

21 January 2008

Southeast False Creek and Olympic Village Project Office
1800 Spyglass Way
Vancouver, BC V5Z 4K8

Attention: Ian Smith, Manager of Development

**Re: Salt Building, 85 West 1st Avenue
Recommendation To Raise The Salt Building**

Dear Ian,

With reference to Change Order #1, dated 10 January 2008, to the Salt Building Services Agreement, the following report has been prepared by the Salt Building Restoration Corp. (SBRC). The intent of this report is to provide the City of Vancouver with recommendations to raise the Salt Building, as opposed to having it partially buried, as it shall be, should the building remain at its present elevation with respect to the elevations of the soon to be constructed City of Vancouver sidewalks and streets that will surround the Salt Building site.

The report has been assembled in four (4) sections for ease of reference as follows:

1. Recommendations to Raise the Salt Building;
2. Analysis for Raising The Salt Building Versus Not Raising The Salt Building;
3. Budget Comparison of Raising The Salt Building Versus Not Raising The Salt Building; and
4. Schedule Impacts: Raising the Salt Building Versus Not Raising The Salt Building.

We trust that the attached report satisfactorily provides the SEFC Project Office with the information required for presentation to Council. We would be pleased to make a presentation to Council to explain the rationale for raising the building and to answer any questions that Council may have regarding this matter.

Please do not hesitate to contact us should you require any clarifications.

Regards,



for
Kevin Johnston, PRESIDENT
Salt Building Restoration Corp.

encl

cc Ken Bayne, Director of Financial Planning & Treasury, COV

1637 W 5 Avenue
Vancouver BC
Canada V6J 1N5

t 604.739.3344
f 604.739.3355
1.877.737.3344

RECOMMENDATIONS TO RAISE THE SALT BUILDING

We strongly recommend that the Salt Building be raised to a height between 37 to 45 inches (exact height yet to be determined), for the following reasons:

1. The recently constructed sidewalk and streets that surround the Salt Building have been designed higher than the original grades leaving the existing building partially buried along the north, east and west sides.
2. The relationship of the main floor of the building to Walter Hardwick Way is awkward. In particular, the north side, which will face Vancouver's premiere public plaza in the SEFC Village, will be sunken below grade and will not be accessible to those with disabilities.
3. The main floor level will look like a basement space below grade, inhibiting and compromising the quality of public, social and retail interaction planned. This will be critical to the success of any business or civic functions envisioned to take place within and around the Salt Building. The currently proposed uses of restaurant, brew pub, bakery and coffee house require a near-grade accessible relationship at the north side facing the SEFC Village public plaza.
4. The building's heritage piles and support structure below the main floor level will no longer be visible from any side of the building, as they have been throughout its history. Lifting the building will allow public views to the historic pile foundation.
5. Significant areas of the existing historic wood siding and timber structure at the perimeter of the building have begun to be buried through construction of the street and sidewalk retaining system that will surround the site. The buried timber elements will be exposed to water and insects, thereby making the building structure and envelope vulnerable to rot and damage. Raising the building would eliminate the buried condition and facilitate the restoration and future maintenance of the building structure and envelope.
6. The piled basement area located below the Salt Building has been designed to act as a sump to relieve water pressure on the surrounding City street and sidewalk retaining walls. SBRC has recently been advised that it is probable that the piled basement area may be filled with several inches of water at any given time and that the piled basement will remain a wet or damp space throughout the year. Raising the Salt Building will permit natural ventilation to take place in the piled basement space. Conversely, leaving the building at its present level may require the construction of ventilation wells in City sidewalks surrounding the building that may, in turn, require mechanical assistance to adequately ventilate the piled basement.
7. The City is constructing a new basement at the north end of the building for use by the building's commercial tenant. Headroom access to this new basement will be restricted and compromised and may not prove to be very useful for the purposes intended if the building is not raised.

Analysis of Raising The Salt Building

1. NOT LIFTED

If the building is not raised, a number of negative conditions will arise as follows:

- a) Untreated wood floor structure and siding will be located below grade and will be located adjacent to an existing concrete retaining wall — the untreated wood elements will be susceptible to rot and insects.
- b) Given that the existing concrete retaining wall has been placed within 25-50mm of the face of the existing wood elements and given that the wood elements are buried up to approximately 750mm below the concrete wall at its highest point, there is no room available to work to implement restoration and remedial work on the wood structure.
- c) We understand that the roof of the new City-built basement that is to be constructed to the north of the existing building is to follow the sidewalk grades that have already been established. Construction of the roof at this elevation would therefore further bury wood elements of the existing building along the entire length of the north elevation to a depth of approximately 750mm. The result would be that the floor elevation of the restaurant/pub proposed to be located at the north end of the building would be located approximately 750mm below grade. This would then result in a condition whereby patrons sitting in the restaurant/pub would be looking out at the knees of passersby. Furthermore, there would not be an opportunity to efficiently serve patrons that were seated out at the terrace that is proposed to be located on top of the basement roof structure. Clearly, these are not desirable conditions.
- d) Based on the above-noted scenario, the reduction in headroom of the new basement would mean that access into the new basement through the existing pile basement could not be achieved unless the existing perimeter floor beam was cut away.

Hypothetically, given the above noted undesirable conditions, and assuming that SBRC and the City found the conditions to be acceptable, we would recommend that the top of the existing retaining wall be cut down to a level that would align with the underside of the 300 x 350mm beams that rest upon the piles. A new wall extension would be constructed along the outside of the retaining wall such that it aligned with the design grades for the surrounding sidewalk. This would create a runnel alongside the existing building that would be approximately 300 to 350mm in width which would create enough space for work to be performed whereby the existing wood would be adequately exposed such that rot and insect action would not result and the building components located alongside the runnel could be restored.

The relatively small openings that would be located between the existing beams at the piled basement would be in-filled to prevent unwanted access into the basement. This material would likely be some form of stiff steel mesh to allow ventilation into the piled basement that has been designed by others to be a permanently wet and/or damp condition. Ventilation into the piled basement would likely have to be supplemented at locations around the building perimeter through grates that would be located in the City sidewalk, for which approval would have to be obtained. Also, it is likely that ventilation would have to be supplemented by mechanical means in order that sufficient ventilation may be achieved within the damp and/or wet piled basement.

Given all of the above noted less than desirable conditions, it is our opinion that keeping the building in place, i.e. not raising the building, is not a viable option.

2. LIFTED

Raising the building up to a height of approximately 1150mm, which is the estimated height at which the underside of the 12x14 beams would be located above the adjacent City sidewalk, would result in the following benefits:

- a) All untreated wood components would be located above grade and all wood elements would be readily accessible for restoration and remedial work.
- b) Assuming that the roof for the new basement would be constructed as designed by others to align with the surround sidewalk grades, lifting of the building would result in a condition whereby patrons of the restaurant/pub would be elevated above the surrounding grade. In addition, a raised terrace linked to the adjacent sidewalk by means of a gently sloping ramp could be constructed for use by restaurant/pub patrons.
- c) Given that the building has been raised and assuming that the roof for the new basement would be constructed as designed by others to align with the surround sidewalk grades, sufficient headroom would be available to permit access into the new basement through the piled basement.
- d) Lifting of the building would create significant view opportunities into the piled basement. Given the damp and/or wet conditions to be expected in the piled basement, we have proposed that a portion of the perimeter skirt be constructed with a combination of galvanized steel frame sections and heavy gauge stainless steel architectural grade wire mesh. This will secure unwanted access into the piled basement while allowing ventilation into the space. For the remainder of the perimeter, we propose that new concrete walls be constructed on top of the existing concrete retaining walls to permit the structural engineer to tie into the combined concrete walls to effectively achieve seismic requirements for the existing building.
- e) Lifting the building will positively alter the relationship between the main floor level and the north end of the building, facing the SEFC Village Plaza. Instead of the main floor level looking like a basement below grade, the main floor level will be universally accessible from the sidewalk adjacent to Walter Hardwick Way, between the Plaza and the building. This will be critical to the success of the proposed businesses and potential public features of the building.

