

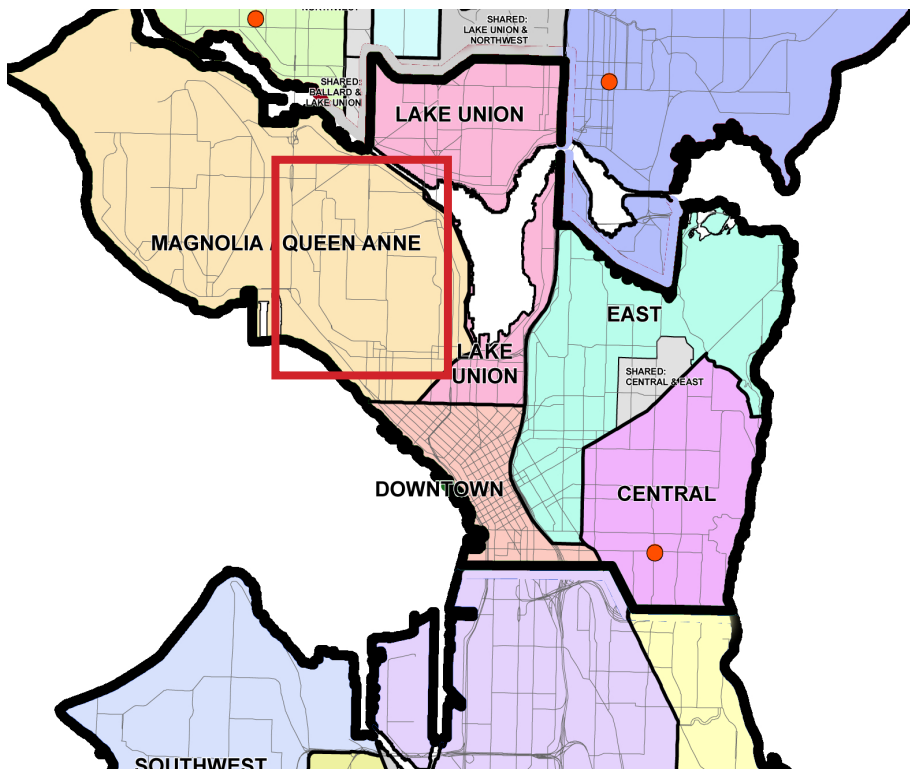
# Queen Anne Pedestrian Crossing Safety Enhancements Across Arterials

This project includes 19 intersections spread across the neighborhood of Queen Anne as listed below.

Part A of this application is to equip the following prioritized list of existing crosswalks with pedestrian activated, solar powered flashers:

## Priority Number Arterial Crossed Cross Street

- |   |   |
|---|---|
| 1-A Queen Anne Ave N. Between:<br>Mercer St. & Republican St. | 7-A Queen Anne Dr. Warren Ave N.            |
| 2-A W McGraw Street 7th Ave W.                                | 8-A Nickerson St. Dravus St.                |
| 3-A Taylor Ave N. Galer St.                                   | 9-A Boston St. 2nd Ave N.                   |
| 4-A Queen Anne Dr. 4th Ave N.                                 | 10-A W Galer St. 2nd Ave W (south of Galer) |
| 5-A Queen Anne Ave N. Lee St.                                 | 11-A W. McGraw Pl. W. Smith St.             |
| 6-A W. Olympic Pl. 3rd Ave W.                                 |   |



**PROJECT TYPE**  
Pedestrian Improvement

**COST ESTIMATE**  
\$1,060,000

Part B of this application is painting crosswalks at the following prioritized list of existing arterial crossings:

- |     |   |     |   |
|-----|---|-----|---|
| 1-B | Queen Anne Dr. Warren Ave N.                | 5-B | 1st Ave N. Thomas St.                   |
| 2-B | Queen Anne Ave N. Howe St.                  | 6-B | W. Highland Dr 2nd Ave W.               |
| 3-B | 6th Ave W. W. Crocket St.                   | 7-B | W McGraw Place/W Smith St<br>1st Ave W. |
| 4-B | W. Galer St. 3rd Ave W.<br>(north of Galer) | 8-B | Smith Street Queen Anne Ave N.          |
- 

