TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

Oak Street & West 41st Avenue

Transportation Assessment and Management Study

Draft

Prepared for

Wesgroup Properties

Date

August 14, 2020

Project No.

04-20-0213

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Graham Brewster
Senior Development Manager
Wesgroup Properties
Suite 910 – 1055 Dunsmuir Street
Vancouver, BC
V7X 1L3

Dear Graham:

Re: Oak Street & West 41st Avenue
Transportation Assessment and Management Study (TAMS)

Bunt & Associates Engineering Ltd. (Bunt) has completed the Transportation Access and Management Study (TAMS) for the proposed mixed-use development project located at Oak Street & West 41st Avenue in the City of Vancouver, BC.

The attached study documents the site context and accessibility, project statistics, site access, parking and loading arrangements, Transportation Demand Management plan, projected site vehicle trips and anticipated impact on the adjacent street network traffic operations.

We are pleased to have the opportunity to work with Wesgroup Properties on this project and trust that our input will be sufficient to move the planning and design work forward in an efficient manner.

Yours truly,
Bunt & Associates

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1. INTRODUCTION

1.1 Background

Wesgroup Properties (Wesgroup) is proposing to construct a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at the southwest corner of Oak Street & W 41st Avenue in Vancouver, BC.

As part of the project approvals process, the City of Vancouver has requested that a Transportation Assessment and Management Study (TAMS) be prepared in support of the application. In response to this request, Wesgroup retained Bunt & Associates Engineering Ltd. (Bunt) to conduct the TAMS, which includes an assessment of the development's traffic impact, a parking & loading supply analysis, a Transportation Demand Management (TDM) overview, and a site design review related to vehicle maneuvering in and around the site.

The key findings and recommendations from this assessment are documented in the following report.

1.2 Study Scope & Area

1.2.1 Study Scope

To determine the study scope, Bunt consulted with the City's Engineering Department. Bunt first issued a proposed Terms of Reference (ToR) document on June 19, 2020 and issued a subsequent update to the ToR, which sought to amend the extent of the traffic operations assessment, on July 22, 2020.

A formal response regarding the ToR was received from the City on July 30, 2020. The key item agreed with the City was that a simplified TAMS with limited traffic analysis would be generally acceptable and a detailed operational assessment would not be required. The agreed upon ToR is included in **Appendix A** for reference.

1.2.2 Site Location and Study Area

The development site is located at 1008 W 41st Avenue in Vancouver, BC, at the southwest corner of the W 41st Avenue and Oak Street intersection. The site is bounded by W 41st Avenue to the north, W 42nd Avenue to the south, Oak Street to the east and a laneway to the west. The subject site is located along the western edge of the City of Vancouver's Cambie Corridor study area boundary.

Today, this site is occupied by community garden and a 2-storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

The study area is consistent with other similar-scale projects undertaken in the area by Bunt, focusing on the Weekday morning and afternoon peak hours at the following locations:

- W 41st Avenue & Oak Street
- W 42nd Avenue & Oak Street
- W 43rd Avenue & Oak Street
- W 41st Avenue & N-S Lane
- W 42nd Avenue & N-S Lane
- W 43rd Avenue & N-S Lane

The site location and the study area can be seen in **Exhibit 1.1**.

1.3 Organization of Report

The report sections of the study have been organized as follows:

- **Section 1** presents the study background, study area, study scope, existing area context, relevant municipal policies, and details of the proposed development.
- **Section 2** estimates the site trip generation for the proposed development and discusses its effect on the adjacent road network.
- **Section 3** includes a parking assessment for the development, comparing the proposed supply to the supply required by the City of Vancouver.
- **Section 4** provides a design review of the transportation-related components of the development including the site access driveways, parkade access, loading access, and waste collection facilities.
- **Section 5** provides the summary and recommendations of the study based on Bunt's analysis.



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Exhibit 1.1

Site Location & Study Area

W 41st & Oak Street

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1.4 Existing Conditions

Ample pedestrian amenities are located nearby including numerous restaurants, retail services, and parks (i.e., Montgomery Park). The site is also well served by cycling connections such as painted on-street cycle lanes along W 41st Avenue to the east of Oak Street and a designated east-west cycling corridor along W 37th Avenue to the north.

The development site is also well-connected to transit with frequent bus routes located along both W 41st Avenue and Oak Street, and the Oakridge – 41st Canada Line SkyTrain station located approximately 800m to the east.

In January 2020, the R4 RapidBus was introduced to the 41st Avenue corridor. The 41st Ave RapidBus service connects UBC, the Canada Line, and the Expo Line with fast, frequent, and reliable transit service. The 41st Ave corridor is the second busiest bus corridor in the region after Broadway serving more than 11 million trips per year. During the weekday peak periods, the RapidBus serves stops within the vicinity of the site with a frequency of 3-6mins, providing regular connections to the Oakridge -41st Canada Line SkyTrain station.

1.5 Cambie Corridor Plan

The Cambie Corridor has been undergoing major transformation since the Canada Line opened in 2009. Phases 1 and 2 have led to significant residential development along Cambie Street and connecting arterials. Phase 3 of the Plan is now included (2018) and addresses areas off the arterials and a new Municipal Town Centre. The plan extends from Oak Street to the west and Ontario Street to the east and is therefore a consideration in this report.

The site is located within the Oakridge Municipal Town Centre neighbourhood of the Cambie Corridor and is discussed within Section 4.3 of the plan. The following comments set out the plan for the 41st Avenue arterial:

'Along 41st Avenue, new residential and mixed-use buildings will offer opportunities for enhancing the public realm with wide green setbacks and additional landscaping'

Section 8 sets out plans for '*Transportation and Mobility'* along the corridor. Along Oak Street, crossing improvements are planned at regular intervals along the north-south corridor, while '*complete street improvements'* are planned to span the length of 41st Avenue, including improvements to all transportation modes.

As highlighted within the plan, the City has plans to signalize (pedestrian activated or full) the existing W 43rd Avenue & Oak Street intersection to the south of the site. This is shown in Figure 8.3 of the plan and is discussed later within this report.

In addition to the 'complete street improvements', and beyond the scope of the Cambie Corridor Plan, Figure 8.3 identifies proposed walking and cycling improvements along W 41st Avenue, west of its

intersection with Oak Street. These include the R4 RapidBus service and cycling infrastructure improvements that have already been implemented, as discussed above.

Section 8.7 of the plan discusses the Parking Strategy for the Oakridge Municipal Town Centre neighbourhood, as well as Transportation Demand Management (TDM) programs. With regards to TDM, the following guidance is provided:

'[TDM] programs encourage reduced driving, and thus parking demand. They employ multiple strategies that are complementary and coordinated, and typically include initiatives to expand travel choice as well as incentives to reduce vehicle travel. Programming should be reviewed on a regular basis to ensure implementation tools are effective and are responsive to dynamic local conditions'

Shared parking is discussed as a strategy:

'Given the amount and variety of vehicle parking demand in the area, an overarching parking strategy for the MTC is to approach parking as a shared resource […] To help minimize the amount of parking required for the entire area, the shared use of parking spaces should be considered in a manner that does not encourage or require increased vehicle use. Sharing parking between different developments will require further work from the City and the development community to implement in the shorter term but offers the opportunity to make the best use of an expensive resource'

1.6 Proposed Development

The proposed development includes the construction of a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at the southwest corner of Oak Street & W 41st Avenue.

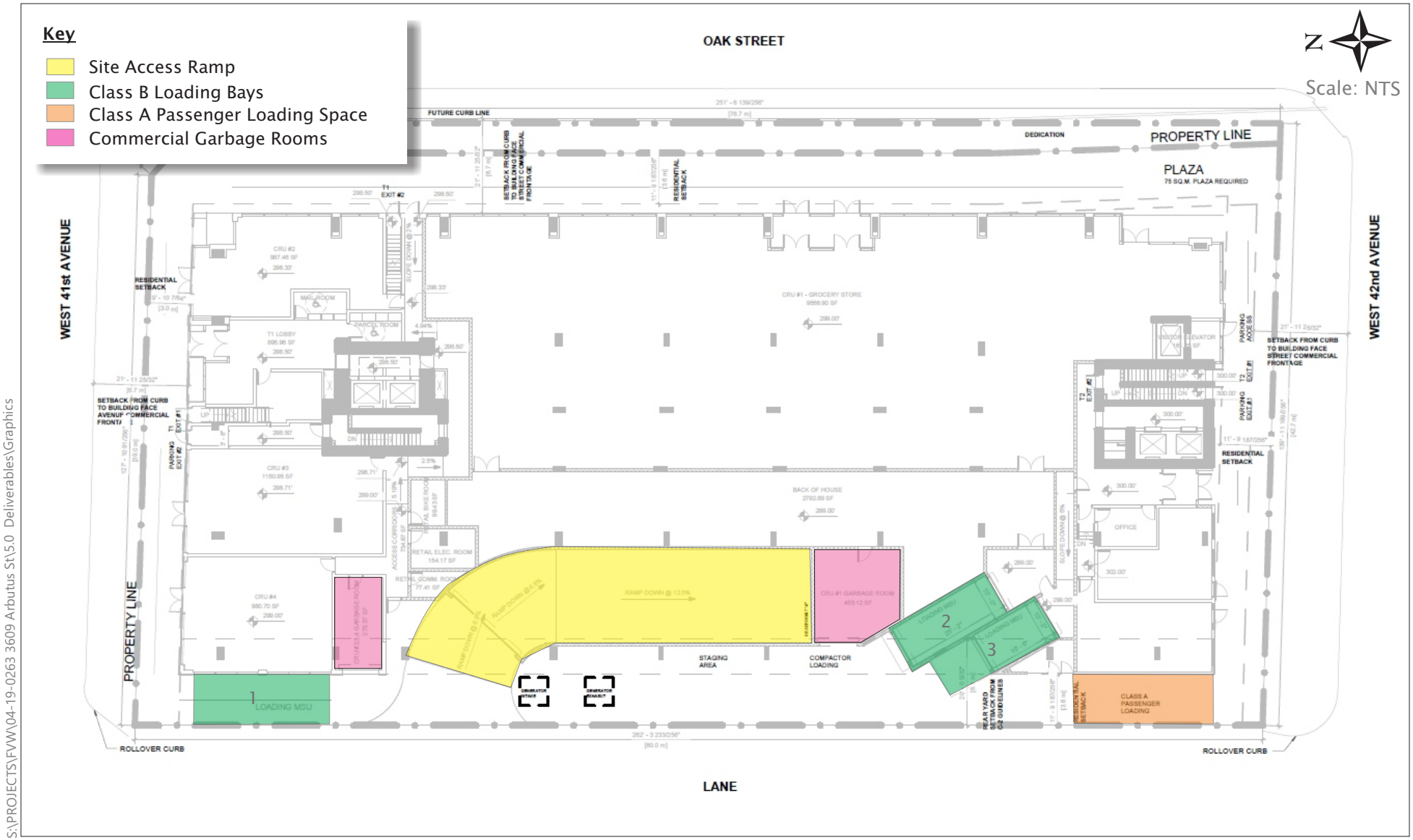
Currently, this site is occupied by a community garden and a 2-storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

Vehicle access to the development will be from the rear lane which runs parallel to Oak Street, connecting to W 41st Avenue to the north and W 42nd Avenue to the south. The proposed site plan is shown in **Exhibit 1.2**.

Table 1.1: Proposed Land Uses

LAND USE	DENSITY	UNITS
Residential (Rental)	15,451 sqm	222
Commercial (Standard Retail)	292 sqm	-
Commercial (Grocery Retail)	1,317 sqm	-

Note: Area calculated in the same manner as Floor Space Ratio (FSR)



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Exhibit 1.2

Site Plan

W 41st & Oak Street
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1.7 Vehicular Access

Exhibit 1.3 illustrates the existing laning and traffic control for the agreed study area road network.

Vehicle access to the site is planned from the laneway at the rear of the site. In order for vehicles to travel to/from the laneway via Oak Street, drivers are restricted to right-in/out movements at the W 42nd Avenue & Oak Street intersection, which is enforced by a median in the centre of the Oak Street roadway. The W 41st Avenue & Rear Lane intersection to the north is also restricted to right-in/out movements. Given the location and angled alignment of the proposed loading bays, Wesgroup intends to route all servicing and private garbage collection vehicles in a northbound direction along the laneway, entering from either W 42nd Avenue or W 43rd Avenue and exiting onto W 41st Avenue.

Drivers intending to perform left-in/out movements to and from Oak Street would have to travel via W 43rd Avenue, which is currently a two-way stop-controlled intersection.

