



DEPARTMENT OF PUBLIC WORKS

Town of Durham, New Hampshire
100 Stone Quarry Drive
Durham, New Hampshire 03824
(603) 868-5578
FAX (603) 868-8063

Memorandum

TO: Town of Durham Planning Board

CC: Michael Behrendt, Durham Town Planner

FROM: Richard Reine, M.S.C.E., CA, Director of Public Works
April Talon, P.E., Town Engineer

DATE: June 28, 2021

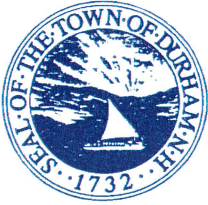
SUBJECT: Durham Public Works Comments related to Road Construction Regulation
Waiver Requests

*Richard Reine
6/28/21
AT 6/28/21*

Public Works Director, Rich Reine and Town Engineer April Talon P.E. have been in contact with project representative and design engineer Michael Sievert P.E. from Horizons Engineering to review the waiver requests related to the Gerrish Drive/Ambler Way Subdivision located at 91 Bagdad Road, Tax Map 10, Lot 8-6.

Durham Public Works has reviewed the following documents and provides the following comments:

- VHB Engineers 3rd Party Review – Comment Letter Dated March 4, 2021
- Horizons Engineering – Response to Engineering Technical Review Letter Dated April 22, 2021
- Horizons Engineering - Revised Drainage Report Prepared for Michael and Marty Mulhern Dated April 21, 2021



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- Horizons Engineering - Civil Design Plan Sheets No. C-100, C-104, C-105 and C-505 Dated April 20, 2021
- Horizons Engineering – Response to Additional Information Requested for review Letter Dated April 22, 2021
- Town Planners Review dated June 9, 2021
- Application for Waiver from regulation submitted by project representative Mike Sievert, Horizon’s Engineering dated June 8, 2021
- Waiver Letter submitted to Public Works Director, Rich Reine dated June 24, 2021
- Turning Radius Template – “Existing Layout” dated June 24, 2021
- Turning Radius Template – “Updated Site Layout June 24, 2021

Based on the application submitted, the following waivers have been requested by the applicant. Durham Public Works responses are shown in **bold**.

Section 4.01 - Durham Road Construction Regulations require a minimum right of way width of 50 feet where the applicant has provided 50 feet for the access road from station 0+00 to approximately station 3+10 and 30 feet for the “loop road”.

Durham Public Works response : No exceptions taken.

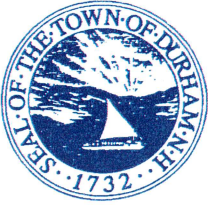
Section 4.02 - Durham Road Construction Regulations require a minimum pavement width of 20 feet where the applicant has provided an 18-foot pavement width for the “loop road”.

Durham Public Works response : No exceptions taken.

Section 4.03 - Durham Road Construction Regulations require minimum shoulder width of 4 feet where the applicant has provided a shoulder width of 3 feet on the Access road and has increased the shoulder width from 1 foot to 2 feet on the “loop road” in the pending redesign.

Durham Public Works response : No exceptions taken.

Section 4.13 - Durham Road Construction Regulations require minimum tangent length



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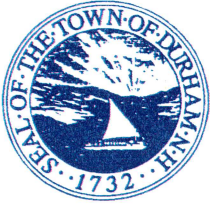
between reverse curves of 75' where the applicant has provided 50' for the "loop road".

Durham Public Works response : The applicant was asked to provide a citation for the basis of design, document the design speed and submit a vehicle tracking template demonstrating that a WB40 type vehicle consistent with Town of Durham fire apparatus could successfully navigate the roadway network. The applicant provided the attached letter and templates which support the design decisions. Notwithstanding meeting the AASHTO standards as shown in the *"Guidelines for Geometric Design of Very Low-Volume Local Roads with an average daily traffic volume (ADT) of < 400 (AASHTO 2001)"*, Project Engineer Mike Sievert acknowledges the turning/tracking template is tight and for this and other reasons has revised the roadway design to improve vehicle circulation and safety, inclusive of modifying the curve radius located between stations 12+75 and 14+00. A revised turning/tracking template titled "NM10063 Turn Radius Updated Site Layout" has also been submitted indicating an improved geometric design. In addition, the applicant proposes to include the installation of protective guardrail beginning at station 13+50 to station 15+00, as recommended.

