



Downtown Parkade Study

District of Squamish | 32214

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1.0 Project Background

The District of Squamish (the District) retained ISL Engineering and Land Services Ltd. (ISL) to undertake a review of potential parkade locations, parkade size, develop a conceptual design and cost estimate, and review the cash-in-lieu bylaw. This section provides some project history in relation to the parking strategy that is driving this study, the recent parking demand study and the Cash-in-Lieu Bylaw.

1.1 Parking Strategy 2016-2020

In 2016 the District of Squamish (The District) developed a Parking Strategy, the objective was *“To maintain reasonable parking systems and infrastructure to support citizens and economic development initiatives while encouraging a transition from private vehicle use to alternate modes of transportation throughout Squamish.”*

With regard to Downtown, the Strategy objective was *“To effectively utilize the current supply of Downtown parking stalls. To encourage redevelopment of the Downtown area, encourage visitation and tourism, and to delay construction of a parkade structure(s) until absolutely necessary.”*

The strategy also recognizes that there are alternatives to increasing the supply of parking *“parking demands in the Downtown area are sufficiently satisfied to continue to facilitate the Districts’ commitment to the ongoing revitalization and redevelopment of the Downtown area. This intent has to be balanced with the commitment to encouraging the use of active transportation in the community. Also need to balance parking provision with the need to foster a pedestrian friendly downtown full of amenities and character.”*

The strategy states the intent is to accommodate primarily residential parking and enable the vision of mixed-use buildings downtown *“New development downtown is often very challenged by parking requirements, since underground parking is difficult and expensive to construct. Providing insufficient parking or parking variances may have the result of having long term residential parking being pushed onto Downtown streets, and thereby competing with residents trying to access businesses. It may be necessary to provide a parking structure or structure Downtown where developers can purchase the spaces required for residential parking. This will assist in allowing continued residential density in the Downtown area and assist in its redevelopment. Without this option it may also not be feasible to achieve the vision of mixed use buildings outlined in the Downtown Neighbourhood Plan. This may also require amendments to both the Zoning Bylaw and the Cash in Lieu of Parking Policy.”*

It is important to note that the strategy specifically states the parking structure will accommodate residential parking. However, discussions to date have indicated that the structure is more likely required to serve commercial land uses. As detailed later in this study, current developments have been able to meet their residential parking requirement but not the commercial parking requirement. Where one has to give, it is most likely the residential parking will be provided on site, and cash-in-lieu paid for the commercial parking spots. It should also be noted that the intent of this study was to consider possible locations downtown. The scope did not include the possibility of remote parkade locations with improved shuttle access to the downtown core.



1.2 2017 Downtown Parking Study

In 2017, the District retained ISL to conduct the Squamish Downtown Parking Study, to undertake parking surveys for the downtown area in order to determine average and peak occupancy rates, average turnover percentage, and average parking duration.

A parking inventory survey was conducted to determine the number of available on-street parking stalls within the study area as of August 2017. The parking is comprised of parallel, angle (30-degree, 45-degree, or 60-degree), and perpendicular parking stalls with or without pavement marking. Parking time limit (2-hour maximum or no time limit) and no parking allowed zones were also found. In addition, oversized vehicle parking area, handicapped accessible parking stalls, and loading zones were identified. Locations and numbers of parking stalls within all off-street parking lots in the study area were also determined during the parking inventory survey. The breakdown (time limits and configurations) of all on-street parking stalls in different sub-areas within the downtown area were counted and are summarized in the following table:

Downtown Area	Number of Parking Stalls					
	2-Hour Limit	No time Limit	Total	Parallel	Angle	90-Degree
Downtown Commercial	279	0	279	185	94	0
Downtown Residential	32	391	423	381	16	26
Others	58	351	409	225	75	109
Overall	369	742	1,111	791	185	135

The parking utilization, duration and turnover surveys were conducted during a long weekend, Saturday September 2, 2017 (Labour Day Long Weekend) and a typical weekday, Thursday September 14, 2017. To cover the peak on-street parking demand, the six-hour parking survey during the long weekend was conducted between 11:00am to 5:00pm. During the typical weekday, the survey was also conducted in six hours with AM peak (9:00am to 11:00am), midday peak (12:00pm to 2:00pm), and PM peak (3:00pm to 5:00pm). The on-street parking demand within the Downtown Residential Area was further surveyed from 6:00pm to 8:00pm. Two survey types were conducted during each study period: parking utilization survey and license plate survey.

Downtown Area	Utilization Rate			
	Average		Peak	
	Weekday	Weekend	Weekday	Weekend
Downtown Commercial	57%	60%	68%	75%
Downtown Residential	43%	42%	48%	44%
Overall	52%	51%	58%	56%

The study concluded that future parking demand will likely come in two different forms, including commercial/tourism and residential parking demands. Both anticipated future parking demands will have distinct features.

Commercial and tourism parking demand growth would be generated during the mid-day peak hour weekday and weekends as observed during the surveys. On the other hand, residential parking demand growth from future developments would likely be generated mostly during weekday evenings and overnight. However, residential parking may also impact the long weekend parking demand throughout the day and into the evening. As the peak times for these two land uses are not the same, it is expected that different strategies will be required to address future parking demand.

For example, the tourism / commercial parking demand could potentially be reduced through strategic and effective regional transit initiatives or providing off-street parking options to reduce the impact on on-street parking supply. Additionally, residential parking demand could potentially be reduced by implementing additional timed parking restrictions, pay-parking initiatives and reviewing the development permit bylaw in order to reduce the spillover effect of resident / visitor parking on the on-street parking.

Many members of the community believe additional parking supply is needed. The data indicates that on most occasions there is still parking available on street, however, during the peak hour of the long weekend on-street parking supply, particularly along Cleveland Avenue is close to full utilization. However adjacent streets often have available parking. Parking management strategies often cite a target of 85% utilization on every block at peak times to ensure that parking spaces are always available and reduce the number of vehicles circling the block waiting for a space to become available. As demand increases over time, some combination of additional parking or management strategies may be necessary.

1.3 Cash-in-Lieu and Alternative Transportation Fund Bylaws

The District of Squamish Payment in Lieu of Off-Street Parking Spaces Bylaw No.2553, 2017 states *“The owner or occupier of any lands regulated under the District of Squamish Zoning Bylaw will satisfy the requirement to provide the off-street parking spaces in accordance with the Zoning Bylaw by making a cash payment in lieu thereof of fifteen thousand dollars (\$15,000.00) per off-street parking space.”*

The bylaw states that the funds collected under the bylaw may also be used for alternative transportation projects *“All payments in lieu required by this Bylaw will be deposited by default to the credit of the District of Squamish Municipal Off-street Parking Facilities Reserve Fund except when determined specifically by Council to the Alternative Forms of Transportation Reserve Fund.”*

The District of Squamish Alternative Forms of Transportation Reserve Bylaw No. 2581, 2017 states *“The Reserve Fund comprising both principal and interest shall be expended for the purpose of undertaking projects to improve transportation infrastructure that support walking, bicycling, public transit or other alternative forms of transportation.”*



1.4 Zoning Bylaw

The Zoning Bylaw sets out minimum parking requirements for the District in general, and two special exceptions for Downtown Squamish. Downtown, the two rates specified are 1 space per residential dwelling, no matter the number of bedrooms, or 2 spaces per 100m² for all other uses.

