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**Riverfront Area and Wetland Alternatives Analysis**

**Prospect Hill Subdivision  
Prospect Street, Bellingham, MA**

**Prepared for:**

**Wall Street Development**

Prepared By:



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Paul J. McManus, SPWS  
President

Revised December 27, 2022

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**Introduction**

This Alternatives Analysis addresses the provisions of the Massachusetts Wetland Regulations (310 CMR 10.00 – “the Regulations”) and Bellingham Wetlands Bylaw for a proposed roadway construction at the Prospect Hill Subdivision site. Bordering Vegetated Wetland (“BVW”), streams, and several segments of presumed “Rivers” have been identified on the Prospect Hill subdivision site located in Bellingham (and to a lesser degree in Franklin). EcoTec has delineated the BVW boundaries and Mean Annual High Water (“MAHW”) boundaries that define Riverfront Area (“RFA”) on the site. GLM Engineering has surveyed located and plotted the BVW and MAHW boundaries and associated RFA boundaries and Buffer Zone to BVW. GLM then measured the RFA on each area of the site (see attached RFA Calculation Figure). Total site RFA is 936,460 square feet (“sf”).

### **Existing Conditions of Riverfront Area**

Portions of the subject property contain native soils and a largely native second-growth forest cover, while much of the site has been subject to sand and gravel mining operations dating back to the 1960's. As a result of the long history of mining, soil conditions in some of the former mined areas have recovered to varying degrees. Former mined areas range from bare unvegetated sand through wooded areas with shallow but discernible topsoil. EcoTec has delineated the portions of the RFA which, in our opinion, qualify as "degraded" in accordance with 310 CMR 10.58(5):

*"A previously developed riverfront area contains areas degraded prior to August 7, 1996 by impervious surfaces from existing structures or pavement, absence of topsoil, junkyards, or abandoned dumping grounds."*

EcoTec has delineated "degraded" RFA areas on the property which include the obvious unvegetated bare sand, as well as areas where early colonization has occurred, but no discernible topsoil soil horizon has developed, in our opinion. Degraded RFA field delineation flagging was placed by EcoTec and reviewed by BSC on behalf of the Bellingham Conservation Commission. The limits of degraded RFA discussed below and indicated on the referenced plans represent the degraded RFA delineation as reviewed and confirmed (with minor modification) by BSC and survey located by GLM.

### **Proposed "Limited Project"**

The proposed project includes a subdivision roadway that would cross the BVW and RFA at the location of an existing crossing where BVW and stream channel were historically filled, presumably for mining operation access to the upland area in the rear (western) portion of the site. Although the proposed roadway makes use of the existing historically filled wetland, in order to comply with current standards for road width, filling of BVW and RFA, including Inner Riparian, is proposed, with a road generally perpendicular to the wetland and including a culvert compliant with Massachusetts Stream Crossing Standards.

As a result, the project is filed under the "Limited Project" provisions of 310 CMR 10.53(3)(e), which requires consideration of impacts and alternatives. From 310 CMR 10.53:

*"The Issuing Authority shall consider the following factors: the magnitude of the alteration and the significance of the project site to the interests identified in M.G.L. c. 131, § 40, the availability of reasonable alternatives to the proposed activity, the extent to which adverse impacts are minimized, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40."*

And

*“(e) The construction and maintenance of a new roadway or driveway of minimum legal and practical width acceptable to the planning board, where reasonable alternative means of access from a public way to an upland area of the same owner is unavailable. Such roadway or driveway shall be constructed in a manner which does not restrict the flow of water. Reasonable alternative means of access may include any previously or currently available alternatives such as realignment or reconfiguration of the project to conform to 310 CMR 10.54 through 10.58 or to otherwise minimize adverse impacts on resource areas. The issuing authority may require the applicant to utilize access over an adjacent parcel of land currently or formerly owned by the applicant, or in which the applicant has, or can obtain, an ownership interest. The applicant shall design the roadway or driveway according to the minimum length and width acceptable to the Planning Board, and shall present reasonable alternative means of access to the Board. The applicant shall provide replication of bordering vegetated wetlands and compensatory flood storage to the extent practicable....”*

Commentary included in MassDEP’s Notification of Wetlands Protection Act File Number dated April 22, 2022, recommended that the Commission further review the criteria necessary for the proposed project to qualify as a “limited project” and ensure that BVW replication and compensatory flood storage is provided. It should be noted that the revised Notice of Intent subdivision plan includes the following:

1. BVW replication is provided in accordance with 310 CMR 10.55(4)(b); and
2. Compensatory flood storage is provided on an incremental basis, as required under the Bordering Land Subject to Flooding performance standards at 310 CMR 10.57(4)(a).