### Applicant Problem:

Existing safety concerns: Uncontrolled pedestrian crossings can be conflict points between pedestrians and drivers due to:

- Poor visibility of:
  - pedestrians by drivers and also
  - cars by pedestrians
- Reasons affecting visibility:
  - Sight lines may be blocked by buses, parked vehicles, or curves in the roadway
  - Sun shining in the eyes of drivers (particularly as days get longer),
  - Rainy weather,
  - Long nights,
  - Dark clothing,
  - Long crossings from curb to curb,
  - Many visual distractions (urban areas), etc.
- Irregularity of pedestrians at the crossing

Our application is intended to be scalable to allow for as much to be done within the range of funding available through the NSF. However, based on referenced costs, we have estimated (as presented below) that the full works should be able to be completed within the budget available. Part A is the first prioritization with Part B secondary street improvements. Our hope is that by bundling together these common pedestrian improvements within the same neighborhood that costs can be minimized.

Per FHWA: “Motorists often fail to yield right-of-way to pedestrians in crosswalks. Thus, being a pedestrian can be extremely dangerous. The majority of pedestrian crashes occur at mid-block crossings... One inexpensive device to increase yielding rates on multilane roads is the use of pairs of rectangular yellow LED beacons that employ a stutter flash pattern similar to that used on emergency vehicles.”

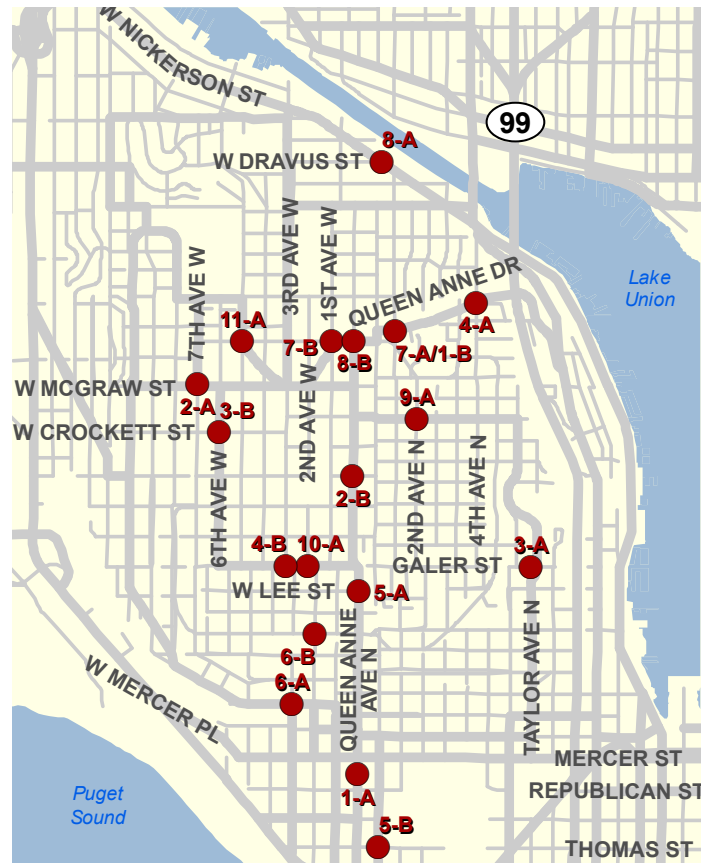
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## Applicant Solution:

Technology: Federal Highways Administration (FHWA) standard Rectangular Rapid Flash Beacons (RRFB) and conventional painted crosswalks.

