

VISITABILITY PROTOTYPES STUDY

SUMMARY

The purpose of this study is to explore potential impacts of visitability (accessibility) requirements on a 3-5 unit small scale rowhouse building that is elevated above the public sidewalk. Standards for visitability include a no-step entry and ramped walkways sloping no more than 10% and providing access to a single visitable dwelling unit.

The following plans depict a rowhouse building that is level with the sidewalk, as well as scenarios where the rowhouse is 3, 4.5 and 6 feet above the sidewalk. Although the building is considered a multi-dwelling structure and the units are located on a single tax lot, the townhouse provisions of the Oregon Residential Specialty Code (ORSC) will be utilized. The site is assumed to be zoned RM2 or similar.

A range of options meeting these requirements were developed to illustrate various issues associated with visitability requirements. The comments below address impacts of visitability on project feasibility.

Main Entry & Pedestrian Standards

Meeting the Pedestrian Standards of 33.120.255 likely requires the use of both a ramp and a stair. Since the Main Entrance standards require a street-facing entrance within 8 feet of the longest street facing wall of the building, the westernmost entrance must serve as the main entry in this type of building. The main entry must be served by a pedestrian connection of limited length; using the ramp for this

connection exceeds the standard in most instances. Using the south yard as a "courtyard" main entry is an possibility, but the minimum courtyard width of 15 ft required by 33.120.231.C.2 is a large space compared to the size of the lot.

ORSC Ramp Requirements

Section R311.8 of the ORSC addresses ramps that serve the egress doors of units, and requires them to be maximum 1:12 slope with. If this standard were applied to the ramps proposed in these schemes, they would occupy more space on site than what is shown. While the method for determining whether a ramp "serves" an egress door is not prescribed, consultations with two City plans examiners revealed that both would consider any ramp located within the immediate vicinity of the unit entry door to be "serving" that door. Clarification of when and how this standard applies is critical to ensure the proposed zoning code is coordinated with the ORSC.

Ramp Near Property Lines

A major concern for feasibility will be any excavation required near property lines, such as is required for the "side" ramp configurations. Ramp excavations that have the potential to undermine building footings, walking surfaces, or other features on adjacent properties will require shoring for excavation and become highly infeasible, depending on local soil conditions. Excavation depths of 3-5 feet within a foot or two of a property line are reasonable, since most adjacent properties will not have structures closer than 3-5 feet to the property line. This allows for a 1:1 angle of repose for soil between the excavation an adjacent structure. However, deeper excavations may prove to be problematic.

Site Plan Configuration

Generally, the impact of visibility requirements (beyond the cost of a ramp) on a site 3 feet above the sidewalk are minimal. As the grade change approaches 4.5 ft, the requirements become more challenging, presenting developers with a choice of utilizing a side ramp configuration which may pose excavation challenges, or a front ramp which will reduce the building footprint, increase the front setback and may lose a unit. Although row house widths on the east coast run as narrow as 12 feet, 17-18 feet is more ideal. In general, a ramp that can be accomplished in a single run across the front of the lot, while still accommodating a stair will have minimal impact on project feasibility (30-35 ft long ramp).

Construction Cost Implications

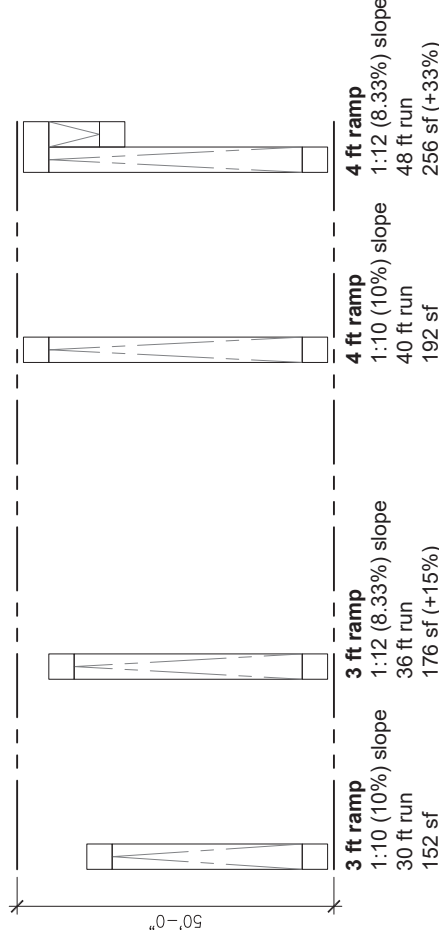
For smaller buildings, the prospective cost of a ramp will constitute a larger proportion of the total project cost than for a larger building. The table below is a comparison of ramp construction costs with building construction costs for the 3 scenarios:

Scenario	Ramp Cost	Building Cost	Ramp Portion
30' ramp	\$30,000 +/-	@ \$160/sf = 953,600	3%
45' ramp	\$50,000 +/-	@ \$160/sf = 950,400	5%
60' ramp	\$82,000 +/-	@ \$160/sf = 950,400	9%

The possibility of shoring requirements may add considerable cost to longer ramps requiring deeper excavation. Therefore, costs for the longer ramps will be more sensitive to context than for shorter ones.

Ramp Slope

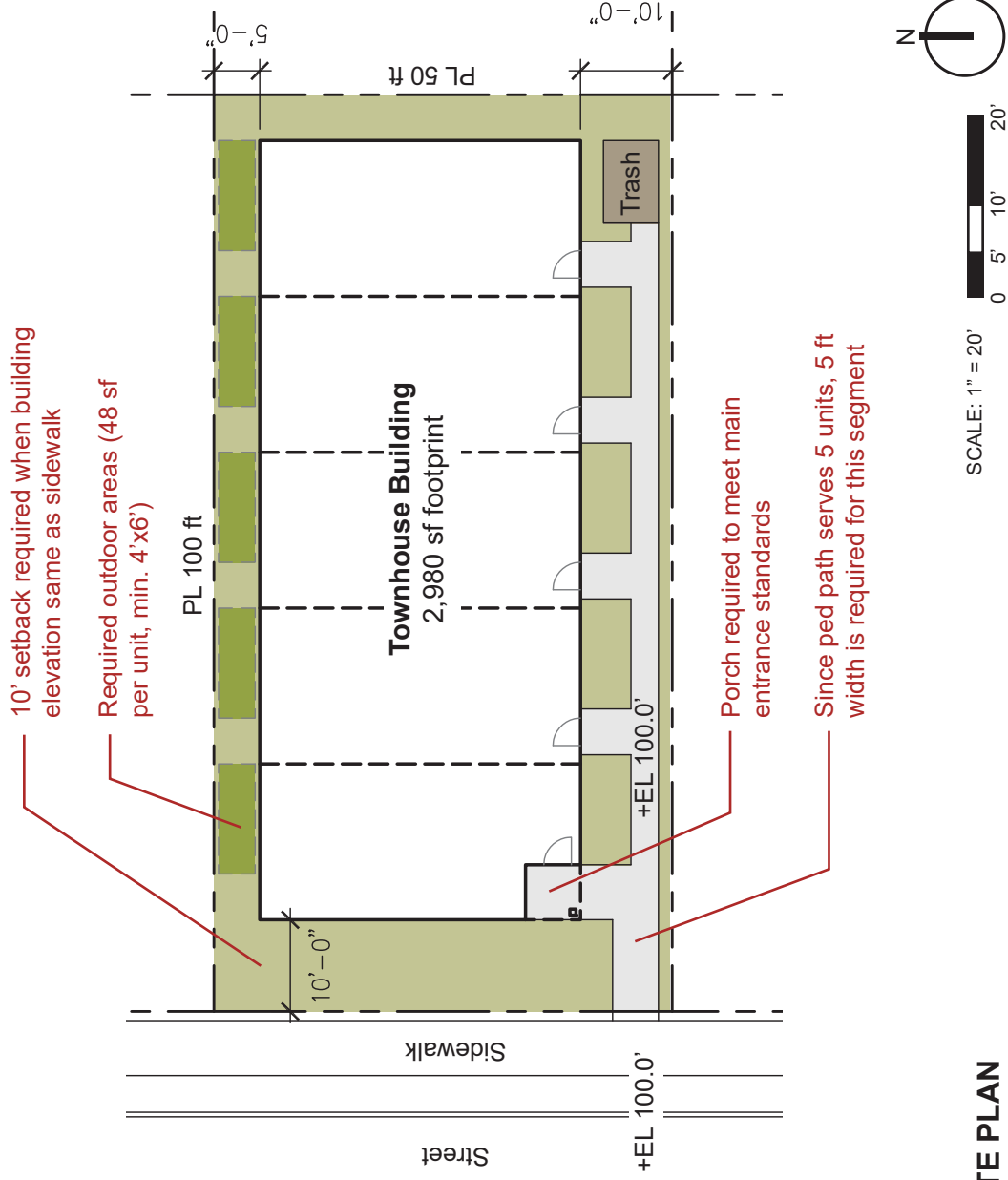
Although a 1:10 (10%) slope ramp is proposed for visibility, a 1:12 (8.3%) slope limitation is a much more common standard carried in the ORSC and the Oregon State Structural Specialty Code (commercial code). The difference in required site area between the two ramp slopes is illustrated in the diagram below.



