Electric Vehicle Planning Committee (EV-PC) Report on Electric Vehicle (EV) Charging System Solution

REPORT SUMMARY

After much research, the EV-PC is presenting three options for council's review as paths forward for enabling EV charging at Vanier Court.

The EV-PC determined that there are two types of EV charging systems or *levels* appropriate for our building. Level 1, which uses 110V and Level 2, which uses 208V. Level 1 systems charge more slowly and are less expensive to install than Level 2 systems. Current EV owners were polled and the majority indicated that a Level 1 system currently meets their needs.

The EV-PC identified that we are eligible for a rebate program run by BC Hydro, known as CleanBC, designed to assist multi-unit residential buildings such as Vanier Court EV add charging systems.

The CleanBC program roll out was delayed until December 4th, 2020 which delayed our ability provide this guidance. However, after having conversations with our CleanBC advisor, the EV-PC clearly understands the program and eligibility requirements for the financial incentives. CleanBC rebates are generous and attractive, however they are only available for Level 2 systems.

The EV-PC had 3 contractors conduct site inspections at Vanier Court, and they provided information on technology options and initial estimates. The information on the following pages is based on these inspections and estimates.

Note that all options require coring holes through the concrete to allow the EV infrastructure to supply both the upper and lower parkades.

Regardless of the level system or approach selected, cost recovery of electricity use, the recommendations charging for the electricity is the same. For sustainability and ease of administration, the EV-PC recommends that an exclusive use agreement similar to the Laundry Room Agreement be utilized, with participating EV users agreeing to a fair usage policy and paying a fee for their estimated usage. This could be revisited in the future if individual metering systems become easier to install and more cost-effective.

These are the 3 options the EV-PC would like the council to consider. You will also find a comparison table, as well as the vendor quotes received.

OPTION 1 – Maximize rebate, 52 Level 2 plugs in stalls

Level 2 EV Charging Plugs to every stall

- All 52 strata lots (SL) will have access to a Level 2 plug in their stall. SLs with 2 parking stalls will have one plug.
- Provides the most robust charging system to all owners
- The property value to all owners will be elevated, as demand for EV capable buildings will only increase.
- Eligible for refunds from the BC Hydro/CleanBC rebate program.
    - BC Hydro rebates will cover up to 50% of the costs, up to a maximum of $600 per parking stall made EV-ready.
    - Rebate requires EV Ready Plan before any work commences. For the 2020 fiscal year plan must be completed by Feb. 28, 2021.
    - Cost of EV Ready Plan rebated up to 75% once the project is completed
- Individual EV owners must purchase their own charging stations (Rebates available)
- The approximate infrastructure cost per Strata Lot (SL) would likely be $650-$740.
- Installation details:
    - Install 300A connection to Main Distribution Panel (MDP) in the electrical room
    - Run a 2” conduit from MDP to an EV panel to be in the upper garage recycling area
    - Install wiring and electrical receptacles for EV charging stations
    - Core a hole through concrete floor from recycling area to lower garage
    - Install conduit from upper garage EV sub- panel to junction box in the lower garage
    - Install wiring and electrical receptacles for EV charging stations

OPTION 2 – Cheaper with 40 Level 1 plugs available

Level 1 EV Charging to most but not all

- 40 Level 1 plugs.
- Each EV user would individually pay for their wiring to their respective stall.
- The approximate infrastructure cost per Strata Lot (SL) would likely be $375 - $450.
- Installation details:
    - Install 300A connection to Main Distribution Panel (MDP) in the electrical room

- Run a 2” conduit from MDP to an EV panel to be in the upper garage recycling area
- Install upper garage EV sub-panel with dedicated breaker, dedicated meter, and space for 40 Level 1 charger connections
- Install wiring and between panels and junction boxes
- Core a hole through concrete floor from recycling area to lower garage
- Install conduit from upper garage EV sub- panel to junction box in the lower garage.

