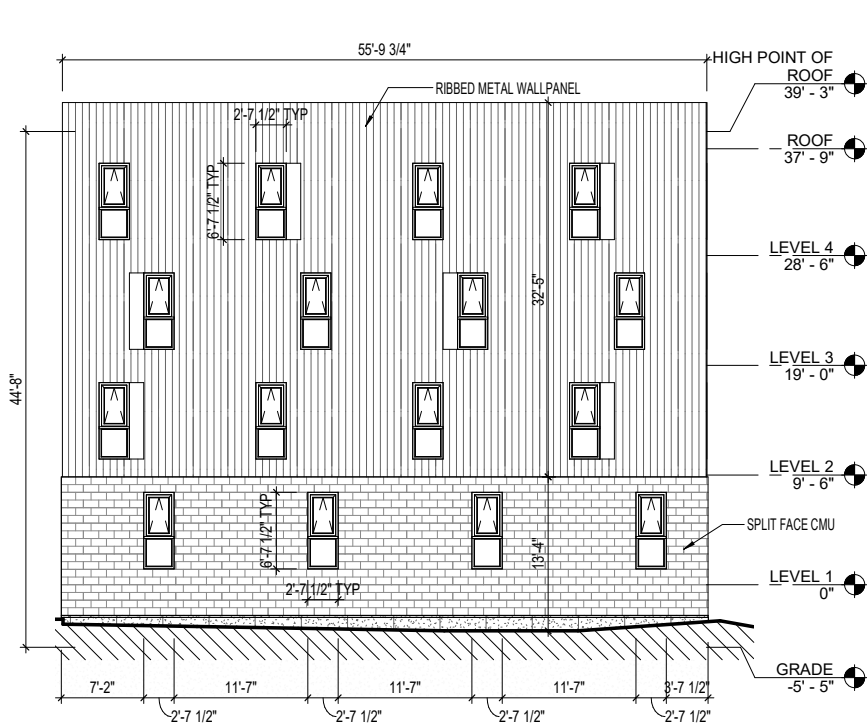


BUILDING 4
ELEVATIONS AND MATERIALS



BUILDING 4

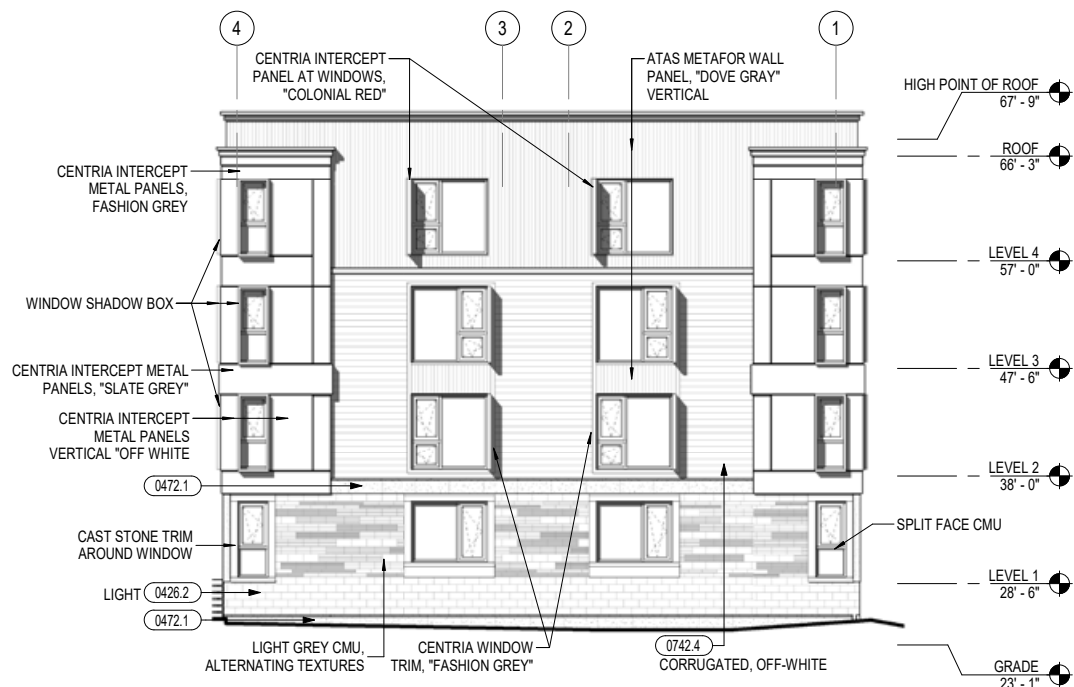
PREVIOUS AND CURRENT ELEVATIONS



► PREVIOUS WEST ELEVATION - MAIN ST



► PREVIOUS WEST ELEVATION - COURTYARD



► CURRENT WEST ELEVATION - MAIN ST



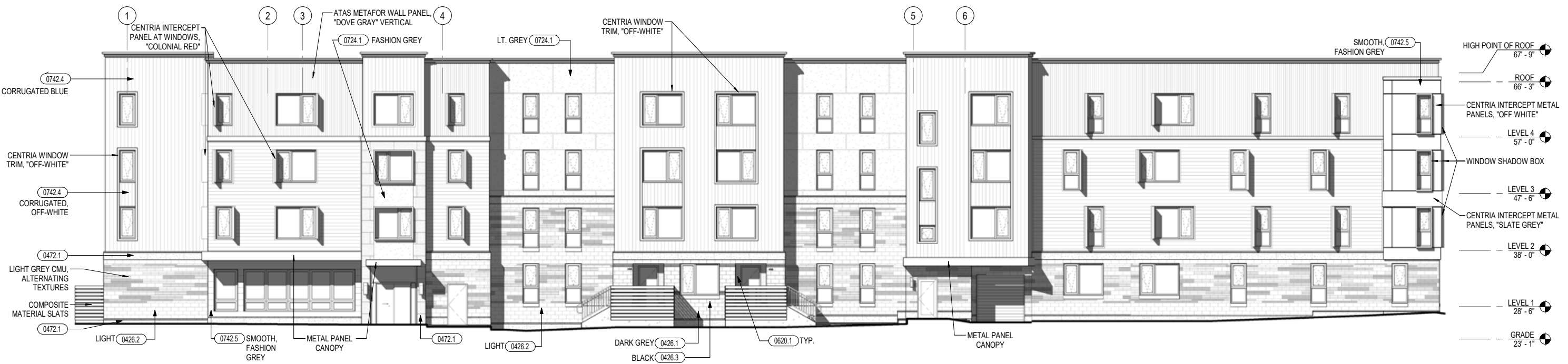
► CURRENT WEST ELEVATION - COURTYARD

BUILDING 4

PREVIOUS AND CURRENT ELEVATIONS



PREVIOUS EAST ELEVATION - EAST ST



CURRENT EAST ELEVATION - EAST ST

BUILDING 4 ELEVATIONS

Added larger windows at prominent Main Street views to give more formality and continuity to Main Street

Restricted use of EIFS to less prominent recessed bays, relegated only to upper floors

More developed courtyard building entry to activate building corner and strengthen visual cues. Added roof terrace to enhance public connection to courtyard and provide community space.

Additional detailing at windows to create a second layer of scale while increasing presence of windows

► WEST ELEVATION (COURTYARD)



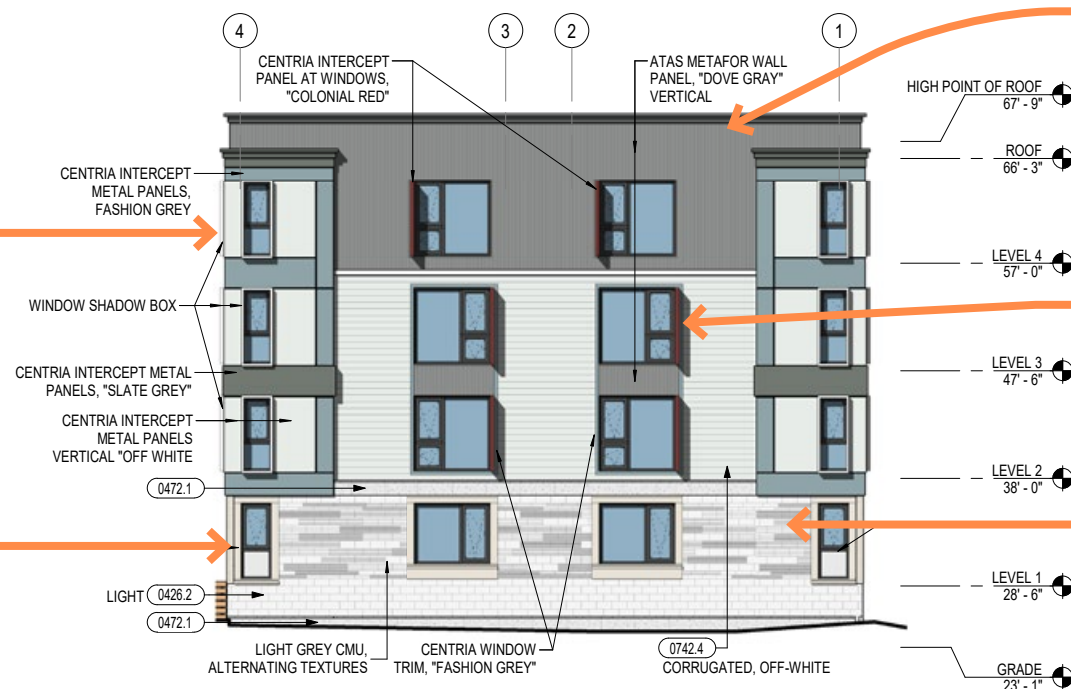
Facade subdivided in three horizontal layers, "base, middle, top"

Window fins to enhance scale of opening

More developed detailing at masonry to add visual depth and interest

More developed building corners with importance to the Main Street hierarchy

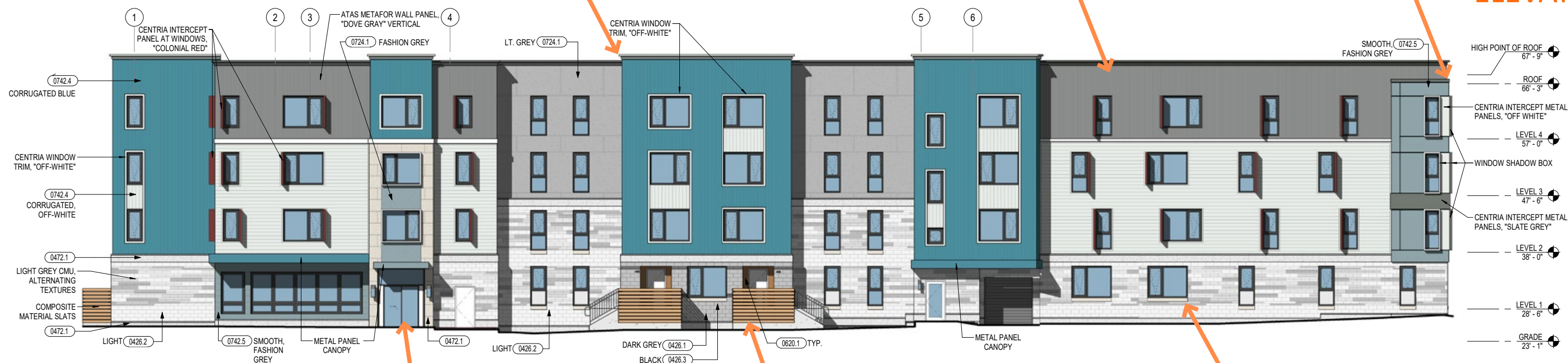
Cast stone trim around windows to give more formality and continuity to Main Street



► WEST ELEVATION - MAIN ST

BUILDING 4

ELEVATIONS



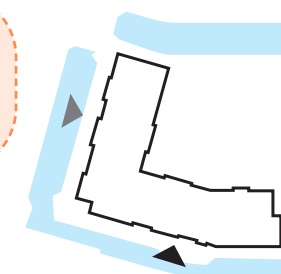
► EAST ELEVATION - EAST ST

Larger windows, accent panels and stronger cornice treatment to give prominence to Main St.

More developed East Street building entry to activate building corner and strengthen visual cues

Added additional wood detailing at unit entries to add additional warmth while visually connecting to JP Fed and JP State

More developed detailing at masonry to add visual depth and interest

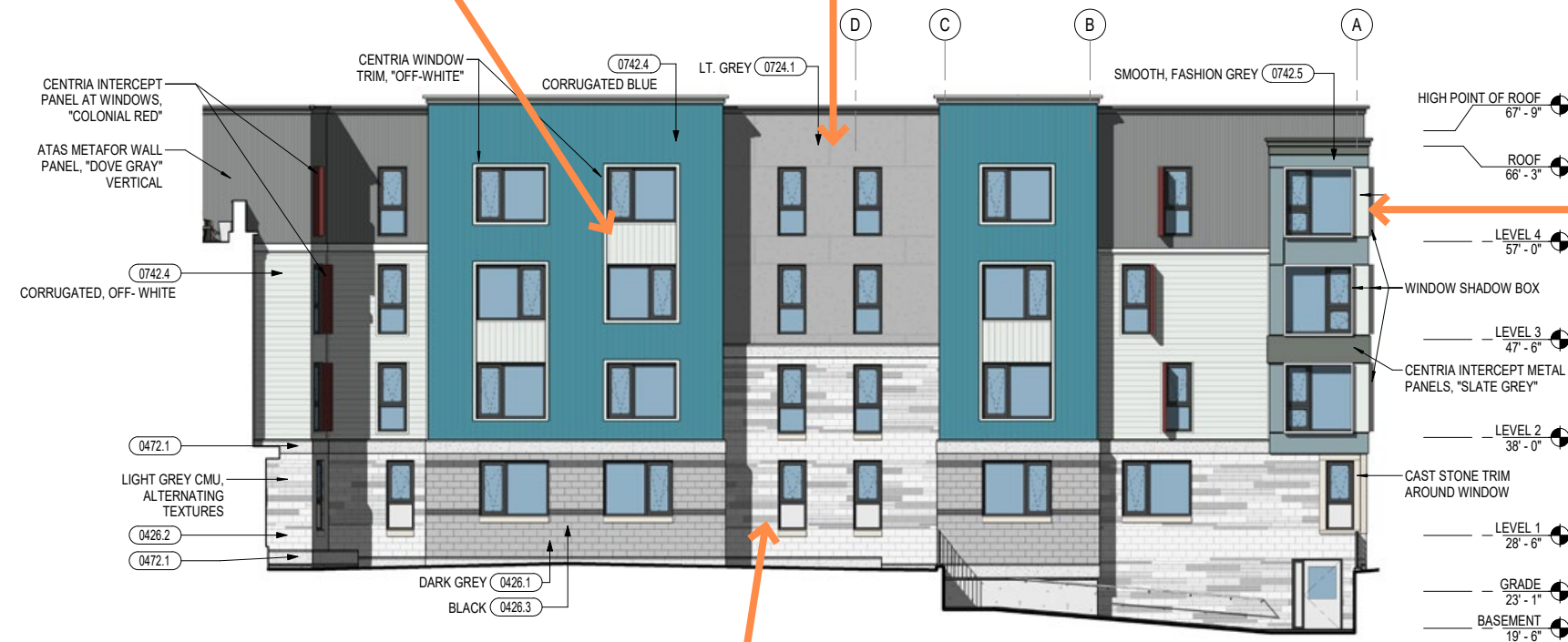


► SOUTH ELEVATION - SOUTH ST

Additional detailing at windows to create a second layer of scale

Restricted use of EIFS to less prominent recessed bays, relegated only to upper floors

BUILDING 4 ELEVATIONS



Added larger windows at prominent Main Street views to give more formality and continuity to Main Street

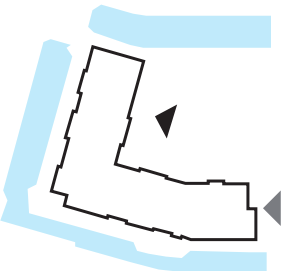
Facade subdivided in three horizontal layers, "base, middle, top"

More developed detailing at masonry to add visual depth and interest

► NORTH ELEVATION (COURTYARD)



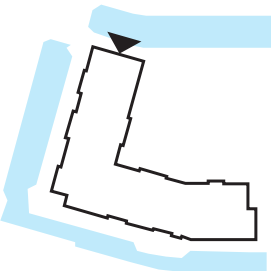
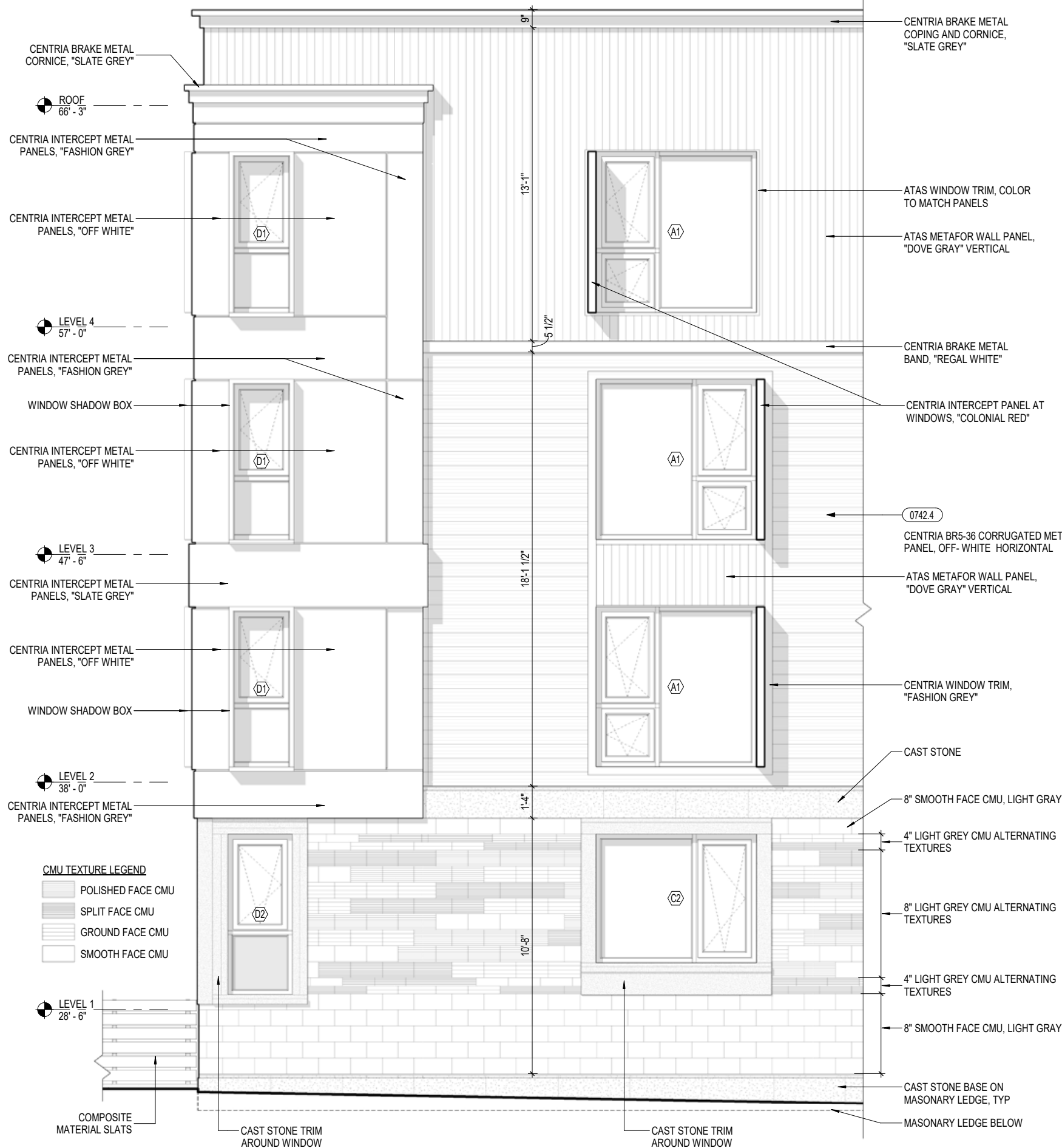
► NORTH ELEVATION



BUILDING 4 ELEVATIONS

CODED NOTES

0742.4 CORRUGATED/RIBBED MTL WALL PANEL (TYPE 4) W/ EXPOSED FASTENERS

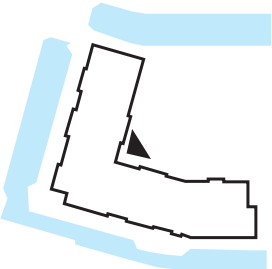
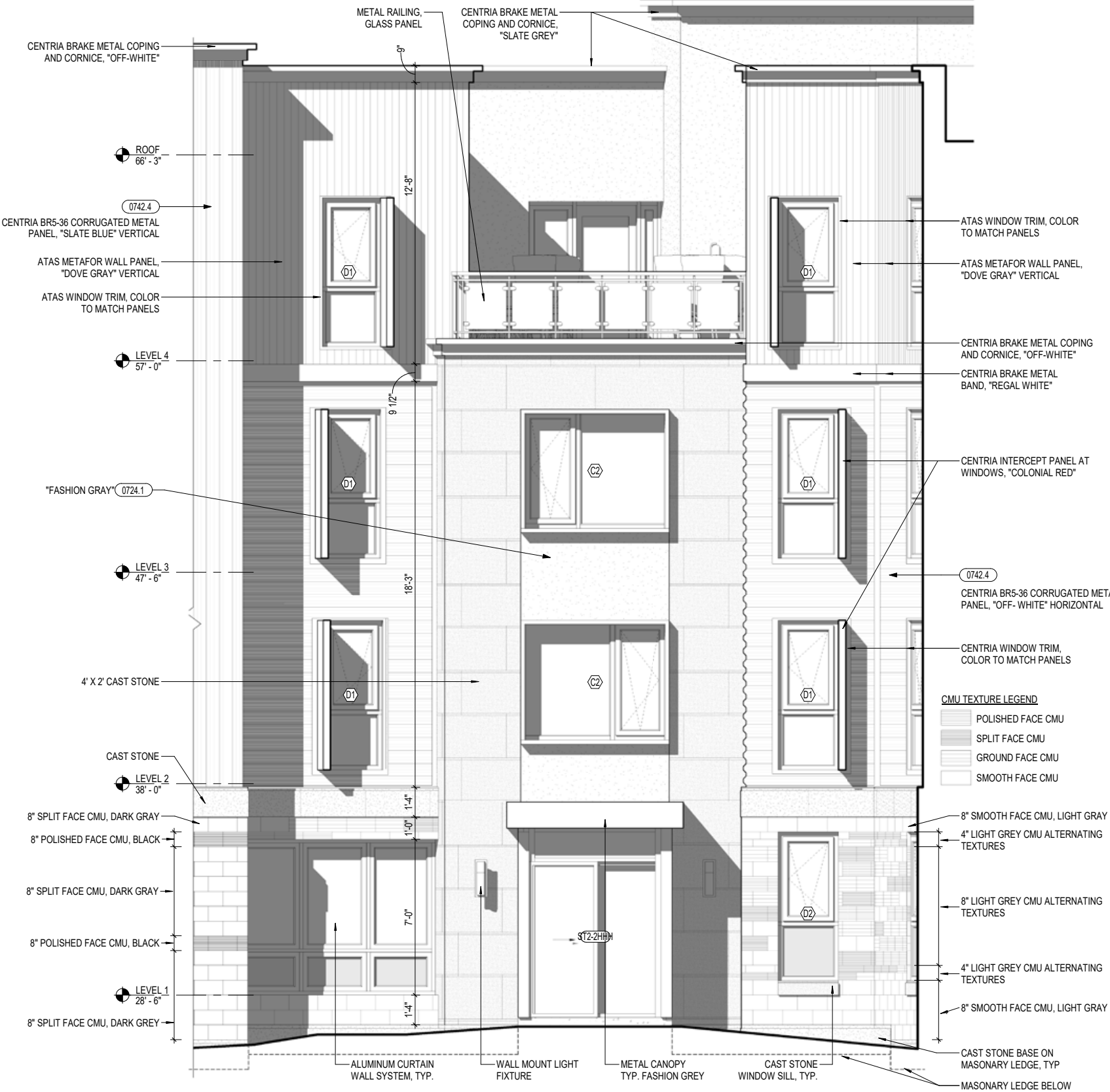