On small sites where site area is at a premium, the additional space required for a 1:12 ramp instead of a 1:10 will create more challenges in site design. Once the ramp length is long enough to require a switchback ramp, the front setback and building footprint are significantly impacted.

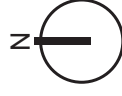
Conclusions

In general, visibility for sites 3-4 feet above grade seems reasonable to achieve. Sites beyond 3.5 ft above grade necessitate a switchback front ramp which starts to impact building area more significantly. Adding provisions to the pedestrian and main entry standards to remove constraints and avoid a redundant stair for these types for sites would make visibility easier to achieve. Reducing the required width for a courtyard entry on a small site to serve as a main entry could help with this. The proposed reduced front setback (from 10' to 5') for elevated lots helps these sites achieve development potential similar to flat sites, except when a front switchback ramp is proposed. Soil type and features on adjacent sites will highly affect the feasibility of any ramping or excavation work needed near property lines.



SITE PLAN

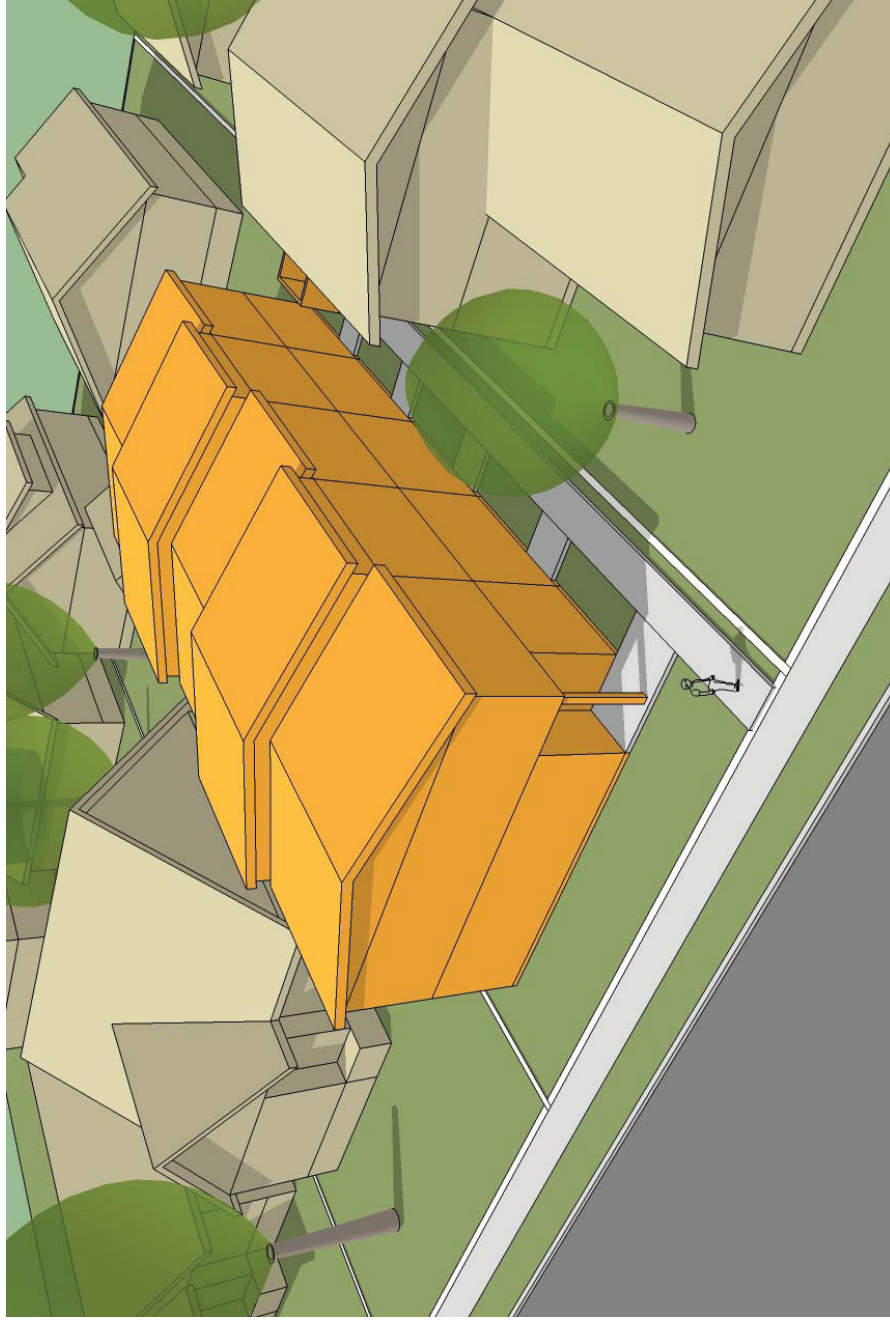
SCALE: 1" = 20'
0 5' 10' 20'



BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	0 ft
Building Coverage:	2,980 sf (60%)
Building Area:	5,960 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,550 sf (31%)
Paving Area:	480 sf (10%)

OPT 1 Baseline Building

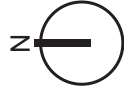
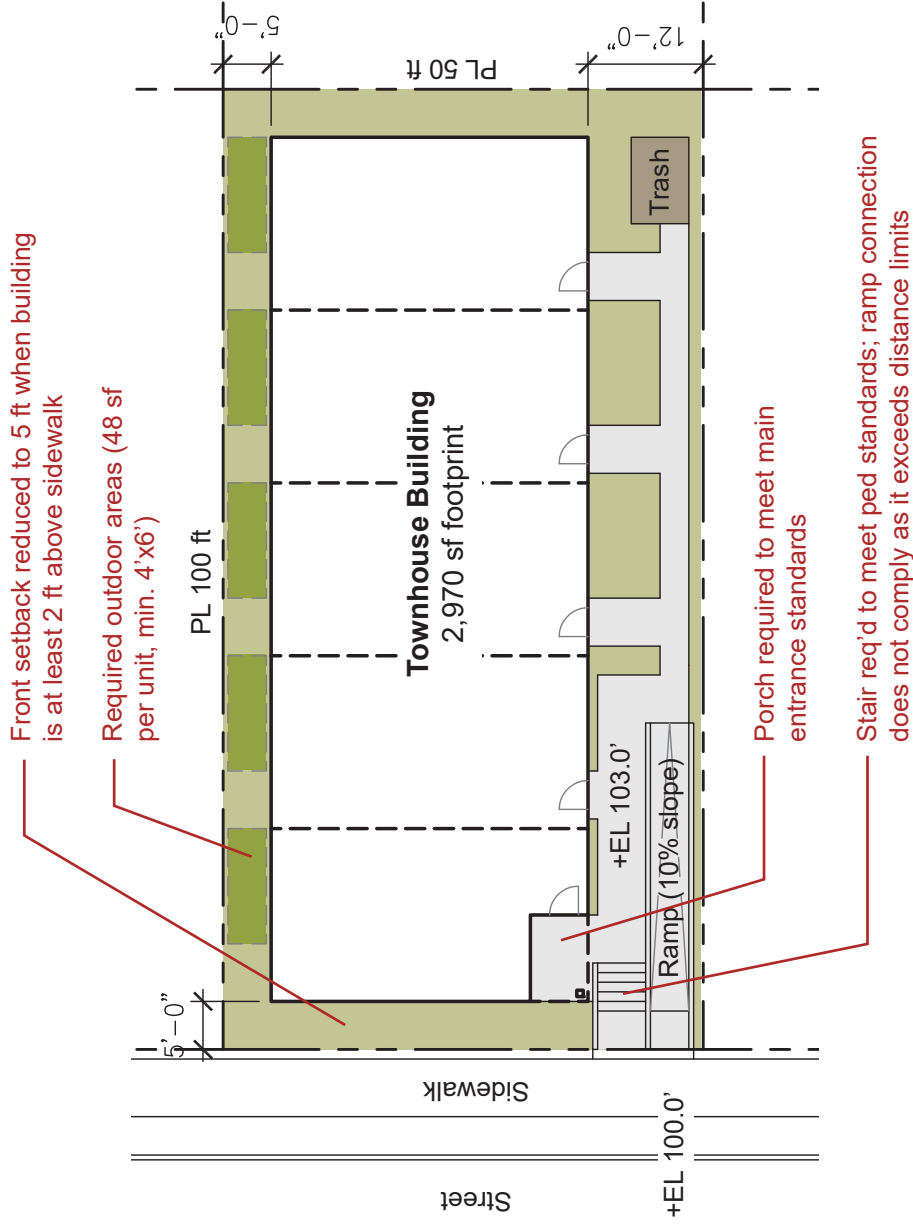


MASSING STUDY VIEW FROM SOUTHEAST

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	0 ft
Building Coverage:	2,980 sf (60%)
Building Area:	5,960 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,550 sf (31%)
Paving Area:	480 sf (10%)

OPT 1 Baseline Building

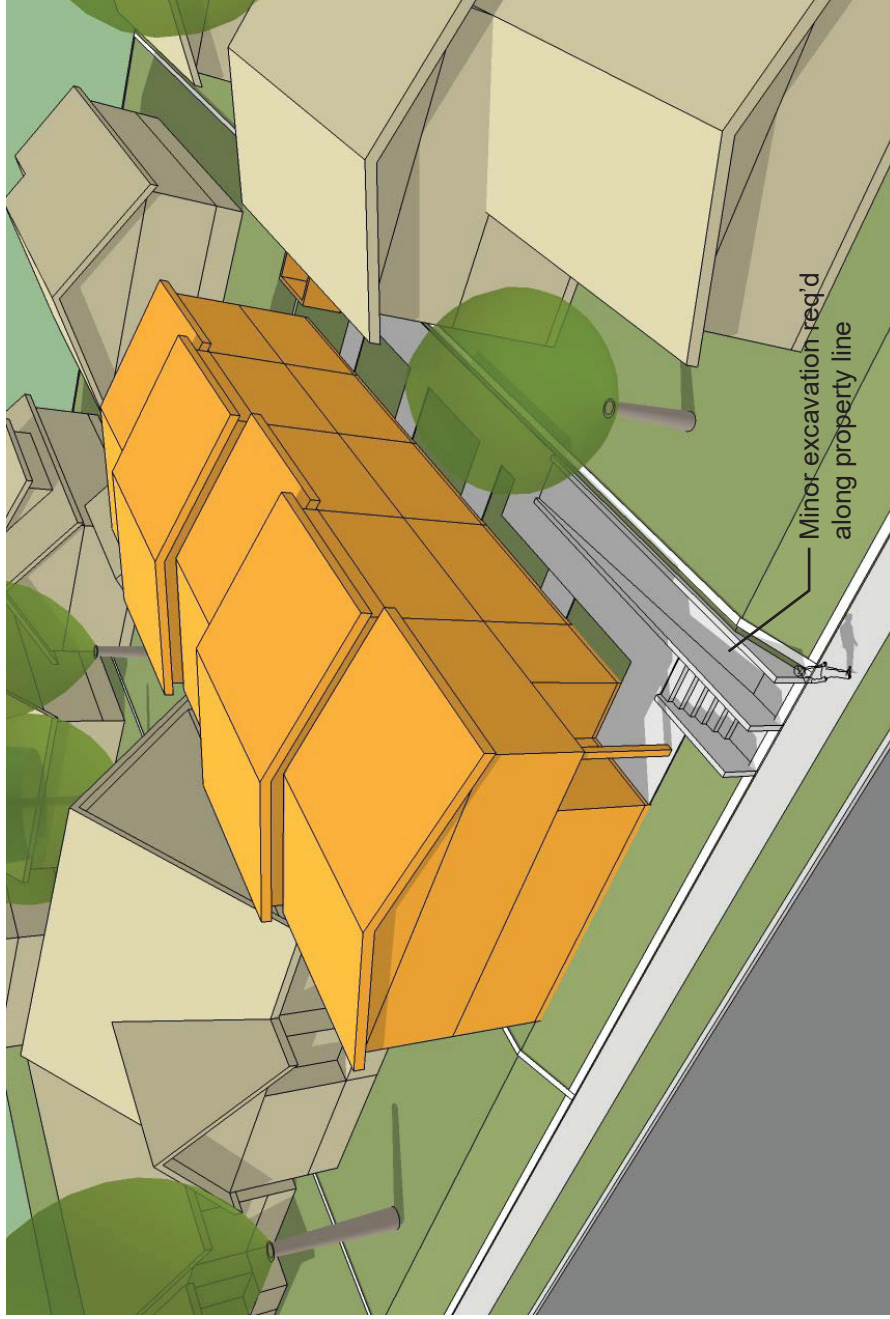


SITE PLAN

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	3 ft
Building Coverage:	2,970 sf (59%)
Building Area:	5,940 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,080 sf (22%)
Paving Area:	710 sf (14%)

OPT 3a Building elevated 3 ft w/ side ramp

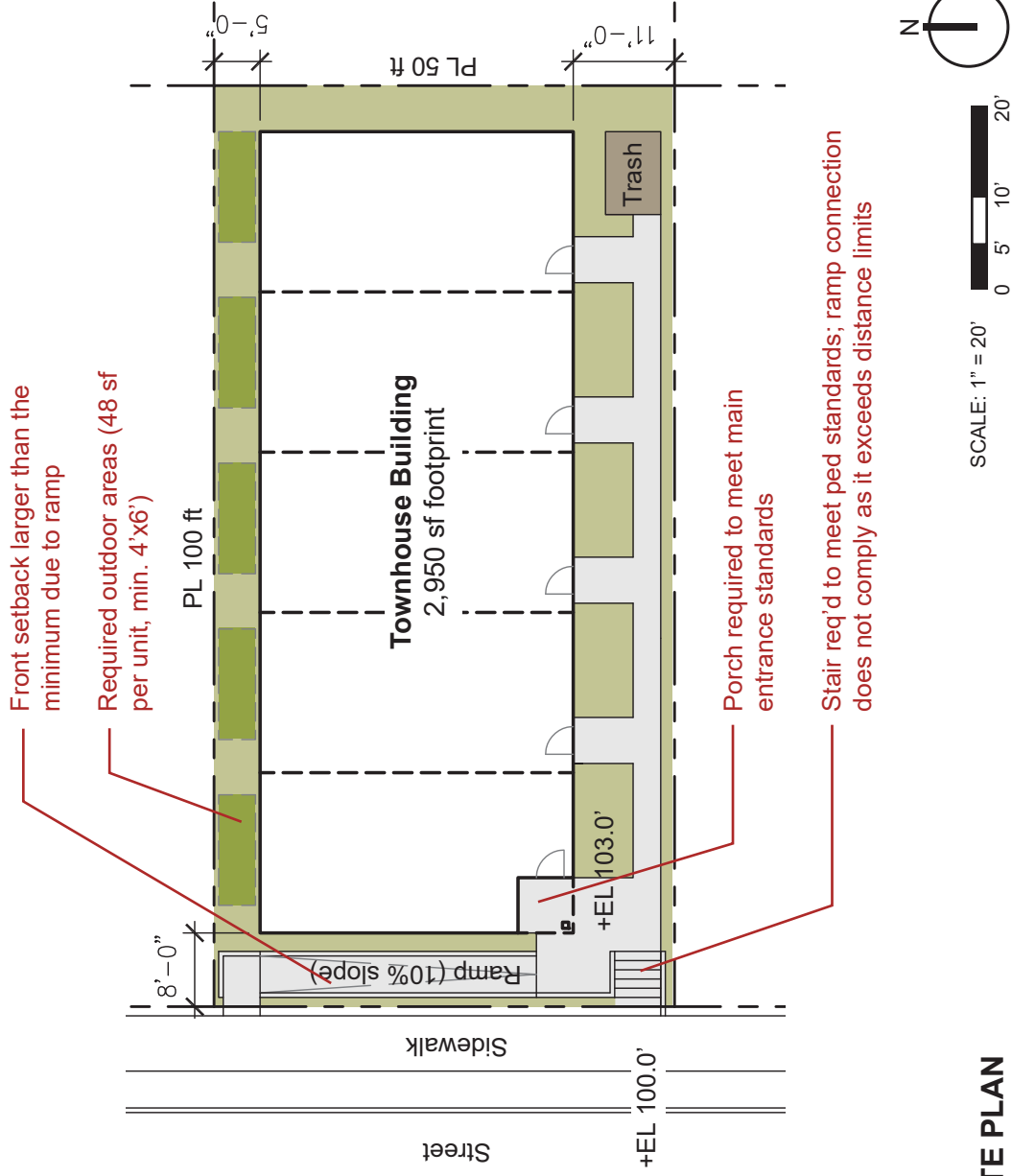


MASSING STUDY VIEW FROM SOUTHEAST

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	3 ft
Building Coverage:	2,970 sf (59%)
Building Area:	5,940 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,080 sf (22%)
Paving Area:	710 sf (14%)

