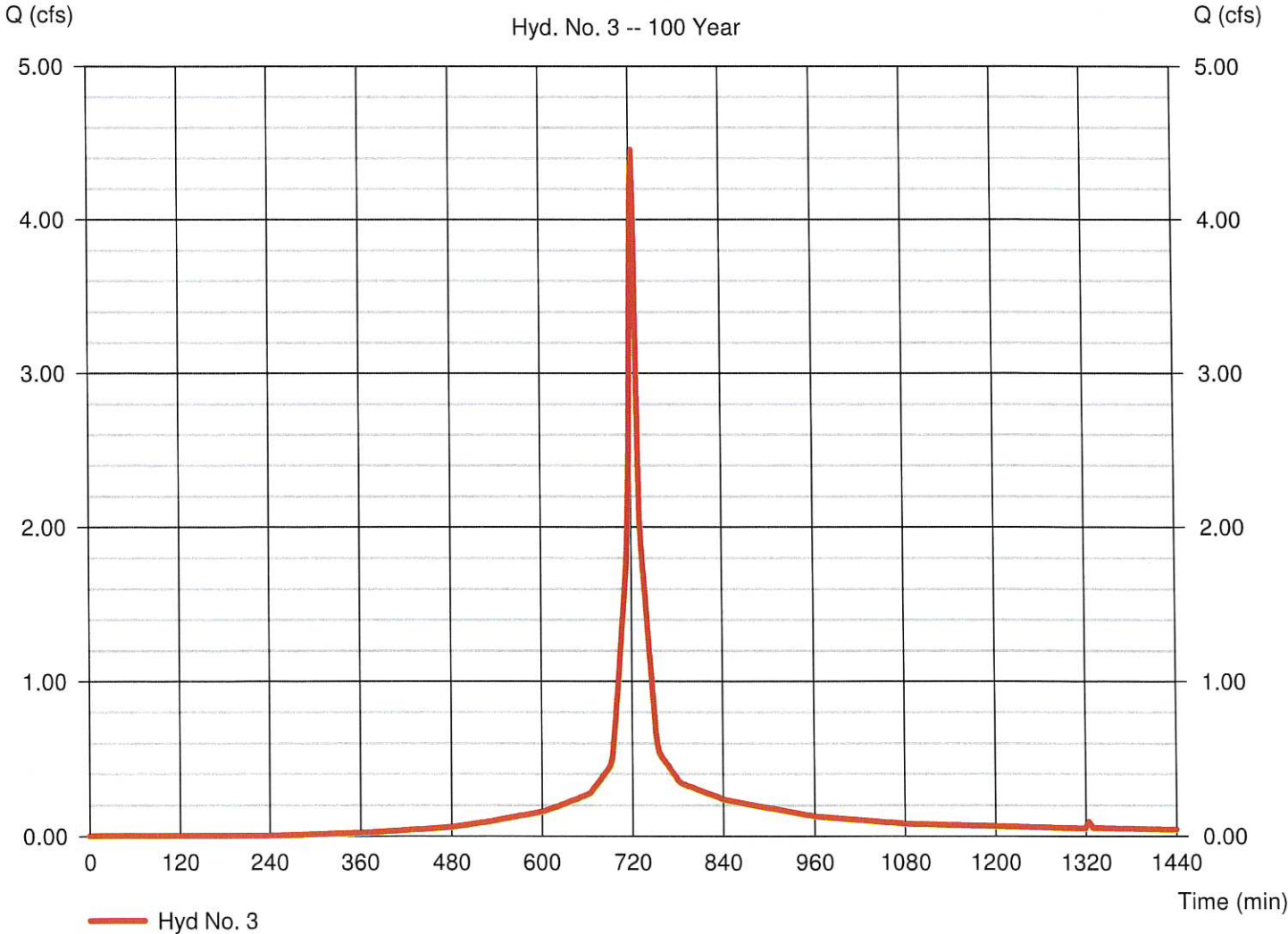
Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Time interval = 2 min
Drainage area = 0.650 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.97 in
Storm duration = 24 hrs

Peak discharge = 4.453 cfs
Time to peak = 724 min
Hyd. volume = 13,941 cuft
Curve number = 86*
Hydraulic length = 0 ft
Time of conc. (Tc) = 5.00 min
Distribution = Type III
Shape factor = 484

* Composite (Area/CN) = [(0.320 x 98) + (0.330 x 74)] / 0.650

PROPOSED

Hyd. No. 3 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Friday, Oct 22, 2021

Hyd. No. 4

Det Basin Outflow

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 2 min
Inflow hyd. No. = 3 - PROPOSED
Reservoir name = Proposed Detention Basin

