

BA BEALS

ASSOCIATES, PLLC

Land Planning • Civil Engineering
Landscape Architecture • Septic Design & Evaluation
Stratham, NH

Barrington Planning Board,
Vanessa Price, Town Planner
P.O. Box 660
4 Signature Drive
Barrington, NH 03825

Jan 17, 2022

Ref: Map 239 Lot 35 Guptill
Bending Brook Residential Development Review #1

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Dear Mr., Chairman & Members of the Board:

We are in receipt of a review letter from CMA Engineers, dated Jan. 17, 2023 and we offer the following responses to the noted comments. Each comment is followed by our response in **bold**.

PROJECT APPLICATION:

1. The project application is incomplete. Email addresses for the owner, applicant and engineer are missing. The owner's phone number is missing.
2. The spelling of Guptill in the project name is different than the spelling of the owner's name, Guptill.
3. The application has not been signed by the owner, applicant or staff and has not been dated.
4. The Lot is listed as Lot 35, but the plans refer to Lots 34 & 35, which appears to apply. The corresponding area is for Lot 35 only, but the plans include areas for Lots 34 & 35.

Response: The original signed application was submitted and additional data supplied to the planning department by the developer. The application was already accepted by the board.

Article 4 Dimensional Requirements

- 4.1.1 The max building height is listed as 30 feet in Note 4 on Sheet 1. The maximum building height for the Village District is 35 feet.

Response: The notes have been updated.

Article 6. Conservation Subdivision

- 6.2.6 On the Subdivision Plan, the 100-ft perimeter buffer is shown; however, it does not appear the two lots accessed off Mallego Road meet this requirement. Please address.

Response: An application has been made for a variance from the ZBA.

- 6.3.5 The applicant shall provide details of the Homeowner's Association.

Response: The legal docs are in process and will be submitted as a condition of approval. There are items to be decided by the board to be included in the HOA docs.

SUBDIVISION REGULATIONS

5.3 Specific Plan Information

- 5.3.2(11) Provide the size and location of all proposed public and private utilities, including but not limited to: water lines, sewage facilities, gas lines, power lines, telephone lines, fire hydrants and alarm

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connections, underground storage tanks, and other utilities;

Response: All available utility information has been provided.

5.3.2(12) Provide the location, type, design, and intensity of any street lighting, including the cone of illumination on the site, if proposed.

Response: No street lighting is proposed

5.3.2(13) Provide the location and description of proposed easement(s) and/or rights-of-way.

Response: This data is provided

5.3.2(14) Provide the location and size of all proposed open space areas or parcels to be dedicated to public use and the conditions of such dedication and a copy of such private deed restrictions as are intended to cover part or all of the tract.

Response: The open area is labeled and to be deeded to the town.

5.3.2(16) Provide The location of all monumentation that is to be installed in accordance with these regulations shall be shown on the plans.

Response: Proposed monumentation is provided.

Article 7. Additional Information and Studies

7.3 Stormwater Management Plan

The proposed stormwater management plan uses a combination of open swales, culverts, closed drainage and level spreaders to convey stormwater to a sediment forebay and bioretention pond.

7.3.4(3)(a) There are additional structures and piping from Mallego Road for the Town to tie into in the future to convey stormwater to the forebay and pond. The Town should have a maintenance easement for this infrastructure, and this should be shown on the plans and included in the HOA.

Response: The open space area is being deeded to the town so easements are not needed in these areas. An easement is provided over lot 17 as required.

7.5. Traffic Impact Analysis

This section gives the Planning Board the purview to require a traffic impact analysis. Does the Board deem a traffic impact analysis necessary for this project?

Response: This was not requested from the board as the anticipated additional traffic is minor for the area.

Article 10. Conservation Subdivisions

10.6. Ownership and Maintenance of Common Facilities and Open Space

The applicant should provide the Town with information regarding the proposed Homeowner's Association in accordance with the Ordinances.