Durham Public Works takes no exceptions with this approach relative to minimum tangent length and minimum center line curve radius.

Section 4.17 - Durham Road Construction Regulations minimum center line curve radius of 180 feet where the applicant has provided 50' for the "loop road."

Durham Public Works response : The applicant was asked to provide a citation for the basis of design, document the design speed and submit a vehicle tracking template demonstrating that a WB40 type vehicle consistent with Town of Durham fire apparatus could successfully negotiate the roadway network. The applicant provided the attached letter and templates which supports the design decisions. Notwithstanding meeting the AASHTO standards as shown in the *"Guidelines for Geometric Design of Very Low-Volume Local Roads with an average daily traffic volume (ADT) of < 400 (AASHTO*

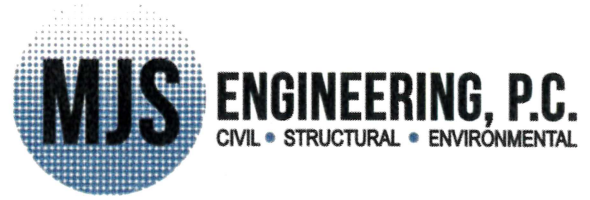
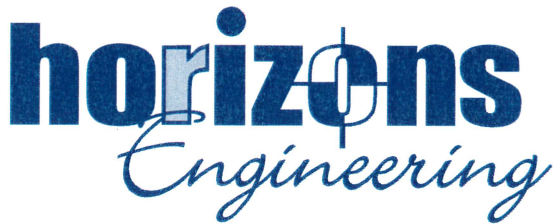


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Durham Public Works takes no exceptions with this approach relative to minimum tangent length and minimum center line curve radius.



5 Railroad Street, Newmarket, NH 03857 • Ph 603-659-4979 • Fax 603-659-4627 • www.horizonsengineering.com

June 24, 2021

Rich Reine MSCE
Director of Public Works
Town of Durham
100 Stone Quarry Dr.
Durham, NH 03824

RE: Michael and Marti Mulhern 91 Bagdad Road proposal for subdivision and conditional use permit.

Dear Rich;

This letter is being provided to better explain the justification of the waivers from the Road Construction Standards. As you know we are requesting seven waivers from the road construction standards and you have requested additional information with regard to two of the waivers. One is section 4.13, for the minimum tangent length between reverse curves and the other is 4.17, the minimum center line curve radius.

The Basis for this road design is the Guidelines for Geometric Design of Very Low-Volume Local Roads with an average daily traffic volume (ADT) of < 400 (AASHTO 2001). The design speed used for this road was 15 MPH. Based on this reference this, the minimum radius for very low volume-low speed roads would be between 40 and 70'. The sight distance on horizontal curves for this roadway is 65'.

In summary, the road design guidelines per AASHTO for low volume-low speed rural and urban roads are reduced. The current design does meet this, however as you can see the vehicle tracking is tight, especially on the very tight curve. Give those findings and other factors throughout the permitting process, we have revised the design in an effort to help reduce construction costs and provide better vehicle movement. We believe that the existing design met the requirements, including the minimum requirements of the fire department, however this new revised design is more compliant. This design still requires the same waivers so there should not be any issues with the revised design.

If you need additional information, please do not hesitate to contact me.

Sincerely;

A handwritten signature in black ink that reads "Michael J. Sievert". The signature is written in a cursive style.

Michael J. Sievert
VP Structural Engineering

Cc: Michael Behrendt

Horizons Engineering, Inc.

New London, NH • Newport, VT • Littleton, NH • Sharon, VT • Kennebunk, ME • Conway, NH • Newmarket, NH

