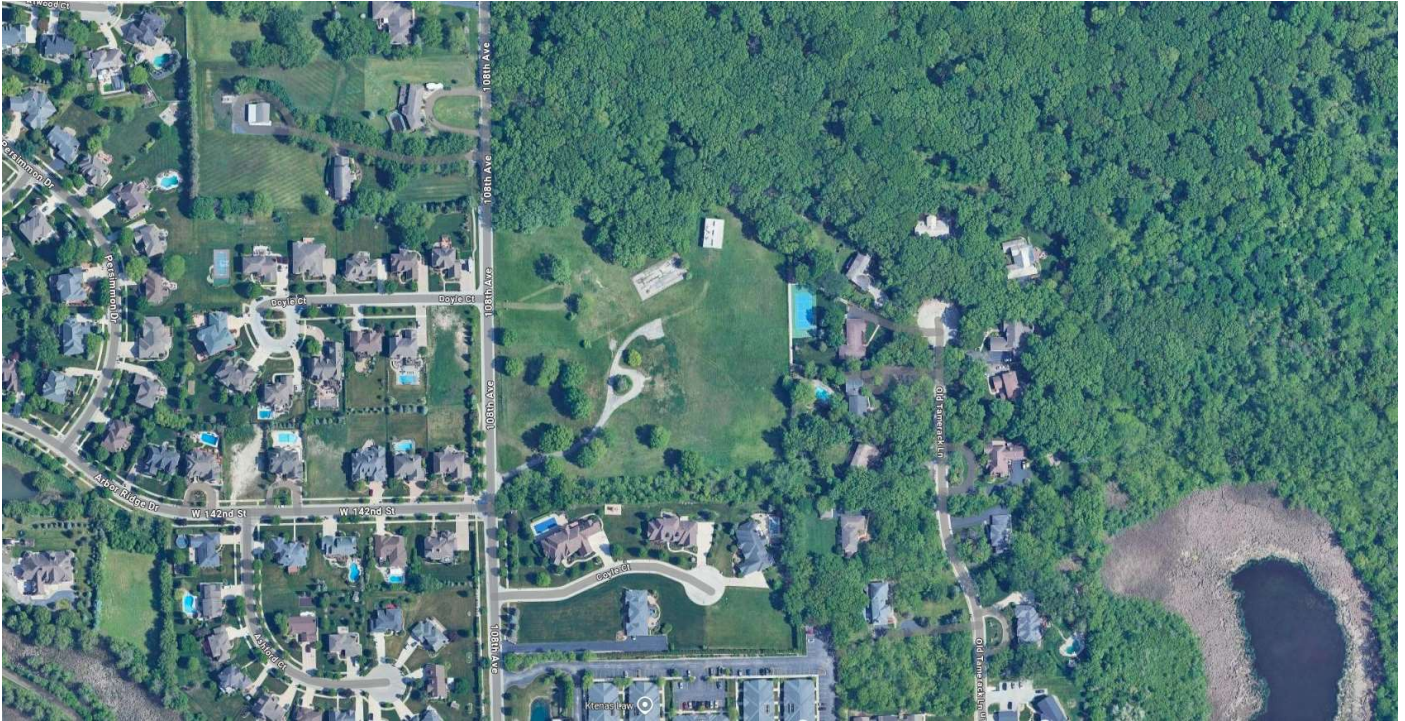




Preliminary Stormwater Report

ERA Project #W24323.00

Prepared for:

RT/MGR, LLC

September 8, 2025

(14137 S 108th Ave.) – Bridlewood Subdivision
Orland Park, Cook County, Illinois

September 8, 2024

Village of Orland Park,
14700 S. Ravinia Ave.
Orland Park, IL 60462

Subject: Preliminary Stormwater Report

ERA is pleased to submit this preliminary report for the stormwater calculations for the Bridlewood Subdivision development in Orland Park at 14137 S 108th Ave. Enclosed you will find calculations, exhibits, and a narrative describing the proposed work for this project. Also see the provided preliminary civil engineering plan.

All work has been completed by me or someone directly under my supervision, and this sheet signed and sealed will encompass all documents pertaining to the stormwater report.

I appreciate the opportunity for your review of this project.

Sincerely,

Kevin Faje, P.E.
Design Engineer



Expires: November 30, 2025

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STORMWATER REPORT

Bridlewood Subdivision
14137 108th Ave.
Orland Park, IL 60467

PROJECT SUMMARY

The project site is located at 14137 108th Ave in Orland Park, IL 60467. The existing site has a driveway and building. The subject property is bound by 108th Ave. on the west, Forest Preserve on the north, and residential lots on the east and south (See Location Map). The subject property has a total area of 9.44 acres. The owner is proposing to demolish the existing driveway and structure. A 20-lot residential subdivision will then be constructed on the site. The subdivision improvements will include a new 50' wide dedicated roadway, mass grading, storm sewer, sanitary sewer, water main, lighting, detention, bmps, landscaping, and erosion control. In accordance with the Village of Orland Park and the MWRD-WMO Stormwater Ordinance, ERA has designed a stormwater management plan that incorporates runoff control, volume control, and detention for the new impervious area on the site.

The existing site has approximately 0.49 acres of existing impervious area. The existing runoff from the site is split between the north property line, south property line, and front ROW. No floodplains are present within the parcel or within 100 feet of the project area. Wetlands are present in the steep area on the north side of the site (See attached wetland delineation). The existing wetland will not be disturbed as part of this project. There are proposed temporary and permanent impacts to the buffer that will be mitigated as part of this project. (See attached NWI Map and FIRM).

The redevelopment area of the site is 8.04 acres. The redevelopment will remove all the existing impervious area on the site. The redeveloped site will have 3.00 acres of impervious area. The impervious area on the site will increase by 2.51 acres. Runoff from the site will be captured by storm sewer and drain to either the proposed detention basin in the southwest corner or to the wetland on the north side of the property. Some impervious areas on the north side of the site will continue to drain to the wetland to the north to maintain wet conditions for the wetland. Runoff to the wetland in the proposed condition will decrease by about 20%. Emergency overflow from the detention basin will overflow a 20' wide 1.0' tall weir to the ROW. The runoff will then flow through the ditch and storm sewer and eventually make its way to Longrun Creek.

The proposed stormwater management was designed to satisfy the requirements of the Village of Orland Park and the MWRD.

STORMWATER

In the existing conditions the peak flow from the site is 23.16 cfs, and in the proposed conditions the peak flow from the redevelopment area will be 31.67 cfs for the 100-year critical duration storm. There are about 1.64 acres of offsite area tributary to the site. Peak flow was calculated using a TR-20 analysis with a curve number of 75.24 for the existing conditions. The proposed development has a CN of 82.96. An adjusted CN of 78.39 was used for the TR-20 calculations. The hydrologic soil group for the site is type C with a curve number of 74 for pervious areas and 98 for impervious areas. Bulletin 75 rainfall data and distributions were used for the TR-20 analysis. The 100-year 24-hour storm event was used to calculate the required detention for the site. A time of concentration of 0.40 hours was used for the existing condition and 0.16 hours for the proposed development.

Volume control requirements are proposed to be satisfied using storage beneath the detention outlet in the detention basin. The required vcbmp storage volume is 0.25 ac-ft, and 0.35 ac-ft of storage is provided beneath the outlet of the detention basin. Storage volume was calculated using a 0.36 air void ratio for the coarse aggregate, and a 0.25 air void ratio for the soil media. The vcbmp basin has a half foot depth of surface storage with a normal water level of 727.50 and a bottom elevation of 727.00. Below the surface storage there is 18 in. of soil media between elevations 727.00 and 725.50. Below the soil media there is 8 in. of coarse aggregate between elevations 725.50 and 724.83. A 4" underdrain is proposed in the coarse aggregate 2" off the bottom at invert elevation 725.0. Storage within the coarse aggregate and soil media mix above the underdrain invert is credited toward vcbmp volume at 50%. The vcbmp basin has 9,146 c.f. of surface storage, 3,311 c.f. of soil media storage, 1,589 c.f. of coarse aggregate storage above the underdrain invert, and 1,060 c.f. of coarse aggregate storage below the underdrain invert. The total storage of the vcbmp basin is 0.35 ac-ft.

Additional volume control storage is provided in a bio-swale on the northwest side of the site prior to releasing to the wetland. The proposed bio-swale has 0.02 ac-ft of volume. The bio-swale has surface storage with a half foot depth. Below that there is 24 in. of soil media mix. Then there is 6 in. of coarse aggregate. A 4" underdrain is proposed in the coarse aggregate 2" off the bottom. Storage within the coarse aggregate and soil media above the underdrain invert is credited toward vcbmp volume at 50%. The bio-swale has 520 c.f. of surface storage, 390 c.f. of soil media storage, 31 c.f. of coarse aggregate storage above the underdrain invert, and 31 c.f. of coarse aggregate storage below the underdrain invert. The total storage of the vcbmp basin is 0.02 ac-ft.

Required detention was calculated using TR-20. Orland Park's required release rate from the redevelopment area is 0.04 cfs/ac for the 2-year, 24-hour storm event and 0.15 cfs/ac for the 100-year, 24-hour storm event. The redevelopment area of the project is 8.04 acres. The max release rates are 0.32 for the 2-year, 24-hour storm and 1.21 cfs for the 100-year, 24-hour storm. The detained area has an adjusted curve number of 78.39. A two-stage restrictor is proposed to meet the release requirements. A 2.5 in. orifice is proposed at elevation 725.0 and a 4.0 in. orifice is proposed at elevation 729.0. Detention was designed to detain the 100-year, 24-hour storm using Bulletin-75 rainfall data. The proposed detention

design has a required detention volume of 2.77 ac-ft at HWL 732.34. The detention basin has a total storage volume of 2.97 ac-ft with a footprint of 33,382 sq. ft. at HWL 732.50 and a depth of 5.00' to the NWL of 727.50. The detention basin has an inundation time of 87.0 hours from the start of the 100-year, 24-hour storm event. (See attached TR-20 Proposed Detention analysis and Hydrographs) Here is a summary of the TR-20 Analysis.

Storm Event	100-Yr 24-hr	10-Yr 24-hr	5-Yr 24-hr	2-Yr 24-hr
Runoff (in)	5.967	2.875	2.160	1.402
Peak Runoff (cfs)	1.21	0.76	0.52	0.32
Peak Runoff Time (hr)	21.15	21.07	21.17	22.14
Inundation Time (hr)	87.0	67.5	62.0	50.0
HWL (ft.)	732.34	730.01	729.44	728.74

STORM SEWER ANALYSIS / OVERLAND FLOW

Emergency overflow from the site will overflow a 20' wide 1.0' tall weir on the west side of the detention basins to 108th Ave. The weir has a capacity of 60.0 cfs, which was calculated using the broad-crested rectangular weir equation. The emergency overflow weir has a base elevation of 732.5 and a top of berm elevation of 733.5. The proposed development area will have a peak runoff of 31.67 for the 100-year critical duration storm event.

The proposed storm sewer has capacity for the 100-year storm event. The storm sewer flow was calculated in excel using rational method, Manning's equation, and Bernoulli's equation. Rational method was used to calculate the flow to each manhole in the 10 and 100-year storms based off bulletin 75 rainfall data. Manning's equation was then used to calculate the capacity for each pipe. In the excel sheet under the "CAP?" column "OK" means that the pipe has capacity, which means that the "Q FULL (DESIGN)" column calculates a larger pipe capacity than the amount of runoff in the "TOTAL RUNOFF COLUMN". Bernoulli's equation was used to calculate the hydraulic grade line elevation. In the excel sheet under the "CONTAINED IN STRUCTURE" column "YES" means that the hydraulic grade line doesn't exceed the corresponding structure's rim elevation. The "CONTAINED IN STRUCTURE" column compares the "RESULTING UPSTREAM WATER ELEVATION" column to the "RIM" column to check that the hydraulic grade line doesn't exceed the structure's rim.

There are a couple emergency overland flow routes across the site. The proposed leg of the roadway and adjacent front yards will drain along the roadway west to 108th Ave. The roofs and rear yards north of the leg of the roadway will drain northwest to the 108th Ave. parkway. The detention basin's emergency overflow will overflow the weir southwest to the 108th Ave. parkway. The roofs, rear yards, and offsite flow on the northeast side of the site will drain to the wetland on the north side of the site. The roofs, rear yards, and offsite flow on the southeast side of the site will drain to the proposed detention basin. The north half of the roadway loop and adjacent front yards will overflow between lots 5 and 6 towards the wetland. The south half of the roadway loop and adjacent front yards will overflow between lots 15 and 16 towards the detention basin.

Swales are proposed around the site and between homes to convey overland flow. The capacity of the swales are calculated using Manning's equation. At a minimum swales are typically half a foot deep with 4:1 side slopes, a half a foot bottom width, and 1.0% longitudinal slope. A Manning's roughness coefficient of 0.027 is assumed for the swales. This value is chosen as a medium value roughness coefficient for "earth, straight, and uniform excavated channels with short grass, and few weeds". At a half foot depth the minimum swale section will have a 2.94 cfs capacity. The swale capacity between lots 5 and 6 is 55.44 cfs at 1.0' of depth and 1.0' freeboard to the lowest adjacent opening. The bottom of the swale is at elevation 747.00 and the lowest adjacent opening is at elevation 749.00. The swale capacity between lots 15 and 16 is 70.23 cfs at 1.0' of depth and 1.0' freeboard to the lowest adjacent opening. The bottom of the swale is at elevation 745.00 and the lowest adjacent opening is at elevation 747.00.

INDIRECT IMPACT ANALYSIS

TR-20 was used to analyze the runoff to the wetland in the existing and proposed conditions for the 6-month, 1 year, 2-year, 5-year, 10-year and 100-year, 24-hour storm events. Runoff vs time hydrographs were created using the TR-20 output (See attached TR-20 wetland analysis and Hydrographs). Elevation vs time hydroperiod graphs were also created using a swale capacity table for the wetland area. In the existing conditions the wetland tributary area has an area of 3.86 acres with a CN of 76.98 and a time of concentration of 0.24 hours. In the proposed conditions the wetland tributary area has an area of 2.87 acres with a CN of 78.61 and a time of concentration of 0.24 hours. Here is a summary of the TR-20 Analysis.

Storm Event	Ex. 100-Yr 24-hr	Ex. 10-Yr 24-hr	Ex. 5-Yr 24-hr	Ex. 2-Yr 24-hr	Ex. 1-Yr 24-hr	Ex. 6-Mo 24-hr
Runoff (in)	5.784	2.737	2.038	1.304	0.907	0.577
Peak Runoff (cfs)	2.63	1.35	1.04	0.70	0.51	0.35
Peak Runoff Time (hr)	16.01	16.04	16.03	17.02	17.02	17.03
Inundation Time (hr)	24.5	24.5	24.5	24.5	24.5	24.5
Maximum Depth (ft.)	734.02	733.94	733.91	733.87	733.85	733.82

Storm Event	Prop. 100-Yr 24-hr	Prop. 10-Yr 24-hr	Prop. 5-Yr 24-hr	Prop. 2-Yr 24-hr	Prop. 1-Yr 24-hr	Prop. 6-Mo 24-hr
Runoff (in)	5.993	2.895	2.177	1.416	1.000	0.650
Peak Runoff (cfs)	2.04	1.06	0.82	0.56	0.41	0.28
Peak Runoff Time (hr)	16.02	16.03	16.04	16.05	17.02	17.02
Inundation Time (hr)	24.5	24.5	24.5	24.5	24.5	24.5
Maximum Depth (ft.)	733.98	733.91	733.89	733.86	733.83	733.80

SOIL EROSION AND SEDIMENT CONTROL

EROSION AND SEDIMENT CONTROL SCHEDULE OF IMPLEMENTATION

1. Sediment and Erosion Control measures will be installed prior to the commencement of work.
2. The disturbed areas of the property shall be stabilized with seed and blanket within 7 days after ground disturbing activities are completed.

NOTE: All erosion control items shall be maintained throughout the project duration and until all areas are permanently stabilized.

EROSION AND SEDIMENT CONTROL MAINTENANCE SCHEDULE

Erosion Control Blankets:

1. Shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
2. Blanket should be replaced if it becomes ineffective before ground has become permanently stabilized.

Other:

1. Sediment should be removed from the roadway after each rainfall.
2. Fix any damage that may occur to roadway or turf outside project limits.
3. Except as prevented by inclement weather conditions, all disturbed areas to remain inactive for more than fourteen days will be stabilized by seeding, sodding, mulching, covering, or by other equivalent erosion control measures within seven days. Permanent soil stabilization shall be provided within seven days after final grade is established.
4. All temporary erosion and sediment control practices shall be removed and disposed of within thirty days after site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment shall be permanently stabilized to prevent further erosion.

COMMITMENT AND RESPONSIBILITY

The owner or HOA will be the responsible entity for the long-term funding, operation, and maintenance activities for stormwater facilities, as described in this document.

CONSTRUCTION TIMELINE

Construction activities will commence in Fall of 2025.

MAINTENANCE PLAN FOR BRIDLEWOOD SUBDIVISION DEVELOPMENT

The owner or HOA of the Bridlewood Subdivision Development, with facilities as shown on the civil plan set shall assume responsibility for the following perpetual maintenance activities:

1.General

Regular inspections and routine maintenance of general areas shall be performed on a monthly or as-needed basis. Specific items of concern include:

- Litter and debris shall be controlled
- Landscaped areas shall be maintained with regular mowing and restored with appropriate seeding/vegetation as necessary
- Accumulated sediment shall be disposed of properly, along with any wastes generated during maintenance operations
- Roads shall be swept, vacuumed and/or washed on a regular basis
- Riprap areas shall be repaired with the addition of new riprap, as necessary, of similar size and shape

2. Stormwater Management Facilities

All components of the stormwater management facilities shall be checked monthly between March and November and maintained as necessary to ensure proper performance. It is critical that all inflows and outflows to the detention facility are clean and performing as designed. In addition, the design volume of the detention facility shall also be maintained. Inspections for the following specific items should be conducted monthly between March and November:

Side Slopes/Embankment/Emergency overflow Structure

- Inspect embankments for settlement and erosion
- Remove woody growth from the embankment
- Any breaks, hire Registered Professional Engineer for design resolution
- Seed and sod any eroded areas
- Signs of piping (leakage) or seepage, repair
- Stabilize emergency overflow structure if erosion observed
- Remove obstructions blocking emergency overflow spillway

Outlet Control Structure

- Inspect restrictor and remove debris if clogged or discharge reduced _ Remove accumulated sediment at outlet
- Scour and erosion at outlet, repair and reseed
- Any ice damage to outlet of pipe, repair if necessary
- Check outlet channel conditions downstream, repair if necessary

- Maintain access for Maintenance Equipment

Detention Volume

Inspect all stormwater detention facilities to ensure that the constructed volume for detention is maintained. No sediment, topsoil, or other dumping into the facility shall be allowed. Specific locations in the stormwater management system, designed to accumulate sediment, shall be dredged as necessary to prevent sediment from reaching the invert of any gravity outlet pipe.

3. Volume Control Facilities

Routine inspections and maintenance of volume control facilities shall be performed by the owner or HOA on a yearly or as-needed basis. Specific items of concern include:

- Facility shall be inspected yearly using the observation well to verify the system is functioning properly.
- Clogs shall be removed from and damage shall be repaired for the systems observation wells and underdrains.
- If inspection shows that water is not draining out of the system, the underground stone or soil media mix may be clogged. If the facility is clogged, water may need to be pumped out and the clog removed. If the clog can not be removed the stone or soil media mix will need to be replaced.
- Filter fabric shall be provided around the top and sides of the system with a small lip around the bottom edge. To provide protection from siltation
- Clean debris from the drainage area and structures tributary to the facility regularly.
- Native vegetation shall be maintained and remain uncut. Vegetation shall be reseeded or replanted as necessary.

4. Storm water Collection System

The owner or HOA shall perform monthly inspections of all components of the stormwater collection system. The monthly inspection shall occur between March and November and include the following specific areas of concern:

Storm Inlets/Manholes

- Remove accumulated leaves and other debris from grates
- Reset covers/lids on as-needed basis
- Remove accumulated sediment from manhole bottom when 50% of sump is filled

Storm Sewers/Culverts

- Visually inspect pipes by removing manhole lids, make repairs as necessary
- Storm sewers and culverts shall be checked for siltation deposits at inlets, outlets, and within the conduit, clean out as necessary
- Replant and reseed any eroded areas

Overland Flow Routes (Ditches/Swales)

- Annual visual inspections shall be performed that verify the design capacity of the overland flow routes is maintained. The slope and cross-sectional area of the ditch/swale shall be verified during this inspection.
- Remove any obstructions that have been placed in the drainage path
- Seed and sod any eroded areas
- Restore riprap as necessary
- Regrade to provide positive drainage as necessary
- Regular mowing to control vegetation

5. Vegetated Areas:

- Provide planting, reseeding, or sodding if needed.
- Repair any damage done by grazing, motorbikes, or other vehicles.
- Check for invasive vegetation and remove when possible.
- Regular mowing to control vegetation. Do not mow native plantings.
- Dead or damaged non-native grassy areas – repair with seeding with fertilization or seeding with mulch.
- Need for planting, reseeding or sodding. Supplement alternative native vegetation if a significant portion has not established (50% of the surface area). Reseed with alternative grass species if original grass cover has not successfully established.
- All vegetation must be maintained per the approved plan

COMPOSITE RUNOFF CURVE NUMBER (CN)

PROJECT: Bridlewood Subdivision PERMIT NUMBER:

LOCATION: 14137 S 108th Ave, Orland Park DATE: 6/16/2025

TYPE OF AREA (SELECT WITH DROP-DOWN)

DETAINED AREA MAJOR STORMWATER SYSTEM
UNRESTRICTED AREA X OTHER: Entire Site
UPSTREAM AREA

CONDITION (SELECT WITH DROP-DOWN)

PROPOSED CONDITION X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious	C	98	0.49	48.02
Pervious	C	74	8.95	662.30
TOTALS:			9.44	710.32

COMPOSITE RUNOFF CURVE NUMBER

Composite CN = $\frac{\text{Total Product}}{\text{Total Area}}$ = $\frac{710.32}{9.44}$ → Composite CN = 75.25

COMPOSITE RUNOFF CURVE NUMBER (CN)

PROJECT: Bridlewood Subdivision PERMIT NUMBER:

LOCATION: 14137 S 108th Ave, Orland Park DATE: 7/30/2025

TYPE OF AREA (SELECT WITH DROP-DOWN)

X DETAINED AREA MAJOR STORMWATER SYSTEM
UNRESTRICTED AREA OTHER:
UPSTREAM AREA

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious	C	98	3.00	294.00
Pervious	C	74	5.04	372.96

TOTALS:	8.04	666.96
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COMPOSITE RUNOFF CURVE NUMBER

Composite CN = $\frac{\text{Total Product}}{\text{Total Area}}$ = $\frac{666.96}{8.04}$ → Composite CN = 82.96

ADJUSTED COMPOSITE RUNOFF CURVE NUMBER (CN_{ADJ})

PROJECT: Bridlewood Subdivision

PERMIT NUMBER:

LOCATION: 14137 S 108th Ave, Orland Park

DATE: 7/30/2025

DEVELOPMENT INFORMATION

1. Area Detained, A	8.036	acres
2. Total Impervious Area	3.005	acres
3. Composite CN	82.96	
4. Volume Control Storage Provided, VC_P	0.369	ac-ft
5. Depth of Rainfall, P	8.57	inches

RUNOFF VOLUME (NRCS EQUATIONS)

6. Maximum Retention, S	$S = \frac{1000}{CN} - 10$	2.05	inches
7. Runoff Depth, Q_D	$Q_D = \frac{(P - 0.2S)^2}{(P + 0.8S)}$	6.52	inches
8. Runoff Volume, V_R	$V_R = Q_D A \left(\frac{1}{12 \frac{in}{ft}} \right)$	4.37	ac-ft

VOLUME CONTROL STORAGE

9. Volume Control Storage Required, VC_R	0.250	ac-ft
10. Additional Volume Control Storage Provided	0.119	ac-ft

ADJUSTED RUNOFF VOLUME

11. Adjusted Runoff Volume, V_{ADJ}	$V_{ADJ} = V_R - VC_P$	3.996	ac-ft
12. Adjusted Runoff Depth, Q_{ADJ}		5.97	inches
13. Adjusted Maximum Retention, S_{ADJ}		2.76	inches

ADJUSTED COMPOSITE RUNOFF CURVE NUMBER

14. Adjusted Runoff Curve Number, CN_{ADJ}	78.39
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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 6/16/2025
REV. DATE:

TIME OF CONCENTRATION, SITE RUNOFF

ASSUMPTIONS: Manning's Roughness Coeff., n
grass areas: 0.24
paved areas: 0.011

<u>Sheet Flow</u>	Unit	Tc	Tc
		Ex.	Prop.
Manning's Roughness Coeff., n		0.24	0.24
Flow Length, L ($L \leq 100$ ft)	ft	100	100
2-yr 24-hr Rainfall, P_2	in	3.04	3.04
Upstream Elevation	ft	748.90	751.00
Downstream Elevation	ft	748.20	745.00
Land Slope, s	ft/ft	0.0070	0.0600
$T_t = [0.007 (nL)^{0.8}] / [P_2^{0.5} s^{0.4}]$	hr	0.37	0.16

<u>Shallow Concentrated Flow</u>			
Surface Description (u or p)		u	u
Flow Length, L	ft	428	21
Upstream Elevation	ft	748.20	745.00
Downstream Elevation	ft	721.50	744.00
Watercourse Slope, s	ft/ft	0.0624	0.0476
Average Velocity, V	fps	4.03	3.52
$T_t = L / 3600 V$	hr	0.03	0.00

<u>Channel Flow</u>			
		n/a	n/a
Cross Sectional Flow Area, a	ft ²		
Wetted Perimeter, p_w	ft		
Hydraulic Radius, $r = a / p_w$	ft		
Channel Slope, s	ft/ft		
Manning's Roughness Coeff., n	ft/ft		
Velocity, $v = (1.49 * r^{(2/3)} * s^{(1/2)}) / n$	fps		
Flow Length, L			
$T_t = L / 3600 V$	hr	0	0

$T_c = T_t + T_t + T_t$	hr	0.40	0.16
Use in Model (5 min. minimum)	min	24	10



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BY: KF
DATE: 6/16/2025
REVISED 7/30/2025

ORIFICE FLOW EQUATION: $Q = C_d A (2GH)^{1/2}$

WEIR FLOW EQUATION: $Q = 3.0 L (H)^{1.5}$

HYDRAULIC DIMENSIONS

ORIFICE 1 AREA (ft ²)	0.03
ORIFICE 1 DIAMETER (in)	2.5
ORIFICE 1 DISCHARGE COEFFICIENT	0.61
ORIFICE 1 ELEV. (ft-NAVD88)	725.0
TAILWATER OR CENTROID 2 (ft-NAVD88)	725.10
ORIFICE 2 AREA (ft ²)	0.09
ORIFICE 2 DIAMETER (in)	4.0
ORIFICE 2 DISCHARGE COEFFICIENT	0.61
ORIFICE 2 ELEV. (ft-NAVD88)	729.0
TAILWATER OR CENTROID 2 (ft-NAVD88)	729.17
WEIR LENGTH (ft)	20
WEIR COEFFICIENT	3
WEIR ELEV. (ft-NAVD88)	732.5

ELEVATION-DISCHARGE RELATIONSHIP

ELEVATION (feet)	Q-ORIFICE 1 (cfs)	Q-ORIFICE 2 (cfs)	Q-WEIR (cfs)	Q-TOTAL (cfs)
725.0	0.00	0.00	0.00	0.00
725.5	0.10	0.00	0.00	0.10
726.0	0.16	0.00	0.00	0.16
726.5	0.20	0.00	0.00	0.20
727.0	0.23	0.00	0.00	0.23
727.5	0.26	0.00	0.00	0.26
728.0	0.28	0.00	0.00	0.28
728.5	0.31	0.00	0.00	0.31
729.0	0.33	0.00	0.00	0.33
729.5	0.35	0.25	0.00	0.60
730.0	0.37	0.39	0.00	0.76
730.5	0.39	0.49	0.00	0.88
731.0	0.41	0.58	0.00	0.98
731.5	0.42	0.65	0.00	1.07
732.0	0.44	0.72	0.00	1.16
732.5	0.45	0.78	0.00	1.23
733.0	0.47	0.84	21.21	22.52
733.5	0.48	0.89	60.00	61.37



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DATE: 6/16/2025
REVISED 07/30/2025

STAGE-STORAGE TABLE (AVERAGE END AREA METHOD)

ELEVATION	Area	Area	Average	Incremental	Cumulative
			Area	Storage	Storage
(feet)	(sq. ft.)	(ac.)	(ac.)	(ac. ft.)	(ac. ft.)
727.50	18,926	0.43	-	-	0.00
728.00	20,193	0.46	0.45	0.22	0.22
728.50	21,549	0.49	0.48	0.24	0.46
729.00	22,905	0.53	0.51	0.26	0.72
729.50	24,326	0.56	0.54	0.27	0.99
730.00	25,746	0.59	0.57	0.29	1.28
730.50	27,232	0.63	0.61	0.30	1.58
731.00	28,717	0.66	0.64	0.32	1.90
731.50	30,266	0.69	0.68	0.34	2.24
732.00	31,815	0.73	0.71	0.36	2.60
732.50	33,382	0.77	0.75	0.37	2.97
733.00	34,949	0.80	0.78	0.39	3.36
733.50	36,502	0.84	0.82	0.41	3.77



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 6/16/2025
REVISED: 7/17/2025

STORAGE - VCBMP BASIN

Proposed Impervious Area: 130,896 Sq. Ft.
Required Volume Control: 10,908 C.F.

Surface Storage (6" Depth):

Elevation (NAVD88)	Surface Area (S.F.)	Volume (C.F.)
727.0	17,659	-
727.5	18,926	9,146

Soil Media Storage (18" Depth): (727.0 - 725.5)

Soil Media Volume: 26,489 C.F.
Soil Media Void Ratio: 0.25
Soil Media Storage: 3,311 C.F.

Stone Storage Above Underdrain (6" Depth): (725.5- 725.0)

Stone Volume: 8,830 C.F.
Stone Void Ratio: 0.36
Stone Media Storage: 1,589 C.F.

Stone Storage Below Underdrain (2" Depth): (725.0 - 724.83)

Stone Volume: 2,943 C.F.
Stone Void Ratio: 0.36
Stone Storage: 1,060 C.F.

VCBMP Basin Volume: 15,106 C.F.

VCBMP Basin Volume: 0.35 AC.-FT.



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BY: KF
DATE: 7/30/2025
REVISED:

STORAGE - VCBMP BIO-SWALE

Proposed Impervious Area: 130,896 Sq. Ft.
Required Volume Control: 10,908 C.F.

Surface Storage (6" Depth):

Depth (Ft.)	Surface Area (S.F.)	Volume (C.F.)
0.0	520	-
0.5	1,560	520

Soil Media Storage (24" Depth):

Soil Media Volume: 3,120 C.F.
Soil Media Void Ratio: 0.25
Soil Media Storage: 390 C.F.

Stone Storage Above Underdrain (4" Depth):

Stone Volume: 173 C.F.
Stone Void Ratio: 0.36
Stone Media Storage: 31 C.F.

Stone Storage Below Underdrain (2" Depth):

Stone Volume: 87 C.F.
Stone Void Ratio: 0.36
Stone Storage: 31 C.F.

VCBMP Basin Volume: 972 C.F.
VCBMP Basin Volume: 0.02 AC.-FT.