Response: See response to comment 7.3.

Article 11. General Design Standards

11.5. Fire Protection

11.5(2) The applicant is proposing the use of a cistern for fire protection. Has the Barrington Fire Department approved its proposed location and design?

Response: The plans have been revised and approved by the Fire dept.

Article 12. Road Design & Construction Standards

12.2.1 Road Design Standards

The proposed roadway should meet the design standards shown in Table 1 – Road Design Standards. Based on this table, the proposed roadway is considered a Major Access Road, and it shall meet these requirements. Since dimensional information is not shown on the plans, it is not clear if these standards

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are met.

Response: The curve data has been added as requested.

The proposed roadway length is approximately 1200 feet; however, Table 1 limits the maximum roadway length to 1000 feet. Please address.

Response: The Roadway length has been defined in previous projects as the length to the throat of the cul-de-sac from the existing road which is approx. 970' for this design. If the board feels a waiver is necessary one will be provided.

We note that the applicant submitted a waiver requesting a waiver from the maximum grade standard of 7% to 8%. We understand this waiver was reviewed, and approved, by the Planning Board.

Additionally, roads located in the Village District should incorporate additional features such as trees, planting strips, buffer vegetation, shoulders/bike lanes, buffers/pathways, etc. in accordance with Figure 4C. These features are not proposed.

Response: The planning board reviewed this location on a site walk and board meetings. The developed portion is far away from the existing road and very low in elevation that would not be seen. The client has agreed to provide a rec. trail for the snowmobile club and parking area to access the open space and Brook.

12.3.2 Driveway Design

From the information shown in the Site Plan drawings, and in the Typical Rural Driveway – Cross Section Detail, it is not clear the driveway requirements in this section are met. Please review this regulation and update the detail.

Response: The detail has been updated and requirements added.

12.5 Sidewalks, Bikeways and Trails

12.5. Has the Board determined that sidewalks are required? None are shown on the plans. In accordance with 12.5.1(1)(b), the recreational land (open space), may deem sidewalk access appropriate.

Response: Sidewalks are not required as they would not lead to anything, and a trail is provided.

12.7 Intersection Design Standards

The proposed intersection should meet the design standards shown in Table 2 – Intersection Design Standards for a Major Access Road. From the information provided, the vertical alignment landing distance, curb radius requirements are not met. It is unclear if the clear distances are met. Since Table 2 does not include design requirements for a 30 mph approach speed (the posted speed for Mallego Road), a suggested reference is AASHTO's A Policy on Geometric Design of Highways and Streets, Section 9.5 – Intersection Sight Distance. Per the reference, the guidelines specify:

- Height of eye at the stopped vehicle 3.5 ft
- Height of object 3.5 ft
- Distance of eye from edge of intersecting travelway 18 ft
- Sight Distance: Case B1, Left Turn Stop 335 ft
- Sight Distance: Case B2, Right Turn Stop 290 ft

Response: The radii and sight elevations have all been corrected as required and the sightline has been revised to 18' off of traveled way.

12.8 Road Construction Standards

12.8.1(3) On sheet 20, Typical Cross Section Detail, the base materials and pavement thicknesses

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shall be in accordance with Table 3 – Road Construction Standards for a Major Access Road.

Response: The detail and data have been revised as requested.

12.8.2 Pavement

On sheet 20, Typical Cross Section Detail, the pavement mix design and installation shall meet the requirements of this section. Update detail accordingly.

Response: The detail and data have been revised as requested.

12.8.6 Are Street lights required by the Board?

Response: Street lights were not required.

12.8.7 Underdrain shall be installed in cut sections and where the SHWT is within 3-ft of the subbase elevation. The roadway profile shows underdrain being installed in the roadway's cut section, but it does not provide a cover depth. The Underdrain Detail, Sheet 20, shows a cover depth of 1-ft which does not meet the Town requirements. Update the roadway profile and detail accordingly.

