DEPARTMENT OF PUBLIC WORKS

Town of Durham, New Hampshire
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Memorandum

TO: Town of Durham Planning Board

CC: Todd Selig, Durham Town Administrator
Michael Behrendt, Durham Town Planner

FROM: Richard Reine, M.S.C.E., CA, Director of Public Works 5.7.21
April Talon, P.E., Town Engineer AT 5/7/21

DATE: May 5, 2021

SUBJECT: Gerrish Drive/Ambler Way Subdivision - Comments regarding Private Access Road - Durham Public Works

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The following documents were reviewed in preparation of this memo.

- Horizons Engineering - Revised Drainage Report prepared for Michael and Marty Mulhern Dated April 21, 2021
- Horizons Engineering - Civil Design Plan Sheets No. C-100, C-104, C-105 and C-505 Dated April 20, 2021
- Horizons Engineering – Site Plan for Michael and Marti Mulhern, 93 Bagdad Road, October 28, 2020 revised February 4, 2021
- Stormwater Systems Management Plan, prepared for Michael and Marti Mulhern, 93 Bagdad Road Prepared by MJS Engineering, dated February 15, 2021

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This memorandum has been prepared in advance of the May 12th Planning Board meeting and is intended to further substantiate Town staff's recommendation that, in the event the Gerrish/Ambler subdivision receives approval, the access road shown on the plan dated April 20, 2021, and extending from station 0+00 to 5+00, leading to the Gerrish/Ambler "loop road", remain a Private roadway upon completion, rather than a publicly accepted road.

As any community approaches a build-out scenario, available parcels become more challenging and costly to develop. This is the case with this parcel, identified on Durham's Tax Map 10, Lot 8-6 involving a large wetland crossing, steep topography, and a stream crossing.

Town staff has evaluated the matter of a public versus private Access Road extensively since the subdivision was initially proposed. A consensus recommendation has been developed and that recommendation has been voiced on several occasions, that the entire roadway become private upon completion.

Below, please find a summary of the basis supporting this recommendation.

1. It has been mentioned on a few occasions that the roadway "nearly" meets the Town subdivision standard with a 20-foot-wide pavement width and the only deficiency is the shoulder width of 3 feet, where the Town standard requires 4 feet. This, in my opinion, overlooks many critical factors in the proposed roadway design and construction. One of those factors is the inclusion of substantial portions of precast concrete block retaining walls to accommodate the roadway design.

   It is essential to recognize the pavement and shoulder width represent only two of the critical components of the overall roadway and are not the only factors in the Town's roadway standard design. Many other components are reviewed including side slopes, fill slopes, guardrails, utility layout, gutter width, etc. For example, in accordance with the Town standard, as detailed in the Road Construction Regulations adopted by the Planning Board, *"Embankment slopes away from the edge of the finished roadway shall not be constructed at a ratio steeper than 4' horizontal to 1' vertical unless the length of the grade is greater than 10'. If the horizontal length of the grade exceeds 10', a ratio of 3' horizontal to 1' vertical may be used. W beam guard rail may be required by the Dept. of Public Works."* Approximately 135 lineal feet of roadway, located between the two wetland

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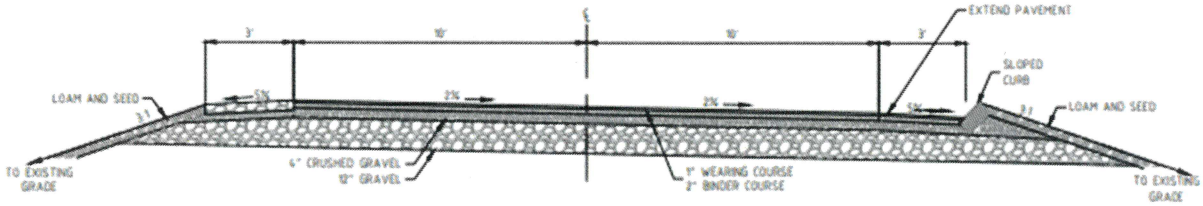
crossing areas has been designed in general conformance with the standard. A detail is shown below for your reference. Please note the 3:1 fill slope and lack of retaining walls in this limited section.



TYPICAL ACCESS ROAD CROSS-SECTION
NTS

The balance of the roadway, adjacent to the first wetland crossing from station 0+25 to 2+25 raises a concern. This section includes the use of a precast block retaining wall which is not a standard detail for a Town of Durham accepted roadway and must be evaluated individually. In this case, the project utilizes 318 feet of precast block retaining walls on both the left and right side of the roadway in the first wetland crossing, with a maximum height of approximately 6 feet. The applicant has apparently chosen to utilize a retaining wall construction method to minimize the impact on wetland resources however, this construction technique is not consistent with our Road Construction Regulations and creates a significant future capital burden when replacement becomes necessary.

Please also note, the design not only lacks the additional 2 feet (total) of shoulder width as would be required for a Town accepted road, but also an additional 12"-18" of gutter width added to the 20' of minimum pavement, as required in the Town's Road Regulations. This results in all utilities being placed below the roadway surface with the sewer force main placed under the culvert at the first wetland crossing. The additional 2 feet of shoulder width and 3 feet of gutter width, consistent with the Town standard, could potentially allow the entire water main and sewer force main to be placed outside of the roadway surface. As stated in the Road Construction Regulations, *"When possible, water and sewer mains, storm drains and other underground utilities shall be constructed outside the road surface area and preferably, outside the ditch line, but within the Right*

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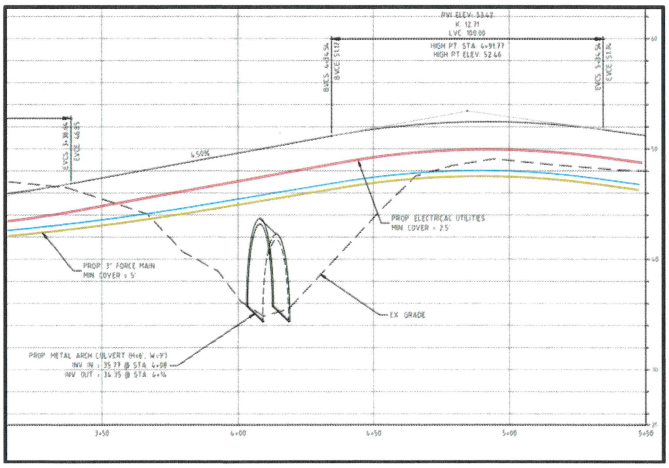
of Way (ROW)" Water and Sewer infrastructure on the access and loop roads are all designed with the understanding they will remain private private utilities.

