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ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES

FOR

TRINITY DEVELOPMENT GROUP INC. 145 LORETTA AVENUE NORTH / 951 GLADSTONE AVENUE

CITY OF OTTAWA

PROJECT NO.: 18-1026

OCTOBER 2018 – REV 1

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CITY OF OTTAWA

DSEL PROJECT NO.: 18-1026

1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Trinity Development Group Inc. to prepare an Assessment of Adequacy of Public Services report in support of the application for Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBLA) at 145 Loretta Avenue North and 951 Gladstone Avenue.

The subject property is located within the City of Ottawa urban boundary, in the Kitchissippi Ward. As illustrated in ***Figure 1***, below, the subject property is located north east of the intersection of Loretta Avenue and Gladstone Avenue. The subject property measures approximately ***1.00 ha*** and is zoned General Industrial, (IG1 H(11)).

Figure 1: Site Location

The existing site area consists of two 2-storey, one 1-storey and one 3-storey commercial buildings. Surface parking also exists on site. The contemplated application for OPA and ZBLA would allow for the mixed-use development of three multi-storey residential towers (30, 35 and 40 storeys) above a common retail and office podium with a contemplated zoning of Mixed-Use Centre (MC). The redevelopment of the subject property involves the retention of the existing 3-storey Standard Bread Building constructed in 1924.

The contemplated redevelopment consists of approximately ***931*** total residential units, ***3,628 m²*** of total retail area (including existing retail), and approximately ***13,169 m²*** of office space. Underground parking garage is also anticipated.

The objective of this report is to provide sufficient detail to demonstrate that the contemplated development is supported by existing municipal services.

1.1 Existing Conditions

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontage within the adjacent municipal right-of-ways:

Loretta Avenue:

- 200 mm diameter unlined cast iron watermain
- 1372 mm diameter concrete pressure watermain backbone pipe
- 1350 mm diameter concrete storm sewer
- 1050 mm diameter concrete sanitary sewer trunk
- 300 mm diameter concrete combined sewer

Gladstone Avenue:

- 200 mm diameter PVC watermain east of Loretta and Gladstone intersection
- 400 mm diameter PVC watermain west of Loretta and Gladstone intersection
- 1350 mm diameter concrete storm sewer
- 375 mm diameter PVC storm sewer
- 1050mm diameter concrete sanitary sewer east of Loretta and Gladstone intersection
- 250 mm diameter PVC sanitary sewer west of Loretta and Gladstone intersection

1.2 Required Permits / Approvals

The contemplated development is subject to the Zoning By-law Amendment approval process. The City of Ottawa must approve engineering reports prior to issuing ZBLA approval.

1.3 Pre-consultation

Pre-consultation correspondence from the City of Ottawa, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report:

- **Ottawa Sewer Design Guidelines,**
  City of Ottawa, October 2012.
  (City Standards)

  - **Technical Bulletin ISDTB-2014-01**
    City of Ottawa, February 5, 2014.
    (ITSB-2014-01)

  - **Technical Bulletin PIEDTB-2016-01**
    City of Ottawa, September 6, 2016.
    (PIEDTB-2016-01)

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (ISTB-2018-01)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (ISDTB-2010-2)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (ISDTB-2014-02)

  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (ISDTB-2018-02)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 1W pressure zone. A local 200 mm diameter watermain and a 1372 mm diameter backbone pipeline exist within the Loretta Avenue right-of-way and a 200 mm diameter watermain exists within the Gladstone Avenue right-of-way east of the intersection, as shown by the ***City Water Distribution Mapping*** located in ***Appendix B***.

Table 1, below, estimates the water demand of the existing buildings, based on the ***Water Supply Guidelines*** shown in ***Table 2.***

Table 1
Water Demand
Existing Conditions

Design Parameter	Anticipated Demand[1] (L/min)
Average Daily Demand	22.5
Max Day	33.8
Peak Hour	60.8

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.

3.2 Water Supply Servicing Design

It is anticipated that the contemplated development will be serviced via a minimum of 2 service connections to the 200 mm diameter watermains within Gladstone and Loretta Avenues. As the water demand exceeds 50 m^3/day it is proposed to loop the services internally to allow for redundancy in case of interruption of service to either service.

Table 2, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 2
Water Supply Design Criteria

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential 3 Bedroom Apartment	3.1 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	2.5 x Average Daily *
Residential Maximum Hourly	5.5 x Average Daily *
Commercial Space	2500 L/(1000m^2/d)
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa

** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons. Above 500 persons, refer to Table 4.2 from City Guidelines.*
-Table updated to reflect ISD-2018-02

Table 3, below, summarizes the anticipated water supply demand and boundary conditions, received from the City of Ottawa, for the proposed development based on the ***Water Supply Guidelines***. Refer to ***Appendix B*** for correspondence with the City of Ottawa.

Table 3
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Connection 1 Boundary Conditions[2] (m H_2O / kPa)		Connection 2 Boundary Conditions[3] (m H_2O / kPa)	
Average Daily Demand	394.7	47.8	468.9	47.8	468.9
Max Day + Fire Flow Scenario 1 (per ISDTB-2018-02)	900.5 + 26,000	35.1	344.3	Max 350 L/s @ 140 kPa	
Max Day + Fire Flow Scenarios 2 &3 (per ISDTB-2018-02)	900.5 + 19,000	37.8	370.8	18.5	181.5
Max Day + Fire Flow (per OBC)	900.5 + 3,450	41.5	407.1	40.3	395.3
Peak Hour	1929.3	40.5	397.3	40.5	397.3

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions above for connection 1 to Gladstone Avenue assumed ground elevation equal to 67.0m
3) Boundary condition for connection 2 to Loretta Avenue assumed ground elevation equal to 67.0m

Based on the boundary conditions summarized in ***Table 3***, pressure during average day and peak hour scenarios fall within desired operating pressure found in ***Table 2***. There is available pressure to provide adequate fire flow for all scenarios from the Gladstone Avenue watermain. A maximum of 350 L/s is available at 140 kPa from the Loretta Avenue watermain, it is anticipated the ***26,000 L/min*** described in Scenario 3 can be serviced by watermain within Gladstone Avenue.

Based on correspondence with the City of Ottawa, the Loretta North Avenue will undergo reconstruction, resulting in the replacement of the existing 200 mm diameter watermain between Gladstone and Laurel with a new 200 mm diameter watermain. The future watermain project could potentially affect the boundary condition results, refer to ***Appendix B*** for correspondence with the City.

The required fire flow was estimated using two methods. The ***OBC*** method resulted in a fire flow of ***3,450 L/min***. Fire flow calculated using the ***ISTDB-2018-02*** method used the following assumptions from the Architect, refer to ***Appendix B*** for correspondence:

- Type of construction – Non-Combustible Construction
- Occupancy type – Limited Combustible
- Sprinkler Protection – Sprinklered - Supervised

The above assumptions were used to estimate the fire flow requirement for 3 different scenarios. For scenario 1, the calculated fire flow was approximately ***26,000 L/min*** to accommodate the fire flow requirement resulting from Tower 1. For scenarios 2 and 3, the calculated fire flows were both approximately ***19,000 L/min*** to accommodate fire flow requirements from Towers 2 and 3 respectively. It must be noted that actual building materials selected will affect the estimated flow. A certified fire protection system specialist will need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

3.3 Water Supply Conclusion

The anticipated water demand based on the concept plan was submitted to the City of Ottawa for establishing boundary conditions. As demonstrated by ***Table 3***, the municipal system is capable of delivering water within the ***Water Supply Guidelines*** pressure range.

A certified fire protection system specialist will need to be employed in order to design the building's fire suppression system and confirm the maximum fire flow demand for the design. However, the current maximum fire flow that can be supplied to the contemplated development exceeds the maximum fire flow required as per ***ISTDB-2018-02*** calculations.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within Mooney's Bay Collector Sewer catchment area, as shown by the ***Sanitary & Storm Collection System Maps,*** included in ***Appendix C***. There is an existing 1050 mm diameter Mooney's Bay Collector Trunk sanitary sewer within Loretta Avenue and within Gladstone Avenue east of the Gladstone and Loretta intersection. A 250 mm diameter sanitary sewer exists within Gladstone Avenue fronting the subject property.

Table 4, below, summarizes the estimated wastewater flows for the existing development.

Table 4
Summary of Estimated Existing Peak Wastewater Flow

Design Parameter	Existing Flow (L/s)
Estimated Average Dry Weather Flow	0.75
Estimated Peak Dry Weather Flow	1.13
Estimated Peak Wet Weather Flow	1.46

The existing building is comprised primarily of commercial space and is estimated to have a peak wastewater flow of **1.46 L/s**.

4.2 Wastewater Design

The contemplated development is anticipated to discharge to the 1050 mm diameter sanitary trunk within Loretta Avenue.

Table 5, below, summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 5
Wastewater Design Criteria

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential 3 Bedroom Apartment	3.1 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 3.8, Min 2.0
Commercial Floor Space	5 L/m²/d
Commercial Office Space	75 L/9.3m²/d
Infiltration and Inflow Allowance	0.33 L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 6 below demonstrates the anticipated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 6
Summary of Estimated Proposed Peak Wastewater Flow

Design Parameter	Proposed Flow (L/s)
Estimated Average Dry Weather Flow	6.79
Estimated Peak Dry Weather Flow	18.56
Estimated Peak Wet Weather Flow	18.89

The anticipated peak wet weather flow of ***18.89 L/s*** is a ***17.43 L/s*** increase from the existing condition.

It is anticipated that the 1050 mm trunk sewer can accommodate the increase in flow. The City of Ottawa will need to confirm available capacity in the trunk sewer.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Mooney's Bay Collector Trunk sanitary sewer. The anticipated wet weather flow is ***18.89 L/s*** which is a ***17.43 L/s*** increase from the existing condition.

It is anticipated that the existing 1050 mm sanitary trunk sewer within Loretta and Gladstone Avenues will be capable of accommodating the increase in flow.

The proposed wastewater servicing design conforms to all relevant City Guidelines and Policies.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Ottawa Central sub-watershed. As such, approvals for contemplated developments within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix A***.

Existing 1350 mm diameter Mooney's Bay Collector Storm Sewer Trunk runs along Loretta Avenue and Gladstone Avenue east of Loretta and Gladstone intersection.

It is anticipated that the existing development contains no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized in ***Table 7,*** below

Table 7
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	192.0
5-year	260.5
100-year	496.0

5.2 Post-development Stormwater Management Target

City of Ottawa Standards and pre-consultation was used to determine stormwater management requirements, where the development is required to:

- Meet an allowable release rate based on the lesser of either the existing calculated Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 5-year storm with a time of concentration equal to or greater than 10 minutes;
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site; and
- Based on coordination with the RVCA, enhanced quality level treatment (80% TSS removal) will be required for the contemplated development; correspondence with the RVCA is included in ***Appendix A***.

Based on the above, the allowable release rate for the contemplated development is ***144.7 L/s***. Refer to city pre-consultation correspondence in ***Appendix A.***

5.3 Proposed Stormwater Management System

It is anticipated that the stormwater outlet from the contemplated development will discharge to the existing 1350 mm diameter Mooney's Bay Collector Storm sewer within Loretta Avenue. The contemplated development is proposed to utilize an internal cistern to meet the stormwater objectives.

Table 8 below summarizes post-development flow rates. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to Loretta Avenue and Gladstone Avenue right-of-ways without flow attenuation. These areas will be compensated for in areas with flow attenuation.

Table 8
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	26.0	0.0	49.6	0.0
Attenuated Areas	50.2	130.2	95.1	246.8
Total	**76.2**	**130.2**	**144.7**	**246.8**

It is anticipated that approximately ***246.8 m^3*** of storage, provided via an internal cistern, will be required on site to attenuate flow to the established release rate of ***144.7 L/s***; storage calculations are contained within ***Appendix D***.

Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors including, but not limited to, grading constraints and external drainage.

To meet quality controls, on-site treatment including LID measures and oil/grit separators will be contemplated to achieve 80% TSS removal.

5.4 Stormwater Servicing Conclusions

In accordance with City of Ottawa ***City Standards***, post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm. The post-development allowable release rate was calculated as ***144.7 L/s***; it is estimated that ***246.8 m^3*** of storage provided by an internal cistern to meet the established release rate.

Based on coordination with the RVCA, enhanced quality level treatment (80% TSS removal) will be required for the contemplated development; correspondence with the RVCA is included in ***Appendix A***. To meet quality controls, on-site treatment including LID measures and oil/grit separators will be contemplated to achieve 80% TSS removal.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies for approval.

6.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Trinity Development Group Inc. to prepare an Assessment of Adequacy of Public Services report in support of the application for an Official Plan and Zoning Bylaw Amendment at 145 Loretta Avenue North and 951 Gladstone Avenue. The preceding report outlines the following:

- Based on boundary conditions provided by the City, the existing municipal water infrastructure is capable of providing the contemplated development with water within the City's required pressure range;
- The ISDTB-2018-02 method for estimating maximum fire flow indicated ***26,000 L/min*** is required for the proposed development;
- The proposed development is anticipated to have a peak wet weather flow of ***18.89 L/s***, which is a ***17.43 L/s*** increase from the existing condition. It is anticipated that the 1050 mm diameter Mooney's Bay Collector Trunk sewer is capable of accommodating this increase in flow;
- Based on the City of Ottawa's City Standards the contemplated development will be required to attenuate post development flows to an equivalent release rate of ***144.7 L/s*** for all storms up to and including the 100-year storm event;
- It is contemplated that stormwater objectives will be met by an internal cistern, it is estimated that ***246.8 m^3*** of onsite storage will be required to attenuate flow to the established release rate;
- To meet quality controls, on-site treatment including various LID and oil/grit separators will be contemplated to achieve 80% TSS removal.

Prepared by,

David Schaeffer Engineering Ltd.

Per: Amr Salem

Reviewed by,

David Schaeffer Engineering Ltd.

LICENSED PROFESSIONAL ENGINEER
S. L. MERRICK
100186523
2018-10-30
PROVINCE OF ONTARIO

JOB # 18-1026

Per: Steven L. Merrick, P.Eng

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1026 04/10/2018

	4.1 General Content	
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☐	Reference to geotechnical studies and recommendations concerning servicing.	N/A
☐	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	N/A

	4.2 Development Servicing Report: Water	
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☐	Analysis of available capacity in existing public infrastructure.	N/A
☐	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	N/A
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, Section 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☐	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	N/A
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 6.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

Amr Salem

From: Amr Salem
Sent: September 28, 2018 10:26 AM
To: 'Buchanan, Richard'
Subject: RE: 1026 - 145 Loretta Ave North/ 951 Gladstone Ave

Hello Richard,

Yes, that is what we assumed. Thank you for confirming.

Regards,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Sent: September 26, 2018 4:01 PM
To: Amr Salem <ASalem@dsel.ca>
Subject: FW: 1026 - 145 Loretta Ave North/ 951 Gladstone Ave

Hi Amr

You are proposing to outlet into the Mooney's Bay Storm Collector. We require a C=0.5 for a 1:5 year storm event as the control flow to the system (up to the 1:100 year storm event) and a 10 min concentration time?

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

From: Amr Salem <ASalem@dsel.ca>
Sent: Wednesday, September 26, 2018 1:37 PM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 1026 - 145 Loretta Ave North/ 951 Gladstone Ave

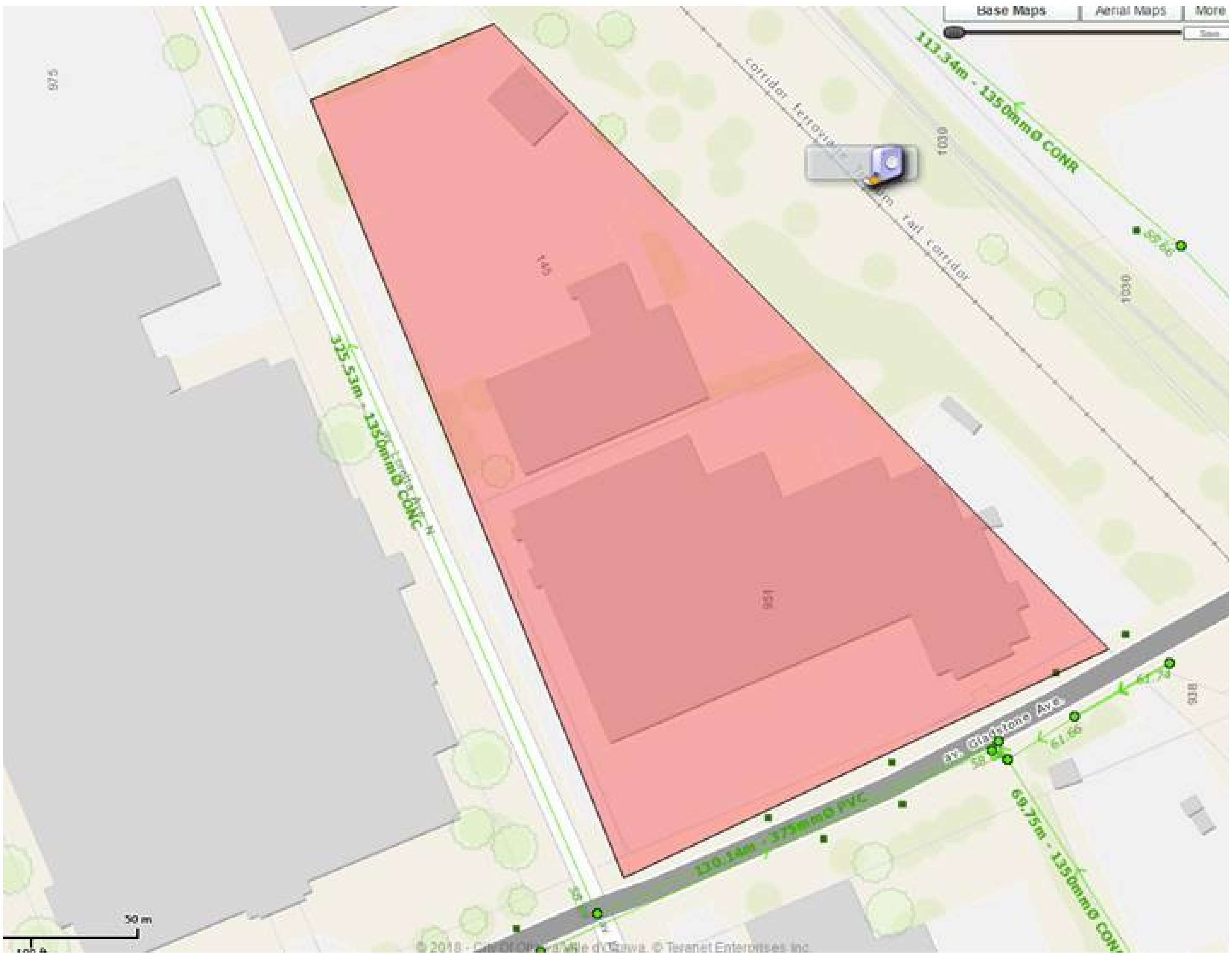
Hello Richard,

Can you please provide your input regarding the required Stormwater Management criteria for the subject property at 145 Loretta Avenue North and 951 Gladstone Avenue;

It is proposed that the development will discharge to the municipal infrastructure (1350 mm Diameter Storm Sewer) within Lorretta Avenue.