► DETAIL ELEVATION - MAIN ST

BUILDING 4

ELEVATIONS

CODED NOTES	
0724.1	EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)
0742.4	CORRUGATED/RIBBED MTL WALL PANEL (TYPE 4) W/ EXPOSED FASTENERS



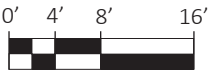
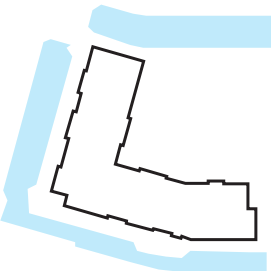
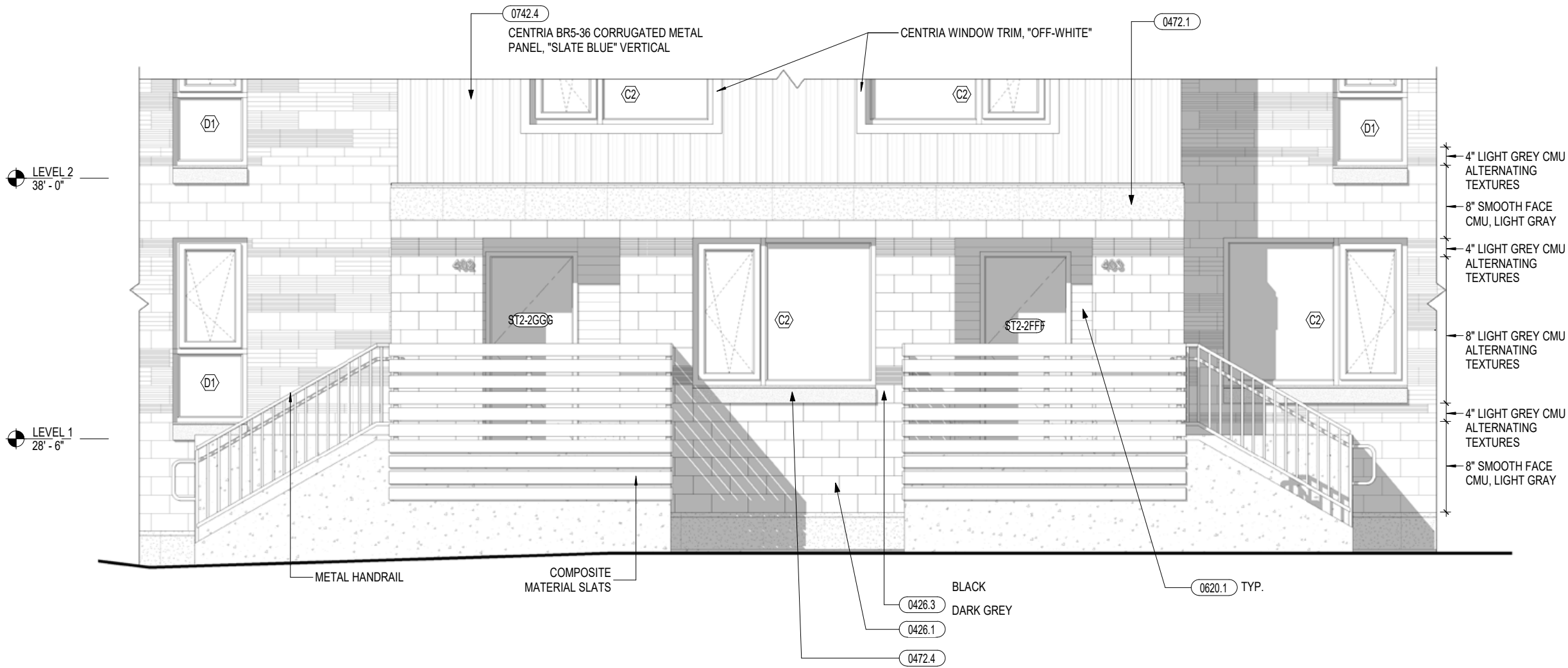
► DETAIL ELEVATION - COURTYARD ENTRANCE

BUILDING 4

ELEVATIONS

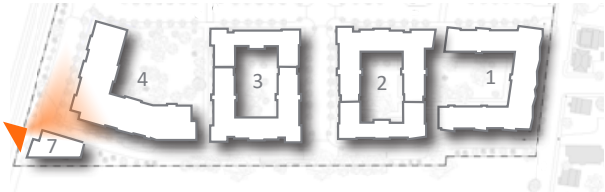
CODED NOTES

0426.1	SPLIT FACE CMU (CMU1) (BY SECTION 040001)
0426.3	POLISHED FACE CMU (CMU3) (BY SECTION 040001)
0472.1	CAST STONE TRIM UNIT (BY SECTION 040001)
0472.4	CAST STONE SILL (BY SECTION 040001)
0620.1	SHIPLAP SIDING - TRANSPARENT FINISH
0742.4	CORRUGATED/RIBBED MTL WALL PANEL (TYPE 4) W/ EXPOSED FASTENERS

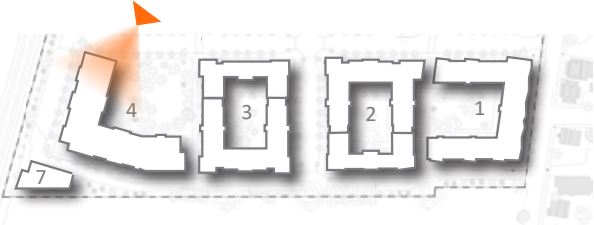


► DETAIL ELEVATION - STOOP ENTRANCE

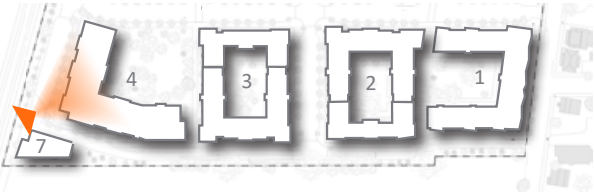
BUILDING 4
PERSPECTIVES

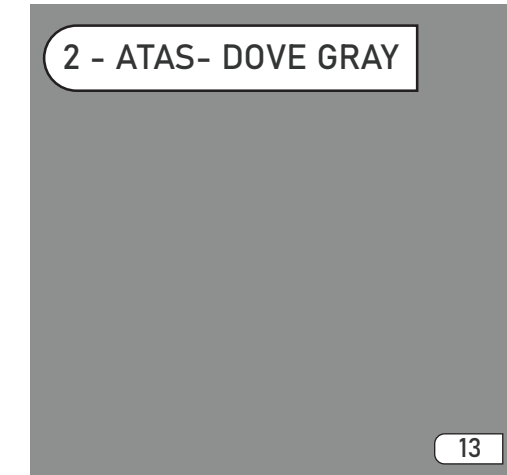
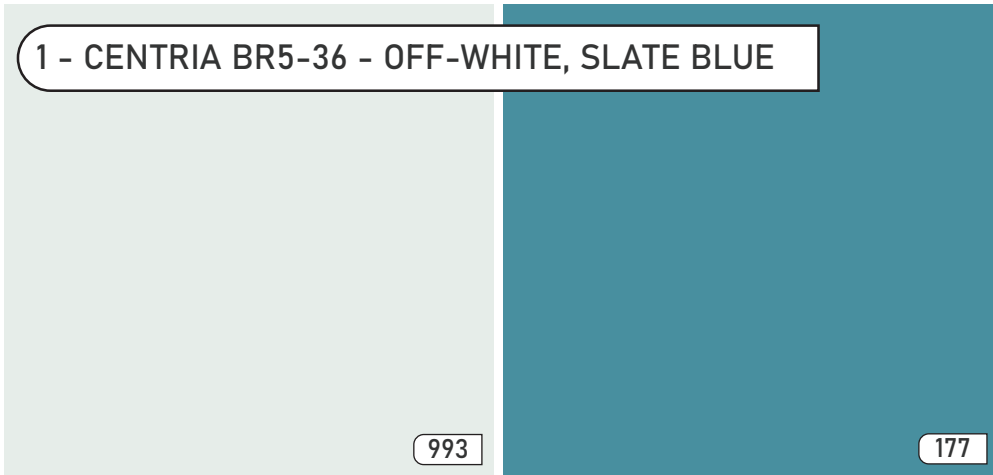


BUILDING 4
PERSPECTIVES

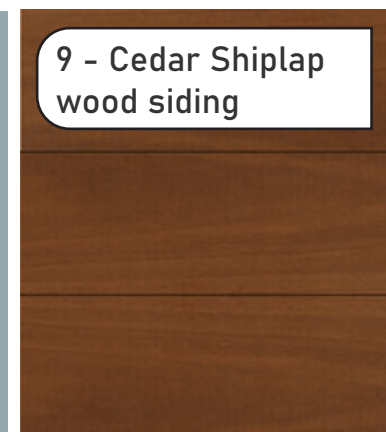
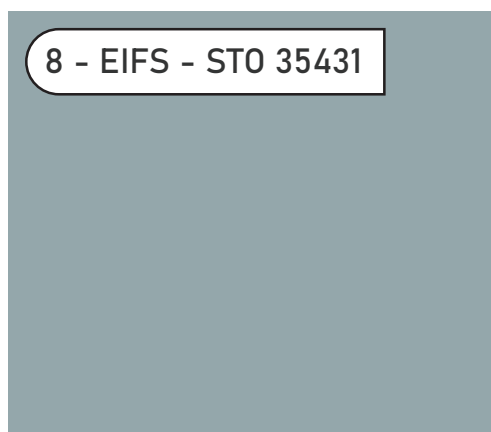
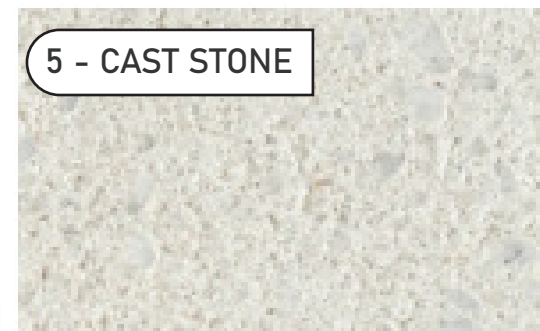
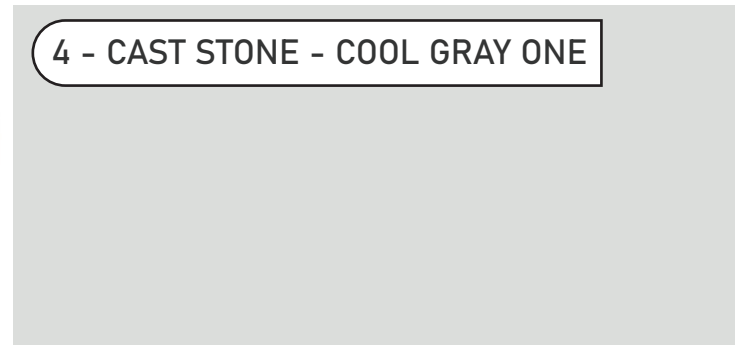
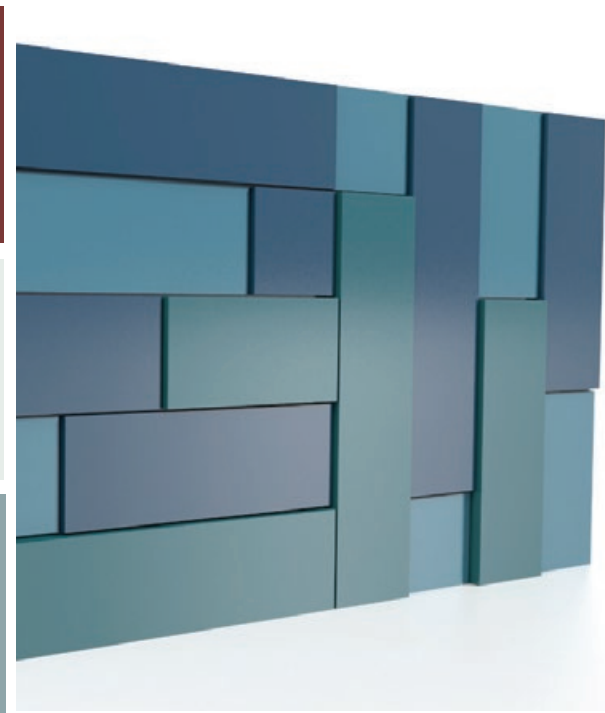
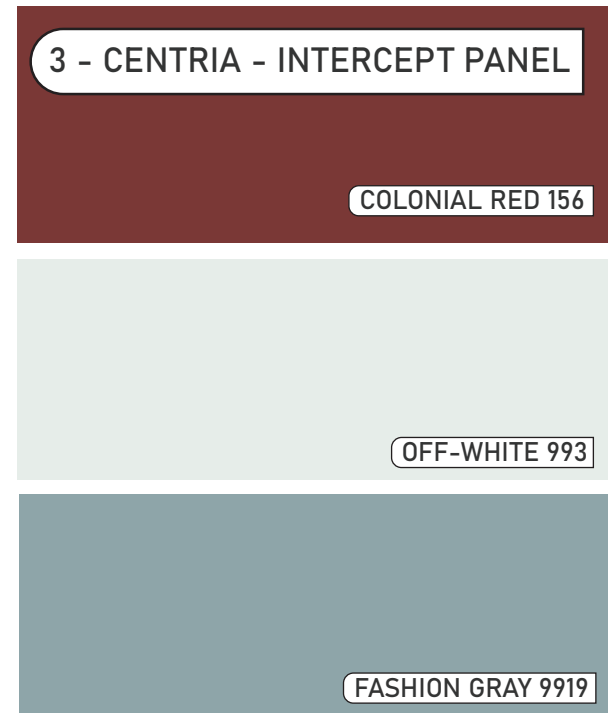


BUILDING 4
PERSPECTIVES





BUILDING 4 MATERIAL PALETTE



BUILDING 4

PREVIOUS MATERIAL PALETTE



Centria Accents



Centria Main Field 2



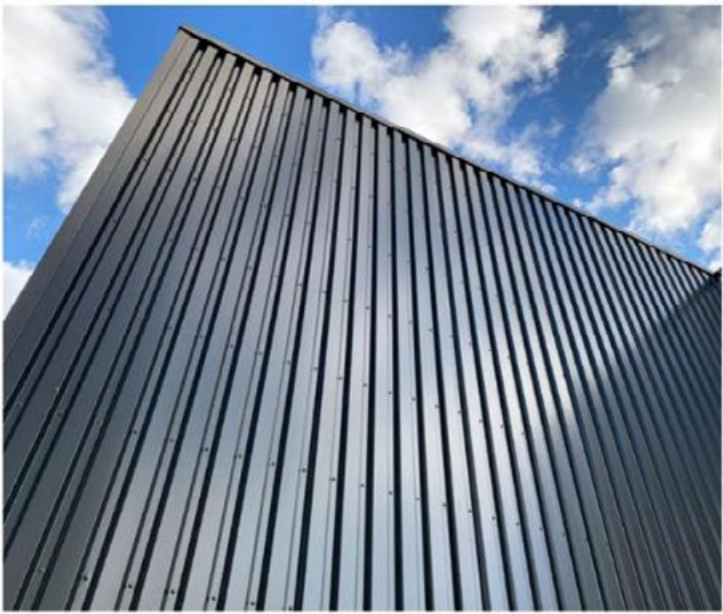
Centria Main Field 1



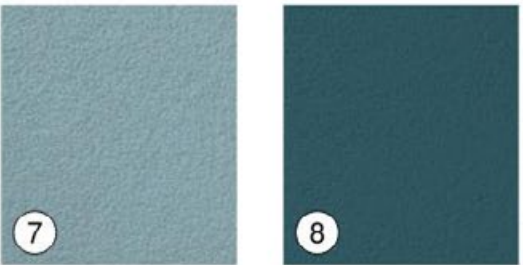
CMU Accent



CMU Main Field



Centria BR5-36 Sample



EIFS Accents



EIFS Main Field



EIFS Patterning Sample



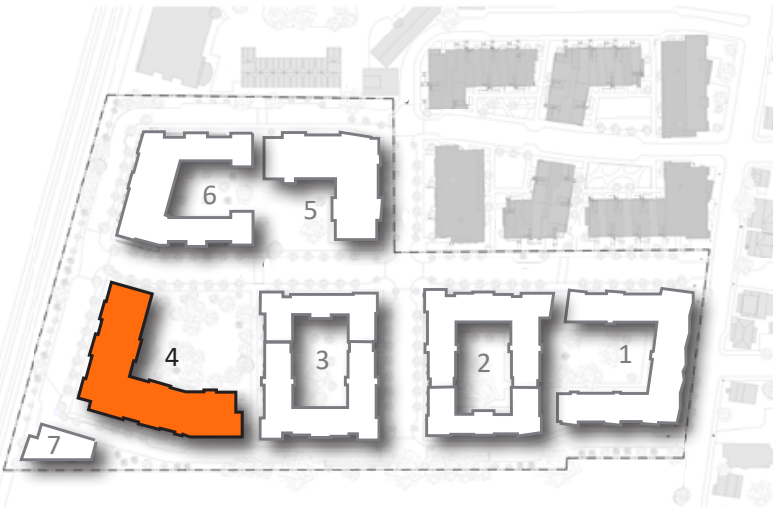
Wood at Unit Entry Niches



Building 4 West Elevation - Courtyard Entry



Building 4 East Elevation - Main Entry



BUILDING 5 ELEVATIONS AND MATERIALS



BUILDING 5

PREVIOUS AND CURRENT ELEVATIONS



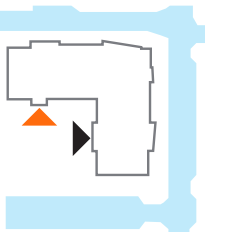
► PREVIOUS EAST ELEVATION (COURTYARD)

► PREVIOUS SOUTH ELEVATION (COURTYARD)



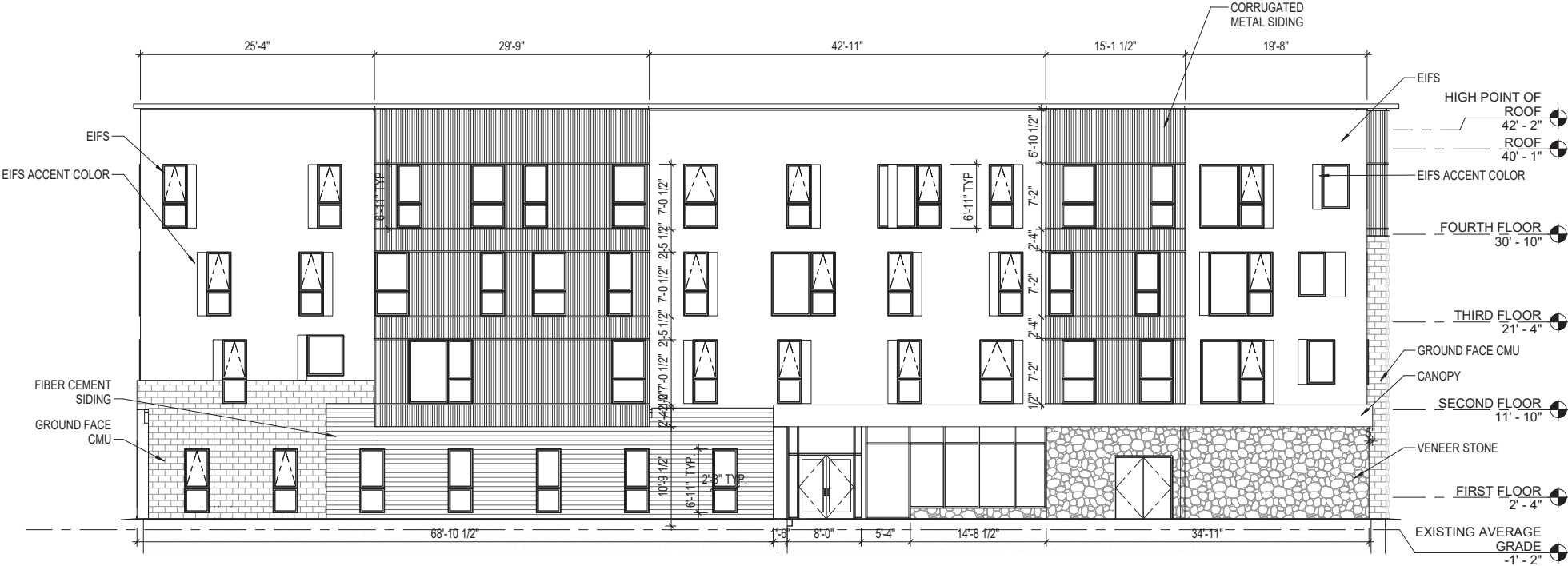
► CURRENT EAST ELEVATION - COURTYARD

► CURRENT SOUTH ELEVATION (COURTYARD)