Response: The underdrain detail has been revised to min. 3' of cover.

12.8.9 For projects within the Village Distract, the Planning Board may require curbing, and it's at their discretion.

Response: The use of curbing is not proposed or requested by the board.

12.8.13 Date Requirements

12.8.13(2)(c) Slope and drainage easements should be shown. For the Mallego Road drainage system connection, the Town should have a maintenance easement shown on the plans and recorded with the Registry of Deeds.

Response: See previous response to the easements.

12.8.13(2)(d) All centerline data (tangent lengths and bearings, curve data and stationing) should be shown.

Response: The missing math has been added as requested.

12.8.13(2)(f), (g), &(h) Roadway cross sections should be provided.

Response: Provided as requested.

12.8.13(2)(m) The ADT should be provided.

Response: A note has been added (7) of 141.6 ADT

12.8.13(2)(n) Provide ADT Design Year.

Response: Based on the latest edition (10th) of the ITE Manuel

12.8.13(2)(q) Provide utility locations and details.

Response: Underground utilities have been provided and are subject to Utility company review.

12.8.13(2)(s) Provide a detailed engineer's estimate of construction cost.

Response: A construction estimate is to be provided as a condition of approval.

12.8.13(2)(t) Provide a notarized letter fixing the legal responsibility for maintenance of the streets.

Response: This item to be discussed with the board.

12.8.13(2)(v) Provide general notes for inspections.

Response: The inspection stages have been added to sheet 15.

Article 14. Utility Design Standards

All easements dedicating rights to the Town of Barrington shall be not less than 25 ft wide, have satisfactory access, and be shown on the plans.

Response: All easements are 25' wide where needed as required.

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Article 15. Subsurface Sewage System Design Standards

Each lot in the subdivision shall include a subsurface sewage disposal system. The plan set should show a 4,000 square foot leaching system reserve area and system details that comply with State/Town regulations. Update the plan set to show this information.

Response: Every proposed lot was shown with a 4k area and test pits.

Article 16. Water System Design Standards

Each lot in the subdivision shall include a water supply well. The plan set should show entire well radius protection area. Update the plan set to show this information.

Response: Every proposed lot was shown with a proposed well and associated protective well radius.

Article 17. Landscaping, Recreation and Open Space Standards

17.1. Landscape Objectives

17.1.2. Street trees are required for roads constructed in an open field. Trees shall be planted on both sides of the road at a spacing of 30 to 40 feet, have a caliper of at least 3 inches at a point 6 inches above the root ball, and be a hardwoods species.

Response: Although this property is not an open field as is a gravel pit, the client has agreed to plant 1-2 trees on every lot along the road outside the ROW. IT has been found trees to close to the road have a short life span because of salts and exposure.

17.2. Recreation and Open Space Requirements

17.2.3 Ownership of the open space should be defined, deeded, and the space made accessible to the public, if appropriate.

Response: As stated the open space is being deeded to the town and documents will be provided.

STORMWATER MANAGEMENT & SEDIMENT AND EROSION CONTROL PLAN:

We have the following comments that relate to the stormwater management plan:

1. The Stormwater Management Plan makes several references to ponds but only one pond is indicated on the plans.
Response: The narrative has been corrected.
2. The Stormwater Management Plan describes that a future tie-in by the Town is anticipated and provides structures and piping for this tie-in; however, it is not clear that the additional stormwater flows associated with the tie-in are accounted for in the stormwater model. Applicant should coordinate with Town's project engineer for additional flow information.
Response: There is ongoing design for the off-site improvements to be finalized at a future date by the town's design engineer. This will require a separate AoT permit and/or revisions to the town drainage portion. Estimated flows have been used for sizing of the pond and piping. The open space is to be deeded to the town so any revisions will be at the towns discretion.
3. An Alteration of Terrain Permit is required for this project and should be provided to the Town.
Response: The permit will be provided.
4. The culverts should be labelled on the plans (culv 1, culv 3, etc.).
Response: The culvert numbering has been added.
5. In the proposed stormwater modeling, culvert 1 has an invert in of 181.00 but an invert of 180.97' on the plans.
Response: This has been corrected on the plans.
6. In the proposed stormwater modeling, there are two culvert 1s and the one from subcatchment 2B has no inverts shown on the plans (assumed to outlet into the same riprap as culvert 1).
Response: The labeling for culv. 2 has been corrected and the inverts added to the plans.

