ATTAR
ENGINEERING, INC
CIVIL • STRUCTURAL • MARINE

Mr. Lee Jay Feldman, Town Planner
Town of Arundel, Maine
257 Limerick Road
Arundel, ME 04046

August 10, 2021
Project No.: C195-21

RE: Private Way Application
Tuckers Way / Tax Map 39, Lot 45D
Arundel, Maine

Dear Mr. Feldman:

On behalf of Richard J. Lovejoy, I have enclosed the above referenced permit application and plan set.

The applicant is proposing to extend the traveled portion of Tucker's Way, an existing private way, approximately 315' to provide access to one single family residential back lot (M39/L45D), which is currently undeveloped. The subject lot is considered a back lot, therefore, the private way will end at the lot boundary (approx. Sta 3+15) and continue as a driveway to serve the lot. The driveway will cross a stream at approx. Sta 3+50. A hammerhead turnaround for emergency vehicles is proposed on the lot, westerly of the stream crossing.

Since property is not in a shoreland zone, we understand that the project requires review by the Staff Review Committee. Please schedule this project for review at the next available Staff Review Committee meeting. We look forward to discussing this project further at the meeting.

Please contact me for any additional information required.

Thank you for your consideration.

Sincerely;

Lewis Chamberlain, P.E.

cc: Richard J. Lovejoy

C195-21_Private Way_cover.doc

1284 State Road, Eliot, ME 03903 ◆ tel (207) 439-6023 ◆ fax (207) 439-2128

Town of Arundel, Maine

PRIVATE WAY APPLICATION

APPLICANT INFORMATION

1. **Project Name**: Tuckers Way
2. **Owner Name**: Richard J. Lovejoy / J. Robin Lovejoy
   Mail Address: PO Box 448
   Town, State, ZIP Code North Berwick, ME 03906
   Telephone #: 207-967-3433
   Email: richardlovejoy@gmail.com
3. **Applicant Name** (if different): same as owner
   Mail Address: _____
   Town, State, ZIP Code _____
   Telephone #: _____
   Email: _____
4. **Authorized Agent** (person(s) who will be responsible for all communication with the Staff Review Committee):
   Name: same as owner
   Mail Address: _____
   Town, State, ZIP Code _____
   Telephone #: _____
   Email: _____
5. **Design Consultants** (Surveyor/ Engineer)
   Name: Lewis Chamberlain, P.E., Attar Engineering, Inc.
   Mail Address: 1284 State Road. Eliot ME 03903
   Telephone # 207-439-6023 Email lew@attarengineering.com

   Name: _____
   Mail Address: _____
   Telephone #_____ Email_____

GENERAL INFORMATION

6. **Project Location** Tuckers Way off Log Cabin Road Arundel Tax Map 39 Lot 45D
7. Private Way proposed to serve 1 lots and 1 dwelling or commercial units.

SITE INFORMATION

9. Please describe the existing use of the property to be developed and neighboring properties.
   Subject property is vacant land, neighboring properties are residential.

   Please describe the proposed use of the property.
   One building lot for private home.

10. Total Acreage of Site: 2.02 acres Proposed Development Area: _____
    Proposed Road/driveway Length: _____

11. Proposed Infrastructure Improvements (List Facility Type & Public/Private Ownership)
    Sewer: _____ Water: _____
    Road: _____ Utilities: _____

12. Application Fee:

    ☑ Pre-Application: $25

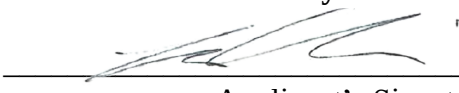
    ☑ $250 for new applications and revisions

Application fee is doubled if work has started prior to application

13. Waiver Requests? (Submit in writing) Yes ☐ No ☑

14. Please complete the attached Private Way Checklist to assure your application and site plan are complete.

To the best of my knowledge, all of the above stated information is true and correct.



,Agent 8/10/2021

Applicant's Signature Date

Town of Arundel Private Way Application Checklist

Project Name Tuckers Way

This checklist has been prepared to assist applicants develop their applications. It should be used as a guide. The checklist does not substitute for following the requirements of section 2.0 of the *Street Design and Construction Ordinance*. The Committee will also be using the checklist to make sure your application is complete. Indicate in the first and third columns if the information has been submitted or if you request it to be waived. If you feel the information is not applicable to your project please indicate so in the second column.

Private Way Plan Requirements	Submitted by Applicant	Does Not Apply	Applicant Requests to be Waived	Received by Town Planner	Comments
1. Perimeter survey prepared and sealed by a Land Surveyor licensed to practice in the state of Maine showing the dedicated right of-way for the proposed Private way and any abutting properties to the proposed private way.	✓				
2. Plan view prepared and sealed by a Land Surveyor or civil engineer licensed to practice in the State of Maine, showing horizontal layout of the proposed right of way and travelway including relevant horizontal curve data, and may contain the following information:	✓				
• Existing and proposed topographic contours	✓				
• Existing and proposed drainage facilities and discharge areas for drainage facilities	✓				
• Invert elevations for all existing and proposed curbing, culverts, catch basins and other drainage structures	✓				
• Location of all natural features including but not limited to wetlands, streams, rock outcrops, well as built structures including fences, signs, lighting, walls, and buildings;	✓				
• Location and identification of all existing and proposed utilities including water, sewer, electric service, gas lines, telephone, and cable TV, street lighting,	✓				
• Sight distances of all intersections of the private way with own streets and other private ways shall also be provided	✓				
• Title Block containing applicant and surveyor/engineer information, scale and north arrow	✓				
• Staff Review Committee signature block;	✓				
• Site Data summary including length of roadway, road width, construction specifications, and number of lots / units served;	✓				
• Typical road construction crossection	✓				
• Location and identification of test pits used for soil investigation or confirmation of installed materials in existing roads	✓				
• Location of sedimentation and soil erosion control devices;	✓				
3. If required by the Staff Review Committee, profile of the proposed roadway drawn at a scale not less than 1" =40 feet horizontal and a vertical scale of 1" + 4 feet vertical, stationed in 50 foot horizontal increments, showing	✓				

centerline and left and right side profiles of the road, vertical curves, culverts, underground utilities, and stream beds					

4. Detail sheet containing detail drawings of drainage and utility structures, soil erosion control devices, schedule of soil erosion control practices on the site; planting schedules and specifications.	✓				

WRITTEN SUBMISSION REQUIREMENTS					
1. Complete Application Form	✓				
2. Name, mailing addresses, and Map/Lot number of all abutters within 200 feet of the subject property printed on Avery 5160 labels.	✓				
3. Evidence of applicant's right, title or interest (deed, lease agreement, purchase & sale, or letter of authorization) in the property and any deed restrictions or easements on the property	✓				
4. If required by the Staff Review Committee, drainage calculations for 5, 10, and 25-year frequency storm prepared and sealed by a civil engineer licensed to practice in the State of Maine	✓				
5. Private Way Maintenance Agreement	✓				
6. Copies of proposed temporary and or permanent easements including utility, construction, access, and drainage easements;		✓			
7. Written copies of all required state and federal approvals. Relevant state and federal laws include, but are not limited to Stormwater, Site Location, Natural Resources Protection Act, and Sec. 404 Clean Water Act (federal), and all Maine Department of Transportation permits.					To be submitted prior to construction.

For Staff Review Committee Review: Submit five (5) copies of this application and supporting documentation showing or accompanied by the information required by Section 2.0 of the *Street Design & Construction Ordinance* (2019).

Applications will not be placed upon a Staff Review Committee agenda until the Town Planner receives all the plans, fees, written submissions or waiver requests to be considered complete. After receipt of all the necessary information, the Town Planner shall place the application on the next available agenda.

