# **APPENDIX C** | CAPITAL INVESTMENT CONCEPTS

As part of the TDP, the team identified locations for capital improvements to enhance operations and the overall passenger experience. Preliminary locations were chosen with input from TCAT staff during a field in the spring of 2021:

- Community Corners: Hanshaw Road and Pleasant Grove Road
- Cornell A Lot: Pleasant Grove Road
- Cornell B Lot: Campus Road and Tower Road
- Green Street at Ithaca Commons
- State Street and South Fulton Street
- State Street and North Plain Street
- Jessup Road and Pleasant Grove Road
- Dryden Road

The following summarizes the recommended capital improvements. The rationale for choosing each location, the site-specific recommendations, and the potential benefits to be realized will each is discussed. Graphics illustrating conceptual design and conceptual-detail-level cost estimates for each location are also included.

### Community Corners – Hanshaw Road and Pleasant Grove Road

Recommendations for capital improvements at this location include the establishment of a bus stop on Hanshaw Road in both the eastbound direction, adjacent to the shopping center, and the westbound direction, adjacent to the Village Center. No stops currently exist at this location. Community Corners is growing, including a new medical facility. This location could also serve as a transfer location for Routes 30, 32, and 41, benefiting riders going between the Ithaca Mall area and northeast Ithaca (eliminating the need to transfer at Cornell or Downtown).

The existing wide shoulders on both sides of Hanshaw Road can be leveraged to establish bus turnout lanes at both stops to allow buses to pull out of the flow of traffic to conduct passenger loading and unloading operations. Recommendations include the installation of concrete bus pads within the new turnout lanes to improve durability and decrease long-term maintenance costs. New TCAT bus shelters and concrete shelter pads are recommended for installation behind the existing sidewalk and both stops.

Additional recommended improvements include the installation of a new concrete curb and rehabilitation of existing sidewalk along both sides of Hanshaw Road between Pleasant Grove Road and North Triphammer Road. Currently, the lack of a curb along this segment results in storm water draining directly into landscaped maintenance strips. The new turnout lanes and concrete curb may necessitate the installation of new drainage structures and implementation of storm water management measures. While determining the precise design of drainage elements was beyond the scope of this study, conceptual cost estimates developed for this site do carry an assumed lump sum line item to account for these improvements.

To improve safety for pedestrians crossing Hanshaw Road between these new paired bus stops, the eastern of the two existing unsignalized midblock crossings should be relocated to fall between the eastbound and westbound stops, so crossing occurs behind the bus. This will reduce the potential for pedestrian crossings Hanshaw Road will be visually obscured by a bus stopped at a bus stop. Additionally, advanced pedestrian crossing warning signs are recommended to be installed in accordance with the most recent New York State pedestrian safety guidance and standards.

### Cornell A Lot – Pleasant Grove Road

There are currently two separate TCAT bus stops within the Cornell University A Lot and passenger loading and unloading occurs at both stops. This can cause confusion and unnecessary operational challenges when passengers are unsure where to wait. Additionally, there are oversized, non-standard wooden bus shelter at both stops. These are in poor condition, and their non-transparent siding can obscure passengers waiting inside from approaching buses and vice versa, potentially leading to missed connections.

Recommendations for capital improvements at this site include the consolidation of the two stops into a single stop by removing the existing wooden shelters and replacing both with a single, large modern shelter at a new location between the two existing stops. The passenger waiting area at the relocated, consolidated stop will be expanded by enlarging the paved sidewalk area through the elimination of approximately four existing parking spaces. The expanded sidewalk area could be further enhanced with the installation of an embedded snow melt system to reduce

hazardous conditions during winter weather. To improve pavement durability, it is recommended that a new concrete bus pad be installed adjacent to the consolidated bus stop location.

Most of the parking spaces eliminated by this recommendation could be regained through a realignment of one of the drive aisles at the north side of the parking lot. This realignment would be possible by eliminating the existing bus stop and shelter. It would allow for a net gain of three parking spaces, resulting in a total net loss of only one space.

### Cornell B Lot – Campus Road and Tower Road

Several routes converge at the intersection of Campus Road and Tower Road, yielding a natural transfer location between routes serving Downtown Ithaca, the Cornell University Campus, and the residential areas along Dryden Road. Rural routes heading east could allow transfers to Campus routes at the edge of campus without traveling through campus (e.g., Routes 40, 43, and 53).

It is recommended that the existing bus stops and bus shelters on Campus Road adjacent to B Lot be relocated to newly established stops west of Tower Road. In the westbound direction, a new far side stop will be established utilizing the existing wide shoulder and wide landscaped maintenance strip to establish a turnout lane to allow buses to pull out of the flow of traffic. Based on the frequency of buses proposed and anticipated passenger activity at this location, it is recommended that this stop be sufficiently long to accommodate two 40-foot vehicles simultaneously. A concrete bus pad should be installed within the new westbound turnout lane to improve long-term durability of treatments. The existing sidewalk at this location is in good condition and sufficiently wide to accommodate a relocated bus shelter and concrete bus pad within the existing width while providing clearances compliant with ADA standards. Minor adjustments to the radius of the northwest corner of Tower Road and Campus Road would be required to facilitate bus turns from southbound Tower Road onto westbound Campus Road and into the newly established bus stop.

In the eastbound direction, a new stop and turnout lane will be established to the west of the existing entrance to the parking lot at the south of Campus Road. The purpose of the setback of the bus stop from Tower Road is to avoid conflicts with the right turn lane and bike lane at the intersection. Like the westbound stop, the eastbound stop should be sized to accommodate two 40-foot vehicles on a concrete bus pad. Improvements at this location would provide the opportunity to complete the sidewalk network by connecting the existing sidewalk to the west, behind the new bus stop, and across to the existing sidewalk extending to Tower Road.

### Green Street at Ithaca Commons

The south curb of Green Street east of Cayuga Street is one of TCAT's main transit hubs. It serves as the terminal stop of several routes that bring passengers into Downtown Ithaca. The south curb lane is designated for TCAT buses only and parking is prohibited at all times, however TCAT personnel indicated that this curb lane is commonly blocked by private vehicles and intercity buses. A TCAT shelter exists at this location, but it lacks amenities.

Recommended capital improvements for the hub include replacing the entire curb lane with a long concrete bus pad to improve durability and transit operations. The curb lane could also be painted red with "BUS ONLY" pavement markings to reinforce messaging to motorists. The existing stop bar preceding the mid-block signal could be recessed for general traffic, giving buses priority while queuing for the green light and reducing potential for vehicle queues blocking the bus.

As this is a highly visible and important loading location for TCAT passengers, it is recommended that embedded snow melt equipment be installed in the sidewalk area between the existing bus shelter and curb. This will reduce the sidewalk icing during inclement weather and help improve the passenger experience and safety. To further enhance the passenger experience, general improvements to street lighting should be considered.

### State Street and Fulton Street, Rt 13

State Street is one of the major corridors that brings motorists into Downtown Ithaca from residential areas to the west, and the intersection of State Street and South Fulton Street is routinely congested at peak times. A new, dense residential redevelopment effort is currently underway to the south of State Street adjacent to the Cayuga Inlet, which will likely add to general peak period congestion in the area.

The existing right of way is constrained by waterways and development, making improvements outside of existing roadway widths challenging. However, a 12-foot-wide hatched median on State Street to the west of the intersection with South Fulton Street separates the eastbound and westbound lanes. This median could be converted to a queue jump lane for eastbound buses by installing a new bus-only signal head at the intersection. When buses approach the intersection at a red light, the lane will allow them to skip to the head of the queue and the signal will give them preemption.

Signals such as these are typically actuated by either camera detection or inductive loops embedded in the pavement. Transit preemption would require only approximately seven seconds of clearance time at the start of the signal phase, which could be realized by reducing the north-south and east-west green phases marginally when a bus is detected. Vehicle detection loops would only trigger the signal on the presence of a TCAT bus, preventing general traffic from using the lane. Buses arriving at the signal on a green phase would not utilize the lane, remaining in the flow of traffic and proceeding as normal. A comprehensive traffic analysis and modeling effort should be completed before adoption of this recommendation to fully understand and quantify its impacts and benefits.

### State Street and North Plain Street – Queue Jump and Transit Preemption

A conceptual design for capital investment was developed at the intersection of State Street and North Plain Street. However, design concept and elements could be considered for implementation by TCAT wherever similar geometries and conditions occur.

State Street is a two-lane roadway with parking on both sides and a total curb-to-curb width of 38 feet. TCAT operates nearside bus stops in both directions. Utilizing the same signal technology as described above, a bus-only signal head and signal phase can be added to the intersection. Vehicle detection would be performed by either embedded inductive loops in the curb lanes at the bus stops or by camera detection. After a bus unloads and loads at the curb, the vehicle detection would trigger the signal preemption phase at the start of the subsequent east-west green phase, providing buses with priority to advance ahead of traffic and proceed on State Street. If buses depart the stop during the east-west green phase, vehicles would merge back into the flow of traffic as normal.

Neckdowns are also recommended for the far side corners in both directions. These neckdowns will reduce pedestrian crossing distances, provide additional space for pedestrians to wait, and provide traffic calming benefits on State Street. These recommendations could be implemented with little to no impact on existing on-street parking supply and minimal impacts to traffic operations.

### State Street and North Plain Street – Bus Bulbs and Pedestrian Improvements

An alternative recommendation for capital improvements was developed for State Street at North Plain Street. As with the previous recommendation, this treatment and design elements could be considered for implementation by TCAT at any intersection with similar geometries and road conditions.

This alternative includes 40-foot-long bus bulbs at each near side stop in the eastbound and westbound directions. Bus bulbs are typically built to be slightly less wide than an adjacent parking lane width. They provide bus riders a waiting area outside of the stream of through pedestrians and reduce effective crossing distances at adjacent crosswalks. Bus bulbs can also provide additional width for the installation of shelters. Bus bulbs provide benefits to transit operations by eliminating the need for buses to pull out of and back into the flow of general traffic, typically reducing total dwell times and trip delay, especially where buses frequently get trapped by adjacent vehicle queues.

A concrete bus pad should be installed adjacent to the bus bulbs in both directions to improve long-term durability of pavement. Neckdowns are also recommended at the far side corners in both directions to further reduce effective crossing distances and improve pedestrian safety. In total, a bus bulb and neckdown would reduce crossing distances by 14 feet on both the east and west intersections.

The overall lengths of the bus bulbs and the transition back to the existing curb line can be sized to roughly the total length of the existing bus stop, allowing for implementation with no impact to existing parking supply. Eliminating the need for buses to pull out of the flow of traffic to access a stop results in buses stopping in the lane of traffic to conduct passenger loading and unloading operations and impeding the flow of general traffic. However, dwell times for urban, mid-route bus stops without heavy passenger

loading activity typically average fifteen seconds per stop, so overall delays to traffic are minimal.

### Jessup Road and Pleasant Grove Road

TCAT's Route 30 is one of the agency's high ridership routes and has been identified for increased service frequency in the TDP. Downtown-bound buses utilize southbound Pleasant Grove Road, turning right onto westbound Jessup Road before serving a stop on the north side of Jessup Road, west of Pleasant Grove Road. The existing stop lacks amenities and an established sidewalk and can be blocked by illegally parked vehicles. Since Route 30 is important to the TCAT enhanced service plan, it is recommended that investment in passenger amenities along this route be prioritized to improve rider experience.

A capital improvement that could benefit both transit operation and passenger amenities would involve the consolidation of the existing Route 30 stop on the north side of Jessup Road with the existing southbound Route 37 stop on the west side of Pleasant Grove Road, north of Jessup Road. This existing stop currently provides a median and gravel turn out lane to allow Route 37 buses to pull out of the flow of traffic to access the stop. These elements should be enhanced by replacing the gravel with a paved turnout lane with length sufficient to accommodate two 40-foot TCAT vehicles simultaneously. The conceptual design recommendations include the installation of a concrete bus pad in the turnout lane to improve long-term durability. A new curb can be installed along the entire length of the new turnout lane and the existing sidewalk be rehabilitated to improve condition and ensure an ADA-compliant 2% cross slope. Further, there appears to be sufficient space behind the sidewalk to install a concrete shelter pad and shelter to serve passengers for both routes.

To facilitate right turns from southbound Pleasant Grove Road onto Jessup Road, the existing stop bar at the eastbound approach to the intersection should be recessed slightly. Observations of bus maneuvers may be required to determine the precise location.

### Dryden Road Bus Stop Improvements

Dryden Road was identified in the TDP as one of three enhanced corridors to be prioritized for increased bus frequencies and improved passenger amenities. However, existing stops along this route are typical of a rural corridor, providing little more than a pole mounted sign indicating the location of the stop. The following two templates can be utilized at bus stops along this corridor, one for stops located at unsignalized intersections, and one for midblock stops. These templates are not intended to be location-specific and should be adjusted appropriately based on field conditions.