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7. In the Summary for Pond 2DP:Culv 4, the inverts do not match those shown on the plan.
Response: The labels have been corrected on the plans.
8. The inverts and length for Pond 2FP:DMH1 are different in the stormwater modeling and on the plans.
Response: The plan labels have been corrected.
9. There is no test pit log for the one test pit conducted in the area of the bioretention pond (TP-5D).
Response: See attached.
10. How was the infiltration rate for the pond (10.00 iph) derived?
Response: The low Ksat based on SSSNNE SP #5, for Hinkley soils (parent material) is 20in/hr. Applying the required factor of safety of 2 the model infiltration rate is 10 in/hr. In addition, the field testing depicted the same as all but 1 of the amoozometer tests resulted in the meter not being able to saturate the soil (in such cases, NHDES AoT has cited use 10 in/hr as the design rate and there must be a filtration practice which is proposed).
11. The sizing of the western sediment forebay does not include the Town drainage from Mallego Road. Applicant should coordinate with the Town's project engineer for stormwater flow rates/volumes to update the size of the sediment forebay.
Response: The size of the forebay has been increased based on estimated flows.
12. The sizing of the eastern sediment forebay is not included in the bioretention worksheet. Applicant should coordinate with the Town's project engineer for stormwater flow rates/volumes to size the sediment forebay.
Response: The size of the forebay has been increased based on estimated flows.
13. On the Existing Watershed W1, it is not clear what the watershed/subcatchment limits are. Please update.
Response: The subcat. Lines have been thickened and the subcat. labels embellished (errant subcat. #4 labels removed) to enhance clarity.
14. On the Overall Watershed Plan #2, remove the Density Calcs from the sheet.
Response: The density calculations have been removed.
15. The proposed drainage system to be accepted by the Town includes pipes with a design slope of 18 percent. The applicant should provide confirmation from the pipe manufacturer, and general design considerations, that these slopes, and resulting flow velocities, are satisfactory for long term system maintenance. In addition, if high water velocities, how does this affect the receiving manhole structure?
Response: The drain pipes leading from Mallego road have been revised to a lower slope of 15%. Which meets the manufacturers criteria. The actual velocities are unknown at this time until finalized by the town's design engineer.

TEST PIT EVALUATION REPORT

1. There are test pit numbers on the plans without corresponding test pit logs (TP-1A, TP-1B, TP-2A, TP-2B, etc.).
Response: See attached
2. There is no test pit log for the test pit located in the bottom of the pond TP-5D.
Response: See attached

PLAN SET:

1. General Comments
 - a. The title of the plan set has Lots 35, while the Subdivision plans and Existing Conditions plan sheets list Lots 34 & 35.
Response: Lot 34 has been removed.
 - b. Proposed utilities shall be installed underground and shown on the plans.

Response: Utilities are proposed underground.

- c. Landscaping and lighting plans/details/information shall be included in the drawing set.

Response: Landscaping detail has been added. Lighting is not proposed.

- d. In the proposed drawings, it is difficult to read and differentiate between existing and proposed objects. See comment above on Site Plan Review Regulation Section 3.5.1.

Response: The existing features have been additionally faded back .

2. Title Sheet

- a. Under "Record Owners" the Lot numbers (34 & 35) differ from the Lot number in the title (Lots 35).

- b. In the title, the Lot number is specified as Lots 35, when there is one lot listed.

- c. The names in the index do not correspond to names on the sheets. Please update.

- d. There are items in the Plan Set Legend that do not apply to this project.

Response: These items have been revised.

3. Sheets 1 through 5 – Subdivision Plan

- a. There are items in the Legend that do not apply to the plan.

- b. The Owner of Record's address is different from that listed on the Title Sheet.

- c. Sheets shall include the Wetland Scientist's stamp.

Response: These items have been revised.

4. Sheets 6 through 10 – Existing Conditions Plan

- a. There are items in the Legend that do not apply to the plan.

- b. The Owner of Record's address is different from that listed on the Title Sheet.

- c. Sheets shall include the Wetland Scientist's stamp.

Response: These items have been revised.

5. Sheet 11 – Yield Site Plan

- a. The plan does not state the residential lot density yield calculations. These are located on Overall Watershed Plan W2.

Response: There are no longer any density calcs required as is based on conventional yield. The incorrect notes have been removed.

6. Sheet 12 – Site Plan

- a. Sheet title should be changed to differentiate it from Sheet 13 and 14. **Revised.**

- b. Note 6 is incomplete. **Note updated per survey info.**

- c. Provide Rec. Trail Detail. **The proposed rec trail is not constructed and is placed in areas void of trees by the snowmobile club. No detail needed.**

- d. The plan is difficult to read. See comment above on Site Plan Review Regulation Section 3.5.1.

7. Sheets 13 and 14 – Site Plan

- a. Note 6 is incomplete. **Revised.**

- b. Note 10 references requested waivers that have not been provided. **Incorrect Notes removed.**

- c. Proposed features should be called out. **Labels added.**

- d. A match line should be included to show its relation to Sheet 14. **Match line added.**

8. Sheet 15 – Plan & Profile – P1

- a. Subdivision Regulations Section 12.7-Intersection Design Standards, Table 2, requires the first 100 ft of the roadway to have a 2% max slope, but the vertical curve starts at STA 0+75, so this requirement is not met. Please correct.

Response: In review with the planning board there was concern to keep the 8% grade away from the horizontal curve. There is an adequate platform provided and a waiver will be requested if necessary.

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- b. The proposed culverts should be labeled to correspond to the stormwater analysis.
Response: The labels have been added
- c. Culverts should be labeled on the profile.
Response: The culvert sizes are labeled on the profiles.
- d. Has the USPS approved the proposed location of the mail kiosk?
Response: Location is pending approval.
- e. The proposed roadway and open space parking are separated by 70 ft; however, Town standards require 150 feet of separation. The open space parking should be accessed off the proposed roadway and the parking area formalized.
Response: This has been discussed in detail with the board and the location has been approved.
- f. The proposed underdrain should be shown in the plan view. **Response: Added.**
- g. Drainage swales installed on road grades 6% and steeper should be stone-lined swales.
Response: The requirement of stone lined has been added.
- h. Sheet H1 notes the existing drainage culvert under Mallego Road is to be discontinued. This note should be shown on Sheet P1. Since the pipe is being discontinued, it should be abandoned in-place and filled with flowable fill.
Response: The note has been added and revised to be removed by the town.
9. Sheet 16 - Plan & Profile – P2
- a. The proposed culverts should be labeled to correspond to the stormwater analysis.
Response: Th labels have been embellished to match the SA.
- b. Culverts should be labeled on the profile.
Response: The pipe sizes are labeled on the profiles.
- c. The locations of the access road and temporary sedimentation basin provided as details on the sheet are not shown on either the plan or profile.
Response: The access road has been added. The temporary basin location is decided in the field.
- d. The roadway profile has a sag vertical curve with a low point at STA 8+83. How is stormwater being collected, and removed from the roadway, to prevent ponding?
Response: As there is no curbing the run-off simply drains into the roadway swale.
10. Sheet 17- Plan & Profile P3
- a. Bioretention Basin Details.
- i. The Bioretention section contains an underdrain, which does not appear to apply to this project.
Response: The invalid pipe note has been removed.
- ii. The bioretention details should be to scale and specific to the project.
Response: The detail has been revised to be specific
- iii. What are the dimensions of the basins?
Response: Dimensions have been added to the plan for the pond.
- iv. Provide Sediment Forebay and Riprap Weir Details.
Response: Riprap weir detail has been added and pond detail revised to add forebay.
- b. The pipe slope from DMH#4 to DMH#3 is over 19% and excessive for closed drainage, have any alternative configurations/layouts been considered? We note that this portion of drainage is for a future tie-in by the Town and has not been modeled. In addition, the slope of the pipe on the plan is incorrect.
Response: The pipe slope has been lowered and drainage values added from the town's design engineer.
- c. On the future Town drainage system, the town should be provided a drainage easement and it should be shown on the plans.
Response: All needed easements are provided.
- d. DMH #5 should be a catch basin, so it can capture roadway stormwater.