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BY: KF
DATE: 6/11/2025
REV. DATE:

INLET CAPACITY CALCULATIONS (TYPE 8 GRATE)

Weir Flow Calculations

Weir Equation $Q = 3.3 P(h)^{1.5}$

Q = Capacity in CFS

P = Feet perimeter

h = Head in feet

Orifice Flow Calculations

Orifice Flow Equation $Q = 0.6A(2gh)^{0.5}$

Q = Capacity in CFS

A = Free open area of grate in sq. ft.

g = 32.2 (feet per sec/sec)

h = Head in feet

Neenah Catalog Number and Grate Type:

4340-B

Feet perimeter (P): 6.0

Free Open area in sq. ft. (A): 1.1

Head in feet (h):	Weir Capacity in cfs:	Transitional flow in cfs:	Orifice capacity in cfs:
0.1	0.63		
0.2		1.76	
0.3			2.90
0.4			3.35
0.5			3.75
0.6			4.10
0.7			4.43
0.8			4.74
0.9			5.02
1.0			5.30



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INLET CAPACITY CALCULATIONS (TYPE 12 GRATE)

Weir Flow Calculations

Weir Equation $Q = 3.3 P(h)^{1.5}$

Q = Capacity in CFS

P = Feet perimeter

h = Head in feet

Orifice Flow Calculations

Orifice Flow Equation $Q = 0.6A(2gh)^{0.5}$

Q = Capacity in CFS

A = Free open area of grate in sq. ft.

g = 32.2 (feet per sec/sec)

h = Head in feet

Neenah Catalog Number and Grate Type:

3503-B

Feet perimeter (P): 4.1

Free Open area in sq. ft. (A): 2.0

Head in feet (h):	Weir Capacity in cfs:	Transitional flow in cfs:	Orifice capacity in cfs:
0.1	0.43		
0.2		2.85	
0.3			5.27
0.4			6.09
0.5			6.81
0.6			7.46
0.7			8.06
0.8			8.61
0.9			9.14
1.0			9.63



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 06/11/2025
REV. DATE: 8/29/2025

STORM SEWER CAPACITY

DESIGN STORM (year)	FROM	TO	INCR. TRIB. AREA (ac)	C	TIME OF CONC. (min)	TIME IN PIPE (min)	STORM EVENT (10, 100) (yr)	TB 75 INT. I (in/hr)	INCR. RUNOFF Q = CiA (cfs)	TOTAL RUNOFF Q = CiA (cfs)	DESIGN		PIPE			STRUCTURE			RIM TO INVERT (ft)	CAP?
											Q FULL (cfs)	VEL. FULL (fps)	LENGTH (ft)	DIA. (in)	SLOPE (%)	RIM (ft)	INVERT (ft)	SIZE (in)		
10	206	205	0.24	0.69	5.00	0.20	10	7.44	1.22	1.22	5.04	6.42	74	12	2.00	743.10	739.18	24	3.92	OK
10	205	204	0.19	0.65	5.00	0.20	10	7.44	0.93	2.15	5.04	6.42	82	12	2.00	741.20	737.70	24	3.50	OK
10	204	203	0.24	0.69	5.00	0.20	10	7.44	1.22	3.37	6.17	7.86	95	12	3.00	739.90	736.06	48	3.84	OK
10	203	202	0.00	0.90	5.00	0.70	10	7.44	0.00	3.37	5.75	3.26	130	18	0.30	736.50	733.21	48	3.29	OK
10	202	201	0.32	0.68	5.00	0.00	10	7.44	1.60	6.57	12.87	7.28	20	18	1.50	741.20	732.82	48	8.38	OK
10	201	200	0.31	0.69	5.00	0.30	10	7.44	1.60	9.77	19.41	8.07	135	21	1.50	741.20	732.52	48	8.68	OK
10	200	199	0.00	0.90	5.00	0.10	10	7.44	0.00	9.77	19.41	8.07	33	21	1.50	735.00	730.50	48	4.51	OK
PROP. INV. =																	730.00			
100	206	205	0.24	0.69	5.00	0.20	100	12.36	2.03	2.03	5.04	6.42	74	12	2.00	743.10	739.18	24	3.92	OK
100	205	204	0.19	0.65	5.00	0.20	100	12.36	1.55	3.58	5.04	6.42	82	12	2.00	741.20	737.70	24	3.50	OK
100	204	203	0.24	0.69	5.00	0.20	100	12.36	2.03	5.61	6.17	7.86	95	12	3.00	739.90	736.06	48	3.84	OK
100	203	202	0.00	0.90	6.00	0.70	100	12.05	0.00	5.61	5.75	3.26	130	18	0.30	736.50	733.21	48	3.29	OK
100	202	201	0.32	0.68	5.00	0.00	100	12.36	2.67	10.95	12.87	7.28	20	18	1.50	741.20	732.82	48	8.38	OK
100	201	200	0.31	0.69	5.00	0.30	100	12.36	2.66	16.27	19.41	8.07	135	21	1.50	741.20	732.52	48	8.68	OK
100	200	199	0.00	0.90	5.00	0.10	100	12.36	0.00	16.27	19.41	8.07	33	21	1.50	735.00	730.50	48	4.51	OK
PROP. INV. =																	730.00			
10	206	201	0.31	0.69	5.00	0.10	10	7.44	1.60	1.60	7.13	9.07	74	12	4.00	743.80	735.48	24	8.32	OK
PROP. INV. =																	732.52			
100	206	201	0.31	0.69	5.00	0.10	100	12.36	2.66	2.66	7.13	9.08	74	12	4.00	743.80	735.48	24	8.32	OK
PROP. INV. =																	732.52			
10	207	202	0.32	0.68	5.00	0.10	10	7.44	1.60	1.60	7.13	9.07	77	12	4.00	743.80	735.90	24	7.90	OK
PROP. INV. =																	732.82			
100	207	202	0.32	0.68	5.00	0.10	100	12.36	2.67	2.67	7.13	9.08	77	12	4.00	743.80	735.90	24	7.90	OK
PROP. INV. =																	732.82			



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LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 06/11/2025
REV. DATE: 8/29/2025

STORM SEWER CAPACITY

DESIGN STORM (year)	FROM	TO	INCR. TRIB. AREA (ac)	C	TIME OF CONC. (min)	TIME IN PIPE (min)	STORM EVENT (10, 100) (yr)	TB 75 INT. I (in/hr)	INCR. RUNOFF Q = CiA (cfs)	TOTAL RUNOFF Q = CiA (cfs)	DESIGN		PIPE			STRUCTURE			RIM TO INVERT (ft)	CAP?
											Q FULL (cfs)	VEL. FULL (fps)	LENGTH (ft)	DIA. (in)	SLOPE (%)	RIM (ft)	INVERT (ft)	SIZE (in)		
10	309	308	0.43	0.70	5.00	0.10	10	7.44	2.25	2.25	4.57	3.72	23	15	0.50	747.80	743.12	24	4.68	OK
10	308	307	0.14	0.86	5.00	0.20	10	7.44	0.89	3.14	5.40	4.40	42	15	0.70	747.80	743.00	48	4.80	OK
10	307	306	0.12	0.45	5.00	0.50	10	7.44	0.40	3.54	6.46	5.26	155	15	1.00	748.80	742.71	48	6.09	OK
10	306	305	0.16	0.45	5.00	0.40	10	7.44	0.52	8.55	14.48	8.19	210	18	1.90	746.00	741.16	48	4.84	OK
10	305	304	0.20	0.62	5.00	0.30	10	7.44	0.94	9.49	15.85	6.59	120	21	1.00	747.50	737.17	48	10.33	OK
10	304	303	0.31	0.65	5.00	0.20	10	7.44	1.49	10.98	18.75	7.79	113	21	1.40	742.00	735.97	48	6.03	OK
10	303	302	0.45	0.54	5.00	0.20	10	7.44	1.83	12.81	21.84	9.08	108	21	1.90	738.00	734.39	48	3.62	OK
10	302	301	0.35	0.57	5.00	0.20	10	7.44	1.46	14.27	24.03	9.99	124	21	2.30	736.20	732.33	48	3.87	OK
10	301	300	0.18	0.51	5.00	0.10	10	7.44	0.67	14.94	25.79	8.21	37	24	1.30	733.50	729.48	48	4.02	OK
PROP. INV. =																	729.00			
100	309	308	0.43	0.70	5.00	0.10	100	12.36	3.75	3.75	4.57	3.72	23	15	0.50	747.80	743.12	24	4.68	OK
100	308	307	0.14	0.86	5.00	0.20	100	12.36	1.49	5.24	5.40	4.41	42	15	0.70	747.80	743.00	48	4.80	OK
100	307	306	0.12	0.45	5.00	0.50	100	12.36	0.67	5.91	6.46	5.27	155	15	1.00	748.80	742.71	48	6.09	OK
100	306	305	0.16	0.45	5.00	0.40	100	12.36	0.87	14.25	14.48	8.20	210	18	1.90	746.00	741.16	48	4.84	OK
100	305	304	0.20	0.62	5.00	0.30	100	12.36	1.57	15.82	15.85	6.59	120	21	1.00	747.50	737.17	48	10.33	OK
100	304	303	0.31	0.65	5.00	0.20	100	12.36	2.48	18.30	18.75	7.80	113	21	1.40	742.00	735.97	48	6.03	OK
100	303	302	0.45	0.54	5.00	0.20	100	12.36	3.03	21.33	21.84	9.08	108	21	1.90	738.00	734.39	48	3.62	OK
100	302	301	0.35	0.57	5.00	0.20	100	12.36	2.43	23.76	24.03	10.00	124	21	2.30	736.20	732.33	48	3.87	OK
100	301	300	0.18	0.51	5.00	0.10	100	12.36	1.12	24.88	25.79	8.21	37	24	1.30	733.50	729.48	48	4.02	OK
PROP. INV. =																	729.00			
10	311	310	0.24	0.84	5.00	0.10	10	7.44	1.47	1.47	2.52	3.21	23	12	0.50	745.80	741.92	24	3.88	OK
10	310	309	0.58	0.70	5.00	0.10	10	7.44	3.02	4.49	7.64	6.23	46	15	1.40	745.80	741.80	48	4.00	OK
PROP. INV. =																	741.16			
100	311	310	0.24	0.84	5.00	0.10	100	12.36	2.45	2.45	2.52	3.21	23	12	0.50	745.80	741.92	24	3.88	OK
100	310	309	0.58	0.70	5.00	0.10	100	12.36	5.02	7.47	7.64	6.23	46	15	1.40	745.80	741.80	48	4.00	OK
PROP. INV. =																	741.16			



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STORM SEWER CAPACITY

DESIGN STORM (year)	FROM	TO	INCR. TRIB. AREA (ac)	C	TIME OF CONC. (min)	TIME IN PIPE (min)	STORM EVENT (10, 100) (yr)	TB 75 INT. I (in/hr)	INCR. RUNOFF Q = CiA (cfs)	TOTAL RUNOFF Q = CiA (cfs)	DESIGN		PIPE			STRUCTURE			RIM TO INVERT (ft)	CAP?
											Q FULL (cfs)	VEL. FULL (fps)	LENGTH (ft)	DIA. (in)	SLOPE (%)	RIM (ft)	INVERT (ft)	SIZE (in)		
10	403	402	0.22	0.61	5.00	0.40	10	7.44	0.98	4.82	6.46	5.26	111	15	1.00	748.50	744.75	24	3.75	OK
10	402	401	0.07	0.45	5.00	0.50	10	7.44	0.23	5.05	6.46	5.26	162	15	1.00	747.10	743.64	24	3.46	OK
10	401	400	0.30	0.56	5.00	0.30	10	7.44	1.28	6.33	6.46	5.26	102	15	1.00	745.00	742.02	24	2.98	OK
PROP. INV. =																	741.00			
100	403	402	0.22	0.61	5.00	0.40	100	12.36	1.64	8.03	6.46	5.27	111	15	1.00	748.50	744.75	24	3.75	NO
100	402	401	0.07	0.45	5.00	0.50	100	12.36	0.38	8.41	6.46	5.27	162	15	1.00	747.10	743.64	24	3.46	NO
100	401	400	0.30	0.56	6.00	0.30	100	12.05	2.07	10.48	6.46	5.27	102	15	1.00	745.00	742.02	24	2.98	NO
PROP. INV. =																	741.00			
10	501	500	0.00	0.90	5.00	0.10	10	7.44	0.00	1.21	10.12	12.89	83	12	8.07	733.50	730.20	48	3.30	OK
PROP. INV. =																	723.50			
100	501	500	0.00	0.90	5.00	0.10	100	12.36	0.00	1.21	10.12	12.89	83	12	8.07	733.50	730.20	48	3.30	OK
PROP. INV. =																	723.50			



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BY: KF
DATE: 06/11/2025
REV. DATE: 7/30/2025

STORM SEWER HYDRAULIC GRADE LINE

DESIGN STORM (year)	FROM	TO	RIM (ft)	INVERT (ft)	Q (cfs)	PIPE			VEL. (fps)	LOSSES				DOWNSTREAM WATER ELEV. (ft)	UPSTREAM WATER ELEV. (ft)	CONTAINED IN STRUCT.
						DIA. (in)	LENGTH (ft)	SLOPE (%)		ENTRANCE (ft)	SLOPE (ft)	EXIT (ft)	TOTAL (ft)			
10	206	205	743.10	739.18	1.22	12	74	2.00	1.55	0.00	1.48	0.01	1.49	738.32	739.81	YES
10	205	204	741.20	737.70	2.15	12	82	2.00	2.74	0.01	1.64	0.03	1.68	736.64	738.32	YES
10	204	203	739.90	736.06	3.37	12	95	3.00	4.29	0.04	2.85	0.07	2.96	733.68	736.64	YES
10	203	202	736.50	733.21	3.37	18	130	0.30	1.91	0.10	0.39	0.01	0.50	733.18	733.68	YES
10	202	201	741.20	732.82	6.57	18	20	1.50	3.72	0.02	0.30	0.05	0.37	732.81	733.18	YES
10	201	200	741.20	732.52	9.77	21	135	1.50	4.06	0.08	2.03	0.06	2.16	730.65	732.81	YES
10	200	199	735.00	730.50	9.77	21	33	1.50	4.06	0.09	0.50	0.06	0.65	730.00	730.65	YES
			PROP. INV. =	730.00	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.											
100	206	205	743.10	739.18	2.03	12	74	2.00	2.58	0.00	1.48	0.03	1.51	739.46	740.97	YES
100	205	204	741.20	737.70	3.58	12	82	2.00	4.56	0.04	1.64	0.08	1.76	737.70	739.46	YES
100	204	203	739.90	736.06	5.61	12	95	3.00	7.14	0.11	2.85	0.20	3.16	734.54	737.70	YES
100	203	202	736.50	733.21	5.61	18	130	0.30	3.17	0.28	0.39	0.04	0.71	733.83	734.54	YES
100	202	201	741.20	732.82	10.95	18	20	1.50	6.20	0.05	0.30	0.15	0.50	733.33	733.83	YES
100	201	200	741.20	732.52	16.27	21	135	1.50	6.76	0.21	2.03	0.18	2.41	730.92	733.33	YES
100	200	199	735.00	730.50	16.27	21	33	1.50	6.76	0.25	0.50	0.18	0.92	730.00	730.92	YES
			PROP. INV. =	730.00												
10	206	201	743.80	735.48	1.6	12	74	4.00	2.04	0.00	2.96	0.02	2.98	732.81	735.79	YES
			PROP. INV. =	732.52	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.											
100	206	201	743.80	735.48	2.66	12	74	4.00	3.39	0.00	2.96	0.04	3.00	733.33	736.33	YES
			PROP. INV. =	732.52												
10	207	202	743.80	735.90	1.6	12	77	4.00	2.04	0.00	3.08	0.02	3.10	733.18	736.28	YES
			PROP. INV. =	732.82	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.											
100	207	202	743.80	735.90	2.67	12	77	4.00	3.40	0.00	3.08	0.04	3.12	733.83	736.95	YES
			PROP. INV. =	732.82												



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 06/11/2025
REV. DATE: 7/30/2025

STORM SEWER HYDRAULIC GRADE LINE

DESIGN STORM (year)	FROM	TO	RIM (ft)	INVERT (ft)	Q (cfs)	PIPE			VEL. (fps)	LOSSES				DOWNSTREAM WATER ELEV. (ft)	UPSTREAM WATER ELEV. (ft)	CONTAINED IN STRUCT.
						DIA. (in)	LENGTH (ft)	SLOPE (%)		ENTRANCE (ft)	SLOPE (ft)	EXIT (ft)	TOTAL (ft)			
10	309	308	747.80	743.12	2.25	15	23	0.50	1.83	0.00	0.12	0.01	0.13	744.41	744.54	YES
10	308	307	747.80	743.00	3.14	15	42	0.70	2.56	0.02	0.29	0.03	0.34	744.07	744.41	YES
10	307	306	748.80	742.71	3.54	15	155	1.00	2.88	0.04	1.55	0.03	1.62	742.45	744.07	YES
10	306	305	746.00	741.16	8.55	18	210	1.90	4.84	0.05	3.99	0.09	4.13	738.32	742.45	YES
10	305	304	747.50	737.17	9.49	21	120	1.00	3.95	0.13	1.20	0.06	1.39	736.93	738.32	YES
10	304	303	742.00	735.97	10.98	21	113	1.40	4.56	0.08	1.58	0.08	1.75	735.18	736.93	YES
10	303	302	738.00	734.39	12.81	21	108	1.90	5.33	0.11	2.05	0.11	2.28	732.90	735.18	YES
10	302	301	736.20	732.33	14.27	21	124	2.30	5.93	0.15	2.85	0.14	3.14	729.76	732.90	YES
10	301	300	733.50	729.48	14.94	24	37	1.30	4.76	0.19	0.48	0.09	0.76	729.00	729.76	YES
				PROP. INV. =	729.00	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.										
100	309	308	747.80	743.12	3.75	15	23	0.50	3.06	0.00	0.12	0.04	0.15	746.87	747.02	YES
100	308	307	747.80	743.00	5.24	15	42	0.70	4.27	0.05	0.29	0.07	0.42	746.45	746.87	YES
100	307	306	748.80	742.71	5.91	15	155	1.00	4.82	0.10	1.55	0.09	1.74	744.71	746.45	YES
100	306	305	746.00	741.16	14.25	18	210	1.90	8.06	0.13	3.99	0.25	4.37	740.34	744.71	YES
100	305	304	747.50	737.17	15.82	21	120	1.00	6.58	0.35	1.20	0.17	1.72	738.62	740.34	YES
100	304	303	742.00	735.97	18.3	21	113	1.40	7.61	0.24	1.58	0.22	2.04	736.58	738.62	YES
100	303	302	738.00	734.39	21.33	21	108	1.90	8.87	0.31	2.05	0.31	2.67	733.91	736.58	YES
100	302	301	736.20	732.33	23.76	21	124	2.30	9.88	0.43	2.85	0.38	3.66	730.25	733.91	YES
100	301	300	733.50	729.48	24.88	24	37	1.30	7.92	0.53	0.48	0.24	1.25	729.00	730.25	YES
				PROP. INV. =	729.00											
10	311	310	745.80	741.92	1.47	12	23	0.50	1.87	0.00	0.12	0.01	0.13	743.17	743.30	YES
10	310	309	745.80	741.80	4.49	15	46	1.40	3.66	0.02	0.64	0.05	0.72	742.45	743.17	YES
				PROP. INV. =	741.16	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.										
100	311	310	745.80	741.92	2.45	12	23	0.50	3.12	0.00	0.12	0.04	0.15	745.55	745.70	YES
100	310	309	745.80	741.80	7.47	15	46	1.40	6.09	0.05	0.64	0.14	0.84	744.71	745.55	YES
				PROP. INV. =	741.16											



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 06/11/2025
REV. DATE: 7/30/2025

STORM SEWER HYDRAULIC GRADE LINE

DESIGN STORM (year)	FROM	TO	RIM (ft)	INVERT (ft)	Q (cfs)	PIPE			VEL. (fps)	LOSSES				DOWNSTREAM WATER ELEV. (ft)	UPSTREAM WATER ELEV. (ft)	CONTAINED IN STRUCT.
						DIA. (in)	LENGTH (ft)	SLOPE (%)		ENTRANCE (ft)	SLOPE (ft)	EXIT (ft)	TOTAL (ft)			
10	403	402	748.50	744.75	4.82	15	111	1.00	3.93	0.00	1.11	0.06	1.17	743.99	745.16	YES
10	402	401	747.10	743.64	5.05	15	162	1.00	4.12	0.08	1.62	0.07	1.77	742.22	743.99	YES
10	401	400	745.00	742.02	6.33	15	102	1.00	5.16	0.09	1.02	0.10	1.22	741.00	742.22	YES
			PROP. INV. =	741.00	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.											
100	403	402	748.50	744.75	8.03	15	111	1.00	6.54	0.00	1.11	0.17	1.28	744.60	745.88	YES
100	402	401	747.10	743.64	8.41	15	162	1.00	6.85	0.23	1.62	0.18	2.04	742.56	744.60	YES
100	401	400	745.00	742.02	10.48	15	102	1.00	8.54	0.26	1.02	0.28	1.56	741.00	742.56	YES
			PROP. INV. =	741.00												
10	501	500	733.50	730.20	1.21	12	83	8.07	1.54	0.00	6.70	0.01	6.71	723.50	730.21	YES
			PROP. INV. =	723.50	* SEE STORM SEWER CALCULATIONS FOR PIPE, STRUCTURE, AND FLOW INFORMATION.											
100	501	500	733.50	730.20	1.21	12	83	8.07	1.54	0.00	6.70	0.01	6.71	723.50	730.21	YES
			PROP. INV. =	723.50												



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 7/30/2025
REVISED:

SWALE CAPACITY - TYPICAL SWALE

Side Slope 1:	0.25	ft/ft	Bottom Width:	0.50	ft
Side Slope 2:	0.25	ft/ft			
Longitudinal Slope:	0.010	ft/ft	MANNING'S n:	0.027	ft

SWALE CAPACITY ANALYSIS TABLE:

Depth	Depth	FLOW AREA	WETTED PERIMETER	HYDRAULIC RADIUS	CAPACITY
	(ft.)	(sq. ft.)	(ft.)		(cfs)
0.00	0.00	0.00	0.50	-	-
0.10	0.10	0.09	1.30	0.07	0.08
0.20	0.20	0.26	2.10	0.12	0.36
0.30	0.30	0.51	2.90	0.18	0.88
0.40	0.40	0.84	3.70	0.23	1.73
0.50	0.50	1.25	4.50	0.28	2.94
0.60	0.60	1.74	5.30	0.33	4.57
0.70	0.70	2.31	6.10	0.38	6.67
0.80	0.80	2.96	6.90	0.43	9.29
0.90	0.90	3.69	7.70	0.48	12.47
1.00	1.00	4.50	8.50	0.53	16.25



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 7/30/2025
REVISED:

SWALE CAPACITY - OVERLAND FLOW ROUTE NORTH

Side Slope 1:	0.20	ft/ft	Bottom Width:	0.50	ft
Side Slope 2:	0.25	ft/ft	Bottom Elevation:	747.00	ft
Longitudinal Slope:	0.095	ft/ft	MANNING'S n:	0.027	ft

SWALE CAPACITY ANALYSIS TABLE:

Elevation	Depth	FLOW AREA	WETTED PERIMETER	HYDRAULIC RADIUS	CAPACITY
	(ft.)	(sq. ft.)	(ft.)		(cfs)
747.00	0.00	0.00	0.50	-	-
747.10	0.10	0.10	1.40	0.07	0.27
747.20	0.20	0.28	2.30	0.12	1.17
747.30	0.30	0.56	3.20	0.17	2.94
747.40	0.40	0.92	4.10	0.22	5.78
747.50	0.50	1.38	5.00	0.28	9.89
747.60	0.60	1.92	5.90	0.33	15.45
747.70	0.70	2.56	6.80	0.38	22.63
747.80	0.80	3.28	7.70	0.43	31.58
747.90	0.90	4.10	8.60	0.48	42.47
748.00	1.00	5.00	9.50	0.53	55.44



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LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 7/30/2025
REVISED:

SWALE CAPACITY - OVERLAND FLOW ROUTE SOUTH

Side Slope 1:	0.18	ft/ft	Bottom Width:	0.50	ft
Side Slope 2:	0.21	ft/ft	Bottom Elevation:	745.00	ft
Longitudinal Slope:	0.120	ft/ft	MANNING'S n:	0.027	ft

SWALE CAPACITY ANALYSIS TABLE:

Elevation	Depth	FLOW AREA	WETTED PERIMETER	HYDRAULIC RADIUS	CAPACITY
	(ft.)	(sq. ft.)	(ft.)		(cfs)
745.00	0.00	0.00	0.50	-	-
745.10	0.10	0.10	1.53	0.07	0.32
745.20	0.20	0.31	2.56	0.12	1.42
745.30	0.30	0.61	3.60	0.17	3.62
745.40	0.40	1.03	4.63	0.22	7.18
745.50	0.50	1.54	5.66	0.27	12.36
745.60	0.60	2.16	6.69	0.32	19.39
745.70	0.70	2.88	7.72	0.37	28.49
745.80	0.80	3.70	8.75	0.42	39.86
745.90	0.90	4.63	9.79	0.47	53.72
746.00	1.00	5.66	10.82	0.52	70.23



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PROJECT: 14137 S 108th Ave
LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 7/30/2025
REVISED:

SWALE CAPACITY - WETLAND SWALE

Side Slope 1:	0.17	ft/ft	Bottom Width:	0.00	ft
Side Slope 2:	0.23	ft/ft	Bottom Elevation:	733.66	ft
Longitudinal Slope:	0.05	ft/ft	MANNING'S n:	0.027	

SWALE CAPACITY ANALYSIS TABLE:

Elevation	Depth	FLOW AREA	WETTED PERIMETER	HYDRAULIC RADIUS	CAPACITY
	(ft.)	(sq. ft.)	(ft.)		(cfs)
733.66	0.00	0.00	0.00	-	-
733.76	0.10	0.05	1.02	0.05	0.09
733.86	0.20	0.20	2.05	0.10	0.54
733.96	0.30	0.46	3.07	0.15	1.60
734.06	0.40	0.82	4.09	0.20	3.45
734.16	0.50	1.28	5.12	0.25	6.26
734.26	0.60	1.84	6.14	0.30	10.18
734.36	0.70	2.51	7.16	0.35	15.36
734.46	0.80	3.27	8.18	0.40	21.93
734.56	0.90	4.14	9.21	0.45	30.02
734.66	1.00	5.12	10.23	0.50	39.76

COMPOSITE RUNOFF CURVE NUMBER (CN)

PROJECT: Bridlewood Subdivision PERMIT NUMBER:

LOCATION: 14137 S 108th Ave, Orland Park Bridlewood DATE: 6/16/2025

TYPE OF AREA (SELECT WITH DROP-DOWN)

DETAINED AREA MAJOR STORMWATER SYSTEM
UNRESTRICTED AREA X OTHER: Ex. Wetland Trib Area
UPSTREAM AREA

CONDITION (SELECT WITH DROP-DOWN)

PROPOSED CONDITION X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious	C	98	0.48	47.04
Pervious	C	74	3.38	250.12

TOTALS:	3.86	297.16
---------	------	--------

COMPOSITE RUNOFF CURVE NUMBER

Composite CN = $\frac{\text{Total Product}}{\text{Total Area}}$ = $\frac{297.16}{3.86}$ → Composite CN = 76.98

COMPOSITE RUNOFF CURVE NUMBER (CN)

PROJECT: Bridlewood Subdivision PERMIT NUMBER:

LOCATION: 14137 S 108th Ave, Orland Park Bridlewood DATE: 7/30/2025

TYPE OF AREA (SELECT WITH DROP-DOWN)

DETAINED AREA MAJOR STORMWATER SYSTEM
UNRESTRICTED AREA X OTHER: Prop. Wetland Trib Area
UPSTREAM AREA

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious	C	98	0.57	55.90
Pervious	C	74	2.40	177.46
TOTALS:			2.97	233.37

COMPOSITE RUNOFF CURVE NUMBER

Composite CN = $\frac{\text{Total Product}}{\text{Total Area}}$ = $\frac{233.37}{2.97}$ → Composite CN = 78.61



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LOCATION: Orland Park Bridlewood
PROJECT #: W24323.00

BY: KF
DATE: 6/16/2025
REV. DATE:

TIME OF CONCENTRATION, WETLAND TRIBUTARY AREA

ASSUMPTIONS: Manning's Roughness Coeff., n
grass areas: 0.24
paved areas: 0.011

<u>Sheet Flow</u>	Unit	Tc	Tc
		Ex.	Prop.
Manning's Roughness Coeff., n		0.24	0.24
Flow Length, L (L ≤ 100 ft)	ft	100	100
2-yr 24-hr Rainfall, P ₂	in	3.04	3.04
Upstream Elevation	ft	753.70	753.70
Downstream Elevation	ft	750.20	750.00
Land Slope, s	ft/ft	0.0350	0.0370
$T_t = [0.007 (nL)^{0.8}] / [P_2^{0.5} s^{0.4}]$	hr	0.20	0.19

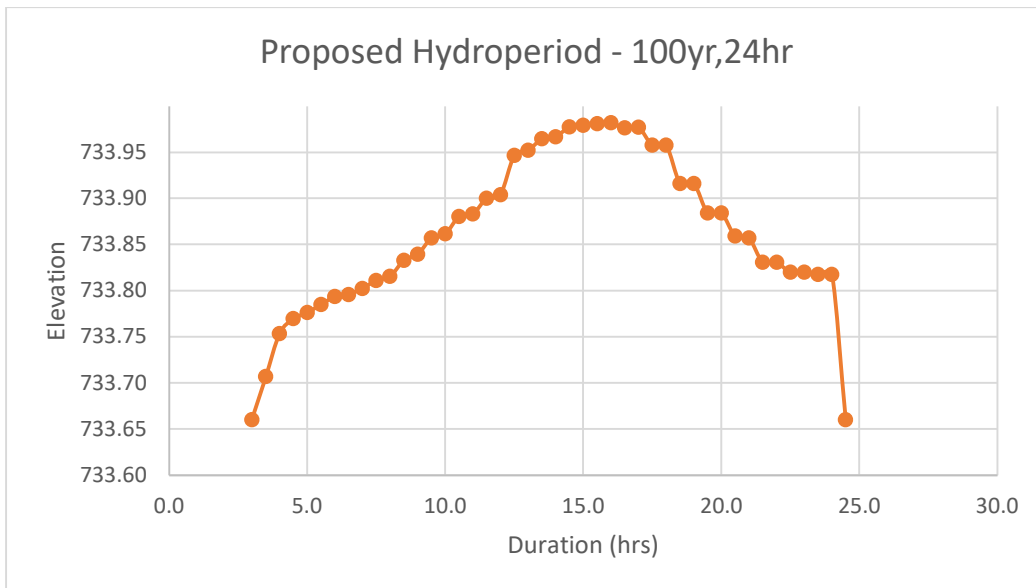
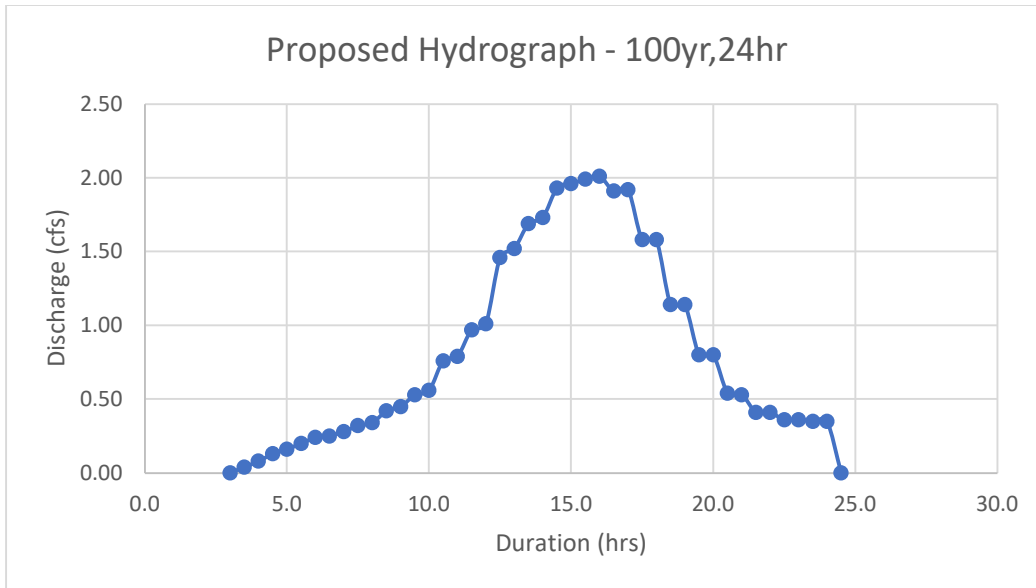
Shallow Concentrated Flow