OPTION 3 – Cheapest with 20 Level 1 plugs available

Level 1 EV Charging plugs to first come

- 20 available Level 1 outlets from existing breaker panel ‘H’ (common property panels) in the electrical room
- Each EV user would individually pay for their wiring to their respective stall.
- The approximate infrastructure cost per Strata Lot (SL) would likely be $70 -$90.
- Installation details:
  - Core a hole through concrete wall from electrical room to recycling area
  - Core a hole through concrete floor from recycling area to lower garage
  - Install 1"conduit and BX armored cable from Panel ‘H’ to junction box in the lower garage
  - Install three 1-pole 20a circuit breakers for panel H with options for 17 more.

Comparison Table (next page)

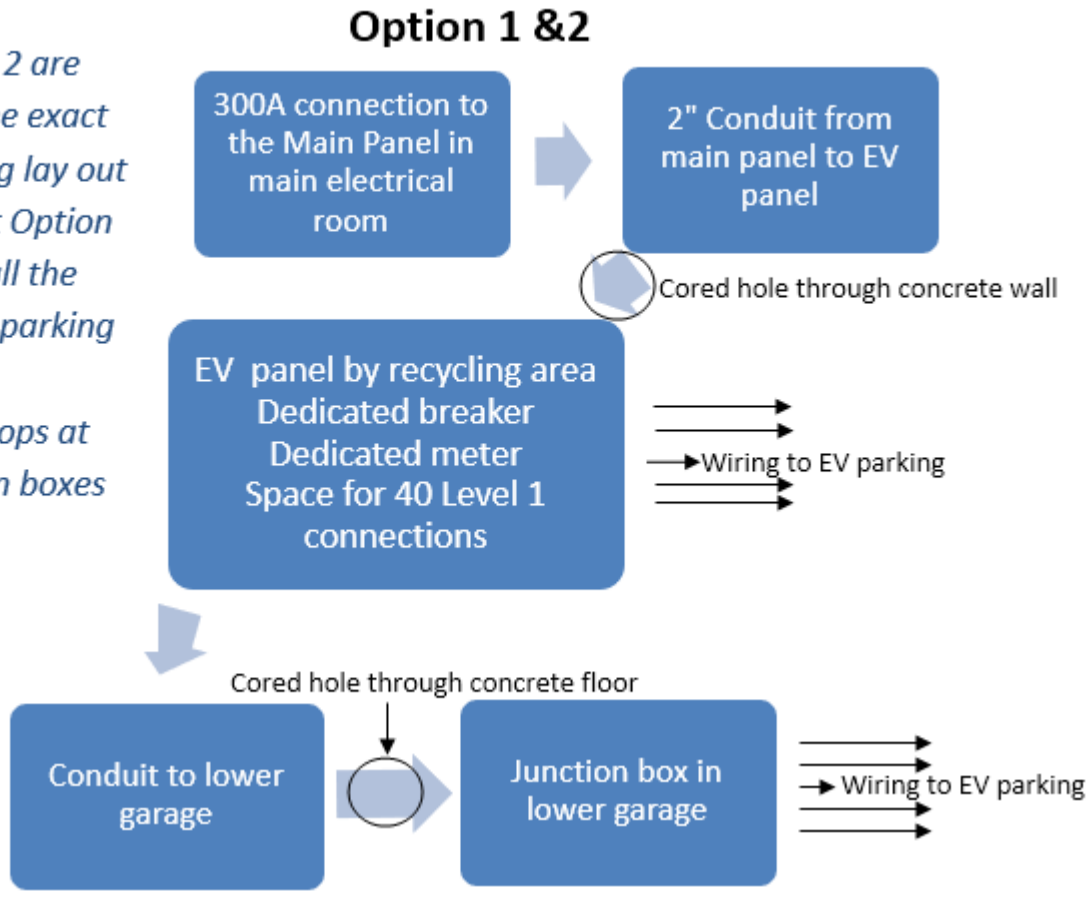
	Option 1		Option 2	Option 3
Key points	• Maximized rebate • All owners have their spot ready to plug-in an EV charger • Charging type L2* considered future standard • Long term increase in property value		• No rebate • Less expensive to strata corp/owners • 40 available plugs but expandable to 58 • Charging type L1^ lower capacity, not future standard, may be upgradable to L2* if carefully implemented • Medium term increase in property value	• No rebate • Least expensive to strata corp/owners • Charging type L1^ lower capacity, not future standard • Not expandable past 20 plugs • Negligible increase in property value • Easiest to implement
Number of plugs at installation	52 (1 plug per Strata Lot (SL))		40	3
Number of expansion spots possible	3 (guest parking spots), at reduced amperage		18 with added panel and breakers	17 with added breakers
Time needed for full charge (varies by vehicle type)	6-14 hours		12-20 hours	12-20 hours
Who pays for wiring/plug installation	50% BC Hydro rebate (CleanBC) after completion of approved, subsidized plan 50% strata council		Individual owners with EVs	Individual owners with EVs
Who pays for power?	EV Users Contribute to EV Power fund (as done with Laundry Room)			
Scope of infrastructure changes	• Install new EV sub-electrical panel with dedicated breaker, dedicated meter • Add 300A connection to Main Distribution Panel (MDP) in the electrical room • Add sub-panel junction box to lower parkade • Core hole to lower parkade to for EV connections • Connect panels			• Install 1-pole 20a circuit breakers to building breaker panel (H), 1 circuit breaker required for each parking spot • Add sub-panel junction box to lower parkade • Core hole from electrical room to lower parkade to for EV connections • Connect panel to junction box (1"conduit)
Owner responsibility at parking spot (with added $ to owner)	• Wiring and receptacles are required for rebate, therefore project cost, not individuals • Purchase personal charging stations designed for Multi-Unit Residential Buildings (MURB) • CleanBC rebates available		• Install wiring and electrical receptacles to parking spots	
Estimated cost to strata corp (see quotes for details)	$32,745 after rebate (Rebate of $31,200)	EV Plan $2700 +GST Project $58,200 +GST Total $60,900	$17,800 +GST (plus individual owners paid wiring & electric)	$3,105 +GST (plus individual owners paid wiring & electric)
Possible Clean BC rebate	Up to 50% of the costs, up to $600/electrified parking space,		$0	$0
Level 1 *or Level 2^	Level 2*		Level 1^	Level 1^

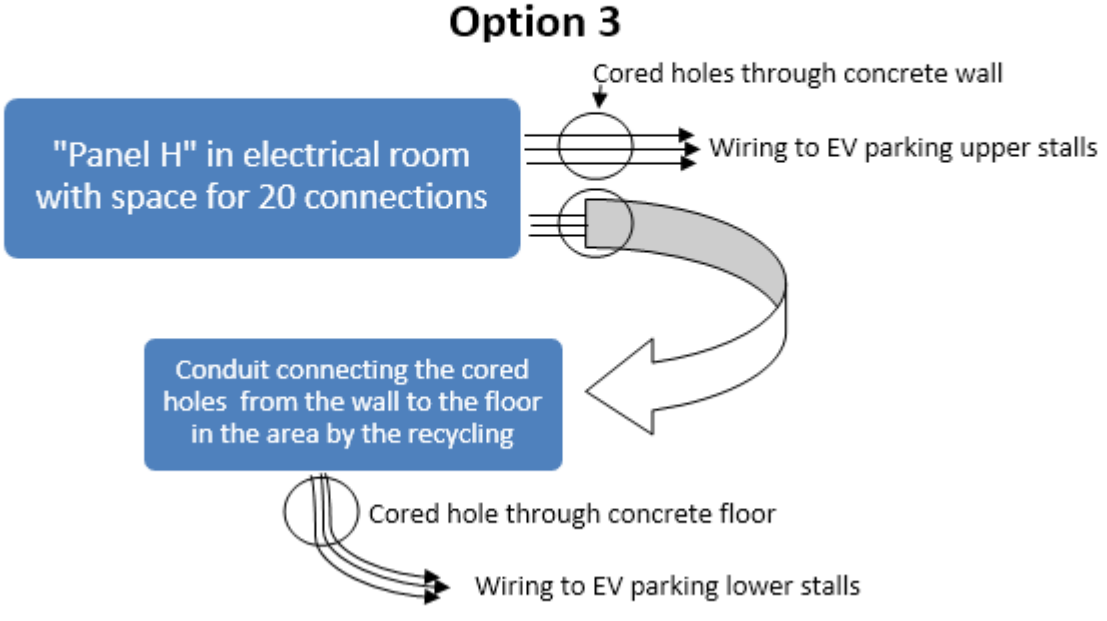
* L1 - Level 1 system – 110v, slower “trickle” chargers, no computerization

^ L2 Level 2 system – 208v, faster chargers, more than twice as fast as Level 1, future expansion and ability to have centralized computer control

Illustration of Installation Approaches

Option 1 & 2 are basically the exact same wiring lay out except that Option 1 is wired all the way to the parking stalls.
Option 2 stops at the junction boxes





Visual guide to Options 1 and 2

Vanier Court has a large Main Distribution Panel (MDP)

We have space inside the MDP to install a 300 amp breaker specifically for EV charging

Large conduit would connect the MDP to the distribution panels via holes cut in the concrete wall and floor to lower parkade (Only 1 large conduit is required for our project)

Distribution box to take the single conduit and split it up between individual parking stalls.

This box also provides individual circuit protection.

In Option 1, smaller conduit and BX Armor wire is run from the distribution boxes to the everyone's parking stalls.

In Option 2, EV owners pay to install their own conduit wiring and plug.

In option 1, each stall gets a Level 2 Plug.

Then EV owners then purchase and install their own charger. (Two of many, styles shown)

Visual guide to Option 3

Inside the electrical room, beside the Main Distribution Panel (MDP), is "Panel H" which has available space for expansion.

Inside Panel H is space for Twenty; 20 amp breakers which could be dedicated for individual EV use.

In all options; holes are drilled in the electrical room wall, and garbage area floor, to allow for the passage of wiring or conduits.

Individual EV owners would connect to panel H with their own BX Armored wiring, and plug.

Individual EV owners would connect to their plug with their own charging cable specific to their vehicle.

CleanBC EV Charger Rebate Program

BC Hydro/CleanBC Electric EV Charger Rebate program has recently revamped their incentives program to make it easier for MURBs (Multi-unit Residential Buildings including condominiums) to apply.

Published on December 4th, here are the highlights of how we could proceed through this program, should we decide to move forward with Option 1, above.

Step 1 Obtain the Required EV Ready Plan

Without this plan, we cannot apply for funding.

Hire an electrical engineer to create an EV Ready Plan. This plan will be reimbursed by CleanBC for up to 75% of the costs up to a $3,000 maximum.

The EV Ready Plan provides:

- Building electricity capacity assessment (see Vanier Court's Morrison Hershfield EV Charging Report obtained by council in 2020 – titled "(Governing Document) Vanier Court - EV Charging Feasibility Report.pdf.pdf" on TownSq)
- The minimum charging performance requirements for the building
- The charging options for parking stalls to be made EV Ready
- Cost estimates sufficient for budgeting purposes

Since these items in the EV Ready Plan are minimum requirements set out by CleanBC, effectively the EV Ready Plan ensures we meet the requirement for funding. After an approved EV Ready Plan is created, Vanier Court will be pre-approved for the program as long as the project is completed before the provided deadline.

Step 2 EV Infrastructure Installation

Vanier Court decides whether to proceed based on project costs and knowledge of rebate eligibility. If proceeding:

- Select an EV Ready Plan recommended contractor.
- Council develops the EV user exclusive use agreement to outline usage policies and costs for participating owners
- We pay contractor, and contractor assists in applying for the rebate
- Upon completion of the project and approval of rebate application, CleanBC refunds the eligible amount.

Step 3 EV Charging Station rebates

This CleanBC program offers a further $14,000 in rebates on the purchase of the charging stations that will be required in individual stalls. EV owners interested in the rebate must purchase their charging station and then apply for the rebate noting our buildings participation in the program.

For more information see:

https://goelectricbc.gov.bc.ca/

https://electricvehicles.bchydro.com/incentives/charger-rebates

https://electricvehicles.bchydro.com/incentives/charger-rebates/apartment

Vendor Quotes

PROJECT

“EV CHARGER PROPOSAL, 1355 HARWOOD ST”

VANCOUVER, BC

SEPTEMBER 26th, 2020

BC HYDRO POWER SMART ID: 8007

Estimated by:

Quinn McLaughlin

Owner/Operator

info@mjrelectric.ca

778-776-4781

Project Description:

Installation of electrical conduit and wiring for EV Charger in parking stall

Inclusions:

- Electrical installation as per the latest CEC 2018 standard
- WCB coverage and $5,000,000 liability insurance for MJR Electric, including all MJR Electric employees
- Canadian and North American sourced products
- Installation of conduit from house panel to parkade
- Installation of unistrut hangers to run our conduit
- Installation of junction box in electrical room for 2" conduit
- Installation of 150 feet 2" conduit from old house panel to central parkade location
- Installation of 2 junction boxes in the parkade for accessibility
- Organized shutdown for power if needed
- Run two 3/4" conduits from junction in the parkade to one parking stall locations
- Pull 4 No.10 AWG copper and 1 No. 12 AWG bond through conduit
- Terminations and budget for a typical 40-amp single phase breaker
- Terminations and wiring of terminal blocks in parking stall
- Tie into existing house panel with new breakers
- Installation of 2 4x4 boxes and Nema 14-20R outlets
- Installation of bollards for equipment protection
- Hiring 3rd party contractor for coring and x ray scanning
- Testing and paperwork required for verification of the system
- Application with BC Hydro for incentive approval
- Educating client on usage of charger and cloud platform
- Electrical permit city of Vancouver and Safety Authority
- Clean up and material handling
- Trouble shooting, safe lockout tagout procedure, and other safety practices

Total job value for electrical conduit (150 feet) and Nema 14-20R outlets: $8,300 plus GST

Total job value for electrical conduit (400 feet) and 2 Nema 14-20R outlets: $13,500 plus GST

Total job value for 400-amp panel with 300 amp breaker and meter: $9,500 plus GST

Total job value for load sharing Eaton 200-amp panel and breakers: $25,500 plus GST

***** See spec in Google drive link for Eaton load sharing panel below *****

Installation of individual chargers from parkade junction box to panel:

- Run 50’ of 3/4” conduit from junction in the parkade parking stall
- Pull 2 No.10 AWG copper and 1 No. 12 AWG bond through conduit to main panel
- Terminations and budget for a typical 40-amp single phase breaker
- Installation of bollard in front of electrical equipment
- Installation of 4x4 boxes and Nema 14-20R outlets in each parking stall
- Troubleshooting and testing
- Material handling and delivery

Total job value for individual chargers (not including permit): $1,400 each plus GST

***** Check out www.pluginbc.ca or www.bchydro.com for incentives, up to $14,000 available for charging installations *****

Link to charging specs:

https://drive.google.com/drive/folders/19nN4gabUG9vfIRi_BvWtjE26UmrJOwIC?usp=sharing

General Exclusions:

- Major drywall removal
- Concrete forming or pouring
- Data or Wi-Fi boosters if needed for networking of chargers
- Additional dirt removal from trenching or unforeseen costs
- Asphalt repair and concrete pouring
- All pricing excludes GST
- Design may change based upon BC Hydro approval; prices may vary if changes are required
- Scissor or JLG lift rental
- Utility fees
- Seismic and inspection cost for engineer signoff
- Installation of new panel and fuses if needed
- Working with PCB or other harmful substances
- Fire caulking and fire stopping
- Transformer upgrades
- Unforeseen electrical issues from usage over time
- Any additional costs for subscription fees, cellular fees, etc.
- Fire caulking and fire stopping
- Removal and recycle of drywall, garbage, and waste material
- Security system cameras and devices
- Home automation switches and control

Scheduled timelines will not be compromised by MJR Electric for any reason within our control. Safe work practices (meeting or exceeding Worksafe BC standards) are utilized and enforced at all times. Change Orders for additional work or modifications are fairly priced.

