



How can aging
infrastructure be turned
into an urban opportunity?

DOT Commissioner Update

August 2019

BIG + Arcadis + Sherwood + MVVA
+ Nelson Nygaard + Kameron + VJ

Study Prepared by:

BIG - Bjarke Ingels Group - Planning + Design

Arcadis US - Engineering

Sherwood Design Engineers - Civil Engineering

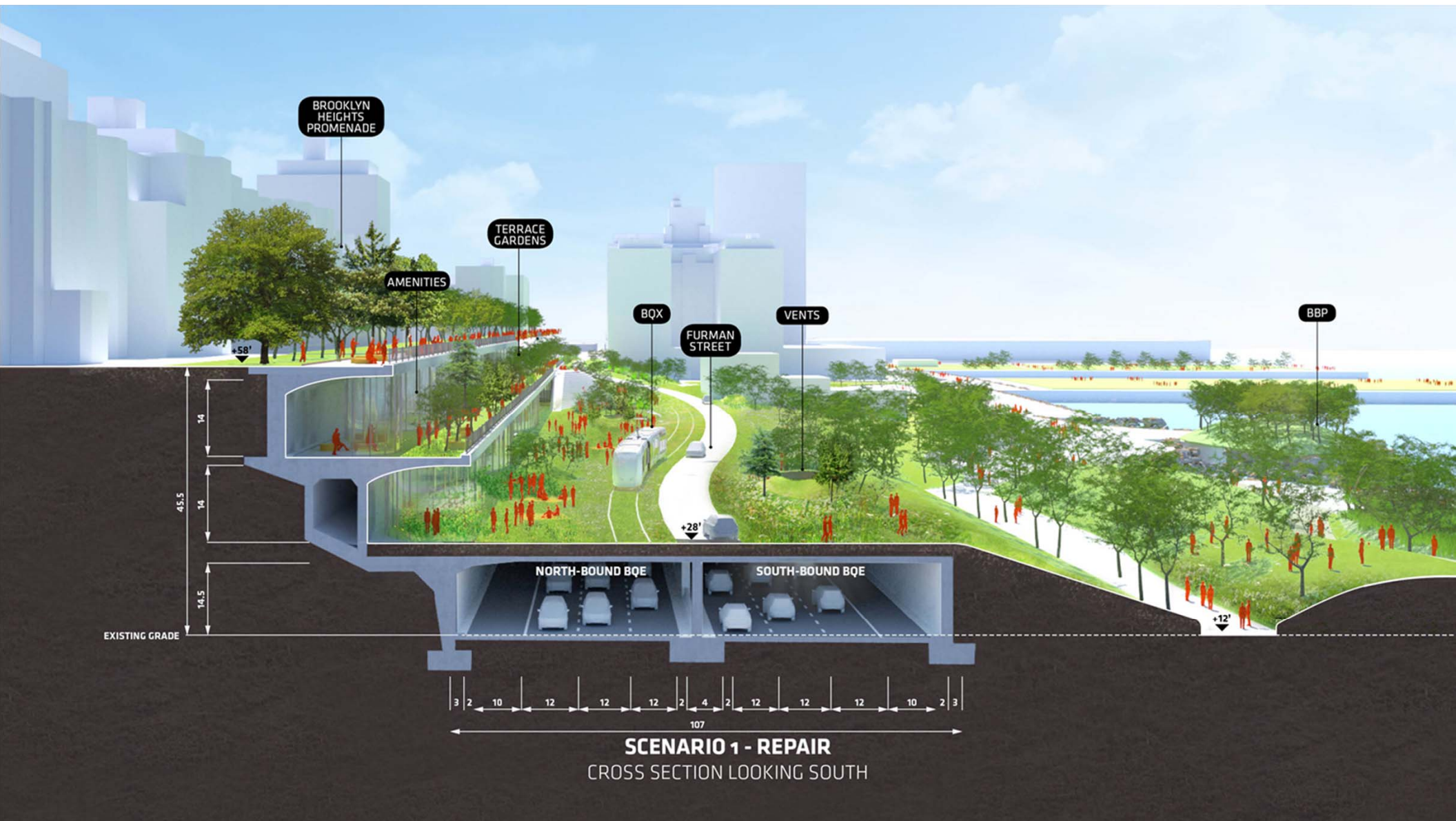
Nelson Nygaard - Traffic

Ed Kammerer - Utilities

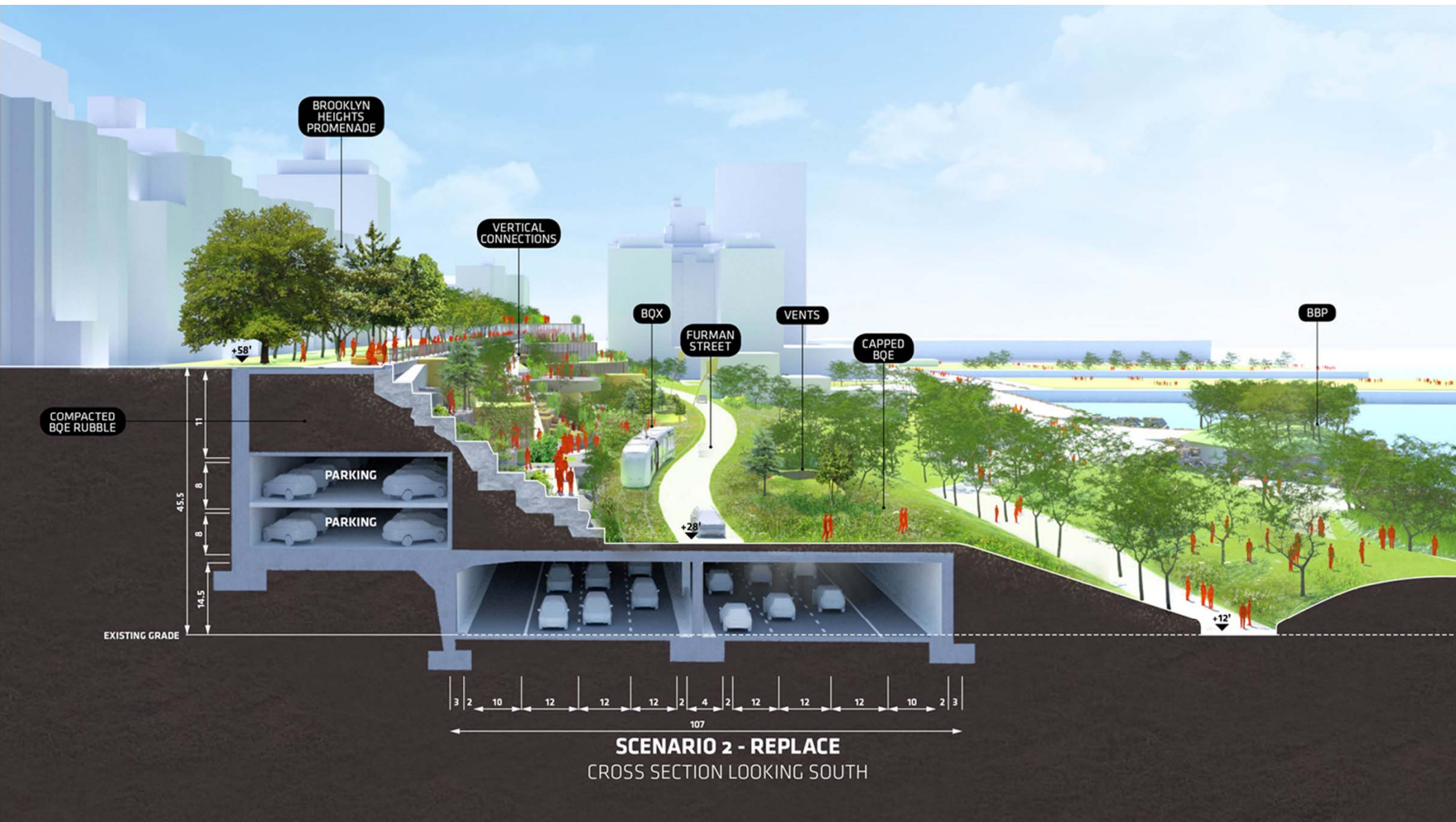
Michael Van Valkenburgh Associates - Landscape

VJ Associates - Costing

TEAM



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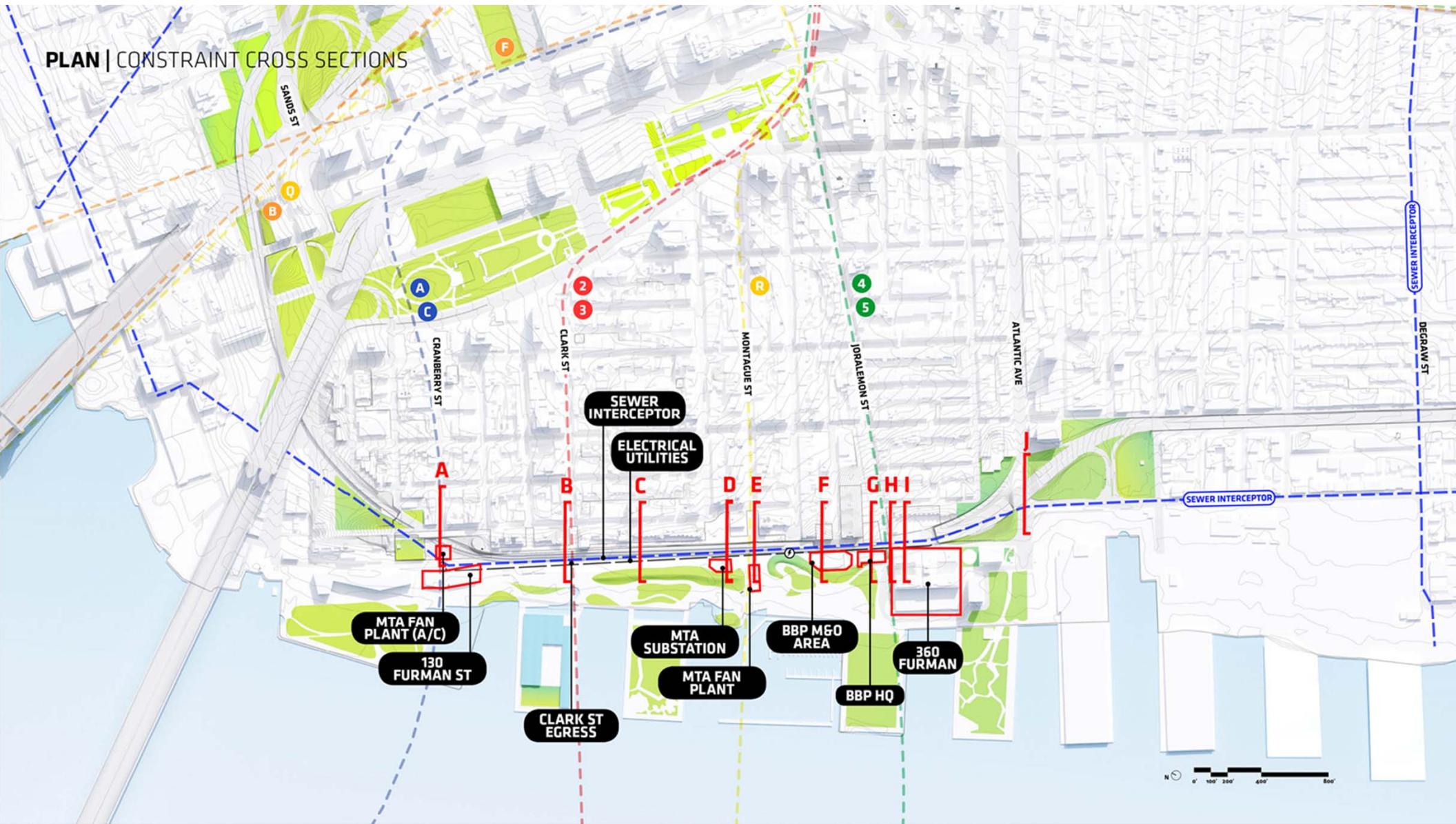
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Since April 25th Presentation to the Expert Panel, the team has been focusing on...

- 360 Form and St. Outreach and Approach Update
- Brooklyn Bridge Park Integration
- MTA NYCT Impacts
- General Existing Facility Impacts
- Cost Validation

Update



360 FURMAN ST.



MTA
INFRASTRUCTURE



TUNNEL
PARAMETERS



ATLANTIC AVE.



COST



BBP
INTEGRATION



DEP
INFRASTRUCTURE



ROADWAY
DESIGN



COLUMBIA
HEIGHTS



REHABILITATION
CONCEPTS

Frequently Asked Questions



Roadway Design



Roadway Design

- Roadway design assumes current DOT assumptions for 6 lanes with breakdown shoulders for each direction.
- Proposal is able to accommodate 5% Maximum Slope with 1060' Minimum Radius (Federal Standards).
- To accommodate 6 lanes, select areas will require reduction of width in shoulders (as also in DOT Schemes e.g. at Columbia Heights).
- Reducing lanes from 6 to 4, as recommended by RPA and under study by Expert Panel, would reduce cost and physical impacts of scheme further.

Overview



360 Furn an St.



360 Furr an St. M eetings June 26th and July 31st

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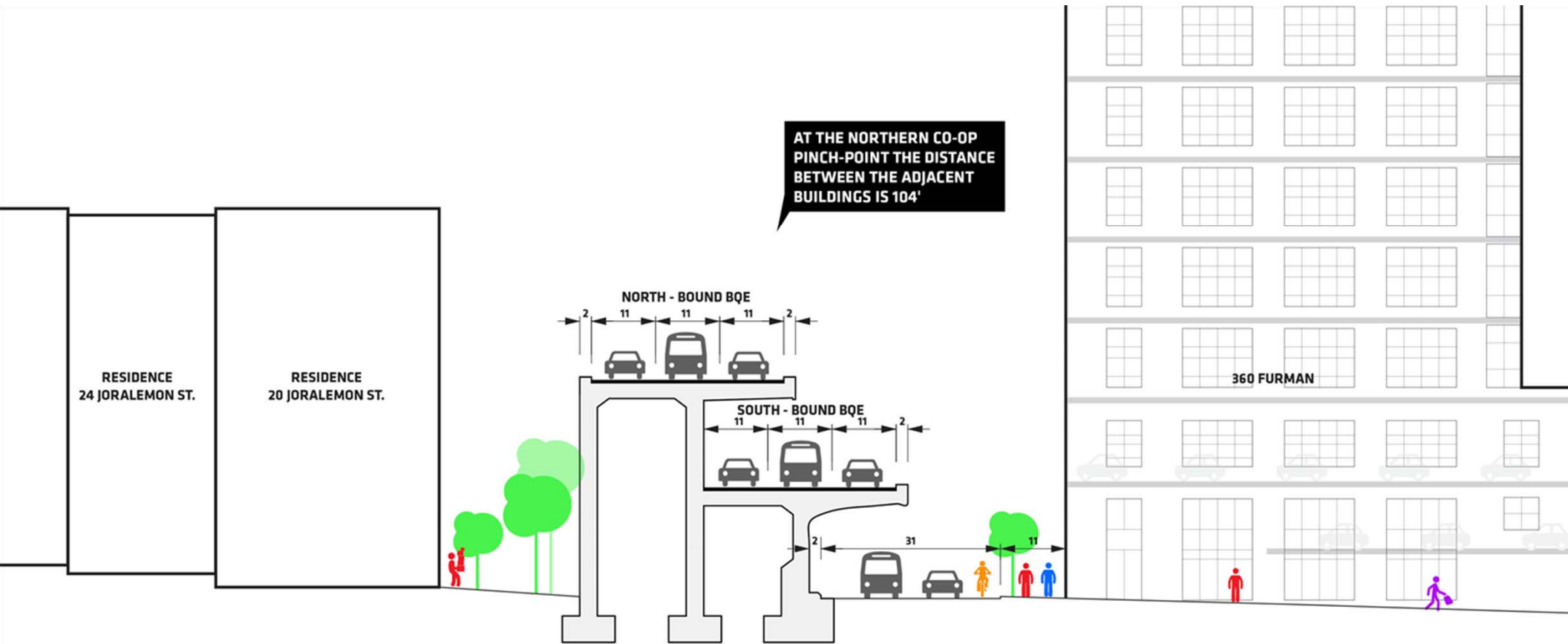


360 Furman Street

- BQE to be reconstructed below grade, along Furman Street.
- Lobby and ground floor retail to remain in place in final condition. Lobby temporarily accessed from corridor entry at northern end of building during construction.
- Final condition to bury highway and vastly improve lower floor conditions for building.
- Access from Jerusalem St. to be preserved in final condition and during construction (via temporary bridge).

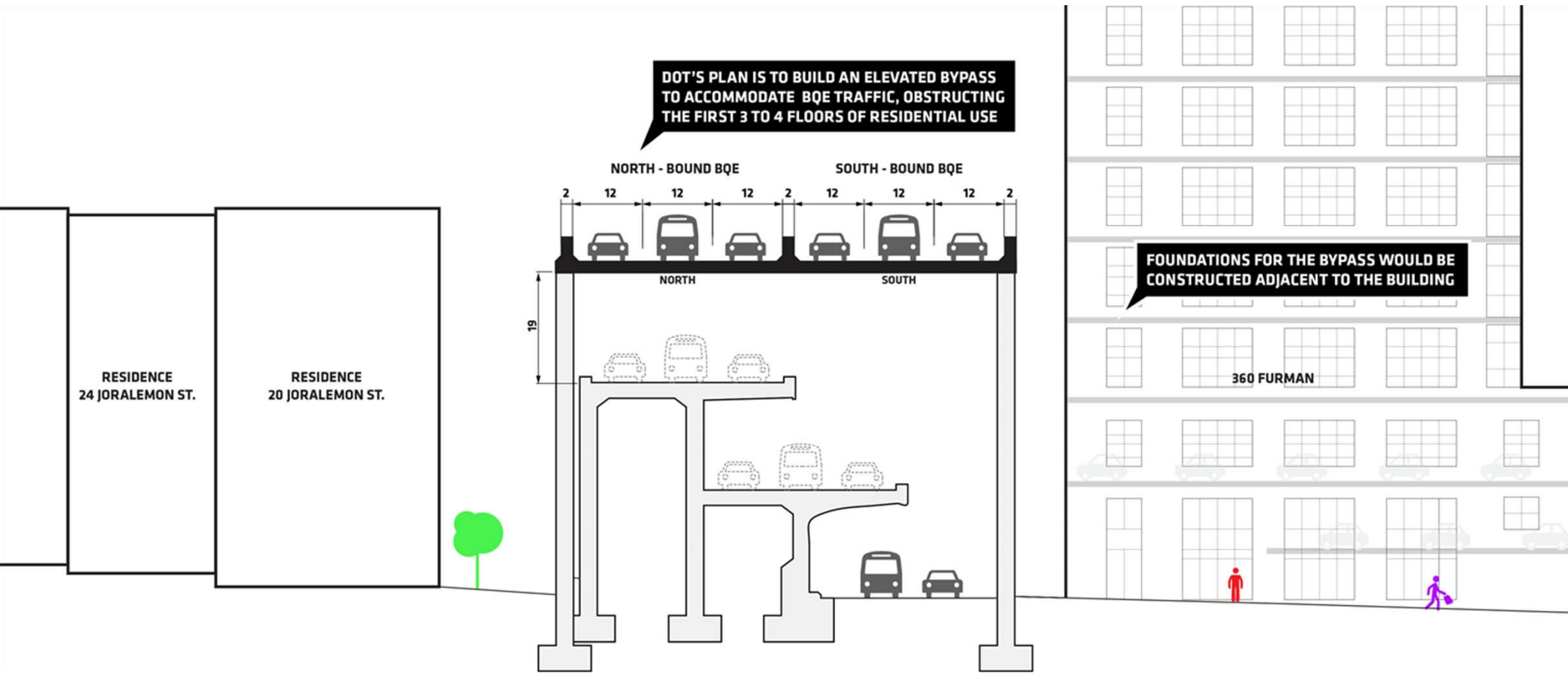
Overview

Approach 1

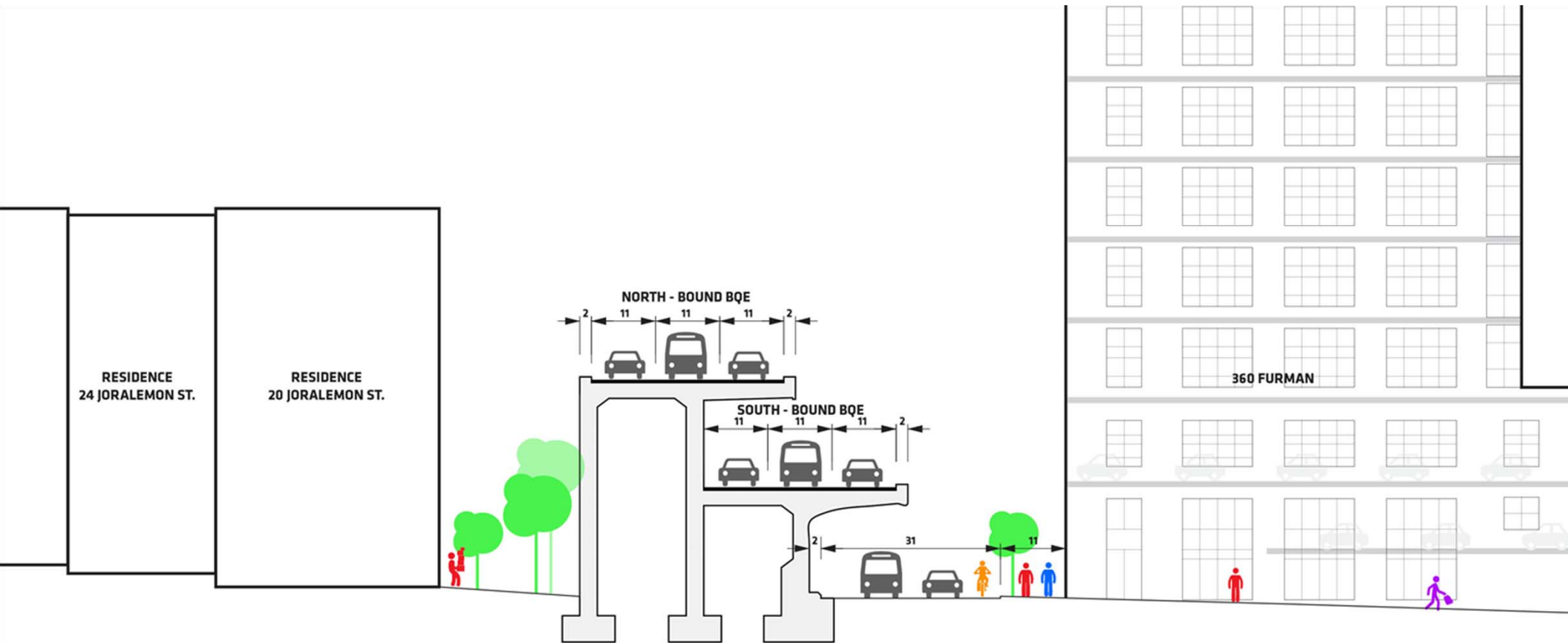


EXISTING PINCH POINT AT NORTHERN CO-OP BUILDING

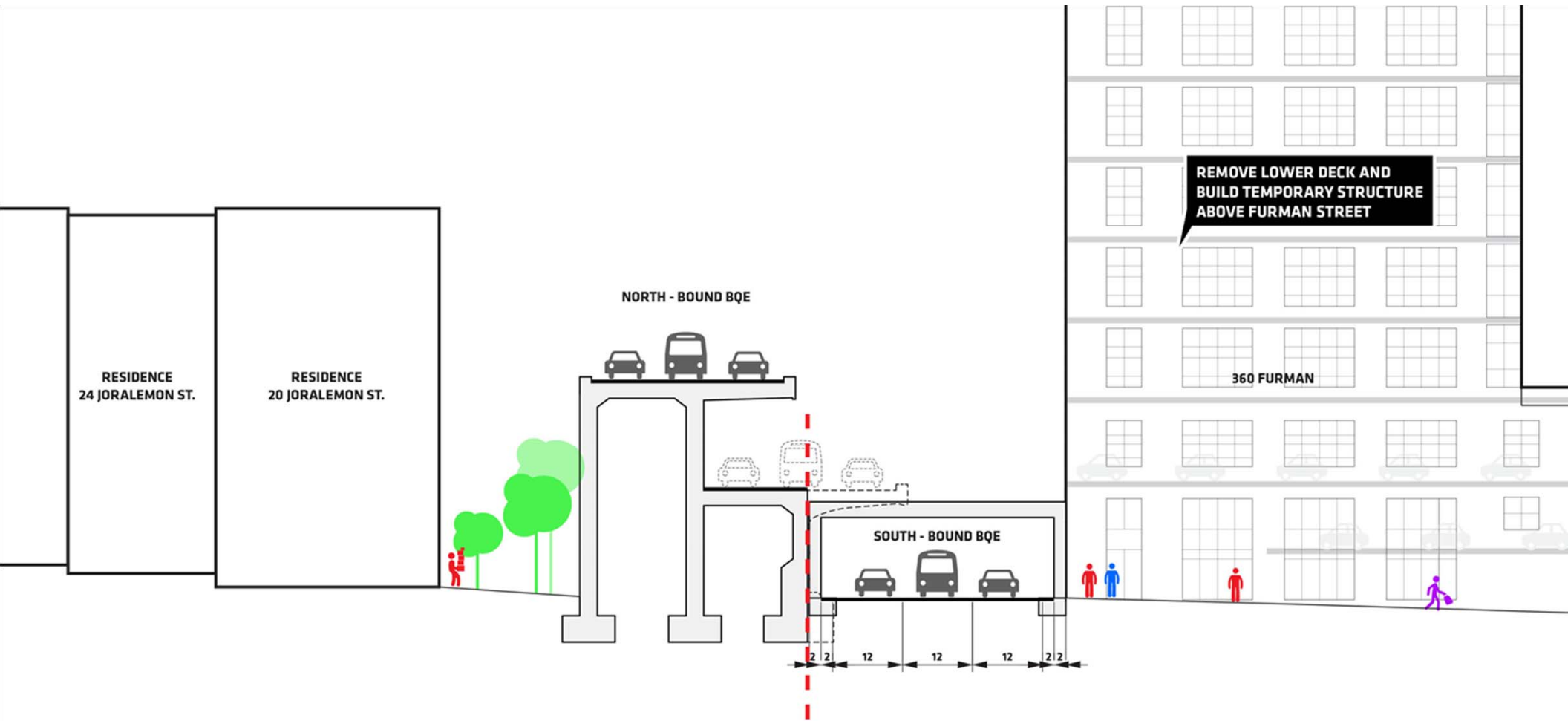
* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