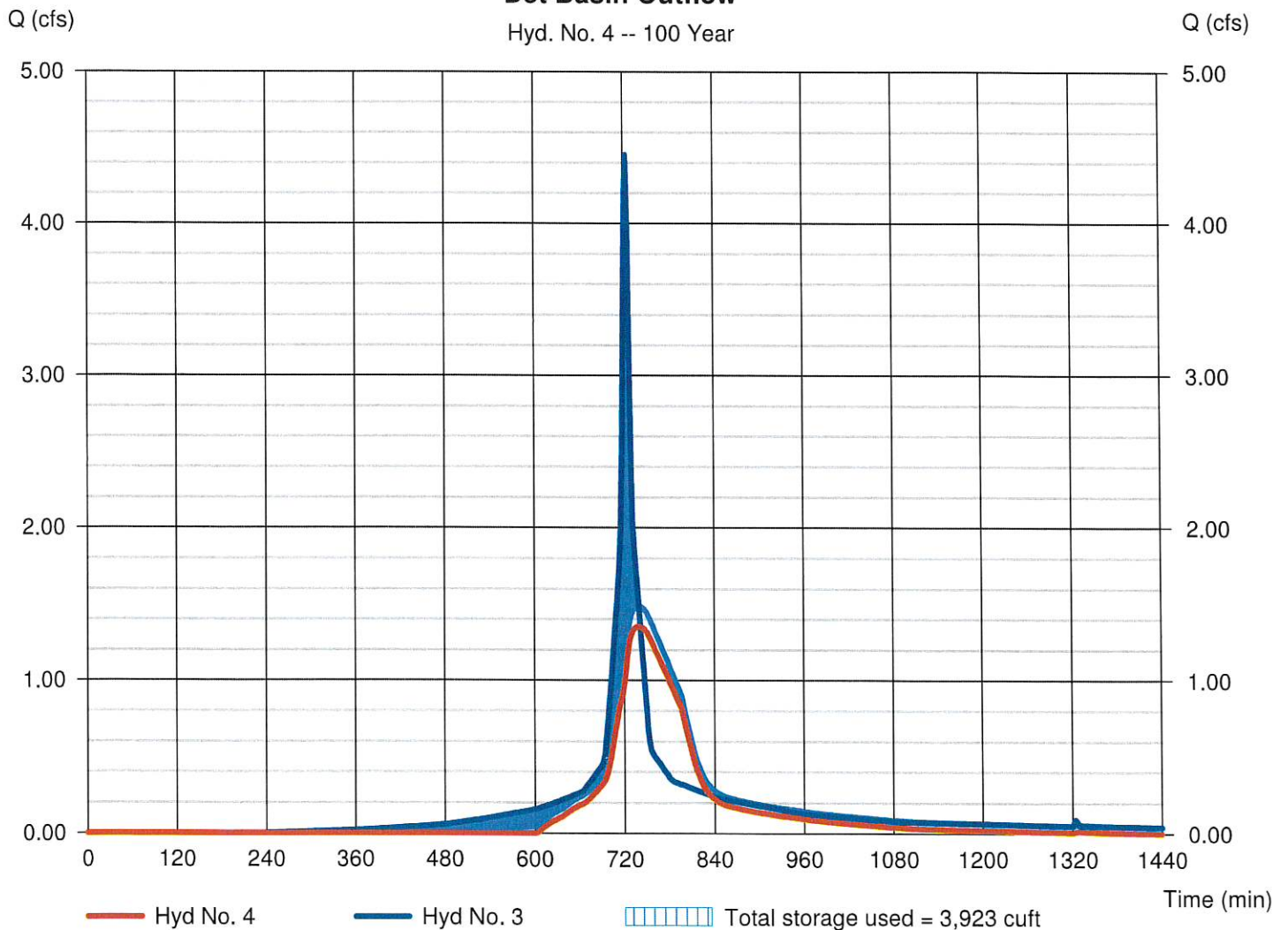
Peak discharge = 1.352 cfs
Time to peak = 740 min
Hyd. volume = 10,082 cuft
Max. Elevation = 303.30 ft
Max. Storage = 3,923 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

*0.7' to spillway
1.2' freeboard
to top of berm*

Det Basin Outflow

Hyd. No. 4 -- 100 Year



Pond No. 1 - Proposed Detention Basin

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 300.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	300.00	505	0	0
2.00	302.00	1,233	1,685	1,685
4.00	304.00	2,272	3,452	5,137
4.50	304.50	2,566	1,209	6,345