Surface Description (u or p)		u	u
Flow Length, L	ft	290	371
Upstream Elevation	ft	750.20	750.00
Downstream Elevation	ft	745.10	742.00
Watercourse Slope, s	ft/ft	0.0176	0.0216
Average Velocity, V	fps	2.14	2.37
$T_t = L / 3600 V$	hr	0.04	0.04

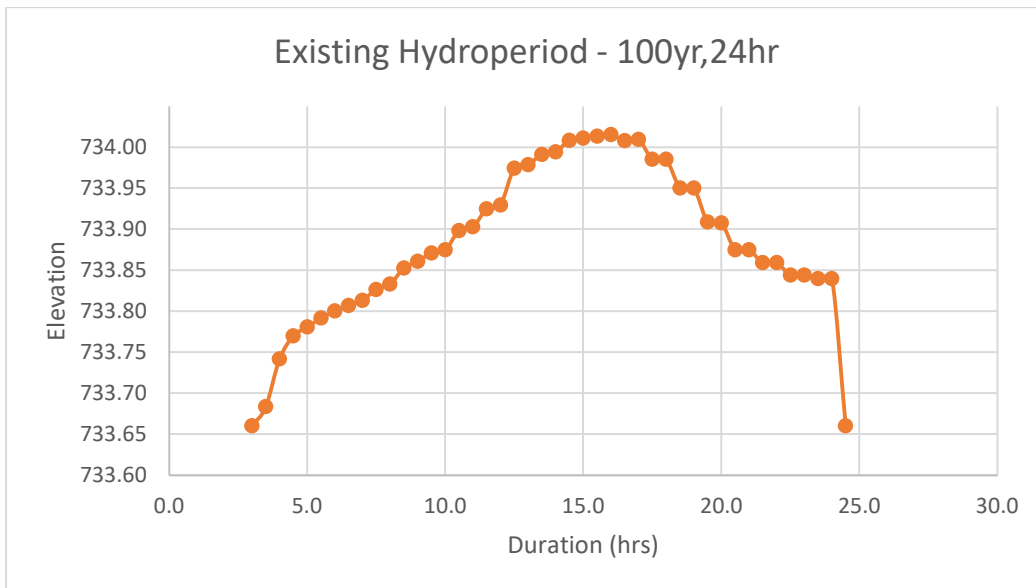
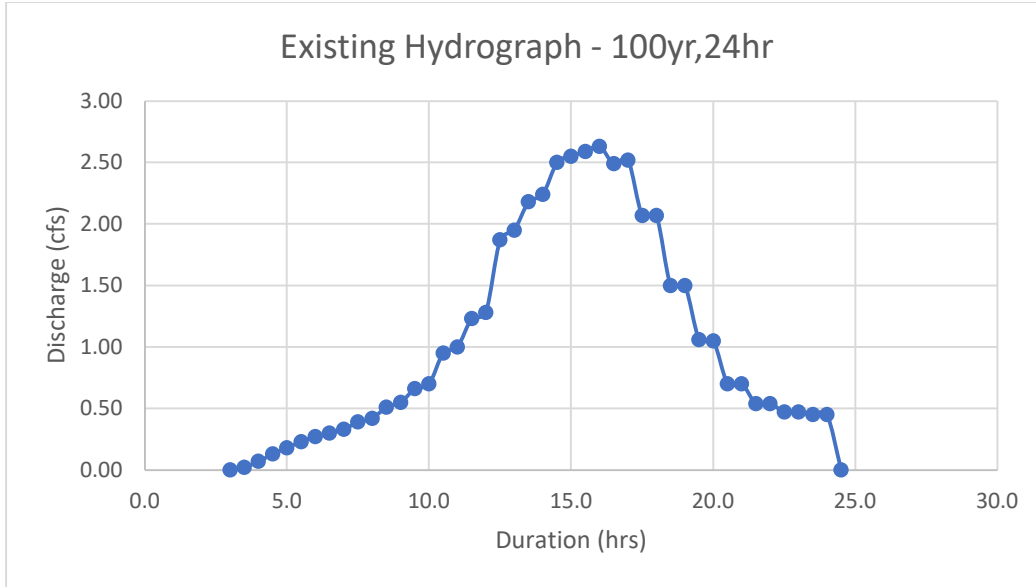
Channel Flow

Cross Sectional Flow Area, a	ft ²	6.5	6.5
Wetted Perimeter, p _w	ft	13	13
Hydraulic Radius, $r = a / p_w$	ft	0.50	0.50
Channel Slope, s	ft/ft	6.0000	8.4000
Manning's Roughness Coeff., n	ft/ft	0.24	0.24
Velocity, $v = (1.49 * r^{(2/3)} * s^{(1/2)}) / n$	fps	9.58	11.34
Flow Length, L		252	252
$T_t = L / 3600 V$	hr	0.01	0.01

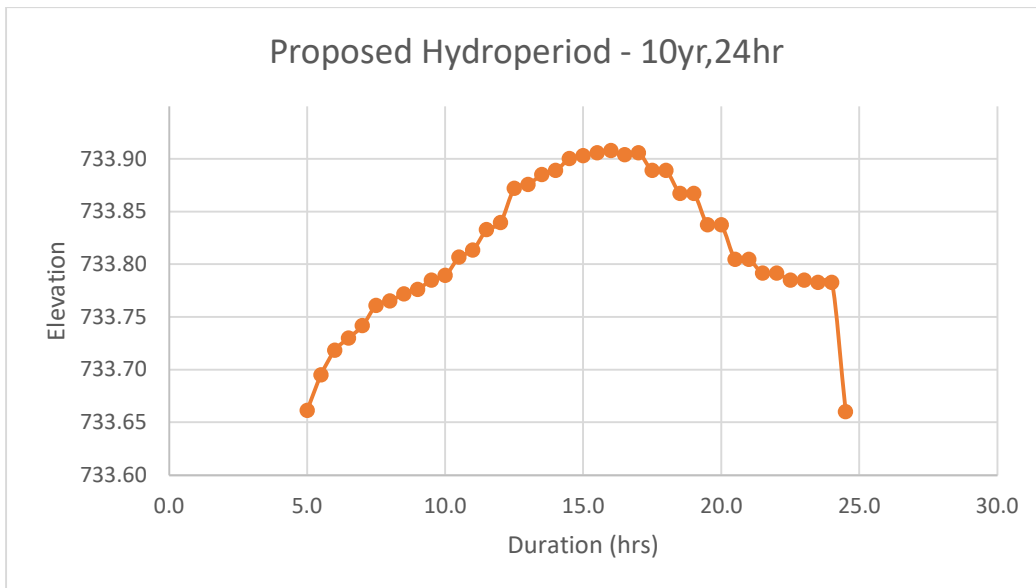
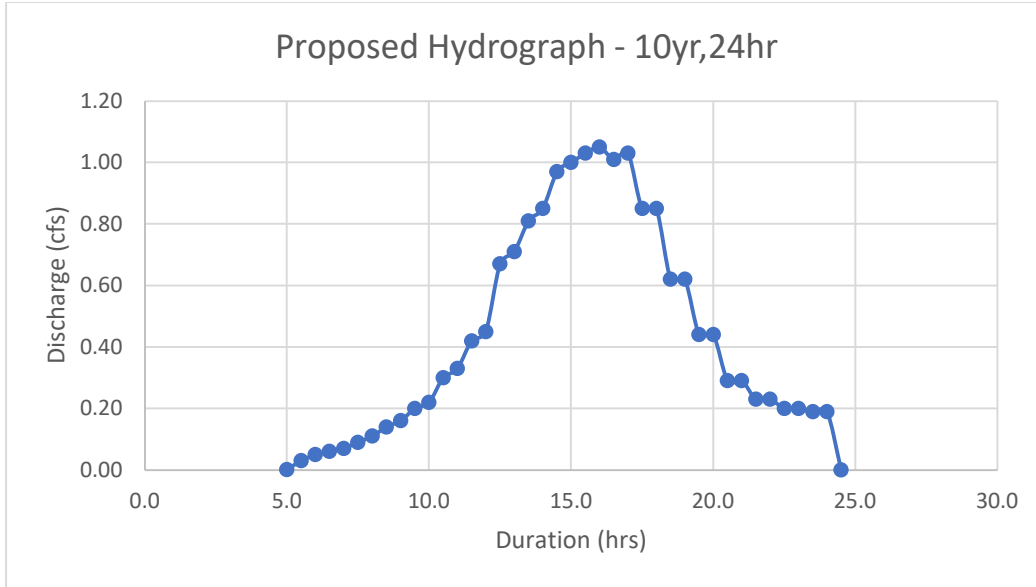
$T_c = T_t + T_t + T_t$	hr	0.24	0.24
Use in Model (5 min. minimum)	min	14	14



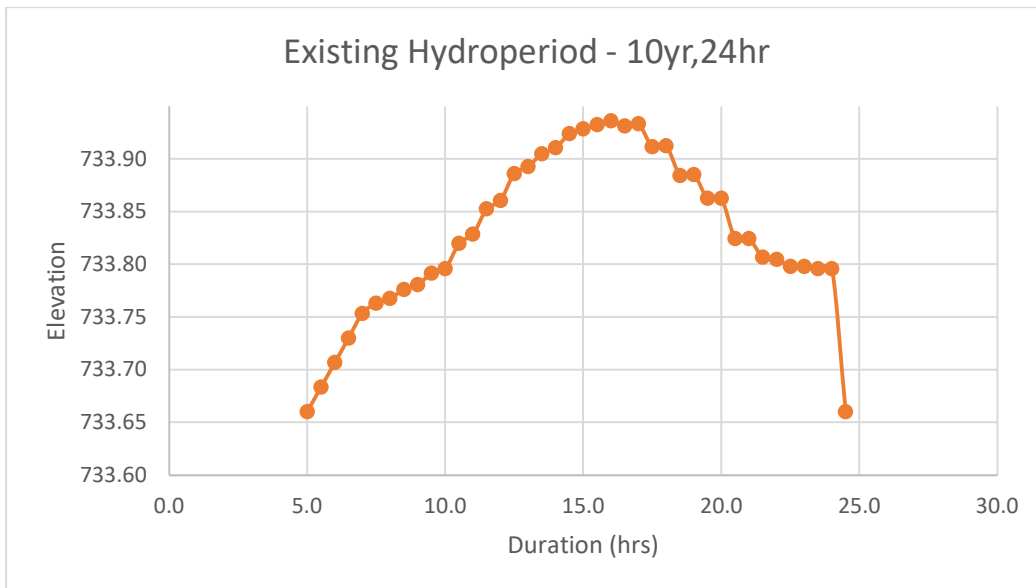
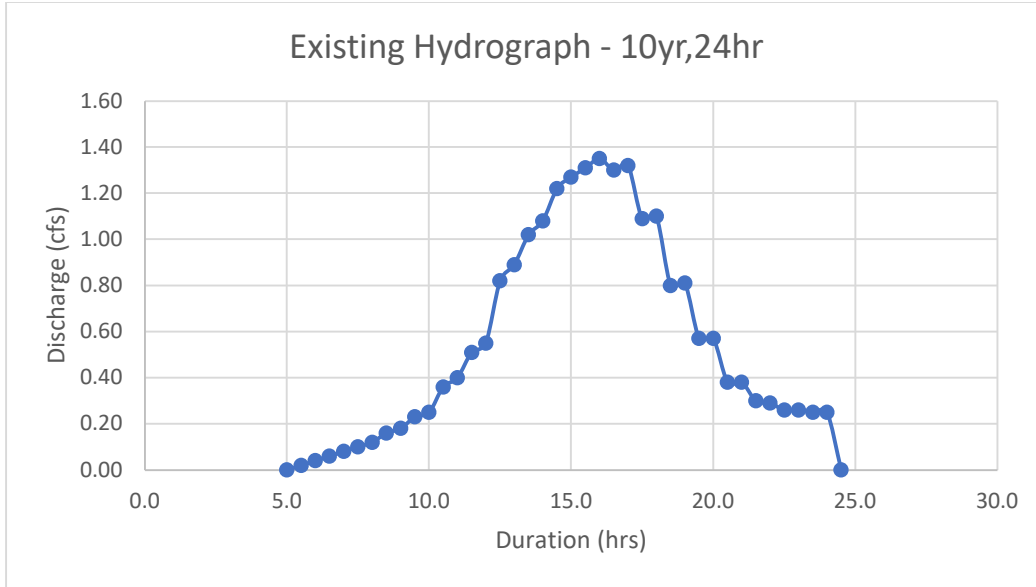
Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetland	0.005		5.993		16.02	2.04	434.2



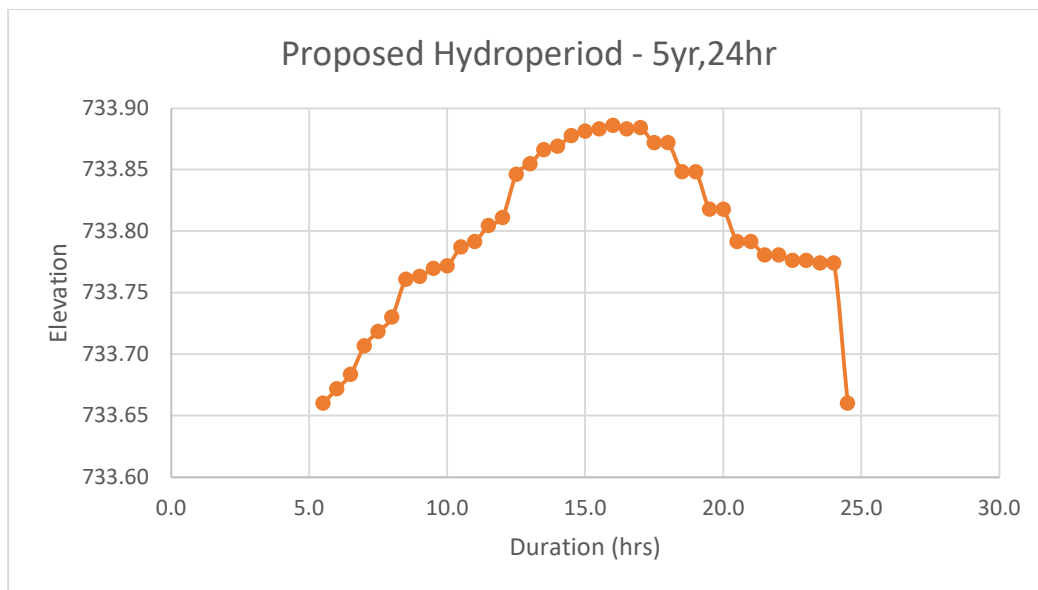
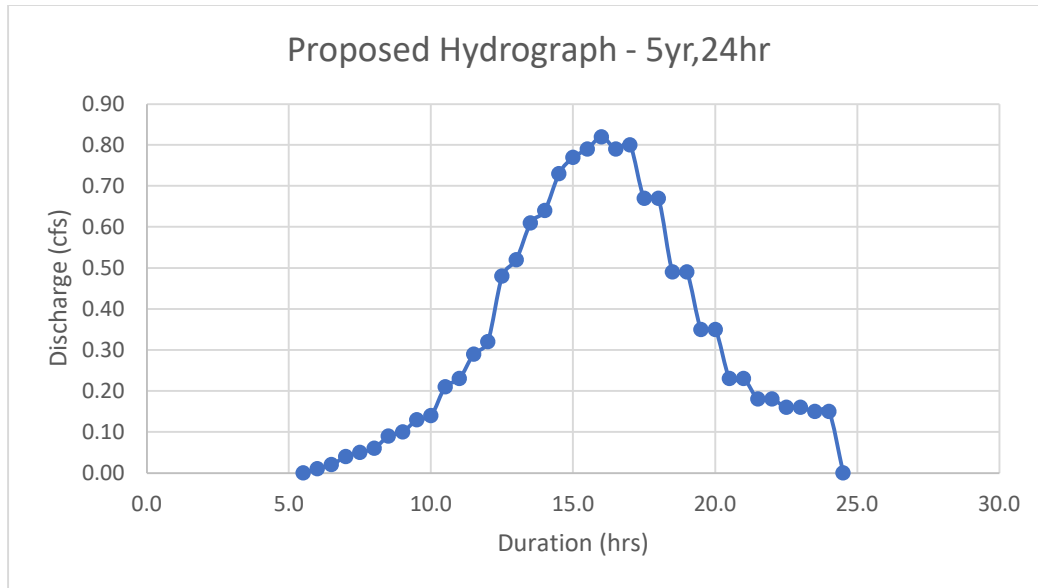
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Ex Wetland	0.006		5.784		16.01	2.63	425.44



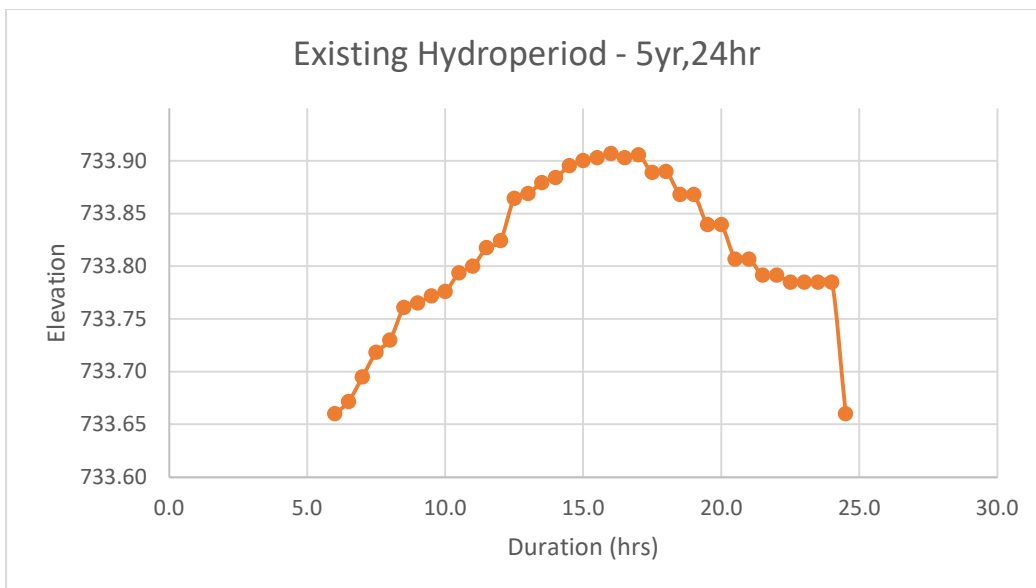
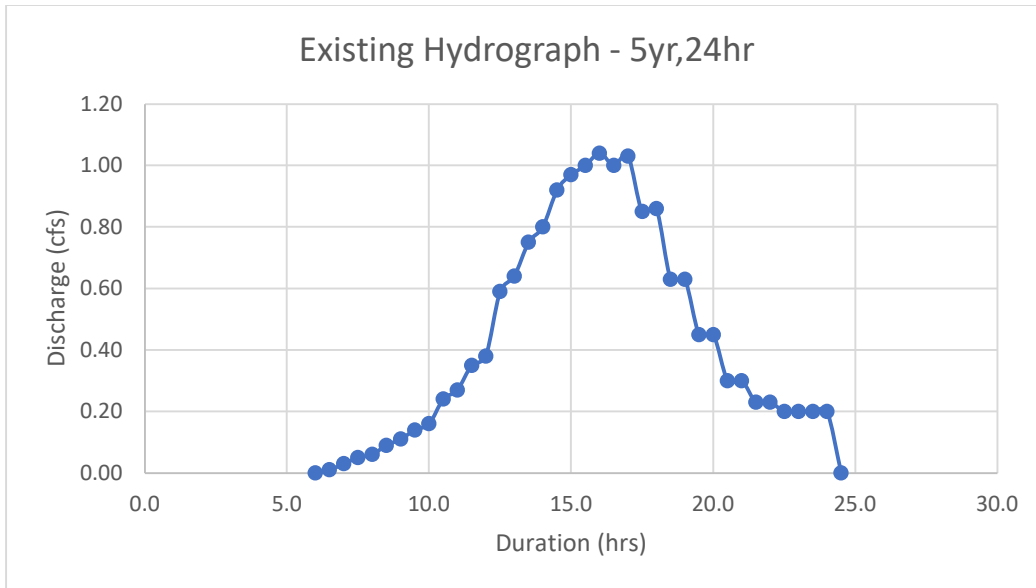
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Prop Wetland	0.005		2.895		16.03	1.06	227.54



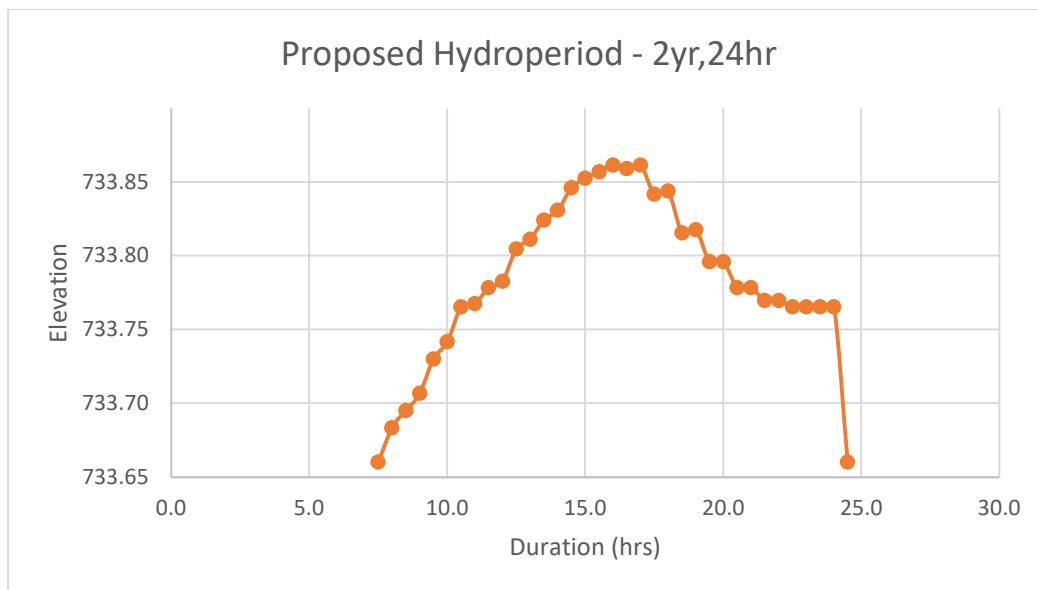
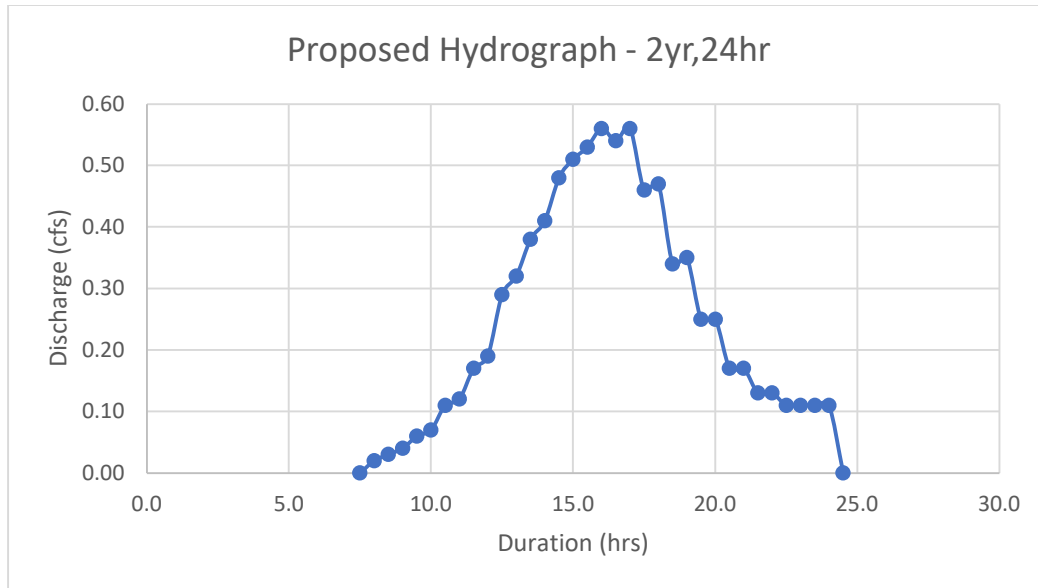
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Ex Wetland	0.006		2.737		16.04	1.35	218.83



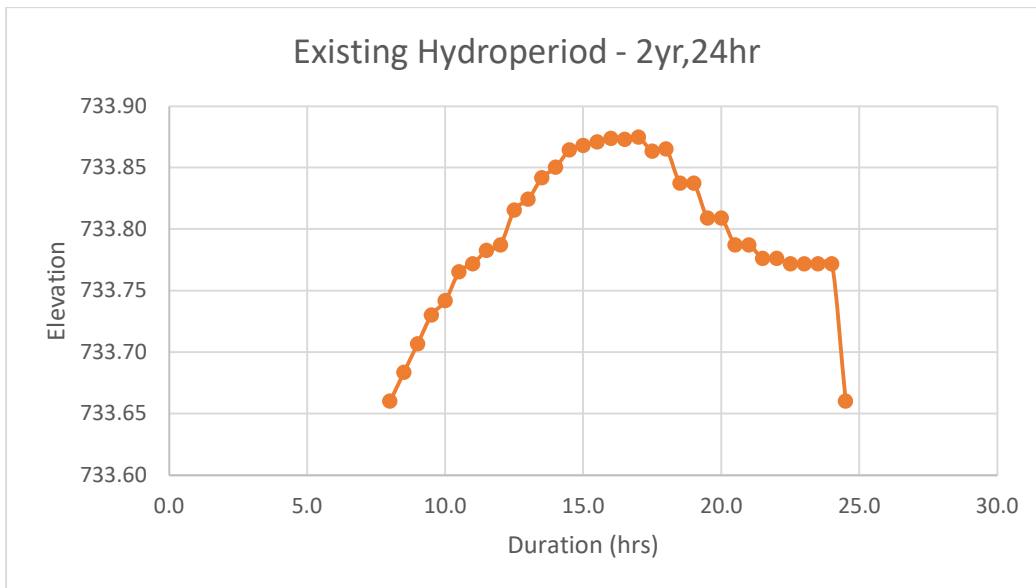
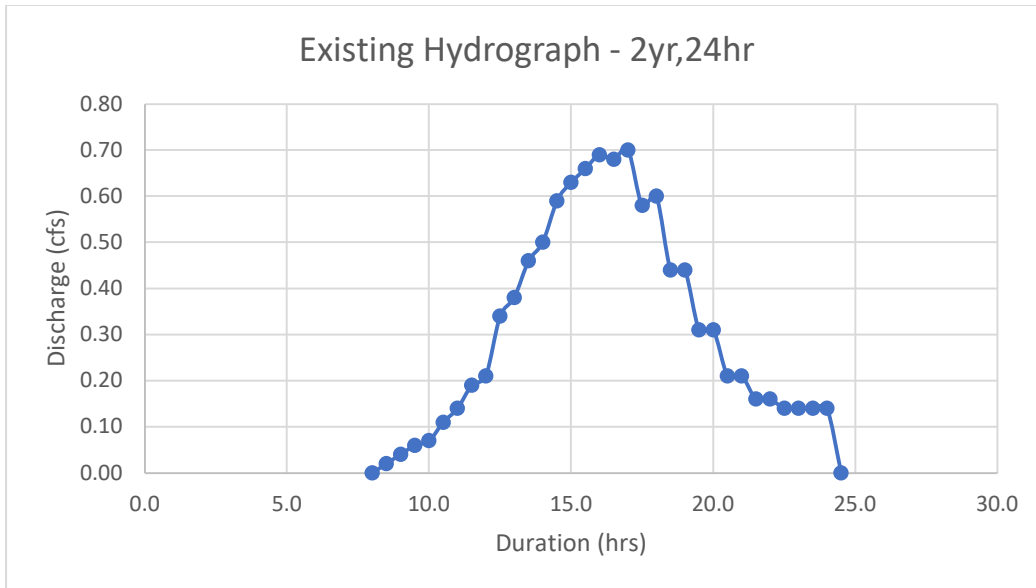
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Prop Wetland	0.005		2.177		16.04	0.82	176.54



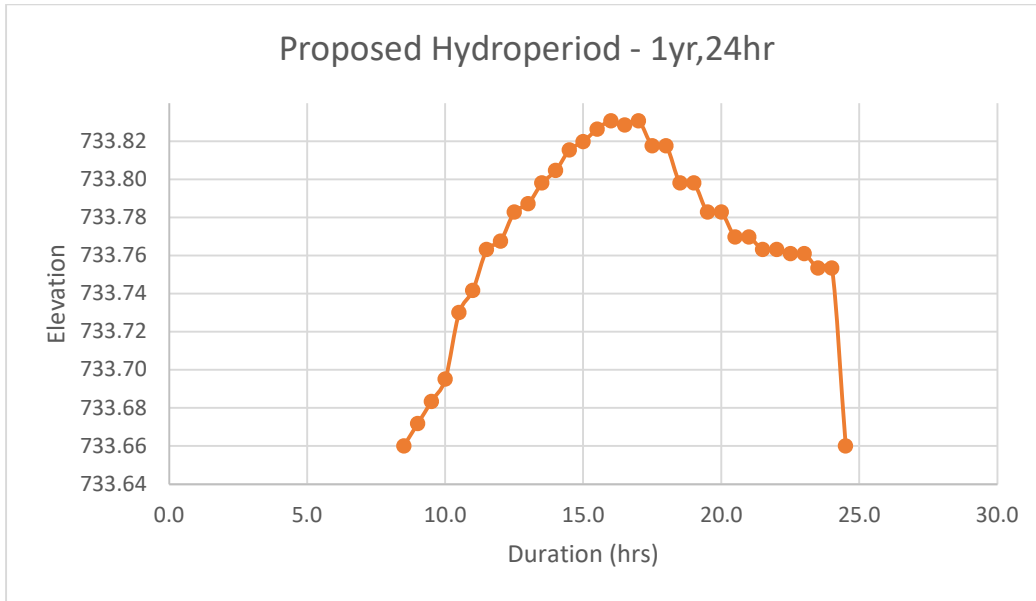
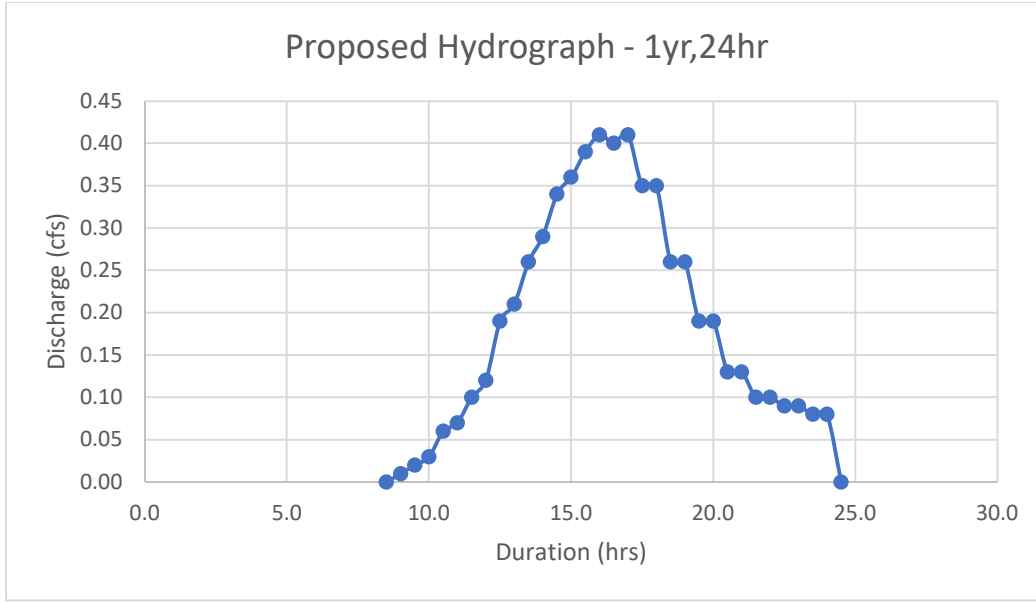
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Ex Wetland	0.006		2.038		16.03	1.04	168.23