Given all of the benefits associated with raising the building, and in consideration of the negative issues associated with keeping the building in place, it is our recommendation that the building be lifted.



building buried below
grade at side elevations
and at north end

no views to piles

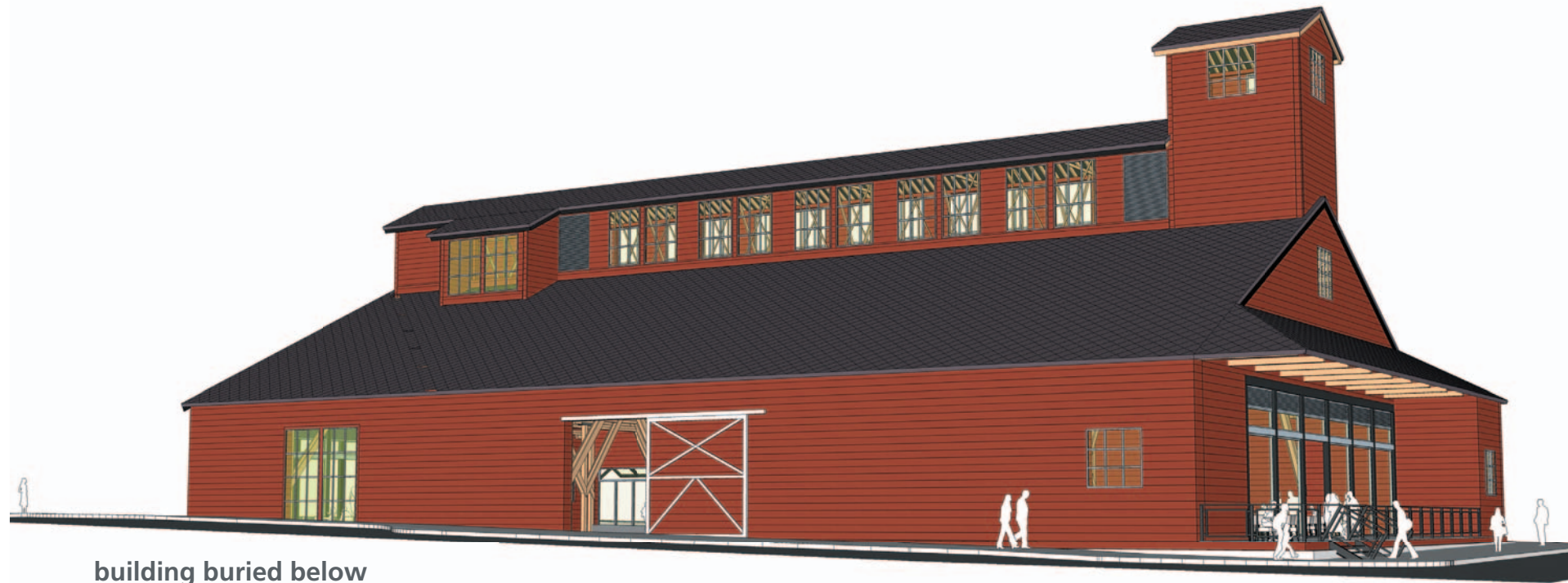
NOT LIFTED



building raised above
grade at side elevations
and at north end

views to piles

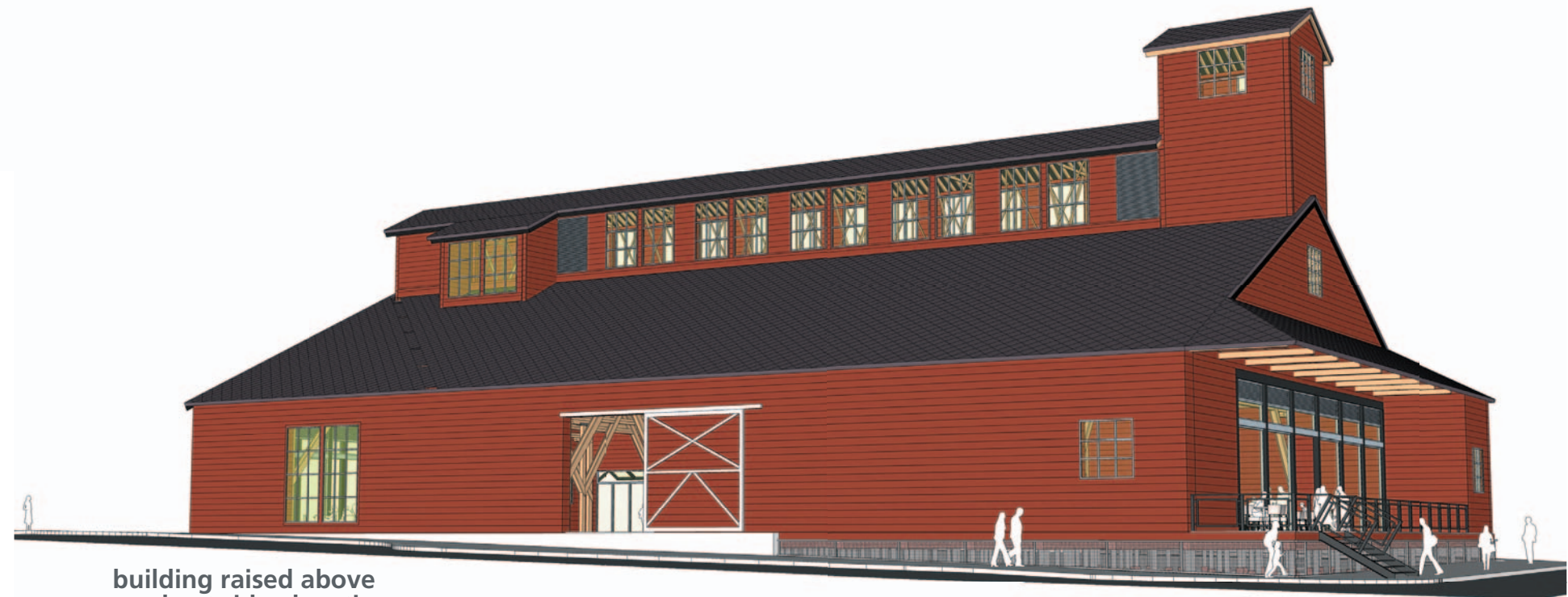
LIFTED



building buried below grade at side elevations and at north end

no views to piles

NOT LIFTED



building raised above grade at side elevations and at north end

views to piles

LIFTED



interior floor elevation buried below grade at north end and at side elevations

NOT LIFTED

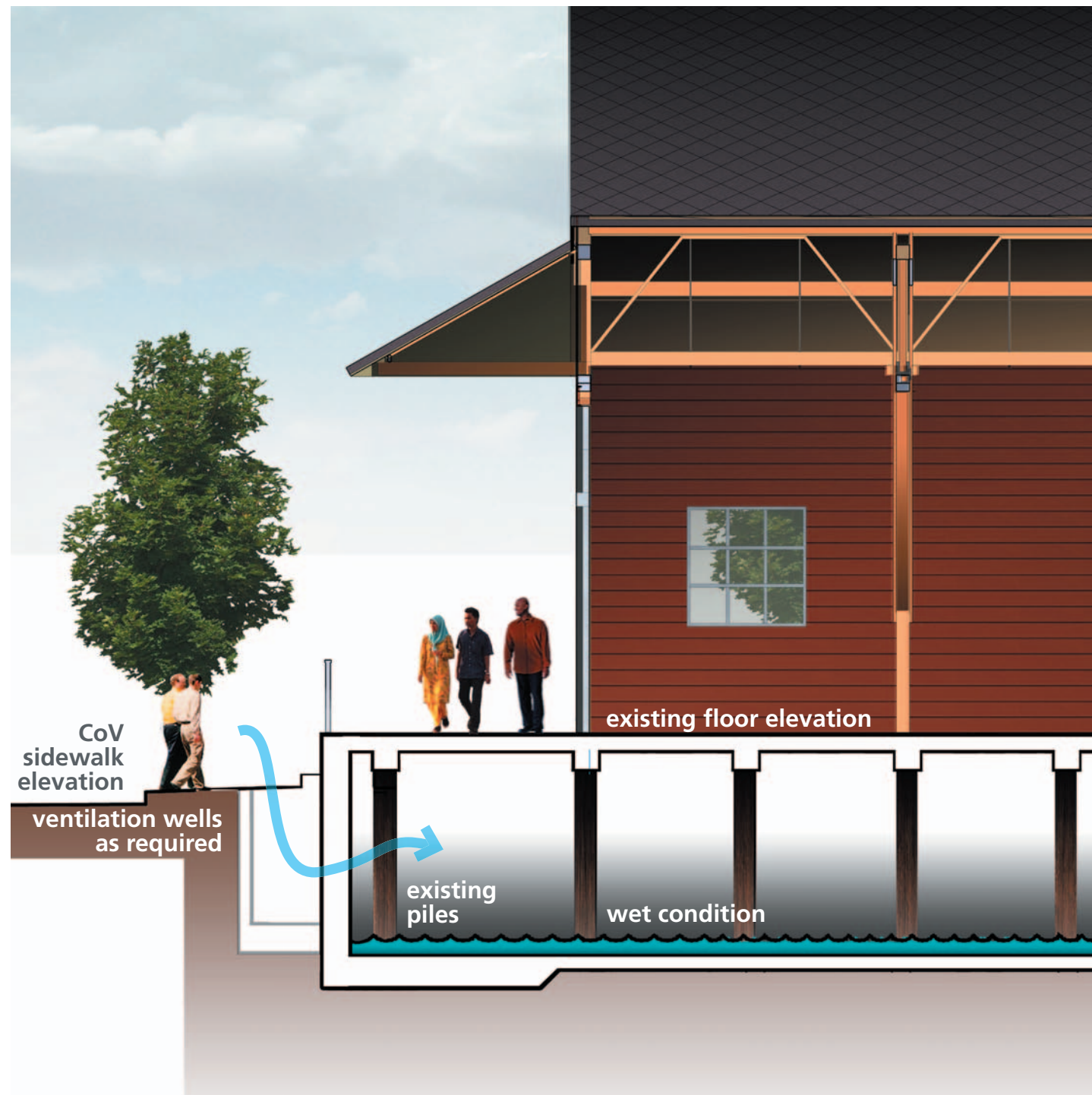
no accessible relationship between interior and exterior of building