Goal of the enhancements:

- Add push button activated Rectangular Rapid Flash Beacons with solar power to create safer crossings for both pedestrians and cars by increasing yield rates of drivers.
- Minimize cost by re-using existing sign poles
- Solar energy eliminates need for electrical grid connection
- Flashing only occurs if button is pushed, helping to alert drivers of the presence of a pedestrian without “crying wolf”.
- Add painted crosswalks to existing posted crossings to increase driver awareness of pedestrians and boost safety of pedestrians.
- Encourage pedestrian movement across the hill by boosting safety.
- Lessening driver stress by clear visual cue that pedestrians are present at a crossing.
- Safety improvements for user groups that need additional crossing time, are less confident at crossing the street, or their visual presence is often obstructed:
  - Children
  - Families
  - Elderly
  - Wheel chair users
  - Parents with strollers
  - Cyclists.



Map of reviewed proposed crossings

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## Project Description:

SDOT uses a wide range of tools to improve pedestrian crossing safety. The most basic include parking restrictions near intersections. When a regular number of people use a particular crossing, a marked crosswalk may be recommended. Additional improvements to marked crosswalks are recommended based on the characteristics of the street people are crossing. Streets with more motor vehicle traffic typically warrant increased crossing improvements.

During the conceptual design phase, each proposed crossing location was assessed for modifications by collecting traffic data, counting the number of pedestrian crossing the street, and reviewing the site to see if physical improvements are already present. Ten intersections were determined to have met either warrants for a marked crosswalk (where one was not currently present), a rectangular rapid flashing beacon (RRFB), or both. These sites are described in detail below.

### **1-A Queen Anne Ave between Mercer St & Republican St**

This location is a mid-block crosswalk across Queen Anne Ave. Queen Anne Ave is a 2-lane principal arterial. The existing crosswalk has curb extensions on either side. The crosswalk is marked with pavement markings and an overhead crosswalk sign.

This conceptual design includes the installation of an RRFB at this marked crosswalk. Additionally, a stop bar and accompanying signing will be installed 30 feet in advance of the marked crosswalk.

### **2-A W McGraw St and 7th Ave W**

This location is on a Parks Boulevard. SDOT is working with the Parks Department through the Safe Routes to School Program to explore improvements at this intersection. No improvements are proposed as part of this conceptual design.

### **3-A Taylor Ave N and N Galer St**

Taylor Ave N is a minor arterial roadway with one through lane in each direction and on-street parking on both sides. There is an uphill bike lane for the northbound direction. The estimated traffic volume is less than 7,000 vehicles per day. N Galer St is a non-arterial roadway with on-street parking on both sides. N Galer St dead-ends for vehicles at Taylor Ave, however, there is a staircase continuing the N Galer St alignment west of the intersection. The intersection has stop sign control for traffic on N Galer St. There is a marked crosswalk across the south leg of this

intersection and is along a school walking route.

Due to the low traffic volume, no RRFB will be installed, however, this conceptual design proposes a concrete curb bulb installed to shorten the crossing and exposure to roadway traffic. Curb ramps would also be improved at this intersection.

### **4-A Queen Anne Dr and 4th Ave N**

This intersection is an all-way stop and all pedestrian crosswalks are already marked. Improvements such as RRFBs cannot be installed at all-way stop locations. No improvements are proposed as part of this conceptual design.

### **5-A Queen Anne Ave N and W Lee St**

Queen Anne Ave N is a minor arterial roadway with one through lane in each direction and on-street parking on both sides. The average weekday traffic volume is 12,110 vehicles per day. Approximately 47 pedestrians cross this location in an hour. W Lee St is a non-arterial roadway with on-street parking on both sides. The intersection has stop sign control for traffic on W Lee St. There is a marked school crosswalk across the south leg of the intersection.

This conceptual design proposes concrete curb bulbs on each side of the street and an RRFB system installed due to the high volume of both pedestrians and motor vehicle traffic.

### **6-A W Olympic Pl and 3rd Ave W**

While there are more than 40 pedestrians an hour crossing W Olympic Pl, the traffic volumes on this street are too low to recommend the installation of an RRFB. Curb bulbs are not recommended at this location due to existing Metro transit stops.

### **7-A/1-B Queen Anne Dr and Warren Ave**

Queen Anne Ave N is a minor arterial roadway with 1 through lane in each direction and no on-street parking. Warren Ave is a non-arterial roadway with on-street parking on both sides. The intersection has stop sign control for traffic on Warren Ave.

Due to the low pedestrian crossing volume, an RRFB is not recommended at this location, however, ADA ramps are proposed in order to facilitate all users crossing this intersection.

### **8-A Nickerson St and Dravus St**

Nickerson St is a principal arterial roadway with 1 through lane in each direction, on-street parking on both sides

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and a center left turn lane. There is an existing marked crosswalk on the west leg. Additionally, there is a median island marked with flexible marker posts located in the center left turn lane. The average weekday traffic volume is 11,148 vehicles per day. Approximately 90 pedestrians cross this location in an hour. Dravus St is a non-arterial roadway with on-street parking on both sides. The intersection has stop sign control for traffic on Dravus St.

This intersection warrants the installation of an RRFB system. To reduce the exposure of pedestrians to traffic a raised island is proposed to replace the flexible markers. Furthermore, the addition of curb bulbs into the parking lane is proposed to reduce crossing distance, increase visibility, and decrease motor vehicle speeds in the vicinity. The driveway realignment for the property on the southeast corner will require coordination with the adjacent property owner.

## **9-A Boston St and 2nd Ave N**

There is an existing marked school crosswalk on the east leg of the intersection of Boston St and 2nd Ave N. The average weekday traffic volume on Boston St is 5,572 vehicles a day, which is too low to recommend installation of an RRFB.

## **10-A W Galer St and 2nd Ave W**

W Galer St is a two lane street in the Queen Anne neighborhood, currently classified as a collector arterial. The intersections of W Galer St with 3rd Ave W and 2nd Ave W are offset t-intersections. The north legs of 3rd Ave W and 2nd Ave W are west of the south legs. There is currently a marked crosswalk at the east leg of 2nd Avenue West. The traffic volumes on W Galer St do not warrant additional improvements to this marked crosswalk. This conceptual design includes the installation of painted curb bulbs at the existing marked crosswalk.

## **11-A W McGraw St and Smith St**

W McGraw St is a collector arterial roadway with one through lane in each direction with no on-street parking. Near the intersection with Smith St, McGraw St is curving from an east-west orientation to an angled orientation. At this location there are warning signs for disabled pedestrians crossing and an ADA ramp to the traffic island. The ramp does not meet ADA requirements.

Due to the curve and because there is low pedestrian usage of this crossing, no marked crosswalk is recommended. This conceptual design includes curb ramps for the unmarked crossing.

## **2-B Queen Anne Ave N and Howe St**

Queen Anne Ave N is a principal arterial street with 1 through lane in each direction and on-street parking on both sides. Over 20 pedestrians cross this location on both the north and south legs in an hour. Howe St is a non-arterial roadway with on-street parking on both sides. The intersection has stop sign control for traffic on Howe St. There are no marked crosswalks across the north or south legs of the intersection.

This conceptual design includes the installation of a marked crosswalk on both the north and south legs. New ADA ramps are also proposed on the corners which have not been upgraded.

## **3-B 6th Ave W and W Crockett St (Site 3-B)**

6th Ave W is a collector arterial street with 1 through lane in each direction and on-street parking on both sides. Based on PM peak hour counts, the average weekday traffic volume is approximately 3,800 vehicles per day. W Crockett St is a non-arterial roadway with on-street parking on both sides. The intersection has stop sign control for traffic on W Crockett St. There are no marked crosswalks at this location. ADA ramps were recently installed as part of a spot paving project. Northbound and southbound Metro transit stops are located at this intersection.

This conceptual design includes marked crosswalks and signs on the north and south legs of the intersection. Note that there are existing trees which can obscure warning signs and crossing pedestrians. Tree trimming is recommended and included in the cost estimate.

## **4-B W Galer St and 3rd Ave W**

W Galer St is a two lane street in the Queen Anne neighborhood, currently classified as a collector arterial. The intersection of W Galer St with 3rd Ave W is an offset t-intersection. The north legs of 3rd Ave W is west of the south legs. W Galer St is 42 feet wide with parking on both sides of the street and a Metro trolley bus route running east and west.