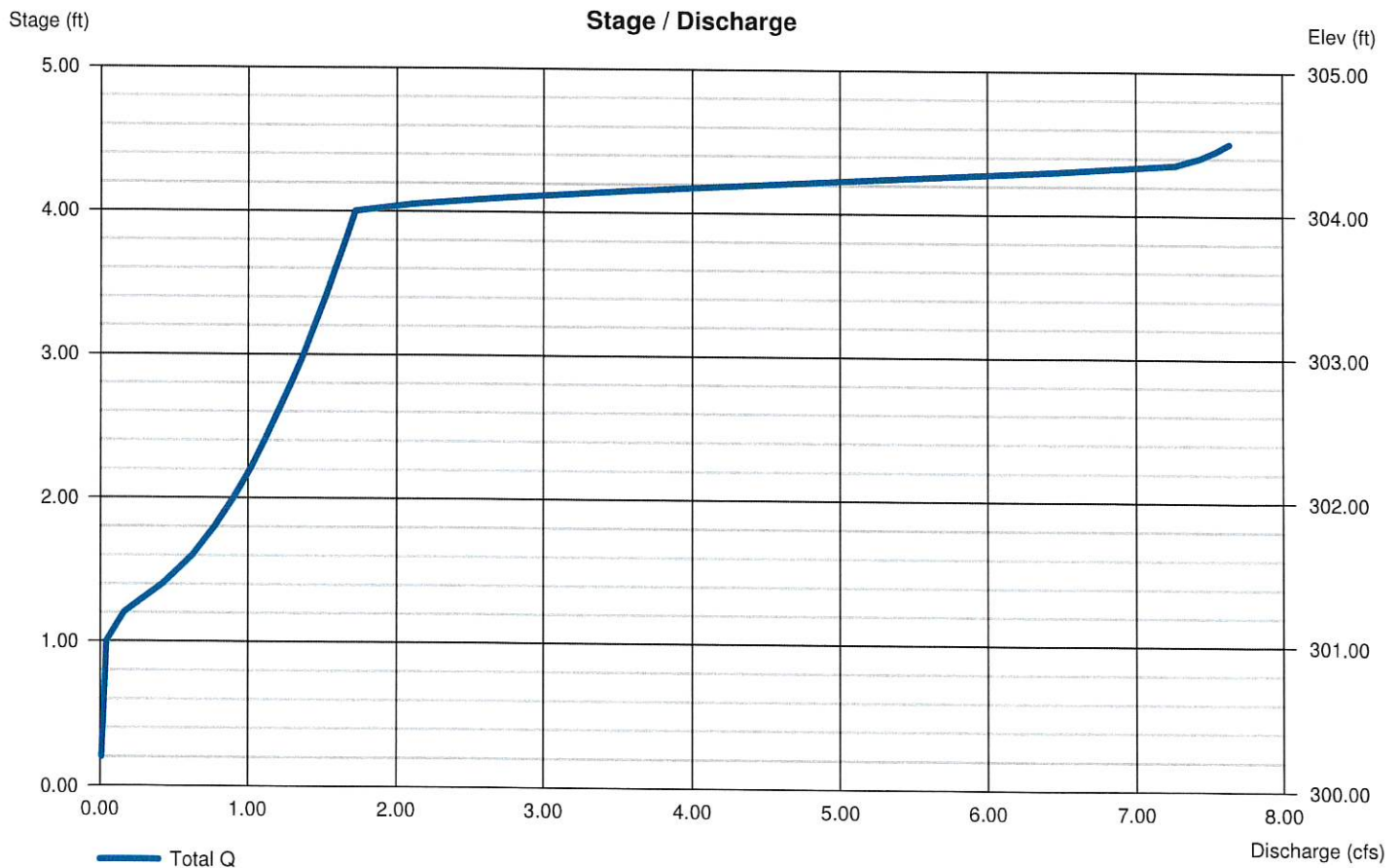
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 300.00	301.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 0.02	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	Yes	No	No