### Bus Stops at Unsignalized Intersections

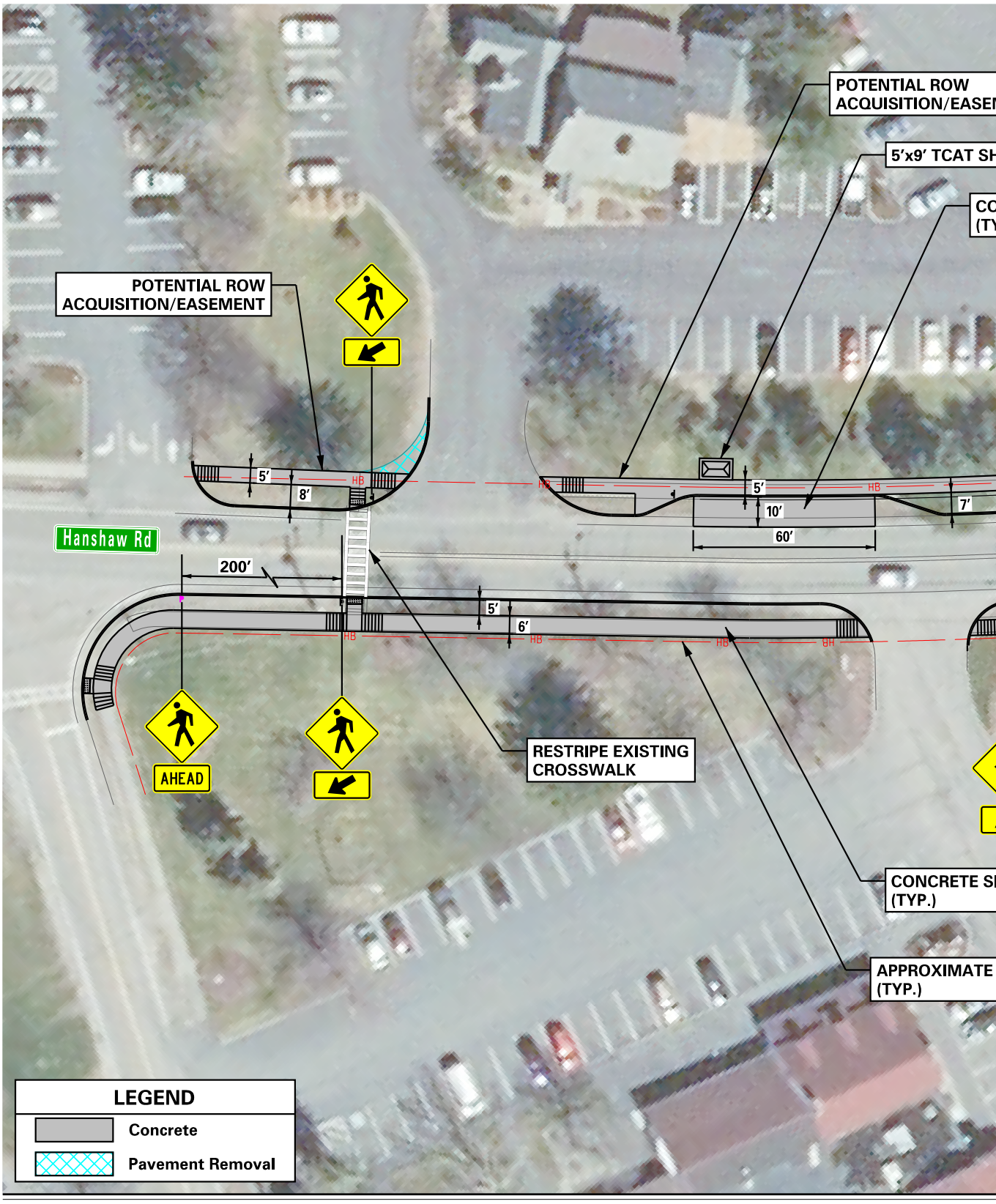
TCAT buses currently pull into the shoulder and out of the flow of traffic to load and unload passengers at most bus stops along Dryden Road. For bus stops at unsignalized intersections, the shoulder should be rehabilitated to ensure that the asphalt is in good condition and that the cross slope does not exceed 2%. To provide a comfortable and safe place for customers to wait, a concrete pad with a cross slope of no more than 1.5% should be constructed adjacent to the existing roadway. This will provide customers with a designated waiting area which is clear of shrubbery and outside of the roadway. Drainage structures can also be considered to reduce the potential for water pooling within the designated bus stop area.

### Mid-Block Bus Stops

Passengers boarding the bus traveling in one direction presumably use the bus stop in the opposite direction on their return trip. Designated pedestrian crossings along Dryden Road are often quite distant from mid-block bus stops, requiring these passengers to cross Dryden Road without the protection of a designated crosswalk and the benefits of advanced warning signs to motorists as recommended by current New York State pedestrian safety guidance and standards.

The recommendations developed for these stops include the same treatments as those described above, but with the addition of a designated mid-block pedestrian crossing and advanced warning signs. By law, motorists are required to yield to pedestrians at mid-block crosswalks. Advanced warning signs should alert oncoming vehicles to the potential of pedestrians in the crosswalk.

Further considerations for the placement of treatments at both unsignalized intersections and mid-block stops are included on the conceptual design drawings included with this report. As conditions at bus stops along Dryden Road can vary significantly, it is recommended that each location be evaluated for safety and best practices.

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Creighton Manning

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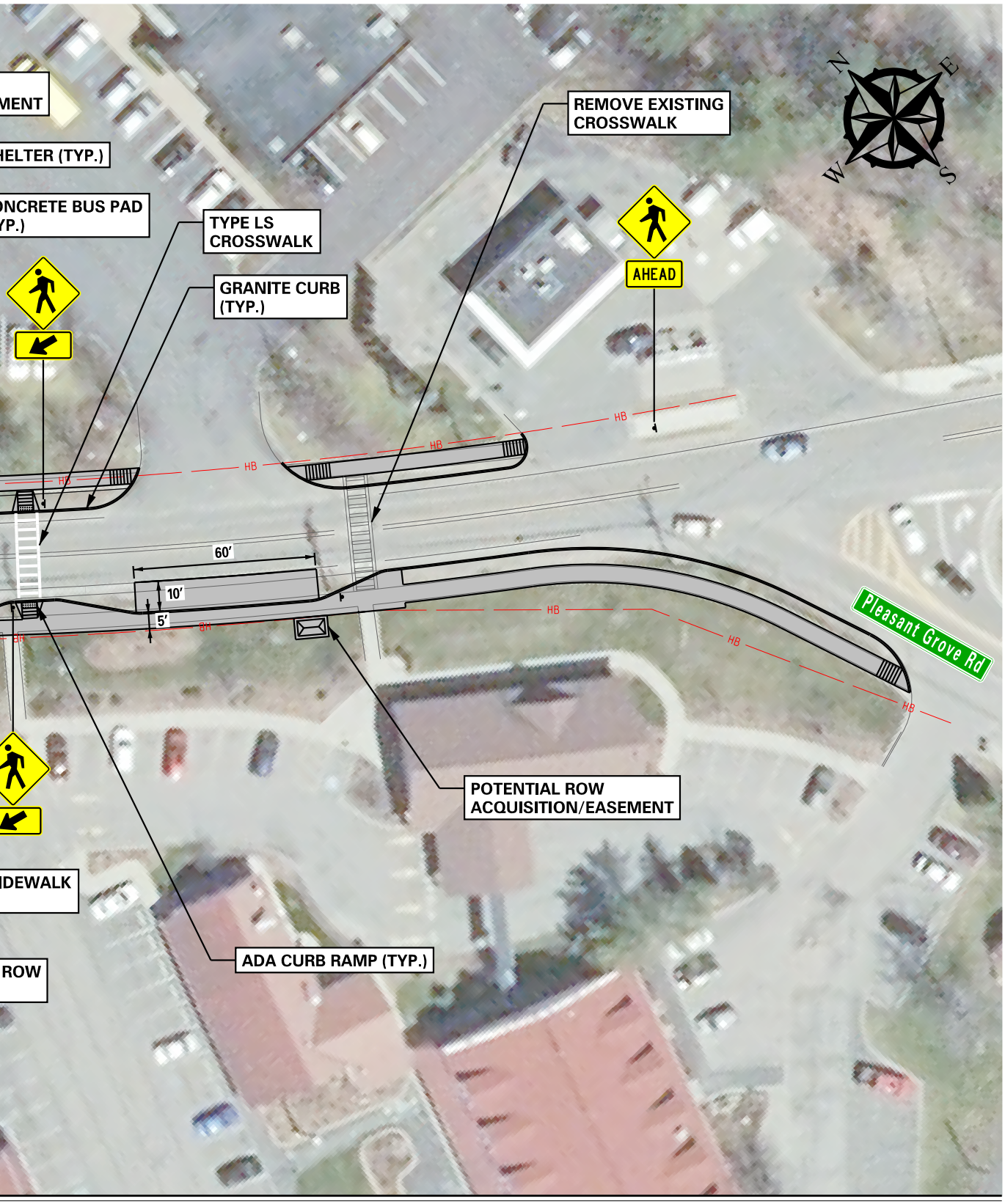
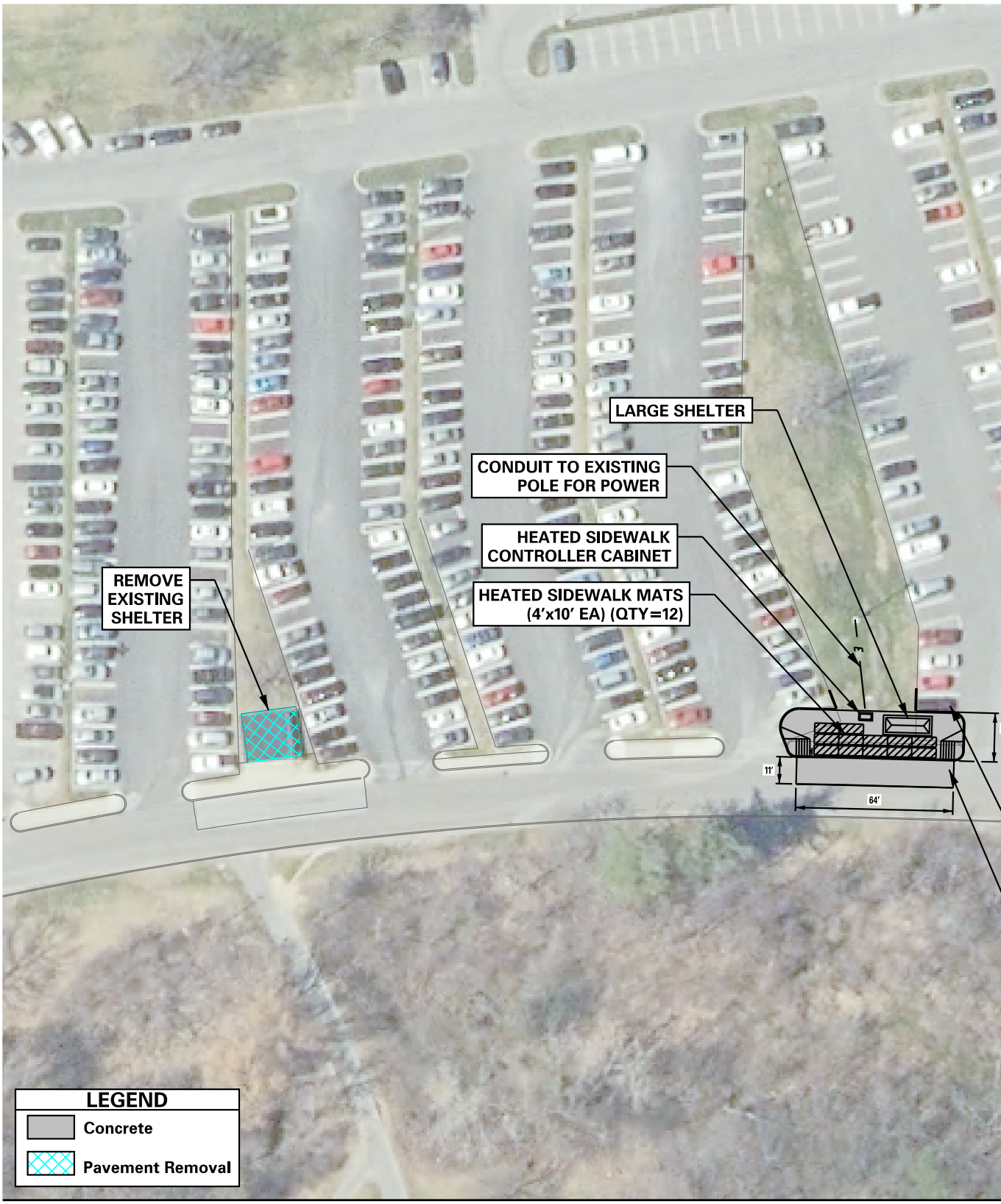



*Community Corners Concept*

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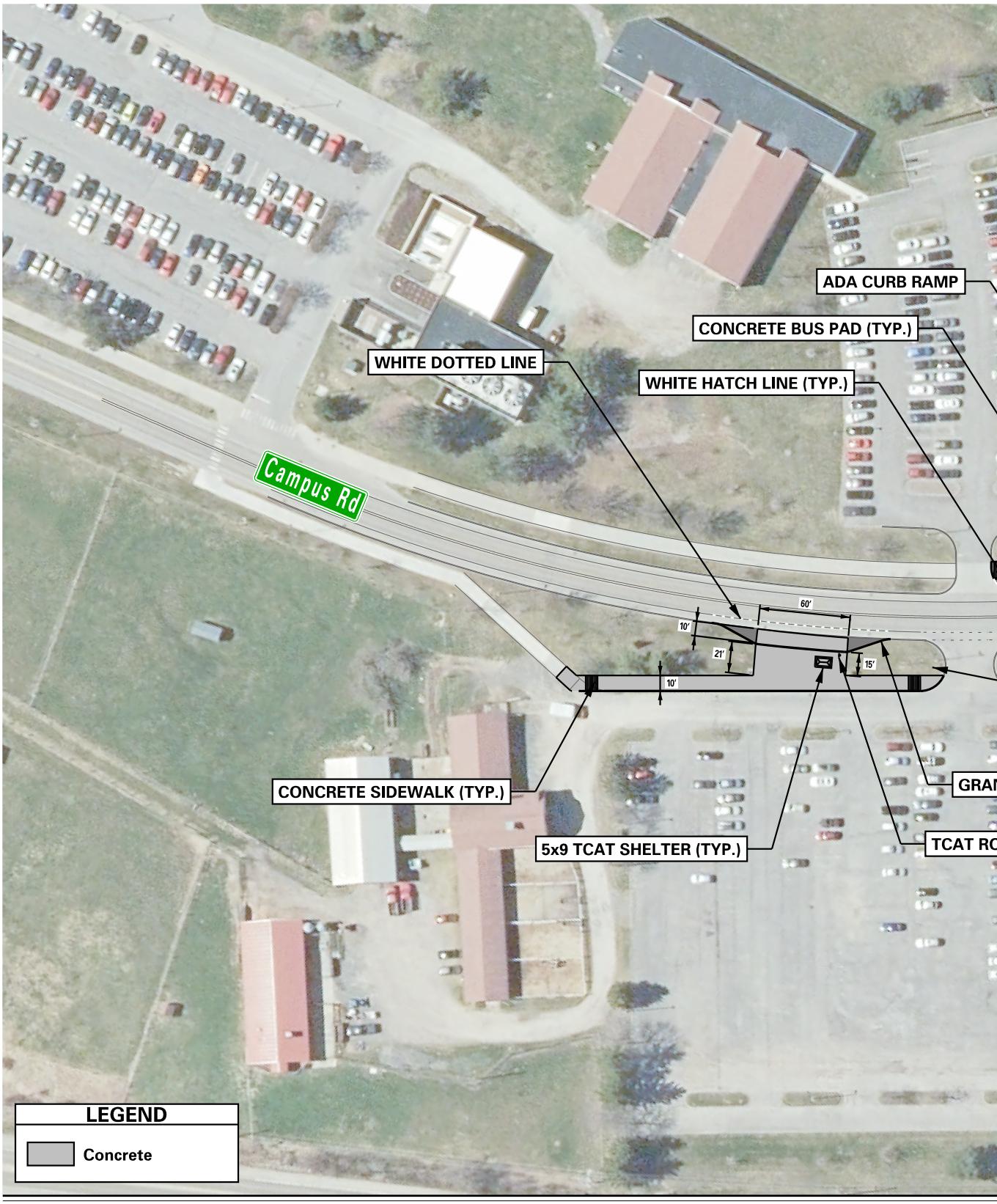
*Cornell A Lot Concept #2*
*Gain of 1 Parking Space*

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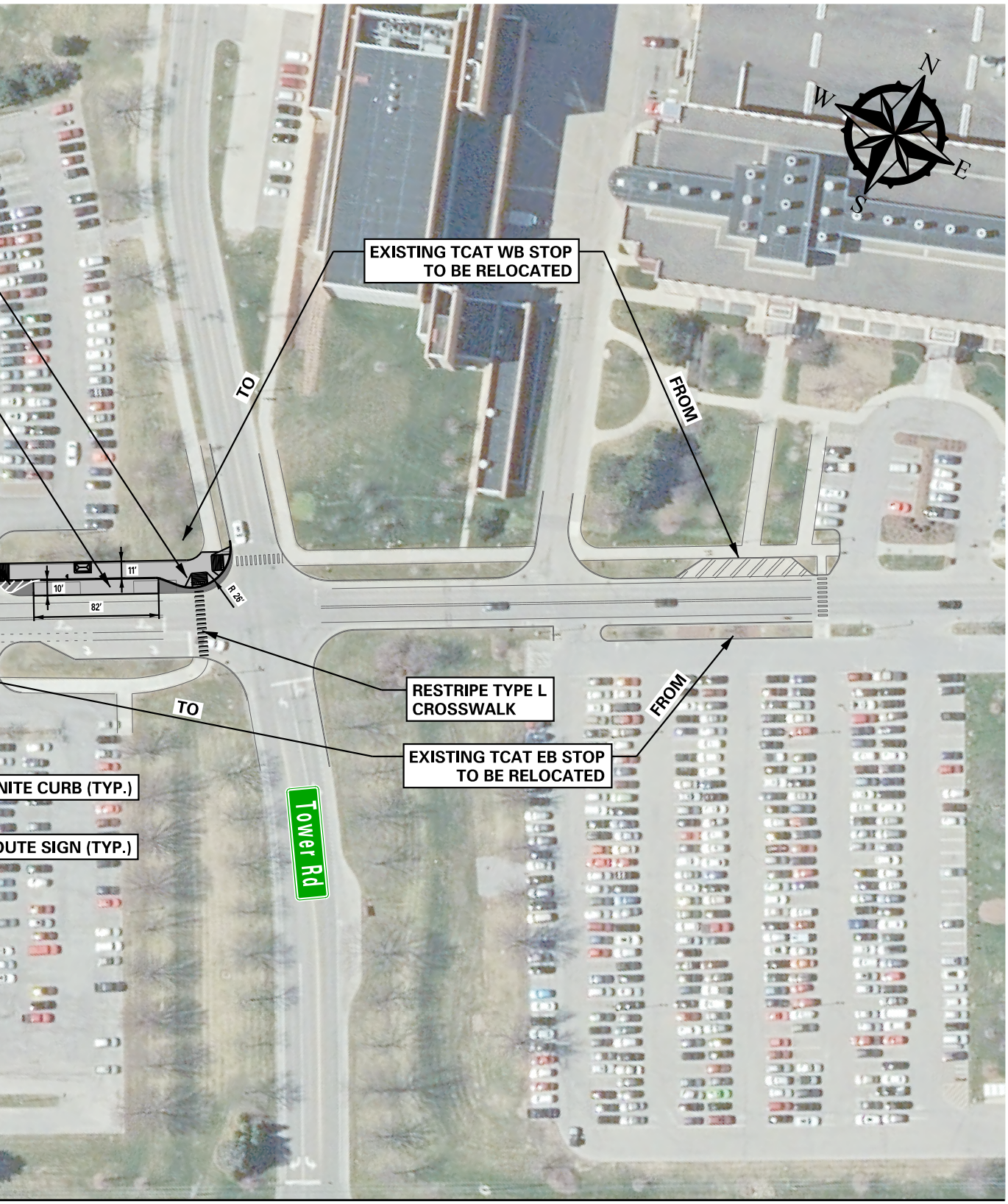
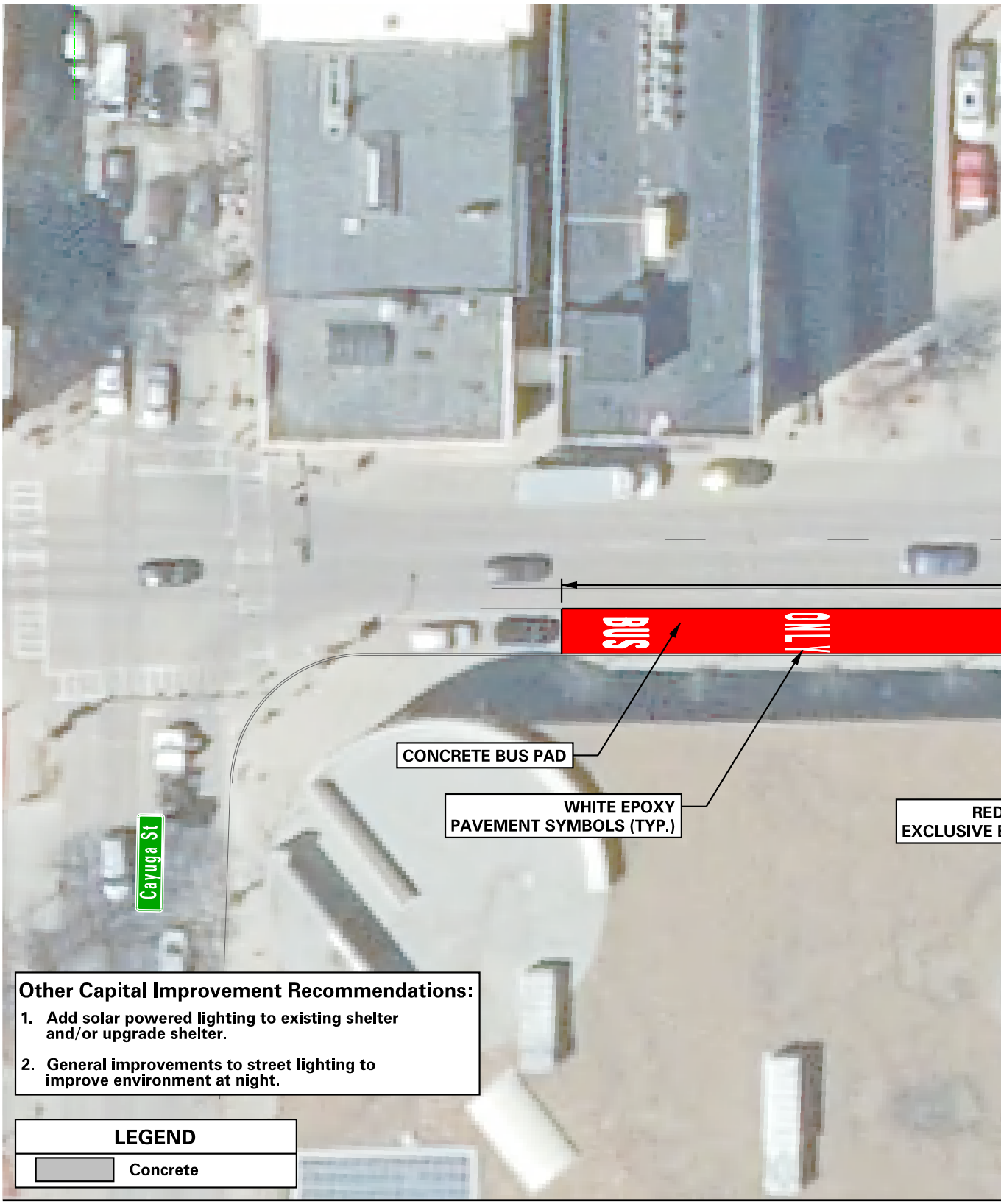



*Campus Road and Tower Road/B Lot Concept*


BUS
ONLY
CONCRETE BUS PAD
WHITE EPOXY
PAVEMENT SYMBOLS (TYP.)
RED
EXCLUSIVE
Cayuga St
Other Capital Improvement Recommendations:
1. Add solar powered lighting to existing shelter and/or upgrade shelter.
2. General improvements to street lighting to improve environment at night.
LEGEND
Concrete
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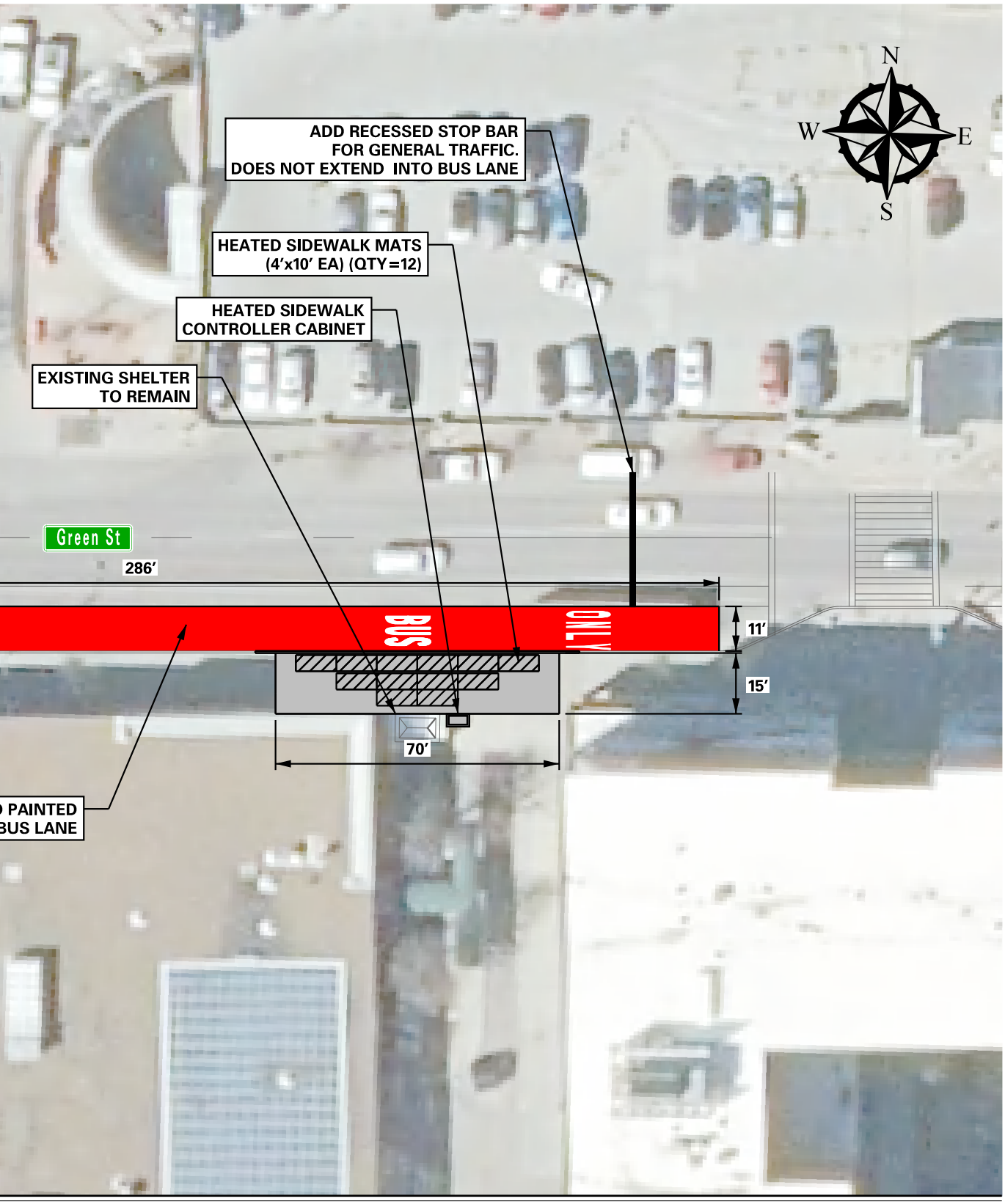
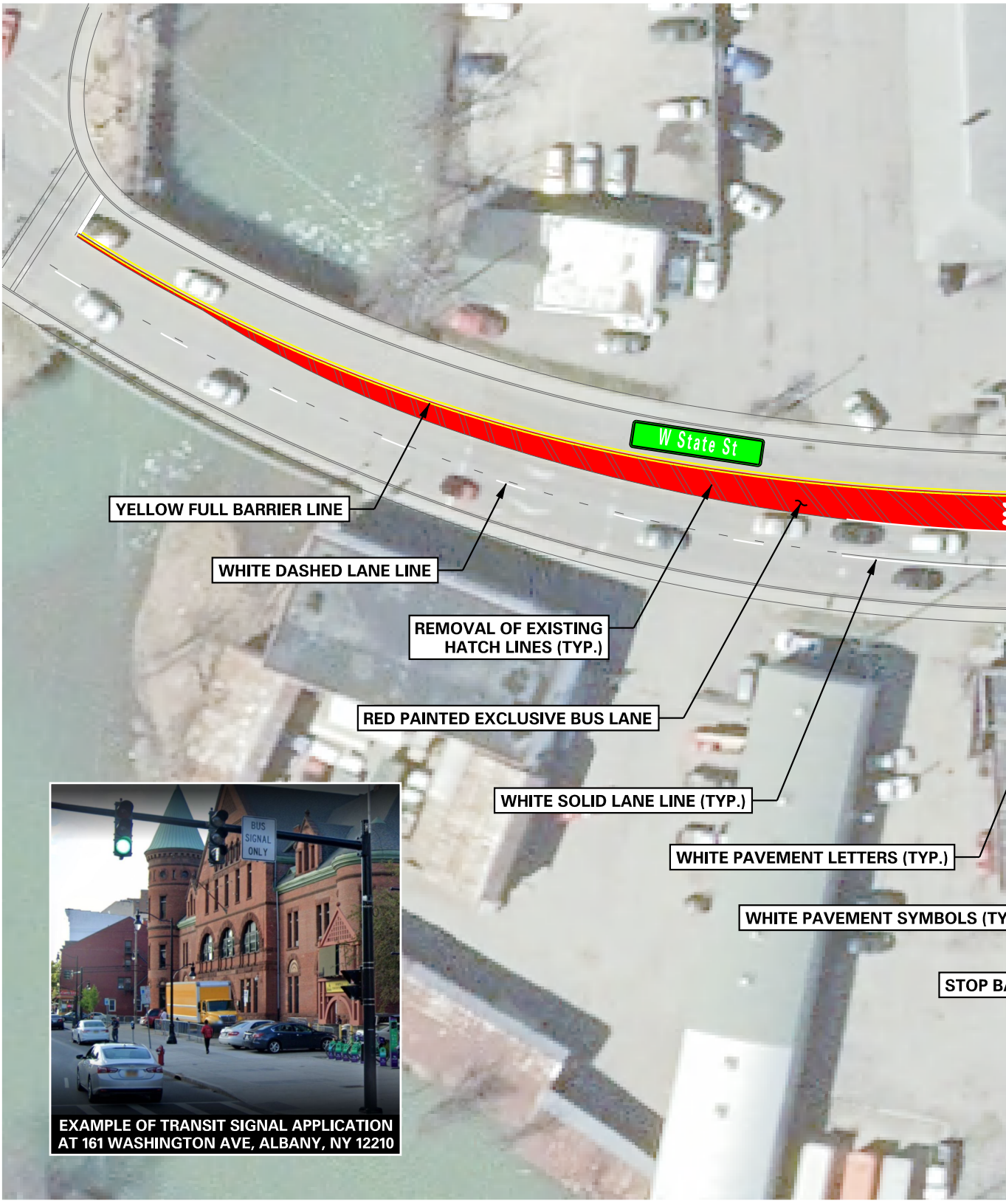



*Green Street at Ithaca Commons Concept*

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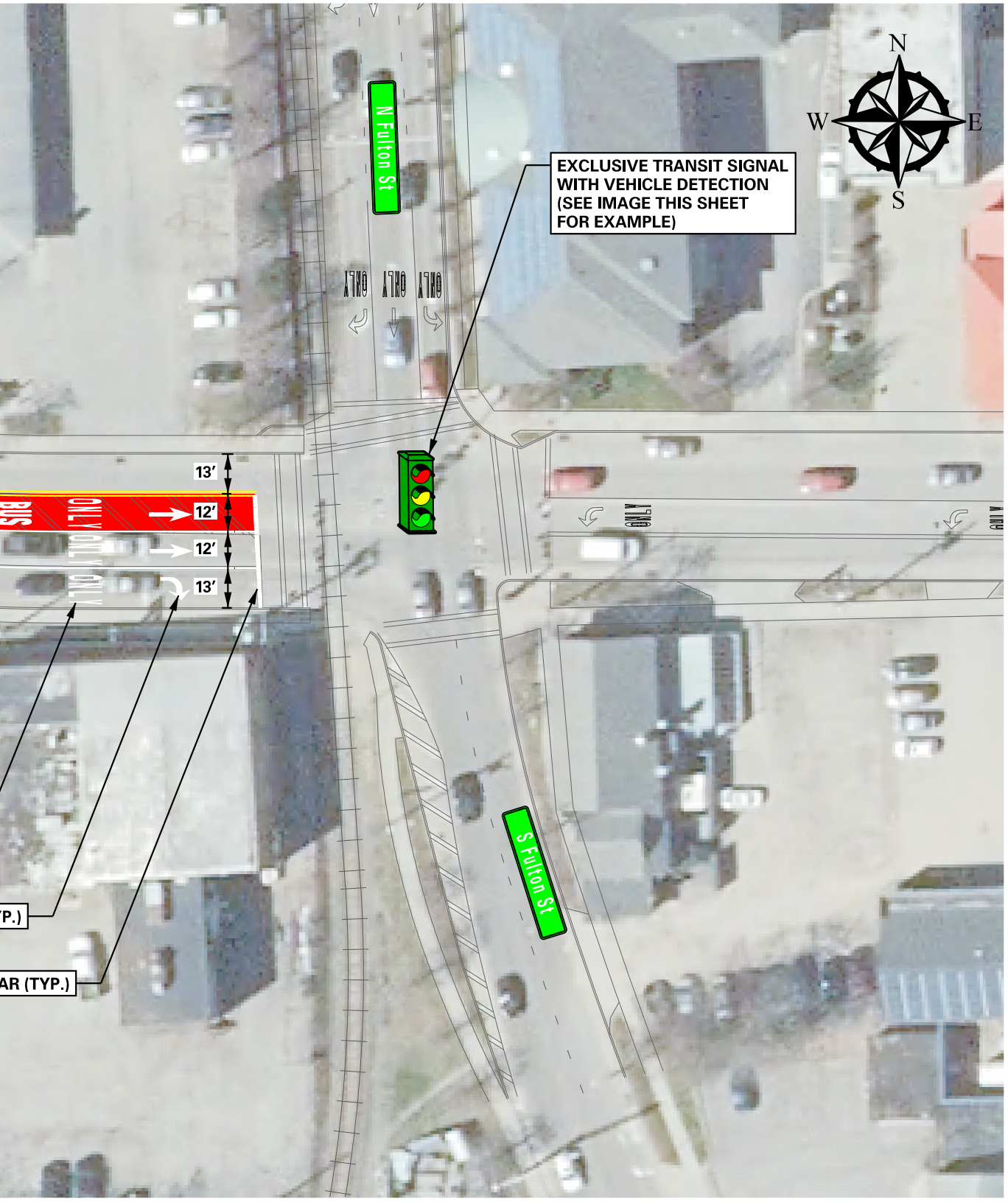
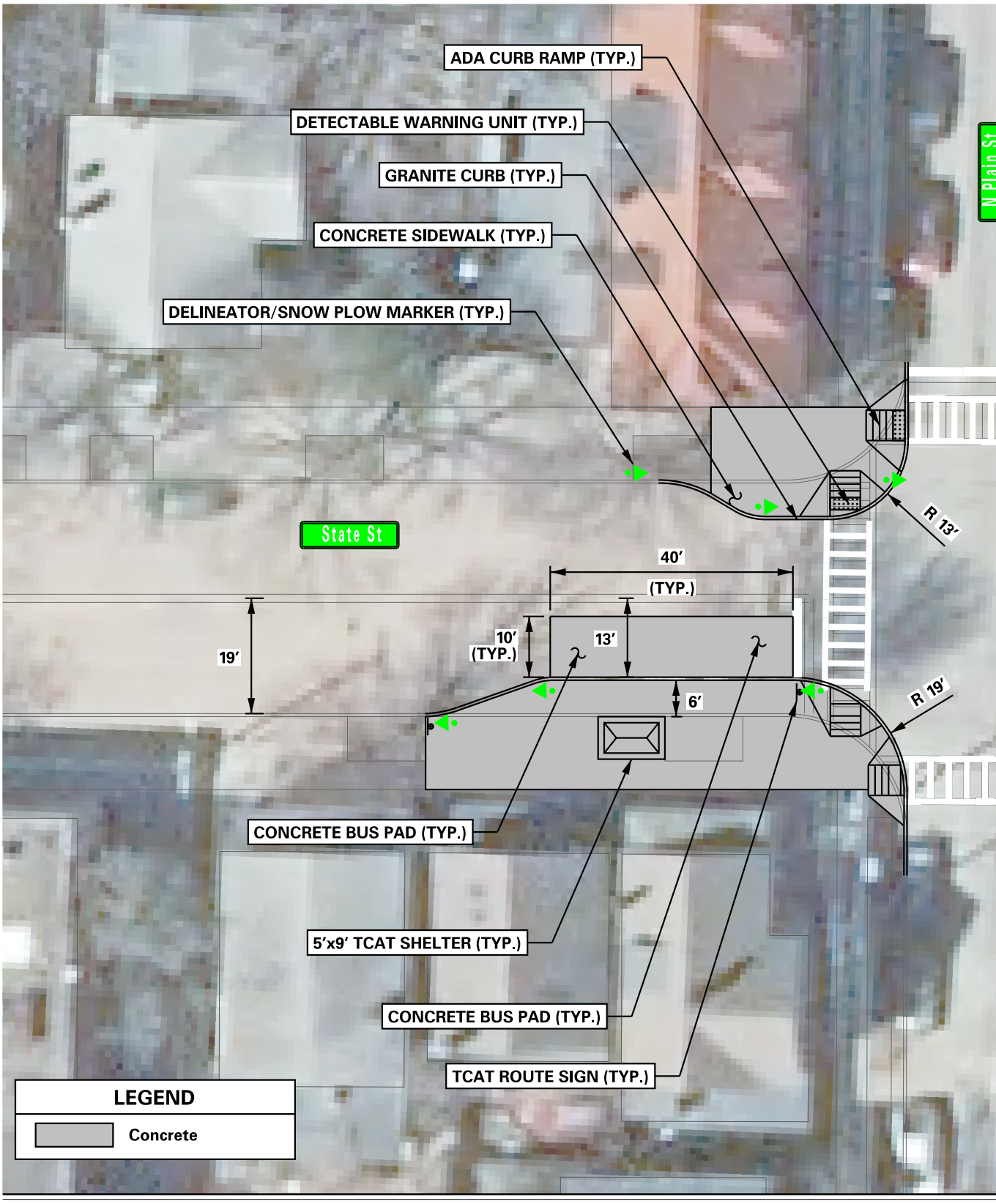



*State Street and S Fulton Street Concept*

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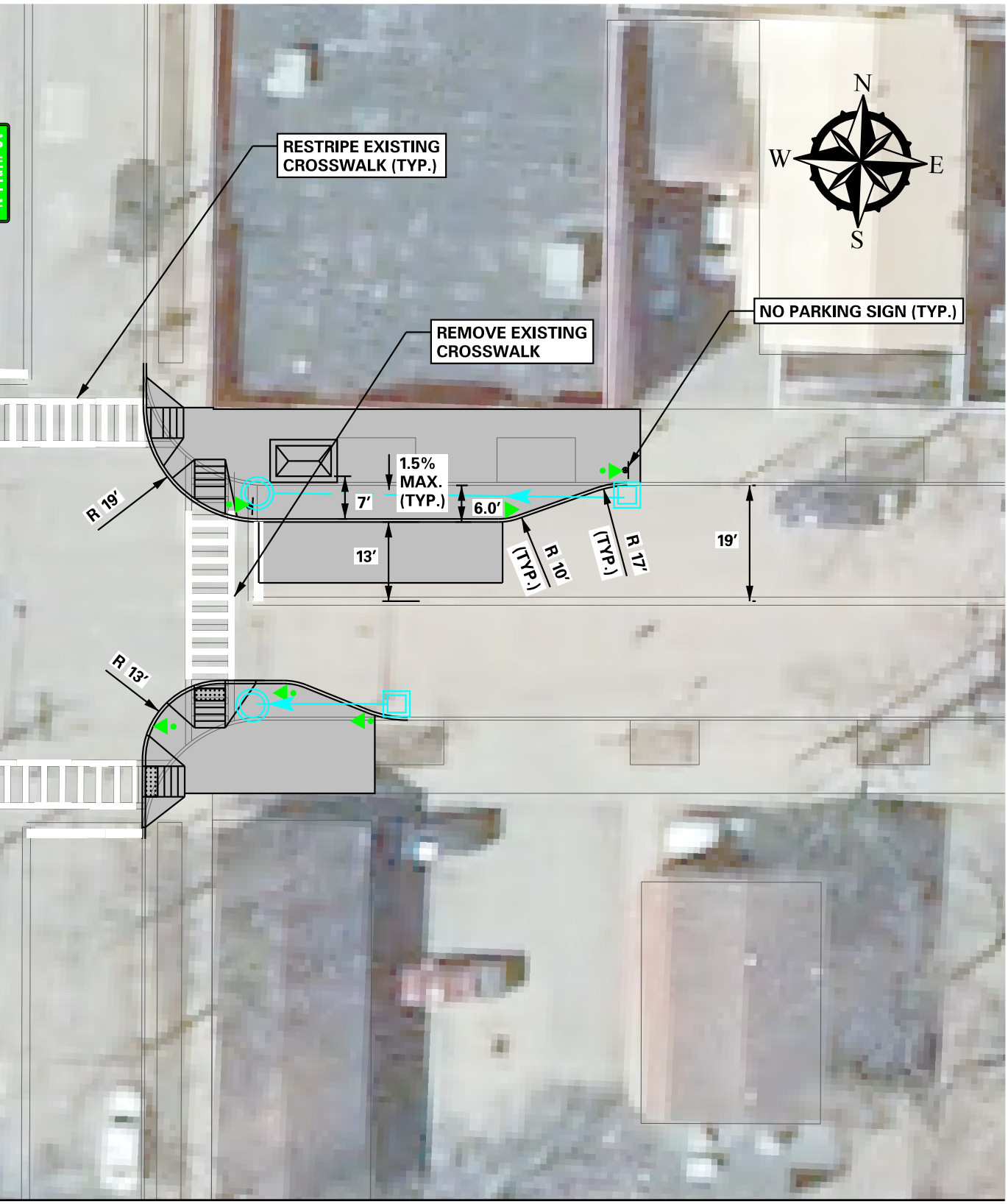