List of Abutters

Project: Tuckers Way

Location: Map 39 Lot 45D

Map	Lot	Property Owner	Mailing Address
38	10	David Berg	Red Apple Campground PO Box H Kennebunkport, ME 04046
38	11	Eric & Diane Wyman, C/O Matthew Wyman	90 Log Cabin Road Arundel, ME 04046
38	11A	John Roy	94 Log Cabin Road Arundel, ME 04046
39	32	Steven & Kim Monks	81 Sinnott Road Arundel, ME 04046
39	45	Nason Property Management LLC	PO Box 384 Kennebunk, ME 04043
39	45B	Marguerite Thibodeau	PO Box 1805 Kennebunkport, ME 04046
39	45C	Richard Lovejoy	PO Box 448 North Berwick, ME 03906
39	46	35 Tuckers Way LLC	PO Box 1517 Kennebunkport, ME 04046

ATTAR
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DRAINAGE ANALYSIS – CULVERT SIZING
RESIDENTIAL ROADWAY STREAM CROSSING
TUCKERS WAY, ARUNDEL, MAINE

Project No.: C195-21 August 10, 2021

Scope
This drainage analysis has been prepared for the construction of a residential roadway and stream crossing located on Tuckers Way off Log Cabin Road in Arundel, Maine. The extension of an existing private roadway is intended to serve one residential dwelling unit on a single lot, Town of Arundel Tax Assessor's Map 39, Lot 45D. The purpose of the analysis and report is to demonstrate adequate sizing of the culvert.

Development Description
The project will occur on Tucker's Way, an existing 30' wide right-of-way, off Log Cabin Road in Arundel, Maine. The existing roadway extends approximately 920' from Log Cabin Road and serves two residential dwelling units. The roadway will be extended approximately 450' from the end of the existing traveled way to serve as a driveway to Map 39, Lot 45D. The roadway extension will require a stream crossing to include the installation of a 71" W x 49" H x 45' L pipe arch culvert.

Site and Watershed Description
The watershed upstream of the proposed culvert includes roads, residential areas and wooded areas and includes land on the east and west sides of Log Cabin Road. Topography, in general, is rolling with slopes from 3% to 15%.

The stream to be crossed (unnamed) is in the watershed of the Goff Mill Brook and the Kennebunk River.

Soils/Hydrologic Soil Groups
The sois types used in the analysis were determined from the Soil Survey of York County, Maine to be mainly Lyman – Rock outcrop complex (HSG D), Naumburg sand (HSG D) and Croghan loamy sand (HSG A).

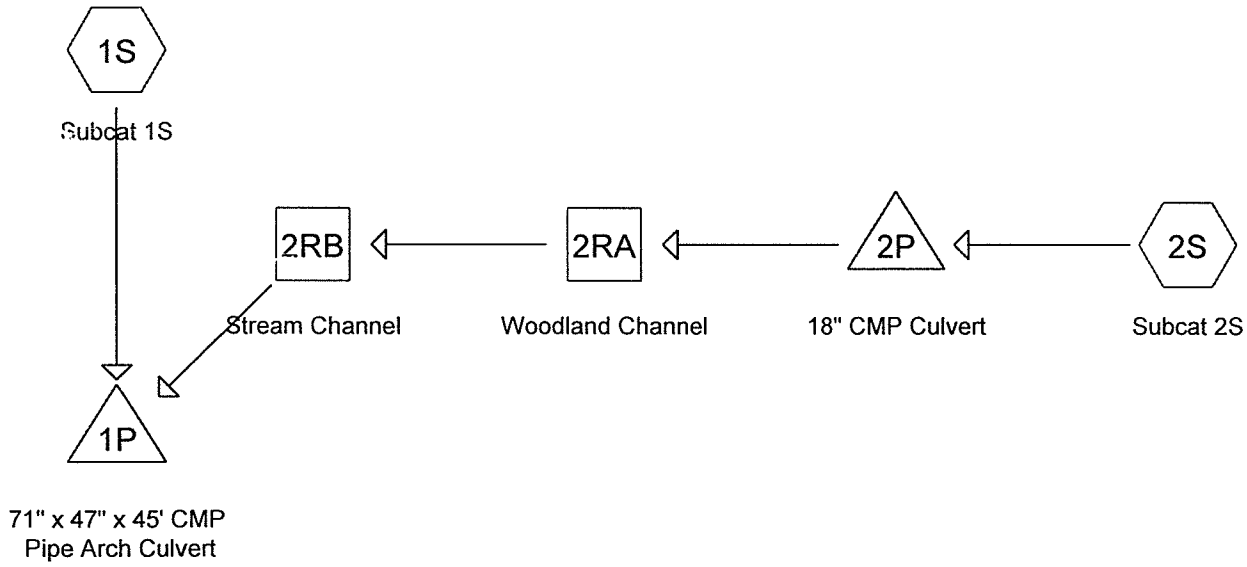
Methodology
The stormwater quantity analysis was conducted using the HydroCAD Stormwater Modeling System by Applied Microcomputer Systems. The analysis was accomplished to determine the "Existing Condition" and "Developed Condition" stormwater flows. Both cases were analyzed for the 2-year, 10-year and 25-year, 24-hour frequency storm events. The Developed Condition models the project with the proposed improvements described above.