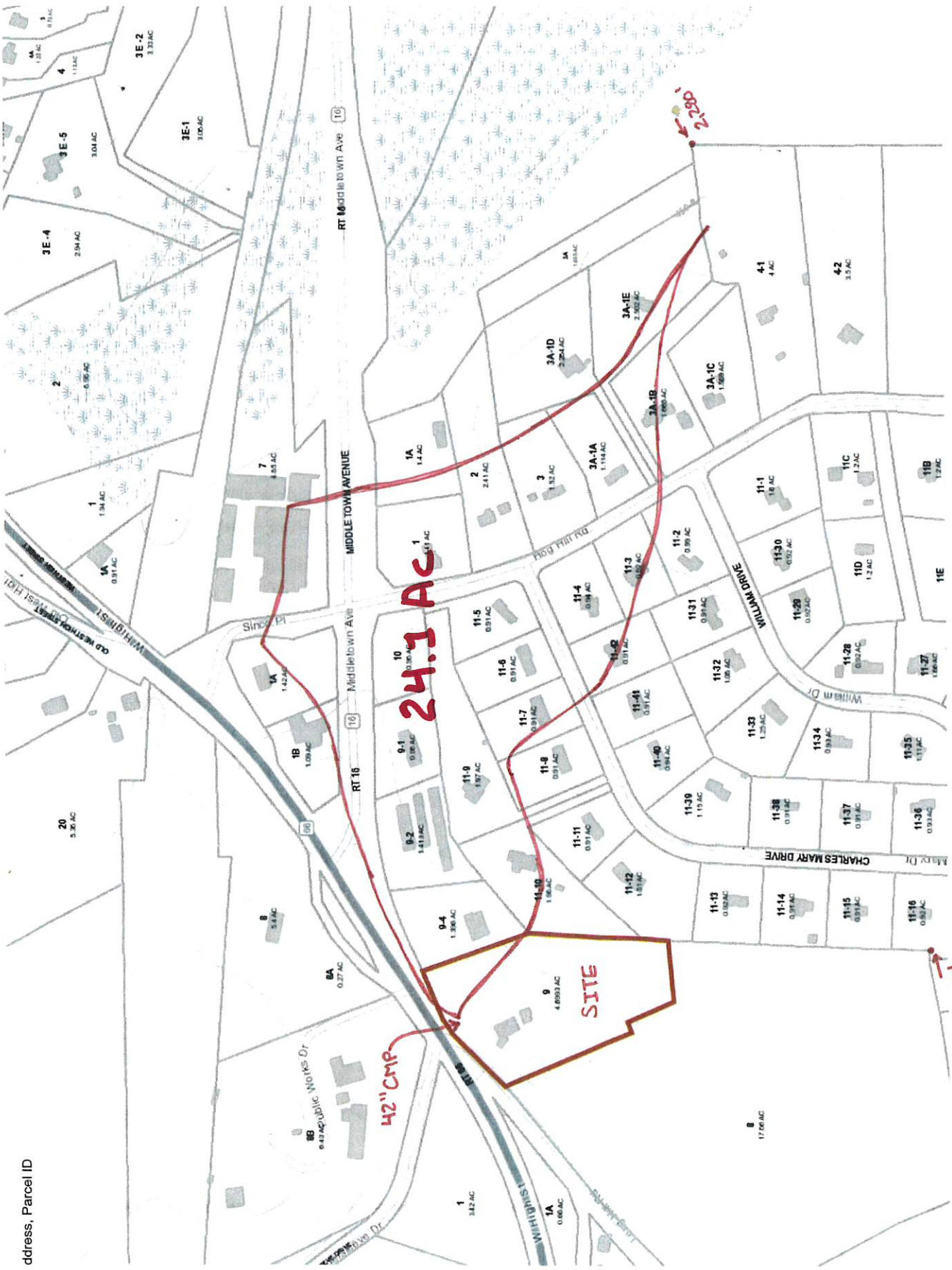
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 304.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 3.000 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet and outlet control. Weir risers are checked for orifice conditions.



address, Parcel ID



Watershed to
42" C.M.P.