DOT TEMPORARY AT NORTHERN CO-OP BUILDING

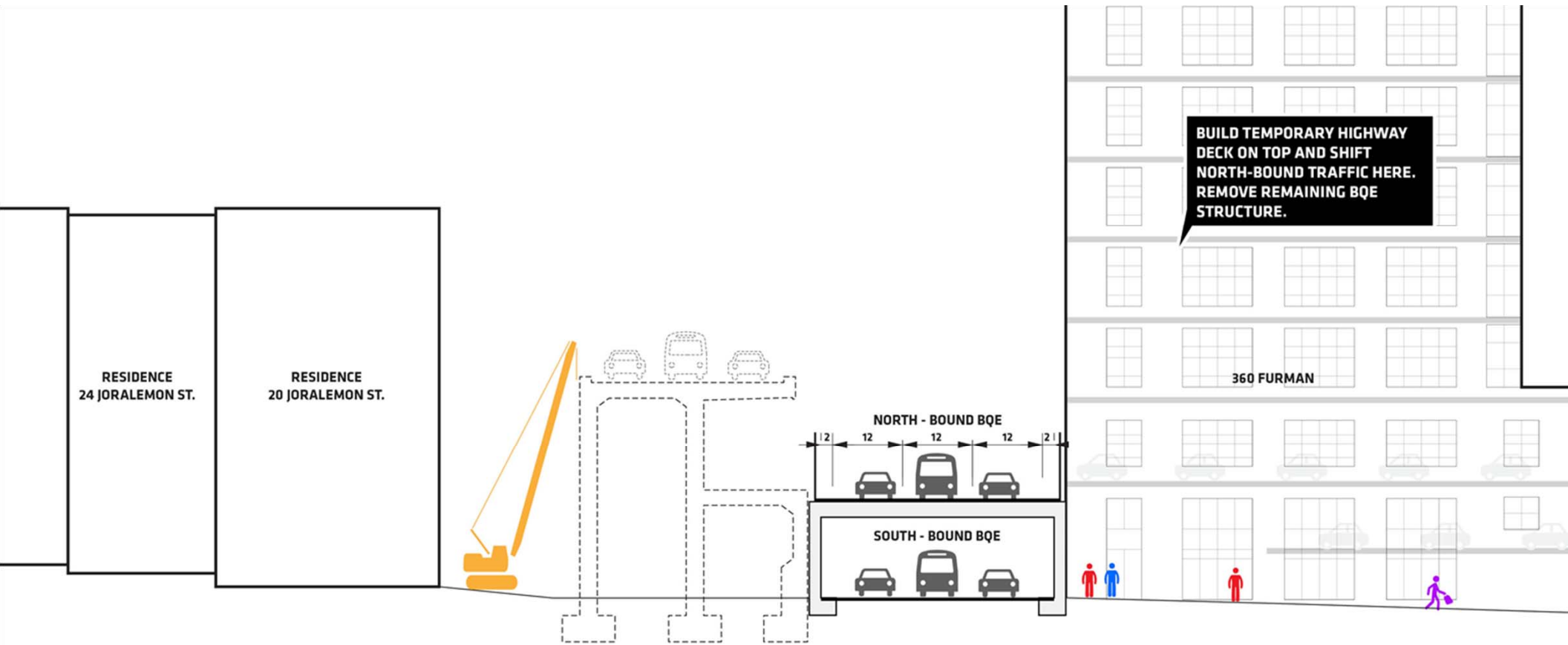


DOT OPTION AT NORTHERN CO-OP BUILDING



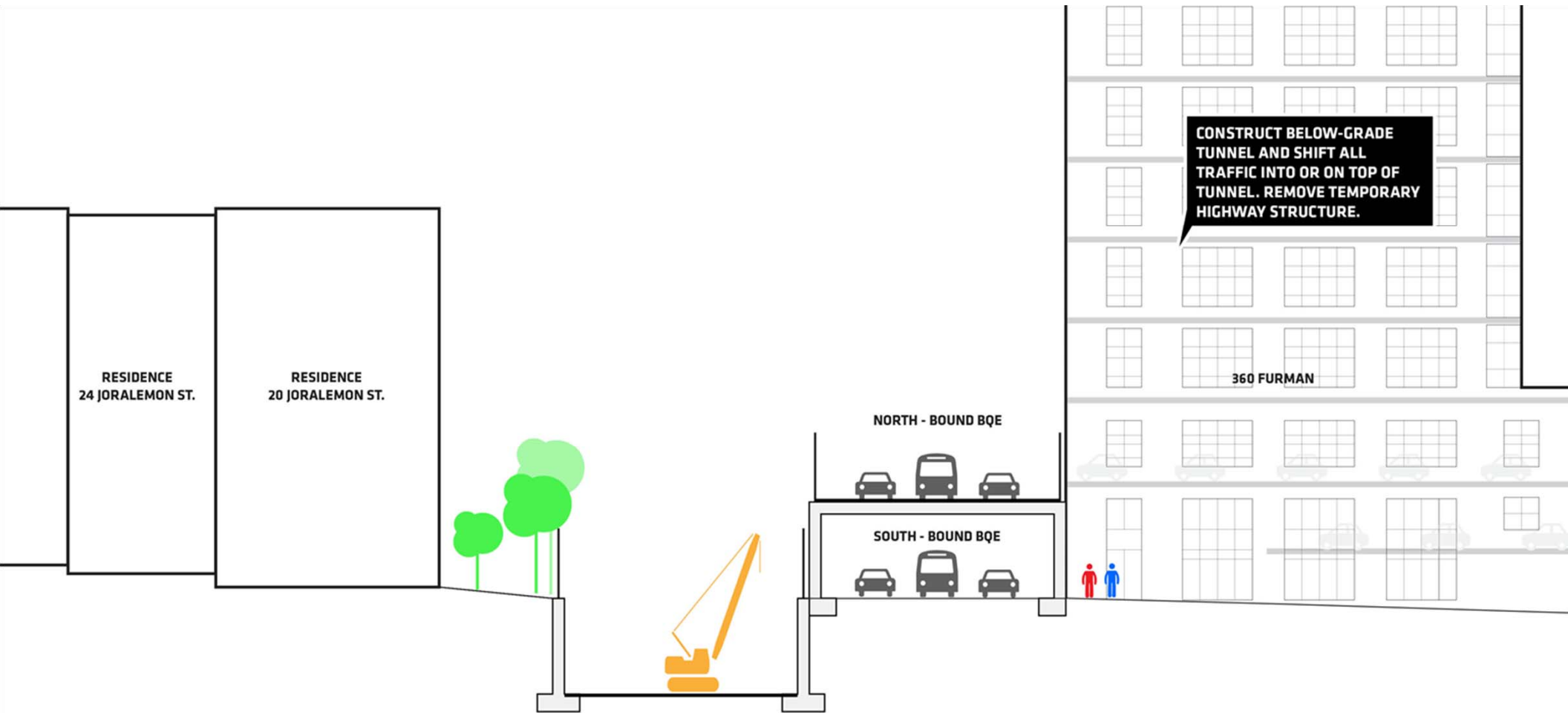
LANE BY LANE CONSTRUCTION PHASING

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



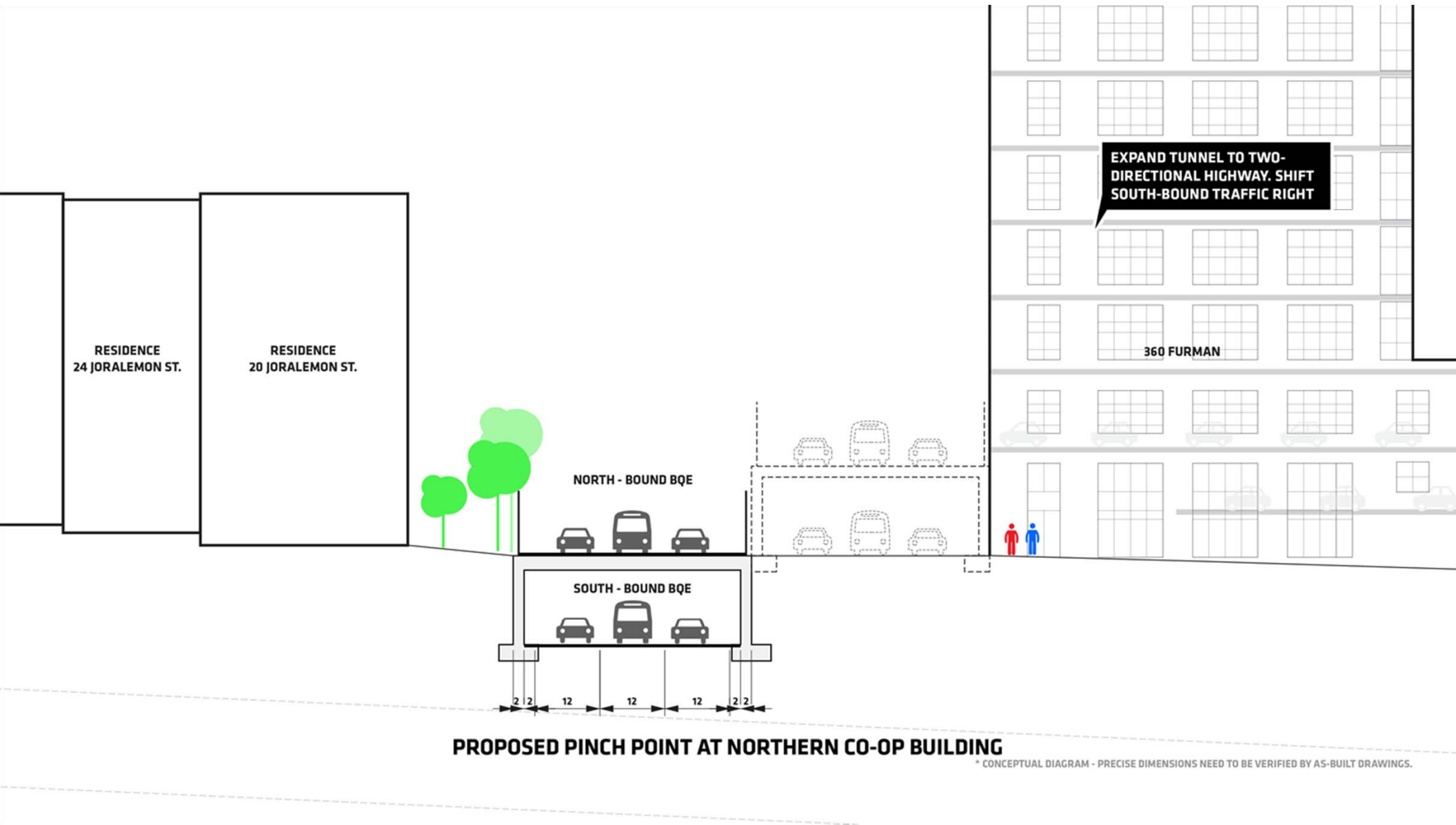
LANE BY LANE CONSTRUCTION PHASING

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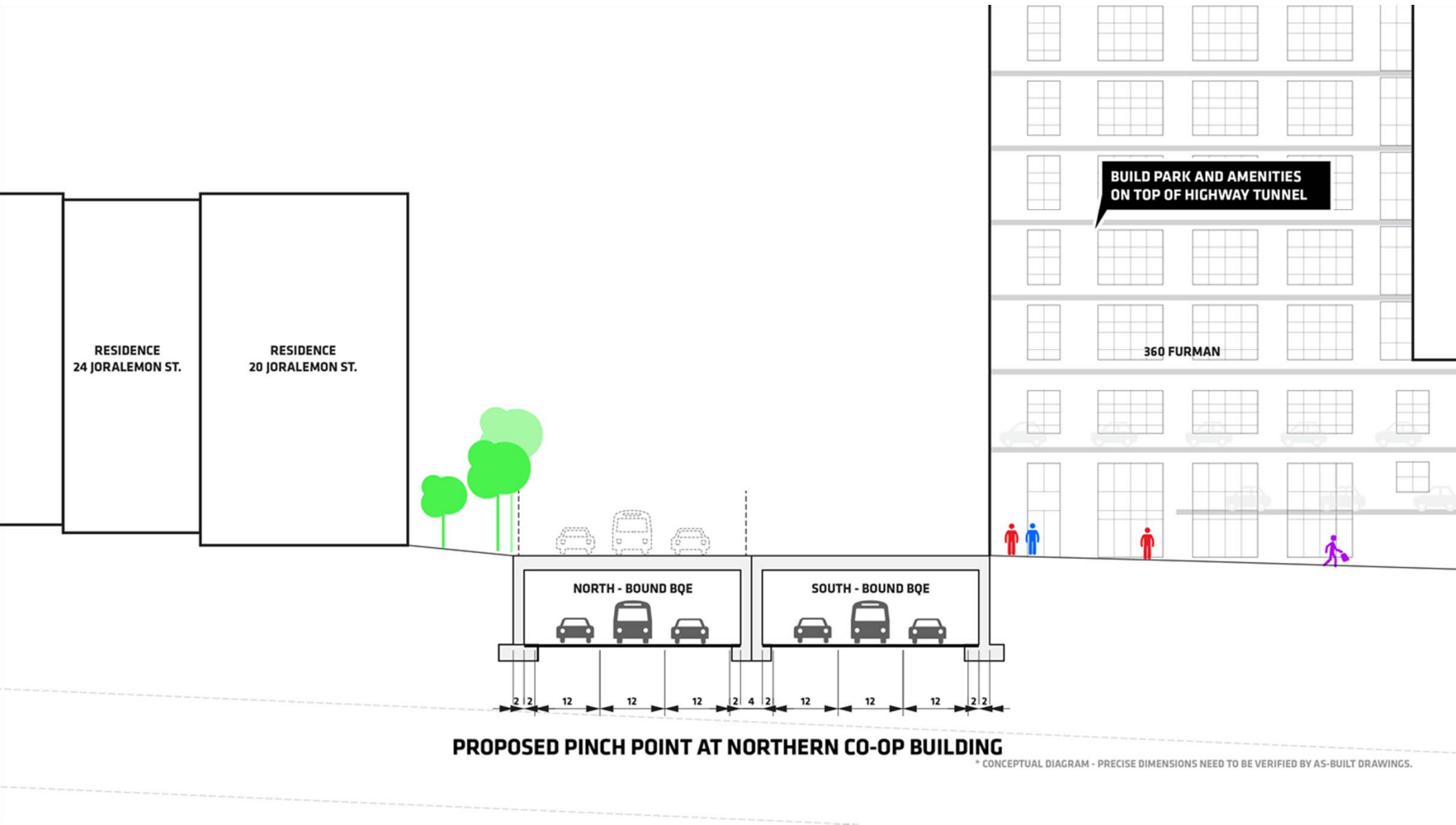


STACKED CONSTRUCTION PHASING

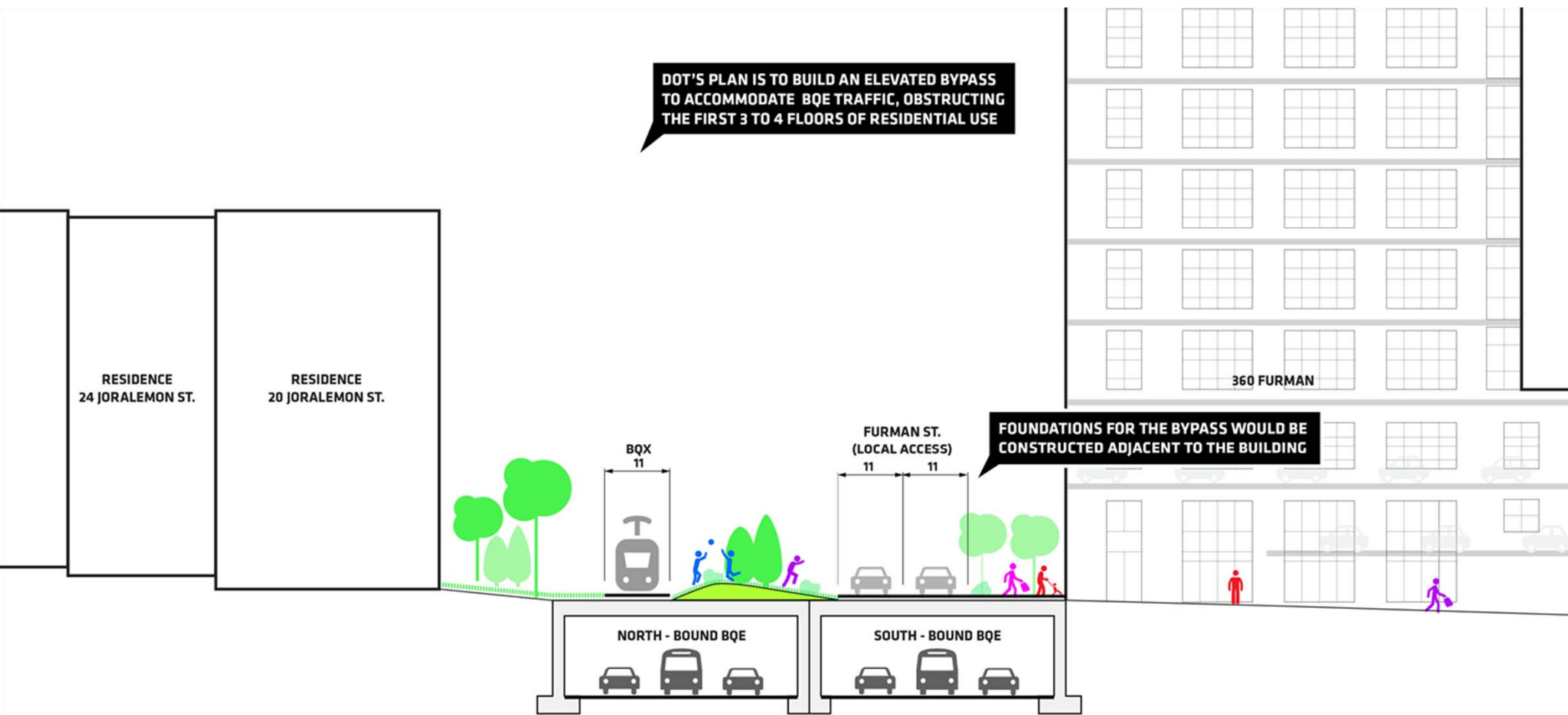
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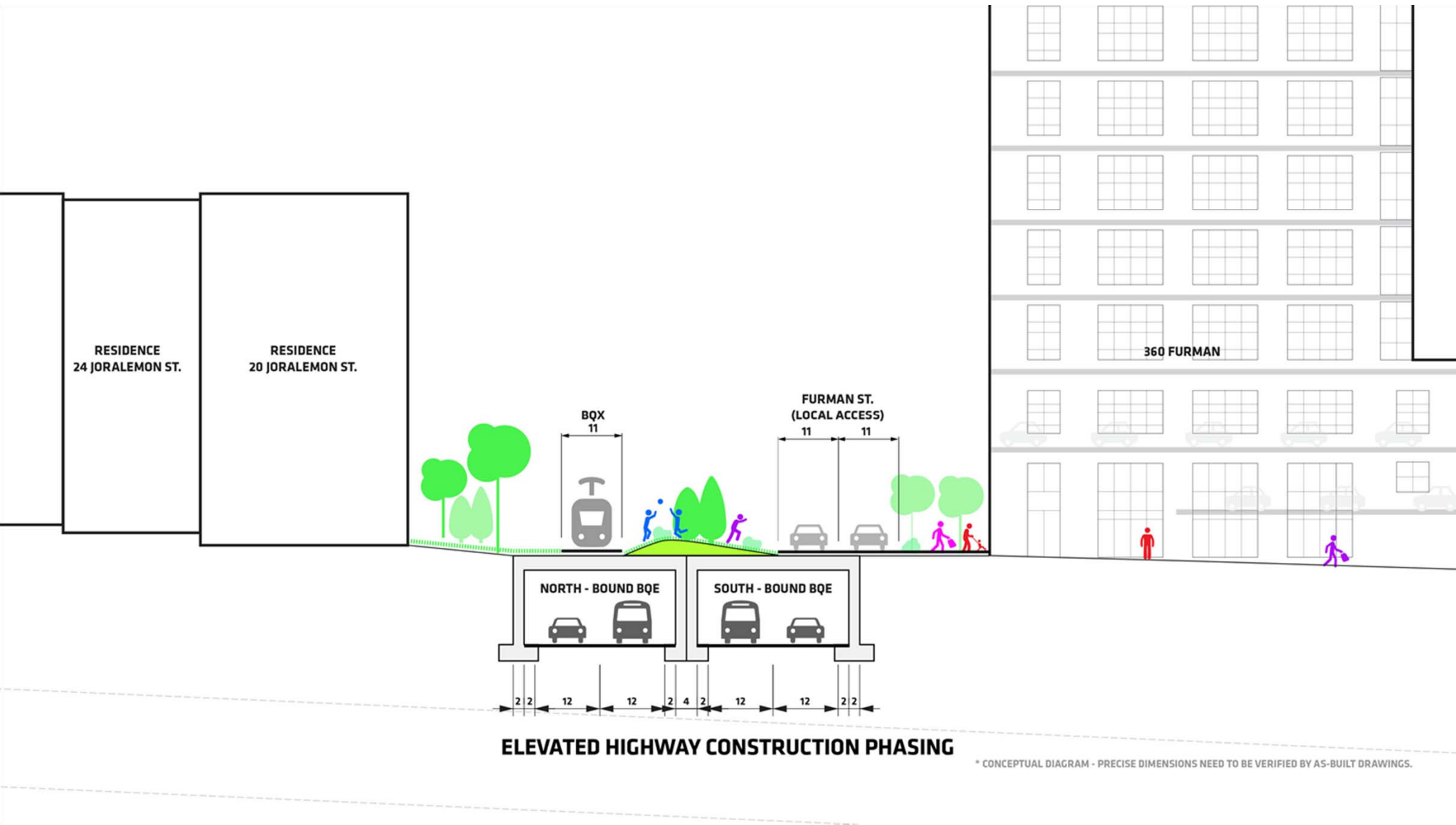


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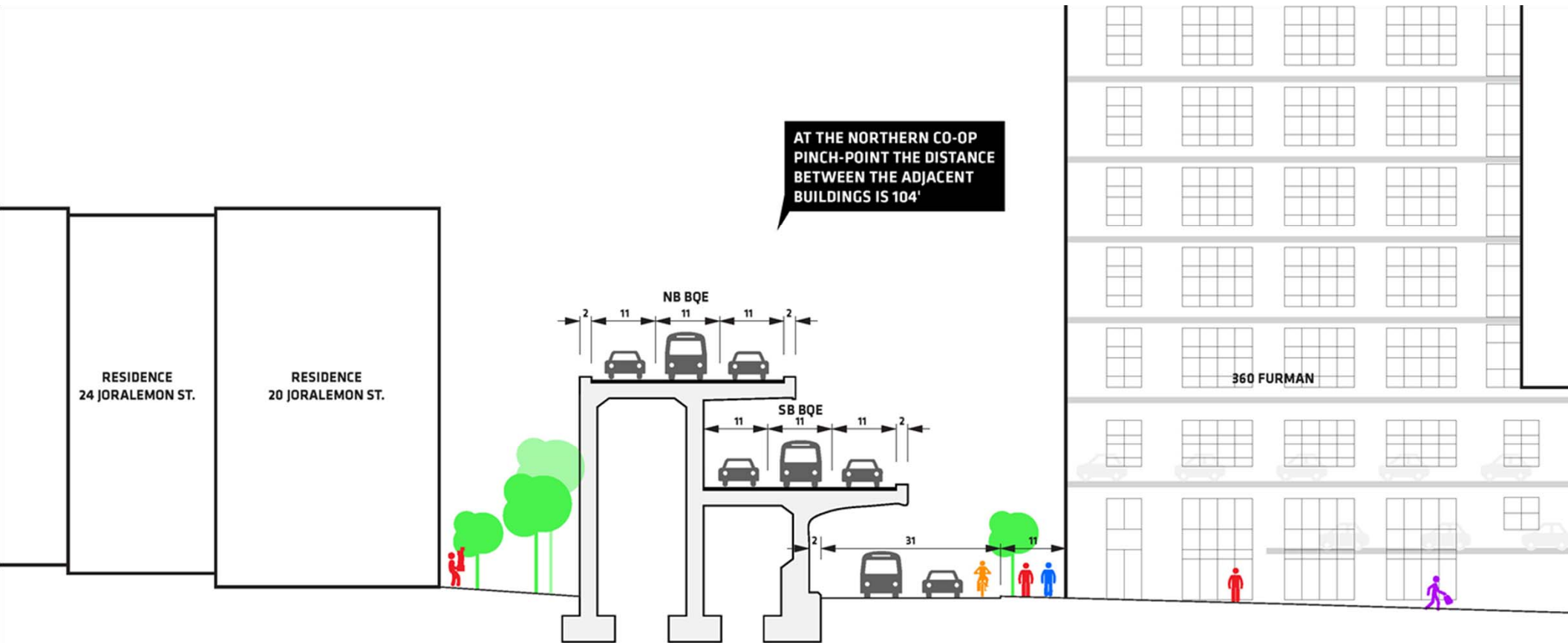
ELEVATED HIGHWAY CONSTRUCTION PHASING

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



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Approach 2

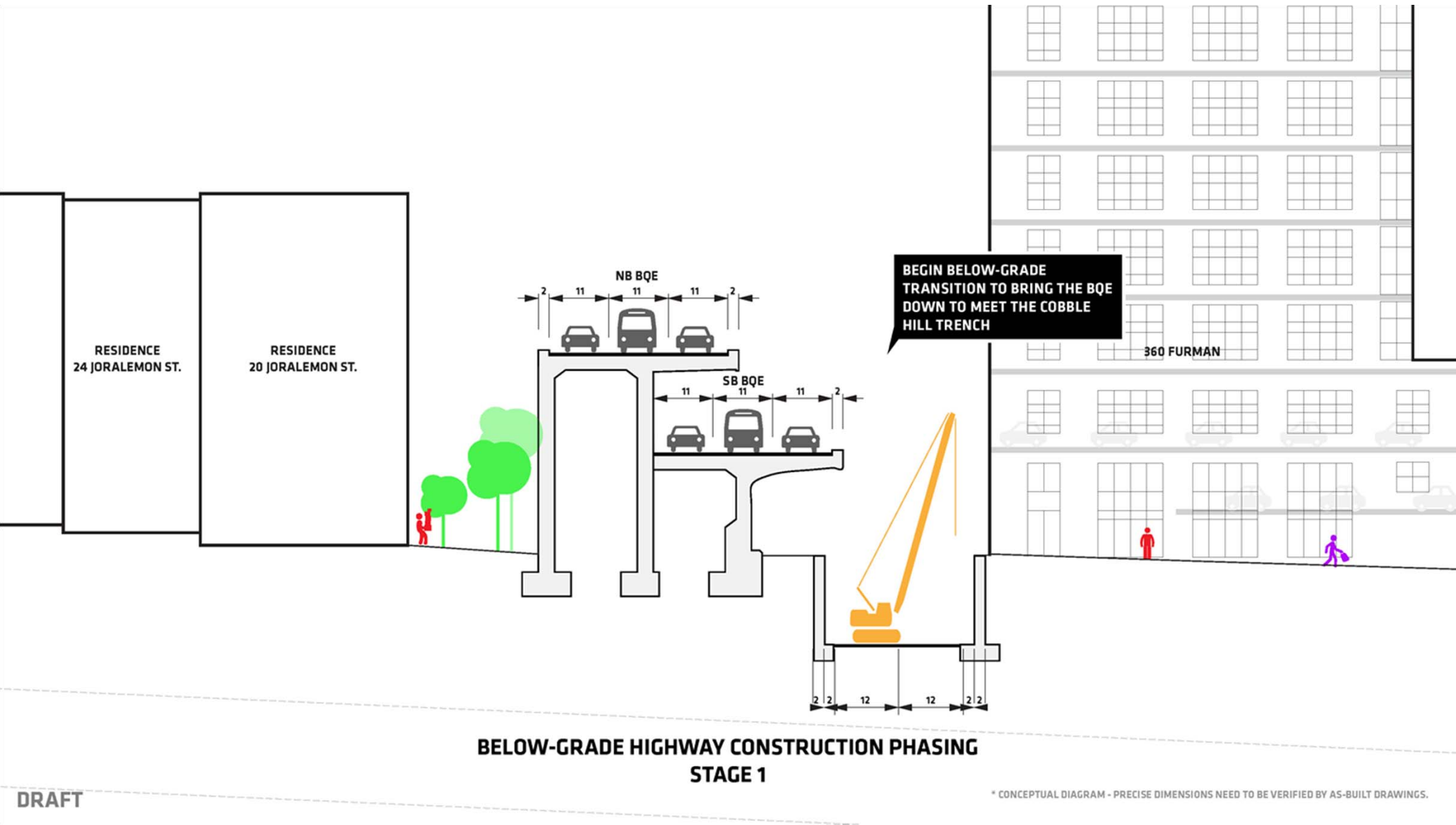


AT THE NORTHERN CO-OP
PINCH-POINT THE DISTANCE
BETWEEN THE ADJACENT
BUILDINGS IS 104'