Water Quantity Analysis and Results
Developed Condition
The site was modeled as two sub-catchments (1S and 2S) for the Developed Condition analysis. Reaches 2RA and 2RB provide routing of SC 2S through SC 1S. An existing culvert at SC 1S is modeled as Pond 2P and the proposed culvert is modeled as Pond 1P. Adequate culvert sizing is verified by assessing the pond headwater elevation for a given storm event.

Summary
Peak runoff quantity from the 25-year storm event results in a Pond 1 headwater elevation of 31.2'. The driveway elevation at the crossing is approximately 36.3' therefore flooding of the driveway is not anticipated and the culvert is adequately sized.

Respectfully submitted,

Lewis Chamberlain, P.E.



Subcat Reach Pond Link

Routing Diagram for SWA EXT - TUCKERS WAY BASE
Prepared by Attar Engineering, Inc., Printed 8/24/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.744	49	50-75% Grass cover, Fair, HSG A (1S)
4.058	84	50-75% Grass cover, Fair, HSG D (1S, 2S)
0.124	96	Gravel surface, HSG A (1S)
0.982	96	Gravel surface, HSG D (1S)
0.150	98	Paved parking, HSG A (1S, 2S)
0.841	98	Paved parking, HSG D (1S, 2S)
0.134	98	Roofs, HSG A (1S)
0.395	98	Roofs, HSG D (1S, 2S)
12.797	30	Woods, Good, HSG A (1S, 2S)
36.484	77	Woods, Good, HSG D (1S, 2S)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1S Runoff Area=1,823,104 sf 2.46% Impervious Runoff Depth>0.52"
Flow Length=2,985' Tc=129.8 min CN=64 Runoff=5.88 cfs 1.811 af

Subcatchment 2S: Subcat 2S Runoff Area=647,142 sf 3.29% Impervious Runoff Depth>1.27"
Flow Length=1,244' Tc=28.0 min CN=78 Runoff=13.84 cfs 1.574 af

Reach 2RA: Woodland Channel Avg. Flow Depth=0.11' Max Vel=0.57 fps Inflow=1.69 cfs 0.914 af
n=0.050 L=2,239.0' S=0.0070 '/' Capacity=20.45 cfs Outflow=1.62 cfs 0.680 af

Reach 2RB: Stream Channel Avg. Flow Depth=0.06' Max Vel=1.13 fps Inflow=1.62 cfs 0.680 af
n=0.040 L=388.0' S=0.0377 '/' Capacity=2,015.47 cfs Outflow=1.62 cfs 0.658 af

Pond 1P: 71" x 47" x 45' CMP Pipe Arch Culvert Peak Elev=30.04' Storage=100 cf Inflow=6.01 cfs 2.470 af
1.0" x 47.0", R=35.9"/110.3" Pipe Arch Culvert w/ 12.0" inside fill n=0.020 L=45.0' S=0.0111 '/' Outflow=6.01 cfs 2.469 af

