

Innovations in Electric Vehicle Charging

EV Infrastructure Project: Siting Considerations

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Presented by:
Clay Howey, Smart Microgrid
Applied Research Team

Project Demonstration Sites

Curbside Site Selection Process

- Community Outreach
- Streetlight Considerations
- Parking Considerations
- Political Considerations
- Good Neighbour Protocol

Commercial Parking Lot Site

MURB Demonstration Site



Curbside Charging

Strategy to address “Garage Orphans”, which are:

- EV owners, or potential EV buyers, who can't charge at home
- No access to off-street parking
- Can't run an extension cord over the sidewalk due to tripping hazard
- Can't trench city owned property next to curb
- With no way to charge at home, it is usually inadvisable to purchase an EV
- This represents a significant barrier to EV adoption in dense urban areas
- BCIT partnered with the City of New Westminster to demonstrate curbside charging using streetlight infrastructure



Curbside Charging Site Selection

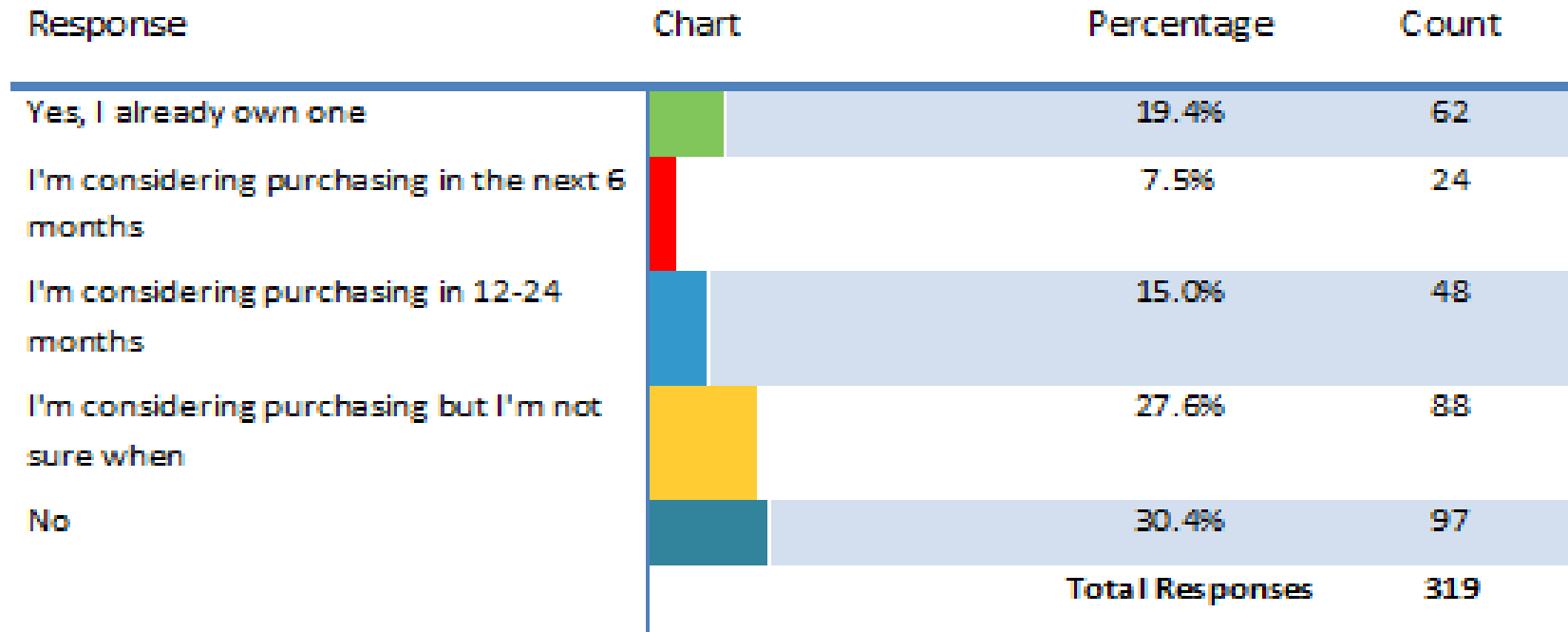
Community Outreach

- Engaged with City of New Westminster's Communications and Economic Development Manager Blair Fryer, who brought his Communications Team on board
- Together, BCIT & CoNW developed a survey to locate 'Garage Orphans' in the City of New Westminster
- CoNW also used Social Media Channels – Facebook, Twitter, Instagram, and paid advertising on Facebook to create awareness and distribute the on-line survey
- Printed and on-line surveys collected at in-person events at River Market, Century House, Urban Solar Garden Launch Event, Anvil Centre, Queensborough Community Centre, and new Uptown Parklette at corner of Belmont & 6th St in front of Tim Hortons at seating area






Curbside Charging - Survey

1. Do you own an Electric Vehicle?



Curbside Charging - Survey

2. Do you have the ability to install a charging station at your residence?

| Response | Chart | Percentage | Count |
|-----------------|--|------------|-------|
| Yes |  | 33.5% | 107 |
| No |  | 48.0% | 153 |
| I don't know |  | 18.5% | 59 |
| Total Responses | | | 319 |




Curbside Charging - Survey

3. How easy is it (or would it be) to charge an EV near you:

| | Not easy | Somewhat easy | Very easy | Unsure | NA | Total Responses |
|--|----------------|------------------|---------------|------------|----------------|--------------------|
| Home in New Westminster? | 105 (35.4%) | 55 (18.5%) | 39 (13.1%) | 58 (19.5%) | 40 (13.5%) | 297 |
| Place of employment in New Westminster? | 61 (21.6%) | 22 (7.8%) | 15 (5.3%) | 36 (12.7%) | 149 (52.7%) | 283 |
| Place of learning in New Westminster? | 44 (15.8%) | 22 (7.9%) | 18 (6.5%) | 38 (13.7%) | 156 (56.1%) | 278 |
| Place of recreation in New Westminster? | 94 (32.9%) | 41 (14.3%) | 31 (10.8%) | 84 (29.4%) | 36 (12.6%) | 286 |

Curbside Charging - Survey

4. Would you like to see more electric vehicle charging stations available in the City of New Westminster?

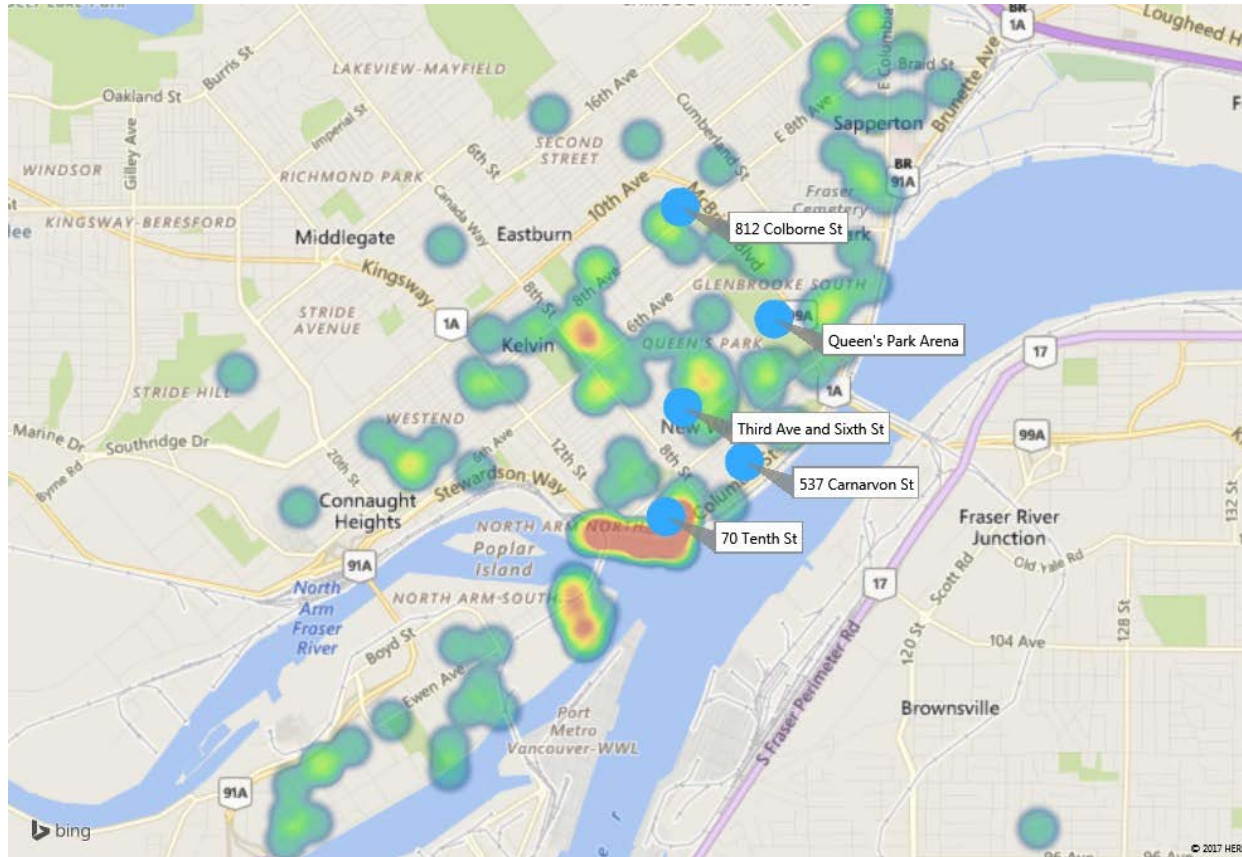
| Response | Chart | Percentage | Count |
|-----------------|--|------------|-------|
| Yes |  | 86.5% | 269 |
| No |  | 3.5% | 11 |
| Unsure |  | 10.0% | 31 |
| Total Responses | | | 311 |

Curbside Charging - Survey

5. What area of New Westminster do you live in?

| Response | Chart | Percentage | Count |
|----------------------------------|-------|------------|-------|
| Connaught Heights | | 0.6% | 2 |
| West End | | 5.2% | 16 |
| Moody Park | | 7.4% | 23 |
| Glenbrook North | | 5.2% | 16 |
| Massey Victory Heights | | 4.5% | 14 |
| Brow of the Hill | | 4.2% | 13 |
| Queen's Park | | 7.1% | 22 |
| <u>Sapperton</u> | | 7.7% | 24 |
| Quayside | | 18.4% | 57 |
| Downtown | | 5.2% | 16 |
| <u>Queensborough</u> | | 14.5% | 45 |
| I do not live in New Westminster | | 22.3% | 69 |
| Total Responses | | | 310 |

Curbside Charging – Survey Results



Curbside Charging

Streetlight Considerations

- While Community Outreach was taking place, we looked at existing street lighting in the CoNW
- Much was antiquated, with mostly Metal Halide (MH), or High Pressure Sodium (HPS), and few areas retrofit to LED
- In some cases, streetlights were fed by taps directly off of overhead power lines
- LEDs consume approximately 80 W, where HSP consume 150W, and MH consume 250 W
- Engineering Dept provided maps of areas that had been retrofit with LEDs
- Areas that had been retrofit to LEDs comprised neighbourhoods that either had off street parking (i.e. were not garage orphans), or had the streetlights installed on the far side of the sidewalk, which would necessitate trenching



Curbside Charging

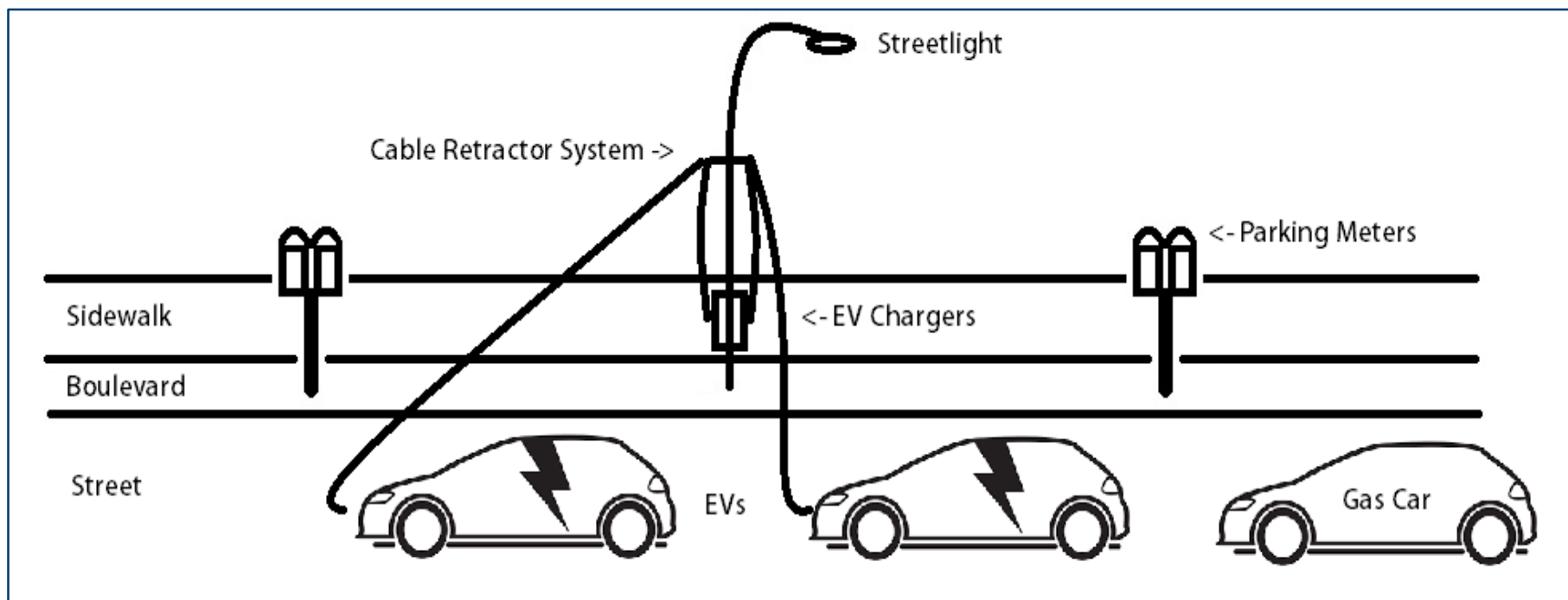
Electrical Considerations

- Majority of CoNW's lighting at 240V, some at 208V
- Load studies – needed to check how much current was on each phase of the lighting circuits
- Due to photocells on some light fixtures, some load studies had to be done at night
- Voltage checks
- Number of LEDs retrofits required



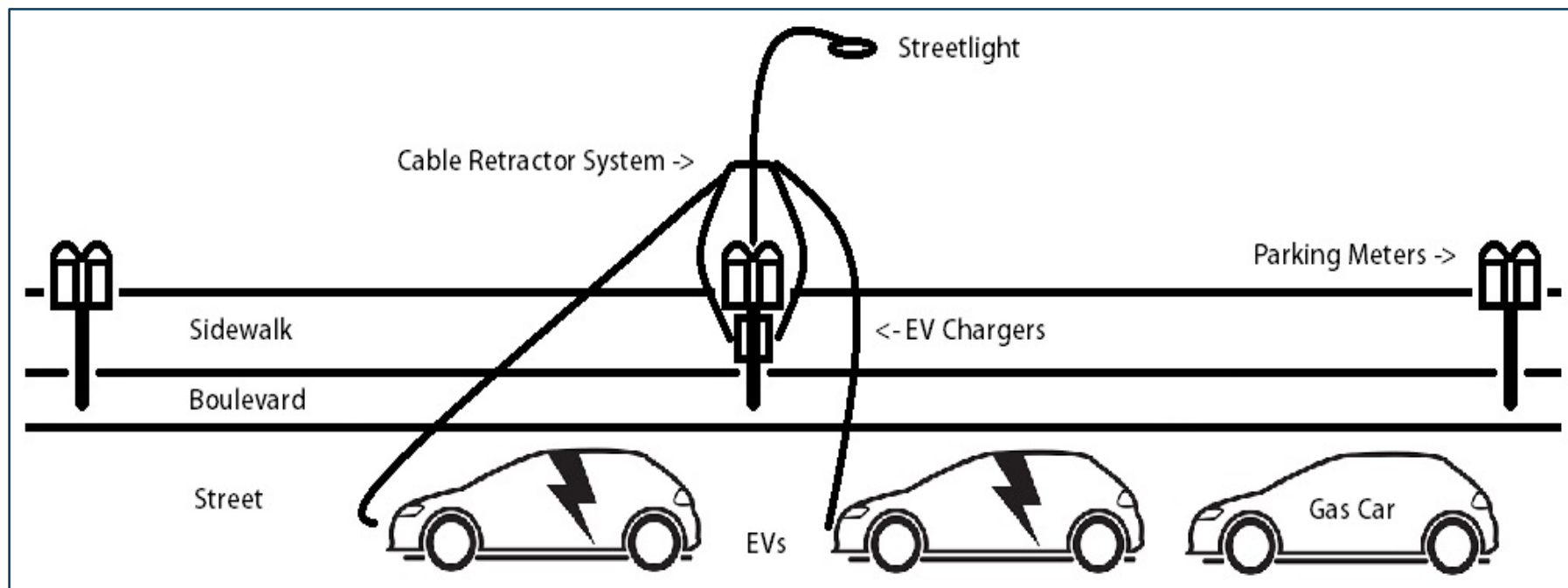
Curbside Charging

Parking Meter Considerations – Preferred Meter Placement



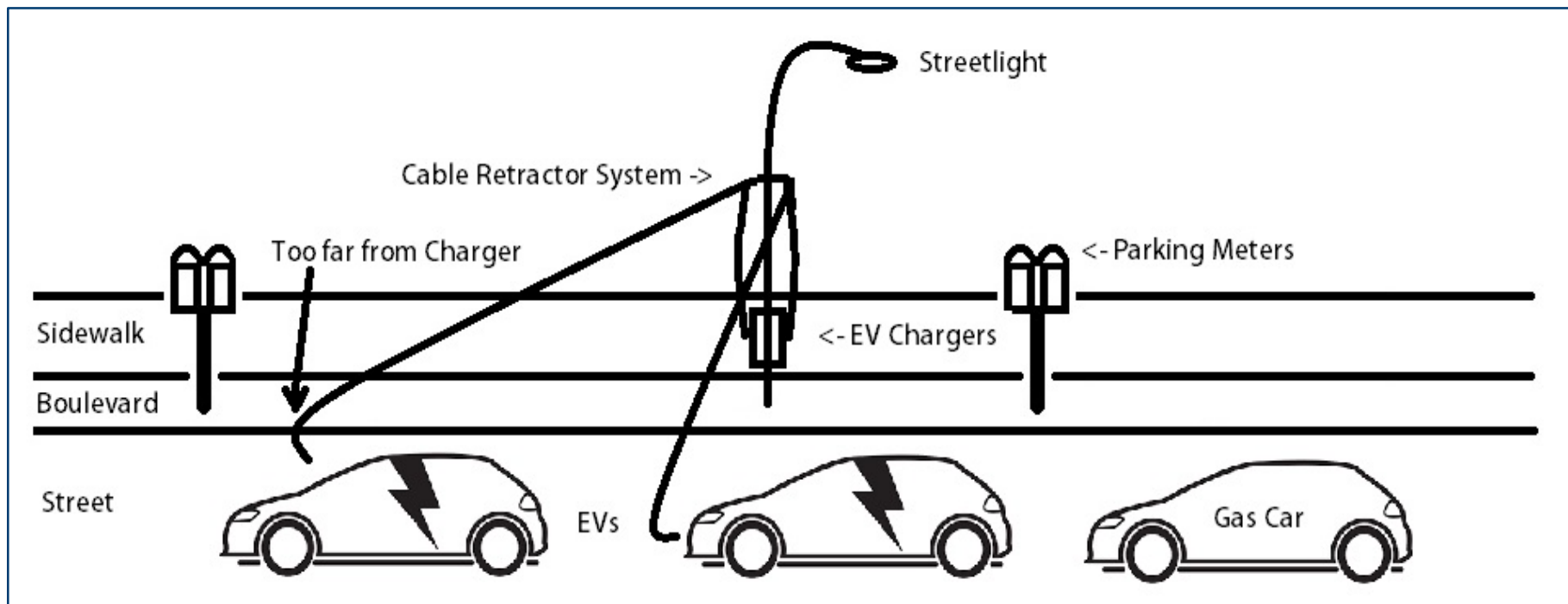
Curbside Charging

Parking Meter Considerations – Acceptable Meter Placement



Curbside Charging

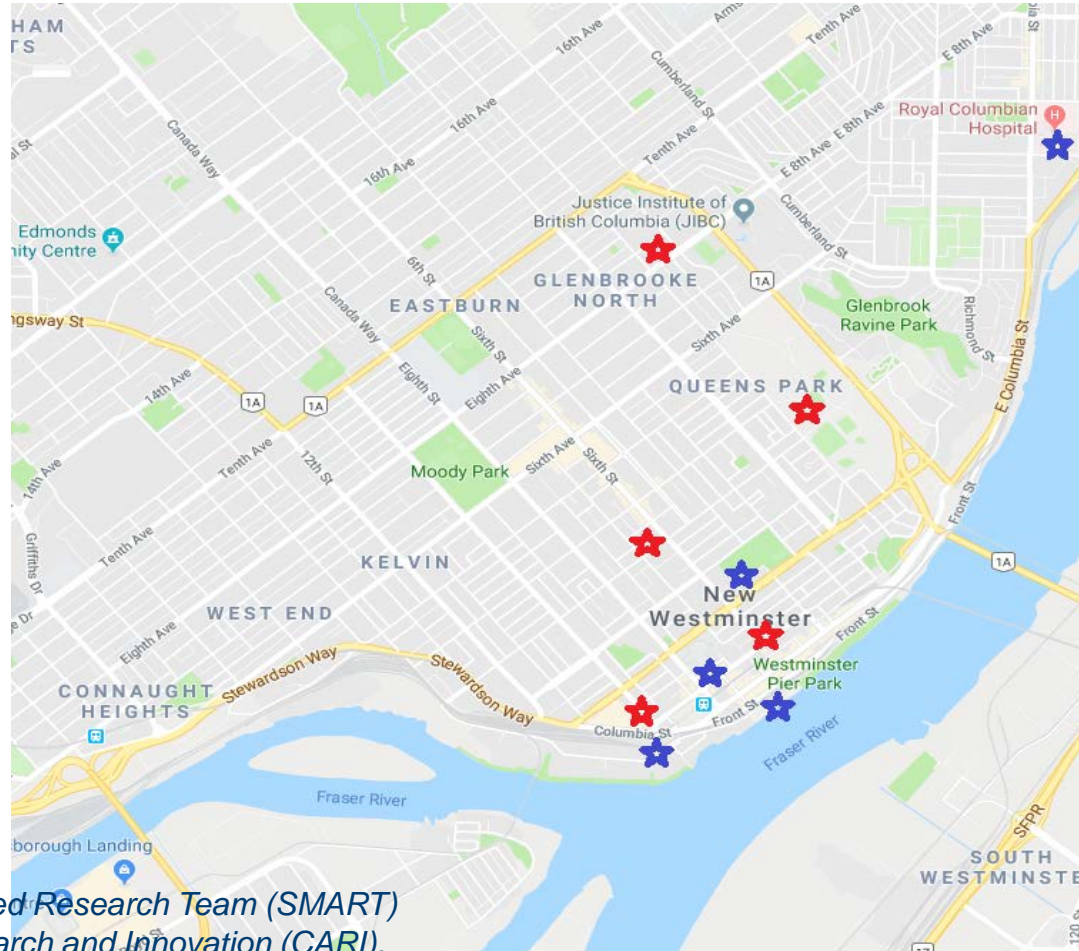
Parking Meter Considerations – Problematic Meter Placement



Curbside Demonstration Sites

Legend

- Blue stars denote previously existing EV charge stations
- Red stars denote new EV charge station locations
- 5 new sites, with total of 12 new EV charger installs funded by the project.



Curbside Demonstration Sites

3rd Ave & 6th Street

- Close to commercial, uptown area
- Lighting retrofit HPS with LED
- Two ClipperCreek EVSEs
- Will have overhead cable management system as in other locations



Curbside Demonstration Sites

812 Colbourne Street

- High density residential area
- Close to Canada Games Pool, Justice Institute, Royal Square Mall, and Glenbrook School
- Retrofit HPS to LED
- Needed to upgrade branch breaker from 20 A to 60 A
- Minor work to pull additional wire to upgrade from 120 V to 240 V
- Two AddEnergie EVSEs



Curbside Demonstration Sites

537 Carvarvon Street

- High density residential area
- Close to Douglas College, West Coast College of Massage, Law Courts, SkyTrain station
- Lighting retrofit HPS with LED
- Two AddEnergie EVSEs



Curbside Demonstration Sites

70 10th Street

- High density residential area
- Downtown location, close to Columbia Square Plaza, Cinemas, SkyTrain station, River Market
- Lighting retrofit HPS with LED
- Back-in angle parking
- Two ClipperCreek EVSEs
- Will have overhead cable management system as in other locations



Curbside Demonstration Sites

Queens Park Arena

- Queens Park heavily used by community
- Arena used for hockey & lacrosse, baseball park is nearby, as are tennis courts, theatre and petting zoo
- Installing 4 IBX variablegrid chargers on 2 street lights
- Lighting retrofit from MH to LED
- Required an upgrade to feed from arena to exterior panel
- Currently resolving GFCI issues



Curbside Demonstration Sites

Good Neighbour Protocol

- While the CoNW has the authority to install the chargers on city property, they understandably want to avoid conflict
- There are 7 guidelines making up the protocol, but the main thing is to communicate with affected neighbours, respecting hours of work, and minimizing impact and disruption to the community
- The CoNW sent out 15 letters in total, and spoke to 11 businesses directly in the areas where the EV chargers were being installed
- Of the 11, 10 were enthusiastic and encouraging

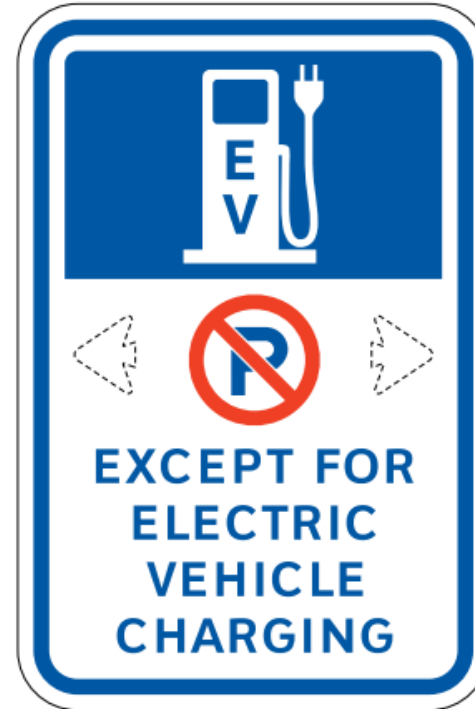


Signage Considerations

Standardization is Recommended

- These are directly from the Province of BC's Ministry of Transportation and Infrastructure
- EV Signage Package available on the Plug In BC website:

pluginbc.ca/resource/electric-vehicle-signage-package/



Signage Considerations

Standardization is Recommended

- City of New Westminster is going to see how this signage goes
- They have limited enforcement, and those resources are already stretched
- City has limited parking
- They want to see how much of a problem 'ICed' EVSEs will be
- While the signs adhere to the Provincial standard, BCIT recommends the "No Parking Except for EV Charging" language
- No current parking limits or rates were changed for this project