With regard to review of alternatives, we note that:

- a. The “limited project” provision for a roadway crossing [10.53(3)(e)] standard of review for eligibility is that the alternative “minimize adverse impacts on resource areas.”
- b. The Riverfront Area standard of review (for non-degraded areas) is to “protect the interests” of the Act;
- c. The standard for projects that involve redevelopment is “improves existing conditions;”

and

- d. The BVW fill and replication provisions at 10.54(4)(b) require consideration of magnitude of the alteration, significance to the interests, the extent to which adverse impacts can be avoided, the extent to which impacts are minimized, and the extent to which mitigation measures contribute to the protection of the interests.

Because the above standards of review have significant overlap, this alternatives analysis considers the various criteria as a whole.

### **RFA Regulatory Provisions**

The RFA provisions of 310 CMR 10.58(4) for areas not “previously developed” require that there be:

*“No practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. c.131 § 40 and that the work, including proposed mitigation, will have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131 § 40.”*

For work within previously developed, RFA, the Regulations state:

*“(5) Redevelopment Within Previously Developed Riverfront Areas; Restoration and Mitigation. Notwithstanding the provisions of 310 CMR 10.58(4)(c) and (d), the issuing authority may allow work to redevelop a previously developed riverfront area, provided the proposed work improves existing conditions. Redevelopment means replacement, rehabilitation or expansion of existing structures, improvement of existing roads, or reuse of degraded or previously developed areas.”*

### **Project Purpose and Alternatives**

The project purpose is to develop a roadway providing access from the existing site frontage (on Prospect Street) to the interior of the site, with associated development of house lots and single-family homes. Implicit in the project purpose is economic viability, considering the cost of roadway and required infrastructure, offset by the number and character of revenue-generating house lots.

The following alternatives have been considered:

- No Build: This alternative would have no wetland impacts but would not allow for any economic return and therefore is not a substantially equivalent economic alternative; nor does it satisfy the project purpose. It is therefore not discussed further;
- Preferred Alternative: Access from prospect Street using the existing (to be expanded and upgraded) gravel wetland crossing and a proposed road layout from the nearest portion of Prospect Street;
- Alternative 1: Through access roadway loop with two connections to Prospect Street (i.e., a combination of the Preferred Alternative and Alternative 3, discussed below);
- Alternative 2: Access from Prospect Street shifted south of Preferred Alternative;
- Alternative 3: Access from Prospect Street at north lot line (short version: 1,575 lf, to match the length of road, and therefore the approximate cost, of the Preferred Alternative);
- Alternative 4: Access from Prospect Street at north lot line (long version: 2,075 lf, to extend fully into the main proposed development area west of the wetland).

Attached for reference purposes are preliminary plans showing each of the above referenced alternatives.

This alternatives analysis considers the following factors:

1. Factors related to wetland interests:
  - a. RFA alteration (Inner and Outer Riparian zones, considering “Degraded” and “non-Degraded” RFA);
  - b. BVW fill;
  - c. Buffer Zone alteration, including the 100-foot, 50-foot, and 25-foot Buffer Zones; and
  - d. Whether the existing culvert would be improved to Massachusetts Stream Crossing Standards;

2. Factors related to feasibility and the requirement that an alternative (for non-degraded RFA) be “substantially equivalent economically:”
  - a. Length of roadway (as a general measure of cost to construct); and
  - b. Numbers of house lots that allow for the placement of a market-compatible house and appurtenances (as a general measure of revenue) including a septic system, with consideration as to the character of the lots (e.g., sufficient upland to allow for a suitable yard).

The following Table 1 provides a comparative analysis of the impacts to BVW, Buffer Zone and Riverfront Area for each of the considered alternatives. Additional breakdown of proposed alteration to RFA (degraded vs non-degraded) is provided in Table 1 Notes.