Pond 2P: 18" CMP Culvert Peak Elev=60.81' Storage=39,542 cf Inflow=13.84 cfs 1.574 af
18.0" Round Culvert n=0.020 L=40.0' S=0.0050 '/' Outflow=1.69 cfs 0.914 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1S Runoff Area=1,823,104 sf 2.46% Impervious Runoff Depth>1.53"
Flow Length=2,985' Tc=129.8 min CN=64 Runoff=19.40 cfs 5.353 af

Subcatchment 2S: Subcat 2S Runoff Area=647,142 sf 3.29% Impervious Runoff Depth>2.76"
Flow Length=1,244' Tc=28.0 min CN=78 Runoff=30.27 cfs 3.423 af

Reach 2RA: Woodland Channel Avg. Flow Depth=0.19' Max Vel=0.81 fps Inflow=4.20 cfs 2.239 af
n=0.050 L=2,239.0' S=0.0070 '/' Capacity=20.45 cfs Outflow=4.07 cfs 1.874 af

Reach 2RB: Stream Channel Avg. Flow Depth=0.10' Max Vel=1.59 fps Inflow=4.07 cfs 1.874 af
n=0.040 L=388.0' S=0.0377 '/' Capacity=2,015.47 cfs Outflow=4.07 cfs 1.840 af

Pond 1P: 71" x 47" x 45' CMP Pipe Arch Peak Elev=30.78' Storage=628 cf Inflow=21.39 cfs 7.193 af
" x 47.0", R=35.9"/110.3" Pipe Arch Culvert w/ 12.0" inside fill n=0.020 L=45.0' S=0.0111 '/' Outflow=21.38 cfs 7.191 af

Pond 2P: 18" CMP Culvert Peak Elev=61.37' Storage=85,602 cf Inflow=30.27 cfs 3.423 af
18.0" Round Culvert n=0.020 L=40.0' S=0.0050 '/' Outflow=4.20 cfs 2.239 af

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcat 1S Runoff Area=1,823,104 sf 2.46% Impervious Runoff Depth>2.31"
Flow Length=2,985' Tc=129.8 min CN=64 Runoff=29.74 cfs 8.042 af

Subcatchment 2S: Subcat 2S Runoff Area=647,142 sf 3.29% Impervious Runoff Depth>3.78"
Flow Length=1,244' Tc=28.0 min CN=78 Runoff=41.09 cfs 4.676 af

Reach 2RA: Woodland Channel Avg. Flow Depth=0.23' Max Vel=0.90 fps Inflow=5.60 cfs 3.099 af
n=0.050 L=2,239.0' S=0.0070 '/' Capacity=20.45 cfs Outflow=5.49 cfs 2.651 af

Reach 2RB: Stream Channel Avg. Flow Depth=0.12' Max Vel=1.77 fps Inflow=5.49 cfs 2.651 af
n=0.040 L=388.0' S=0.0377 '/' Capacity=2,015.47 cfs Outflow=5.49 cfs 2.610 af

Pond 1P: 71" x 47" x 45' CMP Pipe Arch Peak Elev=31.24' Storage=1,268 cf Inflow=33.16 cfs 10.652 af
" x 47.0", R=35.9"/110.3" Pipe Arch Culvert w/ 12.0" inside fill n=0.020 L=45.0' S=0.0111 '/' Outflow=33.16 cfs 10.649 af

Pond 2P: 18" CMP Culvert Peak Elev=61.69' Storage=118,353 cf Inflow=41.09 cfs 4.676 af
18.0" Round Culvert n=0.020 L=40.0' S=0.0050 '/' Outflow=5.60 cfs 3.099 af

Summary for Subcatchment 1S: Subcat 1S

Runoff = 29.74 cfs @ 13.75 hrs, Volume= 8.042 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.54"