This conceptual design includes concrete curb bulbs are proposed on the north and south sides of Galer at 3rd Ave W. A new marked crosswalk would be added at 3rd Ave W between the new curb bulbs. Because this crossing is proposed as a future neighborhood greenway, this design will include bike ramps to access the curb bulbs.

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## **5-B 1st Ave N and Thomas St**

1st Ave N is a principal arterial roadway with two through lanes in the northbound direction and on-street parking on both sides of the street. Over 20 pedestrians cross this location on both the north and south legs in an hour. Thomas St is a non-arterial street with on-street parking on both sides. The intersection has stop sign control for traffic on Thomas St. This location sees high pedestrian traffic leading to the Seattle Center located to the east of the intersection.

This conceptual design includes the installation of marked crosswalks on both the north and south legs and an RRFB system. New ADA ramps are also proposed.

## **6-B W Highland Dr and 2nd Ave W**

W Highland Dr is a non-arterial street adjacent to Kerry Park. SDOT does not mark non-arterial crosswalks aside from locations adjacent to schools. No improvements are proposed for this location.

## **7-B W McGraw Pl/W Smith St/1st Ave W**

Due to the low pedestrian volumes counted at this location and the geometrics of this street, marked crosswalks are not recommended at this location.

## **8-B Queen Anne Ave N and Smith St**

There is an existing marked crosswalk at this location. Crosswalk remarking is one of SDOT's maintenance programs. This location will be remarked as part of this program and does not require NSF funding.

## **Constructability**

- Constructability varies by locations. Most curb bulb locations will require drainage adjustments including inlet relocations/reinstallations to catch storm water.
- Minor re-grading is expected to ensure the new curb ramps are ADA-compliant.
- Some utility covers are located near the curb bulbs locations will require adjustments to the curb bulb geometry

## **Impacts:**

- There may be a perception of parking loss where new curb bulbs are installed.

## **Benefits:**

- Increased safety for pedestrians by reducing the overall distance to cross and increase in visibility.
- Increased safety for pedestrians through installation of RRFB's and marked crosswalks where warranted.
- Increased accessibility through installation of new ADA ramps.