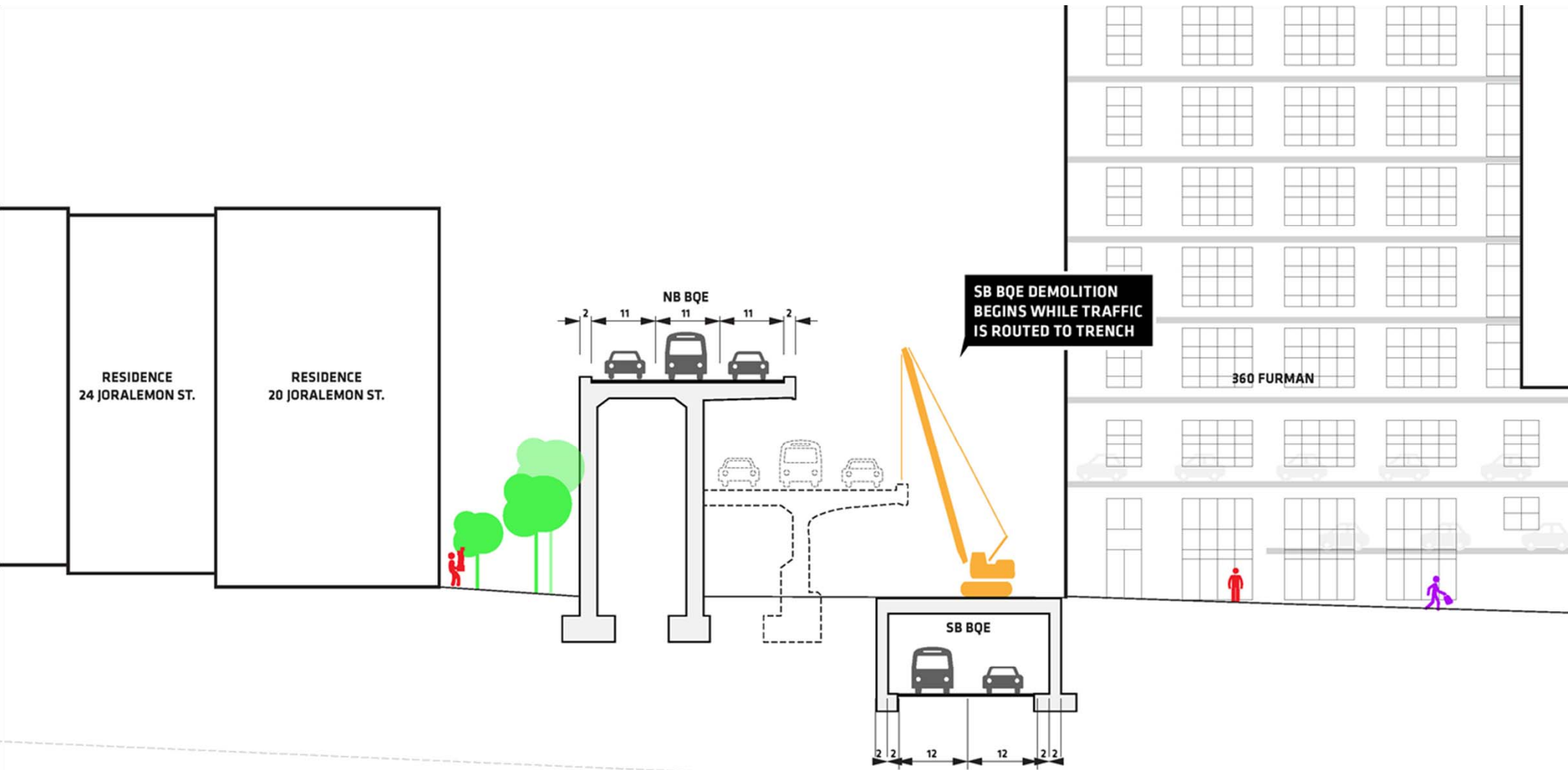
EXISTING PINCH POINT AT NORTHERN CO-OP BUILDING

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* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



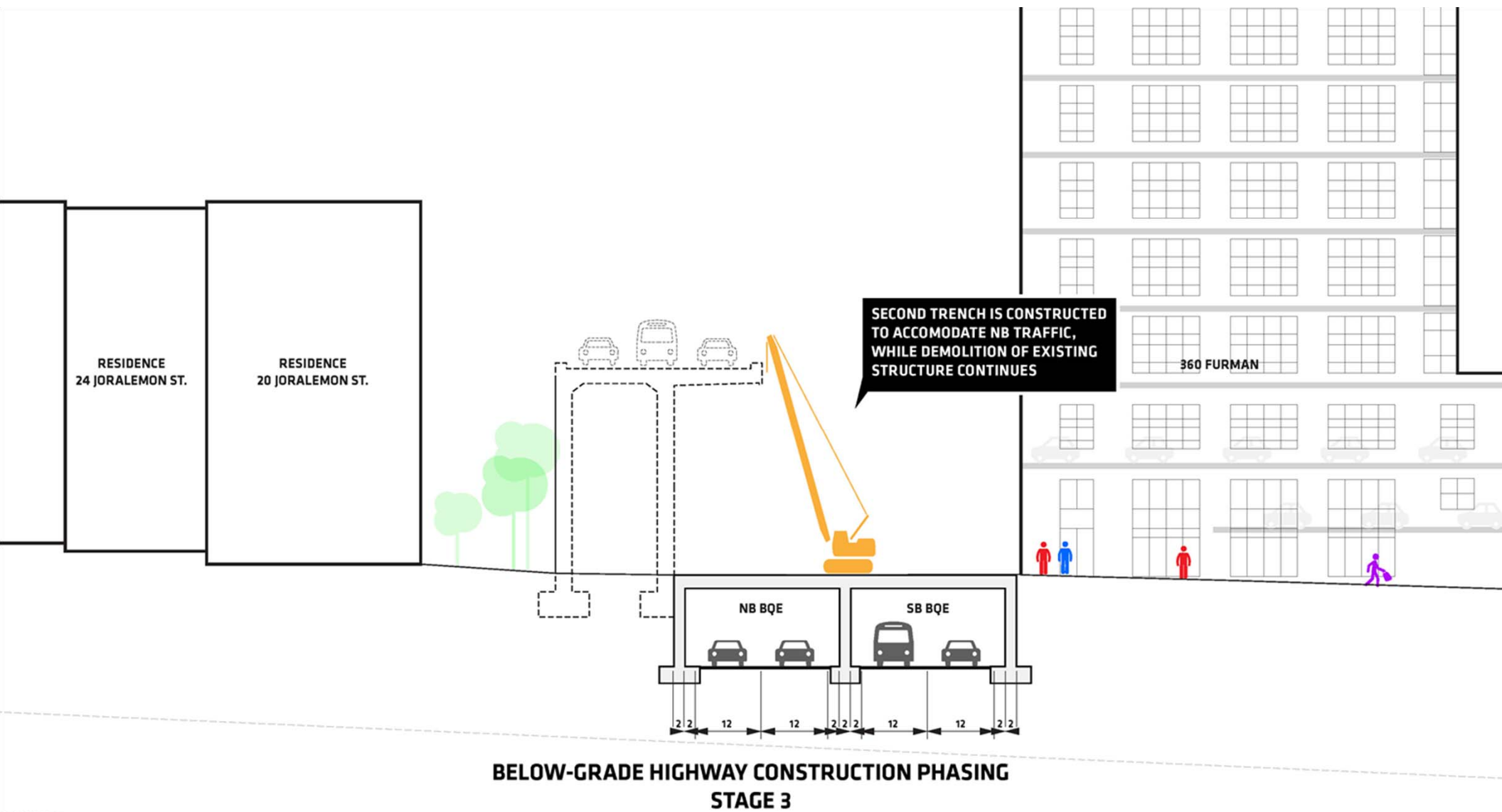
**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
STAGE 1**



**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
STAGE 2**

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.

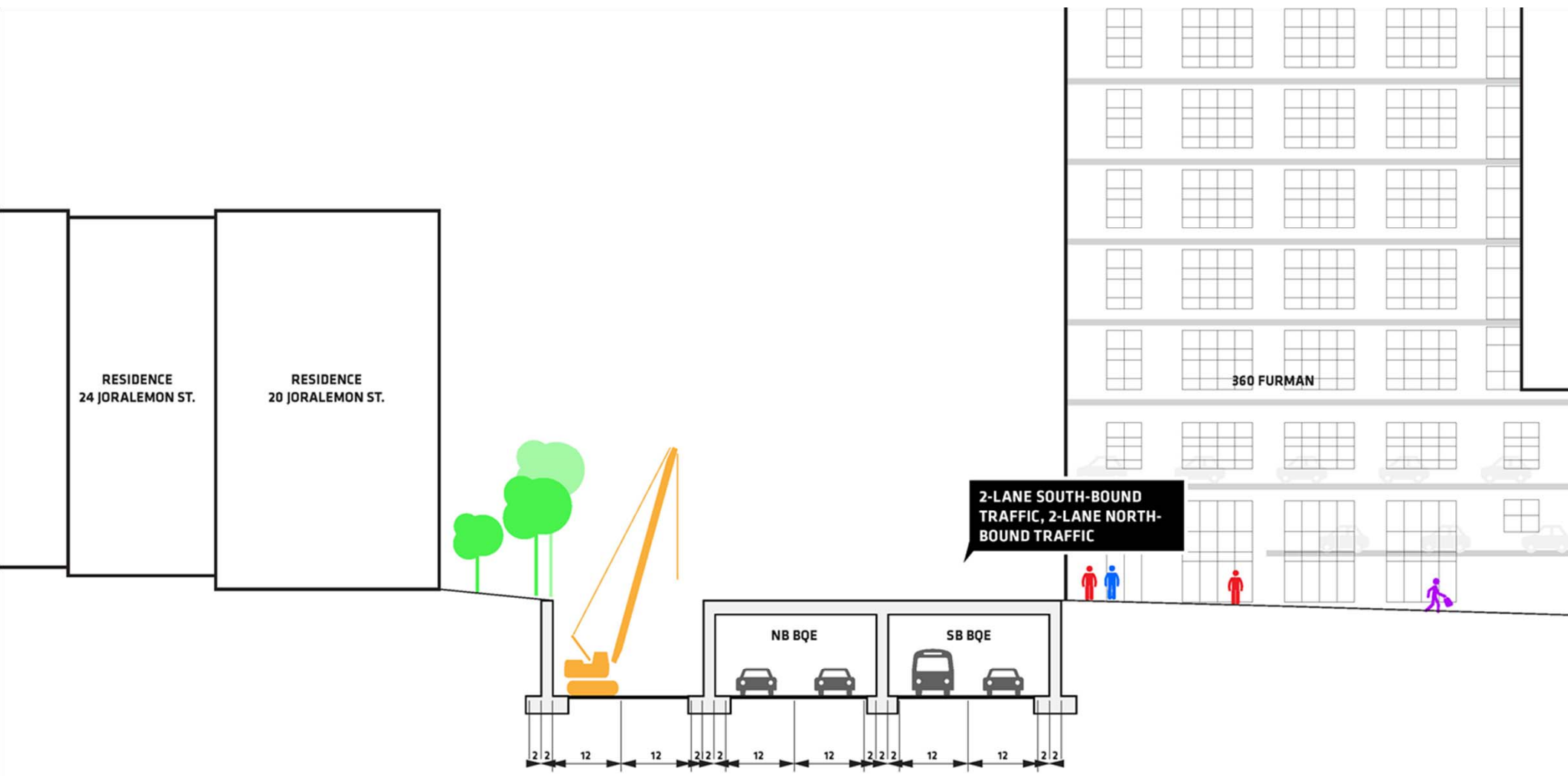
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**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
STAGE 3**

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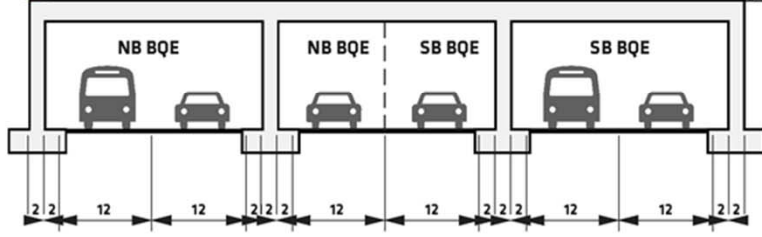
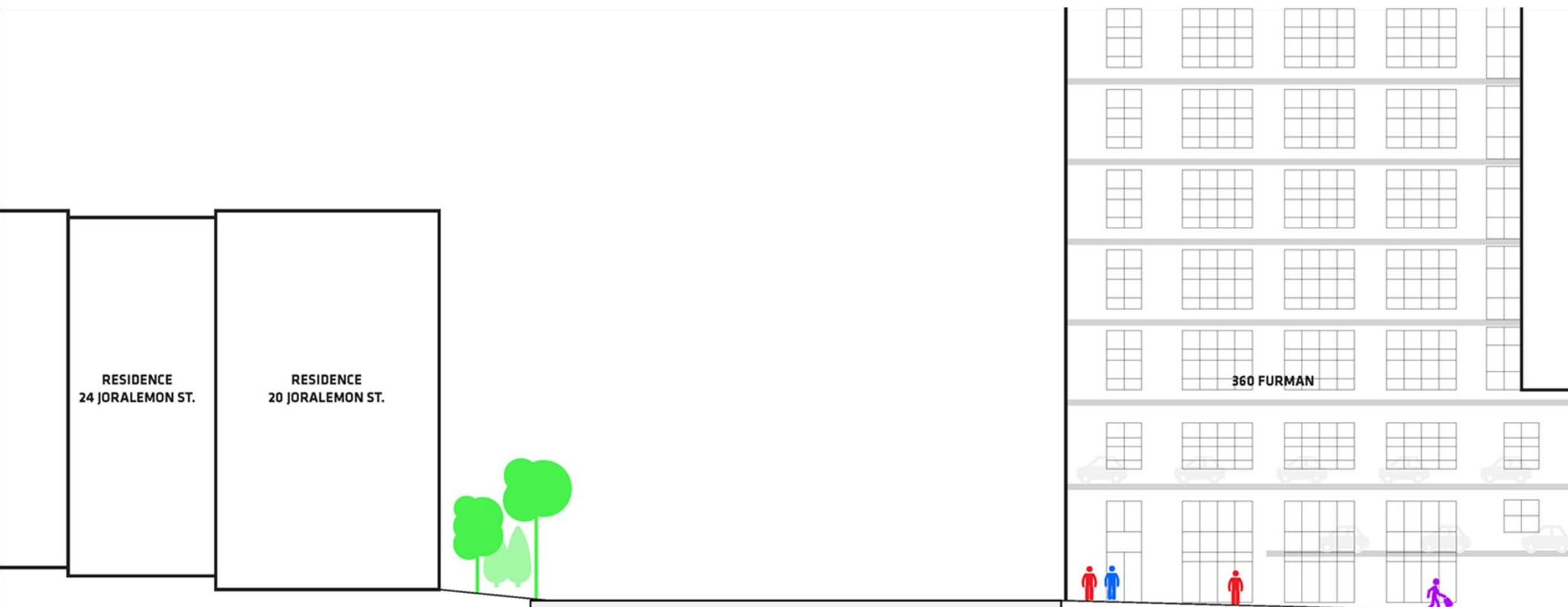
* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
STAGE 4**

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* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.

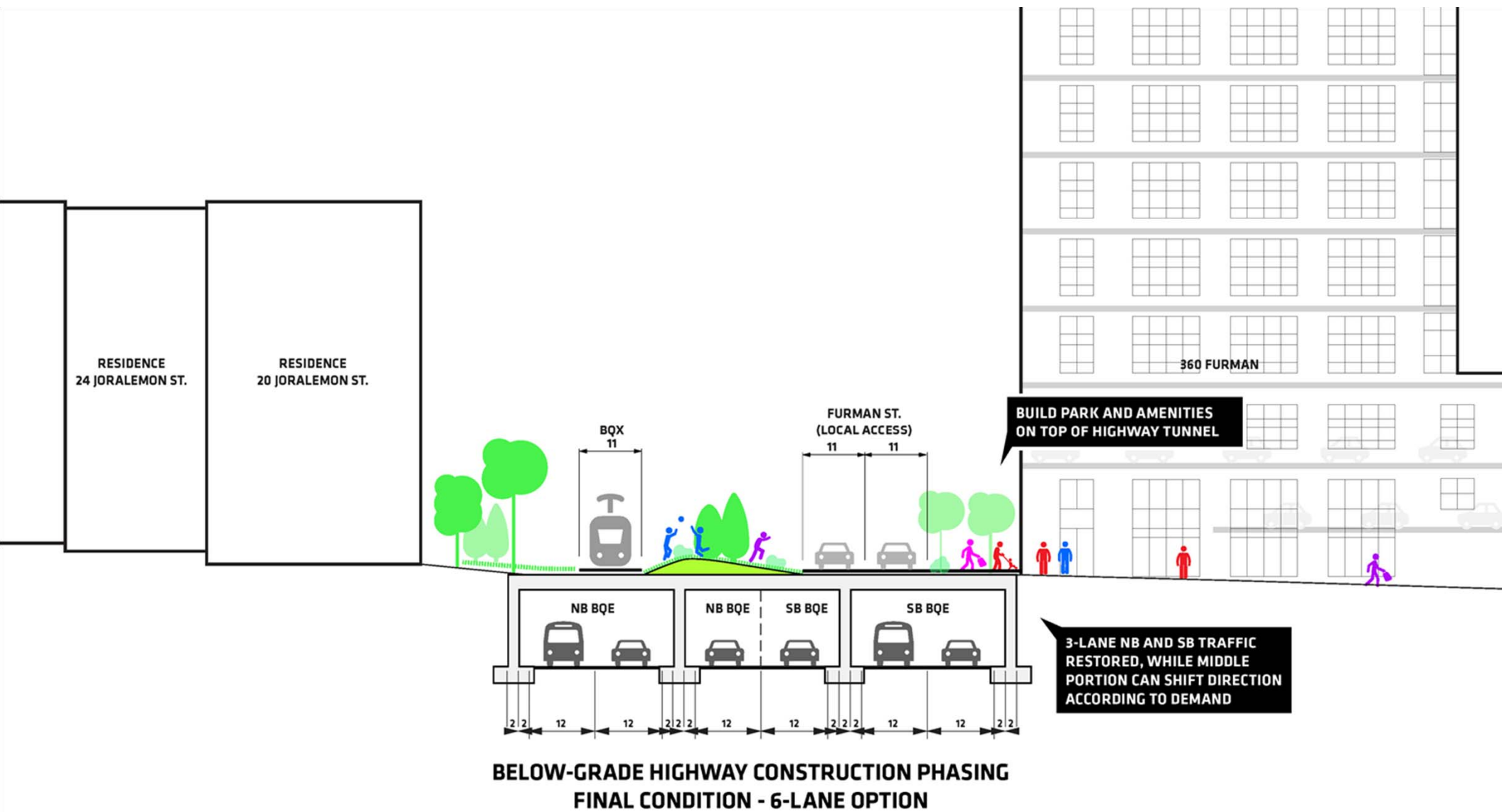


3-LANE NB AND SB TRAFFIC RESTORED, WHILE MIDDLE PORTION CAN SHIFT DIRECTION ACCORDING TO DEMAND

**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
STAGE 5**

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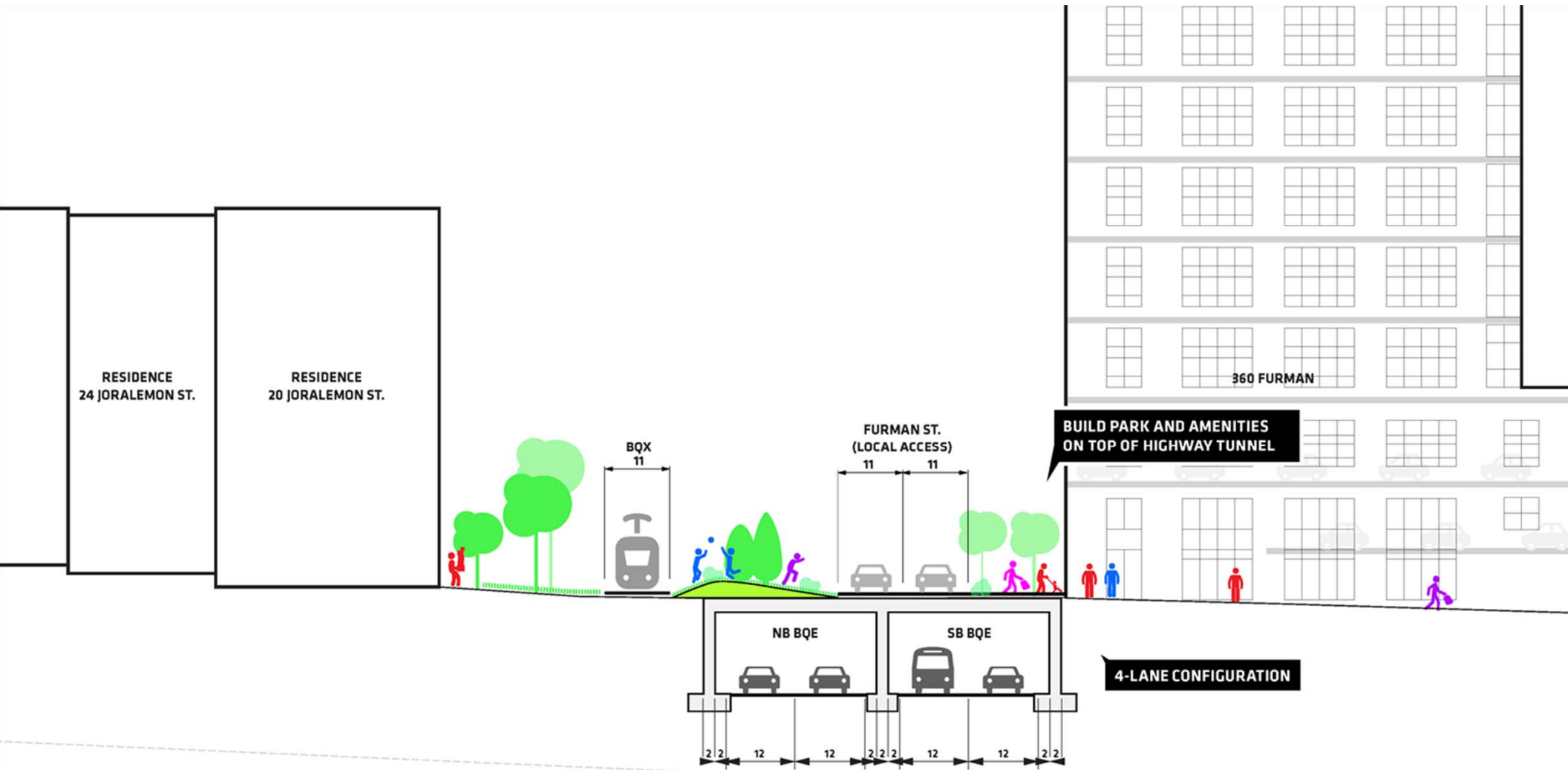
* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
FINAL CONDITION - 6-LANE OPTION**

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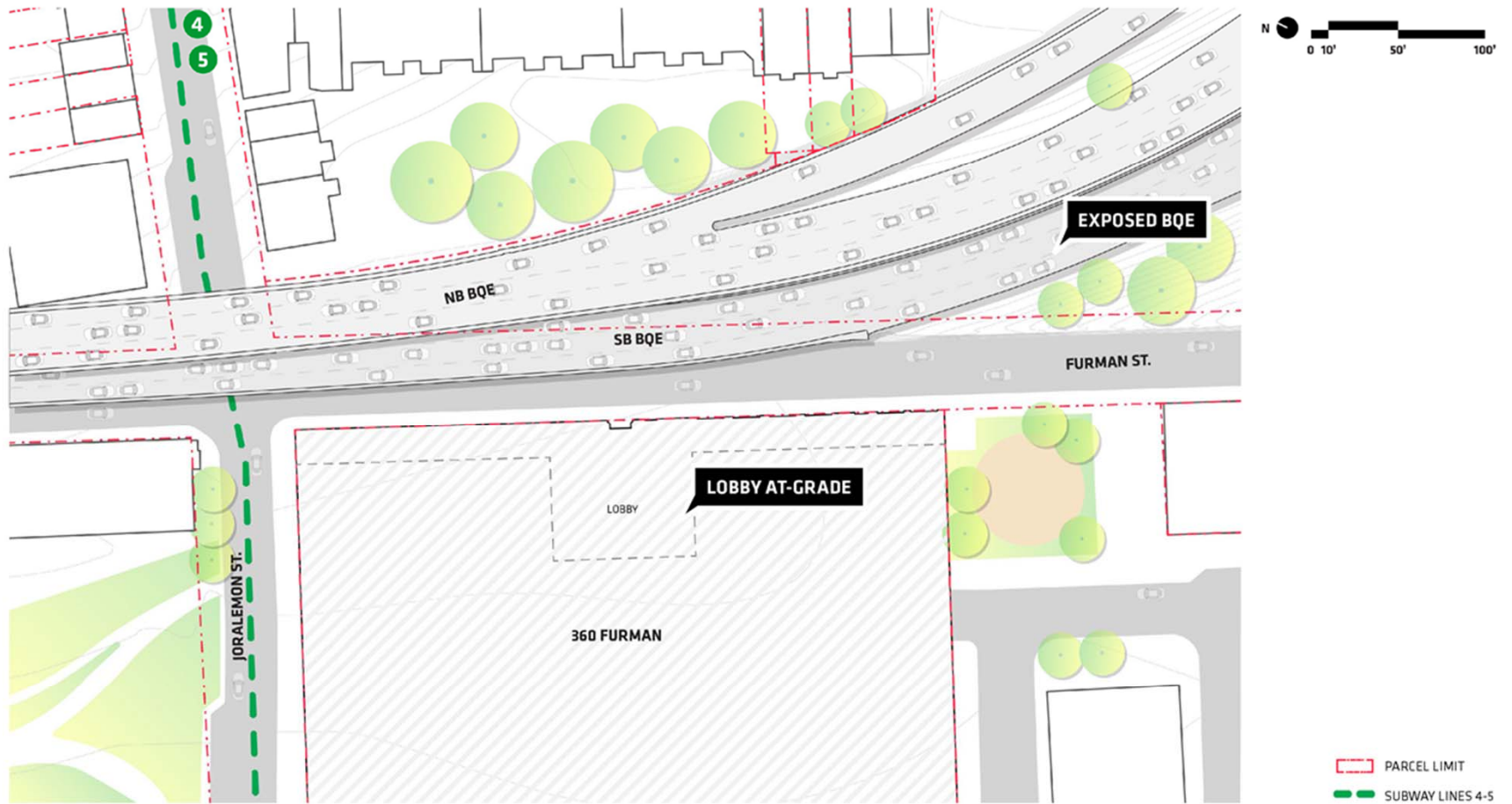
* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.



**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
FINAL CONDITION - 4-LANE OPTION**

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.