Area (sf)	CN	Description
32,395	49	50-75% Grass cover, Fair, HSG A
135,756	84	50-75% Grass cover, Fair, HSG D
530	96	Gravel surface, HSG A
4,888	96	Gravel surface, HSG A
42,777	96	Gravel surface, HSG D
3,193	98	Paved parking, HSG A
20,585	98	Paved parking, HSG D
5,816	98	Roofs, HSG A
12,471	98	Roofs, HSG D
2,834	98	Paved parking, HSG A
556,831	30	Woods, Good, HSG A
1,005,028	77	Woods, Good, HSG D
1,823,104	64	Weighted Average
1,778,205		97.54% Pervious Area
44,899		2.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
41.7	100	0.0143	0.04		**Sheet Flow, SF 100'** Woods: Dense underbrush n= 0.800 P2= 3.36"
87.7	2,497	0.0090	0.47		**Shallow Concentrated Flow, SCF 2497'** Woodland Kv= 5.0 fps
0.4	388	0.0377	15.26	2,014.61	**Trap/Vee/Rect Channel Flow, CF 388'** Bot.W=25.00' D=4.00' Z= 2.0 '/' Top.W=41.00' n= 0.040 Winding stream, pools & shoals
129.8	2,985	Total			

Summary for Subcatchment 2S: Subcat 2S

Runoff = 41.09 cfs @ 12.39 hrs, Volume= 4.676 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.54"

Area (sf)	CN	Description
41,019	84	50-75% Grass cover, Fair, HSG D
501	98	Paved parking, HSG A
16,067	98	Paved parking, HSG D
4,737	98	Roofs, HSG D
618	30	Woods, Good, HSG A
584,200	77	Woods, Good, HSG D
647,142	78	Weighted Average
625,837		96.71% Pervious Area
21,305		3.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0706	0.13		**Sheet Flow, SF 100'** Woods: Light underbrush n= 0.400 P2= 3.36"
15.3	1,144	0.0620	1.24		**Shallow Concentrated Flow, SCF 1144'** Woodland Kv= 5.0 fps
28.0	1,244	Total			

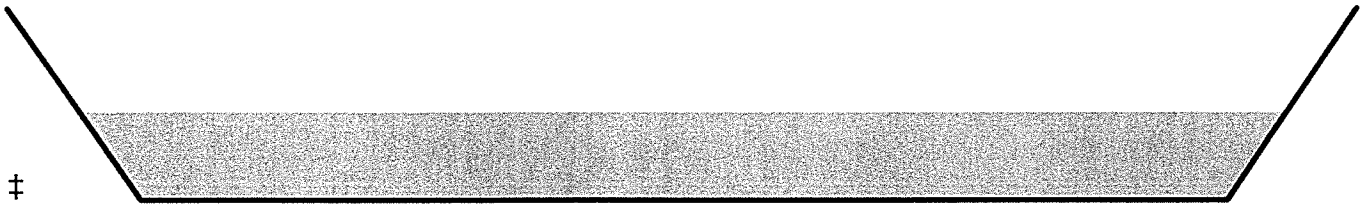
Summary for Reach 2RA: Woodland Channel

Inflow Area = 14.856 ac, 3.29% Impervious, Inflow Depth > 2.50" for 25-YR event
Inflow = 5.60 cfs @ 13.73 hrs, Volume= 3.099 af
Outflow = 5.49 cfs @ 15.37 hrs, Volume= 2.651 af, Atten= 2%, Lag= 97.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.90 fps, Min. Travel Time= 41.4 min
Avg. Velocity = 0.56 fps, Avg. Travel Time= 66.7 min

Peak Storage= 13,615 cf @ 14.68 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.50' Flow Area= 14.0 sf, Capacity= 20.45 cfs

25.00' x 0.50' deep channel, n= 0.050 Scattered brush, heavy weeds
Side Slope Z-value= 6.0 '/' Top Width= 31.00'
Length= 2,239.0' Slope= 0.0070 '/'
Inlet Invert= 59.80', Outlet Invert= 44.14'