BUILDING 5

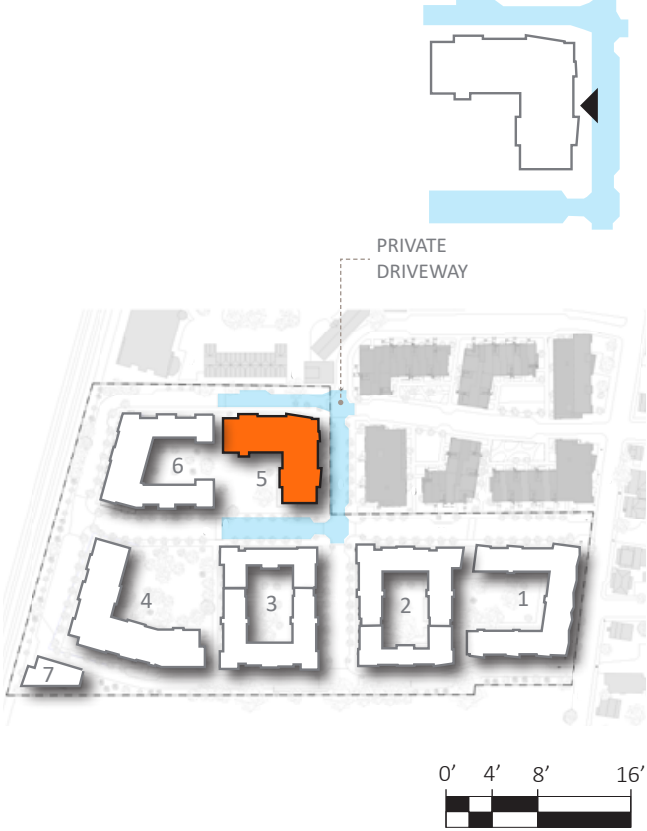
PREVIOUS AND CURRENT ELEVATIONS



► PREVIOUS NORTH ELEVATION

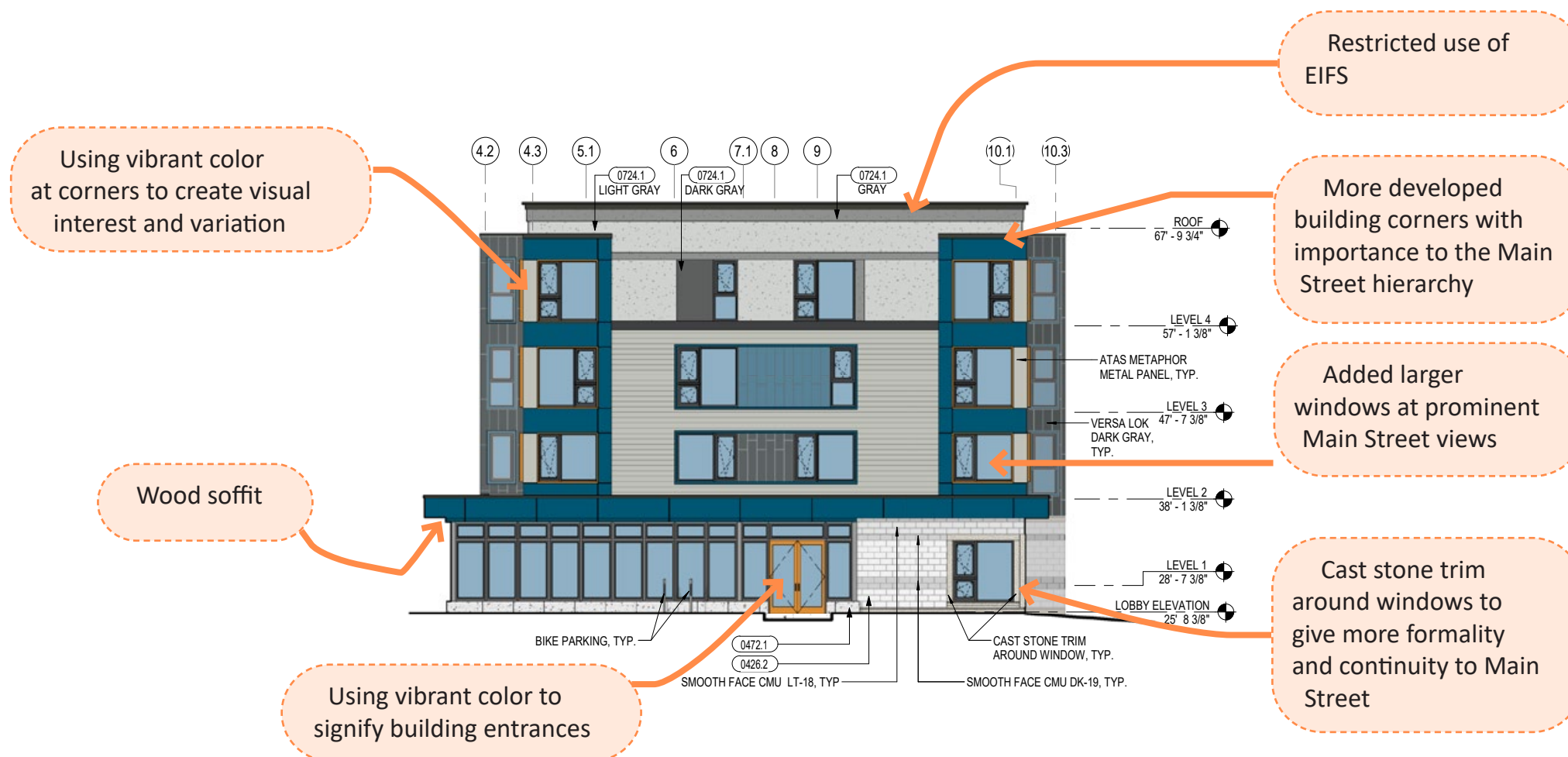


► CURRENT NORTH ELEVATION



BUILDING 5

ELEVATIONS



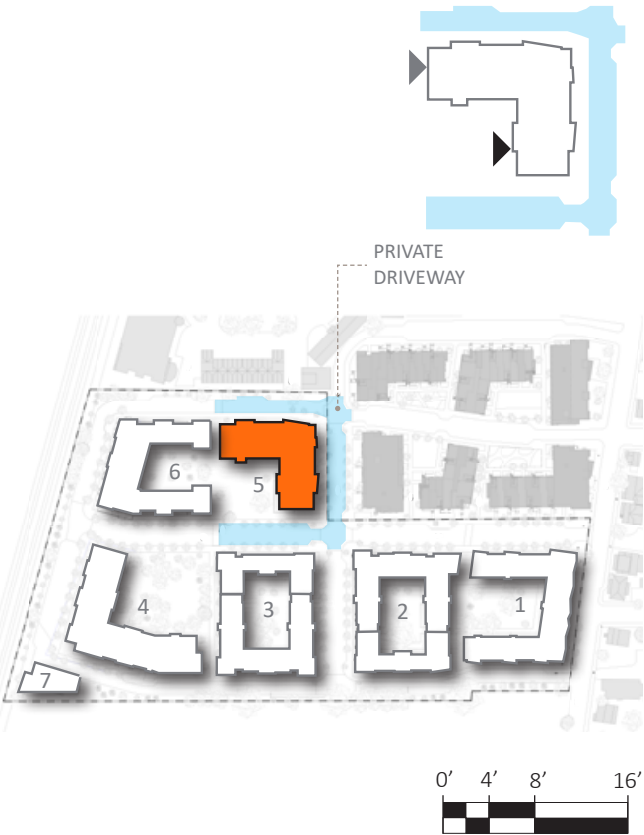
BUILDING 5 ELEVATIONS



► SOUTH ELEVATION (COURTYARD)



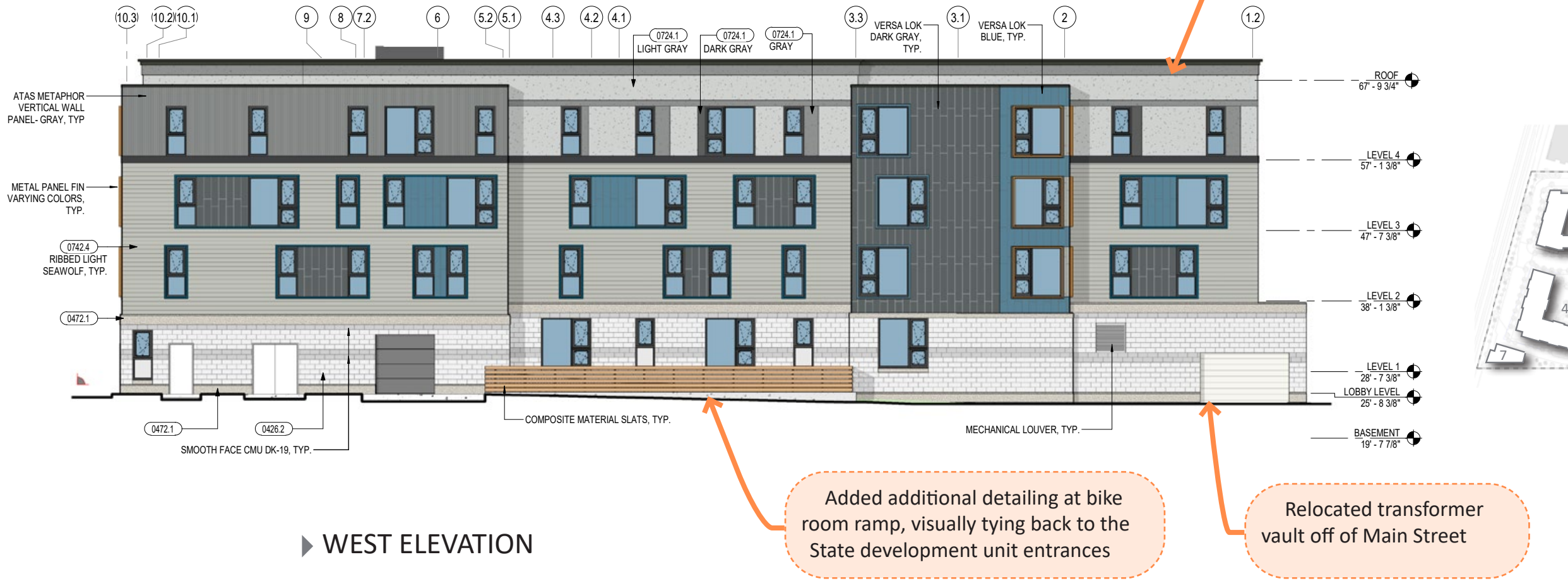
► SOUTH ELEVATION



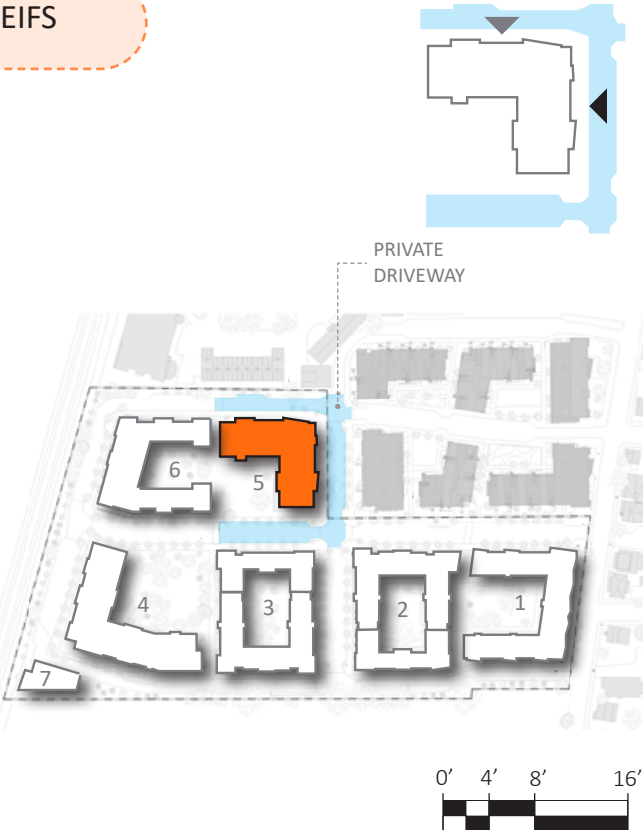
BUILDING 5
ELEVATIONS



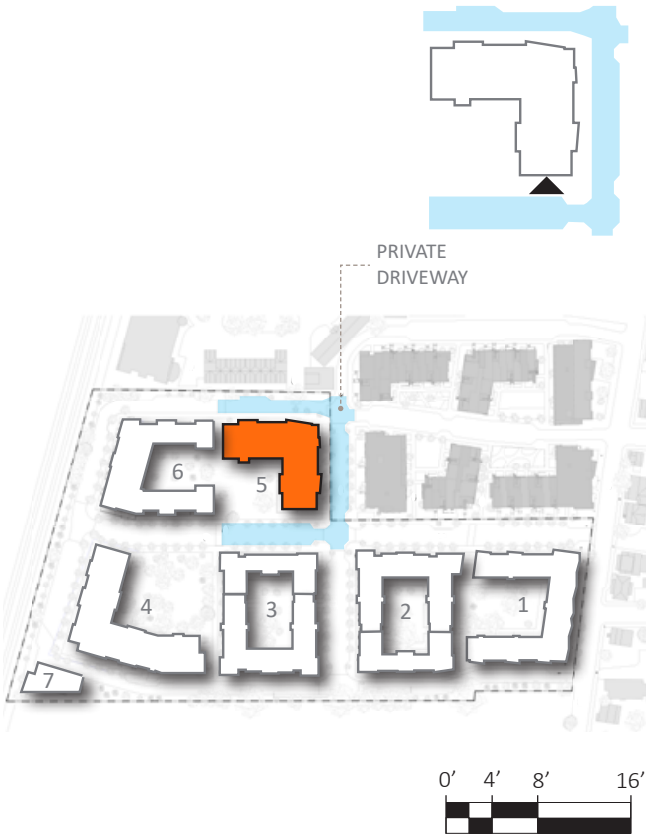
► NORTH ELEVATION



► WEST ELEVATION

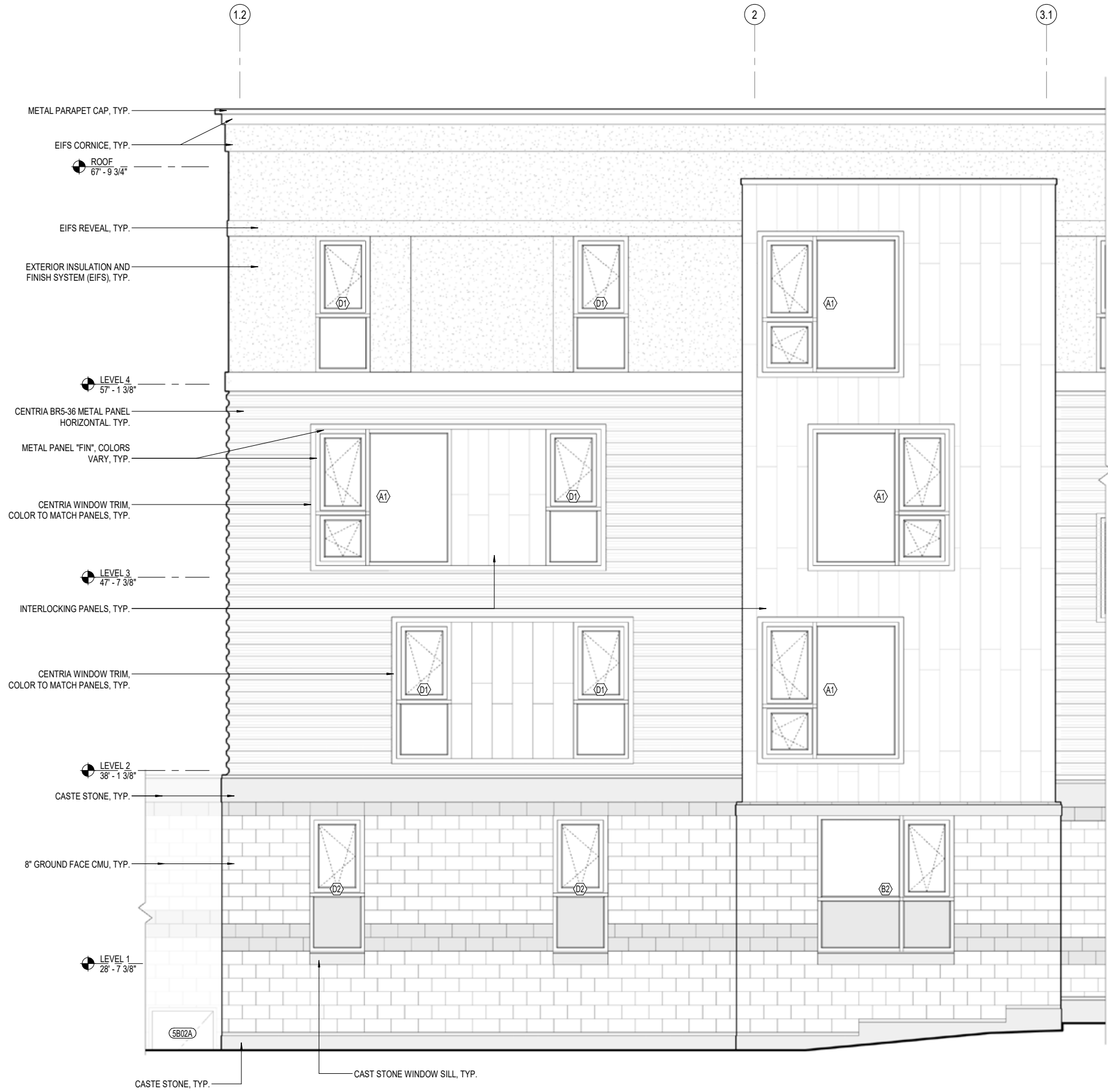


BUILDING 5
ELEVATIONS

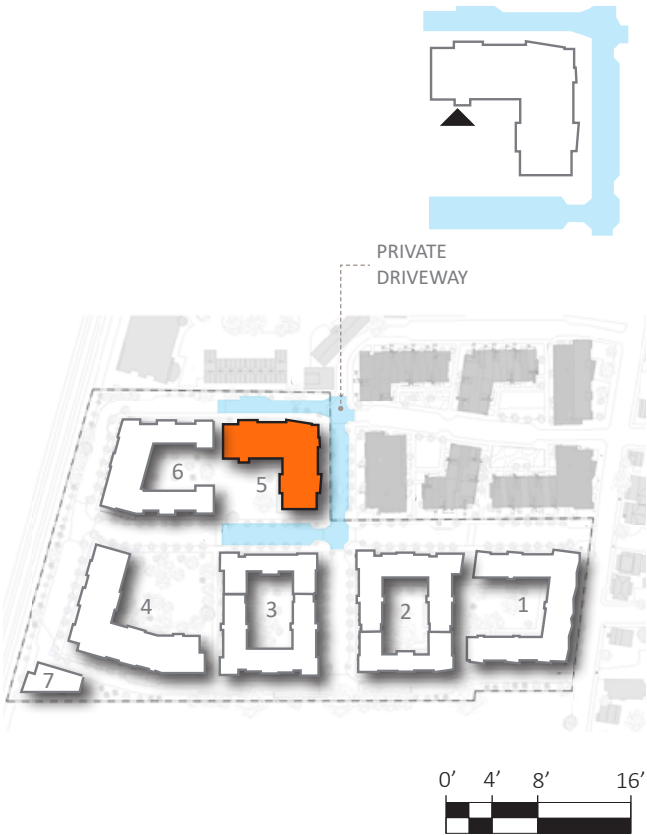


► DETAIL ELEVATION EAST - MAIN ST

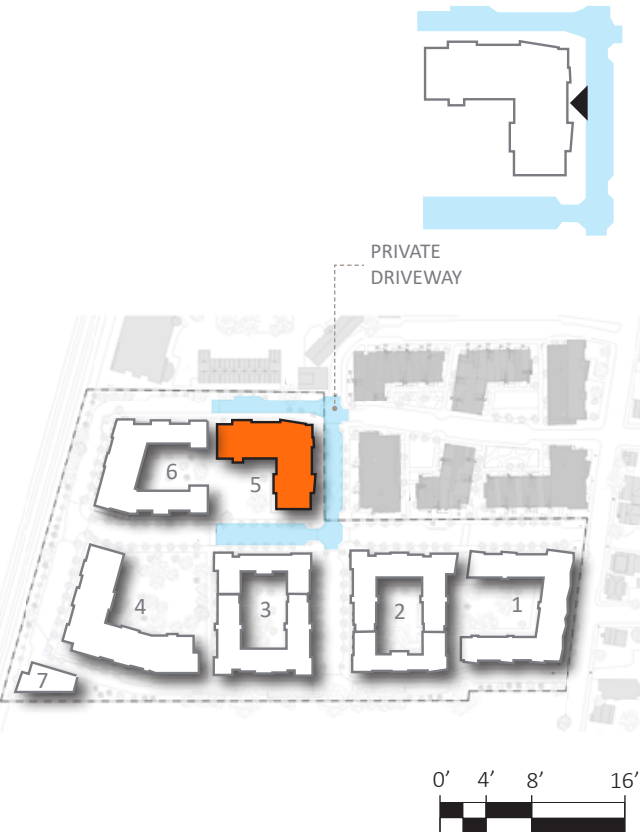
BUILDING 5 ELEVATIONS



► DETAIL ELEVATION EAST - COURTYARD



BUILDING 5
ELEVATIONS

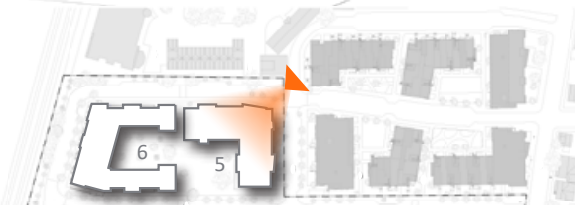


► DETAIL ELEVATION NORTH - MAIN ENTRANCE

BUILDING 5
PERSPECTIVES



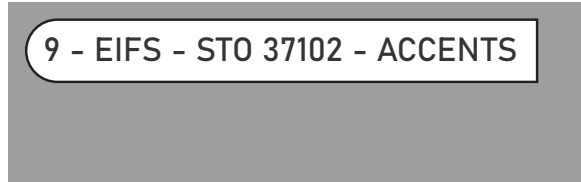
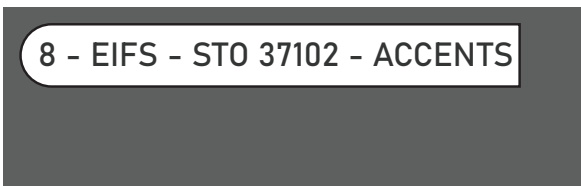
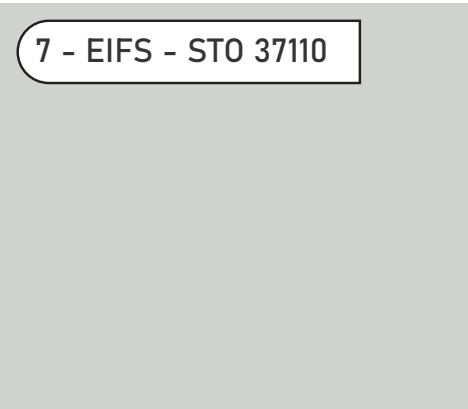
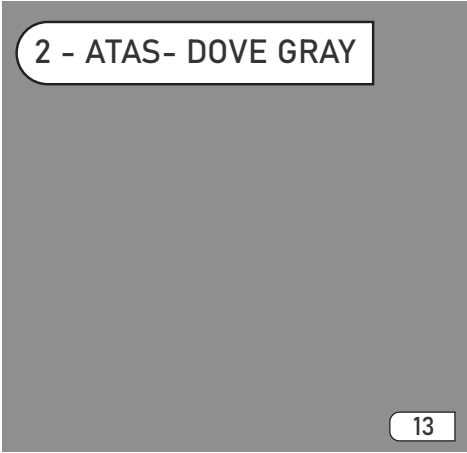
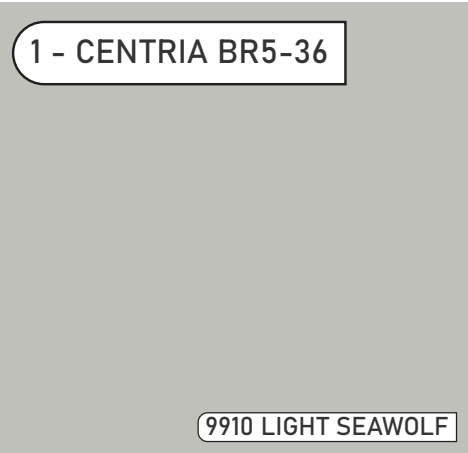
BUILDING 5
PERSPECTIVES



BUILDING 5
PERSPECTIVES

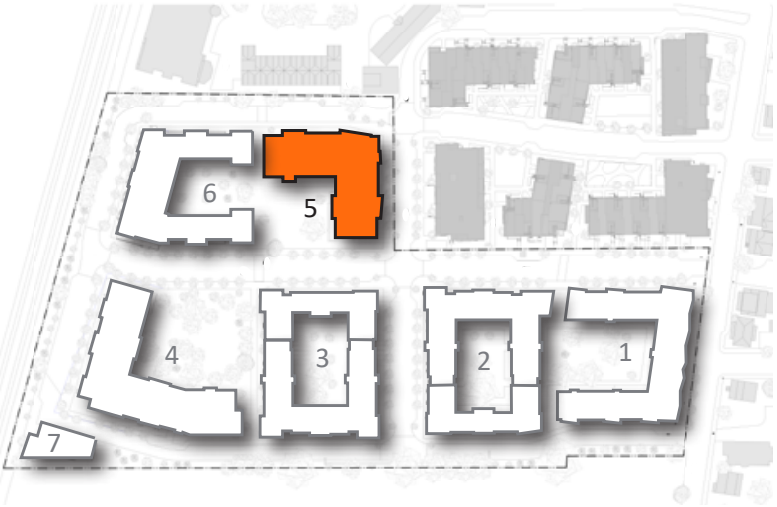
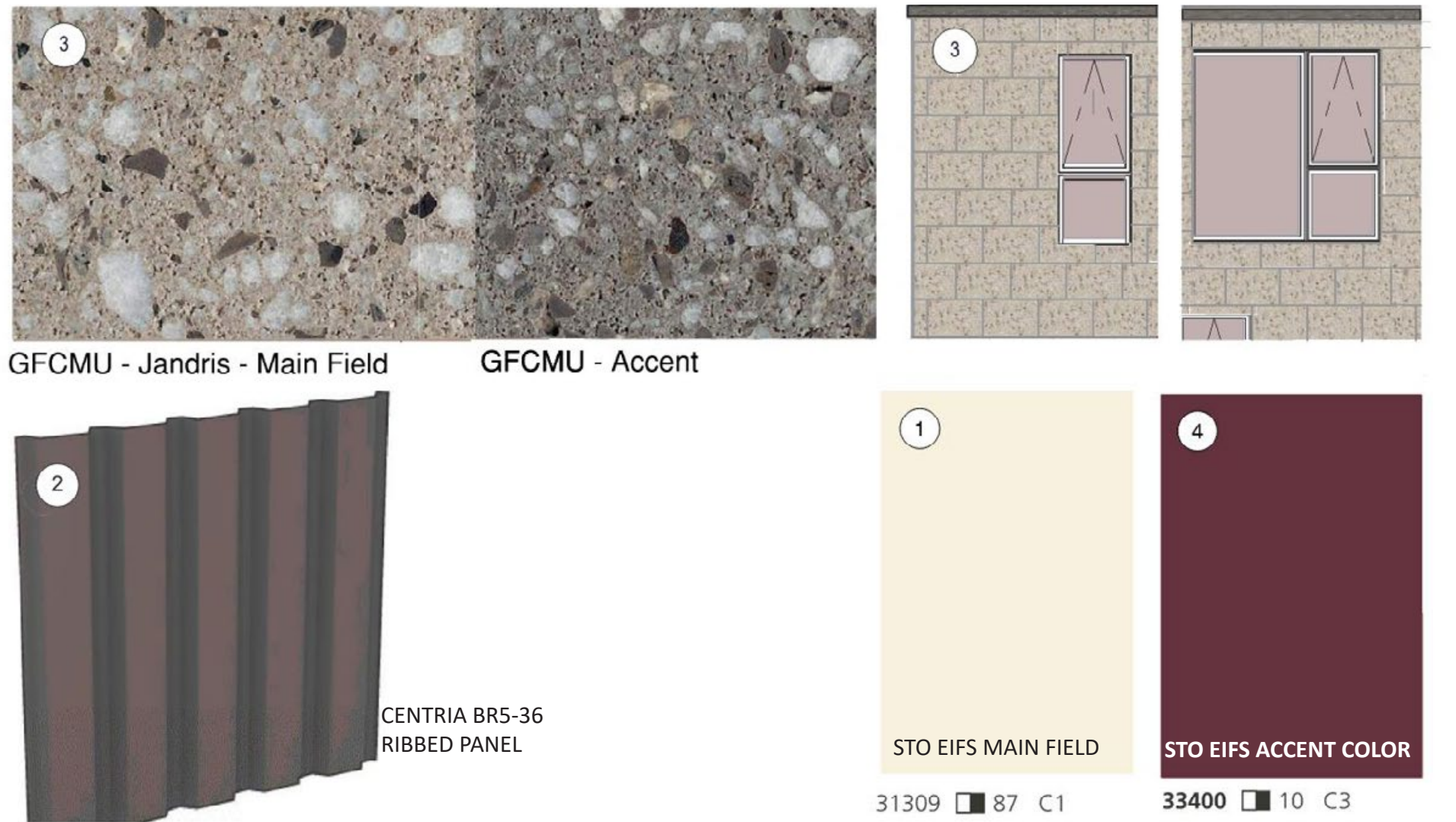


BUILDING 5
CURRENT MATERIAL PALETTE



BUILDING 5

PREVIOUS MATERIAL PALETTE



BUILDING 6
ELEVATIONS AND MATERIALS



BUILDING 6

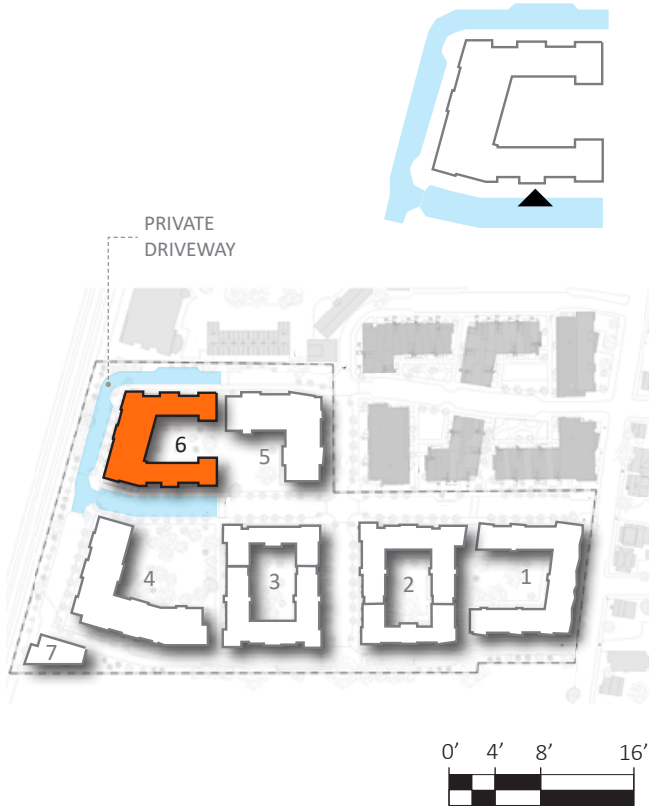
PREVIOUS AND CURRENT ELEVATIONS



► PREVIOUS EAST ELEVATION - MAIN ST

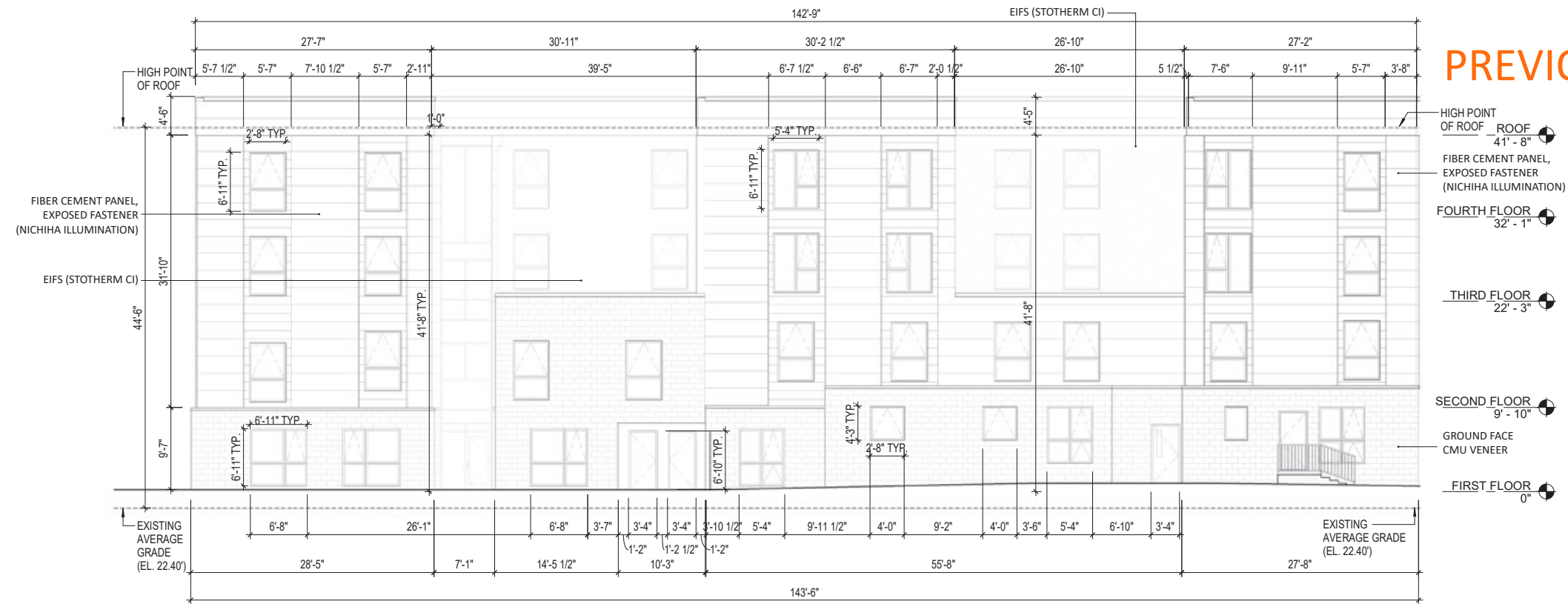


► CURRENT EAST ELEVATION - MAIN ST

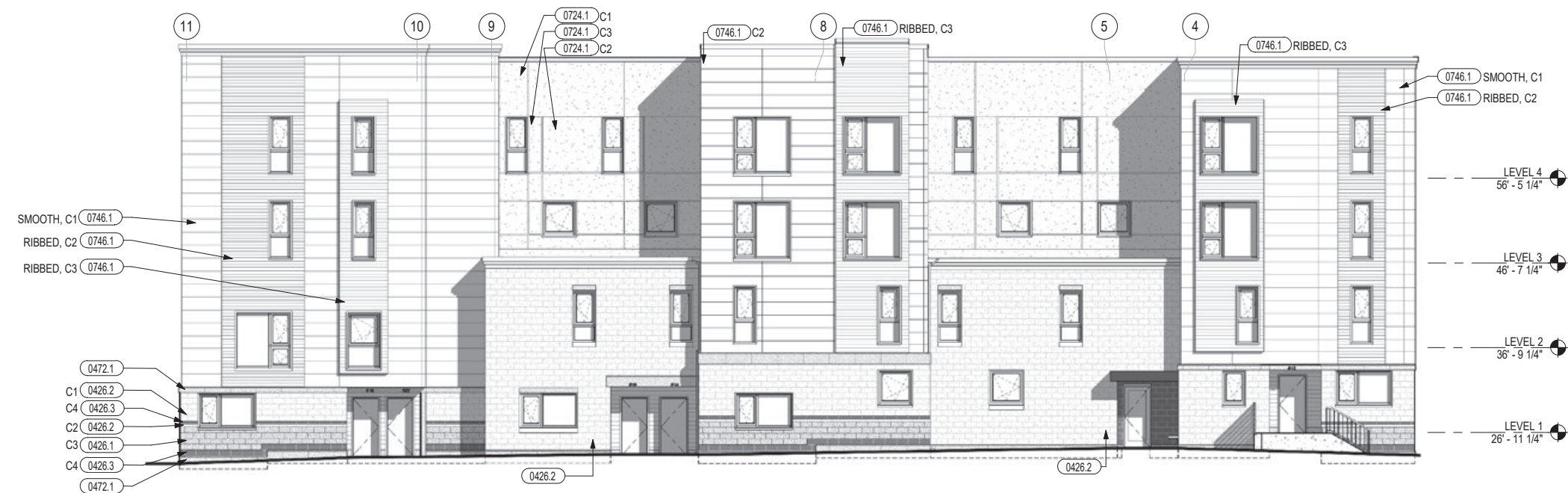


BUILDING 6

PREVIOUS AND CURRENT ELEVATIONS



PREVIOUS WEST ELEVATION - WEST ST



CURRENT WEST ELEVATION - WEST ST



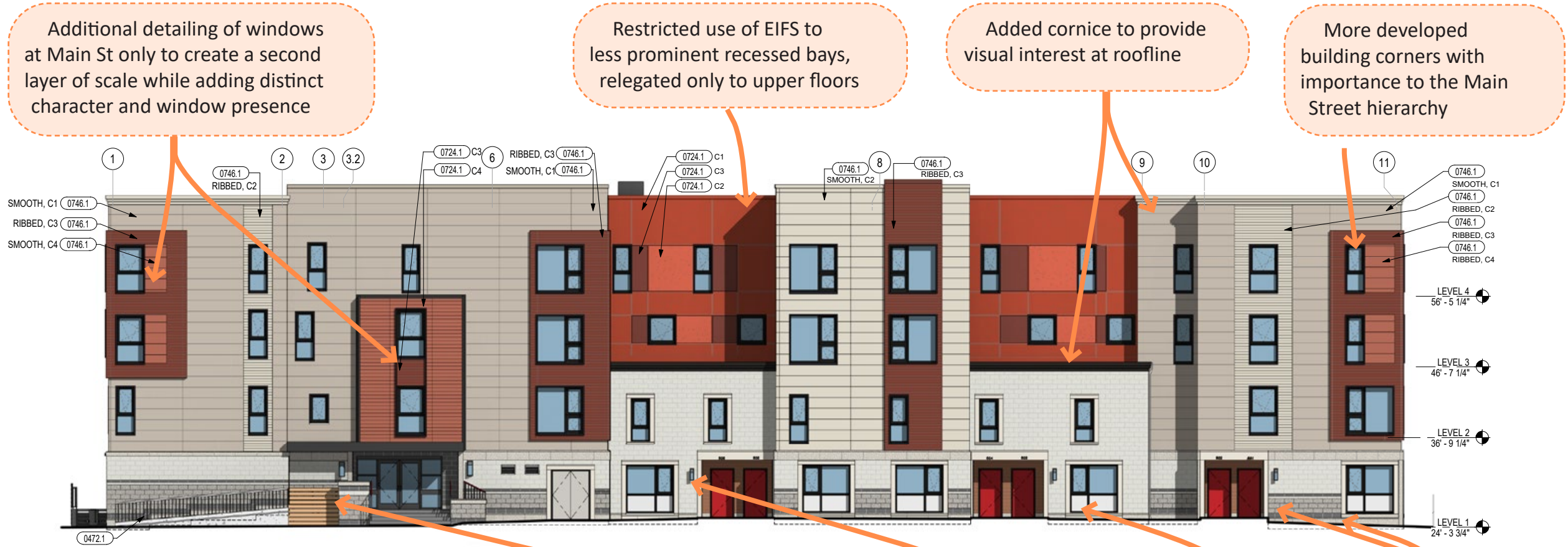
BUILDING 6 ELEVATIONS

CODED NOTES

- 0426.1 SPLIT FACE CMU (CMU1) (BY SECTION 040001)
- 0426.2 GROUND FACE CMU (CMU2) (BY SECTION 040001)
- 0426.3 POLISHED FACE CMU (CMU3) (BY SECTION 040001)
- 0472.1 CAST STONE TRIM UNIT (BY SECTION 040001)
- 0746.1 FIBER-CEMENT PANEL SIDING TYPE 1

COLOR KEY

- 1. FIBER CEMENT FACADE COLORS:
 - C1: BM 997 BAJA DUNES
 - C2: BM HC-84 ELMIRA WHITE
 - C3: BM 2005-10 RED ROCK
 - C4: BM 1202 BAKED TERRA COTTA
- 2. CMU VENEER COLORS:
 - C1: WHITE, GROUND FACE - JANDRIS 5110-G
 - C2: GREY, GROUND FACE - JANDRIS W-60
 - C3: GREY, SPLIT FACE - JANDRIS W-60
 - C4: BLACK, POLISHED FACE - JANDRIS 4540
- 5. EIFS COLORS:
 - C1: STO 32440
 - C2: STO 32401
 - C3: STO 33240



► EAST ELEVATION - MAIN ST

Window has less presence on side streets to enhance prominence of Main St at primary spine

Prominent building entrance featuring material and color change, benches, large lighting fixtures, and wood screen to signal entry

Added sconces at doors on Main St to help distinguish and formalize this street relative to side streets

More large windows on Main St relative to other facades

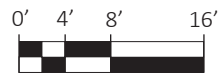
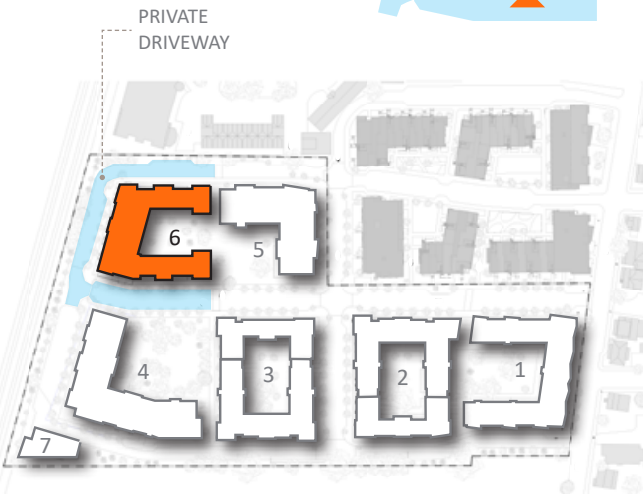
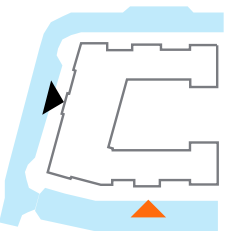
Cast stone trim around windows to give more formality and continuity to Main Street



► SOUTH ELEVATION - SOUTH ST

Cast stone lintel only on side streets

Added additional wood detailing at unit entries to add additional warmth while visually connecting to JP Fed and JP State



BUILDING 6 ELEVATIONS



► WEST ELEVATION - WEST ST



► WEST ELEVATION - COURTYARD

CODED NOTES

- 0426.1 SPLIT FACE CMU (CMU1) (BY SECTION 040001)
- 0426.2 GROUND FACE CMU (CMU2) (BY SECTION 040001)
- 0426.3 POLISHED FACE CMU (CMU3) (BY SECTION 040001)
- 0472.1 CAST STONE TRIM UNIT (BY SECTION 040001)
- 0746.1 FIBER-CEMENT PANEL SIDING TYPE 1

COLOR KEY

- 1. FIBER CEMENT FACADE COLORS:
 - C1: BM 997 BAJA DUNES
 - C2: BM HC-84 ELMIRA WHITE
 - C3: BM 2005-10 RED ROCK
 - C4: BM 1202 BAKED TERRA COTTA
- 2. CMU VENEER COLORS:
 - C1: WHITE, GROUND FACE - JANDRIS 5110-G
 - C2: GREY, GROUND FACE - JANDRIS W-60
 - C3: GREY, SPLIT FACE - JANDRIS W-60
 - C4: BLACK, POLISHED FACE - JANDRIS 4540
- 5. EIFS COLORS:
 - C1: STO 32440
 - C2: STO 32401
 - C3: STO 33240



BUILDING 6

ELEVATIONS

CODED NOTES

- 0426.1 SPLIT FACE CMU (CMU1) (BY SECTION 040001)
- 0426.2 GROUND FACE CMU (CMU2) (BY SECTION 040001)
- 0426.3 POLISHED FACE CMU (CMU3) (BY SECTION 040001)
- 0472.1 CAST STONE TRIM UNIT (BY SECTION 040001)
- 0746.1 FIBER-CEMENT PANEL SIDING TYPE 1

COLOR KEY

- 1. FIBER CEMENT FACADE COLORS:
 - C1: BM 997 BAJA DUNES
 - C2: BM HC-84 ELMIRA WHITE
 - C3: BM 2005-10 RED ROCK
 - C4: BM 1202 BAKED TERRA COTTA
- 2. CMU VENEER COLORS:
 - C1: WHITE, GROUND FACE - JANDRIS 5110-G
 - C2: GREY, GROUND FACE - JANDRIS W-60
 - C3: GREY, SPLIT FACE - JANDRIS W-60
 - C4: BLACK, POLISHED FACE - JANDRIS 4540
- 5. EIFS COLORS:
 - C1: STO 32440
 - C2: STO 32401
 - C3: STO 33240