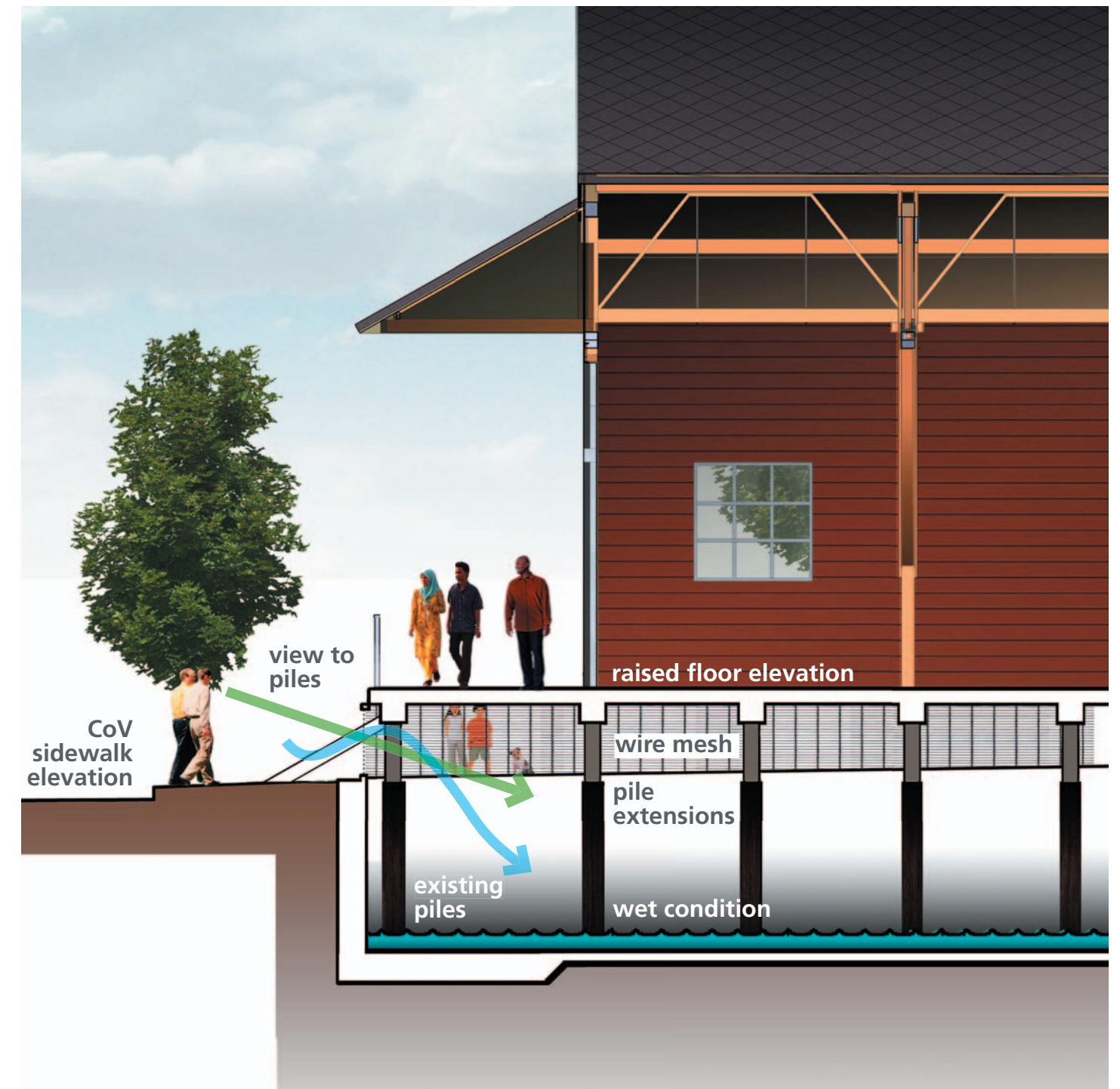
interior floor elevation above grade at north end and at side elevations

LIFTED

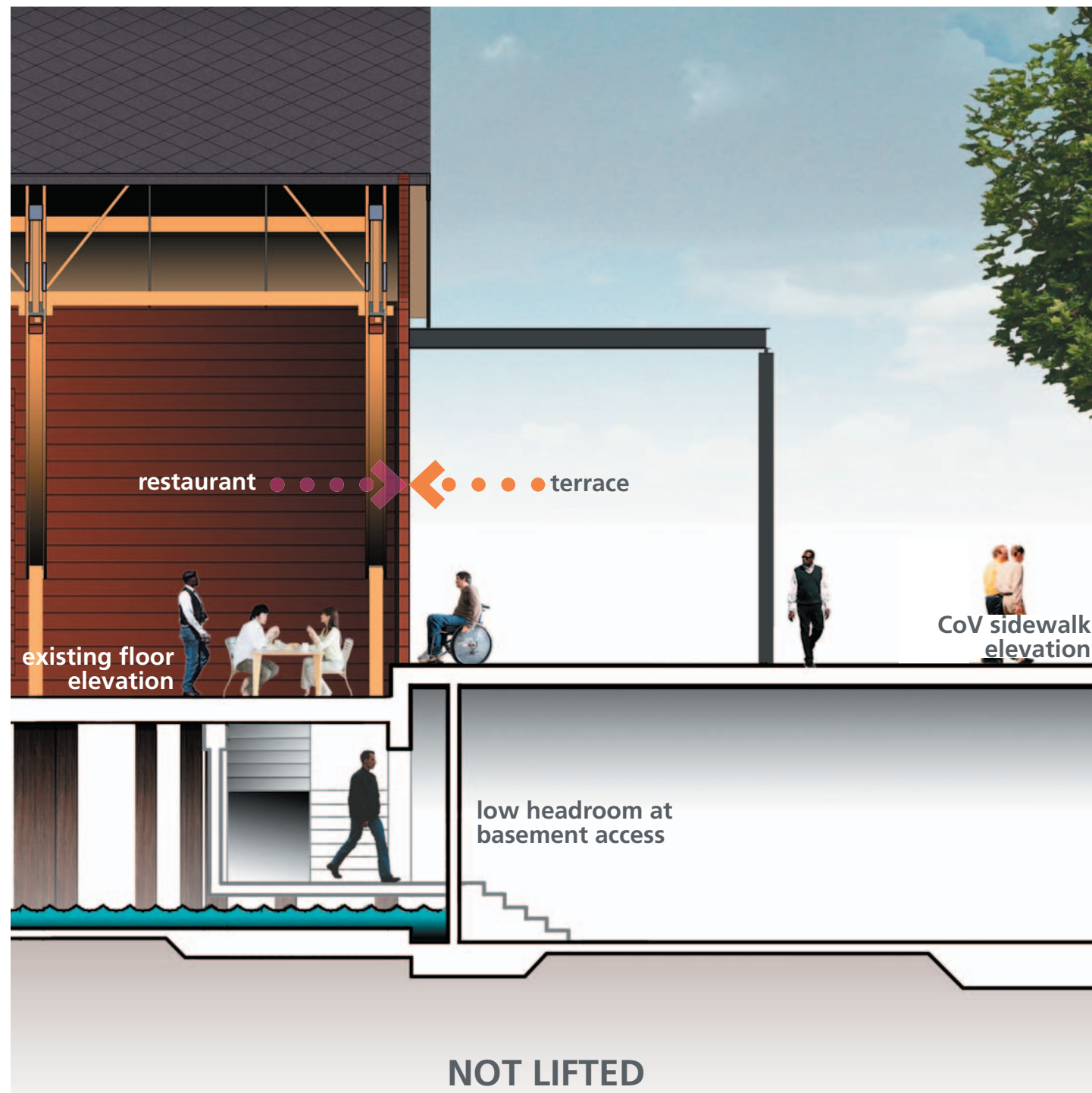
accessible relationship between interior and exterior of building



