



## **BERRY SURVEYING & ENGINEERING**

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October 12, 2021

Barrington Planning Board  
Attention: Marcia Gasses  
PO Box 660  
Barrington, NH 03825

Re: Site Plan Review  
Berry Surveying & Engineering  
Dove Development Group, LLC  
The Village at Barrington Square  
Tax Map 235, Lot 2 1-1 & 3

Based on comments from CMA Engineers Technical Review, we respectfully submit the following comments and revisions. Our comments are in **bold**.

### **SITE PLAN REVIEW COMMENTS**

1. Possible future development
  - a. If there is a proposed future development, is there a conceptual design of the future development available?  
**There is not a conceptual design available at this time. Potential future phase may include two additional mixed-use buildings.**
  - b. Will roundabouts at the end of High Point Drive and Community Way provide access to a future development? If so, why not construct a temporary hammerhead for the interim condition? It may make for a better condition for the future development instead of going around a roundabout to get through.  
**It is preferred by the client and the town that cul-de-sacs are utilized. While the applicant intends to develop the remaining land to the fullest extent possible, there is no guarantee than this future development will happen.**
  - c. Are there proposed stormwater treatment devices to be used for the future development?  
**All stormwater BMP's proposed with the exception of Rain Garden #101 on TM 239-2 are used to treat the shown proposal and no future development.**

2. In the future, does the applicant intend to have Town take ownership of Community Way and High Point Drive?  
**Community Way is proposed as a public roadway and High Point Drive will remain private.**
3. Show limits of designated snow storage areas on plans.  
**Snow storage has been added to the plans. See Site Plans, sheets #31-33.**
4. What is the anticipated production volume for each well? This is needed to check the sanitary protective area radii.  
**The wells are proposed to be permitted at a combined 57,600 GPD (28,800 GPD/well).**
5. Well access trail to the community wells should include a truck turnaround.  
**A truck turnaround has been added to the end of well access trail.**
6. Sheets 66/67, proposed septic tank size shown in plan view does not match the septic tank size shown in the Profile of Septic System. Please clarify.  
**Septic designs have been revised.**
7. Sheets 69/70, for Septic System #5 and #6, it is unclear what the proposed septic tank size(s) are intended to be. Please clarify.  
**Septic designs have been revised.**
8. Deep sump catch basins are generally standard practice to provide preliminary sediment removal from stormwater, and they would reduce the sediment loading on, and maintenance of, proposed stormwater treatment devices. Why are "no-sump" catch basins proposed?  
**On several of our recent more rural NHDES AoT permitted projects, NHB & NH F&G has requested that deep sumps be removed from catch basins and special bee-hive grates be used on catch basins in grassed areas. We have not received return correspondence from NHB or NH F&G to this point, but are expecting similar to comments to what has been received previously and will adjust the design as needed.**
9. Town Subdivision Regulation 12.3.1(1) requires 300-Ft of road frontage for two access points for one lot. Describe how North Point Common Mixed-Use building meets, or addresses this requirement. Please clarify or is a waiver needed.  
**Community Way is proposed to be a public roadway. This satisfies 300' of road frontage for two access points to one lot for North Point Common.**



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10. Town Subdivision Regulation 12.3.2(5) requires commercial driveways to have a 25' minimum curb radius, and the Mixed-Use building does not meet this. Will a waiver be requested?

**A waiver was requested and approved at the September 7<sup>th</sup> Planning Board Meeting. Please find attached waiver request.**

11. For Community Way and High Point Drive, please describe how the proposal meets the intent of the Town's Village Center shoulder, sidewalk, and planting strip requirements as depicted in Figure 4C – Road Design Standards and Guidelines. Is this an alternative design and will waiver(s) be appropriate?

**A waiver was requested and approved at the September 7<sup>th</sup> Planning Board Meeting. Please find attached waiver request.**

12. Sheets 30/31, town Regulations detail 50' radius from center of cul-de-sac to inner edge of pavement and 70-74' radius from center to outer edge of pavement. Both cul-de-sacs do not meet these requirements. See subsequent comments regarding truck turning motions.

**Community Way was revised to conform to this preferred cul-de-sac layout. A waiver was requested and approved for a 45' centerline radius for the High point Drive cul-de-sac. See revised Site and Grading Plans. Please find attached waiver request.**

13. Sheet 42, Access Road Profile has a roadway grade of 9.75%, but the Town standard is 9%. Would further elevating the abutting driveway allow the Access Road to meet the Town Regulation?

**This profile has been modified to be 9%. See Plan & Profile, sheet #44.**

14. Sheet 92, Bituminous Concrete Pavement Detail specifies 1.5" bit. concrete wearing course pavement to be 1/2", 75 GYR mix; however, the Roadway Sections on Sheet 94-95 specify a 1/2", 50 GYR mix. Please clarify.

**This detail has been corrected to 50 GYR mix, see corresponding sheets.**

15. Sheet 95, Typical Roadway Section Driveway Reconstruction and Typical Roadway Section Well Access Trail specifies the driveway/access trail to be constructed using 12 in of bank run gravel. We recommend using crushed gravel because it is a better material for this application.

**This specification has been revised. See sheet #97.**

16. Sheet 97, Rip-Rap Lined Swale specifies 4 in loam, seed swale to be lined with Mirafi 180N. Detail should be updated to specify rip-rap.

**This detail has been revised. See sheet #99.**



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## 17. Underground Utilities

- a. Sheet 77, Plan View, we recommend a gate valve be installed on each leg of the tee at STA 27+75, LT.

**Gate valves have been added, see sheet #79.**

- b. Sheet 98, Typical Detail for Water System more information should be included on the tracer wire, i.e. tracer wire requirements, splice details, etc.

**An entire sheet is now dedicated to these details, see sheet #103.**

- c. Sheet 98, Valve Box Detail should include details on transitioning the tracer wire through the valve box.

**An entire sheet is now dedicated to these details, see sheet #103.**

- d. Caps installed at the end of a water main should include a thrust block.

**Thrust blocks have been added in locations where water line end caps are shown. See sheets #77 & 79.**

- e. For underdrain to function properly, it needs to be deep enough to drain water from the road base plus some portion of the subgrade material to prevent water trapped under the roadway to freeze and heave the road. Underdrain is typically installed 4 ft to 6 ft deep to accomplish this. The plans show the underdrain being installed approximately 2ft to the pipe invert. We recommend the underdrain pipe depth be lowered.

**After consideration from BS&E, underdrain is remaining in the same location at the bottom of the bankrun gravel layer, for multiple reasons. In several previous projects designed in Barrington, underdrain has been located at this elevation. In our experience, underdrain is commonly placed at this location in the roadway and is effective. Furthermore, the majority of locations that underdrain is proposed have ledge at or close to road select material elevation. Trenching an additional 3-4' into ledge would create unnecessary construction and be ineffective in these applications.**

- f. Sewer force mains do not run in a straight line, so we recommend tracer wire be installed on PVS/HDPE sewer mains for future utility location.

**Tracer wire or equivalent is shown above proposed water and sewer lines. Runs have been revised to be straight as possible.**



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18. Sheet 99, Pump Chart Detail is empty. Is this intentional?

**Pump Chart has been filled out from the revised septic designs. See sheet #101.**

19. Sheets 104 and 105, Fire Truck Turning Motions, general comments.

a. Trucks should be able to make all turning motions by staying within their lanes, i.e. Sheet 104, Fire Truck Turning Right

**Curb radii have been revised across the project in several locations, including North Point Common entrances, High Point Drive, and the access road. NHDOT allows for fire truck movements that cross the yellow lines at a stop controlled intersection. If this was not the case, turn radii required would be well above the 25' minimum required in this sort of application.**

b. Proposed turning motions do not allow for much leeway in regard to edge of pavement, curbing locations, or driver accuracy, i.e. Sheet 103, Fire Truck Exit Right.

**Truck turning movements and pavement radii have been revised across the project.**

c. Some turning motions show the fire truck driving off roadway, or over curbing, to complete the turning motion, i.e. Sheet 105, Fire Truck Turning Entrance.

**Truck turning movements and pavement radii have been revised across the project.**

d. Truck turning motions for High Point Drive cul-de-sac should be included.

**Truck turning movements for High Point Drive cul-de-sac are now included. See sheet #109.**

e. Intersection, and island layouts should be revised so truck turning motions are more accommodating.

**Intersections and island layouts have been revised across the project.**

## REVIEW OF DRAINAGE ANALYSIS

Peak Flow

1. Post-development peak flow rates increase in Reach 800 during the 10-year storm by 0.18 cfs (+3.5%) and in Reach 200 during the 2-year storm by 0.08 cfs



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(+25%). AoT requires all post-development peak flow rates to be less than pre-development peak flow rates.

**Drainage Analysis has been revised. See revised Existing & Proposed Drainage Analyses. In response to NHDES AoT request, off site areas of Hollis-Charlton soil were previously modeled as 50% A/D split have been revised to a 50% B/C split.**

#### Channel Protection Requirements

1. Channel Protection Requirements are not met for Reach 200. See requirements listed in Env-Wq 1507.05.

**Drainage Analysis has been revised and is now conforming. See revised Existing & Proposed Drainage Analyses.**

#### Infiltration Feasibility Report

1. This report is listed in Table of Contents but was not included in Drainage Analysis Binder. Was infiltration testing performed for infiltration practices? If so, please provide.

**The study was mistakenly omitted from this submission but included in the NHDES AoT submission. The study is included in this submission.**

#### Typical BMP Comments

1. Many of the proposed BMPs are designed with 2:1 side slopes, and one BMP is designed with 1:1. NHDES BMP Manual details 3:1 maximum side slopes for BMPs.

- a. How are side slopes constructed?

**Rain Garden #101 & #102 were constructed in 2019 and were approved. All further proposed BMP's are proposed with 3:1 side slopes with the exception of GW #104. This BMP is constructed with 2:1 side slopes due to space constraints and was found acceptable by NHDES AoT Bureau.**

- b. What permanent erosion control measures (i.e. blankets) will be used to stabilize these steeper slopes?

**Permanent erosion control measures are shown on the Erosion & Sediment control plans (sheets #59-62) and are detailed in Sheet E102, Erosion & Sediment control details, detail E21.**

- c. How will the side slopes be maintained?

**In the revised submittal, proposed BMP side slopes are proposed to be 3:1 with the exception of GW #104. This BMP is provides a berm for perimeter access and maintenance of the BMP by hand.**



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2. The layers of pea gravel and crushed gravel in the Rain Garden Details are flipped from BMP Manual's detail. Please correct.  
**The layers of pea gravel and crushed gravel are correct as shown. Env-Wq 1508.07(g)(3) requires the stone layer be separated from the filter media with a 3-inch layer of 3/8" pea gravel.**

#### Wetland Crossing

1. On Sheet 56, the wetland crossing culvert is shown as 15", but it is shown and modeled as 24" elsewhere. Please clarify.  
**This has been corrected, please find sheet #58.**

#### Infiltration Basin 13

1. There is no detail sheet for this BMP.  
**There is no detail sheet since this BMP has already been constructed. Please find the revised BMP excel sheet and storage tables.**
2. BMP Manual requires pretreatment for infiltration basins, but from the information provided, it is not apparent that pretreatment is proposed.  
**This BMP has already been constructed and was approved under prior town engineer review.**

#### Detention Pond 110

1. Gravel roads are considered impervious areas and should receive treatment. Detention ponds are not listed in BMP Manual as a stormwater treatment device.  
**In BS&E's opinion, this gravel road does not required treatment due to regulations put forth from Env-Wq 1500. According the Env-Wq 1502.32, "Impervious Cover" includes compacted soils and roadways with a curve number of 98 or greater. Gravel as modeled has a curve number of 96. In addition, gravel does not contain the same hydrocarbons and other pollutants that occur from paved surfaces.**
2. For the 50-year storm event, BMP Manual requires detention ponds to have 1' of freeboard. The detention pond has 0.7' of freeboard and does not meet this requirement.  
**According to Env-Wq 1508.17(d)(6)(a & b), Detention Basins shall be constructed with an emergency spillway and be able to discharge the 100-year, 24-hour storm without overtopping the embankment crest. Detention Pond #110 meets both of these requirement. Please find attached 100-year, 24-hour storm summary for Detention Pond #110.**
3. BMP Manual requires detention ponds to have >1' of separation from ledge to Bottom of Pond (BOP). If this requirement cannot be met, an impermeable liner is required.



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**A low perm material liner has been previously proposed in the Detention Pond to ensure infiltration does not occur in the practice. Please find sheet #58. A callout clarifying the low-perm material requirement has been added to the plan.**

#### Rain Garden 101

1. A proposed tree is shown in forebay berm. Was this intentional?  
**This BMP has already been constructed. The tree is shown in the side slope of the roadway, not in the forebay berm.**
2. The forebay is 1' deep, but BMP Manual requires a 2' minimum forebay depth. This requirement is not met.  
**This BMP has already been constructed and reviewed/approved by the prior town review engineer.**
3. The rain garden detail shows ESHWT within the washed stone layer. BMP Manual requires an impermeable liner if there is <1' depth to SHWT.  
**This BMP has already been constructed and reviewed/approved by the prior town review engineer.**

#### Rain garden 102

1. The rain garden detail shows ESHWT within the washed stone layer. BMP Manual requires an impermeable liner if there is <1' depth to SHWT.  
**This BMP has already been constructed and reviewed/approved by the prior town review engineer.**
2. From the BMP worksheet provided, the rain garden is only designed to treat the proposed additional impervious area, and it does not account for the existing impervious runoff flowing to the existing rain garden. Therefore, the BMP is designed to treat approximately half of the impervious area that is actually flowing to it, and it will not function properly. The rain garden should be designed for all impervious area flowing to it.  
**Rain Garden #102 does not need to be designed for all impervious area flowing to the BMP. This BMP was designed for additional impervious area created as part of the 2019 approved project. Remaining impervious area that is not accounted for in the WQV is greater than 10 years old and the applicant would not be responsible for treatment of this impervious surface according to Env-Wq 1502.58(b)(2).**

#### Rain Garden 105

1. Forebay volume is incorrect on BMP worksheet  
**BMP has been revised, please find revised BMP sheet and storage tables.**



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#### Rain Garden 106

1. BMP Manual requires rain garden to have >1' of separation from ledge to Bottom of Pond (BOP). If this requirement cannot be met, an impermeable liner is required.

**A low perm material liner has been added to Rain Garden #106. See sheet #54.**

#### Rain Garden 107

1. Forebay volume is incorrect on BMP worksheet.

**BMP has been revised, please find revised BMP sheet and storage tables.**

#### Rain Garden 108

1. The forebay is <2' deep. See comment on Rain Garden 101.

**The sediment forebay is less than two feet deep because the BMP has less than 2' of open water storage.**

#### Rain Garden 109

1. It appears this BMP is treating clean stormwater. Was this designed for stormwater treatment of future, phased development off cul-de-sac? If so, please provide BMP design information.

**This BMP has been removed from the design.**

#### Gravel Wetlands

1. Detail does not follow the BMP Manual Gravel Wetland design guidelines. What's the basis for deviating from the design guidelines?

**The BMP manual is superseded by the administrative code and updated publications. Env-Wq 1508.05 requires gravel wetlands to be designed in accordance with "UNHSC Subsurface Gravel Wetland Design Specifications" dated June 2016. That being said, primary concrete inlet structures have been removed and replaced with a rip-rap primary hydraulic inlet from NHDES AoT comment. Gravel wetland #104 has been converted to two cells and now complies with Env-Wq 1500 standards.**

2. For the 50-year storm event, BMP Manual requires gravel wetlands to have 1' of freeboard. Gravel Wetland 104 has 0.43' of freeboard and does not meet this requirement.

**The BMP manual is superseded by the administrative code and updated publications. Outlet Structure #104 has been reconfigured to have a 48" open top as opposed to the 12" restricted top (horizontal orifice) than has previously been proposed.**



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3. The BMP Manual specifies the lowest orifice to be at least 2' below SHWT. The lowest orifice on Wetland 104 is 1.93' below SHWT.  
**Gravel Wetland #104 has been proposed to be lined with a low perm liner, which complies with the requirement shown on the BMP excel sheet. Since Ksat Charlton > than 0.015 in/hr, the BMP to be lined w/ low perm material.**

#### Review of Traffic Analysis

1. How is the parking demand calculated?  
**Parking demand was calculated using Barrington Site Review Regulations Table 6: Parking Standards by Use and is shown on the Overview Site Plan, sheet #30.**
2. At the 25 housing units, how many parking spaces are available for residents and visitors.  
**10 parking spaces have been added to High Point Drive.**
3. Where are proposed loading areas?  
**A proposed loading area has been added adjacent to the front right corner of North Point Commons.**
4. A 12-ft lane with a median is tight, as shown by the exact turning templates.  
**Islands and curb radii have been adjusted across the project and are shown in the turning templates. A waiver for the proposed cross section was approved on September 7<sup>th</sup> Planning Board Meeting.**
5. Is a pedestrian connection required between the 25 housing units and the commercial building?  
**A sidewalk is now provided for High Point Drive to North Point Commons.**
6. At the end of Christmas Lane, turning onto Route 9, are the left and right turn lane storage lengths adequate?  
**The storage lengths that have been constructed are adequate. At the weekday PM peak hour, 32 trips are proposed to exit left (eastbound) and 14 trips are proposed to exit right (westbound). This would be an average of one vehicle exiting left every two minutes, allowing for safe entry to NH Route 9.**



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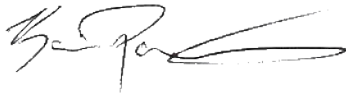
7. In table 6, the total existing trips do not properly sum the trips from Tables 4 & 5.  
**This summation has been corrected.**
8. In Table 7, the peak hour trip rates used do not match the Land Use Code 221 rates in the ITE Trip generation Manual (10<sup>th</sup> edition).  
**The provided peak hour trip rates are the correct rates for General Urban/Suburban setting. See Appendix D, Figures 40-42.**
9. In Table 10, the total proposed trips do not properly sum the trips from Tables 7, 8, and 9.  
**This summation has been corrected.**
10. Land Use Code 231 only has two data points, which is not enough information to estimate trip generation. The applicant should use land use codes with better R-squared value.  
**Land Use Code 231 units have been replaced by Land Use Code 221. The generations from the townhouses vs mixed use buildings are still separated out for calculation clarity.**
11. Confirm the allowable uses for the office building that are allowed without a change of use permit from the Planning Board. Land Use code 710 is at the lower end of trip generation relative to other commercial uses.  
**Sample land use codes for the commercial portion of the mixed use building have been modified to allow higher generating users. Of the 5 commercial units, one is proposed general office space (710), one is Health/Fitness Club (492), one is Apparel Store (876), and two area Medical-dental Office (720).**
12. On Route 9, how are Saturday peak hour volumes determined?  
**Saturday peak hour volumes from September 2021 are now included in the analysis.**
13. Based on corrected land use trip generation, and summation of tables, subsequent tables and figures may need to be updated.  
**The traffic analysis has been revised.**



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14. After adjusting land use codes and correction summations, recalculate turn warrant from Route 9 onto Christmas Way.  
**The traffic analysis has been revised. Left and right turn bays are not required for this project.**

Very truly yours,  
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**20-097 Proposed Analysis**

Type III 24-hr 100YR - 24HR Rainfall=8.37"

Prepared by {enter your company name here}

Printed 10/13/2021

HydroCAD® 10.00-22 s/n 07605 © 2018 HydroCAD Software Solutions LLC

**Summary for Pond 110P: Detention Pond #110**

Inflow Area = 3.325 ac, 0.00% Impervious, Inflow Depth > 3.86" for 100YR - 24HR event  
 Inflow = 8.85 cfs @ 12.37 hrs, Volume= 1.070 af  
 Outflow = 4.98 cfs @ 12.72 hrs, Volume= 0.888 af, Atten= 44%, Lag= 21.0 min  
 Primary = 4.31 cfs @ 12.72 hrs, Volume= 0.876 af  
 Secondary = 0.67 cfs @ 12.72 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 223.59' @ 12.72 hrs Surf.Area= 7,849 sf Storage= 17,752 cf  
 Flood Elev= 224.00' Surf.Area= 8,531 sf Storage= 20,244 cf

Plug-Flow detention time= 197.2 min calculated for 0.887 af (83% of inflow)  
 Center-of-Mass det. time= 128.2 min ( 980.9 - 852.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	217.50'	2,079 cf	<b>Detention Area (Irregular)</b> Listed below (Recalc)
#2	217.50'	483 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)
#3	219.50'	17,681 cf	<b>Open Water Storage (Irregular)</b> Listed below (Recalc)
		20,244 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
217.50	608	91.8	0	0	608
218.00	744	101.3	337	337	762
219.00	1,298	134.0	1,008	1,346	1,385
219.50	1,644	152.0	734	2,079	1,801

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
217.50	89	39.4	0	0	89
218.00	152	49.6	60	60	165
219.00	327	71.8	234	294	387
219.50	434	82.0	190	483	518

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
219.50	2,290	188.9	0	0	2,290
220.00	2,581	198.3	1,217	1,217	2,595
221.00	3,222	220.7	2,896	4,113	3,371
222.00	3,916	234.0	3,563	7,676	3,903
223.00	4,848	267.9	4,374	12,050	5,280
224.00	6,453	300.1	5,631	17,681	6,763

Device	Routing	Invert	Outlet Devices
#1	Primary	217.50'	<b>15.0" Round 15" HDPE N-12</b> L= 30.0' Ke= 0.500 Inlet / Outlet Invert= 217.50' / 217.00' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	217.50'	<b>3.0" Vert. 3" Orifice</b> C= 0.600
#3	Device 1	222.00'	<b>3.0" Vert. 3" Orifice</b> C= 0.600
#4	Device 1	223.40'	<b>48.0" Horiz. 48" Outlet Structure</b> C= 0.600

**20-097 Proposed Analysis**

Type III 24-hr 100YR - 24HR Rainfall=8.37"

Prepared by {enter your company name here}

Printed 10/13/2021

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#5	Secondary	223.50'	Limited to weir flow at low heads
			<b>10.0' long x 7.0' breadth 10' Emergency Spillway</b>
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50 5.00 5.50
			Coef. (English) 2.40 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65
			2.65 2.66 2.65 2.66 2.68 2.70 2.73 2.78

**Primary OutFlow** Max=4.20 cfs @ 12.72 hrs HW=223.59' TW=217.81' (Dynamic Tailwater)

- ↑ 1=15" HDPE N-12 (Passes 4.20 cfs of 13.81 cfs potential flow)
- ↑ 2=3" Orifice (Orifice Controls 0.57 cfs @ 11.57 fps)
- ↑ 3=3" Orifice (Orifice Controls 0.29 cfs @ 5.82 fps)
- ↑ 4=48" Outlet Structure (Weir Controls 3.34 cfs @ 1.42 fps)

**Secondary OutFlow** Max=0.62 cfs @ 12.72 hrs HW=223.59' TW=217.81' (Dynamic Tailwater)

- ↑ 5=10' Emergency Spillway (Weir Controls 0.62 cfs @ 0.71 fps)