Response: This will be decided by the town as part of the road upgrade design.

11. Sheet 17- Plan & Profile P4

- a. The slope of the pipe from DMH#9 to DMH#8 is 18% and excessive for closed drainage, have any alternative configurations/layouts been considered? We note that this portion of drainage is for a future tie-in by the Town and has not been modeled.

Response: The pipe slope has been lowered and drainage values added from the town's design engineer.

- b. On the future Town drainage system, Town should be provided a drainage easement and it should be shown on the plans.

Response: All needed easements are provided.

- c. DMH #9 should be a catch basin, so it can capture roadway stormwater.

Response: This will be decided by the town as part of the road upgrade design.

12. Sheet 19 – Highway Access Plan – H1

- a. The stop bar should be shown on the plan (the leader does not point to anything) and dimensioned.

Response: A stop bar has been added as requested 10' from edge of pavement. A stop line 20' back on an interior curve presents a hazardous condition as the vehicle is harder to see from on coming traffic. A detail has been provided from NHDOT in design.

- b. See comments, Subdivision Review Regulation 12.7.

Response: See previous response.

13. Sheet 20 – Construction Details D1

a. Pipe Outlet Protection Detail

- i. In the Riprap Gradation Range tables, the required stone sizes are larger than the riprap layer thickness. Please adjust.

Response: The detail has been updated with correct thickness value.

b. Typical Rural Driveway Cross Section Detail

- i. See comments in Subdivision Regulation 12.3.2 above. **See Previous response**
ii. Town prefers a -4% grade on the driveway apron through the right-of-way, so the tip of the wing plow does not catch the driveway. **Response: Detail has been revised.**

c. Typical Cross Section Detail

- i. See comments in Subdivision Regulations 12.2.1 12.8 above.
ii. The right-of-way should be dimensioned on the Typical Cross Section. **See Previous response**
iii. The roadway underdrain locations should be specified by the design engineer, not the Town's consulting engineer as indicated on the Typical Cross Section. These locations should be shown on the plan. **Response: Notes have been updated**

d. Underdrain Trench Detail

- i. The detail shows the underdrain being installed with 1 ft of cover to the pipe crown. 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 from freezing and heaving the road. Underdrain is typically installed 4 ft to 6 ft deep to accomplish this. We recommend the underdrain pipe depth be lowered.

Response: The incorrect depth has been revised to min. 3.5' to get below road materials.

14. Sheet 21 – Fire Cistern Details

- a. The Traffic Control Schedule and Street Sign Detail should be moved to another sheet since they do not relate to the fire cistern.

Response: The sign schedule has been moved to the detail sheet and no-parking signs added per

fire dept.

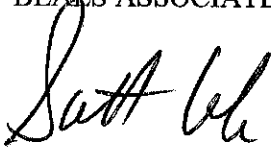
b. Has the fire chief reviewed/approved the cistern details?

Response: See previous response.