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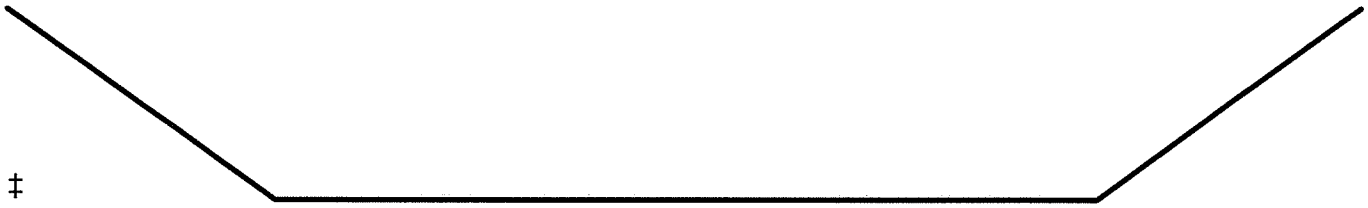
Summary for Reach 2RB: Stream Channel

Inflow Area = 14.856 ac, 3.29% Impervious, Inflow Depth > 2.14" for 25-YR event
Inflow = 5.49 cfs @ 15.37 hrs, Volume= 2.651 af
Outflow = 5.49 cfs @ 15.46 hrs, Volume= 2.610 af, Atten= 0%, Lag= 5.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.77 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 4.8 min

Peak Storage= 1,201 cf @ 15.40 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 4.00' Flow Area= 132.0 sf, Capacity= 2,015.47 cfs

25.00' x 4.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 41.00'
Length= 388.0' Slope= 0.0377 '/'
Inlet Invert= 44.14', Outlet Invert= 29.50'



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Summary for Pond 1P: 71" x 47" x 45' CMP Pipe Arch Culvert

Inflow Area = 56.709 ac, 2.68% Impervious, Inflow Depth > 2.25" for 25-YR event
Inflow = 33.16 cfs @ 13.93 hrs, Volume= 10.652 af
Outflow = 33.16 cfs @ 13.93 hrs, Volume= 10.649 af, Atten= 0%, Lag= 0.3 min
Primary = 33.16 cfs @ 13.93 hrs, Volume= 10.649 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 31.24' @ 13.93 hrs Surf.Area= 1,649 sf Storage= 1,268 cf

Plug-Flow detention time= 0.5 min calculated for 10.649 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (925.8 - 925.4)

Volume	Invert	Avail.Storage	Storage Description
#1	29.50'	19,838 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.50	100	0	0
30.00	250	88	88
32.00	2,500	2,750	2,838
34.00	4,000	6,500	9,338
36.00	6,500	10,500	19,838

Device	Routing	Invert	Outlet Devices
#1	Primary	29.50'	**71.0" W x 47.0" H, R=35.9"/110.3" Pipe Arch CMP_Arch_1/2 71x47 w/ 12.0"** L= 45.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 28.50' / 28.00' S= 0.0111 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 13.59 sf

Primary OutFlow Max=33.15 cfs @ 13.93 hrs HW=31.24' (Free Discharge)
↑—**1=CMP_Arch_1/2 71x47** (Inlet Controls 33.15 cfs @ 3.42 fps)

Summary for Pond 2P: 18" CMP Culvert

Inflow Area = 14.856 ac, 3.29% Impervious, Inflow Depth > 3.78" for 25-YR event
Inflow = 41.09 cfs @ 12.39 hrs, Volume= 4.676 af
Outflow = 5.60 cfs @ 13.73 hrs, Volume= 3.099 af, Atten= 86%, Lag= 81.0 min
Primary = 5.60 cfs @ 13.73 hrs, Volume= 3.099 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 61.69' @ 13.73 hrs Surf.Area= 110,198 sf Storage= 118,353 cf

Plug-Flow detention time= 215.3 min calculated for 3.089 af (66% of inflow)
Center-of-Mass det. time= 148.0 min (947.4 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	430,000 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
60.00	30,000	0	0
62.00	125,000	155,000	155,000
64.00	150,000	275,000	430,000

Device	Routing	Invert	Outlet Devices
#1	Primary	60.00'	**18.0" Round CMP_Round 18"** L= 40.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.00' / 59.80' S= 0.0050 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.60 cfs @ 13.73 hrs HW=61.69' (Free Discharge)
↑—**1=CMP_Round 18"** (Barrel Controls 5.60 cfs @ 3.52 fps)