Director	Municipal Manager

COUNCIL AGENDA	
Date: June 3, 2024	Item: 7.

7.

DISTRICT OF WEST VANCOUVER

750 17TH STREET, WEST VANCOUVER BC V7V 3T3

COUNCIL REPORT

Date:	May 2, 2024
From:	Hanna Demyk, Planning Technician
Subject:	Proposed Development Permit with Variances at 2368 Bellevue Avenue
File:	1010-20-23-079

RECOMMENDATION

THAT the applicant for the proposed "Development Permit No. 23-079" for 2368 Bellevue Avenue be directed to revise their application to respond to staff advice as outlined in the report dated May 2, 2024.

1.0 Purpose

To present to Council a proposed development permit with variances to allow a new single-family dwelling at 2368 Bellevue Avenue.

2.0 Legislation/Bylaw/Policy

Provincial Legislation

The *Local Government Act* allows the designation of Development Permit Areas (DPAs) for the purposes of establishing objectives for the form and character of intensive residential development and for protection of development from hazardous conditions.

Official Community Plan

The *Official Community Plan (OCP)* includes requirements and conditions for the development of lands designated by the OCP within the Ambleside Apartment DPA to promote a high standard of construction; integrate new development with existing views, circulation, and the character of existing buildings; and promote an interesting, pedestrian friendly streetscape design and pedestrian linkages subject to Guidelines BF-B4 specified in the OCP.

The OCP also includes requirements and conditions for the development of lands designated by the OCP as a DPA to minimize risk to people and property from coastal hazards including sea level rise, storms, wave effects, and flooding; support coastal management in reducing flooding risks; and preserve and enhance the integrity of the intertidal habitat of the foreshore and minimize shoreline erosion in accordance with the Guidelines NE2 specified in the OCP.

Zoning Bylaw

The Zoning Bylaw regulates permitted uses, form, and location of buildings and structures on individual lots. The subject site is zoned Multiple Dwelling Zone 1 (RM1), which permits both multi-family and single-family dwellings.

3.0 Official Community Plan and Council Strategic Objective(s)

3.1 The OCP includes community-wide policies in support of proposals that respect neighbourhood character:

2.1.8 Ensure that new single-family dwellings respect neighbourhood character by:

a. Reviewing regulations controlling the scale of new single-family dwellings;

b. Applying and updating built-form guidelines, as relevant, in regards to neighbourhood context and character, streetscape and natural features, and

c. Requiring all development permit applications, rezoning applications, and variance applications to include a section demonstrating how the proposed project respects or enhances existing neighbourhood character.

3.2 Ambleside Apartment Area Design Guidelines BF-B4 in the OCP, which apply to the subject site, also highlight the importance of considering surrounding neighbourhood context as part of development proposals. Relevant guidelines include the following excerpts:

I. Context and Site Design

c. Minimize obstruction of views from public pedestrian areas, common living areas or other developments, and from existing residential units.

II. Building Design

d. Detailing should be designed in keeping with the character of the building and landscape.

h. Avoid blank or undifferentiated facades at the ground level.

k. Design buildings and landscape elements to minimize shading, and intrusion on privacy of adjacent buildings.

III. Landscape Design

a. Integrate landscape features and elements with the adjacent streetscape, use established vegetation where feasible, and provide a mature and varied appearance upon construction completion.

4.0 Background

4.1 Existing Conditions

The subject site is zoned RM1, 1,258.3 m^2 in area, and located in the Dundarave neighbourhood. The site is currently occupied by a two-storey building consisting of one dwelling unit on the main storey and two dwelling units on the upper storey (Figure 1). All three dwelling units have been purchased by the current owners and the site is currently being used as a single-family dwelling.

Figure 1 - Subject Site and Surrounding Context

Site access is provided through an existing easement registered on title allowing the owners of Lot B (2368 Bellevue Avenue) to access the site with or without vehicles through Lot A (the Seastrand at 150 24th Street).

4.2 History and Previous Decisions

On December 7, 1978, the District registered a covenant on the subject site restricting development of the lands to one residential building comprising no more than three dwelling units with a maximum cubic area of 71,300 cubic feet measured from the top of the finished main floor to the top of the roof, excluding exterior stairs and chimneys. The covenant was designed to specifically accommodate the existing building.

In 1986, previous co-owners of 2368 Bellevue Avenue requested permission from the District to change the form of ownership of the subject property from a joint tenants-in-common arrangement to a separate strata title for each of the three suites in the existing building. The subject site was converted into three strata lots numbered Lots 1, 2 and 3 under the *Condominium Act* on July 15, 1986.

In 2023, representatives for the owners requested wind up of the strata corporation contending that the strata corporation is no longer relevant as all units were owned by the current owners and their intent was to develop a new single family dwelling on the property. On December 4, 2023, Council approved wind up of the strata corporation for Strata Plan VAS1722 at 2368 Bellevue Avenue, as described in the report dated November 9, 2023.

5.0 Analysis

5.1 Current Proposal

The owners are proposing to construct a new single-family dwelling, pool, hot tub, covered patio, driveway, retaining walls, and landscaping on the subject site (Figure 2; **Schedule A of Appendix A**).

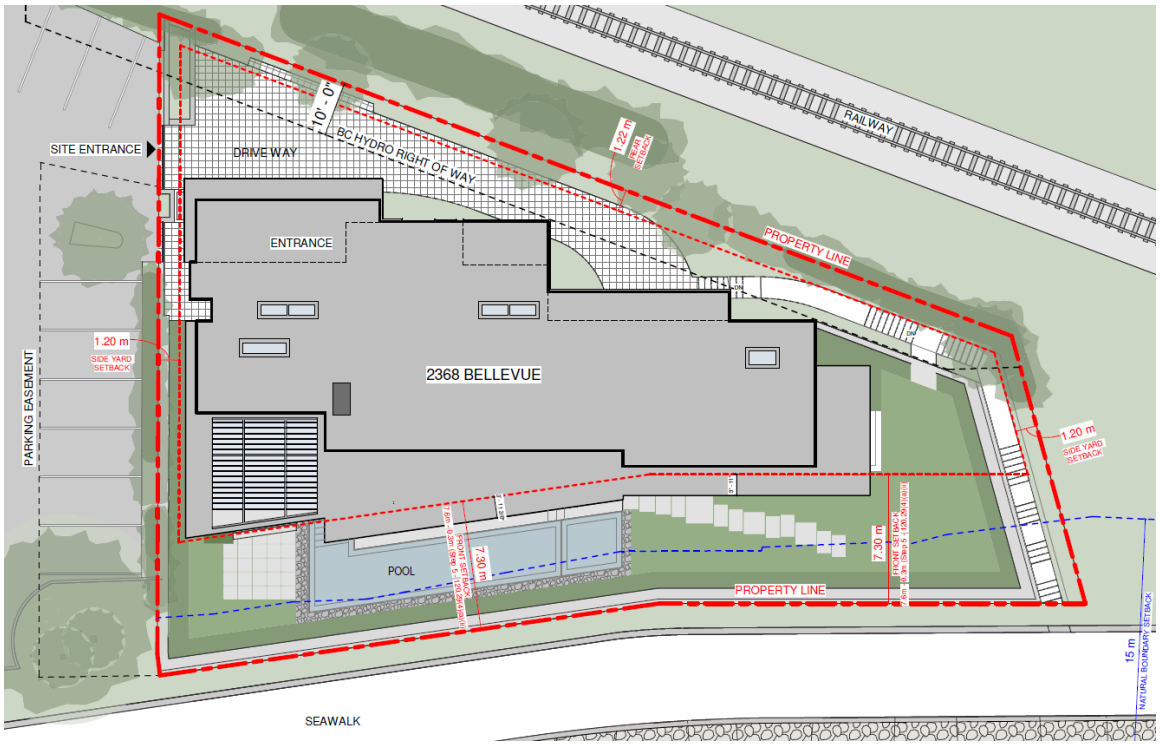


Figure 2 – Site plan showing proposed development.

Proposed house design

The house is proposed to be two storeys and 7.91 m in height, which is approximately 1.2 m taller than the existing building (Figure 3). While the existing building consists of habitable space on the two storeys, in compliance with foreshore DPA guidelines in the OCP the proposed residential dwelling is required to keep habitable space above the Flood Control Level (FCL), which is determined to be 7.01 m for the subject site (**Schedule C of Appendix A**). As such, the proposed home includes habitable space above FCL at a main floor elevation of 7.30 m with flood-proof space on the lower level, including a garage, storage room, mechanical room, and gym.

	RM1 zone requirement	Existing building	Proposed dwelling
Number of Storeys	Maximum 2 storeys	2 storeys (2 habitable storeys)	2 storeys (1 habitable storey above FCL)
Building Height	Maximum 7.62 m (7.92 m for Step 5) (26 ft.)	6.7 m (22 ft.) (estimate based on historical plans)	7.91 m (26 ft.) (Step 5 proposed)
Site Coverage	Maximum 40%	30% (estimate based on historical plans)	29.5%
Floor Area Ratio	No maximum for single-family dwellings	N/A	N/A
Cubic Area (Covenant F85424)	Maximum 71,300 ft^3 (measured from top of finished main floor to top of roof)	71,300 ft^3	53,581.5 ft^3

Figure 3 – Comparison or zoning/covenant requirements, existing building, and proposed dwelling.

Proposed retaining (flood protection) walls

The proposal also includes new retaining walls along the south, west, and east of the subject site (**Schedule A of Appendix A**). The retaining walls are proposed to be constructed adjacent to property lines, allowing for additional yard space to the south of the site where a pool, hot tub, and covered patio spaces are proposed (Figure 4).

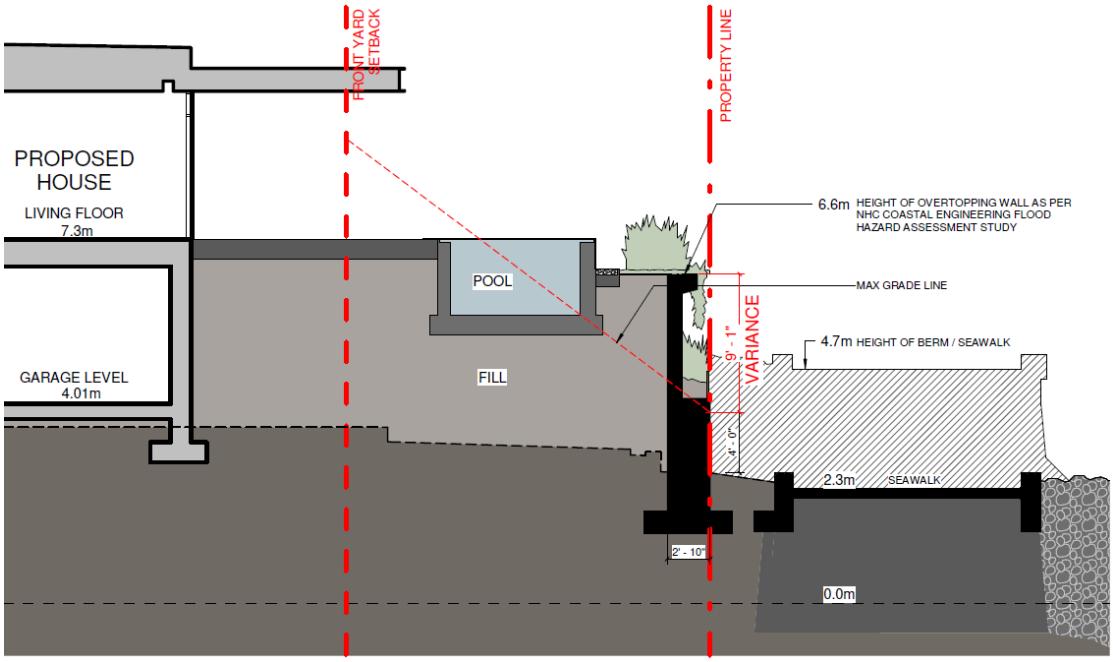


Figure 4 – Section showing proposed retaining wall to the south of the site adjacent to the Centennial Seawalk.

The applicant proposes zoning bylaw variances to retaining wall height and grade line angle as per proposed plans and outlined below (Figure 5). In general, the maximum permitted height of a retaining wall adjacent to a property line is 1.2 m. The retaining wall along the south property line is

proposed to be 4.1 m in height, 2.9 m taller than permitted in the zoning bylaw. The retaining wall along the west property line is proposed to be 2.3 m in height, 2.1 m taller than permitted in the zoning bylaw. The proposed retaining wall to the east of the site complies with zoning regulations adjacent to the property line but requires a variance to the required grade line angle. Overall, this would result in a significantly higher wall located adjacent to the Centennial Seawalk than would otherwise be permitted as shown in Figure 4.

Zoning Regulation	Permitted	Proposed	Variance
Section 120.22 Retaining wall height (south)	Maximum 1.2 m (4 ft.)	4.1 m (13.1 ft.)	2.9 m (9.1 ft.)
Section 120.22 Retaining wall height (west)	Maximum 1.2 m (4 ft.)	2.3 m (10.85 ft.)	2.1 m (6.85 ft.)
Section 120.22 Maximum grade line angle for retaining wall (east)	Maximum 1.2 m (4 ft.) at property line and in towards property at 36.9^{o} grade line	1.2 m (4 ft.) at property line and in towards property at 45^{o} grade line	8.1^{o} grade line

Figure 5 – Proposed Zoning Bylaw Variances.

Proposed landscaping, tree retention and tree removal

The applicant is proposing on-site landscaping and landscaping on District lands between the south property line and Centennial Seawalk (**Schedule B and D of Appendix A**). Landscaping on District lands requires approval prior to installation. All landscaping will be installed at the cost of the owners, however landscaping on District lands will be maintained by the District after installation. As part of the proposed development, all on-site trees are proposed for removal. A variety of trees, shrubs, grasses, and perennials are proposed to be planted on and off-site.

5.2 Public Engagement and Outreach

On April 17, 2024, the applicant held an informal information meeting with residents of the Seastrand at 150 24th Street to present the proposed development, answer questions, and receive feedback. Approximately 35 to 40 residents attended the meeting. Additionally, in compliance with the *Development Procedures Bylaw*, the applicant held a Proposed Development Information Meeting on April 18, 2024, from 6 p.m. to 8 p.m. at the West Vancouver Community Centre. The applicant sent out public notices to residents within 100 m of the subject site (256 notices) two weeks prior to the meeting. A total of 18 residents attended the meeting.

Since the information meeting, staff have directly received letters from 19 residences in support of the proposed development and 2 letters raising concerns or in opposition of the proposed development.

Discussions during information meetings and feedback received directly by staff include comments in support of the proposed development, including:

- That the proposed flood protection walls and zoning variances are reasonable and thoughtfully designed to provide safety and protection to the site;
- the proposed house design is beautiful and would add value to surrounding properties;
- the proposal would provide significant improvement to the current state of the seawalk and property;
- the District's current bylaws are punitive and would lead to the applicant losing a large portion of their property; and
- the District should be subject to the same rules as property owners and build the seawalk up to a safe height for protection from future flood events.

Staff also received comments raising concerns for the proposal, summarized (with responses shown in highlighted text) as follows:

- That the proposed development would lead to view loss due to the elongated horizontal house design to the east of the property.

  *Architectural plans (**Schedule A of Appendix A**) include clear comparisons of existing and proposed buildings. Additionally, the applicant provided photos showing potential impact of the development proposal on neighbour views upon request (**Appendix B**).*

- Concern about whether the proposed trees and landscaping would impact neighbour views.

  During public information meetings, the applicant stated that the proposed variety and placement of trees and shrubs was specifically chosen to minimize impact on neighbour views.

- Concern about whether the proposed flood protection walls would impact the Seastrand site to the west during flood events.

  The applicant's coastal flood protection engineer responded by email confirming that the proposed development and flood protection measures are not expected to intensify the wave activity or flooding, already potentially impacting the Seastrand property, as the proposed development is located a considerable distance away from the Seastrand high-rise property (approximately 20 meters).

- Concern about construction activities if the proposal proceeds.

  The applicant stated that construction will take approximately two years to complete and trucks will access the site via the right-of-way on the Seastrand property, which will be limited to one truck at a time over the parkade. The applicant also referred to an engineering study regarding the structural capacity of the parkade stating that the parkade is capable of supporting all construction traffic except concrete trucks. As such, the applicant intends to

pump concrete from 24th Street from a pump truck through a pipe to be temporarily installed along the south of the sites.

Other concerns and comments raised by residents include that the proposed retaining walls would set a precedent for future infill waterfront development in the District and noted that rather than proceeding with the proposed development the District should purchase the site to be used as a public park for the benefit of the community.

5.3 Staff Analysis

It is in staff's opinion that the proposed house design aligns with Ambleside Apartment DPA Guidelines BF-B4, is in keeping with the surrounding neighbourhood character, and has been designed to minimize impact on neighbour views. While the proposed house is wider than the existing building, the home is similar in height to the existing building and has been designed to comply with applicable site restrictions, foreshore DPA requirements, and zoning regulations as outlined in this report. As such, staff do not have concerns regarding the proposed house design.

However, since preliminary discussions with the applicant in 2022, staff have raised concern regarding the impact of the proposed raised retaining walls on the public realm, particularly the public view of the large wall faces from the seawalk. Given staff concerns, the applicant has previously been provided with the following alternative options:

a. Revise the proposal to include additional stepped retaining walls in compliance with retaining wall and grade line requirements of the Zoning Bylaw, moving site protection away from the seawalk/public realm; or

b. push the proposed raised retaining wall further behind the property line to provide additional landscaping and buffering between the private and public realm.

Staff acknowledge that both scenarios would need to be reviewed by the applicant's coastal engineer and would lead to a reduction in useable front yard area on the subject site. However, it is our understanding that these options have not been fully considered to date (i.e. review and design development by the applicant's coastal engineer). Instead, the applicant has chosen to proceed with the current proposal which would minimize impact of future flood events on the private property.

6.0 Options

6.1 Recommended

a) THAT Council defer the proposed development permit back to staff and direct the applicant to work with staff to revise the retaining wall design as per alternative options outlined in Section 5.3 of this report; and

b) THAT staff be directed to bring the proposed development permit back to Council once revisions have been made addressing staff concerns.

6.2 Considered Options

Council may:

a) Set a date (to be specified) for Council consideration of Development Permit 23-079, as presented in the report dated May 2, 2024.

8.0 Conclusion

Staff do not have concerns regarding the proposed house design on the subject site as the applicant has demonstrated that the proposed house aligns with Guidelines BF-B4 in the OCP, is in keeping with the neighbourhood character, and complies with site restrictions and applicable zoning regulations. However, staff are concerned with the proposed zoning variances to allow raised retaining walls adjacent to the seawalk/public realm. It is in staff's opinion that the proposed retaining wall design should be revised to reduce impact on the public realm prior to consideration of the development permit by Council.

Author: Hanna Demyk

Hanna Demyk, Planning Technician

Concurrence:

Michelle McGuire, Senior Manager of Current Planning and Urban Design

Appendices:

A. Proposed Development Permit 23-079 with Schedules:

   Schedule A - Architectural Plans prepared by Feenstra Architecture Inc. dated August 17, 2023.

   Schedule B - Landscape Plans prepared by Waterform Design Inc. dated June 19, 2023.

   Schedule C - Flood Hazard Assessment prepared by Northwest Hydraulic Consultants Ltd. dated July 6, 2023.

   Schedule D - Arborist Report prepared by Burley Boys Tree Service Ltd. dated November 22, 2023.

   Schedule E - Construction Environmental Management Plan prepared by Balanced Environmental dated July 6, 2023.

B. Photos from applicant showing impact of proposed development on neighbour views dated April 25, 2024.

Appendix A

District of West Vancouver

Proposed

Development Permit No. 23-079

CURRENT OWNER: Phillip John Cotterill and Janice Christine O'Sullivan
of 2368 Bellevue Avenue
West Vancouver, BC
V7V 1C8

THIS DEVELOPMENT PERMIT APPLIES TO:

CIVIC ADDRESS: 2368 Bellevue Avenue

LEGAL DESCRIPTION: 032-137-991
LOT 1 DISTRICT LOTS 554 AND 3156 GROUP 1 NEW WESTMINSTER DISTRICT PLAN EPP130449
(the 'LANDS')

1.0 This Development Permit:

(a) imposes requirements and conditions for the development of the Lands, which are designated by the Official Community Plan within the Ambleside Apartment Development Permit Area to promote a high standard of construction; integrate new development with existing views, circulation, and the character of existing buildings; and promote an interesting, pedestrian friendly streetscape design and pedestrian linkages subject to Guidelines BF-B 4 specified in the Official Community Plan;

(b) imposes requirements and conditions for the development of the Lands, which are designated by the Official Community Plan as a Development Permit Area to minimize risk to people and property from coastal hazards including sea level rise, storms, wave effects, and flooding; support coastal management in reducing flooding risks; and preserve and enhance the integrity of the intertidal habitat of the foreshore and minimize shoreline erosion in accordance with the Guidelines NE2 specified in the Official Community Plan; and

(c) is issued subject to the Owner's compliance with all of the Bylaws of the District applicable to the Lands, except as varied or supplemented by this Permit.

2.0 The following requirements and conditions shall apply to the Lands:

2.1 Building, structures, driveways, and site development shall take place in accordance with the attached **Schedule A and B** attached hereto.

2.2 Zoning Bylaw No. 4662, 2010, as amended, shall be varied to allow the buildings and structures as described on proposed plans in **Schedule A**.

2.3 Notwithstanding Condition 2.1, the Director of Planning and Development Services may determine that minor changes to the proposal still comply with the Development Permit plans where proposed changes do not

materially affect the intent of the plans attached to this Development Permit.

2.4 All habitable space shall be built above the Flood Construction Level 7.01 m unless floodproofed.

2.5 Recommendations for safe use of the property provided in Section 6 of the Flood Hazard Assessment (**Schedule C**) shall be adhered to. Proposed changes to these recommendations must be approved by a Professional Engineer as defined in Official Community Plan Guidelines NE2.

2.6 Tree work within 15 m of the natural boundary (high tide mark) of the ocean (Foreshore Protection Area) shall be completed in accordance with **Schedule D** attached hereto.

2.7 This Permit allows the removal of Tree #5, #14, and #15, Protected Trees within the Foreshore Protection Area and Tree # 3, # 4, and #7 Protected Trees outside the Foreshore Protection Area. Tree removals approved through this Permit shall only be completed after building permit issuance.

2.8 To compensate for the removal of the Protected Trees within the Foreshore Protection Area, replanting of native species of trees and/or shrubs will be completed at a ratio of 2:1 for replacement trees, 4:1 for replacement shrubs, or a combination of both, within the Foreshore Protection Area.

2.9 The nesting season for songbirds is from March 1 to August 31. This Permit does not constitute an approval under, or relieve the Permittee from complying with, any federal or provincial statute or regulation governing the Permittee's use and development of the Lands, including but not limited to the *Fisheries Act*, *Water Sustainability Act* and regulations, *Species at Risk Act*, *Heritage Conservation Act, Wildlife Act*, *Migratory Birds Convention Act* and regulations, and *Weed Control Act*.

2.10 On-site landscaping shall be installed at the cost of the Owner in accordance with the attached **Schedule B**.

2.11 Off-site landscaping between the subject property line and Centennial Seawalk shall be installed at the cost of the Owner generally in accordance with the attached **Schedule B**, however the District's Parks Department must provide final approval of the off-site landscaping prior to installation. Once installed, off-site landscaping shall be maintained by the District.

2.12 Prior to any site clearing, rock removal, grubbing, stripping, shrub or tree removal, re-contouring or construction on the Lands, sediment and erosion control works shall be installed in accordance with a sediment and erosion control plan and approved on-site by the Land Development Technician.

2.13 Site works within the Foreshore Protection Area must be carried out in accordance with the Construction Environmental Management Plan (**Schedule E**) attached hereto to mitigate environmental impacts to foreshore habitat.

2.14 The sediment and erosion control works shall be removed only upon written approval by the Land Development Technician.

3.0 Prior to Building Permit application and as security for the due and proper completion of the measures to preserve and enhance the integrity of the intertidal habitat of the foreshore set forth in Section 2 of

this Development Permit (the "Foreshore Protection Measures"), the Owner shall:

3.1 Provide security in the amount of $10,000 to the District in the form of cash or cheque; and

3.2 maintain the security upon completion of the Foreshore Protection Measures, and not prior to the date on which the District Environmental Protection Officer authorizes in writing the release of the security.

4.0 Prior to commencing site work or Building Permit issuance, whichever occurs first, the Owner must:

4.1 Provide and implement a plan for traffic management during construction to the satisfaction of the District's Manager of Land Development.

4.2 Install tree, vegetation and/or hedge protection measures as required to the satisfaction of the District Arborist.

4.3 Submit a "Erosion and Sediment Control Plan" to the District's Land Development Technician for approval, which the Owner shall comply with and be responsible for maintaining, repairing and implementing the sediment control measures.

5.0 Prior to Occupancy Permit issuance:

5.1 Prior to final occupancy the applicant must submit documentation demonstrating that the "as-built" development complies with all requirements of this development permit. Any variations must be clearly identified with a rationale and explanation noting that planning staff review and approval may be needed for variations prior to final occupancy.

6.0 This Development Permit lapses if the work authorized herein is not commenced within 24 months of the date this permit is issued.

THE COUNCIL OF WEST VANCOUVER APPROVED THIS PERMIT BY RESOLUTION PASSED ON _____.

_____
MAYOR

_____
CORPORATE OFFICER

THE REQUIREMENTS AND CONDITIONS UPON WHICH THIS PERMIT IS ISSUED ARE ACKNOWLEDGED AND AGREED TO BY THE CURRENT OWNER. IT IS UNDERSTOOD:

- THAT OTHER PERMITS / APPROVALS MAY BE REQUIRED INCLUDING PERMITS / APPROVALS FOR BUILDING CONSTRUCTION, SOIL AND ROCK REMOVAL OR DEPOSIT, BOULEVARD WORKS, AND SUBDIVISION; AND

- THE DEVELOPMENT MUST ATTAIN REQUIREMENTS OF THE BC BUILDING CODE AND ANY VARIANCES TO THE ZONING BYLAW ARE THE RESPONSIBILITY OF THE OWNER AND MUST BE RECTIFED AT THE BUILDING PERMIT STAGE.

FOR THE PURPOSES OF SECTION 6.0 THIS PERMIT IS ISSUED ON _____.
(Council report dated May 2, 2024; eDocs # 5726542)

Schedules:

A – Architectural Plans prepared by Feenstra Architecture Inc. dated August 17, 2023.

B – Landscape Plans prepared by Waterform Design Inc. dated June 19, 2023.

C – Flood Hazard Assessment prepared by Northwest Hydraulic Consultants Ltd. dated July 6, 2023.

D – Arborist Report prepared by Burley Boys Tree Service Ltd. dated November 22, 2023.

E – Construction Environmental Management Plan prepared by Balanced Environmental dated July 6, 2023.

Schedule A

EASEMENTS - SITE ACCESS

G23882 to G23883

This charge allows the owner of Lot B (2368 Bellevue) to enter a part of Lot A (the neighbouring property to the west), for access purposes with or without vehicles and animals; and for access to and use of a parking area.

The extent of the parking easement directly west of the western property line of 2368 Bellevue can be seen on the Site Plan on Sheet A0.02.

G88297

This charge allows the owner of Lot B, (2368 Bellevue) a right to access and use over a portion of Lot A (the neighbouring property to the west), for the purpose of ingress and egress and to install and maintain an underground sanitary swer pipeline and other materials for conducting sewage from Lot B. Lot A owner shall not maintain any building, structure or obstruction upon the easement area nor shall diminish or add to the ground cover or construct any open drains or ditches along underground pipelines. The Easement Area shall be landscaped after consruction so that the surface will be graded evenly with the surface of the adjoining lands. However, the Lot A owner shall restore the easement area following the completition of any work done by Lot B owner.

STATUTORY RIGHT OF WAY - BC HYDRO ACCESS

346235M

This charge BC Hydro a right of access and use over a portion of the lands, to install and maintain poles with guy wires, anchors and transformers for the transmission and distribution of electrical energy and for the telephone and television purposes. The charge holder may clear the right of way of anything that may interfere with the works, including tress, growth, buildings or obstructions. The owner shall not place any building or structure or plant any growth exceeding 15 feet in height. BC Hydro shall pay compensation for any damage to crops or improvements that it causes in exercise of its rights.

The extent of the 10'-0" wide BC Hydro right of way can be seen on the Site Plan on Sheet A0.02.

VOLUME

COVENANT - VOLUME

F85424

This charge restricts development of the lands to one residential building comprising not more than three dwelling units with a maximum cubic area of 71,300 cubic feet measured from the top of the finished main floor to the top of the roof.

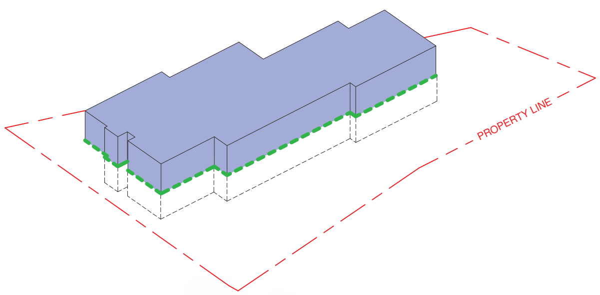
The main floor is located above the Flood Construction Level at an elevation of 7.3m GD.

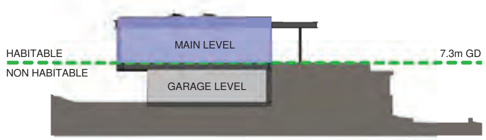
Maximum allowable volume = 71,300 ft³

Volume of habitable space = 53,581.5 ft³

Non habitable spaces

Finished main floor (at 7.3m GD)





PROJECT STATISTICS

2368 BELLEVUE AVENUE

WEST VANCOUVER

LOT DISTRICT LOT 554
PLAN VAS1722
GROUP 1 NWD

ZONING: RM-1

SECTION 300 - MULTIPLE DWELLING ZONES

Item	Allowed	Proposed
301.01 Permitted Uses	(h) single family dwellings	
301.02 Conditions of Use	(1) 2 lodgers within a single family dwelling	
301.03 Site Area	(3) Single family dwelling: 372 m² minimum.	1258.3 m²
301.04 Site Width	(2) 10.1 m minimum	15.3 m at narrowest point
301.05 Floor Area Ratio	(N/A)	
301.06 Site Coverage	(2) 40% maximum	29.5%
301.07 Front Yard	(1) 7.6 m minimum (7.3 m for Step 5)* (2) The front site line shall be deemed to be either the north or south site line	7.3 m South site line
301.08 Rear Yard	(1) The rear yard is measured from the north or south site line (2) 1.52 m minimum (1.22 m for Step 5)**	North site line 1.22 m
301.09 Side Yard	(1) The side yard is measured from the east or west site lines Proposed Side Yard Setbacks: (3) 1.5 m minimum (1.2 m for Step 5) ***	East and west site lines 1.2 m
301.10 Building Width	(N/A)	
301.11 Building Height	(3) 7.62 m maximum (7.92 m for Step 5)****	7.91m
301.12 Number of Storeys	(2) 2 storeys maximum	2
301.13 Off-Street Parking	(3) 1 parking space per dwelling minimum shall be provided.	Parking Easement of G23882 to G23883 allows the use of a parking area directly west of the property.
301.14 Suite Size	(N/A)	
301.16 Canopy	(N/A)	
301.17 Roof Structures	(N/A)	
301.18 Fences	(N/A)	

* As per 120.29(4)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to required yard setback applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the required front yard setback of 7.6 m can be reduced by 0.30 m for a minimum setback of 7.3 m.

** As per 120.29(4)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to required yard setback applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the required rear yard setback of 1.52 m can be reduced by 0.30 m for a minimum setback of 1.22 m.

***As per 120.29(4)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to required yard setback applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the required rear yard setback of 1.5 m can be reduced by 0.30 m for a minimum setback of 1.2 m.

****As per 120.19 (3)(a) & 120.29(1)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to building height applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the maximum building height can be 0.30m above the 7.62m maximum height or 7.92m.

DRAWING LIST

PROJECT DATA & ZONING	A0.00
CONTEXT	A0.01
SITE PLAN	A0.02
SURVEY	A0.03
AVERAGE GRADE & BUILDING HEIGHT	A0.04
MATERIALS	A0.05
GARAGE LEVEL PLAN (NON HABITABLE)	A1.00
MAIN FLOOR	A1.01
ROOF PLAN	A1.02
ELEVATIONS	A2.01
ELEVATIONS	A2.02
BUILDING SECTIONS	A3.01
BUILDING SECTIONS	A3.02
3D VIEWS	A5.01
NEIGHBOUR VIEWS	A5.02
REQUEST FOR VARIANCE	A6.01
PROPOSED RETAINING WALL VARIANCE	A6.02
PROPOSED RETAINING WALL VARIANCE	A6.03

Feenstra ARCHITECTURE INC

601 - 1587 West 8th Ave.
Vancouver, B.C. V6J 1T5
Tel. (604) 739-8888 Fax (604) 739-8889

No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

PROJECT DATA & ZONING

Plot Date: 07/09/02
Drawn by: Author Checked by: Checker
Project No. Scale: As indicated
Drawing No.

A0.00

VIEW OF EXISTING HOUSE ENTRANCE FROM SEASTRAND BUILDING PARKADE

VIEW OF EXISTING HOUSE + SEASTRAND BUILDING FROM SEAWALK

VIEW OF EXISTING HOUSE FROM RAILROAD

VIEWS OF EXISTING HOUSE + SEAWALK

1 CONTEXT PLAN
1/32" = 1'-0"

Feenstra ARCHITECTURE INC

601 - 1587 West 8th Ave.
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Tel. (604) 739-8888 Fax (604) 739-8889

N

No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

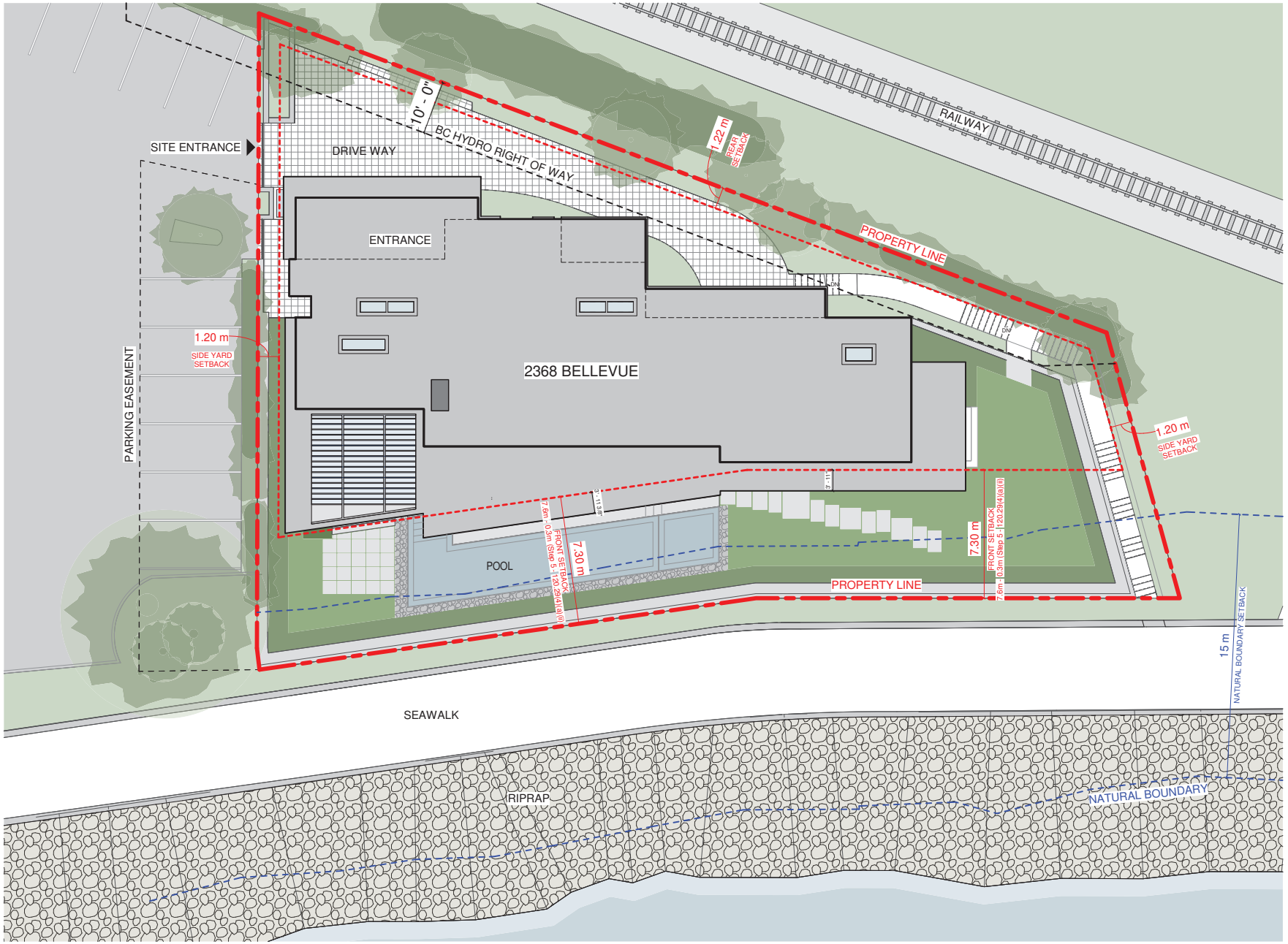
CONTEXT

Plot Date: 07/09/02

Drawn by: Author	Checked by: Checker
Project No.	Scale: 1/32" = 1'-0"

Drawing No.

A0.01



1 SITE PLAN
1/8" = 1'-0"

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No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

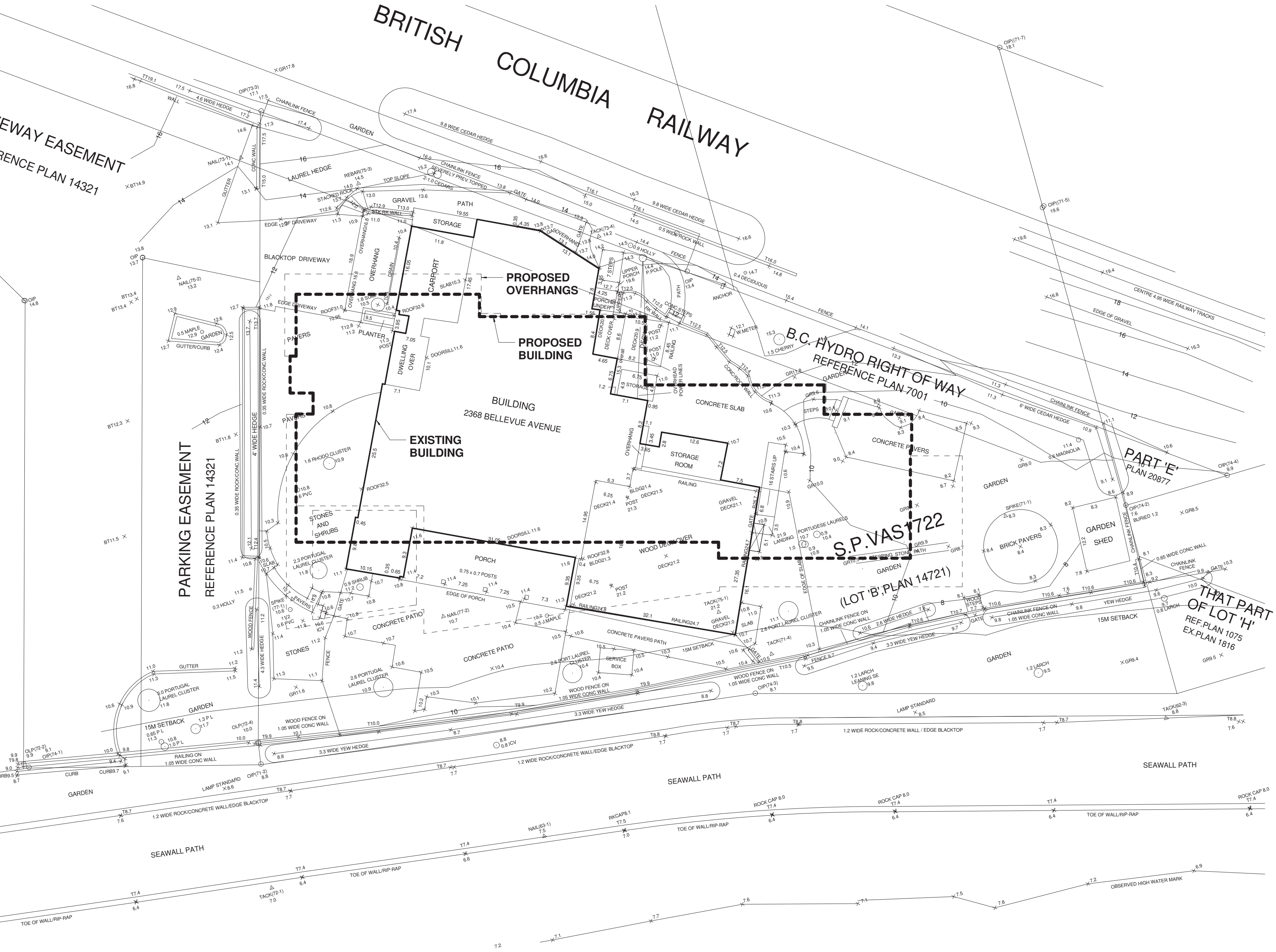
West Vancouver, BC
V7V 1C8

Drawing Title:

SITE PLAN

Plot Date: 07/09/02
Drawn by: Author | Checked by: Checker
Project No. | Scale: 1/8" = 1'-0"
Drawing No.

A0.02



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No.	Description	Date
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1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

SURVEY

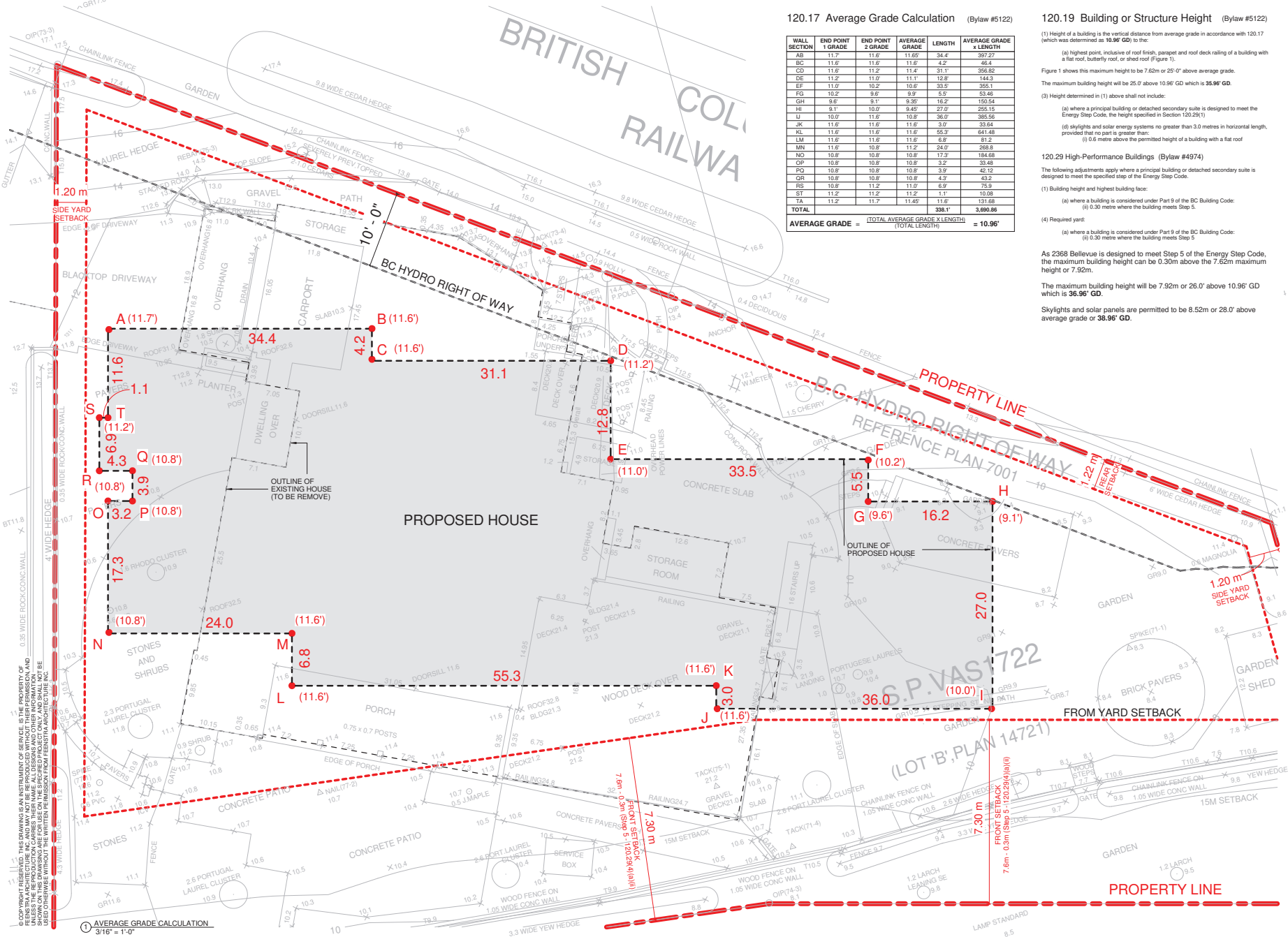
Plot Date: 07/09/02

Drawn by: Author Checked by: Checker

Project No. Scale: 1/8" = 1'-0"

Drawing No.

A0.03



120.17 Average Grade Calculation (Bylaw #5122)

WALL SECTION	END POINT 1 GRADE	END POINT 2 GRADE	AVERAGE GRADE	LENGTH	AVERAGE GRADE x LENGTH
AB	11.7'	11.6'	11.65'	34.4'	397.27
BC	11.6'	11.6'	11.6'	4.2'	46.4
CD	11.6'	11.2'	11.4'	31.1'	356.82
DE	11.2'	11.0'	11.1'	12.8'	144.3
EF	11.0'	10.2'	10.6'	33.5'	355.1
FG	10.2'	9.6'	9.9'	5.5'	53.46
GH	9.6'	9.1'	9.35'	16.2'	150.54
HI	9.1'	10.0'	9.45'	27.0'	255.15
IJ	10.0'	11.6'	10.8'	36.0'	385.56
JK	11.6'	11.6'	11.6'	3.0'	33.64
KL	11.6'	11.6'	11.6'	55.3'	641.48
LM	11.6'	11.6'	11.6'	6.8'	81.2
MN	11.6'	10.8'	11.2'	24.0'	268.8
NO	10.8'	10.8'	10.8'	17.3'	184.68
OP	10.8'	10.8'	10.8'	3.2'	33.48
PQ	10.8'	10.8'	10.8'	3.9'	42.12
QR	10.8'	10.8'	10.8'	4.3'	43.2
RS	10.8'	11.2'	11.0'	6.9'	75.9
ST	11.2'	11.2'	11.2'	1.1'	10.08
TA	11.2'	11.7'	11.45'	11.6'	131.68
TOTAL				338.1'	3,690.86

AVERAGE GRADE = (TOTAL AVERAGE GRADE X LENGTH) / (TOTAL LENGTH) = **10.96'**

120.19 Building or Structure Height (Bylaw #5122)

(1) Height of a building is the vertical distance from average grade in accordance with 120.17 (which was determined as **10.96' GD**) to the:

(a) highest point, inclusive of roof finish, parapet and roof deck railing of a building with a flat roof, butterfly roof, or shed roof (Figure 1).

Figure 1 shows this maximum height to be 7.62m or 25'-0" above average grade.

The maximum building height will be 25.0' above 10.96' GD which is **35.96' GD**.

(3) Height determined in (1) above shall not include:

(a) where a principal building or detached secondary suite is designed to meet the Energy Step Code, the height specified in Section 120.29(1)

(d) skylights and solar energy systems no greater than 3.0 metres in horizontal length, provided that no part is greater than:
(i) 0.6 metre above the permitted height of a building with a flat roof

120.29 High-Performance Buildings (Bylaw #4974)

The following adjustments apply where a principal building or detached secondary suite is designed to meet the specified step of the Energy Step Code.

(1) Building height and highest building face:

(a) where a building is considered under Part 9 of the BC Building Code:
(ii) 0.30 metre where the building meets Step 5.

(4) Required yard:

(a) where a building is considered under Part 9 of the BC Building Code:
(ii) 0.30 metre where the building meets Step 5

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the maximum building height can be 0.30m above the 7.62m maximum height or 7.92m.

The maximum building height will be 7.92m or 26.0' above 10.96' GD which is **36.96' GD**.

Skylights and solar panels are permitted to be 8.52m or 28.0' above average grade or **38.96' GD**.

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1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

AVERAGE GRADE & BUILDING HEIGHT

Plot Date: 07/09/02	
Drawn by: Author	Checked by: Checker
Project No.	Scale: As indicated
Drawing No.	

A0.04

MATERIAL LEGEND

MATERIAL SPECIFICATIONS

① LIMESTONE WALL CLADDING

1 1/4" THICK 'LIMESTONE' STONE VENEER
3/4" BACKING
3/4" STRAPPING

② FIBER CEMENT WALL CLADDING

5/16" THICK VERTICAL FIBER CEMENT PANELS, 12" WIDE BY 12' TALL PANEL
1 1/2" X 1 1/2" X 12' VERTICAL BATTENS
3/4" STRAPPING

③ METAL ROOF TRIM

EXPOSED STEEL, PAINTED BLACK

④ WOOD SOFFIT

3/4" THICK HORIZONTAL WOOD SOFFIT

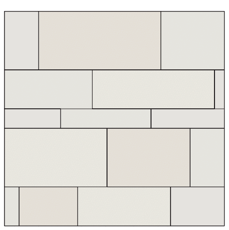
⑤ TRIPLE GLAZED WINDOWS

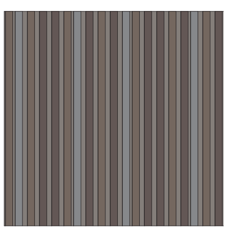
TRIPLE GLAZED DOUBLE LOW-E (USI 0.8)
FIBERGLASS MULLIONS PAINTED BLACK

⑥ BOARD FORM CONCRETE WALLS

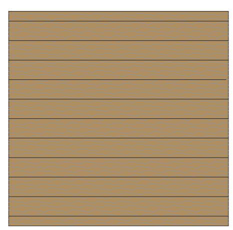
EXTERIOR GRAY CONCRETE WALL

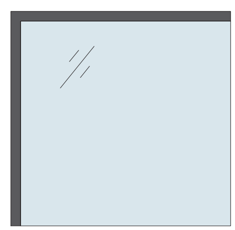
MATERIAL IMAGES

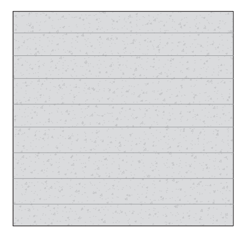

① LIMESTONE WALL CLADDING


② FIBER CEMENT WALL CLADDING


③ METAL ROOF TRIM


④ WOOD SOFFIT


⑤ TRIPLE GLAZED WINDOWS


⑥ BOARD FORM CONCRETE WALL

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No.	Description	Date
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Project:

2368 Bellevue Ave

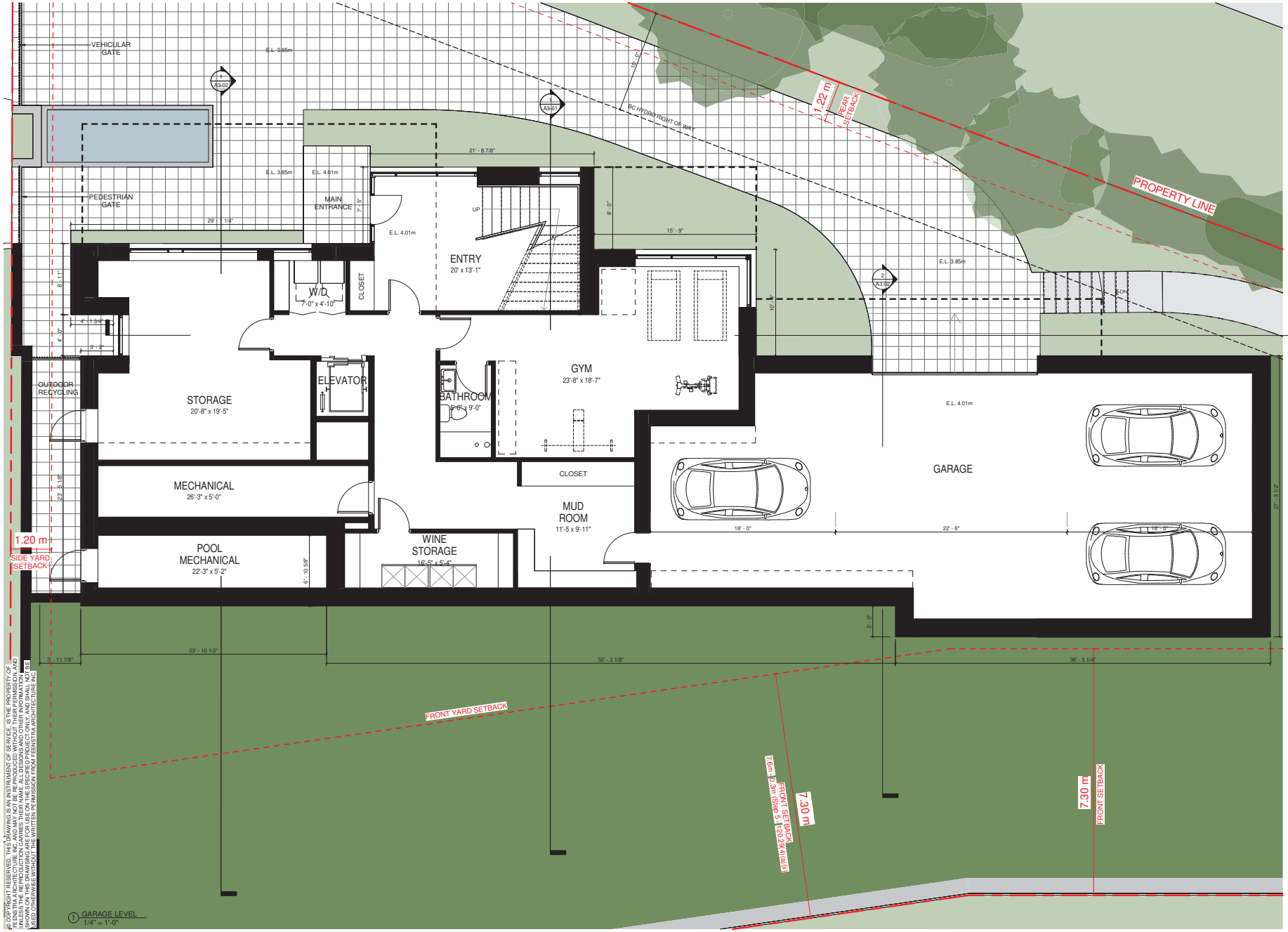
West Vancouver, BC
V7V 1C8

Drawing Title:

MATERIALS

Plot Date: 07/09/02
Drawn by: Author Checked by: Checker
Project No. Scale: As indicated
Drawing No.

A0.05



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No.	Description	Date
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Project:

2368 Bellevue Ave

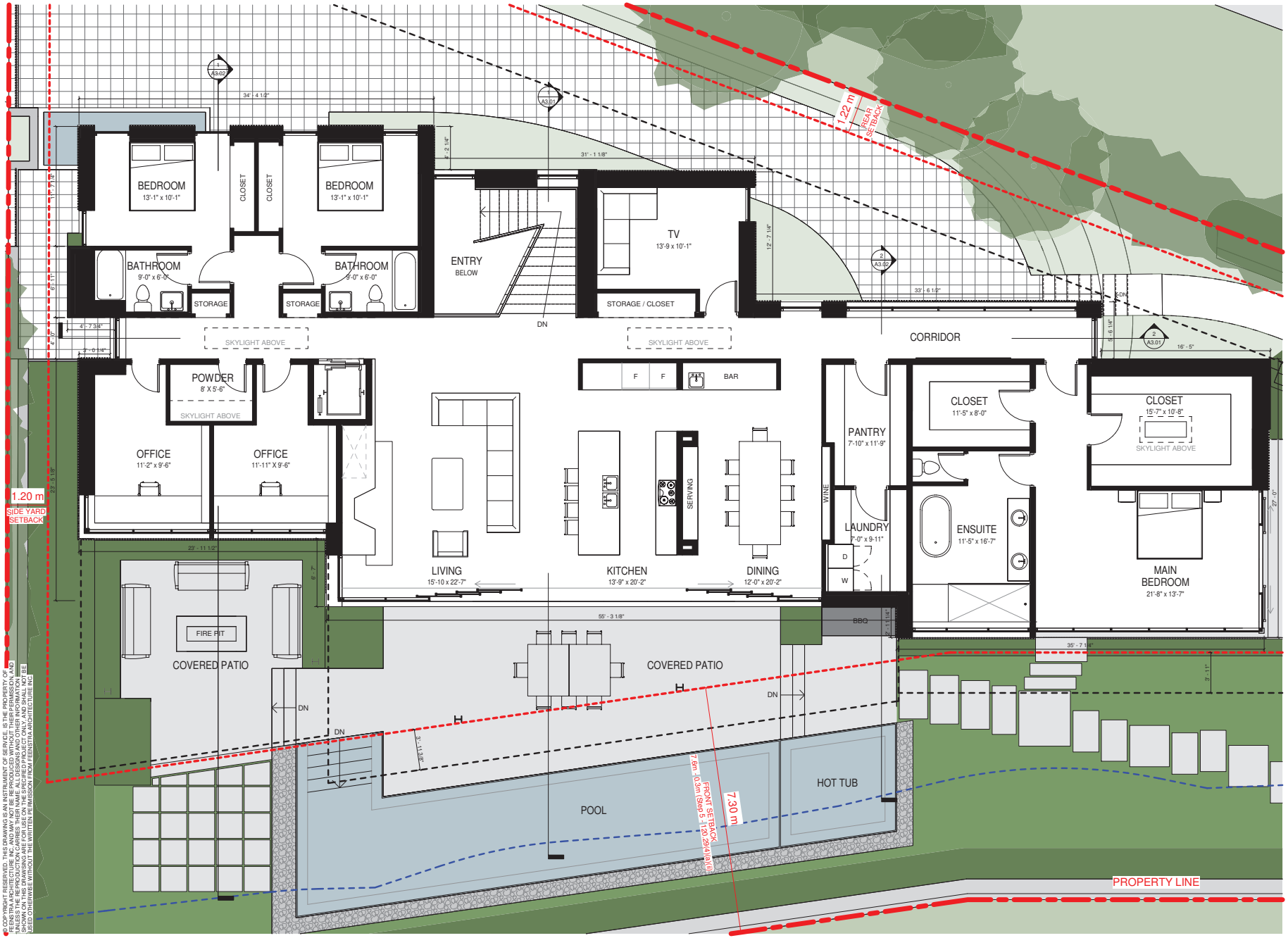
West Vancouver, BC
V7V 1C8

Drawing Title:

GARAGE LEVEL PLAN (NON HABITABLE)

Plot Date: 07/09/02
Drawn by: Author
Checked by: Checker
Project No.
Scale: 1/4" = 1'-0"
Drawing No.

A1.00



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Project:

2368 Bellevue Ave

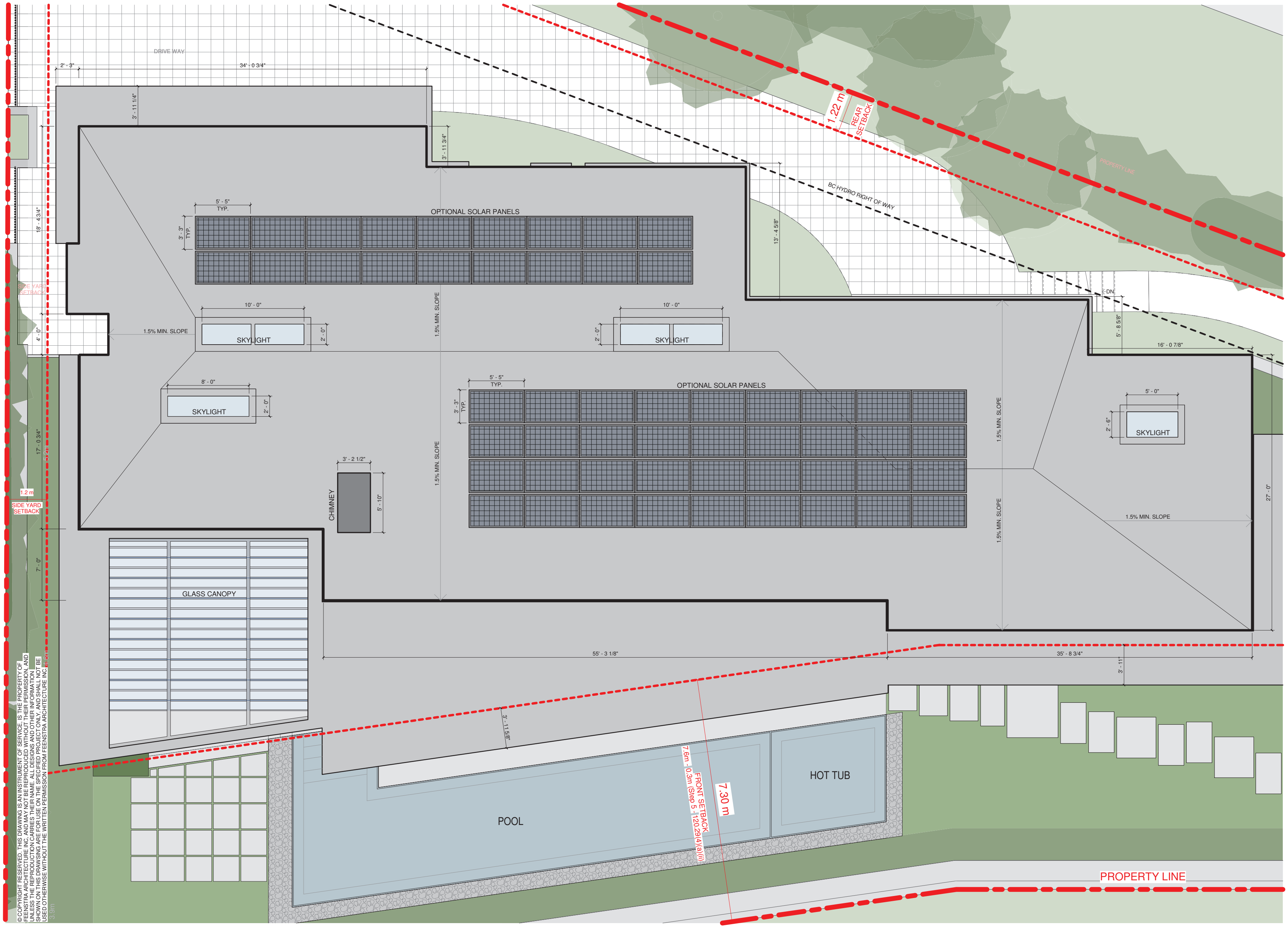
West Vancouver, BC
V7V 1C8

Drawing Title:

MAIN FLOOR

Plot Date: 07/09/02
Drawn by: Author
Checked by: Checker
Project No.
Scale: 1/4" = 1'-0"
Drawing No.

A1.01



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N

No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

ROOF PLAN

Plot Date: 07/09/02
Drawn by: Author — Checked by: Checker
Project No. — Scale: 1/4" = 1'-0"
Drawing No.

A1.02

MATERIAL

1. LIMESTONE WALL CLADDING
2. FIBER CEMENT WALL CLADDING
3. METAL ROOF TRIM
4. METAL SOFFIT, WOOD PATTERN
5. TRIPLE GLAZED WINDOWS
6. BOARD FORM CONCRETE WALLS
7. FIBER CEMENT WALL CLADDING (NO BATTENS)

1 NORTH ELEVATION
1/4" = 1'-0"

2 WEST ELEVATION
1/4" = 1'-0"

Feenstra ARCHITECTURE INC

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No.	Description	Date
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1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

ELEVATIONS

Plot Date: 07/09/02
Drawn by: Author
Checked by: Checker
Project No.
Scale: As indicated
Drawing No.

A2.01

MATERIAL

1. LIMESTONE WALL CLADDING
2. FIBER CEMENT WALL CLADDING
3. METAL ROOF TRIM
4. METAL SOFFIT, WOOD PATTERN
5. TRIPLE GLAZED WINDOWS
6. BOARD FORM CONCRETE WALLS
7. FIBER CEMENT WALL CLADDING (NO BATTENS)

2 SOUTH ELEVATION
1/4" = 1'-0"

1 EAST ELEVATION
1/4" = 1'-0"

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Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

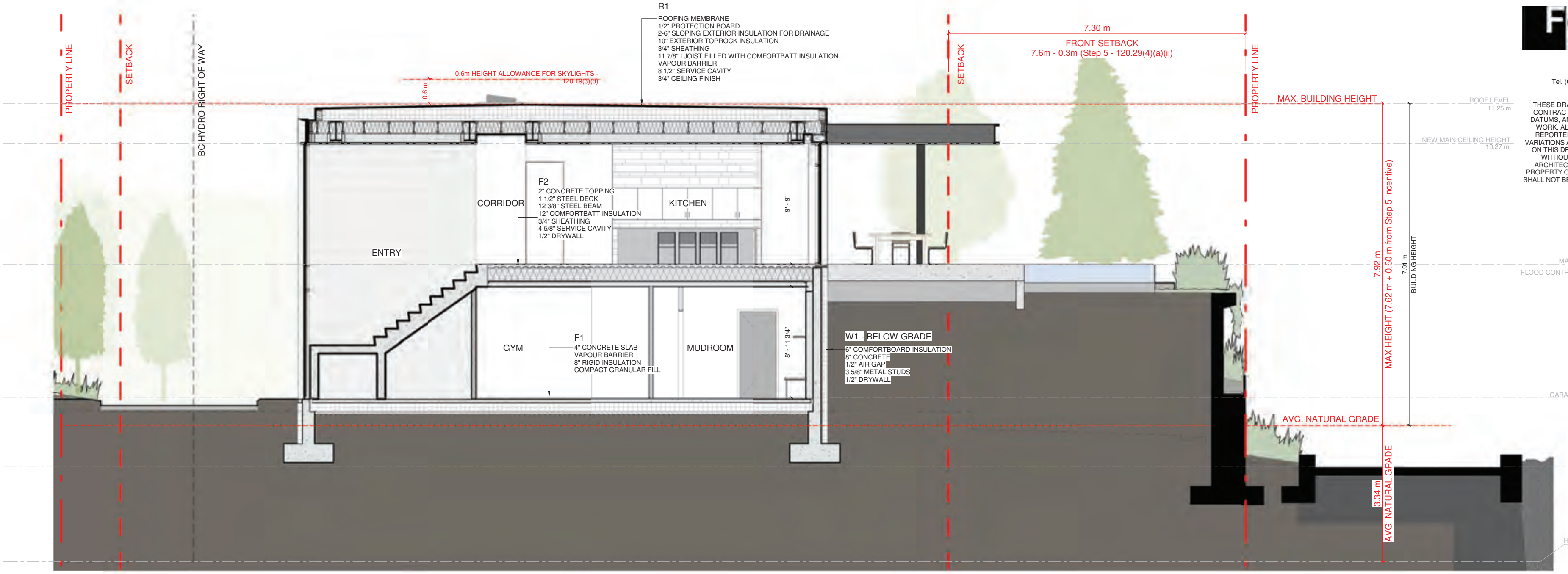
ELEVATIONS

Plot Date: 07/09/02

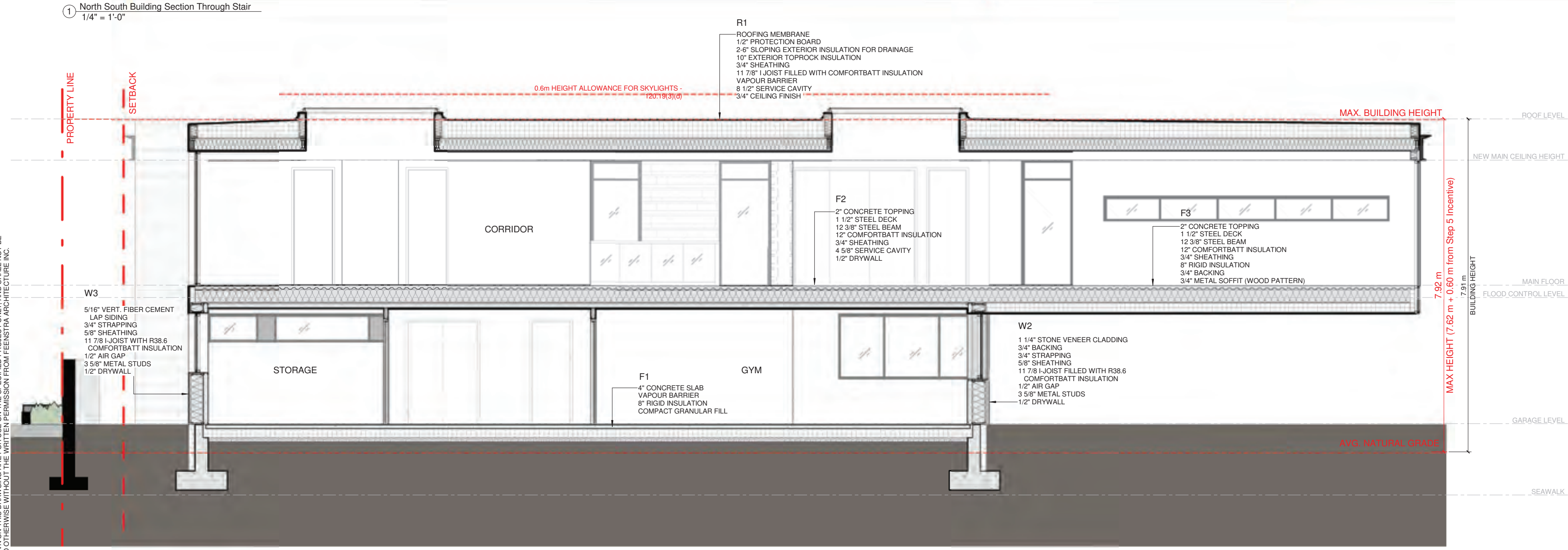
Drawn by: Author	Checked by: Checker
Project No.	Scale: As indicated

Drawing No.

A2.02



1 North South Building Section Through Stair
1/4" = 1'-0"



2 East West Building Section Through Corridor
1/4" = 1'-0"

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No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

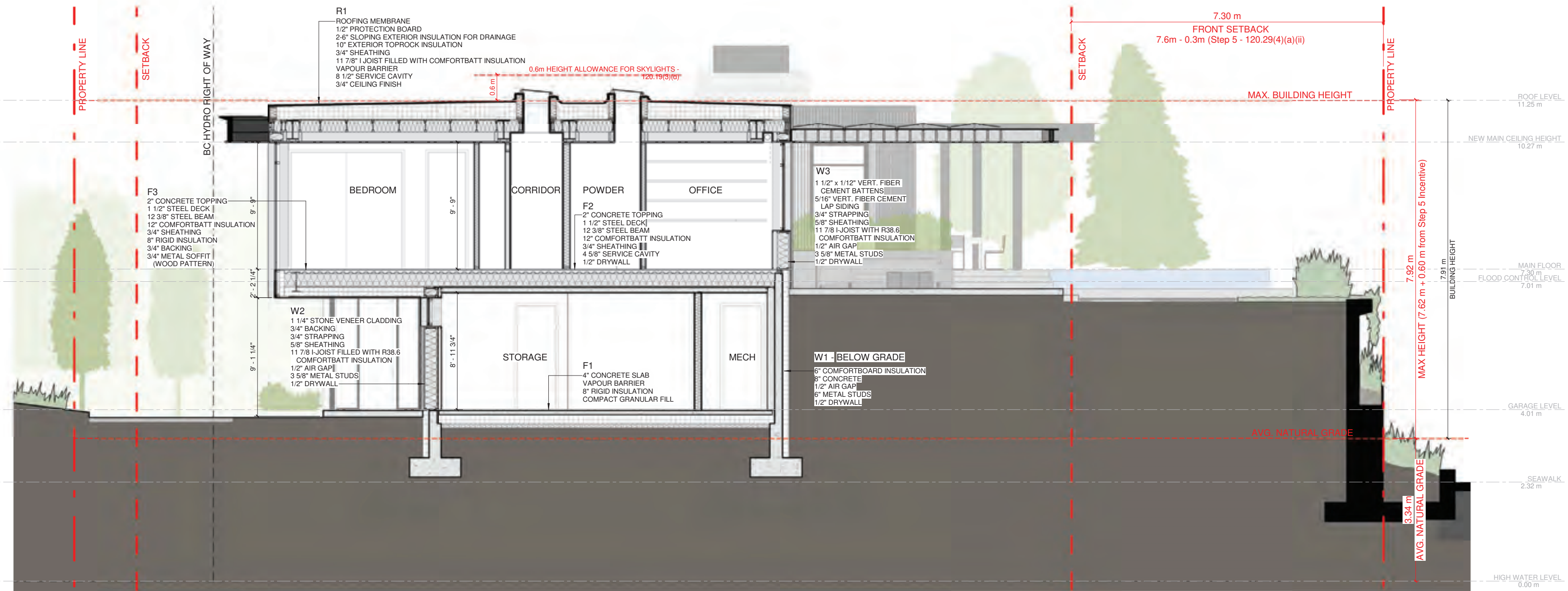
West Vancouver, BC
V7V 1C8

Drawing Title:

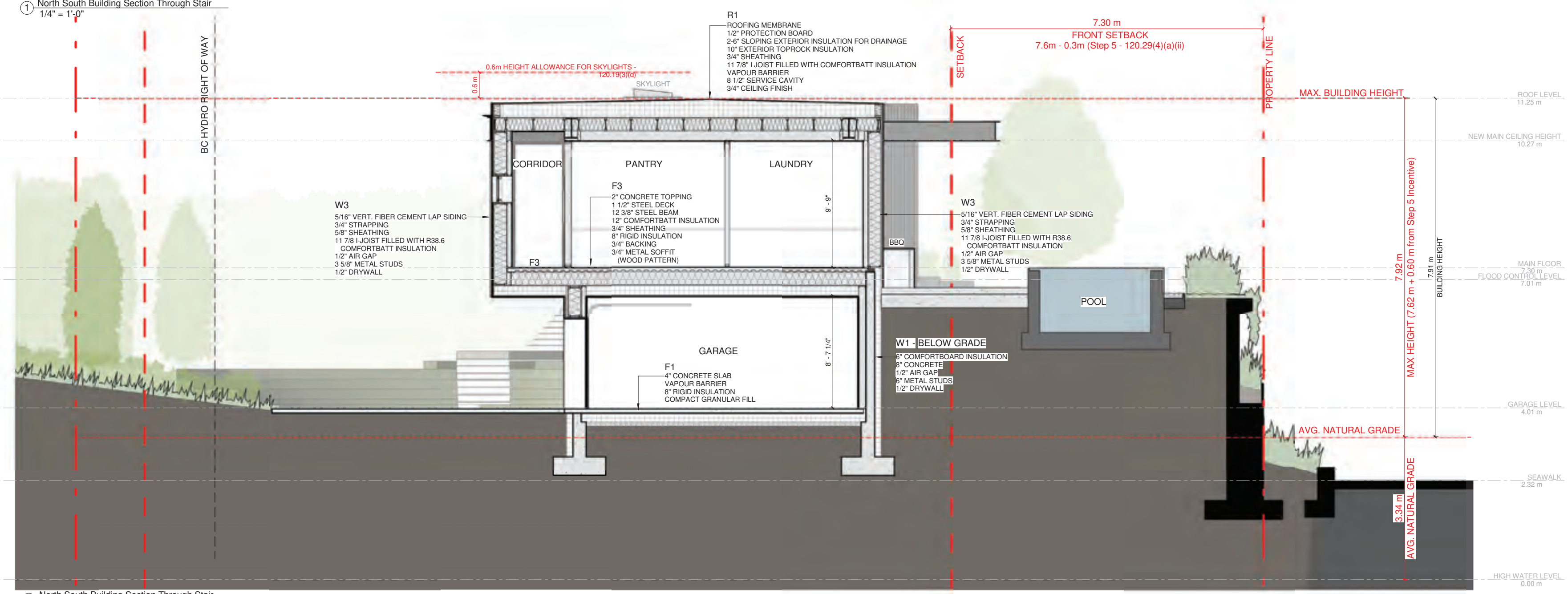
BUILDING SECTIONS

Plot Date: 11/04/22
Drawn by: Author
Checked by: Checker
Project No.
Scale: 1/4" = 1'-0"
Drawing No.

A3.01



1 North South Building Section Through Stair
1/4" = 1'-0"



2 North South Building Section Through Stair
1/4" = 1'-0"

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2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

BUILDING SECTIONS

Plot Date: 11/04/22
Drawn by: Author | Checked by: Checker
Project No. | Scale: 1/4" = 1'-0"
Drawing No.

A3.02

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VIEW TO SITE ENTRANCE

VIEW FROM RAILWAY

VIEW LOOKING EAST FROM SEAWALK

VIEW LOOKING WEST FROM SEAWALK

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Project:

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Drawing Title:

3D VIEWS

Plot Date: 07/09/02	
Drawn by: Author	Checked by: Checker
Project No.	Scale:
Drawing No.	

A5.01

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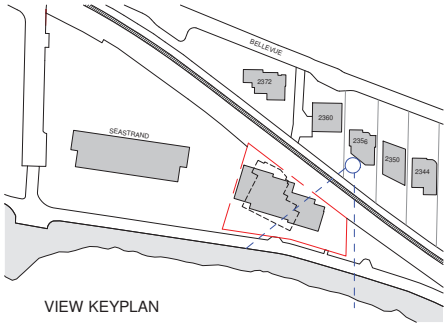
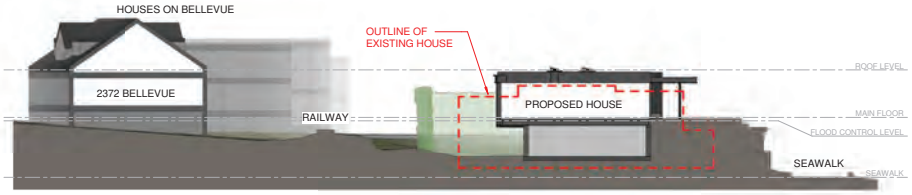


VIEW KEYPLAN



SITE SECTION THROUGH **PROPOSED** HOUSE

VIEW FROM 2356 BELLEVUE SHOWING **EXISTING** HOUSE

VIEW FROM 2356 BELLEVUE SHOWING **PROPOSED** HOUSE

No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
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Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

NEIGHBOUR VIEWS

Plot Date: 07/09/02

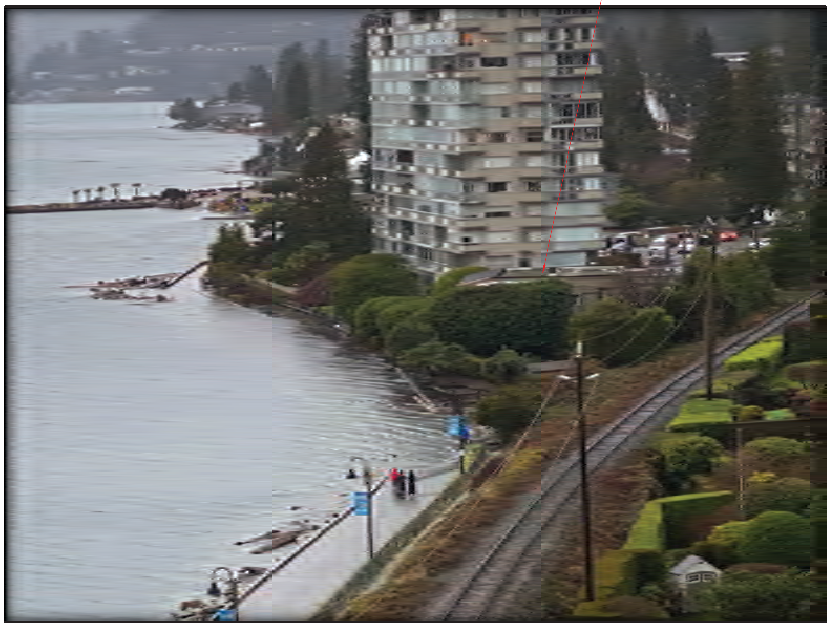
Drawn by: Author | Checked by: Checker

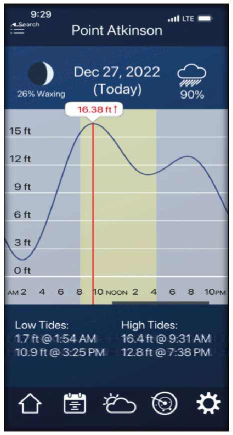
Project No. | Scale: As indicated

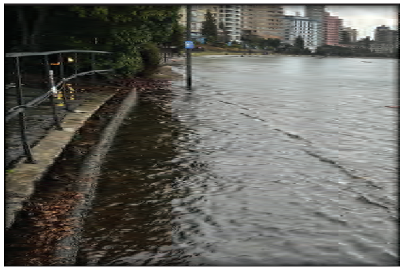
Drawing No.

A5.02

CURRENT HIGH-WATER RISK
December 27, 2022 - High Tide 16.4ft







STORM DAMAGE PHOTOS

REQUEST FOR VARIANCE:

WEST & SOUTH PROPERTY RETAINING WALL HEIGHT AND EAST PROPERTY MAX GRADE ANGLE

This site has a number of unique attributes that impact the site's useability with the most significant related to the flood control regulations that have been adopted for West Vancouver waterfront properties. The need to take significant measures to protect both public and private property has been borne out by a number of weather events in the past few years that have impacted the West Vancouver seawalk and adjacent properties with considerable fiscal impact.

A study completed by NHC COastal Engineering in February 2023 has defined a 7.01m GD Flood Construction Level for this site.

A site specific study completed by NHC Coastal Engineering in February 2023, has defined a 7.01m GD Flood Construction Level for this site. To achieve the site specific FCL, we are requesting permission to vary from the maximum retaining wall height on the west and south property lines to a height of 6.6m GD. On the east property line, we are requesting permission to vary from a max grade angle of 36.9 degree to 45 degrees to allow for a 6.6m GD retaining wall.

The current bylaw allows for a 4 ft (1.2m) wall to be erected at the property line, which for this property would have a top elevation of 3.9m GD. We are looking for permission to build the wall to an elevation consistent with the mitigation measures noted in the WSP study for West Van lands as well as the height of the overtopping wall required for this property as advised by NHC Coastal Engineering. This is 6.6m GD.

It is unfortunate that the timing of the residential redevelopment is occurring well in advance of the plans being developed by West Van Parks and therefore the intersection between the public and private lands will need to be anticipated in the wall design. It was recommended in the WSP study that in order to protect public and private spaces, West Van would need to create a berm to a height of 4.7m GD with the seawalk relocated on top of the berm.

In the variance we are proposing, the south, west, and east perimeter retaining walls will merge with these recommendations when the public property redevelopment eventually takes place. It should be noted that not anticipating this new height will ultimately have two impacts on the existing property. In the short term it is likely that the approximately 2050sf of landscaping adjacent to the lower wall will be at significant risk of regular inundation of seawater which would destroy landscaping resulting in regular and significant cost to the owners. On a longer term basis it would leave that portion of the property significantly below that of the new seawalk height which would have implications for the construction of the berm (future new seawalk) but would also have a significant impact on cost.

The height of the wall would not directly impact neighbors though it would have an impact on those walking along the seawalk. In this regard, the development further to the west along the seawalk already presents a face to the public that is materially higher than the 1.2m wall that the bylaw allows. It should be noted that extensive consdieration is being taken in the design of these retaining walls to reduce their visual impact and to provide a pleasant experience for the public while also taking calculated precautions to combat the ongoing risk that rising sea levels already cause.

Feenstra
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Project:

2368 Bellevue Ave

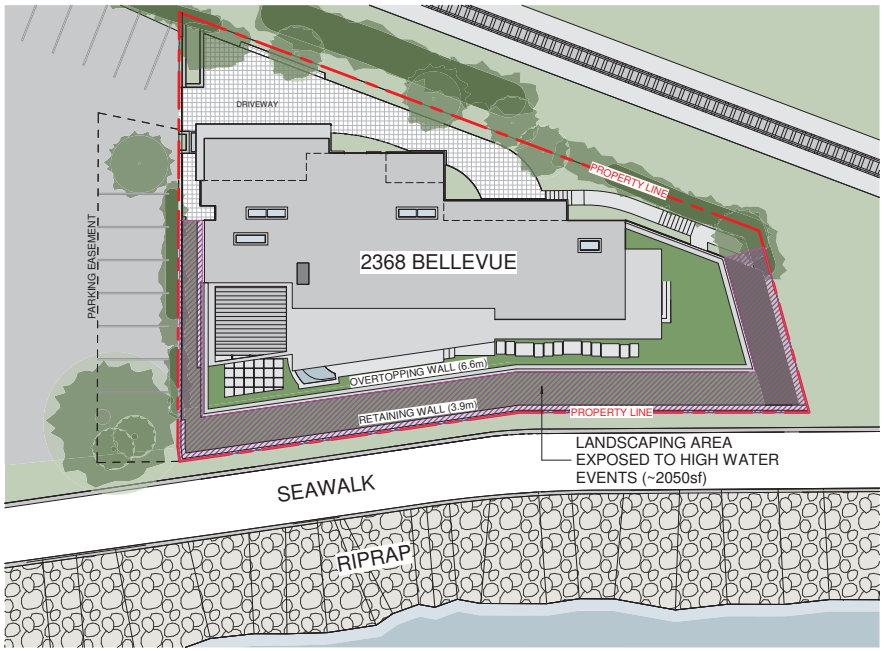
West Vancouver, BC
V7V 1C8

Drawing Title:

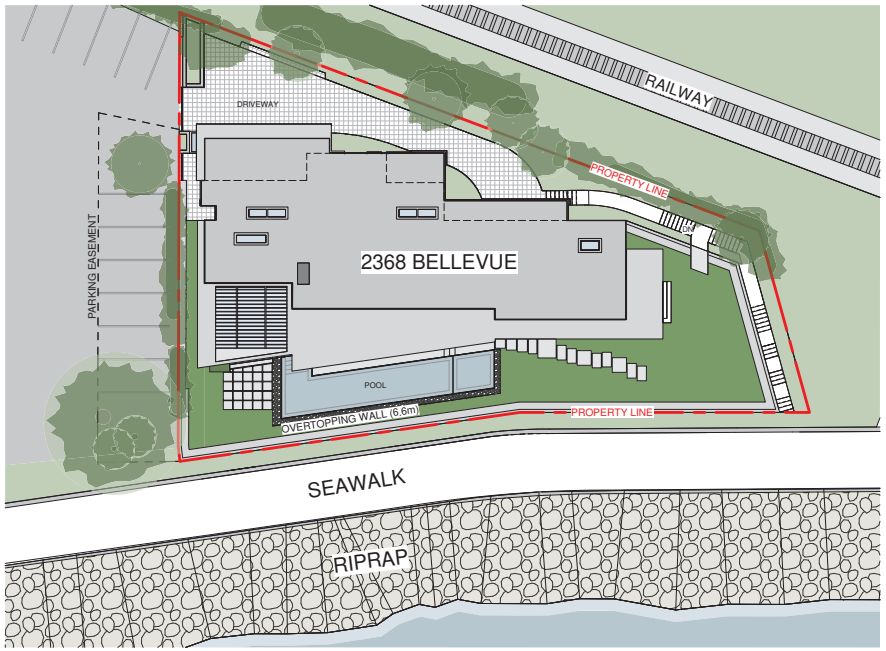
REQUEST FOR VARIANCE

Plot Date:	07/09/02		
Drawn by:	Author	Checked by:	Checker
Project No.		Scale:	1 1/2" = 1'-0"
Drawing No.			

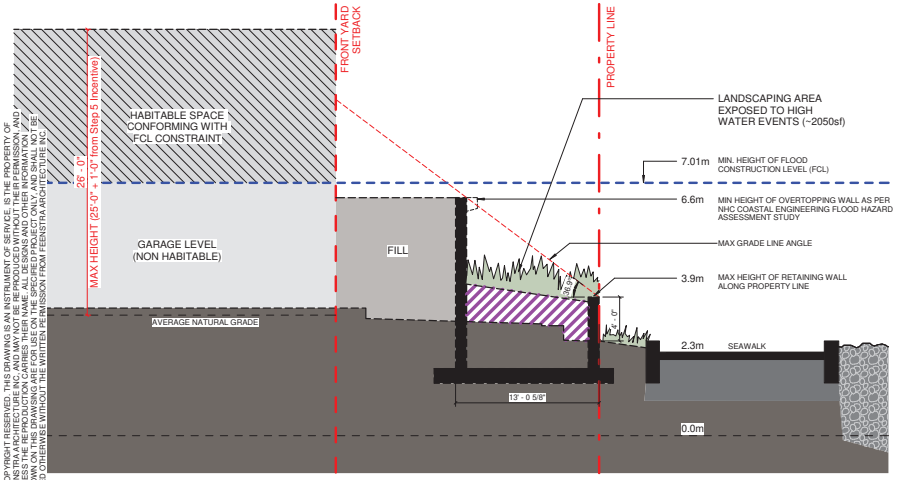
A6.01



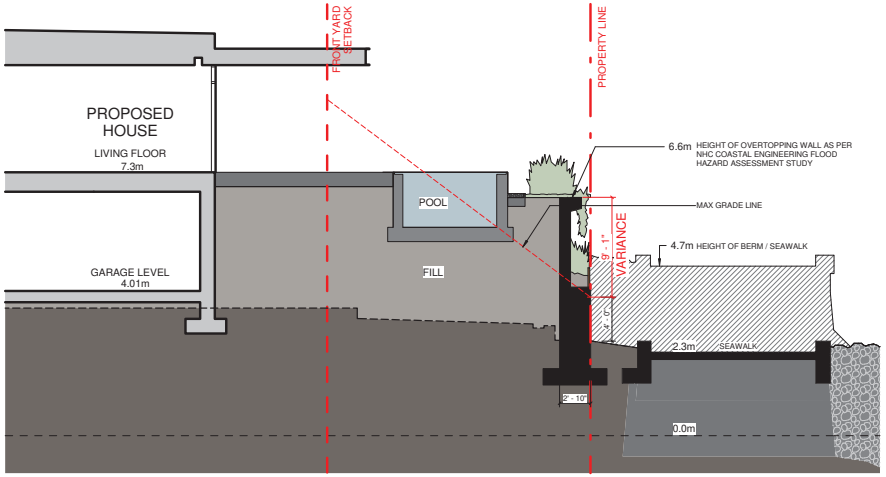
1 SITE PLAN SHOWING CURRENT RETAINING WALL REQUIREMENTS
1/16" = 1'-0"



2 SITE PLAN SHOWING PROPOSED RETAINING WALL VARIANCE
1/16" = 1'-0"



3 CURRENT REQUIREMENTS FOR RETAINING WALLS
3/16" = 1'-0"



4 PROPOSED VARIANCE FOR RETAINING WALL HEIGHT ALONG SOUTH PROPERTY LINE
3/16" = 1'-0"

Feenstra ARCHITECTURE INC
601 - 1587 West 8th Ave.
Vancouver, B.C. V6J 1T5
Tel. (604) 739-8888 Fax (604) 739-8889

N

No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

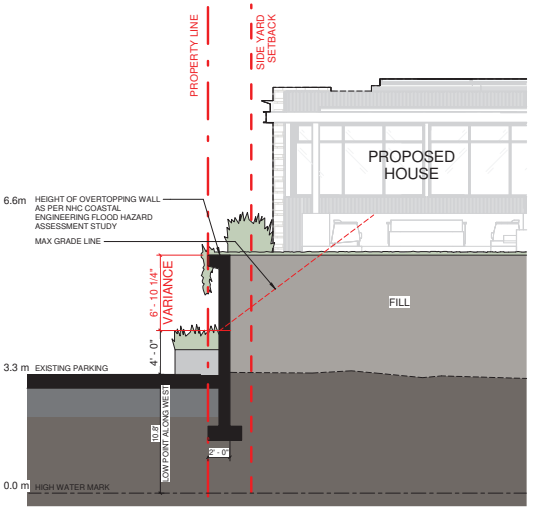
Drawing Title:

PROPOSED RETAINING WALL VARIANCE

Plot Date: 01/27/23
Drawn by: Author | Checked by: Checker
Project No. | Scale: As indicated
Drawing No.

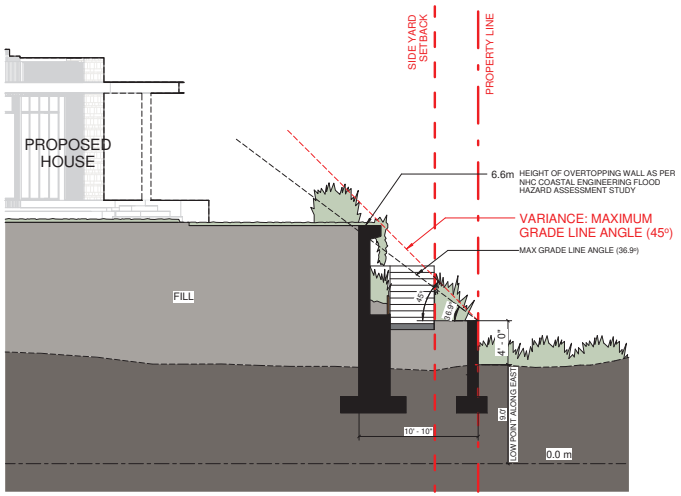
A6.02

VIEW FROM SEAWALK LOOKING EAST SHOWING PROPOSED RETAINING WALL



1 PROPOSED VARIANCE FOR RETAINING WALL HEIGHT ALONG WEST PROPERTY LINE
3/16" = 1'-0"

VIEW FROM SEAWALK LOOKING WEST SHOWING PROPOSED RETAINING WALL



2 PROPOSED VARIANCE FOR MAX GRADE LINE ANGLE ALONG EAST PROPERTY LINE
3/16" = 1'-0"

Feenstra ARCHITECTURE INC

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Vancouver, B.C. V6J 1T5
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No.	Description	Date
2	Re-issued for Development Permit	2023-08-17
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

PROPOSED RETAINING WALL VARIANCE

Plot Date: 02/13/23

Drawn by: Author | Checked by: Checker

Project No. | Scale: 3/16" = 1'-0"

Drawing No.

A6.03

Schedule B

465 MEMORIAL DRIVE
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dale@waterformdesign.ca

waterform
design inc
landscape design consultants

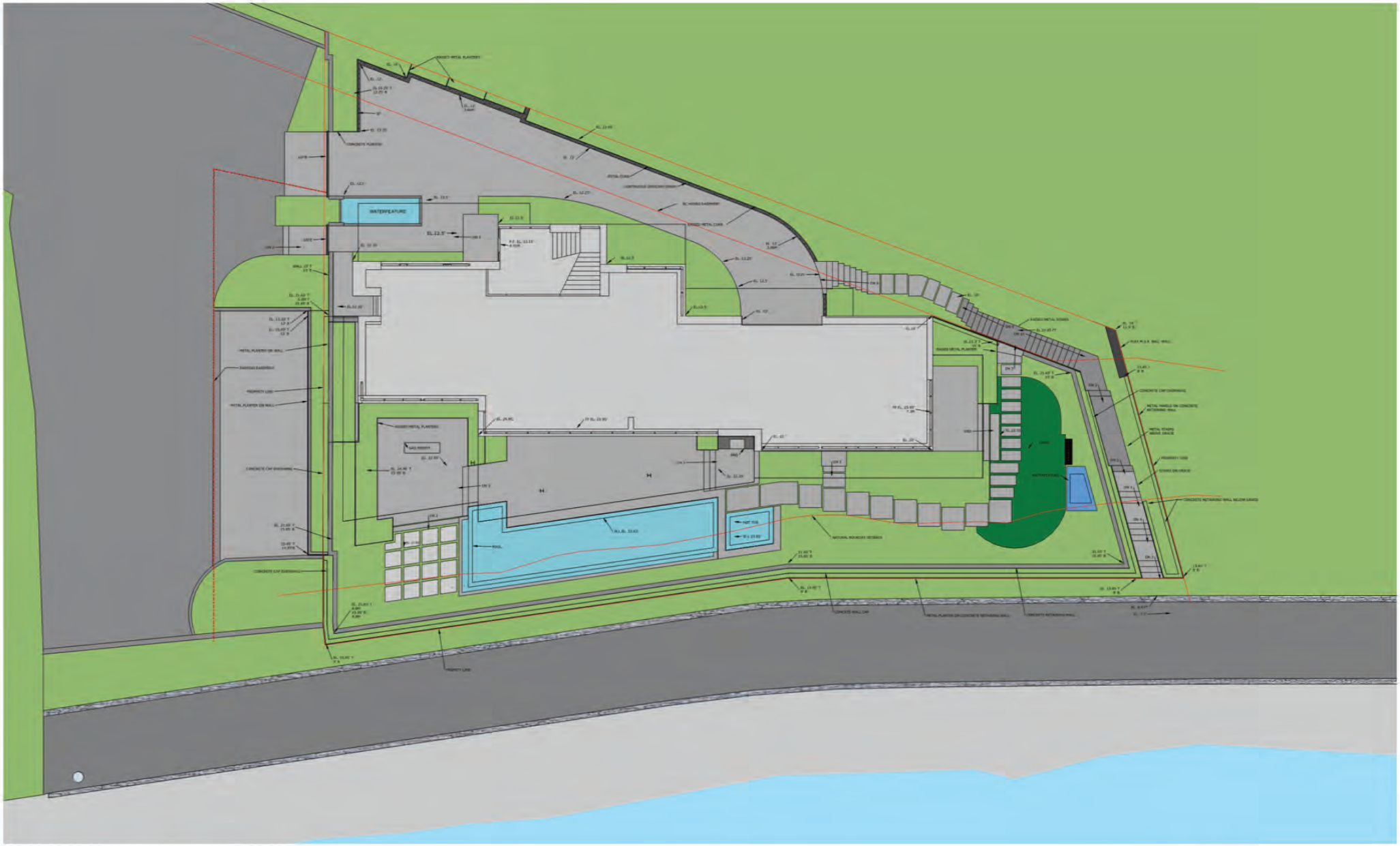
PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
CONCEPT PLAN
DRAWING DATE: June 19, 2023
SCALE1 1" = 10'

NORTH

SHEET: L1.0

REVISION: 1



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landscape design consultants

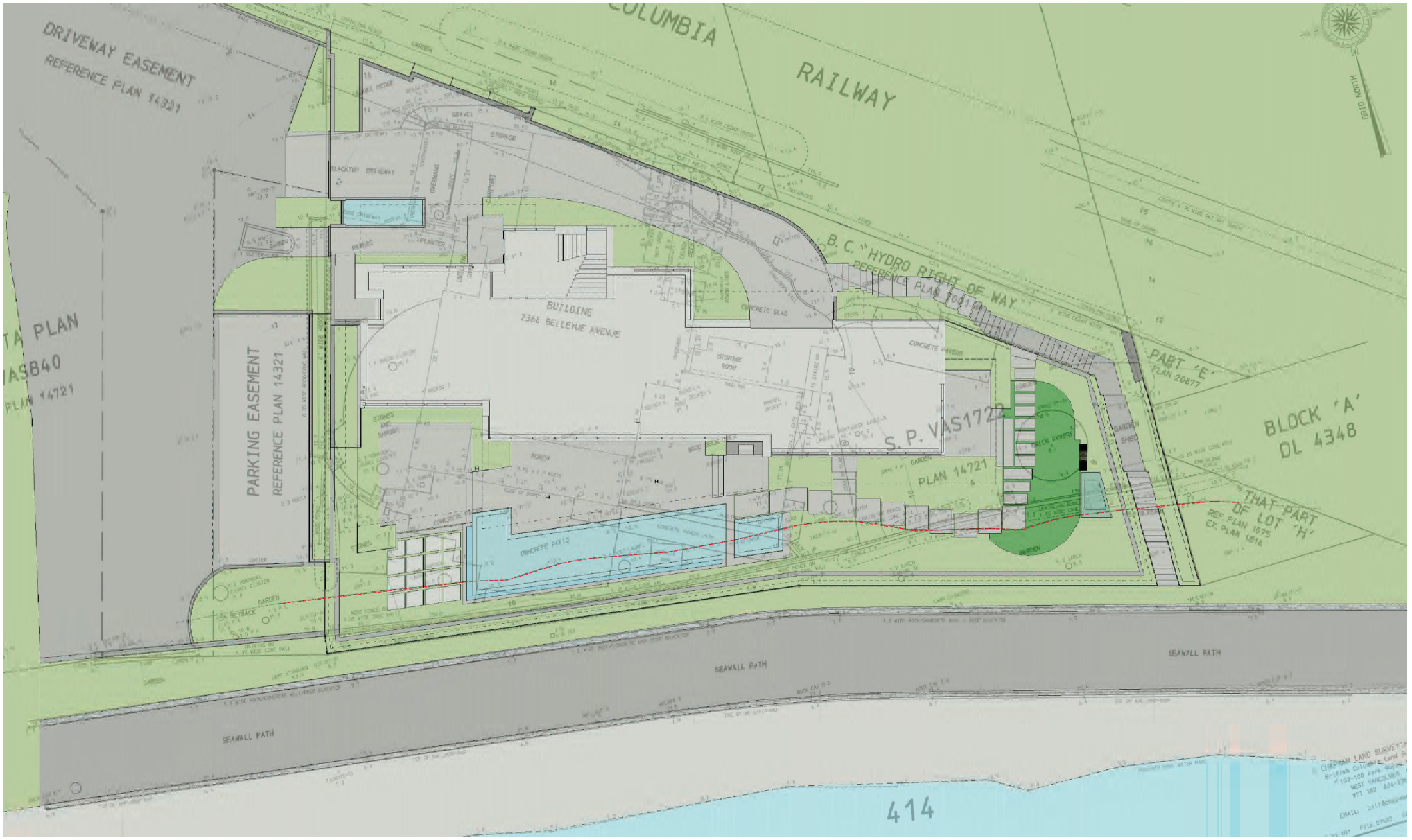
PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
SITE PLAN WITHOUT SURVEY
DRAWING DATE: June 19, 2023
SCALE1 1/8" = 1'

NORTH

SHEET: L2.0

REVISION: 1



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landscape design consultants

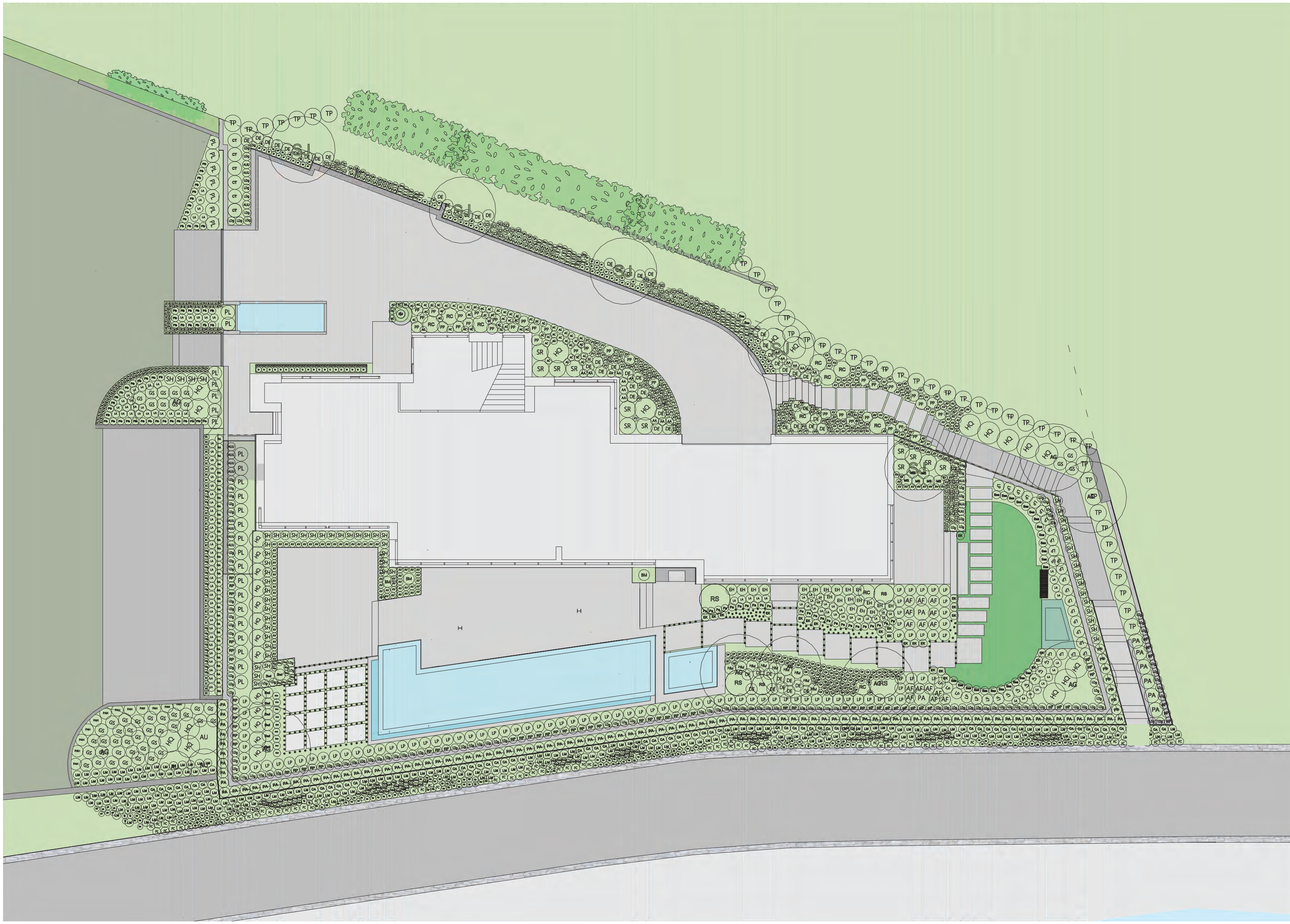
PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
SITE PLAN WITH SURVEY
DRAWING DATE: June 19, 2023
SCALE1 1/8" = 1'

NORTH

SHEET: L2.1

REVISION: 1



THIS DRAWING IS FOR BUILDING PERMIT SUBMISSION.
IT IS NOT FOR CONSTRUCTION .
THIS DRAWING MUST NOT BE SCALED.
THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DATUMS AND LEVELS PRIOR TO COMMENCEMENT OF WORK.
ALL ERRORS AND OMMISSIONS MUST BE REPORTED IMMEDIATELY TO THE DESIGNER.
VARIATIONS AND MODIFICATIONS TO WORK SHOWN SHALL NOT BE CARRIED OUT WITHOUT WRITTEN PERMISSION FROM THE DESIGNER.
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF THE DESIGNER AND CAN BE REPRODUCED ONLY WITH THE PERMISSION OF THE DESIGNER, IN WHICH CASE THE REPRODUCTION MUST BEAR THEIR NAME AS DESIGNERS.
REFER TO THE LANDSCAPE MASTER PLAN AND LANDSCAPE LAYOUT PLAN FOR SITE LAYOUT, CONSTRUCTION, AND DETAILS

	GRASSES AND PERENNIALS			
Abbreviation	**Botanical Name**	**Common Name/Variety**	**Quantity**	**Size**
AA	Astilbe Arendsii	False Spirea	36	1 GAL
AC	Asarum Caudatum	Western Wild Ginger	67	4"
AF	Achillea filipendulina	Yellow Yarrow	15	1 GAL
AM	Achillea millefolium	White yarrow	118	1 GAL
AUU	Arctostaphylos uva-ursi	Vancouver Jade	20	1 GAL
AV	Adiantum Venustrum	Himalayan Maidenhair Fern	254	4"
BM	Brunnera macrophylla	Jack Frost Siberian Bugloss	4	1 GAL
CA	Calamagrostis x acutiflora	Karl Foerster	64	2"
DE	Dryopteris erythorosora	Autumn Fern	61	1 GAL
EC	Erica carnea	Heather Springwood White	26	1 GAL
EH	Escallonia hybrida	Newport Dwarf	20	2"
EK	Erigeron karvinskianus	Mexican fleabane	23	4"
FC	Fragaria chiloensis	Coastal Strawberry	81	4"
HA	Hakenacloa-macra	Japanese forest grass	9	1 GAL
Hr	Helianthemum	Rock rose v.the bride	187	1 GAL
LA	Lavandula angustifolia	Lavender Munstead	100	1 GAL
LDg	Lithodora diffusa	Grace Ward	144	4"
LM	Leymus mollis	American dune grass	234	1 GAL
MS	Matteuccia struthiopteris	Ostrich fern	6	1 GAL
OJ	Ophiopogon japonicus	Mondo Grass	152	1 GAL
OP	Ophiopogon planiscapus Nigrescens	Black Mondo	104	1 GAL
PA	Pennisetum alopecuroides Desert Plains	Desert Plains Fountain Grass	104	2"
Pa	Pennisetum alopecuroides Little Bunny	Little Bunny Fountain Grass	83	1 GAL
PAH	Pennisetum alopecuroides Hameln	Fountain Grass	22	1 GAL
Per	Perovskia atriplicifolia	Russian Sage	2	1 GAL
PP	Polystichum polyblepharum	Tassel Fern	35	1 GAL
PT	Pachysandra terminalis	Japanese Spurge	112	4"
RP	Salvia Rosmarinus prostratus	Creeping Rosemary	31	1 GAL
RS	Rhododendron Specimen	Rhododendron Specimen	5	B&B
S	Salvia	Sage	8	1 GAL
SA	Sedum album	Green ice	81	4"
SAA	Sedum acre Aureum	Golden Stonecrop	89	4"
SD	Sedum divergens	Spreading Stonecrop	55	4"
SH	Sarcococca humilis	Dwarf Sweet Box	80	2"
SS	Sedum spathulifolium	Cape Blanco	15	4"
Ssp	Sedum spectabile	Sedum spectabile	81	4"
Sss	Sedum spectabile - Sedum stardust	Sedum spectabile - Sedum stardust	63	1 GAL
ST	Sedum Ternatum	Wild Stonecrop	81	4"
Swl	Nepeta x Walkers Low	Catmint	8	1 GAL
ThP	Thymus pseudolanuginosus	Whoolly Thyme	331	4"

	TREES AND SHRUBS			
Abbreviation	**Botanical Name**	**Common Name/Variety**	**Quantity**	**Size**
AG	Acer griseum	Paperback Maple	9	B&B
AU	Arbutus Unedo Compacta	Compact Strawberry Bush	3	10 GAL
CT	Choisya Ternata	Mexican Orange Bloom	34	3"
GS	Gaultheria shallon	Gaultheria shallon	47	1"
HQ	Hydrangea Quercifolia	Oak Leaf hydrangea	39	10
LP	Lonicera pileata	Privet honeysuckle	124	B&B
PL	Prunus Lucsitanica Myrtifolia	Portuguese Laurel	32	B&B
RA	Salvia Rosmarius "Arp"	Arp Rosemary	31	2"
RC	Rhododendron Chionoides	Chionoides Rhodo	12	B&B
Sjs	Styrax japonicus	Japanese snowball	5	B&B
SR	Sarcococca ruscifolia	Fragrant Sweet Box	12	2"
TP	Thuja Plicata	Western Red Cedar	43	B&B

THE PURPOSE OF THIS PLANT LIST IS FOR SPECIES IDENTIFICATION, SIZE, CONDITION, AND DESCRIPTION.

ALL PLANTS IN THE LIST ARE SUBJECT TO AVAILABILITY AND ANY SUBSTITUTIONS FOR SPECIES AND/OR PLANT SIZES MUST BE APPROVED BY LANDSCAPE DESIGNER.

465 MEMORIAL DRIVE
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waterform design inc
landscape design consultants

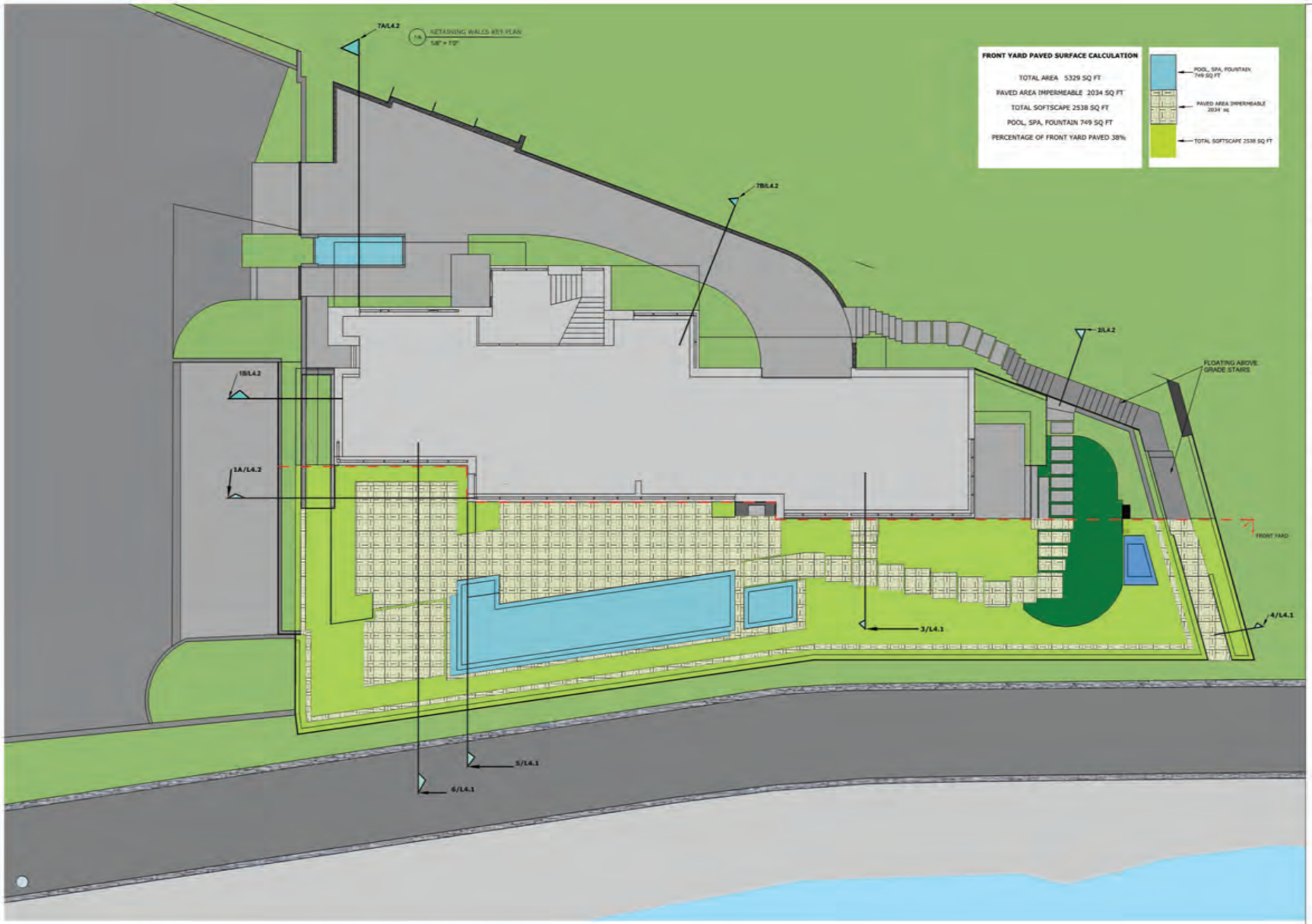
PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
PLANTING PLAN
DRAWING DATE: June 19, 2023
SCALE1 1/8" = 1'

NORTH

SHEET: L3.0

REVISION: 1



GENERAL NOTES:

ALL EXISTING TREES AND PLANTS ON SITE TO BE REMOVED FOR SITE EXCAVATION.

REFER TO ARCHITECTURAL SITE PLAN FOR EXISTING/FINISHED GRADES FOR PURPOSES OF BUILDING HEIGHT CALCULATIONS.

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REFER TO STRUCTURAL ENGINEER DRAWINGS AS REQUIRED PRIOR TO CONSTRUCTION.

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landscape design consultants

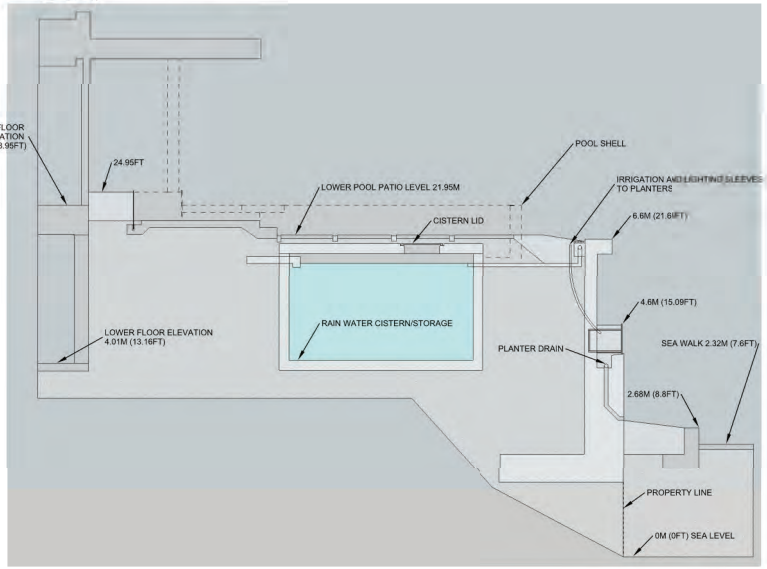
PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
LANDSCAPE DETAILS
DRAWING DATE: June 19, 2023
SCALE1 1/8" = 1'0"

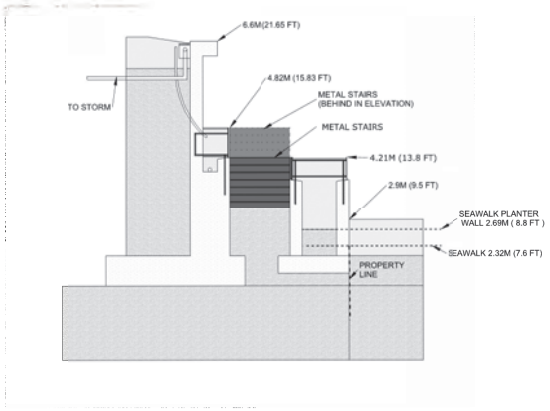
NORTH

SHEET: L4.0

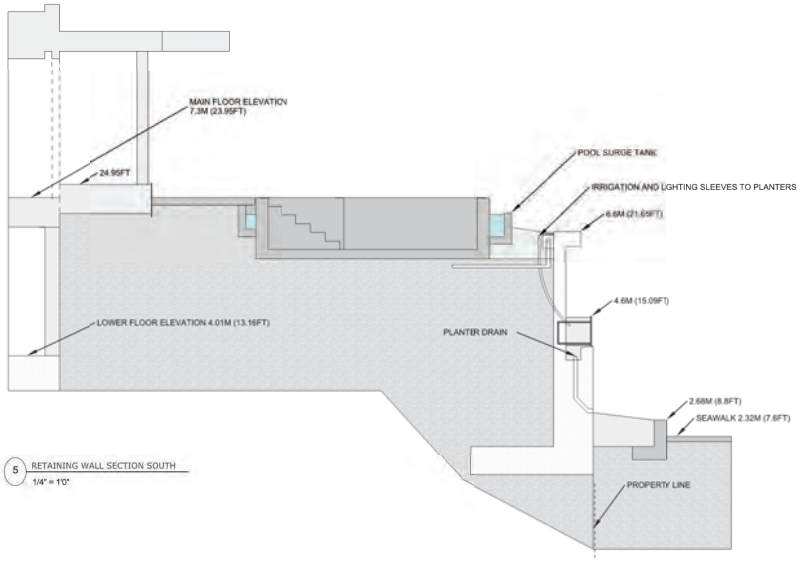
REVISION: 1



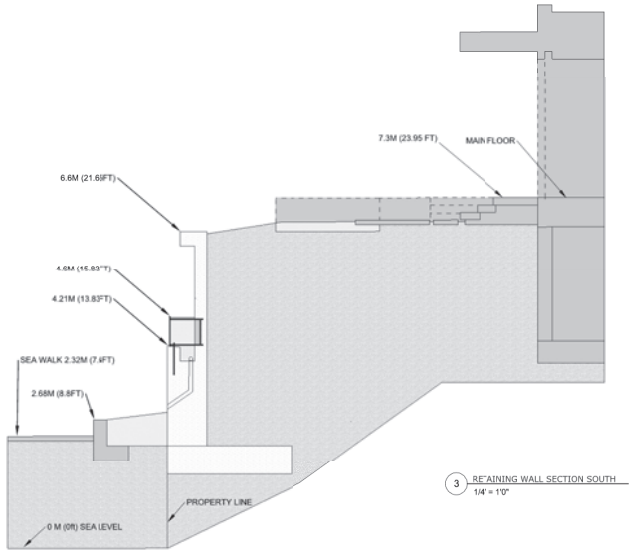
5 RETAIN NG WALL SECTION SOUTH
1/4" = 1'0"



4 RETAINING WALL SECTION EAST
1/4" = 1'0"



5 RETAINING WALL SECTION SOUTH
1/4" = 1'0"



3 RE'AINING WALL SECTION SOUTH
1/4" = 1'0"

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waterform design inc
landscape design consultants

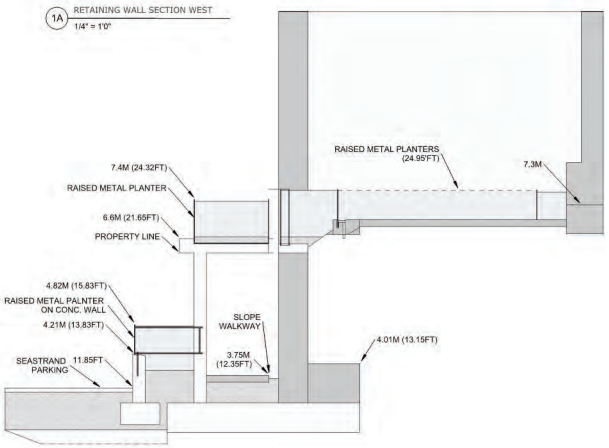
PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
LANDSCAPE DETAILS - SECTION PLAN
DRAWING DATE: June 19, 2023
SCALE: AS SHOWN

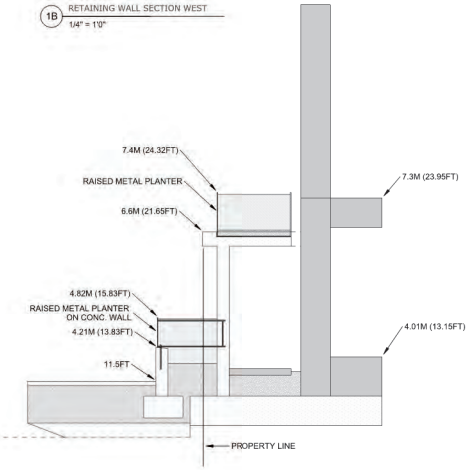
NORTH

SHEET: L4.1 SECTION

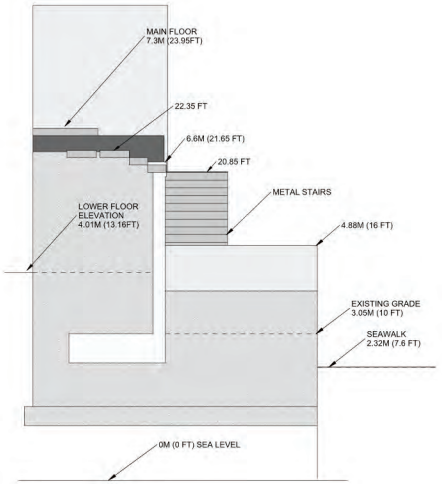
REVISION: 1



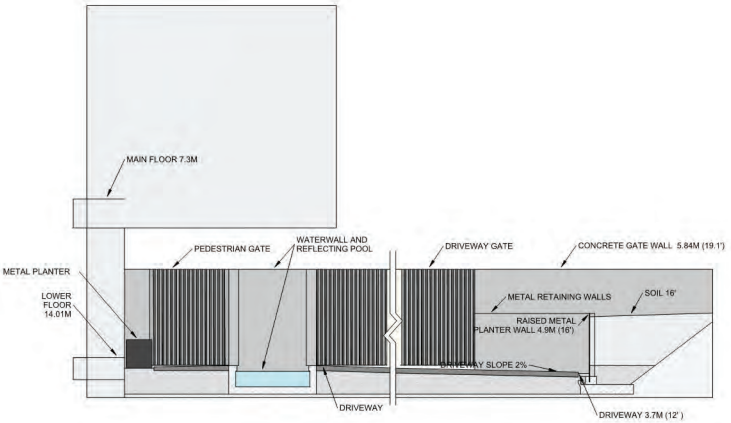
1A RETAINING WALL SECTION WEST
1/4" = 1'0"



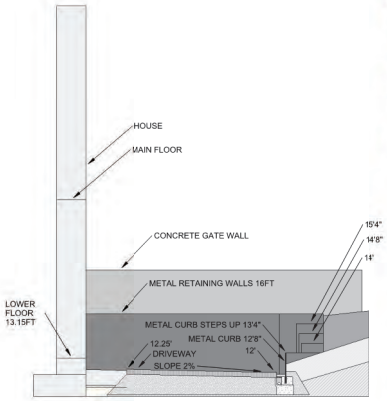
1B RETAINING WALL SECTION WEST
1/4" = 1'0"



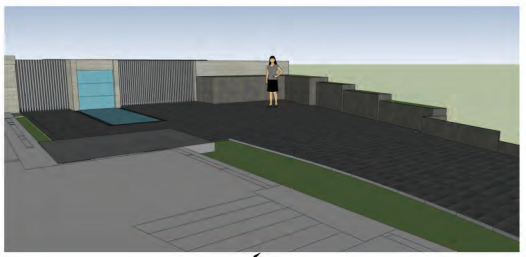
2 RETAINING WALL SECTION NORTH
1/4" = 1'0"



7A ENTRANCE SECTION
1/4" = 1'0"



7B DRIVEWAY SECTION
1/4" = 1'0"



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TREE REPORT BY BURLEY BOYS TREE SERVICE LTD FOR TREE PROTECTION AND REMOVAL SCHEDULE.

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landscape design consultants

PROJECT:
2368 Bellevue
WEST VANCOUVER, BC

DRAWING NAME :
LANDSCAPE DETAILS - SECTION PLAN
DRAWING DATE: June 19, 2023
SCALE: AS SHOWN

NORTH

SHEET: L4.2 SECTION

REVISION: 1

Northwest Hydraulic Consultants Ltd.
30 Gostick Place
North Vancouver, BC V7M 3G3
Tel: (604) 980-6011
www.nhcweb.com

NHC Reference 3007052
April 26, 2023

Philip Cotterill
2368 Bellevue Avenue
West Vancouver, BC V7V 1C8

Attention: Philip Cotterill
Via email: PCotterill@cclgroup.com

Re: **Flood Hazard Assessment**
2368 Bellevue Avenue Final Report, Rev. 3

Dear Mr. Cotterill:

This letter report summarizes the flood hazard assessment (FHA) study conducted by Northwest Hydraulic Consultants Ltd. (NHC) for the proposed development located at 2368 Bellevue Avenue within the District of West Vancouver (DWV).

1 Introduction

A single-family home is being proposed for the property at 2368 Bellevue Avenue (Lots 2, District Lot 554/3156, Plan VAS1722; P.I.D. 004-924-495). The property is located on the north shore of Burrard Inlet within the DWV, east of the Dundarave Pier (**Figure 1-1**). The property is situated within District of West Vancouver's (DWV) foreshore Development Protection Area (DPA), and the DWV Bylaw 4985 requires all applicants developing or altering a dwelling located within the DPA to adhere to an area specific flood construction level (FCL). In addition to the coastal flood hazard, Marr Creek drains the steep slopes of the local mountains to outlet in Burrard Inlet near the subject property (project site). The creek discharges through a culvert beneath the Marine Drive and onto Burrard Inlet. Given the sloping nature of the area between Marine Drive and the water edge, any overland flow in a culvert blockage event is not expected to reach the project site. The risk of flooding from Marr Creek is considered to be of less risk than the coastal flood hazard and therefore the assessment has focused on the coastal derived hazards.

The objective of this assessment is to identify and evaluate the flood hazards that may affect the safe development and use of the property with respect to the proposed development and determine if development is possible to an acceptable safety threshold, either without or with mitigation. Flood hazard is often expressed in terms of the likelihood or probability of a given flood event occurring. The currently accepted safety design flood event in British Columbia is based on a 0.5% annual exceedance probability (AEP) event with consideration of climate change projecting to the year 2100. The 0.5% AEP event is often referred to as the 200-year event as such an event is expected, on average, to occur or be

exceeded, once every 200 years. The report has been structured by presenting referenced guidelines, site observations, coastal assessment, and concluding with findings and recommendations.

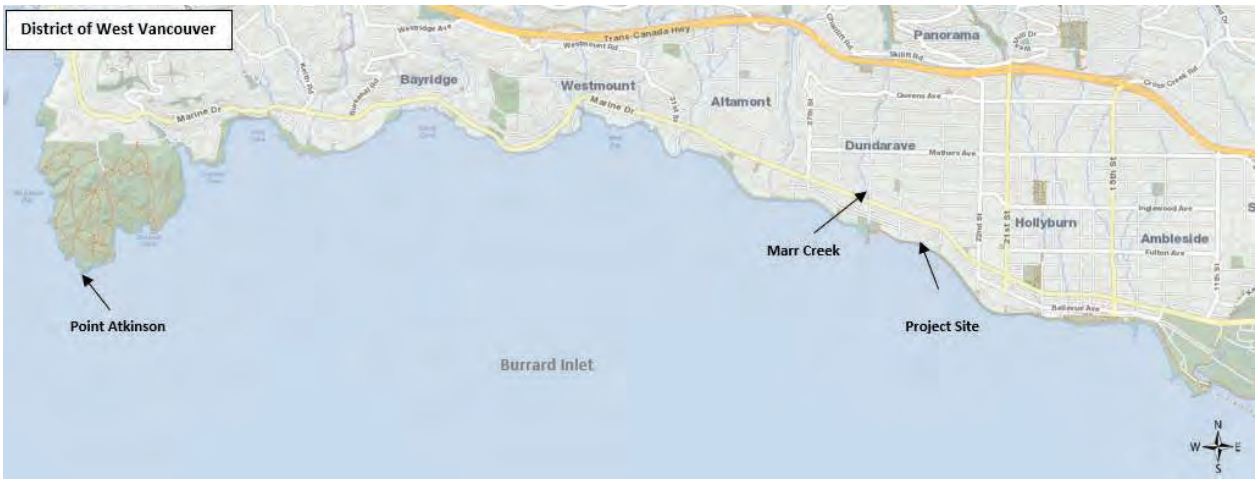

Figure 1-1. Location map of study site (adapted after DWV,2018a).

1.1 Foreshore Development Permit Area (DPA)

The District of West Vancouver has created a Development Permit Area (DPA) for the foreshore (waterfront) that will help protect people and properties, provide information to owners about how to redevelop their properties safely, while sensitively managing the foreshore environment. The Foreshore Development Permit Area was adopted on April 11, 2022. Development in the Foreshore DPA will be subject to protection area guidelines.

The Foreshore DPA has been established to:

1. Minimize risk to people and property from coastal hazards including sea level rise, storms, wave effects, and flooding.
2. Support coastal management in reducing flooding risks.
3. Preserve and enhance the integrity of the intertidal habitat of the foreshore and minimize shoreline erosion.

The District of West Vancouver (2022) Bylaw 4985 requires all applicants developing or altering a dwelling located within the NE2 Foreshore Protection Area to adhere to a an area specific flood construction level (FCL), unless a site specific FHA report is prepared and a FCL level is established by a qualified professional, that confirms the land may be used safely for the use intended. The study site is located within the area transect E, delineated in the Foreshore Development Permit Area Designation Map NE 2, corresponding to a FCL of 7.53 m Geodetic Survey of Canada Datum (GSCD or CGVD28).

2 Referenced Guidelines

The following guidelines and regulations were reviewed as part of our investigation of the possible hydrotechnical hazards that could threaten the study property.

- DWV Official Community Plan (OCP) Bylaw 4985
- Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC (EGBC, 2018)
- Flood Hazard Area Land Use Management Guidelines (BCMFLNRD, 2018)
- Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use – Draft Policy Discussion Paper (BC Ministry of Environment, 2011a)
- Coastal Floodplain Mapping – Guidelines and Specifications (BC Ministry of Environment, 2011b)
- Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use – Guidelines for Management of Coastal Flood Hazard Land Use (BC Ministry of Environment, 2011c)

3 Site Description

A site investigation was conducted on November 30th, 2021, by two coastal engineers from NHC, to identify the condition of existing foreshore structures and substrate characteristics. The weather throughout the site inspection was cloudy with rain and the sea state was relatively calm. The tide level, as recorded at Point Atkinson, located 6.2 km west of the project site, was approximately -0.5 m CGVD28 during the site inspection which permitted the foreshore area just below the toe of the Centennial Seawalk armouring to be visually inspected. **Figure 3-1** illustrates the approximate extent of the visible coastal features along 2368 Bellevue Avenue and neighbouring properties during a typical low tide. The extent of the property lot is outlined in purple.

Figure 3-1. Satellite image showing the foreshore and extent of the subject lots at 2368 Bellevue Avenue, DWV (adapted after DWV, 2019).

The existing foreshore of the property is bounded to the south by the Centennial Seawalk with a top invert elevation at El. 2.3 m CGVD28, and a riprap embankment, approximately 2.3 m CGVD28 high, with a side slope of 2H:1V (**Figure 3-2**). From the toe of the embankment (El. 0.3 m CGVD28), the foreshore transitions into a mild beach (35H:1V) with a bedrock and rock substrate. The foreshore faces toward the south and is exposed to waves from west, south, and east. The property is bounded to the north by the Canadian National Railway with a top invert elevation at El. 6.0m CGVD28. There is no neighboring lot to the east of the site. Along this side, the property lot (El. 2.4 to 2.6 m CGVD28) merges with a green area located between the railway and the seawalk (**Figure 3-3**). Access to the property is provided via the western side of the lot, through the shared parking lot (El. 4.0 m CGVD28) of the 150 24th Street property, as illustrated in **Figure 3-4**. The existing dwelling (**Figure 3-5**) is separated from the seawalk by a concrete curb (El. 3.15 m CGVD28) and a concrete patio (El. 3.1 m to 3.3 m CGVD28) with a setback from the curb between approximately 2 m from the southeastern corner of the dwelling and 8 m from the southwestern corner.

The effects of wave action and overland flow on the project site are evident under present day conditions. A second field visit was conducted by NHC personnel following the January 7th, 2022 westerly wind event[1] . Multiple large debris pieces and dislodged armour rocks were observed to have

[1] Peak water level at Point Atkinson was approximately 2.4 m GD and the wind speed at Point Atkinson was 69 km/hr (from the west northwest) during the event.

been deposited on the seawalk (**Figure 3-6**) and at the toe of the curb wall separating the property from the seawalk. Evidence of overland flow was also evident over the parking lot located west of the site, where smaller debris pieces were deposited (**Figure 3-7**). The proximity and magnitude of this event is illustrated in **Figure 3-8**, showing a snapshot of a video recording taken by the current owner of the property. At the time of the event the seawalk was completely flooded and overland flow and debris reached the curb located along the southern edge of the lot. This wind event does not define the future design condition but offers an example of the severity of the natural processes that are expected to govern.

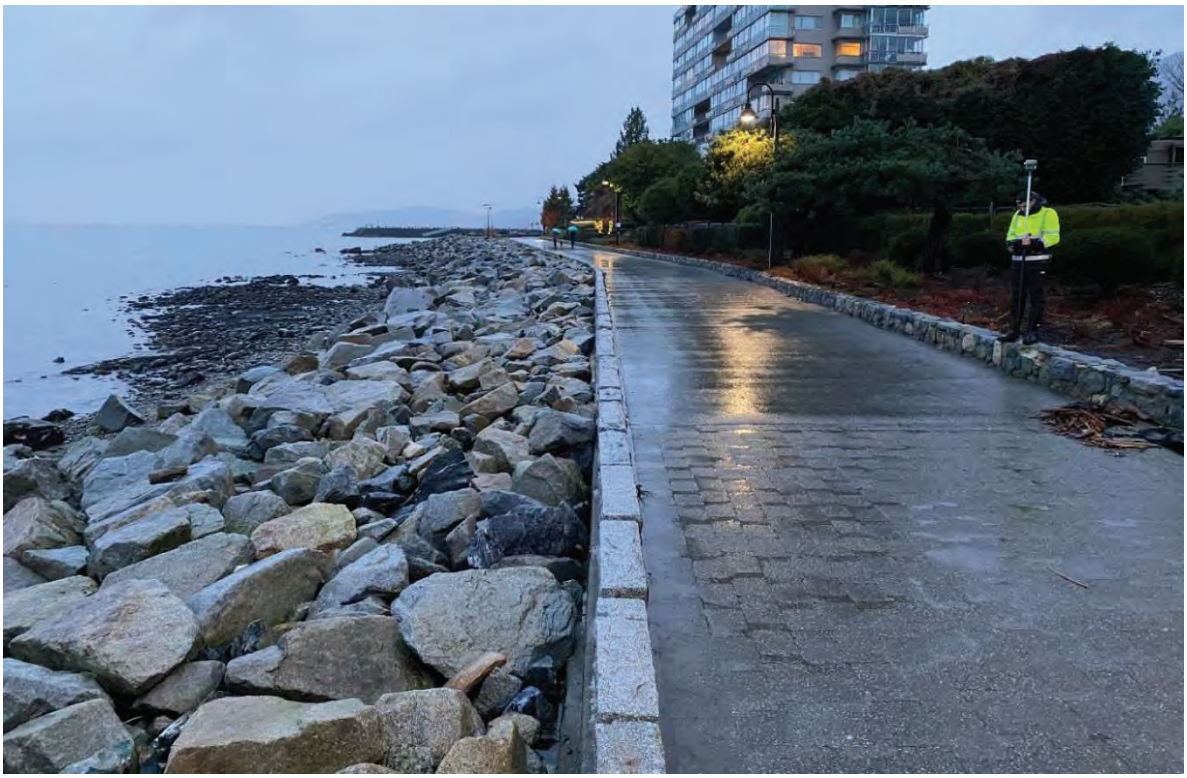

Figure 3-2. Foreshore, rock embankment, and Centennial seawalk– facing west.

Figure 3-3. Eastern side of the property – facing east.

Figure 3-4. Existing dwelling western access and neighboring parking lot – facing east.

Figure 3-5. Concrete patio illustrating the setback between existing dwelling and Centennial seawalk – facing east.

Figure 3-6. Deposited debris and dislodged armour rocks on the Centennial shoreline following the January 7th, 2022 storm – facing west.

Figure 3-7. Flood evidence on the parking lot west of the project site - facing northeast.

Figure 3-8. Observed wave-foreshore interaction from the second floor of the existing 2368 Bellevue dwelling during the January 7th, 2022 storm – facing southwest.

4 Proposed Development

The proposed development consists of a single floor building with basement that is described in the drawing set provided by Feenstra Architecture Inc. The drawings are attached as **Appendix B**. The plan view of the proposed design is illustrated in **Figure 4-1**. The house is to include an elevator to improve accessibility. A retaining wall is proposed along the southern and westerly perimeters of the property. A typical profile view of the retaining wall is shown in **Figure 4-2**.

Key features from the proposed plan that are relevant for the flood hazard assessment consist of the followings:

- A private residence with the lowest floor at El. 7.3 m CGVD28 and basement with floor elevation at 4.01 m CGVD28;
- Mechanical infrastructure located in the basement;
- A driveway providing access to the property along the northwestern side, at El. 4.01 m CGVD28;
- A covered patio that extends seaward from the residence with elevation at El. 7.3 m CGVD28;
- A pool and a hot tub along the covered patio with elevation at El. 7.3 m CGVD28; and
- A recurved retaining wall along the western, southern and eastern perimeters of the site at El. 6.6 m CGVD28.

Given the proximity of the covered patio to the shoreline and the low elevation of the existing seawalk, the area below the retaining wall is expected to be inundated during a wave event at high tide. Under these conditions, overflow and spray over the retaining wall may or can be expected to reach the concrete patio that leads into the dwelling.

Hard engineering solution is proposed at this location instead of soft-shoreline solutions. The purpose of using soft-shore shoreline solutions is typically to preserve the ecological connectivity from terrestrial to marine ecosystems and also to ensure that natural sediment processes (the movement of sand alongshore) are preserved. Considering that the project site is fronted by the DWV Seawalk with its riprap seaward of the property, there is limited benefit to implementing soft-shore shoreline solutions at this location. Additionally, the site will face substantial wave activity under the future design scenario, and the site is extremely constrained by existing structures and the Seawalk. The existing hard structures seaward of the project site will resist scour and erosion, and therefore the proposed retaining wall is not expected to increase scour and erosion in the foreshore area.

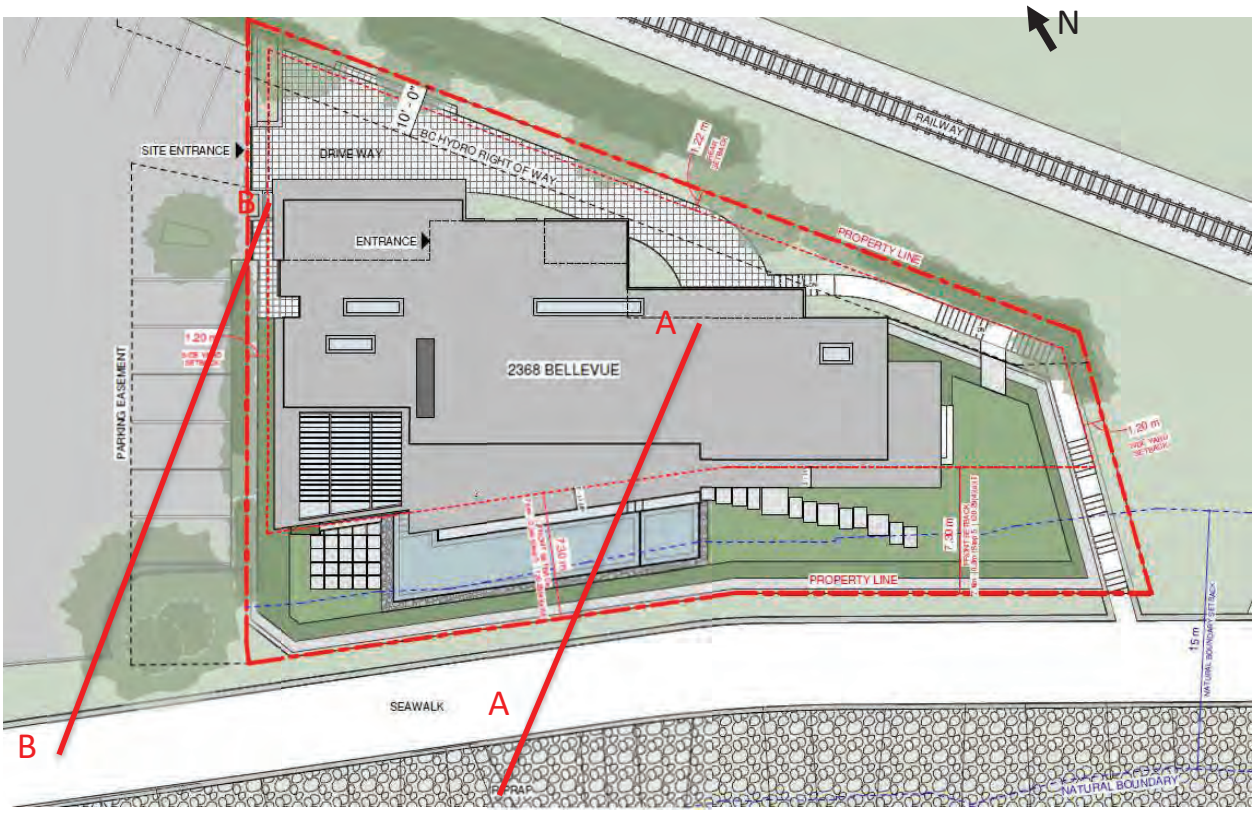

Figure 4-1. Plan view of the proposed development (A0.02 from the drawing set).

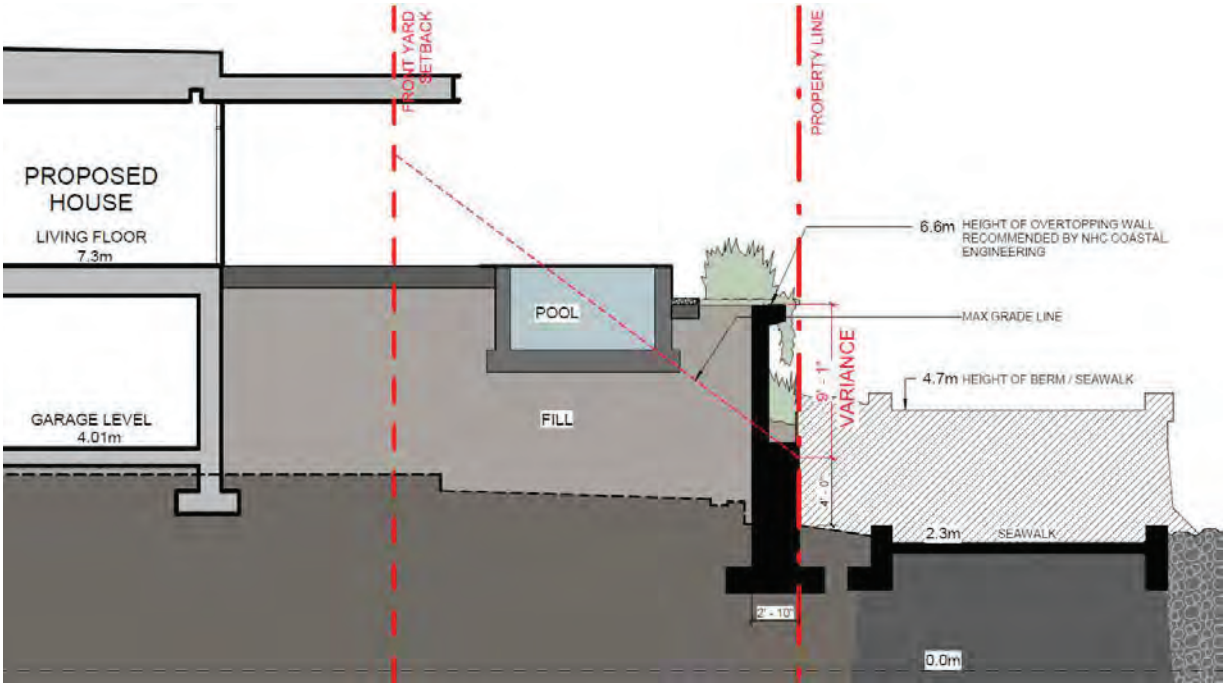

Figure 4-2. Profile view of the proposed retaining wall along the southern property border (A6.02 from the drawing set)

5 Coastal Flood Hazard Analysis

Coastal flood hazards are primarily dictated by flood inundation, but can include overflow and spray, shoreline erosion and scour, beach degradation or aggradation, or physical loading from hydraulic forces or wood debris. Flood inundation is the focus of this coastal assessment. Based on an initial review, other coastal hazards that may be present but do not govern for the purposes of this FHA include:

- Overflow and spray can be assessed and addressed through site drainage design following site design.
- Damage of the retaining walls is expected; this can be mitigated by ensuring that the design can withstand physical loading from hydraulic forces or impact forces from floating debris.
- No scour was identified throughout the field inspection.

The tidal conditions for Point Atkinson are summarized in **Table 5-1,** based on published information for Point Atkinson reference port (Station ID 7795) in the Canadian Hydrographic Service (CHS, 2022) Canadian Tide and Current Tables. The Higher High Water Large Tide[2] at Point Atkinson is at 1.9 m CGVD28. Coastal flood levels due to tide, storm surge, wave effects and long-term changes in global and local sea level are expected to be higher than this elevation and these could lead to flood inundation to some portions of the project site. The historical high water level at Point Atkinson is 2.7 m CGVD28 and occurred in December 2022.

Table 5-1. Tidal heights, extremes, and mean water level at Point Atkinson.

Sea State	Tide Elevation (m CGVD28)
Higher High Water, Large Tide (HHWLT)	1.9
Higher High Water, Mean Tide (HHWMT)	1.4
Mean Water Level (MWL)	0.0
Lower Low Water, Mean Tide (LLWMT)	-1.9
Lower Low Water, Large Tide (LLWLT)	-3.0

5.1 Coastal Flood Level

To reduce the likelihood of damage from coastal flood inundation, the coastal flood level was assessed and used to derive a minimum construction level – the flood construction level (FCL). The FCL provides a level of mitigation to limit the likelihood of flooding for homes located along the coast or rivers and creeks. The FCL is generally based on an event with an AEP of 0.5%, often referred to as the 200-year event; since on average it would be expected to occur or be exceeded once every 200-years. In addition, due to changing conditions (primarily human induced global climate change) future conditions are considered up to the expected life of the project; often limited to the year-2100.

[2] Higher High Water Large Tide is defined as the average of the highest high waters, one from each of 19 years of observations.

The FCL for the project site is determined using the joint probability approach described in the Ministry of Environment's published Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use (BC Ministry of Environment, 2011b) and the BC Ministry of Forests, Natural Resource Operations and Rural Development's amendment (BCMFLNRD, 2018). Parameters that combine to determine the FCL are illustrated in **Figure 5-1** and are described below.

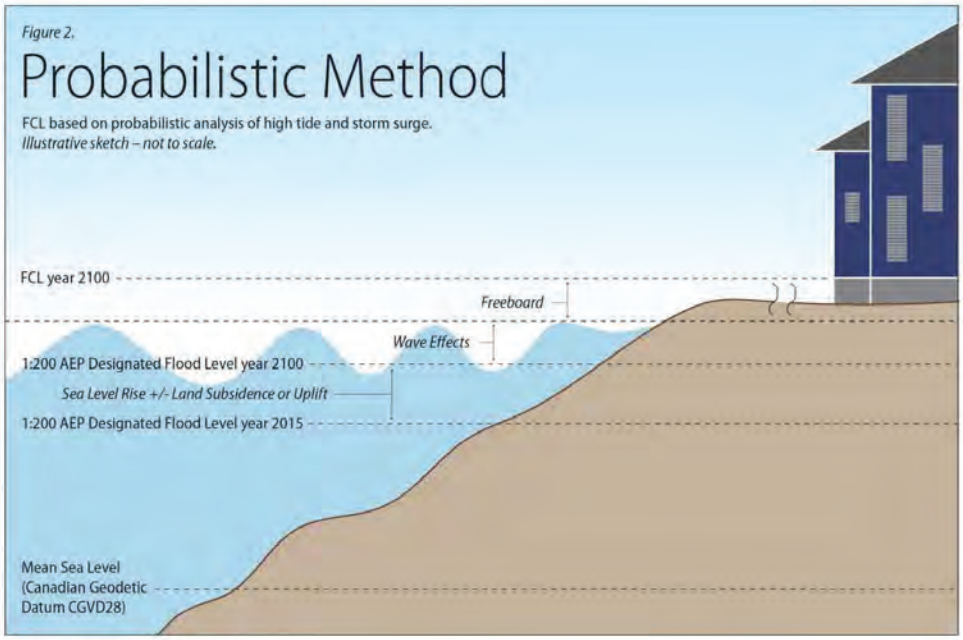

Figure 5-1. FCL based on probabilistic analysis (BCMFLNRD, 2018).

5.2 Coastal Flood Construction Level Assessment

The coastal flood construction level (FCL) using the probabilistic approach is the sum of:

- 1-in-200 AEP total water level as determined by probabilistic analyses of tides and storm surge;
- Allowances for future SLR to the year 2100;
- Allowance for regional uplift or subsidence to the year 2100;
- Estimated wave effects associated with the designated storm with a 1-in-200 AEP; and
- Freeboard.

Each of these components is described in the following sections.

Predicted changes in storm intensity and frequency over the next 77 years, which could influence storm surge and wave effects, are highly variable and inconclusive. Such influence has not been incorporated in this analysis.

5.2.1 Joint Occurrence of Storm Surge and Tides

Coastal flood levels for the 1-in-200 AEP was developed by applying the Empirical Simulation Technique (EST) on the long-term observed data (66 years) at Point Atkinson (NHC, 2008). The EST method is recommended by the Coastal Hydraulics Laboratory (of the US Army Corps of Engineers) and the Federal Emergency Management Agency (FEMA) for frequency related studies. The analysis determined that the 1-in-200 AEP water level for this site is 2.76 m CGVD28.

5.2.2 Sea Level Rise

Global climate change is expected to result in increased sea levels resulting from melting of global ice and increased ocean volume due to rising water temperature. The BC Provincial Sea Dike Guidelines (BC Ministry of Environment, 2011c) recommends that SLR associated with global climate change will result in a base water level 1 m above that seen in the year 2000 by the year-2100. The rate of SLR is projected to increase as the climate warms (**Figure 5-2**). Therefore, any increase incorporated in the past 22 years is expected to be minimal and hence ignored.

Note that the recommended SLR for planning and design in BC was based on a 2008 study by Fisheries and Oceans Canada (Thomson et al., 2008) and MOE (Bornhold, 2008). The authors of those works acknowledge the design SLR for BC is greater than the global mean SLR projected by the IPCC AR4 (2007) for the year 2100 (roughly 40 cm greater). However, more recent studies, such as IPCC AR5 (2014), suggest global mean SLR of up to 1 m or more by the year 2100 can reasonably be expected. These values were based on the Paris Accord being adopted and adhered to, which appears not to be the case.

Other studies have investigated the potential effect of a collapse of the Antarctic ice sheet and have shown that such an event would result in far greater SLR, with estimates that are orders of magnitude larger than the 1 m to 2 m projected over then next 77-178 years. Recent changes in estimates of global mean SLR to the year 2100 or 2200 have not yet been addressed in the context of coastal BC, but based on recent conversations with FLNRORD, the province is amidst a study of SLR to update the 2011 design values. Despite the 1 m adopted by this flood hazard assessment, residents along the coast should therefore be aware that SLR could be substantially greater over the next 77 years, which may require raising, reconstruction, or relocation.

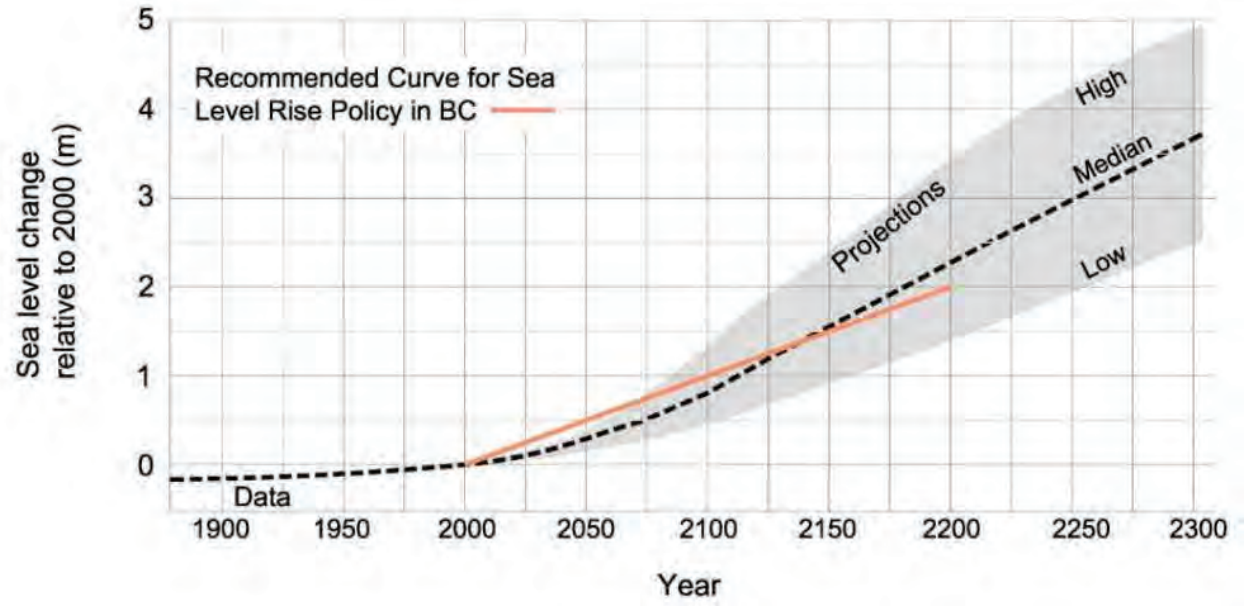

Figure 5-2. Projected climate change (BC Ministry of Environment, 2011c).

5.2.3 Local Subsidence

In addition to a rising sea, downward movement of the ground (subsidence) or upward movement (uplift) will influence the local relative sea level. Provincial guidelines (BC Ministry of Environment, 2011c) for local uplift are based on regional estimates and are less applicable than a more site-specific data source (Mazzotti et al., 2009), which suggests that subsidence for this location is on the order of -1 ± 0.5 mm/y (**Figure 5-3**). To the year 2100, this translates to a relative ground lowering of 0.12 m.

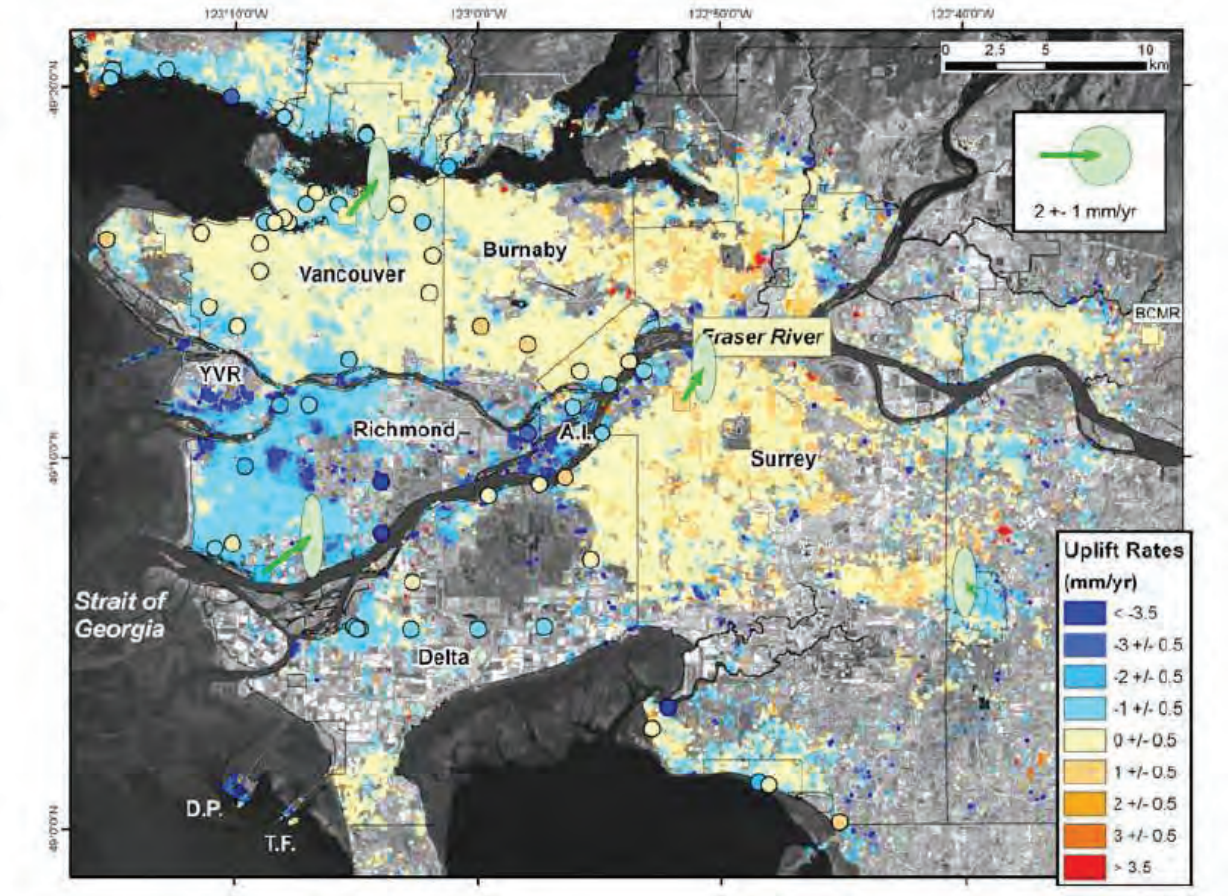

Figure 5-3. Local subsidence, shown as rate of uplift (Mazzotti et al., 2009).

5.2.4 Wave Effect

5.2.4.1 Wind Analysis

The waves at the project site are predominantly wind-generated waves. To determine the design wind-wave climate at the project site, historic wind records from nearby Meteorological Service of Canada (MSC) station 1106200 Point Atkinson were examined; 25 years of hourly wind data (1996 – 2022) was used for the study.

The local wind climate can be visualized using a wind rose plot, utilizing arrows at the cardinal and inter-cardinal compass points to show the direction from which the winds blow and the magnitude and frequency for a given period. A wind rose showing the direction and magnitude of the winds at Point Atkinson is shown in **Figure 5-4.**

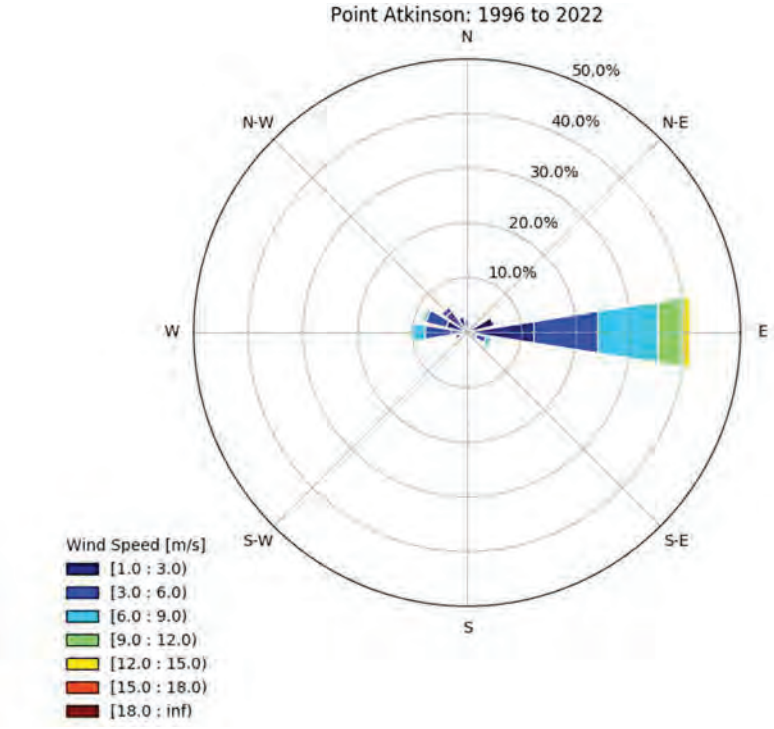

Figure 5-4. Wind rose based on data from Point Atkinson.

The wind rose shows that wind experienced at Point Atkinson is most frequently from the east and secondly from the west. Frequency analysis was conducted on the Point Atkinson data to obtain the wind speed for the design easterly and westerly storm events. The results are summarized in **Table 5-2** with the westerly winds being slightly stronger than from the east for the same return frequency.

Table 5-2. Design wind speeds – Point Atkinson.

Event	Easterly		Westerly	
	Speed (m/s)	Speed (km/h)	Speed (m/s)	Speed (km/h)
1-in-5 year	20.4	74	20.7	74
1-in-10 year	21.0	76	21.9	79
1-in-50 year	22.4	80	24.9	90

The provincial guideline suggests that the wave effect is to be based on the 0.5% AEP storm event. However, NHC considers that establishing the FCL based 0.5% AEP storm event occurring with 0.5% AEP water level (tide and surge) to be overly conservative. For this study, the 50-year (2% AEP) storm events were used to for the flood hazard assessment instead of the 200-year (0.5% AEP) storms.

5.2.4.2 Wave Analysis

To establish the generation and transformation of design waves from deepwater to the project site, a nearshore wave model (Simulating Waves Nearshore or SWAN) of the Strait of Georgia and Burrard Inlet was developed to model wave generation and propagation from deep water into coastal areas and

shorelines. SWAN incorporates physical processes such as wave propagation, wave generation by wind, white-capping, shoaling, wave breaking, bottom friction, sub-sea obstacles, wave setup and wave-wave interactions in its computations (Booij, N. et al., 2004). SWAN version 41.20 was used for this study.

Three model grid resolutions were used for the analysis: a fine grid model of the area surrounding the site was nested in a medium grid model of Burrard Inlet as illustrated in **Figure 5-5**, which was nested in a coarse grid model of the Strait of Georgia. The grid resolutions for the fine, medium and coarse models are 20 m, 50 m, and 500 m, respectively. The model bathymetric data were generated from Canadian Hydrographic Service sonar data, digitized Canadian Hydrographic Charts, and NOAA 3 arc-second resolution data.

Figure 5-5. SWAN nested model grids extents – medium grid (red), fine grid (blue).

The 50-year event (2% AEP) for each of the design wind directions (westerly and easterly) were used to drive the SWAN model. For each event, a spatially varying Strait of Georgia wind field was developed and applied to the models.

Model results from the fine grid model showing the 50-year storm waves from the west and east near the project site are presented in **Figure 5-6** and **Figure 5-7**, respectively. Wave height is shown by colour shading, wave direction and relative heights are shown by vectors (at 100 m spacing). The location of the project site is shown using a red dot. The results show that the largest waves that affect the project site come from the west due to the longer fetch and higher wind speed. Therefore, the westerly wave events govern the FCL at the site. The design significant wave height and peak wave period are **2.7 m** and **7.2 seconds**, respectively.

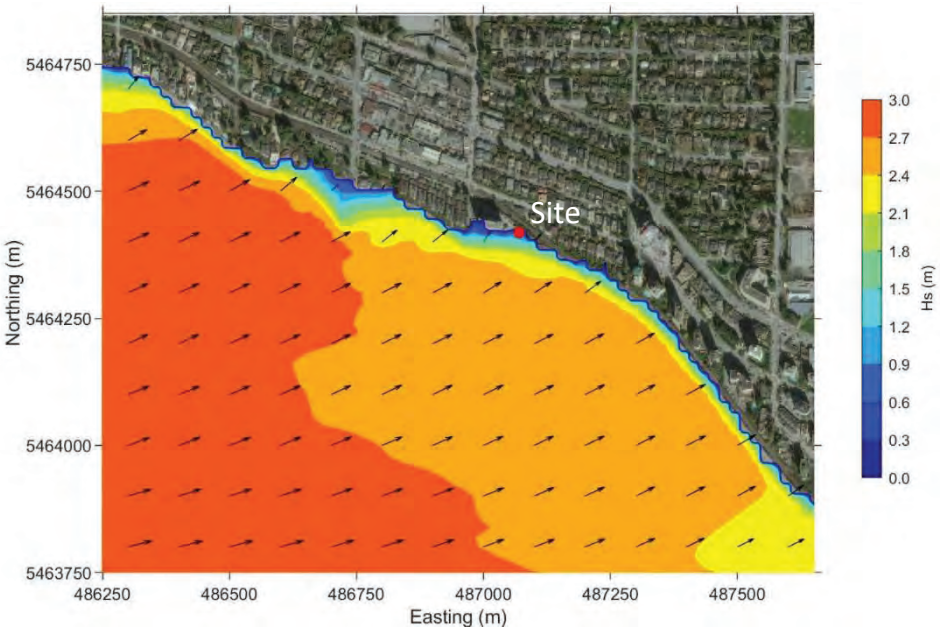

Figure 5-6. Significant wave height (Hs) and direction for a simulated 50-year westerly wind event (year-2100).

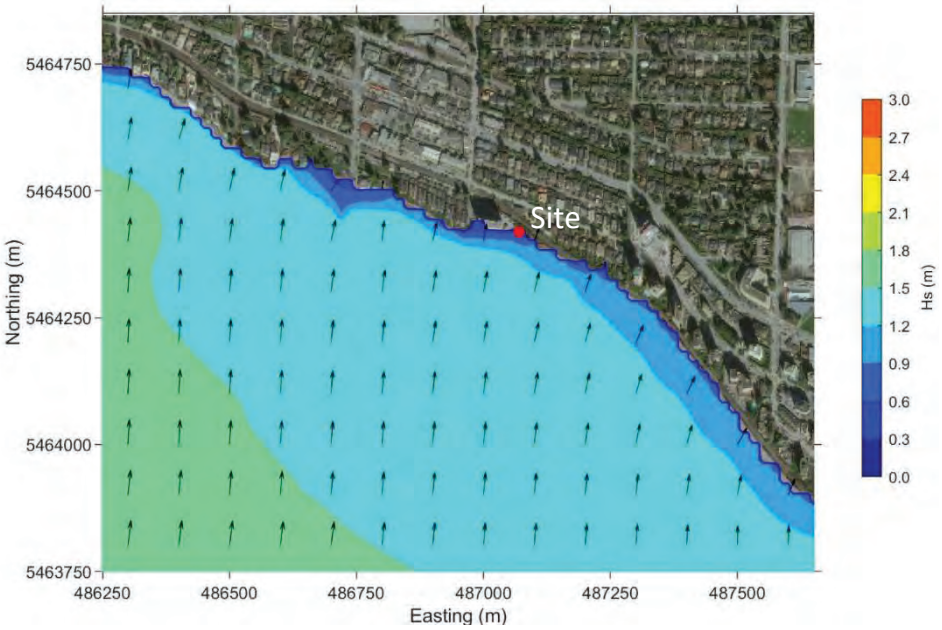

Figure 5-7. Significant wave height (Hs) and direction for a simulated 50-year easterly wind event (year-2100).

5.2.4.3 Wave Runup and Wave Effect Assessment

Wave runup at the shoreline determines the extent over which waves act. Wave runup is therefore an important parameter to determine flood inundation extents from coastal storms. For flood hazard assessment, wave run-up is calculated in terms of the two percent exceedance value of wave run-up ($R_{2\%}$) [3]. To determine $R_{2\%}$, a Simulating Waves till Shore (SWASH) numerical model was developed to simulate the wave transformation, breaking and overflow on the shoreline (The SWASH team, 2018). For this study, SWASH version 5.01 was used.

Two general profiles of the study site were created using the survey data collected by NHC and incorporating the architectural drawings provided by the client (**Appendix B**), and bathymetry data used in the SWAN model. The wave effects were analyzed considering the two upland profiles illustrated in **Figure 4-1**. Section A-A is a representative profile of the retaining wall design along the southern perimeter of the property, consisting of the existing rock revetment, the seawalk (El. 2.3 m CGVD28), the retaining wall (El. 6.6 m CGVD28), and the area leading to the covered patio at El. 6.6 m. Given that the parking area west of the site is submerged under future conditions, the western side of the property can experience flooding. Section B-B represents a typical profile through the west side of the lot, consisting of the existing rock revetment, seawalk, and parking lot, and the retaining wall (El. 6.6 m CGVD28).

Figure 5-8 shows a snapshot of the SWASH model output for the proposed design under future design water level conditions at Section A-A (top panel) and Section B-B (bottom panel). The results along both sections indicate that the $R_{2\%}$ is not expected to exceed the wall crest elevation of 6.6 m CGVD28. Note, SWASH can simulate the effects of complex foreshore on nearshore wave processes, however, it does not account for waves breaking and passing over the crest of the retaining wall. Therefore, it is possible that white water and spray overtopping can enter and flood the concrete patio during design storm events. SWASH model also does not incorporate the recurved wall which is expected to reduce the spray overtopping.

[3] $R_{2\%}$ is defined as the elevation that only two percent of the waves (i.e. 1 wave in 50) that are observed on a shoreline during the peak of a storm will reach or exceed.

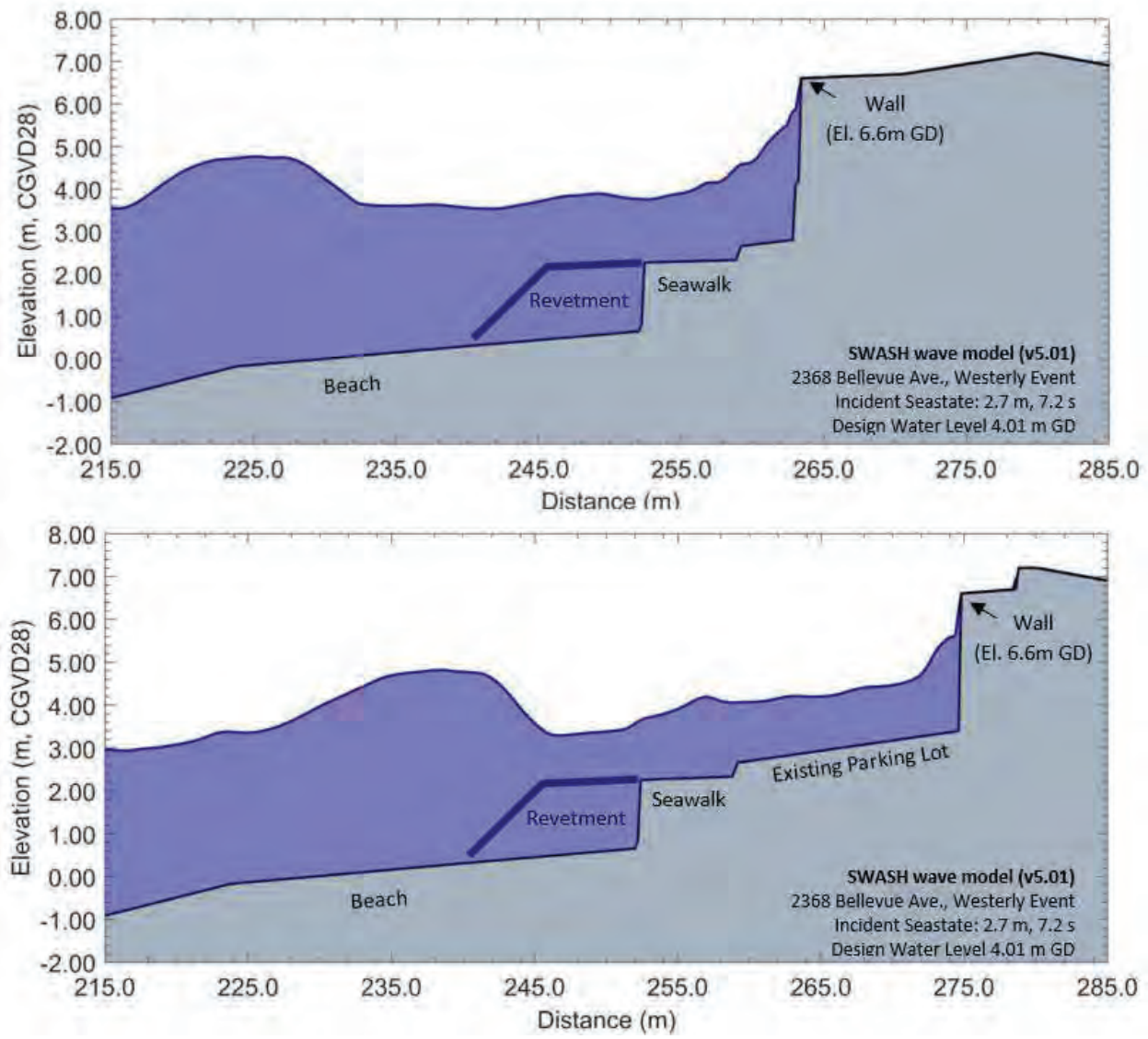

Figure 5-8. SWASH snapshot – suggested design modifications under year-2100 conditions; Section A-A (top) and Section B-B (bottom) in Figure 4-1.

5.3 Freeboard

The freeboard is applied to account for temporal and spatial variances in wave climate and surge, as well as precision of the calculation and data. Freeboard for infrastructure according to the amendment to the Flood Hazard Area Land Use Management Guidelines (BCMFLNRD, 2018) is 0.6 m when using the probabilistic approach.

5.4 Coastal Flood Construction Level

Table 5-3 summarizes the resulting FCL predicted for the year 2100 for the proposed development. The DWV Bylaw 4985 stipulates a FCL of 7.53 m CGVD28 for the study site, higher than the current FCL estimation. The wave effects associated with this FCL are based on empirical equations developed for irregular run-up on a plane impermeable beach, based on the 200-year (0.5% AEP) incident wave conditions and 200-year (0.5% AEP) DWL (WSP Canada Inc., 2019). This methodology does not account for the complex wave-structure interaction resolved by the SWASH model employed in the current study. Furthermore, as mentioned in **Section 5**, the 50-yr (2% AEP) storm event was employed in the SWAN model to estimate the governing offshore wave climate. The smaller 50-yr (2% AEP) event magnitudes will generate smaller wave heights compared to the 200-yr (0.5% AEP) event, and implicitly, smaller run-up values.

Table 5-3. Coastal flood construction levels.

Parameter	Year 2100 Building FCL Elevation (m CGVD28)
Tide + storm surge (joint probability)	2.76
+ wave effect	2.53
+ Design sea level rise (to year 2100)	1.00
+ Subsidence (to year 2100)	0.12
Coastal flood level	6.41
+ Freeboard (m)	0.60
Flood construction level	**7.01**

5.5 Tsunami Hazard

In addition to wave and storm events, high water and coastal property inundation could potentially occur from a tsunami event. Previously denoted as tidal waves, the Japanese term tsunami, is now used to denote long period waves (5 to 60 minutes) that radiate out from the rapid displacement of a large volume of water. The initial displacement can result from an earthquake, landslide, volcanic eruption, glacier calving, or impact from a meteorite. However, major tsunami events generally are a result of earthquakes that produce substantial vertical movement of the sea floor in sufficiently shallow water.

Assessment of tsunami hazards are beyond the scope of this project; however, previous studies suggest that the tsunami wave height reaching Vancouver Harbour would be roughly 10% of the tsunami wave height observed at Tofino on the west coast of Vancouver Island (Spaeth and Berkman, 1967) and that runup from a tsunami is expected to be less than 2 m on the North Shore from a tsunami originating from the Pacific Ocean (Clague et al., 2005). Such an event would be extremely large on the west coast of Vancouver Island assuming the attenuation through the strait is roughly 10%.

The expected maximum tsunami run-up of less than 2 m would be for events far less frequent than the 200-year event, and when added to mean water high high tide (MWHHT), sea level rise, and subsidence, the expected water level (El. 4.42 m CGVD28) is still below the top elevation of the retaining wall (El. 6.6 m CGVD28), and the suggested coastal FCL.

6 Summary and Recommendations

A hydrotechnical flood hazard assessment was conducted for the subject property at 2368 Bellevue Avenue. From this study, the following recommendations are made for safe use of the property:

1. The 2100-year design FCL for the project site is 7.01 m CGVD28 provided that the building is set back from the waterside of the recurved concrete wall structure with crest elevation at El. 6.6 m CGVD28 as per Drawing A6.02 in the drawing set (Appendix B).
2. The retaining wall structures, pool, and foreshore will need to be designed to resist hydrostatic forces, wave effects and debris impacts.
3. Building entrances and windows to habitable space should be at or above the applicable FCL.
4. The side terrace and covered patio area should be provided with drainage to accommodate potential spray and overtopping flow. The design should include considerations of the pool and hot tub. Incorporating recurved wall to the design of the wall can reduce the impact but not eliminate it. Incorporating glass railing on top of the wall could also further reduce the likelihood of potential flooding from overtopping, provided that it does not get damaged.
5. The underside of any wooden floor system, or the top of any concrete floor system used for habitation should be above the FCL.
6. No enclosed space to be used for habitation or storage of goods that can be damaged by floodwaters should be below the FCL. An exception to this recommendation can be made if suitable provisions are made to design the space below the FCL such that flood waters cannot enter the space; for instance, a ‘floodproof’ basement is designed and certified by a qualified engineer.
7. All main electrical and mechanical infrastructure are to be above the applicable FCL. Any electrical supply below the FCL (i.e. outlets or lighting) should be protected by GFCI (ground fault circuit interruption) and designed following electrical practice guidelines for flood resilience (EGBC, 2020). Mechanical infrastructure may be located within a floodproof enclosed space below the FCL.
8. To avoid entrapment, any enclosed space below the FCL is to have safe egress to a location above the FCL or to ground level. Safe egress must be possible without relying on electrical power.
9. Final building plans should be reviewed by a qualified registered engineer to ensure they meet the recommendations presented within this FHA.
10. End users and/or future property owners must be notified of the risk of storage and/or parking below the FCL; possibly through signage, tenancy agreement, and/or property covenant.

11. This flood hazard assessment was conducted following EGBC 2018 Class 1 flood hazard assessment guidelines. A summary of the EGBC criteria for such an assessment is presented in **Table 6-1**.

The set-back requirements in the provincial Flood Hazard Area Land Use Guideline would sterilize the development of this existing lot (not permit any development) and therefore an exception is recommended. The minimum set-back of approximately 1.2 m from the future DFL value from the proposed plan is considered acceptable for this site provided that all recommendations made in this report are met. Additionally, the risk of erosion on the site is deemed low due to the fact that the shoreline is fixed due to the presence of city's seawalk and riprap shoreline. Both the riprap shoreline and the pathway will need to be either maintained in their current status or improved for the conditions stated in this report to be valid.

Hazards other than flood hazards from Burrard Inlet and the adjacent creeks, such as geotechnical, fire, and wildlife hazards have not been assessed as part of this assessment. Stormwater and sediment management have not been designed or assessed through this study and may also impose hazards if not adequately addressed. A residual risk remains, even following the recommendations within this assessment; that is more extreme flood events (greater than the design event) are possible and sea level rise projected over the next 77 years could exceed the 1 m adopted for this flood hazard assessment.

Table 6-1. Summary of EGBC typical Class 1 flood hazard assessment methods and deliverables

EGBC Flood Hazard Assessment Component	Notes
Typical hazard assessment methods and climate/environmental change considerations	
Site inspection and qualitative assessment of flood hazard	Completed by NHC 2021
Identify any very low hazard surfaces in the consultation area (i.e., river terraces)	Completed by NHC 2021
Estimate erosion rates along river banks	River erosion not applicable to site. Coastal erosion not evident.
1-D or possibly 2-D modelling, modelling of fluvial regime and future trends in river bed changes, erosion hazard maps, possibly paleoflood analysis	2-D coastal modelling completed by NHC 2023
Identify upstream or downstream mass movement processes that could change flood levels (e.g., landslides leading to partial channel blockages, diverting water into opposite banks)	Potential blockage of culvert in the channel not considered possible mechanism of the flood scenario
Conduct simple time series analysis of runoff data, review climate change predictions for study region, include in assessment if considered appropriate	N/A – riverine flooding risk deemed low
Quantify erosion rates by comparative air photograph analysis	N/A – erosion risk deemed low
Typical deliverables	
Letter report or memorandum with at least water levels and consideration of scour and bank erosion	Completed

EGBC Flood Hazard Assessment Component	Notes
Cross-sections with water levels, flow velocity and qualitative description of recorded historic events, estimation of scour and erosion rates where appropriate with maps showing erosion over time	N/A – erosion risk deemed low
Maps with area inundated at different return period, flow velocity, flow depth, delineation of areas prone to erosion and river bed elevation changes, estimates of erosion rates	Areas and elevations inundated during the 200-year return period design event described

DISCLAIMER

This report has been prepared by **Northwest Hydraulic Consultants Ltd.** for the benefit of **Philip Cotterill** for specific application to the **Flood Hazard Assessment.** The information and data contained herein represent **Northwest Hydraulic Consultants Ltd.** best professional judgment in light of the knowledge and information available to **Northwest Hydraulic Consultants Ltd.** at the time of preparation and was prepared in accordance with generally accepted engineering and geoscience practices.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by **Philip Cotterill**, its officers and employees. **Northwest Hydraulic Consultants Ltd.** denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this report or any of its contents.

Report prepared by:

2 MAY, 2023

Adrian Simpalean, MASc., EIT
Coastal Engineer
Coastal Analysis

Report reviewed by:

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
E. C. WANG
29366

May 2, 2023

Edwin Wang, MEng., PEng.
Senior Coastal Engineer
Coastal Analysis

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Appendix A

Flood Hazard and Risk Assurance Statement

FLOOD ASSURANCE STATEMENT

Note: This statement is to be read and completed in conjunction with the current Engineers and Geoscientists BC *Professional Practice Guidelines – Legislated Flood Assessments in a Changing Climate in BC* ("the guidelines") and is to be provided for flood assessments for the purposes of the *Land Title Act*, Community Charter, or the *Local Government Act*. Defined terms are capitalized; see the Defined Terms section of the guidelines for definitions.

To: The Approving Authority

Date: 2023 February 22

District of West Vancouver

750-17th Street, West Vancouver BC V7V 3T3

Jurisdiction and address

With reference to (CHECK ONE):

- ☐ *Land Title Act* (Section 86) – Subdivision Approval
- ☒ *Local Government Act* (Part 14, Division 7) – Development Permit
- ☐ Community Charter (Section 56) – Building Permit
- ☐ *Local Government Act* (Section 524) – Flood Plain Bylaw Variance
- ☐ *Local Government Act* (Section 524) – Flood Plain Bylaw Exemption

For the following property ("the Property"):

2368 Bellevue Avenue, West Vancouver, BC (Lot 2, District Lot 554/3156, Plan VAS1722; P.I.D. 004-924-495)

Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a Qualified Professional and is a Professional Engineer or Professional Geoscientist who fulfils the education, training, and experience requirements as outlined in the guidelines.

I have signed, sealed, and dated, and thereby certified, the attached Flood Assessment Report on the Property in accordance with the guidelines. That report and this statement must be read in conjunction with each other. In preparing that Flood Assessment Report I have:

[CHECK TO THE LEFT OF APPLICABLE ITEMS]

___ 1. Consulted with representatives of the following government organizations:

x 2. Collected and reviewed appropriate background information

x 3. Reviewed the Proposed Development on the Property

x 4. Investigated the presence of Covenants on the Property, and reported any relevant information

x 5. Conducted field work on and, if required, beyond the Property

x 6. Reported on the results of the field work on and, if required, beyond the Property

x 7. Considered any changed conditions on and, if required, beyond the Property

8. For a Flood Hazard analysis I have:

- x 8.1 Reviewed and characterized, if appropriate, Flood Hazard that may affect the Property
- x 8.2 Estimated the Flood Hazard on the Property
- x 8.3 Considered (if appropriate) the effects of climate change and land use change
- ___ 8.4 Relied on a previous Flood Hazard Assessment (FHA) by others
- ___ 8.5 Identified any potential hazards that are not addressed by the Flood Assessment Report

9. For a Flood Risk analysis I have:

- ___ 9.1 Estimated the Flood Risk on the Property
- ___ 9.2 Identified existing and anticipated future Elements at Risk on and, if required, beyond the Property
- ___ 9.3 Estimated the Consequences to those Elements at Risk

10. In order to mitigate the estimated Flood Hazard for the Property, the following approach is taken:

X 10.1 A standard-based approach

___ 10.2 A Risk-based approach

___ 10.3 The approach outlined in the guidelines, Appendix F: Flood Assessment Considerations for Development Approvals

___ 10.4 No mitigation is required because the completed flood assessment determined that the site is not subject to a Flood Hazard

11. Where the Approving Authority has adopted a specific level of Flood Hazard or Flood Risk tolerance, I have:

X 11.1 Made a finding on the level of Flood Hazard or Flood Risk on the Property

X 11.2 Compared the level of Flood Hazard or Flood Risk tolerance adopted by the Approving Authority with my findings

X 11.3 Made recommendations to reduce the Flood Hazard or Flood Risk on the Property

12. Where the Approving Authority has not adopted a level of Flood Hazard or Flood Risk tolerance, I have:

___ 12.1 Described the method of Flood Hazard analysis or Flood Risk analysis used

___ 12.2 Referred to an appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk

___ 12.3 Made a finding on the level of Flood Hazard of Flood Risk tolerance on the Property

___ 12.4 Compared the guidelines with the findings of my flood assessment

___ 12.5 Made recommendations to reduce the Flood Hazard or Flood Risk

___ 13. Considered the potential for transfer of Flood Risk and the potential impacts to adjacent properties

___ 14. Reported on the requirements for implementation of the mitigation recommendations, including the need for subsequent professional certifications and future inspections.

Based on my comparison between:

[CHECK ONE]

☒ The findings from the flood assessment and the adopted level of Flood Hazard or Flood Risk tolerance (item 11.2 above)

☐ The findings from the flood assessment and the appropriate and identified provincial or national guideline for level of Flood Hazard or Flood Risk tolerance (item 12.4 above)

I hereby give my assurance that, based on the conditions contained in the attached Flood Assessment Report:

[CHECK ONE]

☐ For subdivision approval, as required by the *Land Title Act* (Section 86), "that the land may be used safely for the use intended":

[CHECK ONE]

☐ With one or more recommended registered Covenants.

☐ Without any registered Covenant.

☒ For a development permit, as required by the *Local Government Act* (Part 14, Division 7), my Flood Assessment Report will "assist the local government in determining what conditions or requirements it will impose under subsection (2) of this section [Section 491 (4)]".

☐ For a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended":

[CHECK ONE]

☐ With one or more recommended registered Covenants.

☐ Without any registered Covenant.

☐ For flood plain bylaw variance, as required by the *Flood Hazard Area Land Use Management Guidelines* and the *Amendment Section 3.5 and 3.6* associated with the *Local Government Act* (Section 524), "the development may occur safely".

☐ For flood plain bylaw exemption, as required by the *Local Government Act* (Section 524), "the land may be used safely for the use intended".

I certify that I am a Qualified Professional as defined below.

2023 February 22
Date

Edwin Wang
Prepared by

Edwin Wang
Name (print)

Signature

30 Gostick Place, North Vancouver, BC
Address

V7M 3G3

604-980-6011
Telephone

EWang@nhcweb.com | DRay@nhcweb.com
Email

Derek Ray
Reviewed by

DEREK RAY
Name (print)

Signature

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
E. C. WANG
29366
Mar 7, 2023

(Affix PROFESSIONAL SEAL here)

If the Qualified Professional is a member of a firm, complete the following:

I am a member of the firm and I sign this letter on behalf of the firm.

Northwest Hydraulic Consultants Ltd. (NHC)
(Name of firm)

Appendix B

Received Design Drawings

EASEMENTS - SITE ACCESS

G23882 to G23883

This charge allows the owner of Lot B (2368 Bellevue) to enter a part of Lot A (the neighbouring property to the west), for access purposes with or without vehicles and animals; and for access to and use of a parking area.

The extent of the parking easement directly west of the western property line of 2368 Bellevue can be seen on the Site Plan on Sheet A0.02.

G88297

This charge allows the owner of Lot B, (2368 Bellevue) a right to access and use over a portion of Lot A (the neighbouring property to the west), for the purpose of ingress and egress and to install and maintain an underground sanitary swer pipeline and other materials for conducting sewage from Lot B. Lot A owner shall not maintain any building, structure or obstruction upon the easement area nor shall diminish or add to the ground cover or construct any open drains or ditches along underground pipelines. The Easement Area shall be landscaped after consruction so that the surface will be graded evenly with the surface of the adjoining lands. However, the Lot A owner shall restore the easement area following the completition of any work done by Lot B owner.

STATUTORY RIGHT OF WAY - BC HYDRO ACCESS

346235M

This charge BC Hydro a right of access and use over a portion of the lands, to install and maintain poles with guy wires, anchors and transformers for the transmission and distribution of electrical energy and for the telephone and television purposes. The charge holder may clear the right of way of anything that may interfere with the works, including tress, growth, buildings or obstructions. The owner shall not place any building or structure or plant any growth exceeding 15 feet in height. BC Hydro shall pay compensation for any damage to crops or improvements that it causes in exercise of its rights.

The extent of the 10'-0" wide BC Hydro right of way can be seen on the Site Plan on Sheet A0.02.

VOLUME

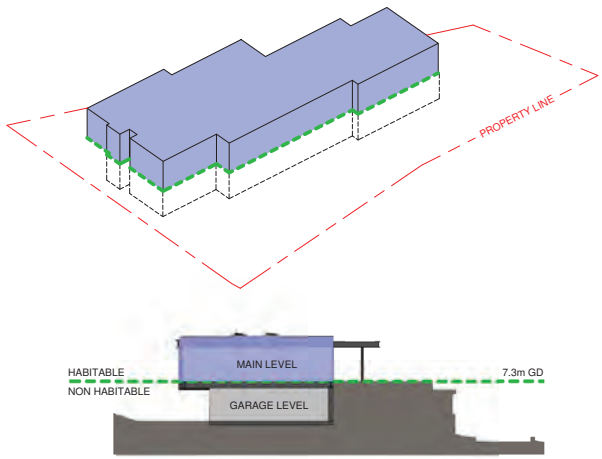
COVENANT - VOLUME

F85424

This charge restricts development of the lands to one residential building comprising not more than three dwelling units with a maximum cubic area of 71,300 cubic feet measured from the top of the finished main floor to the top of the roof.

The main floor is located above the Flood Construction Level at an elevation of 7.3m GD.

Maximum allowable volume = 71,300 ft³
Volume of habitable space = 53,581.5 ft³
Non habitable spaces
Finished main floor (at 7.3m GD)



PROJECT STATISTICS

2368 BELLEVUE AVENUE
WEST VANCOUVER

LOT DISTRICT LOT 554
PLAN VAS1722
GROUP 1 NWD

ZONING: RM-1
SECTION 300 - MULTIPLE DWELLING ZONES

Item	Allowed	Proposed
301.01 Permitted Uses	(h) single family dwellings	
301.02 Conditions of Use	(1) 2 lodgers within a single family dwelling	
301.03 Site Area	(3) Single family dwelling: 372 m^2 minimum.	1258.3 m^2
301.04 Site Width	(2) 10.1 m minimum	15.3 m at narrowest point
301.05 Floor Area Ratio	(N/A)	
301.06 Site Coverage	(2) 40% maximum	29.5%
301.07 Front Yard	(1) 7.6 m minimum (7.3 m for Step 5)* (2) The front site line shall be deemed to be either the north or south site line	7.3 m South site line
301.08 Rear Yard	(1) The rear yard is measured from the north or south site line (2) 1.52 m minimum (1.22 m for Step 5)**	North site line 1.22 m
301.09 Side Yard	(1) The side yard is measured from the east or west site lines Proposed Side Yard Setbacks: (3) 1.5 m minimum (1.2 m for Step 5) ***	East and west site lines 1.2 m
301.10 Building Width	(N/A)	
301.11 Building Height	(3) 7.62 m maximum (7.92 m for Step 5)****	7.91m
301.12 Number of Storeys	(2) 2 storeys maximum	2
301.13 Off-Street Parking	(3) 1 parking space per dwelling minimum shall be provided.	Parking Easement of G23882 to G23883 allows the use of a parking area directly west of the property.
301.14 Suite Size	(N/A)	
301.16 Canopy	(N/A)	
301.17 Roof Structures	(N/A)	
301.18 Fences	(N/A)	

* As per 120.29(4)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to required yard setback applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the required front yard setback of 7.6 m can be reduced by 0.30 m for a minimum setback of 7.3 m.

** As per 120.29(4)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to required yard setback applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the required rear yard setback of 1.52 m can be reduced by 0.30 m for a minimum setback of 1.22 m.

***As per 120.29(4)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to required yard setback applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the required rear yard setback of 1.5 m can be reduced by 0.30 m for a minimum setback of 1.2 m.

****As per 120.19 (3)(a) & 120.29(1)(a)(ii) (Bylaw #4974), where a building is considered under Part 9 of the BC Building Code, a 0.30 metre adjustment to building height applies where the building meets Step 5.

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the maximum building height can be 0.30m above the 7.62m maximum height or 7.92m.

DRAWING LIST

PROJECT DATA & ZONING	A0.00
CONTEXT	A0.01
SITE PLAN	A0.02
SURVEY	A0.03
AVERAGE GRADE & BUILDING HEIGHT	A0.04
MATERIALS	A0.05
GARAGE LEVEL PLAN (NON HABITABLE)	A1.00
MAIN FLOOR	A1.01
ROOF PLAN	A1.02
ELEVATIONS	A2.01
ELEVATIONS	A2.02
BUILDING SECTIONS	A3.01
BUILDING SECTIONS	A3.02
3D VIEWS	A5.01
NEIGHBOUR VIEWS	A5.02
NEIGHBOUR VIEWS	A5.03
RETAINING WALL EXISTING CONDITIONS	A6.01
PROPOSED RETAINING WALL VARIANCE	A6.02
PROPOSED RETAINING WALL VARIANCE	A6.03

Feenstra ARCHITECTURE INC

601 - 1587 West 8th Ave.
Vancouver, B.C. V6J 1T5
Tel. (604) 739-8888 Fax (604) 739-8889

No.	Issued for	Date
1	Issued for Development Permit	2023-03-01
No.	Issued for - Revisions	Date

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

PROJECT DATA & ZONING

Plot Date: 07/09/02
Drawn by: Author | Checked by: Checker
Project No. | Scale: As indicated
Drawing No.

A0.00

EXISTING HOUSE

VIEW OF EXISTING HOUSE ENTRANCE FROM SEASTRAND BUILDING PARKADE

EXISTING HOUSE

VIEW OF EXISTING HOUSE + SEASTRAND BUILDING FROM SEAWALK

EXISTING HOUSE

VIEW OF EXISTING HOUSE FROM RAILROAD

VIEWS OF EXISTING HOUSE + SEAWALK

1 CONTEXT PLAN
1/32" = 1'-0"

Feenstra ARCHITECTURE INC

601 - 1587 West 8th Ave.
Vancouver, B.C. V6J 1T5
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N

No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

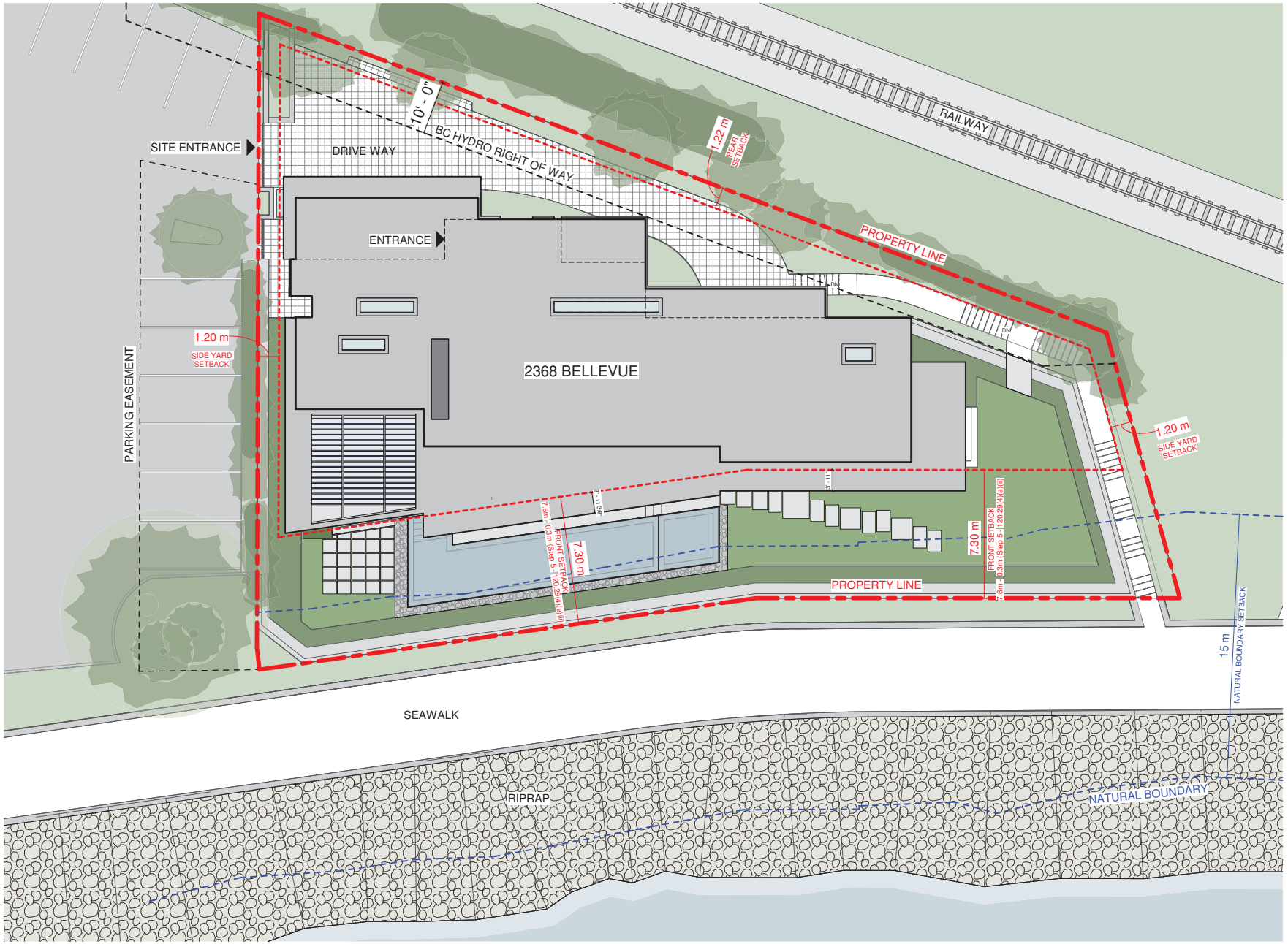
CONTEXT

Plot Date: 07/09/02

Drawn by: Author	Checked by: Checker
Project No.	Scale: 1/32" = 1'-0"

Drawing No.

A0.01



1 SITE PLAN
1/8" = 1'-0"

Feenstra ARCHITECTURE INC

601 - 1587 West 8th Ave.
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Tel. (604) 738-8888 Fax (604) 738-8889

N

No.	Issued for · Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

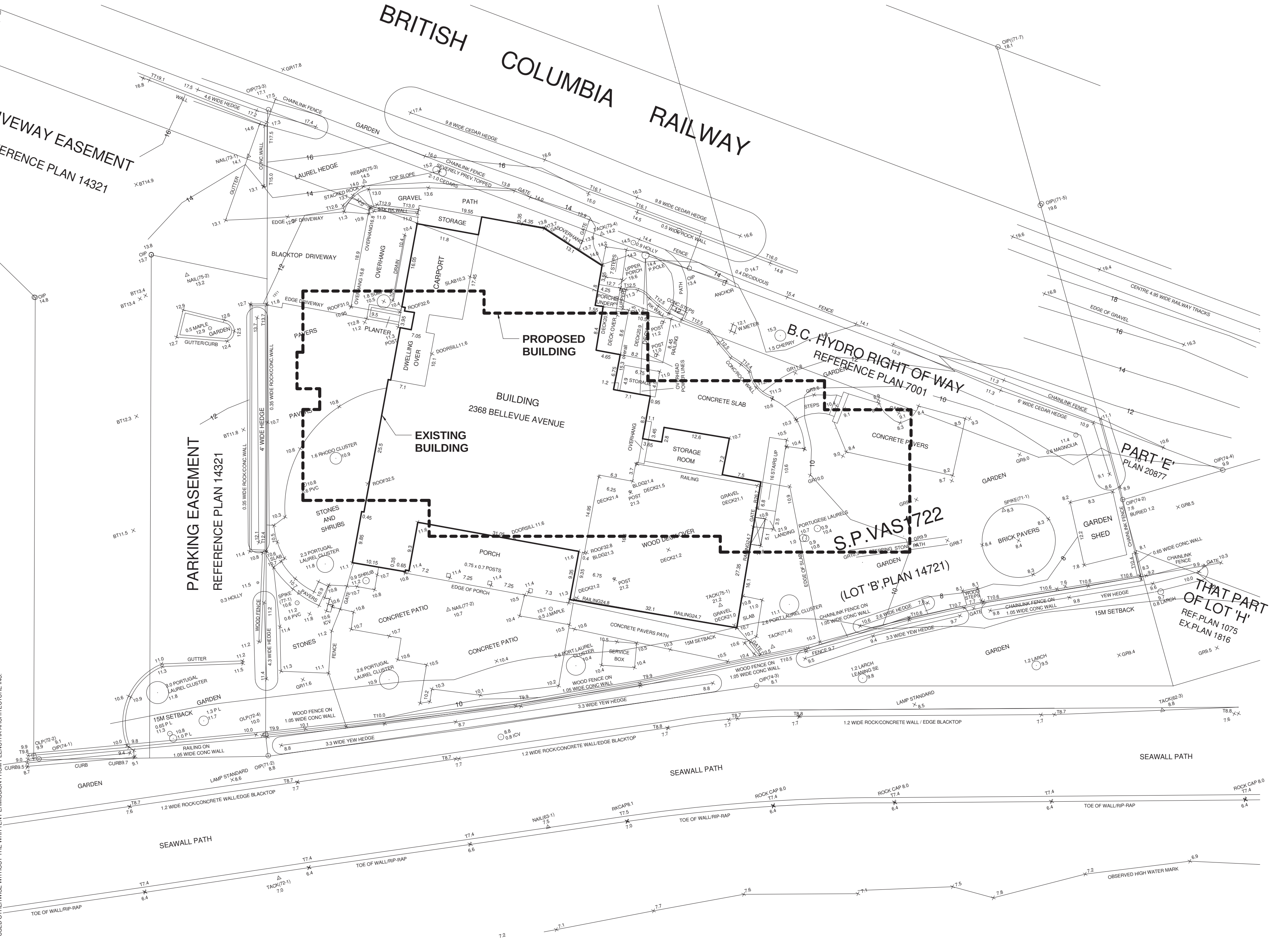
SITE PLAN

Plot Date: 07/09/02

Drawn by: Author	Checked by: Checker
Project No.	Scale: 1/8" = 1'-0"

Drawing No.

A0.02



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1	Issued for Development Permit	2023-03-01
No.	Issued for - Revisions	Date

Project:

2368 Bellevue Ave

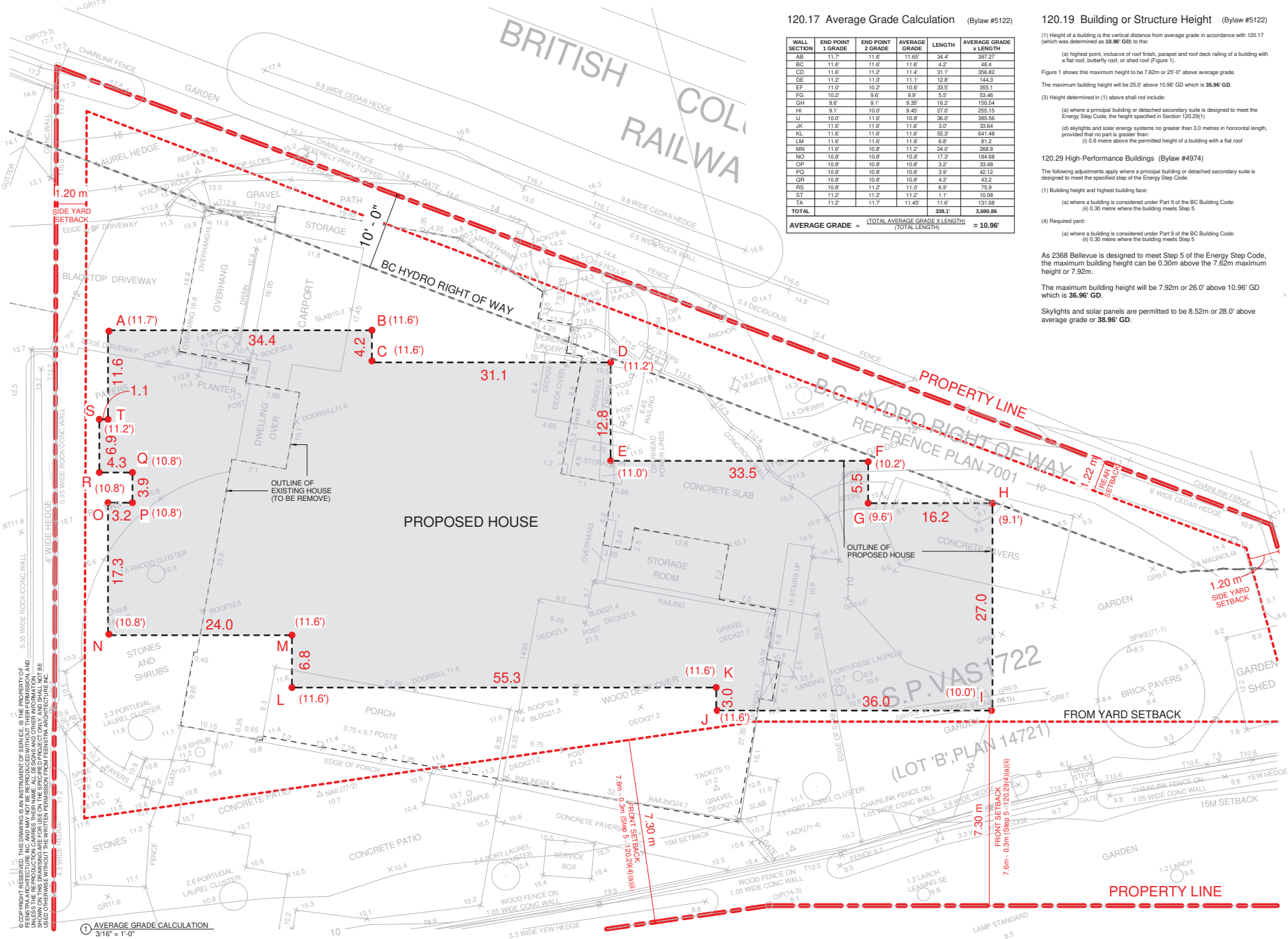
West Vancouver, BC
V7V 1C8

Drawing Title:

SURVEY

Plot Date: 07/09/02	
Drawn by: Author	Checked by: Checker
Project No.	Scale: 1/8" = 1'-0"
Drawing No.	

A0.03



120.17 Average Grade Calculation (Bylaw #5122)

WALL SECTION	END POINT 1 GRADE	END POINT 2 GRADE	AVERAGE GRADE	LENGTH	AVERAGE GRADE x LENGTH
AB	11.7'	11.6'	11.65'	34.4'	397.27
BC	11.6'	11.6'	11.6'	4.2'	46.4
CD	11.6'	11.2'	11.4'	31.1'	356.82
DE	11.2'	11.0'	11.1'	12.8'	144.3
EF	11.0'	10.2'	10.6'	33.5'	355.1
FG	10.2'	9.6'	9.9'	5.5'	53.46
GH	9.6'	9.1'	9.35'	16.2'	150.54
HI	9.1'	10.0'	9.45'	27.0'	255.15
IJ	10.0'	11.6'	10.8'	36.0'	385.56
JK	11.6'	11.6'	11.6'	3.0'	33.64
KL	11.6'	11.6'	11.6'	55.3'	641.48
LM	11.6'	11.6'	11.6'	6.8'	81.2
MN	11.6'	10.8'	11.2'	24.0'	268.8
NO	10.8'	10.8'	10.8'	17.3'	184.68
OP	10.8'	10.8'	10.8'	3.2'	33.48
PQ	10.8'	10.8'	10.8'	3.9'	42.12
QR	10.8'	10.8'	10.8'	4.3'	43.2
RS	10.8'	11.2'	11.0'	6.9'	75.9
ST	11.2'	11.2'	11.2'	1.1'	10.08
TA	11.2'	11.7'	11.45'	11.6'	131.68
TOTAL				338.1'	3,690.86

AVERAGE GRADE = (TOTAL AVERAGE GRADE X LENGTH) / (TOTAL LENGTH) = **10.96'**

120.19 Building or Structure Height (Bylaw #5122)

(1) Height of a building is the vertical distance from average grade in accordance with 120.17 (which was determined as **10.96' GD**) to the:

(a) highest point, inclusive of roof finish, parapet and roof deck railing of a building with a flat roof, butterfly roof, or shed roof (Figure 1).

Figure 1 shows this maximum height to be 7.62m or 25'-0" above average grade.

The maximum building height will be 25.0' above 10.96' GD which is **35.96' GD**.

(3) Height determined in (1) above shall not include:

(a) where a principal building or detached secondary suite is designed to meet the Energy Step Code, the height specified in Section 120.29(1)

(d) skylights and solar energy systems no greater than 3.0 metres in horizontal length, provided that no part is greater than:
(i) 0.6 metre above the permitted height of a building with a flat roof

120.29 High-Performance Buildings (Bylaw #4974)

The following adjustments apply where a principal building or detached secondary suite is designed to meet the specified step of the Energy Step Code.

(1) Building height and highest building face:

(a) where a building is considered under Part 9 of the BC Building Code:
(ii) 0.30 metre where the building meets Step 5.

(4) Required yard:

(a) where a building is considered under Part 9 of the BC Building Code:
(ii) 0.30 metre where the building meets Step 5

As 2368 Bellevue is designed to meet Step 5 of the Energy Step Code, the maximum building height can be 0.30m above the 7.62m maximum height or 7.92m.

The maximum building height will be 7.92m or 26.0' above 10.96' GD which is **36.96' GD**.

Skylights and solar panels are permitted to be 8.52m or 28.0' above average grade or **38.96' GD**.

1 AVERAGE GRADE CALCULATION
3/16" = 1'-0"

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No.	Issued / Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

AVERAGE GRADE & BUILDING HEIGHT

Plot Date: 07/09/02
Drawn by: Author | Checked by: Checker
Project No. | Scale: As indicated
Drawing No.

A0.04

MATERIAL LEGEND

MATERIAL SPECIFICATIONS

① LIMESTONE WALL CLADDING

1 1/4" THICK 'LIMESTONE' STONE VENEER
3/4" BACKING
3/4" STRAPPING

② FIBER CEMENT WALL CLADDING

5/16" THICK VERTICAL FIBER CEMENT PANELS, 12" WIDE BY 12' TALL PANEL
1 1/2" X 1 1/2" X 12' VERTICAL BATTENS
3/4" STRAPPING

③ METAL ROOF TRIM

EXPOSED STEEL, PAINTED BLACK

④ WOOD SOFFIT

3/4" THICK HORIZONTAL WOOD SOFFIT

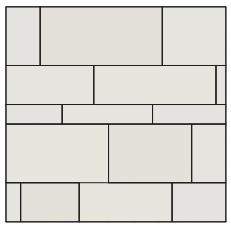
⑤ TRIPLE GLAZED WINDOWS

TRIPLE GLAZED DOUBLE LOW-E (USI 0.8)
FIBERGLASS MULLIONS PAINTED BLACK

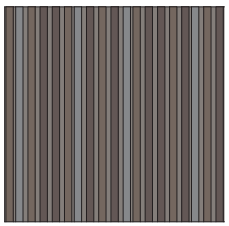
⑥ BOARD FORM CONCRETE WALLS

EXTERIOR GRAY CONCRETE WALL

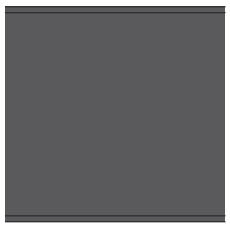
MATERIAL IMAGES



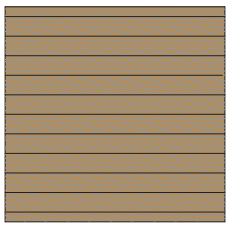
① LIMESTONE WALL CLADDING



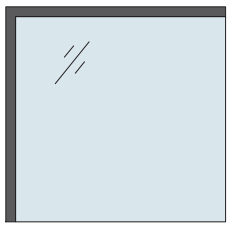
② FIBER CEMENT WALL CLADDING



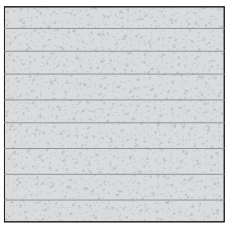
③ METAL ROOF TRIM



④ WOOD SOFFIT



⑤ TRIPLE GLAZED WINDOWS



⑥ BOARD FORM CONCRETE WALL

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

MATERIALS

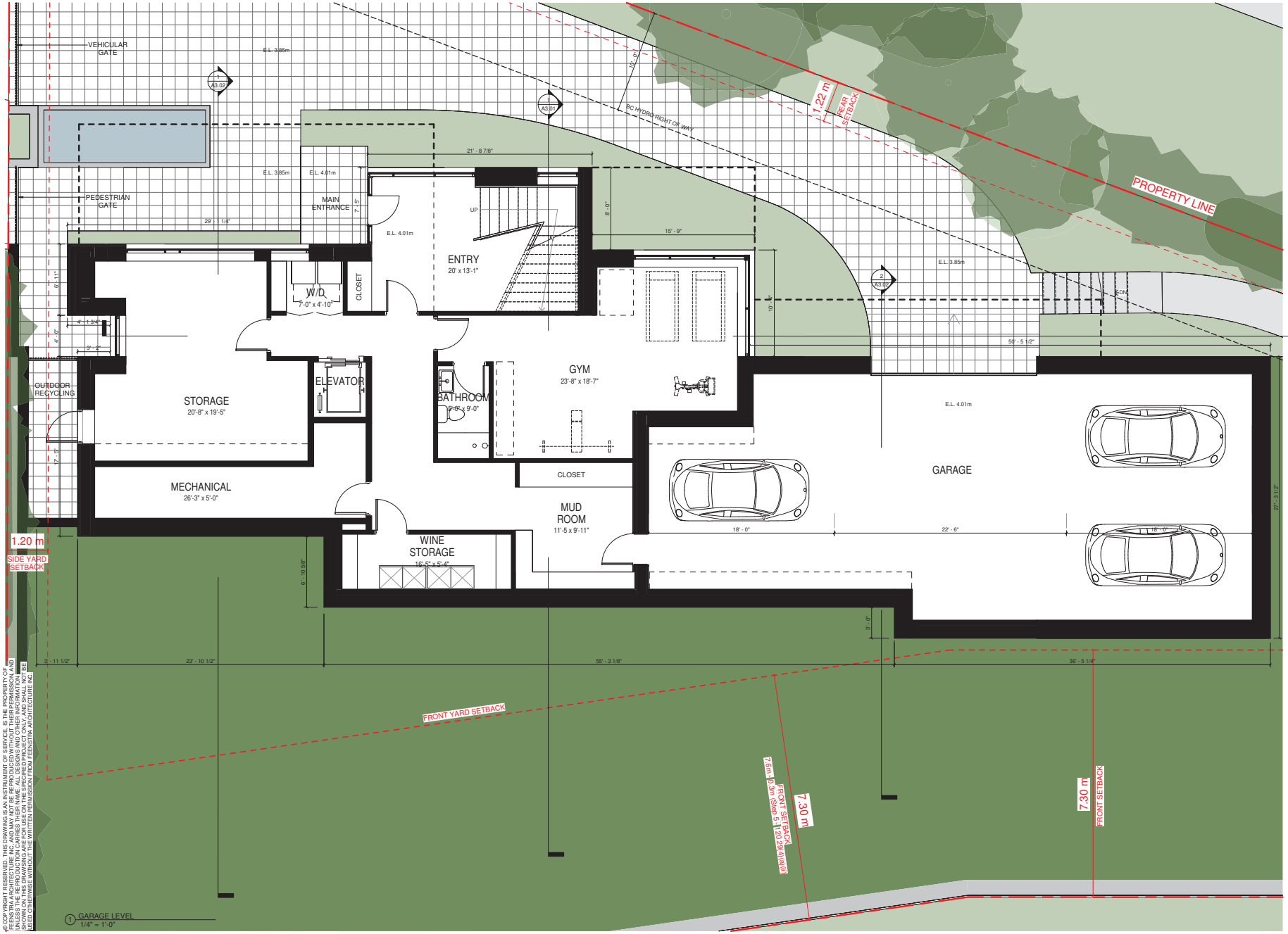
Plot Date: 07/09/02

Drawn by: Author | Checked by: Checker

Project No. | Scale: As indicated

Drawing No.

A0.05



1 GARAGE LEVEL
1/4" = 1'-0"

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

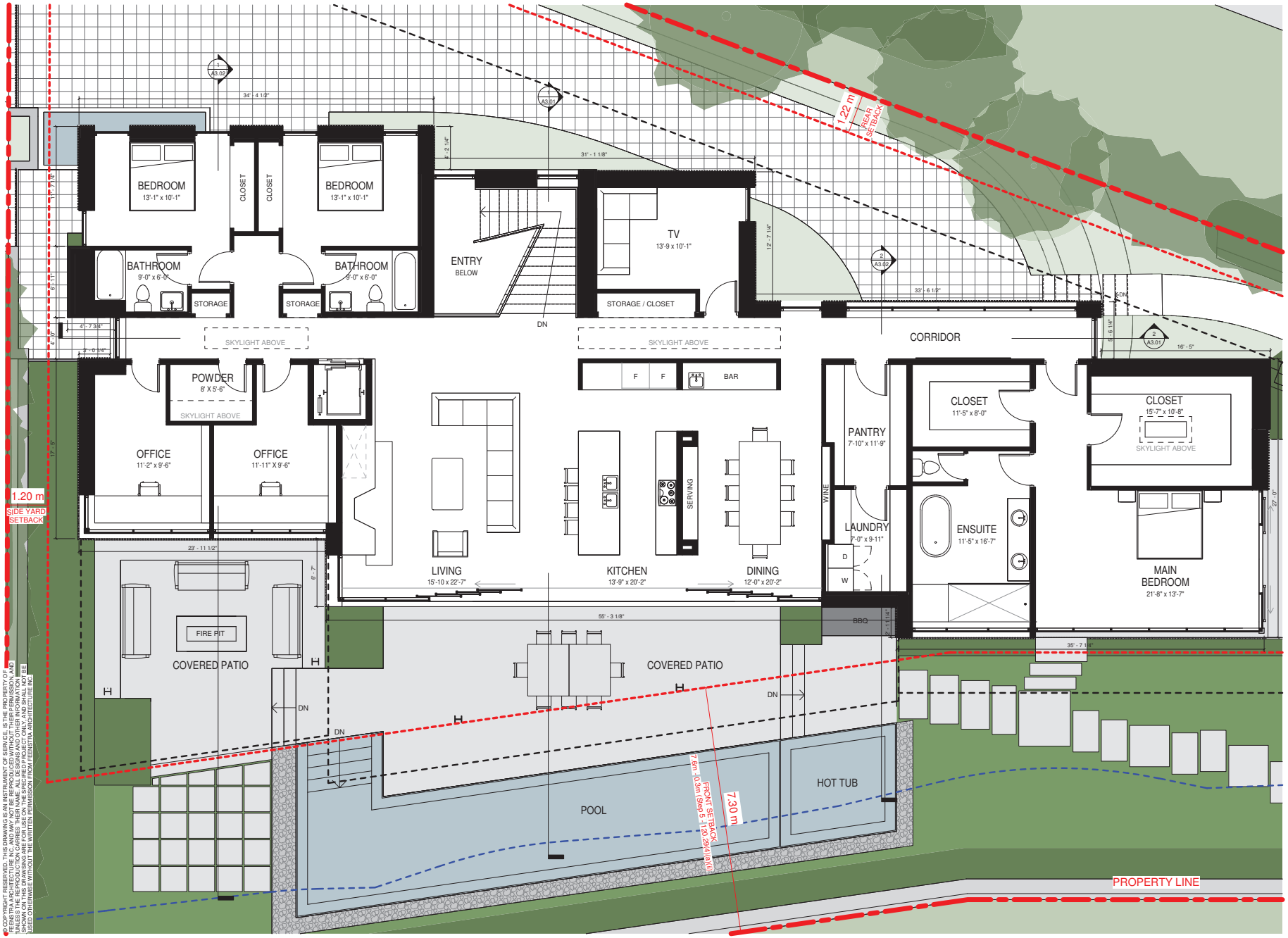
West Vancouver, BC
V7V 1C8

Drawing Title:

GARAGE LEVEL PLAN (NON HABITABLE)

Plot Date: 07/09/02
Drawn by: Author
Checked by: Checker
Project No.
Scale: 1/4" = 1'-0"
Drawing No.

A1.00



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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

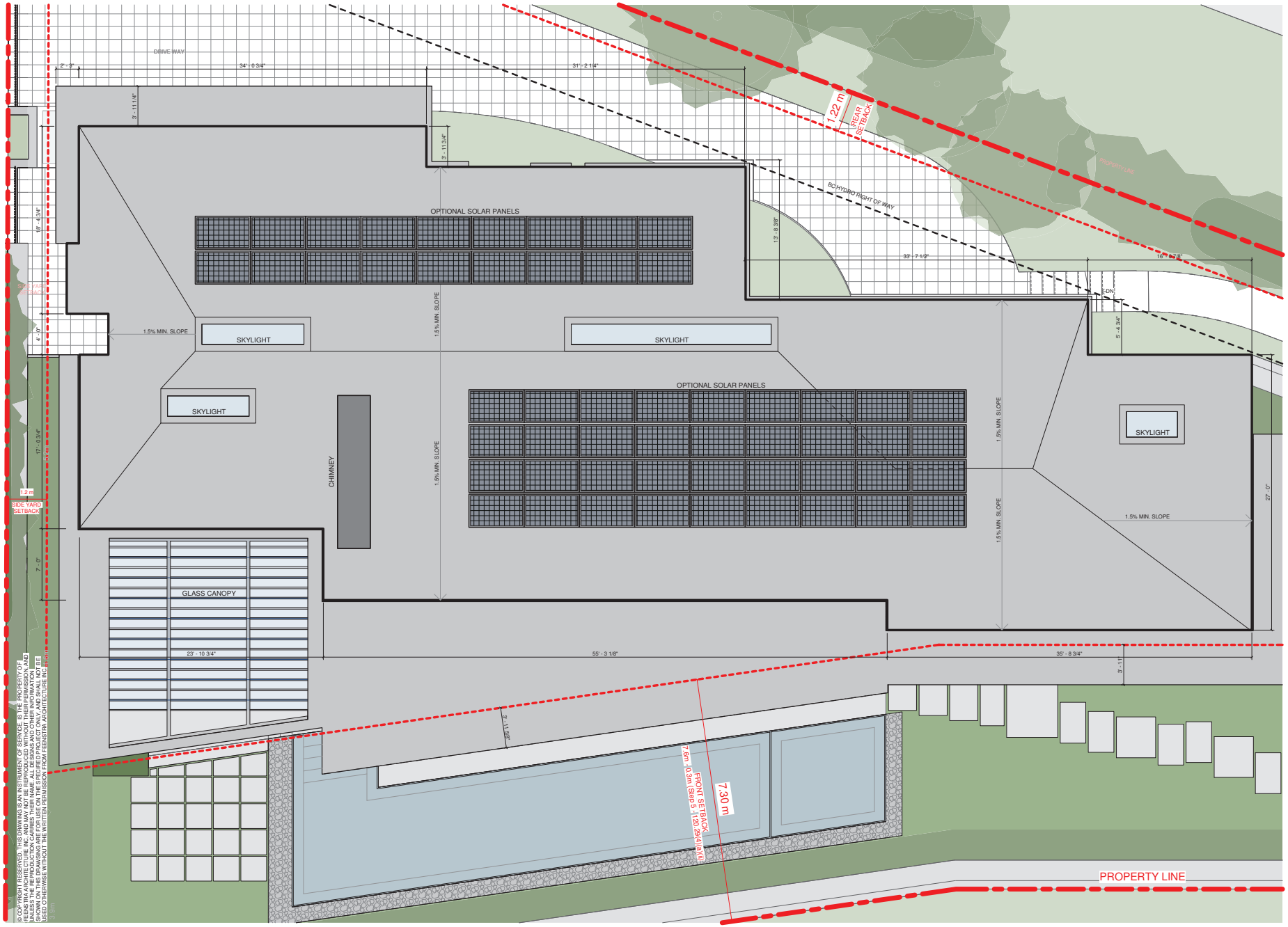
West Vancouver, BC
V7V 1C8

Drawing Title:

MAIN FLOOR

Plot Date: 07/09/02
Drawn by: Author
Checked by: Checker
Project No.
Scale: 1/4" = 1'-0"
Drawing No.

A1.01



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No.	Issued for - Revisions	Date
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Project:

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V7V 1C8

Drawing Title:

ROOF PLAN

Plot Date: 07/09/02

Drawn by: Author	Checked by: Checker
Project No.	Scale: 1/4" = 1'-0"
Drawing No.	

A1.02

MATERIAL

1. LIMESTONE WALL CLADDING
2. FIBER CEMENT WALL CLADDING
3. METAL ROOF TRIM
4. METAL SOFFIT, WOOD PATTERN
5. TRIPLE GLAZED WINDOWS
6. BOARD FORM CONCRETE WALLS
7. FIBER CEMENT WALL CLADDING (NO BATTENS)

1 NORTH ELEVATION
1/4" = 1'-0"

2 WEST ELEVATION
1/4" = 1'-0"

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Project:

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Drawing Title:

ELEVATIONS

Plot Date: 07/09/02
Drawn by: Author | Checked by: Checker
Project No. | Scale: As indicated
Drawing No.

A2.01

MATERIAL

1. LIMESTONE WALL CLADDING
2. FIBER CEMENT WALL CLADDING
3. METAL ROOF TRIM
4. METAL SOFFIT, WOOD PATTERN
5. TRIPLE GLAZED WINDOWS
6. BOARD FORM CONCRETE WALLS
7. FIBER CEMENT WALL CLADDING (NO BATTENS)

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(2) SOUTH ELEVATION
1/4" = 1'-0"

(1) EAST ELEVATION
1/4" = 1'-0"

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Project:

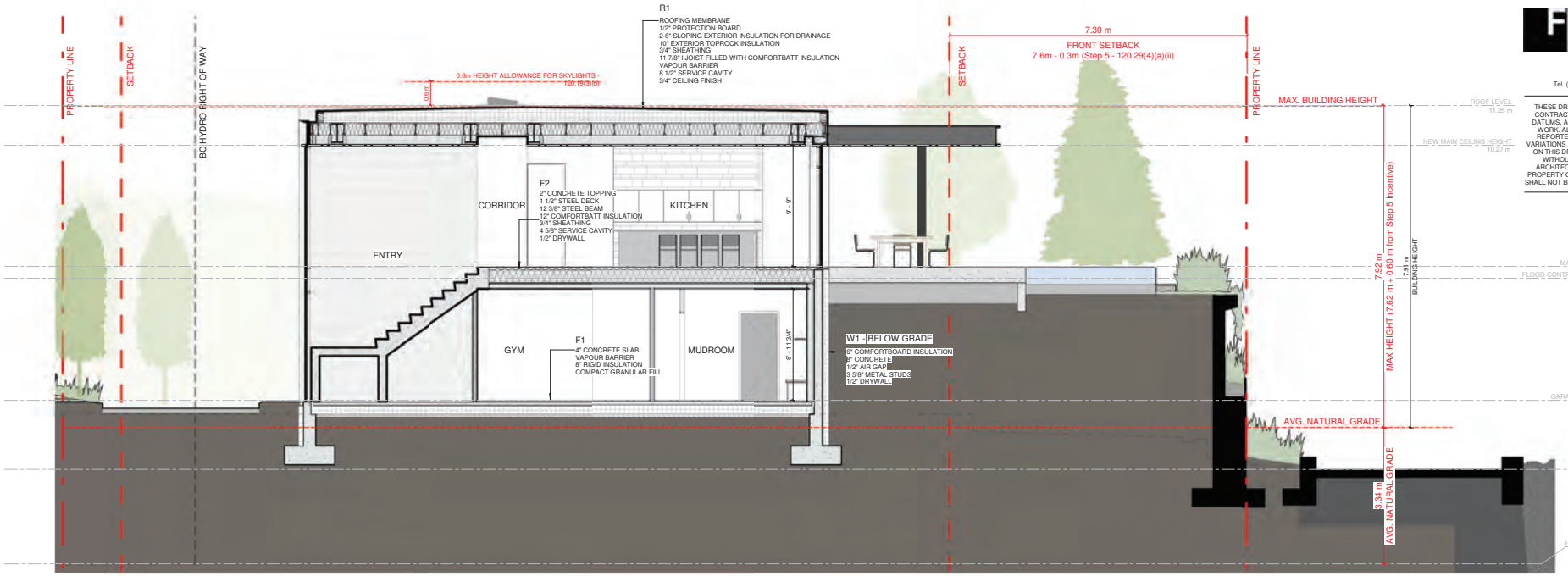
2368 Bellevue Ave
West Vancouver, BC
V7V 1C8

Drawing Title:

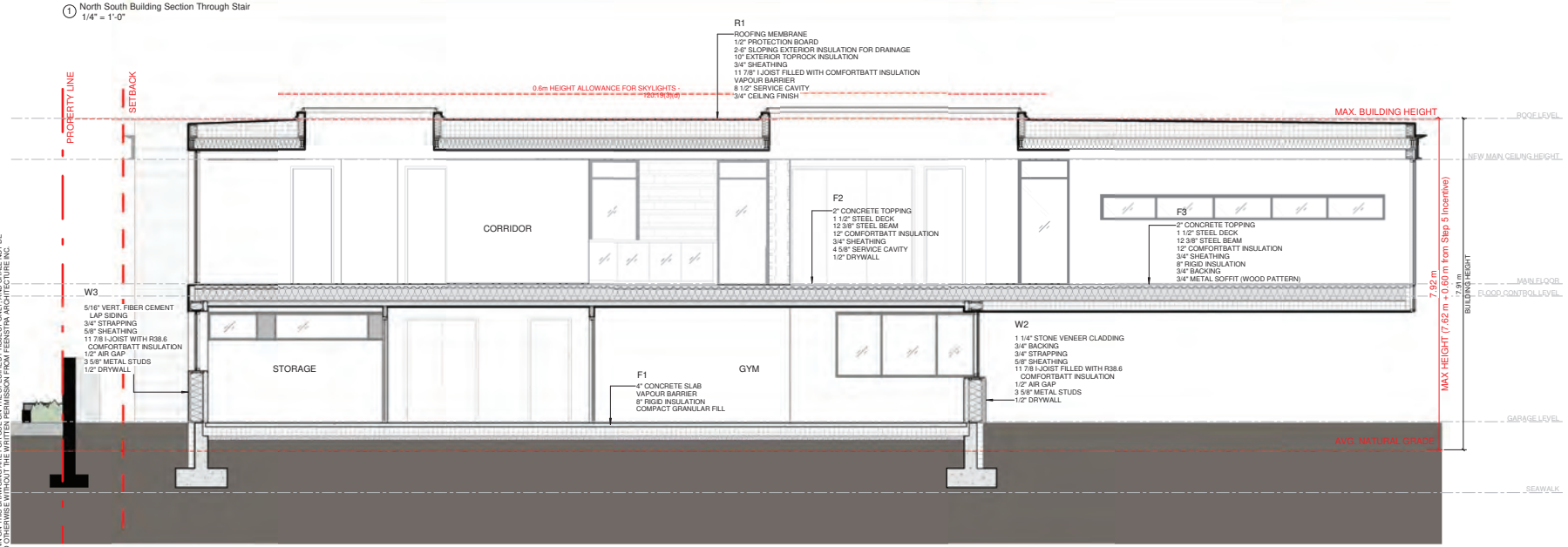
ELEVATIONS

Plot Date: 07/09/02
Drawn by: Author | Checked by: Checker
Project No. | Scale: As indicated
Drawing No.

A2.02



1 North South Building Section Through Stair
1/4" = 1'-0"



2 East West Building Section Through Corridor
1/4" = 1'-0"

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

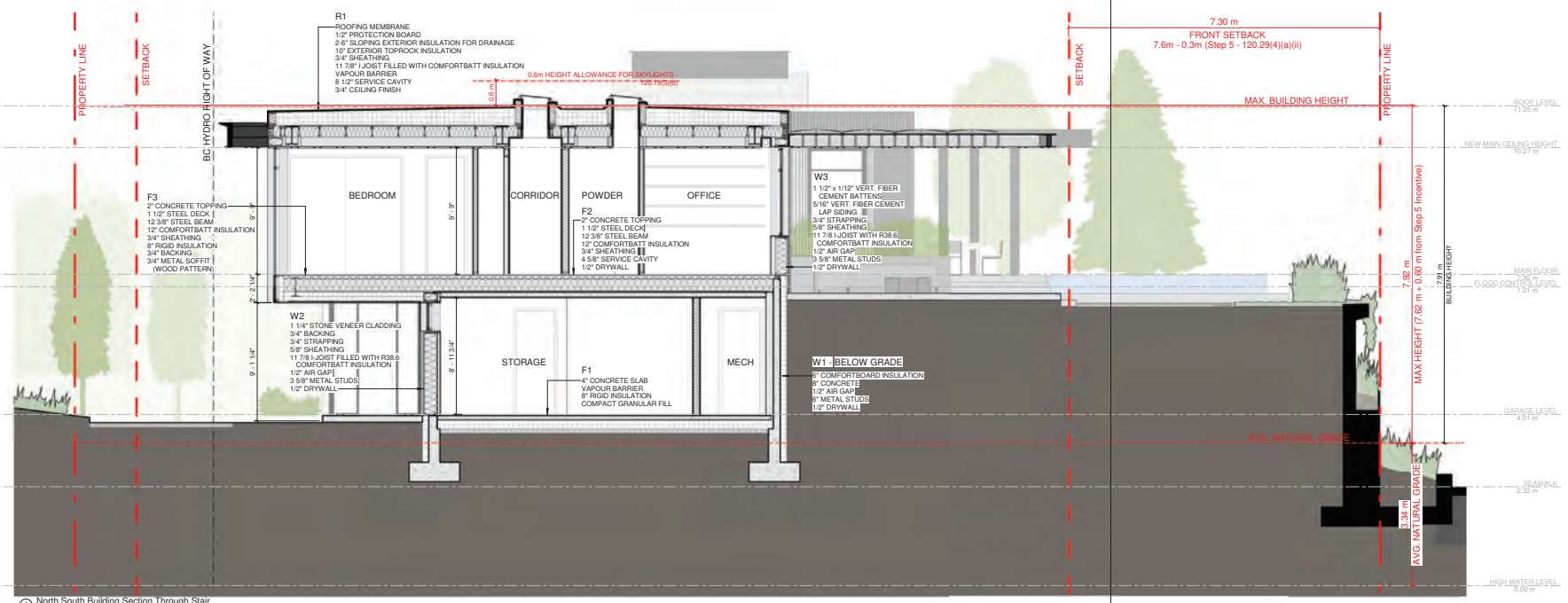
West Vancouver, BC
V7V 1C8

Drawing Title:

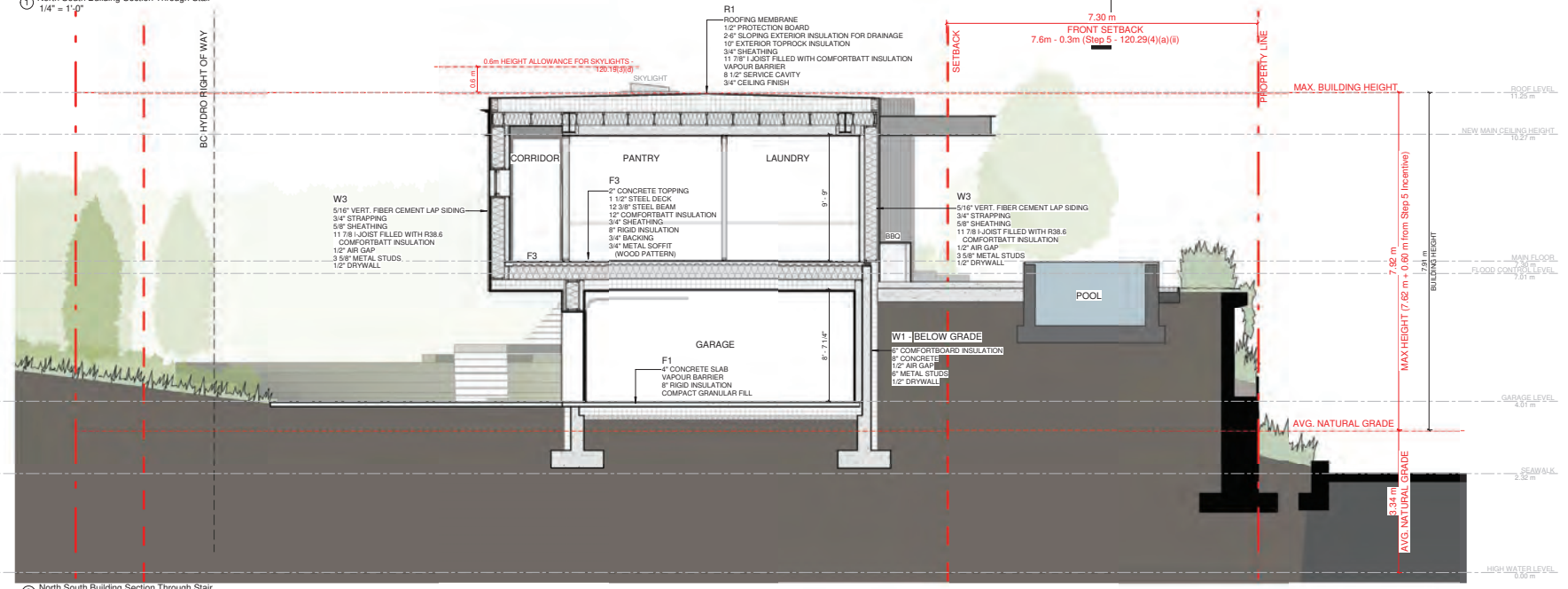
BUILDING SECTIONS

Plot Date: 11/04/22
Drawn by: Author | Checked by: Checker
Project No. | Scale: 1/4" = 1'-0"
Drawing No.

A3.01



1 North South Building Section Through Stair
1/4" = 1'-0"



2 North South Building Section Through Stair
1/4" = 1'-0"

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No.	Issued for - Revisions	Date
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Project:

2368 Bellevue Ave

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V7V 1C8

Drawing Title:

BUILDING SECTIONS

Plot Date: 11/04/22
Drawn by: Author
Checked by: Checker
Project No.
Scale: 1/4" = 1'-0"
Drawing No.

A3.02

VIEW TO SITE ENTRANCE

VIEW FROM RAILWAY

VIEW LOOKING EAST FROM SEAWALK

VIEW LOOKING WEST FROM SEAWALK

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

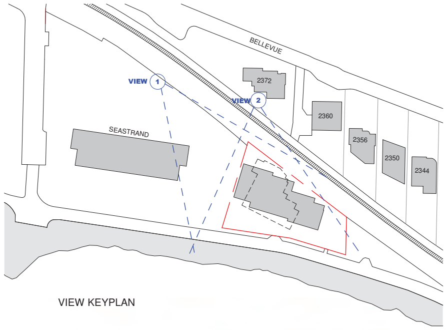
3D VIEWS

Plot Date: 07/09/02

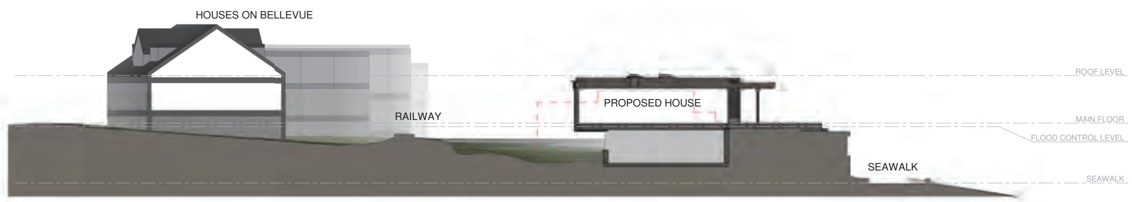
Drawn by: Author	Checked by: Checker
Project No.	Scale:

Drawing No.

A5.01



VIEW KEYPLAN



VIEW 1- EXISTING

VIEW 1- PROPOSED

VIEW 2- EXISTING FROM SECOND FLOOR

VIEW 2- PROPOSED FROM SECOND FLOOR

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

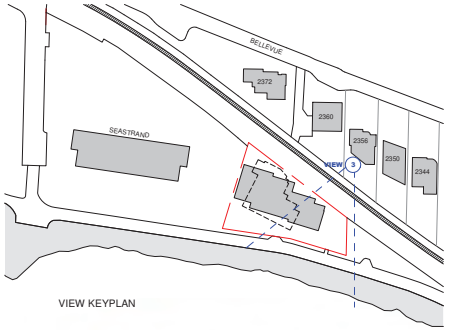
West Vancouver, BC
V7V 1C8

Drawing Title:

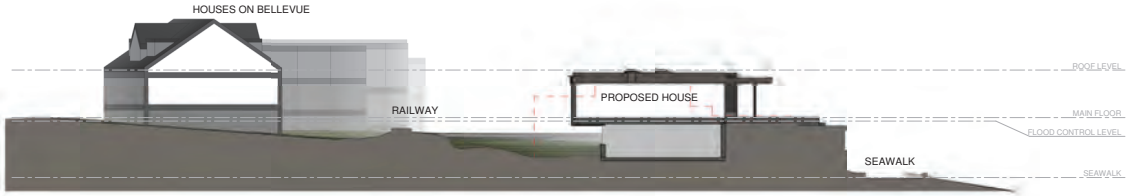
NEIGHBOUR VIEWS

Plot Date: 07/09/02
Drawn by: Author Checked by: Checker
Project No. Scale: As indicated
Drawing No.

A5.02



VIEW KEYPLAN



VIEW 3- EXISTING_GROUND FLOOR

VIEW 3- PROPOSED_GROUND FLOOR

VIEW 3- EXISTING_SECOND FLOOR

VIEW 3- PROPOSED_SECOND FLOOR

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No.	Issued for · Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

NEIGHBOUR VIEWS

Plot Date: 07/09/02
Drawn by: Author
Checked by: Checker
Project No.
Scale: As indicated
Drawing No.

A5.03

REQUEST FOR VARIANCE ON WEST & SOUTH PROPERTY RETAINING WALL HEIGHT AND EAST PROPERTY MAX GRADE ANGLE

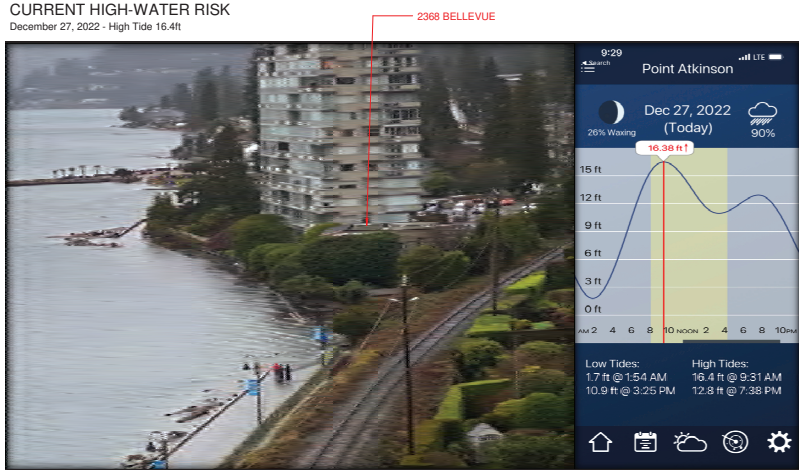
This site has a number of unique attributes that impact the site's useability with the most significant related to the flood control regulations that have been adopted for West Vancouver waterfront properties. The need to take significant measures to protect both public and private property has been borne out by a number of weather events in the past few years that have impacted the West Vancouver seawalk and adjacent properties with considerable fiscal impact. Early in the due diligence process leading to the property purchase, the owners were pointed in the direction of the study that West Vancouver commissioned WSP Canada to undertake estimating interim Flood Construction Levels (FCL) for the District. The study incorporated the coastline from Horseshoe Bay in the west to Ambleside Park at the east of the district and identified potential future Sea Level Rise Planning Areas for the District of West Vancouver. The property is located within the area transect E from the WSP study corresponding to an FCL of 7.53m GD and has a natural grade of 2.75m GD running parallel to the Centennial seawall which sits at a level of 2.3m GD. A site specific study completed by NHC Coastal Engineering on November 2022, has defined a 7.01m GD Flood Construction Level.

The request for variance is related to the wall structures required to achieve the site specific FCL. Specifically, we are requesting permission to vary from the maximum wall height on the west and south property lines to height of 6.6m GD. On the east property line, we are requesting permission to vary from a max grade angle of 36.9 degree to 45 degrees to allow for a 6.6m GD retaining wall.

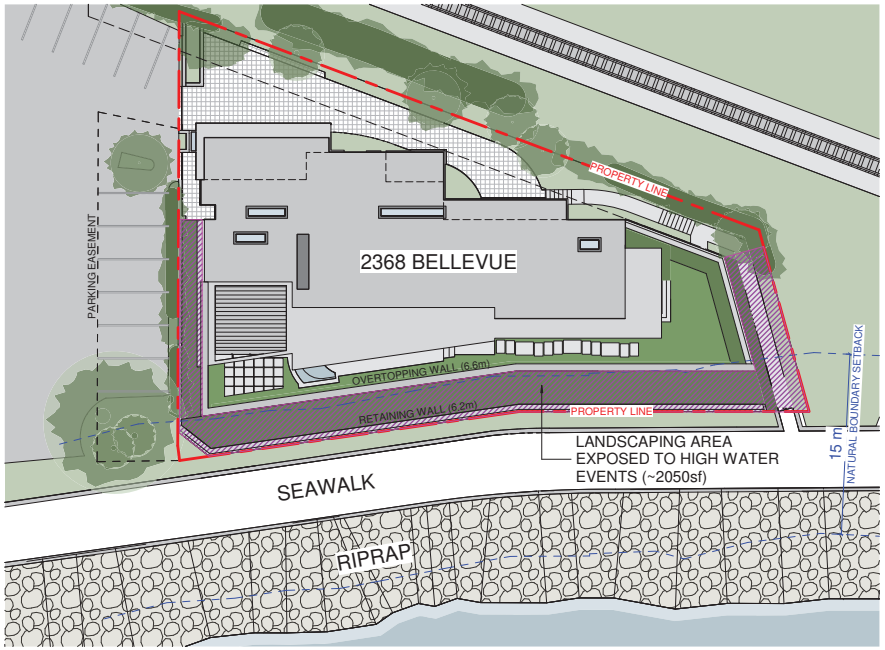
The current bylaw allows for a 4 ft (1.2m) wall to be erected at the property line, which for this property would have a top elevation of 3.9m GD. We are looking for permission to build the wall to an elevation consistent with the mitigation measures noted in the WSP study for W Van lands as well as the height of the overtopping wall required for this property as recommended by NHC Coastal Engineering. This is 6.6m GD. It is unfortunate that the timing of the residential redevelopment is occurring well in advance of the plans being developed by West Van Parks and therefore the intersection between the public and private lands will need to be anticipated in the wall design. It was recommended in the WSP study that in order to protect public and private spaces, West Van would need to create a berm to a height of 4.7m GD with the seawalk relocated on top of the berm. In the variance we are proposing, the south and west perimeter walls will merge with these recommendations when the public property redevelopment eventually takes place. It should be noted that not anticipating this new height will ultimately have two impacts on the existing property. In the short term it is likely that the approximately 2050sf of landscaping on the lower wall will be at significant risk of regular inundation of seawater which would destroy landscaping resulting in regular and significant cost to the owners. On a longer term basis it would leave the property significantly below that of the new seawalk height which would have implications for the construction of the berm but would also have a significant impact on cost. The height of the wall would not impact directly upon neighbors though it would have an impact on those walking along the seawalk. In this regard, the development further to the west along the seawalk already presents a face to the public that is materially higher than the 1.2m wall that the bylaw allows. It should also be noted that this is only a temporary circumstance.

CURRENT HIGH-WATER RISK

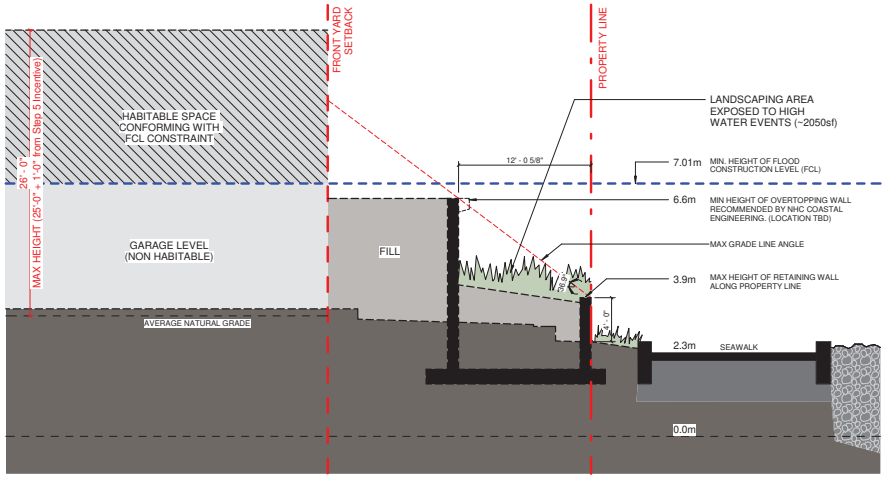
December 27, 2022 - High Tide 16.4ft



STORM DAMAGE PICTURES



CURRENT ZONING REQUIRIMENTS SITE PLAN



CURRENT ZONING REQUIREMENTS FOR RETAINING WALLS

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

RETAINING WALL EXISTING CONDITIONS

Plot Date: 07/09/02

Drawn by: Author | Checked by: Checker

Project No. | Scale: As indicated

Drawing No.

A6.01

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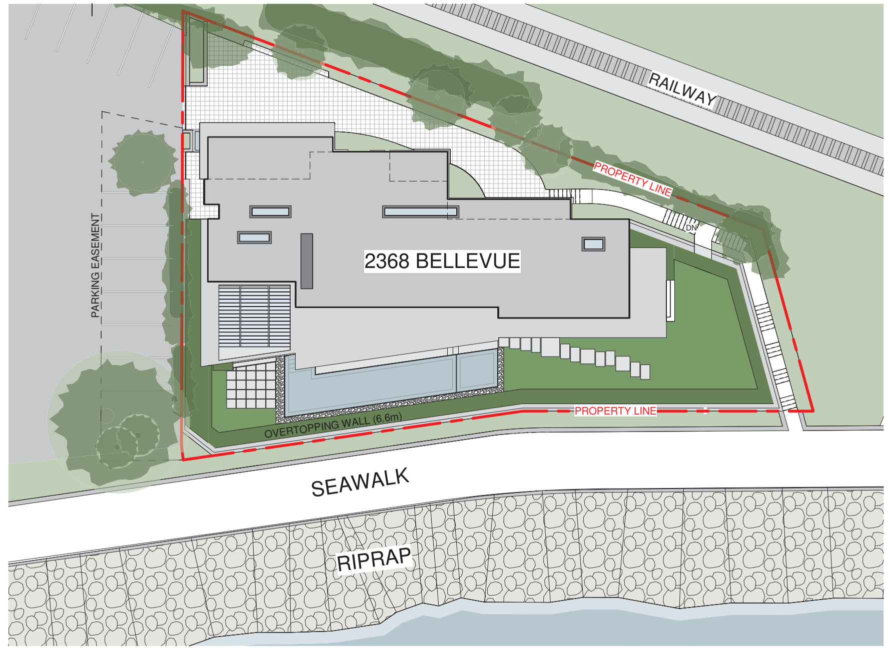
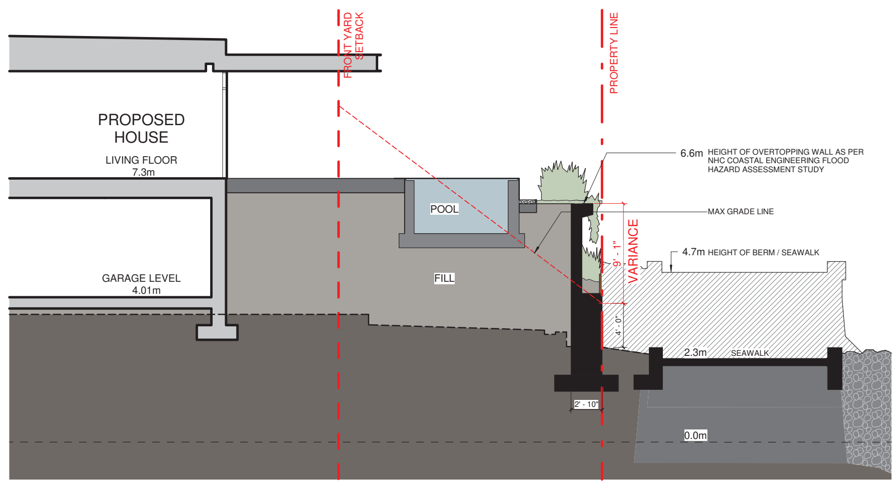
VIEW FROM SEAWALK LOOKING WEST SHOWING PROPOSED RETAINING WALL



PROPOSED VARIANCE FOR RETAINING WALL SITE PLAN


VIEW FROM SEAWALK LOOKING EAST SHOWING PROPOSED RETAINING WALL



PROPOSED VARIANCE FOR RETAINING WALL HEIGHT ALONG SOUTH PROPERTY LINE

No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

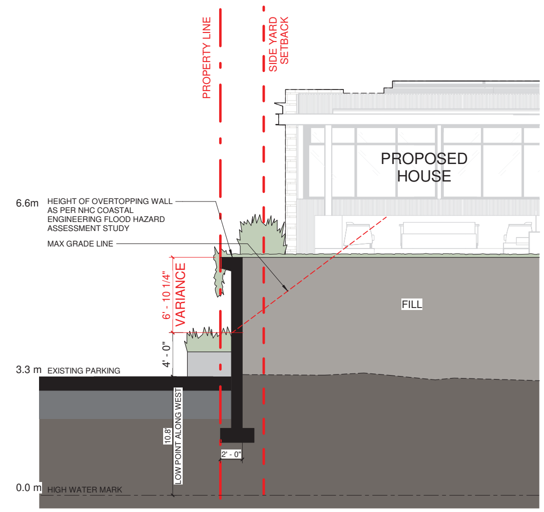
West Vancouver, BC
V7V 1C8

Drawing Title:

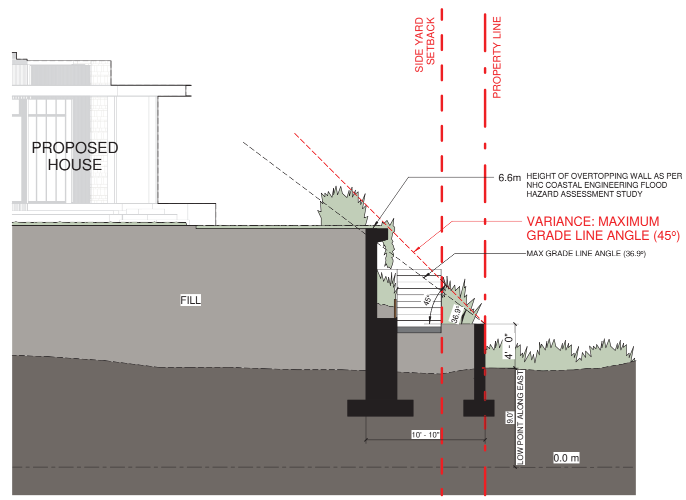
PROPOSED RETAINING WALL VARIANCE

Plot Date: 01/27/23
Drawn by: Author Checked by: Checker
Project No. Scale: As indicated
Drawing No.

A6.02



PROPOSED VARIANCE FOR RETAINING WALL HEIGHT ALONG WEST PROPERTY LINE



PROPOSED VARIANCE FOR MAX GRADE LINE ALONG EAST PROPERTY LINE

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No.	Issued for - Revisions	Date
1	Issued for Development Permit	2023-03-01

Project:

2368 Bellevue Ave

West Vancouver, BC
V7V 1C8

Drawing Title:

PROPOSED RETAINING WALL VARIANCE

Plot Date: 02/13/23
Drawn by: Author | Checked by: Checker
Project No. | Scale: 3/16" = 1'-0"
Drawing No.

A6.03

604-926-8733 | office@burleyboys.com | www.burleyboys.com
2401 Mackay Ave, North Vancouver, BC V7P 2N2

Arborist Report

Authored by: Sean Wightman

ISA Certification #: PN2013A, TRAQ

File #:	23-025
Date:	26 April 2023. Amendment October 17 2023.
Weather:	Overcast, raining
Client:	Waterform Design Inc
Telephone:	250-818-0825
Email:	dale@waterformdesign.com
Site Address:	2368 Bellevue Avenue, West Vancouver, British Columbia V7V 1C8

Purpose:

Burley Boys Tree Service Ltd. has been contracted to provide a *tree inventory and tree* removal/retention outline for the property at 2368 Bellevue Ave, West Vancouver, BC. Plans for the development of the property include full site excavations for a new building.

This report is intended to accompany a development permit for the property which includes the removal of 13 trees on private property which may be noted as being in poor condition, with little or no long-term retention value, or inside/too close to required excavations; not suitable for retention. The property is protected by a Foreshore DPA, therefore, permits are required.

Any recommended tree removal should be considered in conjunction with an approved replanting/landscape plan.

Method:

The site was visited with all trees being assessed from the ground only, using the Visual Tree Assessment (VTA) technique. No trees were climbed or cored during the site visit. Assessed trees and their Critical Root Zones (CRZ) are noted in the Appendix below. These CRZ should be noted for design purposes and to avoid/limit any excavations or grade changes too close to the trees as part of the proposed development.

Limitations:

 This report is based on the method of assessment on the day of the assessment only. It is not to be copied, reprinted, published or otherwise distributed without prior approval by Burley Boys Tree Service Ltd. This report is to be used in its entirety, for its purpose only. Only the subject trees were inspected, and no others. This report does not imply or in any other way infer that other trees on the property or on neighbouring sites are sound and healthy.

The inherent characteristics of trees or parts of trees to fall due to environmental conditions and internal problems are unpredictable. Defects are often hidden within the tree or underground. The project arborist has endeavoured to use his skill, education and judgement to assess the potential for failure, with reasonable methods and detail. It is the owner's responsibility to maintain the trees to reasonable standards and to carry our recommendations for mitigation suggested in this report.

It is the sole responsibility of the client or their representatives to follow through with all recommendations for future consultations or site inspections.

Observations:

13 trees within or near the property were assessed. The trees are not individually tagged, but they are referred to as Trees #1 through #13 in the Appendix below.

The proposed development requires full site excavations and removal of all trees and shrubs

Tree #1 is a mixed hedge, consisting of cedar, holly & laurel. Its stems average 15cm. Iit is in good condition. This hedge is proposed to be removed to facilitate the development. It is on or shared with the west neighbour's property; permission is required.

Tree #2 is a Portuguese laurel growing to the west of the existing building. It has twin stems measuring 28 & 29 cm DBH and is in fair condition; it has been maintained as a hedge ball. This tree is proposed to be removed to facilitate the development.

Tree #3 is a Portuguese laurel growing at the SW corner of the existing building. It has multiple stems measuring 36, 27 & 30 cm DBH. This tree is in poor condition; it has been maintained as a hedge ball and has advanced decay on its main stems. This tree is proposed to be removed to facilitate the development.

Tree #4 is a Portuguese laurel growing at the SW property line. It has multiple stems measuring 32, 28 & 30 cm DBH. This tree is in fair condition; it has been maintained as a hedge ball. This tree is proposed to be removed to facilitate the development.

Tree #5 is a Portuguese laurel growing at the south property line. It is similar in size & condition to Tree #4 above; it has been maintained as a hedge ball. This tree is proposed to be removed to facilitate the development.

Tree #6 is a Portuguese laurel located the the SE corner of the existing building. It has multiple stems measuring 25 & 33 cm DBH and is in fair condition; it has been maintained as a hedge ball. The roots of this tree have damaged the existing patio. This tree is proposed to be removed to facilitate the development.

Tree #7 is a Portuguese laurel growing at the east side of the existing building, north of Unit #6. It has multiple stems measuring 28, 30 & 32cm. This tree is in fair condition. It is proposed to be removed to facilitate the development.

Tree #8 is a Southern magnolia located at the NE corner of the property. It measures 25 cm DBH and is in fair condition. This tree is proposed to be removed to facilitate the development.

Tree #9 is an Emerald cedar hedge, growing along the NE property line. Its stems average 10 cm DBH and it is in good condition. This hedge is proposed to be removed to facilitate the development.

Tree #10 is a Cherry, growing at the north property line. It measures 45 cm DBH and is in fair condition. This tree is proposed to be removed to facilitate the development.

Tree #11 is a holly, growing at the NE corner of the existing building. It measures 26 cm DBH and is in fair condition. This tree is proposed to be removed to facilitate the development.

Tree #12 is a Cypress growing at the NW corner of the existing building; it appears to be on CN Rail or District property. It has twin stems measuring 35 & 38 cm DBH. This tree is in poor condition; it has heavy lean and has been previously topped, maintained as a hedge. This tree is proposed to be removed to facilitate the development; ownership TBD (permit/permission required).

Tree #13 is a Laurel hedge growing at the NW corner of the property. Its stems average 15 cm DBH and it is in poor condition. This hedge is proposed to be removed to facilitate the development.

Tree #14 is a Pine tree with a DBH of 46cm. It is in poor condition; partially uprooted and leaning heavily to the SE towards a lamp standard and the publick seawall pathway. It has been previously topped and maintained as a hedge at approximately 4m. This tree is not suitable for long term retention and is recommended to be removed.

Tree #15 is a Pine tree with a DBH of 35cm. It is in poor condition; It has been previously topped and maintained as a hedge at approximately 3m. This tree is not suitable for long term retention and is recommended to be removed.

Conclusions:

Any removal/retention recommendations are based on both the trees' current health, condition, and long-term viability as a retained tree and their relative proximities to required excavations.

The critical root zones of retained trees should be observed and protected from any excavations, grade changes or storage of construction materials.

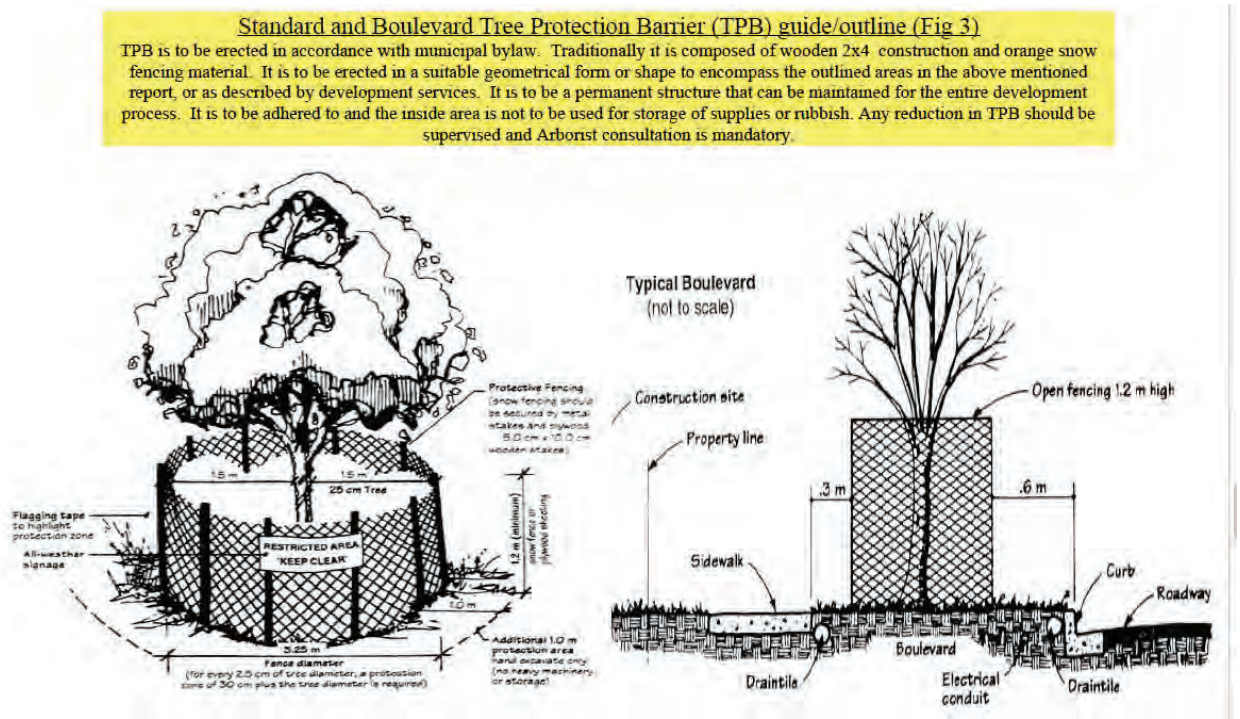
Any recommended tree removals should be considered in conjunction with a District approved re-planting / landscape plan.

Tree Retention Outline:

A tree preservation fence must be constructed around the root areas of all trees that are to be retained. Wherever possible, the radius of the tree preservation fence should extend as far as the drip line of the tree's canopy. If this is not possible, the fence should be located no closer than the determined CRZ for each individual tree. This will ensure that the critical root zone for each tree is protected. Protecting the tree's critical root zones will help reduce the amount of soil compaction to the root areas, and will also aid in retaining the moisture in the soils during the construction period.

Should any excavations be required within 1m of the determined critical root zone of any tree to be retained, a certified arborist must be on site to assess and document the roots being affected and mitigate appropriately. If any roots are expected to be uncovered, damaged or cut, it is recommended that a certified arborist be retained to supervise the excavations and mitigate any damaged roots accordingly.

Heavy machines should be kept out of the drip line of all trees on the property. Designated roadways for machines to move through the property may prove beneficial. Construction materials, particularly concrete, should not be stored inside the root zones. Waste concrete should not, under any circumstances, be disposed of inside root zones. This includes hosing down tools used to mix or spread concrete. Any large roots (over 15cm) exposed by excavation should have broken ends cleanly sawn off.



Appendix:

Below details the tree assessed. "DBH" is the main trunk diameter of the tree measured approximately 1.4m from grade. The determined condition of each tree is relative to its health, canopy structure, colour and vigour and any defects noted in the stem, canopy or root plate. Retention values are based on the tree species profile, growing conditions & viability as long-term. "CRZ" is the determined Critical Root Zone of each tree. Preferred & Minimum CRZs are outlined below. The Minimum CRZ measurement is based on 6xDBH, while Preferred CRZ measurement is based on 10xDBH; Tree protection barriers should be located no closer to the trunk than this distance and must be minimum 1.2 m in height. It should be noted trees with excavations required inside the Preferred CRZ can often be retained.

Tree /Tag #	**Species**	**DBH** (cm)	**Condition** Good Fair Poor Dead/Dying	**Retention Value** High Moderate Low Unsuitable	**CRZ** (Min) (m)	**CRZ** (Pref'd) (m)	**Comments & Recommendations**
1	Cedar, holly, laurel	15 (avg)	Good	Moderate	0.90	1.50	• Mixed species hedge • On/shared with west neighbour **Recommend:** • *Remove; Permission required*
2	Portuguese laurel	57	Fair	Moderate	3.42	5.70	• Combined DBH; Twin stems (28, 29 cm) • Maintained as hedge ball **Recommend:** • *Remove to facilitate proposed development*
3	Portuguese laurel	93	Poor	Unsuitable	5.58	9.30	• Combined DBH; Multi-stemmed (36, 27, 30 cm) • Advanced decay on main stems • Maintained as hedge ball **Recommend:** • *Remove to facilitate proposed development*
4	Portuguese laurel	90	Fair	Moderate	5.40	9.00	• Combined DBH; Multi-stemmed (32, 28, 30cm) • Maintained as hedge ball **Recommend:** • *Remove to facilitate proposed development*
5	Portuguese laurel	90	Fair	Moderate	5.40	9.00	• Combined DBH; Multi-stemmed (32, 28, 30cm) • Maintained as hedge ball **Recommend:** • *Remove to facilitate proposed development*
6	Portuguese laurel	58	Fair	Moderate	3.48	5.80	• Combined DBH; Multi-stemmed (25-33 cm) • Maintained as hedge ball • Roots damaged existing patio **Recommend:** • *Remove to facilitate proposed*

							development
7	Portuguese laurel	90	Fair	Moderate	5.40	9.00	• Combined DBH; Multi-stemmed (28, 30, 32 cm) **Recommend:** • *Remove to facilitate proposed development; permit required*
8	Southern magnolia	25	Fair	Moderate	1.50	2.50	**Recommend:** • *Remove to facilitate proposed development*
9	Emerald cedar	10 (avg)	Good	Moderate	0.60	1.00	• Hedgerow **Recommend:** • *Remove to facilitate proposed development*
10	Cherry	45	Fair	Moderate	2.70	4.50	**Recommend:** • *Remove to facilitate proposed development*
11	Holly	26	Fair	Low	1.56	2.60	**Recommend:** • *Remove to facilitate proposed development*
12	Cypress	73	Poor	Unsuitable	4.38	7.30	• Combined DBH; twin stems (35, 38cm) • Heavy lean • Previously topped • Maintained as hedge **Recommend:** • *Remove to facilitate proposed development* • *Possibly on DWV or CN Property; permission/permit required*
13	Laurel	15 (avg)	Poor	Unsuitable	0.90	1.50	• Hedgerow **Recommend:** • *Remove to facilitate proposed development*
14	Pine	46	Poor	Unsuitable	0.90	1.50	• Partially uprooted with heavy lean to SE. • Previously topped **Recommend:** • *Remove to facilitate proposed development*
15	Pine	35	Poor	Unsuitable	0.90	1.50	• Previously topped **Recommend:** • *Remove to facilitate proposed development*

Tree Removal/Retention Summary:

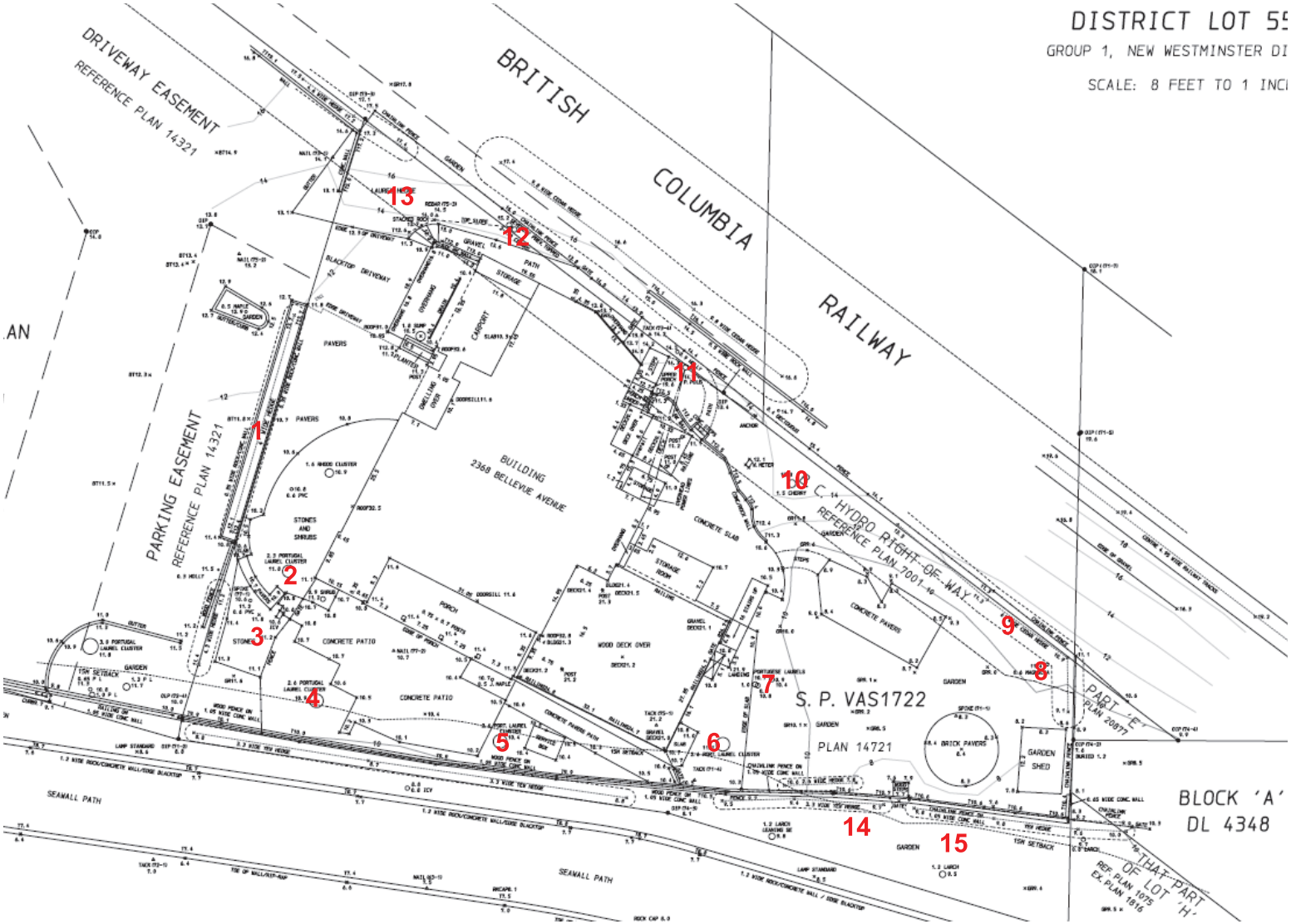
Number of permit protected trees to be removed:	15
Number of non-permit protected trees to be removed:	0
Number of retained trees on site:	0

Site Maps:

The below sitemaps note approximate tree locations & outlines Foreshore DPA

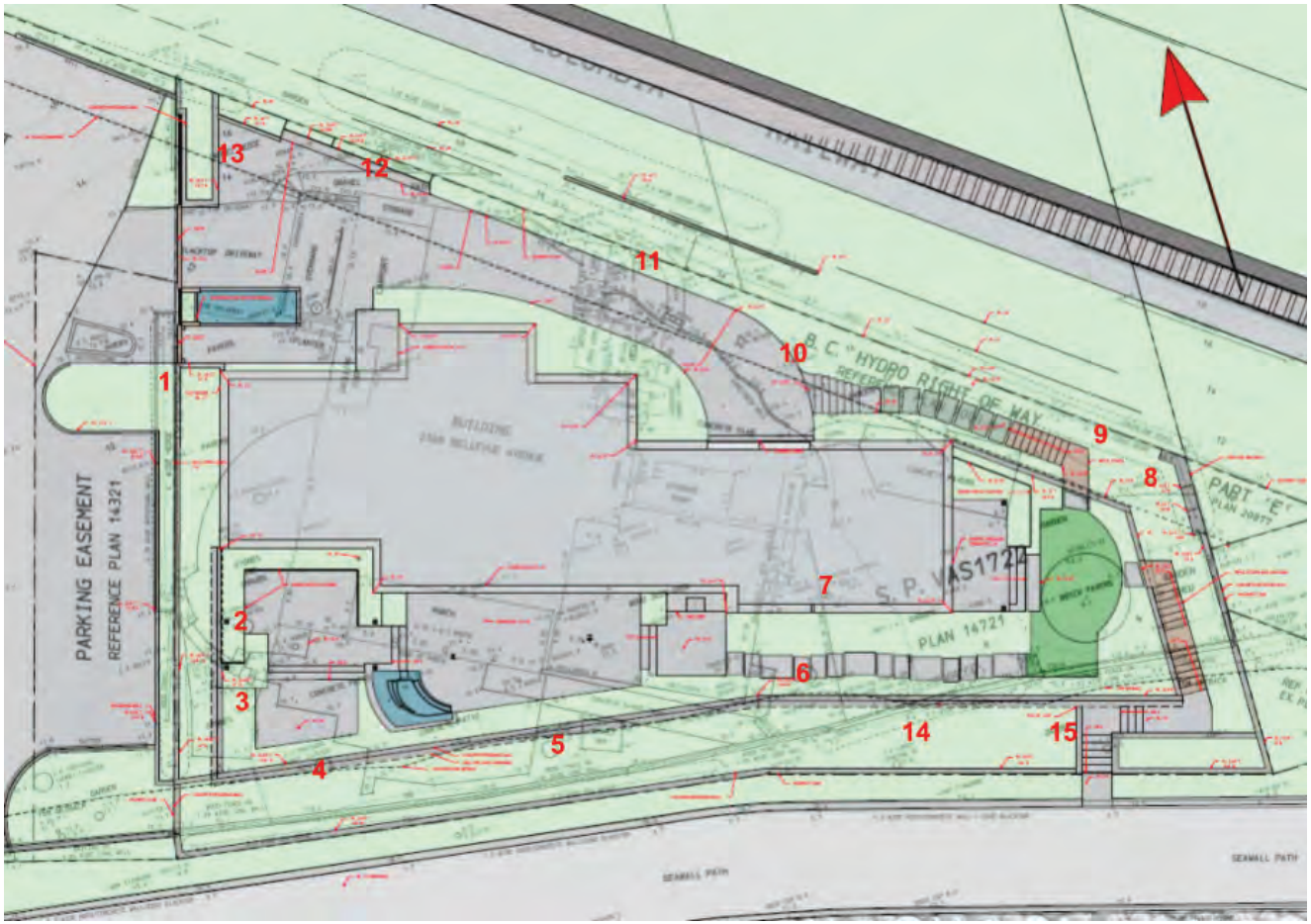
Site Survey:

The below site survey plots tree locations.

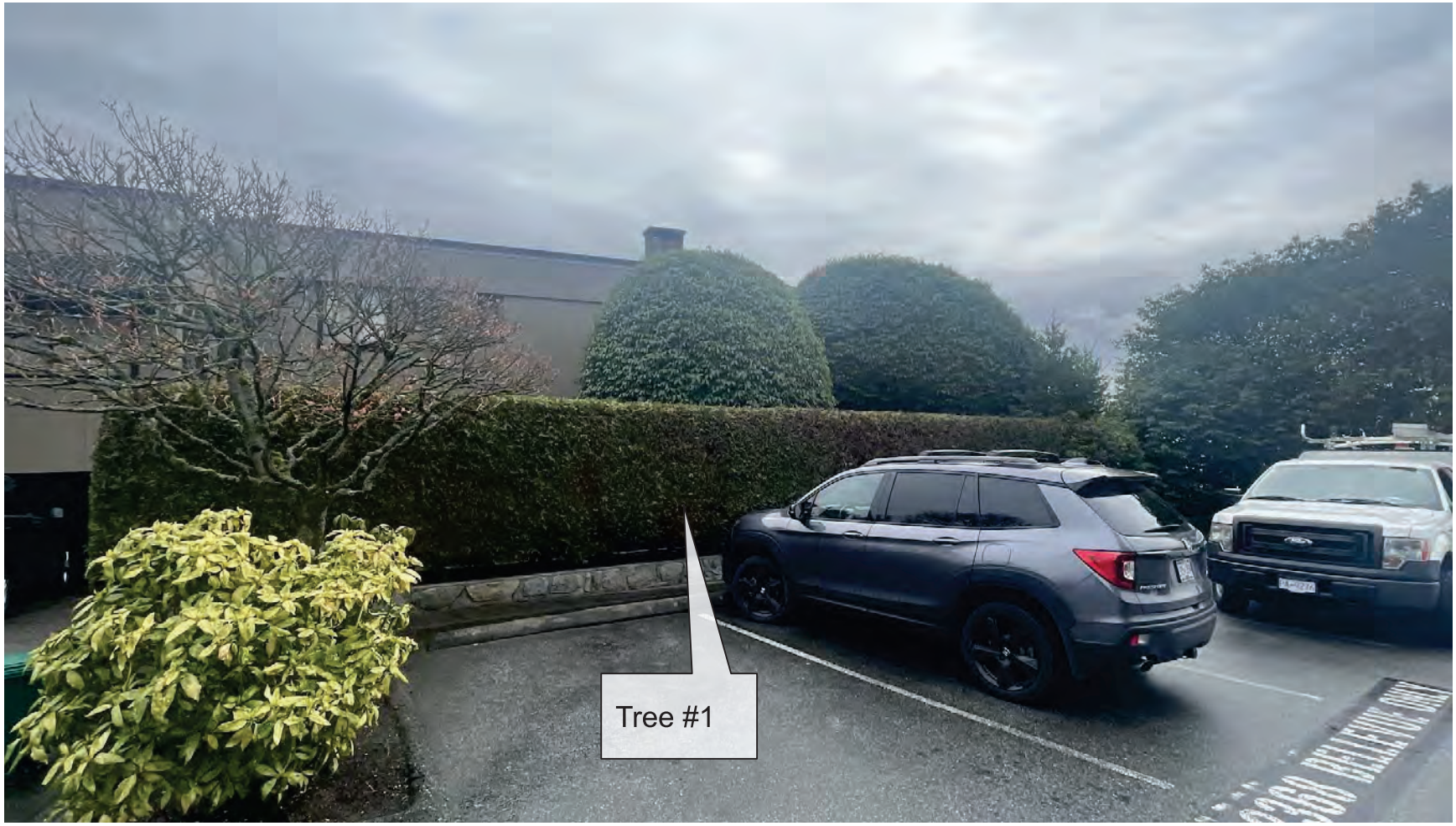


Site Plan:

The below site plan plots tree locations and outlines removal/retention recommendations (Retain, Remove). Approximate Tree Protection Zones are outlined in yellow. Retained Trees requiring Arborist Supervision are outlined in orange. An original large scaled copy of the site plan indicating trees marked for removal, and the locations of Tree Protection Zones has not been included with this report; this is to be provided by the applicant, if required.



Images:




Tree #2
Tree #3


Tree #4
Tree #4


Tree #6


Tree #6&7


Tree #9
Tree #8


Tree #10


Tree #11
Tree #12


Tree #12
Tree #13


Tree #14.
Uprooting with
heavy lean


Tree #14


Tree #15

BALANCED
ENVIRONMENTAL

Schedule E
RECEIVED
July 6, 2023
Planning and Development Services

Foreshore Protection Area
Construction Environmental Management Plan

Residential Re-development
2368 Bellevue Avenue
West Vancouver, British Columbia

Balanced Report: 9538-CEMP-01.1
Date: May 18, 2023

Prepared by:

Balanced Environmental Services Inc.
Unit 1, 5 Senator Road
North Vancouver, B.C.
V7P 3H9

Prepared for:

Feenstra Architecture Inc.
601 - 1587 West 8th Avenue
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1 Background

This Construction Environmental Management Plan (CEMP) report is appended to Balanced Environmental Assessment (EA) report 9538-R-02.1, as Appendix A.

Balanced Environmental Services (Balanced) prepared this CEMP report in relation to the proposed redevelopment of the residential lot at 2368 Bellevue Avenue, West Vancouver, British Columbia (the Development).

The southern boundary of the Development lot (the Lot) abuts the District of West Vancouver (DWV) Seawalk and the associated rock rip rap shore protection revetment. DWV has designated the area of backshore upland within 15 metres (m) inland of the natural boundary with the sea as the Foreshore Protection Area (FPA). The Lot is approximately 11-12m landward of the natural boundary with the sea. The part of the Development that lies within the DWV 15m FPA comprises a strip of land, approximately 3-4m wide and 52.7m long running along the entire southern margin of the Lot (the FPA Strip). The FPA Strip abuts the DWV Seawalk.

DWV Official Community Plan (OCP) Schedule ii provides guidelines for development within the FPA. The Foreshore Development Permit Area (FDPA) Section V guideline is for a CEMP be applied to development work within the 15m FPA or on public foreshore for access to the upland development property. The purpose of the CEMP is to describe mitigation and protection measures to be applied during development activities within the FPA.

In keeping with FDPA guidelines DWV is requiring a CEMP be prepared for Development work, activity, and undertakings (WAUs) within the 3-4m wide FPA Strip.

1.1 FPA Strip

Due to Lot limitations, DWV flood construction level requirements, and necessary flood protection works, the Development will include the entire Lot, including the FPA Strip.

A Balanced Qualified Environmental Professional (QEP), a Registered Professional Biologist (R.P.Bio.), carried out the EA survey of the Development site and environs on February 17, 2023. Findings of the EA survey are presented in Balanced EA report 9538-R-01.2, and in the addendum to that report, Balanced report 9538-R-02.1.

In the view of the Balanced QEP:

- There are no ecological features or functions associated with foreshore habitat within the Lot, including the FPA Strip.
- There is no ecological connectivity between the Lot, including the FPA Strip, and foreshore habitat.

Considering the foregoing, the focus of the CEMP will be measures to be applied to Development WAUs to protect foreshore habitat beyond the bounds of the Lot, and/or mitigate unavoidable Development-related adverse impact to foreshore habitat beyond the bounds of the Lot.

2 Construction Environmental Management Plan (CEMP)

The measures described below constitute the recommended Construction Environmental Management Plan (CEMP) for the Development.

Balanced recommends that the following measures be applied adaptively and effectively to Development WAUs.

None of the measures described in this CEMP are intended to supersede or replace any requirement of any regulatory authority.

2.1 Environmental Management

Require all Project contractors to demonstrate that they have in place environmental management protocols appropriate for the Development, including adaptive application of the CEMP mitigation measures described below, or equivalent.

2.2 Environmental Monitoring

Engage an appropriately qualified environmental professional to be the Development Environmental Monitor (EM).

Develop and implement an appropriate EM monitoring protocol and schedule.

Empower the EM to:

- Monitor the Development whenever there is, in the opinion of the EM, substantive potential for the Development to result in adverse environmental effect, including adverse effect on foreshore habitat.
- Implement this CEMP, or equivalent measures to avoid and mitigate adverse environmental effects.
- Direct contractor(s) and Development WAUs as necessary, to avoid and/or remedy Development-related adverse environmental effect.

2.3 Development WAUs Areas

Except for Development WAUs within the bounds of the Lot, require that all Development WAUs avoid encroaching upon the DWV 15m FPA.

That includes:

- Placement and operation of machinery and equipment;
- Storage, temporary storage, and stockpiling of:
  - demolition materials and debris;
  - construction materials and waste.

2.4 Machinery and Equipment

For all machinery and equipment that will be located and/or operated within the Lot, within the FPA Strip, require the machinery and equipment to be maintained:

- in good operating and clean condition;
- free of organic material from off site;
- free of leaks of hydrocarbon products, including fuel, hydraulic fluid, and lubricants.

2.5 Erosion and Sediment Management

Develop and implement an adaptive Erosion and Sediment Control Plan (ESCP) for the Development that will prevent both direct and indirect deposit of Development-related sediment, sediment-laden water, and turbid water, in the sea. That includes preventing deposit in the sea through storm sewer discharge.

Inspect the erosion and sediment control facilities regularly as necessary to ensure the facilities are working effectively. Adapt the ESCP as necessary to maintain effective erosion and sediment control. Maintain the erosion and sediment control features as long as there is the potential for Development-related deposit of sediment, sediment-laden water, and/or turbid water, in the sea.

2.6 Deleterious Substances

Prevent both direct and indirect deposit in the sea of any Development-related deleterious substance*, including:

- hydrocarbon products, including gasoline, diesel fuel, oil, lubricants, and solvents;
- uncured cementitious products, including cement, uncured concrete, uncured grout;
- water that has been in contact with uncured cementitious products, including water used to wash items that have been in contact with uncured cementitious products, including tools and containers;
- sediment, sediment laden water, and turbid water.

That includes preventing deposit in the sea through storm sewer discharge.

***** Note: A substance is considered to be deleterious if it is harmful to fish or wildlife, if it limits the use of fish by humans, or if through degradation it has a negative environmental effect.

2.7 Spill Prevention and Management

Develop and implement an appropriate spill response plan for the Development:

- Ensure that workers working on the Development at the Development site are familiar with the spill response plan.
- Keep on site appropriate spill response materials, accessible and ready to be used as necessary without delay for the duration of the Development.

Ensure that:

- There is no storage of Development-related hydrocarbon products, or machinery or equipment fuelling or servicing, within the DWV 15m FPA.
- All on site storage of Development-related hydrocarbon products and on site machinery and equipment fuelling and servicing is carried out with appropriate hydrocarbon product containment and spill prevention measures in place.

2.8 Vegetation removal

Avoid disturbing active bird nests.

To that end, do not undertake any substantive removal of trees or shrubs, including hedges, during local bird nesting season.

2.9 Spill Reporting

Report without delay any Project related spill of:

- a “listed substance”, as defined by the Environmental Management Act Spill Reporting Regulation (Province of British Columbia 2017);
- any other substance with the potential to cause substantive harm to the environment that enters or is likely to enter the sea.

Report the spill to the Provincial Emergency Program (PEP) by calling 1-800-663-3456

2.10 Occurrence Notification

Notify Fisheries and Oceans Canada (DFO) without delay of any Development-related:

- substantive deposit of any deleterious substance in water frequented by fish, including the sea;
- substantive death of fish;

- substantive harmful alteration, disruption, or destruction of fish habitat (HADD);
- serious and imminent danger of any such occurrence.

Notify DFO of the occurrence or the serious and imminent danger of any such occurrence by calling the DFO occurrence reporting number 604-607-4186 or 1-800-465-4336.

As soon as feasible, take all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat to prevent the occurrence or to counteract, mitigate, or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it.

As soon as feasible after the occurrence or after learning of the serious and imminent danger of the occurrence, provide DFO with a written report on the occurrence or danger of the occurrence by e-mail at dfo.orr-ons.mpo@dfo-mpo.gc.ca.

3 References

Province of British Columbia. 2017. Environmental Management Act Spill Reporting Regulation. Available: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/187_2017

4 Clarifications, Limitations, Signatures

This report, Balanced report 9538-CEMP-01.1, is appended to Balanced EA report 9538-R-02.1 as Appendix A.

This report has been prepared by Balanced for the exclusive use and benefit of Feenstra Architecture (Feenstra) in relation to the residential re-development of the property at 2368 Bellevue Avenue, West Vancouver, B.C. (the Development).

The contents, implied or written, of this report and related media may not be utilized in part or in whole by parties other than Balanced or Feenstra without authorization by Balanced or Feenstra.

This report provides technical and Qualified Environmental Professional (QEP) opinion information in response to comments made by District of West Vancouver. This report reflects Balanced's best judgment in light of the information available at the time of its preparation, consistent with the Development scope of work: it is accurate and complete to the best of Balanced's knowledge.

Balanced's services associated with the preparation of this report have been carried out in a manner consistent with that level of skill and care ordinarily exercised by QEPs currently practicing under similar conditions. No warranty, express or implied, is made.

In preparing this document Balanced has relied in part on personal communications from Feenstra, and Development drawings provided by Feenstra, copies of which are appended to Balanced EA report 9538-R-1.2 as Appendix 1.

This report does not constitute approval under any local government, provincial, or federal legislation; it does not relieve anyone from any obligation to comply with relevant local government, provincial, or federal legislation or requirements.

BALANCED ENVIRONMENTAL SERVICES INC.

Prepared by:

Bruce Clark, R.P.Bio.
Project Biologist

Reviewed by:

Scott Christie, R.P.Bio.
Senior Biologist

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Appendix B

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