For this reason, it could be expected that parking requirements will not stifle parking within the core, nor require any developer to pay Cash-in-Lieu fee's for development within that area. Given only those areas out with the Downtown core have minimum parking requirements and may have to contribute to the Cash-in-Lieu fund, it would make more sense that any parkade structure is best positioned to service these developments.

1.5 Summary

Some members of the community believe parking is a problem in the downtown core. The available data suggests this is only the case during the peak hour of busy periods such as a long weekend. The vision to increase density and create a diverse mixed-use downtown core is somewhat reliant on providing appropriate parking to support planned density. Without that, the District may not be able to achieve its vision. The District has recognized that a Downtown parkade may help achieve the vision, however, it also aspires to create a more walkable Downtown where the need for a vehicle is reduced. The fund set up to construct a parkade may also be used for alternative transportation projects to reduce the need to drive, and hopefully, the car ownership of residents downtown. The challenge with making reduced vehicle ownership a reality is the location of Squamish relative to popular employment centres. Many of those that choose to live Downtown for its walkable amenities, may work elsewhere in the Sea to Sky Corridor, such as in Whistler or Metro Vancouver.

■ 2.0 Parkade Sizing

The parkade size must ideally be sufficient to accommodate the anticipated future parking demand. This would be a function of the anticipated development, the mandated parking requirements within the bylaw and the assumptions with regards to spaces that will be paid through cash-in-lieu rather than provided on site.

It should be noted, that the previous chapter states that the cash-in-lieu of parking fund may also be used to fund alternative transportation infrastructure that may reduce vehicle ownership or vehicle usage and parking demands.

There are no recent projections of population and employment in Downtown Squamish. Thus, using historic data, existing data, and estimates is required.

2.1 Current Land Use Data

Existing downtown land use was determined based on a number of methods. Residential units in 2018 were determined through analysis of BC Assessment data. This identified 1,299 residential properties, of which 137 were single family and 1,162 were multi-family. It also identified 219 commercial properties.

The residential development is not critical to the parkade calculation as most development can accommodate residential parking requirements on-site. With regard to the commercial development this is primarily where developers will opt to pay cash-in-lieu.

The District provided an estimate of the number of businesses and employees downtown. This was somewhat higher than the number of commercial properties, which could be due to home-based businesses having a business licence but no commercial property. The number of Downtown businesses were estimated at 300 with an average of 5 employees per business resulting in approximately 1,500 employees downtown currently, however, some businesses were missing from this list and thus the real number may be closer to 2,000 employees.

2.2 Future Land Use Estimates

The future land use has been difficult to establish for Downtown Squamish. The following pieces of information have helped establish an estimate of future Downtown Land Use. To estimate the potential development to the 2040 OCP Horizon Year, ISL have also studied the previous 2005 Growth Management Study and Previous 2009 Downtown Transportation Plan.

2040 Official Community Plan

With regard to recent historic growth in the District, the Squamish 2040 OCP Bylaw 2500, 2017 adopted in June 2018 states *“Squamish continues to experience strong growth. In 2016, Squamish was listed in the Top 25 fastest growing Canadian communities with a population over 5,000, reaching 19,512 residents. This was a 13.7% increase over the 2011 Census and was significantly higher than the provincial growth average (5.6%) and the national growth average (5%). The bulk of housing growth in the Squamish-Lillooet Regional District (SLRD) between 2016 and 2036 is expected to occur in Squamish (42%). Squamish is also expected to continue to capture a greater*

proportion of children and families in the Sea to Sky Corridor, and is an increasingly popular choice for families looking for more affordable alternatives to Metro Vancouver.” The OCP does not provide specific existing or forecast populations for Downtown Squamish.

With regard to projected growth, the Squamish 2040 OCP Bylaw 2500, 2017 adopted in June 2018 states *“SLRD municipalities are generally expecting an average annual growth rate between 1.5-1.8% to the year 2036. Adjusting for Squamish’s historically higher growth rate over the regional average, the community could see a higher projected growth trajectory, potentially reaching 30,000 by 2031 and 34,000 by 2036. Substantial development capacity remains available within existing neighbourhoods and designated development areas to accommodate this anticipated population growth. Under a high growth scenario, however, Squamish could see approximately 24,000 new residents by 2036 with an associated housing need for 9,600 new units, or 480 units per year. In this high growth scenario, some additional lands identified for future growth may be required within the timeline of this plan to meet both local housing and employment needs. Under a low or moderate growth scenario, additional residential capacity will not be required.”*

The above projection of a 34,000 population would result in a 37,500 population by the 2040 OCP horizon year. As Figure 2.1 illustrates, it will require a slightly more aggressive growth rate than has historically occurred and would result in almost double the existing population.

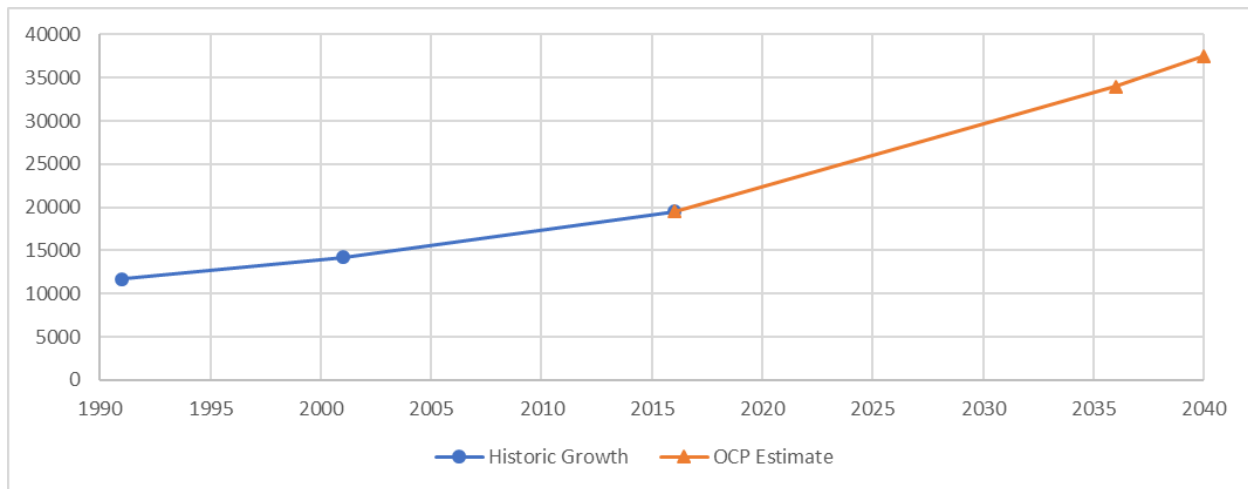


Figure 2.1: Historic Growth and Projected OCP Growth

2.3 2005 Growth Management Strategy

The 2005 Growth Management Study was prepared by Urbanics Consultants Ltd. in support of previous OCP initiatives. At the time of writing the report stated *“the population of the District of Squamish was 14,247 in 2001. This represents a 22% increase from the 11,705 people who lived in Squamish in 1991 (Figure 2-3). Including an estimate for the Census undercount, BC Stats estimates that the population in Squamish was 15,390 in 2004.”*

The report provided low and high projections for population to the 2031 horizon year *“The low and high projection is for the District’s population to reach 25,700 and 41,300 people respectively by the year 2031.”*

Figure 2.2 illustrates both growth projections against historic growth and the OCP projections. When we compare historic growth from 1991 to 2016 it tracks almost exactly in line with the low population estimate of 25,700 by 2031. Continued growth at that rate would equate to approximately 29,000 by the 2040 OCP Horizon Year. As we can see, the population estimates in the current OCP (orange or middle line) are slightly more aggressive than historic growth.