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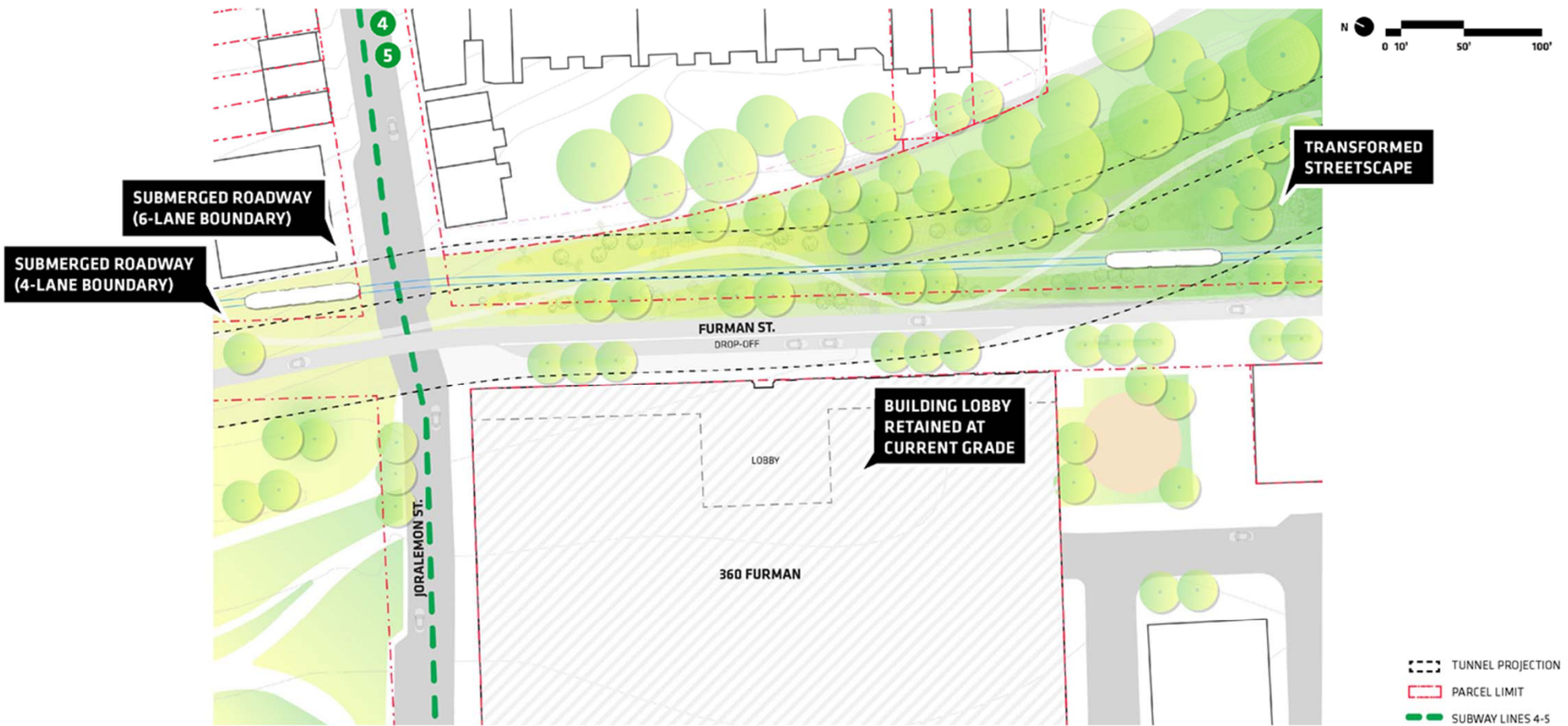


EXISTING PINCH POINT AT NORTHERN CO-OP BUILDING

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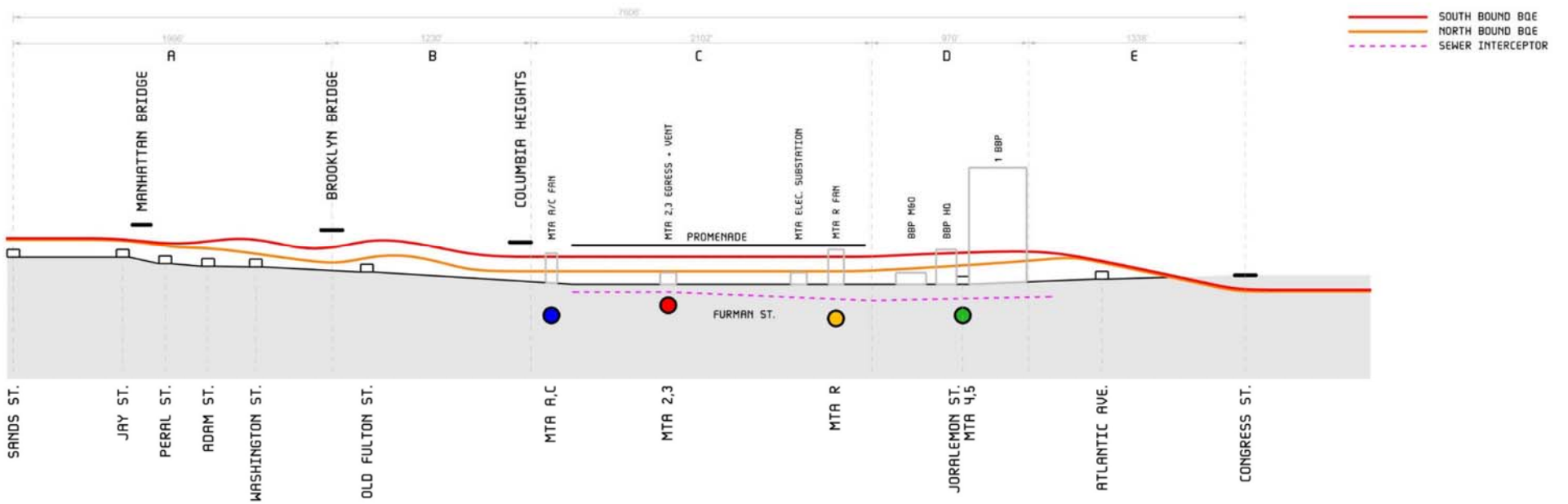
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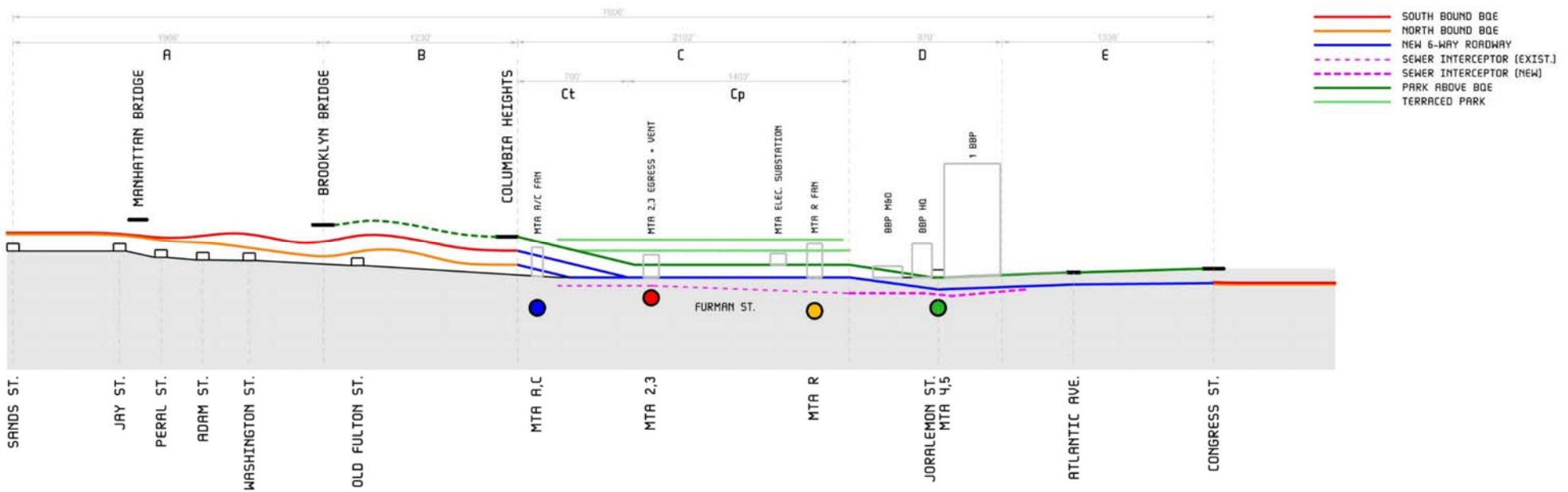
**BELOW-GRADE HIGHWAY CONSTRUCTION PHASING
FINAL CONDITION - 4-6 LANES**

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.

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EXISTING BQE PROFILE



REVISED BQ P PROFILE
 Updated from Montague to Atlantic Ave.



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DEP Infrastructure and Utilities



DEP Infrastructure and Utilities

- 10' sewer interceptormay remain in place along majority of length, with +/- 1000' to be reconstructed between Joralemon Street and Atlantic Ave. to accommodate cut-and-cover trench.
- Cost of +/- \$100 Million, assuming \$100k/Linear Foot.
- Water, gas, and electrical utilities along Furman St. to remain in place or relocate to new elevated utility corridor.
- NYC Franchise Area: Utilities must accommodate any request for relocation if required for public improvements.

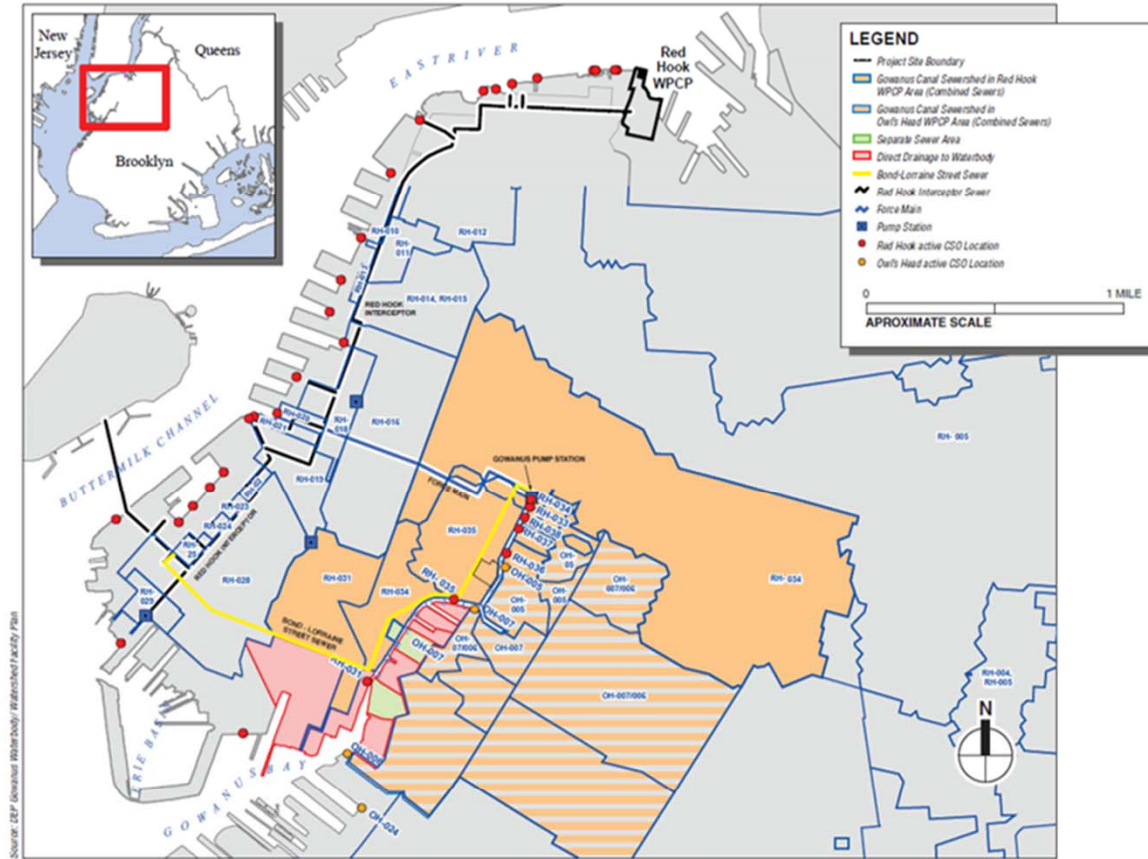
Overview

RED HOOK WPCP

- DRY WEATHER FLOW 60 MGD
- WET WEATHER FLOW 120 MGD

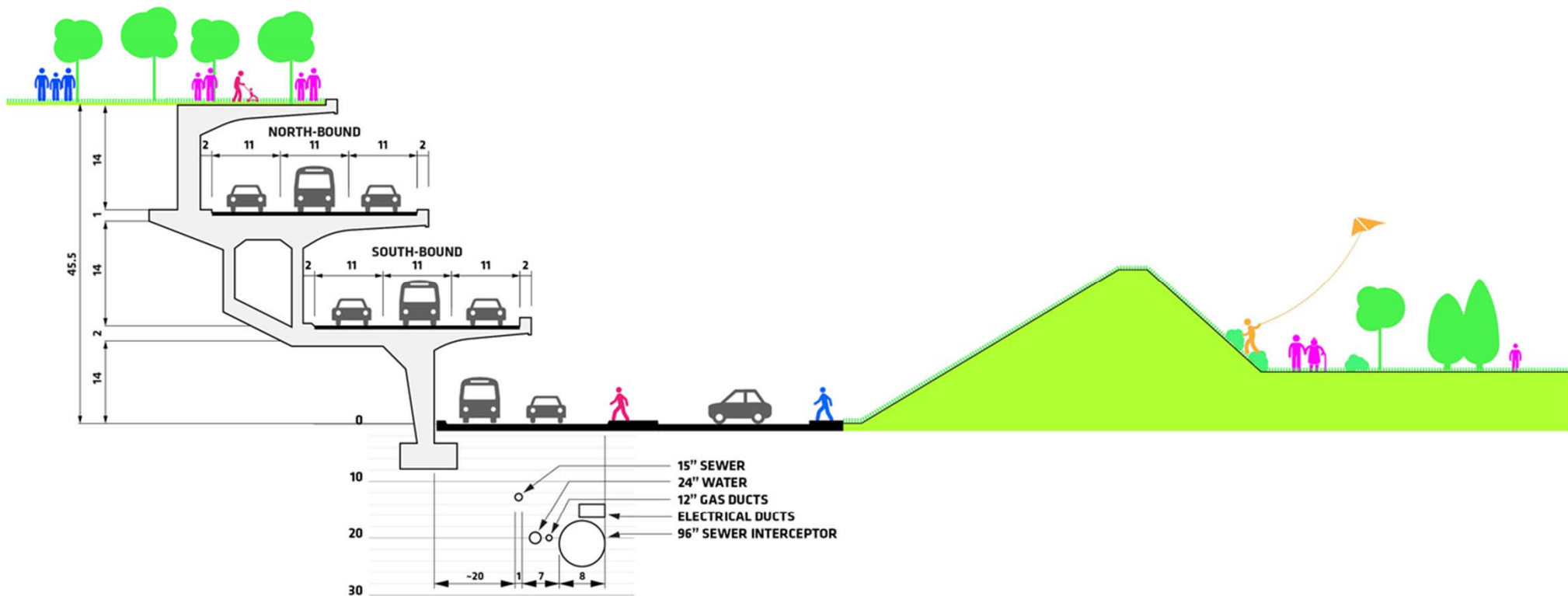
INTERCEPTOR

- BUILT IN 1970
- 10'5" IN DIAMETER
- 8,600 FT AS CONSTRUCTED
- \$425M (2019)
- \$50,000/LF (2019)
- SLURRY SHIELD
- NO CURRENT BYPASS



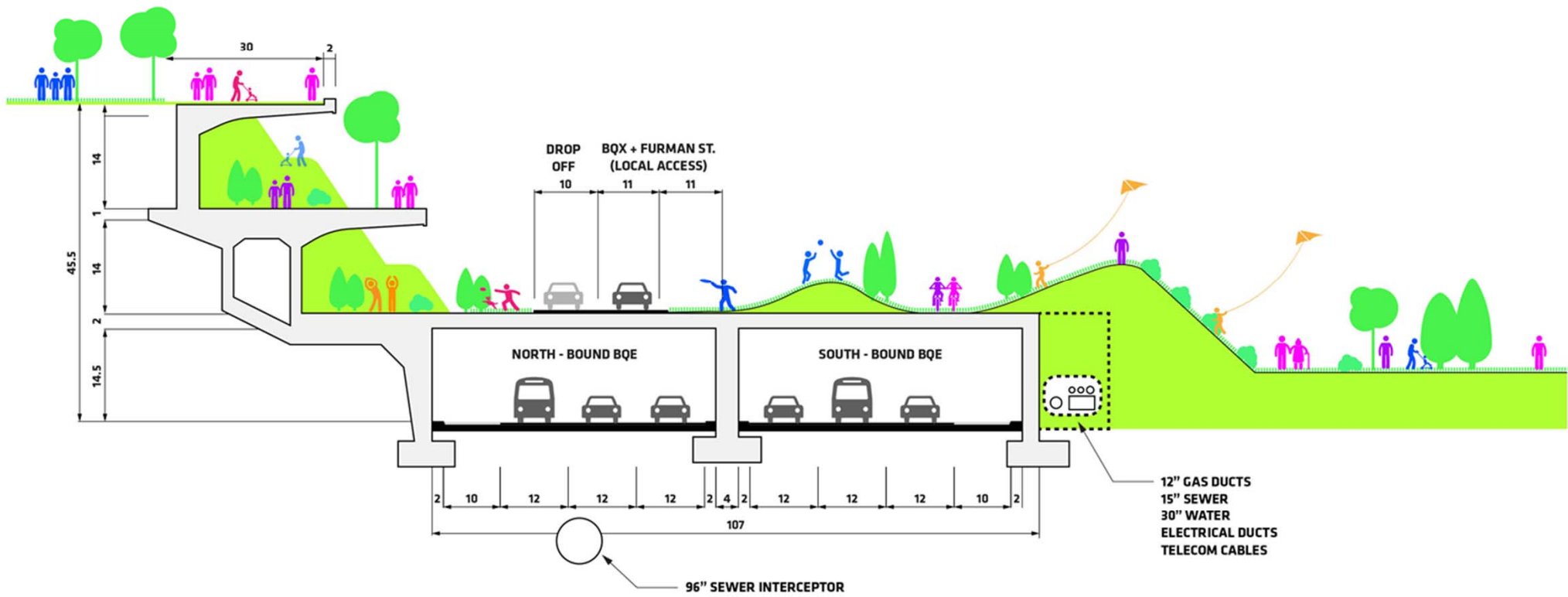
RED HOOK WPCP

UTILITY CHALLENGE I : SEWER INTERCEPTOR



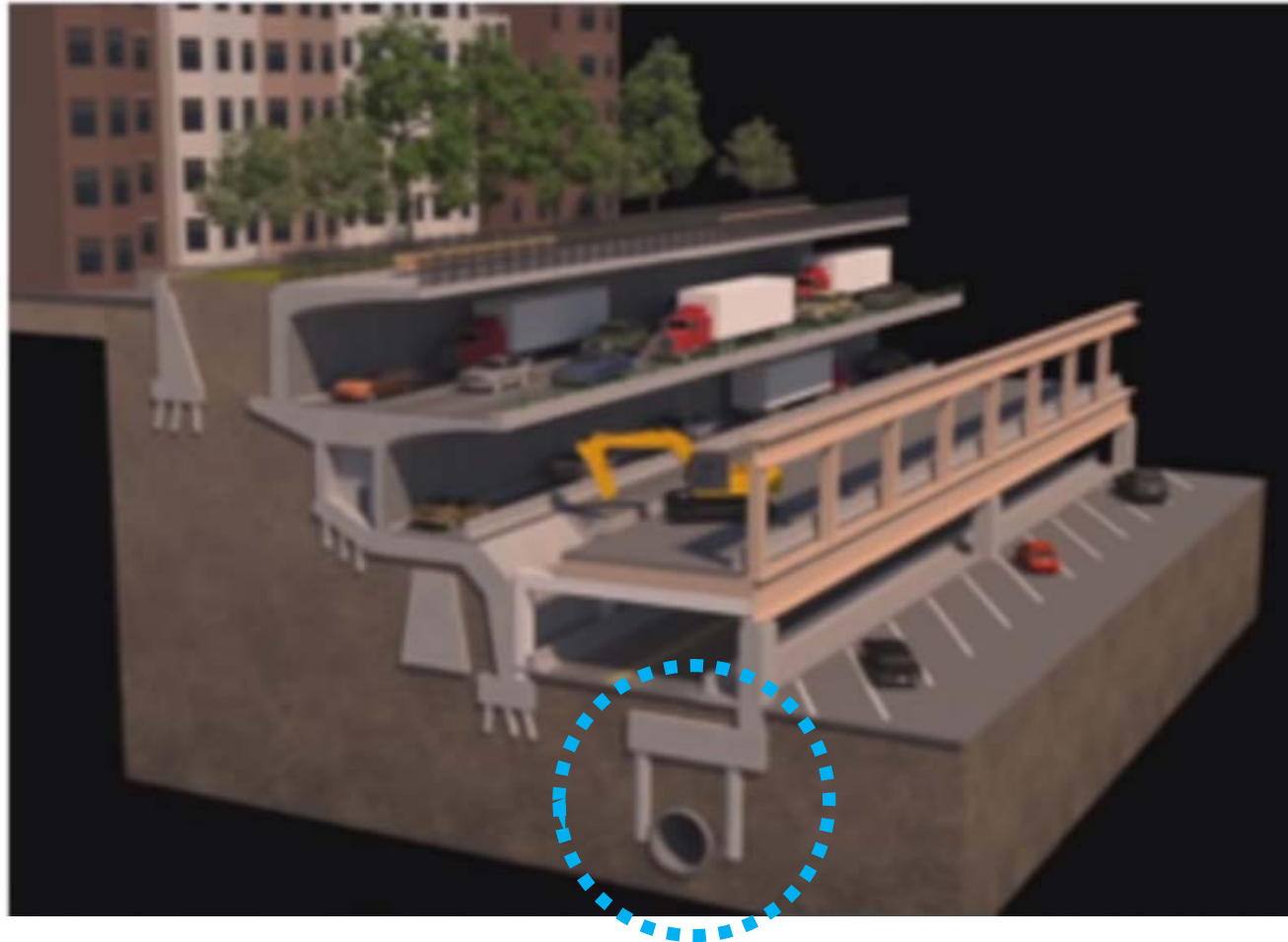
SECTION AT PIER 3 UPLAND

* CONCEPTUAL DIAGRAM - TO BE VERIFIED BY COMPLETE SURVEY

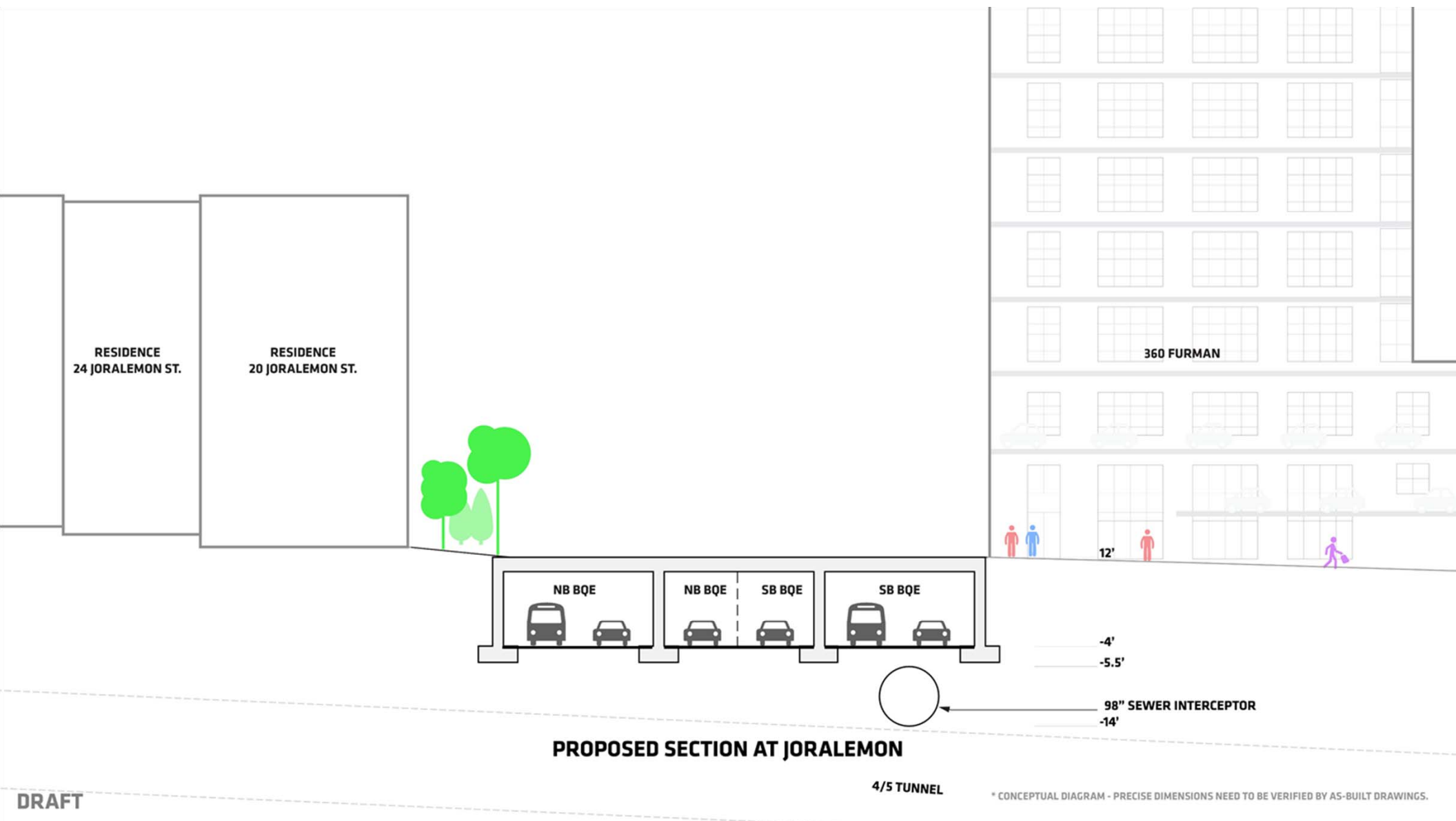


SECTION AT PIER 3 UPLAND

* CONCEPTUAL DIAGRAM - TO BE VERIFIED BY COMPLETE SURVEY



DOT Interceptor Approach

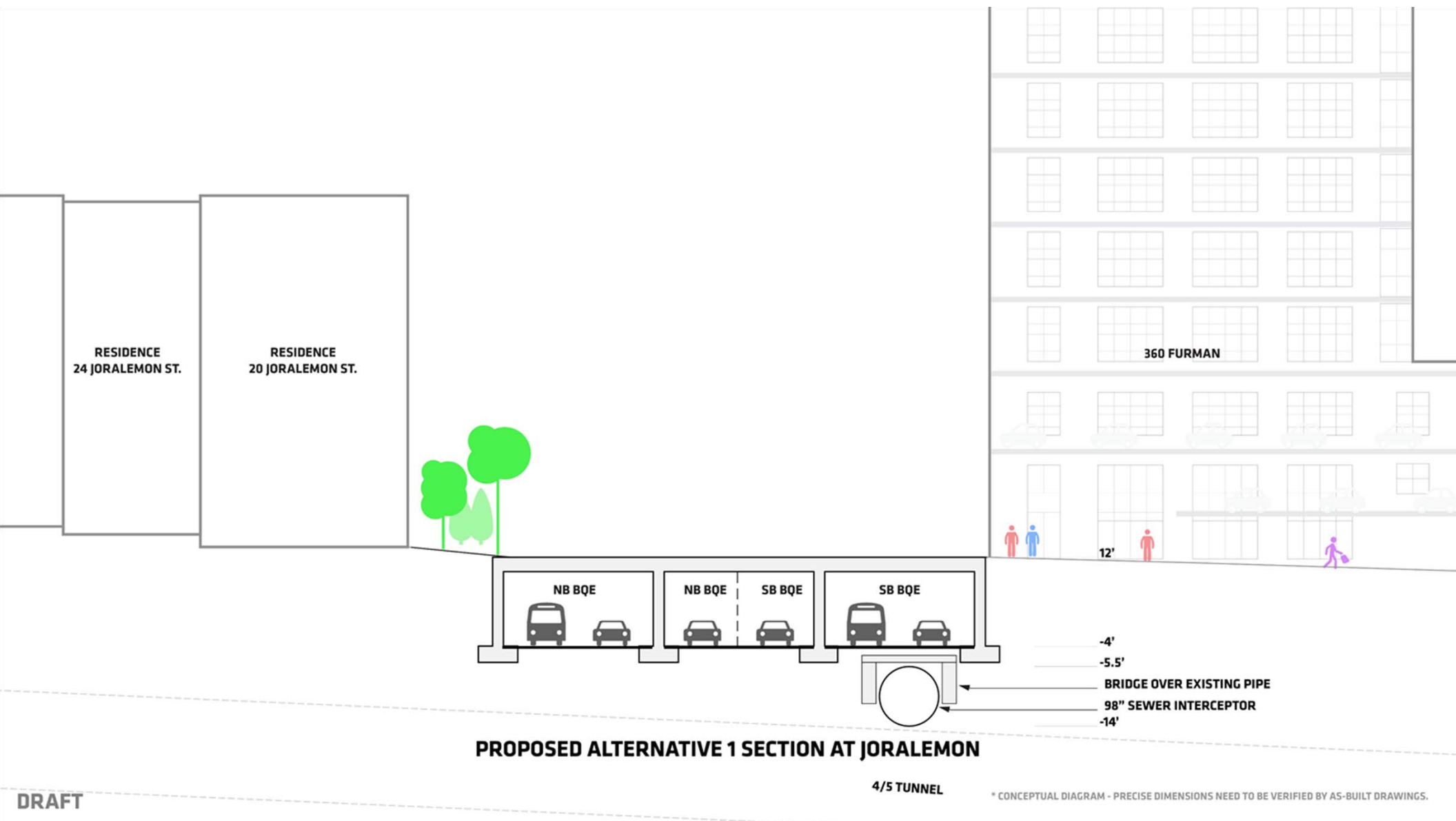


PROPOSED SECTION AT JORALEMON

4/5 TUNNEL

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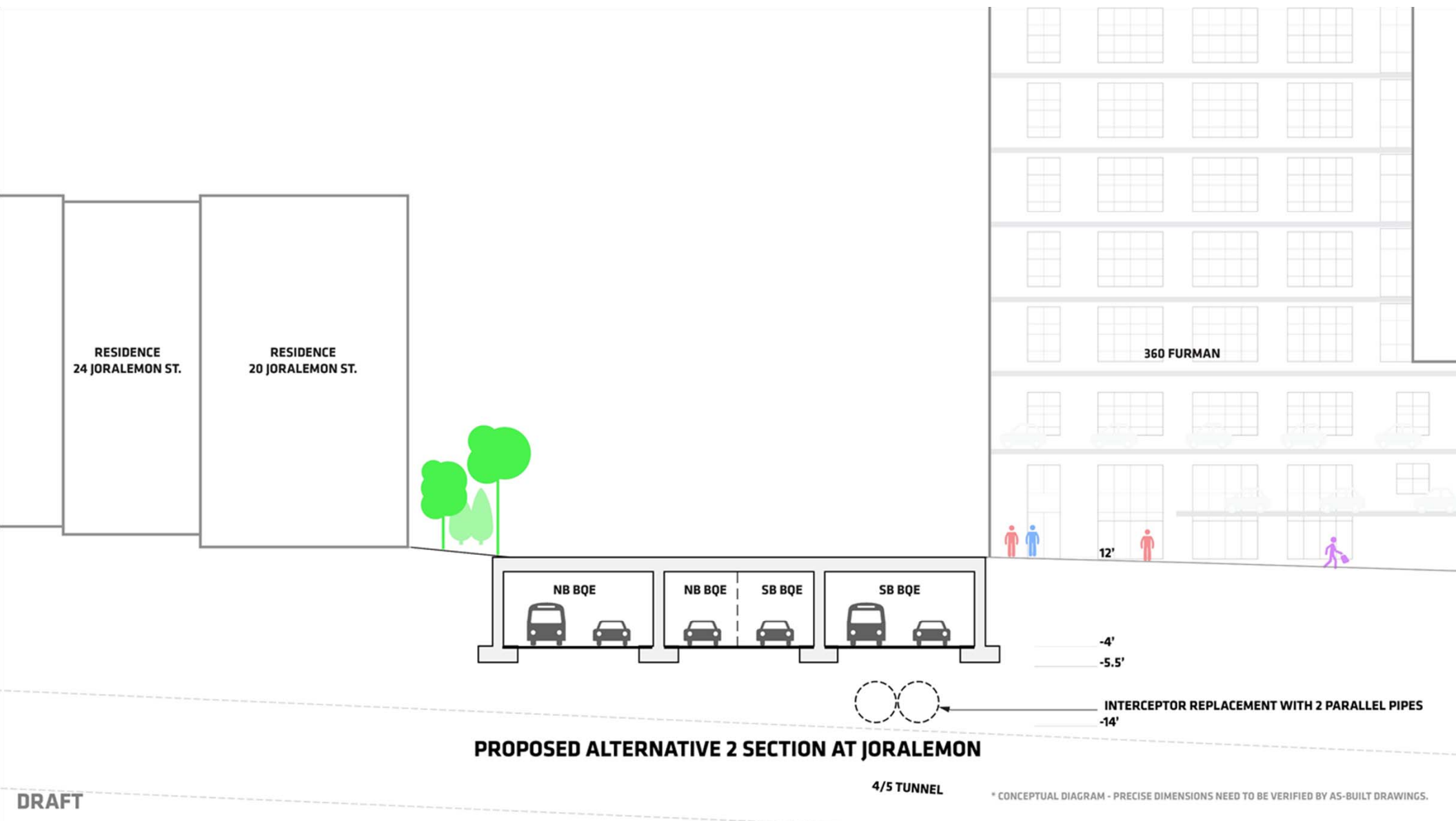


PROPOSED ALTERNATIVE 1 SECTION AT JORALEMON

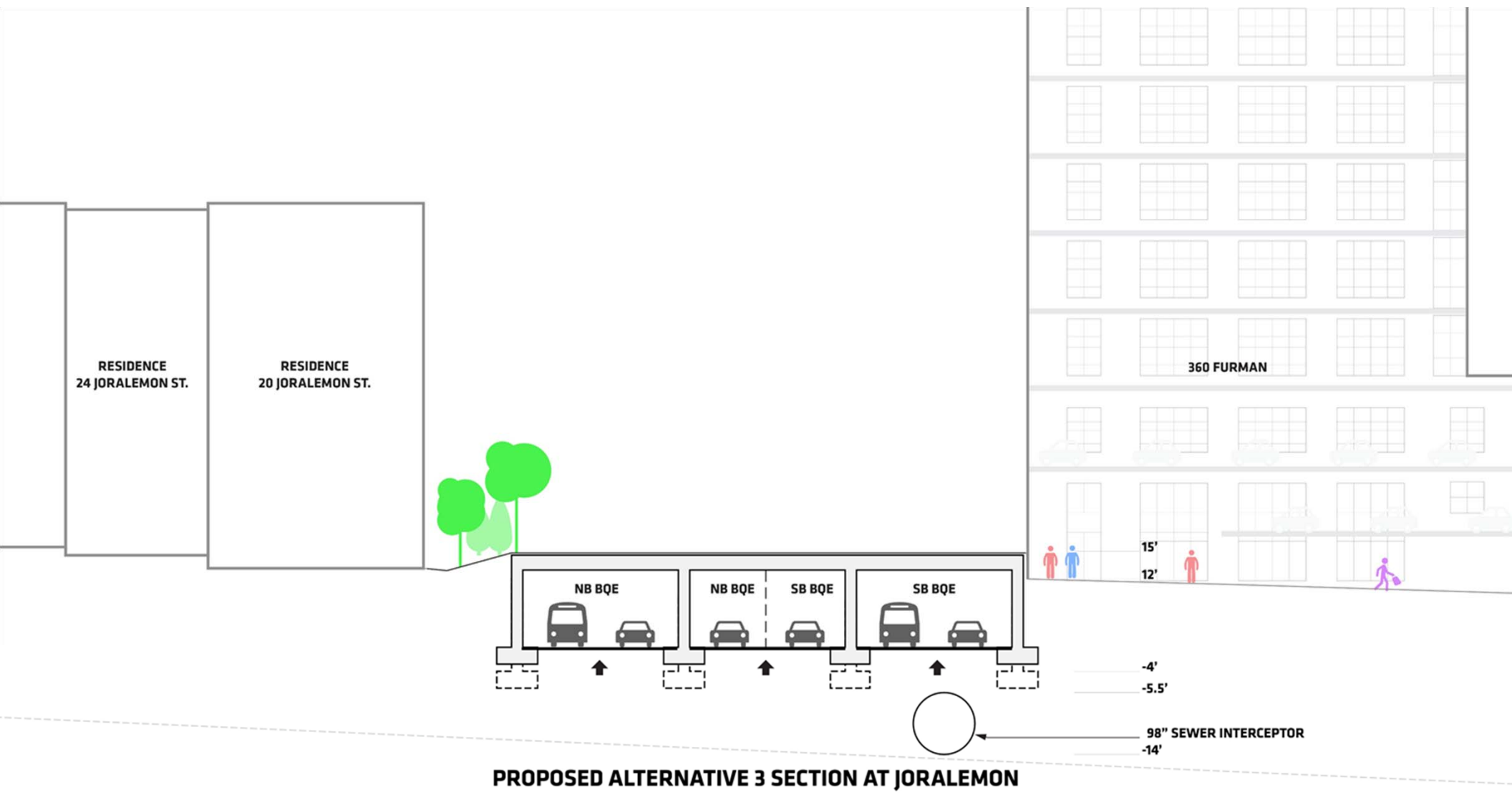
4/5 TUNNEL

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.

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PROPOSED ALTERNATIVE 3 SECTION AT JORALEMON

4/5 TUNNEL

* CONCEPTUAL DIAGRAM - PRECISE DIMENSIONS NEED TO BE VERIFIED BY AS-BUILT DRAWINGS.

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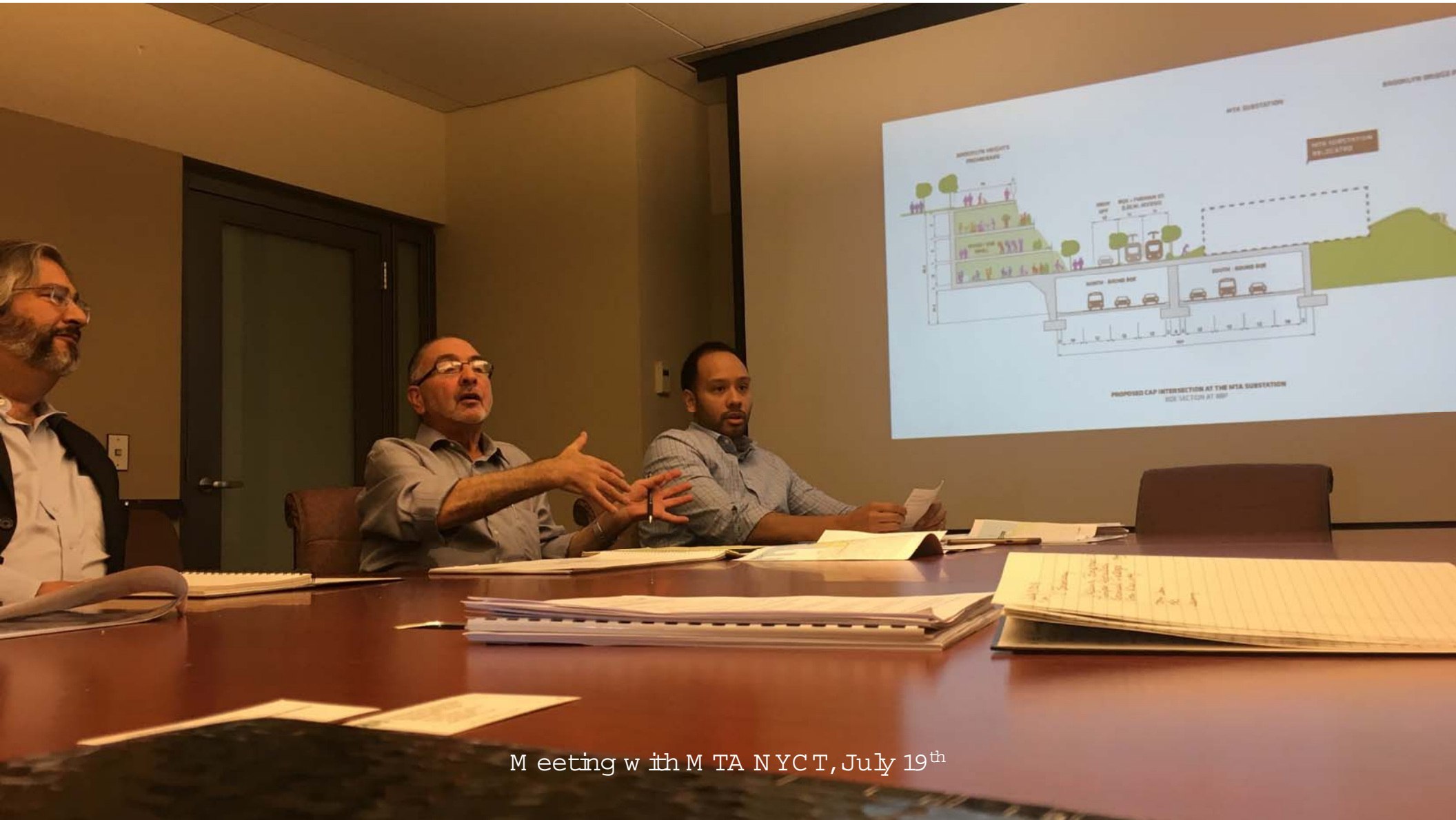
M T A Infrastructure



MTA Infrastructure

- No MTA fan plants (A/C, 2/3, R) require re-location for the proposal.
- 2/3 Train Vent and Emergency Egress to remain in place, with simple stair and chimney accommodated in deck structure.
- MTA Electrical Substation at 304 Furman St. to be relocated vertically at cost of approx. \$100 Million. 1970s facility is currently in the floodplain and relocation provides modernization and resiliency benefits.
- R Train Fan Plant to remain in place. Impacted manhole access to east of building to be preserved through utility hatches in new roadway surfacing.
- 4/5 Subway Tube found to be at sufficient depth to allow for excavation of roadway trench to accommodate 360 Furman St. access at existing grade. Measures should be taken to counteract any vertical buckling in tube associated with reduced loading from excavated fill.

Overview



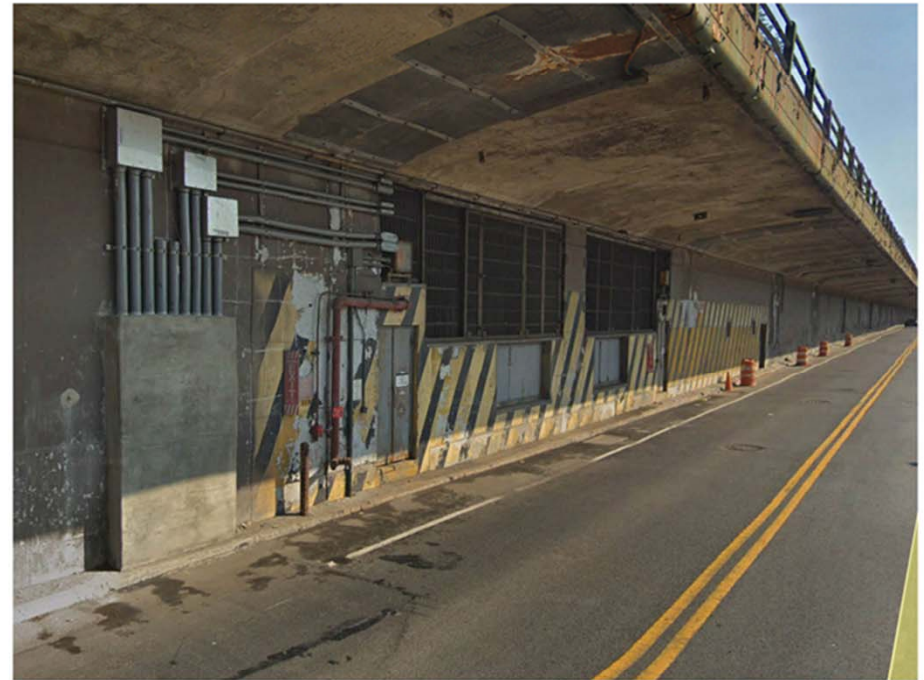
Meeting with MTA NYCT, July 19th



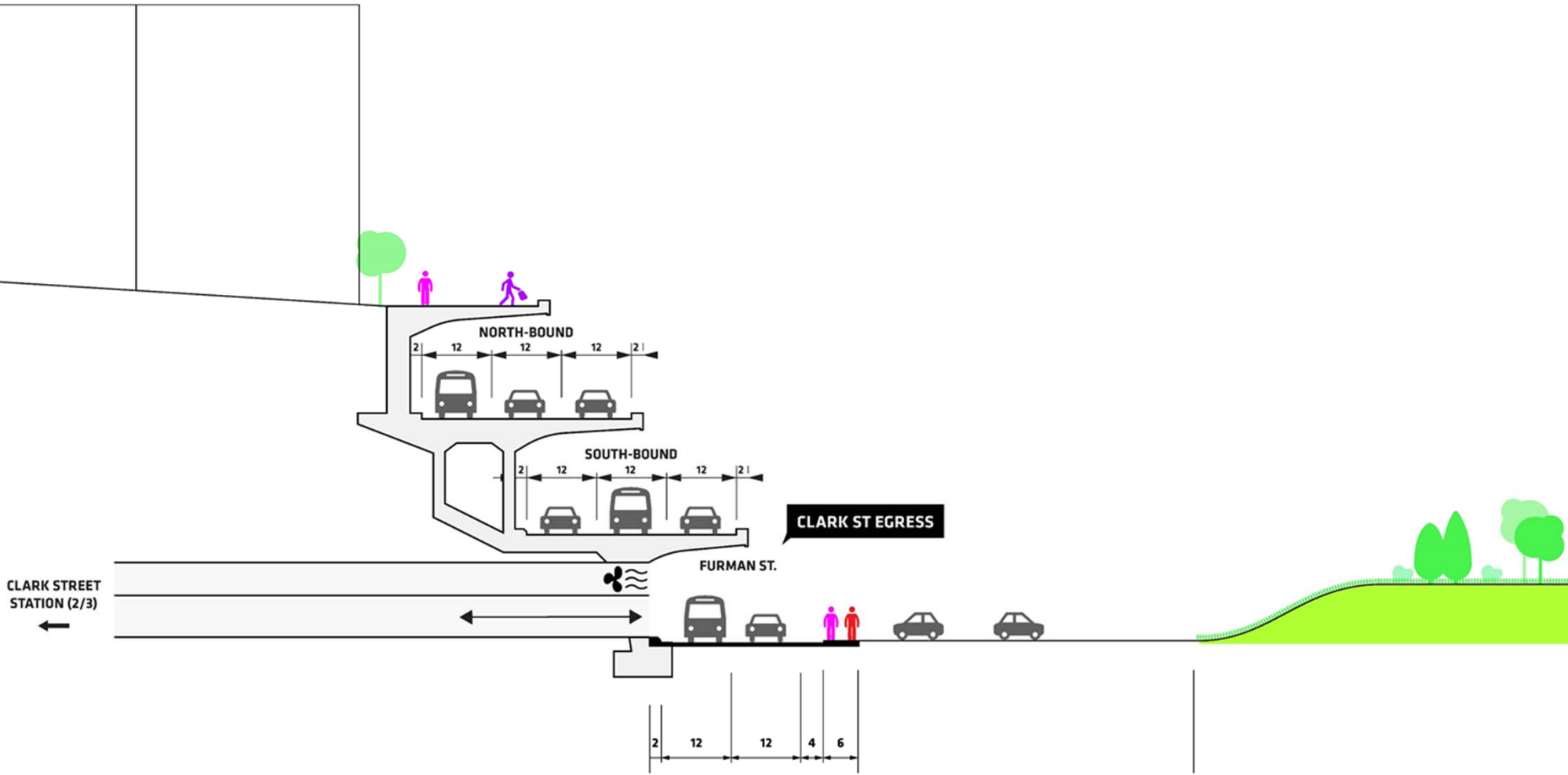
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CLARK ST. EMERGENCY EGRESS & VENTILATION (2/3 TRAIN MTA)

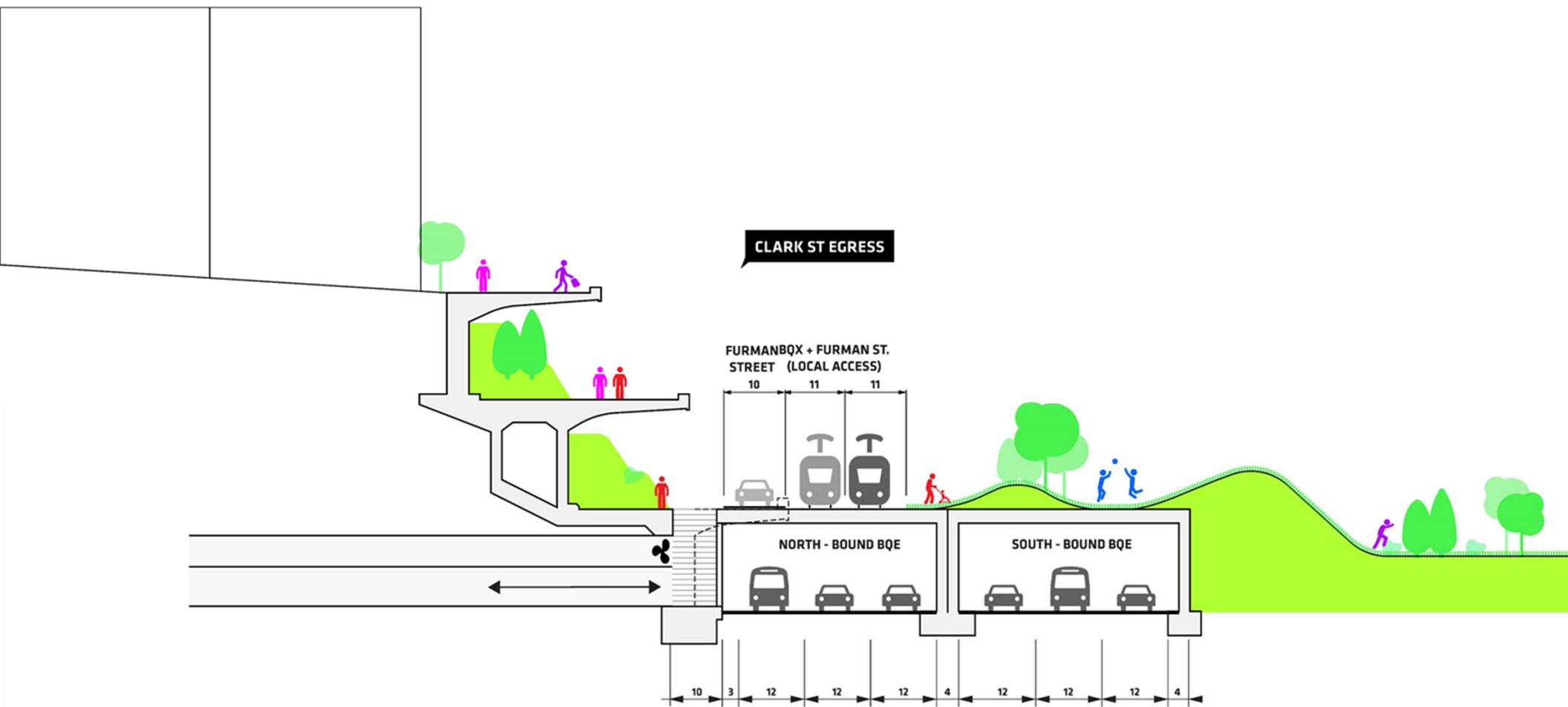
- 3 DOORWAYS (TOTAL WIDTH 9 FT)
- 2 VENTILATION GRILLS (TOTAL AREA 800 SF)
- UTILITIES AND ACCESS PANELS



MTA INFRASTRUCTURE



CAP INTERSECT WITH CLARK STREET SUBWAY EGRESS



CAP INTERSECT WITH CLARK STREET SUBWAY EGRESS



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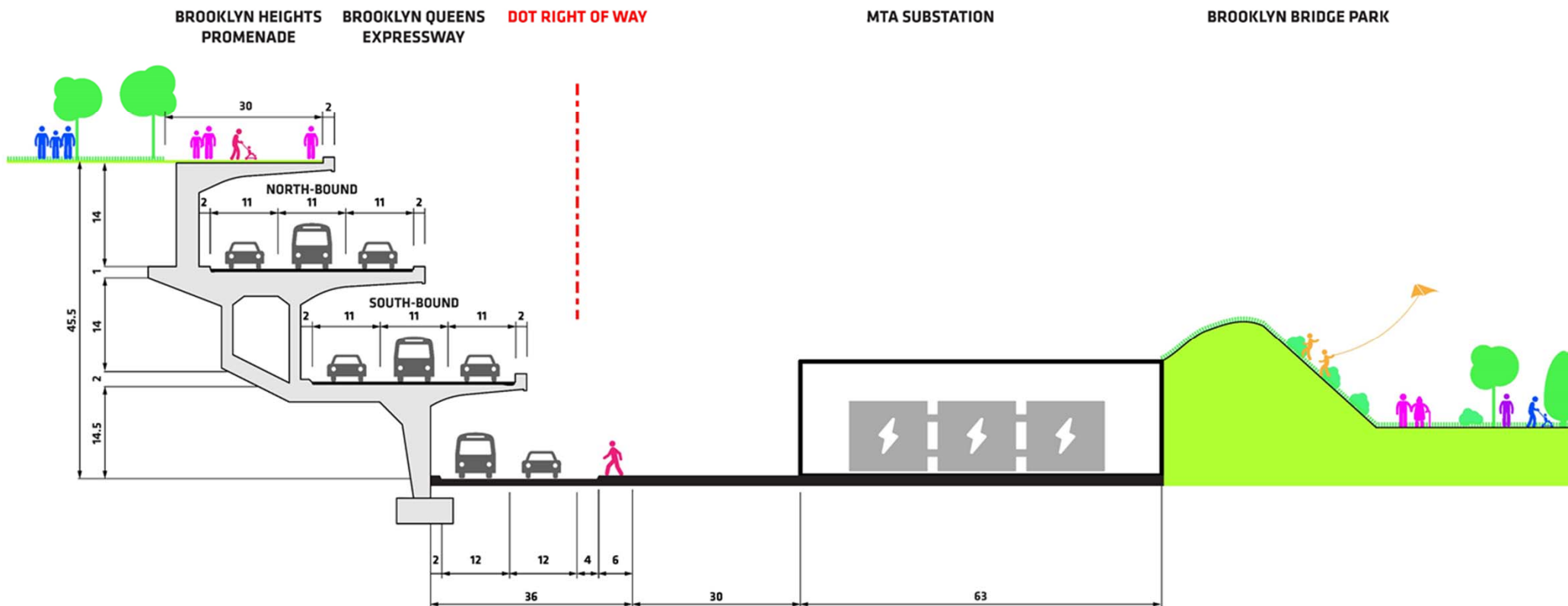
304 FURMAN STREET SUBSTATION (MTA)