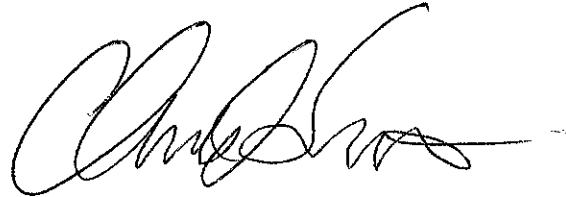
Thank you for your timely and professional review of the submitted plans. We hope the information provided address your concerns. Please feel free to contact our office if you have any additional question and/or comments.

Very Truly Yours,

BEALS ASSOCIATES, PLLC



Scott D. Cole
Senior Project Manager



Christian O. Smith, PE
Principal

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1/18/2023

3-4 MINIMUM VELOCITY CONSIDERATIONS

Sediment can reduce the capacity of a stormwater pipe over time. In some installations, it may render the pipe useless until the system can be cleaned. This is an expensive, time-consuming undertaking so preventative measures should be taken during design. Sedimentation is of great concern in sewer applications since large, heavy grit may be present.

To minimize potential problems, flow should be maintained at a minimum, or self-cleansing, velocity. A commonly accepted self-cleansing velocity for storm and sanitary sewers is 3 fps (0.9 m/s). In each design, a final check should be performed to compare the expected velocity with the self-cleansing velocity. The design velocity for full-flowing pipes can be *approximated* with Equation 3-5:

$$V = \frac{Q}{A} \qquad \text{Equation 3-5}$$

The potential for settling is determined by the specific gravity and diameter of particle, its cohesive properties, flow velocity, and the roughness of the pipe interior. For further discussion on the complexities and variables associated with determining the self-cleansing velocity for a specific pipe diameter and material, refer to ASCE publication No. 60, "Gravity Sanitary Sewer Design and Construction." In some specialized installations where sediment is a known problem it may be wise to perform a soil analysis prior to final drainage design.

3-5 MAXIMUM VELOCITY CONSIDERATIONS

High flow velocity can also create problems if not properly taken into consideration. High velocity is usually considered to be approximately 12 fps (3.7 m/s) but can vary depending on the specific site conditions.

The preferred method of contending with high velocity is to look for opportunities to minimize it, such as reducing the slope of the pipe. If that is not feasible, and many times it is not, the velocity must simply be managed the best way possible.

High velocity, especially if it carries an abrasive effluent, can present durability problems. Over time, the invert of the pipe can wear prematurely. Thermoplastics resist the effects of these rigorous conditions better than many other traditional pipe materials. Additional information specific to the effects of abrasives on many types of pipe materials is provided in the *Durability* section (Section 4) of the Drainage Handbook.

Special consideration should also be given to the conditions at the pipe outlet. High flow velocity can erode the channel where the flow is deposited. Erosion management methods, such as rip-rap, should be considered in these areas.

NH-1443-Proposed

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Type III 24-hr 50 YR Rainfall=7.00"

Prepared by Beals Associates, PLLC

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Summary for Pond 6P: DMH 4

Inflow = 35.00 cfs @ 1.00 hrs, Volume= 205.401 af, Incl. 35.00 cfs Base Flow
 Outflow = 35.00 cfs @ 1.00 hrs, Volume= 205.401 af, Atten= 0%, Lag= 0.0 min
 Primary = 35.00 cfs @ 1.00 hrs, Volume= 205.401 af
 Routed to Pond 4P : DMH 3

Routing by Stor-Ind method, Time Span= 1.00-72.00 hrs, dt= 0.01 hrs
 Peak Elev= 202.34' @ 1.00 hrs
 Flood Elev= 208.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	194.46'	24.0" Round Culvert L= 135.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 194.46' / 174.21' S= 0.1500 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=35.00 cfs @ 1.00 hrs HW=202.34' (Free Discharge)
 ←1=Culvert (Inlet Controls 35.00 cfs @ 11.14 fps)

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Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation