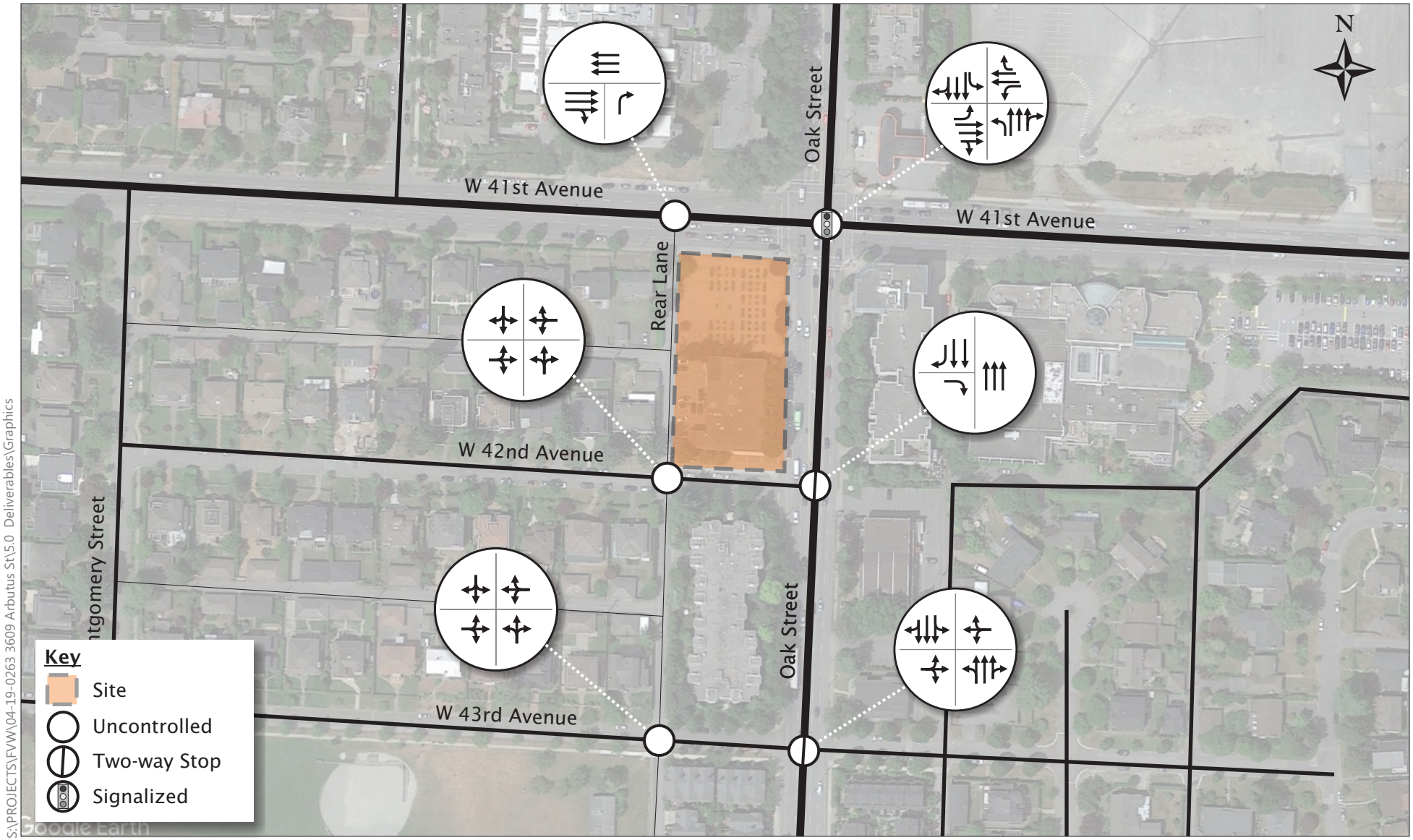
As mentioned previously, the City has future plans to install a pedestrian-actuated traffic signal at the W 43rd Avenue & Oak Street intersection as part of the Cambie Corridor Plan.

Although not forming part of the Rezoning Application at this time, Bunt has previously explored opportunities for providing a left-in movement at the W 42nd Avenue & Oak Street intersection.

The merits of this option were previously considered by Bunt and include the creation of additional routing choices that would be made available to both site traffic and nearby residents, the introduction of a second controlled pedestrian crossing in the area, and the enabling of easier truck turning movements.

However, from a transportation perspective, there are also several challenges associated with this option including breaking the existing median and creating a left-turn storage lane, which would require additional road width which may not be readily available.

Wesgroup would be open to exploring the option of providing a left-in from Oak Street should the City find this to be an acceptable arrangement.



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Exhibit 1.3

Laning & Traffic Control

W 41st & Oak Street

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2. TRAFFIC IMPACT ASSESSMENT

2.1 Traffic Forecasts

2.1.1 Trip Generation & Net Impact

As part of this simplified TAMS report, the effects of the proposed development on the transportation system have been analysed in order to determine if adequate transportation infrastructure exist to serve the proposed development and to clearly identify any capital improvements required to mitigate the impacts on the transportation system.

As there are existing uses operating on the site today and the site is being redeveloped, this assessment compares vehicle trips estimated to be generated by both the existing uses and the proposed development to approximate the net new trips generated as a result of redeveloping the site. The critical time periods for the existing (commercial) and proposed uses (residential and commercial) would typically follow the standard commuter periods, i.e., the weekday AM and PM peak hours.

Existing Vehicle Trip Generation

For previous work conducted on the subject site, Bunt collected count data of on-site and on-street parking associated with the exiting commercial premises. This data was collected on September 28, 2017 (Thursday) at two locations during the weekday AM and PM peak hour. The count locations included on-street parking along Oak Street immediately adjacent to the commercial site frontage, which can accommodate approximately 5-6 vehicles, as well as the rear parking lot accessed from the north-south laneway, which accommodates 16 parking stalls.

While the laneway parking lot is reserved for patrons of the commercial premises, it is acknowledged that the on-street parking is available to all users. However, it is assumed that the majority of users are visiting the various uses located within the existing site that include a BMO bank, pharmacy, delicatessen, and insurance broker.

The inbound and outbound vehicle trips recorded at these two locations during the weekday peak hours are summarised below in **Table 2.1**.

Table 2.1: Observed Existing Site-Generated Vehicle Trips

COUNT LOCATIONS	AM PEAK			PM PEAK		
	INBOUND	OUTBOUND	TWO-WAY	INBOUND	OUTBOUND	TWO-WAY
On-street	3	4	7	27	24	51
Rear Parking Lot	4	1	5	20	16	36
TOTAL	7	5	12	47	40	87

Accounting for rounding, the surveys indicate that the existing commercial premises generate approximately 10 two-way vehicle trips and 85 two-way vehicle trips during the AM and PM peak hours respectively.

Even if it is considered that a portion of the observed on-street parking was not associated with the commercial premises but was instead parking to visit other local destinations, it should be acknowledged that the existing site would not generate an insignificant volume of vehicular traffic.

Proposed Vehicle Trip Generation

A trip generation analysis for the proposed form of development was conducted to determine the net increase in vehicle trips. **Table 2.2** presents the vehicle trip rates, while the corresponding future site-generated vehicle trips are outlined in **Table 2.3**. The trips rates used were taken from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Ed.).

Table 2.2: ITE Vehicle Trip Rates

LAND USE	AM PEAK			PM PEAK		
	INBOUND	OUTBOUND	TWO-WAY	INBOUND	OUTBOUND	TWO-WAY
Residential (LUC: 222[1])	0.03	0.18	0.21	0.13	0.06	0.19
Commercial (LUC: 820[2])	0.58	0.36	0.94	1.83	1.98	3.81

Note: LUC abbreviated form of Land Use Code

1. ITE Multi-family Housing (High Rise), Dense Multi-Use Urban rate

2. ITE Shopping Centre rate

Table 2.3: Estimated Proposed Site-Generated Vehicle Trips

LAND USE	AM PEAK			PM PEAK		
	INBOUND	OUTBOUND	TWO-WAY	INBOUND	OUTBOUND	TWO-WAY
Residential	6	41	47	30	13	42
Commercial	10	6	16	32	34	66
TOTAL	16	47	63	61	47	108

The key finding is that the proposed form of development is expected to generate approximately 65 vehicle trips during the weekday AM peak hour and about 110 vehicle trips during the weekday PM peak hour. This translates to approximately 1 vehicle per minute and between 1 and 2 vehicle trips per minute, on average, in the AM and PM peak hours, respectively.

Net (New) Vehicle Trip Generation

An ITE best practice is that a Transportation Impact Study be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the

adjacent roadways' peak hours or the development's peak hour.[1] This site trip generation threshold is appropriate for the following reasons:

- 100 vehicles per hour (vph) is a magnitude that can change the level of service of an intersection approach; and
- Left- or right-turn lanes may be needed to satisfactorily accommodate site traffic without adversely impacting through (non-site) traffic.

The net (new) vehicle trips are set out in **Table 2.4** below and have been calculated by subtracting the existing trip generation of the site from the estimated trip generation for the proposed development.

Table 2.4: Net (New) Vehicle Trip Generation Comparison

	AM PEAK			PM PEAK		
	INBOUND	OUTBOUND	TWO-WAY	INBOUND	OUTBOUND	TWO-WAY
Existing Uses	7	5	12	47	40	87
Proposed Use	16	47	63	61	47	108
NET DIFFERENCE	+9	+42	+51	+14	+7	+21

It can be seen that the potential net vehicle trip generation of the site is well below the generally accepted threshold of 100 or more added (new) peak direction trips.

To further support this, it is acknowledged that "internal capture" trips associated with a mixed-use development would result in a further reduction of the trip generation of the proposed uses. Internal capture trips are those that occur at mixed-use sites due to the interaction among the multiple land uses, particularly where there the trips can be made by walking. The occurrence of these shared trips result in the total generation of external vehicle trips (that is, those entering and exiting the overall site) to be less than the simple sum of the trips generated by each discrete land use.

Consequently, a Transportation Impact Study (TIS) is not warranted and has therefore not been included in the TAMS.

2.1.2 Trip Distribution & Assignment

Although a full TIS is not warranted, a simple trip distribution and assignment exercise has been completed. Trip distributions were estimated based on existing travel patterns from the counts and summarized in **Table 2.5**.

[1] *Traffic Access and Impact Studies for Site Development: A Recommended Practice* (Washington, DC: ITE, 1991) p. 5

Table 2.5: Estimated Trip Distribution

ORGIN/DESTINATION	AM PEAK HOUR		PM PEAK HOUR	
	IN (%)	OUT (%)	IN (%)	OUT (%)
Oak Street (North)	30%	35%	35%	30%
W 41st Avenue (West)	15%	20%	15%	15%
W 41st Avenue (East)	20%	20%	20%	25%
Oak Street (South)	35%	25%	30%	30%
TOTAL	100%	100%	100%	100%

All site traffic is expected to travel along Oak Street or W 41st Avenue. For outbound movements heading west along W 41st Avenue, turning restrictions have been accounted for and it is anticipated that these would first travel west along W 42nd Avenue before routing north along Montgomery Street and turning left onto W 41st Avenue. **Exhibit 2.1** presents the resulting site traffic for the AM and PM peak hours.



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Exhibit 2.1

Site Traffic Forecasts

04-20-0213

W 41st & Oak Street
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3. PARKING AND LOADING SUPPLY REVIEW

3.1 Vehicle Parking Supply

The required off-street parking supply was calculated based on the City of Vancouver Parking Bylaw. When calculating the total requirement, reductions to the base requirement were applied based on Transit Accessibility reductions only.

3.1.1 Transit Accessibility

As outlined in the City of Vancouver's *Transportation Demand Management for Developments in Vancouver* document, a development can obtain a scaled parking reduction based on the site's proximity to high quality transit. The proposed development is located within Level "A' Transit Accessibility as summarized below:

Level A Definition:

Within:

- 100m walking distance of any one existing FTN route, including B-line stops, or,
- 200m walking distance of any intersection of two existing FTN routes, including B-line stops only; or,
- 400m walking distance of a SkyTrain station.

Given that the site is located within 100m of bus stops at the Oak Street & W 41st Avenue intersection which are served by a number of FTN services, including the R4 RapidBus (introduced as a replacement for the previous B-line services), the site qualifies for Level "A" Transit Accessibility reductions from the base parking rates. These reductions include a 20% reduction for the rental residential use and a 10% reduction for the commercial uses.

Further to the above, the City provides additional guidelines on transit accessibility reductions for developments that satisfy the criteria outlined within the Moderate Income Rental Household Pilot Program (MIRHPP) document. For developments where 100% of the residential floor area is secured rental housing and at least 20% of the residential floor area that is counted in the calculation of floor space ratio is made available to moderate income households, additional parking bylaw reductions can be applied.

The proposed development will satisfy this requirement, ensuring that a minimum of 20% of the residential floor area is available to moderate income households. On this basis, Section 3d of the MIRHPP document states that, *"For sites with Transit Accessibility Level A, the minimum parking requirement can be reduced by an additional 10%*".

It is understood that this additional reduction is applicable only to the portion of the building available to moderate income households (20%) and has therefore been applied in this manner in the calculations below.

3.1.2 Transportation Demand Management

In 2019, the City of Vancouver developed a TDM policy using a framework modeled on a "points menu". As the site is not located Downtown and is not defined as a 'large site' (total site size of 8,000 sqm or 45,000 sqm of new floor area) a TDM Plan is not mandatory. No TDM reductions have been applied in the following calculations.

3.1.3 Accessible Parking Stalls

According to the City of Vancouver's Parking Bylaw, the number of required accessible parking stalls is based on the following:

- Multiple dwelling or live-work use: there must be at least one accessible parking space for each building that contains at least seven residential units and an additional 0.034 space for each additional dwelling unit.
- Non-residential uses, there must be at least one accessible parking space for each building that contains at least 500 sqm. of gross floor area and an additional 0.4 parking space for each 1000 sqm. of gross floor area.

With 222 residential units and 1,609 sqm. of commercial GFA, 8 residential accessible stalls and 1 commercial accessible stall would be required.

3.1.4 Adjusted Parking Supply Requirement

Applying the Transit Accessibility reduction to the base off-street parking requirements, the adjusted total parking requirement is summarized in **Table 3.1**.

Table 3.1: Parking Supply Requirement

TYPE	UNIT TYPE	QTY	REF.	BYLAW RATE	REQ'D (STALLS)	TOTAL REDUCTION % APPLIED[2]	ADJ. REQ'D (STALLS)	ACC.[3] (STALLS)	PHYSICAL REQ. (STALLS)
Residential (Market Rental)	All	12,361 sqm (FSR)	Bylaw 4.5.B1	1 space per 125 sqm	99	20%	79	8	89
Residential (MIRHPP)	All	3,090 sqm (FSR)	Bylaw 4.5.B1	1 space per 125 sqm	25	30%	18		
Residential (Visitor)	All	222 units	Bylaw 4.1.16	0.05 spaces per unit	11	-	11	0	11
RESIDENTIAL SUB-TOTAL					135	-	108	8	100
Commercial (Standard)	n/a	292 sqm (FSR)	Bylaw 4.2.5.1	1 per 100sqm up to 300sqm, 1 per each additional 50sqm of GFA	3	10%	3	1	51
Commercial (Grocery)	n/a	1,317 sqm (FSR)	Bylaw 4.2.5.3	1 per 100sqm up to 300sqm, 1 per each additional 20sqm of GFA	54	10%	49		
COMMERCIAL SUB-TOTAL					57	-	52	1	51
TOTAL					192	-	160	9	151

1. As outlined in City's Parking Bylaw, where GFA is used to calculate the number of required parking spaces, it shall be calculated in the same manner as the FSR.

2. Reduction accounts for Transit Accessibility.

3. ACC = Accessible Stalls

After applying the Transit Accessibility reduction, the total off-street parking requirement for the development is 160 parking stalls, including 108 residential stalls and 52 commercial stalls.

Once accounting for accessible parking stall discounts (i.e., each accessible stall counts as two stalls based on the Parking Bylaw), the physical parking requirement for the development is 151 parking stalls, including 100 residential stalls and 51 commercial stalls.

3.1.5 Vehicle Parking Summary

The proposed vehicle parking provision will exceed the minimum requirement by providing a total of 212 parking stalls (203 physical stalls), as outlined in **Table 3.2** below.

Table 3.2: Proposed Parking Supply by Parking Stall Type

LAND USE	STANDARD	SMALL	ACCESSIBLE	TOTAL (PHYSICAL)	TOTAL (EQUIVALENT)
Resident	118	16	8	141	149
Residential Visitor	6	5	0	11	11
Commercial	43	7	1	51	52
TOTAL	167	28	9	203	212

A maximum of 25% of the total parking required may be allocated as small car spaces. With a requirement of 151 stalls (after adjustments) from Table 3.1, a maximum of 38 small car stalls could be provided. The developer proposes to provide 28 small car stalls which falls within the maximum allowance.

3.2 Passenger Vehicle Space

Table 3.3 summarizes the Class A passenger vehicle space requirement and proposed supply for the development. As defined in the City's Parking Bylaw, a Class A passenger vehicle space is a designated space, clear of any driving or maneuvering aisles or means or emergency egress, for loading passengers to or from an automobile.

Table 3.3: Passenger Vehicle Space Bylaw Requirement & Provision

LAND USE	SIZE	BYLAW RATE	BYLAW SUPPLY REQ. (SPACES)	PROVIDED (SPACES)	DIFFERENCE (SPACES)
Residential	222 Units	Class A: A minimum of one space for any development with 50 to 125 dwelling units, plus one space for every additional 150 dwelling units.	Class A: 2	Class A: 2	Class A: 0
Commercial	1,609 sqm	Class A: A minimum of one space for each 4000 sqm of GFA	Class A: 0	Class A: 0	Class A: 0
TOTAL			CLASS A: 2	CLASS A: 2	CLASS A: 0

The City's Parking Bylaw requires that two Class A passenger spaces be provided for the residential component. The developer proposes to provide two Class A passenger spaces, meeting the City's bylaw requirement. Of these spaces, one will be provided at-grade to the east of the lane as a parallel space, just north of the W 42nd Avenue & Rear Lane intersection, while the second passenger space will be provided on Level P1.

The passenger loading space provided at Level P1 is proposed with a length of 5.5m and a width of 4m, meeting the Bylaw requirements for the first passenger space to meet these dimensions (i.e., a wider width). The parallel passenger space provided at-grade meets the requirement for a minimum length of 6m and has a width of 3.6m.

3.3 Bicycle Parking

Well managed, secure, accessible and covered bicycle parking will be provided as part of the development plan. **Table 3.4** summarizes the Class A and Class B bicycle parking requirement for the development.

Note that Class A stalls are secure long-term parking that protect against and from inclement weather, whereas Class B stalls are for short-term "visitor" parking.

Table 3.4: Bicycle Parking Supply Requirement

LAND USE	UNIT SIZE	QUANTITY	BYLAW RATE		BYLAW REQUIREMENT		PROPOSED	
			LONG-TERM (CLASS A)	SHORT-TERM (CLASS B)	LONG-TERM (CLASS A)	SHORT-TERM (CLASS B)	LONG-TERM (CLASS A)	SHORT-TERM (CLASS B)
Residential	Less than 65 sqm	136 units	1.5 spaces per unit for unit < 65 sqm	2 spaces for 20 units, plus 1 space per each additional 20 units	204	12	468	13
	Between 65 sqm and 105 sqm	86 units	2.5 spaces per unit for unit between 65 sqm and 105 sqm		215			
	Greater than 105 sqm	0 units	3 spaces per unit for unit > 105 sqm		0			
Commercial	-	1,609 sqm (FSR)	1 space per 340 sqm	A min. of 6 spaces	5	6	5	6
TOTAL					424	18	473	19

As the table indicates, the development requires 442 bicycle spaces, including 424 Class A spaces and 18 Class B spaces. The proposed bicycle parking supply exceeds these requirements by providing 473 Class A spaces (+49 spaces) and 19 Class B spaces (+1 spaces).

3.4 Loading

Table 3.5 summarizes the proposed off-street loading supply for the development in comparison to the City of Vancouver's Parking Bylaw minimum requirement.

Table 3.5: Loading Space Bylaw Requirement & Provision

LAND USE	SIZE	BYLAW RATE	BYLAW SUPPLY REQ. (SPACES)	PROVIDED (SPACES)	DIFFERENCE (SPACES)
Residential	222 Units	Class B: At least one space for 100 to 299 dwelling units	Class B: 1	Class B: 3	Class B: 0
Commercial	1,609 sqm	Class B: No requirement for less than 100 sqm of GFA. A minimum of one space for the first 465 sqm of GFA plus one space for any portion of the next 1,860 sqm and one additional space for each additional 2,325 sqm.	Class B: 2		
TOTAL			CLASS B: 3	CLASS B: 3	CLASS B: 0

The City's Bylaw requires that three Class B loading spaces be provided to support the proposed development. The developer plans to provide a total of three Class B loading spaces, meeting the minimum bylaw requirement.

All loading bays will be accessed at-grade from the rear laneway. One of the loading bays will provided as a layby at the northern end of the lane, while the remaining two bays will be angled with vehicles backing up to a dedicated loading area to the rear.

Maneuvering for loading access will be discussed within **Section 4** of this report.

3.4.1 Loading Management Plan

Wesgroup intends to share the use of the proposed loading bays between the commercial and residential uses as appropriate. Of the angled loading bays, the one adjacent to the CRU#1 garbage room (Loading Bay 2 in Exhibit 1.2) will be for dedicated commercial use, while the remaining two will be shared by the residential and commercial uses. This is considered an appropriate arrangement given the separation of the site into two distinct cores, with each core occupied by both residential and commercial components. This arrangement will also prevent the need for trolleying goods across the length of the laneway, reducing the risk of conflict with passenger vehicles and pedestrians/cyclists.

To facilitate management for the use of the on-site loading facilities, an online scheduling tool will be made available to the future residents/tenants to book loading facilities for their deliveries. This online scheduling tool will be managed by the designated (building operator) and they will also use it to manage any scheduling changes or conflicts that may arise.

The designated operator will be responsible for entering and managing all loading activities for the building and the only one who can edit the calendar which would be made available in view format only to residents/tenants. Tenants who wish to schedule deliveries would make their request through the online scheduling tool of which the designated building operator staff would then confirm if the timeslot is available.

Residents/tenants should notify any changes to the loading schedule immediately to the designated operator in advance of the schedule for the upcoming week if possible. If scheduling conflicts arise, these must be addressed in advance with the designated staff member to avoid issues "on the ground". Any other issues related to loading or scheduling (e.g. unscheduled deliveries, schedule delays) are to be brought to the attention of the designated operator via the contact information noted in the Manual or web portal. Contact information of the designated operator will also be posted and updated regularly at visible locations within the loading facility.

Compliance to the loading management and communication protocol will be mandatory to all residents/tenants of the building. The designated operator will make every effort to record any person who violates the procedures, outlined in the Loading Management Plan, and notify them of the violation.

Vehicles loading illegally on the City's property will be outside of the scope of the building operator's responsibilities. The designated operator will take a note of the information and share with residents/tenants. This information may also be shared with the appropriate authorities, who regulate curb space and/or laneway use, for them to take further action such as issuing tickets as appropriate.

4. SITE PLAN DESIGN REVIEW

This section provides a design review of the transportation-related components of the development including the site access driveways, parkade access, loading access, and waste collection facilities. Given the high number of vehicle swept path diagrams required for the analysis, all exhibits described in this section are contained within **Appendix B** in order to keep the report within a reasonable length.

4.1 On-Site Vehicle Circulation

4.1.1 Site Access

As **Exhibit 4.1** indicates, residents and visitors of the site would enter and exit the site via the laneway driveway to the west of the site. This driveway connects with the parkade ramp, which has a slope of 12.5% leading down to Level P1.

As shown, the site access design allows for concurrent passenger vehicle movements at the ramp entrance as well as along the ramp itself.

4.1.2 Parkade Circulation

Exhibit 4.2 demonstrates passenger vehicle circulation at the key corners within Level P1 where the most vehicle interaction is likely to occur. A corner cut enables concurrent vehicle paths at the first turn, while a convex mirror is recommended at the second corner to assist with simultaneous inbound/outbound maneuvering. This analysis shows that no maneuvering issues are anticipated.

4.2 Passenger Loading

Exhibit 4.3 demonstrates the use of the at-grade passenger loading space provided to the east of the lane. As the exhibits indicates, no maneuvering issues are anticipated.

4.3 Service Vehicle Operations

4.3.1 Loading

Explained in further detail within **Section 3** of this report, the City's Bylaw requires that three Class B loading spaces be provided for the development; two for the commercial uses and one for the residential use. The developer plans to provide a total of three loading bays, meeting the requirement.

Given the location and angled alignment of the proposed loading bays, the developer intends to route all servicing and private waste collection vehicles in a northbound direction along the laneway, entering from either W 42nd Avenue or W 43rd Avenue and exiting with a right-turn onto W 41st Avenue.

Exhibit 4.4 illustrates a standard SU9 design vehicle entering the laneway from the south and departing to the north. To accommodate turning maneuvers for an SU9 vehicle, it is recommended that alterations are made to the existing curb northeast of the W 42nd Avenue & Rear Lane intersection and also east of the

lane at its intersection with W 41st Avenue. The AutoTurn analysis shows that the SU9 design vehicle would overrun the existing curbs and it is recommended that these are converted to rollover curbs. At the time of writing, the project Architect has acknowledged this recommendation and has communicated that this site modification will be incorporated into the design.

Exhibit 4.5 shows the SU9 design vehicle maneuvering in and out of the three Class B loading bays. As the exhibit indicates, the SU9 design vehicle would be able to successfully enter and exit the loading bays without any maneuvering issues.

4.3.2 Waste Collection

Commercial Waste Collection

The garbage and recycling bins for the commercial component of the development are planned to be located in two garbage rooms located at-grade off the rear lane, with the first situated adjacent to the northern Class B loading space and the second provided immediately north of the angled Class B loading bays. These were shown earlier in Exhibit 1.2.

For CRUs #2-4 (north garbage room), the development plans to use traditional full-size waste bins and totes. For collection, a waste collection vehicle would enter the lane from the south and then momentarily stop in the lane adjacent to the garbage room. The waste containers would then be wheeled out from the garbage room and their contents dumped into the waste collection vehicle. Once the containers have been emptied, they would be wheeled back to the garbage room and the waste collection vehicle would then exit via W 41st Avenue.

For CRU #1 (south garbage room), the recycling and organic waste would be collected in the same manner as for the other CRUs, i.e., using traditional bins and totes. However, for garbage collection, the development plans to use a low-profile compactor. For collection, a garbage compactor truck (typically a Ford F550 pick-up truck) would enter the lane, reverse itself in line with the compactor, attach the compactor onto its back, and then take the compactor off-site to be emptied. Once emptied, the compactor truck would return to the site to drop off the empty compactor to the garbage room

Exhibit 4.6 and **Exhibit 4.7** show the vehicle swept paths of an MSU design vehicle entering the laneway from the south and departing to the north, as well as the collection maneuvers. **Exhibit 4.8** shows the entering and exiting movements of the compactor truck. The analysis shows the maneuvering for both vehicles would occur without any issues.

Residential Waste Collection

The garbage and recycling for the residential component of the development are planned to be located in a garbage room situated at the bottom of the ramp access on Level P1.

Garbage Collection

Similar to CRU #1, for residential garbage, the development plans to use a low-profile compactor rather than a traditional garbage container. For collection, a garbage compactor truck would enter the underground parking, attach the compactor onto its back, and then take the compactor off-site to be emptied. Once emptied, the compactor truck would return to the site to drop off the empty compactor to the garbage room. **Exhibit 4.9** shows the entering and exiting maneuvers of the compactor truck. As the exhibits indicate, no maneuvering issued are anticipated.

Recycling and Organic Waste Collection

In terms of residential recycling and organic waste, the development plans to use traditional full-size waste bins and totes. In terms of collection, a small jitney truck would access the parkade, attach the bins or totes to its back, and then leave the containers at the surface level in the staging area located north of the south garbage room. Within the P1 garbage room, the containers would be situated immediately next to the compactor, and therefore a very similar turning path for the garbage pick up would be followed.

The full set of maneuvers at Levels L1 and P1 can be seen in **Exhibit 4.10** and **Exhibit 4.11**. As such, no maneuvering issues are anticipated for the recycling container collection.

5. SUMMARY & RECOMMENDATIONS

5.1 Summary

Wesgroup is proposing to construct a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at 1008 W 41st Avenue situated in the southwest corner of Oak Street & W 41st Avenue in Vancouver, BC.

The site is bounded by W 41st Avenue to the north, W 42nd Avenue to the south, Oak Street to the east and a laneway to the west. The subject site is located along the western edge of the City of Vancouver's Cambie Corridor study area boundary.

Today, this site is occupied by community garden and a 2-storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

The development site is also well-connected to transit with frequent bus routes, including the R4 RapidBus introduced in early 2020, located along both W 41st Avenue and Oak Street, and the Oakridge – 41st Canada Line SkyTrain station located approximately 800m to the east. The site is also well served by pedestrian and cycling connections.

Vehicle access to the site is planned from the laneway at the rear of the site. In order for vehicles to travel to/from the laneway via Oak Street, drivers are restricted to right-in/out movements at the W 42nd Avenue & Oak Street intersection, which is enforced by a median to the centre of the Oak Street road way. The W 41st Avenue & Rear Lane intersection to the north is also restricted to right-in/out movements. Given the location and angled alignment of the proposed loading bays, Wesgroup intends to route all servicing and private garbage collection vehicles in a northbound direction along the laneway, entering from either W 42nd Avenue or W 43rd Avenue and exiting onto W 41st Avenue.

Drivers intending to perform left-in/out movements to and from Oak Street would have to travel via W 43rd Avenue, which is currently a two-way stop-controlled intersection. Noting the location of the site within the Oakridge Municipal Town Centre neighbourhood of the Cambie Corridor, it is understood that the City has future plans to signalize (pedestrian activated or full) the existing W 43rd Avenue & Oak Street intersection to the south of the site.

Although not forming part of the Rezoning Application at this time, Bunt has previously explored opportunities for providing a left-in movement at the W 42nd Avenue & Oak Street intersection. Wesgroup would be open to exploring the option of providing a left-in from Oak Street should the City find this to be an acceptable arrangement.

The net (new) vehicle trip generation of the site is anticipated to be approximately 50 vehicle trips (= 10 entering + 40 exiting) during the weekday AM peak hour and about 20 vehicle trips (= 15 entering + 5 exiting) during the weekday PM peak hour, both well below the generally accepted threshold of 100 or

more added (new) peak direction trips. Consequently, a Transportation Impact Study is not warranted and has therefore not been included in the TAMS. This was agreed with the City as part of the ToR.

Three levels of underground parking are proposed, accessed via a single two-way ramp on the north-south back lane. CoV bylaw requirements have been calculated at a minimum of 160 parking spaces, inclusive of 11 visitor parking spaces. When taking into account the "2 for 1" accessible stall credit, this translates to 151 physical stalls. The developer intends to provide 212 vehicle parking stalls (203 physical stalls), which would exceed the minimum requirement.

A further two Class A passenger spaces are also required in addition to 424 Class A (long-term) and 18 Class B (short-term) bicycle parking spaces. The passenger space requirements will be met, while the bicycle parking requirements will be exceeded with a provision of 473 Class A and 19 Class B bicycle parking spaces proposed.

The City's Bylaw requires that three Class B loading spaces be provided to support the proposed development. The developer plans meet this requirement.

All three loading bays will be accessed at-grade from the rear laneway. One Class B loading bay will be provided in the form of a layby, while the remaining two bays will be angled with vehicles backing up to a dedicated loading area to the rear.

Wesgroup intends to share the use of the proposed loading bays between the commercial and residential uses as appropriate. Of the angled loading bays, the one adjacent to the garbage room will be for dedicated commercial use, while the remaining two will be shared by the residential and commercial uses. This is considered an appropriate arrangement given the separation of the site into two distinct cores, both with a mix of residential and commercial components.

The site design review shows that mountable curbs or a change to the curb radii would be required at both the W 41st Avenue & Rear Lane and W 42nd Avenue & Rear Lane intersections to accommodate maneuvers associated with larger servicing/delivery and garbage collection vehicles. At the time of writing, the project Architect has acknowledged this recommendation and has communicated that this site modification will be incorporated into the design. The analysis indicated that all other loading and waste collection vehicle maneuvers could be achieved without any operational issues.

5.2 Recommendations

1. Given both sites modest contribution to vehicle traffic at the six study area intersections and that the developments do not cause the intersections to exceed performance thresholds, no operational improvements are recommended to facilitate the proposed development.

2. Install rollover curbs at both the W 41st Avenue & Rear Lane and W 42nd Avenue & Rear Lane intersections to accommodate maneuvers associated with larger servicing/delivery and garbage collection vehicles.

APPENDIX A

Terms of Reference

MEMO

DATE: July 22, 2020
PROJECT NO: 04-20-0231P
PROJECT: West 41st Avenue & Oak Street
SUBJECT: Proposed TAMS Terms of Reference

TO: Rosemarie Draskovic, City of Vancouver

PREPARED BY: Luke Kenny, Bunt & Associates

The following document outlines Bunt's proposed Terms of Reference (ToR) for the Transportation Assessment and Management Study (TAMS) for the West 41st Avenue & Oak Street Rezoning Application.

This document (V02) has been updated following a change in the methodology regarding the Transportation Impact Study component of the TAMS.

The proposed study requirements reflect the City's general requirements outlined with their Letter of Response to the applicant, Wesgroup Properties (Wesgroup) dated April 28, 2020.

Should you have any questions or comments, please do not hesitate to contact us.

Yours truly,

Bunt & Associates

Luke Kenny, B.Sc.
Transportation Analyst

James Lee, P.Eng., MBA, PMP
Associate, Senior Transportation Engineer

1. INTRODUCTION

Wesgroup Properties (Wesgroup) is proposing to construct a 16-storey and 8-storey secured market rental building with 227 units and ground floor retail at the southwest corner of Oak Street & W 41st Avenue in Vancouver, BC. Currently, this site is occupied by a community garden and a 2-storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

As instructed by the City of Vancouver in their letter *Rezoning Enquiry – 5763-5791 Oak Street & 1008 W 41st Avenue,* dated April 28, 2020, a TAMS is required to support any future rezoning applications for this site. Although there are still some uncertainties regarding parking and loading supplies, it is our understanding that the proposed development will likely seek a parking variance supported by TDM measures consistent with the City's TDM Policy program.

2. PROPOSED TERMS OF REFERENCE

2.1.1 Pre-Study Consultation & Data Collection/Review

a. Confirm the project scope of work with the City of Vancouver (i.e. Terms of Reference);

b. Conduct a site visit to observe existing traffic operations in the area and obtain the additional context of infrastructure adjacent to the site; and,

c. Provide descriptions of existing transportation systems of all modes (vehicle, pedestrians, cyclists, and public transit) in the vicinity of the development site.

2.1.2 Transportation Impact Study

a. Complete a simplified TAMS without a Transportation Impact Study, on the basis of the rationale set out below.

   An Institute of Transportation Engineers (ITE) best practice is that a Transportation Impact Study (TIS) be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the adjacent roadways' peak hours or the development's peak hour. This site trip generation threshold is appropriate for the following reasons:

   - 100 vehicles per hour (vph) are a magnitude that can change the level of service of an intersection approach; and
   - Left- or right-turn lanes may need to satisfactorily accommodate site traffic without adversely impacting through (non-site) traffic.

A trip generation analysis for the proposed form of development was conducted in order to determine if a TIS is warranted. **Table 1** presents the vehicle trip rates as well as the corresponding future site-generated vehicle trips.

Table 1: Estimated Peak Hour Site-Generated Vehicle Trips

LAND USE	WEEKDAY AM PEAK HOUR				WEEKDAY PM PEAK HOUR			
	TRIP RATE	IN	OUT	2-WAY	TRIP RATE	IN	OUT	2-WAY
Residential (LUC 222)	0.21	6	41	47	0.19	30	13	42
Commercial (LUC 820)	0.94	10	6	16	3.81	32	34	66
-	-	16	47	63	-	62	47	109

The site is expected to generate approximately 65 and 110 two-way vehicle trips during the respective peak hours.

Further to this, Bunt holds count data of on-site and on-street parking associated with the exiting commercial premises indicating that the existing commercial premises generates approximately 15 two-way vehicle trips and 85 two-way vehicle trips during the AM and PM peak hours respectively.

Although not explicitly calculated for the purposes of the ToR, it should be acknowledged that internal capture associated with the proposed mixed-use development would result in a further reduction of the trip generation presented in Table 1.

Therefore, the net vehicle trip generation of the site is expected to be well below the generally accepted threshold of 100 or more added (new) peak direction trips. Consequently, a Transportation Impact Study does not appear to be warranted and would therefore not be included in the TAMS.

Further analysis of the count data referenced above, as well as the internal capture methodology, will be presented in the TAMS.

2.1.3 Site Design Analysis & Parking/Loading Variances

a. Review vehicle parking, vehicle loading, passenger loading, and bicycle parking requirements as per the City of Vancouver's Zoning Bylaw and identify whether any parking and/or loading variances are required; and

b. Review the transportation-related components of the site design to confirm that site circulation and vehicle maneuvering for loading, waste collection, and parking can be performed without any anticipated issues.

2.1.4 Transportation Demand Management (TDM) Strategy

a. In consultation with Wesgroup and the City of Vancouver, develop an appropriate TDM Plan to support any required parking variances based on consideration of external transportation system influences and the City's TDM Policy points program. The TDM Plan would be incorporated into the TAMS report; and

b. Complete the City's TDM Worksheets and include as part of the TDM Plan.

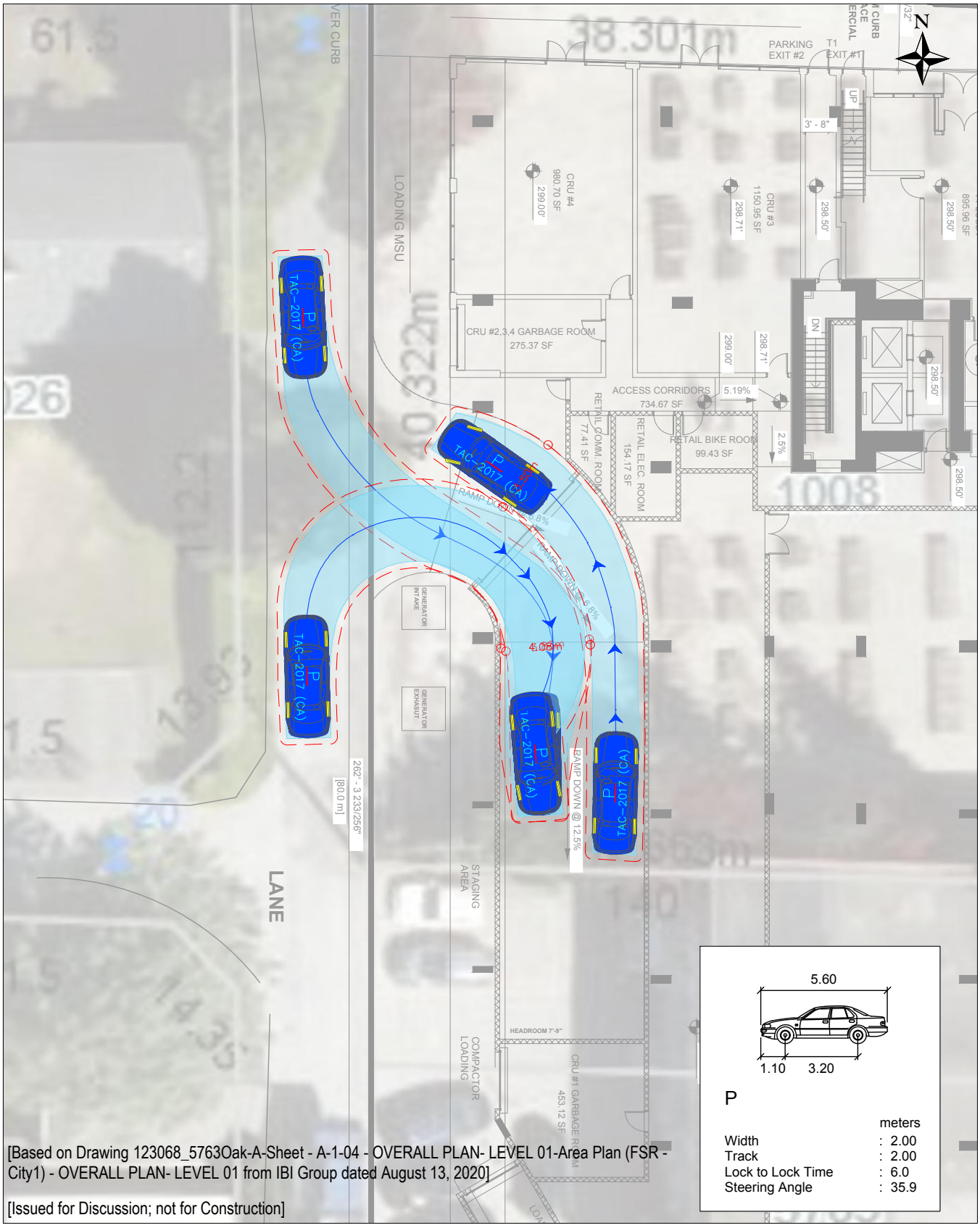
2.1.5 Reporting

a. Summarize findings, recommendations, and conclusions in a Draft TAMS Report to be submitted to the City for review and comments.

APPENDIX B

Site Design Review

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[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

[Issued for Discussion; not for Construction]

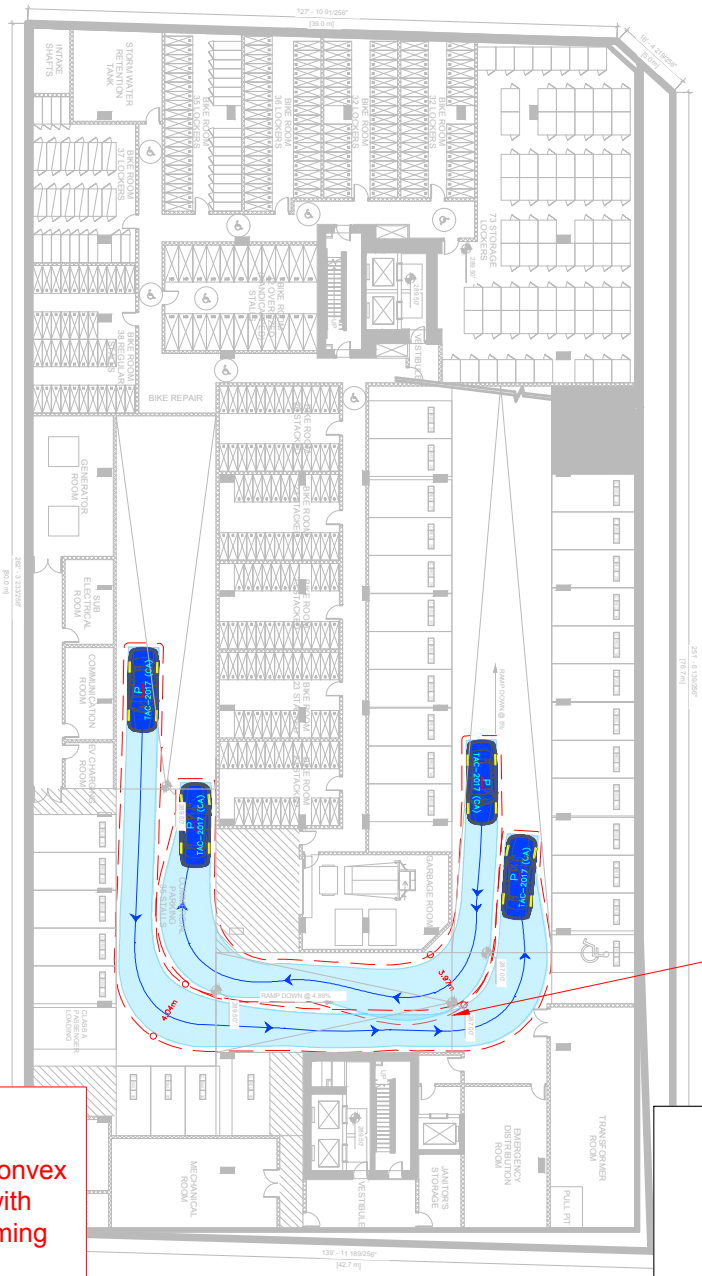
Exhibit 4.1

PTAC Site Access

04-20-0213 August 2020 Scale 1:250 on Letter 41st & Oak Prepared by EFT

bunt & associates

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Note(s):

1. Recommend a convex mirror to assist with visibility of oncoming traffic.

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

[Based on Drawing 123068_5763OAK-A-SHEET - A-1-03 - OVERALL PLAN- LEVEL P1-AREA PLAN (FSR - CITY1) - OVERALL PLAN- LEVEL P1 from IBI Group dated August 13, 2020]

[Issued for Discussion; not for Construction]

Exhibit 4.2

PTAC P1 Circulation

04-20-0213 August 2020 Scale 1:500 on Letter 41st & Oak Prepared by EFT

bunt & associates

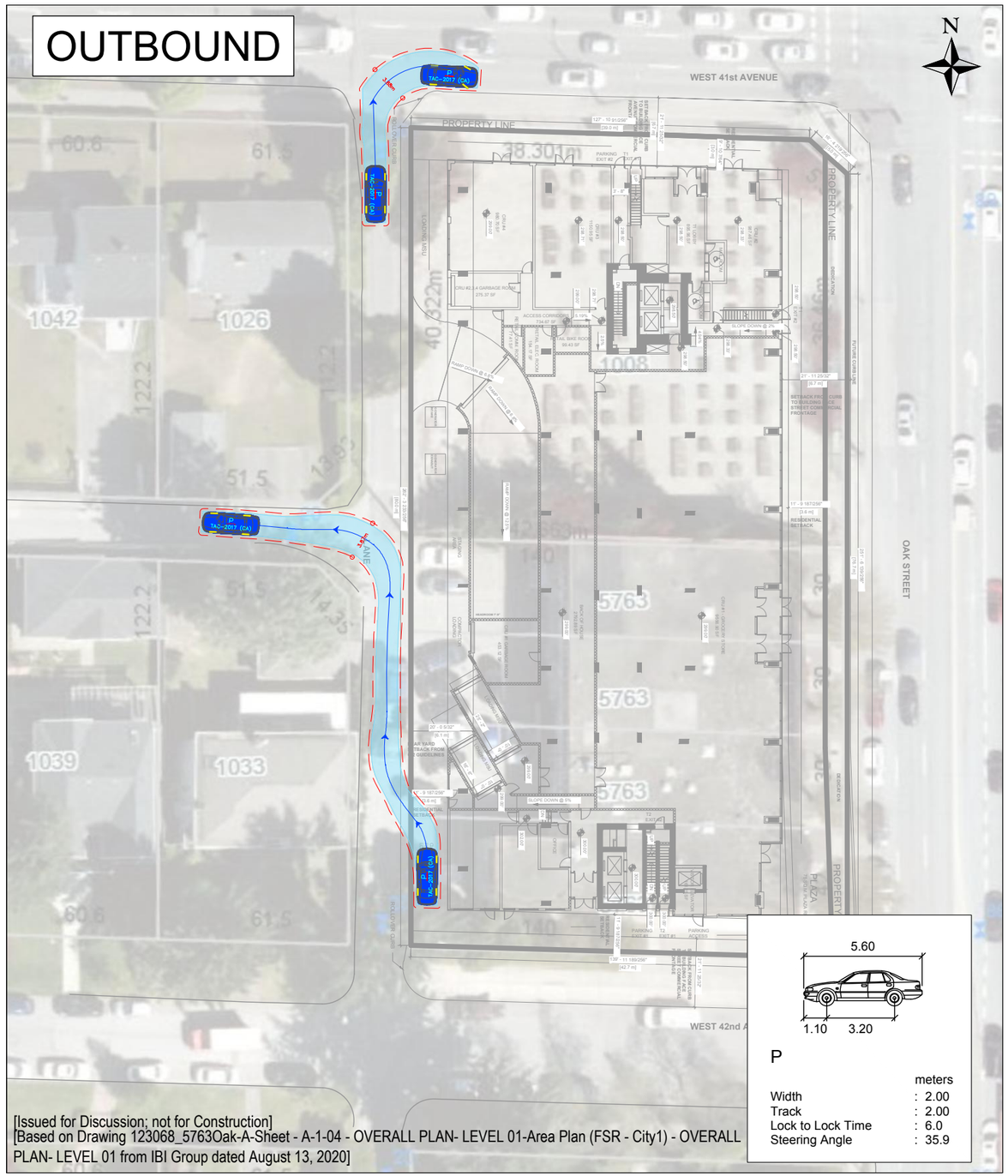
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[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

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[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

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Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

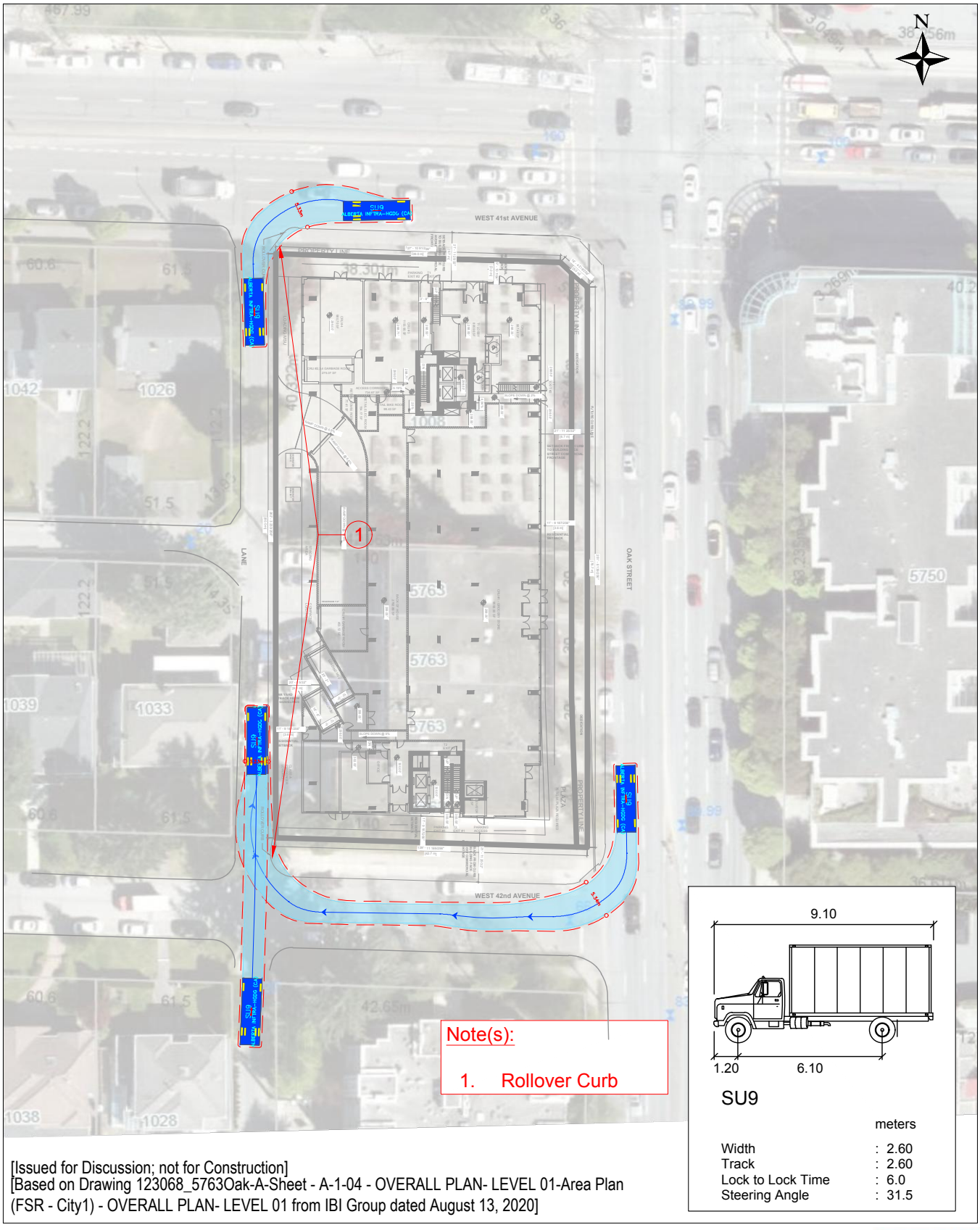
Exhibit 4.3

PTAC Passenger Loading Maneuvers

04-20-0213 August 2020 Scale 1:500 on Ledger 41st & Oak Prepared by EFT

bunt & associates

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Note(s):

1. Rollover Curb

SU9

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 31.5

[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

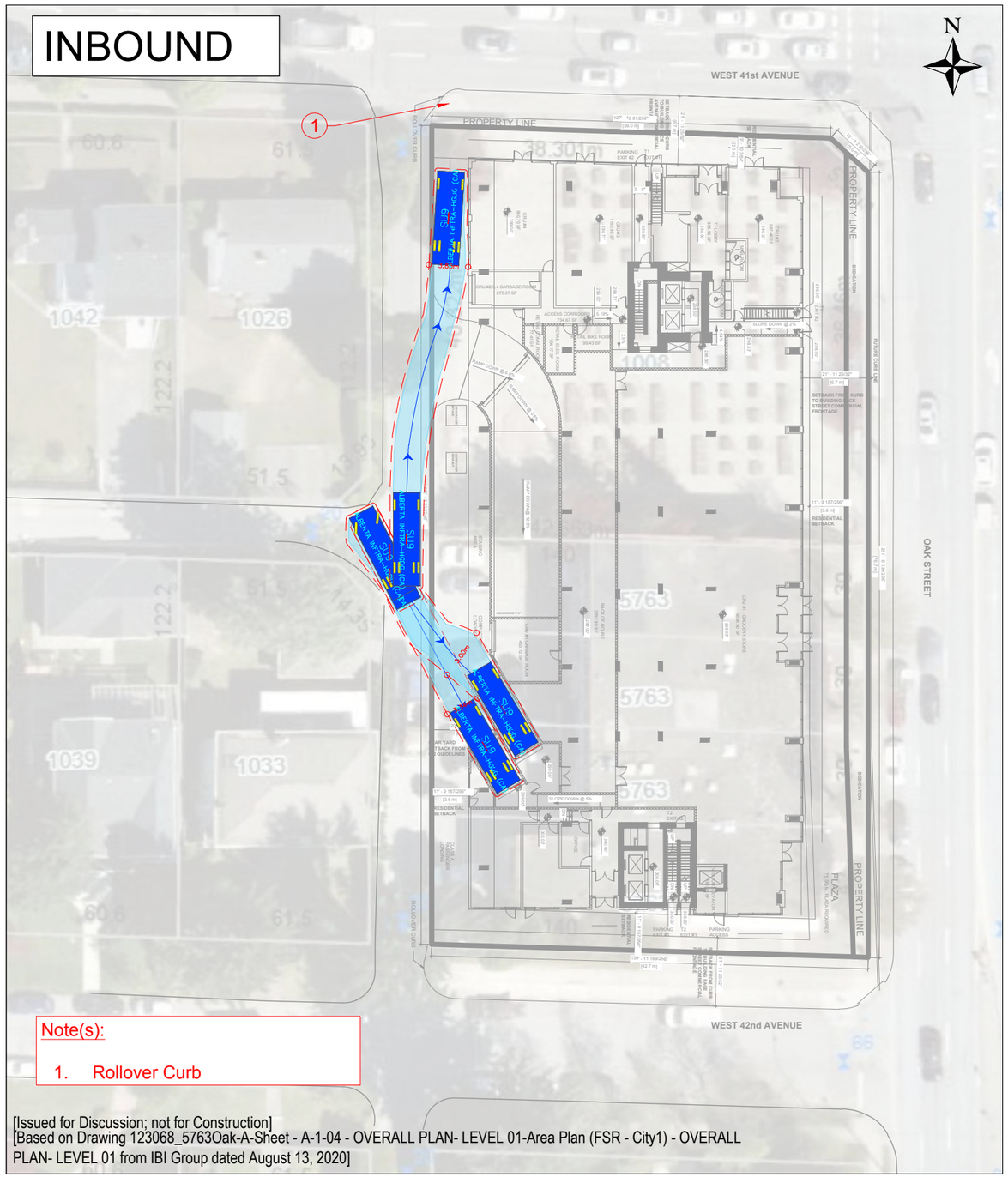
Exhibit 4.4
SU9 Site Access

04-20-0213 August 2020 Scale 1:750 on Letter 41st & Oak Prepared by EFT

bunt & associates

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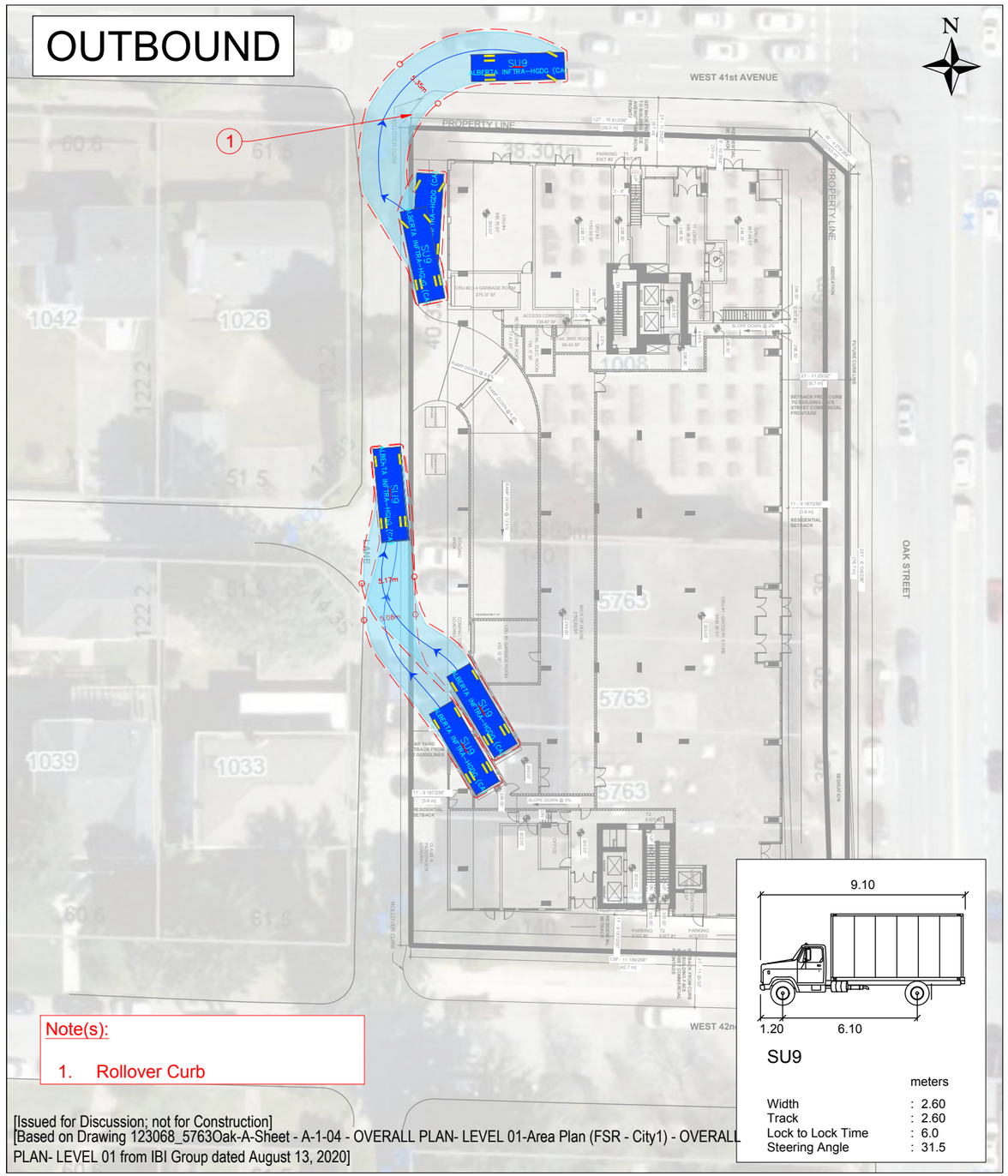


Note(s):

1. Rollover Curb

[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

OUTBOUND



Note(s):

1. Rollover Curb

[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

SU9

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 31.5

Exhibit 4.5

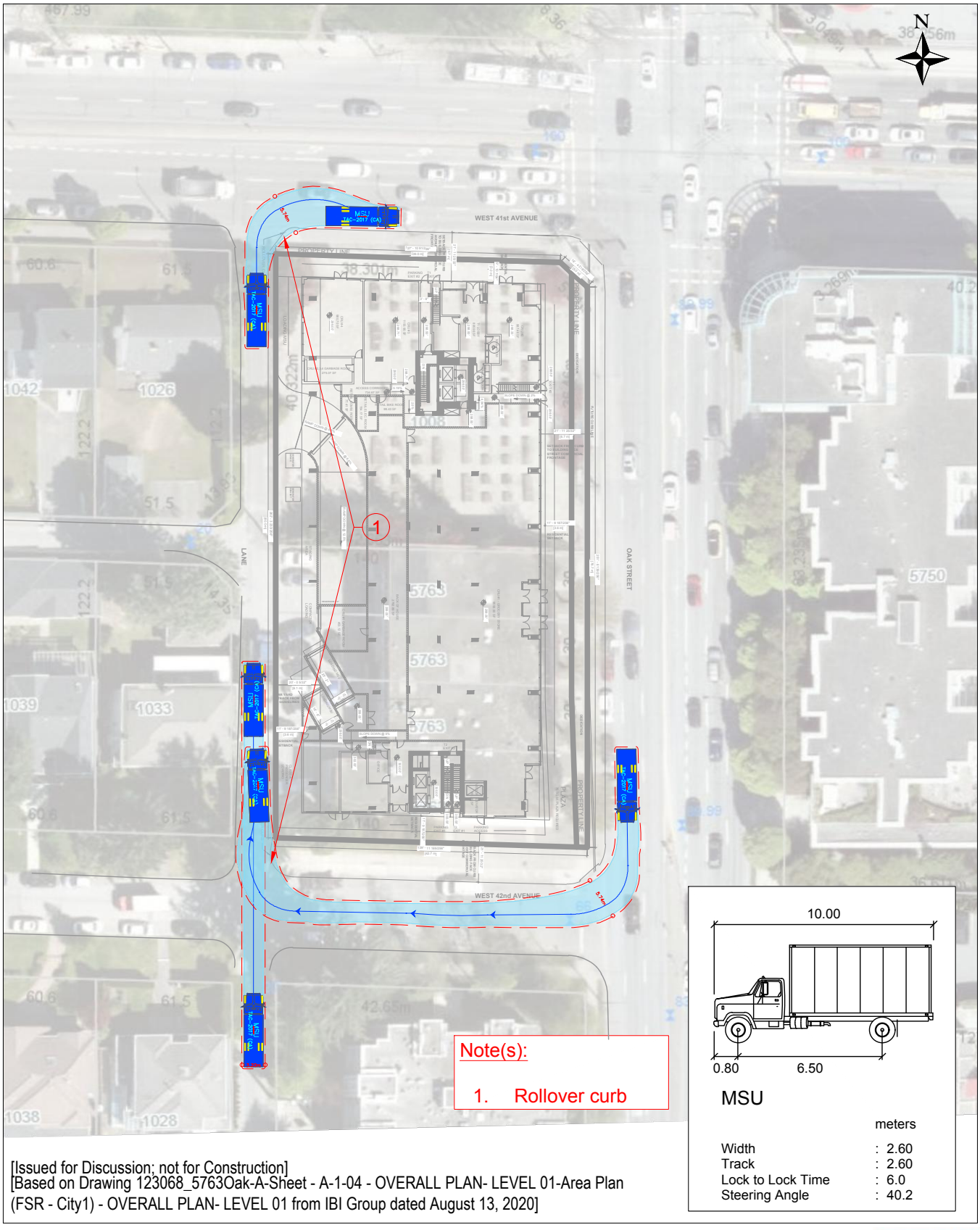
SU9 Loading Maneuvers

04-20-0213 August 2020 Scale 1:500 on Ledger

41st & Oak
Prepared by EFT

bunt & associates

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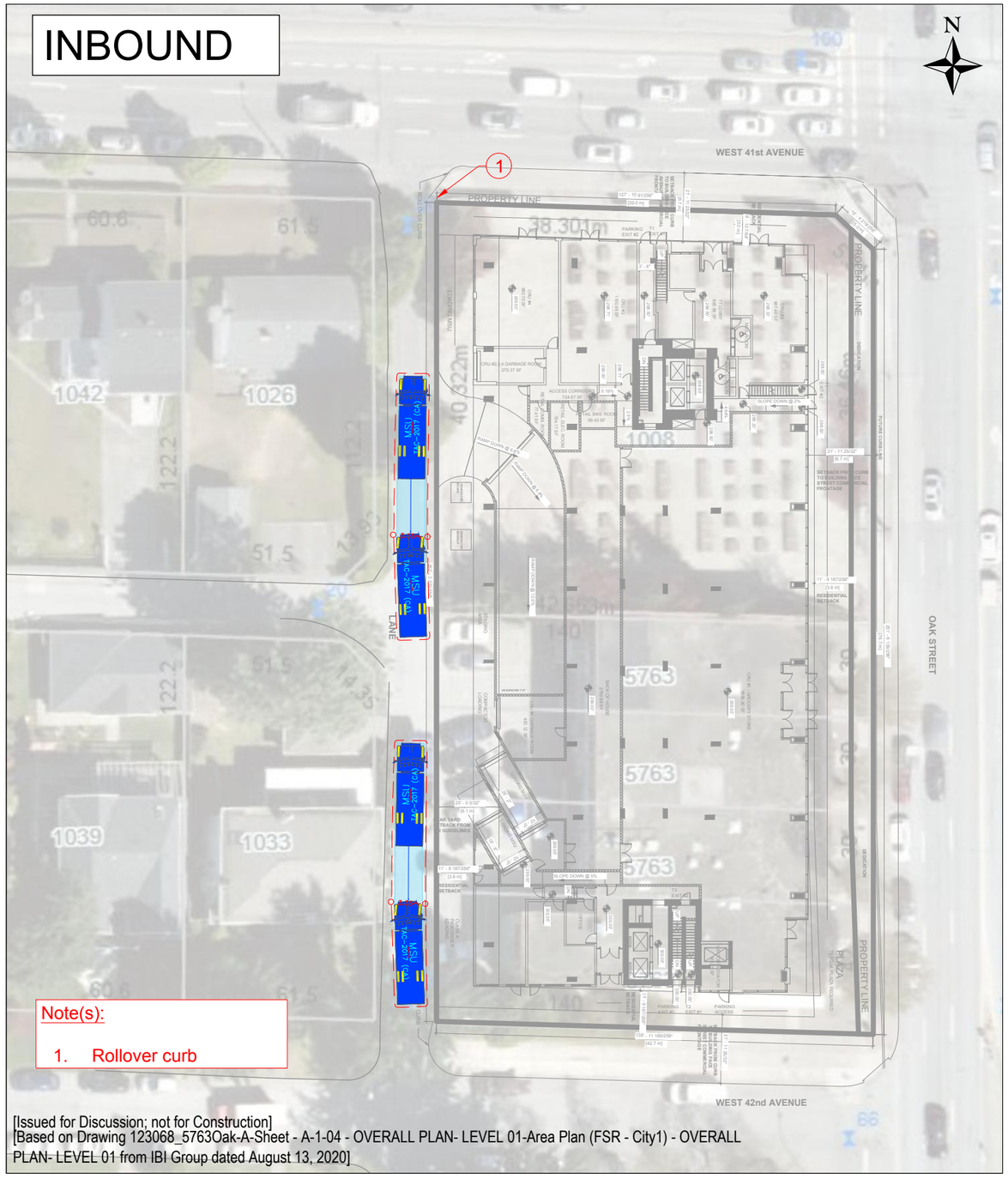
Exhibit 4.6
MSU Site Access

04-20-0213 August 2020 Scale 1:750 on Letter 41st & Oak Prepared by EFT

bunt & associates

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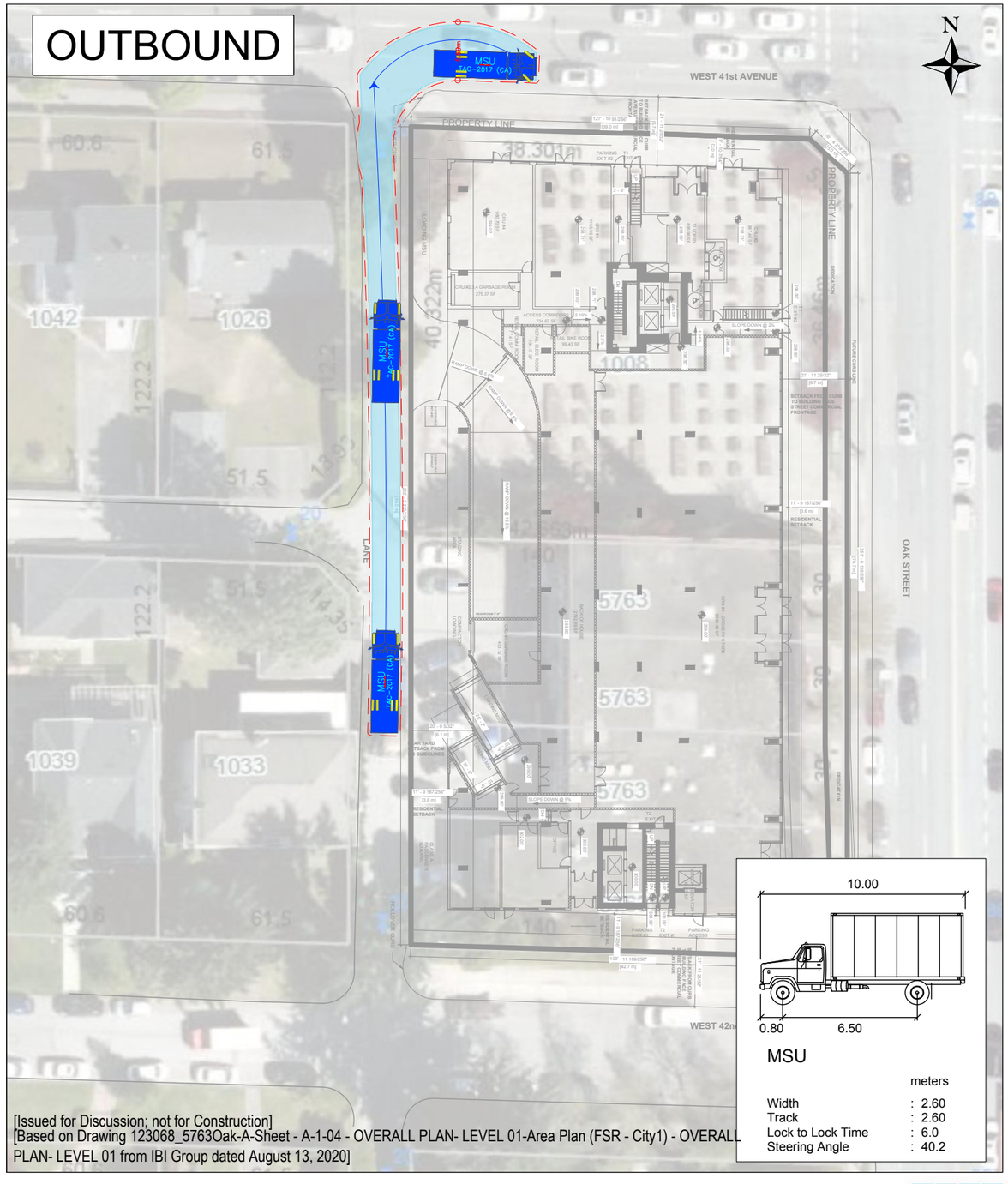


Note(s):

1. Rollover curb

[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

OUTBOUND



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

Exhibit 4.7

MSU Garbage Collection Maneuvers

04-20-0213 August 2020 Scale 1:500 on Ledger 41st & Oak Prepared by EFT

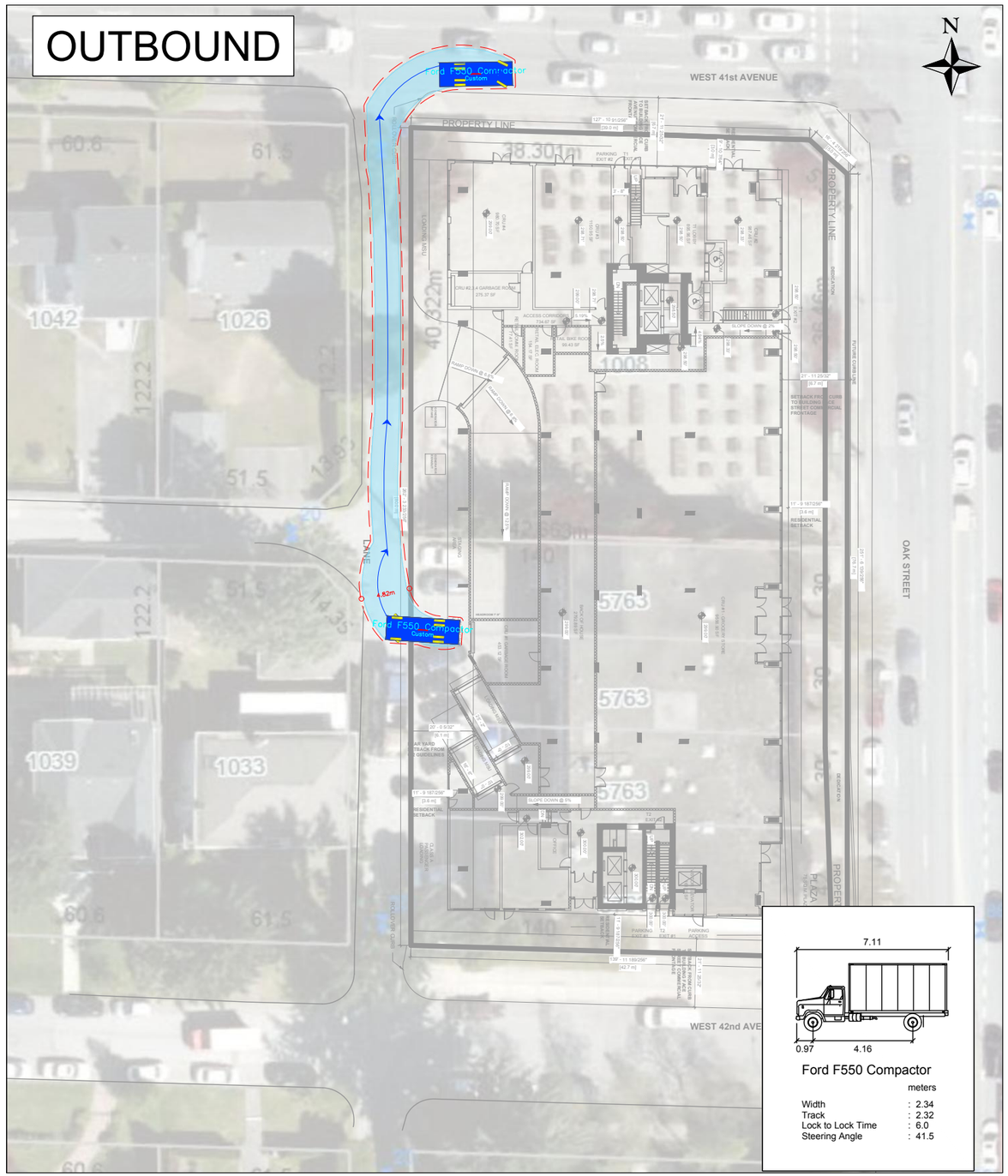
bunt & associates

\\Bunt.local\data\Shared\PROJECTS\JBL\04-20-0213 41st Ave & Oak St TAMS\4.0 Analysis & Design\4.1 ACAD\Swpt_Pth

INBOUND



OUTBOUND



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

Exhibit 4.8

Compactor Garbage Collection Maneuvers

04-20-0213 August 2020 Scale 1:500 on Ledger 41st & Oak Prepared by EFT

bunt & associates

\\Bunt.local\data\Shared\PROJECTS\JBL\04-20-0213 41st Ave & Oak St TAMS\4.0 Analysis & Design\4.1 ACAD\Swept_Pth

INBOUND



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763OAK-A-SHEET - A-1-03 - OVERALL PLAN- LEVEL P1-AREA PLAN (FSR - CITY1) - OVERALL PLAN- LEVEL P1 from IBI Group dated August 13, 2020]

OUTBOUND



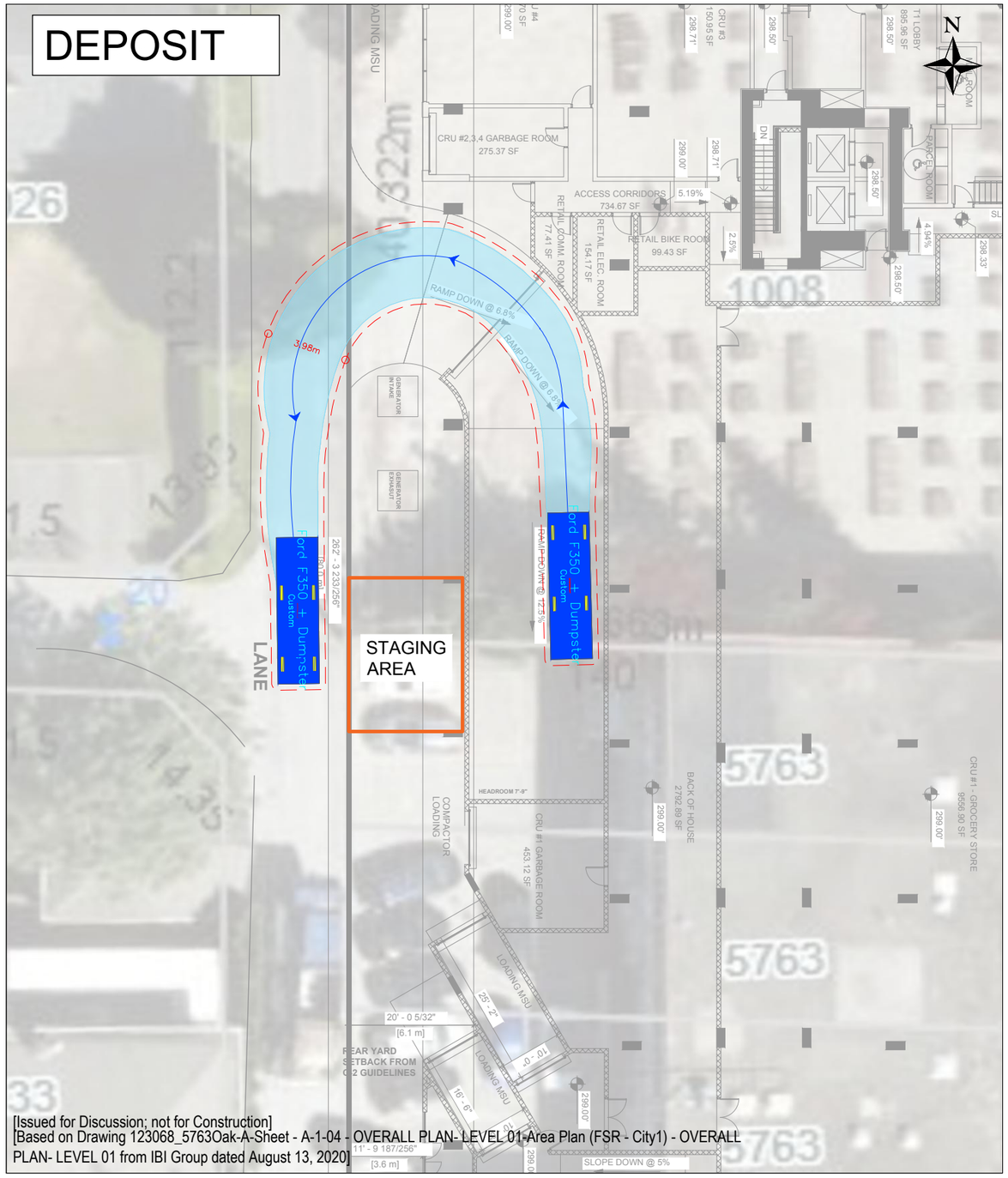
[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763OAK-A-SHEET - A-1-03 - OVERALL PLAN- LEVEL P1-AREA PLAN (FSR - CITY1) - OVERALL PLAN- LEVEL P1 from IBI Group dated August 13, 2020]

Exhibit 4.9

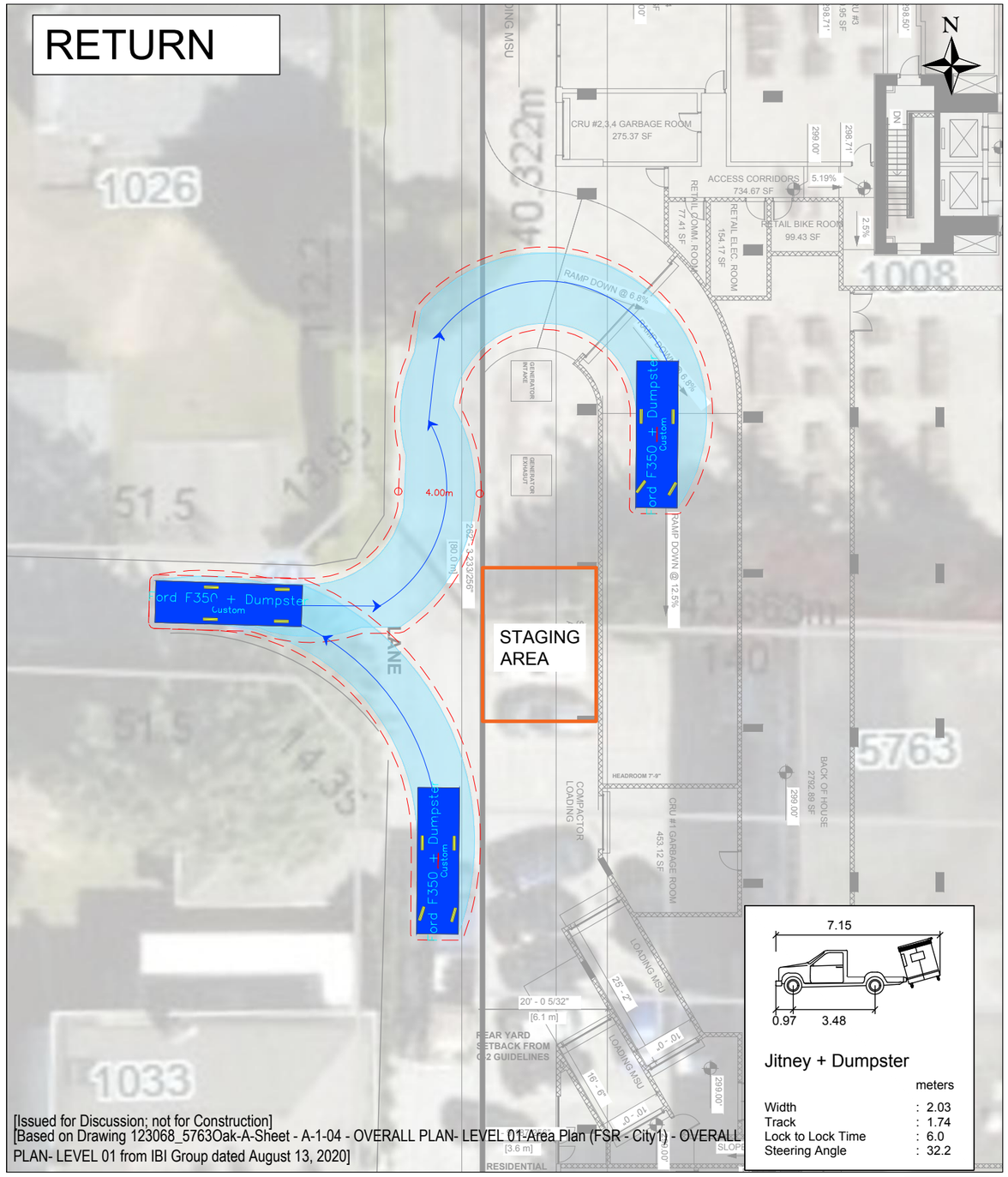
Compactor Garbage Collection Maneuvers - P1

04-20-0213 August 2020 Scale 1:250 on Ledger 41st & Oak Prepared by EFT

bunt & associates



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763Oak-A-Sheet - A-1-04 - OVERALL PLAN- LEVEL 01-Area Plan (FSR - City1) - OVERALL PLAN- LEVEL 01 from IBI Group dated August 13, 2020]

Jitney + Dumpster

	meters
Width	: 2.03
Track	: 1.74
Lock to Lock Time	: 6.0
Steering Angle	: 32.2

Exhibit 4.10

Jitney Garbage Collection Maneuvers

04-20-0213 August 2020 Scale 1:250 on Ledger 41st & Oak Prepared by EFT

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\\Bunt.local\data\Shared\PROJECTS\JBL\04-20-0213 41st Ave & Oak St TAMS\4.0 Analysis & Design\4.1 ACAD\Swpt_Pth

\\Bunt.local\data\Shared\PROJECTS\JBL\04-20-0213 41st Ave & Oak St TAMS\4.0 Analysis & Design\4.1 ACAD\Swpt_Pth

INBOUND



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763OAK-A-SHEET - A-1-03 - OVERALL PLAN- LEVEL P1-AREA PLAN (FSR - CITY1) - OVERALL PLAN- LEVEL P1 from IBI Group dated August 13, 2020]

OUTBOUND



[Issued for Discussion; not for Construction]
[Based on Drawing 123068_5763OAK-A-SHEET - A-1-03 - OVERALL PLAN- LEVEL P1-AREA PLAN (FSR - CITY1) - OVERALL PLAN- LEVEL P1 from IBI Group dated August 13, 2020]

Exhibit 4.11

Jitney Garbage Collection Maneuvers - P1

04-20-0213 August 2020 Scale 1:250 on Ledger 41st & Oak Prepared by EFT

bunt & associates