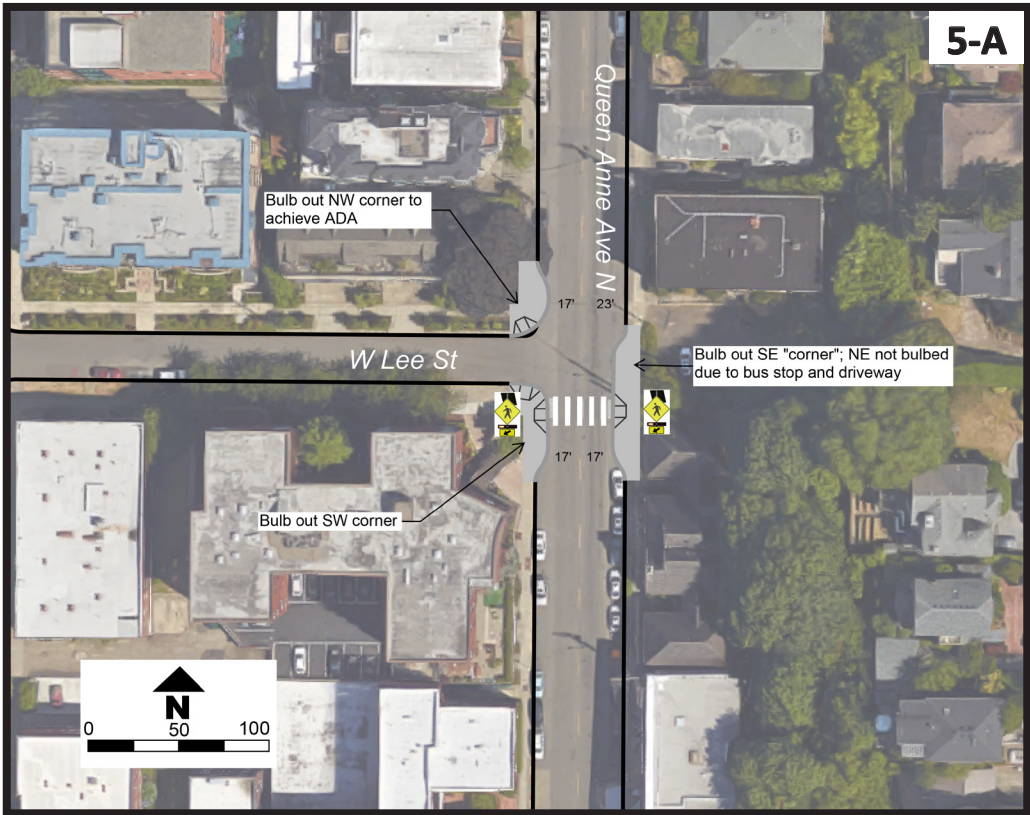


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