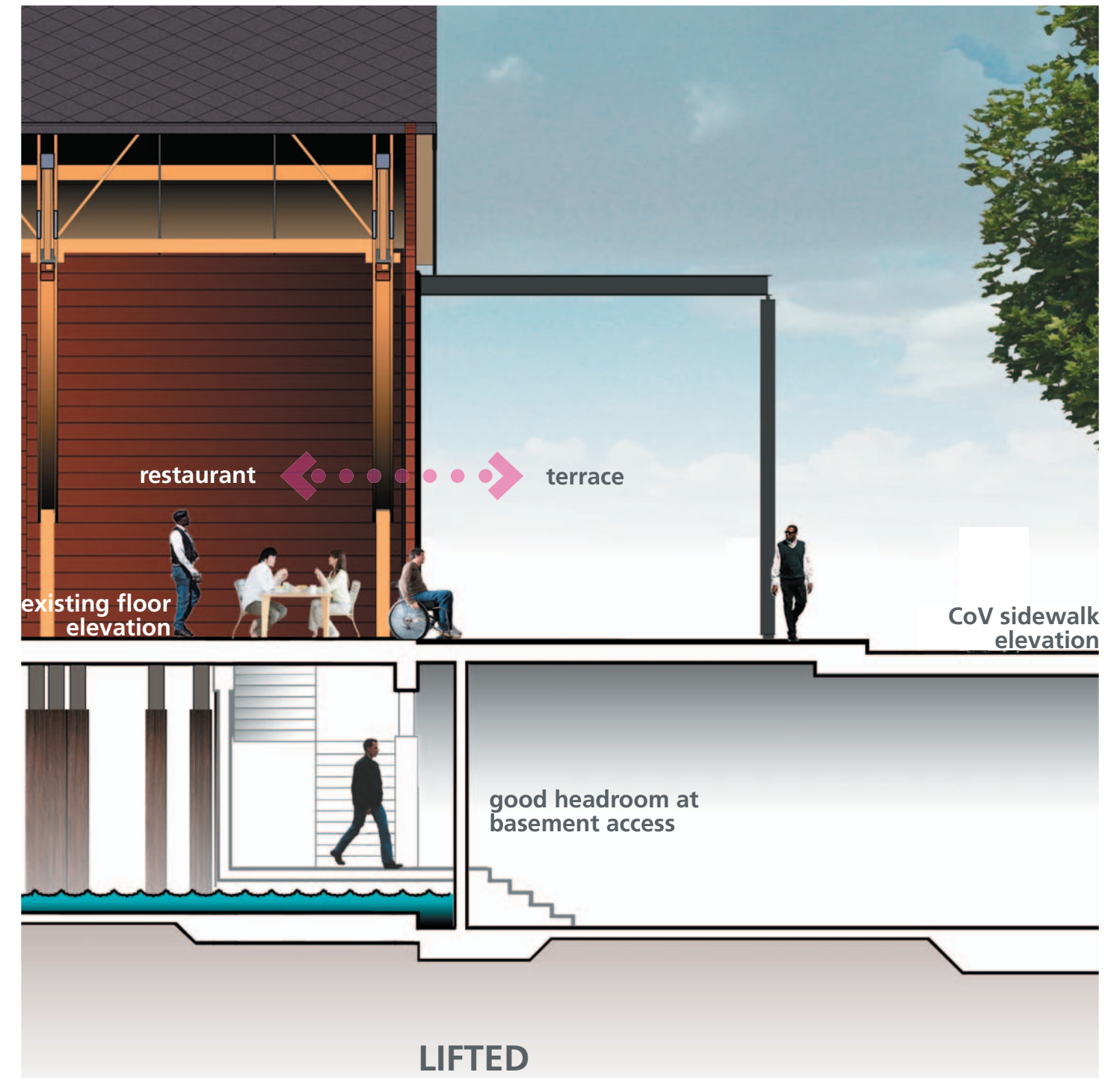
NOT LIFTED



LIFTED



no accessible relationship between interior and exterior of building



accessible relationship between interior and exterior of building

BUDGET COMPARISON

Costs

The budget comparison follows the format contained in Purchase Order #1 dated 10 January 2008. The intent is to provide an apple to apples comparison of order of magnitude costs for raising the Salt Building versus leaving the building buried at its current elevation.

Lifting

Unknown at the time the Purchase Order was issued were the design parameters of the concrete slab located in the piled basement and the underlying soil-bearing capacity. When the original cost estimate was prepared, the assumption was that the building could be raised by jacking it from off of the existing concrete slab located in the piled basement.

A meeting was held with the COV, Stantec, and Levelton on 15 January 2008 where SBRC was advised that the concrete slab in the piled basement had no additional load capacity and therefore, jacking from off of the concrete slab would cause extensive damage to the slab. This would also be the case even if the existing concrete topping located on the existing main floor was removed to potentially reduce the weight of the entire building by half. At the suggestion of the COV, SBRC investigated whether it would be possible to lift the Salt building by jacking off of the piles rather than off of the slab in the piled basement. It was subsequently determined that jacking from off of the piles was possible although to do so would require the fabrication of steel clamps to be installed on the piles. The clamps would support steel W8 beams that would provide an elevated base from which the jacking could be performed. It must be noted that these particular materials would have to be placed into the piled basement as they would be in addition to lifting materials that have already been placed under the Salt Building. While the cost of jacking from off of the piles is only a minimal increase in comparison to jacking from off the concrete slab, the fabrication, installation, and subsequent removal of the clamps and steel beams after the building is lowered presents an increase in cost. This cost information is shown in Option A.

Pile Extension

A practical solution to extending the piles was developed based on a knife-plate connection that would be placed into slots cut in the pile tops. This approach allows the following advantages:

1. installation with minimum headroom requirements
2. continuity and stability of the piles
3. flexibility with respect to varying diameters of piles
4. potential for equal bearing on all piles by trimming pile tops level
5. elegant structural expression detail of steel pipe pile extension fixed to knife plate

Seismic Upgrade

Seismic requirements dictate that the Salt Building incorporate seismic braces below the main floor level in order that loads from the structure located above the piles may be transferred to the perimeter retaining walls that have been put in place to support the future street and sidewalk construction that will surround the building.

Analysis determines that both options, i.e. *Option A: Building is Lifted* and *Option B: Building is Not Lifted*, require that the existing concrete floor topping slab located on the main floor of the building be removed. This is necessary in order that satisfactory connections may be incorporated into the seismic design to realize the required transfer of lateral forces from the building structure to a diaphragm located at the main floor level and down to the piles and over to the perimeter retaining walls.

The braces installed will be the same for both *Option A: Building is Lifted* and *Option B: Building is Not Lifted*. However, Option A will require that a few more braces be installed to compensate for the increase in lateral forces as the building is raised. Therefore, the cost of removing the existing main floor concrete topping slab is common to both options and was not contemplated in the original renovation proposal.

SALT BUILDING RESTORATION CORP.