2290

Channel Report

Hydraflow Express by Intelisolve

Monday, Oct 11 2021

Roadside Swale from 42 CMP

Trapezoidal

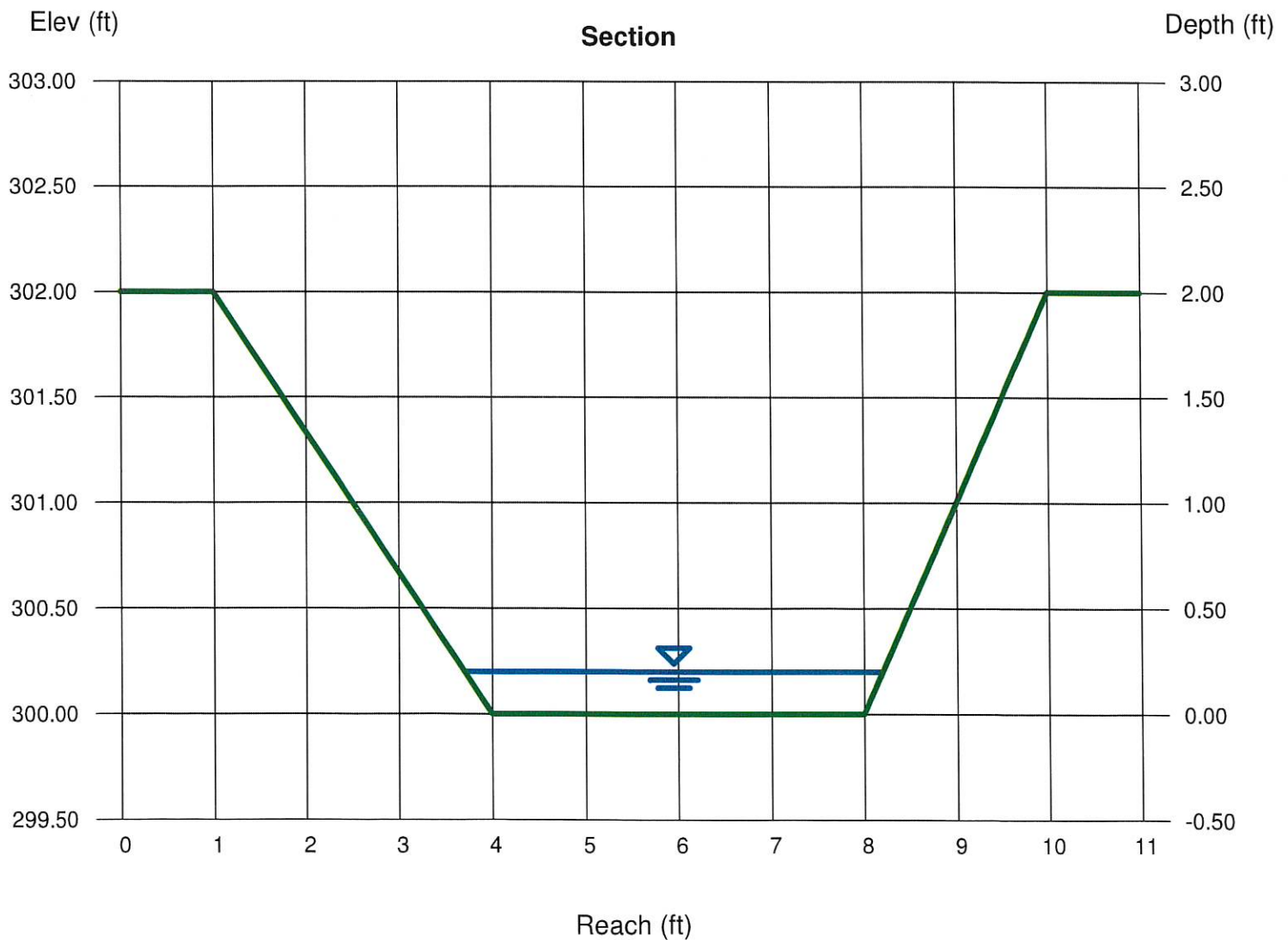
Bottom Width (ft) = 4.00
Side Slopes (z:1) = 1.50, 1.00
Total Depth (ft) = 2.00
Invert Elev (ft) = 300.00
Slope (%) = 4.00
N-Value = 0.030

Highlighted

Depth (ft) = 0.20
Q (cfs) = 2.713
Area (sqft) = 0.85
Velocity (ft/s) = 3.19
Wetted Perim (ft) = 4.64
Crit Depth, Yc (ft) = 0.01
Top Width (ft) = 4.50
EGL (ft) = 0.36

Calculations

Compute by: Q vs Depth
No. Increments = 10



Channel Report

Roadside Swale from 42 CMP

Trapezoidal

Bottom Width (ft) = 4.00
 Side Slopes (z:1) = 1.50, 1.00
 Total Depth (ft) = 2.00
 Invert Elev (ft) = 300.00
 Slope (%) = 4.00
 N-Value = 0.030

Highlighted

Depth (ft) = 0.20
 Q (cfs) = 2.713
 Area (sqft) = 0.85
 Velocity (ft/s) = 3.19
 Wetted Perim (ft) = 4.64
 Crit Depth, Yc (ft) = 0.01
 Top Width (ft) = 4.50
 EGL (ft) = 0.36

Calculations

Compute by: Q vs Depth
 No. Increments = 10

25yr - 51cfs - E = 301.1 D = 1.1'
50yr - 58cfs - E = 301.2 D = 1.2'
100yr - 61.2cfs - E = 301.25 D = 1.25'
Aveil D = 2'