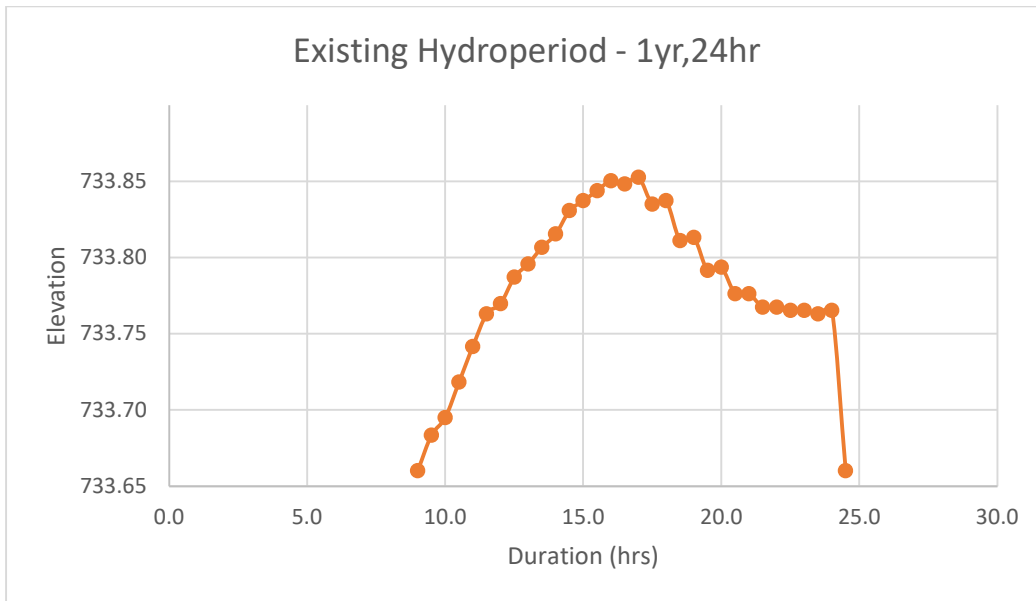
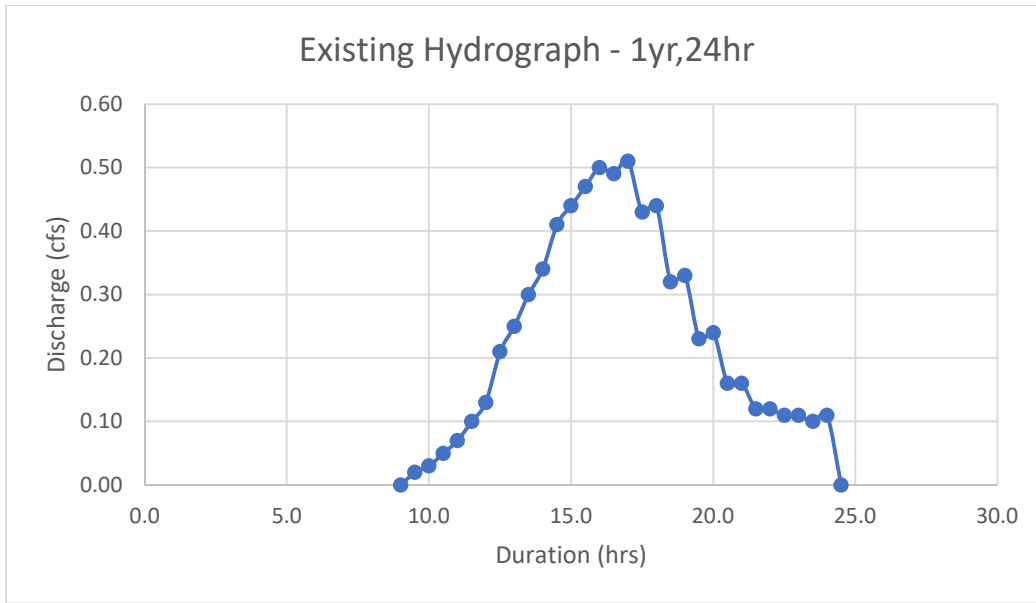
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Prop Wetland	0.005		1.416		16.05	0.56	120.1



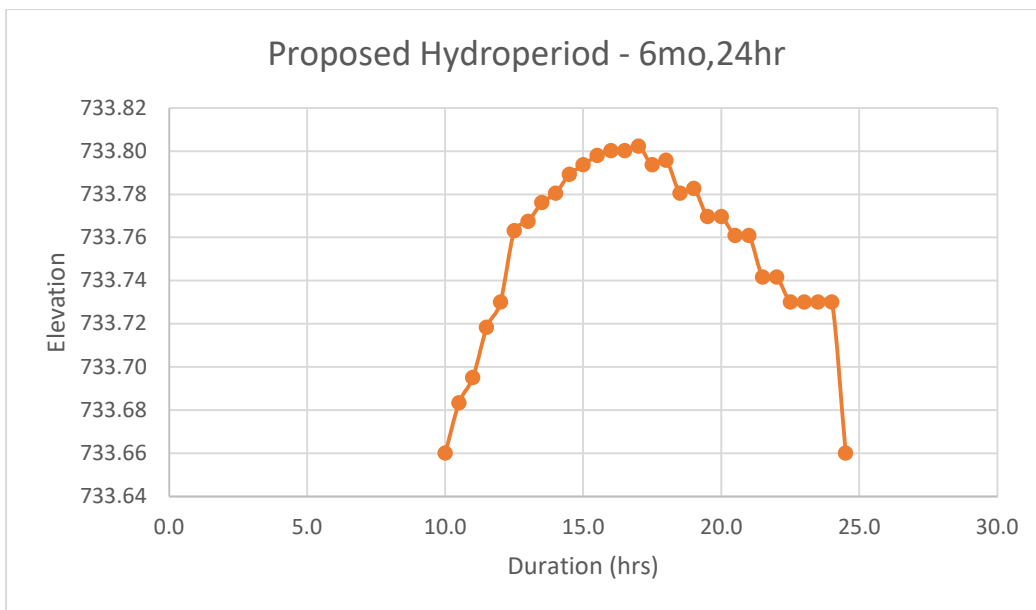
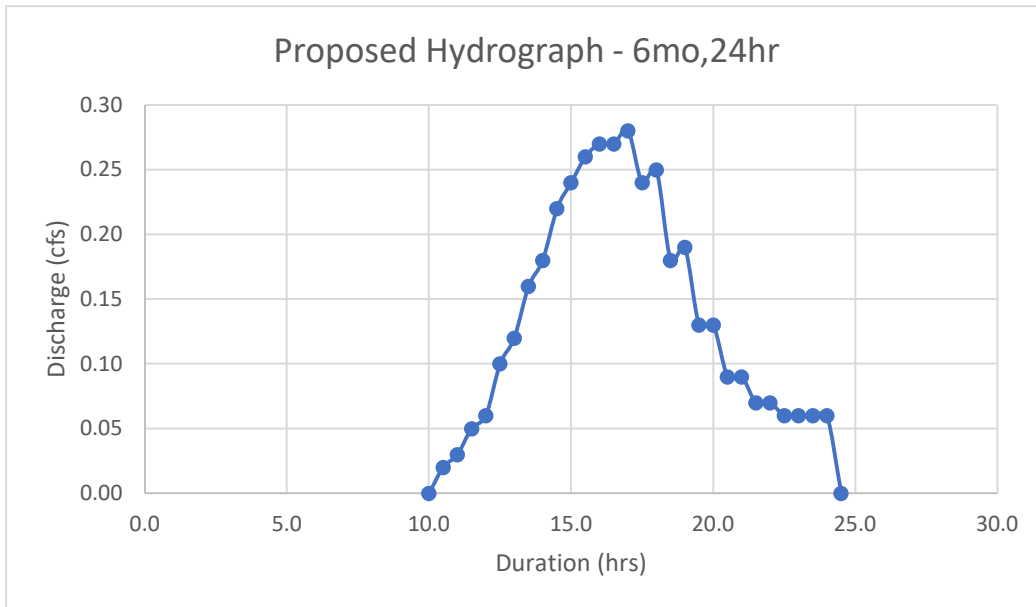
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Ex Wetland	0.006		1.304		17.02	0.70	113.29



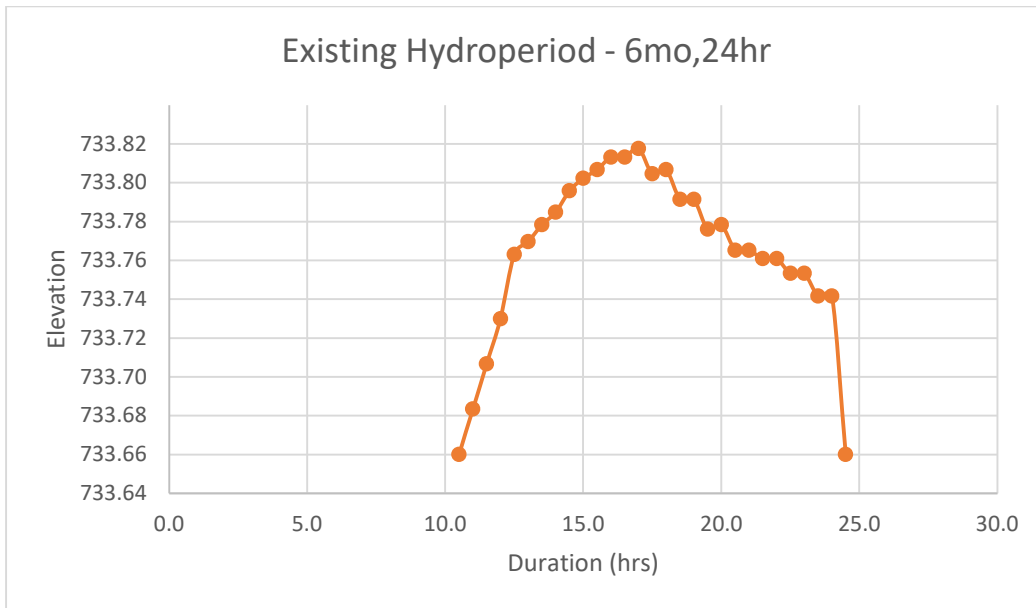
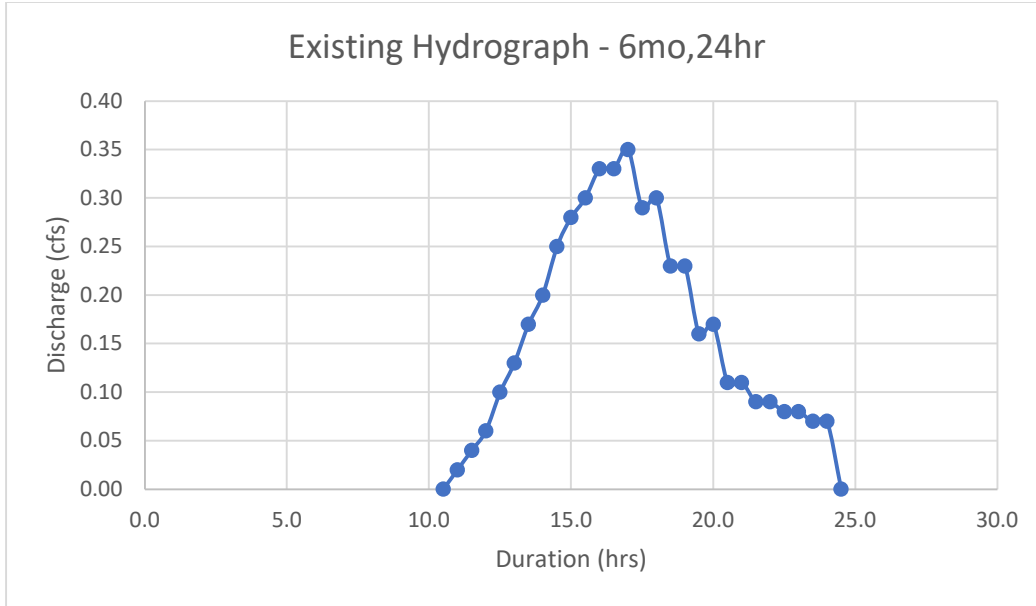
Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetland	0.005		1.000		17.02	0.41	88.98



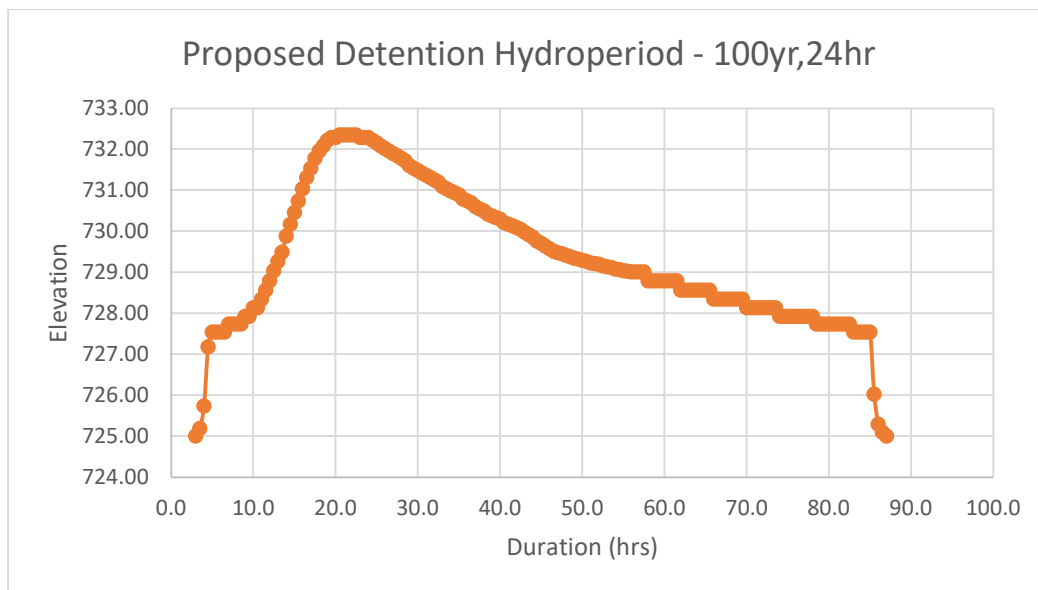
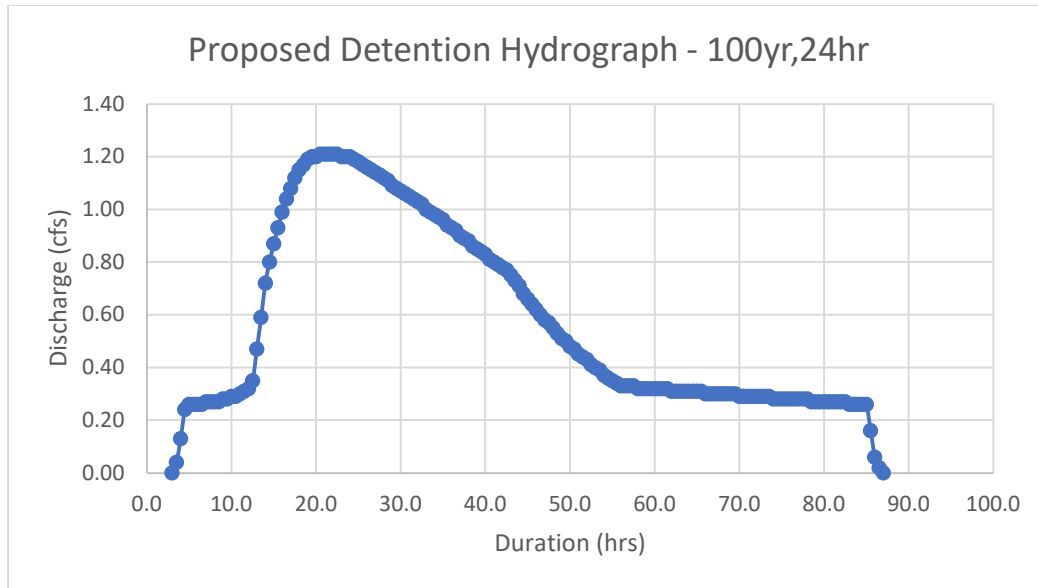
Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		0.907		17.02	0.51	82.96



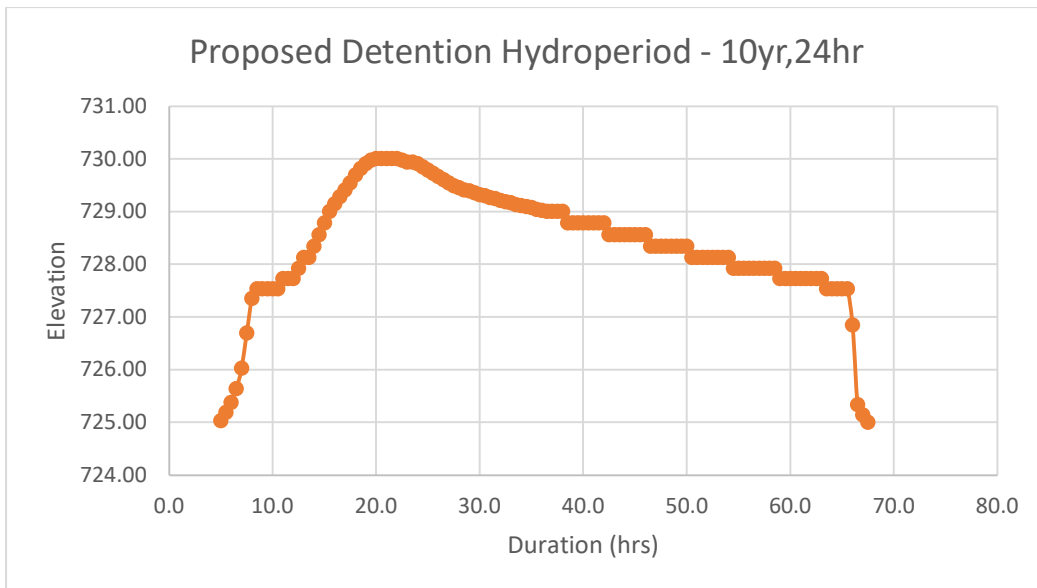
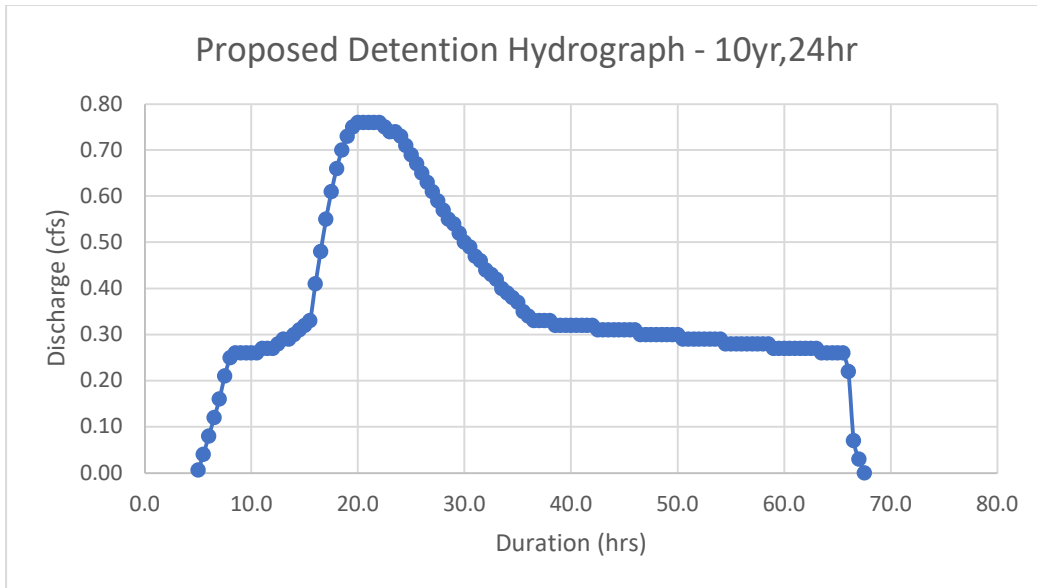
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Prop Wetland	0.005		0.650		17.02	0.28	61.43



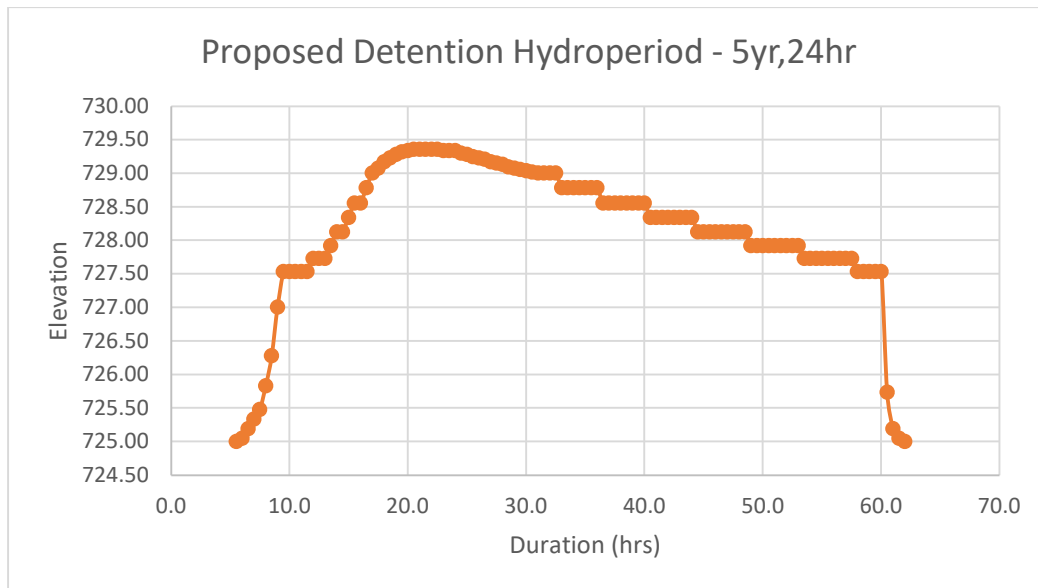
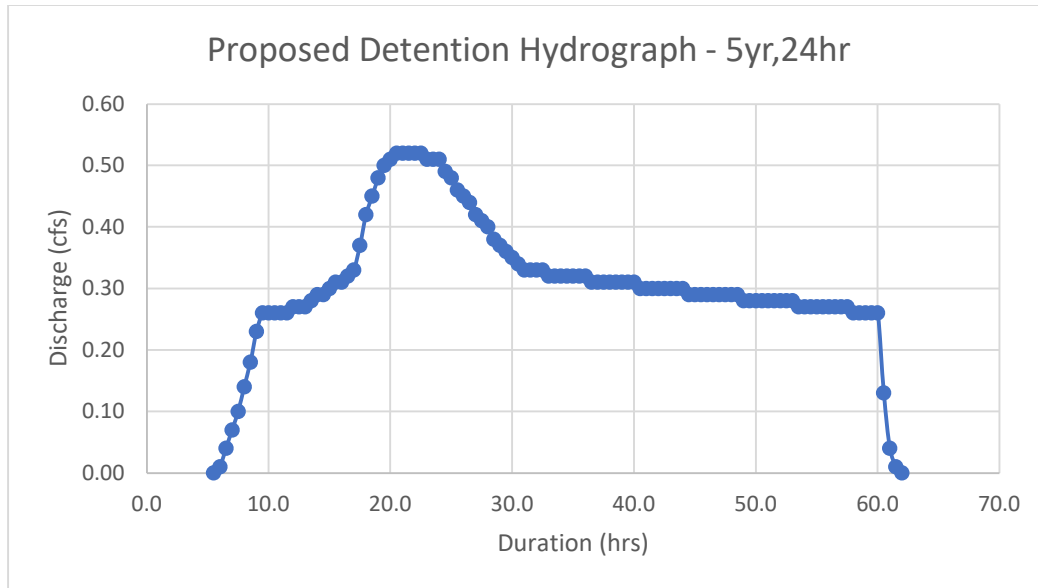
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Ex Wetland	0.006		0.577		17.03	0.35	56.16



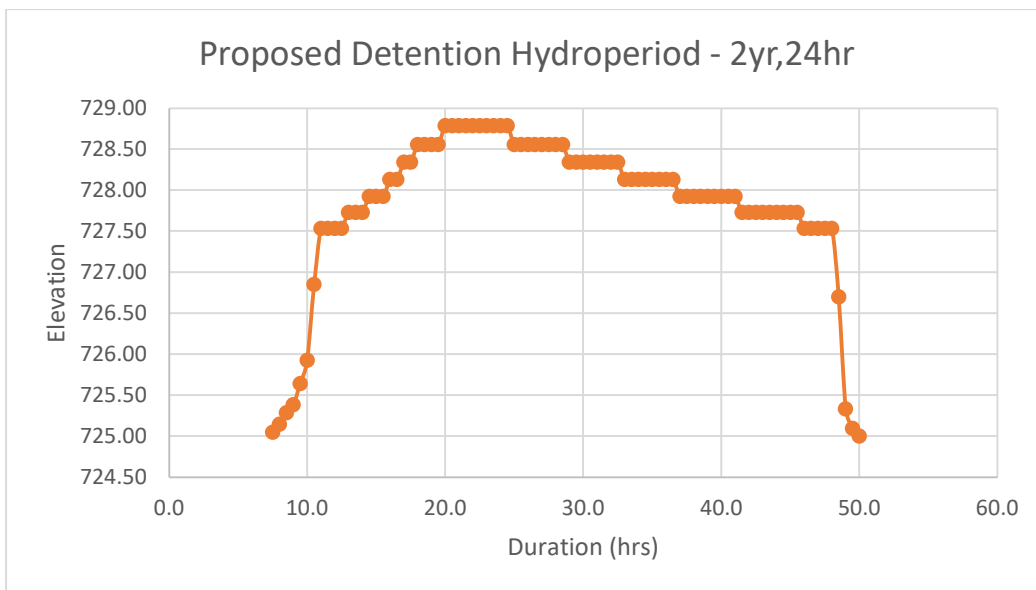
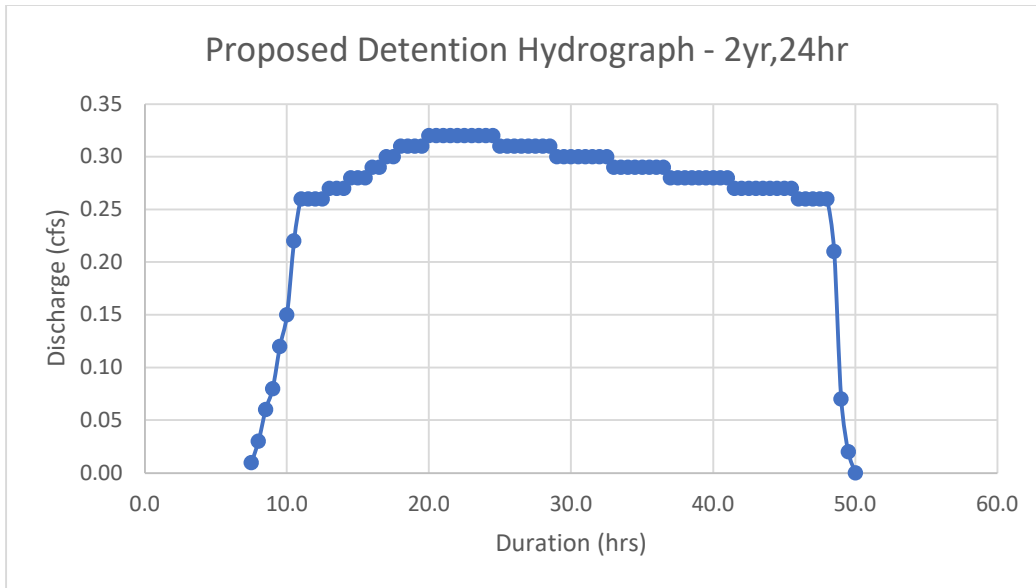
Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013		5.967	732.34	21.15	1.21	96.18



Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Reach 1	0.013		2.875	730.01	21.07	0.76	60.72



Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Reach 1	0.013		2.16	729.44	21.17	0.52	41.38



Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Reach 1	0.013		1.402	728.74	22.14	0.32	25.23

TR-20 Existing Runoff

WinTR-20 Printed Page File Beginning of Input Data List
 C:\Users\kfaje\Desktop\TR-20\Existing Detention.inp

WinTR-20: version 3.20 0 0 0.001 0
 Bridlewood Subdivision
 Existing Runoff

SUB-AREA:

Existing OUTLET 0.01474 75.24 0.40

STORM ANALYSIS:

100yr-48h	0.	9.28	100yr-48h 2	3.34
100yr-24h	0.	8.57	100yr-24h 2	3.34
100yr-12h	0.	7.46	100yr-12h 2	3.34
100yr-6h	0.	6.43	100yr-6h 2	3.34
100yr-3h	0.	5.49	100yr-3h 2	3.34
100yr-1h	0.	4.03	100yr-1h 2	3.34

RAINFALL DISTRIBUTION:

100yr-48h	2.0			
0.	0.0231	0.0479	0.0712	0.0978
0.1253	0.1523	0.1791	0.2033	0.2283
0.2541	0.2835	0.3125	0.3390	0.3633
0.3861	0.4124	0.4508	0.5129	0.5931
0.6919	0.8005	0.8971	0.9604	1.
100yr-24h	1.0			
0.	0.0205	0.0431	0.0667	0.0912
0.1171	0.1436	0.1691	0.1964	0.2278
0.2633	0.3093	0.3635	0.4392	0.5211
0.6102	0.6989	0.7819	0.8492	0.8974
0.9311	0.9534	0.9706	0.9856	1.
100yr-12h	0.50			
0.	0.0229	0.0482	0.0778	0.1133
0.1579	0.2139	0.2841	0.3644	0.4529
0.5435	0.6238	0.6976	0.7548	0.8038
0.8470	0.8781	0.9022	0.9217	0.9381
0.9529	0.9657	0.9774	0.9884	1.
100yr-6h	0.25			
0.	0.0836	0.1773	0.2811	0.3833
0.4745	0.5550	0.6225	0.6722	0.7082
0.7417	0.7697	0.7981	0.8255	0.8518
0.8740	0.8947	0.9117	0.9270	0.9403
0.9536	0.9656	0.9774	0.9884	1.
100yr-3h	0.125			
0.	0.0836	0.1773	0.2811	0.3833
0.4745	0.5550	0.6225	0.6722	0.7082
0.7417	0.7697	0.7981	0.8255	0.8518
0.8740	0.8947	0.9117	0.9270	0.9403
0.9536	0.9656	0.9774	0.9885	1.
100yr-1h	0.04167			
0.	0.0836	0.1773	0.2811	0.3833
0.4745	0.5550	0.6225	0.6722	0.7082
0.7417	0.7697	0.7981	0.8255	0.8518

0.8740	0.8947	0.9117	0.9270	0.9403
0.9536	0.9656	0.9774	0.9885	1.

GLOBAL OUTPUT:

2	0.01	0.5	YY	Y	YY	Y
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WinTR-20 Printed Page File End of Input Data List

Bridlewood Subdivision
Existing Runoff

Name of printed page file:
C:\Users\kfaje\Desktop\TR-20\Existing Detention.out

STORM 100yr-48h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.015		6.240		42.03	4.26	289.28

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
6.000	0.0	0.02	0.06	0.10	0.14	0.18	0.21
9.500	0.25	0.28	0.31	0.34	0.36	0.39	0.41
13.000	0.43	0.45	0.48	0.45	0.46	0.48	0.49
16.500	0.52	0.54	0.55	0.57	0.60	0.61	0.62
20.000	0.64	0.73	0.75	0.77	0.78	0.79	0.80
23.500	0.81	0.82	0.77	0.77	0.78	0.79	0.74
27.000	0.73	0.74	0.75	0.71	0.71	0.72	0.72
30.500	0.82	0.84	0.85	0.86	1.21	1.27	1.28
34.000	1.29	2.01	2.13	2.16	2.18	2.77	2.88
37.500	2.91	2.94	3.58	3.70	3.73	3.77	4.13
41.000	4.20	4.24	4.26	3.87	3.84	3.85	3.87
44.500	2.71	2.56	2.56	2.56	1.73	1.61	1.61
48.000	1.61	0.20	0.0				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.015		6.240		42.03	4.26	289.28

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)

6.000	0.0	0.02	0.06	0.10	0.14	0.18	0.21
9.500	0.25	0.28	0.31	0.34	0.36	0.39	0.41
13.000	0.43	0.45	0.48	0.45	0.46	0.48	0.49
16.500	0.52	0.54	0.55	0.57	0.60	0.61	0.62
20.000	0.64	0.73	0.75	0.77	0.78	0.79	0.80
23.500	0.81	0.82	0.77	0.77	0.78	0.79	0.74
27.000	0.73	0.74	0.75	0.71	0.71	0.72	0.72
30.500	0.82	0.84	0.85	0.86	1.21	1.27	1.28
34.000	1.29	2.01	2.13	2.16	2.18	2.77	2.88
37.500	2.91	2.94	3.58	3.70	3.73	3.77	4.13
41.000	4.20	4.24	4.26	3.87	3.84	3.85	3.87
44.500	2.71	2.56	2.56	2.56	1.73	1.61	1.61
48.000	1.61	0.20	0.0				

STORM 100yr-24h

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Bridlewood Subdivision
Existing Runoff

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.015		5.588		16.07	6.12	415.32

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		
3.500	0.0	0.07	0.20	0.31	0.43	0.53	0.60
7.000	0.68	0.80	0.89	1.09	1.19	1.42	1.53
10.500	2.04	2.22	2.71	2.89	4.09	4.42	4.93
14.000	5.15	5.71	5.91	6.01	6.12	5.86	5.88
17.500	4.96	4.86	3.67	3.52	2.60	2.48	1.75
21.000	1.65	1.32	1.28	1.13	1.11	1.08	1.07
24.500	0.13	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.015		5.588		16.07	6.12	415.32

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		
3.500	0.0	0.07	0.20	0.31	0.43	0.53	0.60
7.000	0.68	0.80	0.89	1.09	1.19	1.42	1.53
10.500	2.04	2.22	2.71	2.89	4.09	4.42	4.93
14.000	5.15	5.71	5.91	6.01	6.12	5.86	5.88
17.500	4.96	4.86	3.67	3.52	2.60	2.48	1.75
21.000	1.65	1.32	1.28	1.13	1.11	1.08	1.07
24.500	0.13	0.0					

STORM 100yr-12h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.015		4.584		5.11	9.38	636.27

Line Start Time (hr)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)
1.500	0.0	0.14	1.03	2.42	4.34	6.30	8.11	
5.000	9.27	8.94	8.54	6.98	6.01	5.35	4.01	
8.500	3.10	2.50	2.10	1.88	1.64	1.49	1.40	
12.000	1.46	0.18	0.0					

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Bridlewood Subdivision
Existing Runoff

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.015		4.584		5.11	9.38	636.27

Line Start Time (hr)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)
1.500	0.0	0.14	1.03	2.42	4.34	6.30	8.11	
5.000	9.27	8.94	8.54	6.98	6.01	5.35	4.01	
8.500	3.10	2.50	2.10	1.88	1.64	1.49	1.40	
12.000	1.46	0.18	0.0					

STORM 100yr-6h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.015		3.676		1.51	13.68	928.12

Line Start Time (hr)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment of 0.500 hr (cfs)
0.0	0.0	0.47	9.85	13.68	11.23	7.12	5.73	
3.500	5.47	4.54	3.49	2.85	2.55	2.40	0.30	
7.000	0.0							

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.015		3.676		1.51	13.68	928.12

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
0.0	0.0	0.47	9.85	13.68	11.23	7.12	5.73
3.500	5.47	4.54	3.49	2.85	2.55	2.40	0.30
7.000	0.0						

STORM 100yr-3h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.015		2.874		0.93	19.61	1330.31

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Bridlewood Subdivision
Existing Runoff

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
0.0	0.0	6.03	19.38	10.82	8.31	5.31	4.10
3.500	0.50	0.01	0.0				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.015		2.874		0.93	19.61	1330.31

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
0.0	0.0	6.03	19.38	10.82	8.31	5.31	4.10
3.500	0.50	0.01	0.0				

STORM 100yr-1h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Existing	0.015		1.706		0.53	23.16	1571.45

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
0.0	0.0	22.80	12.24	1.15	0.03	0.0	

Area or Reach	Drainage Area	Rain Gage ID or	Runoff Amount	----- Elevation	Peak Flow Time	Rate	Rate
------------------	------------------	--------------------	------------------	--------------------	-------------------	------	------

Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
OUTLET	0.015		1.706		0.53	23.16	1571.45

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
0.0	0.0	22.80	12.24	1.15	0.03	0.0

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Bridlewood Subdivision
Existing Runoff

Area or Reach Identifier	Drainage Area (sq mi)	----- 100yr-48h (cfs)	----- 100yr-24h (cfs)	----- 100yr-12h (cfs)	----- 100yr-6h (cfs)	----- 100yr-3h (cfs)
Existing	0.015	4.26	6.12	9.38	13.68	19.61
OUTLET	0.015	4.26	6.12	9.38	13.68	19.61

Area or Reach Identifier	Drainage Area (sq mi)	----- 100yr-1h (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
Existing	0.015	23.16				
OUTLET	0.015	23.16				

TR-20 Proposed Detention

WinTR-20 Printed Page File Beginning of Input Data List
 C:\Users\kfaje\Desktop\TR-20\Proposed Detention.inp

WinTR-20: Version 3.20 0 0 0.001 0
 Bridlewood Subdivision
 Proposed Detention

SUB-AREA:

proposed Reach 1 0.01256 78.39 0.17 YY Y

STREAM REACH:

Reach 1 OUTLET Detention

STORM ANALYSIS:

100yr-48h	0.	9.28	100yr-48h 2	3.34
100yr-24h	0.	8.57	100yr-24h 2	3.34
100yr-12h	0.	7.46	100yr-12h 2	3.34
100yr-6h	0.	6.43	100yr-6h 2	3.34
100yr-3h	0.	5.49	100yr-3h 2	3.34
100yr-1h	0.	4.03	100yr-1h 2	3.34
2yr-24hr	0.	3.34	100yr-24h 2	3.34
5yr-24hr	0.	4.30	100yr-24h 2	3.34
10yr-24hr	0.	5.15	100yr-24h 2	3.34

STRUCTURE RATING:

Detention 725.0		
725.0	0.	0.
727.5	0.26	0.01
728.0	0.28	0.22
729.0	0.33	0.72
730.0	0.76	1.28
731.0	0.98	1.90
732.0	1.16	2.60
732.5	1.23	2.97
733.5	61.37	3.77

RAINFALL DISTRIBUTION:

100yr-48h	2.0			
0.	0.0231	0.0479	0.0712	0.0978
0.1253	0.1523	0.1791	0.2033	0.2283
0.2541	0.2835	0.3125	0.3390	0.3633
0.3861	0.4124	0.4508	0.5129	0.5931
0.6919	0.8005	0.8971	0.9604	1.
100yr-24h	1.0			
0.	0.0205	0.0431	0.0667	0.0912
0.1171	0.1436	0.1691	0.1964	0.2278
0.2633	0.3093	0.3635	0.4392	0.5211
0.6102	0.6989	0.7819	0.8492	0.8974
0.9311	0.9534	0.9706	0.9856	1.
100yr-12h	0.50			
0.	0.0229	0.0482	0.0778	0.1133
0.1579	0.2139	0.2841	0.3644	0.4529
0.5435	0.6238	0.6976	0.7548	0.8038
0.8470	0.8781	0.9022	0.9217	0.9381

	0.9529	0.9657	0.9774	0.9884	1.
100yr-6h		0.25			
	0.	0.0836	0.1773	0.2811	0.3833
	0.4745	0.5550	0.6225	0.6722	0.7082
	0.7417	0.7697	0.7981	0.8255	0.8518
	0.8740	0.8947	0.9117	0.9270	0.9403
	0.9536	0.9656	0.9774	0.9884	1.
100yr-3h		0.125			
	0.	0.0836	0.1773	0.2811	0.3833
	0.4745	0.5550	0.6225	0.6722	0.7082
	0.7417	0.7697	0.7981	0.8255	0.8518
	0.8740	0.8947	0.9117	0.9270	0.9403
	0.9536	0.9656	0.9774	0.9885	1.
100yr-1h		0.04167			
	0.	0.0836	0.1773	0.2811	0.3833
	0.4745	0.5550	0.6225	0.6722	0.7082
	0.7417	0.7697	0.7981	0.8255	0.8518
	0.8740	0.8947	0.9117	0.9270	0.9403
	0.9536	0.9656	0.9774	0.9885	1.

GLOBAL OUTPUT:

2 0.01 0.5 YY Y YY Y

WinTR-20 Printed Page File End of Input Data List

Bridlewood Subdivision
Proposed Detention

Name of printed page file:
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STORM 100yr-48h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		6.634		42.00	3.75	298.18

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	----- (cfs)
5.000	0.0	0.03	0.06	0.10	0.14	0.21
8.500	0.25	0.28	0.31	0.33	0.35	0.40
12.000	0.42	0.44	0.46	0.47	0.49	0.47
15.500	0.48	0.49	0.52	0.53	0.54	0.58
19.000	0.59	0.60	0.61	0.71	0.72	0.74
22.500	0.74	0.75	0.76	0.77	0.71	0.72
26.000	0.73	0.68	0.68	0.68	0.69	0.65

29.500	0.66	0.66	0.77	0.77	0.78	0.78	1.15
33.000	1.16	1.17	1.17	1.91	1.93	1.95	1.97
36.500	2.56	2.58	2.61	2.63	3.26	3.29	3.31
40.000	3.33	3.68	3.71	3.73	3.75	3.35	3.36
43.500	3.37	3.38	2.22	2.23	2.23	2.23	1.40
47.000	1.40	1.40	1.40	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	6.634		42.00	3.75	298.18

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
5.000	0.0	0.03	0.06	0.10	0.14	0.17	0.21
8.500	0.25	0.28	0.31	0.33	0.35	0.38	0.40
12.000	0.42	0.44	0.46	0.47	0.49	0.46	0.47
15.500	0.48	0.49	0.52	0.53	0.54	0.56	0.58
19.000	0.59	0.60	0.61	0.71	0.72	0.73	0.74
22.500	0.74	0.75	0.76	0.77	0.71	0.72	0.72
26.000	0.73	0.68	0.68	0.68	0.69	0.65	0.65
29.500	0.66	0.66	0.77	0.77	0.78	0.78	1.15
33.000	1.16	1.17	1.17	1.91	1.93	1.95	1.97
36.500	2.56	2.58	2.61	2.63	3.26	3.29	3.31
40.000	3.33	3.68	3.71	3.73	3.75	3.35	3.36
43.500	3.37	3.38	2.22	2.23	2.23	2.23	1.40
47.000	1.40	1.40	1.40	0.0			

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Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
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Reach 1	0.013	Downstream	6.633	732.21	48.06	1.19	94.66
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Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
5.500	0.823E-02	0.03	0.07	0.11	0.14	0.18	0.21
9.000	0.25	0.26	0.26	0.26	0.26	0.26	0.26
12.500	0.26	0.26	0.26	0.27	0.27	0.27	0.27
16.000	0.27	0.27	0.27	0.27	0.27	0.27	0.27
19.500	0.28	0.28	0.28	0.28	0.28	0.28	0.29
23.000	0.29	0.29	0.29	0.29	0.30	0.30	0.30
26.500	0.30	0.30	0.30	0.31	0.31	0.31	0.31
30.000	0.31	0.31	0.32	0.32	0.32	0.32	0.33
33.500	0.33	0.35	0.39	0.44	0.48	0.53	0.59
37.000	0.65	0.71	0.77	0.80	0.83	0.87	0.91
40.500	0.95	0.98	1.01	1.04	1.07	1.09	1.12

44.000	1.14	1.15	1.16	1.17	1.18	1.18	1.19
47.500	1.19	1.19	1.18	1.17	1.16	1.15	1.14
51.000	1.13	1.12	1.11	1.09	1.08	1.07	1.06
54.500	1.05	1.04	1.03	1.02	1.00	0.99	0.98
58.000	0.97	0.96	0.94	0.93	0.91	0.90	0.89
61.500	0.88	0.86	0.85	0.84	0.83	0.81	0.80
65.000	0.79	0.78	0.77	0.75	0.73	0.71	0.68
68.500	0.66	0.64	0.62	0.60	0.58	0.56	0.55
72.000	0.53	0.51	0.50	0.48	0.47	0.45	0.44
75.500	0.42	0.41	0.40	0.39	0.37	0.36	0.35
79.000	0.34	0.33	0.33	0.33	0.33	0.32	0.32
82.500	0.32	0.32	0.32	0.32	0.32	0.32	0.31
86.000	0.31	0.31	0.31	0.31	0.31	0.31	0.31
89.500	0.30	0.30	0.30	0.30	0.30	0.30	0.30
93.000	0.30	0.29	0.29	0.29	0.29	0.29	0.29
96.500	0.29	0.29	0.28	0.28	0.28	0.28	0.28
100.000	0.28	0.28	0.28	0.28	0.27	0.27	0.27
103.500	0.27	0.27	0.27	0.27	0.27	0.27	0.26
107.000	0.26	0.26	0.26	0.26	0.16	0.05	0.02
110.500	0.0						

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		6.633		48.06	1.19	94.66

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
5.500	0.823E-02	0.03	0.07	0.11	0.14	0.18	0.21
9.000	0.25	0.26	0.26	0.26	0.26	0.26	0.26
12.500	0.26	0.26	0.26	0.27	0.27	0.27	0.27

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Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
16.000	0.27	0.27	0.27	0.27	0.27	0.27	0.27
19.500	0.28	0.28	0.28	0.28	0.28	0.28	0.29
23.000	0.29	0.29	0.29	0.29	0.30	0.30	0.30
26.500	0.30	0.30	0.30	0.31	0.31	0.31	0.31
30.000	0.31	0.31	0.32	0.32	0.32	0.32	0.33
33.500	0.33	0.35	0.39	0.44	0.48	0.53	0.59
37.000	0.65	0.71	0.77	0.80	0.83	0.87	0.91
40.500	0.95	0.98	1.01	1.04	1.07	1.09	1.12
44.000	1.14	1.15	1.16	1.17	1.18	1.18	1.19
47.500	1.19	1.19	1.18	1.17	1.16	1.15	1.14
51.000	1.13	1.12	1.11	1.09	1.08	1.07	1.06
54.500	1.05	1.04	1.03	1.02	1.00	0.99	0.98
58.000	0.97	0.96	0.94	0.93	0.91	0.90	0.89
61.500	0.88	0.86	0.85	0.84	0.83	0.81	0.80
65.000	0.79	0.78	0.77	0.75	0.73	0.71	0.68
68.500	0.66	0.64	0.62	0.60	0.58	0.56	0.55

72.000	0.53	0.51	0.50	0.48	0.47	0.45	0.44
75.500	0.42	0.41	0.40	0.39	0.37	0.36	0.35
79.000	0.34	0.33	0.33	0.33	0.33	0.32	0.32
82.500	0.32	0.32	0.32	0.32	0.32	0.32	0.31
86.000	0.31	0.31	0.31	0.31	0.31	0.31	0.31
89.500	0.30	0.30	0.30	0.30	0.30	0.30	0.30
93.000	0.30	0.29	0.29	0.29	0.29	0.29	0.29
96.500	0.29	0.29	0.28	0.28	0.28	0.28	0.28
100.000	0.28	0.28	0.28	0.28	0.27	0.27	0.27
103.500	0.27	0.27	0.27	0.27	0.27	0.27	0.26
107.000	0.26	0.26	0.26	0.26	0.16	0.05	0.02
110.500	0.0						

STORM 100yr-24h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		5.967		16.01	5.45	433.68

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		
3.000	0.269E-02	0.11	0.22	0.35	0.45	0.55	0.63
6.500	0.68	0.75	0.87	0.93	1.14	1.21	1.44
10.000	1.51	2.05	2.14	2.63	2.73	3.96	4.10
13.500	4.57	4.69	5.22	5.31	5.37	5.45	5.15
17.000	5.20	4.25	4.27	3.07	3.08	2.16	2.17
20.500	1.44	1.44	1.11	1.11	0.97	0.97	0.93
24.000	0.93	0.0					

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Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	5.967		16.01	5.45	433.68

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		
3.000	0.269E-02	0.11	0.22	0.35	0.45	0.55	0.63
6.500	0.68	0.75	0.87	0.93	1.14	1.21	1.44
10.000	1.51	2.05	2.14	2.63	2.73	3.96	4.10
13.500	4.57	4.69	5.22	5.31	5.37	5.45	5.15
17.000	5.20	4.25	4.27	3.07	3.08	2.16	2.17
20.500	1.44	1.44	1.11	1.11	0.97	0.97	0.93
24.000	0.93	0.0					

Area or	Drainage	Rain Gage	Runoff	-----	Peak Flow	-----
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Reach Identifier	Area (sq mi)	ID or Location	Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Downstream	5.967	732.34	21.15	1.21	96.18

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	Flow (cfs)	Flow (cfs)
3.000	0.0	0.04	0.13	0.24	0.26	0.26	0.26
6.500	0.26	0.27	0.27	0.27	0.27	0.28	0.28
10.000	0.29	0.29	0.30	0.31	0.32	0.35	0.47
13.500	0.59	0.72	0.80	0.87	0.93	0.99	1.04
17.000	1.08	1.12	1.15	1.17	1.19	1.20	1.20
20.500	1.21	1.21	1.21	1.21	1.21	1.20	1.20
24.000	1.20	1.19	1.18	1.17	1.16	1.15	1.14
27.500	1.13	1.12	1.11	1.09	1.08	1.07	1.06
31.000	1.05	1.04	1.03	1.02	1.00	0.99	0.98
34.500	0.97	0.96	0.94	0.93	0.92	0.90	0.89
38.000	0.88	0.86	0.85	0.84	0.83	0.81	0.80
41.500	0.79	0.78	0.77	0.75	0.73	0.71	0.68
45.000	0.66	0.64	0.62	0.60	0.58	0.57	0.55
48.500	0.53	0.51	0.50	0.48	0.47	0.45	0.44
52.000	0.43	0.41	0.40	0.39	0.37	0.36	0.35
55.500	0.34	0.33	0.33	0.33	0.33	0.32	0.32
59.000	0.32	0.32	0.32	0.32	0.32	0.32	0.31
62.500	0.31	0.31	0.31	0.31	0.31	0.31	0.31
66.000	0.30	0.30	0.30	0.30	0.30	0.30	0.30
69.500	0.30	0.29	0.29	0.29	0.29	0.29	0.29
73.000	0.29	0.29	0.28	0.28	0.28	0.28	0.28
76.500	0.28	0.28	0.28	0.28	0.27	0.27	0.27
80.000	0.27	0.27	0.27	0.27	0.27	0.27	0.26
83.500	0.26	0.26	0.26	0.26	0.16	0.06	0.02
87.000	0.0						

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Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		5.967		21.15	1.21	96.18

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	Flow (cfs)	Flow (cfs)
3.000	0.0	0.04	0.13	0.24	0.26	0.26	0.26
6.500	0.26	0.27	0.27	0.27	0.27	0.28	0.28
10.000	0.29	0.29	0.30	0.31	0.32	0.35	0.47
13.500	0.59	0.72	0.80	0.87	0.93	0.99	1.04
17.000	1.08	1.12	1.15	1.17	1.19	1.20	1.20
20.500	1.21	1.21	1.21	1.21	1.21	1.20	1.20
24.000	1.20	1.19	1.18	1.17	1.16	1.15	1.14
27.500	1.13	1.12	1.11	1.09	1.08	1.07	1.06

31.000	1.05	1.04	1.03	1.02	1.00	0.99	0.98
34.500	0.97	0.96	0.94	0.93	0.92	0.90	0.89
38.000	0.88	0.86	0.85	0.84	0.83	0.81	0.80
41.500	0.79	0.78	0.77	0.75	0.73	0.71	0.68
45.000	0.66	0.64	0.62	0.60	0.58	0.57	0.55
48.500	0.53	0.51	0.50	0.48	0.47	0.45	0.44
52.000	0.43	0.41	0.40	0.39	0.37	0.36	0.35
55.500	0.34	0.33	0.33	0.33	0.33	0.32	0.32
59.000	0.32	0.32	0.32	0.32	0.32	0.32	0.31
62.500	0.31	0.31	0.31	0.31	0.31	0.31	0.31
66.000	0.30	0.30	0.30	0.30	0.30	0.30	0.30
69.500	0.30	0.29	0.29	0.29	0.29	0.29	0.29
73.000	0.29	0.29	0.28	0.28	0.28	0.28	0.28
76.500	0.28	0.28	0.28	0.28	0.27	0.27	0.27
80.000	0.27	0.27	0.27	0.27	0.27	0.27	0.26
83.500	0.26	0.26	0.26	0.26	0.16	0.06	0.02
87.000	0.0						

STORM 100yr-12h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		4.938		5.02	8.71	693.74

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
1.500	0.308E-02	0.62	1.62	2.99	4.80	6.46	7.92
5.000	8.70	8.07	7.64	6.04	5.24	4.67	3.38
8.500	2.63	2.14	1.80	1.63	1.41	1.30	1.22
12.000	1.29	0.0					

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Bridlewood Subdivision
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Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	4.938		5.02	8.71	693.74

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
1.500	0.308E-02	0.62	1.62	2.99	4.80	6.46	7.92
5.000	8.70	8.07	7.64	6.04	5.24	4.67	3.38
8.500	2.63	2.14	1.80	1.63	1.41	1.30	1.22
12.000	1.29	0.0					

Area or Reach	Drainage Area	Rain Gage ID or	Runoff Amount	----- Elevation	Peak Flow Time	Rate	Rate
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Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
Reach 1	0.013	Downstream	4.938	731.99	12.05	1.16	92.24

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of 0.500 hr (cfs)	of 0.500 hr (cfs)	----- (cfs)	----- (cfs)
1.500	0.0	0.22	0.26	0.27	0.29	0.40
5.000	0.65	0.82	0.92	0.99	1.04	1.11
8.500	1.13	1.14	1.15	1.15	1.15	1.16
12.000	1.16	1.15	1.14	1.13	1.11	1.09
15.500	1.08	1.07	1.06	1.04	1.03	1.01
19.000	1.00	0.99	0.98	0.97	0.95	0.92
22.500	0.91	0.90	0.88	0.87	0.86	0.83
26.000	0.82	0.81	0.80	0.79	0.78	0.75
29.500	0.72	0.70	0.68	0.66	0.64	0.60
33.000	0.58	0.56	0.54	0.53	0.51	0.48
36.500	0.46	0.45	0.43	0.42	0.41	0.38
40.000	0.37	0.36	0.35	0.34	0.33	0.33
43.500	0.33	0.32	0.32	0.32	0.32	0.32
47.000	0.32	0.31	0.31	0.31	0.31	0.31
50.500	0.31	0.31	0.30	0.30	0.30	0.30
54.000	0.30	0.30	0.30	0.29	0.29	0.29
57.500	0.29	0.29	0.29	0.29	0.29	0.28
61.000	0.28	0.28	0.28	0.28	0.28	0.28
64.500	0.27	0.27	0.27	0.27	0.27	0.27
68.000	0.27	0.27	0.26	0.26	0.26	0.26
71.500	0.12	0.04	0.01	0.0		

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		4.938		12.05	1.16	92.24

Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of 0.500 hr (cfs)	of 0.500 hr (cfs)	----- (cfs)	----- (cfs)
1.500	0.0	0.22	0.26	0.27	0.29	0.40
5.000	0.65	0.82	0.92	0.99	1.04	1.11
8.500	1.13	1.14	1.15	1.15	1.15	1.16
12.000	1.16	1.15	1.14	1.13	1.11	1.09
15.500	1.08	1.07	1.06	1.04	1.03	1.01
19.000	1.00	0.99	0.98	0.97	0.95	0.92
22.500	0.91	0.90	0.88	0.87	0.86	0.83
26.000	0.82	0.81	0.80	0.79	0.78	0.75
29.500	0.72	0.70	0.68	0.66	0.64	0.60
33.000	0.58	0.56	0.54	0.53	0.51	0.48
36.500	0.46	0.45	0.43	0.42	0.41	0.38
40.000	0.37	0.36	0.35	0.34	0.33	0.33

43.500	0.33	0.32	0.32	0.32	0.32	0.32	0.32
47.000	0.32	0.31	0.31	0.31	0.31	0.31	0.31
50.500	0.31	0.31	0.30	0.30	0.30	0.30	0.30
54.000	0.30	0.30	0.30	0.29	0.29	0.29	0.29
57.500	0.29	0.29	0.29	0.29	0.29	0.28	0.28
61.000	0.28	0.28	0.28	0.28	0.28	0.28	0.28
64.500	0.27	0.27	0.27	0.27	0.27	0.27	0.27
68.000	0.27	0.27	0.26	0.26	0.26	0.26	0.26
71.500	0.12	0.04	0.01	0.0			

STORM 100yr-6h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		4.002		1.30	13.28	1057.61

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	Rate (cfs)	Rate (cfs)
0.0	0.0	3.31	12.58	12.66	8.61	5.89	5.06
3.500	4.77	3.81	2.84	2.47	2.20	2.16	0.0

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	4.002		1.30	13.28	1057.61

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	Rate (cfs)	Rate (cfs)
0.0	0.0	3.31	12.58	12.66	8.61	5.89	5.06
3.500	4.77	3.81	2.84	2.47	2.20	2.16	0.0

Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Downstream	4.002	731.55	6.12	1.08	85.93

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	Rate (cfs)	Rate (cfs)
0.0	0.0	0.26	0.29	0.46	0.77	0.86	0.92
3.500	0.98	1.01	1.04	1.05	1.07	1.08	1.07
7.000	1.06	1.05	1.04	1.03	1.02	1.01	1.00
10.500	0.98	0.97	0.96	0.94	0.93	0.92	0.90
14.000	0.89	0.88	0.86	0.85	0.84	0.83	0.82

17.500	0.80	0.79	0.78	0.77	0.75	0.73	0.71
21.000	0.69	0.66	0.64	0.62	0.60	0.59	0.57
24.500	0.55	0.53	0.52	0.50	0.48	0.47	0.45
28.000	0.44	0.43	0.41	0.40	0.39	0.38	0.36
31.500	0.35	0.34	0.33	0.33	0.33	0.33	0.32
35.000	0.32	0.32	0.32	0.32	0.32	0.32	0.32
38.500	0.31	0.31	0.31	0.31	0.31	0.31	0.31
42.000	0.31	0.30	0.30	0.30	0.30	0.30	0.30
45.500	0.30	0.30	0.29	0.29	0.29	0.29	0.29
49.000	0.29	0.29	0.29	0.28	0.28	0.28	0.28
52.500	0.28	0.28	0.28	0.28	0.28	0.27	0.27
56.000	0.27	0.27	0.27	0.27	0.27	0.27	0.27
59.500	0.26	0.26	0.26	0.26	0.26	0.18	0.06
63.000	0.02	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		4.002		6.12	1.08	85.93

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		
0.0	0.0	0.26	0.29	0.46	0.77	0.86	0.92
3.500	0.98	1.01	1.04	1.05	1.07	1.08	1.07
7.000	1.06	1.05	1.04	1.03	1.02	1.01	1.00
10.500	0.98	0.97	0.96	0.94	0.93	0.92	0.90
14.000	0.89	0.88	0.86	0.85	0.84	0.83	0.82
17.500	0.80	0.79	0.78	0.77	0.75	0.73	0.71
21.000	0.69	0.66	0.64	0.62	0.60	0.59	0.57
24.500	0.55	0.53	0.52	0.50	0.48	0.47	0.45
28.000	0.44	0.43	0.41	0.40	0.39	0.38	0.36
31.500	0.35	0.34	0.33	0.33	0.33	0.33	0.32
35.000	0.32	0.32	0.32	0.32	0.32	0.32	0.32
38.500	0.31	0.31	0.31	0.31	0.31	0.31	0.31
42.000	0.31	0.30	0.30	0.30	0.30	0.30	0.30
45.500	0.30	0.30	0.29	0.29	0.29	0.29	0.29
49.000	0.29	0.29	0.29	0.28	0.28	0.28	0.28

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Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		
52.500	0.28	0.28	0.28	0.28	0.28	0.27	0.27
56.000	0.27	0.27	0.27	0.27	0.27	0.27	0.27
59.500	0.26	0.26	0.26	0.26	0.26	0.18	0.06
63.000	0.02	0.0					

STORM 100yr-3h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
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proposed 0.013 3.169 0.71 20.29 1615.28

Line
Start Time ----- Flow Values @ time increment of 0.500 hr -----
(hr) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)

0.0 0.0 15.92 15.80 8.31 6.52 4.12 3.52
3.500 0.0

Area or Drainage Rain Gage Runoff ----- Peak Flow -----
Reach Area ID or Amount Elevation Time Rate Rate
Identifier (sq mi) Location (in) (ft) (hr) (cfs) (csm)

Reach 1 0.013 Upstream 3.169 0.71 20.29 1615.28

Line
Start Time ----- Flow Values @ time increment of 0.500 hr -----
(hr) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)

0.0 0.0 15.92 15.80 8.31 6.52 4.12 3.52
3.500 0.0

Area or Drainage Rain Gage Runoff ----- Peak Flow -----
Reach Area ID or Amount Elevation Time Rate Rate
Identifier (sq mi) Location (in) (ft) (hr) (cfs) (csm)

Reach 1 0.013 Downstream 3.169 731.06 3.16 0.99 78.95

Line
Start Time ----- Flow Values @ time increment of 0.500 hr -----
(hr) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)

0.0 0.0 0.28 0.50 0.79 0.89 0.95 0.99
3.500 0.99 0.97 0.96 0.95 0.93 0.92 0.90
7.000 0.89 0.88 0.87 0.85 0.84 0.83 0.82
10.500 0.80 0.79 0.78 0.77 0.76 0.73 0.71
14.000 0.69 0.67 0.65 0.63 0.61 0.59 0.57
17.500 0.55 0.53 0.52 0.50 0.49 0.47 0.46
21.000 0.44 0.43 0.41 0.40 0.39 0.38 0.37
24.500 0.35 0.34 0.33 0.33 0.33 0.33 0.32

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Bridlewood Subdivision
Proposed Detention

Line
Start Time ----- Flow Values @ time increment of 0.500 hr -----
(hr) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)

28.000 0.32 0.32 0.32 0.32 0.32 0.32 0.32
31.500 0.31 0.31 0.31 0.31 0.31 0.31 0.31
35.000 0.31 0.30 0.30 0.30 0.30 0.30 0.30
38.500 0.30 0.30 0.29 0.29 0.29 0.29 0.29
42.000 0.29 0.29 0.29 0.28 0.28 0.28 0.28
45.500 0.28 0.28 0.28 0.28 0.28 0.27 0.27
49.000 0.27 0.27 0.27 0.27 0.27 0.27 0.27
52.500 0.26 0.26 0.26 0.26 0.26 0.21 0.07
56.000 0.02 0.0

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		3.169		3.16	0.99	78.95

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.0	0.0	0.28	0.50	0.79	0.89	0.95	0.99
3.500	0.99	0.97	0.96	0.95	0.93	0.92	0.90
7.000	0.89	0.88	0.87	0.85	0.84	0.83	0.82
10.500	0.80	0.79	0.78	0.77	0.76	0.73	0.71
14.000	0.69	0.67	0.65	0.63	0.61	0.59	0.57
17.500	0.55	0.53	0.52	0.50	0.49	0.47	0.46
21.000	0.44	0.43	0.41	0.40	0.39	0.38	0.37
24.500	0.35	0.34	0.33	0.33	0.33	0.33	0.32
28.000	0.32	0.32	0.32	0.32	0.32	0.32	0.32
31.500	0.31	0.31	0.31	0.31	0.31	0.31	0.31
35.000	0.31	0.30	0.30	0.30	0.30	0.30	0.30
38.500	0.30	0.30	0.29	0.29	0.29	0.29	0.29
42.000	0.29	0.29	0.29	0.28	0.28	0.28	0.28
45.500	0.28	0.28	0.28	0.28	0.28	0.27	0.27
49.000	0.27	0.27	0.27	0.27	0.27	0.27	0.27
52.500	0.26	0.26	0.26	0.26	0.26	0.21	0.07
56.000	0.02	0.0					

STORM 100yr-1h

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		1.941		0.34	31.67	2521.47

Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
0.0	0.0	21.01	7.69	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	1.941		0.34	31.67	2521.47

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
0.0	0.0	21.01	7.69	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	----- Peak Flow Time (hr)	----- Rate (cfs)	----- Rate (csm)
Reach 1	0.013	Downstream	1.941	729.95	1.22	0.74	58.84

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
0.0	0.0	0.32	0.69	0.73	0.71	0.68	0.66
3.500	0.64	0.62	0.60	0.58	0.57	0.55	0.53
7.000	0.51	0.50	0.48	0.47	0.45	0.44	0.43
10.500	0.41	0.40	0.39	0.37	0.36	0.35	0.34
14.000	0.33	0.33	0.33	0.33	0.32	0.32	0.32
17.500	0.32	0.32	0.32	0.32	0.32	0.31	0.31
21.000	0.31	0.31	0.31	0.31	0.31	0.31	0.30
24.500	0.30	0.30	0.30	0.30	0.30	0.30	0.30
28.000	0.29	0.29	0.29	0.29	0.29	0.29	0.29
31.500	0.29	0.28	0.28	0.28	0.28	0.28	0.28
35.000	0.28	0.28	0.28	0.27	0.27	0.27	0.27
38.500	0.27	0.27	0.27	0.27	0.27	0.26	0.26
42.000	0.26	0.26	0.26	0.16	0.06	0.02	0.0

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	----- Peak Flow Time (hr)	----- Rate (cfs)	----- Rate (csm)
OUTLET	0.013		1.941		1.22	0.74	58.84

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
0.0	0.0	0.32	0.69	0.73	0.71	0.68	0.66
3.500	0.64	0.62	0.60	0.58	0.57	0.55	0.53
7.000	0.51	0.50	0.48	0.47	0.45	0.44	0.43

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Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)	----- (cfs)
10.500	0.41	0.40	0.39	0.37	0.36	0.35	0.34
14.000	0.33	0.33	0.33	0.33	0.32	0.32	0.32
17.500	0.32	0.32	0.32	0.32	0.32	0.31	0.31
21.000	0.31	0.31	0.31	0.31	0.31	0.31	0.30
24.500	0.30	0.30	0.30	0.30	0.30	0.30	0.30
28.000	0.29	0.29	0.29	0.29	0.29	0.29	0.29
31.500	0.29	0.28	0.28	0.28	0.28	0.28	0.28

35.000	0.28	0.28	0.28	0.27	0.27	0.27	0.27
38.500	0.27	0.27	0.27	0.27	0.27	0.26	0.26
42.000	0.26	0.26	0.26	0.16	0.06	0.02	0.0

STORM 2yr-24hr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		1.402		16.02	1.50	119.56

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	
7.000	0.183E-02	0.02	0.05	0.08	0.11	0.15
10.500	0.29	0.33	0.45	0.50	0.79	0.87
14.000	1.11	1.30	1.37	1.44	1.50	1.45
17.500	1.25	1.27	0.92	0.94	0.66	0.67
21.000	0.45	0.34	0.35	0.30	0.30	0.29
24.500	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	1.402		16.02	1.50	119.56

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	
7.000	0.183E-02	0.02	0.05	0.08	0.11	0.15
10.500	0.29	0.33	0.45	0.50	0.79	0.87
14.000	1.11	1.30	1.37	1.44	1.50	1.45
17.500	1.25	1.27	0.92	0.94	0.66	0.67
21.000	0.45	0.34	0.35	0.30	0.30	0.29
24.500	0.0					

Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Downstream	1.402	728.74	22.14	0.32	25.23

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	
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7.500	0.981E-02	0.03	0.06	0.08	0.12	0.15	0.22
11.000	0.26	0.26	0.26	0.26	0.27	0.27	0.27
14.500	0.28	0.28	0.28	0.29	0.29	0.30	0.30
18.000	0.31	0.31	0.31	0.31	0.32	0.32	0.32
21.500	0.32	0.32	0.32	0.32	0.32	0.32	0.32
25.000	0.31	0.31	0.31	0.31	0.31	0.31	0.31
28.500	0.31	0.30	0.30	0.30	0.30	0.30	0.30
32.000	0.30	0.30	0.29	0.29	0.29	0.29	0.29
35.500	0.29	0.29	0.29	0.28	0.28	0.28	0.28
39.000	0.28	0.28	0.28	0.28	0.28	0.27	0.27
42.500	0.27	0.27	0.27	0.27	0.27	0.27	0.27
46.000	0.26	0.26	0.26	0.26	0.26	0.21	0.07
49.500	0.02	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		1.402		22.14	0.32	25.23

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.500	0.981E-02	0.03	0.06	0.08	0.12	0.15	0.22
11.000	0.26	0.26	0.26	0.26	0.27	0.27	0.27
14.500	0.28	0.28	0.28	0.29	0.29	0.30	0.30
18.000	0.31	0.31	0.31	0.31	0.32	0.32	0.32
21.500	0.32	0.32	0.32	0.32	0.32	0.32	0.32
25.000	0.31	0.31	0.31	0.31	0.31	0.31	0.31
28.500	0.31	0.30	0.30	0.30	0.30	0.30	0.30
32.000	0.30	0.30	0.29	0.29	0.29	0.29	0.29
35.500	0.29	0.29	0.29	0.28	0.28	0.28	0.28
39.000	0.28	0.28	0.28	0.28	0.28	0.27	0.27
42.500	0.27	0.27	0.27	0.27	0.27	0.27	0.27
46.000	0.26	0.26	0.26	0.26	0.26	0.21	0.07
49.500	0.02	0.0					

STORM 5yr-24hr

Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
proposed	0.013		2.160		16.02	2.21	175.97

Line Start Time (hr)	----- (cfs)	Flow Values @ time increment of 0.500 hr (cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
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5.500	0.0	0.03	0.06	0.10	0.13	0.17	0.23
9.000	0.27	0.34	0.38	0.56	0.61	0.79	0.86
12.500	1.31	1.42	1.64	1.73	1.98	2.07	2.14
16.000	2.21	2.12	2.17	1.79	1.82	1.32	1.33
19.500	0.94	0.94	0.63	0.63	0.49	0.49	0.43
23.000	0.43	0.41	0.41	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	2.160		16.02	2.21	175.97

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)
5.500	0.0	0.03	0.06	0.10	0.13	0.17	0.23
9.000	0.27	0.34	0.38	0.56	0.61	0.79	0.86
12.500	1.31	1.42	1.64	1.73	1.98	2.07	2.14
16.000	2.21	2.12	2.17	1.79	1.82	1.32	1.33
19.500	0.94	0.94	0.63	0.63	0.49	0.49	0.43
23.000	0.43	0.41	0.41	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Downstream	2.160	729.44	21.17	0.52	41.38

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)
5.500	0.0	0.01	0.04	0.07	0.10	0.14	0.18
9.000	0.23	0.26	0.26	0.26	0.26	0.26	0.27
12.500	0.27	0.27	0.28	0.29	0.29	0.30	0.31
16.000	0.31	0.32	0.33	0.37	0.42	0.45	0.48
19.500	0.50	0.51	0.52	0.52	0.52	0.52	0.52
23.000	0.51	0.51	0.51	0.49	0.48	0.46	0.45
26.500	0.44	0.42	0.41	0.40	0.38	0.37	0.36
30.000	0.35	0.34	0.33	0.33	0.33	0.33	0.32
33.500	0.32	0.32	0.32	0.32	0.32	0.32	0.31
37.000	0.31	0.31	0.31	0.31	0.31	0.31	0.31
40.500	0.30	0.30	0.30	0.30	0.30	0.30	0.30

Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.500 hr (cfs)	----- (cfs)	(cfs)
44.000	0.30	0.29	0.29	0.29	0.29	0.29	0.29
47.500	0.29	0.29	0.29	0.28	0.28	0.28	0.28
51.000	0.28	0.28	0.28	0.28	0.28	0.27	0.27
54.500	0.27	0.27	0.27	0.27	0.27	0.27	0.27

58.000	0.26	0.26	0.26	0.26	0.26	0.13	0.04
61.500	0.01	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
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OUTLET	0.013		2.160		21.17	0.52	41.38
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Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
5.500	0.0	0.01	0.04	0.07	0.10	0.14	0.18
9.000	0.23	0.26	0.26	0.26	0.26	0.26	0.27
12.500	0.27	0.27	0.28	0.29	0.29	0.30	0.31
16.000	0.31	0.32	0.33	0.37	0.42	0.45	0.48
19.500	0.50	0.51	0.52	0.52	0.52	0.52	0.52
23.000	0.51	0.51	0.51	0.49	0.48	0.46	0.45
26.500	0.44	0.42	0.41	0.40	0.38	0.37	0.36
30.000	0.35	0.34	0.33	0.33	0.33	0.33	0.32
33.500	0.32	0.32	0.32	0.32	0.32	0.32	0.31
37.000	0.31	0.31	0.31	0.31	0.31	0.31	0.31
40.500	0.30	0.30	0.30	0.30	0.30	0.30	0.30
44.000	0.30	0.29	0.29	0.29	0.29	0.29	0.29
47.500	0.29	0.29	0.29	0.28	0.28	0.28	0.28
51.000	0.28	0.28	0.28	0.28	0.28	0.27	0.27
54.500	0.27	0.27	0.27	0.27	0.27	0.27	0.27
58.000	0.26	0.26	0.26	0.26	0.26	0.13	0.04
61.500	0.01	0.0					

STORM 10yr-24hr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
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proposed	0.013		2.875		16.01	2.85	226.96
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Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
4.500	0.0	0.03	0.08	0.12	0.16	0.20	0.25
8.000	0.29	0.38	0.43	0.53	0.58	0.82	0.89
11.500	1.13	1.21	1.81	1.93	2.20	2.31	2.61
15.000	2.71	2.78	2.85	2.72	2.77	2.28	2.31

Bridlewood Subdivision
Proposed Detention

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
18.500	1.67	1.68	1.18	1.19	0.79	0.79	0.61
22.000	0.61	0.54	0.54	0.52	0.52	0.0	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Upstream	2.875		16.01	2.85	226.96

Line Start Time (hr)	Flow (cfs)	Values @ time increment (cfs)	of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment (cfs)	of 0.500 hr (cfs)	Flow (cfs)
4.500	0.0	0.03	0.08	0.12	0.16	0.20	0.25
8.000	0.29	0.38	0.43	0.53	0.58	0.82	0.89
11.500	1.13	1.21	1.81	1.93	2.20	2.31	2.61
15.000	2.71	2.78	2.85	2.72	2.77	2.28	2.31
18.500	1.67	1.68	1.18	1.19	0.79	0.79	0.61
22.000	0.61	0.54	0.54	0.52	0.52	0.0	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Reach 1	0.013	Downstream	2.875	730.01	21.07	0.76	60.72

Line Start Time (hr)	Flow (cfs)	Values @ time increment (cfs)	of 0.500 hr (cfs)	Flow (cfs)	Values @ time increment (cfs)	of 0.500 hr (cfs)	Flow (cfs)
5.000	0.636E-02	0.04	0.08	0.12	0.16	0.21	0.25
8.500	0.26	0.26	0.26	0.26	0.26	0.27	0.27
12.000	0.27	0.28	0.29	0.29	0.30	0.31	0.32
15.500	0.33	0.41	0.48	0.55	0.61	0.66	0.70
19.000	0.73	0.75	0.76	0.76	0.76	0.76	0.76
22.500	0.75	0.74	0.74	0.73	0.71	0.69	0.67
26.000	0.65	0.63	0.61	0.59	0.57	0.55	0.54
29.500	0.52	0.50	0.49	0.47	0.46	0.44	0.43
33.000	0.42	0.40	0.39	0.38	0.37	0.35	0.34
36.500	0.33	0.33	0.33	0.33	0.32	0.32	0.32
40.000	0.32	0.32	0.32	0.32	0.32	0.31	0.31
43.500	0.31	0.31	0.31	0.31	0.31	0.31	0.30
47.000	0.30	0.30	0.30	0.30	0.30	0.30	0.30
50.500	0.29	0.29	0.29	0.29	0.29	0.29	0.29
54.000	0.29	0.28	0.28	0.28	0.28	0.28	0.28
57.500	0.28	0.28	0.28	0.27	0.27	0.27	0.27
61.000	0.27	0.27	0.27	0.27	0.27	0.26	0.26
64.500	0.26	0.26	0.26	0.22	0.07	0.03	0.0

Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.013		2.875		21.07	0.76	60.72

Line	----- Flow Values @ time increment of 0.500 hr -----						
Start Time	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
(hr)							
5.000	0.636E-02	0.04	0.08	0.12	0.16	0.21	0.25
8.500	0.26	0.26	0.26	0.26	0.26	0.27	0.27
12.000	0.27	0.28	0.29	0.29	0.30	0.31	0.32
15.500	0.33	0.41	0.48	0.55	0.61	0.66	0.70
19.000	0.73	0.75	0.76	0.76	0.76	0.76	0.76
22.500	0.75	0.74	0.74	0.73	0.71	0.69	0.67
26.000	0.65	0.63	0.61	0.59	0.57	0.55	0.54
29.500	0.52	0.50	0.49	0.47	0.46	0.44	0.43
33.000	0.42	0.40	0.39	0.38	0.37	0.35	0.34
36.500	0.33	0.33	0.33	0.33	0.32	0.32	0.32
40.000	0.32	0.32	0.32	0.32	0.32	0.31	0.31
43.500	0.31	0.31	0.31	0.31	0.31	0.31	0.30
47.000	0.30	0.30	0.30	0.30	0.30	0.30	0.30
50.500	0.29	0.29	0.29	0.29	0.29	0.29	0.29
54.000	0.29	0.28	0.28	0.28	0.28	0.28	0.28
57.500	0.28	0.28	0.28	0.27	0.27	0.27	0.27
61.000	0.27	0.27	0.27	0.27	0.27	0.26	0.26
64.500	0.26	0.26	0.26	0.22	0.07	0.03	0.0

Bridlewood Subdivision
Proposed Detention

Area or Reach Identifier	Drainage Area (sq mi)	----- Peak Flow by Storm -----				
		100yr-48h (cfs)	100yr-24h (cfs)	100yr-12h (cfs)	100yr-6h (cfs)	100yr-3h (cfs)
proposed	0.013	3.75	5.45	8.71	13.28	20.29

Reach 1	0.013	3.75	5.45	8.71	13.28	20.29
DOWNSTREAM		1.19	1.21	1.16	1.08	0.99
OUTLET	0.013	1.19	1.21	1.16	1.08	0.99

Area or Reach Identifier	Drainage Area (sq mi)	----- Peak Flow by Storm -----				
		100yr-1h (cfs)	2yr-24hr (cfs)	5yr-24hr (cfs)	10yr-24hr (cfs)	(cfs)
proposed	0.013	31.67	1.50	2.21	2.85	
Reach 1	0.013	31.67	1.50	2.21	2.85	
DOWNSTREAM		0.74	0.32	0.52	0.76	
OUTLET	0.013	0.74	0.32	0.52	0.76	

TR-20 Wetland Indirect Impact Analysis

WinTR-20 Printed Page File Beginning of Input Data List
 C:\Users\kfaje\Desktop\TR-20\Hydroperiod.inp

WinTR-20: Version 3.20 0 0 0.01 0
 Bridlewood Subdivision
 Hydroperiod Analysis

SUB-AREA:

Ex WetlandOUTLET	0.00618	76.87	0.24	YY	Y
Prop WetlaOUTLET	0.004638	78.61	0.24		

STORM ANALYSIS:

6mo, 24hr	0.	2.24	Huff3Q-24	2	3.34
1yr, 24hr	0.	2.77	Huff3Q-24	2	3.34
2yr, 24hr	0.	3.34	Huff3Q-24	2	3.34
5yr, 24hr	0.	4.30	Huff3Q-24	2	3.34
10yr, 24hr	0.	5.15	Huff3Q-24	2	3.34
100yr, 24hr	0.	8.57	Huff3Q-24	2	3.34

RAINFALL DISTRIBUTION:

Huff1Q-1	0.04167				
0.	0.0836	0.1773	0.2811	0.3833	
0.4745	0.5550	0.6225	0.6722	0.7082	
0.7417	0.7697	0.7981	0.8255	0.8518	
0.8740	0.8947	0.9117	0.9270	0.9403	
0.9536	0.9656	0.9774	0.9885	1.0	
Huff1Q-2	0.0833				
0.	0.0836	0.1773	0.2811	0.3833	
0.4745	0.5550	0.6225	0.6722	0.7082	
0.7417	0.7697	0.7981	0.8255	0.8518	
0.8740	0.8947	0.9117	0.9270	0.9403	
0.9536	0.9656	0.9774	0.9885	1.00	
Huff1Q-3	0.125				
0.	0.0836	0.1773	0.2811	0.3833	
0.4745	0.5550	0.6225	0.6722	0.7082	
0.7417	0.7697	0.7981	0.8255	0.8518	
0.8740	0.8947	0.9117	0.9270	0.9403	
0.9536	0.9656	0.9774	0.9885	1.00	
Huff1Q-6	0.25				
0.	0.0836	0.1773	0.2811	0.3833	
0.4745	0.5550	0.6225	0.6722	0.7082	
0.7417	0.7697	0.7981	0.8255	0.8518	
0.8740	0.8947	0.9117	0.9270	0.9403	
0.9536	0.9656	0.9774	0.9885	1.00	
Huff2Q-12	0.50				
0.	0.0229	0.0482	0.0778	0.1133	
0.1579	0.2139	0.2841	0.3644	0.4529	
0.5435	0.6238	0.6976	0.7548	0.8038	
0.8470	0.8781	0.9022	0.9217	0.9381	
0.9529	0.9657	0.9774	0.9884	1.00	
Huff3Q-18	0.75				
0.	0.0205	0.0431	0.0667	0.0912	
0.1171	0.1436	0.1691	0.1964	0.2278	

	0.2633	0.3093	0.3635	0.4392	0.5211
	0.6102	0.6989	0.7819	0.8492	0.8974
	0.9311	0.9534	0.9706	0.9856	1.00
Huff3Q-24		1.00			
	0.	0.0205	0.0431	0.0667	0.0912
	0.1171	0.1436	0.1691	0.1964	0.2278
	0.2633	0.3093	0.3635	0.4392	0.5211
	0.6102	0.6989	0.7819	0.8492	0.8974
	0.9311	0.9534	0.9706	0.9856	1.00
Huff4Q-48		2.00			
	0.	0.0231	0.0479	0.0712	0.0978
	0.1253	0.1523	0.1791	0.2033	0.2283
	0.2541	0.2835	0.3125	0.3390	0.3633
	0.3861	0.4124	0.4508	0.5129	0.5931
	0.6919	0.8005	0.8971	0.9604	1.00

GLOBAL OUTPUT:

2 0.01 0.5 YY Y YY Y

WinTR-20 Printed Page File End of Input Data List

Bridlewood Subdivision
Hydroperiod Analysis

Name of printed page file:

C:\Users\kfaje\Desktop\TR-20\Hydroperiod.out

STORM 6mo,24hr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		0.577		17.03	0.35	56.16

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	----- (cfs)
10.500	0.0	0.02	0.04	0.06	0.10	0.13
14.000	0.20	0.25	0.28	0.30	0.33	0.35
17.500	0.29	0.30	0.23	0.23	0.16	0.11
21.000	0.11	0.09	0.09	0.08	0.08	0.07
24.500	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetla	0.005		0.650		17.02	0.28	61.43

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		(cfs)
10.000	0.0	0.02	0.03	0.05	0.06	0.10	0.12
13.500	0.16	0.18	0.22	0.24	0.26	0.27	0.27
17.000	0.28	0.24	0.25	0.18	0.19	0.13	0.13
20.500	0.09	0.09	0.07	0.07	0.06	0.06	0.06
24.000	0.06	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.011		0.608		17.02	0.63	58.42

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		(cfs)
10.000	0.0	0.02	0.05	0.08	0.11	0.21	0.26
13.500	0.33	0.38	0.47	0.52	0.56	0.60	0.60
17.000	0.63	0.53	0.55	0.41	0.41	0.30	0.30
20.500	0.20	0.20	0.16	0.16	0.14	0.14	0.13
24.000	0.13	0.0					

STORM 1yr,24hr

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Bridlewood Subdivision
Hydroperiod Analysis

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		0.907		17.02	0.51	82.96

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		(cfs)
9.000	0.0	0.02	0.03	0.05	0.07	0.10	0.13
12.500	0.21	0.25	0.30	0.34	0.41	0.44	0.47
16.000	0.50	0.49	0.51	0.43	0.44	0.32	0.33
19.500	0.23	0.24	0.16	0.16	0.12	0.12	0.11
23.000	0.11	0.10	0.11	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetla	0.005		1.000		17.02	0.41	88.98

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		(cfs)
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8.500	0.0	0.01	0.02	0.03	0.06	0.07	0.10
12.000	0.12	0.19	0.21	0.26	0.29	0.34	0.36
15.500	0.39	0.41	0.40	0.41	0.35	0.35	0.26
19.000	0.26	0.19	0.19	0.13	0.13	0.10	0.10
22.500	0.09	0.09	0.08	0.08	0.0		

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.011		0.947		17.02	0.93	85.54

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
8.500	0.0	0.01	0.04	0.06	0.11	0.14	0.20
12.000	0.24	0.40	0.46	0.56	0.63	0.74	0.81
15.500	0.86	0.91	0.89	0.92	0.78	0.80	0.58
19.000	0.59	0.42	0.42	0.28	0.28	0.22	0.22
22.500	0.19	0.19	0.19	0.19	0.0		

STORM 2yr,24hr

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Bridlewood Subdivision
Hydroperiod Analysis

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		1.304		17.02	0.70	113.29

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
8.000	0.0	0.02	0.04	0.06	0.07	0.11	0.14
11.500	0.19	0.21	0.34	0.38	0.46	0.50	0.59
15.000	0.63	0.66	0.69	0.68	0.70	0.58	0.60
18.500	0.44	0.44	0.31	0.31	0.21	0.21	0.16
22.000	0.16	0.14	0.14	0.14	0.14	0.0	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetla	0.005		1.416		16.05	0.56	120.10

Line Start Time	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)

(hr)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
7.500	0.0	0.02	0.03	0.04	0.06	0.07	0.11
11.000	0.12	0.17	0.19	0.29	0.32	0.38	0.41
14.500	0.48	0.51	0.53	0.56	0.54	0.56	0.46
18.000	0.47	0.34	0.35	0.25	0.25	0.17	0.17
21.500	0.13	0.13	0.11	0.11	0.11	0.11	0.0

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.011		1.352		17.02	1.26	116.11

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
7.500	0.0	0.02	0.05	0.08	0.11	0.14	0.22
11.000	0.26	0.35	0.40	0.63	0.71	0.84	0.92
14.500	1.07	1.14	1.19	1.25	1.22	1.26	1.05
18.000	1.07	0.78	0.79	0.56	0.56	0.38	0.38
21.500	0.29	0.29	0.26	0.26	0.25	0.25	0.0

STORM 5yr,24hr

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Bridlewood Subdivision
Hydroperiod Analysis

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		2.038		16.03	1.04	168.23

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
6.000	0.0	0.01	0.03	0.05	0.06	0.09	0.11
9.500	0.14	0.16	0.24	0.27	0.35	0.38	0.59
13.000	0.64	0.75	0.80	0.92	0.97	1.00	1.04
16.500	1.00	1.03	0.85	0.86	0.63	0.63	0.45
20.000	0.45	0.30	0.30	0.23	0.23	0.20	0.20
23.500	0.20	0.20	0.0				

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetla	0.005		2.177		16.04	0.82	176.54

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		----- (cfs)
5.500	0.0	0.01	0.02	0.04	0.05	0.06	0.09
9.000	0.10	0.13	0.14	0.21	0.23	0.29	0.32
12.500	0.48	0.52	0.61	0.64	0.73	0.77	0.79
16.000	0.82	0.79	0.80	0.67	0.67	0.49	0.49
19.500	0.35	0.35	0.23	0.23	0.18	0.18	0.16
23.000	0.16	0.15	0.15	0.0			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.011		2.098		16.03	1.86	171.79

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		----- (cfs)
5.500	0.0	0.01	0.04	0.06	0.10	0.12	0.17
9.000	0.21	0.27	0.30	0.44	0.49	0.64	0.70
12.500	1.07	1.17	1.35	1.44	1.65	1.73	1.79
16.000	1.86	1.79	1.83	1.52	1.54	1.12	1.13
19.500	0.80	0.80	0.53	0.53	0.41	0.41	0.36
23.000	0.36	0.35	0.35	0.0			

STORM 10yr,24hr

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Bridlewood Subdivision
Hydroperiod Analysis

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		2.737		16.04	1.35	218.83

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)		----- (cfs)
5.000	0.0	0.02	0.04	0.06	0.08	0.10	0.12
8.500	0.16	0.18	0.23	0.25	0.36	0.40	0.51
12.000	0.55	0.82	0.89	1.02	1.08	1.22	1.27
15.500	1.31	1.35	1.30	1.32	1.09	1.10	0.80
19.000	0.81	0.57	0.57	0.38	0.38	0.30	0.29
22.500	0.26	0.26	0.25	0.25	0.0		

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Prop Wetla	0.005		2.895		16.03	1.06	227.54

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
5.000	0.115E-02	0.03	0.05	0.06	0.07	0.09	0.11
8.500	0.14	0.16	0.20	0.22	0.30	0.33	0.42
12.000	0.45	0.67	0.71	0.81	0.85	0.97	1.00
15.500	1.03	1.05	1.01	1.03	0.85	0.85	0.62
19.000	0.62	0.44	0.44	0.29	0.29	0.23	0.23
22.500	0.20	0.20	0.19	0.19	0.0		

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	0.011		2.804		16.03	2.41	222.57

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
5.000	0.115E-02	0.04	0.08	0.12	0.15	0.20	0.23
8.500	0.30	0.34	0.43	0.47	0.67	0.73	0.93
12.000	1.00	1.49	1.60	1.83	1.93	2.19	2.28
15.500	2.34	2.41	2.31	2.35	1.94	1.96	1.42
19.000	1.43	1.01	1.01	0.68	0.67	0.52	0.52
22.500	0.46	0.46	0.44	0.44	0.0		

STORM 100yr,24hr

Bridlewood Subdivision
Hydroperiod Analysis

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Ex Wetland	0.006		5.784		16.01	2.63	425.44

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.500 hr (cfs)	----- (cfs)	(cfs)	(cfs)
3.000	0.0	0.02	0.07	0.13	0.18	0.23	0.27
6.500	0.30	0.33	0.39	0.42	0.51	0.55	0.66
10.000	0.70	0.95	1.00	1.23	1.28	1.87	1.95
13.500	2.18	2.24	2.50	2.55	2.59	2.63	2.49
17.000	2.52	2.07	2.07	1.50	1.50	1.06	1.05
20.500	0.70	0.70	0.54	0.54	0.47	0.47	0.45
24.000	0.45	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
--------------------------------	-----------------------------	--------------------------------	--------------------------	----------------------------	---------------------------	---------------	---------------

Prop Wetla 0.005 5.993 16.02 2.01 434.20

Line Start Time (hr)	Flow Values @ time increment of 0.500 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.000	0.0	0.04	0.08	0.13	0.16	0.20	0.24
6.500	0.25	0.28	0.32	0.34	0.42	0.45	0.53
10.000	0.56	0.76	0.79	0.97	1.01	1.46	1.52
13.500	1.69	1.73	1.93	1.96	1.99	2.01	1.91
17.000	1.92	1.58	1.58	1.14	1.14	0.80	0.80
20.500	0.54	0.53	0.41	0.41	0.36	0.36	0.35
24.000	0.35	0.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
			Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)	
OUTLET	0.011		5.874		16.02	4.64	429.19

Line Start Time (hr)	Flow Values @ time increment of 0.500 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
3.000	0.0	0.06	0.16	0.26	0.34	0.43	0.51
6.500	0.55	0.61	0.71	0.76	0.94	1.00	1.19
10.000	1.25	1.70	1.79	2.20	2.30	3.33	3.46
13.500	3.87	3.98	4.42	4.52	4.58	4.64	4.40
17.000	4.44	3.64	3.65	2.64	2.64	1.86	1.86
20.500	1.24	1.23	0.96	0.95	0.83	0.83	0.80
24.000	0.80	0.0					

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Bridlewood Subdivision
Hydroperiod Analysis

Area or Reach Identifier	Drainage Area (sq mi)	Peak Flow by Storm				
		6mo, 24hr (cfs)	1yr, 24hr (cfs)	2yr, 24hr (cfs)	5yr, 24hr (cfs)	10yr, 24hr (cfs)
Ex Wetland	0.006	0.35	0.51	0.70	1.04	1.35
Prop Wetla	0.005	0.28	0.41	0.56	0.82	1.06
OUTLET	0.011	0.63	0.93	1.26	1.86	2.41