- THE MTA SUBSTATION LOCATED ON THE WEST SIDE OF FURMAN STREET IS RESPONSIBLE FOR FEEDING THE LOCAL TRAIN LINES THEIR STATION LIGHTS, AND TRACK SIGNALS
- TYPICAL MTA STATION WHICH MEANS IT IS A PERMANENT STRUCTURE, THE UTILITY IS FEEDING THIS STATION WITH 4 FEEDERS, WHICH SUPPLIES POWER TO 4 UTILITY 1000 KVA TRANSFORMERS LOCATED IN A UTILITY VAULT
- THESE TRANSFORMERS PROVIDE POWER TO THE MTA SUBSTATION, THIS STATION IS PROBABLY EQUIPPED WITH 8 TRANSFORMERS, APPROPRIATE NETWORK PROTECTORS, SWITCH GEAR, AND BUS COMPARTMENT, CONSISTENT WITH THE STANDARD UTILITY/MTA PROTOCOLS AND STANDARDS DESIGNS
- ALTHOUGH THIS IS IMPORTANT TO THE MTA, THERE IS NO REASON THIS STATION CAN'T BE RELOCATED, HOWEVER IT WOULD NEED STRONG COORDINATION
- AN EXAMPLE OF THIS PERFORMED RECENTLY WAS FOR THE MTA, EAST SIDE ACCESS PROGRAM ON THE QUEENS SIDE OF THE 59 STREET BRIDGE WITH ESTIMATED COST LESS THAN \$50M

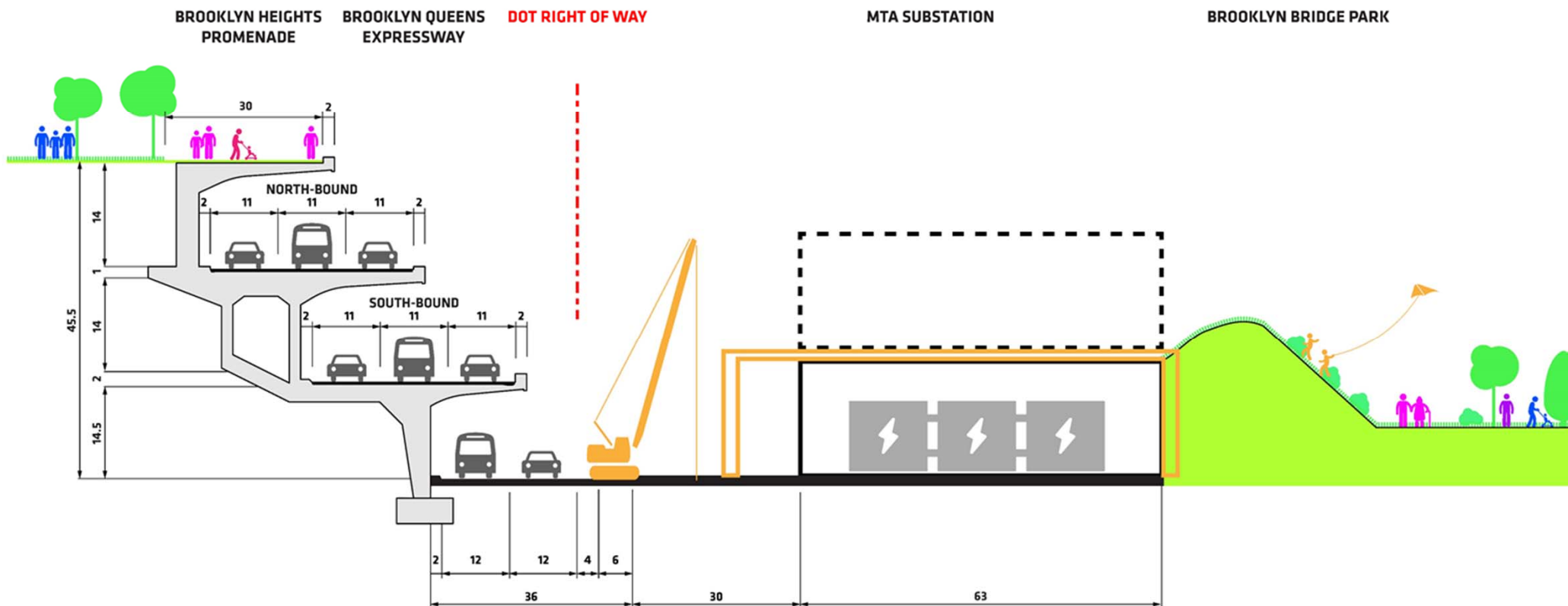


304 FURMAN STREET SUBSTATION (MTA)

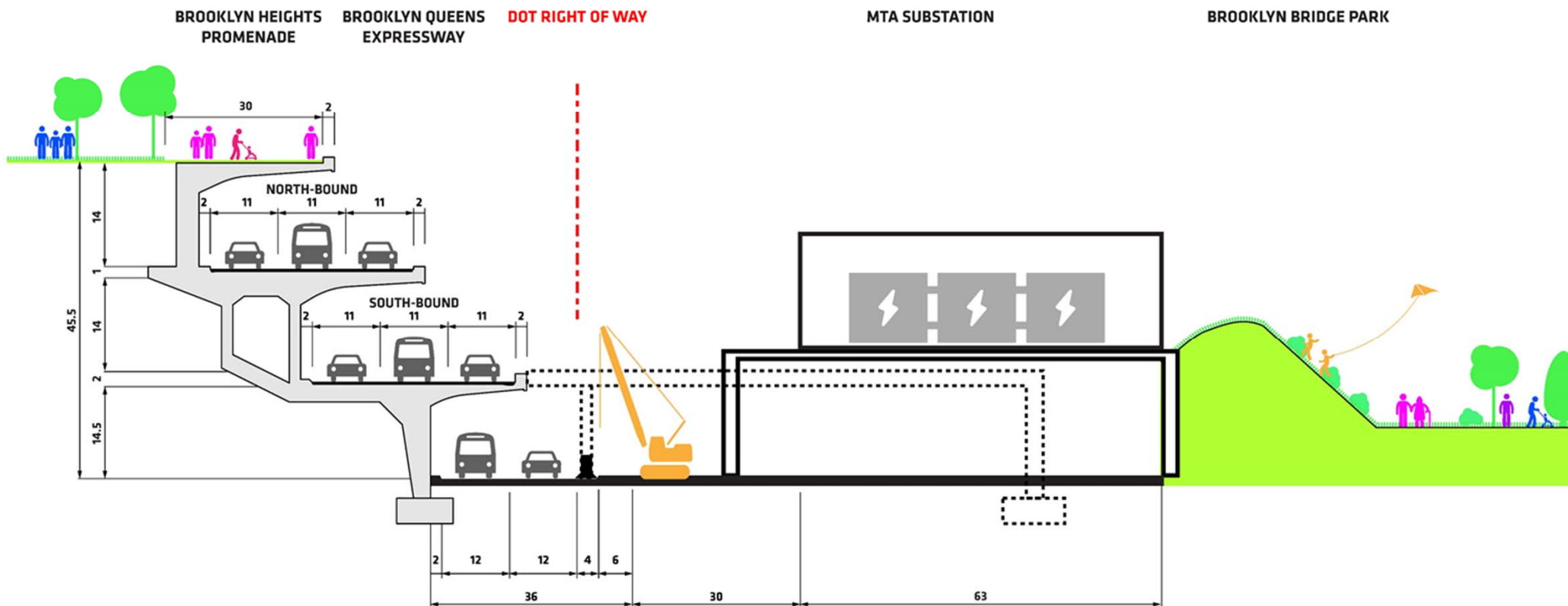
UTILITY CHALLENGE II : ELECTRICAL UTILITIES



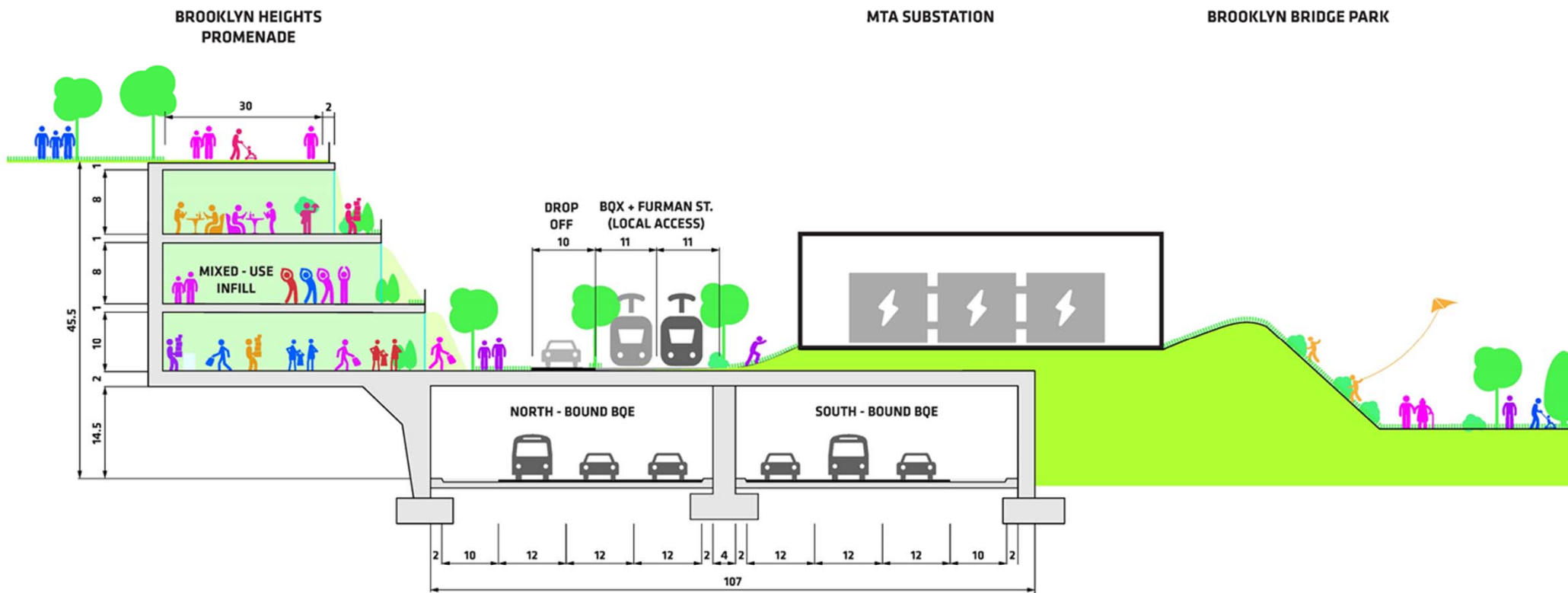
CAP INTERSECT WITH MTA SUBSTATION



CAP INTERSECT WITH MTA SUBSTATION



CAP INTERSECT WITH MTA SUBSTATION



CAP INTERSECT WITH MTA SUBSTATION



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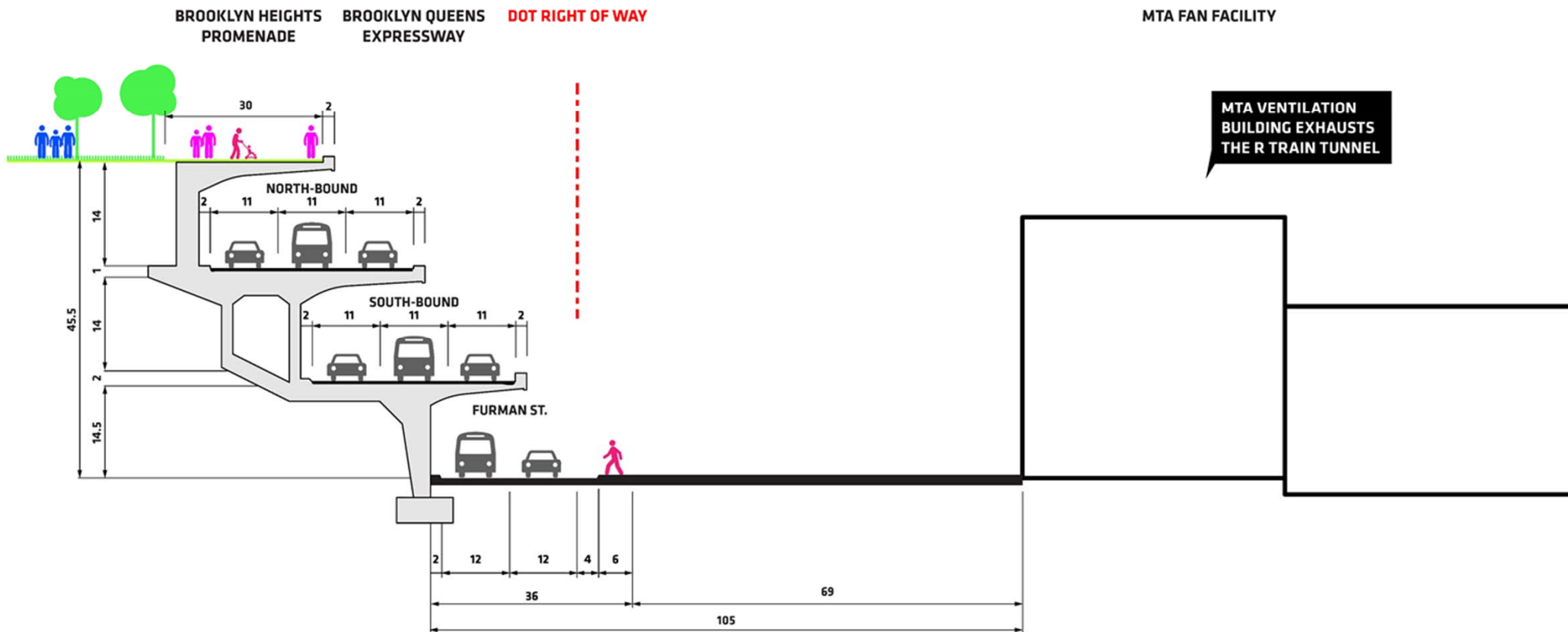
11 MONTAGUE STREET FAN PLANT (R TRAIN MTA)

- 5,000 SF FOOTPRINT
- VENTILATION AND EMERGENCY EGRESS FOR R TRAIN
- APPROX. 3,500 SF ACCESS APRON TO EAST INCLUDING +/-15 MANHOLES FOR SUBSURFACE ACCESS

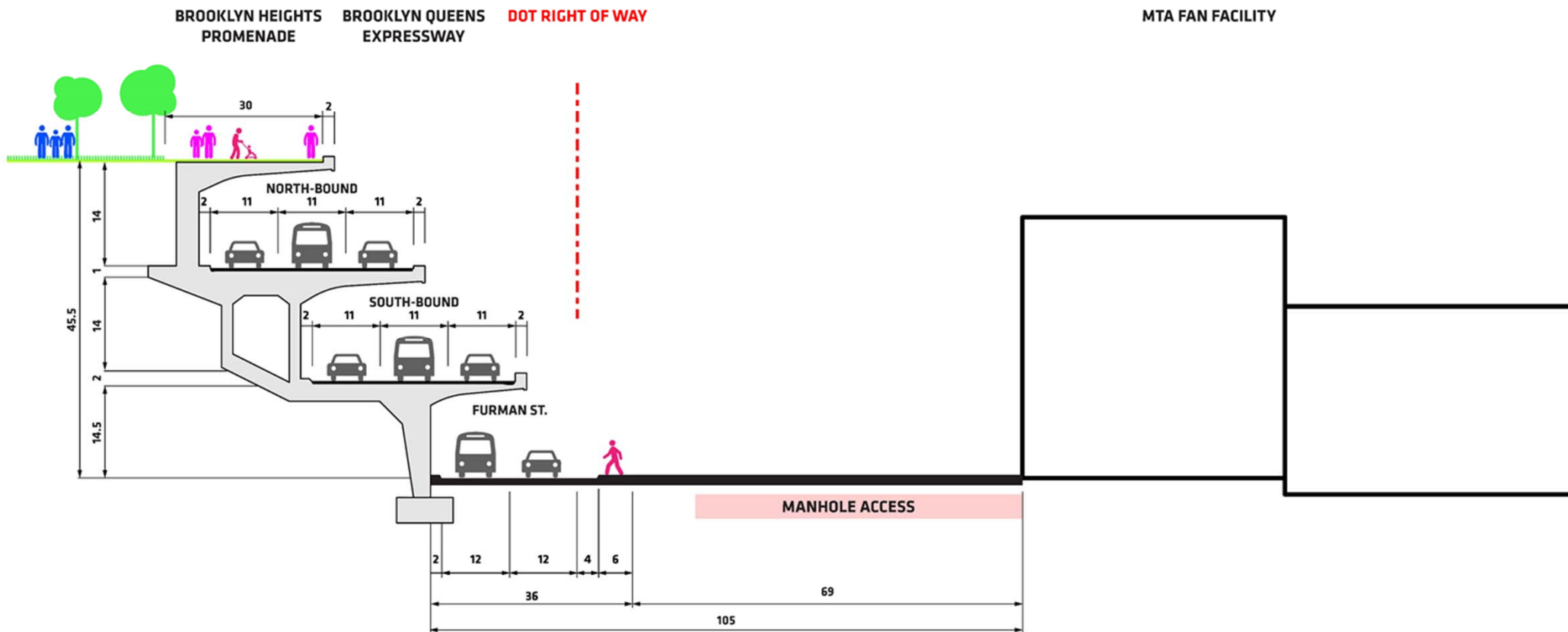


11 MONTAGUE STREET FAN PLANT

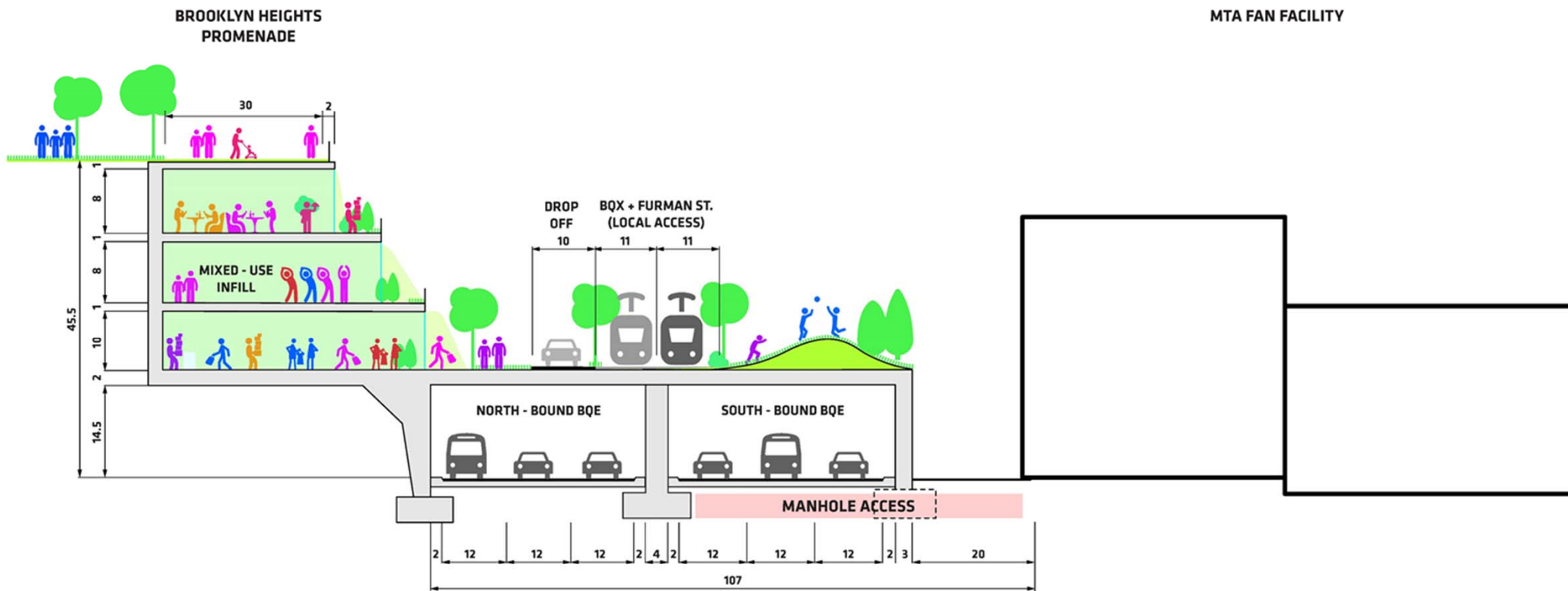
MTA INFRASTRUCTURE



CAP INTERSECT WITH MTA VENTILATION BUILDING



PROPOSED CAP INTERSECT WITH MTA VENTILATION BUILDING



PROPOSED CAP INTERSECT WITH MTA VENTILATION BUILDING



Brooklyn Bridge Park



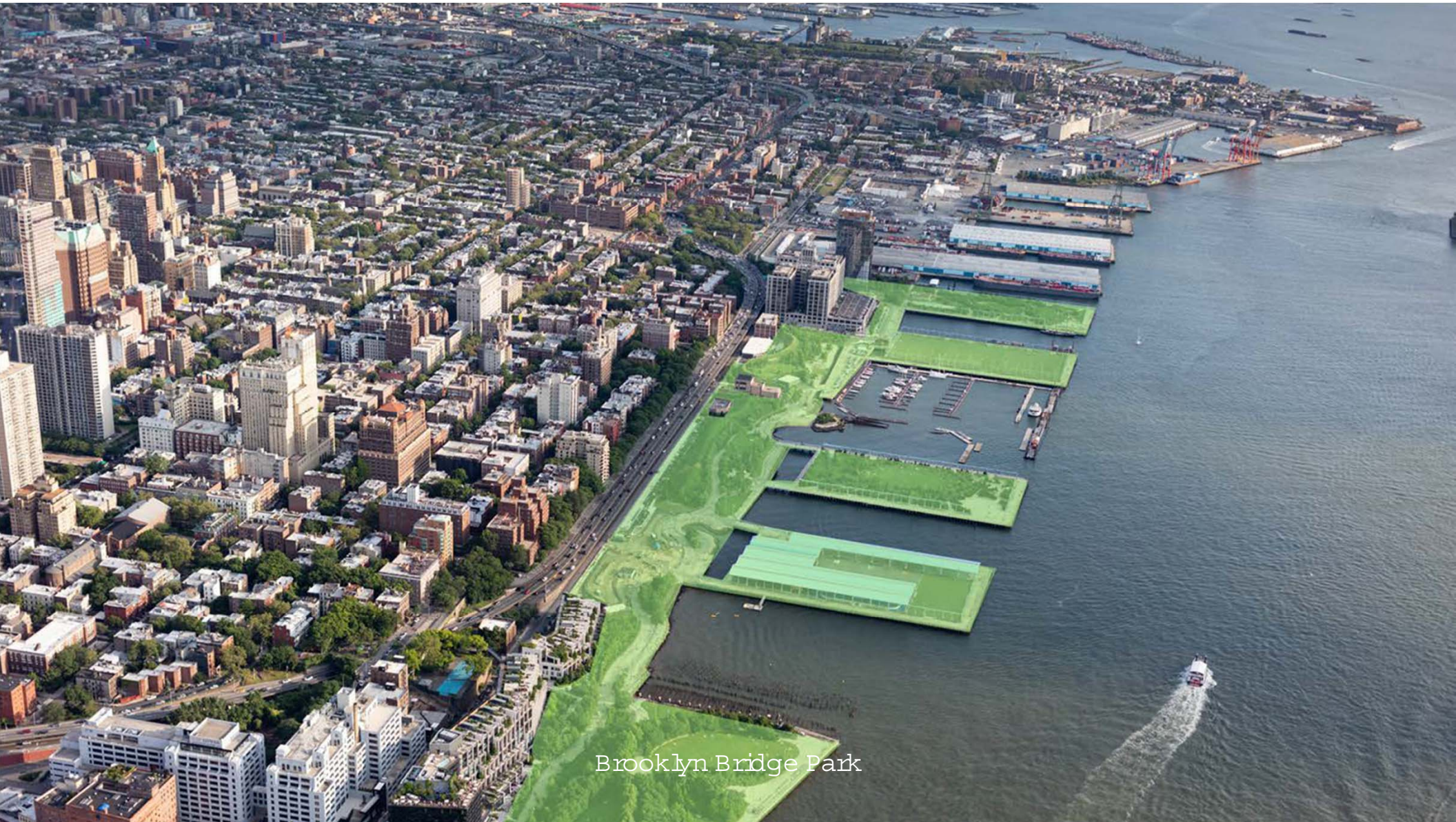
Brooklyn Bridge Park

- Construction of proposal would require 1 Acre (1.6%) of 60 Acre park to undergo regrading and reconstruction.
- BBP M + O Facility and HQ buildings to be reconstructed.
- Pier 2 Utility Building to be relocated.
- Significant positive opportunities for programming and access improvement unlocked by concept (Under Development / Michael van Valkenburgh Associates).
- Governance of new parkland would optimally be absorbed by BBP (Amendment to General Plan Required).

Overview

BQE → BQP

BBP → BQP



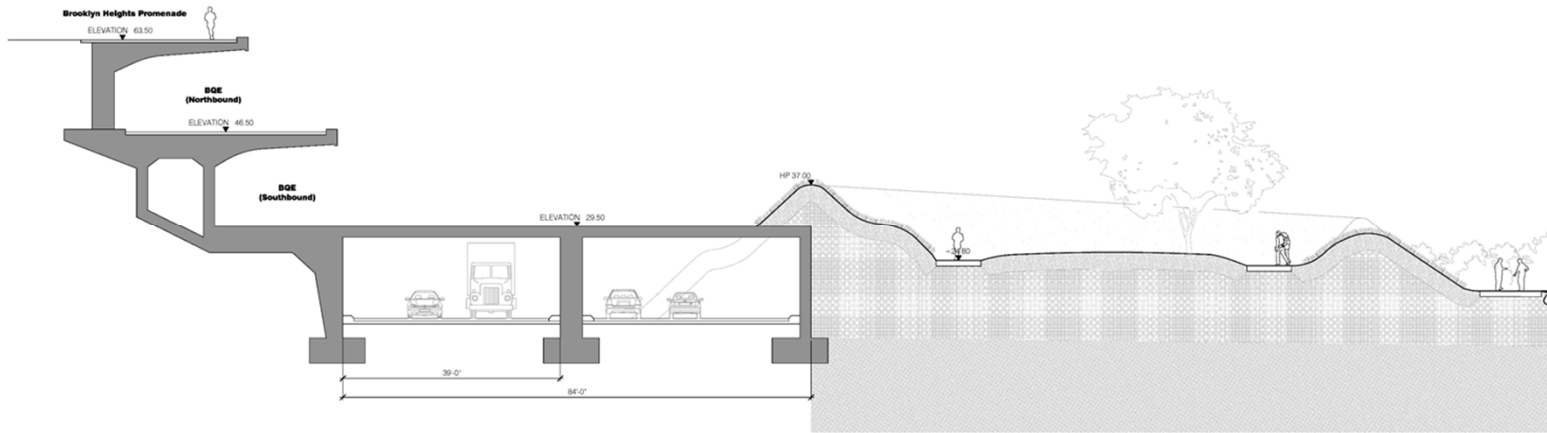
Brooklyn Bridge Park



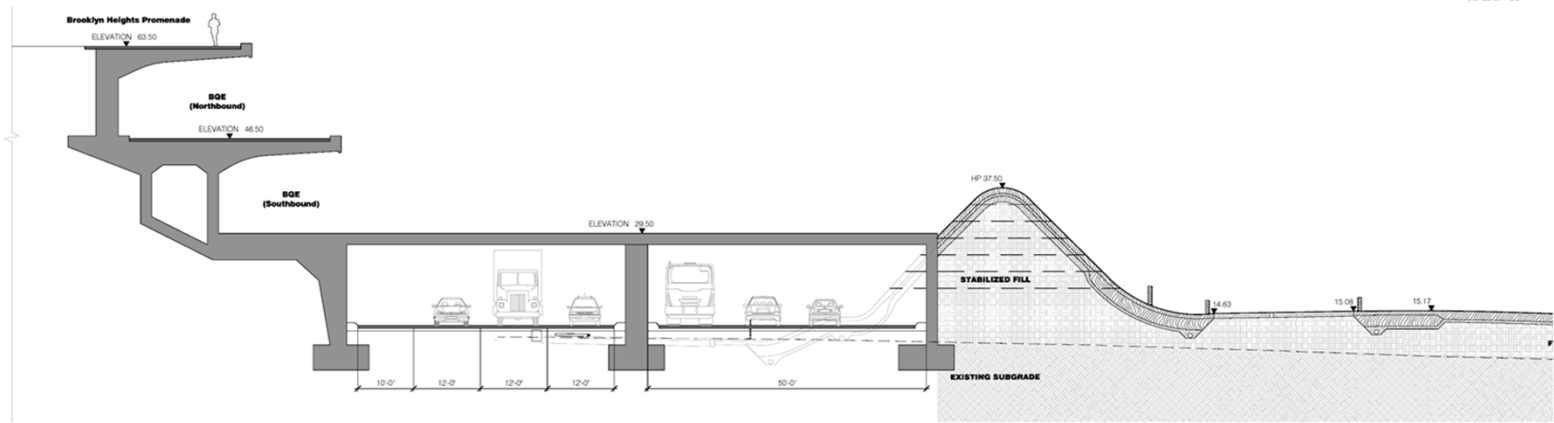
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Potential for Expansion



3 BQE - PIER 5 UPLANDS
Scale 1/8"=1'-0"



2 BQE - PIER 3 UPLANDS
Scale 1/8"=1'-0"

4 and 6 Lane Cross-Sections



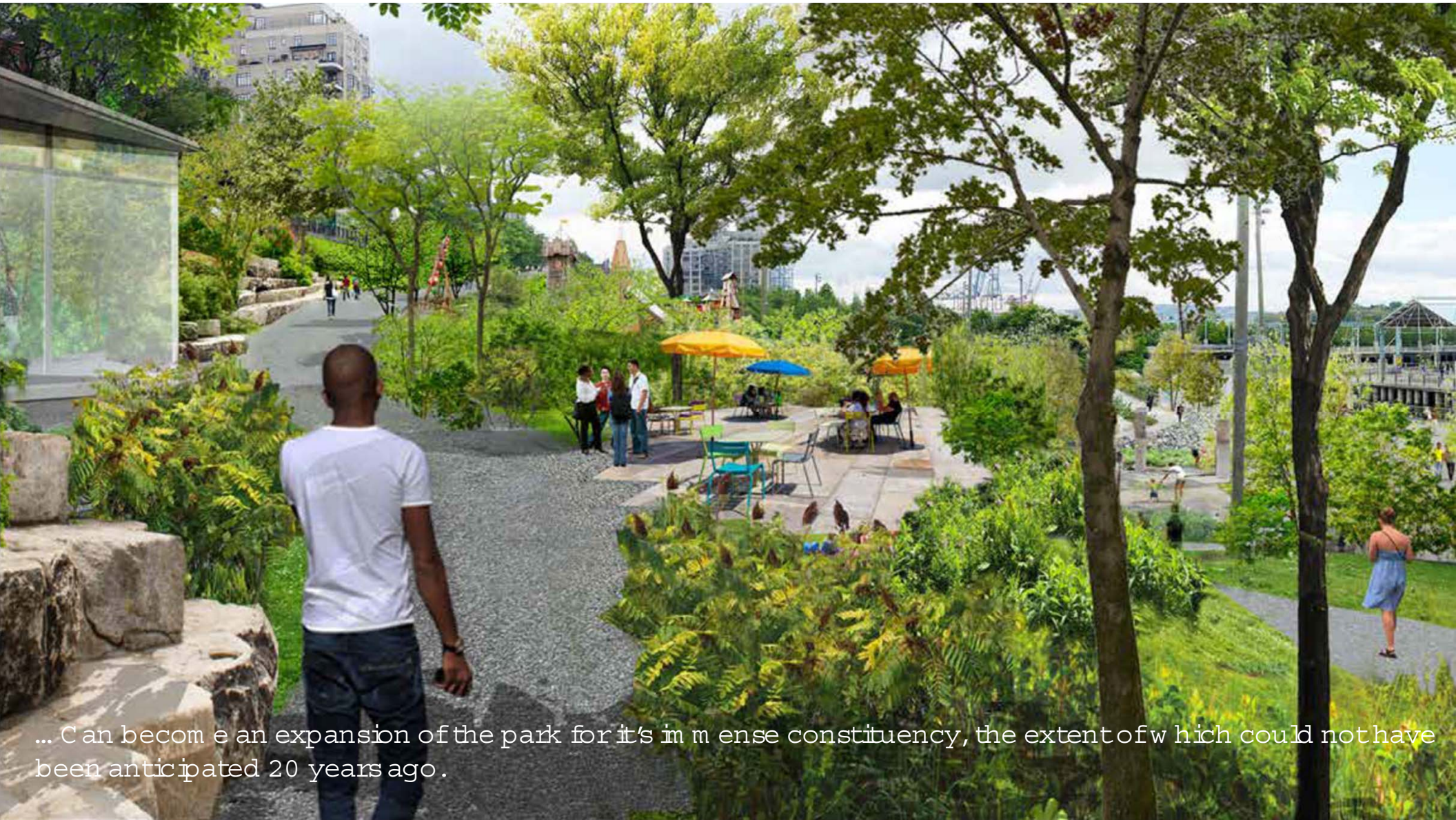
The benignly accepted infrastructure gulfbetween the park berms and esplanade...



... Can be transform ed into a show case m om ent for New York C ity !



The areas of the park originally designed to mitigate the negative impacts of the highway...



... Can become an expansion of the park for its immense constituency, the extent of which could not have been anticipated 20 years ago.



While the park design could not fully eliminate the visual and aural pollution of the BQE...



..The BQ P can accom p lish this feat, as well as introduce new activities and places that connect Brooklyn to the waterfront.



The highest occupiable area in the existing Brooklyn Bridge Park...



... Becomes the natural opportunity to build a land bridge connection to Montague Street!



... Can be transform ed into a show case m om ent for New York C ity!



... Can be transform ed into a show case m om ent for New York C ity!



A promised connection between downtown Brooklyn and Brooklyn Bridge Park ...



...Can become a welcoming threshold into the park, revealing generous views of the harbor and the city skyline.



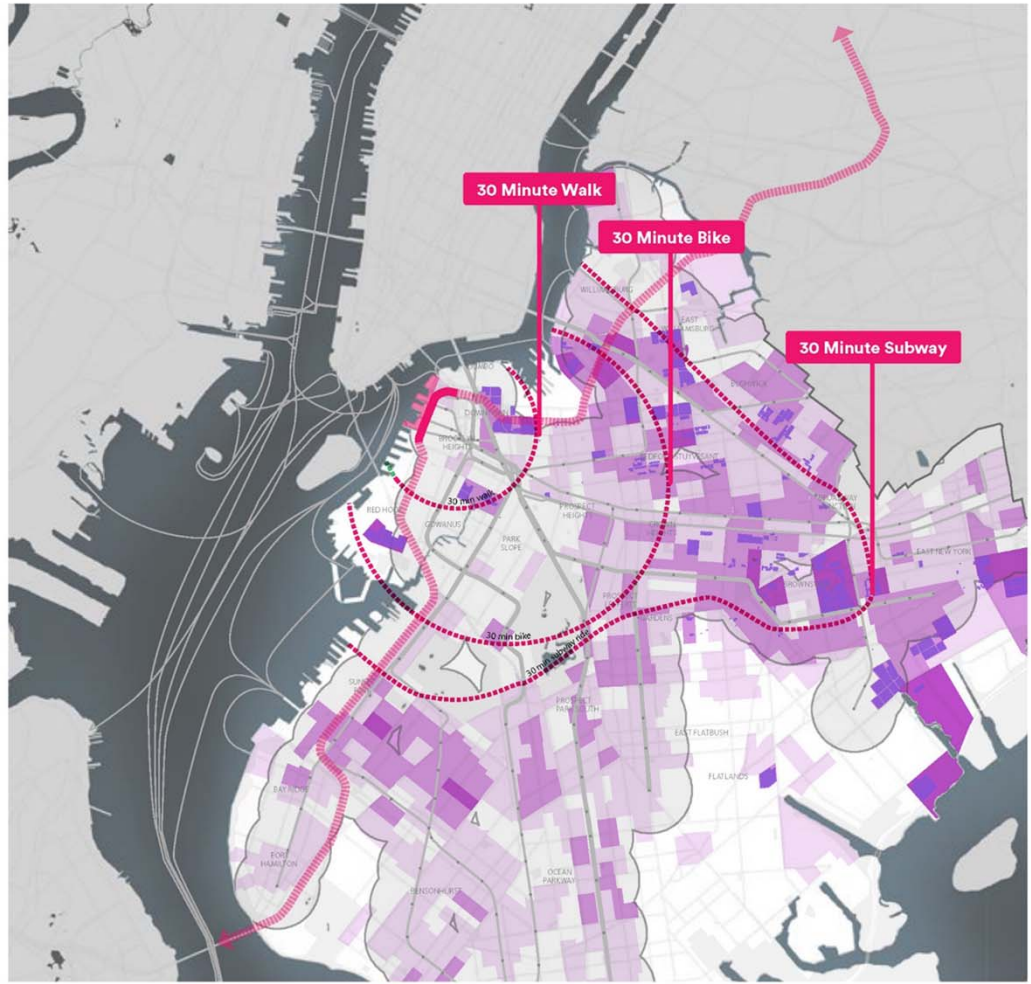
The northern end of Fum an Street which currently experiences the backside of infrastructure and development.



...Can be conveyed on a new parkway that connects to the existing parkland and new park amenities.



A Park Serving A llof Brooklyn



User-Shed



TunnelParameters



Tunnel Parameters

- Vents to be provided every 500', at roughly 200 SF each (6-8 Total within BBP).
- Condition exists in other NYC parks e.g. the Battery.
- Opportunities for carbon/particulate re-capture can be explored.
- TBC, hazardous materials will require surface routing from Atlantic Ave. to terminus of covered roadway. Current volume of Haz-Mat traffic should be determined, and is likely a small% of trips.
- Heavy trucks will be able to continue through system (e.g. Baltimore Inner Harbor, Pittsburgh Squirrel Hill, Boston Ted Williams and Tip O'Neill Tunnels).

Overview

ROADWAY VENTS

- ESTIMATED 6-8 VENTS FOR 0.5 MILE STRETCH OF THE BURIED ROADWAY ALONG BBP.
- VENTS APPROXIMATELY 200 SQUARE FEET EACH
- SPACING APPROXIMATELY EVERY 400-500 FEET

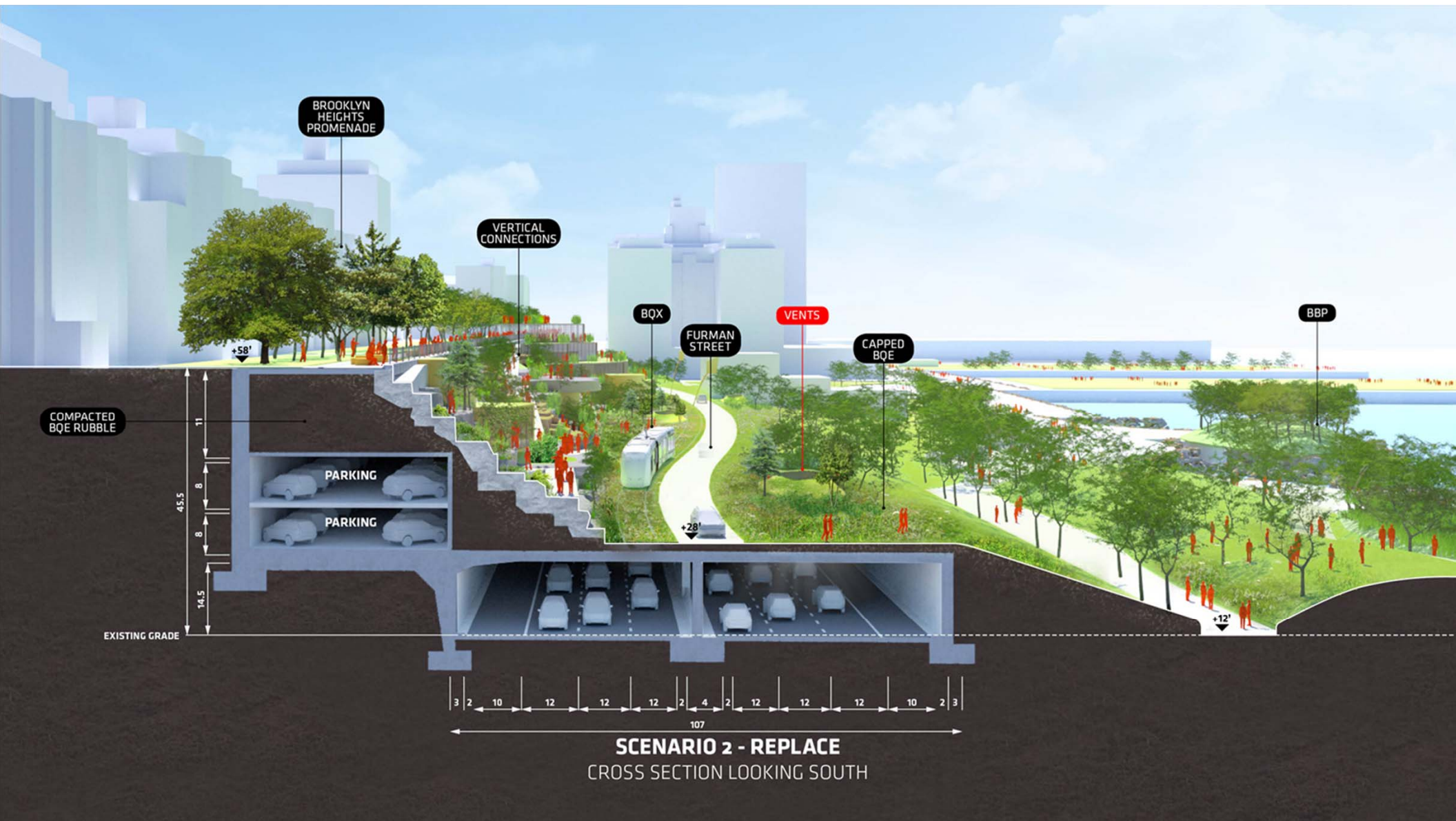


BROOKLYN BATTERY TUNNEL VENTS - BATTERY PARK

ROADWAY VENTING



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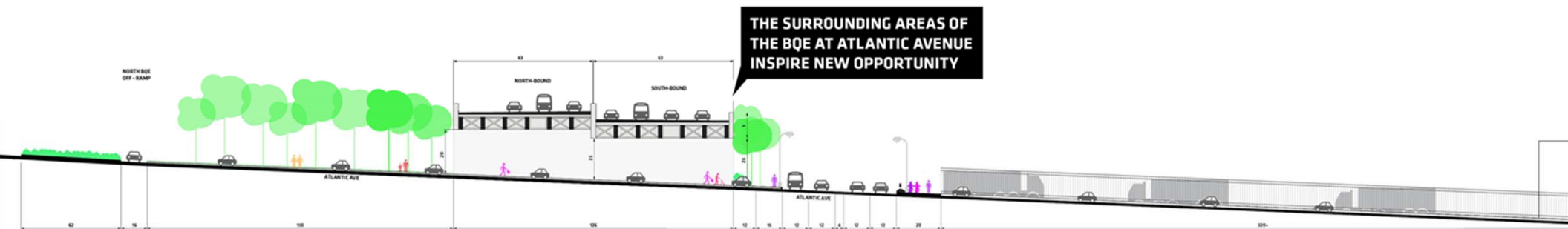
Atlantic Avenue



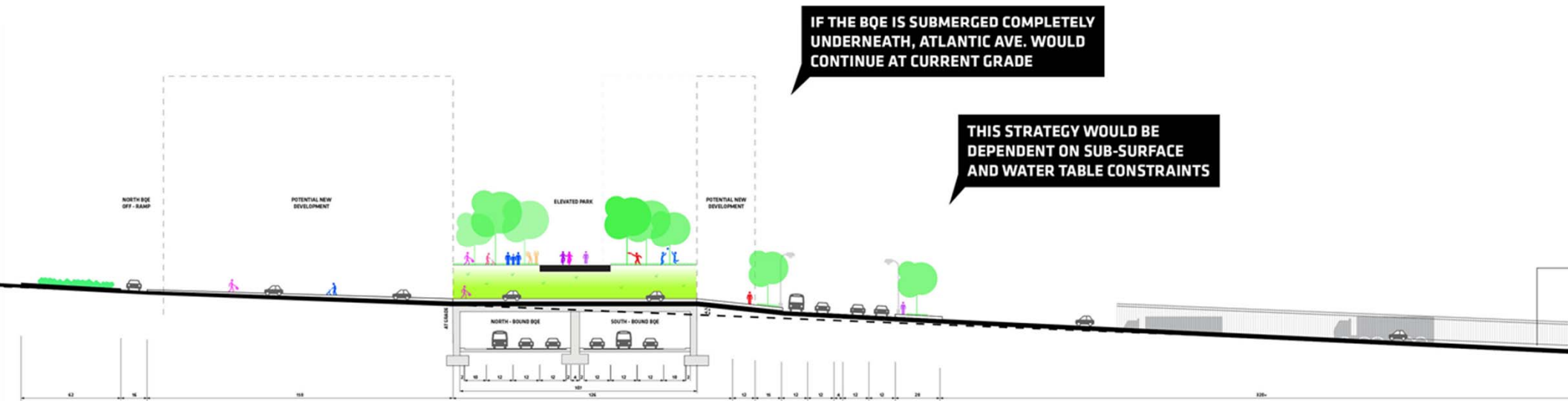
Atlantic Avenue

- New roadway to continue below grade from 360 Furman St., matching into Cobble Hill trench.
- Dangerous on/off ramp conditions can be addressed and reconfigured.
- Vastly improved urban conditions along Atlantic Ave. provide opportunity for creation of additional parkland, as well as revenue generating potential if deemed necessary or desirable.

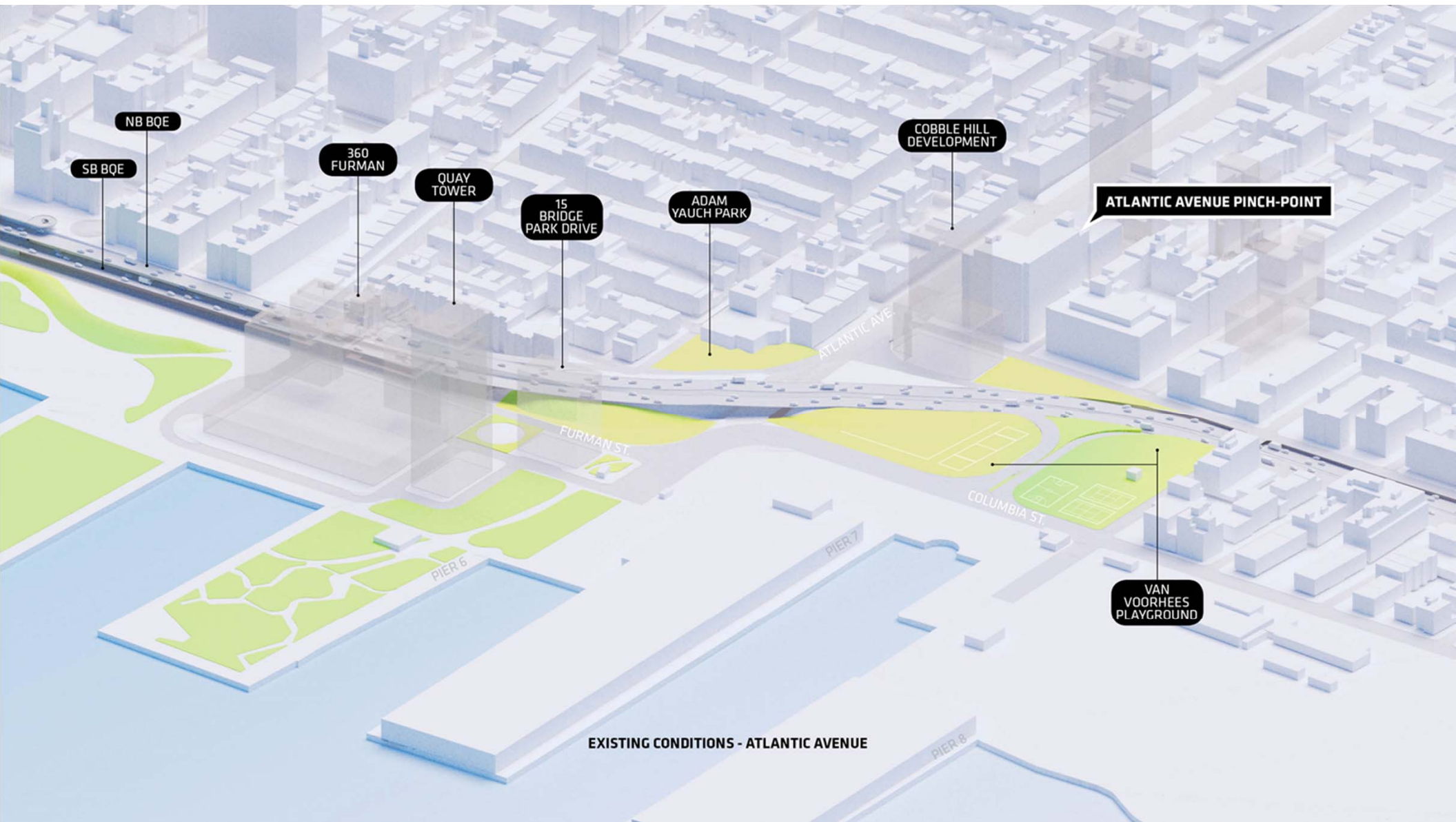
Overview



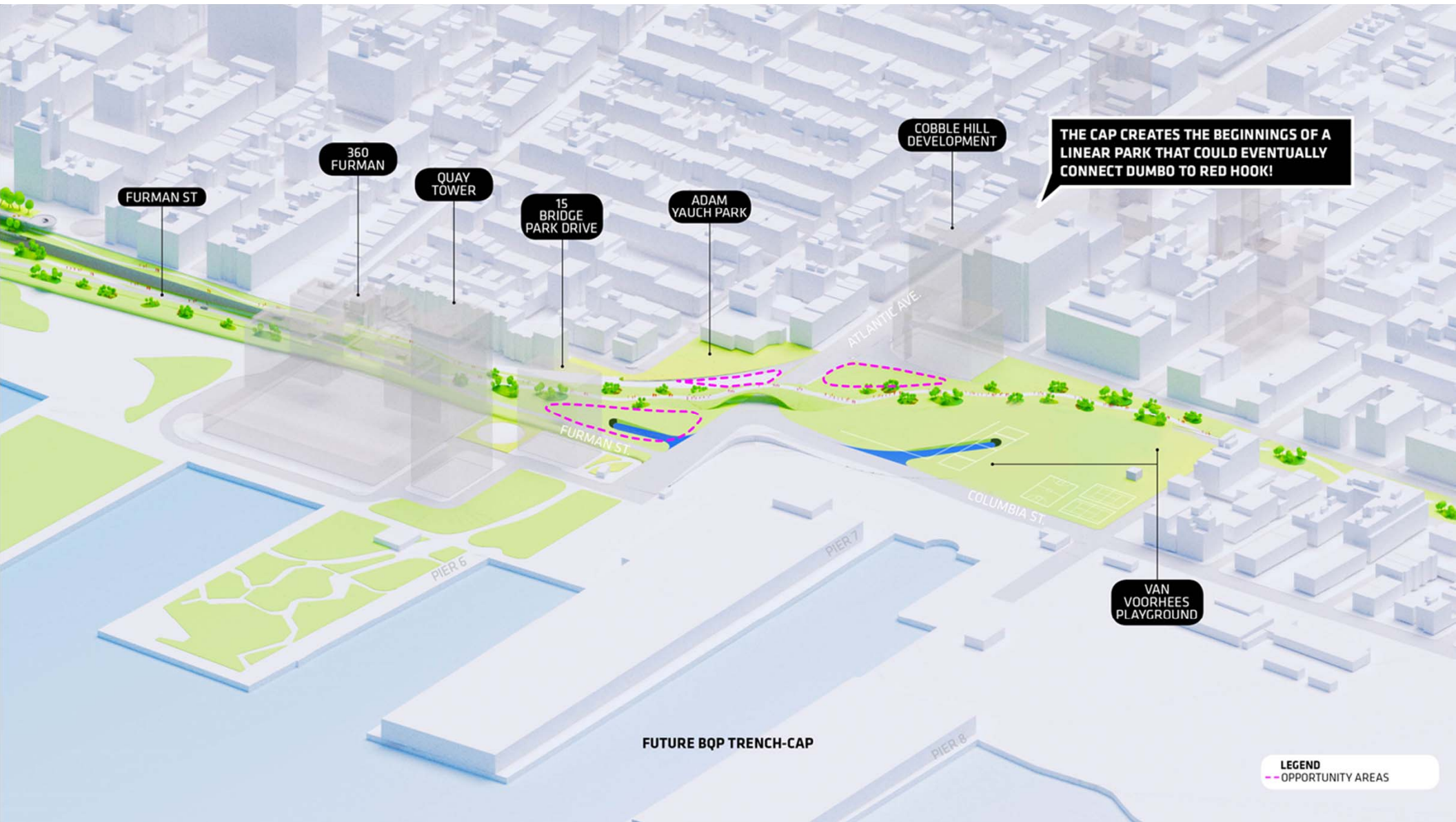
EXISTING CROSS SECTION ATLANTIC AVE.
BQE SECTION AT BBP



**PROPOSED CROSS SECTION ATLANTIC AVE.
BQE SECTION AT BBP**



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C o l u m b i a H e i g h t s