1	Salt Building: Order of Magnitude Budget Comparison	1/21/08
2		
3		Budget Estimates
4	Option A: Building is lifted. Pile extension solution is approved	
5	Lift (additional requirements to lift from piles using clamps)*	\$ 191,500.00
6	A1: Cost of Pile Extension*	\$ 321,500.00
7	A2: Cost Impact on Renovation; Perimeter skirt*	\$ 235,000.00
8	A3: Cost Impact on Renovation: Structure/Seismic *	\$ 554,000.00
9	Contractor's General Conditions / Fee*	\$ 203,490.00
10	Design (pile extension, perimeter skirt, additional seismic & basement conditions)**	\$ 96,000.00
11	Project Management	\$ 64,059.60
12	Subtotal 1	\$ 1,665,549.60
13	SBRC (admin, O/H, profit) 8%	\$ 133,243.97
14	Subtotal 2	\$ 1,798,793.57
15	Contingency 25%	\$ 449,698.39
16	Total Option A	\$ 2,248,491.96
17		
18		
19	Option B. Building is not lifted. No pile extension solution	
20	Cost of lifting materials placed under building***	\$ 120,000.00
21	Cost of Seismic (additional requirements)*	\$ 569,000.00
22	B2: Additional Cost/ Remediation of wood that will be below grade if building is not raised*	\$ 345,000.00
23	Contractor's General Conditions / Fee*	\$ 176,330.00
24	Design (remedial perimeter & basement conditions)**	\$ 88,000.00
25	Project Management	\$ 47,133.20
26	Subtotal 1	\$ 1,345,463.20
27	SBRC (admin, O/H, profit) 8%	\$ 107,637.06
28	Subtotal 2	\$ 1,453,100.26
29	Contingency 25%	\$ 363,275.06
30	Total Option B	\$ 1,816,375.32

31
32 * included in attached Haebler Group Budget Breakdown dated 21 January 2008

33 ** Design fees include consultants as follows:

34 *Prime Consultant Coordination*

35 *Architectural*

36 *Structural*

37 *Mechanical*

38 *Electrical*

39 *Environmental*

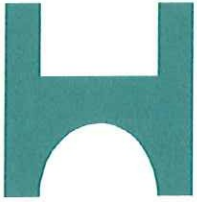
40 *Geotechnical*

41 *Sustainability*

42 *Heritage*

43 *** not included in attached Haebler Group Budget Breakdown dated 21 January 2008

44 GST not included



THE HAEBLER GROUP

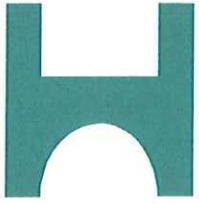
GENERAL CONTRACTORS CONSTRUCTION MANAGEMENT DESIGN-BUILD ENGINEERS
46 E. 3rd AVE., VANCOUVER, B.C. V5T 1C3 TEL: (604) 874-0777 FAX: (604) 874-0841 E-MAIL: info@haebler.ca

Salt Building

21 Jan 08

Option A: Building is lifted - Budget	\$
Remove Concrete topping -Quote from R-Good	64,000
Misc. labour for cleaning floor surfaces, etc	10,000
Remove Lumber on Floor	30,000
Plywood Floor Diaphragm	75,000
Seismic wood blocking between timber joist & anchorage	145,000
Seismic cross bracing at piles - 62 bays	230,000
Stainless steel screen skirt	70,000
Concrete retaining wall extension	75,000
Modify Wood Floor for entry stair	30,000
Perimeter Seismic structure/connect to basement wall	60,000
Temp. Jacks on piles due to inadequate raft slab - Quote from Somerset	191,500
Permanent steel pile extensions -Quote from Somerset	291,500
Basement lighting, Access equipment, Labour, etc	30,000
General Conditions	105,000
SubTotal	1,407,000
Contractor's Fee @ 7%	98,490
TOTAL	1,505,490

Note: These costs are best guess estimates based on conceptual drawings and information provided. Actual costs to be determined upon completion of Design.



THE HAEBLER GROUP

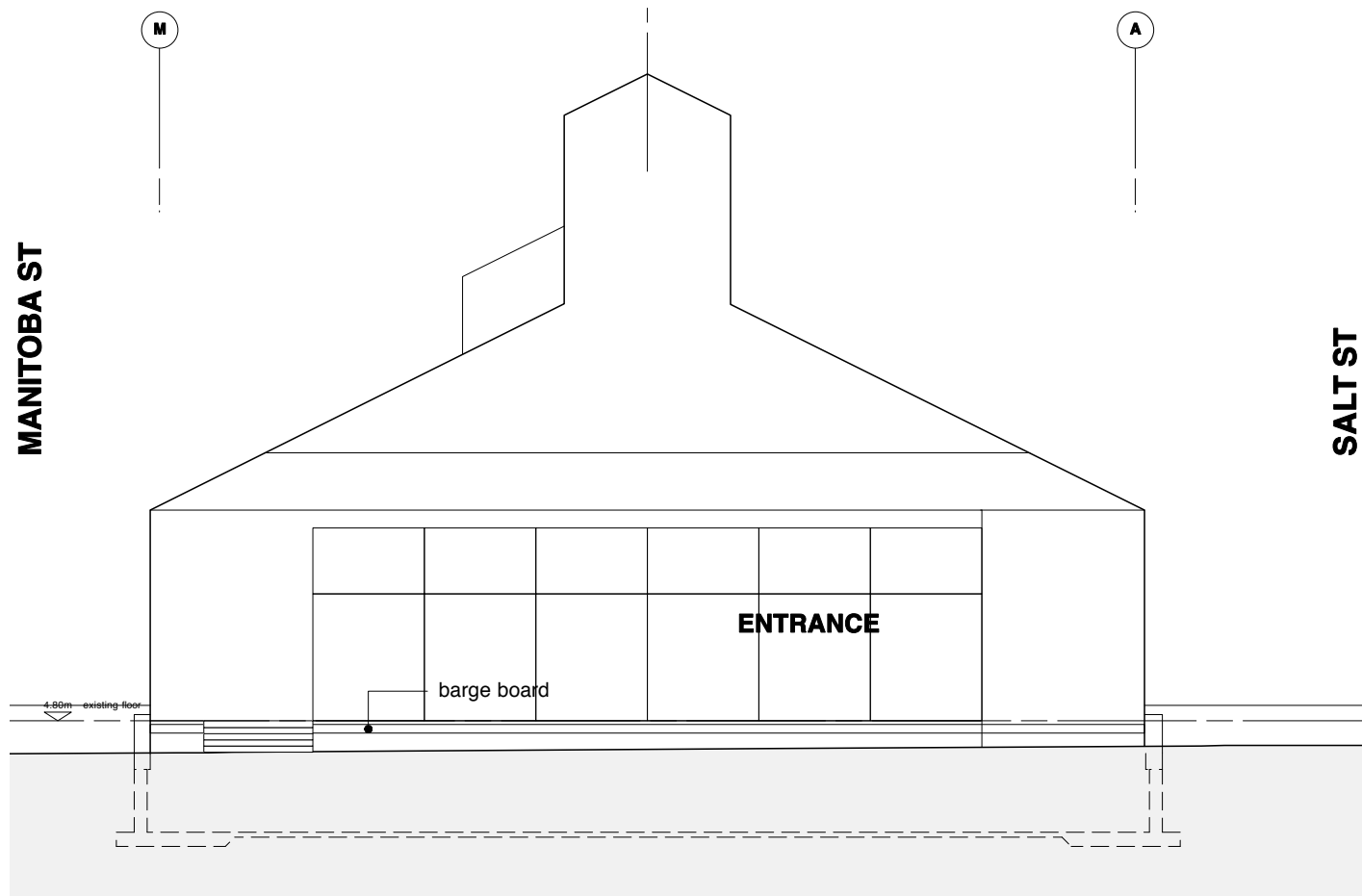
GENERAL CONTRACTORS CONSTRUCTION MANAGEMENT DESIGN-BUILD ENGINEERS
46 E. 3rd AVE., VANCOUVER, B.C. V5T 1C3 TEL: (604) 874-0777 FAX: (604) 874-0841 E-MAIL: info@haebler.ca

Salt Building

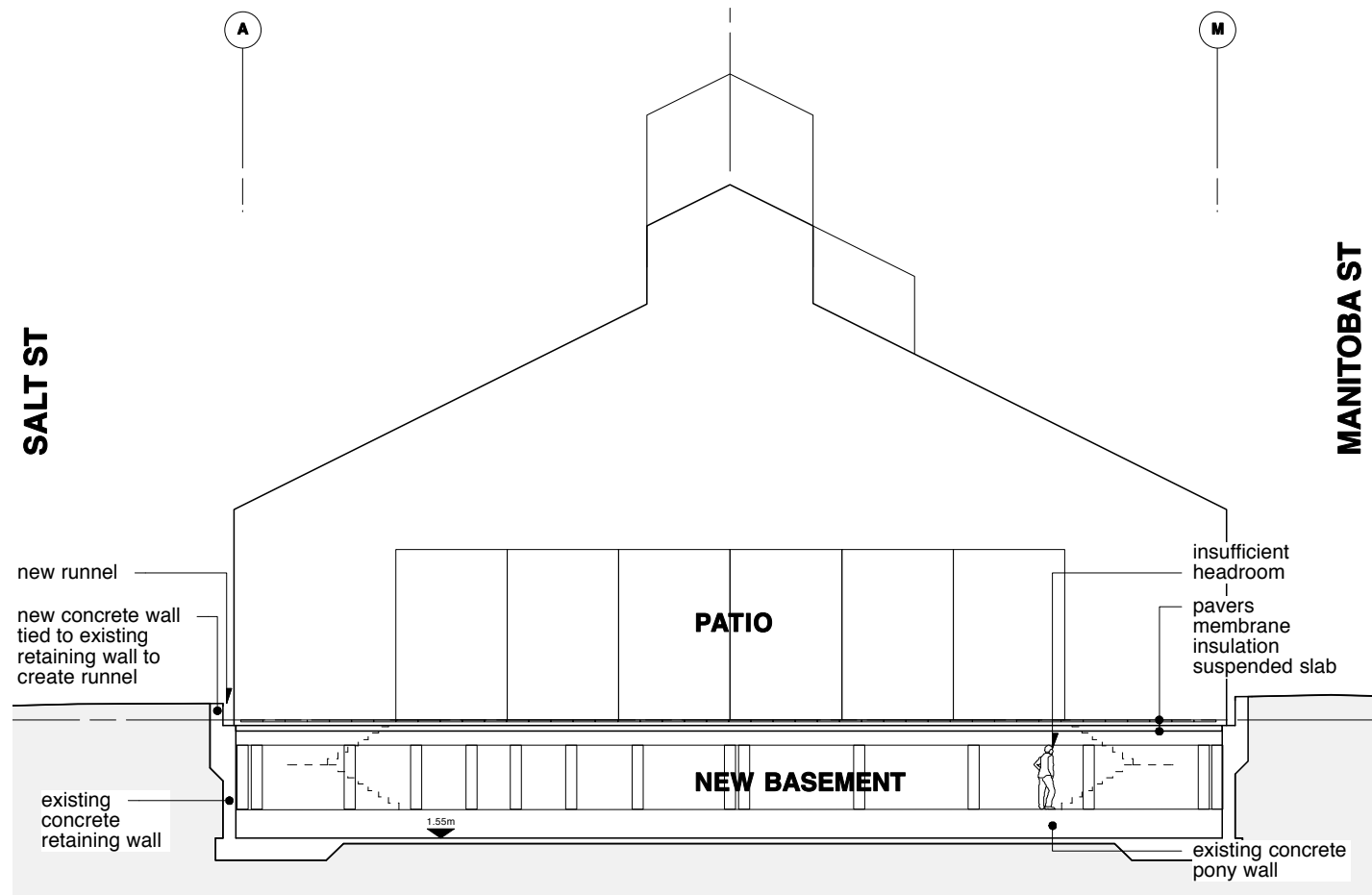
21 Jan 08

Option B: Building in not lifted - Budget	\$
Remove Concrete topping -Quote from R-Good	64,000
Misc. labour for cleaning floor surfaces, etc	10,000
Remove Lumber on Floor	30,000
Plywood Floor Diaphragm	75,000
Seismic wood blocking between timber joist & anchorage	145,000
Seismic cross bracing at piles - 28 bays	140,000
Excavate & Backfill for runnel wall	65,000
New Concrete Runnel wall	170,000
Modify Wood Floor for entry stair	30,000
Perimeter Seismic structure/connect to basement wall	75,000
Saw Cut Existing retaining wall	40,000
Construction of Mechanical wells	20,000
Mechanical Equipment for basement ventilation	20,000
Galvanized steel Barrier at Runnel	30,000
General Conditions	105,000
SubTotal	1,019,000
Contractor's Fee @ 7%	71,330
TOTAL	1,090,330

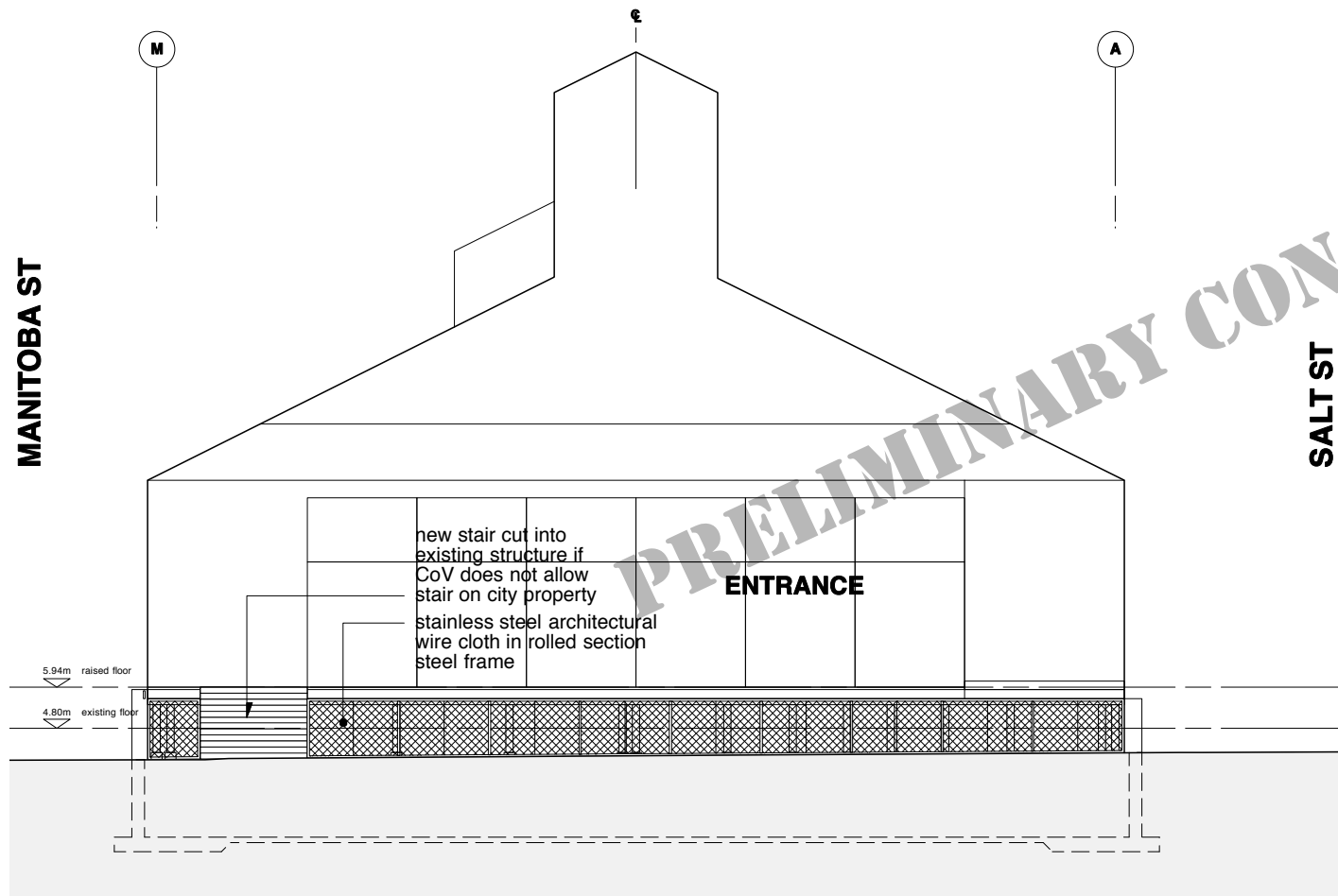
Note: These costs are best guess estimates based on conceptual drawings and information provided. Actual costs to be determined upon completion of Design.



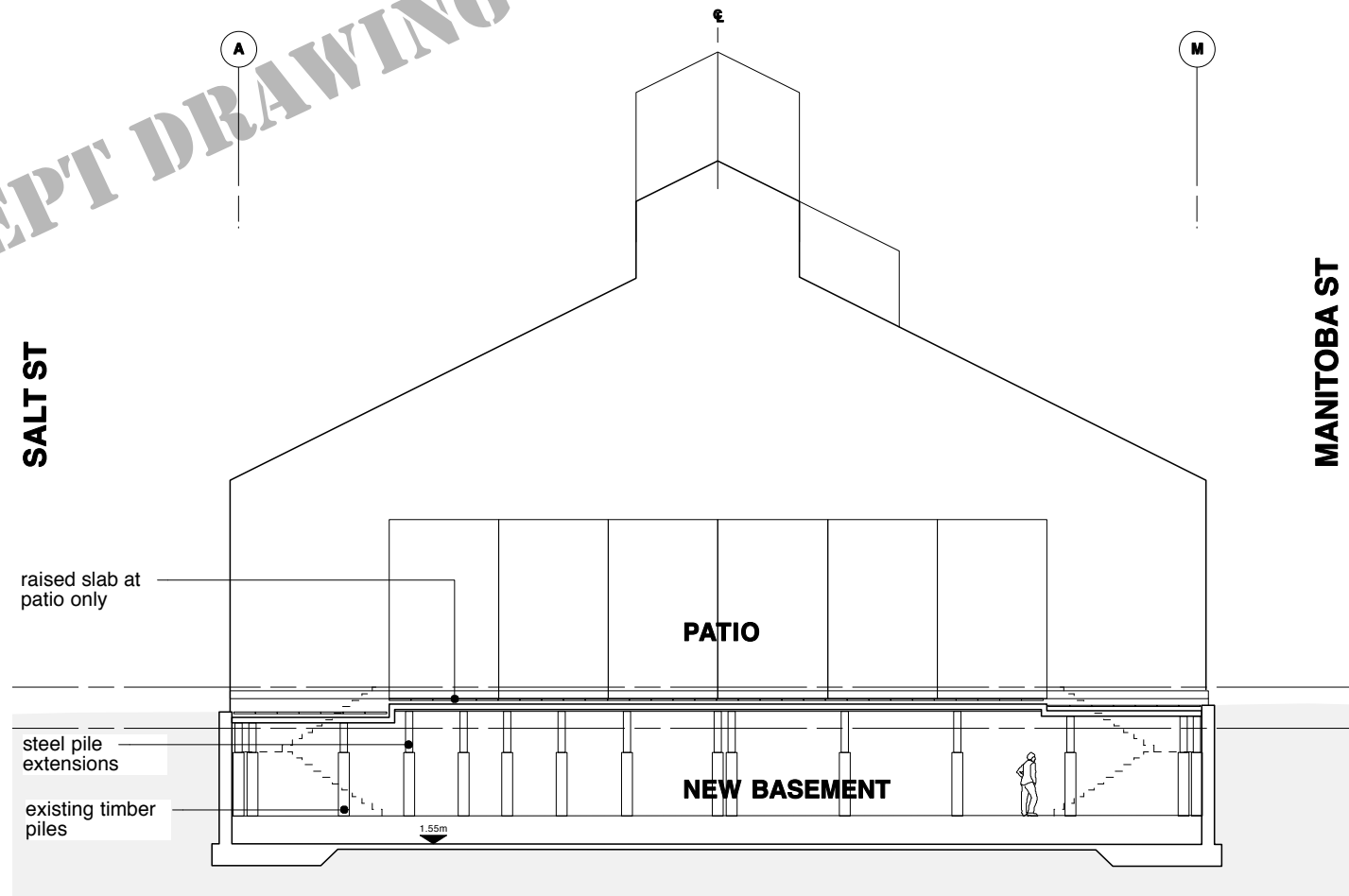
1a south elevation - remain in place
1 : 200



2a north elevation - remain in place
1 : 200

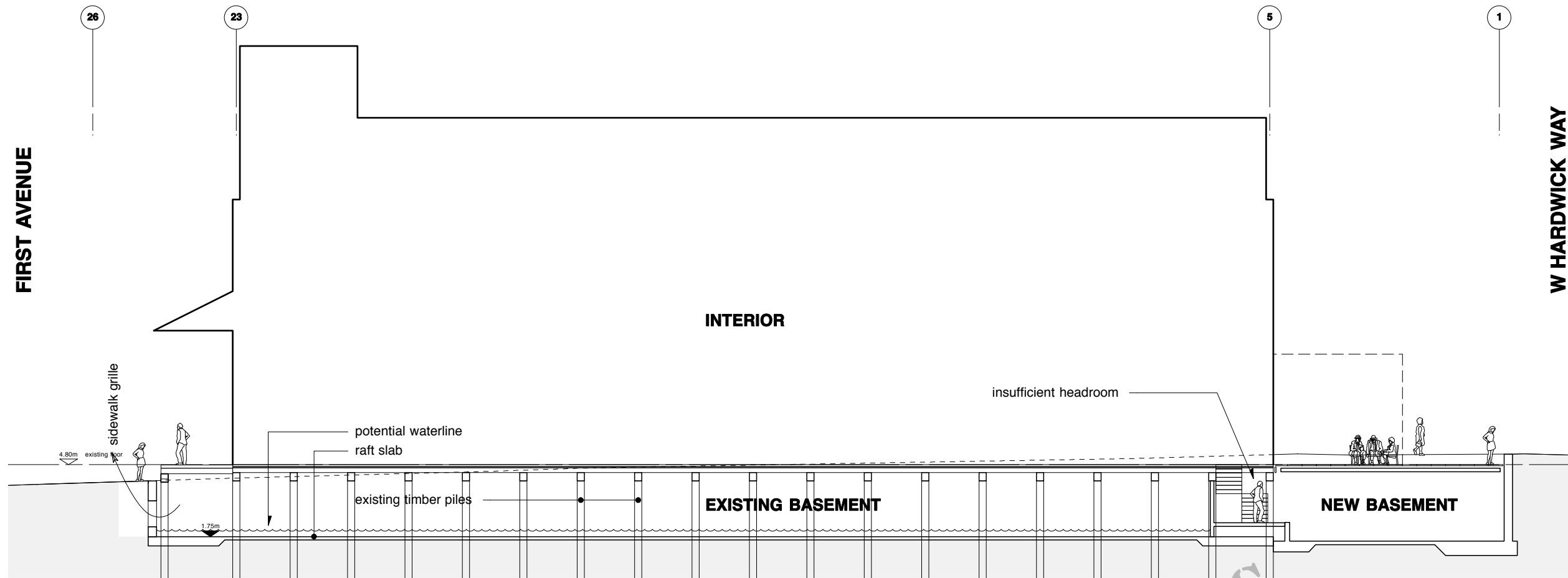


1b south elevation - raised
1 : 200

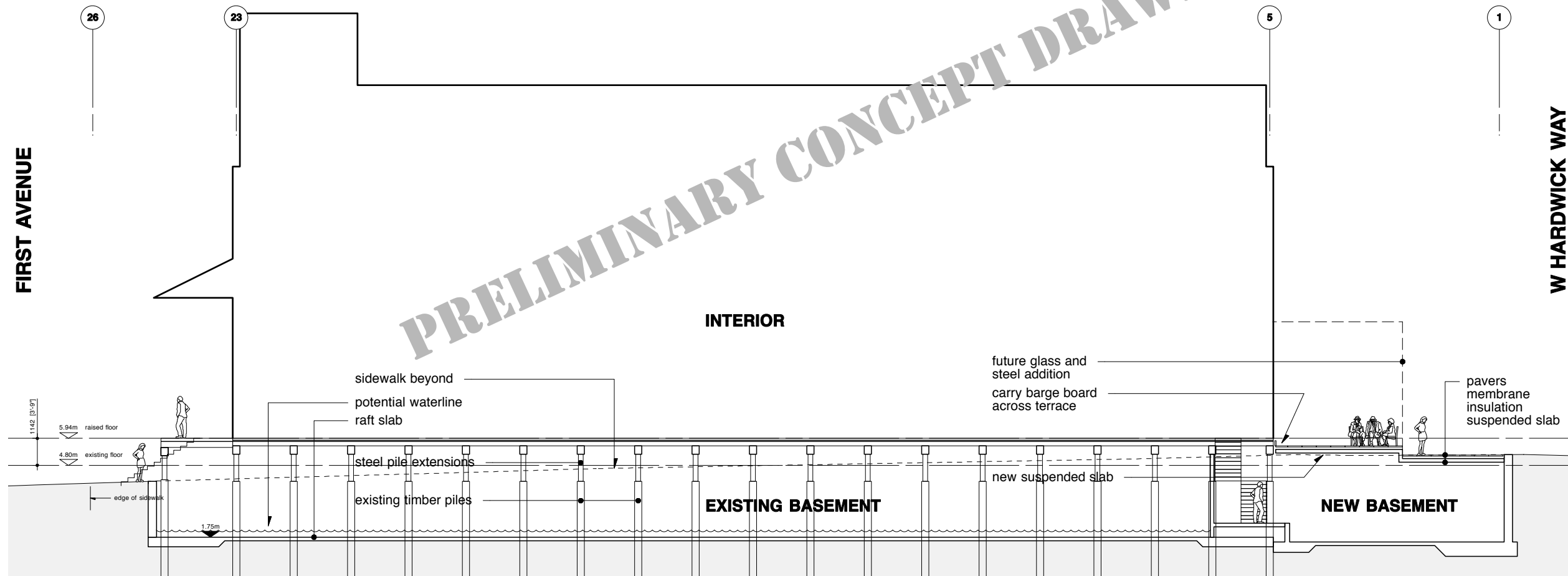


2b north elevation - raised
1 : 200

PRELIMINARY CONCEPT DRAWING

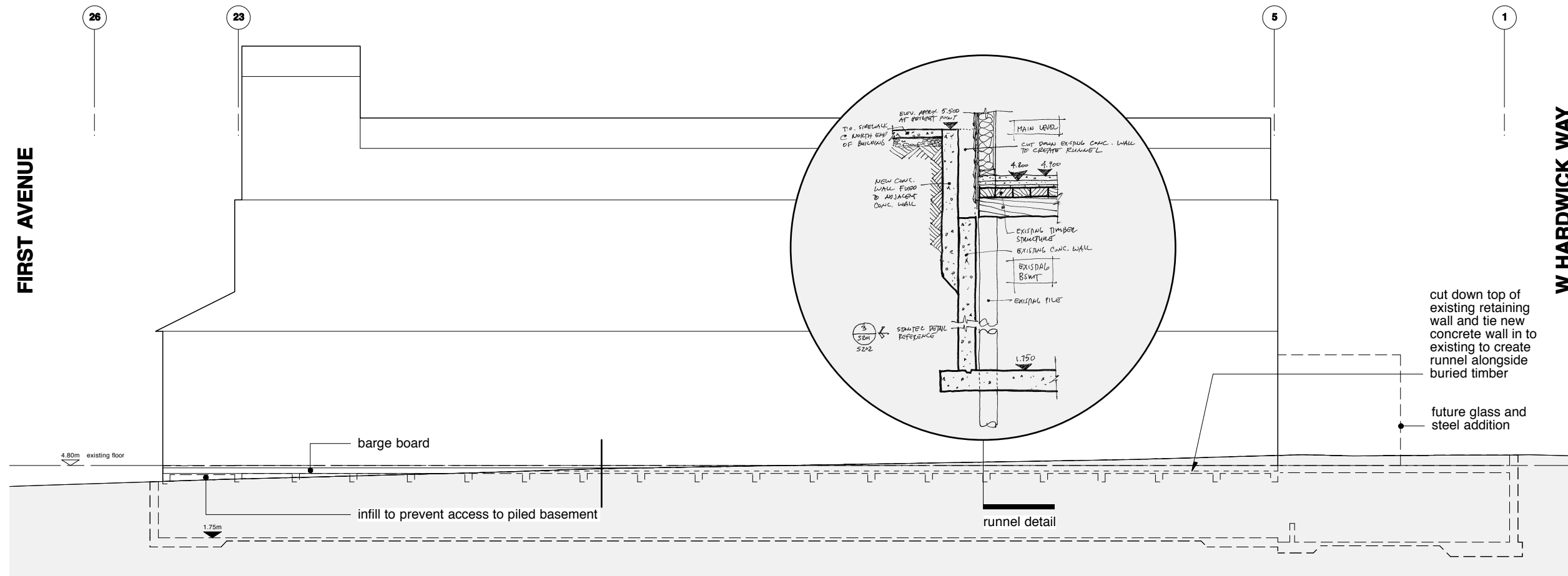


3a longitudinal section - remain in place
1 : 200

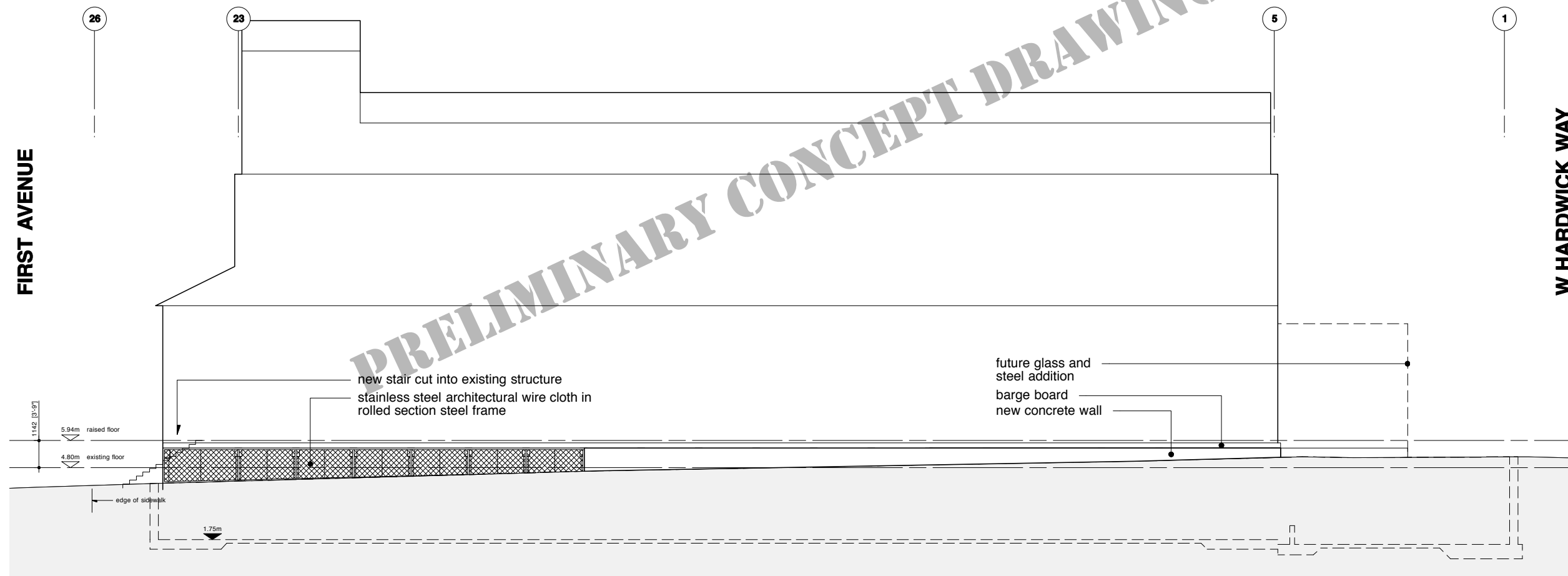


3b longitudinal section - raised
1 : 200

PRELIMINARY CONCEPT DRAWING



4a east elevation - remain in place nb: west elevation similar
1 : 200



4b east elevation - raised nb: west elevation similar
1 : 200

PRELIMINARY CONCEPT DRAWING

SCHEDULE IMPACT

Schedule

The extremely limited time made available for preparation of this report, particularly given the added challenge to determine how the building could be lifted by jacking from off of the piles, did not permit as detailed a review of the schedule as would have been liked.

A very preliminary estimate of the impacts on the schedules presented in the renovation proposal and in the original lift proposal that would be a direct result of lifting the building by jacking from off of the piles, incorporating extension of the piles, related additional seismic upgrade work and the addition of the perimeter skirt are as follows:

1. Lifting Building

- Additional prep work needed by Nickels	1 week
- Shop Drawing Reviews	1 week
- Fabrication of Clamps	3 weeks
- Installation of Clamps	3 weeks
- Lift Building	0 weeks
- Lower Building	0 weeks
- Remove Clamps and Demobilize	1 week
Total	9 weeks additional

2. Pile Extension

- Shop Drawing Reviews	1 week
- Fabricate Connections and Extensions	2 weeks
- Install Extensions	6 weeks*
- Install Lag Bolts into Cap Beams	1 week
Total	10 weeks additional

** It may be possible to reduce this item to 3 weeks*

3. Additional Seismic Upgrade Work

- Hazmat Removal Floor Slab Only	1.5 weeks
- Concrete Topping Removal	1.5 weeks
- Seismic Upgrade Interior Structure	0 weeks**
-Seismic braces to perimeter walls	0 weeks**
Total	3 weeks additional

4. Perimeter Skirt

- Install Perimeter Skirt	0 weeks**
---------------------------	-----------

*** It is anticipated that these items can be completed within the time allotted in the original renovation schedule. This will need to be reviewed in more detail and verified.*

Schedule Summary

A very preliminary review of the schedule, as a result of the combination of the four items, indicate that the combined impact on the renovation and original lifting schedule would be in the order of 19 to 22 additional weeks.

However, we estimate that an early February start of the clamp fabrication and a potential overlap of activities associated with lifting the building and timely incorporation of the pile extension would only impact the work on the critical path such that the overall impact to the schedule would be in the order of 10 to 12 additional weeks