Area or Reach Identifier	Drainage Area (sq mi)	Peak Flow by Storm			
		100yr, 24hr (cfs)	(cfs)	(cfs)	(cfs)
Ex Wetland	0.006	2.63			
Prop Wetla	0.005	2.01			
OUTLET	0.011	4.64			



Exhibit 1
Location Map
 Lat/Long: 41.632854°, -87.881622°
 — Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: Google Maps

Not to Scale



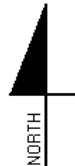
Engineering Resource Associates, Inc.
 3S701 West Avenue, Suite 150
 Warrenville, IL 60555
 Phone: (630) 393-3060 FAX: (630) 393-2152

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Exhibit 2
USFWS National Wetland Inventory Map
 Lat/Long: 41.632854°, -87.881622°

— Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: USFWS NWI Mapper

Not to Scale



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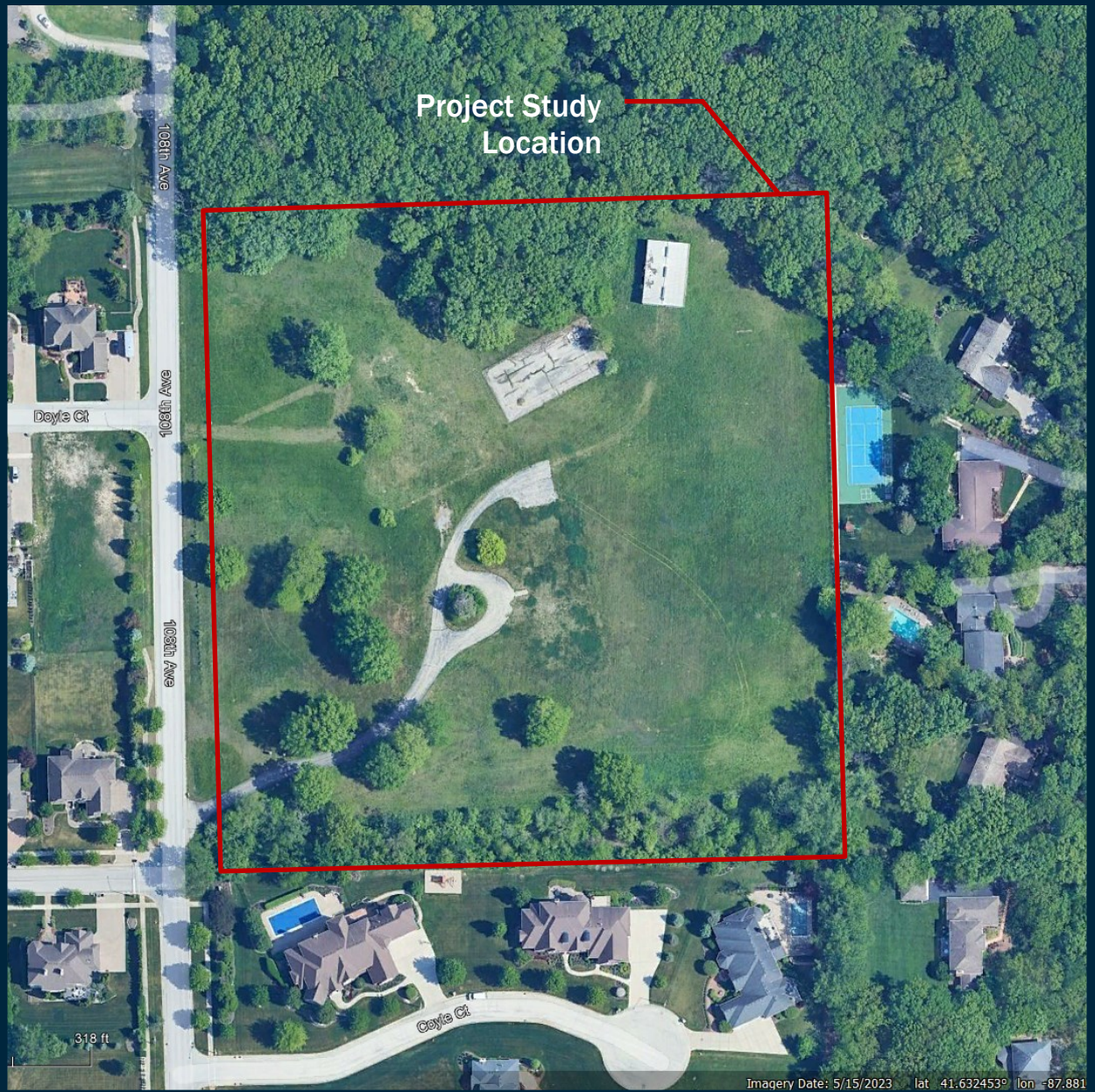
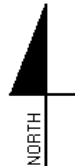


Exhibit 3
Aerial Photograph
 Lat/Long: 41.632854°, -87.881622°
 — Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: Google Earth

Not to Scale

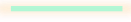


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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
298B	Beecher silt loam, 2 to 4 percent slopes	3.1	31.3%
530C2	Ozaukee silt loam, 4 to 6 percent slopes, eroded	0.0	0.1%
530D	Ozaukee silt loam, 6 to 12 percent slopes	0.8	8.5%
530D2	Ozaukee silt loam, 6 to 12 percent slopes, eroded	1.0	10.0%
530F	Ozaukee silt loam, 20 to 30 percent slopes	0.2	1.9%
531B	Markham silt loam, 2 to 4 percent slopes	4.8	48.2%
Totals for Area of Interest		10.0	100.0%

Exhibit 4
NRCS Soils Map
 Lat/Long: 41.632854°, -87.881622°
 Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: USDA Web Soil Survey

Not to Scale



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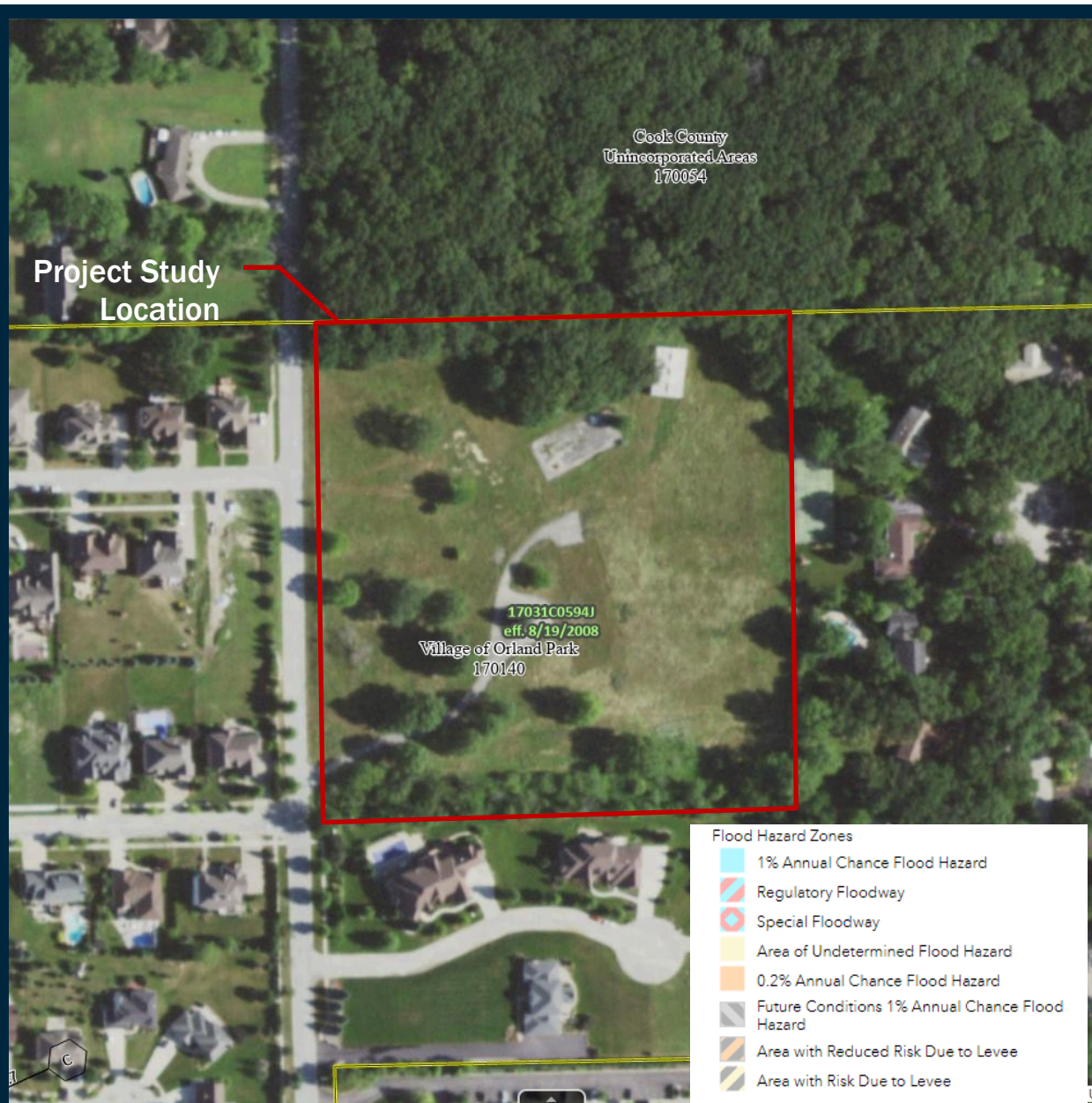


Exhibit 5
FEMA Flood Insurance Rate Map
Lat/Long: 41.632854°, -87.881622°

— Project Study Location



Client: RT-MGR, LLC
Project Name: 14137 S. 108th Avenue
ERA Project #: W24323.00
Source: FEMA FIRM Viewer

Not to Scale

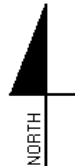


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Exhibit 6
USGS Topographic Map
Lat/Long: 41.632854°, -87.881622°
 Project Study Location



Client: RT-MGR, LLC
Project Name: 14137 S. 108th Avenue
ERA Project #: W24323.00
Source: USGS National Map

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Exhibit 7

Approximate Wetland Boundary

Lat/Long: 41.632854°, -87.881622°

- Approximate Wetland Boundary
- - - Approximate Offsite Wetlands Boundary
- Project Study Location
- Data Point



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: ESRI

Not to Scale



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Wetland Delineation Report

ERA Project #W24323.00

Prepared for:

RT-MGR, LLC

Delineated: May 15, 2025

Prepared: May 27, 2025

Contents

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Exhibits

1. Location Map
2. USFWS National Wetland Inventory Map
3. Aerial Photograph
4. NRCS Soils Map
5. FEMA Flood Insurance Rate Map
6. USGS Topographic Map
7. Approximate Wetland Boundary

Appendices

- A. Data Forms
- B. Floristic Quality Assessment
- C. Photographs
- D. IDNR EcoCAT Consultation
- E. USFWS Consultation

Project Location and Land Uses

The study area is located at 14137 South 108th Avenue in the Village of Orland Park, Cook County, Illinois (**Exhibit 1**), within the Cal-Sag Channel watershed. The study area is bounded by Orland Grove Forest Preserve to the north, residential properties to the east, residential properties to the south, and 108th Avenue to the west. Land use surrounding the study area consists of residential properties, roadways, and nature preserve. The United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (**Exhibit 2**) does not identify the area as a wetland. The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) (**Exhibit 5**) identifies no floodplain in the area.

Purpose of the Field Investigation

The purpose of the field investigation was to determine the existence, location, and size of any jurisdictional wetlands or Waters of the United States (WOTUS) within the scope of the project. The United States Army Corps of Engineers (USACE) outlined methods for delineating wetlands in the Corps of Engineers Wetlands Delineation Manual (Manual) dated 1987/Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region dated September 2008. These methods were used to delineate any jurisdictional areas. A floristic quality assessment was performed for the wetland by calculating the Coefficient of Conservatism ($\hat{c}$) and Floristic Quality Index (I) using plant species observed in the field and nomenclature given in Plants of the Chicago Region (Wilhelm & Rericha, 2017).

Methodology

The USACE Federal Register (1982) and the United States Environmental Protection Agency (USEPA) Federal Register (1980) jointly define wetlands as: "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Therefore, to be considered a jurisdictional wetland, three criteria must be met: soils, hydrology, and vegetation.

The USACE requires data forms and technical information as part of a delineation report to document the three criteria for any area determined to be a wetland. The corresponding data forms for this project are provided in **Appendix A**. A description of the three criteria, field methods, and floristic quality assessment are provided below.

Hydrology:

An area has wetland hydrology if it is inundated or saturated within the root zone and/or within 12 inches of the surface continuously for at least 5% of the growing season, approximately 9-14 days, in most years. The Manual defines the growing season as the portion of the year when the soil temperature (measured 20 inches below the surface) is above biological zero (5°C or 41°F), which can be approximated by the number of "frost free" days (>28°F at a frequency of 5 years in 10 years).

Recorded data such as aerial photographs (**Exhibit 3**), stream gauge data, planning documents, and federal, state, county, and local agency records were examined prior to the site investigation to determine if hydrology may be present. Primary and secondary indicators were investigated in the field. Inundation, saturation in the upper 12 inches, water marks, drift lines, sediment deposits, drainage patterns, oxidized root channels in the upper 12 inches, water-stained leaves, local soil survey data, and the FAC-neutral test are all examples of field indicators. Seasonal factors and professional judgment were also considered when hydrology was determined.

Soils:

Hydric soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. The field indicators of hydric soils in LRR, K, L, M, N, O, and P for Illinois were used to determine if hydric soils are present. Natural Resources Conservation Service (NRCS) soil maps were examined prior to the site investigation to determine if hydric soils were present (**Exhibit 4**). Mapped types and/or the presence of field indicators were confirmed by digging soil pits. Soil pits at all data points were dug to a depth of at least 24 inches if able, as field indicators are typically observed within 20-36 inches of the soil surface. Soil colors were determined using the Munsell Soil Color Book, dated 2009.

Vegetation:

To be considered a wetland, greater than 50% of the dominant plant species in the community must be hydrophytic. The USFWS published a regional list of plant species occurring in wetlands in 1988, which was updated in 2020. Each species is assigned to a wetland indicator category based on its probability of naturally occurring in a wetland (**Table 1**). According to the Manual, hydrophytic vegetation is present when species that adapt for life in anaerobic soil conditions (OBL, FACW, FAC) immediately exceed 50% of the total dominance for each stratum.

Table 1. Plant Indicator Status Categories* (USFWS 1988)

INDICATOR CATEGORY	REGION 3 INDICATOR	DEFINITION
Obligate Wetland	OBL	Occur almost always (estimated probability >99%) under natural conditions in wetlands, but which may also occur rarely (estimated probability <1%) in non-wetlands.
Facultative Wetland	FACW	Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands, but occasionally found in non-wetlands (estimated probability 1%-33%).
Facultative	FAC	Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
Facultative Upland	FACU	Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
Obligate Upland	UPL	Occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified, but which may also occur rarely (estimated probability <1%) in wetlands.

* The three facultative categories are subdivided by (+) and (-) modifiers.

Several other indicators of hydrophytic vegetation may also be utilized, such as the FAC-neutral test, visual observations of plant species growing in prolonged inundation and/or

soil saturation, morphological adaptations, technical literature, and physiological and reproductive adaptations. Plant species lists were compiled during the field inspection at each data point and throughout each wetland to determine hydrophytic dominance and floristic quality.

Using the species list compiled in the field, a floristic quality assessment was performed for each wetland by calculating the Coefficient of Conservatism (C), Floristic Quality Index (I), and mean wetness coefficient (both native and including adventives), utilizing nomenclature given in *Plants of the Chicago Region* (Swink & Wilhelm, 1994). The coefficient of conservatism number (C) is based upon the rarity of a species to occur and/or its resiliency to tolerate disturbance. The greater the number of species with a high C number will result in a higher native mean C ($\bar{C}$) or Floristic Quality Index (I). An area may be considered high quality if the $\bar{C}$ and/or I are equal to or greater than 3.5 and/or 20, respectively. The mean wetness coefficient is calculated utilizing each species indicator status.

Regulatory Requirements

U.S. Army Corps of Engineers:

Areas under the USACE jurisdiction include navigable WOTUS and most other lakes, rivers, streams, small tributary waterways, natural ponds, and wetlands (bogs, fens, wet meadows, etc.). Ditches for drainage excavated in uplands are not considered jurisdictional WOTUS or wetlands. Section 10 of the Rivers and Harbors Act of 1899 (RHA) authorizes the USACE to regulate structures or work in, over, or under navigable WOTUS, while Section 404 of the Clean Water Act (CWA) gives the USACE authority to regulate discharges of dredged or fill material in WOTUS, including wetlands.

However, on January 9, 2001, in the United States Supreme Court Ruling in *Solid Waste Agency of North Cook County v. U.S. Army Corps of Engineers*, USACE regulatory jurisdiction was restricted under Section 404 of the CWA to navigable waters (i.e., Section 10 of RHA), surface tributaries to such navigable waters, and waters and wetlands that are adjacent to the Section 10 waters and their tributaries. Areas under the extended jurisdiction per the “Migratory Bird Rule,” such as “intrastate waters” that lack a connection to a surface water tributary, such as small, isolated waters and wetlands like pocosins, prairie potholes, vernal pools, and playa lakes, were excluded. Wetlands separated from other WOTUS by man-made dikes or barriers, natural river berms, beach dunes, and the like are “adjacent wetlands.”

On August 29, 2023, the EPA and USACE issued a final rule amending the “Revised Definition of ‘Waters of the United States,’” originally published in the Federal Register on January 18, 2023. This amendment aligns the “Waters of the United States” definition with the U.S. Supreme Court’s decision in *Sackett v. Environmental Protection Agency* on May 25, 2023. Certain portions of the January 2023 Rule were deemed invalid based on the Supreme Court’s interpretation of the Clean Water Act in the *Sackett* decision. Consequently, the agencies have adjusted key aspects of the regulatory text to bring it into conformity with the Court’s ruling. The revised rule, titled “Revised Definition of ‘Waters of the United States’; Conforming,” was published in the Federal Register and became effective on September 8, 2023.

This ruling changes the previous Rapanos Supreme Court Ruling as follows:

- It removes the Significant Nexus Test, which allowed the EPA and USACE to evaluate waters (tributaries, ponds, etc.) and wetlands, either separately or collectively, by whether they had a “material influence on the chemical, physical or biological integrity of waters of the United States.” Without such a test, these wetlands are no longer regulated under the CWA unless they are adjacent wetlands.
- To be considered an “adjacent wetland,” it must be adjacent to the territorial seas, interstate waters, waters able to carry interstate commerce, or their tributaries regulated under the CWA. Previously, a wetland that was “bordering, contiguous or neighboring” one of these other waterbodies was considered “adjacent” and thus regulated under the CWA. This ruling decided that the previous definition was overly broad and that only wetlands “having a continuous surface connection” should be regulated as adjacent.

The USACE Chicago District’s Regional Permit Program (RPP) expired on April 1, 2022, and was replaced by 57 Nationwide Permits (NWP), which went into effect on February 25, 2022. The NWPs include specific project limitations and conditions to ensure that adverse environmental impacts are no more than minimal and that the aquatic environment is protected. If a proposed project meets the limitations and conditions of a current nationwide permit approved for use in Illinois, the USACE can provide a simplified and expedited review and project authorization.

Projects not qualifying under a Nationwide Permit or Letter of Permission will be processed as an Individual Permit.

Cook County:

Per Article 6, Section 607 of the Metropolitan Water Reclamation District (MWRD) Watershed Management Ordinance (WMO), any development that impacts Jurisdictional WOTUS or USACE Jurisdictional Wetlands shall be prohibited unless a permit for the regulated activities is obtained from the appropriate federal and state authorities.

Section 604 states that development affecting high-quality isolated wetlands is prohibited unless documentation is submitted demonstrating that onsite wetlands make any economic use of the site impossible or that avoiding the wetlands would create a hazardous road condition, leaving no practical alternative to wetland modification. Similarly, development impacting standard isolated wetlands equal to or greater than 0.10 acre in aggregate onsite is prohibited unless documentation shows no practical alternative to wetland modification. The decision on whether to permit wetland modifications will be made by either the District or an authorized municipality based on a review of the submitted documentation and other available resources. Development that impacts onsite standard isolated wetlands with a total acreage less than 0.10 acre, including contiguous isolated Waters less than 0.10 acre, does not require documentation showing that no practicable alternatives to wetland modification exist.

Mitigation for developments that impact an isolated wetland shall provide for the replacement of the lost wetland environment at the following ratios:

- A. Impacts to standard isolated wetlands less than 0.10 acre in aggregate do not require mitigation;
- B. Impacts to standard isolated wetlands more than or equal to 0.10 acre in aggregate require a minimum mitigation ratio of 1.5:1 acres;
- C. High-quality isolated wetlands impacts require a minimum mitigation ratio of 3:1 acres;
- D. Isolated wetland impacts initiated after the effective date of the WMO and prior to issuance of a Watershed Management Permit, or other unauthorized impacts, require a minimum mitigation ratio of 3:1 acres; and
- E. The District, federal, state, and local authorities may require a greater compensation ratio where unique wetland functions are threatened.

Adverse impacts, such as stream modification, flow quantity or quality changes, and vegetation damage, are not allowed without mitigation. Impacts to wetland buffer areas shall be mitigated through the replacement or enhancement of impacted functions.

Per Article 6, Section 604.10, minimum isolated wetland buffer widths shall be 30 feet from the boundary of standard isolated wetlands between 0.10 and 0.5 acres in area, 50 feet from the boundary of standard isolated wetlands greater than or equal to 0.5 acre in area, or 100 feet from the boundary of high-quality isolated wetlands.

Per Article 6, Section 606.2, for any Jurisdictional WOTUS that does not qualify as a wetland, the riparian environment shall be 50 feet from the Ordinary High Water Mark (OHWM). For any Isolated Waters that do not qualify as a wetland, the riparian environment shall be 30 feet from the OHWM.

Per Article 3, Section 305 of the WMO, a permit application, including Schedule W, is required for developments that impact wetland areas.

Results

There is one wetland located within the study area. The boundary of the wetland was staked with pink pin flags with the wording “Wetland Delineation” which were then located using a handheld GPS with sub-meter accuracy. Data points were taken within and outside of the wetland limits to support the conclusions. These data points are marked on an aerial photograph with the approximate boundary (**Exhibit 7**). The corresponding data forms are provided in **Appendix A**. The following text characterizes the wetland.

Wetland 1:

Wetland 1 covers 0.04 acres of the subject property and consists of a wooded fringe wetland along a stream (**Exhibit 7**). No wetlands (**Exhibit 2**) or floodplains (**Exhibit 5**) were identified in the area. Two data points were used to support the findings.

Hydrophytic vegetation was dominant and consisted of Eastern cottonwood (*Populus deltoides*), Green ash (*Fraxinus pennsylvanica*), Reed canary grass (*Phalaris arundinacea*), and Fox sedge (*Carex vulpinoidea*). Soils are mapped as Ozaukee silt loam (530D) (**Exhibit 4**), and hydric soil indicator F6 “redox dark surface” indicated the presence of hydric soil in the field sample. Hydrology is possibly provided by precipitation, surface runoff, and

groundwater. Drift deposits, drainage patterns, geomorphic position, and a positive FAC-neutral test were the indicators used to determine persistent hydrology. The sample site satisfies all three criteria and, therefore, qualifies as a wetland (**Appendix A.1**).

The Coefficient of Conservatism, Floristic Quality Index, and mean wetness coefficient for Wetland 1 were 1.61, 6.84, and -0.22, respectively. The floristic quality assessment is provided in **Appendix B**.

The Illinois Department of Natural Resources (IDNR) Ecological Compliance Assessment Tool (EcoCAT) (**Appendix D**) and the USFWS Section 7 information on federally-listed threatened and endangered species (**Appendix E**) were used to determine the likely presence of any threatened or endangered species within the scope of the project.

According to the IDNR, the Illinois Natural Heritage Database showed that the following protected resources may be in the vicinity of the project location: McGinnis Slough Illinois Natural Areas Inventory (INAI) Site, Black-crowned night heron (*Nycticorax nycticorax*), Common moorhen (*Gallinula chloropus*), Least bittern (*Ixobrychus exilis*), and Osprey (*Pandion haliaetus*). The IDNR evaluated this information and concluded that adverse effects are unlikely (**Appendix D**).

According to the USFWS, the following species are potentially affected by activities in this location: Northern long-eared bat (*Myotis septentrionalis*), Tricolored bat (*Perimyotis subflavus*), Rufa red knot (*Calidris canutus rufa*), Eastern massasauga (*Sistrurus catenatus*), Hine's emerald dragonfly (*Somatochlora hineana*), Eastern prairie fringed orchid (*Platanthera leucophaea*), and Leafy prairie-clover (*Dalea foliosa*) (**Appendix E**). Northern long-eared bats and Tricolored bats are unlikely to be impacted by this project, as there is not a dense stand of dead or dying trees within the area. Additionally, a preferable habitat may be found in the nearby forest preserve, away from the intended project area. This project site does not present adequate coastal habitat for the Rufa red knot. Hine's emerald dragonfly would not find typical critical habitat on site, as there are no cool water fens within the area. Eastern massasaugas are unlikely to find adequate habitat within the dense, forested area surrounding the wetlands to forage, breed, shelter and hibernate onsite. As the wetlands on site are not high quality, the Eastern prairie fringed orchid is not present. The Leafy prairie-clover is not likely to be found on site, as there are no glades or prairies with limestone substrates. Additionally, according to the USFWS, the site is located in a low-potential zone for Rusty-patched bumble bees (*Bombus affinis*), so the species may be present in the area. However, as the area is frequently disturbed and mowed, it is not likely to present adequate habitat to this ground-nesting species. Further, this species would also find habitat in the adjacent nature preserve.

As the fringe wetland is minimal in size and in quality, it provides functions at a low level. These functions include reduction in flood flow rates, infiltration of stormwater, and pollutant filtration from upland runoff. The wetland also provides a small amount of usable habitat for wildlife.

As the wetland is less than 0.5 acres in area, a 50-foot buffer is present. The 50-foot buffer consists of a mix of maintained lawn and landscaping, a naturalized woodland habitat of moderate quality, and an existing nature preserve. The woody and herbaceous buffer

provides soil stabilization, groundwater infiltration, pollutant assimilation, reduction in flood flow rates, wildlife screening, and habitat for foraging, resting, nesting, and reproducing wildlife. The nature preserve provides these benefits of woody and herbaceous buffer as well. The maintained lawn and landscaping provide similar functions at a minimal level.

Recommendations

As wetlands are present on the site, a stormwater management permit will need to be approved by the MWRD for any work proposing impacts to the waters, wetlands, or buffers onsite.

Impacts to the buffers require the replacement of lost ecological function. Turf grass and landscaping can be replaced in kind, and impacts to impervious areas do not require mitigation. Impacts to naturalized areas require native plantings that sufficiently replace the functions of the removed or impacted vegetation and do have a required maintenance and monitoring period to ensure successful establishment.

The IDNR EcoCAT consultation termination letter regarding state-listed threatened and endangered species is provided in **Appendix D**, and the USFWS Information for Planning and Consultation (IPaC) regarding listed species and their critical habitats is provided in **Appendix E**. Based on these assessments, no threatened, endangered, or protected species are likely to be affected by the development of the study area. However, if tree clearing is necessary, it is recommended to remove trees or brush between November 1st and March 31st to avoid impacts to bats, bees, or birds. Additionally, herbaceous areas within the project construction limits should be mowed as needed from March 15th to October 14th to keep floral resources from blooming.