OPT 3a Building elevated 3 ft w/ side ramp

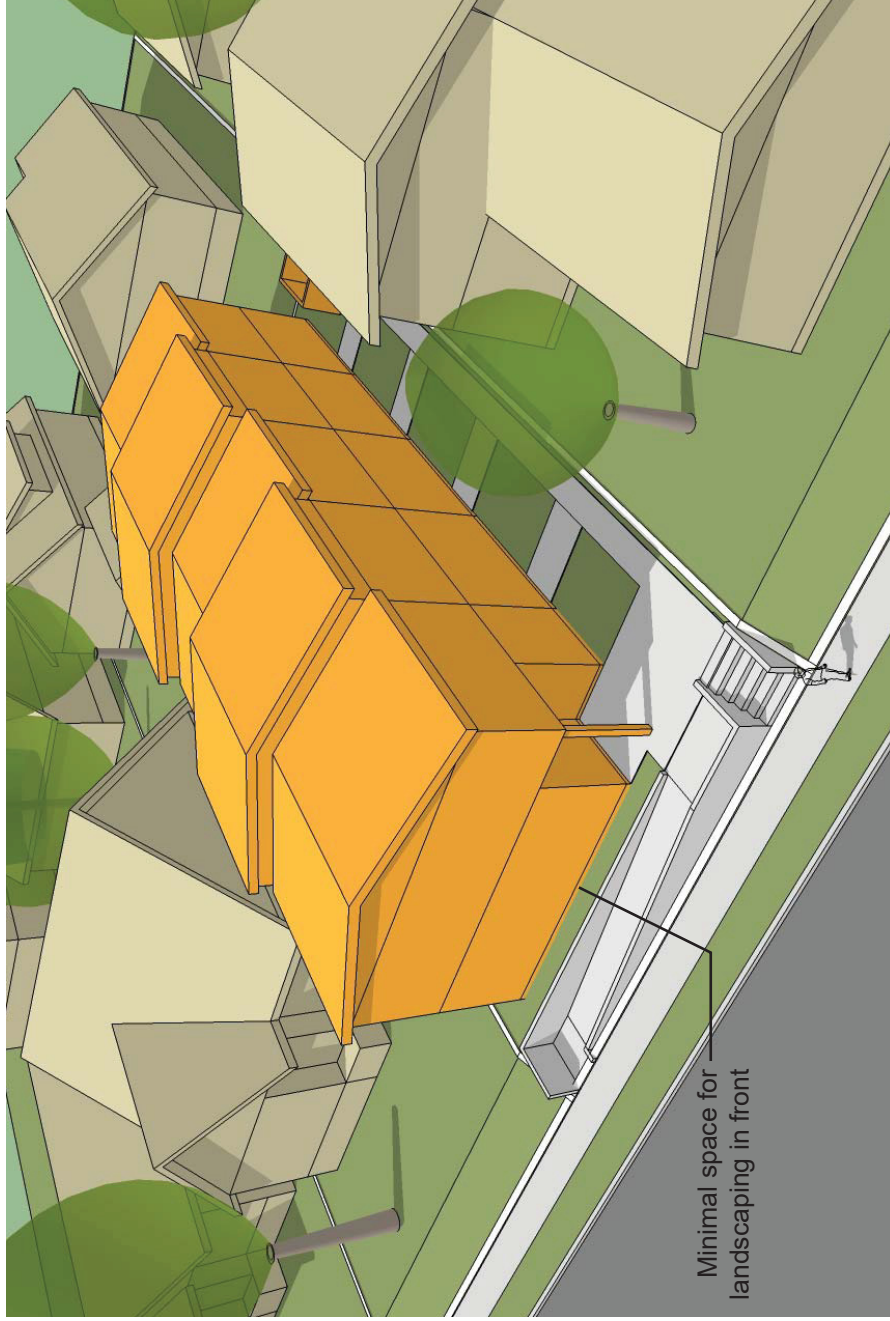


BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	3 ft
Building Coverage:	2,950 sf (59%)
Building Area:	5,900 sf (1.18:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,180 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,070 sf (21%)
Paving Area:	740 sf (15%)

SITE PLAN

OPT 3b Building elevated 3 ft w/ front ramp

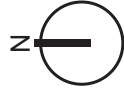
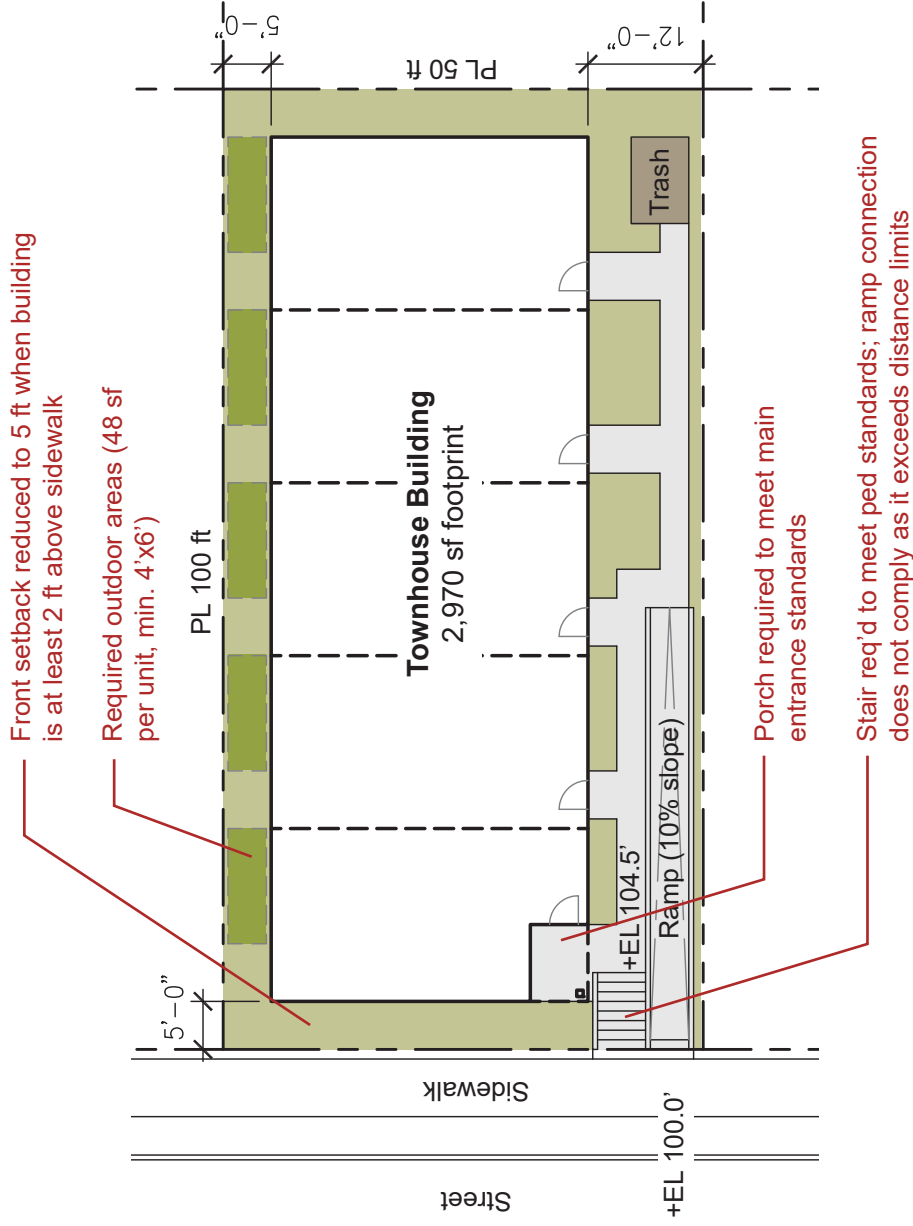


MASSING STUDY VIEW FROM SOUTHEAST

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	3 ft
Building Coverage:	2,950 sf (59%)
Building Area:	5,900 sf (1.18:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,180 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,070 sf (21%)
Paving Area:	740 sf (15%)

OPT 3b Building elevated 3 ft w/ front ramp



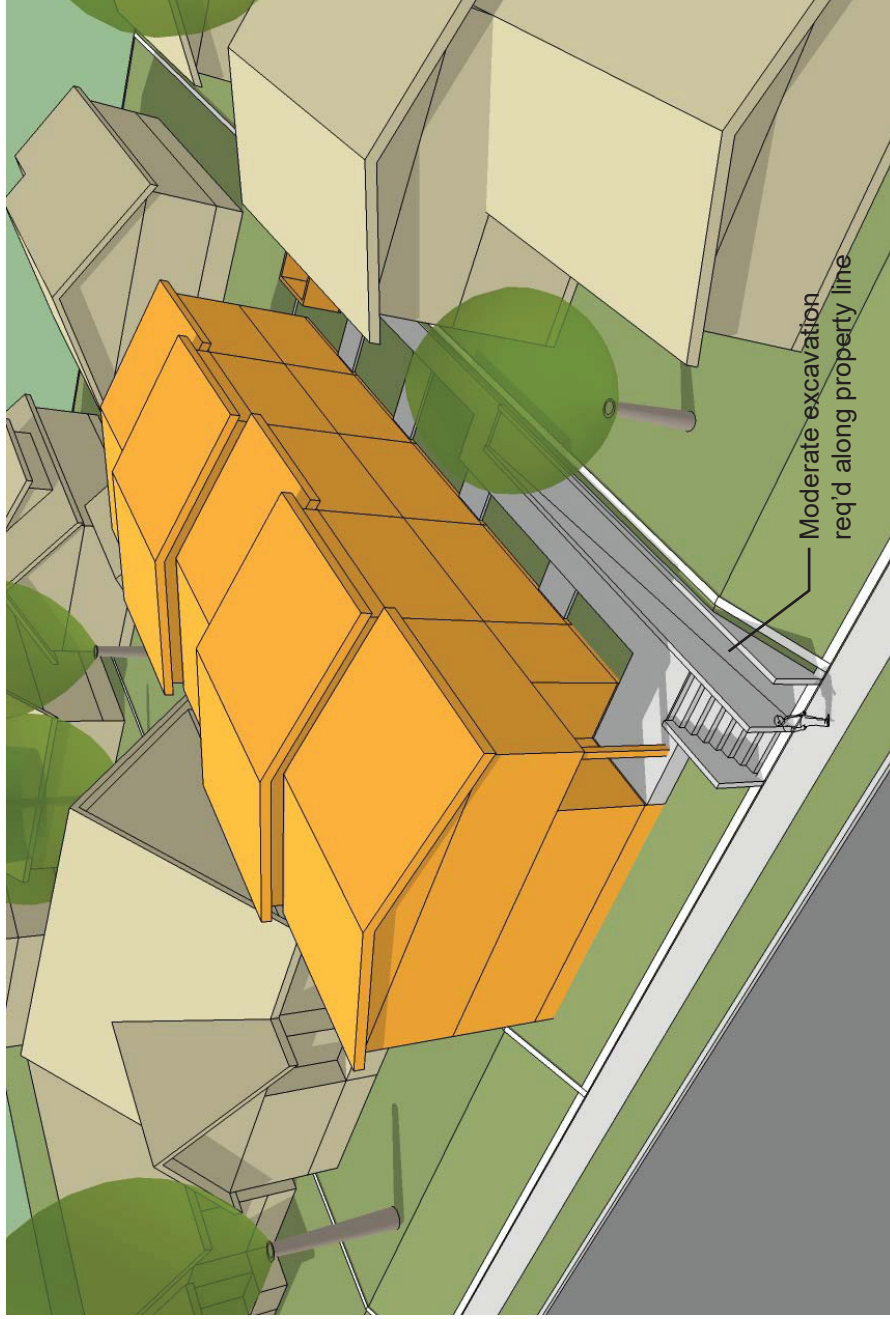
SCALE: 1" = 20'
0 5' 10' 20'

SITE PLAN

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	4.5 ft
Building Coverage:	2,970 sf (59%)
Building Area:	5,940 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,090 sf (22%)
Paving Area:	700 sf (15%)

OPT 4.5a Building elevated 4.5 ft w/ side ramp

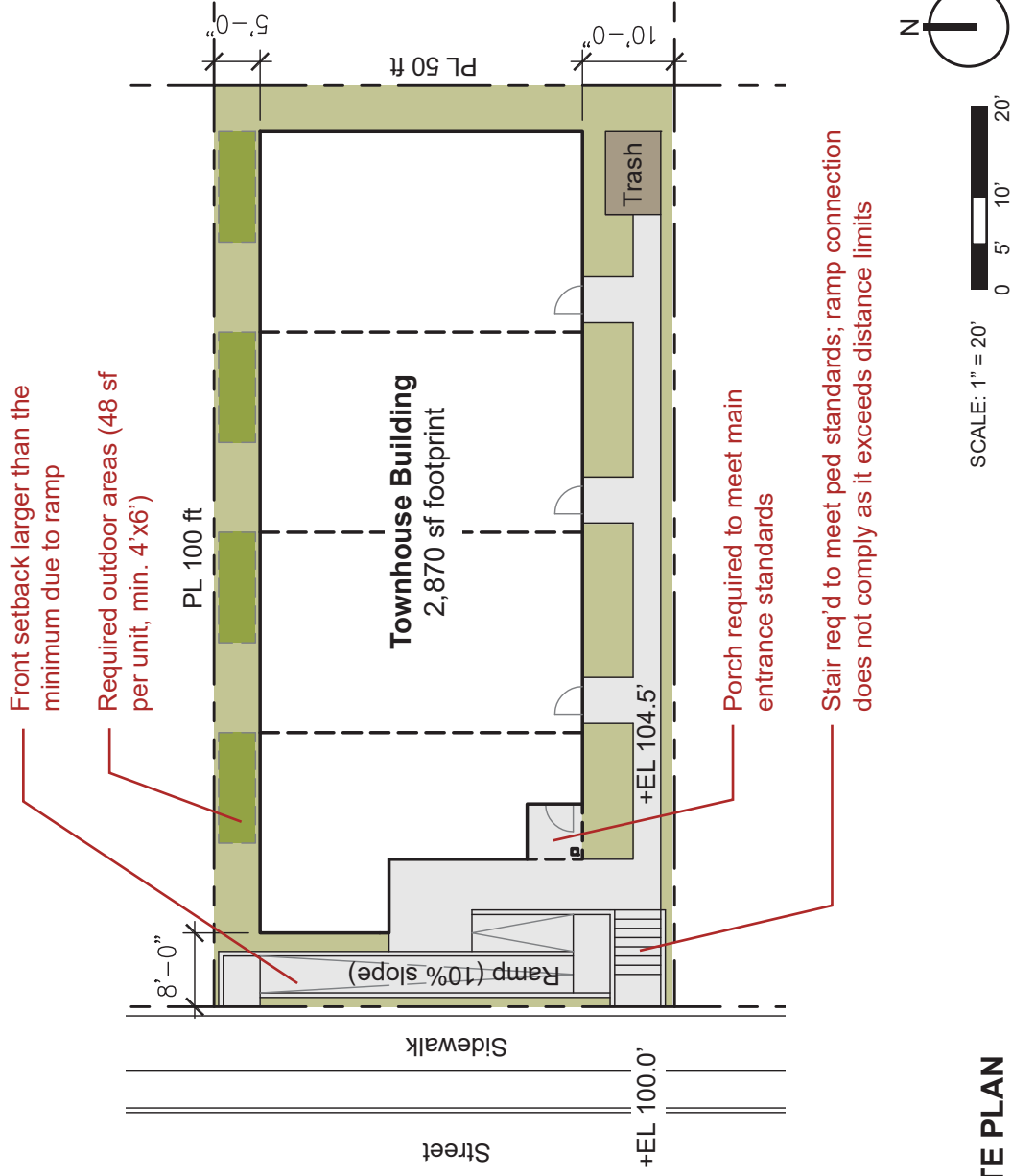


MASSING STUDY VIEW FROM SOUTHEAST

BUILDING SUMMARY

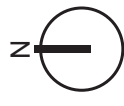
Site Area:	5,000 sf (50' x 100')
Site Grade Change:	4.5 ft
Building Coverage:	2,970 sf (59%)
Building Area:	5,940 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,090 sf (22%)
Paving Area:	700 sf (15%)

OPT 4.5a Building elevated 4.5 ft w/ side ramp



SITE PLAN

SCALE: 1" = 20'
0 5' 10' 20'

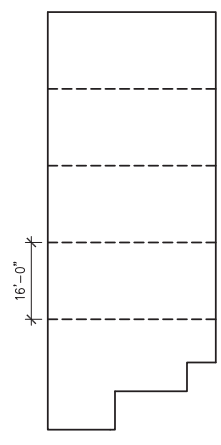


BUILDING SUMMARY

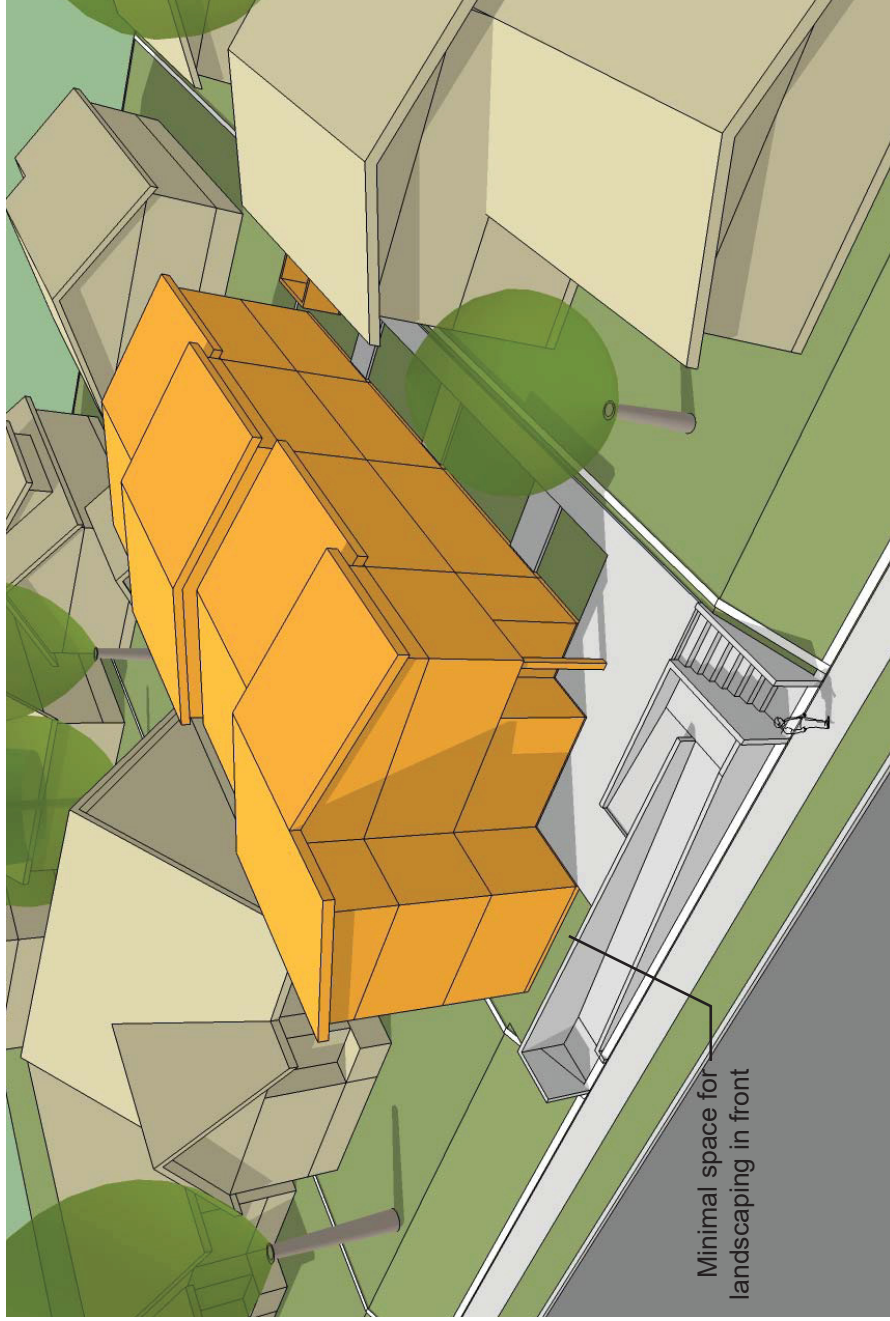
Site Area:	5,000 sf (50' x 100')
Site Grade Change:	4.5 ft
Building Coverage:	2,870 sf (57%)
Building Area:	5,740 sf (1.15:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	4 townhouses (1,435 sf ea.)
Req'd Outdoor Area:	48 sf per un x 4 = 192 sf
Landscape Area:	1,038 sf (21%)
Paving Area:	900 sf (18%)

NOTES:

1) Going to 5 units in this configuration will require sub-16 foot widths for rowhouses, which may be less than ideal.



OPT 4.5b Building elevated 4.5 ft w/ front ramp

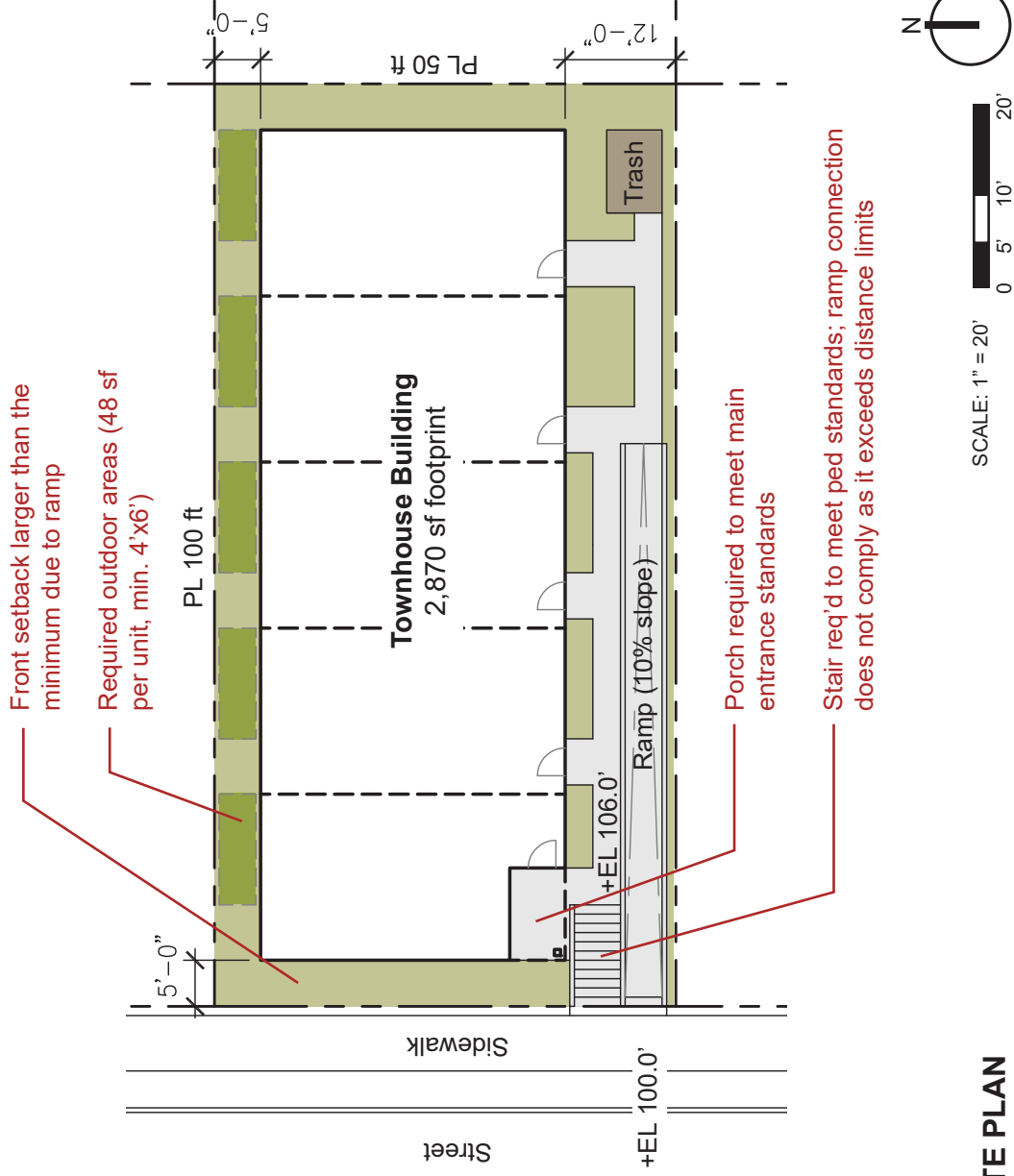


MASSING STUDY VIEW FROM SOUTHEAST

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	4.5 ft
Building Coverage:	2,870 sf (57%)
Building Area:	5,740 sf (1.15:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	4 townhouses (1,435 sf ea.)
Req'd Outdoor Area:	48 sf per un x 4 = 192 sf
Landscape Area:	1,038 sf (21%)
Paving Area:	900 sf (18%)

OPT 4.5b Building elevated 4.5 ft w/ front ramp



SITE PLAN

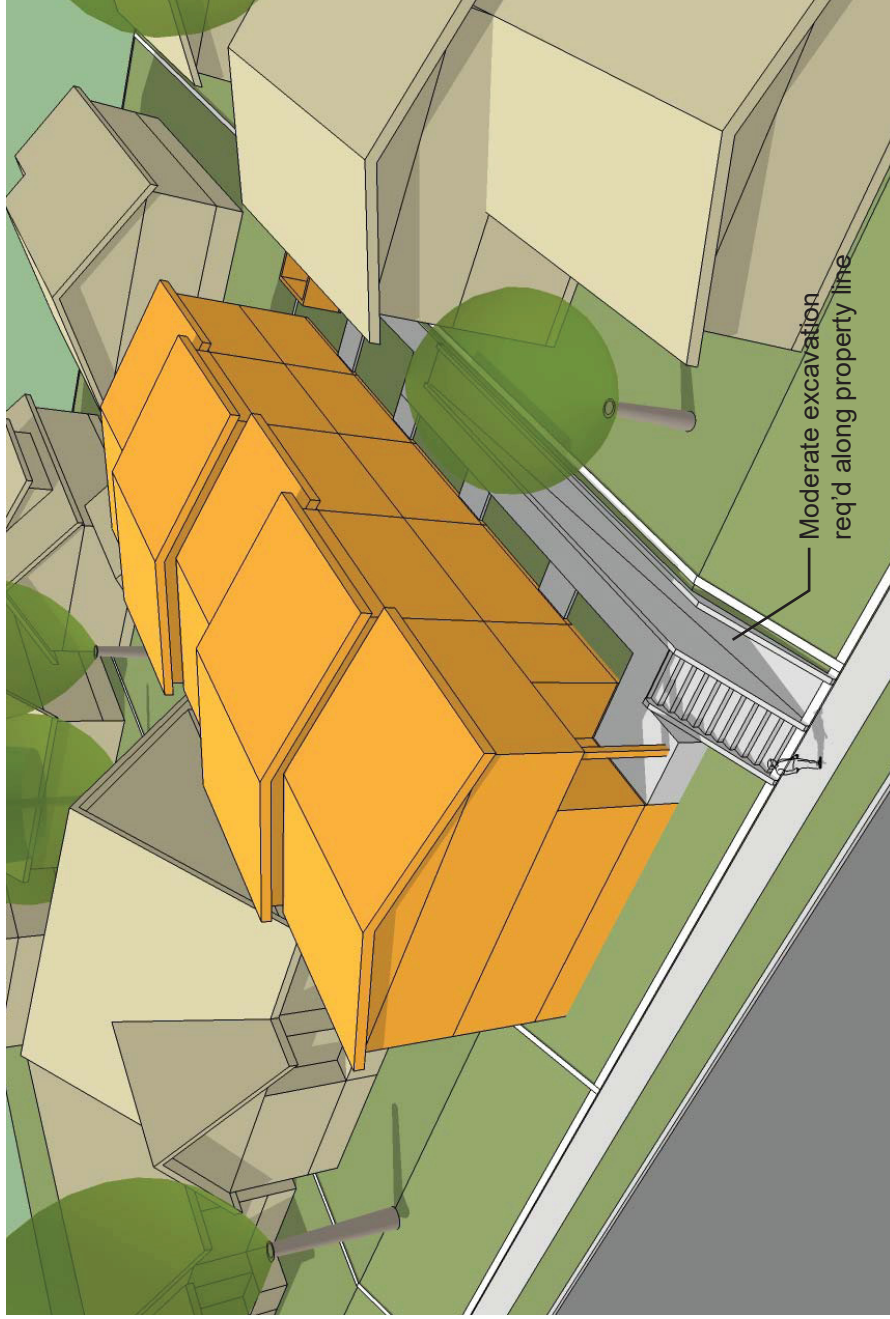
OPT 6a Building elevated 6 ft w/ side ramp

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	6 ft
Building Coverage:	2,970 sf (59%)
Building Area:	5,940 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,030 sf (21%)
Paving Area:	760 sf (18%)

NOTES:

- 1) Traversing 6ft of grade at 10% requires a 60 ft long ramp. In this scenario, a single run of ramp may be difficult for many wheelchair users to navigate without an intermediate landing.



MASSING STUDY VIEW FROM SOUTHEAST

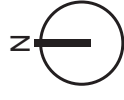
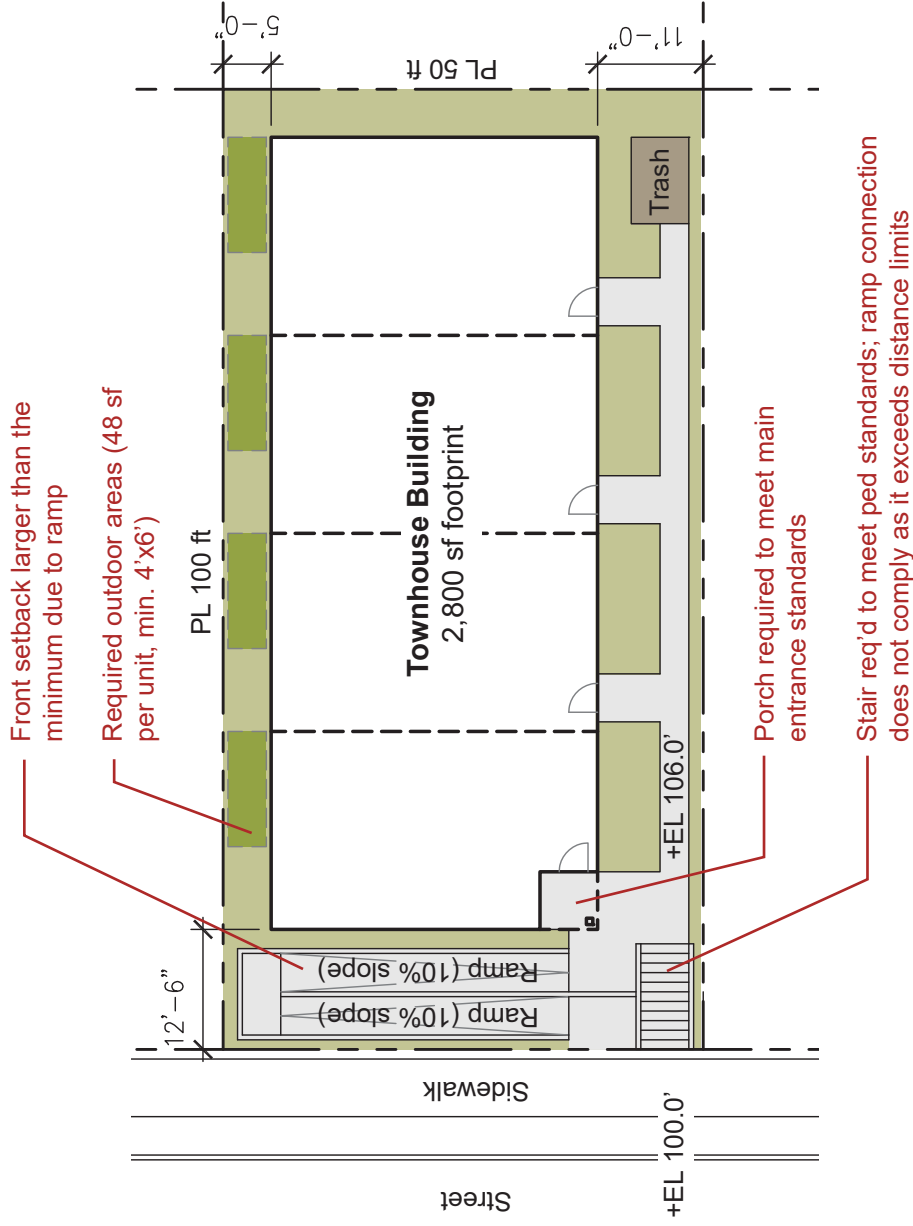
BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	6 ft
Building Coverage:	2,970 sf (59%)
Building Area:	5,940 sf (1.19:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	5 townhouses (1,190 sf ea.)
Req'd Outdoor Area:	48 sf per un x 5 = 240 sf
Landscape Area:	1,030 sf (21%)
Paving Area:	760 sf (18%)

NOTES:

- 1) Traversing 6ft of grade at 10% requires a 60 ft long ramp. In this scenario, a single run of ramp may be difficult for many wheelchair users to navigate without an intermediate landing.

OPT 6a Building elevated 6 ft w/ side ramp



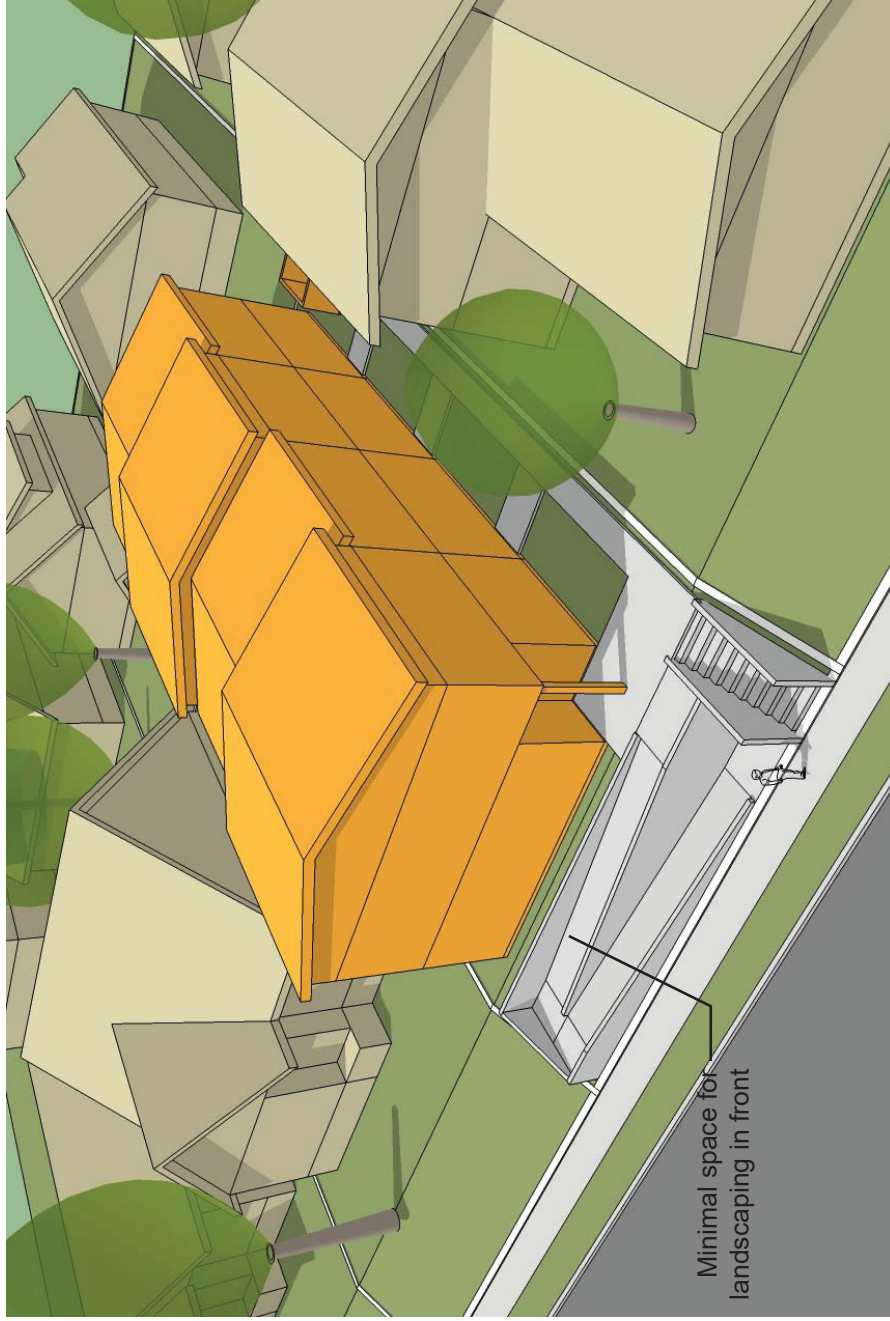
SCALE: 1" = 20'
0 5' 10' 20'

SITE PLAN

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	6 ft
Building Coverage:	2,800 sf (56%)
Building Area:	5,600 sf (1.12:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	4 townhouses (1,485 sf ea.)
Req'd Outdoor Area:	48 sf per un x 4 = 192 sf
Landscape Area:	1,108 sf (22%)
Paving Area:	900 sf (18%)

OPT 6b Building elevated 6 ft w/ front ramp



MASSING STUDY VIEW FROM SOUTHEAST

BUILDING SUMMARY

Site Area:	5,000 sf (50' x 100')
Site Grade Change:	6 ft
Building Coverage:	2,800 sf (56%)
Building Area:	5,600 sf (1.12:1 FAR)
Building Height:	2 stories / 23'-8"
Units:	4 townhouses (1,485 sf ea.)
Req'd Outdoor Area:	48 sf per un x 4 = 192 sf
Landscape Area:	1,108 sf (22%)
Paving Area:	900 sf (18%)

OPT 6b Building elevated 6 ft w/ front ramp

Cost Estimate - 30 ft ramp

Div	Item	QTY	Unit	Cost/Unit	Cost
03 Concrete					
	concrete	5.1	cy	310.00	1,581.00
	forms	180	sfca	20.00	3,600.00
	4" slab	152	sf	7.00	1,064.00
	rebar	630	lb	2.50	1,575.00
	wall finish	360	sf	4.00	1,440.00
					subtotal 9,260.00
05 Metals					
	guardrail				
	handrail	60	lf	220.00	13,200.00
					subtotal 13,200.00
31 Earthwork					
	excavation	16	cy	40.00	640.00
	grade	150	sf	1.00	150.00
	gravel	1.5	cy	60.00	90.00
	shoring				
					subtotal 880.00
					subtotal 23,340.00
	contingency			10%	2,334.00
	index to construction start			5%	1,167.00
	gen conditions / ins / bond			13%	3,034.20
	OH & Profit			5%	1,167.00
					subtotal 7,702.20
					total const cost 31,042.20

Cost Estimate - 45 ft ramp

Div	Item	QTY	Unit	Cost/Unit	Cost
03 Concrete					
	concrete	11	cy	310.00	3,410.00
	forms	450	sfca	20.00	9,000.00
	4" slab	212	sf	7.00	1,484.00
	rebar	302	lb	2.50	755.00
	wall finish	450	sf	4.00	1,800.00
					subtotal 16,449.00
05 Metals					
	guardrail				
	handrail	90	lf	220.00	19,800.00
					subtotal 19,800.00
31 Earthwork					
	excavation	40	cy	40.00	1,600.00
	grade	260	sf	1.00	260.00
	gravel	2	cy	60.00	120.00
	shoring				
					subtotal 1,980.00
					subtotal 38,229.00
	contingency			10%	3,822.90
	index to construction start			5%	1,911.45
	gen conditions / ins / bond			13%	4,969.77
	OH & Profit			5%	1,911.45
					subtotal 12,615.57
					total const cost 50,844.57

6/28/18

Cost Estimate - 60 ft ramp

Div	Item	QTY	Unit	Cost/Unit	Cost
03 Concrete					
	concrete	15	cy	310.00	4,650.00
	forms	840	sfca	20.00	16,800.00
	4" slab	272	sf	7.00	1,904.00
	rebar	504	lb	2.50	1,260.00
	wall finish	840	sf	4.00	3,360.00
					subtotal 27,974.00
05 Metals					
	guardrail				
	handrail	120	lf	220.00	26,400.00
					subtotal 26,400.00
31 Earthwork					
	excavation	50	cy	40.00	2,000.00
	grade	340	sf	1.00	340.00
	gravel	3	cy	60.00	180.00
	shoring	1	ea	5000.00	5,000.00
					subtotal 7,520.00
					subtotal 61,894.00
	contingency			10%	6,189.40
	index to construction start			5%	3,094.70
	gen conditions / ins / bond			13%	8,046.22
	OH & Profit			5%	3,094.70
					subtotal 20,425.02
					total const cost 82,319.02