It is assumed that the site would need to meet an allowable release rate based on either a Rational method Coefficient of 0.50 or the calculated existing Rational Method Coefficient (the lesser), employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration.

Can you please confirm the assumption stated above.



Please feel free to contact me if you have any questions,

Thank you,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

Amr Salem

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: September 26, 2018 9:29 AM
To: Amr Salem
Cc: Steve Merrick
Subject: RE: 1026- 145 Loretta Ave N/951 Gladstone Ave

Hi Amr,

The RVCA looks for on-site enhance level of protection (80% TSS Removal) for quality control for sites less than 2km away from an outlet without an intervening storm water management facility. Specifically as it relates to surface parking, this standard is expected to be achieved, on-site best management practices including LID could be provided and demonstrated through the Site Servicing report.

Thanks,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Amr Salem <ASalem@dsel.ca>
Sent: Wednesday, September 26, 2018 9:24 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: FW: 1026- 145 Loretta Ave N/951 Gladstone Ave

Good morning Eric,

I just wanted to follow up on this. Did you get a chance to review?

Please let me know if you have any questions.

Thank you,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: September 21, 2018 1:47 PM
To: Amr Salem <ASalem@dsel.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>; Eric Lalande <eric.lalande@rvca.ca>
Subject: RE: 1026- 1045 Loretta Ave N/951 Gladstone Ave

Good Afternoon Amr,

I am forwarding this to Eric as it would be in his area.

From: Amr Salem <ASalem@dsel.ca>
Sent: Friday, September 21, 2018 11:47 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 1026- 1045 Loretta Ave N/951 Gladstone Ave

Good morning Jamie ,

We wanted to consult with you regarding a mixed-use development we are working on located at the intersection of Gladstone Avenue and Lorretta Avenue North.

The existing stormwater on site discharges to the municipal infrastructure (1350 mm Diameter Storm Sewer) within Gladstone Avenue and Lorretta Avenue. The stormwater collected from the site travels approximately 1.3 km through municipal sewer to a direct outlet into the Ottawa River.

The development proposes to construct new mixed use buildings (commercial/office/residential) consisting of three high-rise residential towers with one of which stemming from a large commercial/office building fronting Gladstone Ave with the other towers located to the North. The site will be landscape with storm water primarily coming from the roof tops collected from the towers. There will be approximately parking for 14 cars on the surface of the lot with the majority of parking located underground.

At present, the existing site area consists of mostly paved asphalt for surface parking (50+ spots) and 4 buildings.

Can you please provide your input regarding quality controls that maybe required for the site.

Please feel free to contact me if you have any questions.

Regards,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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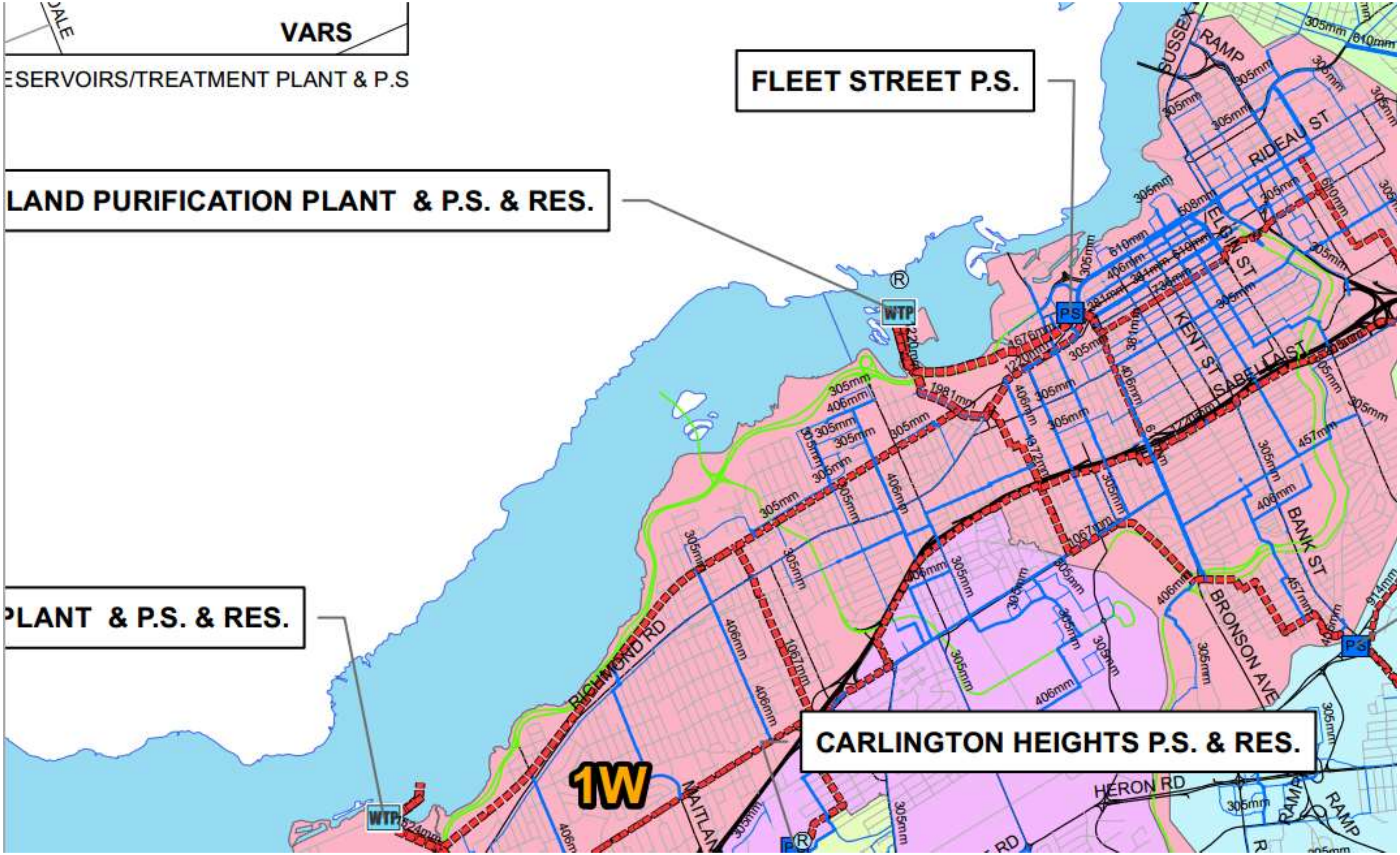
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

APPENDIX B

Water Supply


VARS
ESERVOIRS/TREATMENT PLANT & P.S
FLEET STREET P.S.
LAND PURIFICATION PLANT & P.S. & RES.
PLANT & P.S. & RES.
CARLINGTON HEIGHTS P.S. & RES.
1W
WTP
PS
RIDEAU ST
ELGIN ST
KENT ST
BANK ST
BRONSON AVE
RICHMOND RD
HERON RD
RAMP
305mm
406mm
457mm
508mm
610mm
914mm
1067mm
1372mm
1676mm
1981mm

2012 Water Distribution System

Department of Infrastructure Services

Scale 1:2,500

Ottawa

Legend

- Public Hydrant
- Private Hydrant
- Summer only Flusher Hydrant
- Flusher Hydrant
- Gate Valve
- Tapping Valve
- Butterfly Valve
- Buried Valve
- Drain Pipe
- Check Valve
- Closed Valve
- Drain-Out Valve
- Left Hand Valve
- Spot Elevation
- Pressure Reducing Valve
- Air Relief Valve
- Bypass Valve
- Feedermain Valve
- Inspection Plate
- Cap
- Reducer
- Jump
- Water Meter
- Water Service
- Backbone Pipe
- Watermain with Pipe Diameter, Material and Install Year
- Pipe Casing
- Pressure Zone Delineation and Identifier
- Well
- Elevated Tank
- Water Pumping Station
- Water Reservoir
- Water Treatment Plant

Pipe Equivalents

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

Pipe Materials

A - ASBESTOS
CI - CAST IRON
CO - COPPER
CO0 - AWWA C300
CO1 - AWWA C301
CO2 - AWWA C302
CO3 - AWWA C303
DI - DUCTILE IRON
PE - POLYETHYLENE (DR11 TO DR21)
PVC - POLYVINYL CHLORIDE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON
UNK - UNKNOWN MATERIAL

	364-031	366-031	368-031	370-031
362-030	364-030	366-030	368-030	370-030
362-029	364-029	366-029	368-029	370-029
362-028	364-028	366-028	368-028	370-028
362-027	364-027	366-027	368-027	370-027

145 Loretta Avenue North / 951 Gladstone Avenue
Trinity Development Group Inc
Existing Site Water Demand

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	0	0.0	0.0	0.0	0.0	0.0	0.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate		Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Water Closets	150.0	L/hr		0.00	0.0	0.0	0.0	0.0	0.0
Restaurant	125.0	L/seat/d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space**	5.0	$L/m^2/d$	6,482	32.41	22.5	48.6	33.8	87.5	60.8
Laundry	1,200.0	L/machine/d		0.00	0.0	0.0	0.0	0.0	0.0
School	70	L/student/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
			Total I/CI Demand	32.4	22.5	48.6	33.8	87.5	60.8
			Total Demand	**32.4**	**22.5**	**48.6**	**33.8**	**87.5**	**60.8**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines
**Assuming a 12 hour commercial operation

145 Loretta Avenue North / 951 Gladstone Avenue
Trinity Development Group Inc
Proposed Site Water Demand

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4	192	269
1 Bedroom	1.4	342	479
2 Bedroom	2.1	394	828
3 Bedroom	3.1	3	10
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	1586	444.1	308.4	1110.2	771.0	2442.4	1696.1

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate		Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Office	75	L/9.3m^2/d	13,169	106.20	73.8	159.3	110.6	286.7	199.1
Commercial floor space**	5	L/m^2/d	3,628	18.14	12.6	27.2	18.9	49.0	34.0
Laundry	1,200	L/machine/d		0.00	0.0	0.0	0.0	0.0	0.0
School	70	L/student/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand				124.3	86.3	186.5	129.5	335.7	233.1
Total Demand				**568.4**	**394.7**	**1296.7**	**900.5**	**2778.2**	**1929.3**

**Assuming a 12 hour commercial operation

145 Loretta Avenue North / 951 Gladstone Avenue
Proposed Site Conditions
FUS Calculation Scenario 1
Tower 1 + Office + Retail + Existing Building

Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	44443.1	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	37103.5 L/min	
	37000.0 L/min	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**31450.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction	**-15725 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Non-Combustible	10.1m-20m	33	35	1155	15%
S	Non-Combustible	20.1m-30m	78	3	234	10%
E	Non-Combustible	>45m	33	0	0	0%
W	Non-Combustible	20.1m-30m	49	1	49	8%
		% Increase				**33%** *value not to exceed 75%*

Increase	**10378.5 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	26103.5 L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	26000.0 L/min	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _________________.
-Calculations based on Fire Underwriters Survey - Part II

145 Loretta Avenue North / 951 Gladstone Avenue
Proposed Site Conditions
FUS Calculation - Scenario 2
Tower 2

Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C 0.8 *Type of Construction Coefficient per FUS Part II, Section 1*

A 28851.0 m^2 *Total floor area based on FUS Part II section 1*

Fire Flow 29894.6 L/min
30000.0 L/min *rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow **25500.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction **-12750 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Non-Combustible	20.1m-30m	28	30	840	10%
S	Non-Combustible	10.1m-20m	30	41	1230	15%
E	Non-Combustible	>45m	33	0	0	0%
W	Non-Combustible	>45m	33	1	33	0%
		% Increase				**25%** *value not to exceed 75%*

Increase **6375.0 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow 19125.0 L/min *fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
19000.0 L/min *rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _________________.
-Calculations based on Fire Underwriters Survey - Part II

145 Loretta Avenue North / 951 Gladstone Avenue
Proposed Site Conditions
FUS Calculation - Scenario 3
Tower 3

Fire Flow Estimation per Fire Underwriters Survey
Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	23600.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	27037.6 L/min	
	27000.0 L/min	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	**22950.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction	**-11475 L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC
N	Non-Combustible	10.1m-20m	34	1	34	13%
S	Non-Combustible	20.1m-30m	14	35	490	10%
E	Non-Combustible	>45m	26	0	0	0%
W	Non-Combustible	20.1m-30m	26	1	26	8%
		% Increase				**31%** *value not to exceed 75%*

Increase	**7114.5 L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	18589.5 L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	19000.0 L/min	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _________________.
-Calculations based on Fire Underwriters Survey - Part II

Amr Salem

From: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Sent: October 11, 2018 9:25 AM
To: Amr Salem
Cc: O'Connor, Ann
Subject: FW: 1026 - Loretta and Gladstone - Boundary Request

Amr

FYI

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

From: Tremblay, Marc (ISD)
Sent: Thursday, October 11, 2018 9:23 AM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Subject: RE: 1026 - Loretta and Gladstone - Boundary Request

Hi Richard

The existing 200mm watermain on Loretta North between Gladstone and Laurel is to be replaced with a new 200mm diameter watermain as part of the road reconstruction project. This reconstruction work will not occur until 2020 at the earliest.

Regards
Marc

From: Buchanan, Richard
Sent: Thursday, October 11, 2018 8:24 AM
To: 'Amr Salem' <ASalem@dsel.ca>
Subject: FW: 1026 - Loretta and Gladstone - Boundary Request

Good Morning Amr

Please note that I believe there's future watermain projects (on Loretta specifically) in this area that could affect the results, especially the fire flow results. I'm trying to confirm with our water division to see what the plan is and when it's scheduled for.

The following are boundary conditions, HGL, for hydraulic analysis at 1026 Loretta/Gladstone (zone 1W) assumed to be connected to the 203mm on Gladstone (Connection 1) and 203mm on Loretta (Connection 2). See attached PDF for locations.

	Connection 1 (Gladstone)	Connection 2 (Loretta)
Min HGL	107.5m	107.5m
Max HGL	114.8m	114.8m
Max day + FireFlow (57.5L/s),	108.5m	107.3m
Max day + FireFlow (317 L/s),	104.8m	85.5m
Max day + FireFlow (433 L/s),	102.1m	Available Flow @ 20psi = 350 L/s assuming a ground elevation of 67m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

From: Amr Salem <ASalem@dsel.ca>
Sent: Thursday, September 27, 2018 1:04 PM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 1026 - Loretta and Gladstone - Boundary Request

Good afternoon Richard,

We would like to kindly request boundary conditions for the proposed development at **145 Loretta Avenue North/ 951 Gladstone Avenue** using the following proposed development demands:

1. Location of Service / Street Number: **145 Loretta Avenue North/ 951 Gladstone Avenue**

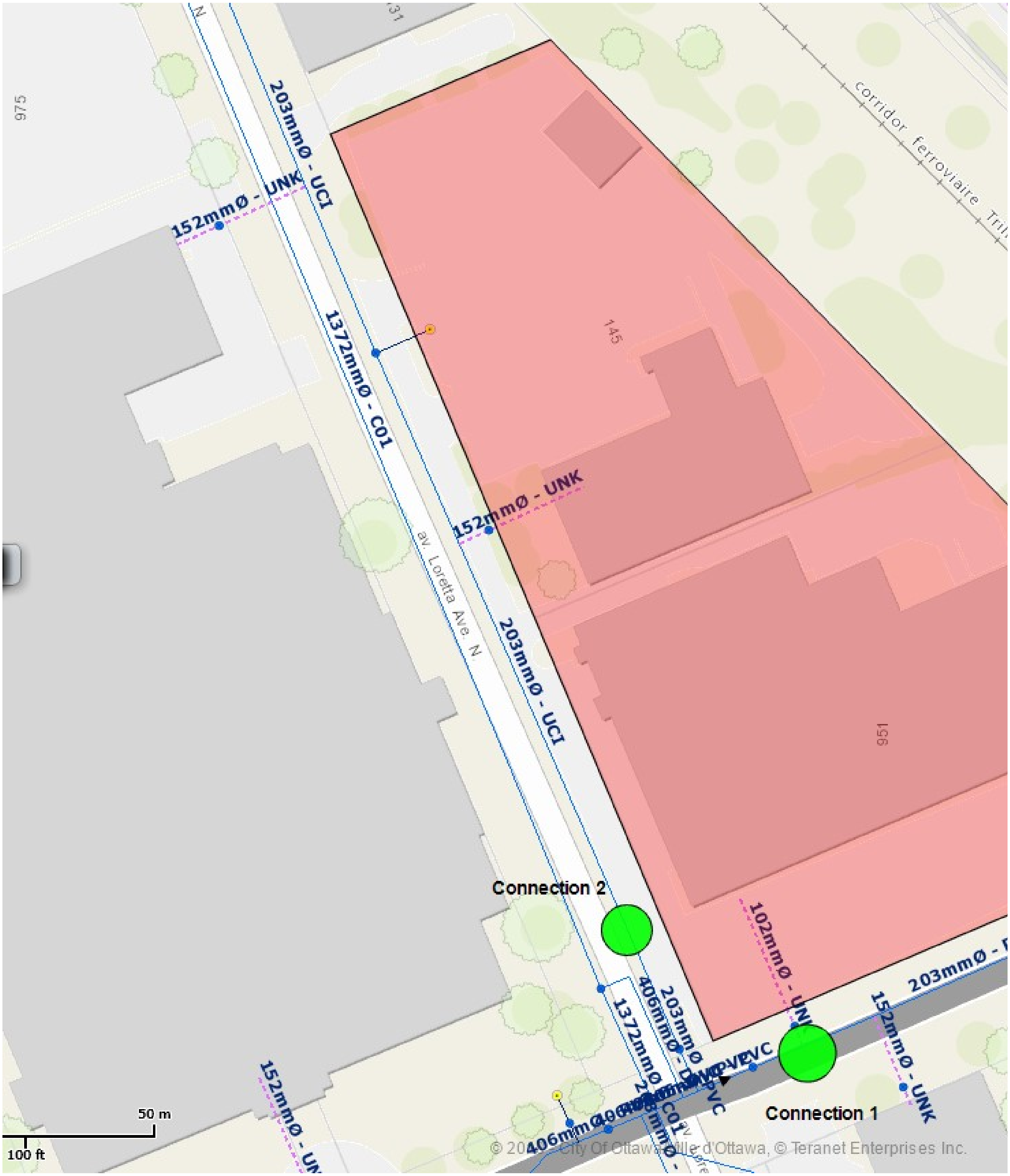
2. Type of development: **The proposed mixed-use development involves 3 multi-storey residential towers (30, 35 and 40 storeys) above a common retail and office podium, consisting of a <u>total of 931 residential units</u>. An underground parking garage extending the footprint of the site is also proposed. Please note that the existing 3-storey Standard Bread Building is to be retained.** *Please find attached the Site Plan for reference*.

3. Proposed Connection points:
   - **Connection 1 to existing 203mm diameter watermain along Gladstone Avenue east of Loretta and Gladstone intersection.**
   - **Connection 2 to existing 203mm diameter watermain along Loretta Avenue north of Loretta and Gladstone intersection.**

     Please see the diagram below for reference.

4. **<u>Please provide pressures for the following water demand scenarios required for the proposed development</u>**:

	L/min	L/s
Avg. Daily	397.6	6.63
Max Day + FUS 1	904.8 + 26000.0 = 26904.8	15.1 + 433.3 = 448.4
Max Day + FUS 2/3	904.8 + 19000.0 = 19904.8	15.1 + 316.7 = 331.8
Max Day + OBC	904.8 + 3450.0 =4354.8	15.1 + 57.5 = 72.6
Peak Hour	1937.1	32.3



Please find attached the related water demand and FUS calculations as well as OBC demand methodology used for reference.

If you have any questions please feel free to contact me.

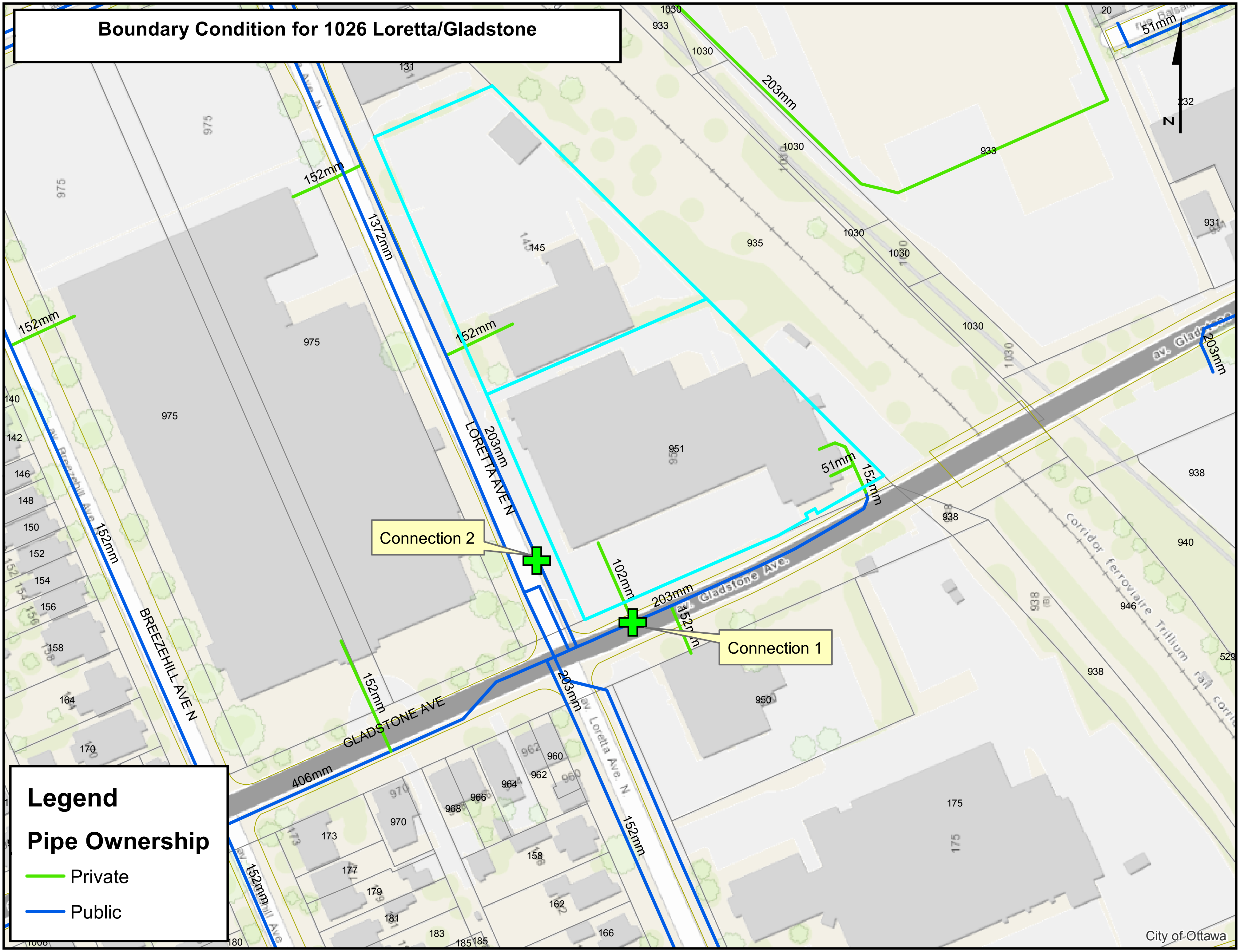
Thank you,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca



Boundary Condition for 1026 Loretta/Gladstone
Connection 1
Connection 2
LORETTA AVE N
GLADSTONE AVE
BREEZEHILL AVE N
av. Gladstone Ave.
av. Loretta Ave. N
corridor ferroviaire Trillium rail corridor
1372mm
406mm
203mm
152mm
102mm
51mm
N
Legend
Pipe Ownership
Private
Public
City of Ottawa

Amr Salem

From: Todd Duckworth <tduckworth@hobinarc.com>
Sent: September 26, 2018 3:10 PM
To: Amr Salem
Cc: Steve Merrick; acameron@trinity-group.com; bjhobin@hobinarc.com
Subject: Re: 1026 - Loretta and Gladstone development

Hi Amr,

We suggest all floor assemblies be made to be 2hrs.

For the connections between buildings: there will definitely be a 2hr separation between Retail and Residential occupancies, and at this point we'd suggest using 2hrs between the res towers as well for ease of safety and security.

Best Regards,

Todd

Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7
t 613-238-7200 x130
f 613-235-2005
e tduckworth@hobinarc.com

hobinarc.com

On 9/25/2018 5:36 PM, Amr Salem wrote:

> Hello Tod,
>
> Thanks for your prompt reply.
>
> I wanted to confirm with you that **all** the floor assemblies in **all** proposed buildings will have a fire rating of at least 2 hours?
>
> If that is the case, each floor level will be evaluated *individually* and fire flow demand will be governed by the total ground floor level **only** *(plus the existing 3-storey building)* as opposed to evaluating each building as a whole individually.
>
> Also, can you please let me know if the connections between towers, *please see attached markup*, will have a fire rating of at least 2 hours? I am more interested in the *wall structures* that these connections share with the adjacent buildings.
>
> Please don't hesitate to contact me if you have any questions.
>
> Thanks,
>
> **Amr Salem**
> Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Todd Duckworth <tduckworth@hobinarc.com>
Sent: September 25, 2018 4:07 PM
To: Amr Salem <ASalem@dsel.ca>; bjhobin@hobinarc.com
Cc: Steve Merrick <SMerrick@dsel.ca>; acameron@trinity-group.com
Subject: Re: 1026 - Loretta and Gladstone development

Hi Amr,

Please see responses to your questions below in Red. Let me know if you need any more info.

Thanks,

Todd

Hobin Architecture Incorporated

63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7

t 613-238-7200 x130
f 613-235-2005
e tduckworth@hobinarc.com

hobinarc.com

On 9/20/2018 4:18 PM, Amr Salem wrote:

Hello,

We are preparing an estimate for the total fire demand for the proposed development at 145 Loretta Avenue North/ 951 Gladstone Avenue and hope you could provide input on the items below:

1) We will need to know if the building will be protected by a sprinkler system that is fully supervised. Yes the buildings will be sprinklered with a fully supervised system

2) Would you be able to confirm the ISO construction type for the buildings. I have included the ISO guide in which sections 1, 2 and 3 on pages 3 to 8 provides definitions to clarify as well as the section from the City's technical bulletin.

Note that ISO refers only to fire-resistive for fire ratings not less than 1-hour. Class 3

3) Are there any areas with **a minimum fire rating of 2 hours**? The reason that's important is because any area that is surrounded by firewalls/has a fire rating of more than 2 hours can be evaluated individually. The floor assemblies will be 2 hour rated and all exit stairs will be 2 hour rated. The main electrical hydro vaults will be 3 hour rated enclosures.

4) Can we get minimum distance measurements from the proposed buildings to existing adjacent buildings. (This only applies if any adjacent building is **less than 45m** away from any proposed building).

- Approx. distance between south edge of proposed Retail Block and the existing building accross Gladstone to the south is ~23m.
- Approx. distance between west edge of proposed Retail Block and existing Canadian Bank Note building accross Loretta to the west is also ~23m
- Approx distance between north edge of north tower (tower 3) and existing neighbouring building to the north is ~15m
- The existing Standard Bread Building onsite will remain and be attached to the proposed Office/Retail block at the ground floor. There will be a separation of about 4m between the Office Block and Standard Bread on the upper levels.

Please feel free to contact me if you have any questions or would like to discuss.

Thank you,

Amr Salem
Project Coordinator

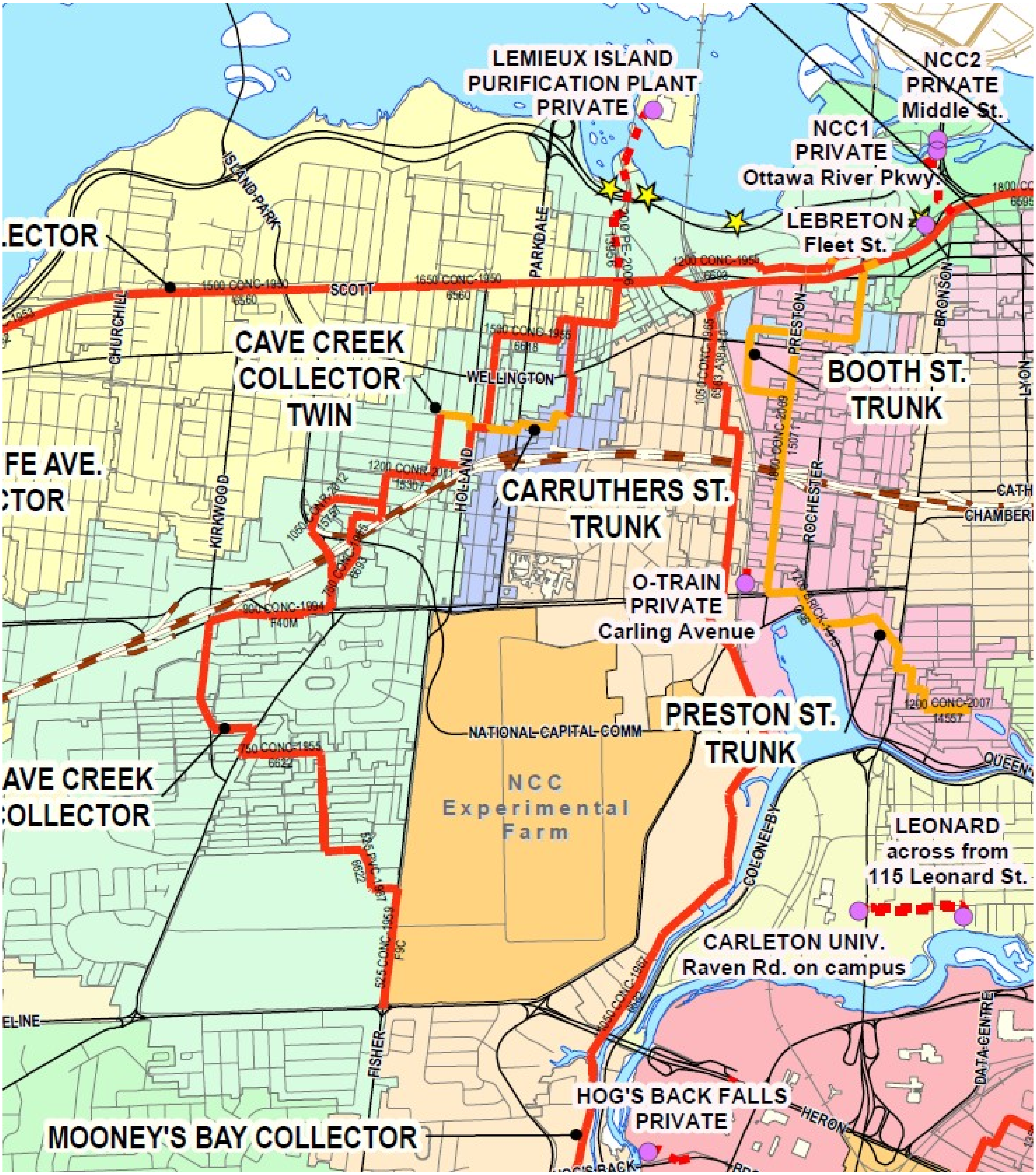
DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

APPENDIX C

Wastewater Collection


LEMIEUX ISLAND
PURIFICATION PLANT
PRIVATE
NCC2
PRIVATE
Middle St.
NCC1
PRIVATE
Ottawa River Pkwy.
LEBRETON
Fleet St.
LECTOR
CAVE CREEK
COLLECTOR
TWIN
BOOTH ST.
TRUNK
FE AVE.
CTOR
CARRUTHERS ST.
TRUNK
O-TRAIN
PRIVATE
Carling Avenue
PRESTON ST.
TRUNK
AVE CREEK
OLLECTOR
NCC
Experimental
Farm
LEONARD
across from
115 Leonard St.
CARLETON UNIV.
Raven Rd. on campus
HOG'S BACK FALLS
PRIVATE
MOONEY'S BAY COLLECTOR
SCOTT
WELLINGTON
CHURCHILL
PARKDALE
PRESTON
BRONSON
ROCHESTER
KIRKWOOD
HOLLAND
FISHER
LYON
ISLAND PARK
NATIONAL CAPITAL COMM
COLONEL BY
HERON
DATA CENTRE
CHAMBERS
QUEEN

145 Loretta Avenue North / 951 Gladstone Avenue
Trinity Development Group Inc
Existing Development Sanitary Flow

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area 1.00 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.33 L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0
Type of Housing	**Per/Bed**	**Beds**	**Pop**
Boarding*	1		0

Total Pop	**0**
Average Domestic Flow	**0.00 L/s**
Peaking Factor	**3.80**
Peak Domestic Flow	**0.00 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Water Closets	150	L/hr		0.00
Restaurant	125	L/seat/d		0.00
Commercial floor space*	5	$L/m^2/d$	6,482	0.75
Laundry*	1,200	L/machine/d		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00

Average I/C/I Flow	**0.75**
Peak Institutional / Commercial Flow	1.13
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**1.13**

** assuming a 12 hour commercial operation*

Total Estimated Average Dry Weather Flow Rate	**0.75 L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.13 L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.46 L/s**

Trinity Development Group Inc
Proposed Development Sanitary Flow

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area	1.00	**ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.33**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	2.3		0
Apartment			
Bachelor	1.4	192	269
1 Bedroom	1.4	342	479
2 Bedroom	2.1	394	828
3 Bedroom	3.1	3	10
Average	1.8		0

Total Pop	**1586**	
Average Domestic Flow	**5.14**	**L/s**
Peaking Factor	**3.13**	
Peak Domestic Flow	**16.09**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Office	75	$L/9.3m^2/d$	13,169	1.23
Restaurant	125	L/seat/d		0.00
Commercial floor space*	5	$L/m^2/d$	3,628	0.42
Laundry*	1,200	L/machine/d		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00

Average I/C/I Flow	**1.65**
Peak Institutional / Commercial Flow	2.47
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**2.47**

** assuming a 12 hour commercial operation*

Total Estimated Average Dry Weather Flow Rate	**6.79**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**18.56**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**18.89**	**L/s**

APPENDIX D

Stormwater Management

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	1.00	ha	
C	0.90	Rational Method runoff coefficient	
L	139	m	
Up Elev	67.25	m	
Dn Elev	64.25	m	
Slope	2.2	%	
Tc	6.0	min	
Tc	10.0	min	<-- Assume 10 minutes as minimum

1) Time of Concentration per Federal Aviation Administration

$$\boxed{t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	**5-year**	**100-year**	
i	76.8	104.2	178.6	mm/hr
Q	192.0	260.5	496.0	L/s

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012
Target Flow Rate

Area	1.00	ha
C	0.50	Rational Method runoff coefficient
t_c	10.0	min *Based on a time of concentration equal to or greater than 10 min*

5-year

i	104.2	mm/hr
Q	144.7	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.100	ha *Conservative estimate of 10% of total site area for unattenuated areas*
C	0.90	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	26.0	26.0	0.0	0.0	178.6	49.6	49.6	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Total Area	0.90	ha
C	0.90	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10	104.2	234.4	50.0	184.5	110.7	178.6	446.4	95.1	351.3	210.8
15	83.6	188.0	50.1	137.9	124.2	142.9	357.2	95.1	262.1	235.9
20	70.3	158.1	50.1	107.9	129.5	120.0	299.9	95.1	204.8	245.7
25	60.9	137.0	50.2	86.8	130.2	103.8	259.6	95.1	164.5	246.8
30	53.9	121.3	50.2	71.1	128.0	91.9	229.7	95.1	134.6	242.2
35	48.5	109.2	50.3	58.9	123.6	82.6	206.4	95.1	111.3	233.8
40	44.2	99.4	50.3	49.1	117.8	75.1	187.9	95.1	92.8	222.6
45	40.6	91.4	50.4	41.0	110.8	69.1	172.6	95.1	77.5	209.3
50	37.7	84.7	50.4	34.3	103.0	64.0	159.9	95.1	64.8	194.3
55	35.1	79.0	50.4	28.6	94.4	59.6	149.1	95.1	53.9	178.0
60	32.9	74.1	50.5	23.7	85.2	55.9	139.7	95.1	44.6	160.6
65	31.0	69.8	50.5	19.4	75.6	52.6	131.6	95.1	36.5	142.4
70	29.4	66.1	50.5	15.6	65.5	49.8	124.5	95.1	29.4	123.3
75	27.9	62.7	50.5	12.2	55.0	47.3	118.1	95.1	23.0	103.6
80	26.6	59.8	50.5	9.2	44.3	45.0	112.5	95.1	17.4	83.3
85	25.4	57.1	50.6	6.5	33.3	43.0	107.4	95.1	12.3	62.6
90	24.3	54.6	50.6	4.1	22.0	41.1	102.8	95.1	7.7	41.4
95	23.3	52.4	50.6	1.8	10.5	39.4	98.6	95.1	3.5	19.8
100	22.4	50.4	50.6	0.0	0.0	37.9	94.8	95.1	0.0	0.0
105	21.6	48.6	50.6	0.0	0.0	36.5	91.2	95.1	0.0	0.0
110	20.8	46.9	50.6	0.0	0.0	35.2	88.0	95.1	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year $Q_{attenuated}$	**50.20 L/s**	**100-year $Q_{attenuated}$**	**95.11 L/s**
5-year Max. Storage Required	**130.2 m^3**	**100-year Max. Storage Required**	**246.8 m^3**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m^3)	100-Year Release Rate (L/s)	100-Year Storage (m^3)
Unattenuated Areas	26.0	0.0	49.6	0.0
Attenututed Areas	50.2	130.2	95.1	246.8
Total	**76.2**	**130.2**	**144.7**	**246.8**

DRAWINGS / FIGURES

9/6/2018

HOBIN ARCHITECTURE

GLADTONE + LORETTA
SITE STATS

Site Area (sq.ft.):	**107,772**
Total GFA, Excl. Parking (sq.ft.)	**1,053,797**
FSI:	**9.78**

Area Schedule (GFA by Floor)

Level	Retail (Incl. Pedestrian Street) (sq.ft.)	Retail Loading (sq.ft.)	Office (sq.ft.)	Existing Building (sq.ft.)	Residential (sq.ft.)			GFA / Level (sq.ft.)	(x) # of Floors	GFA Totals (sq.ft.)
Level P1 - P2								103,476	2	**206,952**
					Cumulative Level 1 Res.					
Level 1	21,686	8,970	0	5,790			23,886	60,332	1	**60,332**
					Tower 1 (34/41 Flrs.)	**Tower 2 (34 /35 Flrs.)**	**Tower 3 (29/30 Flrs.)**			
Level 2 - 3	0	0	28,350	5,790	0	8,750	8,310	51,200	2	**102,400**
Level 4 - 6	0	0	28,350	0	0	8,750	8,310	45,410	3	**136,230**
Level 7 - 23	0	0	0	0	8,800	8,750	8,310	25,860	17	**439,620**
Level 24 - 29	0	0	0	0	9,300	8,750	8,600	26,650	6	**159,900**
Level 30	0	0	0	0	9,300	9,090	8,600	26,990	1	**26,990**
Level 31 - 34	0	0	0	0	9,300	9,090	0	18,390	4	**73,560**
Level 35	0	0	0	0	8,790	9,090	0	17,880	1	**17,880**
Level 36 - 37	0	0	0	0	8,790	0	0	8,790	2	**17,580**
Level 38 - 40	0	0	0	0	5,060	0	0	5,060	3	**15,180**
Level 41	0	0	0	0	4,125	0	0	4,125	1	**4,125**
										1,260,749

Area Schedule (GFA by Type)

GFA Type			GFA Totals (sq.ft)
Retail			21,686
Retail Loading			8,970
Office			141,750
Existing Building			17,370
Residential	Cumulative Level 1 Res.	23,886	
	Tower 1 (34 / 41 Flrs.)	297,575	
	Tower 2 (34 / 35 Flrs.)	299,540	
	Tower 3 (29 / 30 Flrs.)	243,020	
	Total Res.		864,021
			1,053,797

Residential GFA vs Net Area Comparison

Area Type	GFA	Net Area	Efficiency
Tower 1 (34 / 41 Flrs.)	297,575	250,240	84.1%
Tower 2 (34 / 35 Flrs.)	299,540	257,410	85.9%
Tower 3 (29 / 30 Flrs.)	243,020	207,000	85.2%
	840,135	714,650	85.1%

Unit Count

Unit Type	% of total	TOWER 1	TOWER 2	TOWER 3	RES. TOTALS
BACHELOR	20.6%	64	68	60	192
1 BED	36.7%	116	138	88	342
2 BED	42.3%	140	137	117	394
3 BED	0.3%	3	0	0	3
Totals		**323**	**343**	**265**	**931**

HOBIN ARCHITECTURE

GLADTONE + LORETTA
SITE STATS

9/6/2018

Parking Information

No. of Parking Levels:		2
No. of Spaces:	Surface	14
	(P1)	267
	(P2)	267
	Total	**548**

Bylaw Parking Rates (Bylaw 2008-250, Section 103 - "Maximum Limit on Number of Parking Spaces Near Rapid Transit Stations"):

(a) Apartment Bldg Mid - High Rise (Combined Resident & Visitor)	1.75	MAX. spaces per dwelling unit
(e) Office	2.2	MAX. spaces per 1076 sq.ft. ($100m^2$) GFA
(h) Retail	3.6	MAX. spaces per 1076 sq.ft. ($100m^2$) GFA

Bylaw Bicycle Parking Rates (Bylaw 2008-250, Section 111 - "Bicycle Parking Space Rates & Provisions"

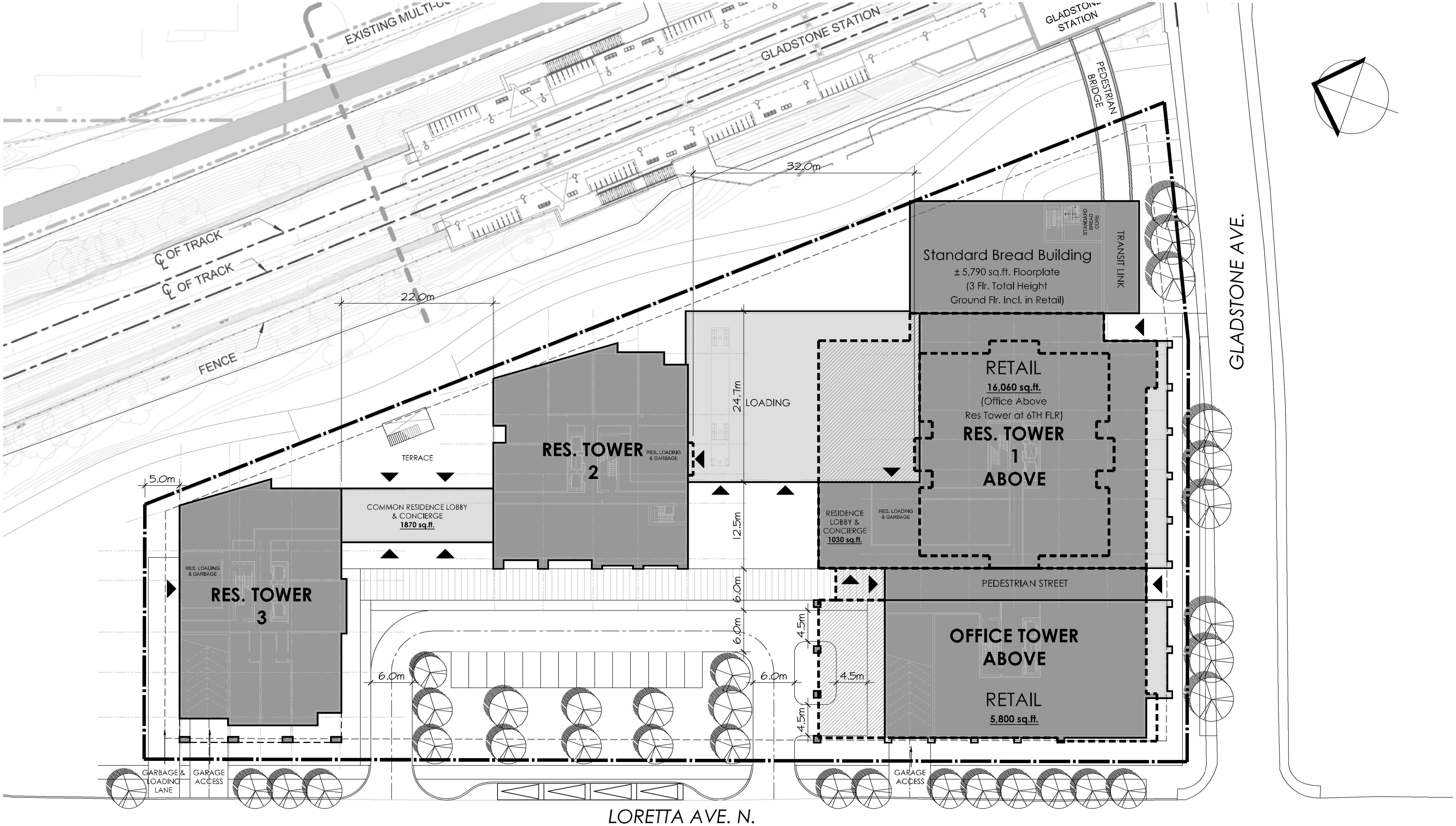
(b) Apartment Bldg	0.5	MIN. per dwelling unit (x931)	466
(e) Office & Retail	1	MIN. Space per 2691 sq.ft. ($250m^2$) GFA (154,468 / 2,691)	57
Total Required			**523**
Total Provided (Anticipated)			**523**

Bylaw Amenity Requirements (Bylaw 2008-250, Table 137 - "Amenity Area")

(5) Apartment Bldg Mid - High Rise: $6m^2$ per dwelling unit (x931) = **5,586 m^2**

Amenity Area Provided

Location of Amenity	Area (m^2)
Landscape Area at Grade	1,616
Rooftop Terrace	1,171
Indoor Communal Amenity	772
Balconies	2,234
Total	**5,793**



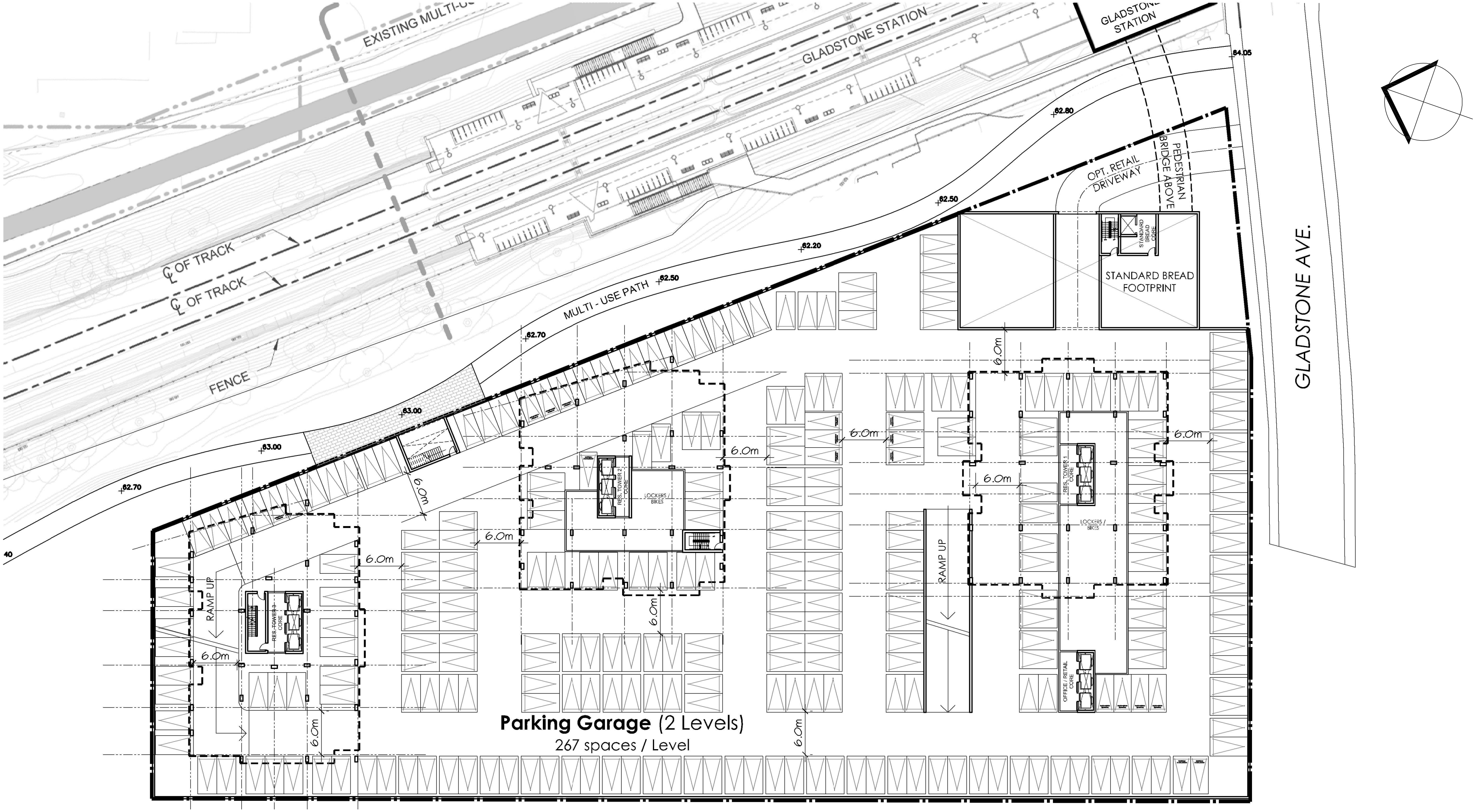
GLADSTONE + LORETTA

Site Plan

scale 1:500

TRINITY

HOBIN



HOBIN

GLADSTONE + LORETTA

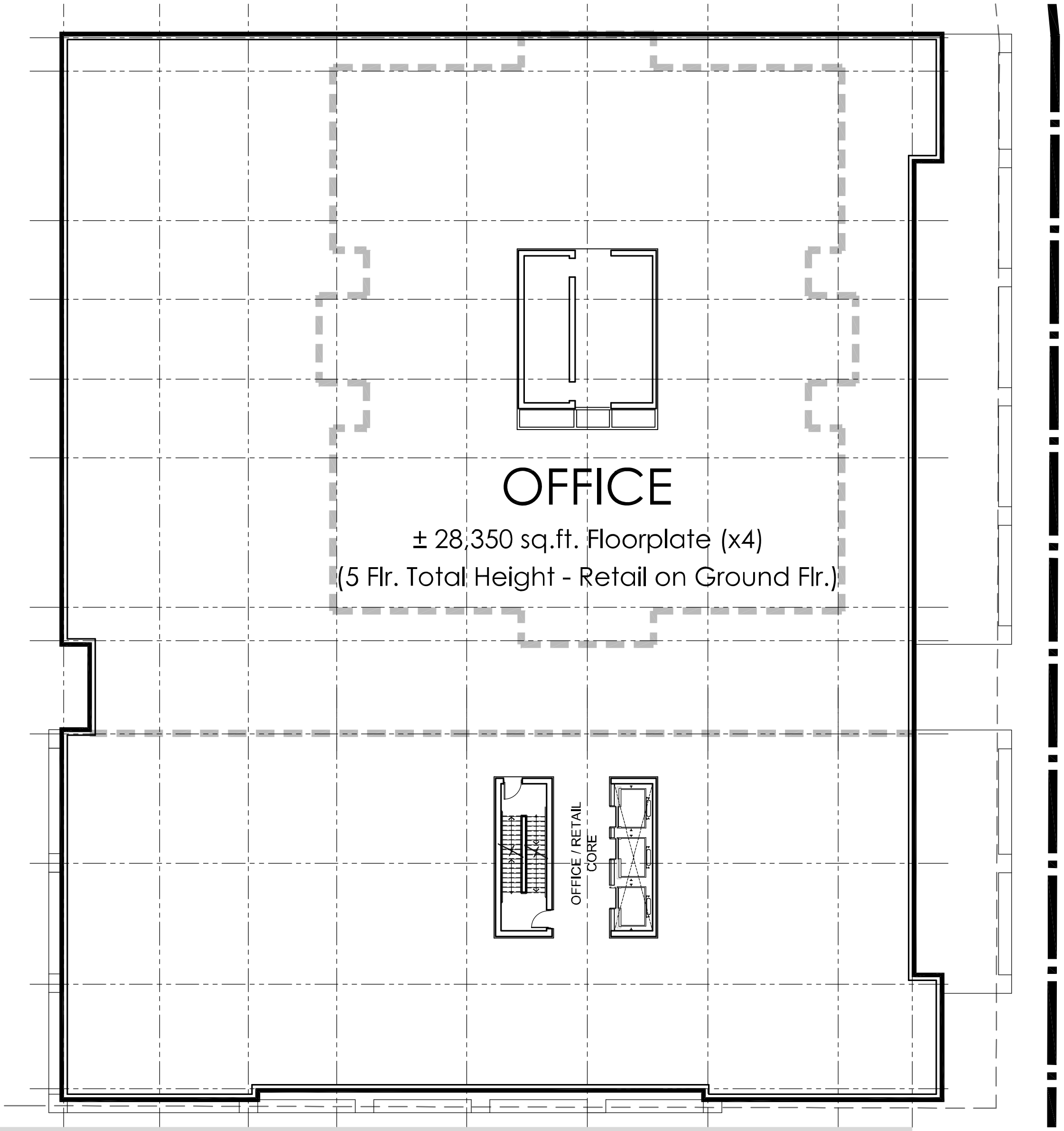
Garage Plan

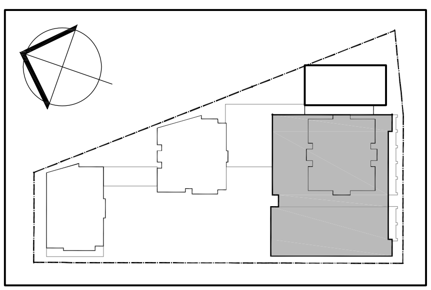
scale 1:500

TRINITY

TYPICAL OFFICE FLOOR x5 (Flr. 2-6)		
GFA	28,350 ft²	(2633.8 m²)

OFFICE BUILDING TOTALS (5 Flrs. Office - 6 Flrs. Total Height)		
GFA	141,750 ft²	(13,169.0m²)





HOBIN

GLADSTONE + LORETTA
Office Building

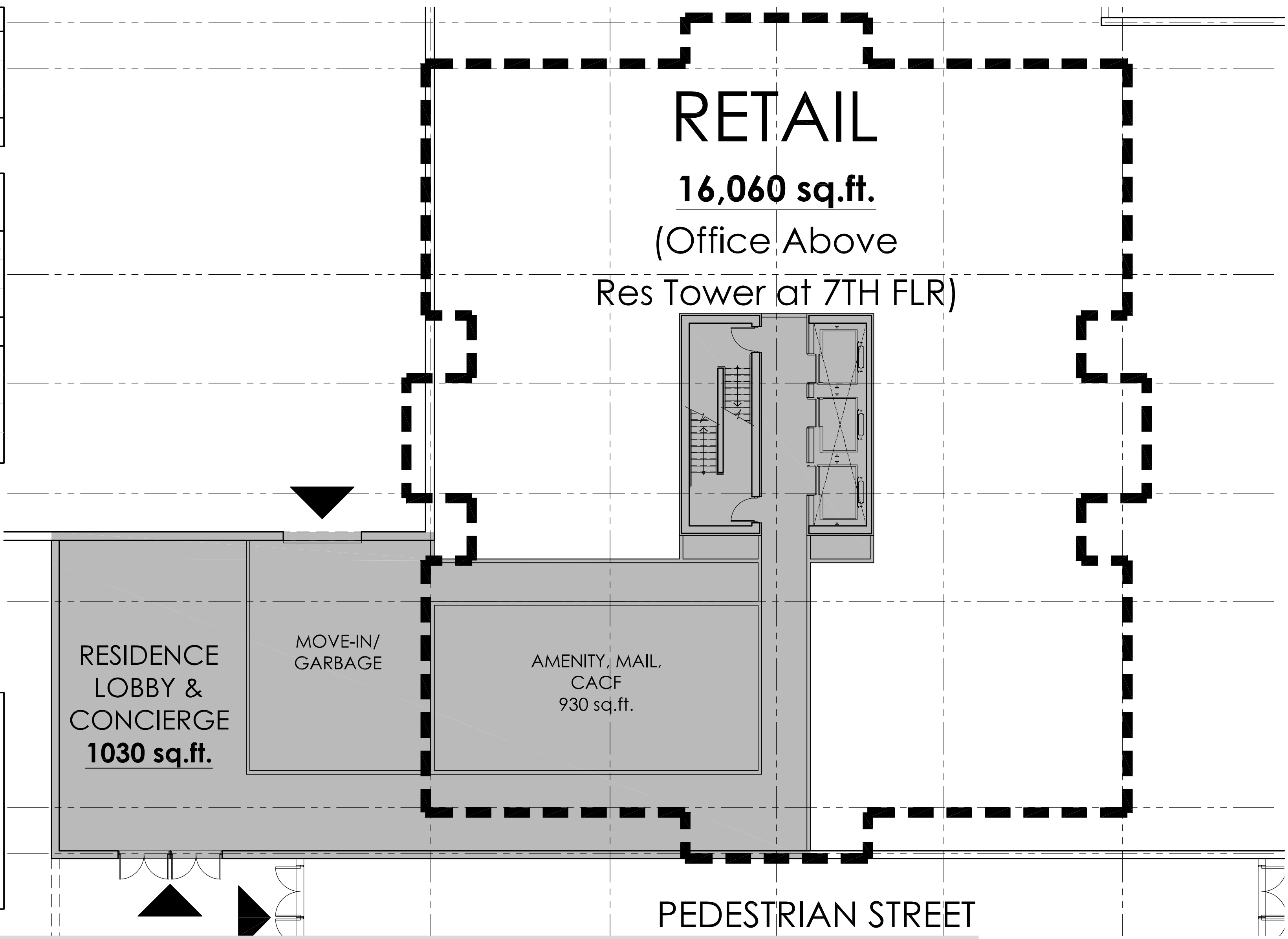
Typical Plan (Flr. 2 - 6)

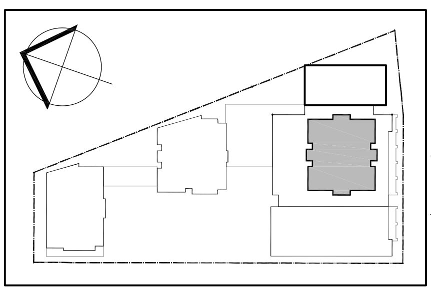
scale 1:250

TRINITY

GROUND FLOOR x1 (Flr. 1)		
GFA	4,690 ft²	(435.8 m²)
NET RES.	0	
EFFICIENCY	NA	
UNITS	0	

RES. TOWER 1 TOTALS (34 Flrs. Res. - 41 Flrs. Total Height)		
GFA	297,575 ft²	(27,262.4m²)
NET RES.	250,240 ft²	(23,248.1m²)
EFFICIENCY	84.1 %	
UNITS	323 (Total)	
Bachelor	64	(~20%)
1 Bed	116	(~35%)
2 Bed	140	(~43%)
3 Bed	3	(~2%)





HOBIN

GLADSTONE + LORETTA

Residential Tower 1

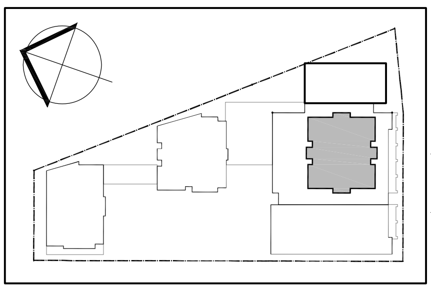
Ground Floor Plan

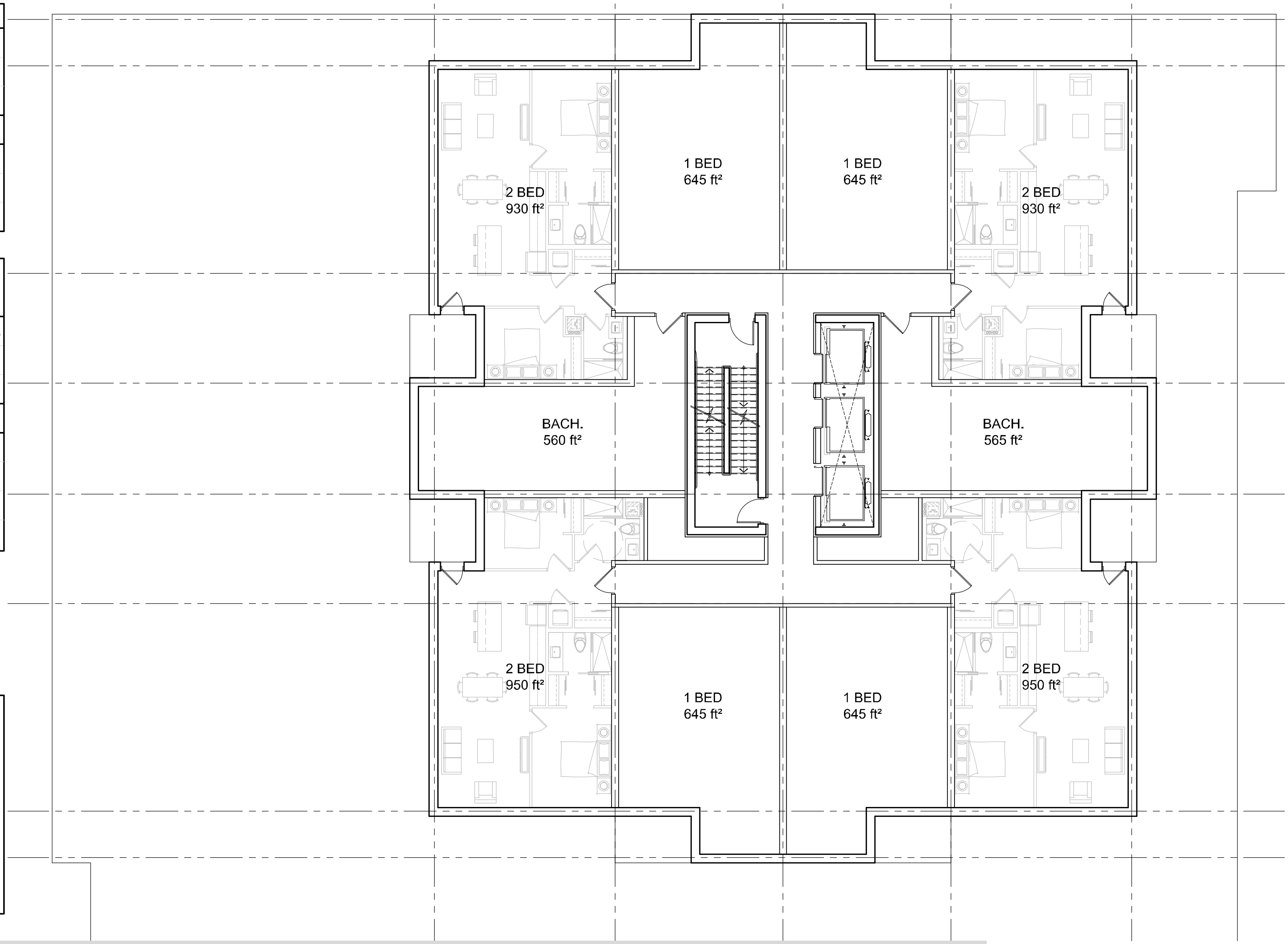
scale 1:150

TRINITY

TYPICAL FLOOR x17 (Flr. 7-23)		
GFA	8,800 ft²	(817.5 m²)
NET RES.	7,470 ft²	(694.0 m²)
EFFICIENCY	84.9 %	
UNITS	10	
Bachelor	2	
1 Bed	4	
2 Bed	4	

RES. TOWER 1 TOTALS (34 Flrs. Res. - 41 Flrs. Total Height)		
GFA	297,575 ft²	(27,262.4m²)
NET RES.	250,240 ft²	(23,248.1m²)
EFFICIENCY	84.1 %	
UNITS	323 (Total)	
Bachelor	64	(~20%)
1 Bed	116	(~35%)
2 Bed	140	(~43%)
3 Bed	3	(~2%)





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GLADSTONE + LORETTA
Residential Tower 1

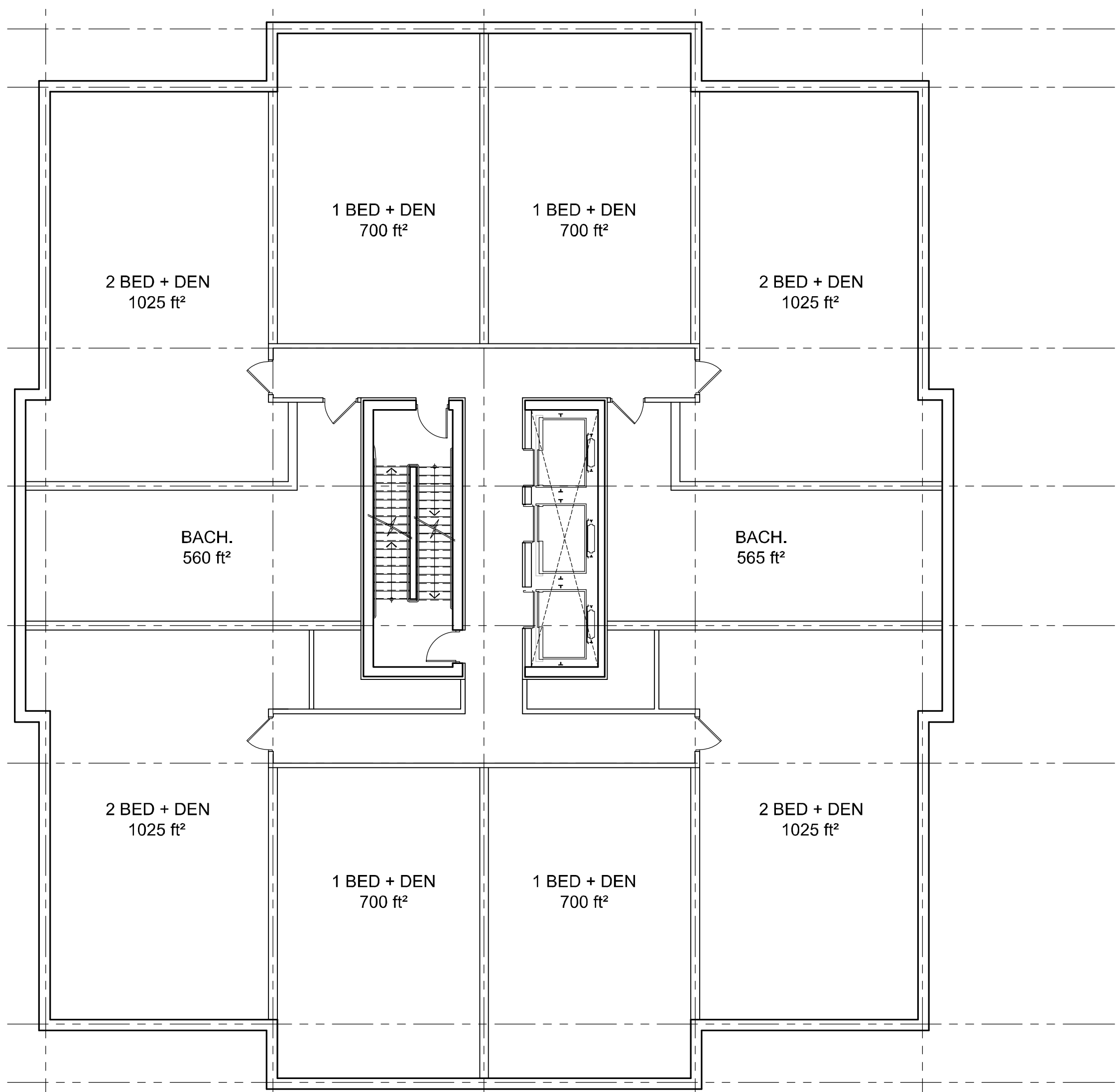
Typical Floor Plan (Flr. 6 - 23)

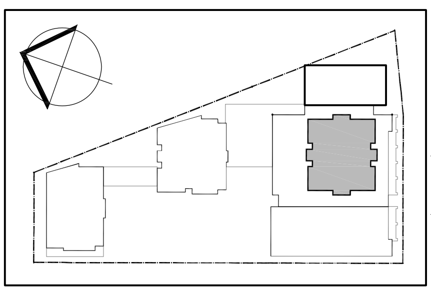
scale 1:150

TRINITY

UPPER FLOOR A x11 (Flr. 24-34)		
GFA	9,300 ft²	(864.0 m²)
NET RES.	8,030 ft²	(746.0 m²)
EFFICIENCY	86.3 %	
UNITS	10	
Bachelor	2	
1 Bed	4	
2 Bed	4	

RES. TOWER 1 TOTALS (34 Flrs. Res. - 41 Flrs. Total Height)		
GFA	297,575 ft²	(27,262.4m²)
NET RES.	250,240 ft²	(23,248.1m²)
EFFICIENCY	84.1 %	
UNITS	323 (Total)	
Bachelor	64	(~20%)
1 Bed	116	(~35%)
2 Bed	140	(~43%)
3 Bed	3	(~2%)





HOBIN

GLADSTONE + LORETTA

Residential Tower 1

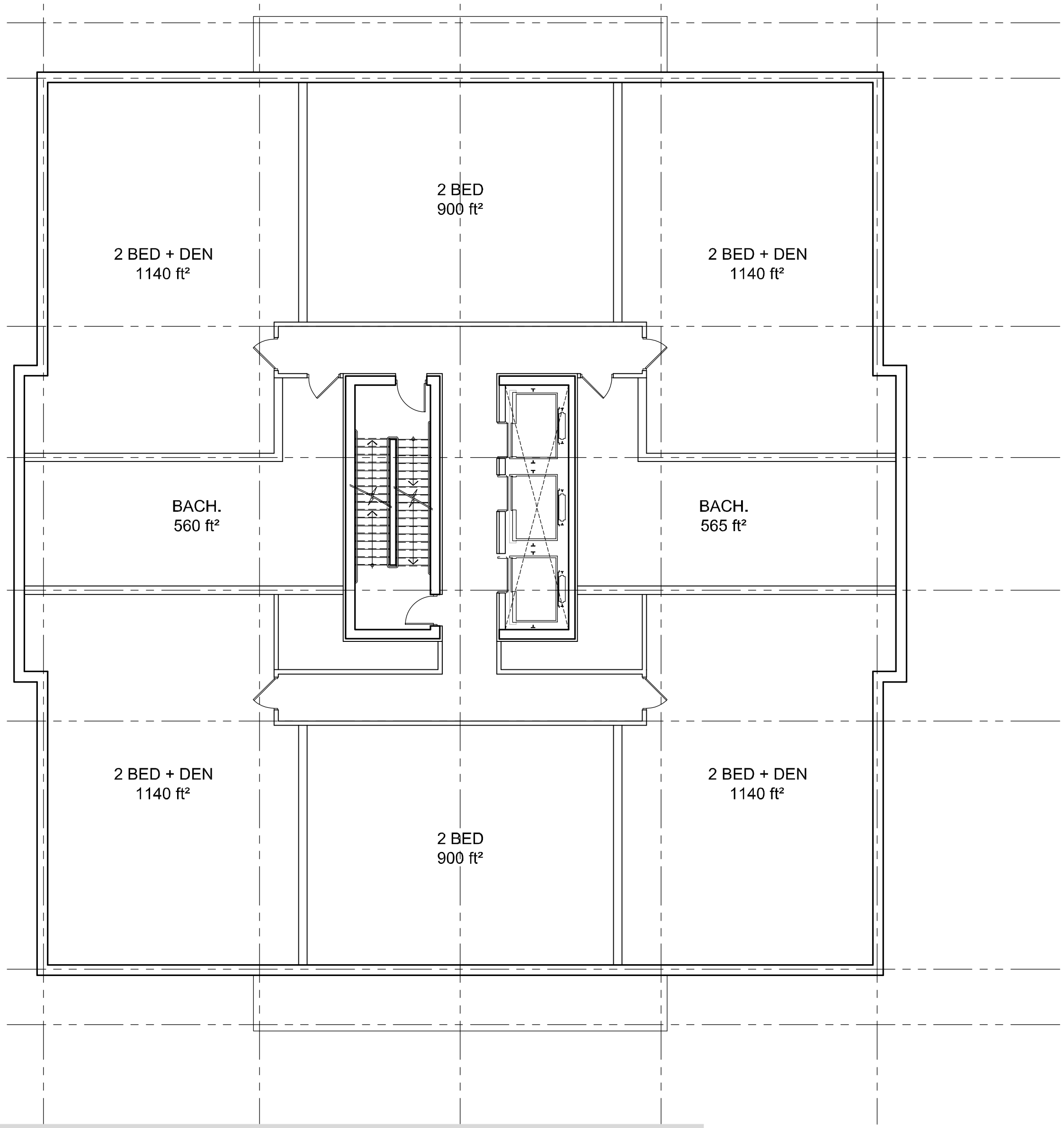
Upper Floor Plan A (Flr. 24 - 34)

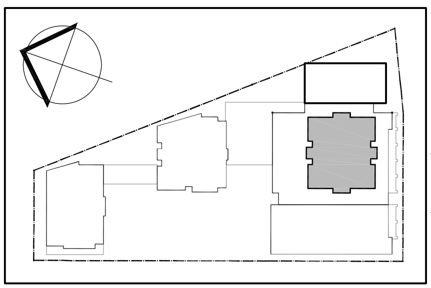
scale 1:150

TRINITY

UPPER FLOOR B x3 (Flr. 35-37)		
GFA	8,790 ft²	(816.6 m²)
NET RES.	7,490 ft²	(695.8 m²)
EFFICIENCY	85.2 %	
UNITS	8	
Bachelor	2	
1 Bed	0	
2 Bed	6	

RES. TOWER 1 TOTALS (34 Flrs. Res. - 41 Flrs. Total Height)		
GFA	297,575 ft²	(27,262.4m²)
NET RES.	250,240 ft²	(23,248.1m²)
EFFICIENCY	84.1 %	
UNITS	323 (Total)	
Bachelor	64	(~20%)
1 Bed	116	(~35%)
2 Bed	140	(~43%)
3 Bed	3	(~2%)





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GLADSTONE + LORETTA

Residential Tower 1

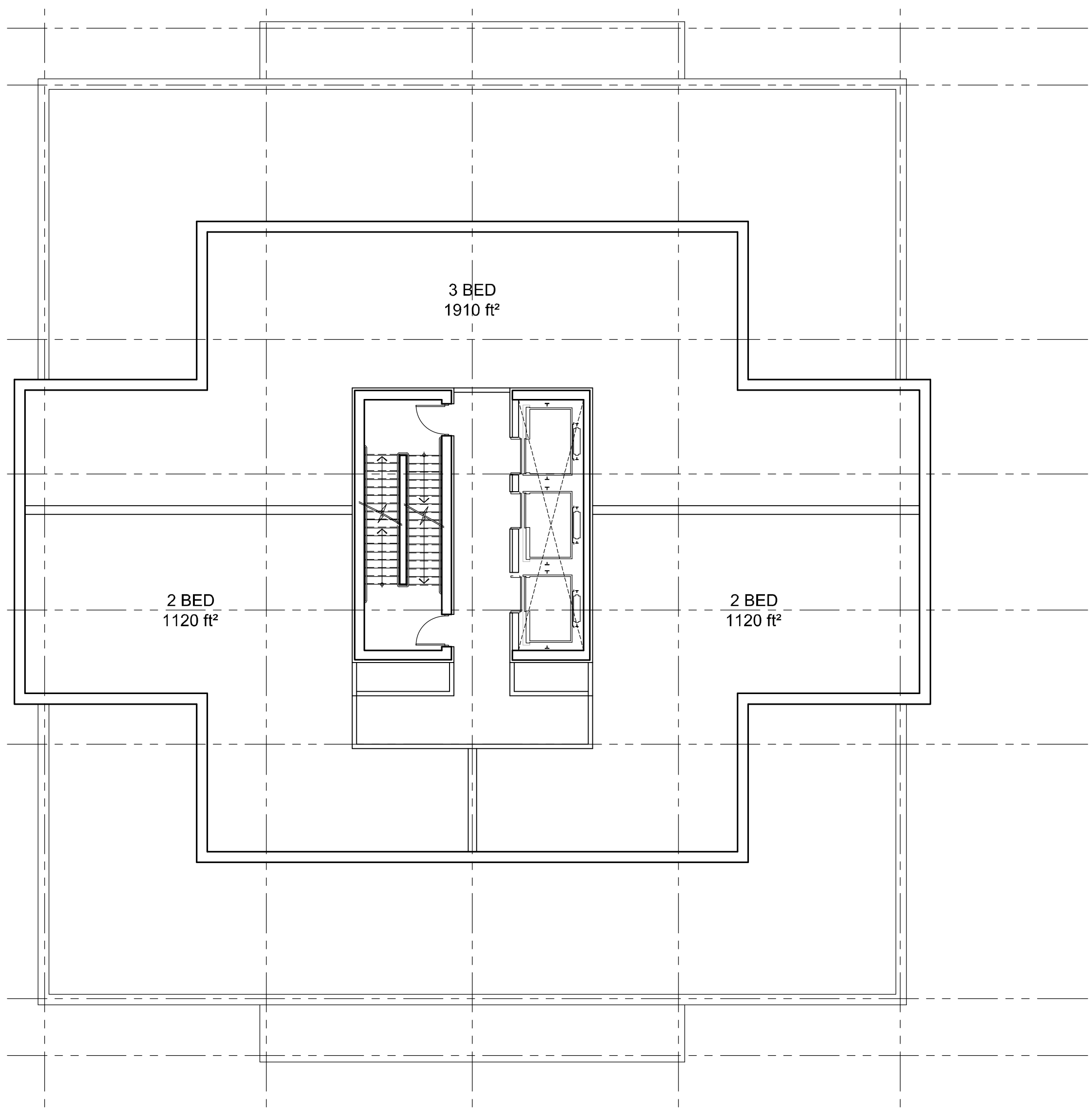
Upper Floor Plan B (Flr. 35 - 37)

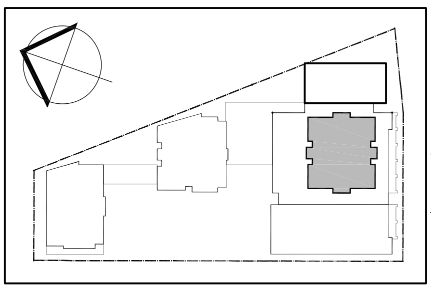
scale 1:150

TRINITY

PENTHOUSE FLOOR x3 (Flr. 38-40)		
GFA	5,060 ft²	(470.0 m²)
NET RES.	4,150 ft²	(385.5 m²)
EFFICIENCY	82.0 %	
UNITS	3	
2 Bed	2	
3 Bed	1	

RES. TOWER 1 TOTALS (34 Flrs. Res. - 41 Flrs. Total Height)		
GFA	297,575 ft²	(27,262.4m²)
NET RES.	250,240 ft²	(23,248.1m²)
EFFICIENCY	84.1 %	
UNITS	323 (Total)	
Bachelor	64	(~20%)
1 Bed	116	(~35%)
2 Bed	140	(~43%)
3 Bed	3	(~2%)





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GLADSTONE + LORETTA
Residential Tower 1

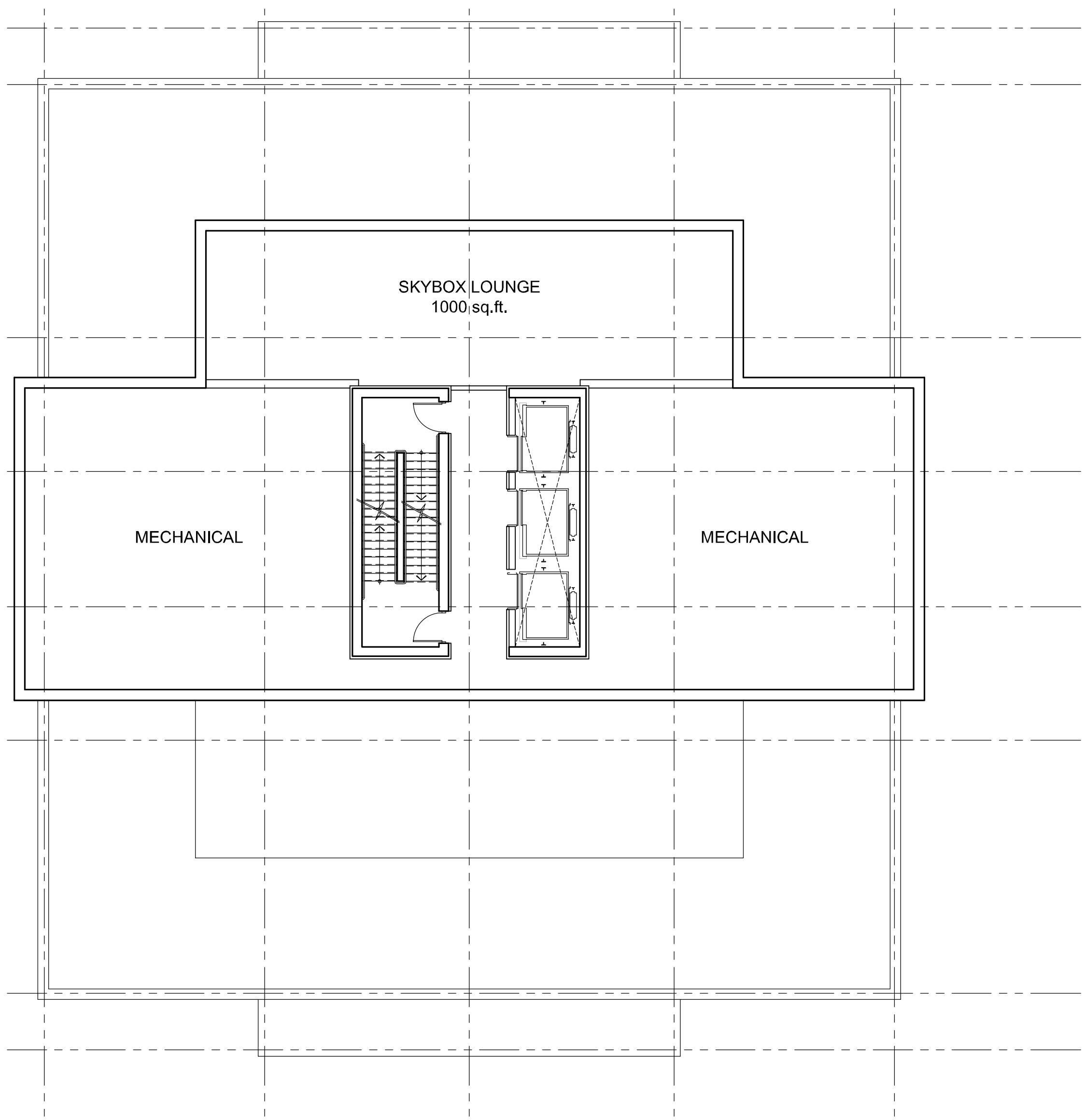
Penthouse Floor Plan (Flr. 38 - 40)

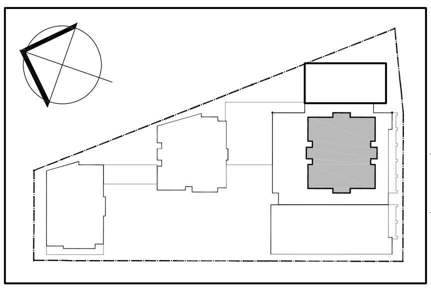
scale 1:150

TRINITY

SKYBOX & MECH. x1 (Flr. 1)		
GFA	4,125 ft²	(435.8 m²)
NET RES.	0	
EFFICIENCY	NA	
UNITS	0	

RES. TOWER 1 TOTALS (34 Flrs. Res. - 41 Flrs. Total Height)		
GFA	297,575 ft²	(27,262.4m²)
NET RES.	250,240 ft²	(23,248.1m²)
EFFICIENCY	84.1 %	
UNITS	323 (Total)	
Bachelor	64	(~20%)
1 Bed	116	(~35%)
2 Bed	140	(~43%)
3 Bed	3	(~2%)





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GLADSTONE + LORETTA
Residential Tower 1

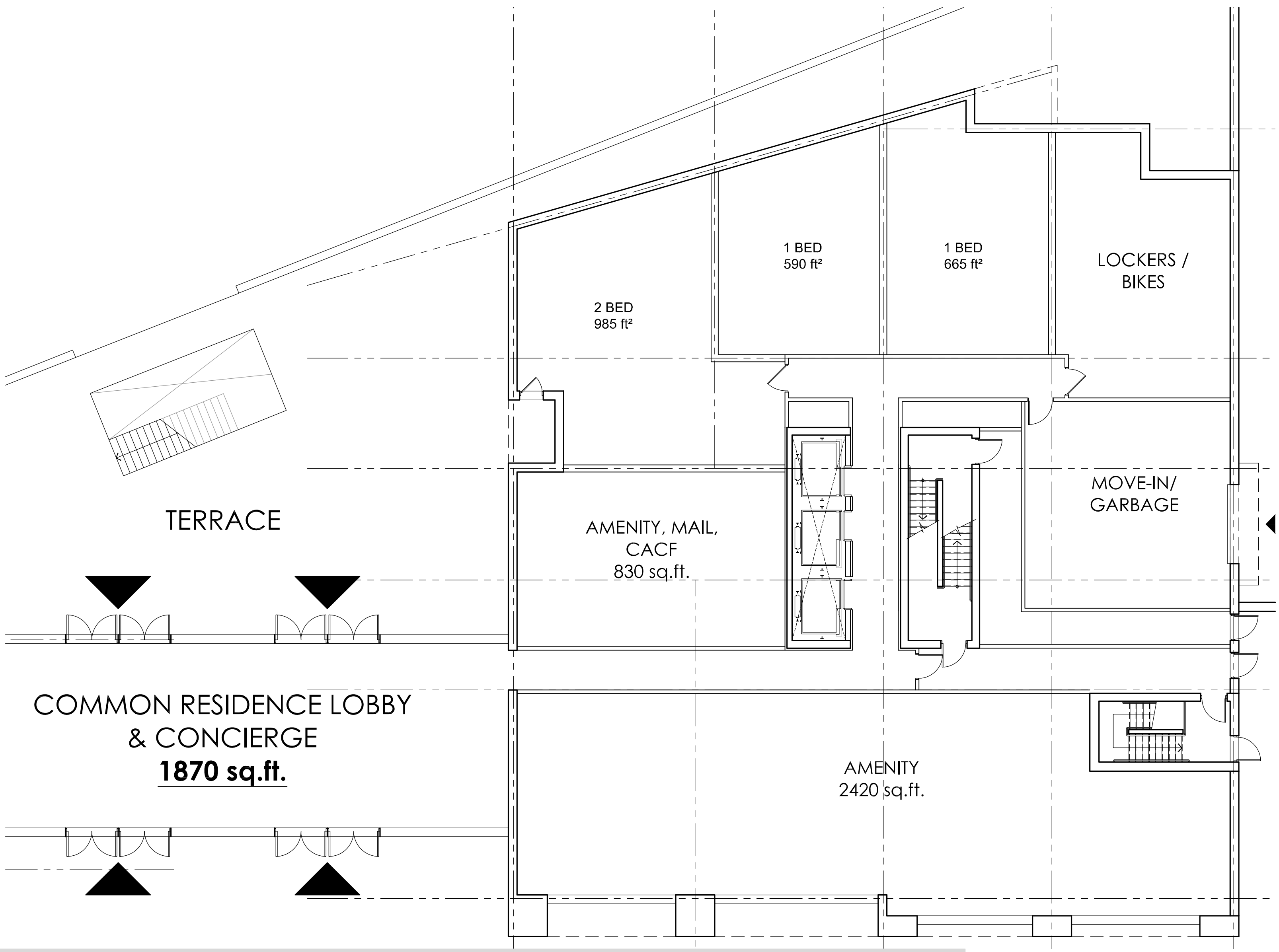
Skybox Lounge & Mechanical
(Flr. 41)

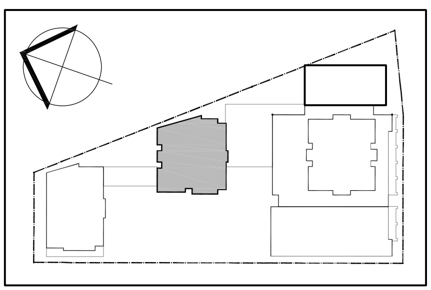
scale 1:150

TRINITY

GROUND FLOOR x1 (Flr. 1)		
GFA	8,870 ft²	(824.0 m²)
NET RES.	2,240 ft²	(208.1 m²)
EFFICIENCY		
UNITS	3	
Bachelor	0	
1 Bed	2	
2 Bed	1	

RES. TOWER 2 TOTALS (35 Flrs.)		
GFA	308,400 ft²	(28,651m²)
NET RES.	259,650 ft²	(24,122m²)
EFFICIENCY	84.2 %	
UNITS	343 (Total)	
Bachelor	68	(~20%)
1 Bed	138	(~40%)
2 Bed	137	(~40%)





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GLADSTONE + LORETTA
Residential Tower 2

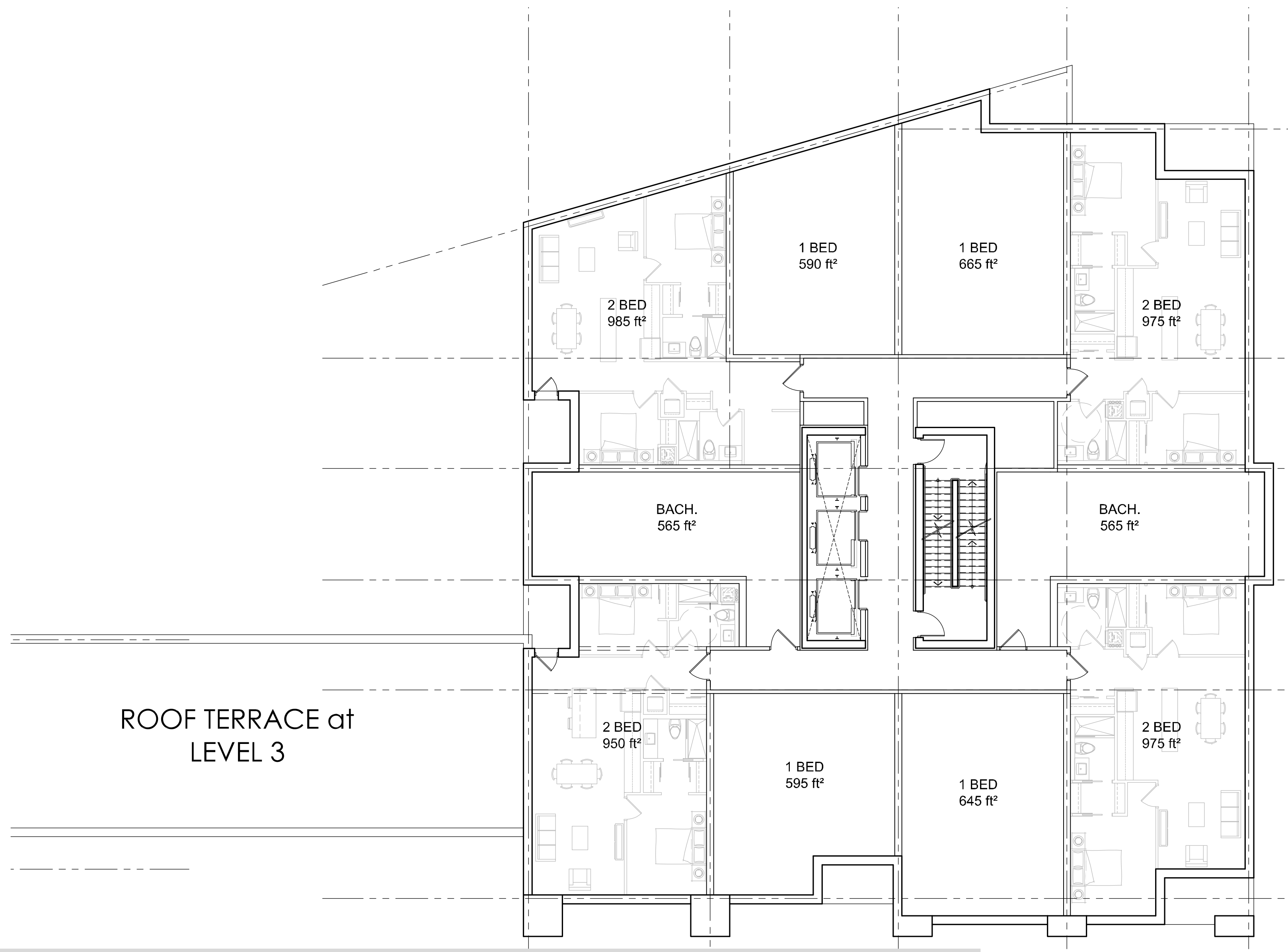
Ground Floor Plan

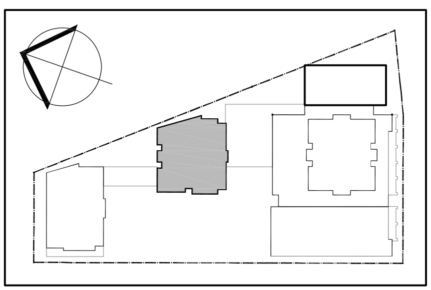
scale 1:150

TRINITY

PODIUM FLOOR x3 (Flr. 2-4)		
GFA	8,750 ft²	(812.9 m²)
NET RES.	7,510 ft²	(697.7 m²)
EFFICIENCY	85.8%	
UNITS	10	
Bachelor	2	
1 Bed	4	
2 Bed	4	

RES. TOWER 2 TOTALS (35 Flrs.)		
GFA	308,400 ft²	(28,651m²)
NET RES.	259,650 ft²	(24,122m²)
EFFICIENCY	84.2 %	
UNITS	343 (Total)	
Bachelor	68	(~20%)
1 Bed	138	(~40%)
2 Bed	137	(~40%)





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GLADSTONE + LORETTA
Residential Tower 2

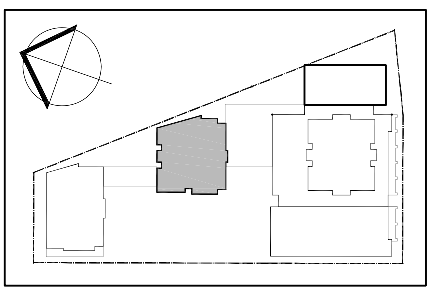
Podium Plan (Flr. 2 - 4)

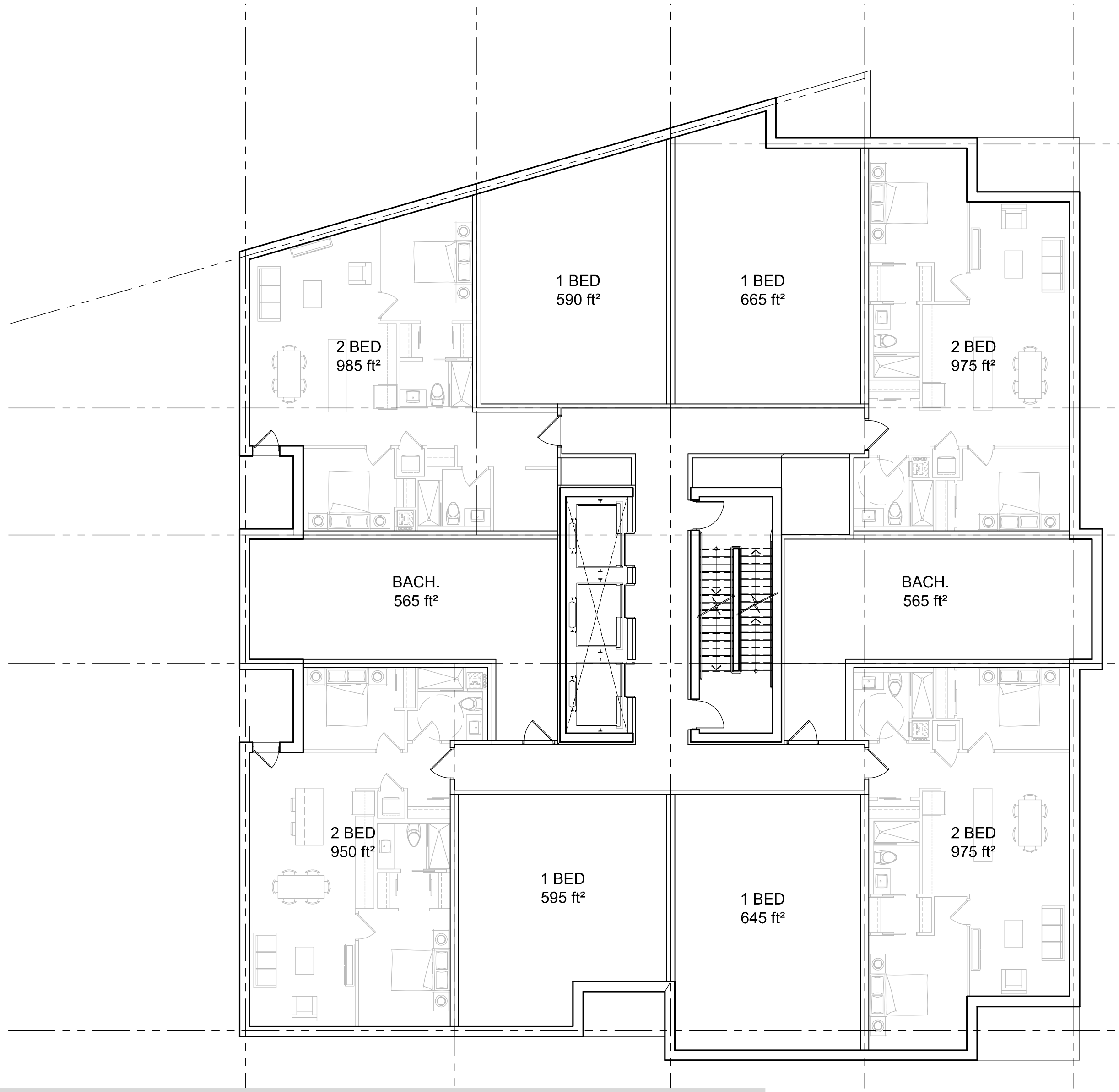
scale 1:150

TRINITY

TYPICAL FLOOR x25 (Flr. 5-29)		
GFA	8,750 ft²	(812.9 m²)
NET RES.	7,510 ft²	(697.7 m²)
EFFICIENCY	85.8%	
UNITS	10	
Bachelor	2	
1 Bed	4	
2 Bed	4	

RES. TOWER 2 TOTALS (35 Flrs.)		
GFA	308,400 ft²	(28,651m²)
NET RES.	259,650 ft²	(24,122m²)
EFFICIENCY	84.2 %	
UNITS	343 (Total)	
Bachelor	68	(~20%)
1 Bed	138	(~40%)
2 Bed	137	(~40%)





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Residential Tower 2

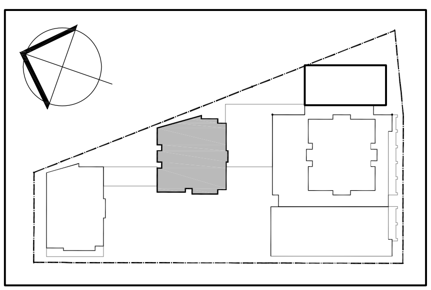
Typical Plan (Flr. 5 - 29)

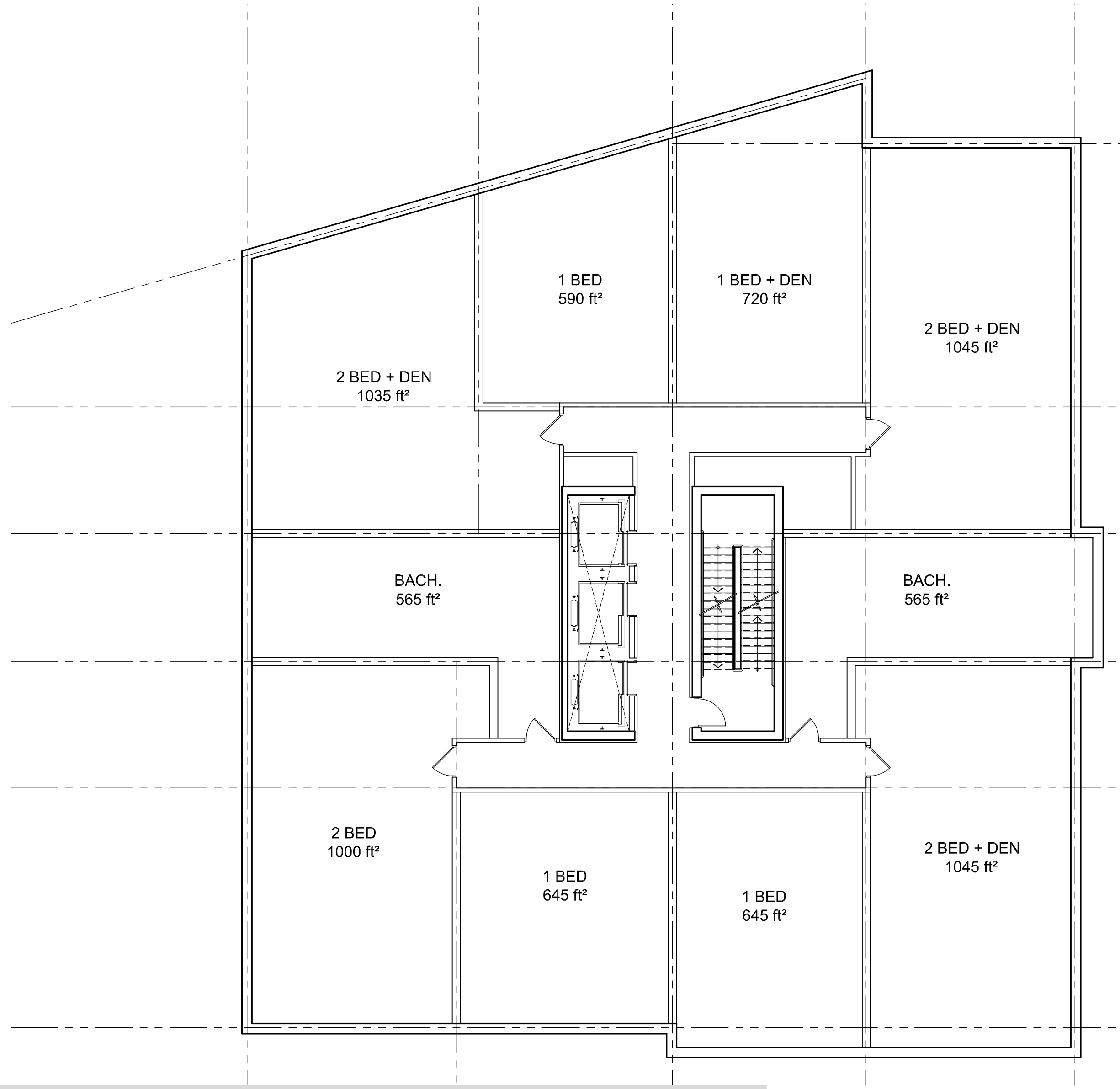
scale 1:150

TRINITY

UPPER FLOOR x6 (Flr. 30-35)		
GFA	9,090 ft²	(844.5 m²)
NET RES.	7,855 ft²	(730.0 m²)
EFFICIENCY	86.4%	
UNITS	10	
Bachelor	2	
1 Bed	4	
2 Bed	4	

RES. TOWER 2 TOTALS (35 Flrs.)		
GFA	308,400 ft²	(28,651m²)
NET RES.	259,650 ft²	(24,122m²)
EFFICIENCY	84.2 %	
UNITS	343 (Total)	
Bachelor	68	(~20%)
1 Bed	138	(~40%)
2 Bed	137	(~40%)





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GLADSTONE + LORETTA
Residential Tower 2

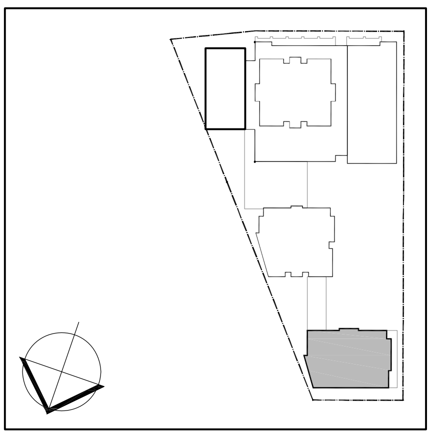
Upper Plan (Flr. 30 - 35)

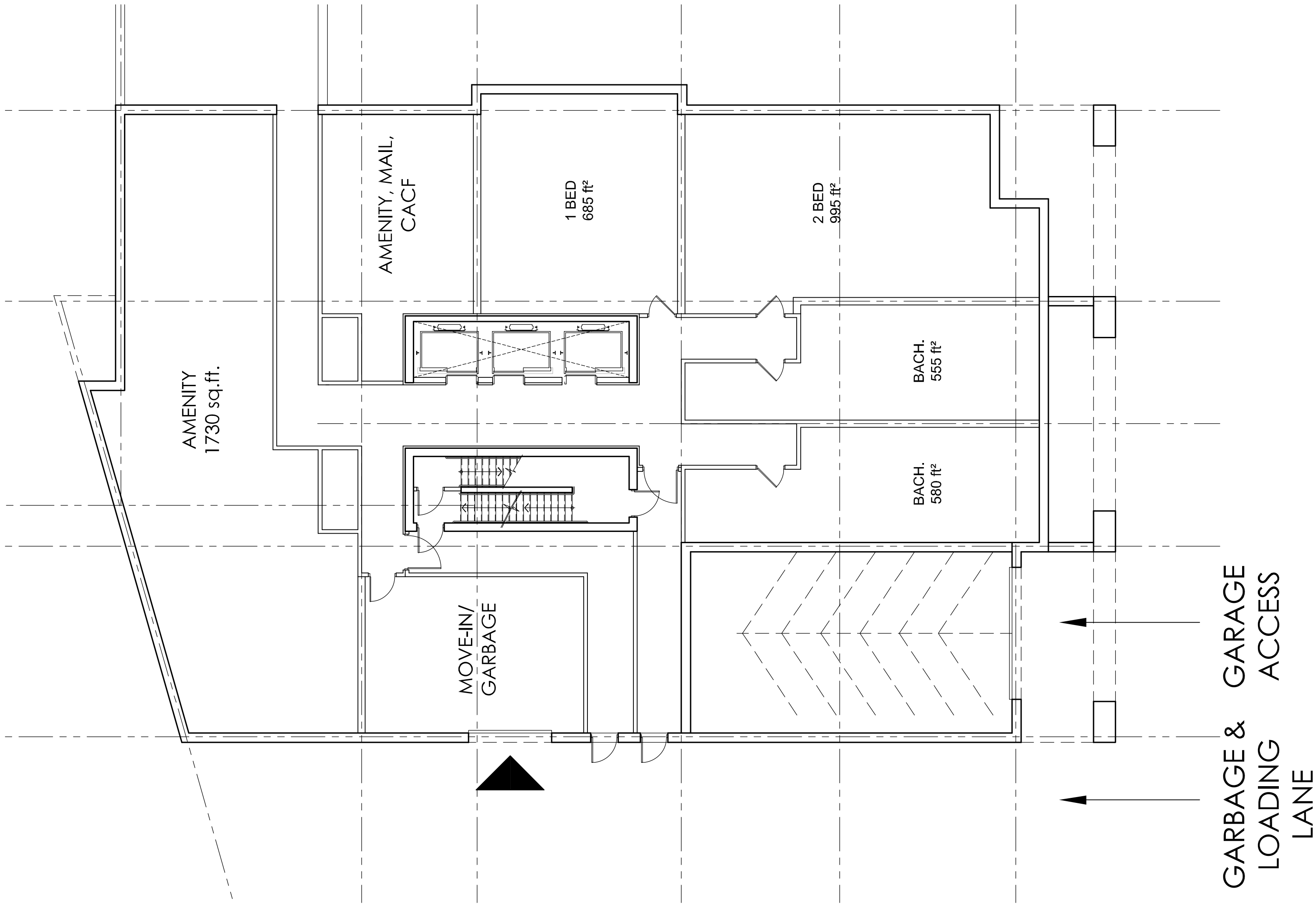
scale 1:150

TRINITY

GROUND FLOOR x1 (Flr. 1)		
GFA	7,560 ft²	(702.3 m²)
NET RES.	2,815 ft²	(261.5 m²)
EFFICIENCY	37.2 %	
UNITS	4	
Bachelor	2	
1 Bed	1	
2 Bed	1	

RES. TOWER 3 TOTALS (30 Flrs.)		
GFA	250,290 ft²	(23,253m²)
NET RES.	209,815 ft²	(19,492m²)
EFFICIENCY	84.0 %	
UNITS	265 (Total)	
Bachelor	60	(~23%)
1 Bed	88	(~33%)
2 Bed	117	(~44%)





GLADSTONE + LORETTA
Residential Tower 3

Ground Floor Plan

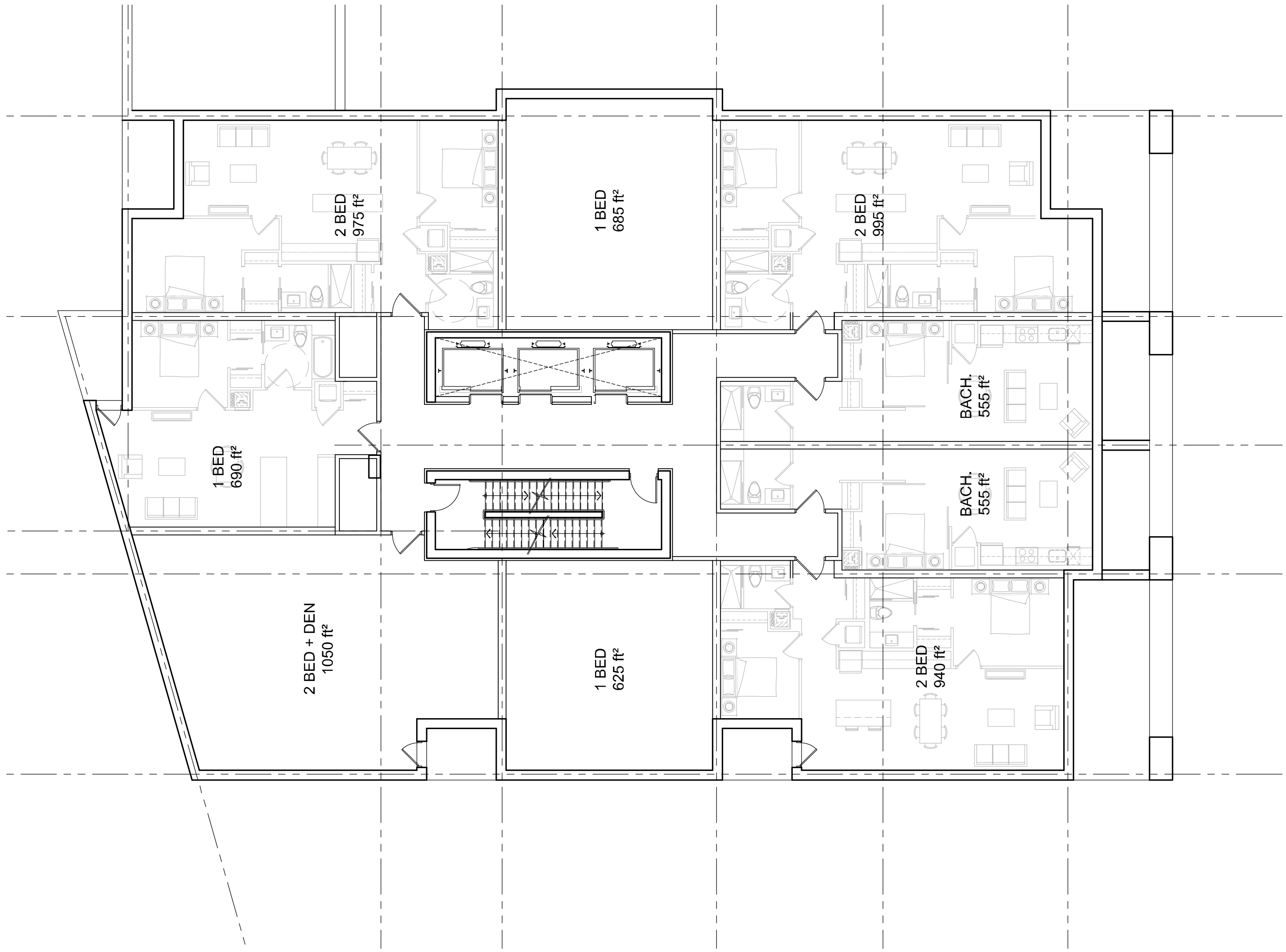
scale 1:150

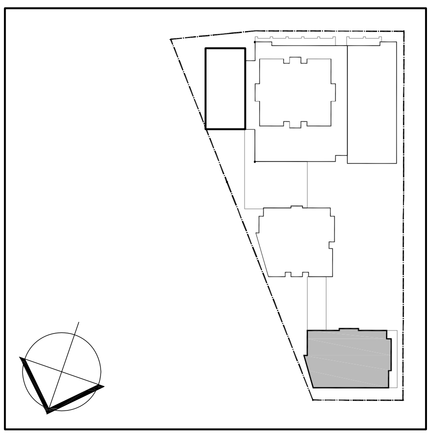
HOBIN

TRINITY

PODIUM FLOOR x3 (Flr. 2-4)		
GFA	8,310 ft²	(772.0 m²)
NET RES.	7,080 ft²	(657.7 m²)
EFFICIENCY	85.1 %	
UNITS	9	
Bachelor	2	
1 Bed	3	
2 Bed	4	

RES. TOWER 3 TOTALS (30 Flrs.)		
GFA	250,290 ft²	(23,253m²)
NET RES.	209,815 ft²	(19,492m²)
EFFICIENCY	84.0 %	
UNITS	265 (Total)	
Bachelor	60	(~23%)
1 Bed	88	(~33%)
2 Bed	117	(~44%)





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GLADSTONE + LORETTA

Residential Tower 3

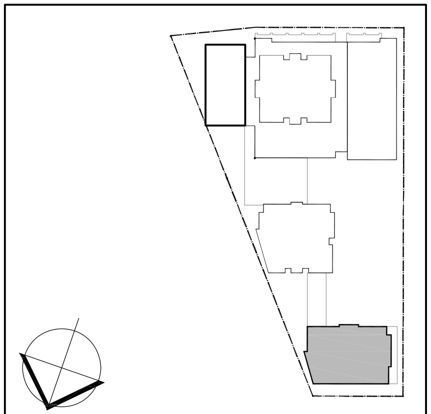
Podium Floor Plan (Flr. 2 - 4)

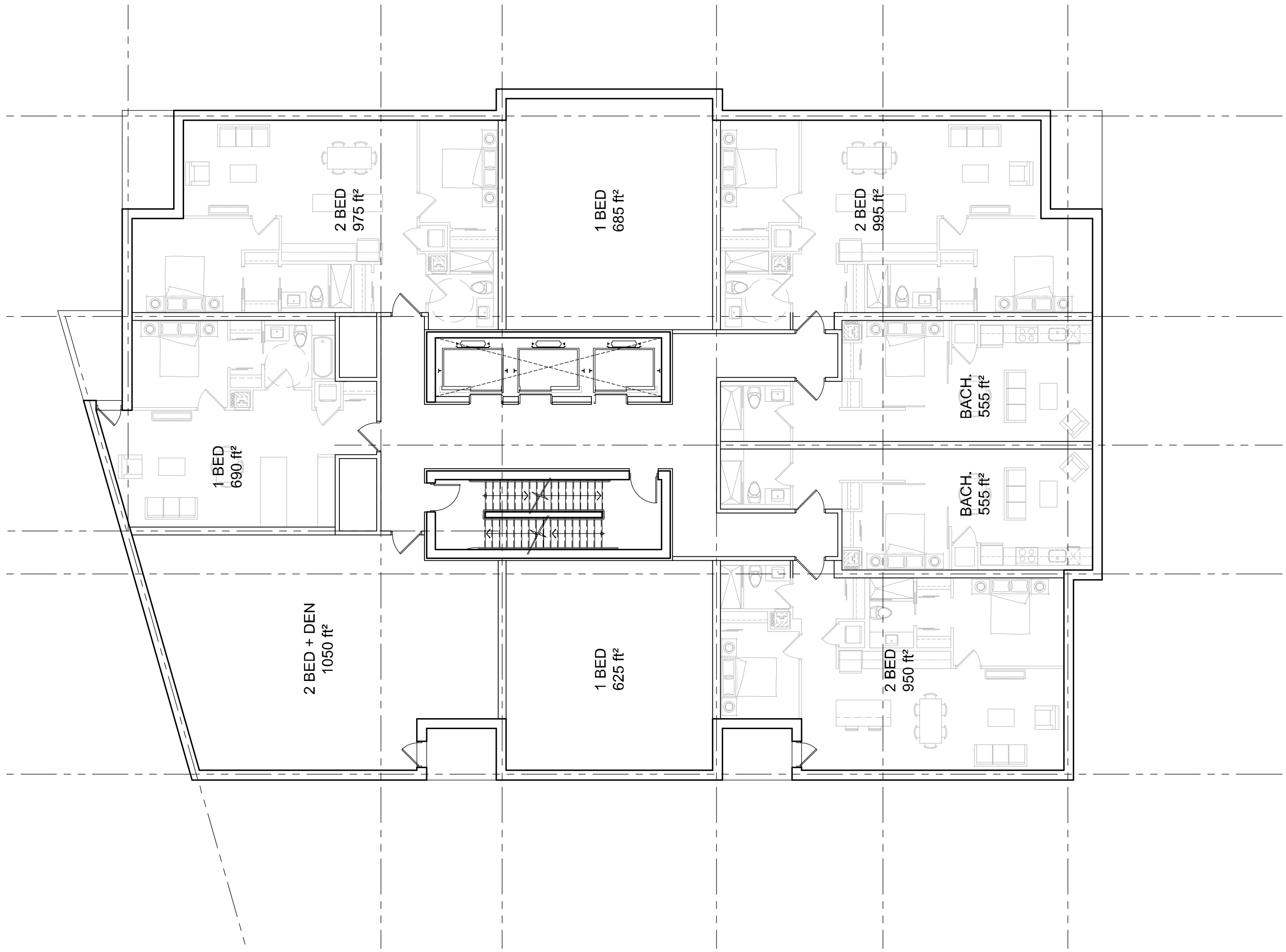
scale 1:150

TRINITY

TYPICAL FLOOR x20 (Flr. 5-24)		
GFA	8,310 ft²	(772.0 m²)
NET RES.	7,080 ft²	(657.7 m²)
EFFICIENCY	85.1 %	
UNITS	9	
Bachelor	2	
1 Bed	3	
2 Bed	4	

RES. TOWER 3 TOTALS (30 Flrs.)		
GFA	250,290 ft²	(23,253m²)
NET RES.	209,815 ft²	(19,492m²)
EFFICIENCY	84.0 %	
UNITS	265 (Total)	
Bachelor	60	(~23%)
1 Bed	88	(~33%)
2 Bed	117	(~44%)





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GLADSTONE + LORETTA

Residential Tower 3

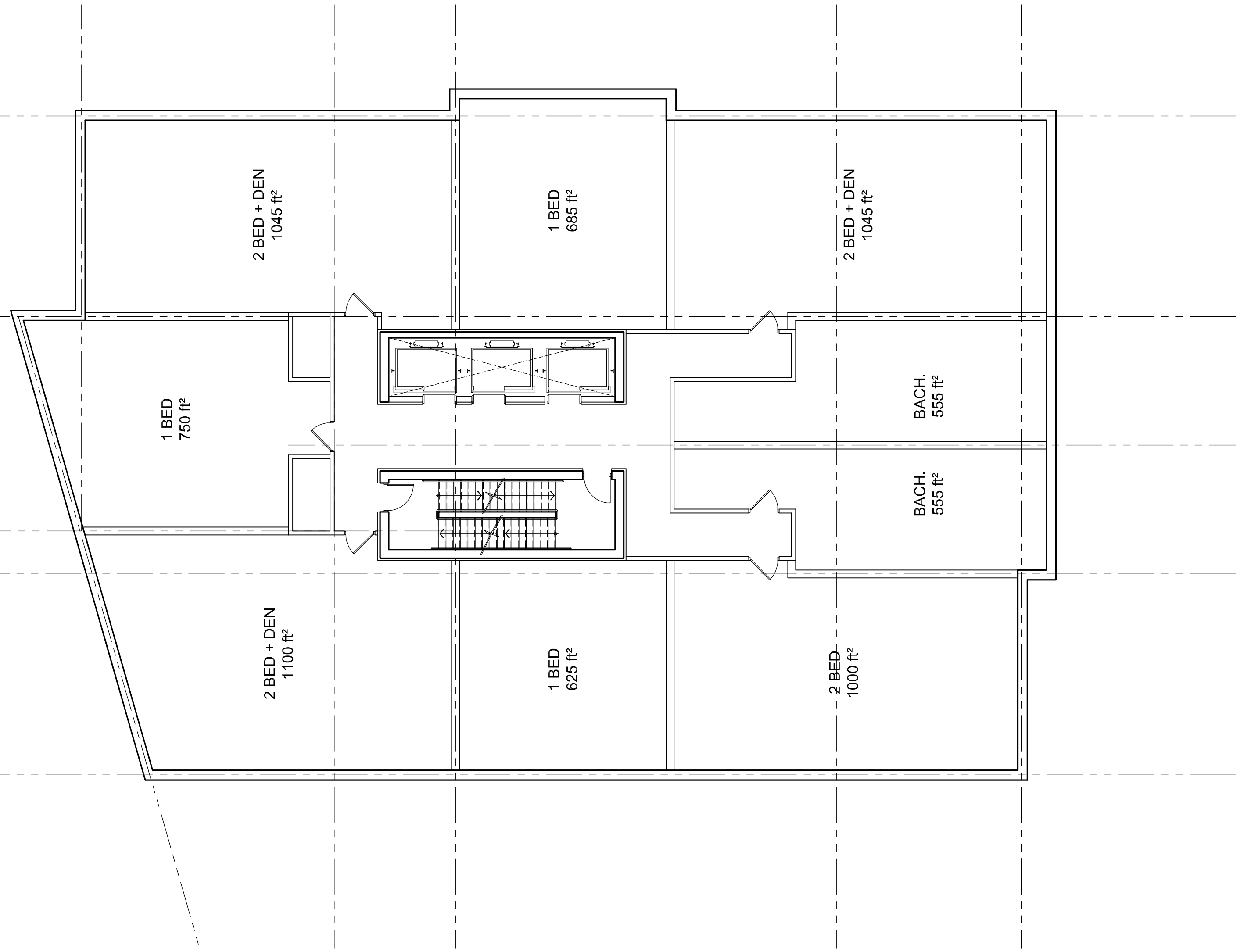
Typical Floor Plan (Flr. 5 - 24)

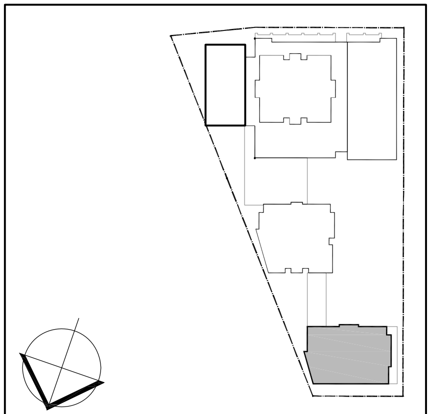
scale 1:150

TRINITY

UPPER FLOOR x6 (Flr. 25-30)		
GFA	8,600 ft^2	(799.0 m^2)
NET RES.	7,360 ft^2	(658.2 m^2)
EFFICIENCY		
UNITS	9	
Bachelor	2	
1 Bed	3	
2 Bed	4	

RES. TOWER 3 TOTALS (30 Flrs.)		
GFA	250,290 ft^2	(23,253m^2)
NET RES.	209,815 ft^2	(19,492m^2)
EFFICIENCY	84.0 %	
UNITS	265 (Total)	
Bachelor	60	(~23%)
1 Bed	88	(~33%)
2 Bed	117	(~44%)





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GLADSTONE + LORETTA

Residential Tower 3

Upper Floor Plan (Flr. 25 - 30)

scale 1:150

TRINITY