It is also worth noting the current plan and utility corridors only identify water, sewer and one UGU (Underground Utility) within the access road. The UGU likely will include underground electric and a minimum of one telecommunications line, each with their own separation requirements and required utility corridor which will occupy a larger ROW footprint. The additional two feet of roadway width and gutter width could prove to be beneficial to accommodate other appurtenances such as transformers, vaults and associated structures. This becomes even more critical if a closed drainage system is used which may be required on a public roadway, following additional analysis as noted below.

The second wetland crossing is substantially larger and more concerning where a metal arch pipe is utilized to carry the roadway over an existing stream. The metal arch pipe is sized as 6' high by 9' wide with over 200 feet of precast retaining wall reaching heights of approximately 16 feet. The consensus, following durability studies conducted by many State Highway Departments is, a corrugated steel pipe has a life expectancy of 35 years before perforation of metal occurs. Coatings can be applied but their performance is marginal, adding maybe an additional 5 years to the expected life. A snip of the profile view of this crossing is shown below for you reference which illustrates the type of structure and wall height.



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The Town of Durham presently has a large metal arch pipe similar to the one being proposed which carries Mill Road over the Oyster River. Following a recent NHDOT bridge inspection, it was found that the metal pipe was exhibiting moderate rusting, pitting and scaling with scattered perforations and 25% section loss. The stone headwall and wing walls have settled and failed downstream. The bridge was added to the Municipal Red List and will require either, an interim repair or full replacement at significant cost, likely exceeding $450,000. In the event the access road was ever to be considered for public roadway acceptance, Durham Public Works would require a concrete box culvert with a natural bottom and the use of precast wing walls to substantially decrease the use of precast blocks and increase the longevity of the structure.

Note, a construction cost estimate of the proposed Gerrish/Ambler subdivision for just the access road is calculated to be well in excess of $1 Million Dollars, exclusive of the loop road and other infrastructure. This replacement cost for the access road infrastructure will only increase, as future construction will require access to the properties to be maintained at all times. Acceptance of this road as a public roadway would place this liability for future capital replacement and ongoing maintenance entirely on the Town of Durham.

2. Stormwater Management and Maintenance – Some statements have been made regarding the ongoing stormwater structural BMP maintenance and the ability of the Town to perform this work in a more consistent and reliable way, as opposed to a Homeowner's Association (HOA). It has been suggested that Town ownership of this responsibility would ensure a higher protection of the wetland resources.

   Although Durham Public Works is appreciative of the confidence the community places in the organization, it is important to recognize that the overwhelming majority of stormwater maintenance requirements as outlined in the Stormwater Operations and Maintenance Plan are located on the "loop road" NOT the proposed access road.

   The primary maintenance tasks associated with the access road include the treatment swale and culvert outlet protection. This is in comparison to the "loop road" and associated structural BMP's which have always been planned to remain private and

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include sediment forebays, gravel wetlands, conveyance swales, treatment swales, outlets, culverts, and detention ponds. The access road has been reviewed with the assumption that it will remain private as indicated on the plans for several iterations. If the project were to be proposed as a publicly accepted roadway, Durham Public Works would require review of the proposed access road stormwater management and conveyance system and potentially require a closed drainage system utilizing drop inlets, due to limited elevations, to achieve treatment through the treatment swale, rather than the current design. In addition, and in accordance with the Town's Road Construction Regulations, inspections of roadway infrastructure, stormwater systems, culverts and utilities will take place on a prescribed schedule, with all costs for inspection borne by the developer.

Furthermore, the issue of flooding and emergency access to the properties has recently been raised as justification that the roadway be accepted as a public road. The hydraulic and hydrologic analysis performed by the project engineer is conservative, as explained previously, and the culvert at the first wetland crossing has been appropriately sized to pass a 100-year storm event with a minimum of 1 foot of freeboard, before overtopping the roadway. The ownership status of the access roadway and associated infrastructure is not at all relevant in this instance.

If there were an acute access issue preventing emergency vehicles from entering the site i.e. historic winter storm event, downed tree, etc., Fire, Police and Public Works would always coordinate to place the protection of public health and safety first.

The "loop road" has clearly been designed in a manner which does not meet Town roadway standards and results in significant cost savings. This also allows for optimization of the project layout. The HOA will retain ownership of this section of roadway as well, including the responsibility for a stormwater structural BMP maintenance, which is certainly more demanding than that of the access road. Yet the public vs. private status of the "loop road" has not been raised as a concern at all.

In closing, if this were a conventional roadway design, consistent with our roadway standards, not requiring excessively costly infrastructure leading to the subdivision, staff

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would have no objection whatsoever with accepting it as a public roadway. That has been done routinely, and in fact would be our preference.

The fact is, we can find no compelling rationale why the Town would accept the most expensive part of the roadway system, which has no connectivity and terminates at a private road. This scenario appears to provide no benefit for the Town of Durham and results in a large future capital liability.