*State Street and N. Plain Street - Bus Bulbs Option*
*Loss of 1 parking space*


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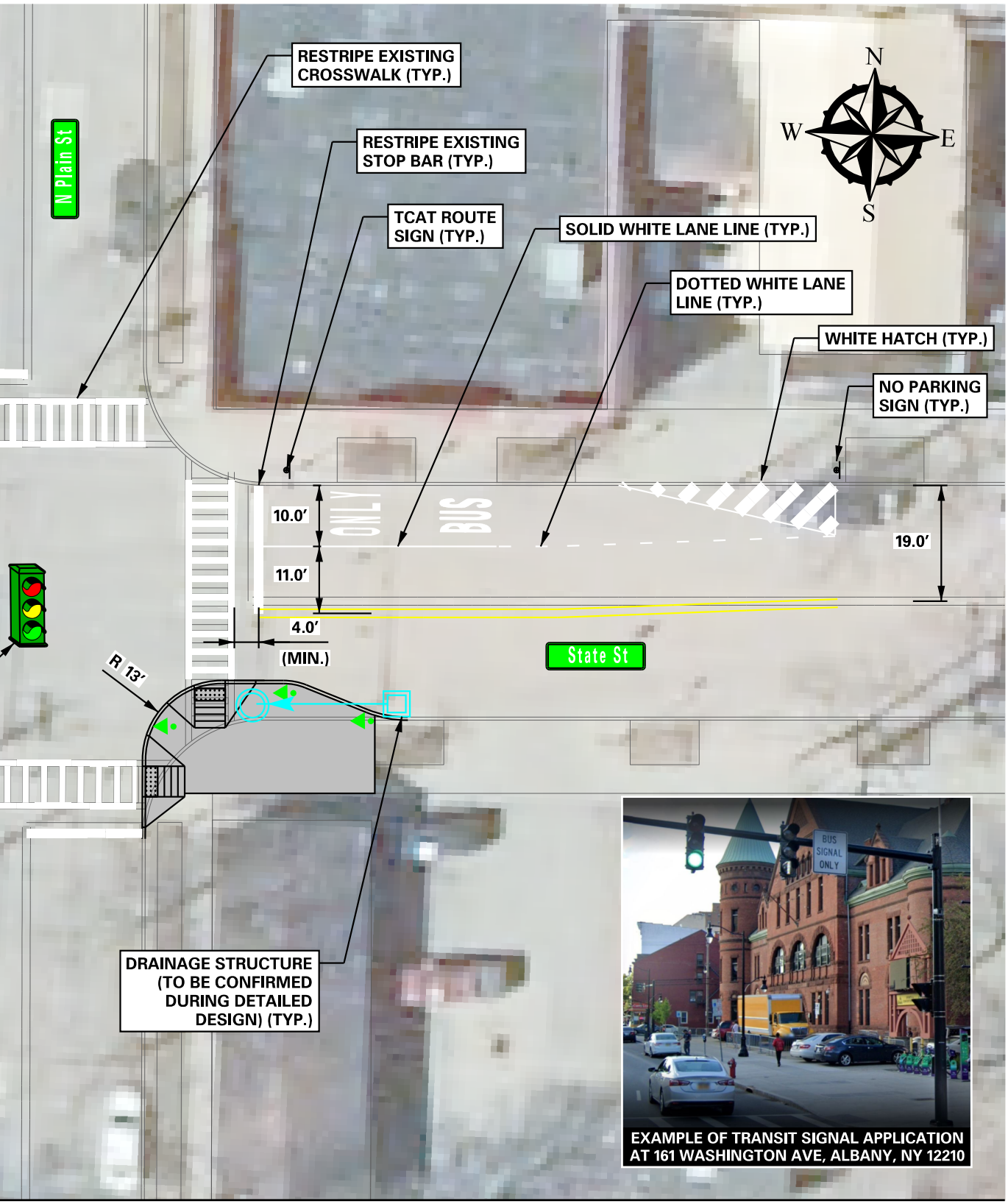
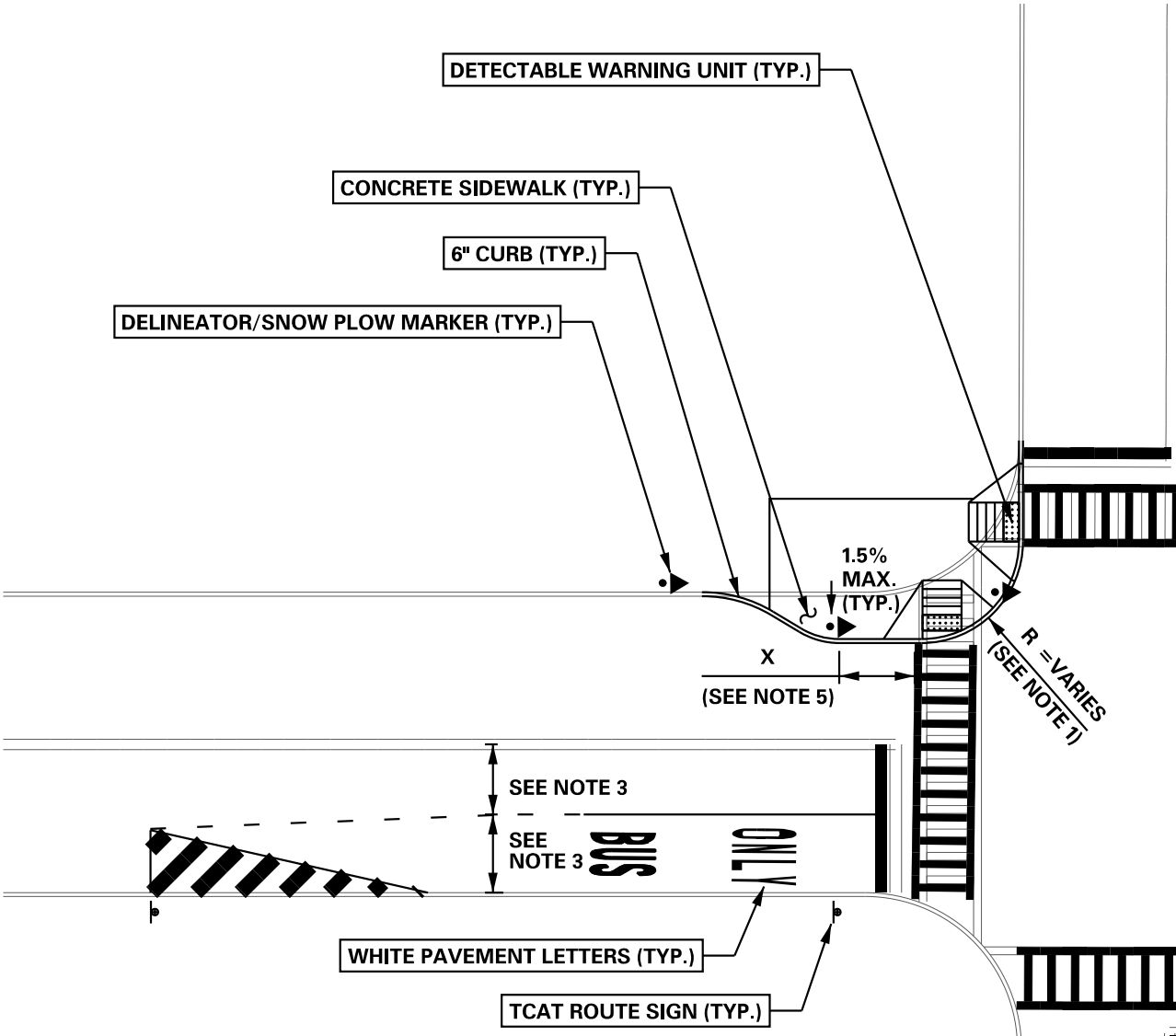






EXAMPLE OF TRANSIT SIGNAL APPLICATION AT 161 WASHINGTON AVE, ALBANY, NY 12210

*State Street and N. Plain Street - QJ Option*
*Loss of 4 parking spaces*




**NOTES:**

1. CORNER RADIUS CURVES TO BE DETERMINED BASED ON THE DESIGN VEHICLE USED.
2. CURB EXTENSION SHOULD GENERALLY BE 1-2 FEET NARROWER THAN THE PARKING LANE.
3. MINIMUM TRAVEL LANE WIDTH TO BE DETERMINED BY USING FUNCTIONAL CLASSIFICATION OF THE ROADWAY.
4. THE LENGTH OF THE QUEUE JUMP LANE TO BE DETERMINED BASED ON THE ANTICIPATED BUS LENGTH AND FREQUENCY.
5. X=5 FT FROM EDGE OF CROSSWALK OR END OF RADIUS, WHICHEVER IS FURTHER FROM THE INTERSECTION.
6. DRAINAGE DESIGN AND LAYOUT WILL VARY BY SITE TOPOGRAPHY AND EXISTING STRUCTURES.
7. PARKING IMPACTS WILL VARY BY SITE.

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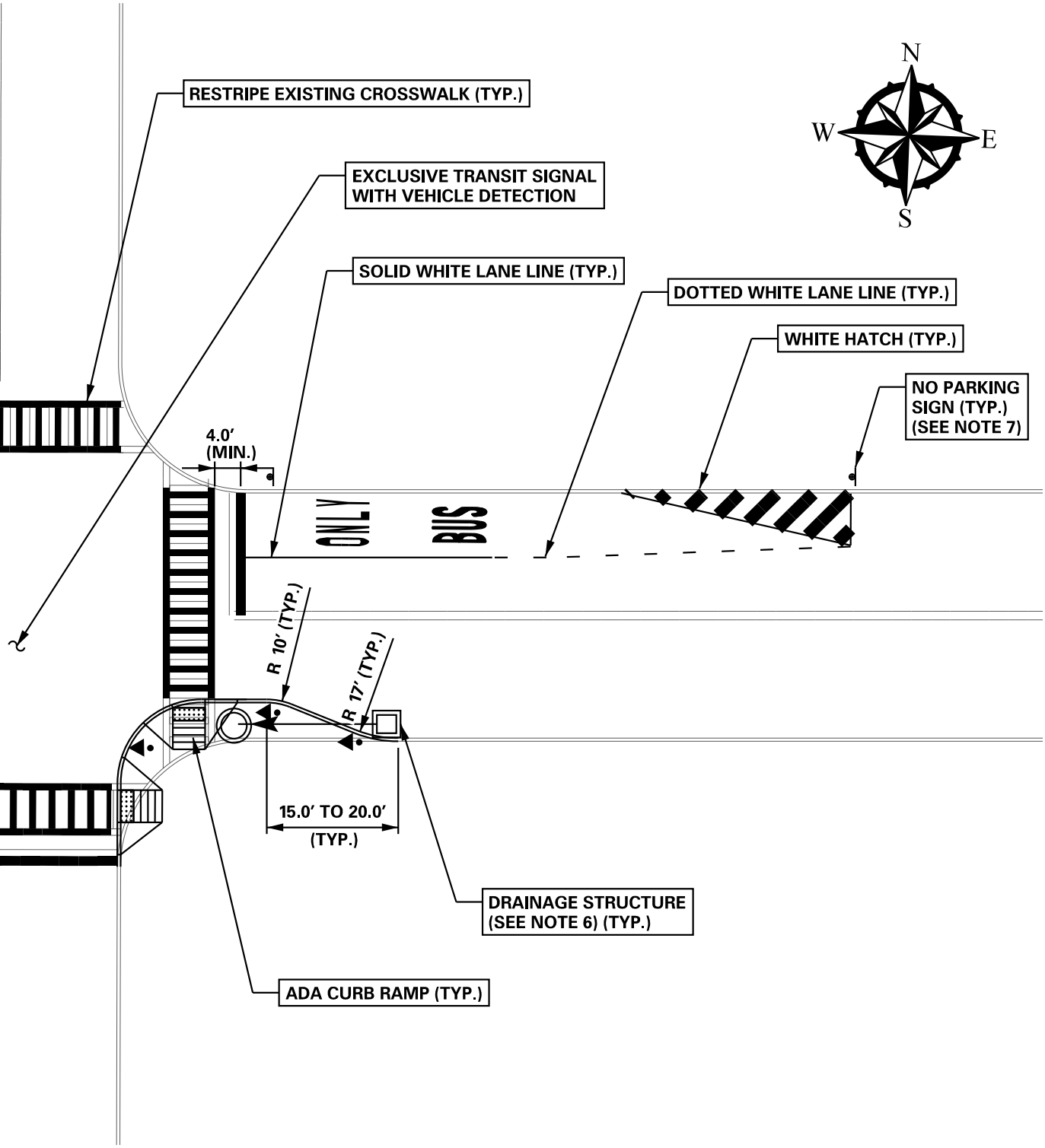
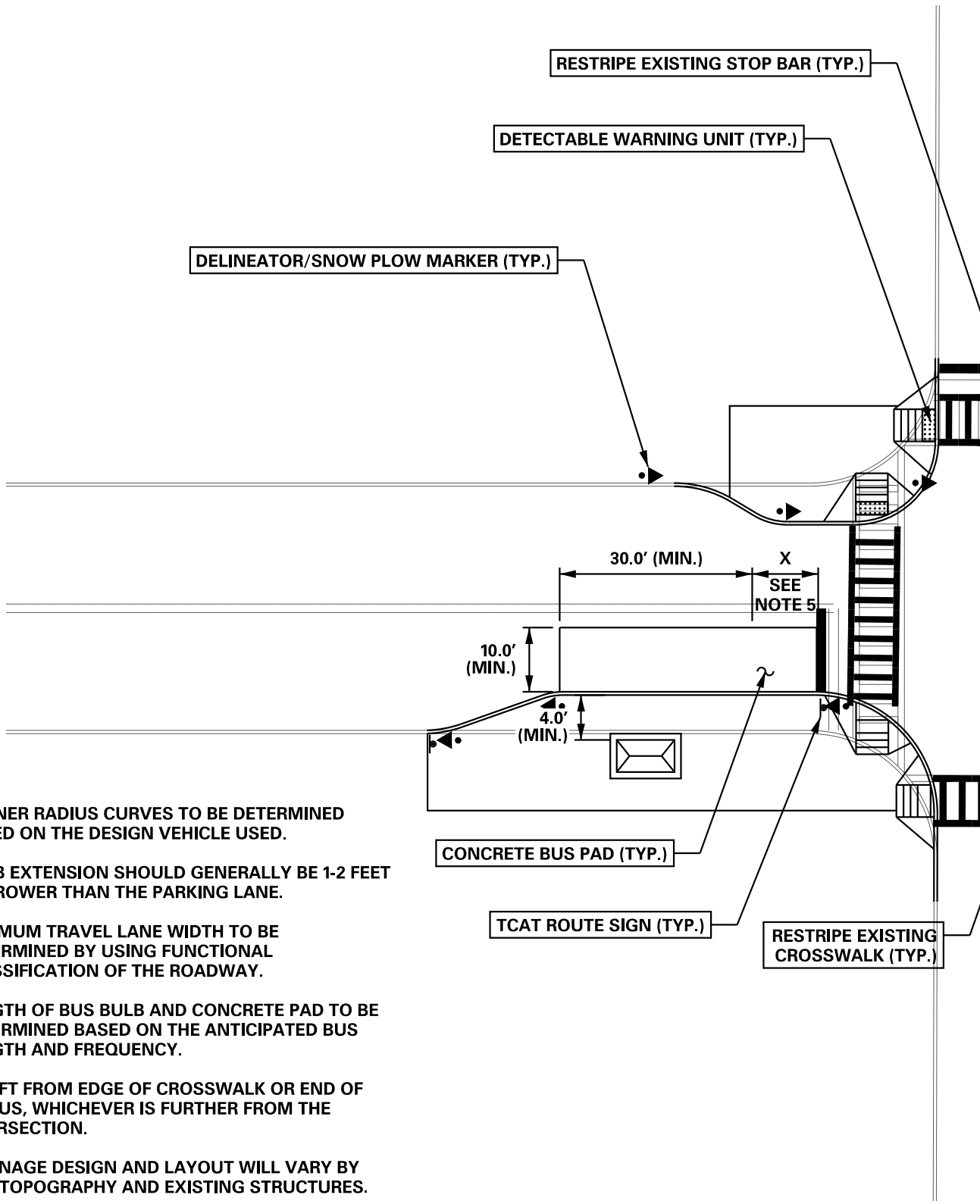



*Typical QJ Layout at 4 Leg Intersection*




**NOTES:**

1. CORNER RADIUS CURVES TO BE DETERMINED BASED ON THE DESIGN VEHICLE USED.
2. CURB EXTENSION SHOULD GENERALLY BE 1-2 FEET NARROWER THAN THE PARKING LANE.
3. MINIMUM TRAVEL LANE WIDTH TO BE DETERMINED BY USING FUNCTIONAL CLASSIFICATION OF THE ROADWAY.
4. LENGTH OF BUS BULB AND CONCRETE PAD TO BE DETERMINED BASED ON THE ANTICIPATED BUS LENGTH AND FREQUENCY.
5. X=5 FT FROM EDGE OF CROSSWALK OR END OF RADIUS, WHICHEVER IS FURTHER FROM THE INTERSECTION.
6. DRAINAGE DESIGN AND LAYOUT WILL VARY BY SITE TOPOGRAPHY AND EXISTING STRUCTURES.
7. PARKING IMPACTS WILL VARY BY SITE.

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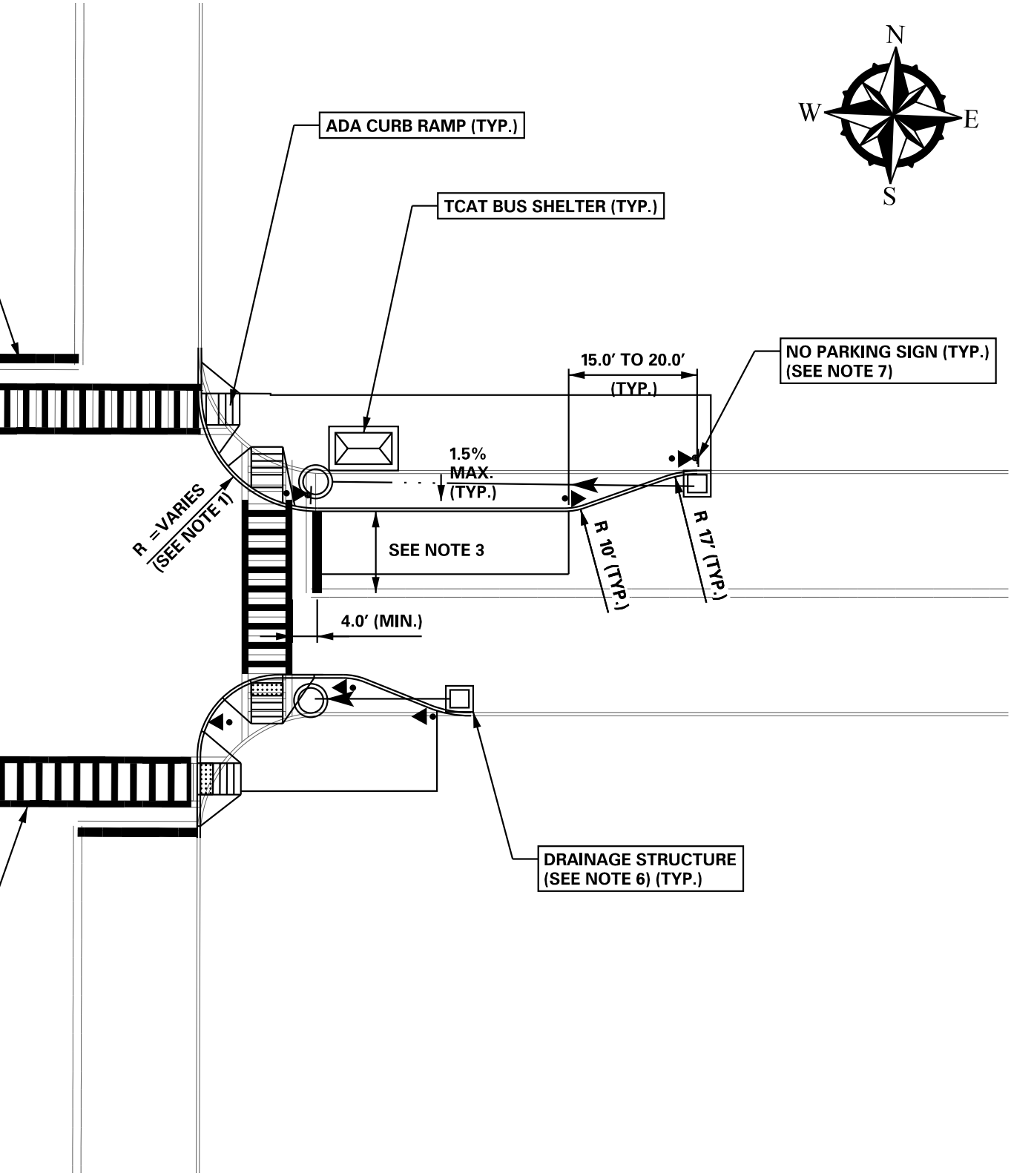


*Typical Bus Bulb Layout at 4 Leg Intersection*


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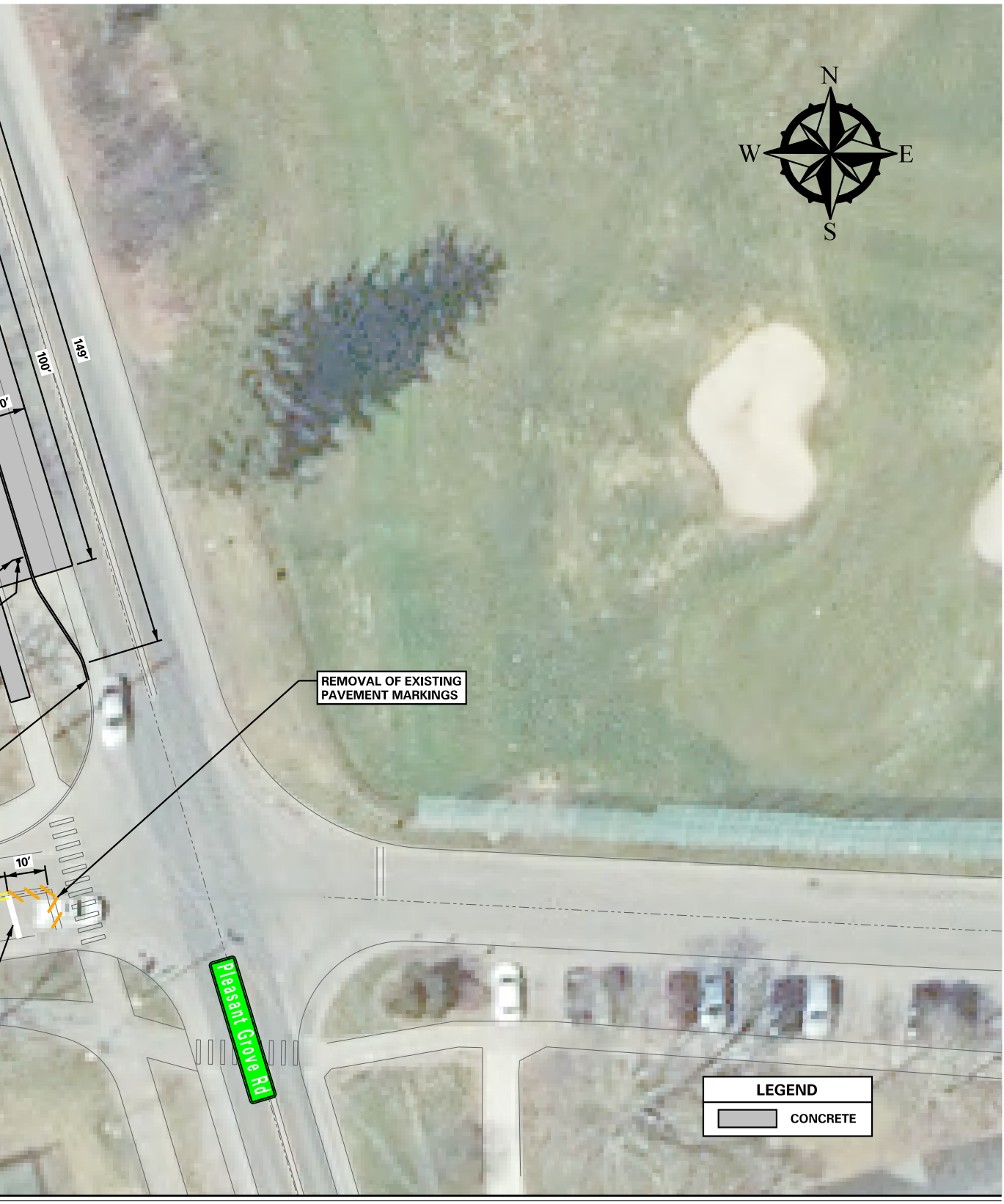
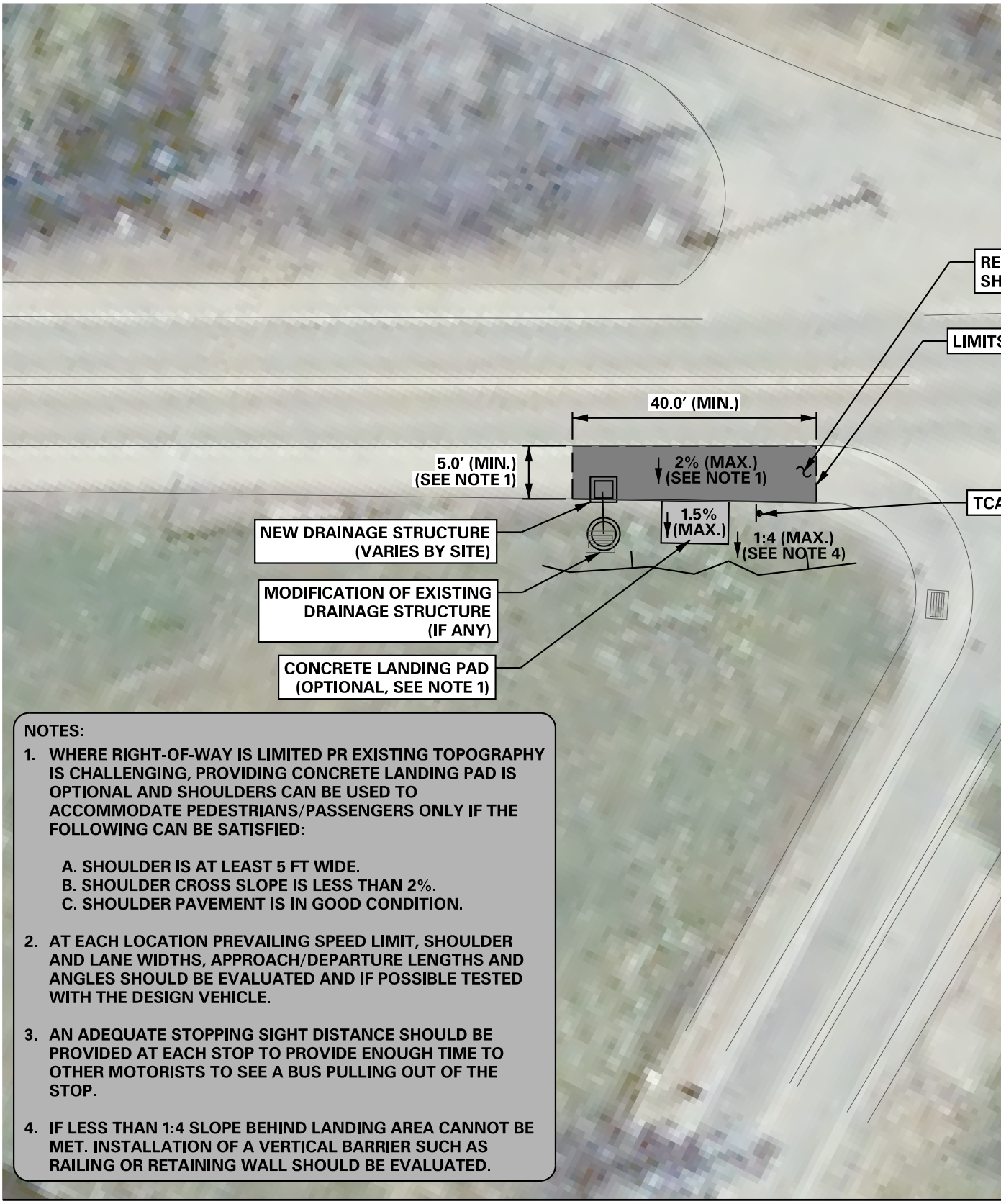



*Jessup Road and Pleasant Grove Road Concept*




NOTES:

1. WHERE RIGHT-OF-WAY IS LIMITED PR EXISTING TOPOGRAPHY IS CHALLENGING, PROVIDING CONCRETE LANDING PAD IS OPTIONAL AND SHOULDERS CAN BE USED TO ACCOMMODATE PEDESTRIANS/PASSENGERS ONLY IF THE FOLLOWING CAN BE SATISFIED:
   A. SHOULDER IS AT LEAST 5 FT WIDE.
   B. SHOULDER CROSS SLOPE IS LESS THAN 2%.
   C. SHOULDER PAVEMENT IS IN GOOD CONDITION.
2. AT EACH LOCATION PREVAILING SPEED LIMIT, SHOULDER AND LANE WIDTHS, APPROACH/DEPARTURE LENGTHS AND ANGLES SHOULD BE EVALUATED AND IF POSSIBLE TESTED WITH THE DESIGN VEHICLE.
3. AN ADEQUATE STOPPING SIGHT DISTANCE SHOULD BE PROVIDED AT EACH STOP TO PROVIDE ENOUGH TIME TO OTHER MOTORISTS TO SEE A BUS PULLING OUT OF THE STOP.
4. IF LESS THAN 1:4 SLOPE BEHIND LANDING AREA CANNOT BE MET. INSTALLATION OF A VERTICAL BARRIER SUCH AS RAILING OR RETAINING WALL SHOULD BE EVALUATED.

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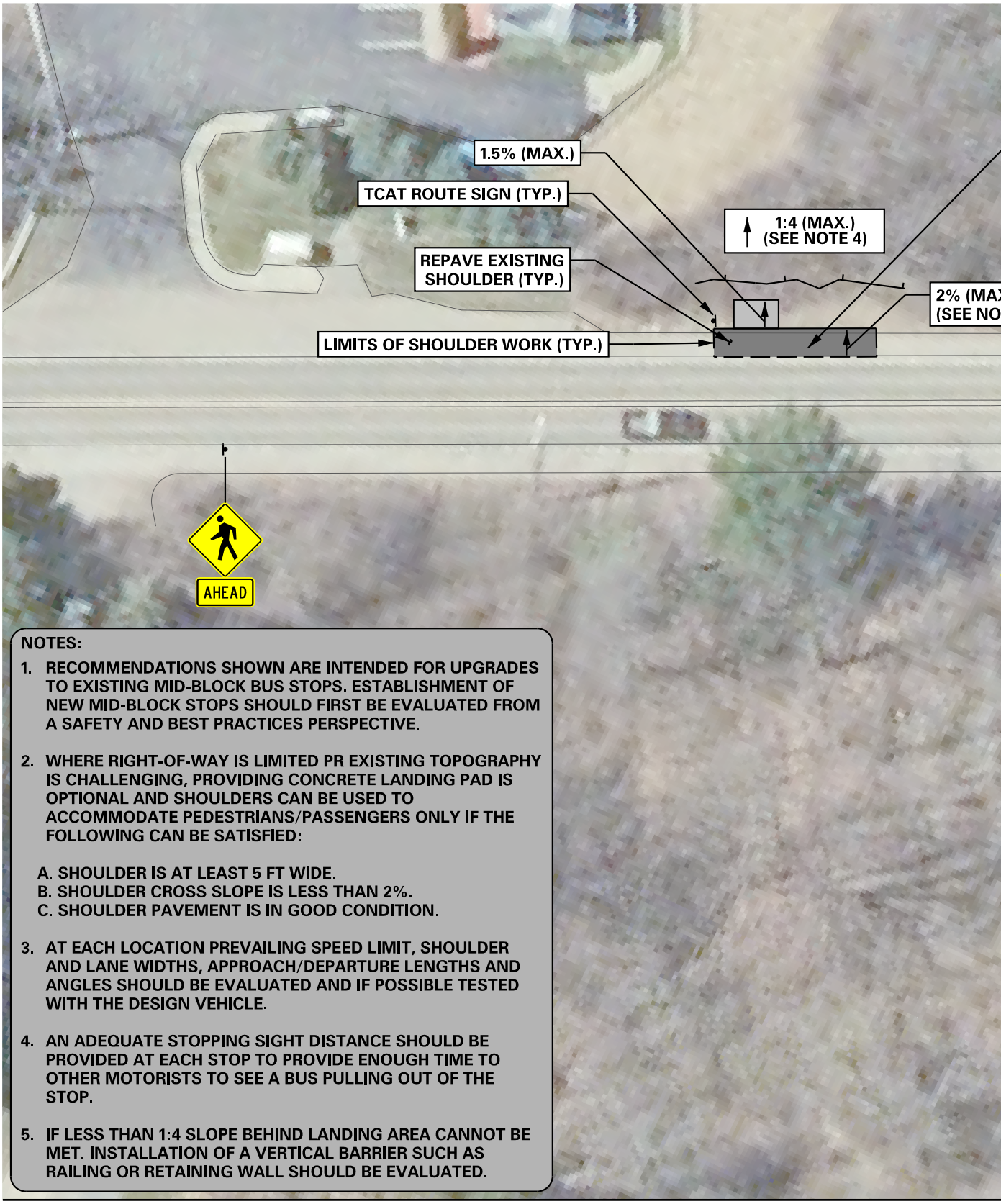
*Design Recommendations for Rural Bus Stop at Intersection*




NOTES:

1. RECOMMENDATIONS SHOWN ARE INTENDED FOR UPGRADES TO EXISTING MID-BLOCK BUS STOPS. ESTABLISHMENT OF NEW MID-BLOCK STOPS SHOULD FIRST BE EVALUATED FROM A SAFETY AND BEST PRACTICES PERSPECTIVE.

2. WHERE RIGHT-OF-WAY IS LIMITED PR EXISTING TOPOGRAPHY IS CHALLENGING, PROVIDING CONCRETE LANDING PAD IS OPTIONAL AND SHOULDERS CAN BE USED TO ACCOMMODATE PEDESTRIANS/PASSENGERS ONLY IF THE FOLLOWING CAN BE SATISFIED:

   A. SHOULDER IS AT LEAST 5 FT WIDE.
   B. SHOULDER CROSS SLOPE IS LESS THAN 2%.
   C. SHOULDER PAVEMENT IS IN GOOD CONDITION.

3. AT EACH LOCATION PREVAILING SPEED LIMIT, SHOULDER AND LANE WIDTHS, APPROACH/DEPARTURE LENGTHS AND ANGLES SHOULD BE EVALUATED AND IF POSSIBLE TESTED WITH THE DESIGN VEHICLE.

4. AN ADEQUATE STOPPING SIGHT DISTANCE SHOULD BE PROVIDED AT EACH STOP TO PROVIDE ENOUGH TIME TO OTHER MOTORISTS TO SEE A BUS PULLING OUT OF THE STOP.

5. IF LESS THAN 1:4 SLOPE BEHIND LANDING AREA CANNOT BE MET. INSTALLATION OF A VERTICAL BARRIER SUCH AS RAILING OR RETAINING WALL SHOULD BE EVALUATED.

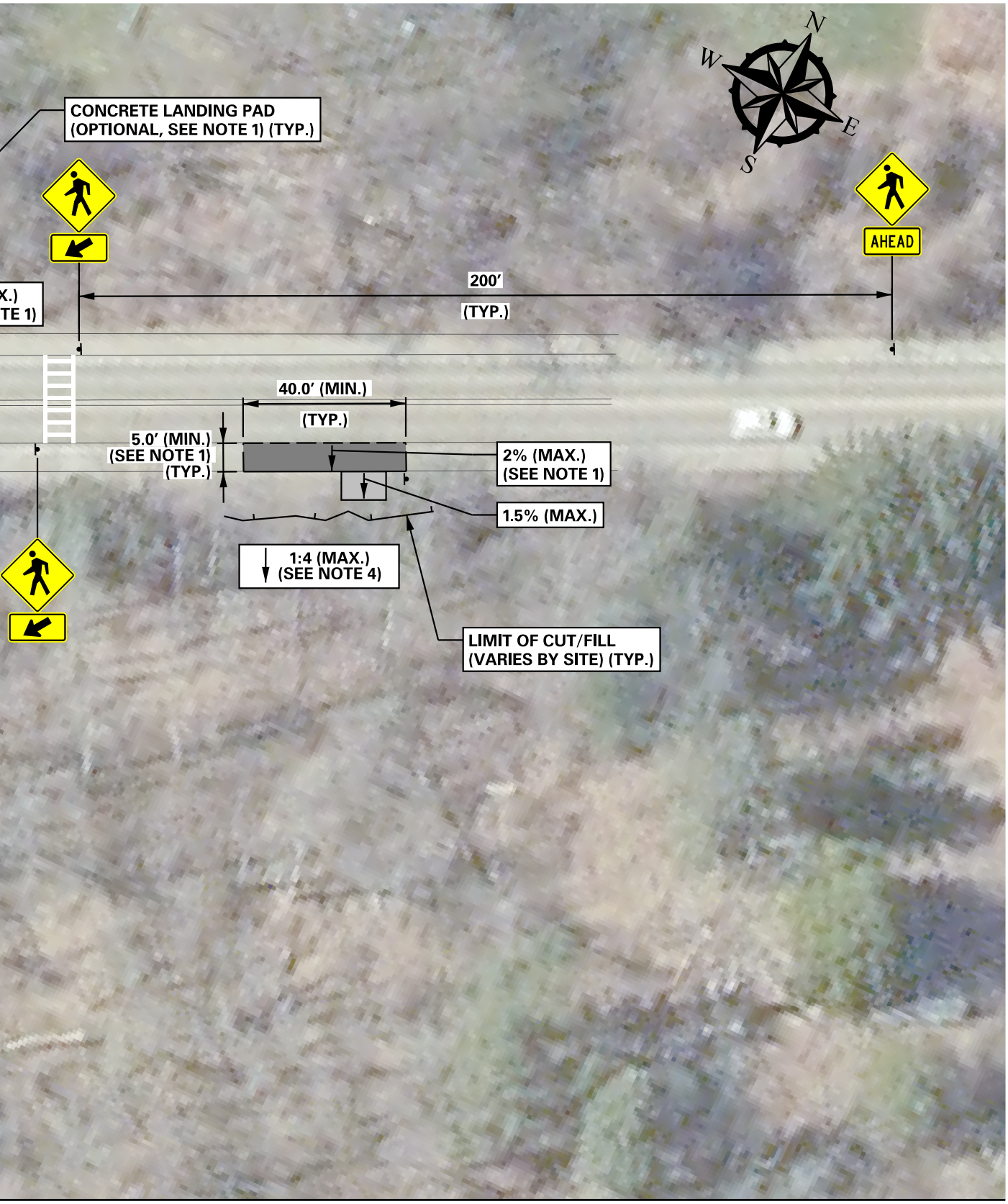
15 0

TCAT - Transit Development Plan
PROJECT: 119-322 DATE: 08/2021

Creighton Manning

TOMPKINS TCAT CONSOLIDATED AREA TRANSIT, INC.

FILE = N:\Projects\2019\119-322 TCAT - Transit Development Plan\Working\CADD\dgn\figures\119-322_fig_cpt_04.dgn




*Design Recommendations for Rural Mid-Block Bus Stop*

Calculated By:__MR_____
Calculated Date:_____
Checked By:__DT_____
Checked Date: _____

## Community Corners

**June 23, 2021**

### Description of Major Improvements:

Community Corners

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | $25.00 | 120 | $3,000 |
| EMBANKMENT IN PLACE | CY | $50.00 | 250 | $12,500 |
| FULL DEPTH PAVEMENT | SF | $9.50 | 1800 | $17,100 |
| CONCRETE BUS PAD | SF | $30.00 | 1200 | $36,000 |
| SIDEWALKS | SF | $10.50 | 5700 | $59,850 |
| GRANITE CURB | LF | $50.00 | 1050 | $52,500 |
| CLEARING AND GRUBBING | LS | $2,000.00 | 1.00 | $2,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | $9,000.00 | 1.00 | $9,000 |
| SIGNING AND STRIPING | LS | $2,700.00 | 1 | $2,700 |
| DRAINAGE BASINS | EA | $6,000.00 | 4 | $24,000 |
| DRAINAGE PIPE | LF | $60.00 | 560 | $33,600 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.20 | $10,000 |
| EROSION CONTROL | LS | $5,000.00 | 1.00 | $5,000 |
| TCAT SHELTER | EA | $20,000.00 | 1.00 | $20,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $23,000 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $14,400 |
| MOBILIZATION | LS | 4% | 1 | $11,500 |
| CONTINGENCY | LS | 25% | 1 | $71,900 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL:** | **$** | **409,000** |
| DESIGN ENGINEERING (10%) | $ | 40,900 |
| CONSTRUCTION INSPECTION (20%) | $ | 81,800 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL:** | **$** | **532,000** |

**Assumptions**

NO OVERHEAD UTILITY IMPACTS
COST EXCLUDES ROW ACQUISITION COSTS

Calculated By:____MR____
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## Cornell A Lot Concept

**June 25, 2021**

### Description of Major Improvements:

Cornell A Lot Concept

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | $25.00 | 130 | $33,250 |
| EMBANKMENT IN PLACE | CY | $60.00 | 60 | $3,600 |
| FULL DEPTH PAVEMENT | SF | $10.00 | 810 | $8,100 |
| CONCRETE BUS PAD | SF | $35.00 | 700 | $24,500 |
| SIDEWALKS | SF | $12.00 | 1800 | $21,600 |
| GRANITE CURB | LF | $55.00 | 450 | $24,750 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | $1,000.00 | 1.00 | $1,000 |
| SIGNING AND STRIPING | LS | $600.00 | 1 | $600 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.10 | $5,000 |
| EROSION CONTROL | LS | $1,000.00 | 1.00 | $1,000 |
| HEATED SIDEWALKS & CONDUIT | LS | $35,000.00 | 1.00 | $35,000 |
| TCAT SHELTER | EA | $35,000.00 | 1.00 | $35,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $9,900 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $6,200 |
| MOBILIZATION | LS | 4% | 1 | $5,000 |
| CONTINGENCY | LS | 25% | 1 | $48,400 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL:** | **$** | **263,000** |
| DESIGN ENGINEERING (10%) | $ | 26,300 |
| CONSTRUCTION INSPECTION (20%) | $ | 52,600 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL:** | **$** | **342,000** |

**Assumptions**

NO DRAINAGE MODIFICATIONS NEEDED

Calculated By:___MR_____
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## Campus Road and Tower Road

**June 23, 2021**

### Description of Major Improvements:

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | $25.00 | 100 | $2,500 |
| FULL DEPTH PAVEMENT | SF | $9.50 | 970 | $9,215 |
| CONCRETE BUS PAD | SF | $30.00 | 1400 | $42,000 |
| SIDEWALKS | SF | $10.50 | 5500 | $57,750 |
| GRANITE CURB | LF | $50.00 | 600 | $30,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | $2,000.00 | 1.00 | $2,000 |
| SIGNING AND STRIPING | LS | $200.00 | 1 | $200 |
| DRAINAGE BASINS | EA | $6,000.00 | 2 | $12,000 |
| DRAINAGE PIPE | LF | $60.00 | 400 | $24,000 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.20 | $10,000 |
| EROSION CONTROL | LS | $500.00 | 1.00 | $500 |
| TCAT SHELTER | EA | $20,000.00 | 2.00 | $40,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $18,500 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $11,600 |
| MOBILIZATION | LS | 4% | 1 | $9,300 |
| CONTINGENCY | LS | 25% | 1 | $57,600 |

**CONSTRUCTION SUBTOTAL: $ 328,000**

DESIGN ENGINEERING (10%) $ 32,800
CONSTRUCTION INSPECTION (20%) $ 65,600
ANTICIPATED ROW COST $ -

**PROJECT TOTAL: $ 427,000**

**Assumptions**

ASSUMED NEW CATCH BASINS AND DRAINAGE PIPE AT PROPOSED BUS STOPS

Calculated By:_____MR___
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## Green Street at Ithaca Commons

**June 25, 2021**

### Description of Major Improvements:

Green St at Ithaca Commons

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| CONCRETE BUS PAD | SF | $30.00 | 3150 | $94,500 |
| SIDEWALKS | SF | $12.00 | 1200 | $14,400 |
| GRANITE CURB | LF | $35.00 | 80 | $2,800 |
| SIGNING AND STRIPING | LS | $12,000.00 | 1 | $12,000 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.10 | $5,000 |
| SHELTER LIGHTING | LS | $15,000.00 | 1.00 | $15,000 |
| TCAT SHELTER | EA | $20,000.00 | 1.00 | $20,000 |
| HEATED SIDEWALKS | LS | $35,000.00 | 1.00 | $35,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $10,300 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $6,500 |
| MOBILIZATION | LS | 4% | 1 | $5,200 |
| CONTINGENCY | LS | 25% | 1 | $49,700 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL:** | **$** | **271,000** |
| DESIGN ENGINEERING (10%) | $ | 27,100 |
| CONSTRUCTION INSPECTION (20%) | $ | 54,200 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL:** | **$** | **353,000** |

**Assumptions**

Calculated By:___MR_____
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## State Street and S Fulton Street

**June 23, 2021**

### Description of Major Improvements:

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| SIGNING AND STRIPING | LS | $15,100.00 | 1 | $15,100 |
| EXCLUSIVE TRANSIT SIGNAL & SIGN | EA | $2,500.00 | 1 | $2,500 |
| VEHICLE DETECTION LOOP | EA | $5,000.00 | 1 | $5,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $1,900 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $1,200 |
| MOBILIZATION | LS | 4% | 1 | $1,000 |
| CONTINGENCY | LS | 25% | 1 | $5,700 |
| | | | **CONSTRUCTION SUBTOTAL:** | **$ 33,000** |
| | | | DESIGN ENGINEERING (10%) | $ 3,300 |
| | | | CONSTRUCTION INSPECTION (20%) | $ 6,600 |
| | | | ANTICIPATED ROW COST | $ - |
| | | | **PROJECT TOTAL:** | **$ 43,000** |

**Assumptions**

Traffic signal controller and cabinet are capabale of supporting transit signal and phase.
Existing mast arm or ped poles can support new signal head.

Calculated By:____MR____
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## State Street and N. Plains Bus Bulb

**June 23, 2021**

### Description of Major Improvements:

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | $25.00 | 100 | $2,500 |
| CONCRETE BUS PAD | SF | $30.00 | 810 | $24,300 |
| SIDEWALKS | SF | $10.50 | 3800 | $39,900 |
| GRANITE CURB | LF | $50.00 | 330 | $16,500 |
| SIGNING AND STRIPING | LS | $6,300.00 | 1 | $6,300 |
| DRAINAGE BASIN | EA | $6,000.00 | 4 | $24,000 |
| DRAINAGE PIPE | LF | $60.00 | 85 | $5,100 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.10 | $4,825 |
| TCAT SHELTER | EA | $20,000.00 | 2.00 | $40,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $13,100 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $8,200 |
| MOBILIZATION | LS | 4% | 1 | $6,600 |
| CONTINGENCY | LS | 25% | 1 | $40,900 |

**CONSTRUCTION SUBTOTAL: $ 233,000**

DESIGN ENGINEERING (10%) $ 23,300
CONSTRUCTION INSPECTION (20%) $ 46,600
ANTICIPATED ROW COST $ -

**PROJECT TOTAL: $ 303,000**

**Assumptions**

Calculated By:___MR_____
Calculated Date:_____
Checked By:____DT____
Checked Date: _____

## State Street and N. Plain Street QJ option

**June 23, 2021**

### Description of Major Improvements:

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | $25.00 | 100 | $2,500 |
| SIDEWALKS | SF | $10.50 | 1200 | $12,600 |
| GRANITE CURB | LF | $50.00 | 130 | $6,500 |
| SIGNING AND STRIPING | LS | $7,800.00 | 1 | $7,800 |
| DRAINAGE BASINS | EA | $6,000.00 | 2 | $12,000 |
| DRAINAGE PIPE | LF | $60.00 | 25 | $1,500 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.03 | $1,500 |
| EXCLUSIVE TRANSIT SIGNAL & SIGN | EA | $2,500.00 | 2.00 | $5,000 |
| VEHICLE DETECTION LOOP | EA | $5,000.00 | 2.00 | $10,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $4,800 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $3,000 |
| MOBILIZATION | LS | 4% | 1 | $2,400 |
| CONTINGENCY | LS | 25% | 1 | $14,900 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL:** | **$** | **85,000** |
| DESIGN ENGINEERING (10%) | $ | 8,500 |
| CONSTRUCTION INSPECTION (20%) | $ | 17,000 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL:** | **$** | **111,000** |

**Assumptions**

Traffic signal controller and cabinet are capabale of supporting transit signal and phase.
Existing mast arm or ped poles can support new signal head.

Calculated By:___MR_____
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## Jessup Road and Pleasant Road

**August 3, 2021**

### Description of Major Improvements:

Jessup Road and Pleasant Grove Road Concept

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| UNCLASSIFIED EXCAVATION AND DISPOSAL | CY | $25.00 | 90 | $2,250 |
| EMBANKMENT IN PLACE | CY | $60.00 | 90 | $5,400 |
| FULL DEPTH PAVEMENT | SF | $9.50 | 600 | $5,700 |
| CONCRETE BUS PAD | SF | $30.00 | 1000 | $30,000 |
| SIDEWALKS | SF | $10.50 | 1788 | $18,774 |
| GRANITE CURB | LF | $50.00 | 165 | $8,250 |
| CLEARING AND GRUBBING | LS | $2,000.00 | 1.00 | $2,000 |
| DRAINAGE BASIN | EA | $6,000.00 | 1 | $6,000 |
| DRAINAGE PIPE | LF | $60.00 | 150 | $9,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | $2,000.00 | 1.00 | $2,000 |
| SIGNING AND STRIPING | LS | $300.00 | 1 | $300 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.10 | $5,000 |
| EROSION CONTROL | LS | $1,000.00 | 1.00 | $1,000 |
| TCAT SHELTER | EA | $20,000.00 | 1.00 | $20,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $6,600 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $4,200 |
| MOBILIZATION | LS | 4% | 1 | $3,300 |
| CONTINGENCY | LS | 25% | 1 | $20,600 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL:** | **$** | **151,000** |
| DESIGN ENGINEERING (10%) | $ | 15,100 |
| CONSTRUCTION INSPECTION (20%) | $ | 30,200 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL:** | **$** | **197,000** |

**Assumptions**

Clearing and Grubbing includes cost of 1 tree removal for shelter
Assumed drainage for bump out to tie into existing closed drainage

Calculated By:____MR____
Calculated Date:_____
Checked By:____DT____
Checked Date: _____

## Rural Bus Stop at Intersection

### Description of Major Improvements:

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| CONCRETE BUS PAD | SF | $30.00 | 400 | $12,000 |
| SIDEWALKS | SF | $10.50 | 50 | $525 |
| CLEARING AND GRUBBING | LS | $1,000.00 | 1.00 | $1,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | $1,000.00 | 1.00 | $1,000 |
| SIGNING AND STRIPING | LS | $500.00 | 1 | $500 |
| DRAINAGE BASINS | EA | $6,000.00 | 2 | $12,000 |
| DRAINAGE PIPE | LF | $60.00 | 10 | $600 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.02 | $1,000 |
| EROSION CONTROL | LS | $1,000.00 | 1.00 | $1,000 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $2,400 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $1,500 |
| MOBILIZATION | LS | 4% | 1 | $1,200 |
| CONTINGENCY | LS | 25% | 1 | $7,500 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL WITH DRAINAGE:** | **$** | **43,000** |
| **CONSTRUCTION SUBTOTAL WITHOUT DRAINAGE:** | **$** | **30,400** |
| DESIGN ENGINEERING (10%) | $ | 4,300 |
| CONSTRUCTION INSPECTION (20%) | $ | 8,600 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL WITH DRAINAGE:** | **$** | **56,600** |
| **PROJECT TOTAL WITHOUT DRAINAGE:** | **$** | **44,000** |

**Assumptions**

ASSUMED MINIMUM 25 SF FOR EACH CONCRETE LANDING PAD
NEW PAINTED WHITE LINES ON THE PERIMETER OF THE CONCRETE BUS PAD

Calculated By:___MR_____
Calculated Date:_____
Checked By:___DT_____
Checked Date: _____

## Rural Bus Stop at Mid Block

### Description of Major Improvements:

Approximate ROW required: **SF** **0.0000** **Acres**

| ITEM DESCRIPTION | UNITS | PRICE | QUANTITY | TOTAL |
|---|---|---|---|---|
| CONCRETE BUS PAD | SF | $30.00 | 200 | $6,000 |
| SIDEWALKS | SF | $10.50 | 25 | $263 |
| CLEARING AND GRUBBING | LS | $1,000.00 | 1.00 | $1,000 |
| LANDSCAPING (INCLUDING TOPSOIL AND SEED) | LS | $1,000.00 | 1.00 | $1,000 |
| SIGNING AND STRIPING | LS | $200.00 | 1 | $200 |
| STORMWATER MANAGEMENT ($50,000 /acre) | AC | $50,000.00 | 0.01 | $500 |
| EROSION CONTROL | LS | $500.00 | 1.00 | $500 |
| | | | | |
| WORK ZONE TRAFFIC CONTROL | LS | 8% | 1 | $800 |
| SURVEY AND STAKEOUT | LS | 5% | 1 | $500 |
| MOBILIZATION | LS | 4% | 1 | $400 |
| CONTINGENCY | LS | 25% | 1 | $2,400 |

| | | |
|---|---|---|
| **CONSTRUCTION SUBTOTAL:** | **$** | **14,000** |
| DESIGN ENGINEERING (10%) | $ | 1,400 |
| CONSTRUCTION INSPECTION (20%) | $ | 2,800 |
| ANTICIPATED ROW COST | $ | - |
| **PROJECT TOTAL:** | **$** | **19,000** |

**Assumptions**

ASSUMED MINIMUM 25 SF FOR CONCRETE LANDING PAD
NEW PAINTED WHITE LINES ON THE PERIMETER OF THE CONCRETE BUS PAD