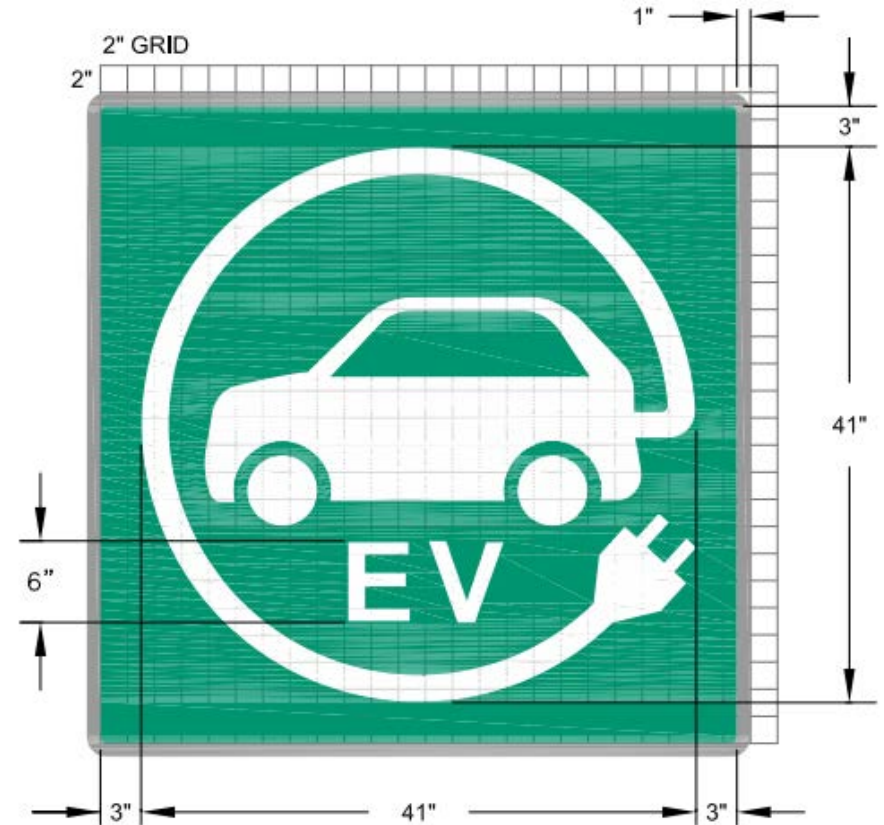


Signage Considerations

Pavement Markings

- These are directly from the Province of BC's Ministry of Transportation and Infrastructure
- EV Signage Package available on the Plug In BC website:

pluginbc.ca/resource/electric-vehicle-signage-package/



Commercial Parking Lot Site

BCIT's Aerospace Technology Campus (ATC)

- Typical outdoor parking lot
- Mostly occupied during the day
- Mostly empty at night, when lights are on
- Generally lots of capacity during day
- 347 V three phase lighting
- EVSEs require 208 V – 240 V, so a transformer was needed
- Some municipalities have streetlighting on odd voltages, so this was a good test case of that scenario
- Six EVSEs funded and installed by the project



Commercial Parking Lot Site

Telecommunication Challenges

- ATC is close to YVR, so wireless communications not an option
- Trenching costs too high
- Used Power Line Communication (PLC) to reach between building electrical panel that feeds the streetlight circuit, and the transformer that we installed to drop streetlight voltage down to EVSE voltage



Commercial Parking Lot Site

AddEnergie Power Managed Solution

- EVSEs are from Montreal-based AddEnergie
- Network called Flo
- Automatically adjusts current delivered to each EVSE in response to lighting load, and aggregate charging load



Commercial Parking Lot Site

Signage

- Typical standard signage
- Additional informational signage to identify the install as a research project, and that charging time may be longer




BCIT
ATC Campus

This EV Charging Facility is a BCIT Research Project

Chargers are supported on a best effort basis. Charging time may be longer due to power sharing with the street lights. This area under video surveillance

For project info see bcit.ca/microgrid
For EV etiquette see bcit.ca/parking/ev

Violators Will Be Ticketed And/Or Towed At Owners Expense

Patrolled By


Lot 1905
www.impark.com

MURB Demonstration Site

BCIT's Energy OASIS

- While not a MURB, we can use the collection of six Level 2s to emulate a typical MURB scenario
- With our advanced metrology, we can simulate electrical feeds that are inadequate to supply all six chargers, and use OCPP to manage the chargers to throttle down to acceptable levels
- Also using this site to investigate harmonics, which are a potential concern in MURB installations



Power Sharing Demonstration Site

BCIT's CARI Building

- Removed a single port EVSE
- Replaced with a dual port unit from Efacec
- Unit shares the power between the two ports
- Charging will be slower with two EVs charging simultaneously
- Reduces the hassle of moving EVs when one is done charging
- Showcases another vendor's approach to power sharing



Power Managed Demonstration Site

BCIT's AFRESH Home

- Removed one Level 2 charger, and one rarely used Level 1 receptacle
- Installing 3 IBX variablegrid EVSEs



QUESTIONS & ANSWERS