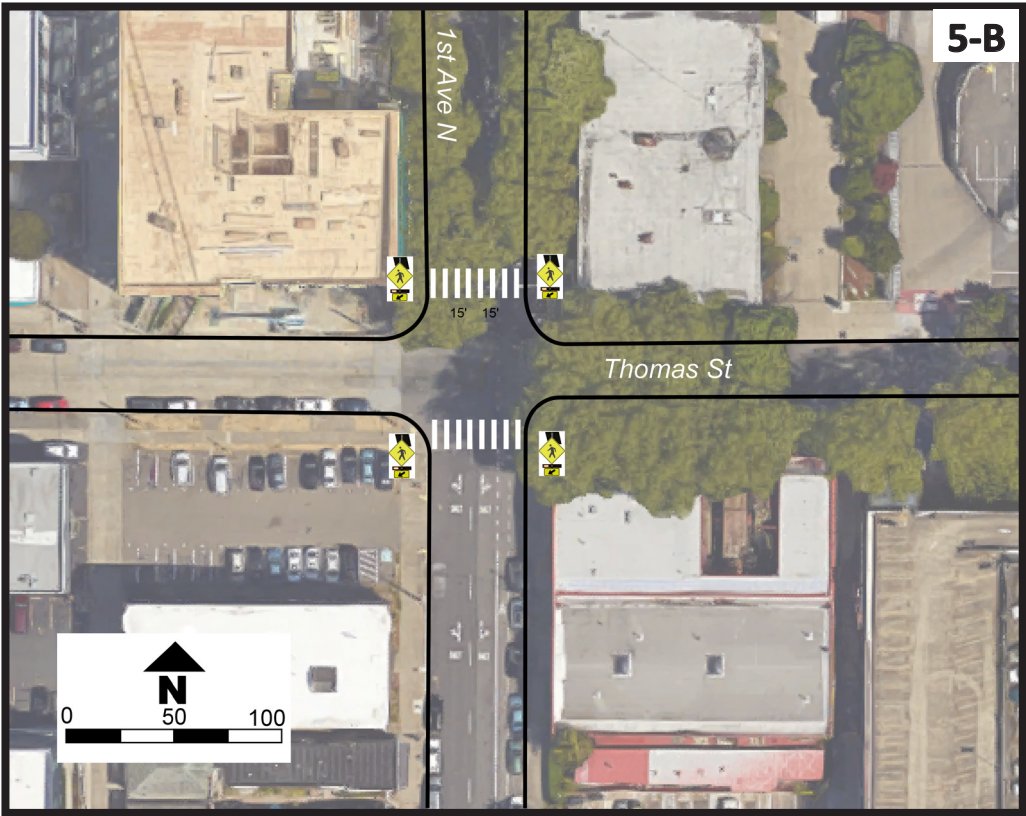
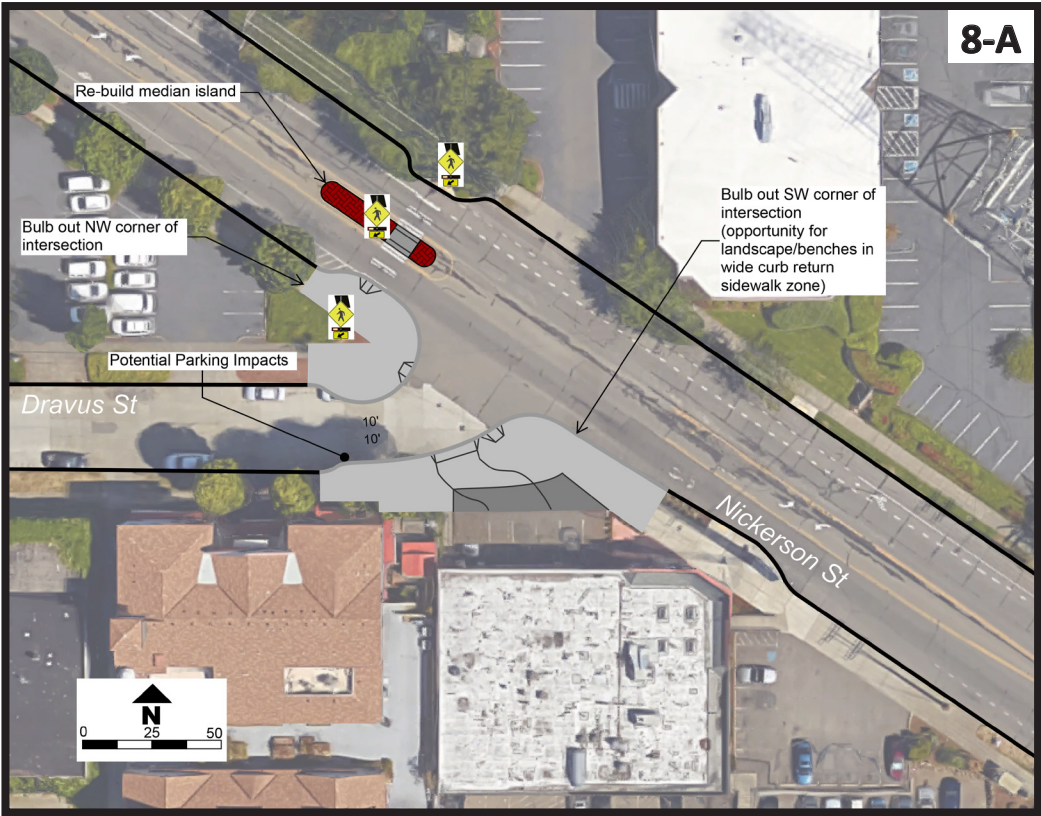