**Table 1:**  
**Alternatives and Measurement Criteria**

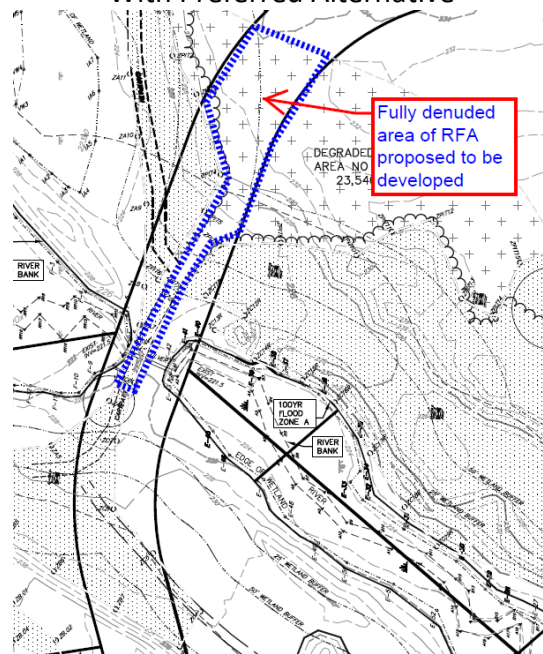
Alternative	Road length	# Lots	BVW Fill	RFA Alt.	Inner RFA Alt.	Outer RFA Alt.	Buffer Zone Alt.	Culvert Upgrade?	Other
No Build	0	0	0		0	0	0	No	
Preferred	1,655	10	580	44,682	18,838 <sup>3</sup>	25,844 <sup>3</sup>	16,180	Yes	
Alt 1	3,070	14	580	44,682	18,838 <sup>3</sup>	25,844 <sup>3</sup>	51,530	Yes	
Alt 2	2,080	9	580	26,617	11,253	15,364	32,805	Yes	Insufficient site Distance
Alt 3	1,575	5	450	0	0	0	35,350 <sup>4</sup>	No	
Alt 4	2,170	10	450	0	0	0	35,350 <sup>4</sup>	No	

**NOTES:**

1. All areas in square feet.
2. RFA impact calculations are based on the original (“RD” series flagging) Mean Annual High Water delineation.
3. For the proposed upgraded crossing at the existing culvert (Alternatives: Preferred, 1 & 2) this includes both degraded and non-degraded RFA:
  - a. 18,838 sf Inner RFA = 9,580 degraded + 9,258 non-degraded
  - b. 25,844 sf Outer RFA = 11,851 degraded + 13,993 non-degraded.

Within the Degraded RFA approximately half (visual estimate) is fully denuded by mining, with the remainder exhibiting varying degrees of plant colonization, as outlined in the figure below:
4. 35,350 Buffer Zone Alteration includes:
  - a. 0-25 ft BZ: 9,920 sf
  - b. 25-50 ft BZ: 13,011 sf
5. Area calculations for alternative layouts are estimates based on road right of way only.
6. BVW impacts at the existing/ proposed wetland crossing are calculated conservatively here to include the defined stream channel and areas below the Mean Annual High Water of the stream.

Fully Denuded Area of Proposed RFA Alteration  
With Preferred Alternative



**Analysis**

Each of the alternatives is compared to the Preferred Alternative below based on the criteria/ factors noted above.

- The No-Build Alternative:  
The No-Build Alternative would have no wetland impacts but would not allow for any economic return or meet the project purpose. Therefore, the No-Build Alternative is not a substantially equivalent economic alternative. It also would not replace the existing small culvert with the proposed box culvert compliant with Stream Crossing Standards.
- Preferred Alternative:  
The Preferred Alternative proposes a 1,655 linear feet ("lf") roadway that would provide frontage for 10 house lots. It makes use of the degraded RFA to the extent feasible, including the fully denuded portion of the degraded RFA:
  - Overall, of the total RFA included in the preferred alternative (44,682 sf), 21,431 is degraded (48%)

- Inner Riparian zone impact = 18,838 sf, of which 11,851 sf is degraded (51%);
- Outer Riparian zone = 25,844 sf, of which 11,851 sf is degraded (46%).

Importantly, the Preferred Alternative would replace the undersized existing culvert with a large box culvert compliant with Stream Crossing Standards. A BVW area of 580 sf would be required outside the existing crossing, with BVW replication in excess of this amount provided. The Preferred Alternative presumes that the length of dead end is acceptable to the Planning Board.

- Alternative 1:  
Alternative 1 proposes a through access roadway of approximately 3,070 +/- lf of roadway looping to and from Prospect Street and providing two means of access/egress to the proposed lots in the subdivision. Alternative 1 would extend the Preferred Alternative to the north, combining with Alternative 3 (discussed below). Alternative 1 is also subject to the discretion of the Planning Board, but provides two connections to the existing public way, which is generally preferred by planning boards. Should the Planning Board determine that the proposed length of dead-end street under the Preferred Alternative does not meet public safety standards and the necessary requirements for fire protection, Alternative 1 may be required by the Planning Board. Notwithstanding the Planning Board's determination regarding the maximum acceptable length of a dead-end street, Alternative 1 results in the same impacts to BVW and RFA alteration as the Preferred Alternative, but requires substantially more alteration of Buffer Zone (51,530 sf vs 16,180 sf) including 8,920 sf in the 0-25-foot Buffer Zone and 13,011 sf in the 25-50-foot Buffer Zone.
- Alternative 2:  
Alternative 2 proposes a single access roadway from Prospect Street ending with a turnaround cul de sac with approximately 2,080 +/- lf of roadway that provides access to 9 lots. This alternative requires an additional 430 +/- feet of additional roadway than the Preferred Alternative. This alternative results in the same impacts to BVW, less impacts to RFA, and greater Buffer Zone alteration compared to the Preferred Alternative. Notwithstanding proposed wetland impacts, Alternative 2 is not a viable alternative due to the close proximity of its proposed Prospect Street connection to the Lake Street/Prospect Street intersection. This situation results in inadequate site distance to meet minimal acceptable public safety standards. For these reasons Alternative 2 is therefore dismissed.
- Alternative 3:  
Alternative 3 proposes a single access roadway from the northerly property line off Prospect Street ending in a turnaround cul de sac. This single access roadway



is proposed to be a similar length of roadway to the Preferred Alternative, approximately 1,575+/- lf. In addition, although Alternative 3 would not have impacts to BVW or RFA, Alternative 3 would require an additional impact to Buffer Zone of approximately 19,170 sf (0.44 acre) when compared to the Preferred Alternative. Moreover, for the same reasons as described in Alternative 1, this alternative would be at the discretion of the Planning Board regarding its determination regarding the acceptable maximum length of a dead-end street. Notwithstanding the Planning Board's ultimate oversight, this alternative results in 5 fewer lots within the proposed subdivision, and therefore is not substantially equivalent economically to the Preferred Alternative. For these reasons this alternative is dismissed. Alternative 3 would not provide for the upgrade of the undersized existing culvert to Stream Crossing Standards.

- Alternative 4:

Alternative 4 proposes a single access roadway from the northerly property line off Prospect Street ending in a turnaround cul de sac similar to Alternative 3. This single access roadway is proposed to be approximately 2,170+/- lf, approximately 515+/- lf more than the roadway proposed in Preferred Alternative. Again, for the same reasons as described in Alternative 1, this alternative would be at the discretion of the Planning Board regarding its determination regarding the maximum length of a dead-end street. While Alternative 4 would provide for the same number of lots as the Preferred Alternative, the additional 515+/- lf of roadway required to provide access for the same number of lots would be at a significant additional expense of approximately \$400,000 – \$500,000 to generate return similar to the preferred Alternative. Thus, Alternative 4 is not a “substantially equivalent economic alternative” when compared to the Preferred Alternative. In addition, although Alternative 4 would not have impacts to BVW or RFA, Alternative 4 would require an additional impact to Buffer Zone of approximately 19,170 sf (0.44 acre). Alternative 4 would not provide for the upgrade of the undersized existing culvert to Stream Crossing Standards. For these reasons Alternative 4 is dismissed.

### **Summary:**

It is therefore EcoTec's opinion that there is no practicable and substantially equivalent economic alternative to the Preferred Alternative proposed project (residential subdivision) with less adverse effects on the wetland interests, and that the proposed wetland crossing meets the regulatory performance standards for the resource areas proposed to be impacted, and also satisfies the Stream Crossing Standards (for new culverts) and Limited Project Roadway provisions.

- The no-build alternative does not accomplish the project purpose;

- Alternative 1 (unless otherwise required, e.g., Planning Board) is rejected because it involves more impact and cost than the Preferred Alternative
- Alternative 2 is not practicable, because it is not a safe alternative;
- When comparing Alternatives 3 or 4 to the Preferred:
  - Similar BVW impact: (450 vs 580 sf)
  - Much larger Buffer Zone alteration: (35,350 sf vs 16,180 sf)
  - No culvert upgrade to Stream Crossing Standards
  - Not substantially equivalent economically (either reduced lots or increased road length)

Encs:

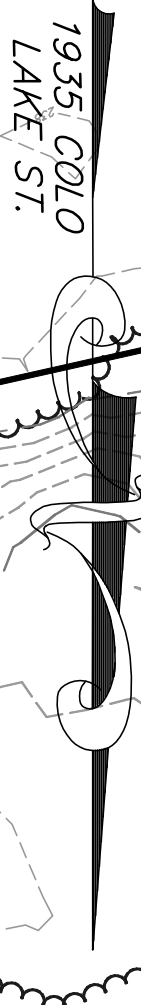
- RFA Calculation Figure: GLM Engineering
- Alternative project configuration figures: GLM Engineering
  - Preferred Alternative (on Degraded RFA plan)
  - Alternative 2
  - Alternative 3
  - Alternative 4
  - (NOTE: Alternative 1 is a combination of the Preferred Alternative and Alternative 3)

c: MassDEP

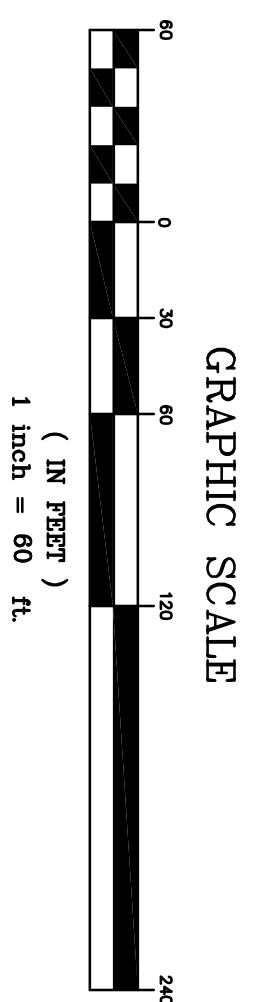
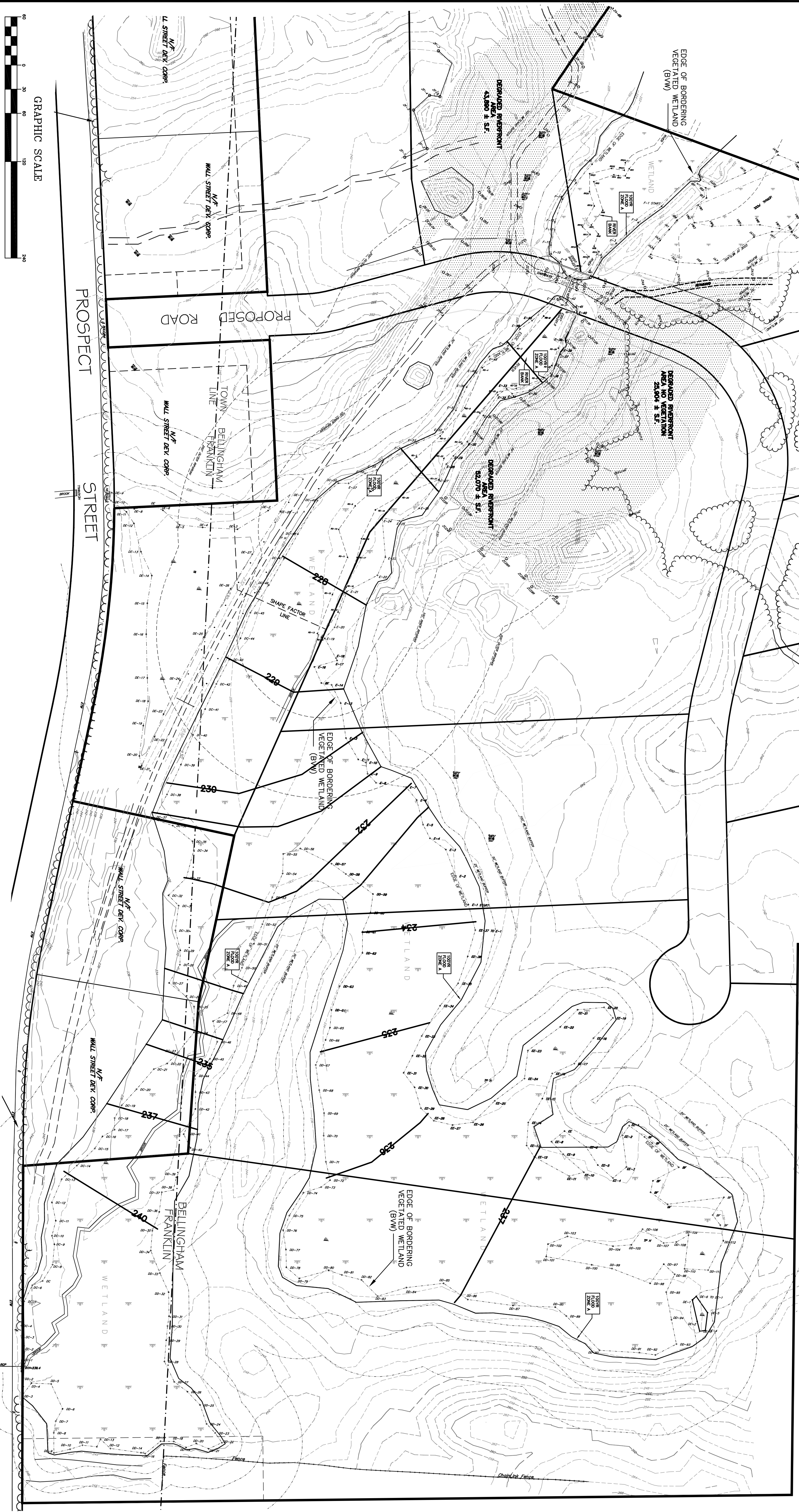
Project Team:

Lou Petrozzi, Wall Street Development  
Robert Truax, PE - GLM Eng.,

- LEGEND
- EXISTING UTILITY POLE
  - EXISTING HYDRANT
  - EXISTING WATER LINE
  - EXISTING CONTOUR LINE
  - PROPOSED CONTOUR LINE
  - PROPOSED CATCH BASIN
  - PROPOSED DRAIN MANHOLE
  - PROPOSED DRAIN LINE
  - PROPOSED CAPE COD BERM
  - WETLAND DELINEATION FLAG
  - DEEP HOLE TEST PIT



PERFERRED ALTERNATIVE	
100-200' RIVERFRONT ALTERATION:	25,844 S.F.
0-100' RIVERFRONT ALTERATION:	18,838 S.F.
0-100' RFA:	9,580 S.F. DEGRADED
100-200' RFA:	11,851 S.F. DEGRADED
BYW FILLED:	580 ± S.F.
LENGTH OF ROADWAY:	1,655 ± L.F.




DEGRADED RIVERFRONT AREA

REVISIONS		
No.	DATE	DESCRIPTION
1	03/02/2022	Conservation Application
2	07/12/2022	Conservation (40 Scale Plan)
3	10/11/2022	Response to Comments
4	12/07/2022	Riverfront Degraded Areas

DEFINITIVE SUBDIVISION PLAN  
PROSPECT HILL ESTATES  
BELLINGHAM, MASSACHUSETTS

PREPARED FOR:  
WALL STREET DEVELOPMENT CORP.  
P.O. BOX 272  
WESTWOOD, MASSACHUSETTS



GLM Engineering  
19 EXCHANGE STREET  
HOLLISTON, MA 01746  
P: 508-429-1100  
F: 508-429-7160  
www.GLMengineering.com

JOB No. 16,590

DATE: MARCH 2, 2022

SCALE: 1"=60'

SHEET: 18 of 25

PLAN #: 27,541

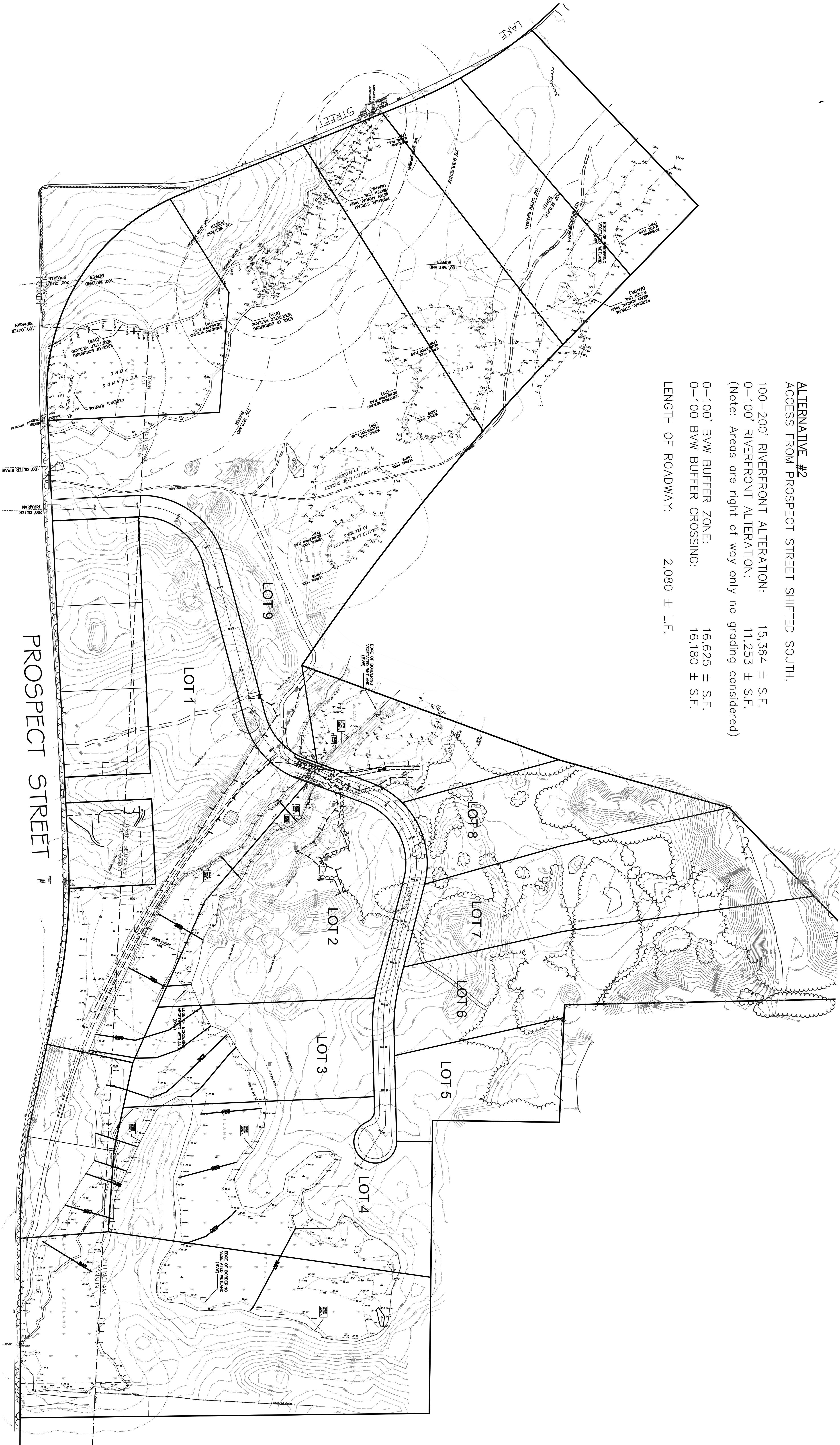


ALTERNATIVE #2  
ACCESS FROM PROSPECT STREET SHIFTED SOUTH.

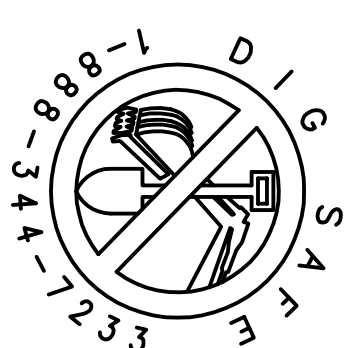
100-200' RIVERFRONT ALTERATION: 15,364 ± S.F.  
0-100' RIVERFRONT ALTERATION: 11,253 ± S.F.  
(Note: Areas are right of way only no grading considered)

0-100' BWV BUFFER ZONE: 16,625 ± S.F.  
0-100 BWV BUFFER CROSSING: 16,180 ± S.F.

LENGTH OF ROADWAY: 2,080 ± L.F.



PROSPECT STREET



NOTE: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. DIGSAFE IS TO BE NOTIFIED 72 WORKING HOURS IN ADVANCE OF CONSTRUCTION. DIGSAFE 1-888-344-7233

REVISIONS			F.L.D.:
No.	DATE	DESCRIPTION	DRW.:
1	12/10/22	RIVERFRONT AREA	
			CHKD.:

**GLM** Engineering Consultants, Inc.  
19 EXCHANGE STREET  
HOLLISTON, MA 01746  
P: 508-429-1100 F: 508-429-7160  
www.GLMengineering.com

ALTERNATIVE #2  
PROSPECT HILL ESTATES  
BELLINGHAM, MASSACHUSETTS  
PREPARED FOR:  
WALL STREET DEVELOPMENT CORP.

JOB No.	16,580
DATE:	AUG. 31, 2022
SCALE:	1"=100'
SHEET:	1 of 1
PLAN #:	









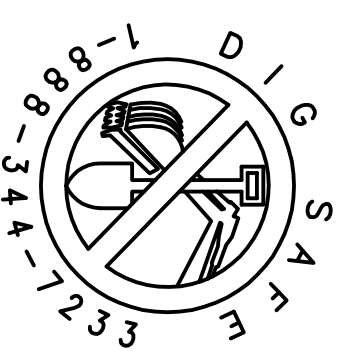
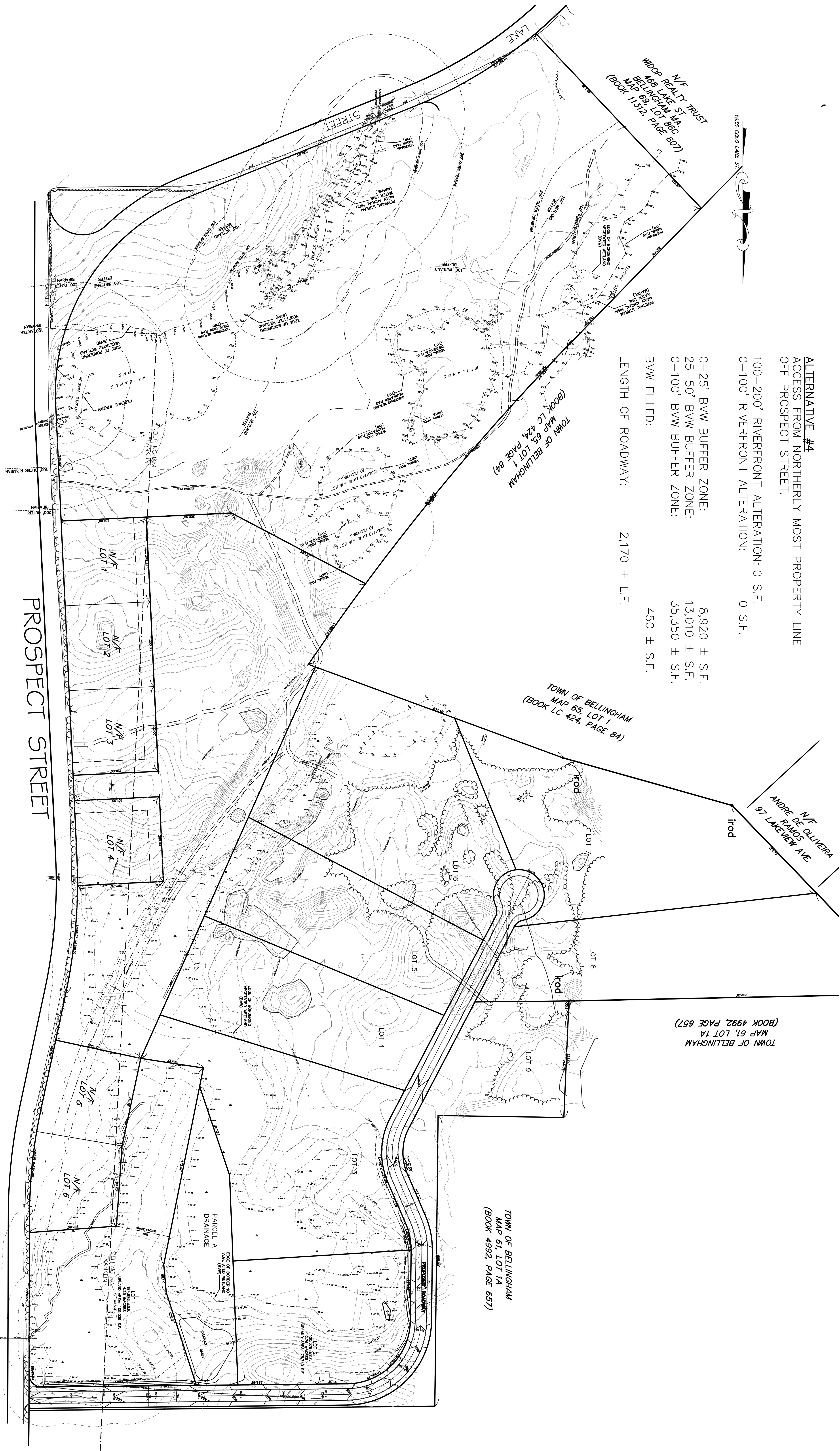
ALTERNATIVE #4  
ACCESS FROM NORTHERLY MOST PROPERTY LINE  
OFF PROSPECT STREET.

100-200' RIVERFRONT ALTERATION: 0 S.F.  
0-100' RIVERFRONT ALTERATION: 0 S.F.

0-25' BWV BUFFER ZONE:	8,920 ± S.F.
25-50' BWV BUFFER ZONE:	13,010 ± S.F.
0-100' BWV BUFFER ZONE:	35,350 ± S.F.

BVW FILLED: 450  $\pm$  S.F.


LENGTH OF ROADWAY: 2,170 ± L.F.



NOTE: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION.

DIGSAFE IS TO BE NOTIFIED 72 WORKING HOURS IN ADVANCE OF CONSTRUCTION.

DIGSAFE 1-888-344-7233

REVISIONS			F.L.D.:	<div> <b>GLM</b> Engineering Consultants, Inc. 19 EXCHANGE STREET HOLLISTON, MA 01746 P: 508-429-1100 F: 508-429-7160 www.GLMengineering.com</div> <div><div>ALTERNATIVE #4 PROSPECT HILL ESTATES BELLINGHAM, MASSACHUSETTS</div><div>PREPARED FOR: WALL STREET DEVELOPMENT CORP.</div></div>
No.	DATE	DESCRIPTION	DRW.:	
1	10/24/22	WETLAND IMPACTS		
CHKD.:				
				JOB No. 16,590
				DATE: AUG. 31, 2022
				SCALE: 1"=100'
				SHEET: 1 of 1
				PLAN #: