

APPENDIX E – TRANSIT SATELLITE GARAGE REQUIRED FEATURE LIST AND DESIGN GUIDELINES

Table 1: Features to Include in Transit Satellite Garage Design

Component	Features
SITE	<ol style="list-style-type: none"> 1. Space for bus movements needs to be more generous than AutoTurn templates suggest; 2. Exterior circulation lanes are to have no curbs; 3. Access/egress routings for buses must be separate from the access/egress routings for other vehicles; 4. Access route for buses is to be controlled by a guardhouse; 5. Concrete aprons at either end of the garage should be of sufficient size; 6. Sufficient dedicated parking is required for Transit Supervisors, contractors, and garage staff; 7. Access to the parking lot is to be controlled by a barrier arm; 8. The parking lot should be located in close proximity to Bus Operator access and Dispatch areas; 9. Adequate space needs to be provided in the parking lot for snow storage; 10. The perimeter of the site is to be enclosed by a fence that is 3.0 metres in height; 11. Three 50,000 litre diesel tank fuel farm and one 5,000 litre windshield washer fluid tank required on site adjacent to vehicle servicing bay; 12. The site is to be monitored by CCTV; 13. The site and all facilities to include wifi coverage;
BUS STORAGE AREA	<ol style="list-style-type: none"> 14. Rows with a maximum of 12 buses are preferred; however, rows of up to 15 buses are acceptable; 15. Pedestrian walkways 1.5 m. wide are to be provided along and across bus parking rows every three buses and along walls; 16. Spacing between buses exclusive of pedestrian walkways to be .95 m. wide; 17. The distance from the garage door to the first or last bus in a row is to be approximately 6.0 m. 18. Garage doors for buses are required to provide a 4.3 m. X 4.3 m. opening;

Component	Features
	<p>19. Floors must be sloped for positive drainage and large sand catch basins with round covers are required to minimize drain blockages;</p> <p>20. One inch cold water hose connections for floor washing and washing out trenches are required every 30 m;</p> <p>21. A maximum of one column line in the centre of the bus storage area is allowed and column spacing must allow bus movements between columns;</p> <p>22. Columns and wall areas must be equipped with adequate numbers of electrical outlets, air drops and telephone jacks.</p> <p>23. Concrete side walls must have a minimum height of 2.5 m;</p> <p>24. Concrete end walls must have a minimum height of 4.3 m.</p> <p>25. Ventilation system capacity and controls designed to ensure that employees are not exposed to concentrations of NO₂, CO and particulates that exceed specified TLV's.</p>
<p>BUS SERVICE BAYS</p>	<p>26. Bus washer to be sized to accommodate articulated buses (18 m length).</p> <p>27. Double service bays are required for two lines of bus servicing equipment.</p> <p>28. The horizontal clearance between the service line entrance door and the rear of the last bus in the service line, and between the front of the first bus in the service line and the exit door, should each be a minimum of 6.0 m.</p> <p>29. Concrete side walls should have a height of 2.5 m.</p> <p>30. Concrete end walls should have a height of 4.3 m.</p> <p>31. Ventilation system capacity and controls designed to ensure that employees are not exposed to concentrations of NO₂, CO and particulates that exceed specified TLV's.</p> <p>32. Garage doors for buses are required to provide a 4.3 m. X 4.3 m. opening;</p>
<p>BUS MAINTENANCE BAYS</p>	<p>33. Vehicle work bay floor slopes suitable for the safe use of safety stands and mobile column lifts.</p> <p>34. Ventilation system capacity and controls designed to ensure that employees are not exposed to concentrations of NO₂, CO and particulates that exceed specified TLV's.</p> <p>35. Sufficient space for tool boxes and equipment on all sides of buses.</p>

Component	Features
	<p>36. Drive in/back out maintenance bays are acceptable.</p> <p>37. Garage doors for buses are required to provide a 4.3 m. X 4.3 m. opening;</p>
STAFF FACILITIES	<p>38. Facilities need to be provided for 25 servicing and maintenance staff including the following:</p> <ul style="list-style-type: none"> • washrooms containing showers, water closets in stalls, lavatories and urinals in men’s; • locker rooms; • lunchroom with kitchen facilities. <p>39. Facilities need to be provided for Bus Operators including the following:</p> <ul style="list-style-type: none"> • washrooms containing showers, water closets in stalls, lavatories and urinals in men’s; • men’s and women’s locker rooms with 30 and ten lockers respectively; <p>40. Hygiene facilities need to be located close to work areas;</p> <p>41. A multi-use room for employees designed to accommodate 40 persons and to include a folding partition to enable the room to be divided into two separate spaces as required. This room to be designed to accommodate exercise classes and equipment as required.</p> <p>42. A bus operator waiting room equipped with a kitchen and food/beverage vending area, tables and chairs to accommodate 100 staff. The room to be separated into two areas with a low wall or partition. One area to house a kitchen/games and one to house a television viewing television area.</p> <p>43. A private meeting room acoustically separated from adjoining spaces with sufficient space to accommodate meetings of up to 10 people at tables and chairs.</p> <p>44. The Dispatch Office area should accommodate 6 work stations, a backup Control Centre, a UPS, and an emergency power generator.</p>

Table 2 provides a list of the guidelines used to determine the functional space requirements for an approximate 200-bus facility.

Table 2: Functional Design Guidelines for New Satellite Garage

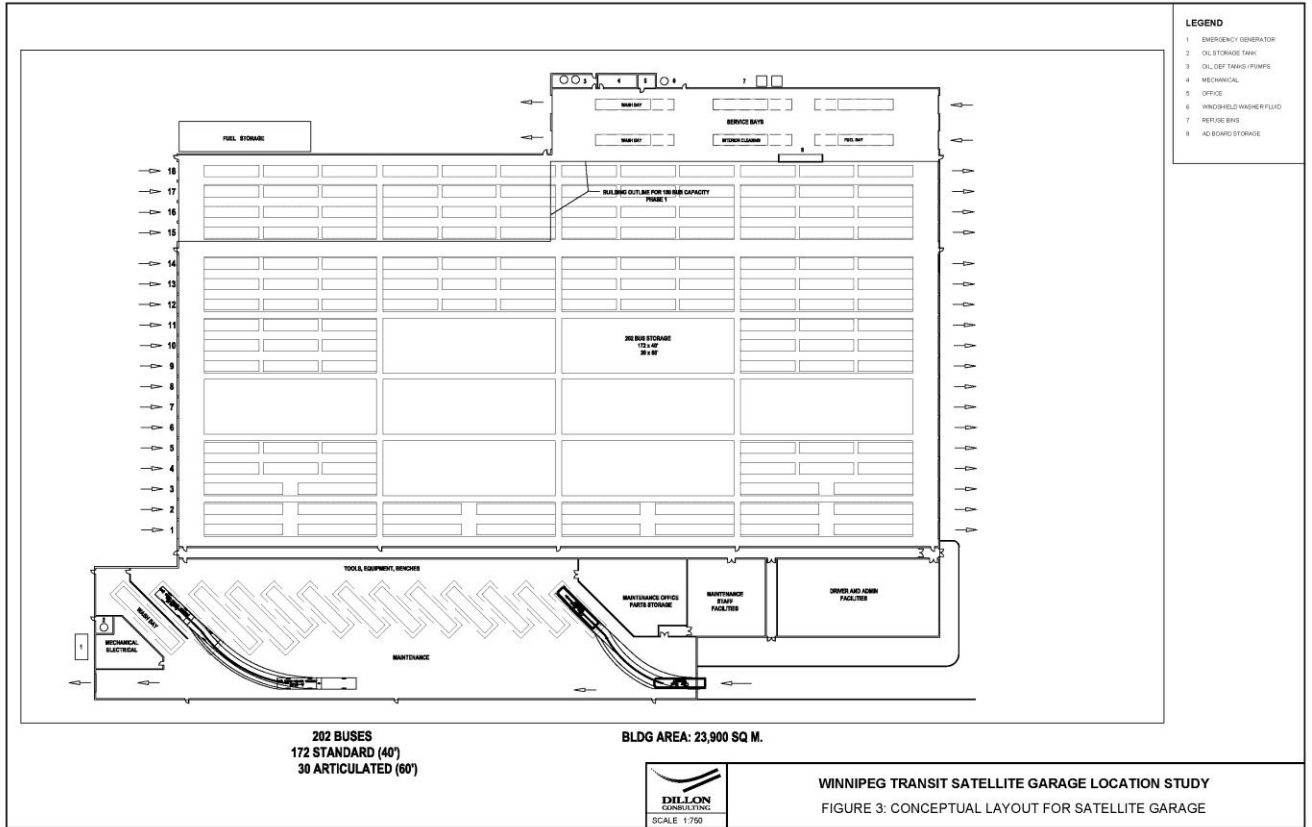
Component	200-Bus Facility
No. of Buses	<p>200 Buses:</p> <ul style="list-style-type: none"> • 170 Standard • 30 Articulated
Bus Dimensions	<p>Standard with Bike Rack:</p> <ul style="list-style-type: none"> • Length: 13.1 m

Component	200-Bus Facility
	<ul style="list-style-type: none"> • Width: 2.6 m • Height: 3.8 m
	Articulated with Bike Rack: <ul style="list-style-type: none"> • Length: 19.2 m • Width: 2.6 m • Height: 3.8 m
Buses per Parking Lane	12 Standard Buses, or 8 Articulated Buses
Approx. No. of Parking Lanes	18
Lane Widths	Must accommodate overhead garage doors 4.30 m in width
Parking Lane Clearances	<ul style="list-style-type: none"> • 0.95 m between parked buses in lanes • 6.0 m between entrance door and back of nearest bus • 6.0 m between front of nearest bus and exit door
Walkway Aisles	<ul style="list-style-type: none"> • 1.50 m wide, between every third row of buses along the length of the parking row and between every third bus across parking rows and along walls.
Parking Lane Other	<ul style="list-style-type: none"> • Secure Storage alcove for bus advertising boards
No. of Servicing Lanes	2 drive-through lanes with two servicing stations in each lane
Servicing Lane Length	120 m
Servicing Lane Width	8 m
Servicing Lane Facilities	<ul style="list-style-type: none"> • Refuelling stations • Interior bus cleaning with vacuum extraction • 2 drive-through bus washers that accommodate standard and articulated buses • Windshield washer, diesel exhaust fluid • Revenue servicing stations
Repair Bays	11 bays: <ul style="list-style-type: none"> • 8 bays with hydraulic inground hoists for standard buses • 3 bays with inground hydraulic hoists for articulated buses • 1 entrance door/1 exit door/single drive-through lane for repair bays
Wash Bay	<ul style="list-style-type: none"> • 1 bay with hoist that accommodates both standard and articulated buses • Requires sand pits and trenches to capture water, dirt, and grease • No electrical, computer rooms, compressor facilities are to be located in wash bay area
Shop Area	<ul style="list-style-type: none"> • Sufficient space for benches, tools, stands, computers, welding booth, grinders, plasma tools, etc. • Exhaust extraction system on moveable rail and tail pipe exhaust.

Component	200-Bus Facility
Other Repair Bay Requirements	<ul style="list-style-type: none"> • Stores area for tools and parts • Maintenance Supervisor office for two workstations • Staff facilities in close proximity (for 25 staff)
Operator Dispatch Office Required Facilities	<ul style="list-style-type: none"> • 3 workstations • 3 enclosed offices (3.0 m x 3.0 m)
Operatore Dispatch Office Required Facilities	<ul style="list-style-type: none"> • 3 workstations • UPS and emergency generator power supply
No. of Staff	<ul style="list-style-type: none"> • 25 service staff • 180 bus operators • 70% male/30% female
Male Washrooms	<ul style="list-style-type: none"> • 4 showers • 1 accessible shower • 1 accessible water closet • 3 conventional water closet • 4 lavatories • 4 urinals • 30 lockers
Female Washrooms	<ul style="list-style-type: none"> • 2 showers • 1 accessible shower • 1 accessible water closet • 2 conventional water closets • 2 lavatories • 15 lockers
Bus Operator Waiting Area	<ul style="list-style-type: none"> • To accommodate 100 staff • Separated into 3 areas with a low wall or partition for a recreation area and full height wall for television viewing area • Include kitchen space and non-fixed tables and chairs
Multi Use Space	<ul style="list-style-type: none"> • To accommodate 40 staff • To include a folding partition or movable wall to enable the room to be divided into two separate spaces as required
Meeting Room	<ul style="list-style-type: none"> • To accommodate 10 staff • To include conference table and chairs
Parking Supervisor Kiosk	<ul style="list-style-type: none"> • Located upstream of entrance to bus storage area • Used by supervisor to issue parking instructions to operators of returning buses • Requires heating, air conditioning, voice and data service, and a telephone on the outside of the kiosk for use by bus operators when a supervisor is not present
On-Site Parking	<ul style="list-style-type: none"> • 150 spaces for a site served by a high level of transit service • 180 spaces for a site that is not proximate to a high level of transit service
Support Facilities	<ul style="list-style-type: none"> • Data/Telecom room • Electrical room • Mechanical room with space for oil tank and air compressors

Component	200-Bus Facility
	<ul style="list-style-type: none">• Outdoor storage space for diesel tanks and windshield washer fluid tank• Indoor storage for oil tank, DEF tank, air compressors, diesel generator• Electric charging station

Figure 1: Conceptual Layout for Transit Satellite Garage



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