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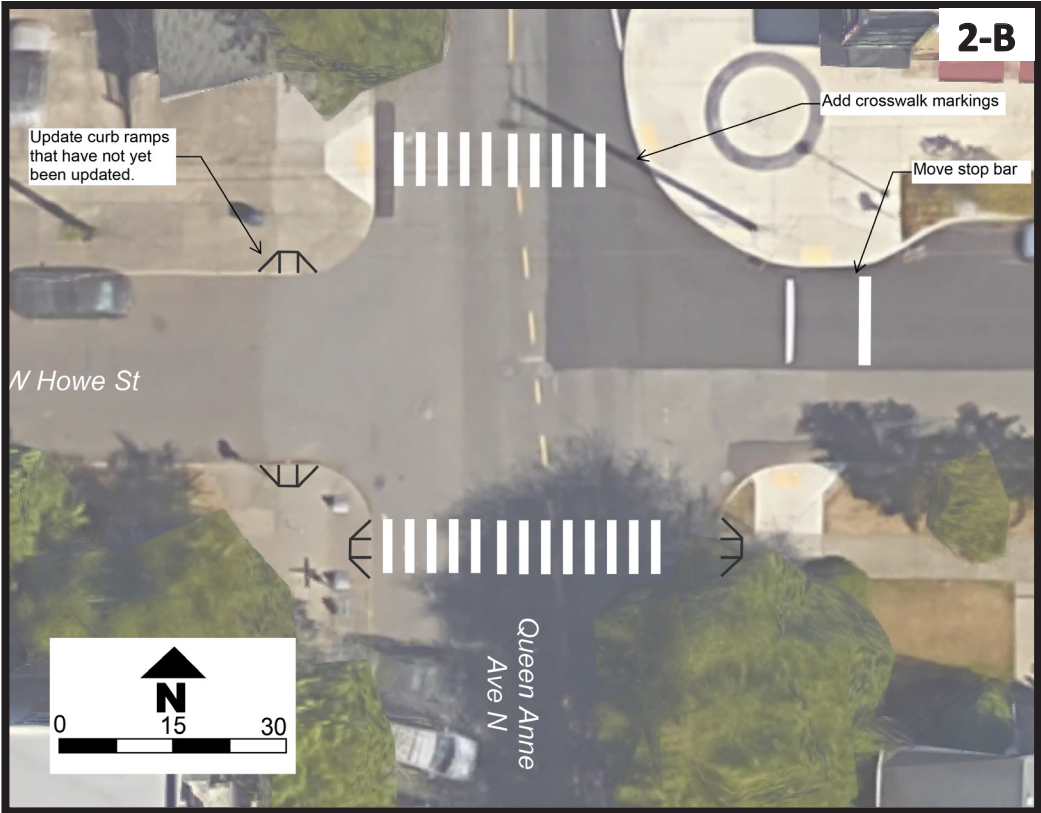
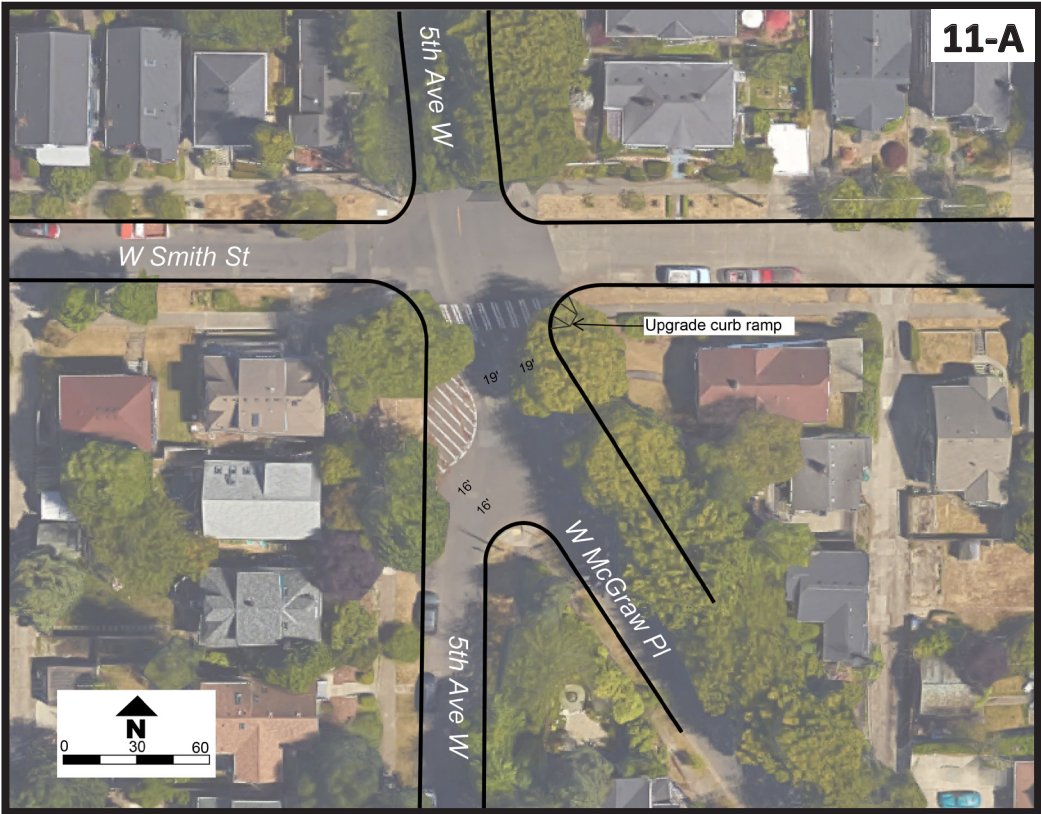




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