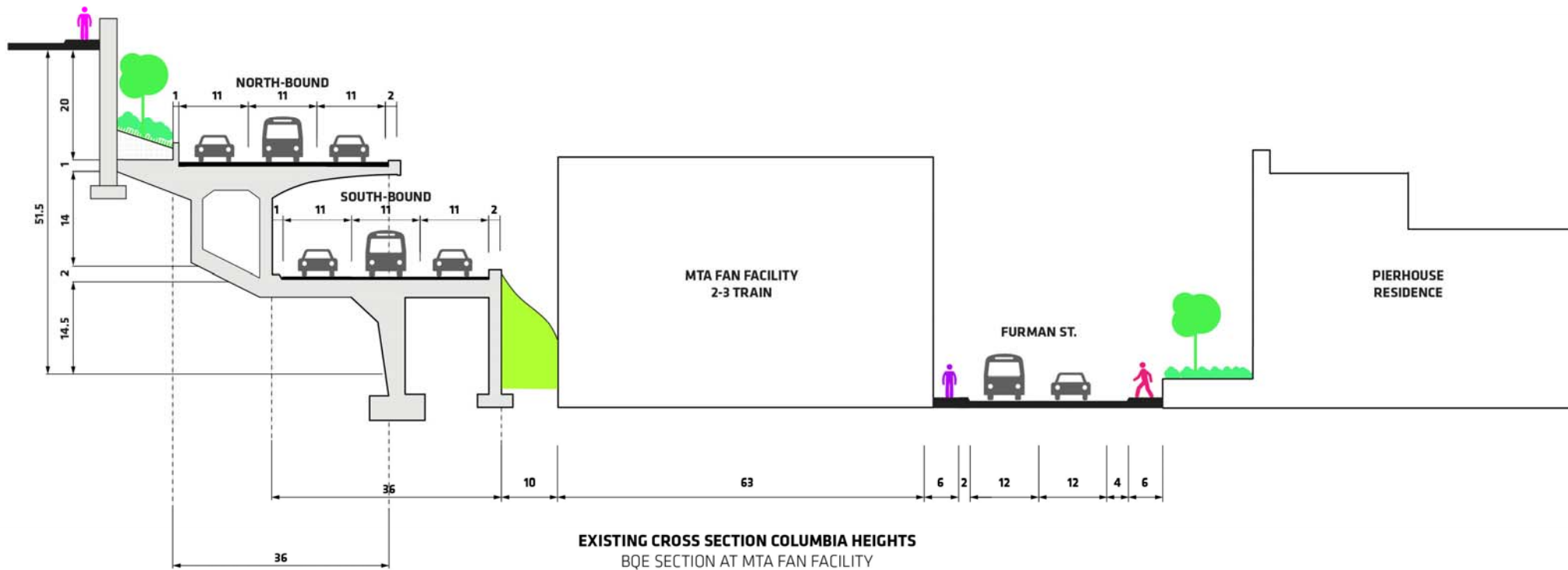


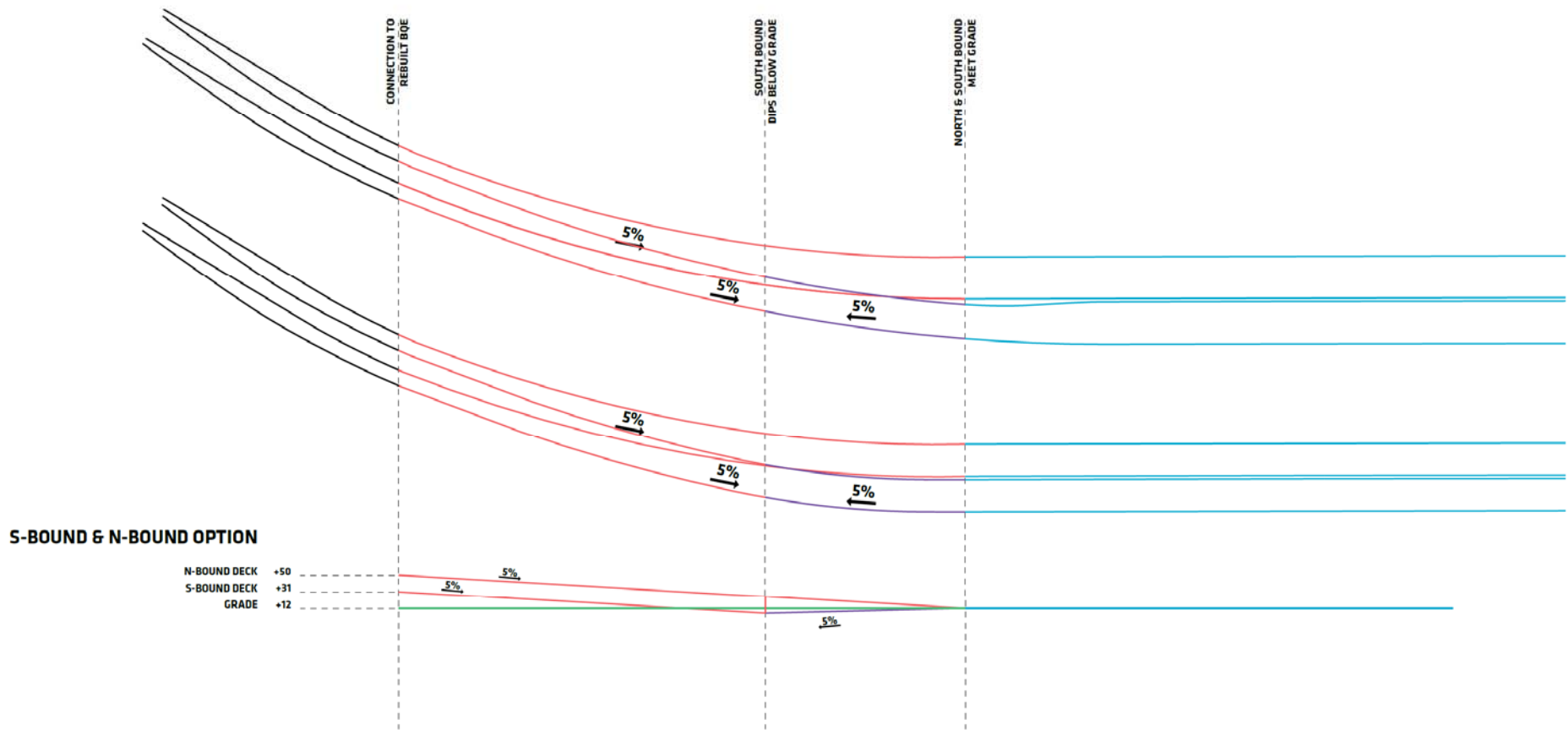
Columbia Heights

- Roadway to transition from at-grade to double stacked before Columbia Heights bridge, at 5% slope and 1060' minimum radius (Federal Standards).
- Potential for park deck to climb with roadway, creating new connection from BBP to Columbia Heights Bridge.
- Additional study should be undertaken to determine opportunities for urban improvements north of Columbia Heights, including ramp connectivity to Brooklyn and Manhattan Bridges.

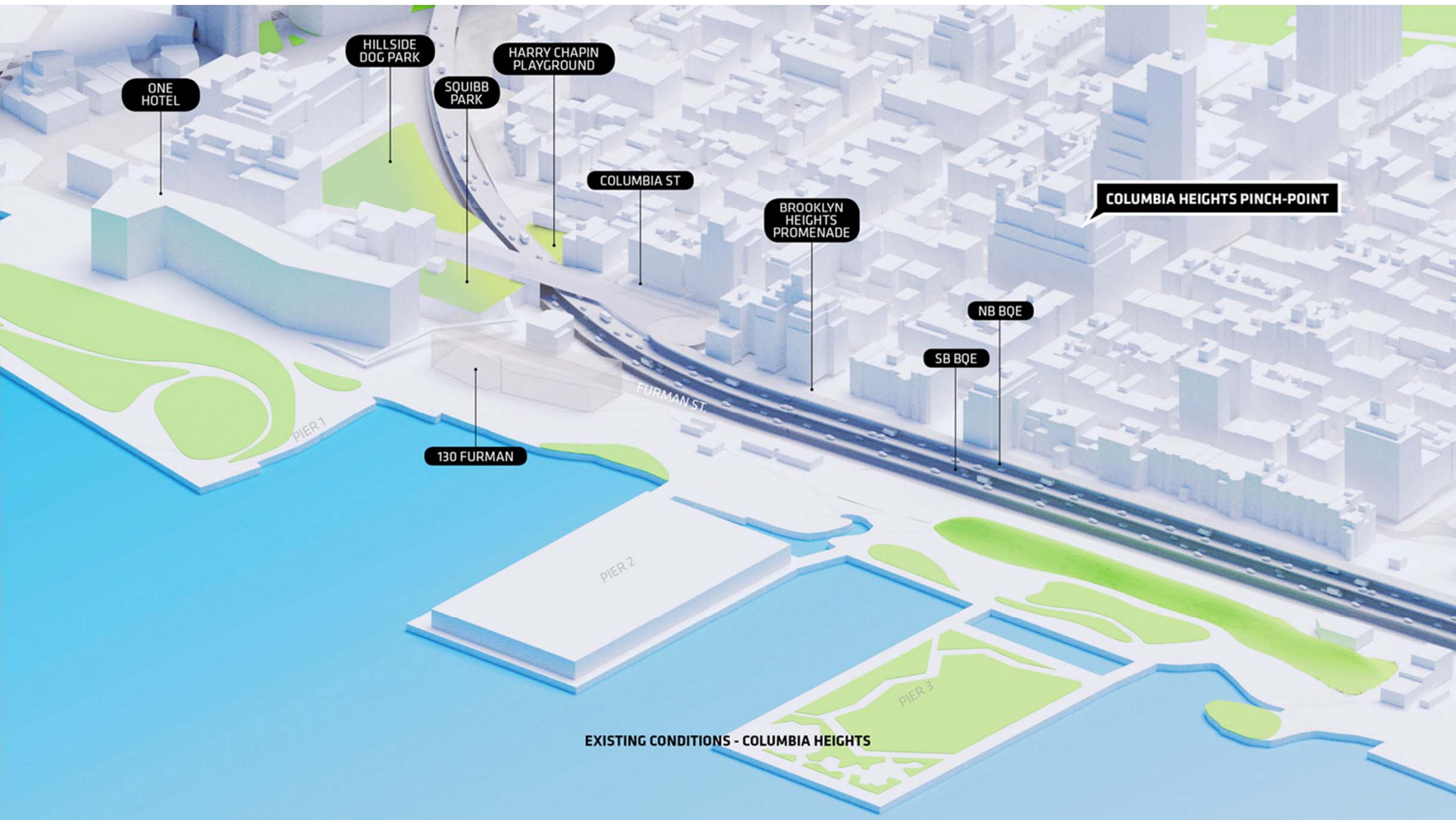
Overview

**BROOKLYN HEIGHTS
PROMENADE**

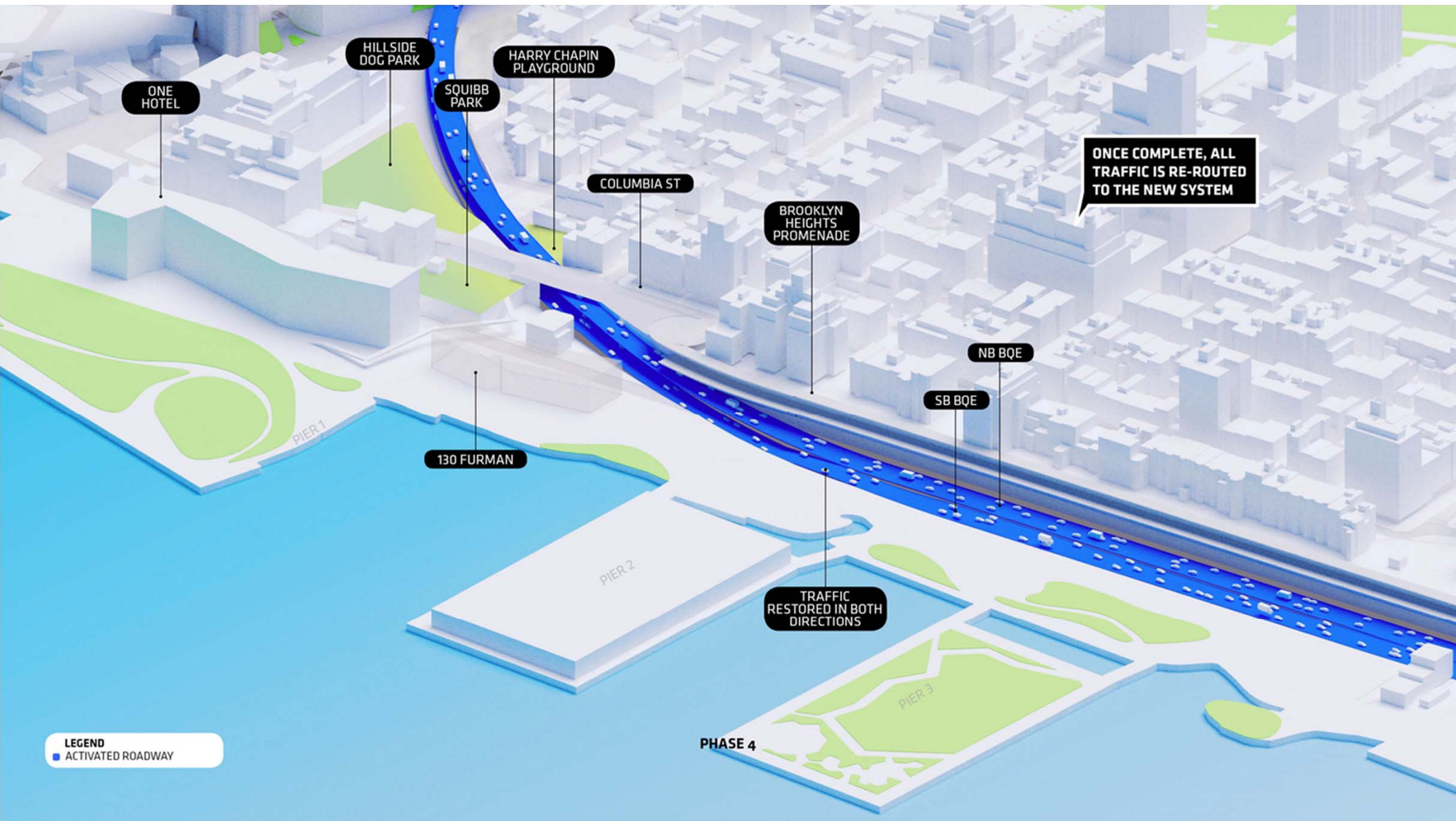




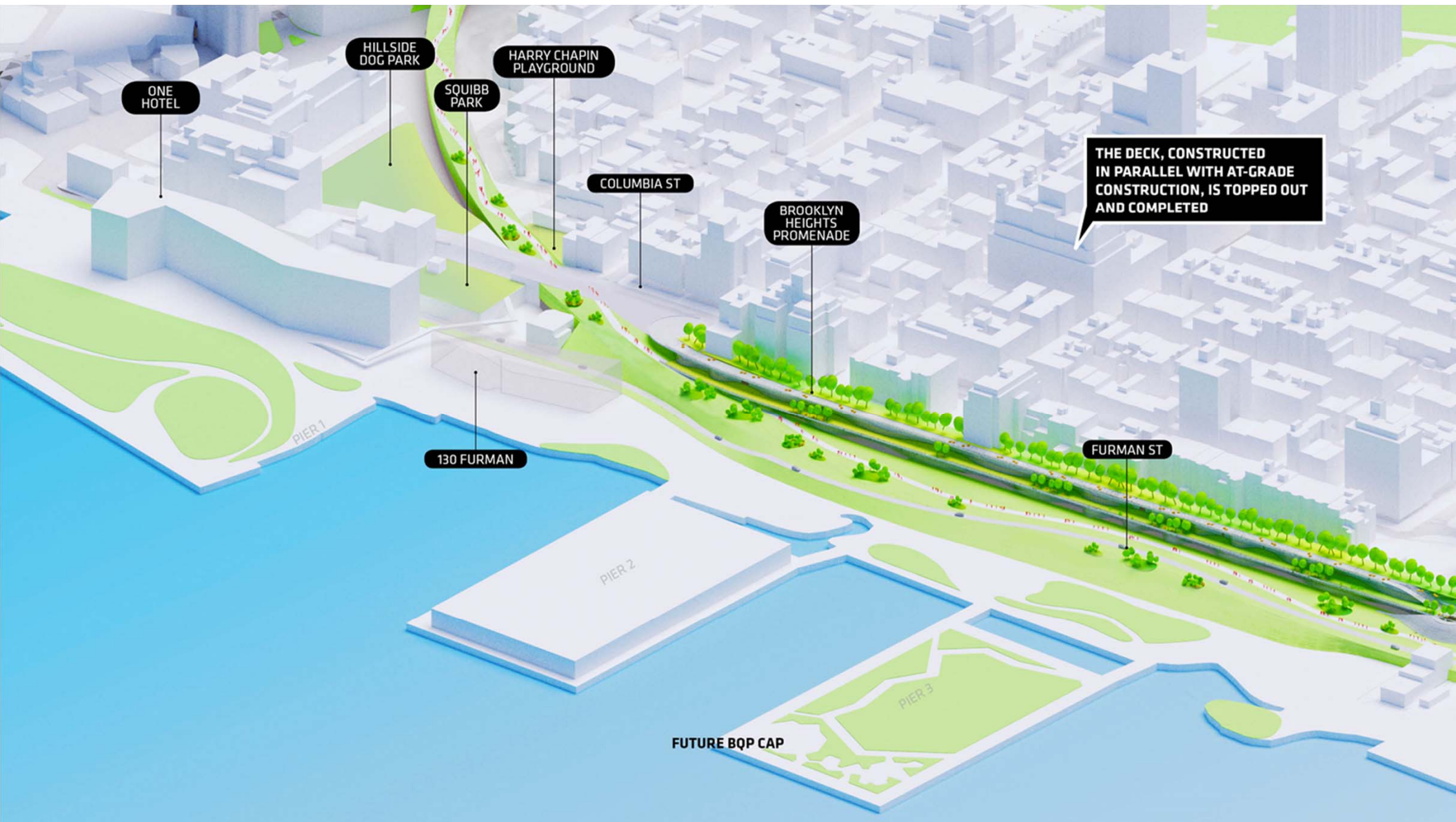
Transition Geometry



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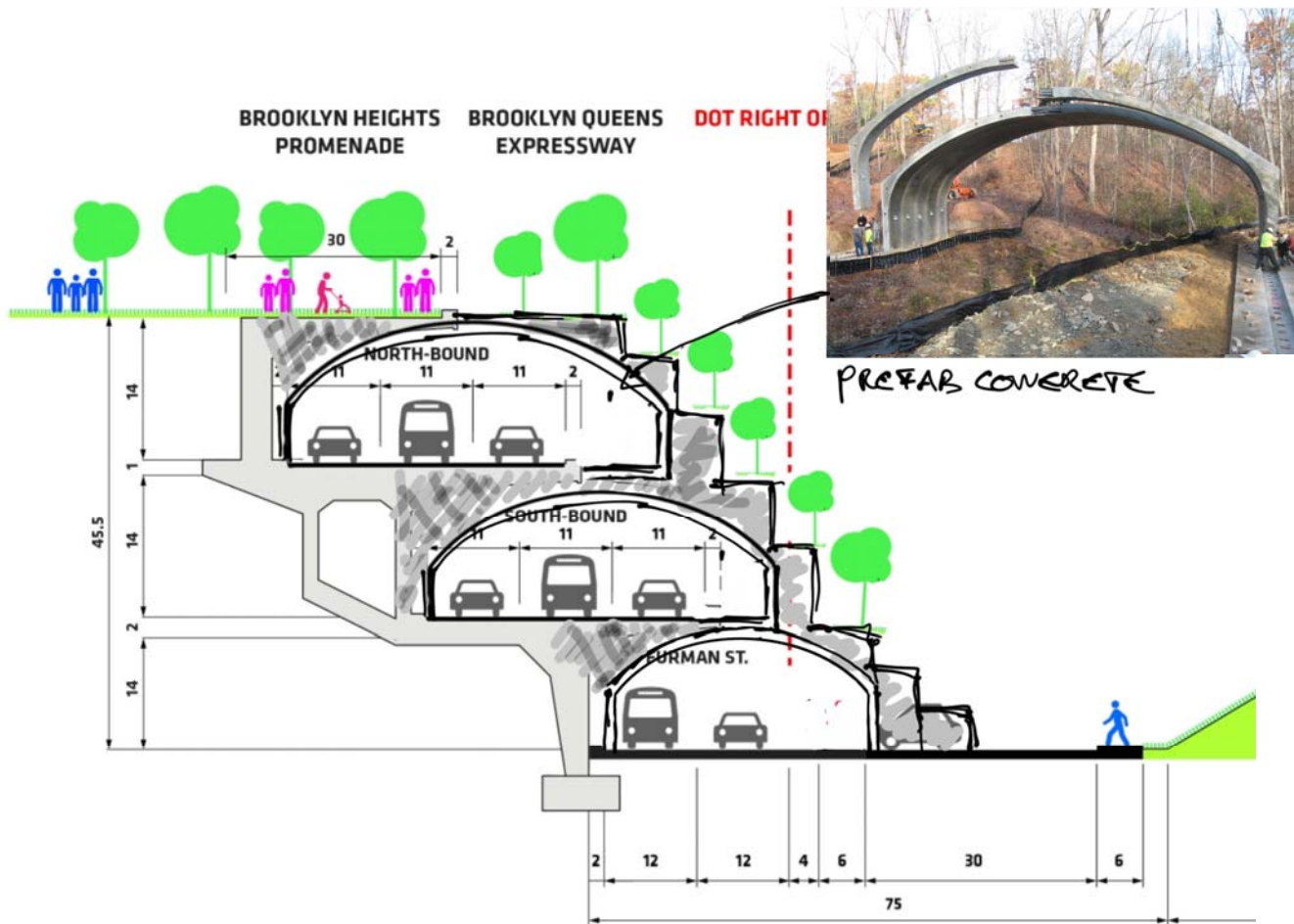
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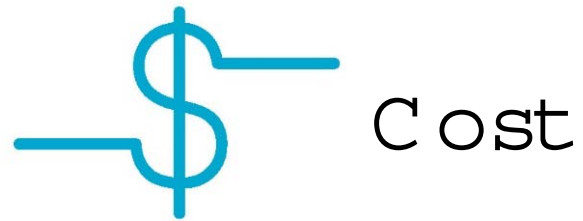
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Rehabilitation Concepts



BQP REHAB ALTERNATIVE

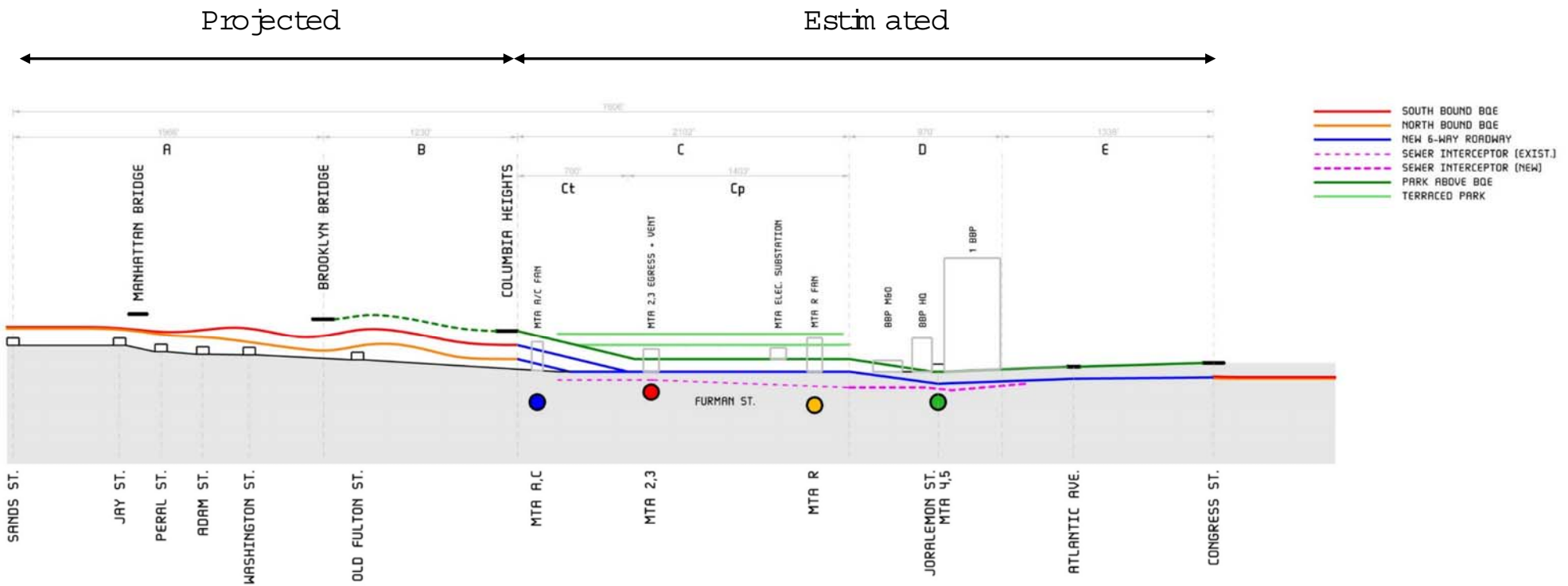




Cost

- An order of magnitude estimate is being prepared by VJ Associates and Arcadis.
- The current estimate supports assumptions that an at-grade scheme of 6 or 4 lanes can be built at less cost than the current baseline alternative.
- If desired, the BQP scheme provides opportunities for revenue generation that can help buy down costs further.

Overview



Proposed Profile and Costing Reaches

DRAFT

Scenario 1 – Repurpose (6 Lanes)

Columbia Heights Through Atlantic Avenue

\$1.6 Billion (Inclusive Services, Markups)

Sands Street Through Columbia Heights

\$1.4 Billion (Projected, at \$447,000 per Linear Foot)

Draft Total

\$3.0 Billion

(4 Lanes)

Columbia Heights Through Atlantic Avenue

\$1.4 Billion (Inclusive Services, Markups)

Sands Street Through Columbia Heights

\$1.2 Billion (Projected, at \$395,000 per Linear Foot)

Draft Total

\$2.6 Billion

All Estimates Include:

Clark St. 2/3 Egress Modifications (\$5 Million)

MTA Sub-Station Reconstruction (\$100 Million)

BBP HQ, M+O Reconstruction (\$25 Million)

Optional:

1000' DEP Sewer Interceptor Reconstruction (\$100 Million)

Franchised Utility Reconstruction (\$100 Million)

Draft Estimate

DRAFT

Scenario 2 - Replace (6 Lanes)

Columbia Heights Through Atlantic Avenue

\$1.8 Billion (Inclusive Services, Markups)

Sands Street Through Columbia Heights

\$1.4 Billion (Projected, at \$447,000 per Linear Foot)

Draft Total

\$3.2 Billion

(4 Lanes)

Columbia Heights Through Atlantic Avenue

\$1.6 Billion (Inclusive Services, Markups)

Sands Street Through Columbia Heights

\$1.2 Billion (Projected, at \$395,000 per Linear Foot)

Draft Total

\$2.8 Billion

All Estimates Include:

Clark St. 2/3 Egress Modifications (\$5 Million)

MTA Sub-Station Reconstruction (\$100 Million)

BBP HQ, M+O Reconstruction (\$25 Million)

Optional:

1000' DEP Sewer Interceptor Reconstruction (\$100 Million)

Franchised Utility Reconstruction (\$100 Million)

Draft Estimate

DOT Cost Estimates

Temporary Elevated Roadway: \$3.2-3.6 Billion

Incremental Lane-by-Lane: \$3.4-4 Billion

Do DOT estimates represent construction costs or total project costs?

If total project cost, do estimates include:

Inflation

Mark-ups

A/E Fee

Bonds and Insurance

PM Cost

Utility Cost

CEI

Is it possible to share DOT estimate for Sands Street through Columbia Heights only?

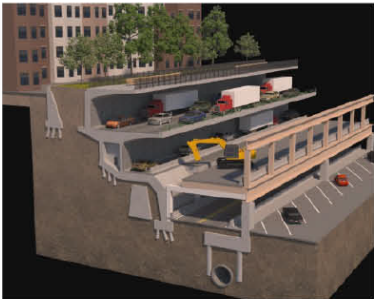
Questions

Construction Methods



Innovative Approach – Temporary Elevated Roadway

- 100 year useful life; \$3.2 - \$3.6 billion
- Anticipated 6 year construction duration (to substantial completion)
- Greatest opportunity for safety, congestion reduction, noise/vibration reduction, connectivity, and aesthetic benefits
- Greatest certainty of cost and schedule
- Dramatic community impact (particularly on Promenade)



Traditional Approach – Incremental Lane-by-Lane Construction

- 100 year useful life; \$3.4 - \$4 billion
- Anticipated 8+ year construction duration (to substantial completion)
- Opportunity for safety benefits, but does not realize broader potential community improvements
- Significant uncertainty in cost and schedule
- Avoids dramatic Promenade impacts, but has major impact on much larger group of residents and drivers

Baseline Estimates