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Exhibit 1
Location Map
 Lat/Long: 41.632854°, -87.881622°
 — Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: Google Maps

Not to Scale



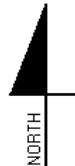
Engineering Resource Associates, Inc.
 3S701 West Avenue, Suite 150
 Warrenville, IL 60555
 Phone: (630) 393-3060 FAX: (630) 393-2152

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Exhibit 2
USFWS National Wetland Inventory Map
 Lat/Long: 41.632854°, -87.881622°

— Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: USFWS NWI Mapper

Not to Scale



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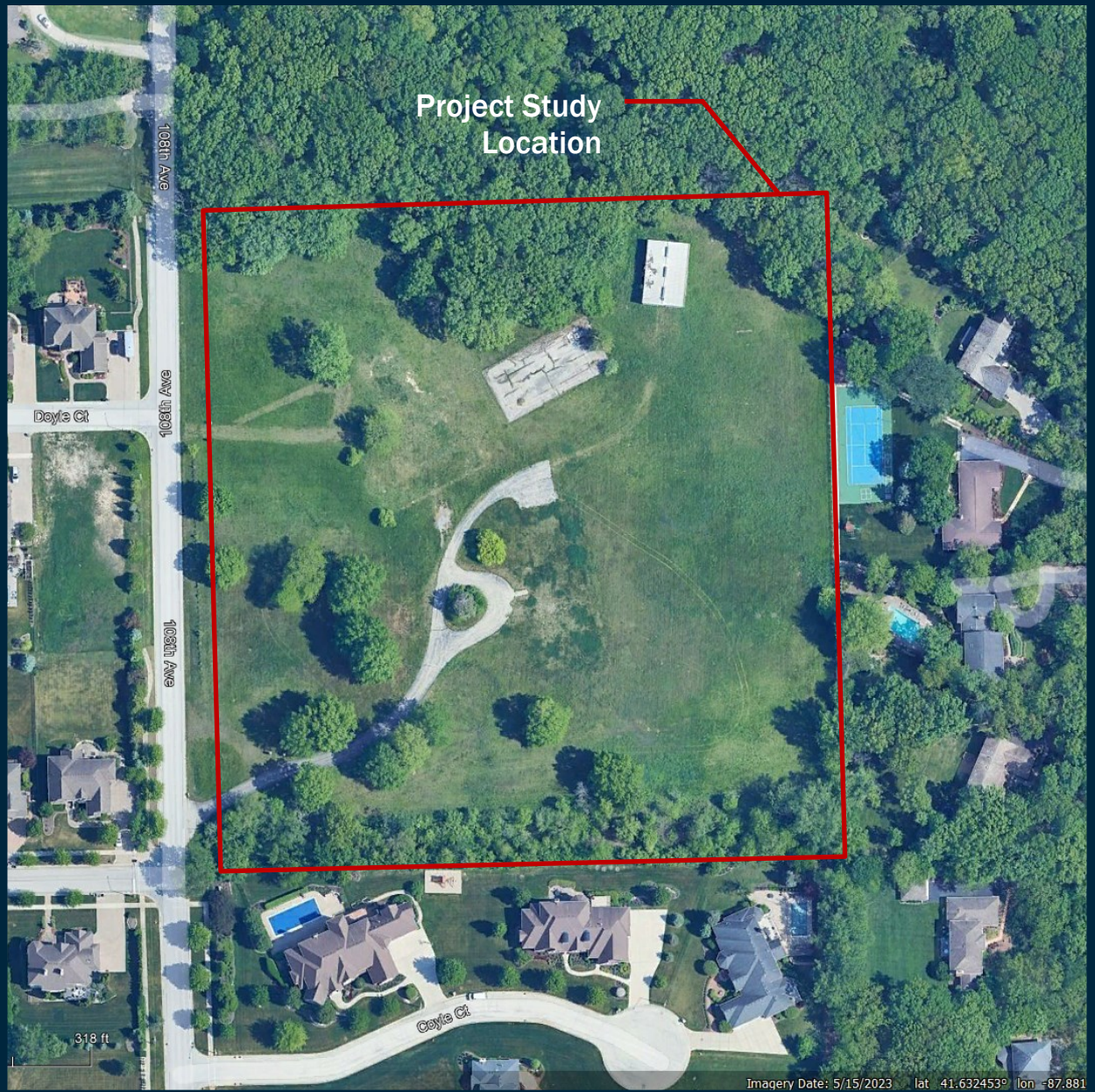
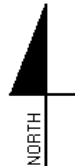


Exhibit 3
Aerial Photograph
 Lat/Long: 41.632854°, -87.881622°
 — Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: Google Earth

Not to Scale

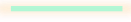


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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
298B	Beecher silt loam, 2 to 4 percent slopes	3.1	31.3%
530C2	Ozaukee silt loam, 4 to 6 percent slopes, eroded	0.0	0.1%
530D	Ozaukee silt loam, 6 to 12 percent slopes	0.8	8.5%
530D2	Ozaukee silt loam, 6 to 12 percent slopes, eroded	1.0	10.0%
530F	Ozaukee silt loam, 20 to 30 percent slopes	0.2	1.9%
531B	Markham silt loam, 2 to 4 percent slopes	4.8	48.2%
Totals for Area of Interest		10.0	100.0%

Exhibit 4
NRCS Soils Map
 Lat/Long: 41.632854°, -87.881622°
 Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: USDA Web Soil Survey

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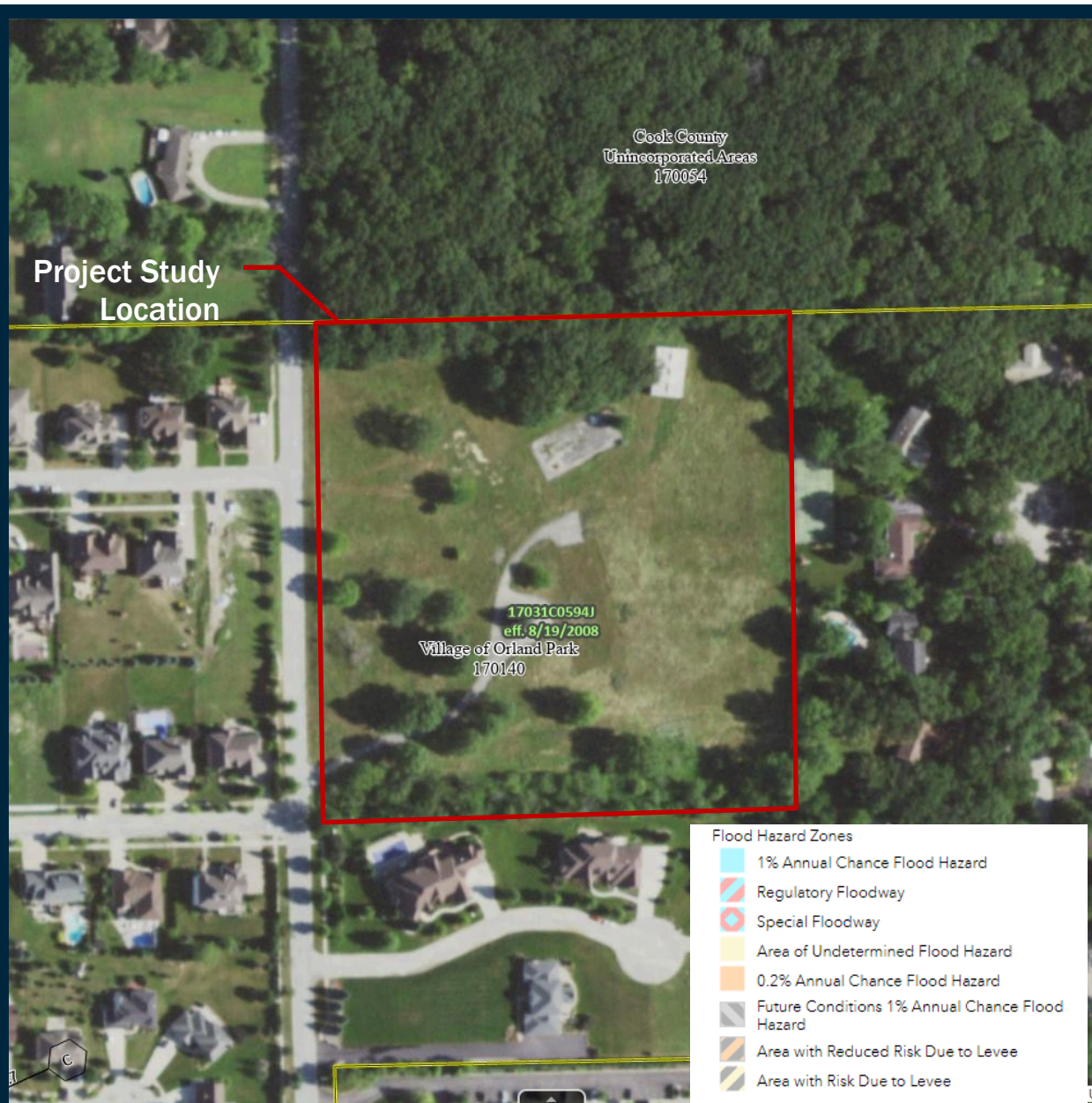


Exhibit 5
FEMA Flood Insurance Rate Map
 Lat/Long: 41.632854°, -87.881622°
 — Project Study Location



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: FEMA FIRM Viewer

Not to Scale

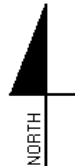


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Exhibit 6
USGS Topographic Map
Lat/Long: 41.632854°, -87.881622°
 Project Study Location



Client: RT-MGR, LLC
Project Name: 14137 S. 108th Avenue
ERA Project #: W24323.00
Source: USGS National Map

Not to Scale



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Exhibit 7

Approximate Wetland Boundary

Lat/Long: 41.632854°, -87.881622°

- Approximate Wetland Boundary
- - - Approximate Offsite Wetlands Boundary
- Project Study Location
- Data Point



Client: RT-MGR, LLC
 Project Name: 14137 S. 108th Avenue
 ERA Project #: W24323.00
 Source: ESRI

Not to Scale



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Appendix A.1

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site 14137 S. 108th Avenue, Orland Park City/County: Cook Sampling Date: May 15, 2025
 Applicant/Owner: RT-MGR, LLC State: IL Sampling Point: DP1
 Investigator(s): Brad Earnest, Madeline Meyer Section, Township, Range: S5 T36N R12E
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): concave
 Slope (%): 6%-12% Lat: 41.633386 Long: -87.881579 Datum: WGS 1984
 Soil Map Unit Name 530D Ozaukee silt loam NWI Classification: none

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed?

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic?

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>Y</u> If yes, optional wetland site ID: <u> </u>
Hydric soil present? <u>Y</u>	
Wetland hydrology present? <u>Y</u>	
Remarks: (Explain alternative procedures here or in a separate report.)	

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>11</u> (A) Total Number of Dominant Species Across all Strata: <u>12</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>91.67%</u> (A/B)
1 <u>Populus deltoides</u>		<u>20</u>	<u>Y</u>	<u>FAC</u>	
2 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
3 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
4 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
5 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>20</u> = Total Cover			
Sapling/Shrub Stratum	(Plot size: <u>15</u>)	Absolute % Cover	Dominant Species	Indicator Status	Prevalence Index Worksheet Total % Cover of: OBL species <u>10</u> x 1 = <u>10</u> FACW species <u>35</u> x 2 = <u>70</u> FAC species <u>35</u> x 3 = <u>105</u> FACU species <u>5</u> x 4 = <u>20</u> UPL species <u>0</u> x 5 = <u>0</u> Column totals <u>85</u> (A) <u>205</u> (B) Prevalence Index = B/A = <u>2.41</u>
1 <u>Fraxinus pennsylvanica</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	
2 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
3 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
4 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
5 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>5</u> = Total Cover			
Herb Stratum	(Plot size: <u>5</u>)	Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u>X</u> Prevalence index is ≤3.0* Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1 <u>Phalaris arundinacea</u>		<u>10</u>	<u>Y</u>	<u>FACW</u>	
2 <u>Carex vulpinoidea</u>		<u>10</u>	<u>Y</u>	<u>OBL</u>	
3 <u>Toxicodendron radicans subsp. negundo</u>		<u>5</u>	<u>Y</u>	<u>FAC</u>	
4 <u>Claytonia virginica</u>		<u>5</u>	<u>Y</u>	<u>FACU</u>	
5 <u>Geum laciniatum</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	
6 <u>Bidens frondosus</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	
7 <u>Viburnum dentatum</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	
8 <u>Parthenocissus quinquefolia</u>		<u>5</u>	<u>Y</u>	<u>FAC</u>	
9 <u>Juncus torreyi</u>		<u>5</u>	<u>Y</u>	<u>FACW</u>	
10 <u>Polygonum virginianum</u>		<u>5</u>	<u>Y</u>	<u>FAC</u>	
		<u>60</u> = Total Cover			
Woody Vine Stratum	(Plot size: <u>30</u>)	Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic vegetation present? <u>Y</u>
1 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
2 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>0</u> = Total Cover			

Remarks: (Include photo numbers here or on a separate sheet)

Appendix A.1

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-2	10 YR 2/1	100					Silty clay loam	
2-8	10 YR 2/1	95	10 YR 4/6	5	C	M		
8-10	10 YR 2/1	75	10 YR 4/6	20	C	M		
			10 YR 5/1	5	D	M		
16-20	10 YR 3/1	20	10 YR 5/8	20	C		Clay loam	
			10 YR 6/1	60	D			

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| ☐ Histisol (A1) | ☐ Sandy Gleyed Matrix (S4) |
| ☐ Histic Epipedon (A2) | ☐ Sandy Redox (S5) |
| ☐ Black Histic (A3) | ☐ Stripped Matrix (S6) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Mucky Mineral (F1) |
| ☐ Stratified Layers (A5) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ 2 cm Muck (A10) | ☐ Depleted Matrix (F3) |
| ☐ Depleted Below Dark Surface (A11) | ☒ Redox Dark Surface (F6) |
| ☐ Thick Dark Surface (A12) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Redox Depressions (F8) |
| ☐ 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|---|
| ☐ Coast Prairie Redox (A16) (LRR K, L, R) |
| ☐ Dark Surface (S7) (LRR K, L) |
| ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| ☐ Iron-Manganese Masses (F12) (LRR K, L, R) |
| ☐ Very Shallow Dark Surface (TF12) |
| ☐ Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| ☐ Surface Water (A1) |
| ☐ High Water Table (A2) |
| ☐ Saturation (A3) |
| ☐ Water Marks (B1) |
| ☐ Sediment Deposits (B2) |
| ☒ Drift Deposits (B3) |
| ☐ Algal Mat or Crust (B4) |
| ☐ Iron Deposits (B5) |
| ☐ Inundation Visible on Aerial Imagery (B7) |
| ☐ Sparsely Vegetated Concave Surface (B8) |
| ☐ Water-Stained Leaves (B9) |

- | |
|---|
| ☐ Aquatic Fauna (B13) |
| ☐ True Aquatic Plants (B14) |
| ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Oxidized Rhizospheres on Living Roots (C3) |
| ☐ Presence of Reduced Iron (C4) |
| ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Thin Muck Surface (C7) |
| ☐ Gauge or Well Data (D9) |
| ☐ Other (Explain in Remarks) |

Secondary Indicators (minimum of two required)

- | |
|--|
| ☐ Surface Soil Cracks (B6) |
| ☒ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Crayfish Burrows (C8) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Stunted or Stressed Plants (D1) |
| ☒ Geomorphic Position (D2) |
| ☒ FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes ☐	No ☒	Depth (inches):	_____
Water table present?	Yes ☐	No ☒	Depth (inches):	_____
Saturation present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):	_____

Wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix A.2

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site 14137 S. 108th Avenue, Orland Park City/County: Cook Sampling Date: May 15, 2025
 Applicant/Owner: RT-MGR, LLC State: IL Sampling Point: DP2
 Investigator(s): Brad Earnest, Madeline Meyer Section, Township, Range: S5 T36N R12E
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): concave
 Slope (%): 6%-12% Lat: 41.633380 Long: -87.881580 Datum: WGS 1984
 Soil Map Unit Name 530D Ozaukee silt loam NWI Classification: none

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed?

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic?

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? <u>Y</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID: <u> </u>
Hydric soil present? <u>Y</u>	
Wetland hydrology present? <u>N</u>	
Remarks: (Explain alternative procedures here or in a separate report.)	

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across all Strata: <u>14</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>57.14%</u> (A/B)
1 <i>Quercus macrocarpa</i>		25	Y	FAC	
2 <i>Quercus alba</i>		20	Y	FACU	
3					
4					
5					
		45	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>15</u> x 2 = <u>30</u> FAC species <u>55</u> x 3 = <u>165</u> FACU species <u>40</u> x 4 = <u>160</u> UPL species <u>5</u> x 5 = <u>25</u> Column totals <u>115</u> (A) <u>380</u> (B) Prevalence Index = B/A = <u>3.30</u>
Sapling/Shrub Stratum	(Plot size: <u>15</u>)				
1 <i>Lonicera maackii</i>		15	Y	NI	
2 <i>Berberis thunbergii</i>		10	Y	FACU	
3 <i>Fraxinus pennsylvanica</i>		5	N	FACW	
4 <i>Ribes missouriense</i>		5	N	NI	
5 <i>Rosa multiflora</i>		5	N	FACU	
		40	= Total Cover		
Herb Stratum	(Plot size: <u>5</u>)				Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u>X</u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1 <i>Toxicodendron radicans subsp. negundo</i>		10	Y	FAC	
2 <i>Bidens frondosus</i>		5	Y	FACW	
3 <i>Lonicera maackii</i>		5	Y	NI	
4 <i>Geum canadense</i>		5	Y	FAC	
5 <i>Plantago rugelii</i>		5	Y	FAC	
6 <i>Claytonia virginica</i>		5	Y	FACU	
7 <i>Parthenocissus quinquefolia</i>		5	Y	FAC	
8 <i>Phalaris arundinacea</i>		5	Y	FACW	
9 <i>Alliaria petiolata</i>		5	Y	FAC	
10 <i>Arctium minus</i>		5	Y	UPL	
		55	= Total Cover		
Woody Vine Stratum	(Plot size: <u>30</u>)				Hydrophytic vegetation present? <u>Y</u>
1					
2					
		0	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-4	10 YR 4/2	100						Clay loam
4-15	10 YR 5/3	50	10 YR 3/2	45	D	M		
			10 YR 5/6	5	C	M		

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| ☐ Histisol (A1) | ☐ Sandy Gleyed Matrix (S4) |
| ☐ Histic Epipedon (A2) | ☐ Sandy Redox (S5) |
| ☐ Black Histic (A3) | ☐ Stripped Matrix (S6) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Mucky Mineral (F1) |
| ☐ Stratified Layers (A5) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ 2 cm Muck (A10) | ☐ Depleted Matrix (F3) |
| ☐ Depleted Below Dark Surface (A11) | ☒ Redox Dark Surface (F6) |
| ☐ Thick Dark Surface (A12) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Redox Depressions (F8) |
| ☐ 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|---|
| ☐ Coast Prairie Redox (A16) (LRR K, L, R) |
| ☐ Dark Surface (S7) (LRR K, L) |
| ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| ☐ Iron-Manganese Masses (F12) (LRR K, L, R) |
| ☐ Very Shallow Dark Surface (TF12) |
| ☐ Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: _____
 Depth (inches): _____
Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | |
|--|
| ☐ Surface Water (A1) |
| ☐ High Water Table (A2) |
| ☐ Saturation (A3) |
| ☐ Water Marks (B1) |
| ☐ Sediment Deposits (B2) |
| ☐ Drift Deposits (B3) |
| ☐ Algal Mat or Crust (B4) |
| ☐ Iron Deposits (B5) |
| ☐ Inundation Visible on Aerial Imagery (B7) |
| ☐ Sparsely Vegetated Concave Surface (B8) |
| ☐ Water-Stained Leaves (B9) |

- | |
|---|
| ☐ Aquatic Fauna (B13) |
| ☐ True Aquatic Plants (B14) |
| ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Oxidized Rhizospheres on Living Roots (C3) |
| ☐ Presence of Reduced Iron (C4) |
| ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Thin Muck Surface (C7) |
| ☐ Gauge or Well Data (D9) |
| ☐ Other (Explain in Remarks) |

Secondary Indicators (minimum of two required)

- | |
|--|
| ☐ Surface Soil Cracks (B6) |
| ☐ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Crayfish Burrows (C8) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Stunted or Stressed Plants (D1) |
| ☐ Geomorphic Position (D2) |
| ☐ FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes ☐	No ☒	Depth (inches):	_____
Water table present?	Yes ☐	No ☒	Depth (inches):	_____
Saturation present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):	_____

Wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix A.3

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site 14137 S. 108th Avenue, Orland Park City/County: Cook Sampling Date: May 15, 2025
 Applicant/Owner: RT-MGR, LLC State: IL Sampling Point: DP3
 Investigator(s): Brad Earnest, Madeline Meyer Section, Township, Range: S5 T36N R12E
 Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): concave
 Slope (%): 6%-12% Lat: 41.631745 Long: -87.882685 Datum: WGS 1984
 Soil Map Unit Name 530D2 Ozaukee silt loam NWI Classification: none

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed?

Are "normal circumstances"

Are vegetation , soil , or hydrology naturally problematic?

present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present? <u>N</u>	Is the sampled area within a wetland? <u>N</u> If yes, optional wetland site ID: <u> </u>
Hydric soil present? <u>N</u>	
Wetland hydrology present? <u>Y</u>	
Remarks: (Explain alternative procedures here or in a separate report.)	

VEGETATION -- Use scientific names of plants.

Tree Stratum	(Plot size: <u>30</u>)	Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B)
1 <u>Ulmus pumila</u>		<u>35</u>	<u>Y</u>	<u>UPL</u>	
2 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
3 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
4 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
5 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>35</u>	= Total Cover		Prevalence Index Worksheet Total % Cover of: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>20</u> x 2 = <u>40</u> FAC species <u>75</u> x 3 = <u>225</u> FACU species <u>20</u> x 4 = <u>80</u> UPL species <u>35</u> x 5 = <u>175</u> Column totals <u>150</u> (A) <u>520</u> (B) Prevalence Index = B/A = <u>3.47</u>
Sapling/Shrub Stratum (Plot size: <u>15</u>)					
1 <u>Rhamnus cathartica</u>		<u>50</u>	<u>Y</u>	<u>FAC</u>	
2 <u>Cornus stolonifera</u>		<u>10</u>	<u>N</u>	<u>FACW</u>	
3 <u>Lonicera maackii</u>		<u>10</u>	<u>N</u>	<u>NI</u>	
4 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
5 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>70</u>	= Total Cover		
Herb Stratum (Plot size: <u>5</u>)					Hydrophytic Vegetation Indicators: <u> </u> Rapid test for hydrophytic vegetation <u> </u> Dominance test is >50% <u> </u> Prevalence index is ≤3.0* <u> </u> Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic hydrophytic vegetation* (explain) *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1 <u>Glechoma hederacea</u>		<u>20</u>	<u>Y</u>	<u>FACU</u>	
2 <u>Alliaria petiolata</u>		<u>15</u>	<u>Y</u>	<u>FAC</u>	
3 <u>Vitis riparia</u>		<u>10</u>	<u>N</u>	<u>FACW</u>	
4 <u>Dipsacus fullonum subsp. sylvestris</u>		<u>5</u>	<u>N</u>	<u>NI</u>	
5 <u>Toxicodendron radicans subsp. negundo</u>		<u>5</u>	<u>N</u>	<u>FAC</u>	
6 <u>Lonicera maackii</u>		<u>5</u>	<u>N</u>	<u>NI</u>	
7 <u>Parthenocissus quinquefolia</u>		<u>5</u>	<u>N</u>	<u>FAC</u>	
8 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
9 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
10 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>65</u>	= Total Cover		
Woody Vine Stratum (Plot size: <u>30</u>)					Hydrophytic vegetation present? <u>N</u>
1 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
2 <u> </u>		<u> </u>	<u> </u>	<u> </u>	
		<u>0</u>	= Total Cover		

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-9	10 YR 2/1	100					Silt loam	
9-15	10 YR 2/1	85						
	10 YR 4/3	15						
>15								Restrictive layer

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- | | |
|--|---|
| ☐ Histisol (A1) | ☐ Sandy Gleyed Matrix (S4) |
| ☐ Histic Epipedon (A2) | ☐ Sandy Redox (S5) |
| ☐ Black Histic (A3) | ☐ Stripped Matrix (S6) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Mucky Mineral (F1) |
| ☐ Stratified Layers (A5) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ 2 cm Muck (A10) | ☐ Depleted Matrix (F3) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Redox Dark Surface (F6) |
| ☐ Thick Dark Surface (A12) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Redox Depressions (F8) |
| ☐ 5 cm Mucky Peat or Peat (S3) | |

Indicators for Problematic Hydric Soils:

- | |
|---|
| ☐ Coast Prairie Redox (A16) (LRR K, L, R) |
| ☐ Dark Surface (S7) (LRR K, L) |
| ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| ☐ Iron-Manganese Masses (F12) (LRR K, L, R) |
| ☐ Very Shallow Dark Surface (TF12) |
| ☐ Other (explain in remarks) |

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

 Type: Stone/Roots
 Depth (inches): 15
Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Aquatic Fauna (B13) |
| ☐ High Water Table (A2) | ☐ True Aquatic Plants (B14) |
| ☐ Saturation (A3) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Water Marks (B1) | ☐ Oxidized Rhizospheres on Living Roots (C3) |
| ☐ Sediment Deposits (B2) | ☐ Presence of Reduced Iron (C4) |
| ☐ Drift Deposits (B3) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Algal Mat or Crust (B4) | ☐ Thin Muck Surface (C7) |
| ☐ Iron Deposits (B5) | ☐ Gauge or Well Data (D9) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |
| ☐ Water-Stained Leaves (B9) | |

Secondary Indicators (minimum of two required)

- | |
|--|
| ☒ Surface Soil Cracks (B6) |
| ☐ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Crayfish Burrows (C8) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Stunted or Stressed Plants (D1) |
| ☒ Geomorphic Position (D2) |
| ☐ FAC-Neutral Test (D5) |

Field Observations:

Surface water present?	Yes ☐	No ☒	Depth (inches): <u> </u>
Water table present?	Yes ☐	No ☒	Depth (inches): <u> </u>
Saturation present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches): <u> </u>

Wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B - Floristic Quality Assessment

SITE: 14137 S. 108th Avenue, Orland Park
LOCALE: Cook County
BY: Brad Earnest, Madeline Meyer
NOTES: 5/15/2025

CONSERVATISM-BASED METRICS		ADDITIONAL METRICS	
MEAN C (NATIVE SPECIES)	2.07	SPECIES RICHNESS (ALL)	18
MEAN C (ALL SPECIES)	1.61	SPECIES RICHNESS (NATIVE)	14
MEAN C (NATIVE TREES)	2.00	% NON-NATIVE	0.22
MEAN C (NATIVE SHRUBS)	0.00	WET INDICATOR (ALL)	-0.22
MEAN C (NATIVE HERBACEOUS)	2.00	WET INDICATOR (NATIVE)	-0.21
FQAI (NATIVE SPECIES)	7.75	% HYDROPHYTE (MIDWEST)	0.78
FQAI (ALL SPECIES)	6.84	% NATIVE PERENNIAL	0.61
ADJUSTED FQAI	18.27	% NATIVE ANNUAL	0.17
% C VALUE 0	0.33	% ANNUAL	0.17
% C VALUE 1-3	0.44	% PERENNIAL	0.83
% C VALUE 4-6	0.22		
% C VALUE 7-10	0.00		

SPECIES ACRONYM	SPECIES NAME (NWPL/ MOHLENBROCK)	SPECIES (SYNONYM)	COMMON NAME	C VALUE	MIDWEST WET INDICATOR	NC-NE WET INDICATOR	WET INDICATOR (NUMERIC)	HABIT	DURATION	NATIVITY
BIDFRO	Bidens frondosa	Bidens frondosa	Devil's-Pitchfork		1 FACW	FACW	-1	Forb	Annual	Native
CXVULP	Carex vulpinoidea	vulpinoidea	Common Fox Sedge		2 FACW	OBL	-1	Sedge	Perennial	Native
CLAVIR	Claytonia virginica	virginica	Springbeauty		4 FACU	FACU	1	Forb	Perennial	Native
		Fraxinus pennsylvanica								
		subintegerrima; Fraxinus lanceolata								
FRAPEN	Fraxinus pennsylvanica	lanceolata	Green Ash		4 FACW	FACW	-1	Tree	Perennial	Native
GALAPA	Galium aparine	spurium	Sticky-Willy		0 FACU	FACU	1	Forb	Annual	Native
GEULAC	Geum laciniatum	laciniatum	Rough Avens		3 FACW	FACW	-1	Forb	Perennial	Native
HACVIR	Hackelia virginiana	virginiana	Beggar's-Lice		1 FACU	FACU	1	Forb	Perennial	Native
JUNTOR	Juncus torreyi	torreyi	Torrey's Rush		2 FACW	FACW	-1	Forb	Perennial	Native
		Parthenocissus quinquefolia								
PARQUI	Parthenocissus quinquefolia	quinquefolia	Virginia-Creeper		4 FACU	FACU	1	Vine	Perennial	Native
POLVIR	Persicaria virginiana	Polygonum virginianum	Jumpseed		4 FAC	FAC	0	Forb	Perennial	Native
		PHALARIS ARUNDINACEA								
PHAARU	Phalaris arundinacea	A	Reed Canary Grass		0 FACW	FACW	-1	Grass	Perennial	Adventive
POAPRA	Poa pratensis	PRATENSIS	Kentucky Blue Grass		0 FAC	FACU	0	Grass	Perennial	Adventive
POPDEL	Populus deltoides	deltoides	Cottonwood		0 FAC	FAC	0	Tree	Perennial	Native
RANABO	Ranunculus abortivus	abortivus	Kidney-Leaf Buttercup		1 FACW	FAC	-1	Forb	Annual	Native
RUMCRI	Rumex crispus	RUMEX CRISPUS	Curly Dock		0 FAC	FAC	0	Forb	Perennial	Adventive
TOXRAD	Toxicodendron radicans	Rhus radicans	Eastern Poison-Ivy		2 FAC	FAC	0	Vine	Perennial	Native
		VIBURNUM DENTATUM								
VIBDEN	Viburnum dentatum	VAR. SCABRELLUM	Southern Arrow-Wood		0 FAC	FAC	0	Shrub	Perennial	Adventive
		Vitis riparia								
VITRIP	Vitis riparia	var. syrticola	River-Bank Grape		1 FACW	FAC	-1	Vine	Perennial	Native

Appendix C — Photographs

Photo 1

Site: 14137 S. 108th Avenue, Orland Park

Date: May 15, 2025

Investigator(s): Brad Earnest, Madeline Meyer

Description: Facing west along the wetland and stream at the northern boundary of the site.



Photo 2

Site: 14137 S. 108th Avenue, Orland Park

Date: May 15, 2025

Investigator(s): Brad Earnest, Madeline Meyer

Description: Facing east along the wetland and stream at the northern boundary of the site.



Photo 3

Site: 14137 S. 108th Avenue, Orland Park

Date: May 15, 2025

Investigator(s): Brad Earnest, Madeline Meyer

Description: Facing east along the swale at the southwest corner of the property.





Applicant: Engineering Resource Associates
Contact: Madeline J Meyer
Address: 3S701 West Ave
 Suite 150
 Warrenville, IL 60555

IDNR Project Number: 2513473
Date: 05/22/2025
Alternate Number: W24323.00

Project: 14137 South 108th Avenue
Address: 14137 108th Ave, Orland Park

Description: Owner wishes to develop a +/- 9.4 -acre property. This proposal is based on a total lot count of +/- 20 single family residences. The project is located in Orland Park, IL.

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Mcginnis Slough INAI Site
 Black-Crowned Night Heron (*Nycticorax nycticorax*)
 Common Moorhen (*Gallinula chloropus*)
 Least Bittern (*Ixobrychus exilis*)
 Osprey (*Pandion haliaetus*)
 Osprey (*Pandion haliaetus*)

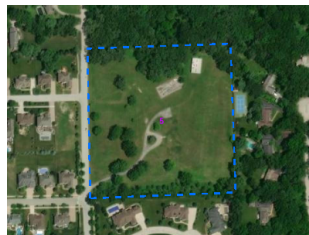
An IDNR staff member will evaluate this information and contact you to request additional information or to terminate consultation if adverse effects are unlikely.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
 36N, 12E, 5



IL Department of Natural Resources
Contact
 Isabella Newingham
 217-785-5500
 Division of Ecosystems & Environment

Government Jurisdiction
 Metropolitan Water Reclamation District
 TBD
 100 East Erie Street
 Chicago, Illinois 60611

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

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EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.



Illinois Department of Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
<http://dnr.state.il.us>

JB Pritzker, Governor

Natalie Phelps Finnie, Director

May 23, 2025

Madeline J Meyer
Engineering Resource Associates
3S701 West Ave
Suite 150
Warrenville, IL 60555

RE: 14137 South 108th Avenue
Project Number(s): 2513473 [W24323.00]
County: Cook

Dear Applicant:

This letter is in reference to the project you recently submitted for consultation. The natural resource review provided by EcoCAT identified protected resources that may be in the vicinity of the proposed action. The Department has evaluated this information and concluded that adverse effects are unlikely. Therefore, consultation under 17 Ill. Adm. Code Part 1075 is terminated.

However, if tree clearing is necessary, the Department recommends removing trees between November 1st and March 31st to avoid impacts to birds and bats.

This consultation is valid for two years unless new information becomes available that was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the project has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary.

The natural resource review reflects the information existing in the Illinois Natural Heritage Database at the time of the project submittal, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, you must comply with the applicable statutes and regulations. Also, note that termination does not imply IDNR's authorization or endorsement of the proposed action.

Please contact me if you have questions regarding this review.

Isabella Newingham
Division of Ecosystems and Environment
217-785-5500

Appendix E - USFWS Consultation



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chicago Ecological Service Field Office

1511 47th Ave

Moline, IL 61265-7022

Phone: (309) 757-5800



In Reply Refer To:

05/27/2025 15:59:37 UTC

Project Code: 2025-0101647

Project Name: 14137 S. 108th Avenue, Orland Park

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

Additionally, please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing

determination for the NLEB by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of NLEB after the new listing goes into effect this will first need to be addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and

their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chicago Ecological Service Field Office

1511 47th Ave

Moline, IL 61265-7022

(309) 757-5800

PROJECT SUMMARY

Project Code: 2025-0101647

Project Name: 14137 S. 108th Avenue, Orland Park

Project Type: Residential Construction

Project Description: Owner wishes to develop a +/- 9.4 -acre property. This proposal is based on a total lot count of +/- 20 single family residences. The project is located in Orland Park, IL.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.632701350000005,-87.88157648898289,14z>



Counties: Cook County, Illinois

ENDANGERED SPECIES ACT SPECIES

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Rufa Red Knot <i>Calidris canutus rufa</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane <i>Grus americana</i> Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non- Essential

REPTILES

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2202	Threatened

INSECTS

NAME	STATUS
Hine's Emerald Dragonfly <i>Somatochlora hineana</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7877	Endangered
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Western Regal Fritillary <i>Argynnis idalia occidentalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: ▪ Follow the guidance provided at https://www.fws.gov/midwest/endangered/section7/s7process/plants/epfos7guide.html Species profile: https://ecos.fws.gov/ecp/species/601	Threatened
Leafy Prairie-clover <i>Dalea foliosa</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5498	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Madeline Meyer
Address: 3s701 West Avenue
Address Line 2: Suite 150
City: Warrenville
State: IL
Zip: 60555
Email: mmeyer@eraconsultants.com
Phone: 6303933060

LEAD AGENCY CONTACT INFORMATION

Lead Agency: County of Cook