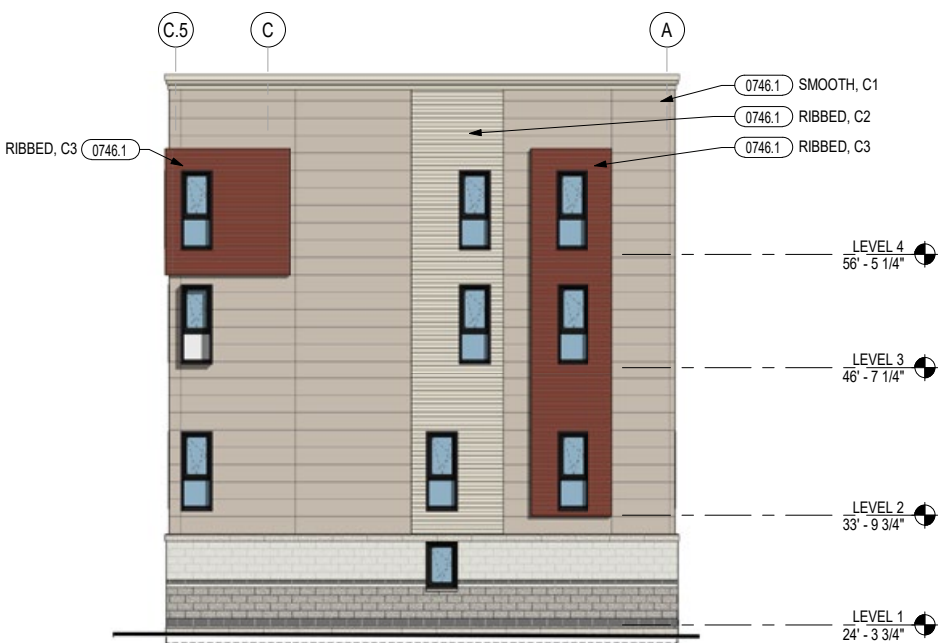
► WEST ELEVATION - COURTYARD



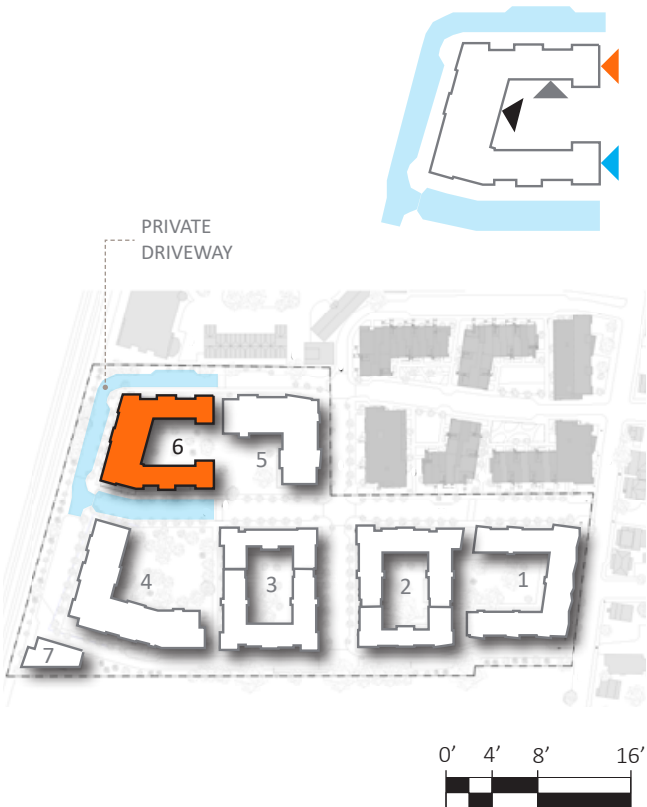
► NORTH ELEVATION - COURTYARD



► NORTH ELEVATION - EAST WING



► NORTH ELEVATION - WEST WING



BUILDING 6 ELEVATIONS

CODED NOTES

0426.1	SPLIT FACE CMU (CMU1) (BY SECTION 040001)
0426.2	GROUND FACE CMU (CMU2) (BY SECTION 040001)
0426.3	POLISHED FACE CMU (CMU3) (BY SECTION 040001)
0472.1	CAST STONE TRIM UNIT (BY SECTION 040001)
0746.1	FIBER-CEMENT PANEL SIDING TYPE 1

COLOR KEY

- FIBER CEMENT FACADE COLORS:
C1: BM 997 BAJA DUNES
C2: BM HC-84 ELMIRA WHITE
C3: BM 2005-10 RED ROCK
C4: BM 1202 BAKED TERRA COTTA
- CMU VENEER COLORS:
C1: WHITE, GROUND FACE - JANDRIS 5110-G
C2: GREY, GROUND FACE - JANDRIS W-60
C3: GREY, SPLIT FACE - JANDRIS W-60
C4: BLACK, POLISHED FACE - JANDRIS 4540
- EIFS COLORS:
C1: STO 32440
C2: STO 32401
C3: STO 33240



► DETAIL ELEVATION - MAIN ENTRANCE



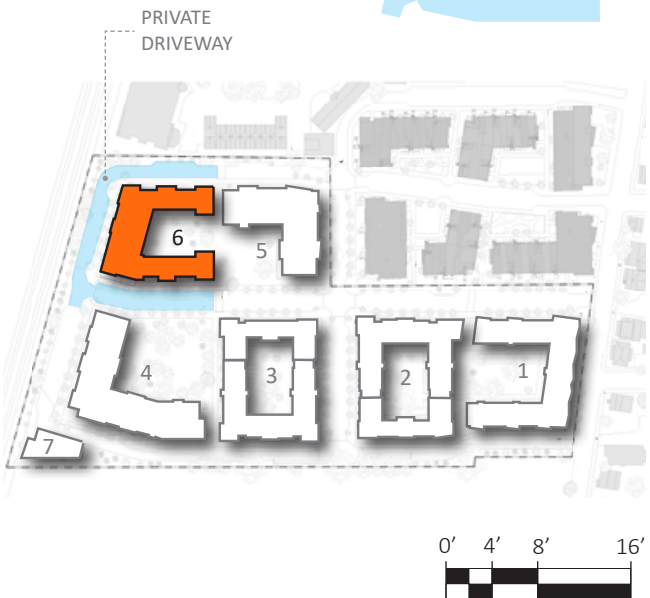
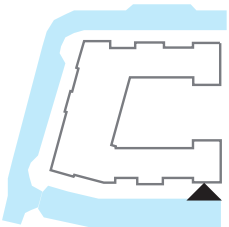
BUILDING 6 ELEVATIONS

CODED NOTES

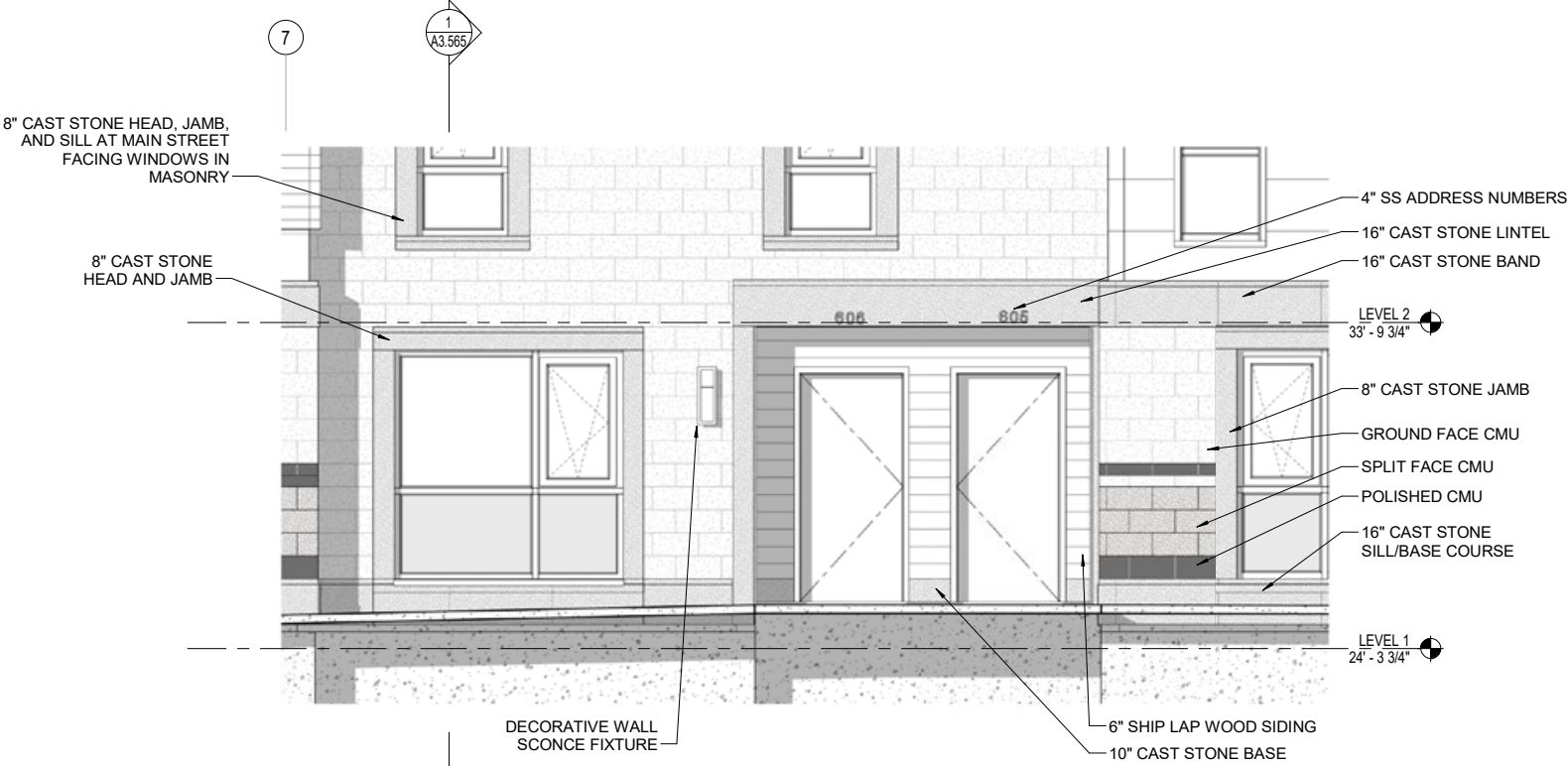
0426.1	SPLIT FACE CMU (CMU1) (BY SECTION 040001)
0426.2	GROUND FACE CMU (CMU2) (BY SECTION 040001)
0426.3	POLISHED FACE CMU (CMU3) (BY SECTION 040001)
0472.1	CAST STONE TRIM UNIT (BY SECTION 040001)
0746.1	FIBER-CEMENT PANEL SIDING TYPE 1

COLOR KEY

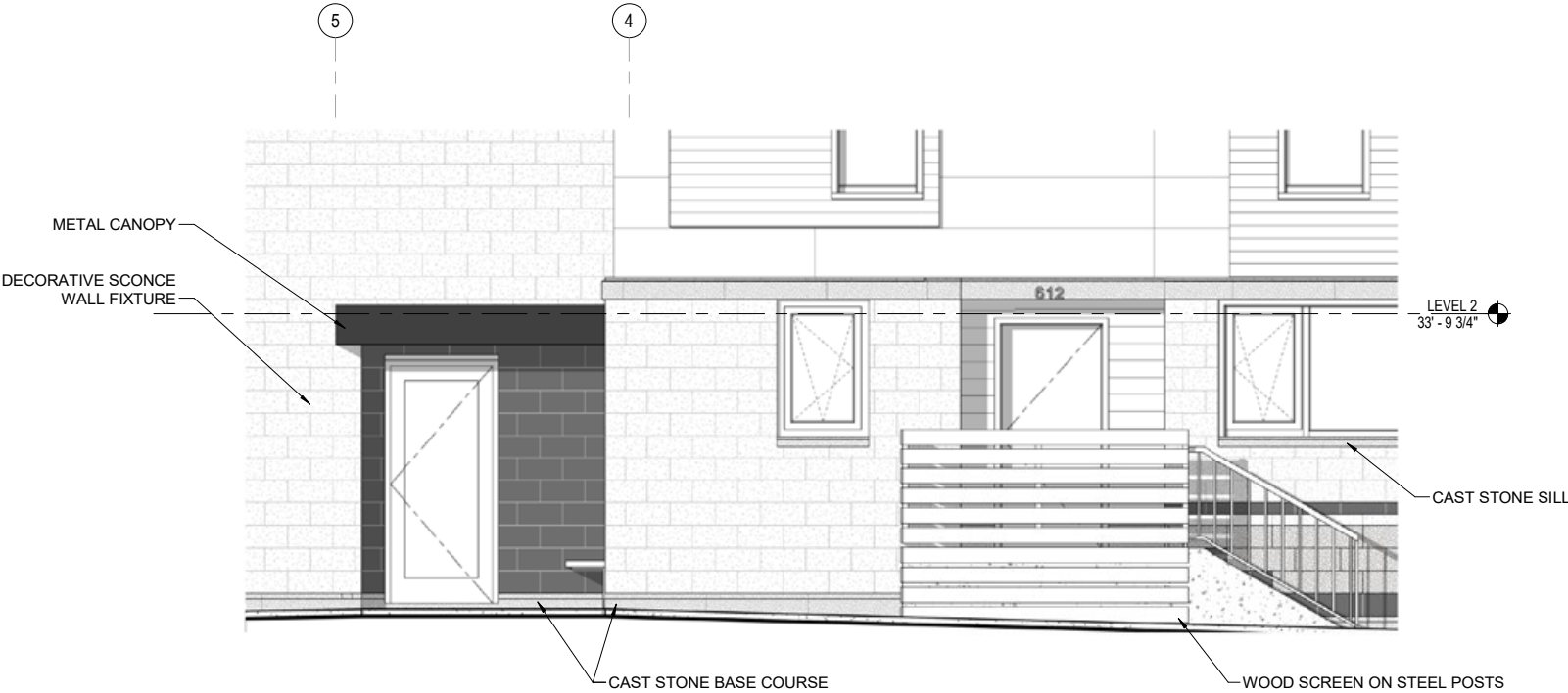
- FIBER CEMENT FACADE COLORS:
C1: BM 997 BAJA DUNES
C2: BM HC-84 ELMIRA WHITE
C3: BM 2005-10 RED ROCK
C4: BM 1202 BAKED TERRA COTTA
- CMU VENEER COLORS:
C1: WHITE, GROUND FACE - JANDRIS 5110-G
C2: GREY, GROUND FACE - JANDRIS W-60
C3: GREY, SPLIT FACE - JANDRIS W-60
C4: BLACK, POLISHED FACE - JANDRIS 4540
- EIFS COLORS:
C1: STO 32440
C2: STO 32401
C3: STO 33240



BUILDING 6
ELEVATIONS



► DETAIL ELEVATION - MAIN ST ENTRANCE



► DETAIL ELEVATION - WEST ST ENTRANCE



BUILDING 6
PERSPECTIVES



BUILDING 6
PERSPECTIVES

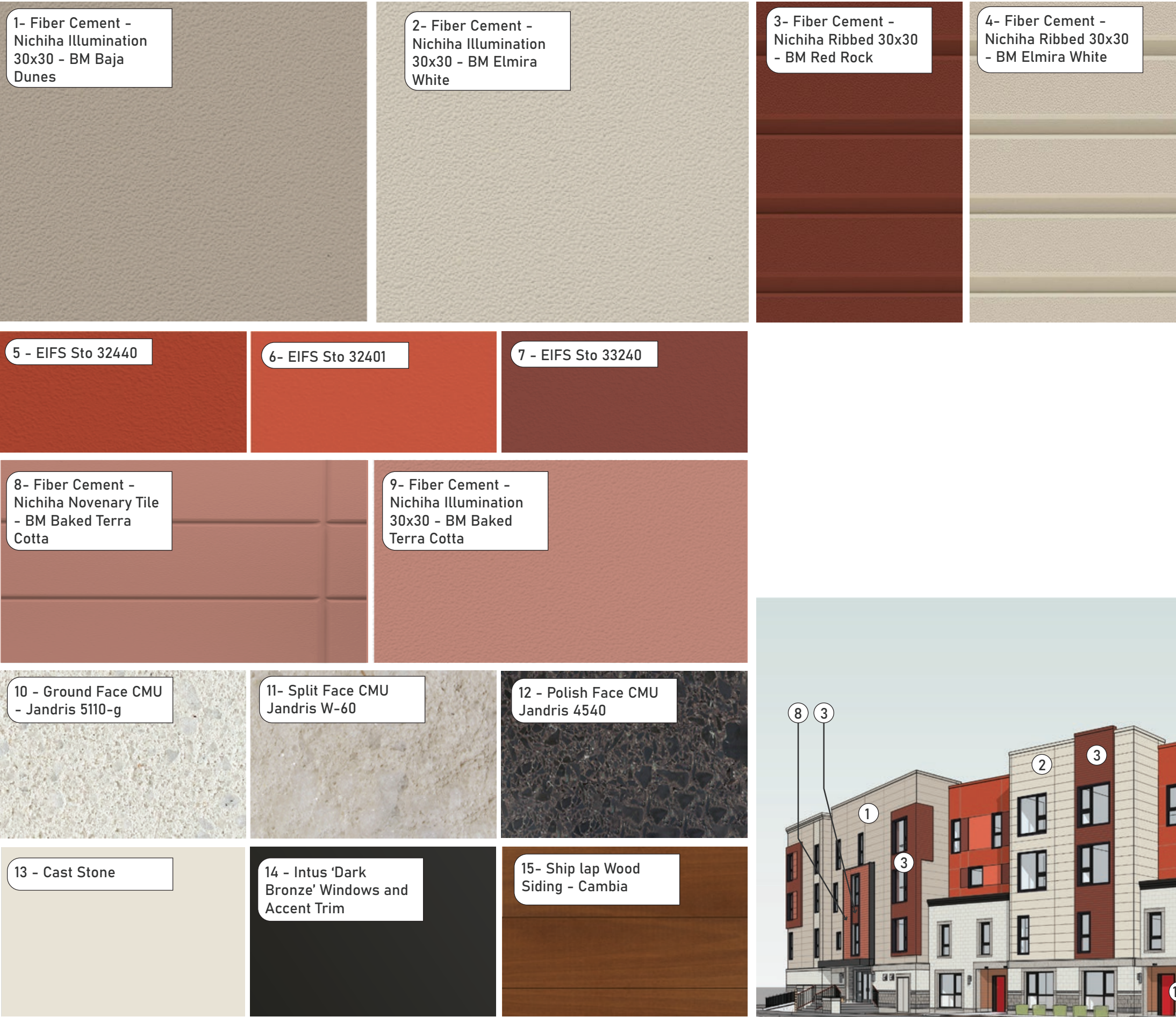


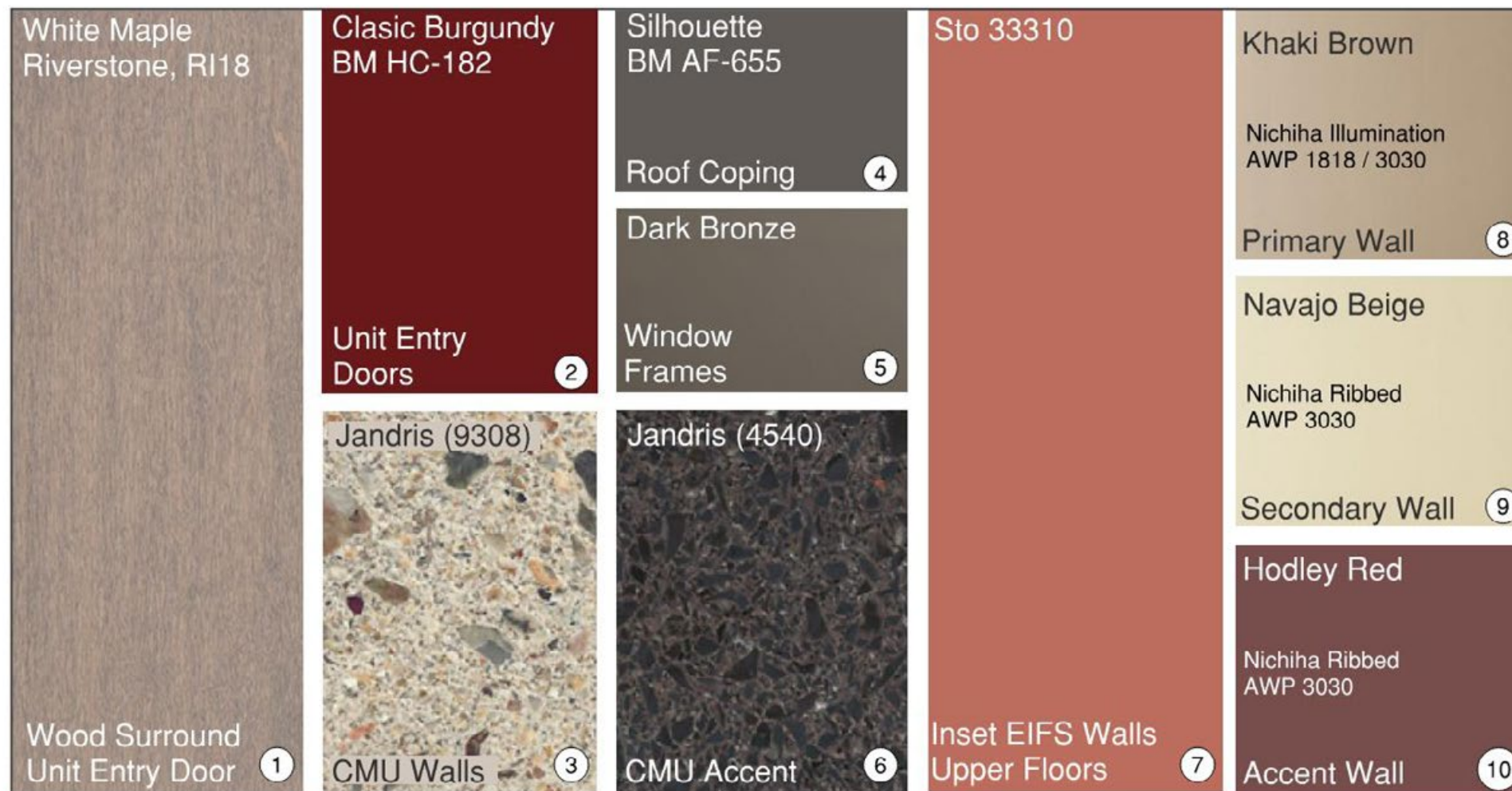
BUILDING 6
PERSPECTIVES



BUILDING 6

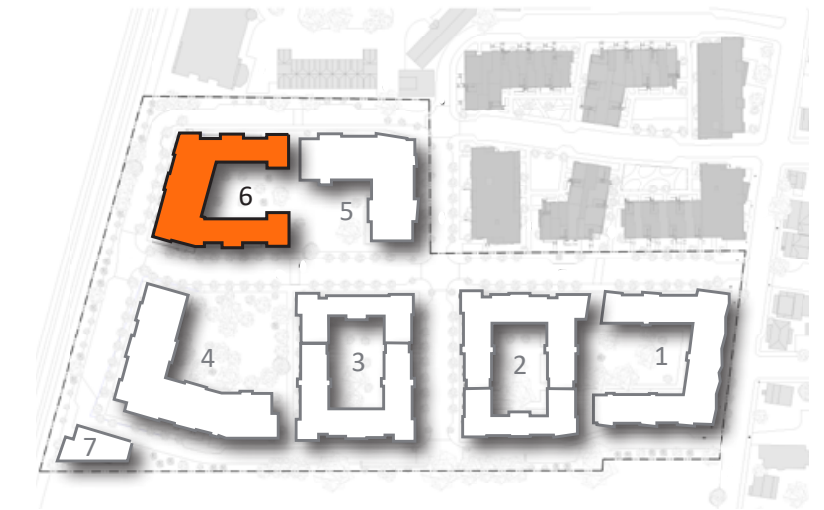
CURRENT MATERIAL PALETTE





BUILDING 6

PREVIOUS MATERIAL PALETTE



PERSPECTIVE SITE VIEWS

PERSPECTIVE SITE VIEWS

MAIN ST LOOKING SW (BUILDINGS 1, 2, 3, 4)

Emphasized “base-middle-top”
expression of building materials

Consistent corner articulation
through window expression, accent
panels and detailed cornice along
Main St.

Cast stone detailing around
windows and doors at ground floor
to distinguish Main St. and enhance
pedestrian scale articulation



PERSPECTIVE SITE VIEWS
MAIN AND NORTH ST LOOKING SOUTH (BUILDINGS 5, 6)



PERSPECTIVE SITE VIEWS
MAIN ST LOOKING SW (BUILDINGS 1, 2, 3, 4)



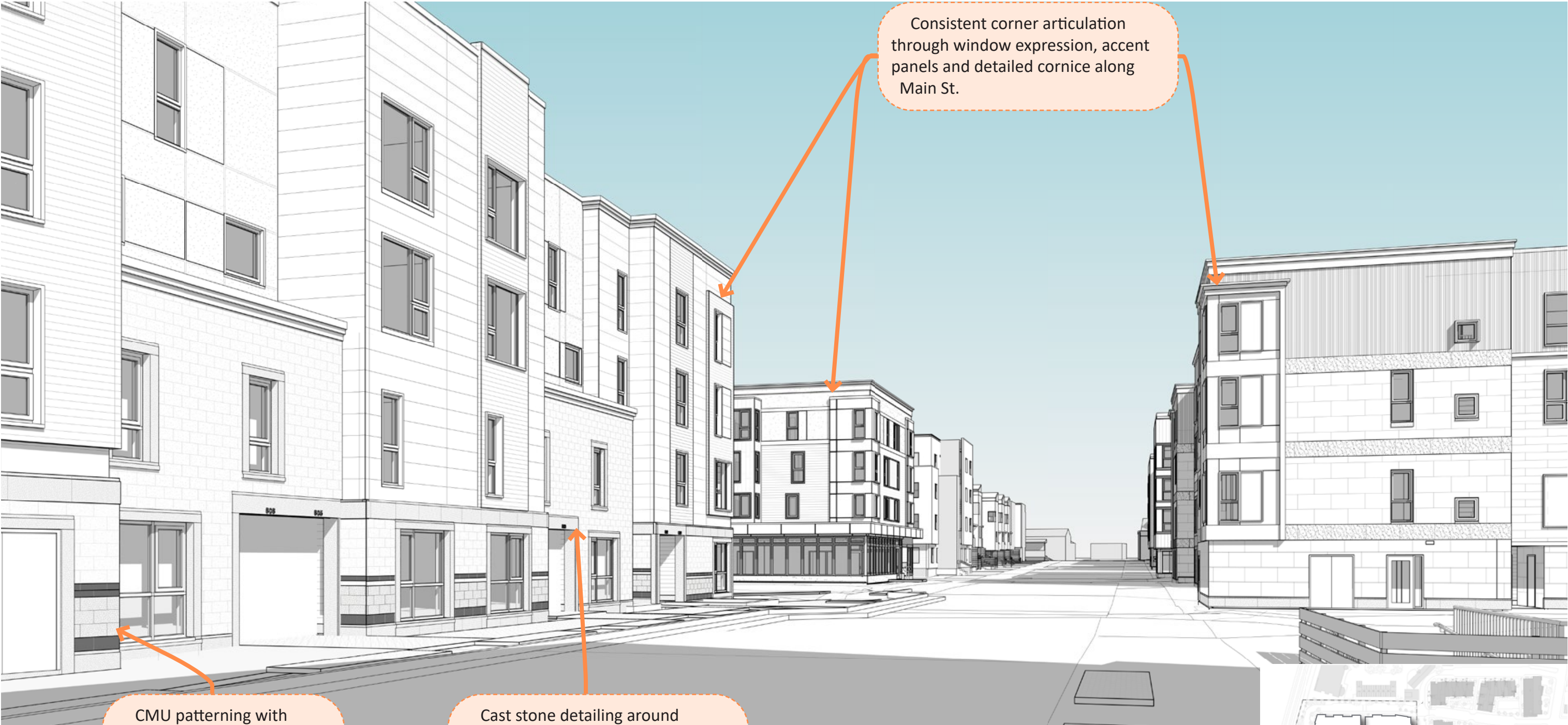
PERSPECTIVE SITE VIEWS

VIEW FROM BUILDING 4 COMMUNITY PARK (BUILDINGS 3, 5, 6)



PERSPECTIVE SITE VIEWS

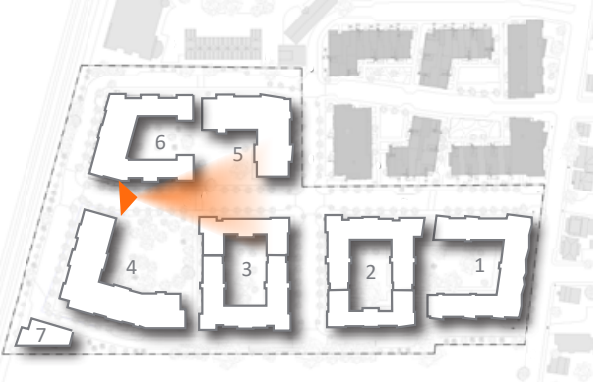
MAIN ST LOOKING NORTH (BUILDINGS 3, 5, 6)



Consistent corner articulation through window expression, accent panels and detailed cornice along Main St.

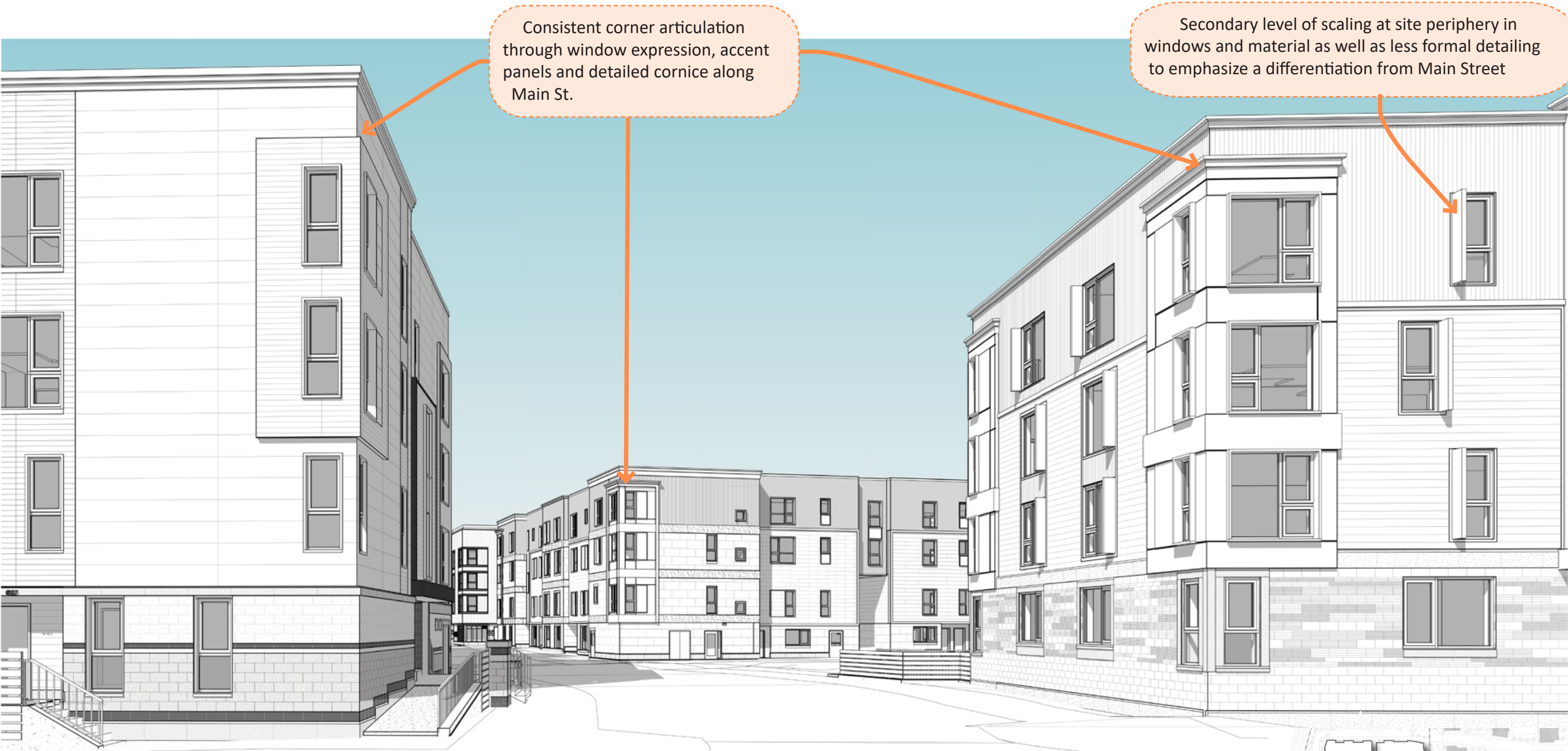
CMU patterning with varied colors and textures to enhance visual interest

Cast stone detailing around windows and doors at ground floor to distinguish Main St. and enhance pedestrian scale articulation



PERSPECTIVE SITE VIEWS

MAIN AND SOUTH ST LOOKING NORTH (BUILDINGS 3, 4, 6)



PERSPECTIVE SITE VIEWS

EAST ST LOOKING NORTH (BUILDINGS 3, 4)



Less formal cornices and window articulation at corners on side streets

Cast stone sill only as opposed to surround trim featured on Main St.

Emphasized “base-middle-top” expression of building materials

PERSPECTIVE SITE VIEWS

EAST ST LOOKING NORTH (BUILDINGS 2, 3)

Less formal cornices and window articulation at corners on side streets

Window detailing does not wrap the corner as on Main St., creating a solid facade corner to make East St. less formal

Cast stone at sill only



PERSPECTIVE SITE VIEWS

WEST ST LOOKING NORTH (BUILDINGS 5, 6)

Smaller windows and less material and cornice articulation on side steets to emphasize Main St. hierarchy



Cast stone at sill only

Wood detailing at unit entries to add warmth while visually connecting to JP Fed and JP State



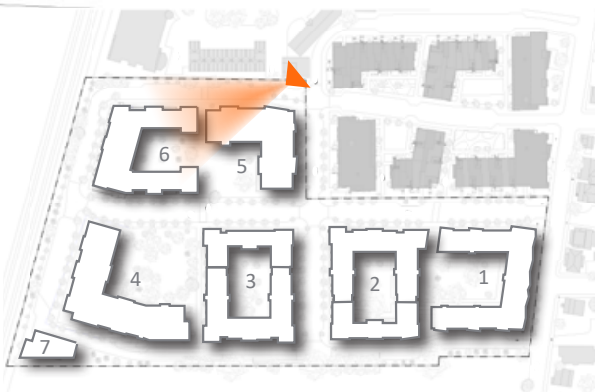
PERSPECTIVE SITE VIEWS
WEST ST LOOKING SOUTH (BUILDINGS 5, 6)

Smaller windows and less material and cornice articulation on side steets to emphasize Main St. hierarchy



Cast stone at sill only

Wood detailing to add warmth while visually connecting to JP Fed and JP State



VOLUME 3: APPENDICES

Report: Jefferson Park Federal Per Unit Construction Costs

The Cambridge Housing Authority has reviewed the construction budget for Jefferson Park Federal to identify cost drivers contributing to the high construction cost of \$745,402 per unit.¹ As noted in Figure 1, \$315,187, or 42% of the per unit costs, are extraordinary costs. These costs are not typical or standard on affordable housing projects. Absent these extraordinary costs, the per unit construction cost at Jefferson Park would be \$430,215. This is in line with other affordable housing projects in the Boston-Cambridge area. For example, two other pending affordable housing projects in Cambridge have comparable cost as the Jefferson Park number with projected costs ranging between \$390,000 and \$477,000 per unit. In addition, all affordable housing projects are currently being impacted by premium costs which are adding approximately 12% to project costs resulting from COVID-19 escalation and supply chain interruptions and enhanced sustainability measures such as Passive House design and net-zero readiness.

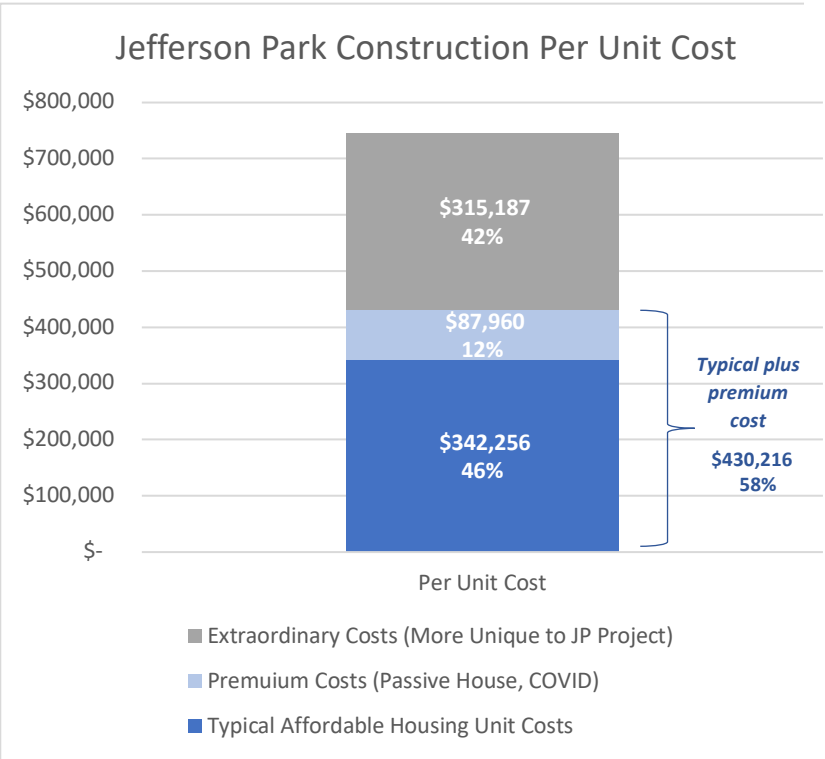


Figure 1: Typical, premium, and extraordinary costs per unit

Figure 2 on the next page illustrates the items that contribute to the \$315,187 per unit in extraordinary costs being incurred specifically by the Jefferson Park project. Extraordinary costs fall into one of five categories:

- (1) the premium resulting from needing to meet prevailing wage and public procurement requirements (\$141,793 per unit);
- (2) the premium relating to the very large percentage of units with three or more bedrooms (\$87,447 per unit);
- (3) the premium required for abating hazardous material and demolishing 11 existing buildings, constructing new site infrastructure and utilities on an 8-acre site and providing a robust tree replanting and maintenance program (\$51,341 per unit);
- (4) the premium associated with the three-year length of construction, overall size and complexity of the project, and project phasing (\$28,558 per unit); and
- (5) the premium to provide Head Start classrooms and area maintenance and management spaces (\$6,049 per unit).

¹ Soft costs add another \$160K in project costs bring the overall per unit cost to approximately \$905.6K. Soft cost expenses cover costs related to project financing, including construction loan interest, architectural services, financing fees, relocation, other project soft costs and developer fee. CHA’s costs in these areas are typical for a low-income housing tax credit, affordable housing development.

In addition to the extraordinary costs being incurred by the Jefferson Park project, two other factors which will be discussed later are currently impacting project costs by \$87,960 or 12%, and include:

- (1) the premium resulting from COVID-19 escalation and supply chain disruptions including labor shortages (\$60,604 for Jefferson Park, or 8% of the per unit construction cost);
- (2) the premium relating to enhanced sustainability and energy efficiency measures including Passive House and net-zero ready designs (\$27,356 for Jefferson Park or 4% of the per unit construction cost).

Details on the cost drivers totaling \$315,187 per unit specific to the Jefferson Park project is provided below.

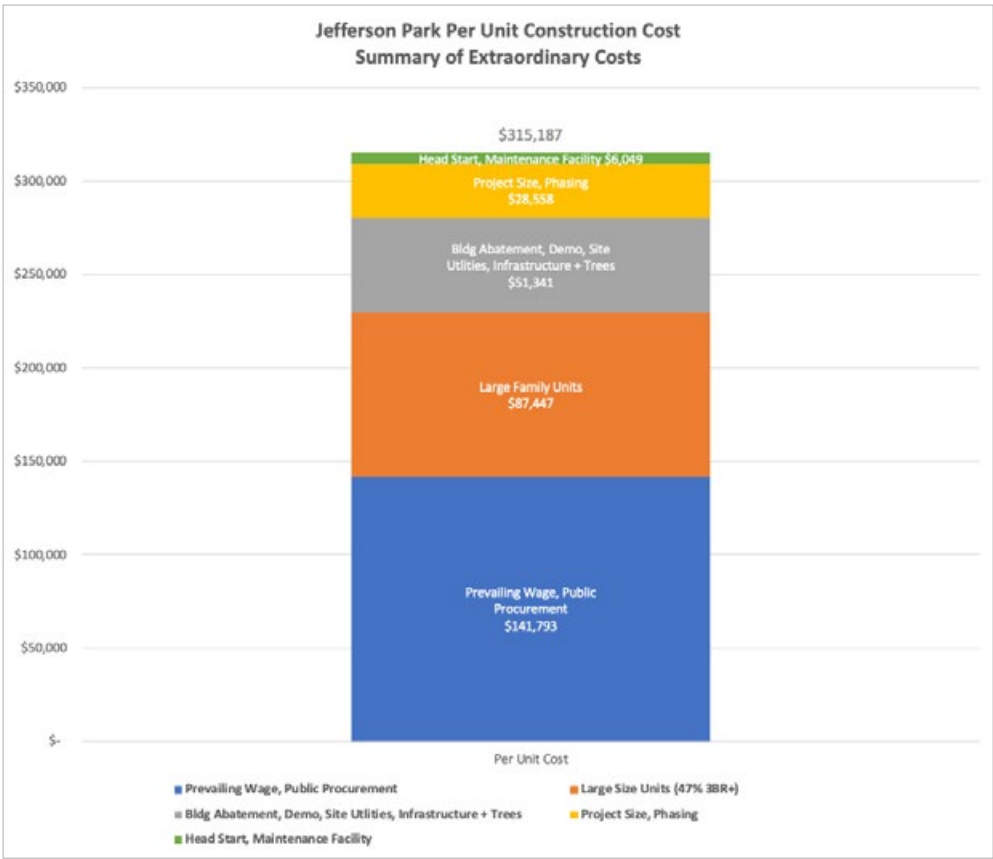


Figure 2: Summary of the Jefferson Park extraordinary costs per unit

Prevailing Wage and Public Procurement. As a public agency, the Cambridge Housing Authority (CHA) is required by Massachusetts General Law to pay prevailing wage and to procure contractors through a two-tiered system. The CHA estimates prevailing wage and public procurement premiums increase the construction costs at Jefferson Park by \$141,793 per unit, or approximately 32% increasing the per unit cost from \$430,215 to \$572,008. This is conservative analysis, as industry standards estimate prevailing wage and public procurement premiums at between 30% and 40% of construction costs.

An example of the cost premium associated with prevailing wage is provided in a 2016 study completed by the Construction Labor Research Council which compared the wage and fringe benefits package between a New England/Boston area Trade Union (Local 357 of NEMCA/Air-Conditioning and Refrigeration Contractors of Boston, Inc), and comparable to prevailing wage, to non-union data for the same occupation in the same geographic region. The study found for the Boston-Cambridge area “that the nonunion total rate range were

from 48 to 57 percent lower than the union rate. (Conversely, the union rate ranges from 92 to 131 percent higher than the nonunion rate.)”

LiUna, a national union representing Laborers reports that nationally the wage rate is 55% higher for a union worker than a non-union worker. This differential is even greater in the Boston-Cambridge area. As further example, the prevailing wage and benefit rates currently being experienced at current CHA projects include rates between \$106.28 to \$123.25 for electricians, \$118.32 to \$122.35 for plumbers, \$107.71 to \$113.10 for HVAC workers, \$152.07 to \$168.06 for elevator operators/technicians, and \$108.97 to \$116.00 for carpenters.

Another factor driving the increase in costs attributable to public procurement is the way in which the process creates smaller pools of potential bidders for filed sub-bid subcontractors. In the fall of 2019, the CHA received only one or two bids for numerous filed sub-bid trades for Burns Apartments and Roosevelt Towers. Among the factors resulting in few potential bidders is the requirement for contractors to go through a pre-qualification process and evidence of a State Contractor Certification which narrows down the number of contractors who are eligible to bid. Once pre-qualified, contractors can see which other contractors have also pre-qualified for a particular trade, resulting in a level of transparency that does not always encourage a competitive market for bidding. In addition, public procurement laws require selection of the lowest responsible bidder for a project’s general contracting work and individual subcontractors for major trades. Typically, in the affordable housing field, developers contract with a general contractor and allow that general contractor to select subcontractors based on experience and their ability to deliver a quality project within budget and on time. Taking the general contractor out of the process of selecting subcontractors based solely on the lowest bidder can create and has created dissonance between general and subcontractors on projects and contract administration. These dynamics result in higher costs, with general contractors and subcontractors building in a cushion driving up the project costs to account for any management-related issues around coordination, timeliness, and quality of product.

In 2018, CHA conducted a review of comparable non-public projects in Cambridge and comparable public projects in Boston. A comparison of costs between a CHA publicly procured project completed in 2015 and a non-publicly bid project completed in 2018 found CHA costs (adjusted for inflation) were 36% higher due to public procurement and prevailing wage. Both projects were new construction of similar design and finishes, located in Central Square, completed by the same contractor and on similar constricted urban sites. CHA also completed cost comparisons with Boston Housing Authority projects that had received home rule approval (i.e. projects that are exempt from public procurement, but not prevailing wage). With most projects ranging between 70 and 120 units, CHA found that the costs of its projects were on average 21.5% higher than Boston Housing Authority.