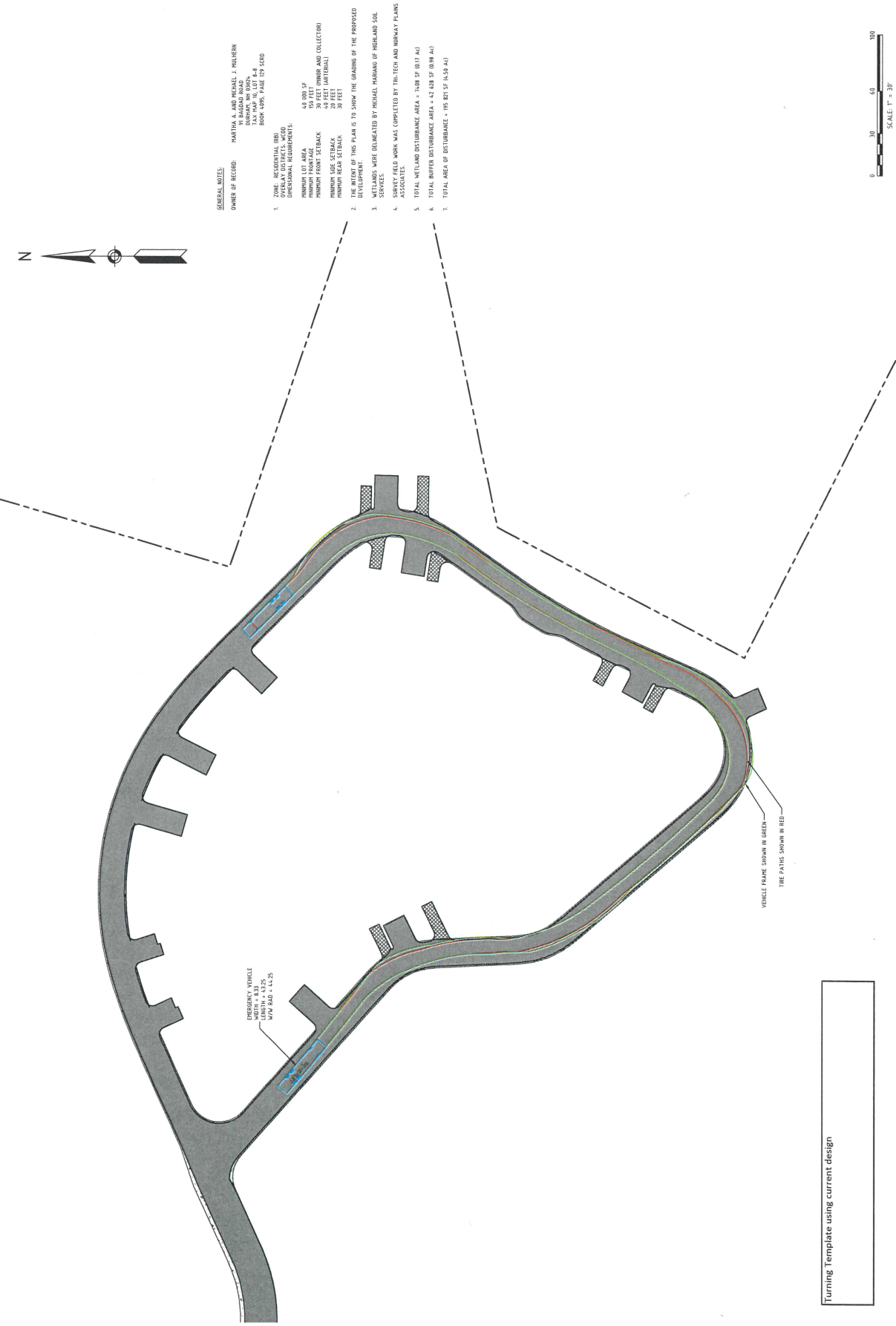


EMERGENCY VEHICLE TURNING PATH
Prepared for
MICHAEL HANRAHAN
TAX MAP 10, LOT 8-6
93 BAGDAD ROAD, DURHAM, NH 03824

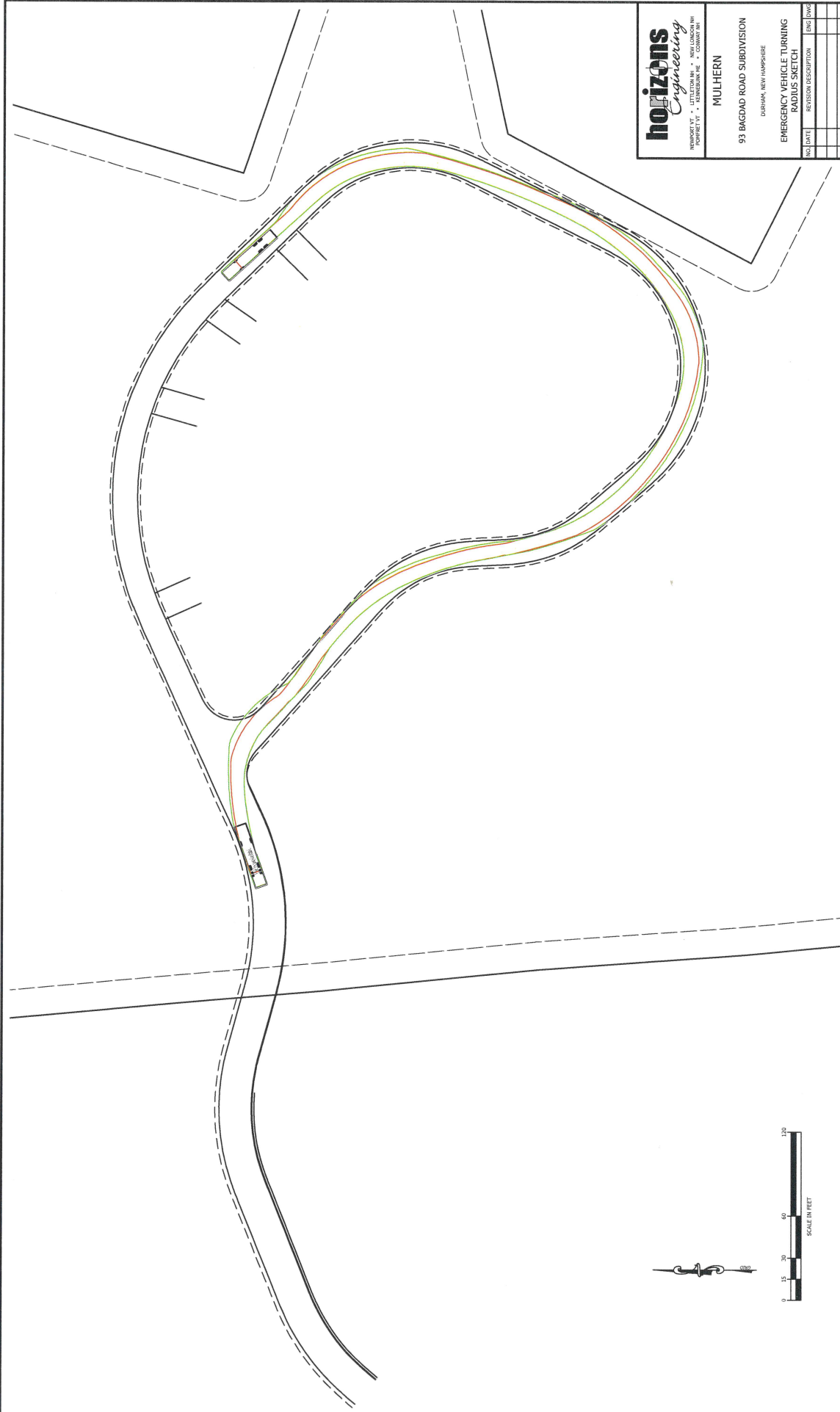
DATE ISSUED	8/26/21
DATE	8/26/21
DESIGNED BY	MCS
DESIGNED BY	MCS
APPROVED BY	MCS
CHKD BY	MCS
DWG FILE	190633_CVD022.DWG

NO.	0
INITIAL SUBMISSION	

NO.	REVISIONS	DATE	INT.



1. ZONE: RESIDENTIAL (R2)
2. OWNER OF RECORD: MARTHA A. AND MICHAEL J. HANRAHAN
93 BAGDAD ROAD
DURHAM, NH 03824
TAX MAP 10, LOT 8-6
BOOK 4596, PAGE 179 C040
3. ZONE, RESIDENTIAL (R2) DIMENSIONAL REQUIREMENTS:
MINIMUM LOT AREA = 6,000 SF
MINIMUM FRONT SETBACK = 150 FEET
MINIMUM FRONT YARD SETBACK = 5 FEET
MINIMUM SIDE SETBACKS = 30 FEET
MINIMUM REAR SETBACKS = 30 FEET
4. THE BOUNDARY OF THE PROPOSED DEVELOPMENT
5. WETLANDS WERE DELINEATED BY MICHAEL HANRAHAN OF HIGHLAND SOIL SERVICES.
6. SURVEY FIELD WORK WAS COMPLETED BY TRITECH AND HIGHWAY PLANS ASSOCIATES.
7. TOTAL WETLAND DISTURBANCE AREA = 7408 SF (0.17 AC)
8. TOTAL BUFFER DISTURBANCE AREA = 42,688 SF (0.98 AC)
9. TOTAL AREA OF DISTURBANCE = 49,096 SF (1.15 AC)