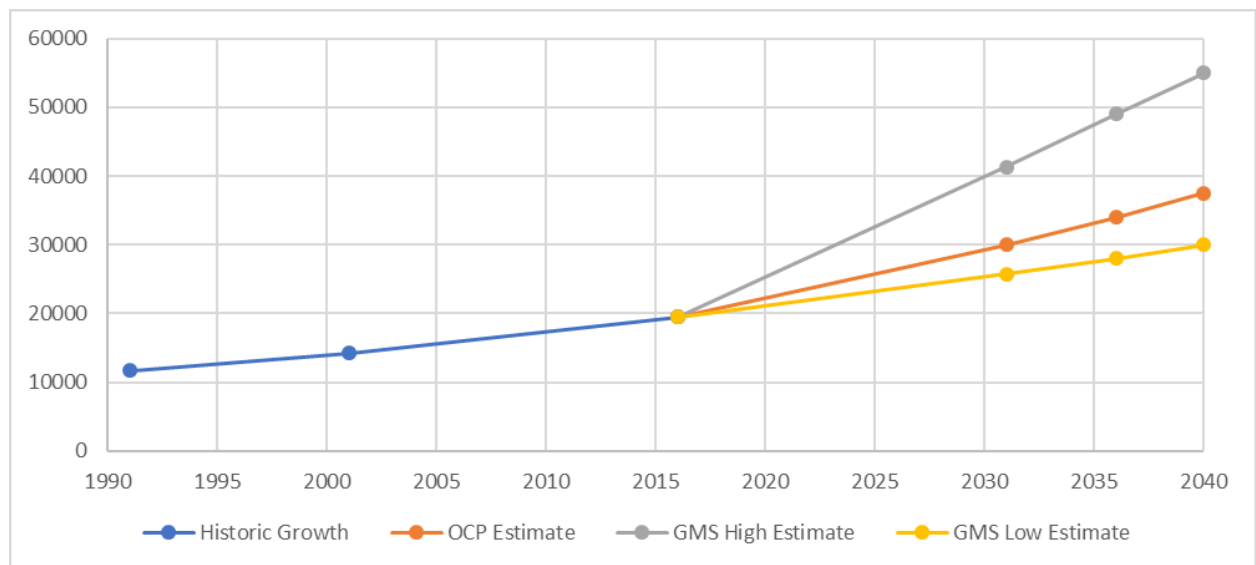


Figure 2.2: Historic Growth, Projected OCP Growth, Growth Management Strategy (GMS) Estimates

2.4 2009 Transportation Plan

This plan utilized the 2005 Growth Management Strategy to develop estimates for the transportation model, including a refined estimate of population and employment in Downtown Squamish. It is somewhat more useful as it divides the Downtown into zones, known as Traffic Analysis Zones (TAZ) and allows us to consider the downtown core more accurately.

As per Figure 2.3, Zones 101 to 707 reflect Downtown, while Zones 101 to 404 (outlined red) were considered to form the downtown core. The 2009 downtown study predicted an increase of 633 residential units and 1,334 employees in the downtown core (Table 2.1).

Table 2.1: 2009 Transportation Plan Land Use Assumptions

Zone 101 to 401	SFH	MFH	Retail	Office	Hotel	Hwy Com.	Govt /Inst	Ind.
	Units	Units	Emp.	Emp.	Rooms	Emp.	Emp.	Emp.
2007	27	141	227	209	142	89	74	24
2031	27	774	939	831	142	89	65	5
Difference	0	633	712	622	0	0	-9	-19
	633		1334					

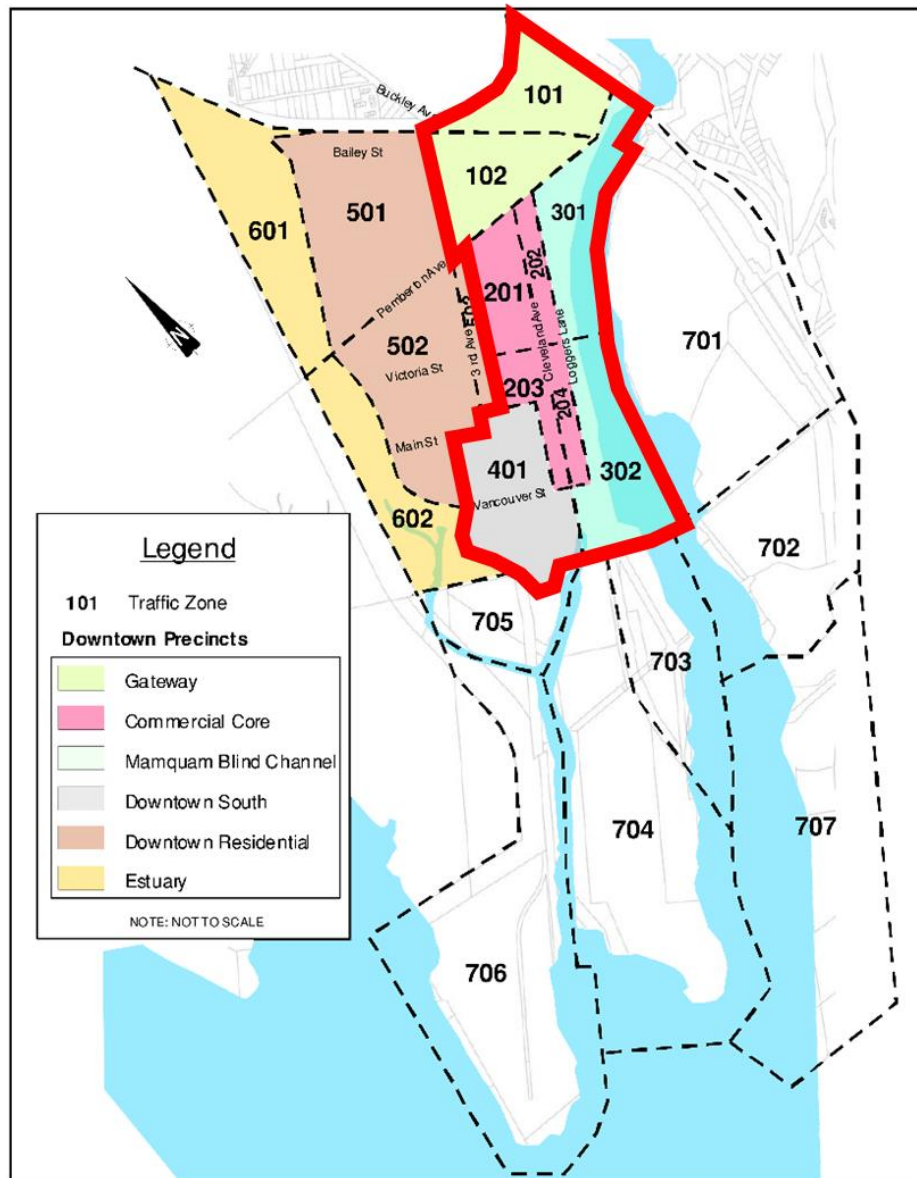


Figure 2.3: Downtown Traffic Analysis Zones

2.5 2019 Downtown Transportation Study

As part of this ongoing study BC Assessment data was collected for the District of Squamish to determine populations for the transportation model. BC Assessment data was cross-referenced with Traffic Analysis Zones for the downtown area.

2.6 Previous Cash-in-Lieu Contributions

Current Cash in lieu payments have been made by 8 separate developments, providing cash in-lieu of 37 parking spaces, and providing \$204,000 in contributions to the fund, prices per space have varied from \$4,000 in 2017, to \$6,000 in early 2018, and \$15,000 in late 2018.

Table 2.2: Current Cash-in-Lieu Contributions

Project Number	DP #	Address	# of Spaces
2016-32	418	38024 Cleveland Avenue	6
2016-	430	38033-51 Second Ave	6
2016-43	425	37870 Third Ave - Lizzy Bay	6
2016-101	443	1365 Victoria Ave	6
2016-47	441	1365 Pemberton	8
2016-31	417	38165/38167 Cleveland Ave	1
2018-11	482	37662 Third	3
<i>historical</i>			
2013-07	339	38116 Loggers	1

2.7 Estimated Parkade Size

Most development in downtown Squamish can provide sufficient residential parking at a rate of 1 parking space per unit, regardless of size. It is primarily the ground level commercial development where cash is typically paid in lieu of on-site parking. The following process to determine an approximate parkade size was determined:

1. Identify future development in the Downtown Core which may need to pay cash-in-lieu of providing on-site parking.
2. Identify how existing developments have been able to accommodate parking on-site and how many spaces they have provided cash-in-lieu for.
3. Because the only available estimate of future employment land is the number of employees, yet parking requirements are based on floor area, determine an average floor space per employee and then anticipated floor space of new commercial development.
4. Apply parking requirements to the estimated floor area to provide total parking required.
5. Determine the ratio of parking to be accommodated on site and thus the number of parking spaces that cash would be paid in lieu of. This is effectively the parkade size requirement.



Step 1: Determine Future Development

The 2009 Transportation Plan land use model inputs of expected growth Downtown are the best available estimate of growth in Downtown. Downtown is expected to grow by 5,675 residential units and 3,734 employees. However, not all growth will occur within the limits of the study area. In the downtown core, it is expected there will be 633 more residential units and 1,334 more employees.

Step 2: Understand What Current Development Trends Have Been

Based on the development at 1365 Victoria Street, this development includes 1 level of commercial development and five levels of residential development including 33 residential units. It will provide 34 on-site parking spaces and cash-in lieu for 6 spaces. In other words, it is able to provide the residential parking requirement of 1 space per unit but only 1 of 7 spaces required for the commercial element.

Step 3: Determine Space Requirements for New Employees

As parking requirements are determined based on floor area, determine how much floor area will be required to accommodate 1,334 employees. A medium density office space has approximately 150 square feet per worker (based on Colliers Canada office leasing frequently asked questions provided in Appendix B). Thus 1,334 employees would require approximately 200,000 square feet of office space or 18,600 square metres.

Step 4: Apply Parking Requirements to Estimated floor Area

In the Downtown core, the Squamish Zoning Bylaw, Section 41.7 Off Street Parking Requirements states that all non-residential land uses shall provide 2 parking spaces for every 100 square metres of floor space, therefore 372 spaces would be required in total to accommodate the new employees.

Step 5: Determine Ratio of Parking to be accommodated on Site

Based on the development at 1365 Victoria Street, 1 space out of 7 for the commercial element was able to be accommodated on site, or approximately 15% of the required parking provision. Thus 85% would need to be accommodated in the parkade. Based on the total requirement of 372 spaces, a requirement to accommodate 85% would result in a 316 space parkade.

2.8 Summary

To summarize, it is estimated that a parkade of 316 parking spaces may be required. In discussion with the District, it was determined that this may not be feasible and that we should consider other options to understand the variance in the cost of parking for a parkade of 200, 300 and 400 vehicles. The design will be subject to available land area and number of floors required to accommodate those spaces.

3.0 Parkade Design

3.1 Parkade Layout

A parkade design was selected that would fit approximately within the four preferred sites and provide the greatest efficiency of parking space to floor area. A single threaded helix design was selected with parking on the sloped floors. While not the most efficient for drivers, it is the most space efficient which is important in a constrained site. The design measures approximately 150m x 37m and can increase the number of spaces by adding additional floors. The exact dimensions and number of levels will depend on the site ultimately selected and the number of spaces deemed appropriate at that time given the size of the cash-in-lieu fund and the success in achieving mode-shift to alternative transportation modes. Figure 3.1 to 3.3 shows the initial parkade concepts that are feasible within a 150m x 37m footprint.

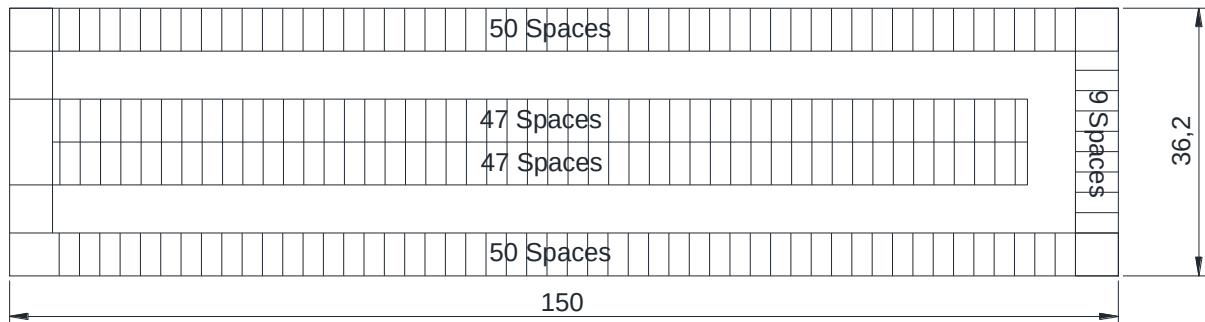


Figure 3.1: 1 Parking Level with 203 Spaces

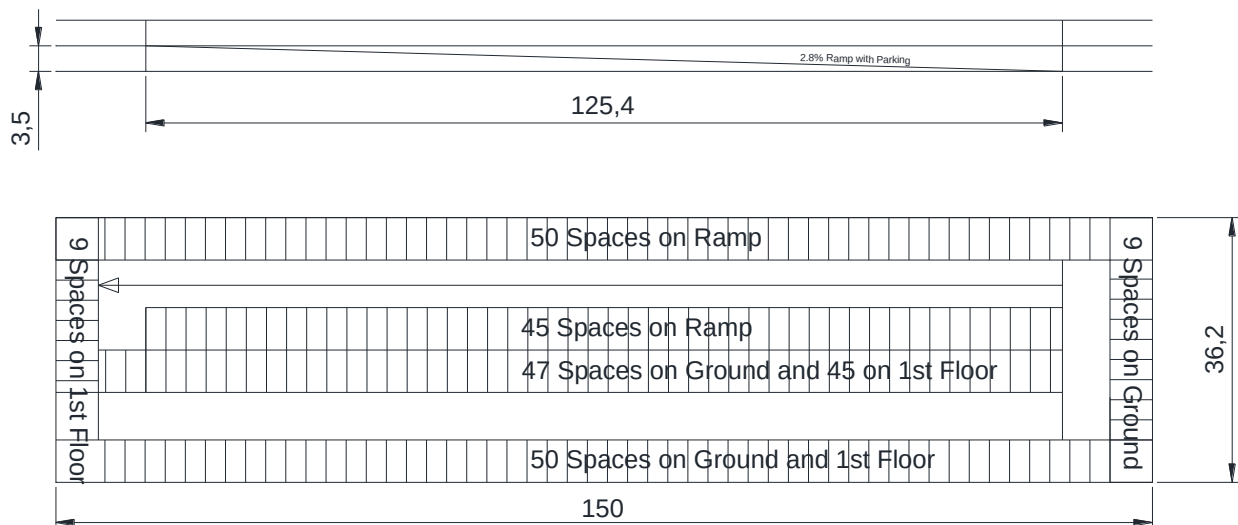


Figure 3.2: 2 Parking Levels with 305 Spaces

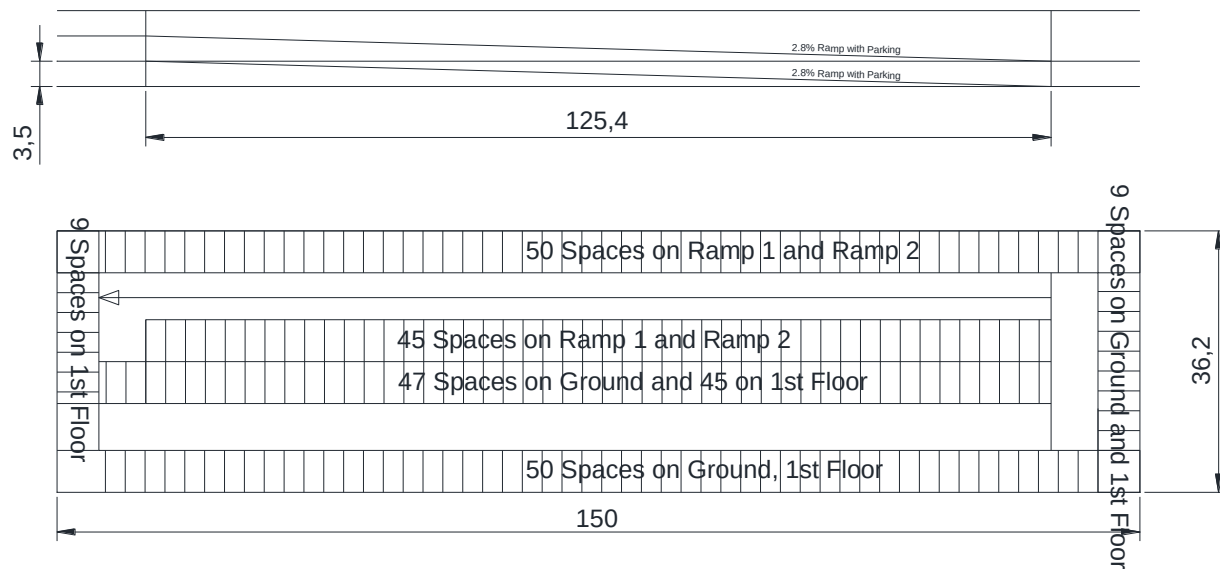


Figure 3.3: 2.5 Parking Levels with 409 Spaces

3.2 Structural Design

ISL has developed a conceptual level design (Figure 3.4) and construction cost estimate for the parking structure. A summary of the proposed structure used in the cost estimate is detailed below and a cost estimate is provided for one, two and three level structure providing 200, 300, and 400 parking spaces respectively.

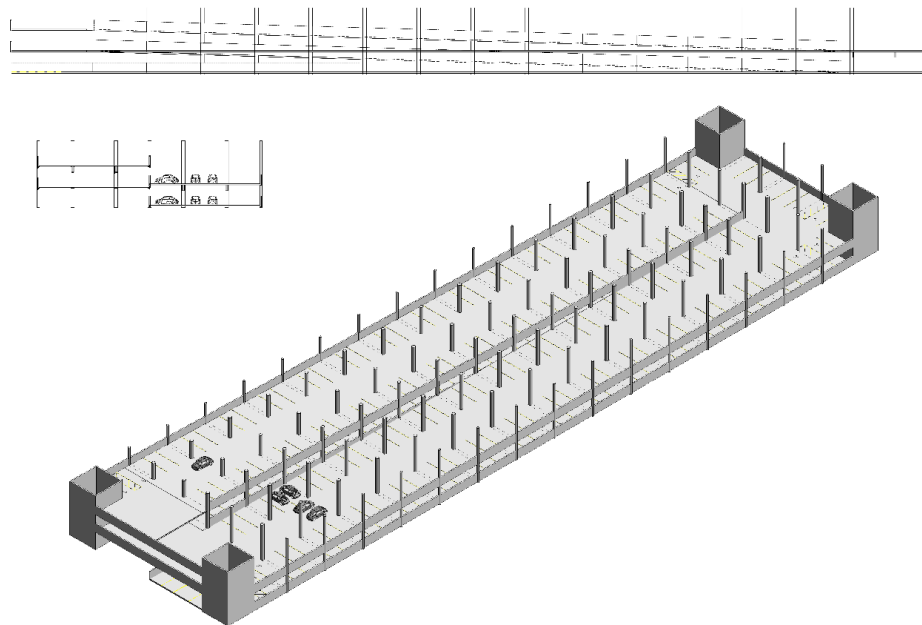


Figure 3.4: Approximately 400 Space Parkade Structural Design

Project Considerations

- The following assumptions are made with respect to geometry of the parkade:
 - Stall dimensions: 5.8m x 2.5m
 - Aisle width: 7m
 - Maximum ramp grade: Up to 15%, 10% on First and Last 6m
 - Ramp Grade if parking on ramp: 6.67%
 - Minimum Clearance: 3m
 - Distance between Floors: 3.5m
- The current structure footprint is large enough to accommodate a four-level structure, the design maintains a maximum of four floors, i.e., a three-level parkade with one commercial floor above, or a one level parkade with three commercial levels above.
- The footprint measures approximately 5430m² per level including the ramps, however its final size will vary depending on the final number of parking stalls required. Sketch SK-1 shows the conceptual design for the building structure.
- The parking stalls are 2.75m wide x 5.8m deep, with handicap parking stalls being wider.
- The proposed foundation for this structure is reinforced concrete spread footings. Depending on the existing ground conditions and bearing capacity, driven steel piles within concrete caps may be required. At this time, a geotechnical investigation has not been completed.
- Each parking level is designed for a total capacity of 199 vehicles, including 8 handicap stalls.
- The structure will be above ground, with the first parking storey at grade level.
- Vehicle entrance to the structure will be subject to the selected site.
- Additional pedestrian exits can be provided by the stairway or elevator cores.

Building Structure

The structure is designed with both precast and cast-in-place concrete components. The floor system is cast in place concrete slab supported by precast beams.

Substructure

The substructure will consist of spread footings and grade beams. The spread footings will be approximately 3500mmx3500mm to support the columns. Grade beams will be used to support the walls.

Structural Shell

The shell of the structure will include the floor, exterior walls, columns, precast beams and concrete floors/slab. The columns selected at this time are circular and will range from 400mm to 600mm in diameter. The beams chosen for this project is precast inverted tee beam 1016mm wide and 1016mm deep. The concrete exterior walls will be 200mm thick. The roof structure will consist of steel trusses and metal deck.

We have used the same structural members for all floors, however, if an additional building structure is constructed above the parking structure this will be dependent on the proportion of office to parking levels chosen.



Interior Considerations

We have included two staircases at two corners of the building, along with an elevator at each remaining corner.

M/E/C Services

This portion of the cost estimate includes all services required for the parking levels (mechanical, electrical, communication and HVAC). This includes the following items: two traction-type geared elevators; sanitary and storm (rainwater drainage) piping, sprinkler system (dry pipe sprinkler, steel, ordinary hazard) and standpipes; electrical services and distribution (6m conduit & wire, 3phase, 4 wire, 120/208V, 400A, feeder installation 600V including RGS conduit and XHHW wire, switchgear installation, panels & circuit breakers, 400A), lighting, motors (3 phase, 200 V, 15HP motor and motor feed system), and branch system (0.8 watt per SF, 20FC, 5 fixtures @32 watt per 1000SF); communication (fire detection, addressable, 12 detectors, including outlets, boxes, conduit and wire); and security system and a back-up electrical system.

Additional services to support potential office or commercial levels have not been included in the design at this time.

Specialized Equipment

We have included an estimate for project specific items such as the automated gates, parking machine printers, signage, installation of the pavement markings and warning systems that are associated with vehicular traffic in the structure.

Office Level

It has been suggested that a parkade structure may be combined with a commercial building. ISL have not included an estimate for this component of the building, however the structure has been designed to accommodate the loading of up to four floors regardless of the ratio of parkade to commercial. The cost will vary depending upon interior design and layout of the commercial space. The roof structure was assumed to be a simple steel truss/metal deck structure.

Construction

We have included an allowance for the construction cost contingency of 40% consistent with conceptual level design. In addition, we included a 25% Contractor's cost to complete this project.

3.3 Parkade Cost Estimate

District staff requested that ISL consider three different sizes of parkade with 200, 300, and 400 spaces. Our conceptual level cost estimates are summarised in Table 3.1 while the detailed cost estimates are provided in Appendix A. The costs vary from \$50,000 to \$63,333 per space, significantly more than the \$15,000 the District is currently collecting for cash-in-lieu per space.

Table 3.1: Cost Estimate

Parkade Cost Estimates	200 Space	300 Space	400 Space
Number of Floors	1	2	3
Raw Construction Cost	~\$6M	~\$11M	~\$15M
Contingency/Contractor Fees	~4M	~\$8M	~\$10M
Total Fee	~\$10M	~\$19M	~\$25M
Cost per Space	\$50,000	\$63,333	\$62,500

Based on the \$15,000 currently being collected, and the predicted need to pay cash-in-lieu for 316 parking spaces, the District will only collect \$4,740,000 in funds for the parkade based on current funding.

Alternate construction techniques may yield lower costs. The District inquired about timber parkade construction. This has not been done before in Canada, and therefore there is little local frame of reference. However, building regulations have changed to allow larger timber buildings, and the cost of these are often lower than the concrete equivalent. Further research would be required if the District were to pursue such a direction.

3.4 Potential Parking Revenue

If the District were to opt for a pay-parking model for the new parkade, it has the potential to cover some of the construction costs, and eventually return positive revenue for the District. It is difficult to predict exactly how much revenue a parkade may generate, and it would come with increased costs to maintain additional equipment, monitor and enforce parking regulations.

Table 3.2 provide some estimates of what revenue could be generated by parkades of varying size. The table assumes the following assumptions:

- Parkade is utilized for 15 hours of the day, 7am to 10pm, 365 days per year.
- Hypothetical utilization is adjusted based on parkade size and cost. Detailed study has not been undertaken to determine these values.
- Revenue is estimated based on hourly costs of \$2, \$3 and \$4 per hour. For comparison rates in downtown Vancouver in EasyPark parking lots controlled by the City vary from approximately \$1 hour to \$4 per half hour.

Table 3.2: Potential Parking Revenue

Parkade Size	Cost Per Hour	Average Utilization	Hours Per Day	Days Per Year	Income Per Year (\$M)	Parkade Cost (\$M)	Cost- CiL Fund (\$M)	Years to Recoup
200	\$2	60%	15	365	\$1.31	\$10.00	\$5.25	4
300	\$2	50%	15	365	\$1.64	\$19.00	\$14.25	9
400	\$2	40%	15	365	\$1.75	\$25.00	\$20.25	12
200	\$3	55%	15	365	\$1.81	\$10.00	\$5.25	3
300	\$3	45%	15	365	\$2.22	\$19.00	\$14.25	6
400	\$3	35%	15	365	\$2.30	\$25.00	\$20.25	9
200	\$4	50%	15	365	\$2.19	\$10.00	\$5.25	2
300	\$4	40%	15	365	\$2.63	\$19.00	\$14.25	5
400	\$4	30%	15	365	\$2.63	\$25.00	\$20.25	8

Subtracting the amount available in the cash-in-lieu fund from the parkade construction cost, based on the above estimates, parking fees could recoup the cost of the parking structure anywhere from 2 to 12 years depending upon the parkade size and rate structure chosen.

The above estimates are subject to those rate structures and achieving the utilization rates. Years to recoup the costs of construction may increase when inflation and cost of borrowing (if necessary) is considered.

With regard to utilization, it should be noted that often during the day, on-street parking is not fully utilized and thus demand to use the parkade will reduce at these times. This could be countered by similar or higher parking rates for on-street parking in high demand locations. However, as development occurs in the downtown core, some of the off-street surface parking lots may disappear, increasing demand for the remaining on-street spaces, and helping to increase parkade utilization.

3.5 Future Needs

Historically its been easy to forecast future automobile use and parking requirements based upon historic patterns. However, new trends and technologies are emerging that potentially will impact the way we travel, the way we use automobiles, and the parking required. Constructing a parkade for todays needs may not be appropriate for future needs.

The most obvious trends emerging today are increased active transportation trips in place of trips previously made by automobiles. This could be for numerous reasons including the reduced financial cost of active transportation and increased health benefits. Any change in this direction will reduce the need for parking particularly where the District can support this by providing safe all ages and abilities routes between the downtown core and outlying neighbourhoods.

Ride-hailing was recently approved in British Columbia, and while the requirement for a class 4 licence has limited the driver pool and thus the number of ride-hailing vehicles available so far, over time, more drivers and vehicles will become available. This easy to use option for infrequent trips may primarily impact the taxi business, but having an easy option for a ride home will reduce their need to

use a private automobile and park it. Perhaps it will even allow families to reduce their vehicle ownership.

Similarly, car sharing services allow some to forgo car ownership completely, or again reduce their household vehicle ownership, opting for a pay-as-you-go model, and reducing the need for parking. By allowing one vehicle to make more trips per day than a personal vehicle, it spends less time parked and more time being utilised, reducing its parking requirement.

Automated vehicles are expected to further increase the attractiveness of ride hailing trips, by reducing the cost or providing an alternate to infrequent transit services. Prediction for their introduction are very different between manufactures, but in time, they might help provide people with an alternative to their private automobile.

In some locations, parkades are already heading into a state of disuse. In London, UK for example, a seven-storey parkade is being repurposed for all sort so things from mini-golf to entrepreneurial space, hair salons to a public house, low cost housing to warehouse data centres.

Should the district proceed with the construction of a parkade, some effort should be assigned to how the design may be repurposed in the future.



■ 4.0 Summary and Strategies

Based on existing development patterns, most developments in the downtown core are mixed-use and can provide the residential parking requirement of 1 space per unit on-site. However, it is typically more difficult to provide parking for the commercial component. It is estimated that new commercial development in the downtown core could comprise 200,000 square feet of commercial space which is expected to provide 2 parking spaces for every 100 square metres of floor space. 372 spaces would be required in total. Past development has been able to provide approximately 15% of the required spaces, resulting in an estimated requirement of 316 spaces in a parkade.

The District wished to understand how much the cost per space might vary with different sizes of parkade. ISL developed concept designs and cost estimated for parkades of 200, 300 and 400 spaces. Each assumed the parkade would have office space above, however that was not included in the cost estimate. The costs were estimated at \$10M for 200 spaces on one level with structure to support office space above, \$19M for 300 spaces over two levels, and \$25M for 400 spaces over three levels. This equated to a cost per space of \$50,000, \$63,333 and \$62,500 for the 200, 300 and 400 space parkades respectively.

The conceptual design and costs estimates developed indicate that the cash-in-lieu fees currently being collected (\$15,000 per space) will not be sufficient to fund the parkade construction. Furthermore, given the current fund stands at just \$204,000, the fund will be insufficient to cover the parkade costs. Based upon the estimated commercial development and need to pay cash-in-lieu of parking, the fund may reach approximately \$5M by the time all development is complete. With every year that passes without construction of a parkade, the money received effectively loses value as the cost of construction typically increases year-on-year.

Increasing the cash-in-lieu fee to reflect the true cost of the parkade facility can be problematic, potentially risking stifling development in the downtown core. The District must balance the real cost of providing parking with the disincentive this might create for development, as well as considering other options to address parking challenges or funding.

Based on the findings of this study, six potential strategies were developed with respect to the cash-in-lieu fees and funding of a parkade structure:

1. Increase the cash-in-lieu fees to reflect the real cost of construction. This strategy risks discouraging development and the associated benefits it brings to the District in terms of tax revenue and vibrancy associated with denser development.
2. Increase the cash-in-lieu fees to more closely reflect the real cost of construction. Examples from other municipalities often lie somewhere between the true cost and the Districts current rates. Examples City of Vancouver at \$24,700 which is based on the cost of construction for recent structures less the present value of future revenue from the spaces constructed, City of Kelowna at \$33,000 estimate they collect approximately 75% of the construction cost (excluding land value) and increase based on consumer price index every year. This strategy blends the risk between discouraging development while potentially raising more funds, but would still leave a shortfall in funding for a parkade structure.

3. Maintain the current rate of \$15,000 per space (increased at cost of inflation per annum) and accept parking will be a challenge. This strategy will enable development to continue at current rates, contribute to tax revenue and vibrancy in the downtown core. Consider addressing parking challenges through pay parking rates and investment in alternative modes.
4. Maintain the current rate of \$15,000 per space (increased at cost of inflation per annum) and subsidise the parkade construction through District funds. This strategy will enable development to continue at current rates, contribute to tax revenue and a bustling downtown. It will require use of district funds that may have been utilised elsewhere.
5. Maintain the current rate of \$15,000 per space (increased at cost of inflation per annum) and use the fund to dramatically improve active transportation infrastructure. This strategy will enable development to continue at current rates, contribute to tax revenue and a bustling downtown with excellent alternatives to driving.
6. Maintain the current rate of \$15,000 per space (increased at cost of inflation per annum) and restrict development to a level that can be accommodated with existing parking provisions. This strategy will stifle development of the downtown core, reduce opportunities for improved amenities and vibrancy, and restrict tax revenue.
7. Maintain the current rate of \$15,000 per space (increased at cost of inflation per annum), and given the new parkade will primarily serve commercial development, adopt a pay-parking structure enabling the District to recoup funds and subject to usage, fund the remaining cost of the parkade over a number of years and eventually generate positive revenue for the District.



APPENDIX
Parkade Structure Concept Design Cost Estimates

A

Table A.1: Conceptual Cost Estimate – One Level – 200 Spaces

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE	AMOUNT
A CONCRETE					
A1	FOUNDATIONS				
	Strip Footings (300x600mm deep)	m3	58	\$1,200.00	\$ 69,811
	Spread Footings (4.5x4.5x1.25)	m3	3443	\$1,200.00	\$ 4,131,000
A2	SLABS				
	Slab on grade (200mm thick)	m3	905	\$1,000.00	\$ 905,388
	Suspended slab (300mm thick)	m3	0	\$1,750.00	\$ -
A3	WALLS				
	200mm thick wall	m3	360	\$1,500.00	\$ 539,350
A4	COLUMNS				
	508mm dia. concrete columns 2nd and 3rd floor	m3	0.0	\$1,500.00	\$ -
	610mm dia. concrete columns ground + 1st floor	m3	0.0	\$1,500.00	\$ -
B PRECAST CONCRETE					
B1	BEAMS				
	401T32	l.m.	0	\$400.00	\$ -
C ROOF STRUCTURE					
	Roof structure (trusses and metal deck)	L.S.	0	\$500,000.00	\$ -
D SERVICE EQUIPMENT					
	Traction Geared Elevator (125fpm)	each	0	\$300,000.00	\$ -
	Plumbing Fixtures	L.S.	1	\$4,000.00	\$ 4,000
	Rain Water Drainage (75 & 100mm piping)	Sq. m	0	\$25.00	\$ -
	Sprinkler System	Sq. m	0	\$45.00	\$ -
	Standpipes (100mm dia. steel)	L.S.	1	\$7,500.00	\$ 7,500
	Electrical Services & Distribution (600V-400A)	L.S.	1	\$45,000.00	\$ 45,000
	Lighting, Motors, and Branch System	Sq. m	0	\$40.00	\$ -
	Communication & Security	L.S.	1	\$12,000.00	\$ 12,000
	Back-up Electrical Systems (generator sets, batteries, etc...)	L.S.	1	\$8,500.00	\$ 8,500
E					
E1	VEHICULAR EQUIPMENT				
	Automatic gates, parking machines, ticket printers, etc...	L.S.	1	\$150,000.00	\$ 150,000
E2	FURNISHES				
	Signage	each	24	\$125.00	\$ 3,000
	Precast Concrete Parking Bumpers (Guide System)	each	398	\$10.00	\$ 3,980
	Pavement Markings	each	398	\$20.00	\$ 7,960
H					
RAW CONSTRUCTION FEES					\$ 5,887,489
H1	CONSTRUCTION				
	- Building Construction Contingencies	%	40%	\$5,887,488.90	\$ 2,354,996
	- Contractors Fees	%	25%	\$5,887,488.90	\$ 1,471,872
TOTAL CONSTRUCTION COSTS					\$ 9,714,357

Table A.2: Conceptual Cost Estimate – Two Levels – 300 Spaces

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE	AMOUNT
A CONCRETE					
A1	FOUNDATIONS				
	Strip Footings (300x600mm deep)	m3	58	\$1,200.00	\$ 69,811
	Spread Footings (4.5x4.5x1.25)	m3	3443	\$1,200.00	\$ 4,131,000
A2	SLABS				
	Slab on grade (200mm thick)	m3	905	\$1,000.00	\$ 905,388
	Suspended slab (300mm thick)	m3	1358	\$1,750.00	\$ 2,376,644
A3	WALLS				
	200mm thick wall	m3	479	\$1,500.00	\$ 719,133
A4	COLUMNS				
	508mm dia. concrete columns 2nd and 3rd floor	m3	0.0	\$1,500.00	\$ -
	610mm dia. concrete columns ground + 1st floor	m3	145.1	\$1,500.00	\$ 217,607
B PRECAST CONCRETE					
B1	BEAMS				
	401T32	l.m.	1023	\$400.00	\$ 409,040
C ROOF STRUCTURE					
	Roof structure (trusses and metal deck)	L.S.	0	\$500,000.00	\$ -
D SERVICE EQUIPMENT					
	Traction Geared Elevator (125fpm)	each	2	\$300,000.00	\$ 600,000
	Plumbing Fixtures	L.S.	1	\$4,000.00	\$ 4,000
	Rain Water Drainage (75 & 100mm piping)	Sq. m	4539	\$25.00	\$ 113,487
	Sprinkler System	Sq. m	18158	\$45.00	\$ 817,106
	Standpipes (100mm dia. steel)	L.S.	1	\$7,500.00	\$ 7,500
	Electrical Services & Distribution (600V-400A)	L.S.	1	\$45,000.00	\$ 45,000
	Lighting, Motors, and Branch System	Sq. m	18158	\$40.00	\$ 726,317
	Communication & Security	L.S.	1	\$12,000.00	\$ 12,000
	Back-up Electrical Systems (generator sets, batteries, etc...)	L.S.	1	\$8,500.00	\$ 8,500
E					
E1	VEHICULAR EQUIPMENT				
	Automatic gates, parking machines, ticket printers, etc...	L.S.	1	\$150,000.00	\$ 150,000
E2	FURNISHES				
	Signage	each	24	\$125.00	\$ 3,000
	Precast Concrete Parking Bumpers (Guide System)	each	398	\$10.00	\$ 3,980
	Pavement Markings	each	398	\$20.00	\$ 7,960
H					
RAW CONSTRUCTION FEES					\$ 11,327,473
H1	CONSTRUCTION				
	- Building Construction Contingencies	%	40%	\$11,327,472.69	\$ 4,530,989
	- Contractors Fees	%	25%	\$11,327,472.69	\$ 2,831,868
TOTAL CONSTRUCTION COSTS					\$ 18,690,330

Table A.3: Conceptual Cost Estimate – Three Levels – 400 Spaces

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	QUANTITY	UNIT PRICE	AMOUNT
A CONCRETE					
A1	FOUNDATIONS				
	Strip Footings (300x600mm deep)	m3	58	\$1,200.00	69,811
	Spread Footings (4.5x4.5x1.25)	m3	3443	\$1,200.00	4,131,000
A2	SLABS				
	Slab on grade (200mm thick)	m3	905	\$1,000.00	905,388
	Suspended slab (300mm thick)	m3	2716	\$1,750.00	4,753,287
A3	WALLS				
	200mm thick wall	m3	959	\$1,500.00	1,438,266
A4	COLUMNS				
	508mm dia. concrete columns 2nd and 3rd floor	m3	100.6	\$1,500.00	150,918
	610mm dia. concrete columns ground + 1st floor	m3	145.1	\$1,500.00	217,607
B PRECAST CONCRETE					
B1	BEAMS				
	401T32	l.m.	2045	\$400.00	818,080
C ROOF STRUCTURE					
	Roof structure (trusses and metal deck)	L.S.	0	\$500,000.00	0
D SERVICE EQUIPMENT					
	Traction Geared Elevator (125fpm)	each	2	\$300,000.00	600,000
	Plumbing Fixtures	L.S.	1	\$4,000.00	4,000
	Rain Water Drainage (75 & 100mm piping)	Sq. m	4539	\$25.00	113,487
	Sprinkler System	Sq. m	18158	\$45.00	817,106
	Standpipes (100mm dia. steel)	L.S.	1	\$7,500.00	7,500
	Electrical Services & Distribution (600V-400A)	L.S.	1	\$45,000.00	45,000
	Lighting, Motors, and Branch System	Sq. m	18158	\$40.00	726,317
	Communication & Security	L.S.	1	\$12,000.00	12,000
	Back-up Electrical Systems (generator sets, batteries, etc...)	L.S.	1	\$8,500.00	8,500
E					
E1	VEHICULAR EQUIPMENT				
	Automatic gates, parking machines, ticket printers, etc...	L.S.	1	\$150,000.00	150,000
E2	FURNISHES				
	Signage	each	24	\$125.00	3,000
	Precast Concrete Parking Bumpers (Guide System)	each	398	\$10.00	3,980
	Pavement Markings	each	398	\$20.00	7,960
H					
RAW CONSTRUCTION FEES					\$ 14,983,207
H1	CONSTRUCTION				
	- Building Construction Contingencies	%	40%	\$14,983,206.87	5,993,283
	- Contractors Fees	%	25%	\$14,983,206.87	3,745,802
TOTAL CONSTRUCTION COSTS					\$ 24,722,291



APPENDIX
Office Space per Person

B

OFFICE LEASING FAQ

How much office space will I need?

[Home](#) [Services](#) [Leasing - Tenant Rep](#) [Office Leasing Guide](#) [FAQ](#) [Office Leasing FAQ](#)

How much office space will I need?

The amount of space you require will vary depending on the nature of your business and the efficient use of space you select. As a rule you will require roughly 120 to 180 square feet of space per employee.

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