Large Family Units. The Jefferson Park project is creating 130 units with three or more bedrooms, or nearly 47% of the total units. The larger units required to house families results in higher construction costs when calculated on a per unit basis than developments with a larger number of studios, one- and two-bedroom units since more space needs to be constructed. In addition, town-house style units (see Figure 3 on the next page) which CHA looks to maximize for larger size families increase the square footage per unit due to the space requirements of internal staircases



Figure 3: Typical 3-bedroom apartment layout (town-house style)

The impact of differing unit mixes is evident when comparing the Jefferson Park project with CHA's Temple Place or Just-A-Start's New Street development. The average gross square footage per unit at Jefferson Park is 1,455 square feet given the high percentage of large family units. For comparison, the per unit gross square footage of CHA's Temple Street Apartment, which consists of only one- and two-bedroom units, is 1,070 square feet. Similarly, at Just-A-Start's New Street development, which has 21 three-bedroom units, or under 20% of the total units planned, the per unit gross square footage is 1,207 square feet. We have calculated the costs for the added square footage of the larger units to be \$24,310,175, or \$87,447 per unit. This reflects the additional ~250 square feet per unit being constructed because of the substantial number of large family units.

In many respects, looking at affordable housing cost on a per unit basis serves as a disincentive to constructing larger size units. CHA could have opted to create many more one-bedroom units in lieu of three-bedroom units within the same square footage effectively driving down the per unit cost. A better measure is cost per bedroom and cost per square foot. When reviewing those metrics against CHA's Jefferson Park State project, completed in 2018, Jefferson Park Federal costs are lower in both instances. Adjusted for inflation, Jefferson Park State had a per square foot cost of \$551.36 versus \$512.47 projected for Jefferson Park Federal. Similarly, Jefferson Park State, with its large number of smaller units, had a per bedroom cost of \$395,125 when adjusted for inflation versus \$309,749 currently projected for Jefferson Park Federal.

Abatement, Demolition, New Site Utilities, and Infrastructure. Very few new affordable housing developments being built today are constructing a new neighborhood, but that is what is happening at Jefferson Park as CHA looks to expand and improve affordable housing opportunities in the city. The proposed design requires the abatement and demolition of eleven obsolete, failing buildings onsite and the reconstruction of all infrastructure and utilities across the 8-acre site. This is a significantly more than typical affordable housing developments that can either repair existing infrastructure and utilities or take advantage of short connections from the site to the public way. CHA only pursued new construction once it determined that poor interior and exterior conditions of the existing buildings coupled with failing site infrastructure made rehabilitation more costly than new construction. New construction also allowed for a significant increase of 103 new affordable apartments for families.

Built in the early 1950's, the existing buildings at Jefferson Park contain significant hazardous materials that need to be abated prior the demolition of buildings. The total cost of the abatement is estimated to be \$2.75 million. The demolition of the buildings is estimated to be an additional \$2.6 million.

Further, the site's infrastructure and utility systems (sewer, water, electric, gas) are between 40 and 80 years old, failing and need to be replaced entirely. The CHA has conducted emergency repairs over the years (see Figure 4), but they are not sufficient. Infrastructure includes the construction of new roads, which will sit above the site's new utility systems and allow for the proposed site design to connect the site to the neighborhood grid and allow for better vehicular and pedestrian access to the property and new units. The site also must meet storm water storage and mitigation requirements and significant increases in electrical requirements from Eversource, including a new Eversource transformer to support the neighborhood. The cost of this new infrastructure, site utilities and related work is close to \$9 million, or \$32K of the \$51K per unit cost.



Figure 4: All existing buildings suffer from failing utilities such as deteriorating sewer pipes and water mains causing flooding onsite.

In all, the cost to abate hazardous materials, demolish the existing buildings, and install new site utilities and infrastructure to replace failing systems is \$14,272,762, or \$51,341 per unit.

Construction Complexity, Length, and Phasing. Given the size and scale of the project, the construction schedule is anticipated to be close to three years in total which is nearly three times longer than the typical affordable housing development project. With a project of this duration, the project incurs more cost related to its administration and supervision. For example, contractor costs are higher since bonding and insurance companies set higher prices for longer, more expensive projects and contractors must include additional costs on longer projects to cover inflation at levels greater than projects with smaller durations given more risks associated with longer projects and the escalation of the price of materials and labor over time.

Additionally, the size of the project presents design and constructability challenges that contribute to higher costs. For example, the site is divided into multiple buildings and multiple blocks (see Figure 5) which add additional square footage, façade area, foundations, and mechanical/electrical/plumbing systems to the project



Figure 5: The 8-acre site is broken up into 6 residential buildings and multiple blocks.

when compared to projects that include only one or two buildings. Furthermore, the size of the project means CHA is not able to provide the contractor with an entirely vacant site. Several buildings, such as the existing Head Start building, will need to be maintained while construction is underway, adding additional phasing costs.

In all, the premium for construction complexity, length and phasing to be over \$7.9 million, or \$28.5K per unit.

Head Start and Maintenance/Management Spaces. The final driver on construction cost is the inclusion of two Head Start classrooms in the project as well as CHA maintenance and management space to support the entire North Cambridge area, as opposed to maintenance and management space to support the property alone. These unique programmatic elements add roughly \$1.68 million to the project, or \$6,000 per unit.

Other Current Factors Driving Up Project Costs (Current “Premium” Costs). As noted earlier, there are two other factors that are generally increasing project costs for affordable housing development at the current time: higher costs due to the COVID 19 pandemic and enhanced sustainability design.

COVID-19 Impact. CHA currently estimates that \$16,848,000, or 8% of the Jefferson Park project costs relates to the cost escalation, supply change disruption, and labor shortages. Consigli who is the CHA’s Construction Manager on the Jefferson Park has been tracking these costs closely, and are reporting a 12% escalation in pricing year to date. They note that the lack of supply and high demand for shipping containers, and ground transportation is influencing pricing. With a strong pipeline of working keeping materials high, they do not expect dramatic drops in pricing, just a price stabilization. Examples of material costs increases include 20% for roof insulation and membranes, 15% for gypsum wall board, and 5% for structural steel, cooper wiring, and mechanical equipment.

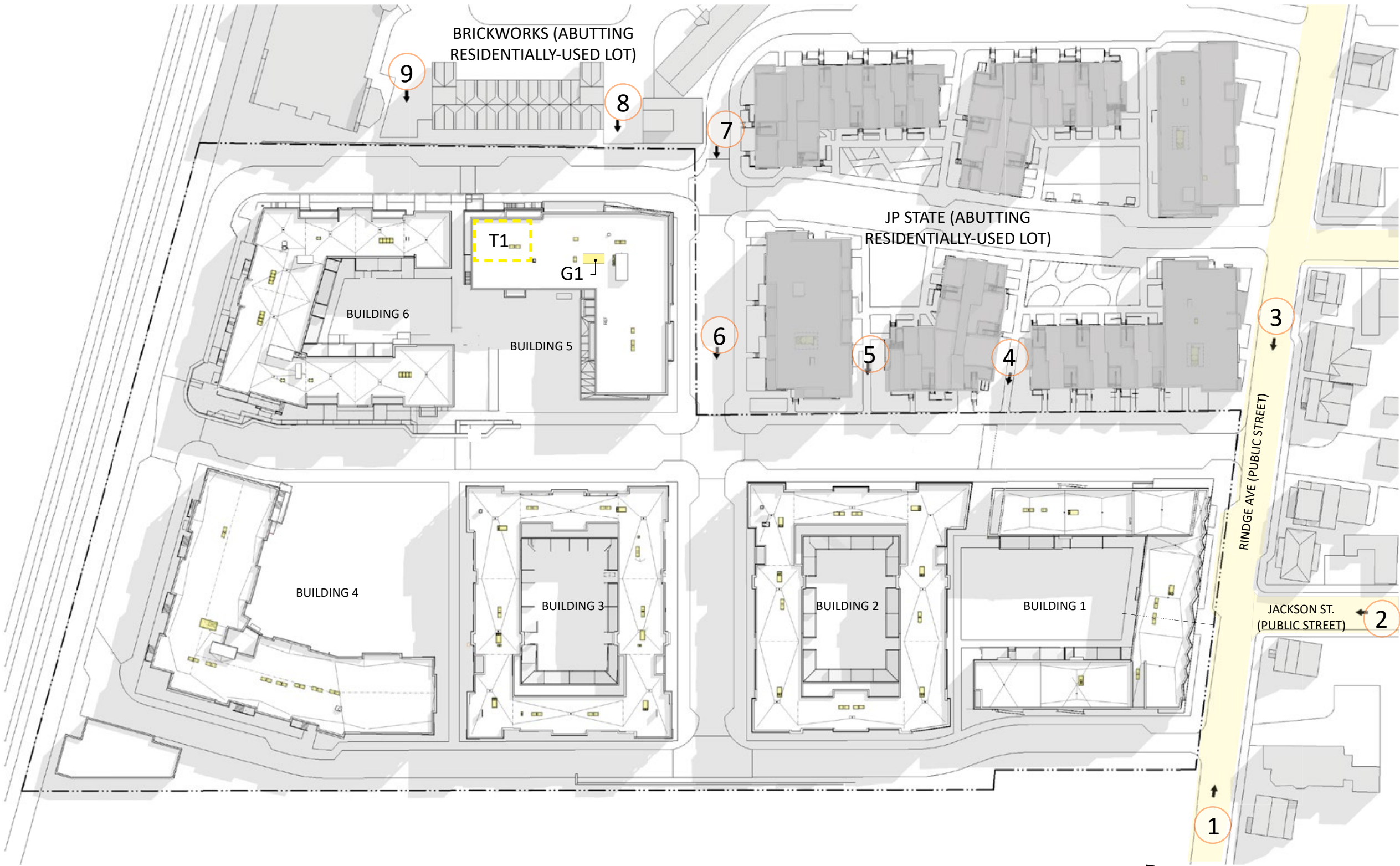
Enhanced Sustainable Design. CHA has made significant progress in reducing its green house gas emissions, increasing its on-site electricity generations, and lowering its gas and electricity usage. However, recognizing that more is required, CHA adopted passive house and net-zero ready designs for Jefferson Park. The implementation of these two designs is adding measurable cost to the project which we conservatively estimate to be \$7,605,000, or \$27,356 per unit or 4% of the project unit costs. We applaud the City’s commitment to assist Jefferson Park in meeting these metrics.

Conclusion. The Jefferson Park team has been mindful when designing the new Jefferson Park to be as efficient and economical in its design while still providing comfortable homes for residents and high-quality buildings that the CHA can successfully manage and maintain long-term. As noted above, the construction cost at Jefferson Park is being impacted by specific procurement and wage requirements that CHA as a public entity must meet, the large number of family size units being constructed on site, the extensive requirements to upgrade a failing site utility and infrastructure, the complexity resulting from a redevelopment of a nearly 8-acre site over a three year period, and the inclusion of two Head Start classrooms as well as a much-needed CHA maintenance facility in the project. These extraordinary costs account for roughly 42% of costs, or \$315,187 per unit. The remaining per unit cost of \$430,215 to construct the new Jefferson Park Federal are in-line with other affordable housing development costs. In addition to costs specific to Jefferson Park, many affordable housing projects including Jefferson Park are also facing unprecedented increases from the COVID 19 pandemic which has impacted supply chain, material, and labor costs. The transition of the industry to a higher, more enhanced sustainable design is also increasing project cost. These additional premium costs account for roughly 12% of costs, or \$87,356 per unit.

MECHANICAL EQUIPMENT

SITE PLAN AND VIEWS

MECHANICAL EQUIPMENT SITE PLAN



- NOTE:**
- 1. All roadways are private driveways unless otherwise noted.
 - 2. No electrical equipment will be located at grade except for Generator G1.
 - 3. All utility-mandated electrical equipment will be located within the transformer vault in building 5.
 - 4. No equipment is visible from further away on Rindge Ave. to the west as well as to the east.

SITE PLAN INFORMATION
(Section 11.207.7.5 of the CZO)
Locations, dimensions, and screening of all mechanical equipment located on-site

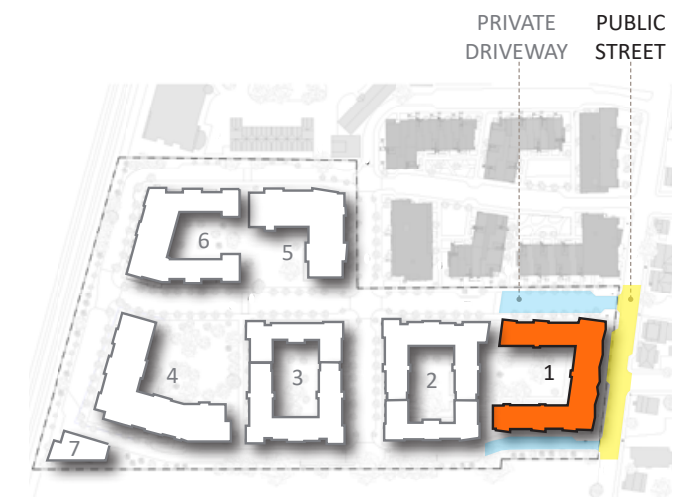
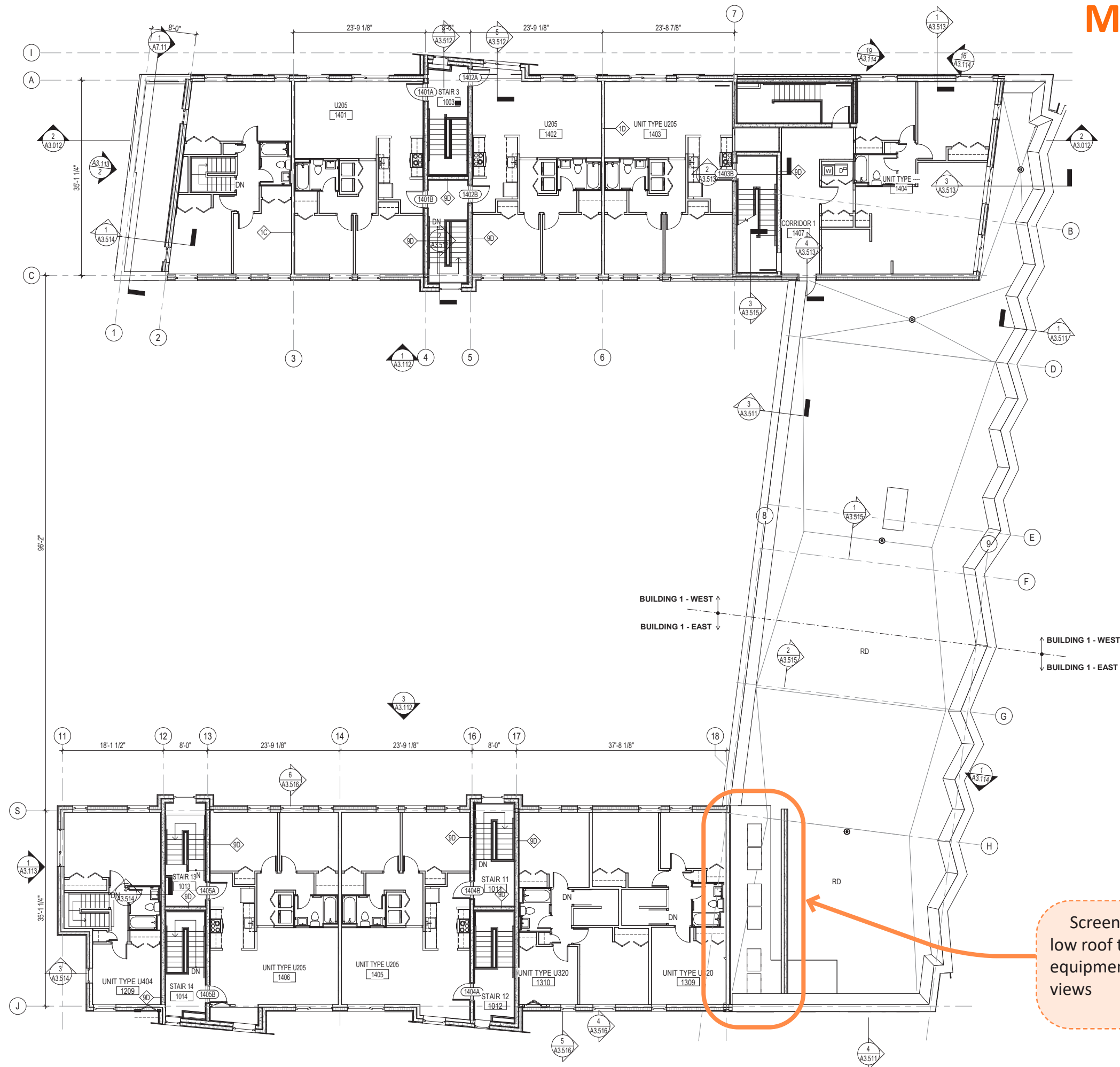
KEY PLAN

MEP EQUIPMENT

SEE NOTE 4

MECHANICAL EQUIPMENT

BUILDING 1 - MEP



FOURTH FLOOR PLAN



Screen added at low roof to shield MEP equipment from all views

MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



2-LOOKING AT BUILDING 1 FROM JACKSON ST.
NO EQUIPMENT VISIBLE

 MEP EQUIPMENT NOT VISIBLE FROM PUBLIC STREET

MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS

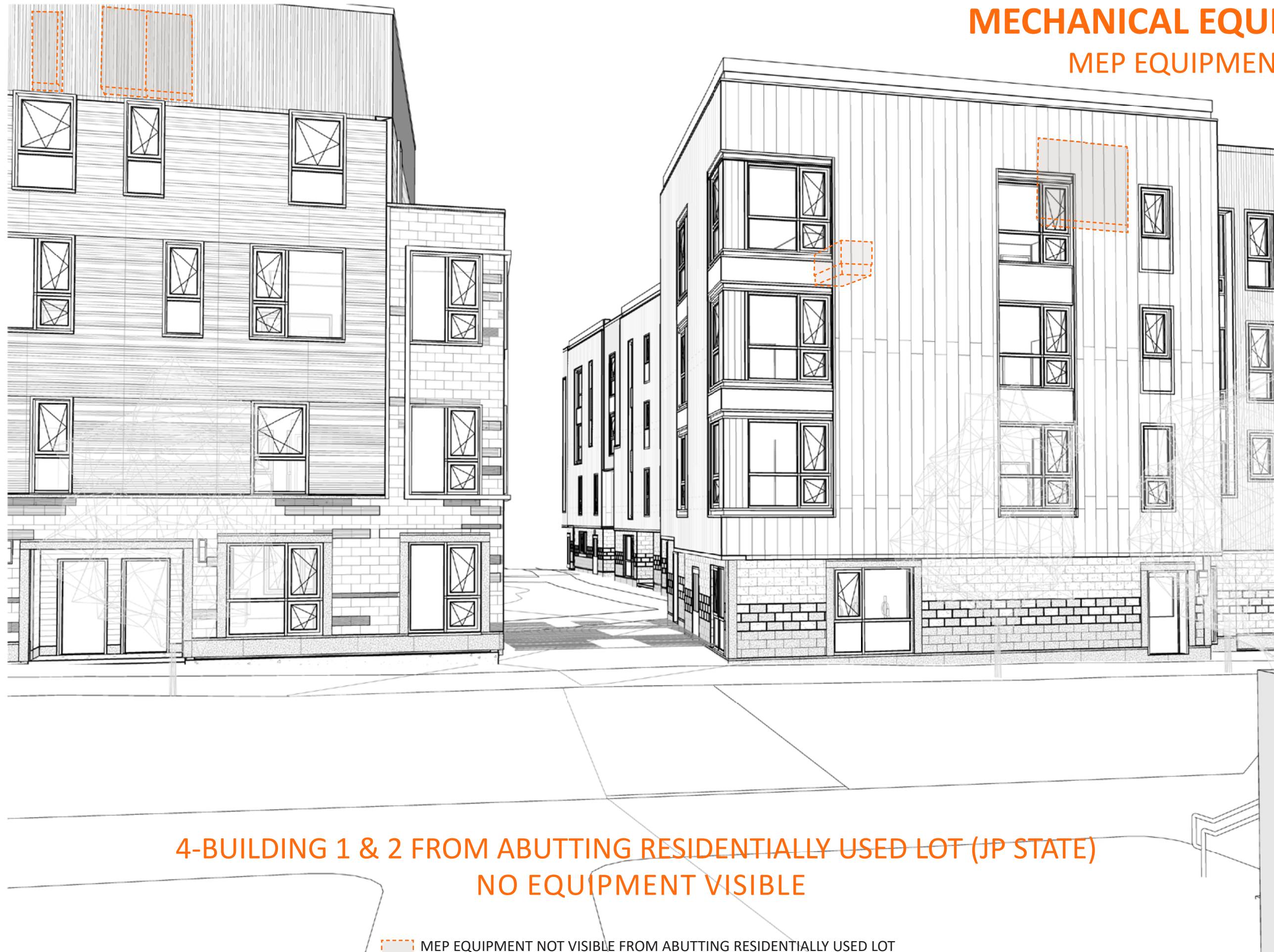


3-RINDGE AVE LOOKING EAST
NO EQUIPMENT VISIBLE

 MEP EQUIPMENT NOT VISIBLE FROM PUBLIC STREET

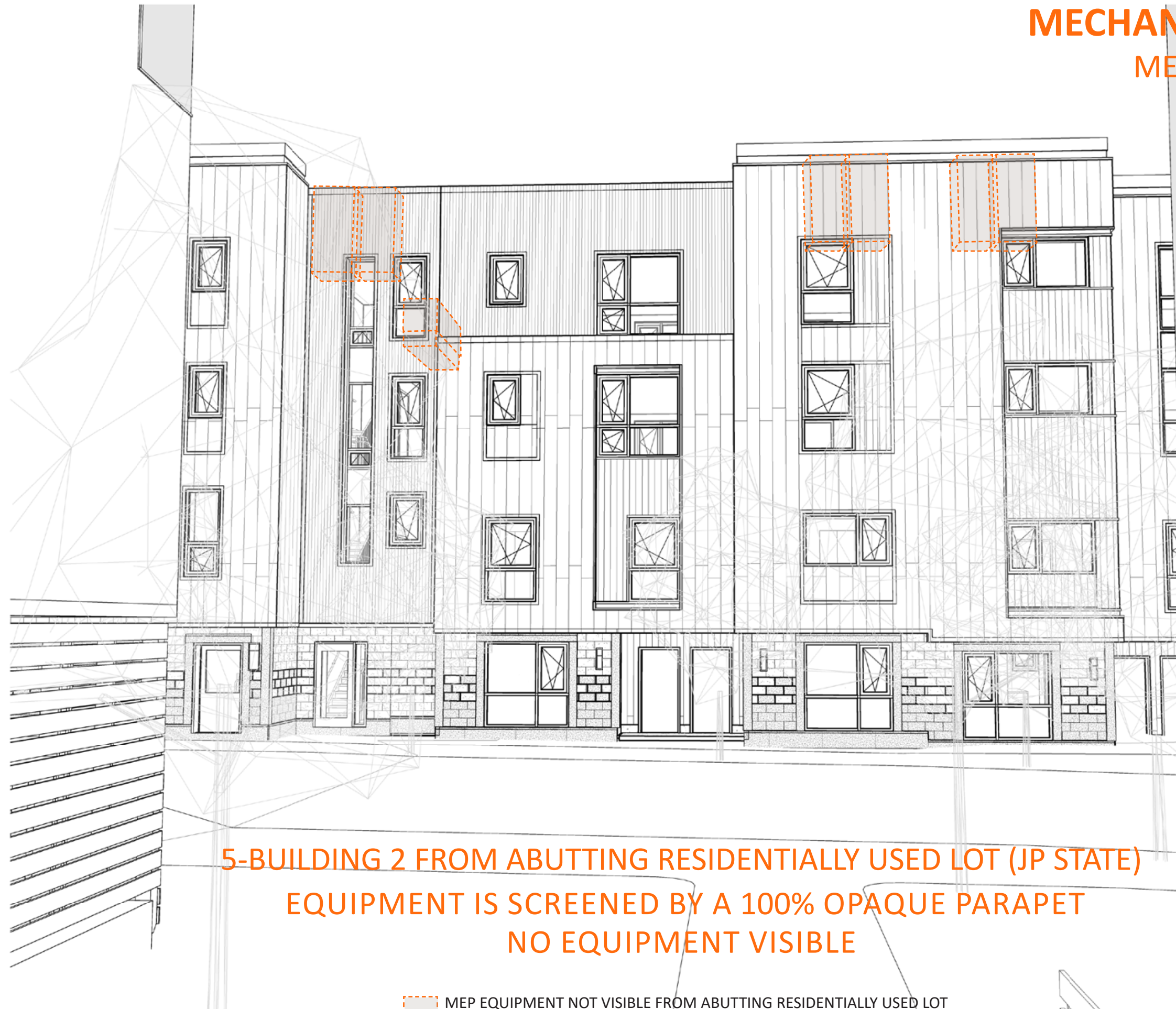
MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



6-BUILDING 2 & 3 FROM ABUTTING RESIDENTIALLY USED LOT (JP STATE)
EQUIPMENT IS SCREENED BY A 100% OPAQUE PARAPET
NO EQUIPMENT VISIBLE

 MEP EQUIPMENT NOT VISIBLE FROM
ABUTTING RESIDENTIALLY USED LOT

MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



7-BUILDING 2, 3 AND 5 FROM ABUTTING RESIDENTIALLY USED LOT (JP STATE)
EQUIPMENT IS SCREENED BY A 100% OPAQUE PARAPET
NO EQUIPMENT VISIBLE

 MEP EQUIPMENT NOT VISIBLE FROM ABUTTING RESIDENTIALLY USED LOT

MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



8-BUILDING 5 FROM ABUTTING RESIDENTIALLY USED LOT (BRICKWORKS)
NO EQUIPMENT VISIBLE

 MEP EQUIPMENT NOT VISIBLE FROM ABUTTING RESIDENTIALLY USED LOT

MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



9-BUILDING 6 FROM ABUTTING RESIDENTIALLY USED LOT (BRICKWORKS)
EQUIPMENT IS SCREENED BY A 100% OPAQUE PARAPET
NO EQUIPMENT VISIBLE

 MEP EQUIPMENT NOT VISIBLE FROM ABUTTING RESIDENTIALLY USED LOT

MECHANICAL EQUIPMENT

MEP EQUIPMENT - VIEWS



10-BUILDING 1 & 2 FROM CEMETERY
EQUIPMENT IS SCREENED BY A 100% OPAQUE PARAPET
NO EQUIPMENT VISIBLE

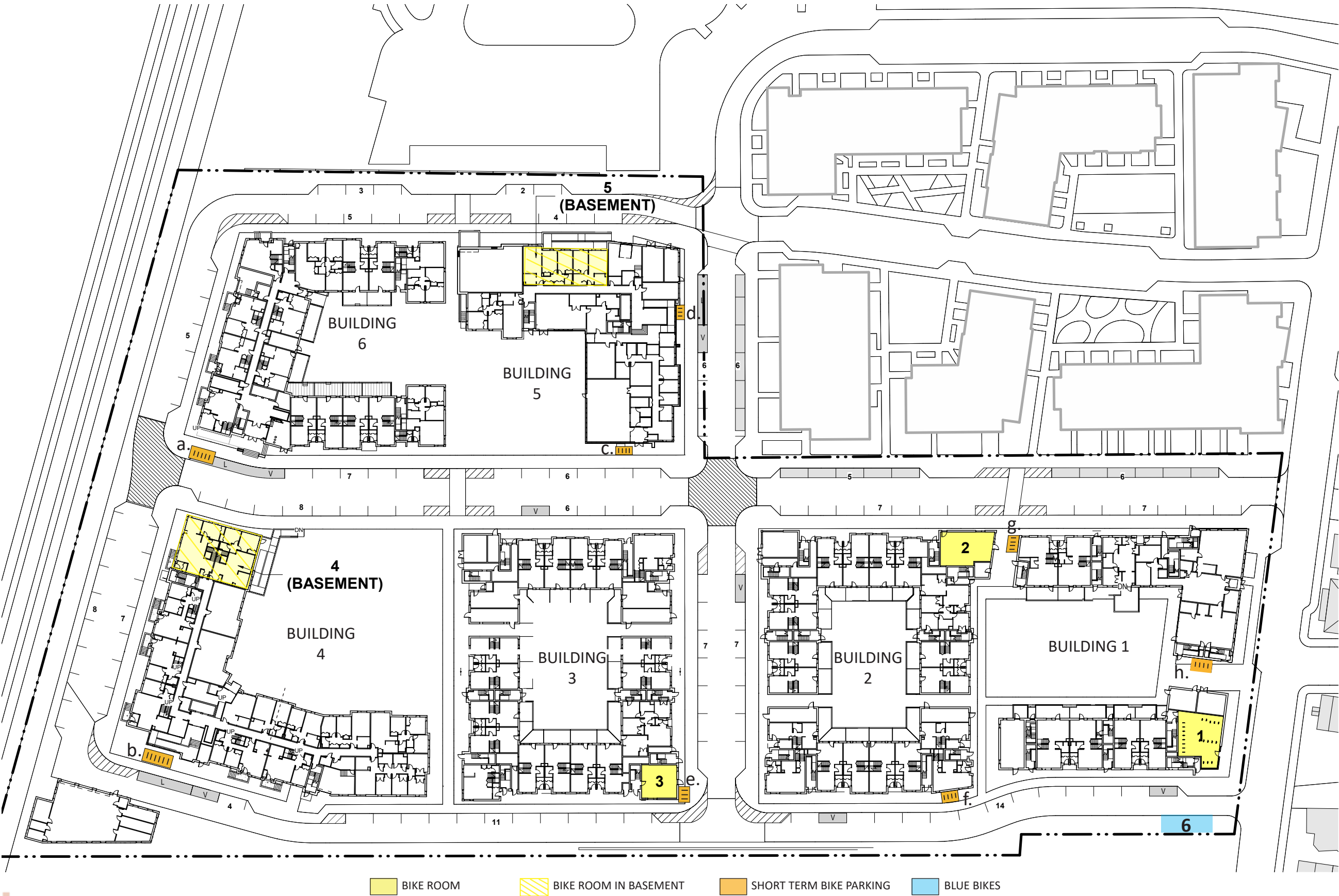
 MEP EQUIPMENT NOT VISIBLE FROM
ABUTTING RESIDENTIALLY USED LOT

BICYCLE PARKING PLANS

SITE PLAN AND FLOOR PLANS

BIKE PARKING PLAN

SITE PLAN



BIKE ROOM	CAPACITY	LOCATION
01	42	B1
02	40	B2
03	28	B3
04	90	B4
05	70	B5
	= 270	
06	30	BLUEBIKES

NOTE 1: Linear blue bike dock dimension is 62'x6'

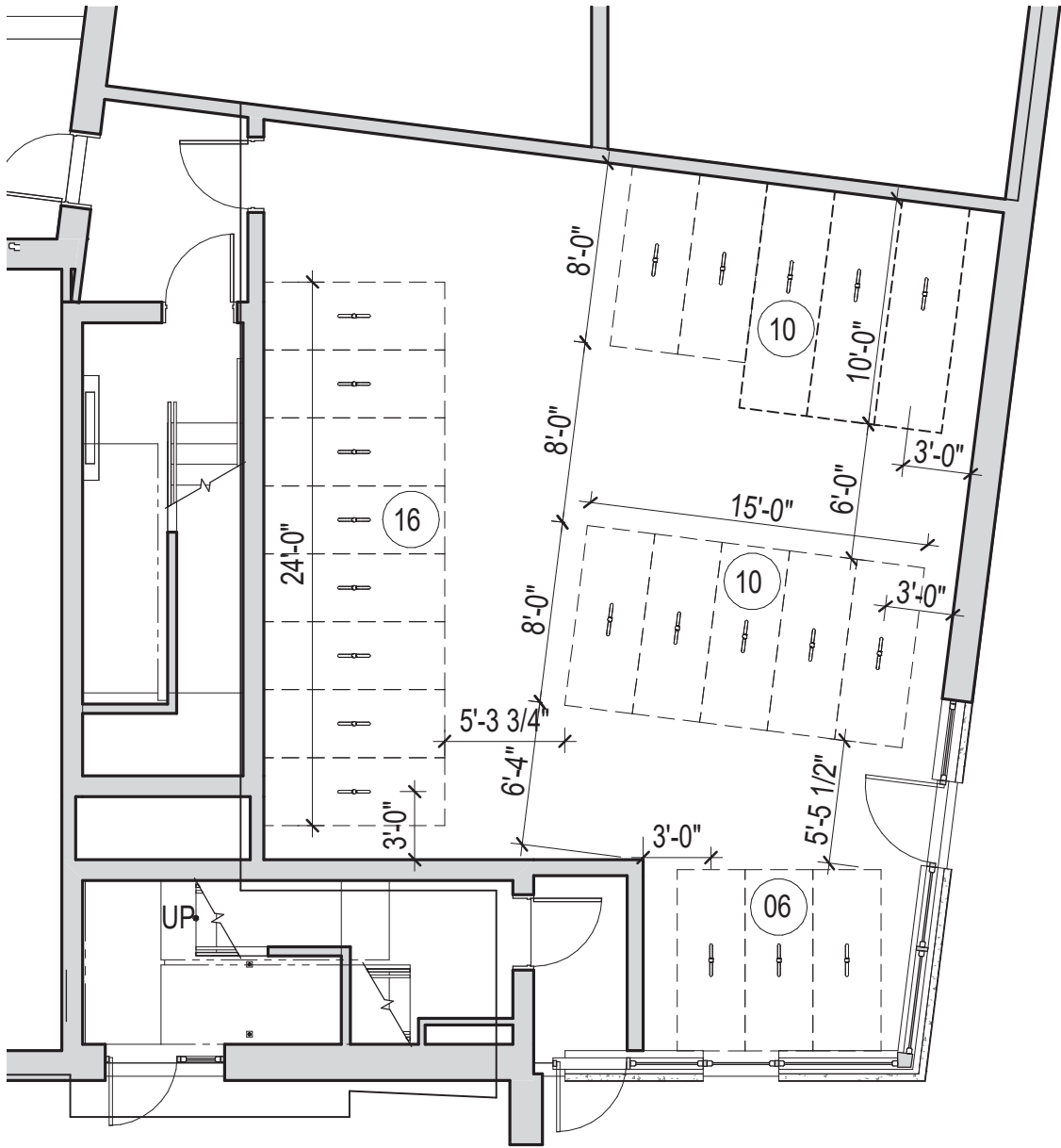
NOTE 2: A 23-dock Blue Bike station is proposed; per zoning requirement, this equals a credit of 30 bicycle parking spaces.

NOTE 3: There are 56 short-term bicycle parking spaces on site.

SHORT TERM BIKE	CAPACITY
a	10
b	12
c,f,g,h	8
d, e	6
Total	66

BIKE ROOM	TANDEM BIKES PER ROOM
01, 04, 05	6
02, 03	4
TOTAL	26

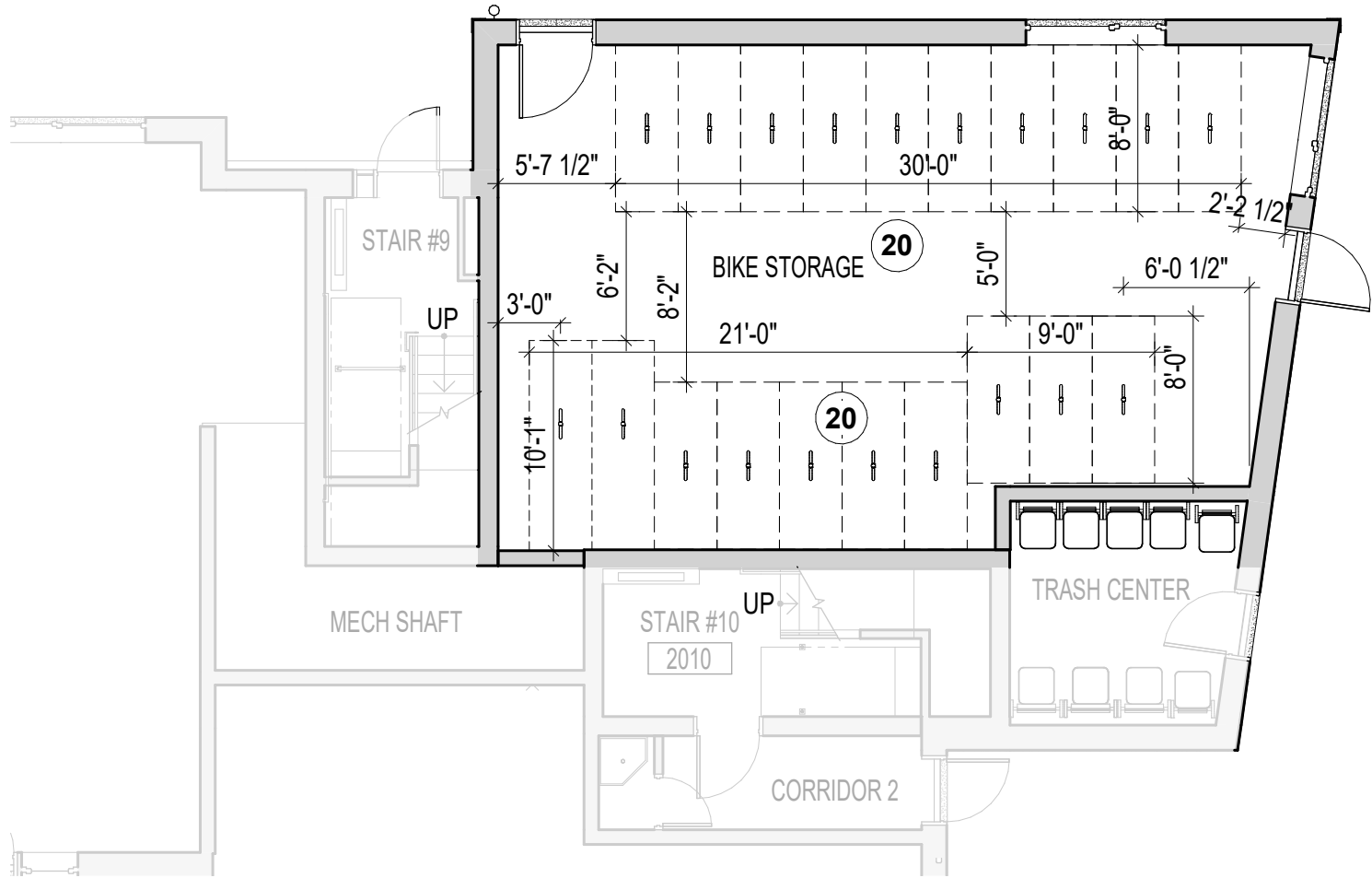
BICYCLE PARKING PLANS
BUILDING 1



B1 - BIKE ROOM

42 BIKES

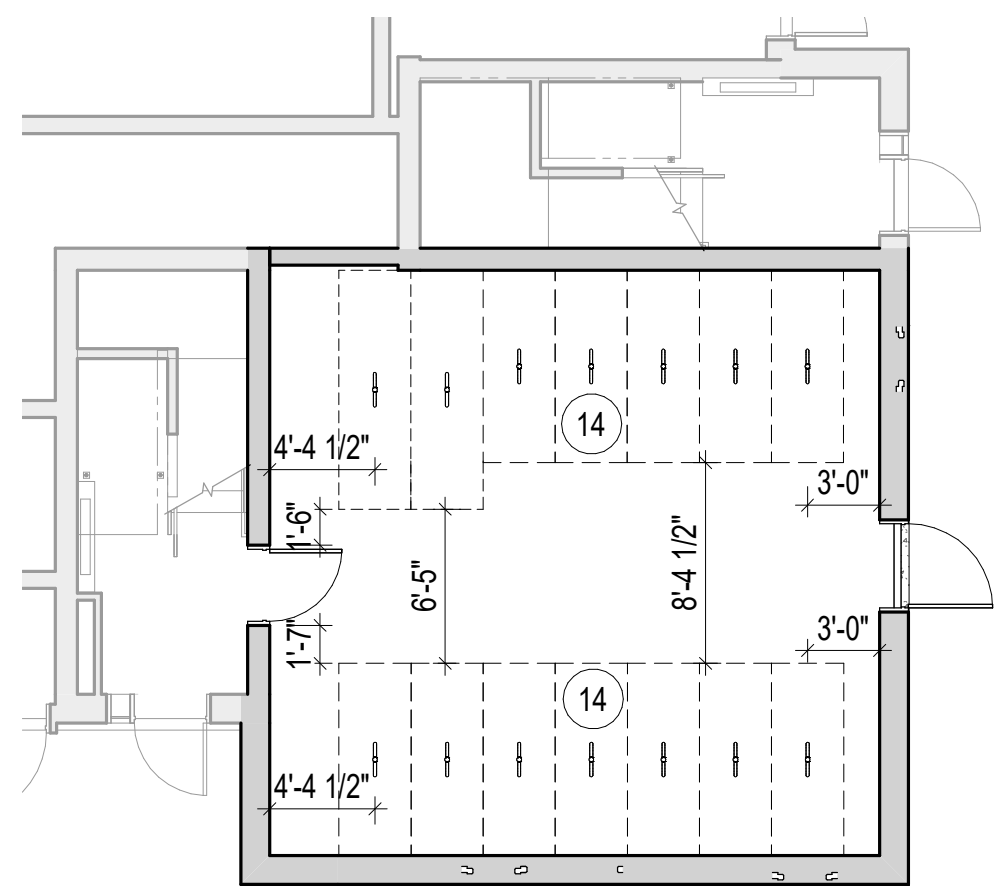
1/8" = 1'-0"



B2 - BIKE ROOM

1/8" = 1'-0"

40 BIKES

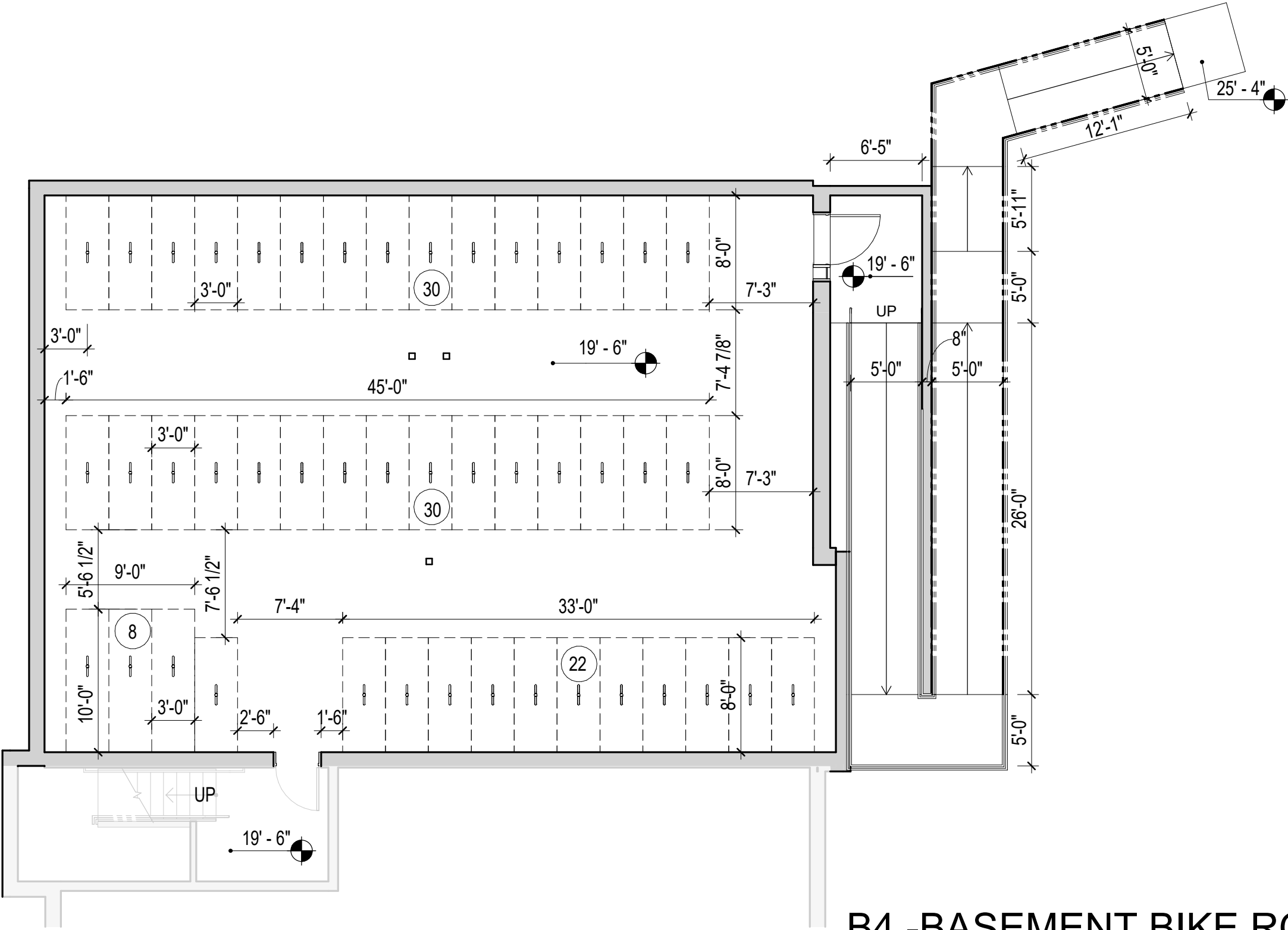


B3 - BIKE ROOM

28 BIKES

1/8" = 1'-0"

BICYCLE PARKING PLANS
BUILDING 4



B4 -BASEMENT BIKE ROOM
1/8" = 1'-0"

90 BIKES