Mission:

MJR Electrical uses the latest innovation and creates a positive environment for customer fulfillment. With safety at the forefront, we work hard to satisfy our customers with punctuality, the quality of our products, the range of our skills, and unique capabilities of our people.

Terms:

The price indicated in this proposal is for the project outlined above only and is valid for 30 days unless otherwise specified. Any changes, additions, deletions, or unforeseen circumstances may affect the final cost of the project

Delays and Change Orders:

Quotation is based on the schedule and installation provided within the tender documents. Any change order or delay of project may be subject to a charge and/or a travel/accommodation surcharge, at MJR Electric's discretion.

Payment Terms:

MJR request that the payment structure to follow this breakdown:

- 40% startup cost
- 40% after rough-in inspection is passed
- 20% upon completion: commissioning, final inspection pass, handover

The entire amount is due on the date stated on the invoice. Any payment not received by the due date stated on the invoice is subject to interest at 1.5% per month (a compounded rate of 19.6%per annum), until paid. If applicable, sales tax is included in the total price. In addition, the customer is responsible for costs of collection including reasonable attorney fees incurred in the collection process. Seller reserves the right to progress invoice between stages of a job or periodically on ongoing jobs.

Warranty:

MJR Electric hereby warrants that the Services provided under this Agreement shall be free from any defects or deficiencies in workmanship, labour, and craftsmanship manifesting within a period of up to 1 year following completion of the Services (the "Warranty Period"), and within such Warranty Period the Contractor shall rectify all such defects or deficiencies at no further cost. Furthermore, within the Warranty Period the Contractor agrees to handle any manufacturers' warranty issues on behalf of the Client. (See official contract for more details

Appreciation:

The staff of MJR Electrical are grateful for the opportunity to bid on this project.

Customer References:

Neil McLean (2018 to present)
Triumf Project Manager
Phone: 778-888-7534
Email: nmclean@triumf.ca

Mark Lentsch (2018 to Present)
Lentsch Contracting Ltd.
Phone: 604-312-0045
Email: lentschmark@gmail.com

Andrew Little: (2018 to present)
Owner SCL Contracting
Email: scl.contracting15@gmail.com
Phone: 604-329-3011

Carlomar Montes (2018 to present)
Rona Allen Building Center North Vancouver
Email: kitchens@homebuilders.ca
Phone: 604-998-1008

Mila Bosnic (June 2018)
Nala Care (EVSE Charger Client)
Phone: 604-721-5311
Email: mila1jb@gmail.com

Website: www.mjrelectric.ca

Google Reviews: "Google MJR Electric BC"

Instagram: @mjrelectricbc

Facebook: https://www.facebook.com/mjrelectricbc/

Google Drive Link for Photos:

https://drive.google.com/open?id=1-KNaDbuf4hg3EDd9WvTDnSSK-902xfYG

TOWER ELECTRIC LTD.
3915 Kitchener St., Burnaby, B.C., V5C 3L9. ph. 604-569-0048. fax. 604-291-8006

QUOTE

DATE: October 8, 2020

TO: Ron Vreeken <vreeken@me.com>

Site: Vanier Court – 1355 Harwood St., Vancouver, BC. V6E 3W3

DESCRIPTION – EV charger electrical panel installation

- Install 300A feeder circuit breaker in existing Westinghouse main distribution panel
    - The new breaker trip unit (functional part of breaker) will be new
    - The circuit breaker frame and mounting hardware will be used
    - All new hardware is available for an additional charge of $2,650.00 + GST
- Install electrical panel in parkade for EV charging purposes
    - 400A rated panel w/ 300A main breaker
    - Locking door
    - Include power cabling between panel and Westinghouse main distribution panel
    - 14 2-pole spaces available in the initial panel installation
    - 14 2-pole spaces can be added in the future by expanding this panel with a second tub (enclosure) beside it.
    - There will be 2 additional single-pole spaces in each tub which can be used for smaller 120v 20 or 30-amp plug-in chargers
- Scanning & coring – locations as discussed during site meeting
    - Includes scanning & coring through wall from electrical room to parkade
    - Includes scanning & coring through floor between the upper and lower parkade levels
    - If scanning reveals that areas can't be cored through, alternate routes may have to be used which could increase the cost of installation
- Install junction boxes in parkade on wall below panels
    - We will supply and install multiple conduits between the panel and a junction box near the top of the wall in the lower parkade level – this will provide a path for wiring between the lower level and the new panel
- Information meter which will read overall/total power consumption of the 300A panel only
    - Includes supply and installation of information meter (AcuRev 1312)
    - Includes 400-amp rated current transformers (CT's)
    - Meter to be installed in enclosure beside panel or inside electrical room
    - Meter is classified as 'information only' and does not include communication modules for remote-reading (must be read in person off meter)
    - Meter can be classified as 'revenue grade' if a factory technician commissions the meter for an additional charge of approximately $1350 + GST.
- Does not include any circuit breakers or wiring between the new panel and parking stalls for chargers

Quote valid for 30 days.
Any questions, please call Clayton Heffernan @ Tel: 604-569-0048 Cell: 604-722-4024

NOTES:

- Shut-down of power will be required to install new circuit breaker in main distribution panel
    - Shut down will last approximately 2 – 3 hours and is best done during the late morning
    - Security and safety monitoring of the building will be the responsibility of the strata since they will likely need to leave parkade gates open during the shutdown.
- Strata agrees to the used circuit breaker frame unless they would like to pay for the upgrade to new parts – we have sourced out these parts and found them in Eastern Canada
- Used parts are *only available while still in stock* and a test fit would need to be performed prior to installing them to ensure compatibility
- Electrical figures are based engineered feasibility report provided by the strata
- Any additional protection requirements to adhere to City of Vancouver building code will be the responsibility of the strata (ie. bollards)
- Work to be completed during normal business hours
- Electrical permit included

QUOTE: $ 17,800.00 + GST

Quote valid for 30 days.

Any questions, please call Clayton Heffernan @ Tel: 604-569-0048 Cell: 604-722-4024

TOWER ELECTRIC LTD.

3915 Kitchener St., Burnaby, B.C., V5C 3L9. ph. 604-569-0048. fax. 604-291-8006

BUDGET

DATE: November 25, 2020

TO: Ron Vreeken <vreeken@me.com>

Site: Vanier Court – 1355 Harwood St., Vancouver, BC. V6E 3W3

DESCRIPTION – EV charger receptacles – PANEL H

- Includes coring out of electrical room and between parkade levels to accommodate this and future EV charger work
- Includes three 1-pole 20a circuit breakers for panel H
- Includes one 1" conduit between upper level parkade and lower level
- Includes BX (armoured cable) between junction boxes and parking stalls
- Include conduit stub-down from ceiling level to parking stall receptacle for protection
- Supply and install 120v, 20-amp, 3-wire receptacle for EV charger

NOTES:

- This budget is for all of the above work completed at the same time
- Remaining physical and electrical capacity of Panel H must be confirmed prior to installation
- Work to be completed during normal business hours
- Electrical permit not included

BUDGET: $ 5,505.00 + GST

This cost includes the circuit breaker and wiring to 3 EV's. Each of these should cost roughly $700 - $800 so the overall quote should be reduced by roughly $2,400. Budget that Vanier Court should expect is $3,105 + GST

Quote valid for 30 days.
Any questions, please call Clayton Heffernan @ Tel: 604-569-0048 Cell: 604-722-4024