horizons
Engineering

PROJECT # 2021-06-04
 DRAWN BY RMD/063
 CHECKED BY JCS
 DATE 06/24/2021
 PROJECT # 2021-06-04
 SHEET # SK-2

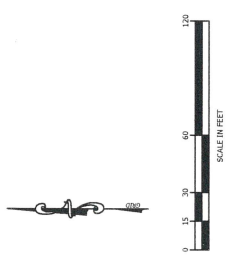
MULHERN
 93 BAGDAD ROAD SUBDIVISION
 DUNSMuir, NEW HAMPSHIRE
 EMERGENCY VEHICLE TURNING
 RADIUS SKETCH

NO.	DATE	REVISION DESCRIPTION	BY	CHKD

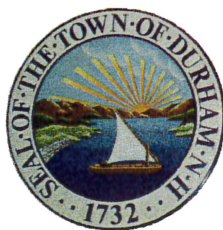
**FOR REVIEW
NOT FOR CONSTRUCTION**

DATE OF PRINT
JUNE 24 2021

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Turning Template Revised Layout



PLANNING DEPARTMENT

Town of Durham

8 Newmarket Road

Durham, NH 03824-2898

Phone (603) 868-8064

www.ci.durham.nh.us

Application for Waiver from Regulation

Town of Durham, New Hampshire

Project name _____ Mulhern Pocket Neighborhood Conservation Subdivision _____

Property Address ___91 Bagdad Road_____ Map and Lot # 10/8-6_____

Site Plan: _____ Subdivision: ___X___ Boundary line adjustment : _____

Section and subsection of the Site Plan Regulations or Subdivision Regulations from which the waiver is requested: Road Construction Regulations of the Town of Durham
_____ **4.01** min ROW width 50'; **4.02** min pavement width 20' ; **4.03** min shoulder width 4'; **4.13** min tangent length between reverse curves; **4.17** min center line curve radius 180'; **4.19** min gutter width 12"-18"; **4.20** min sidewalk const. _____

Reason/justification(s) for the waiver request: These waivers are being requested mainly because this is a private road and the goal of the type of subdivision is to reduce traffic, roadways and impervious surfaces. In addition, the average daily vehicle trips are only 72 trips, which is well within the maximum for these design requirements. The waiver request for sections 4.01, 4.02, 4.13 & 4.17 only apply to the loop road, the requirements in these 4 sections are met for the access road to the intersection. The min. tangent length between reverse curves is about 50', but we designed spiral curves to soften the transition between the reverse curves. This reduced distance helps reduce the overall road length and impervious surface which has been the goal from the beginning. The min. centerline radius of the proposed design is 50' in three locations for short curves, and this again reduces the road impact. The goal is to reduce disturbance, reduce speed and minimize impervious surfaces. The reason for the

waiver from sections 4.19 and 4.20 is due to the goal of minimization especially in this area for the reduction of wetland impact. To minimize the impact to the traveled way of not including a 12" to 18" additional width for a gutter, we paved the entire shoulder providing a gutter width of three feet on the low side. The 3' wide shoulders on both sides will provide for adequate pedestrian access especially at the low vehicle per day traffic rate and the low speeds.

Check which provision this would comply with (RSA 674:44 III. (e) and 676:36 II.(n)):

(1) Strict conformity would pose an unnecessary hardship to the applicant and the waiver would not be contrary to the spirit and intent of the regulations; or

(2) Specific circumstances relative to the site plan or subdivision, or conditions of the land in such site plan or subdivision, indicate that the waiver will properly carry out the spirit and intent of the regulations.

Name of applicant or agent filling out this form: Michael J. Sievert

Applicant? Agent? Today's date 6-08-21

E-mail Address: msievert@horizonsengineering.com Phone # 603-659-4979

----- Office use below -----

Waiver approved: Waiver denied:

Comments:

Signature: Date: