VI. OPTION 3: NEW MASONRY VENEER OVER CONC. & ST. WALLS

1. GENERAL INTRODUCTION

1.0. General

This section addresses issues of general applicability to Part VI: Option 3: New Brick Veneer Over Concrete & Steel-Framed Walls.

Subsection 1.1 includes General Format Notes, which describe the general formatting.

Subsection 1.2, Introductory Notes, outlines some general considerations.

Finally, subsection 1.3, Overall Description of the Option 3 Reconstruction Approach, provides a summary description of the overall approach and its limitations.

1.1. General Format Notes

Please see section IV-1.1, which applies fully to this Option 3 approach as well.

1.2. Introductory Notes

Please see section IV-1.2, which applies fully to this Option 3 approach as well.

1.3. Overall Description of the Option 3 Reconstruction Approach

The recommendations are divided into numerous subsections, each of which addresses a particular element. While this approach provides specific information in a highly retrievable format, the resulting fragmentation may obscure the overall context from which the individual recommendations spring. This section attempts to provide the more holistic explanation.

In brief, like Option 2, this approach recognizes the inherent limitations of Option 1, and also recommends replacement of the exterior cladding with a new masonry veneer. It differs from Option 2 only in that while Option 2 placed cast-in-place concrete walls inward of the masonry veneer at essentially all locations, Option 3 adds such concrete shear walls only where needed to resist lateral loads, and uses standards steel-framed walls elsewhere. In essentially all other respects, Option 3 mimics Option 2.

Where such framed walls occur, the assembly, exterior-to-interior, consists of the masonry veneer placed over a ¾" drain mat, such as Enka-Drain 9120, over 4" rigid insulation, over 3/16" vent-mat, such as Enka-Drain 9714, over 2-layer building wrap, over 5/8" exterior gypsum sheathing, over 6" deep, 16-gage steel studs spaced 16" apart. Batt or rigid insulation can be used within the framing cavities. Over the framing's interior face would be a 6-mil cross-laminated vapor barrier, and 5/8" gypsum wallboard.

The only possible advantage of Option 3, compared to Option 2, appeared to be one of cost, which is also the only reason why this option was evaluated. Option 3 is not technically equal to Option 2. Further, this Option 3 approach somewhat ironically requires significantly more concrete work at the foundations and at the building corners at all floor levels. Consequently, it actually ends up a bit more costly than Option 2. In short, this approach produces a lesser building at higher cost than Option 2, and is thus not recommended by PL:BECS for a major institutional building in Juneau's climate.

My reservations include technical and architectural considerations.

Technical concerns with this approach center on the certainty of recurring internal condensation and associated risks of corrosion, as well as possible risk of fungal infestation.

More specifically, the corrosion concern reflects the vulnerability to losing effective anchorage of the masonry veneer. The stainless steel ties that secure the masonry veneer to the walls are screwed through the gypsum sheathing to the steel stud flanges. If stainless steel screws are used, there remains a risk of corrosion right where the one or two screw threads engage the galvanized steel studs, where even very localized corrosion of the stud flanges around the screw threads can negate the veneer tie securement. I don't think this risk should be underestimated in Juneau's perpetually wet and cool climate.

The fungal concern relates to the use of gypsum sheathing in such a damp climate, especially for a major institutional building with a hopefully longer lifespan than most. Although the recommended Dens-Glass Gold sheathing is silicone-treated to resist absorption, having observed mildew growth even on vertical glass, I would not entirely dismiss the risk of at least localized fungal colonization.

An additional draw-back of this approach is that ironically, it requires appreciably more foundation work, as well as thicker concrete shear walls extending up the building's full height near its corners, to make up for the loss of the new thin concrete walls under and above the windows which are included in Options 1 and 2, but not 3. As a consequence of these thicker concrete walls, the office spaces near the building corners at all floor levels lose some floor space.

For these reasons, I do not consider the Option 3 approach technically equal to Option 2, and strongly recommend Option 2, which is both technically superior and less costly than Option 3.

As this approach is otherwise essentially identical to Option 2, it is not described in detail here. Please see subsections III-1.3.2 and III-1.3.3 and Part V for more detailed descriptions. Also, since Options 2 and 3 are very similar, many of the same drawings describe both options. Thus, Figures III-1.3(15 & 16) illustrate only two typical locations where these differ from Option 2.

Proceeding to the description, this approach is identical to Option 2 where new concrete shear walls are to be added, and this portion is not repeated here. Please see section V-1.3 for this.

Galvanized steel ledgers are secured along all floor lines where needed to support the new brick veneer along each floor level.

The ledgers and the existing protruding concrete lugs are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

Where new framed walls are to replace the existing hollow clay tile walls, the work also begins with the removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

New concrete walls, piers, and headers are cast between existing concrete columns where needed for shear capacity, per subsection VI-2.1.1. New framed walls are installed between these concrete elements, consisting of 6" deep, 16-gage galvanized steel studs spaced 16" apart. Over the exterior wall face, 5/8" exterior gypsum sheathing is screwed to the studs, and is overlaid with a 2-layer building wrap assembly, such as Tyvek Stucco-Wrap overlaid with 60-Minute Grade D paper.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are screwed through the gypsum wall sheathing to the wall framing studs, thus spaced 16" apart horizontally, and vertically continuous.

A thin vent mat, such as Enka-Drain 9714, is placed against the building wrap, and 4" thick extruded polystyrene insulation, such as Dow Board, is placed against this. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18" apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new masonry veneer, consisting of ASTM C-216 face brick, Grade SW, at brick areas, or pre-cast concrete cladding at stone locations, is installed over this, largely to match the existing appearance, but with greatly reduced offsets and with concave-tooled mortar joints to limit water infiltration into the masonry. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18" apart vertically.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

As this Option 3 approach contains both the concrete-backed and framed-wall portions, depending on location, Figure VI-1.3(1) shows a typical exterior detail where it occurs over the existing embedded concrete columns, while Figure VI-1.3(2) shows the corresponding wall assembly where steel-framed walls occur.

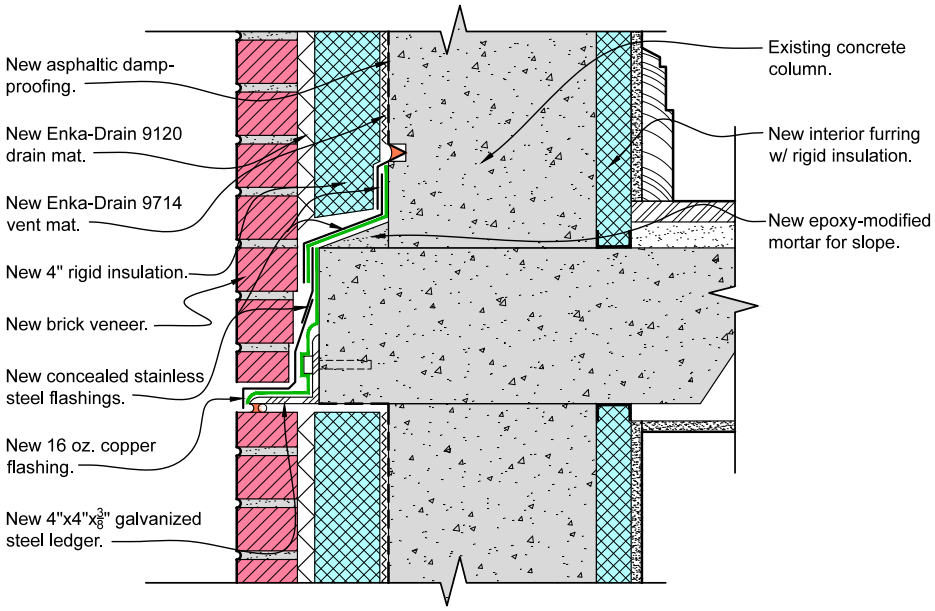

Figure VI-1.3(1): Typ. New Brick Veneer Over Exist. Concrete Column-Opt. 2 & 3

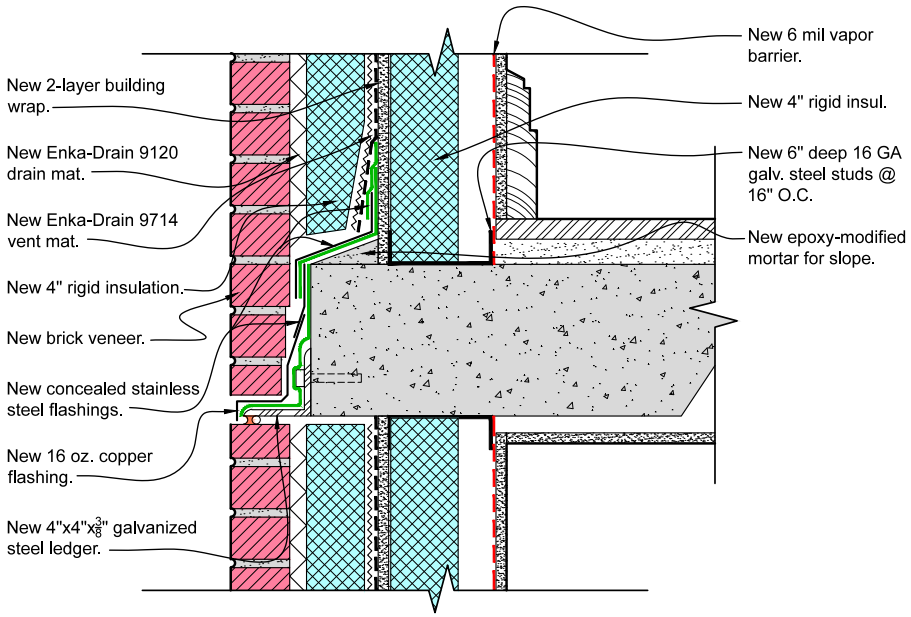

Figure VI-1.3(2): Typ. New Brick Veneer Over New Steel-Framed Wall-Opt. 3 Only

2. STRUCTURE

2.0. General

This section addresses larger-scale structural considerations. It is divided into nine subsections, each of which pertains to a specific sub-element of the structure.

2.1. Basic Structure of Building

2.1.0 General

This subsection pertains to the building's basic structural design in the most general terms.

2.1.1 Basis of Recommendations

Please see subsection IV-2.1.1, which applies fully to this Option 3 approach as well.

2.1.2 Recommended Corrective Actions

With regard to the building's overall structural frame, recommended corrective work is similar to Option 2, and is not described here in detail. It diverges from Option 2 primarily in that rather than adding concrete back-up walls at all locations, Option 3 adds such concrete walls only where needed to provide lateral load resistance, and places metal-framed back-up walls where concrete shear walls are not needed. Consequently, new concrete shear walls are typically added near all building corners, but mid-portions of the exterior walls only receive the metal-framed walls above and below the windows.

Somewhat ironically, the elimination of the concrete shear walls in the wall mid-portions reduces the building's overall shear capacity, and thus requires beefier concrete shear walls near the corners extending the full building height, while Option 2 only requires the thicker concrete shear walls from the foundation level up to level 2, and 5" thick walls extend above this. Thus, Option 3 reduces interior floor space near the building corners at all floor levels.

As outlined in more detail in subsection VI-2.2.2, Option 3 also requires addition of significantly more concrete work to the foundations.

Figures VI-2.1(1-6) show the building's floor plans with specific locations and thicknesses of the new shear walls and piers indicated. See also Figure VI-2.2(1), which shows the related structural work at the foundation level.

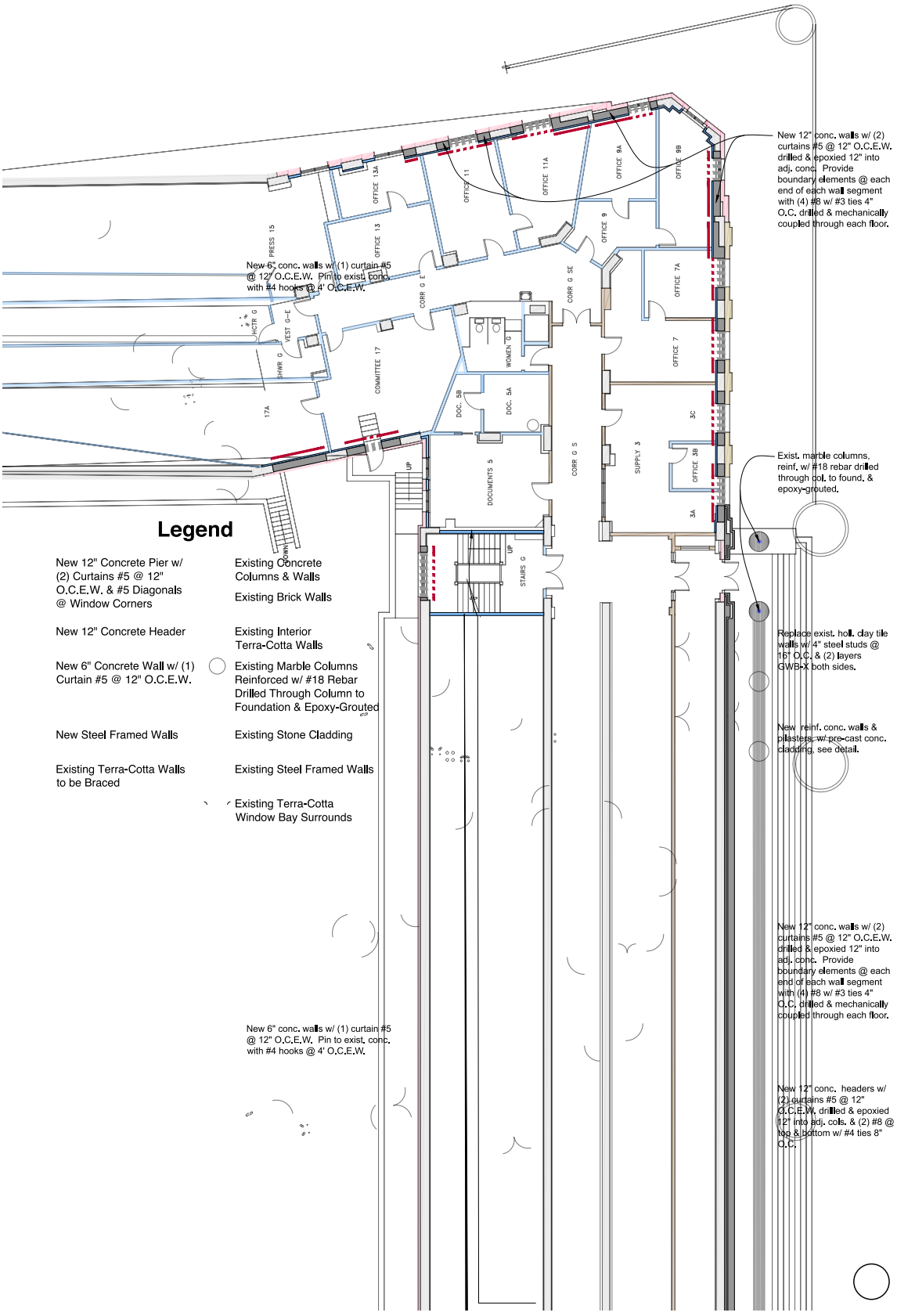

Figure VI-2.1(1): Structural Reinforcing of Building Frame - Ground Floor Level

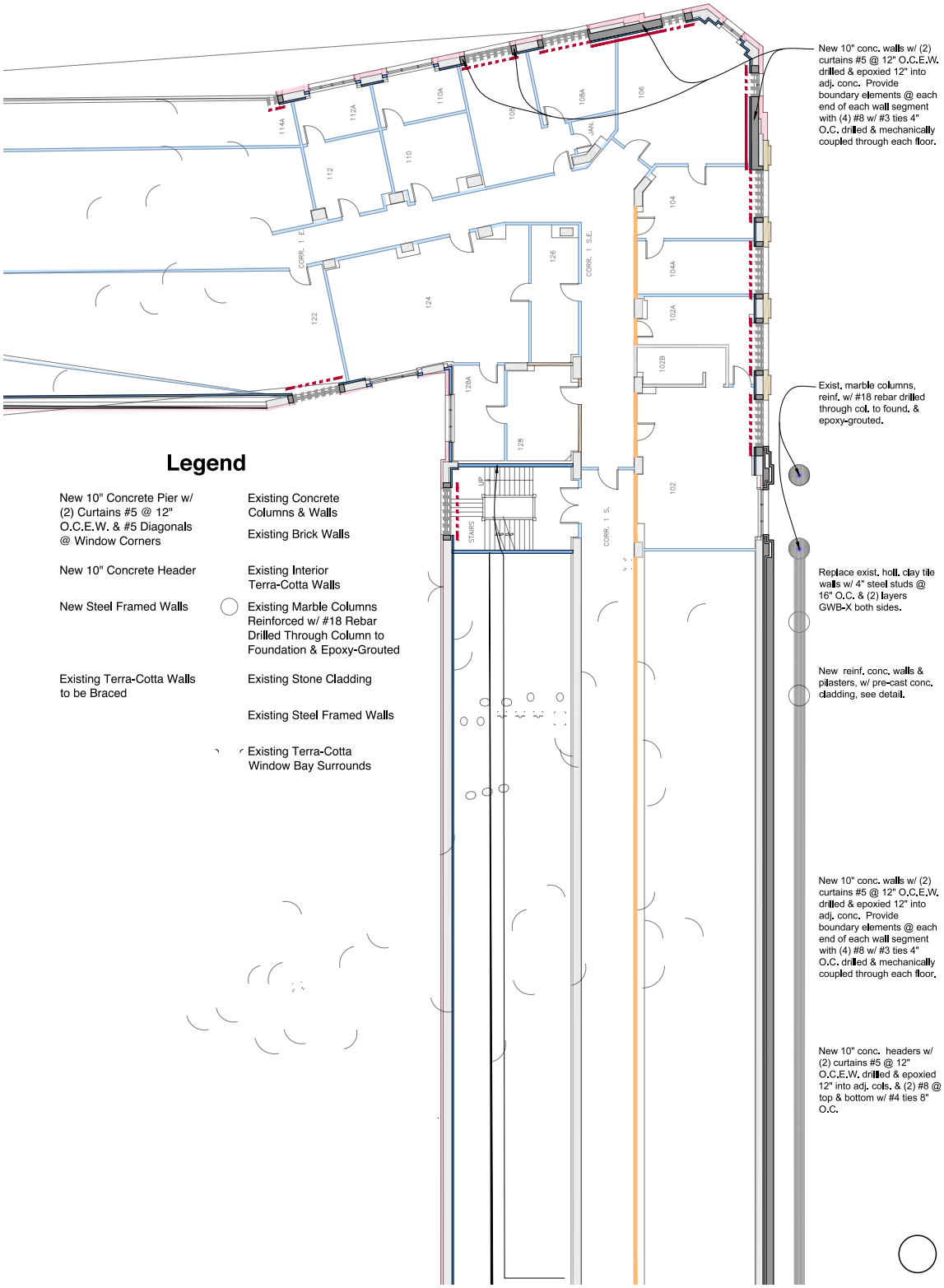

Figure VI-2.1(2): Structural Reinforcing of Building Frame - Floor Level 1

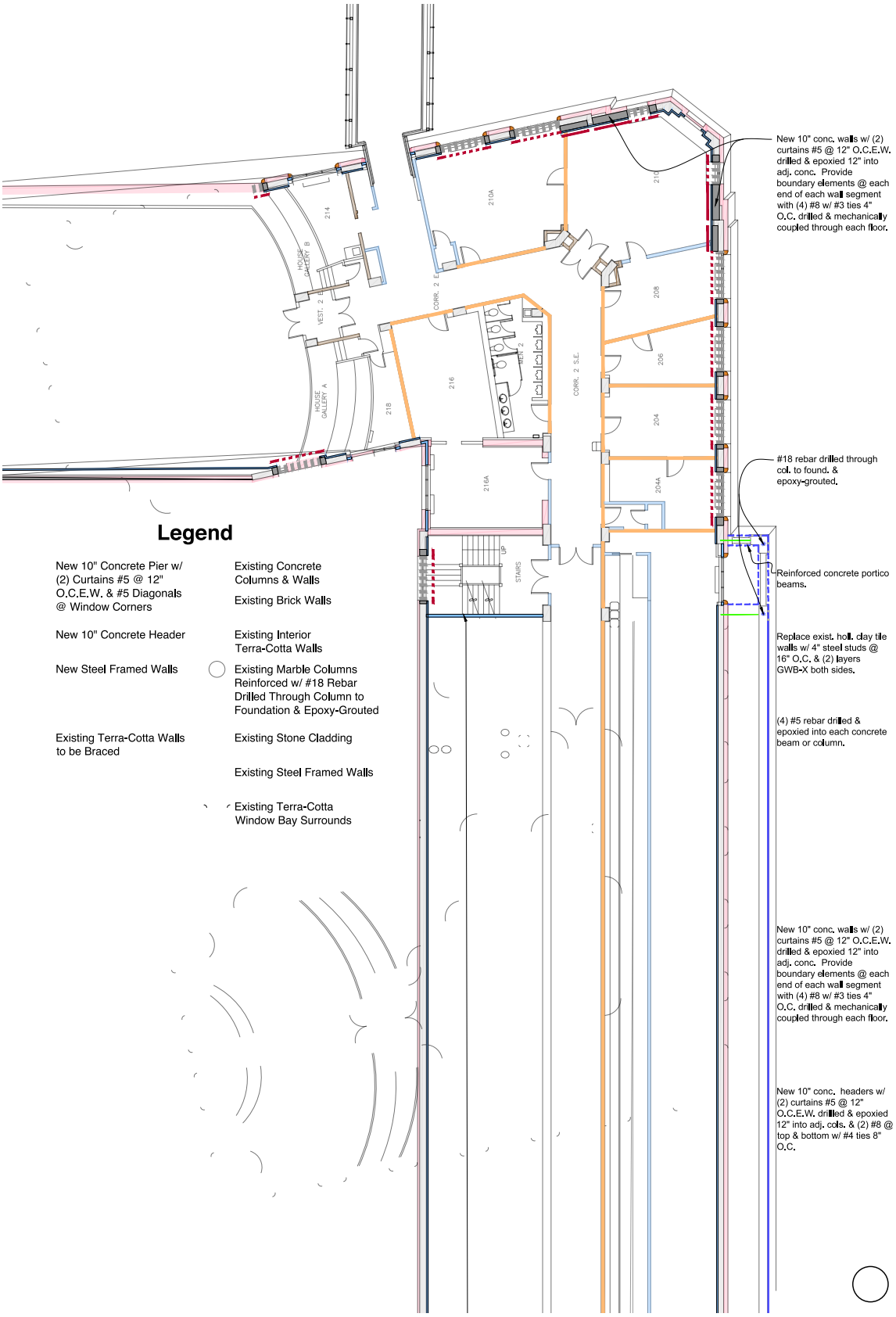

Figure VI-2.1(3): Structural Reinforcing of Building Frame - Floor Level 2

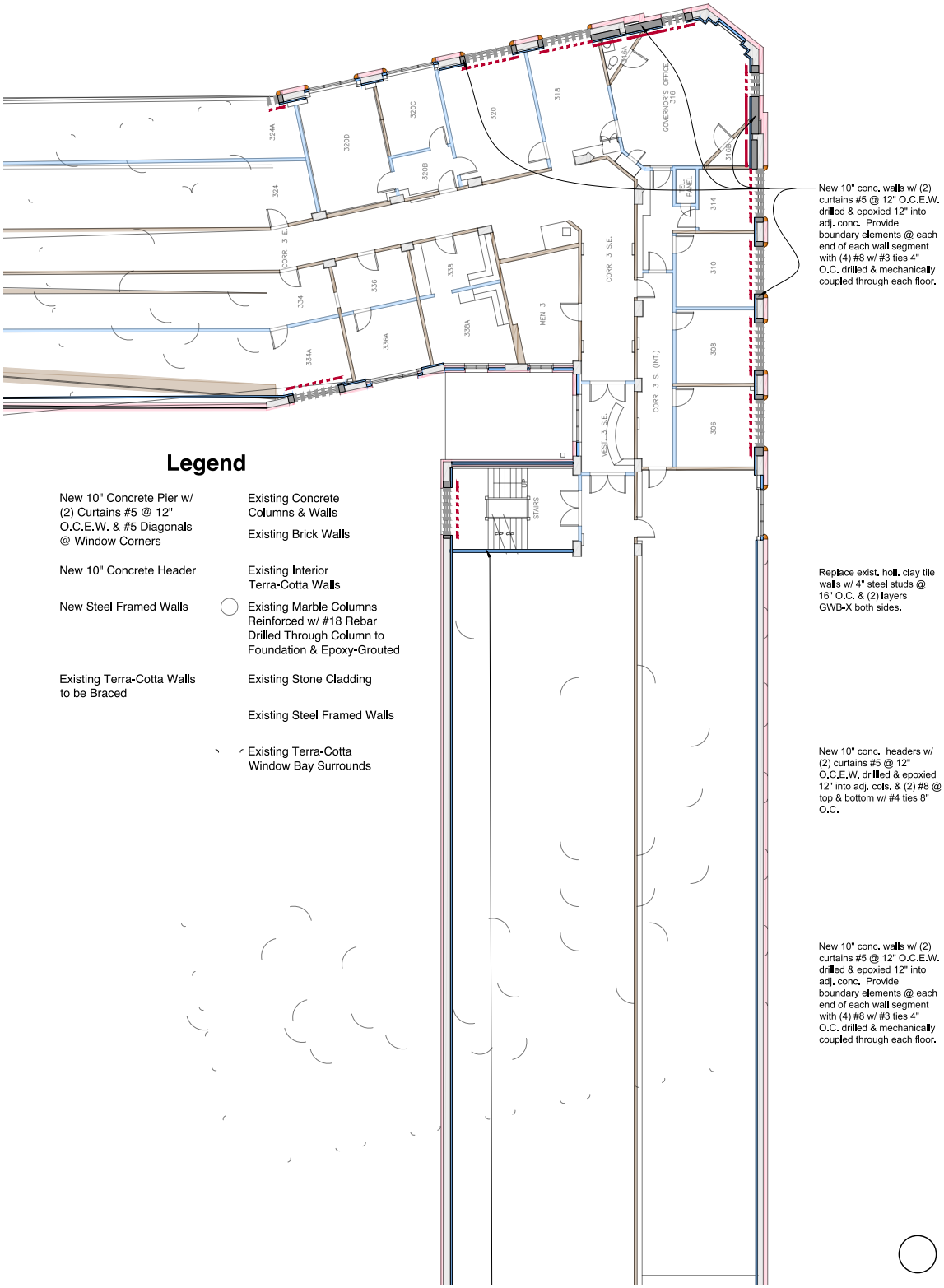

Figure VI-2.1(4): Structural Reinforcing of Building Frame - Floor Level 3

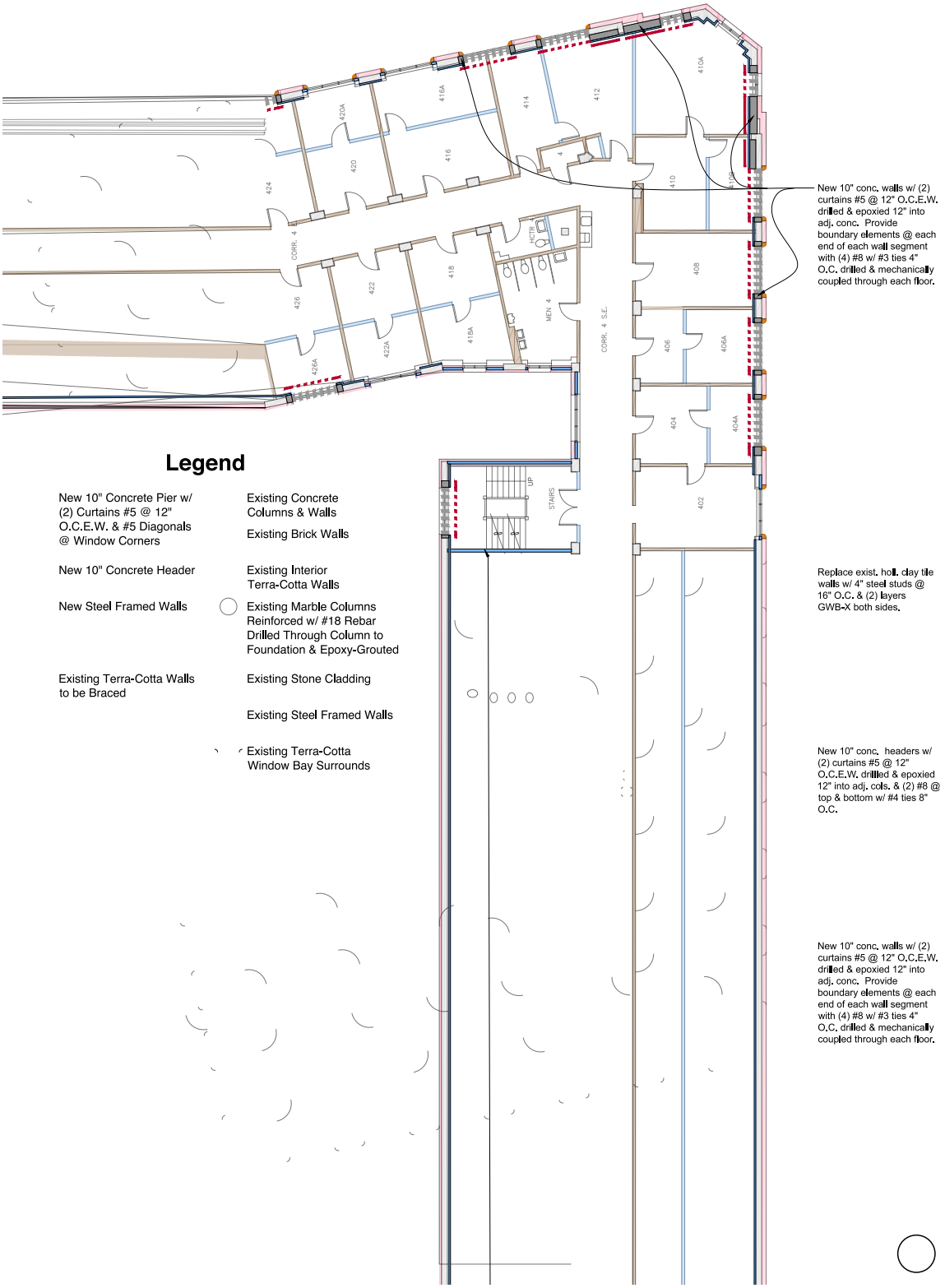

Figure VI-2.1(5): Structural Reinforcing of Building Frame - Floor Level 4

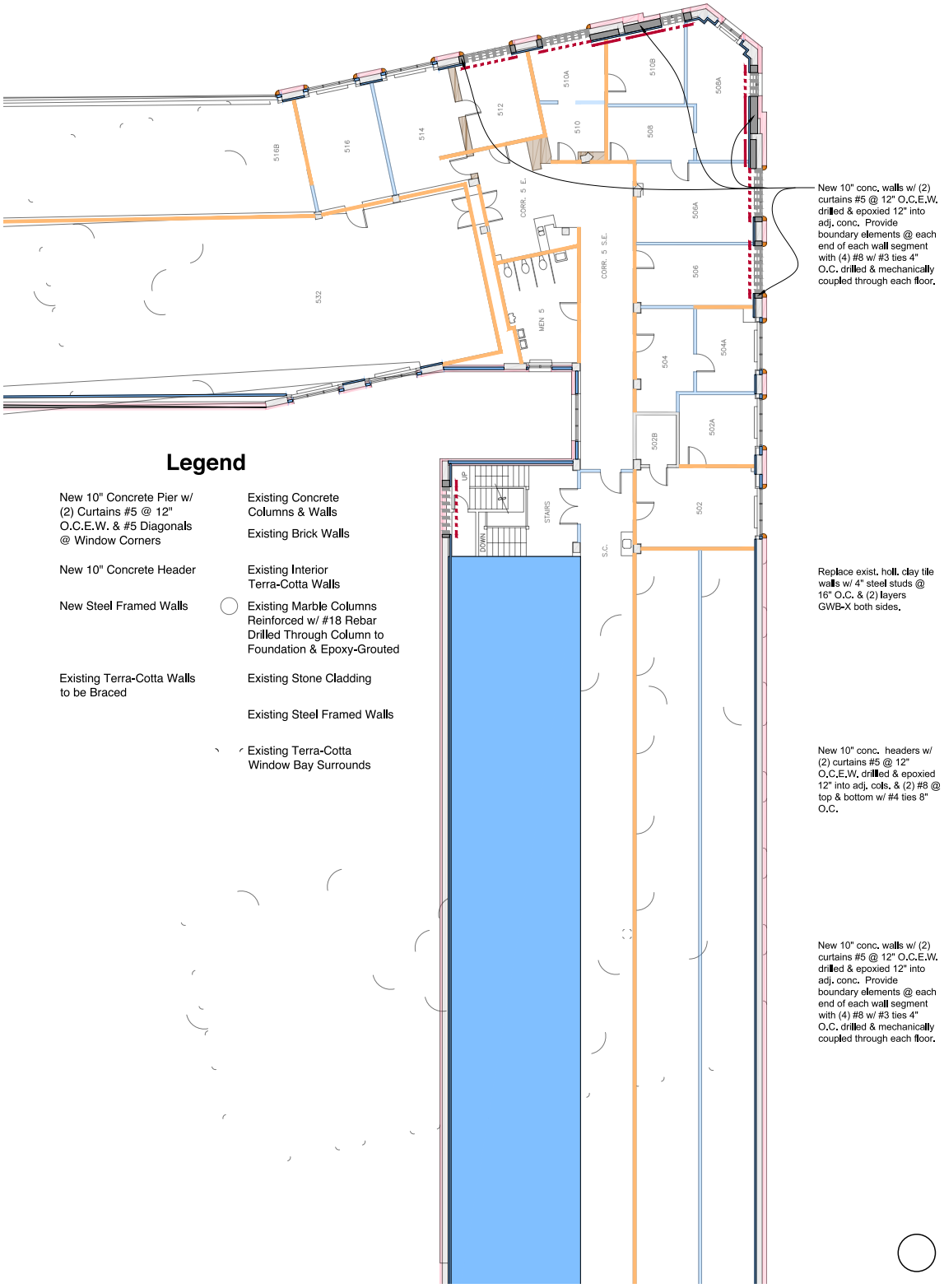

Figure VI-2.1(6): Structural Reinforcing of Building Frame - Floor Level 5

2.2. Foundations

2.2.0 General

This subsection pertains to the building's basic foundation system in general terms. See also section V-3.1: Lowest-Level Crawl Space for related information.

2.2.1 Basis of Recommendations

Please see subsection IV-2.2.1, which applies fully to this Option 3 approach as well.

2.2.2 Recommended Corrective Actions

In most respects, recommended corrective work is very similar to the Option 1 approach, described in greater detail in subsection IV-2.2.2, which applies nearly fully to this Option 3 approach as well.

In brief, the work consists of adding new concrete grade beams and restoring the existing damaged foundations.

In addition, the "experimental" extra corrective approach for the existing damaged foundations, described in detail in subsection IV-2.2.2, consists of several chemical treatments that may prevent or substantially slow further degradation of the foundations.

The existing foundations should be restored as outlined in subsection IV-2.2.2.

The Option 3 work related to the addition of new concrete grade beams is very similar to the corresponding work described for Options 1 and 2. However, as this Option 3 approach reduces concrete shear walls at the upper levels, it ironically requires appreciably more extensive concrete grade beams at the foundation level. Consequently, the new grade beams extend along the entire length of the south wall and also extend farther northward along the building's east and west walls than Options 1 and 2.

The new concrete grade beams should be 12" thick and 84" tall, extending downward 7'-0" from the undersides of the ground-level concrete floor beams.

To limit the destruction of the new grade beams by moisture absorption, as is occurring with the existing foundations, the grade beams should incorporate several measures. First, any reinforcing should be of stainless steel, or hot-dipped galvanized steel as a minimum, to control corrosion. To limit shrinkage cracks and resultant moisture entry, a low shrinkage, low-water concrete mix with polypropylene fiber reinforcing and Kryton KIM admixture should be used.

See Figure VI-2.2(1) for the configuration of these new grade beams.

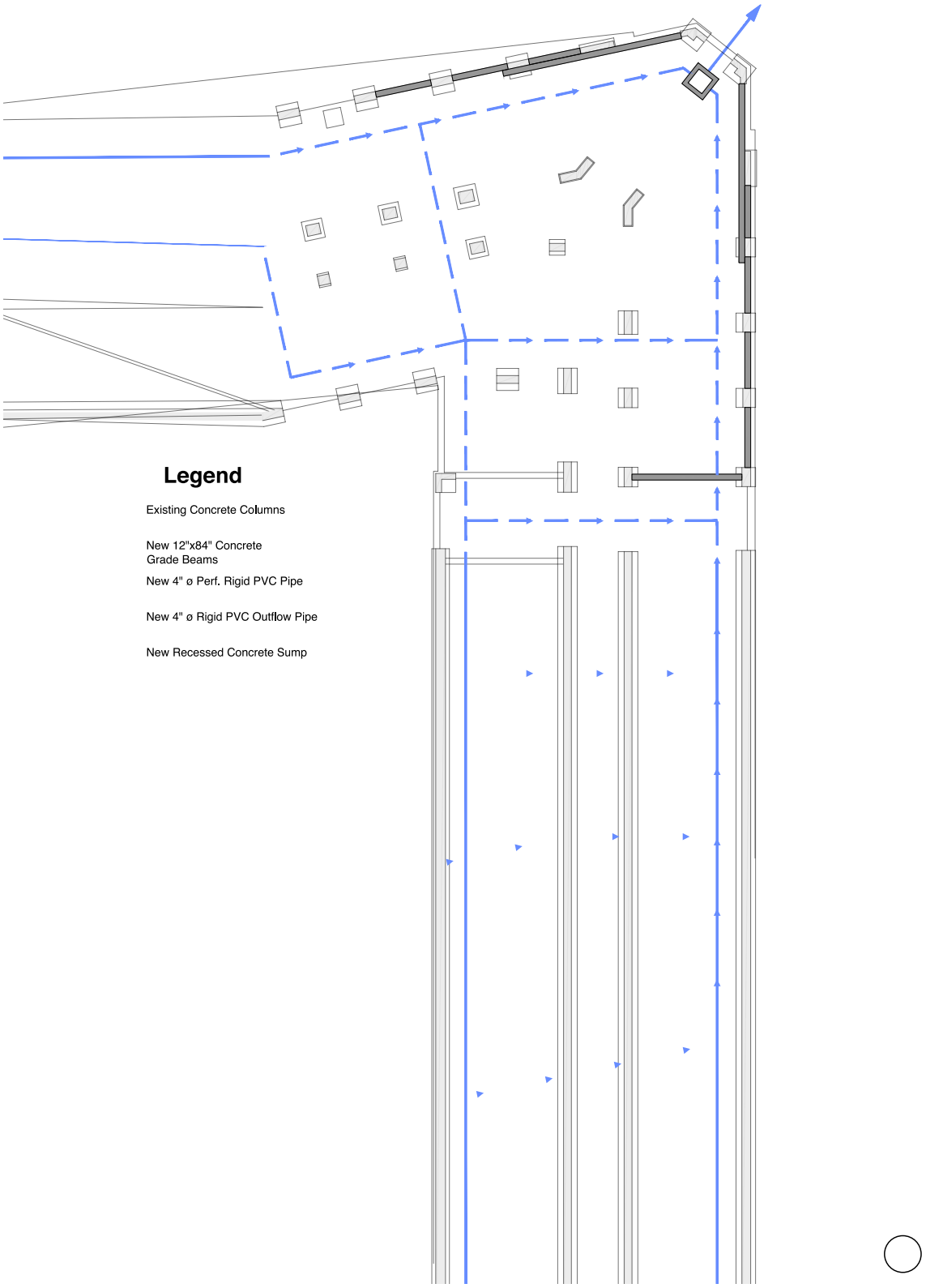

Figure VI-2.2(1): Structural Reinforcing of Foundation System

2.3. Lowest-Level Concrete Floor Framing

2.3.0 General

This subsection pertains to the concrete-framed floor directly above the crawl space.

2.3.1 Basis of Recommendations

Please see subsection IV-2.3.1, which applies fully to this Option 3 approach as well.

2.3.2 Recommended Corrective Actions

Please see subsection IV-2.3.2, which applies fully to this Option 3 approach as well. In brief, this work consists of repairing existing damaged concrete floor joists per subsection IV-2.3.2.

2.4. Level 1 Concrete Floor Slab

2.4.0 General

This subsection pertains to the raised, concrete-framed floor directly above the ground floor level.

2.4.1 Basis of Recommendations

Please see subsection IV-2.4.1, which applies fully to this Option 3 approach as well.

2.4.2 Recommended Corrective Actions

Please see subsection IV-2.4.2, which applies fully to this Option 3 approach as well. In brief, this work consists of injecting existing floor slabs with epoxy per subsection IV-2.4.2.

2.5. Brick Chimney

2.5.0 General

This subsection pertains to the relatively tall brick chimney above the main roof, near the inside corner where the west wing joins the main portion of the building.

2.5.1 Basis of Recommendations

Please see subsection IV-2.5.1, which applies fully to this Option 3 approach as well.

2.5.2 Recommended Corrective Actions

Please see subsection IV-2.5.2, which applies fully to this Option 3 approach as well. In brief, this work consists of shortening the chimney, casting a new concrete cap atop it, installing new flashings, and over-cladding the chimney with a new metal cladding, per subsection IV-2.5.2.

2.6. Securement of Large Masonry Cladding Elements

2.6.0 General

This subsection pertains to the securement of the various masonry elements to the primary structure. These are also discussed in subsequent subsections in greater detail.

2.6.1 Basis of Recommendations

Please see subsection IV-2.6.1, which applies fully to this Option 3 approach as well.

2.6.2 Recommended Corrective Actions

In general, this Option 3 approach involves construction of a new masonry veneer, so essentially all exterior elements will be new, and will be anchored as outlined in other subsections of this Part. No specific work is included in this subsection for this Option 3 approach.

2.7. Interior Hollow Clay Tile Walls

2.7.0 General

This subsection pertains to the interior partition walls comprised of hollow clay tile.

2.7.1 Basis of Recommendations

Please see subsection IV-2.7.1, which applies fully to this Option 3 approach as well.

2.7.2 Recommended Corrective Actions

Please see subsection IV-2.7.2, which applies fully to this Option 3 approach as well. In brief, this work consists of bracing the existing walls per subsection IV-2.7.2 and Figures IV-2.7(1-7).

2.8. Large Mechanical Equipment

2.8.0 General

This subsection pertains to various pieces of large mechanical equipment, such as the boiler.

2.8.1 Basis of Recommendations

Please see subsection IV-2.8.1, which applies fully to this Option 3 approach as well.

2.8.2 Recommended Corrective Actions

Please see subsection IV-2.8.2, which applies fully to this Option 3 approach as well. In brief, this work consists of bolting floor-mounted equipment to the floor slabs and bracing large suspended plumbing lines, per subsection IV-2.8.2.

3. PRIMARY EXTERIOR ENCLOSURE ASSEMBLIES & ELEMENTS

3.0. General

This section of the report addresses issues related to the building's primary exterior elements, such as wall assemblies, ground-level floor slabs, windows, roofs, and similar major components. It is divided into 14 subsections, each of which pertains to a specific primary element. Where appropriate, each subsection contains preliminary drawings depicting the described work. In addition, Figures VI-3.0(1-7) show the exterior elevations which reference the locations of specific details in the various subsections.

Fig. VI-3.0(1): South Elevation

Fig. VI-3.0(2): West Elevation

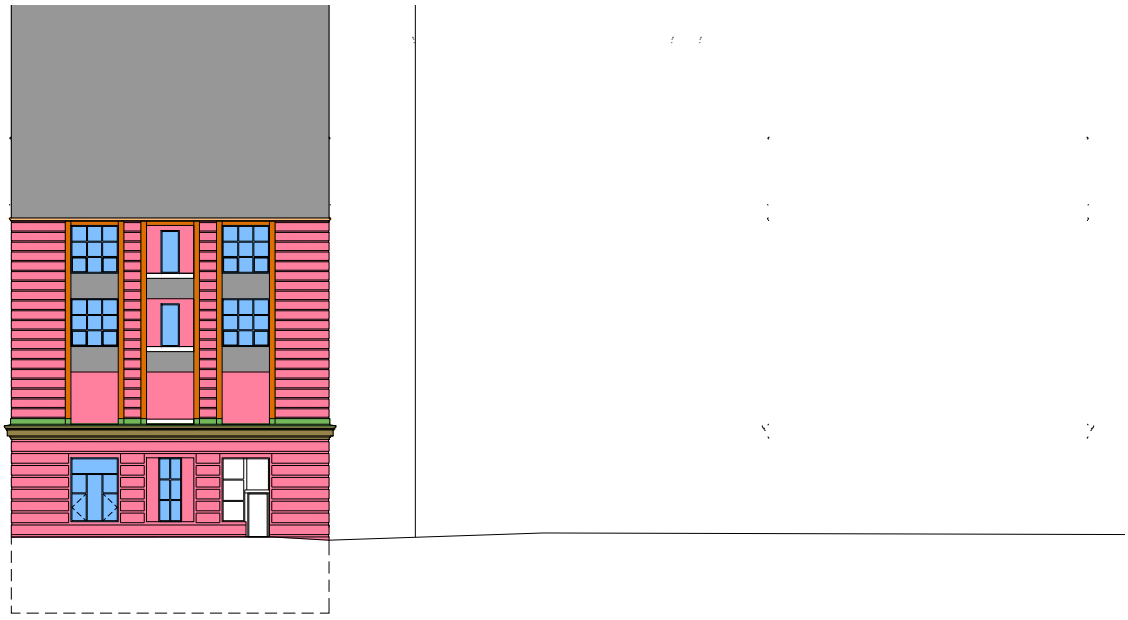

Fig. VI-3.0(3): North Elevation

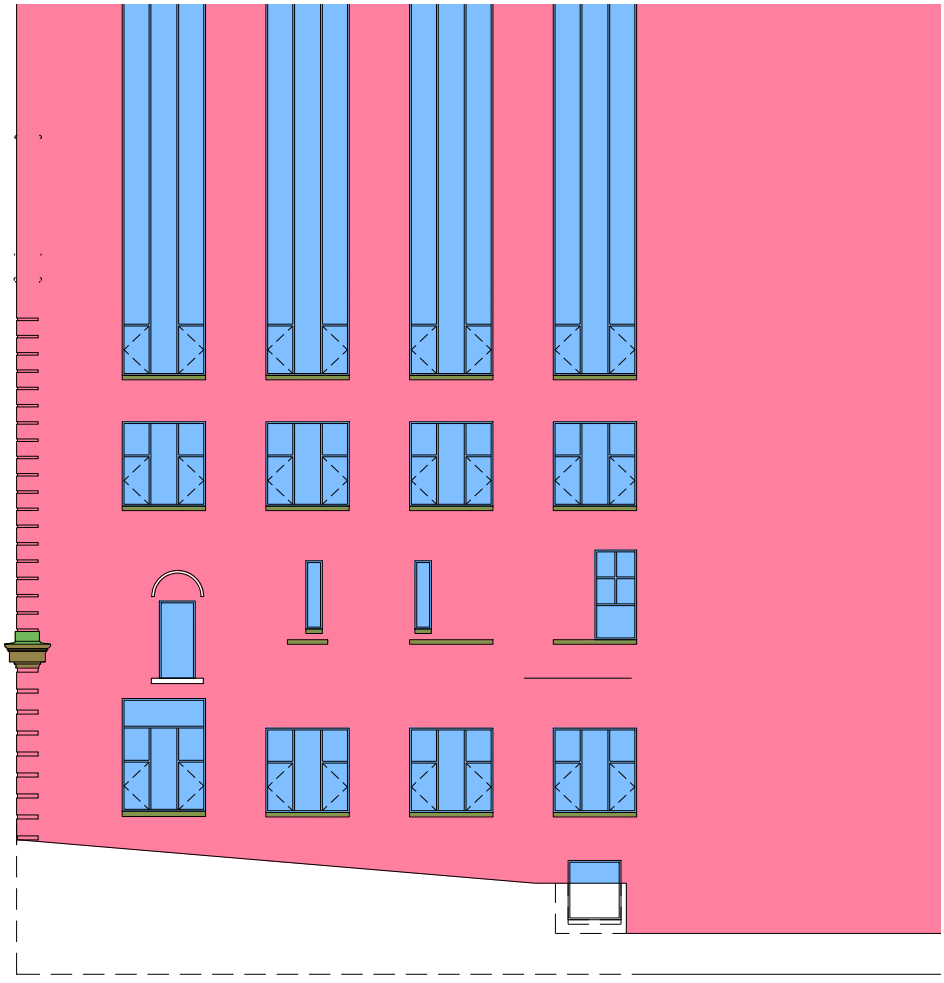

Fig. VI-3.0(4): North Courtyard: West-Facing Wall

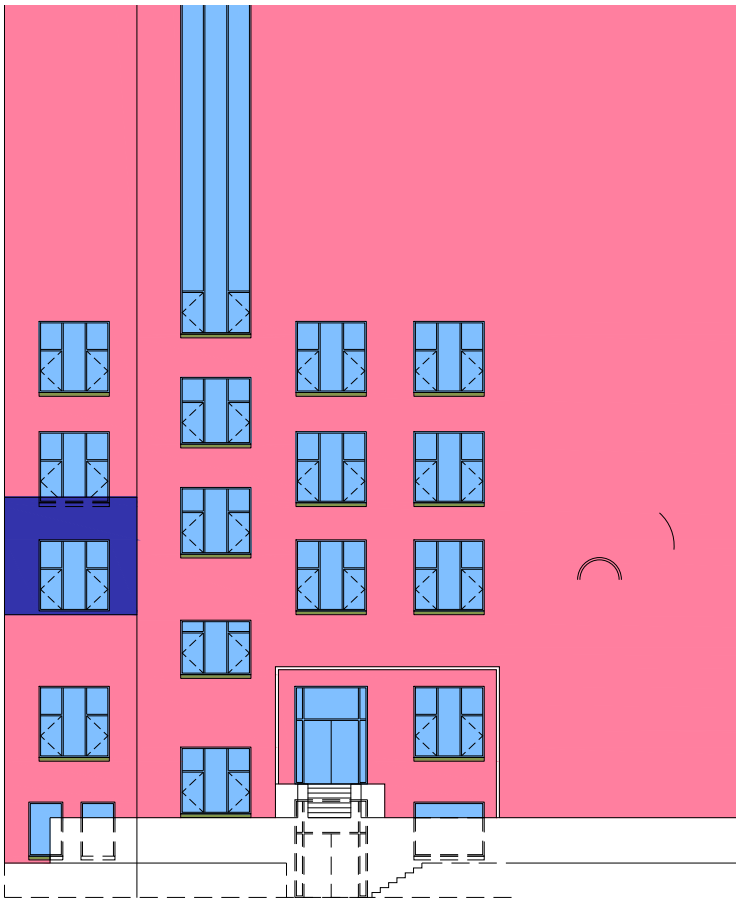

Fig. VI-3.0(5): North Courtyard: North-Facing Wall

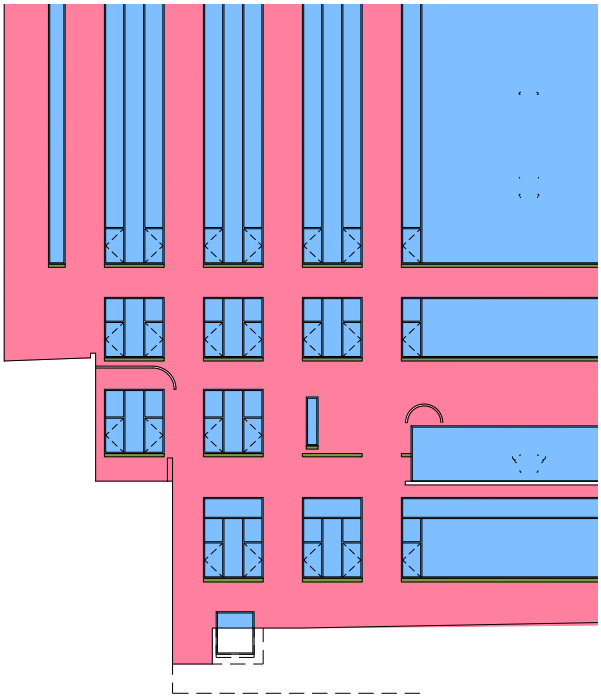

Fig. VI-3.0(6): North Courtyard: East-Facing Wall

Fig. VI-3.0(7): East Elevation

3.1. Lowest-Level Crawl Space

3.1.0 General

This subsection pertains to the crawl space located under the building's main body and under the southerly portions of both north-extending wings, in general terms.

3.1.1 Basis of Recommendations

Please see subsection IV-3.1.1, which applies fully to this Option 3 approach as well.

3.1.2 Recommended Corrective Actions

Please see subsection IV-3.1.2, which applies fully to this Option 3 approach as well. Please see also subsections IV-2.2 and IV-2.3 for related corrective measures not described here.

In brief, this work consists of the installation of a gravity-fed drainage system and soil-capping with a cross-laminated vapor-barrier as part of the Base Bid, as well as optional capping with a 2" thick, fiber-reinforced shot-crete "slab" to help protect the vapor barrier and further reduce humidity. See Figures IV-3.1(1 & 2).

3.2. Concrete On-Grade Floor Slabs

3.2.0 General

This subsection pertains to the on-grade concrete floor slabs that occur at the base of the northern portions of both north-extending wings.

3.2.1 Basis of Recommendations

Please see subsection IV-3.2.1, which applies fully to this Option 3 approach as well.

3.2.2 Recommended Corrective Actions

Please see subsection IV-3.2.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of injecting all accessible floor cracks and the perimeter of the shop slab where it joins the basement walls with epoxy.

3.3. Concrete Sub-Grade Walls

3.3.0 General

This subsection pertains to several sub-grade concrete walls that occur primarily at the base of the northern portions of both north-extending wings.

3.3.1 Basis of Recommendations

Please see subsection IV-3.3.1, which applies fully to this Option 3 approach as well.

3.3.2 Recommended Corrective Actions

Please see subsection IV-3.3.2, which applies fully to this Option 3 approach as well.

In brief, no work related to these walls is recommended at the west wing's sub-grade walls.

At the east wing's sub-grade walls, this work consists of selective removal of interior finishes at locations of apparent leakage, injecting all wall cracks and cold joints with epoxy, treatment of rock pockets and similar flaws with crystalline waterproofing, and replacement of finishes.

3.4. Stone-Clad Exterior Wall Base

3.4.0 General

This subsection pertains to the lowest-level stone base along the south elevation, which extends from grade up to a projecting stone water table, which separates it from the cladding above.

3.4.1 Basis of Recommendations

Please see subsection IV-3.4.1, which applies fully to this Option 3 approach as well.

3.4.2 Recommended Corrective Actions

Please see subsection IV-3.4.2, which applies fully to this Option 3 approach, except that the stone cladding above the base will be removed in Option 3, rather than stabilized as in Option 1.

In brief, the work consists of replacement of this band with a pre-cast concrete cladding per subsection IV-3.4.2. As subsection IV-3.4.2 described the stabilization of the stone cladding above this, rather than its removal, Figure VI-3.4(1) depicts the Option 3 work.

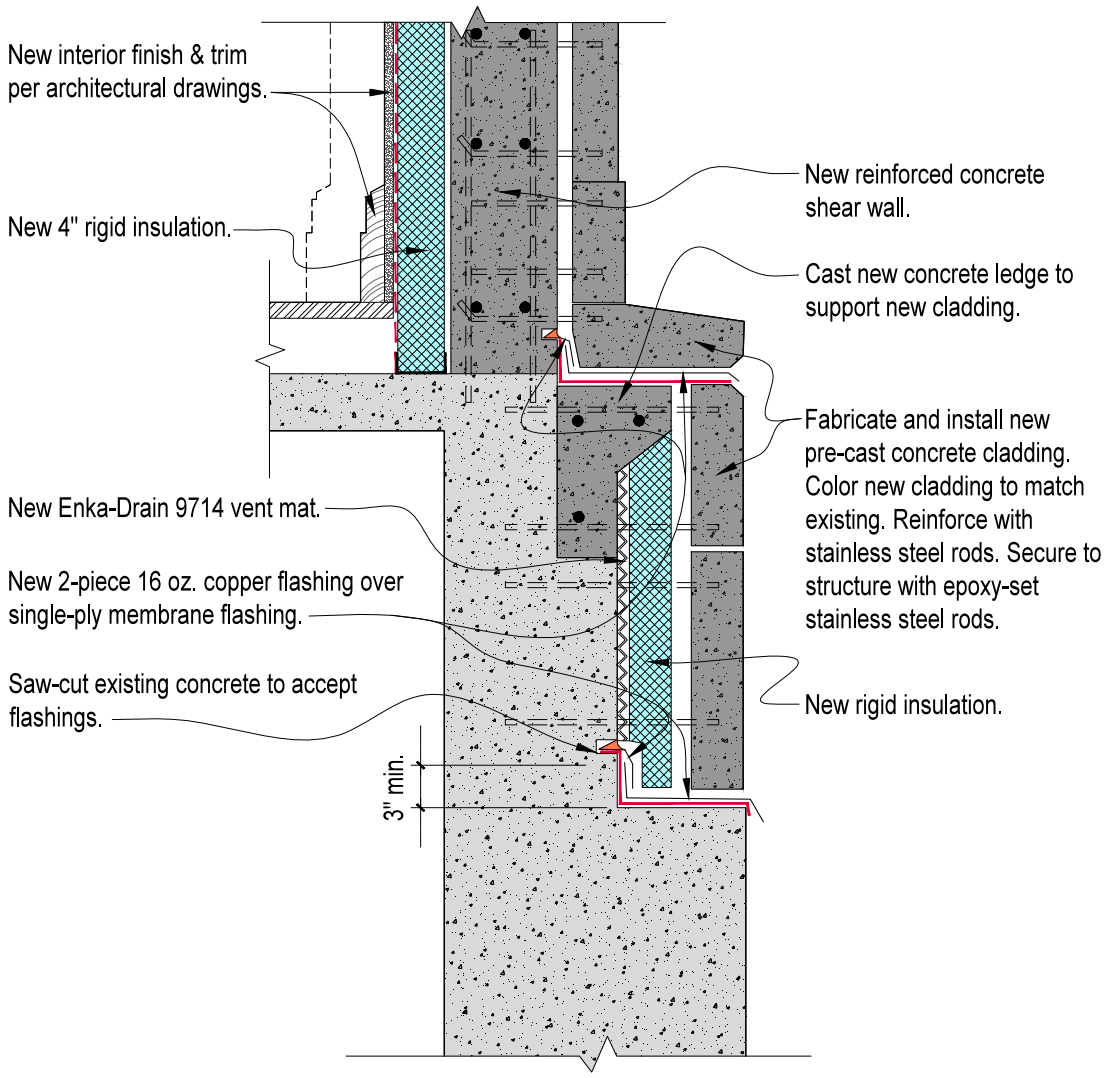

Fig. VI-3.4(1): Stone Base Replacement with Replacement of Cladding Above

3.5. Stone-Clad Exterior Walls Along Bottom 2 Levels

3.5.0 General

This subsection pertains to the stone-clad walls directly above the stone base addressed in subsection VI-3.4. While this cladding is contiguous with and similar to the cladding below the portico, the portico-related cladding is addressed separately in subsection VI-5.3.

3.5.1 Basis of Recommendations

Please see subsection IV-3.5.1, which applies fully to this Option 3 approach as well.

3.5.2 Recommended Corrective Actions

Please see subsection V-3.5.2, which largely applies to this Option 3 approach as well.

In brief, the work consists of replacement of this cladding with a pre-cast concrete cladding per subsection V-3.5.2. See Figure V-3.5(1), which is repeated below for convenience as Figure VI-3.5(1).

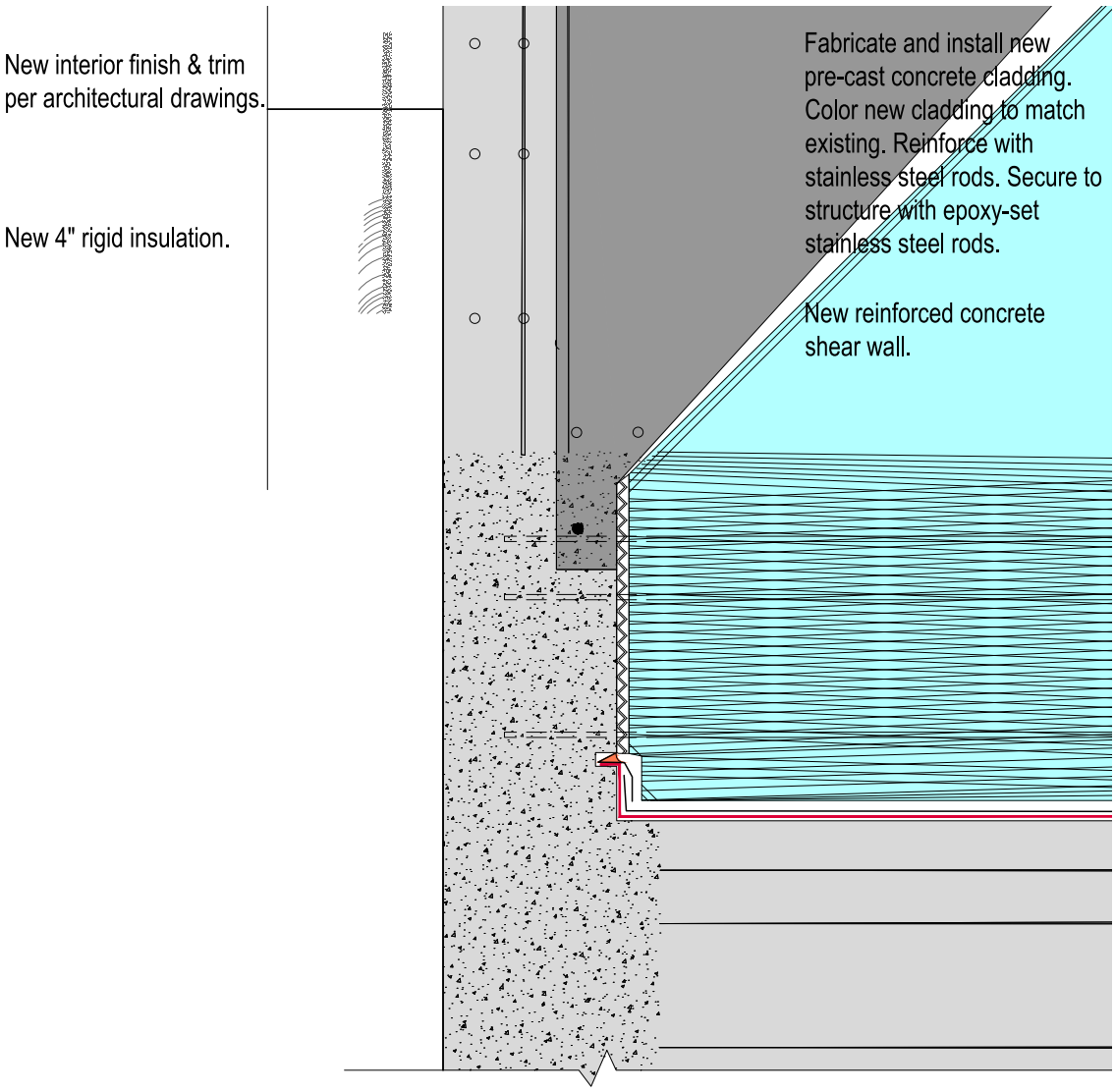

Fig. VI-3.5(1): Stone Cladding Replacement

3.6. Brick-Clad Exterior Public Façade Walls, All Levels

3.6.0 General

This subsection pertains to the brick-clad exterior walls at all floor levels and at all of the building's "public" façades, including its south, east, and west elevations, and the north elevations of its east and west wings. Elements integral to these walls, such as steel lintels above the windows, are also addressed here.

3.6.1 Basis of Recommendations

Please see subsection IV-3.6.1, which applies fully to this Option 3 approach as well.

3.6.2 Recommended Corrective Actions

In general, the work is exactly per the Option 2 approach where concrete back-up walls occur, and is not repeated here for these walls. Please follow recommendations of subsection V-3.6.2.

Where steel-framed interior walls are to occur, the work also begins with removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

After the new concrete walls, piers, and headers are cast per subsection IV-2.1.1, new framed walls are built between the concrete wall elements. Specifically, the assembly, exterior-to-interior, consists of the brick veneer placed over a ¾" drain mat, such as Enka-Drain 9120, over 4" rigid insulation, over 3/16" vent-mat, such as Enka-Drain 9714, over 2-layer building wrap, over 5/8" exterior gypsum sheathing, over 6" deep, 16-gage steel studs spaced 16" apart. Batt or rigid insulation can be used within the framing cavities. The interior face of the framing would receive a 6-mil cross-laminated vapor barrier, and 5/8" gypsum wallboard.

Galvanized steel ledgers are secured along all floor lines where needed to support the new brick veneer along each floor level.

The ledgers and the existing protruding concrete lugs are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are fastened to the framed walls, located over and secured to the wall studs, thus spaced 16" apart horizontally. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18" apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new brick veneer is installed over this, largely to match the existing appearance, but with greatly reduced offsets and with concave-tooled mortar joints to limit water infiltration into the masonry. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18" apart vertically.

With respect to the veneer's specific configuration and brick types, recommendations of subsection V-3.6 should be followed, to limit water-catching recesses, and use a robust brick type.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

Figure VI-3.6(1) shows a typical exterior detail where it occurs over the existing embedded concrete columns. Figure VI-3.6(2) shows a comparable detail at the framed walls.

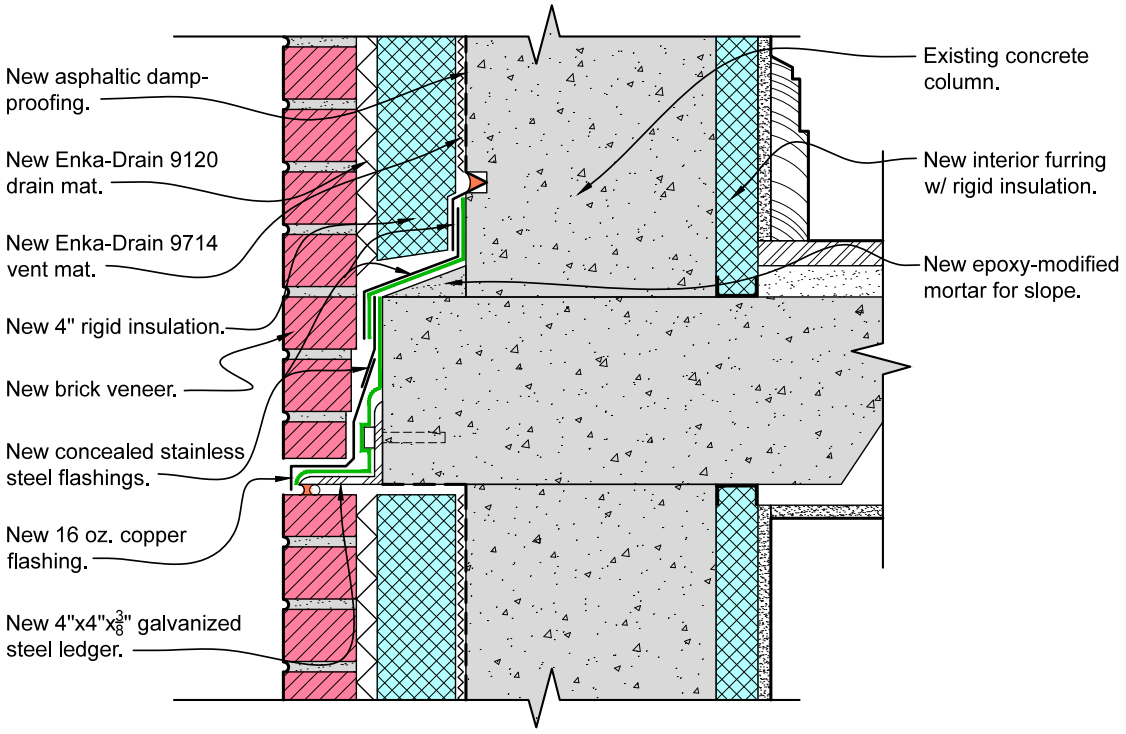

Figure VI-3.6(1): Typ. New Brick Veneer Over Exist. Concrete Column- Opt. 2 & 3

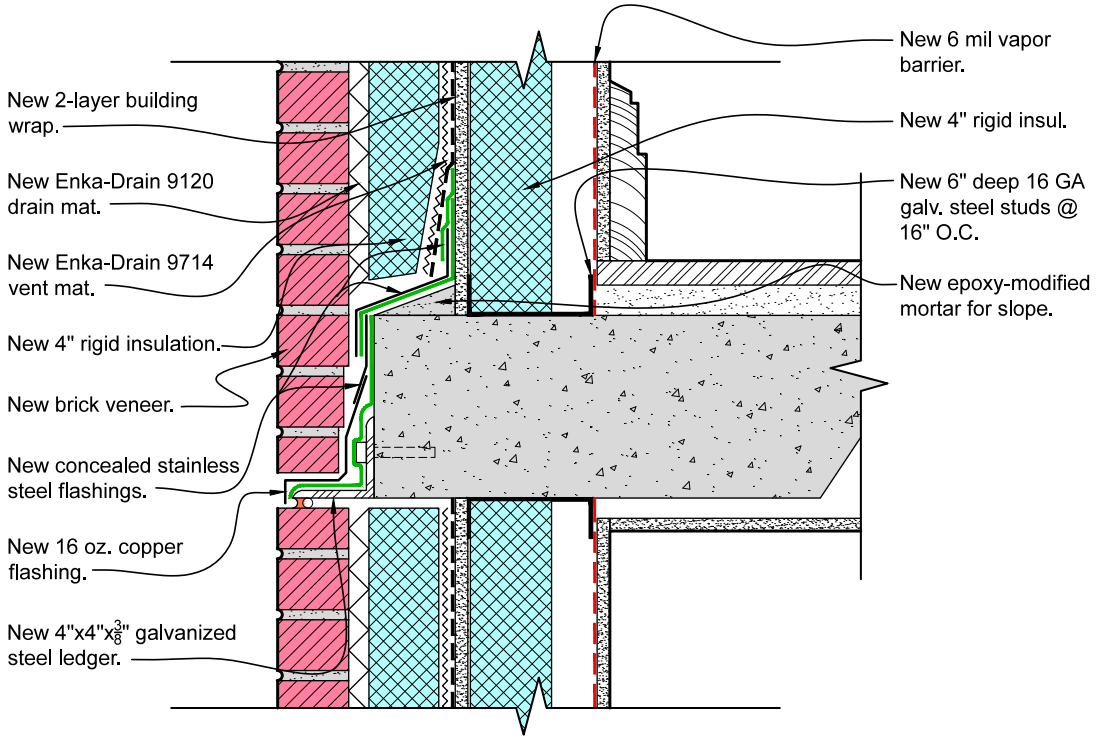

Figure VI-3.6(2): Typ. New Brick Veneer Over New Steel-Framed Wall- Opt. 3 Only

3.7. Terra-Cotta-Clad Exterior Walls at Levels 2-4

3.7.0 General

This subsection pertains to the terra-cotta exterior wall panels that occur between windows at floor levels 2-4 at the building's south, east, west, and north "public" façades.

3.7.1 Basis of Recommendations

Please see subsection IV-3.7.1, which applies fully to this Option 3 approach as well.

3.7.2 Recommended Corrective Actions

To a very large extent, the work is identical to the work of Option 2, as described in subsection V-3.7.2, and is not repeated here in detail. This approach differs from Option 2 in that rather than having concrete back-up walls behind the terra-cotta, these would typically consist of steel stud-framed walls with gypsum sheathing. This approach also replaces the terra-cotta panels with color-matched pre-cast concrete ones.

Since the existing terra-cotta wall panels are recessed inward of the abutting brick, the exterior cavity behind the new pre-cast concrete wall panels does not accommodate exterior rigid insulation, and most of the wall insulation is placed within the framing cavities. However, to both limit the shadowing effect, wherein studs become visible through the wallboard over time, and slow rapid heat loss via the metal studs, I recommend that horizontal furring, spaced 16" O. C., be applied over the interior faces of the steel studs to allow at least ¾" of rigid insulation to be fitted between them. This can be achieved with wood 1 x 3 furring, Z-girts, etc.

Figure VI-3.7(1) shows a generic detail for these steel-framed wall portions.

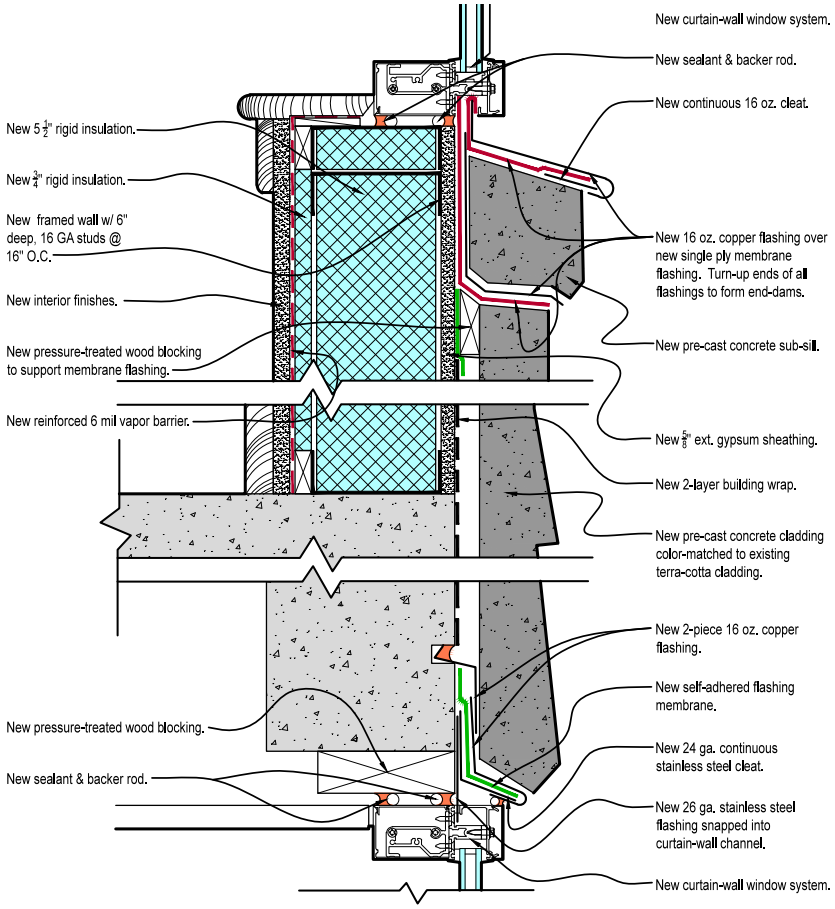

Fig. VI-3.7(1): Replacement of Terra-Cotta Panels With Pre-Cast Concrete Panels

3.8. North Courtyard Walls, Brick-Clad

3.8.0 General

This subsection pertains to the brick-clad exterior walls wrapping the north courtyard, but excludes the stairwell walls. Elements integral to these walls, such as steel lintels above the windows, are also addressed here.

3.8.1 Basis of Recommendations

Please see subsection IV-3.8.1, which applies fully to this Option 3 approach as well.

3.8.2 Recommended Corrective Actions

Recommended work at these walls is essentially identical to the corresponding work of subsection V-3.8.2, and is not repeated here. Please see subsection V-3.8.2 for most information.

The Option 3 approach for these walls differs from Option 2 only in that where new concrete walls are not needed for shear capacity, new back-up walls consisting of 6" deep, 16-gage steel studs spaced 16" O. C. are installed, also 4" inward of the outer concrete faces. These framed walls would have 5/8" exterior gypsum sheathing installed on the exterior stud faces, with a 2-layer building wrap over this. Enka-Drain 9714 vent mat is applied over this, followed by 4" rigid insulation. Over this, Enka-Drain 9120 drain mat is placed, fabric side facing outward. The brick veneer, per subsection V-3.6.2, is installed over this. To minimize heat loss and risk of shadowing, horizontal 1 x 3 wood or similar furring, spaced 16" O. C., is screwed to the interior framing faces, and ¾" rigid insulation is fitted between the furring. Finally, a reinforced, 6-mil vapor barrier and interior finishes are installed over this.

In all other regards, the work should follow recommendations of subsection V-3.8.2.

3.9. North Stairwell Walls, Brick & Stucco-Clad

3.9.0 General

This subsection pertains to the brick-clad exterior walls wrapping the stairwell in the courtyard.

3.9.1 Basis of Recommendations

Please see subsection IV-3.9.1, which applies fully to this Option 3 approach as well.

3.9.2 Recommended Corrective Actions

In most respects, recommended work at these walls is identical to the work recommended for the other courtyard walls, as described in subsection VI-3.8.2, and is not repeated here in detail.

This work also begins with the removal of all existing interior finishes, the hollow clay tile, and all exterior masonry to expose the existing concrete building frame.

New 10" thick concrete walls, piers, and headers are cast between existing concrete columns at the stairwell's north wall, per subsection VI-2.1.2, flush with the outer concrete column faces. At the stairwell's east and west exterior walls, new steel-framed walls of 16-gage steel studs spaced 16" O. C. with 5/8" exterior gypsum sheathing are constructed between the existing concrete columns. All exterior concrete faces are then coated with an asphaltic damp-proofing, while the steel-framed walls are covered with a 2-layer building wrap.

Galvanized steel ledgers are secured along all floor lines where needed to support the new brick veneer along each floor level.

The ledgers are flashed with a double-layer flashing assembly of self-adhered flashing membrane capped with 26-gage stainless steel flashings where fully concealed, and with 16 oz. copper flashings where these become exposed to view.

New stainless steel veneer anchor channels, such as Dur-O-Wal DA904, are fastened to the concrete or framed walls, spaced 16” apart horizontally, and vertically continuous.

A thin vent mat, such as Enka-Drain 9714, is placed against the damp-proofed concrete walls and over the exterior building wraps on the framed walls, and 4” thick extruded polystyrene insulation, such as Dow Board, is placed against this. Stainless steel veneer anchors, such as Dur-O-Wal DA931, are clipped into the channel slots, spaced 18” apart vertically. A thicker drain mat, such as Enka-Drain 9120, is placed over the insulation, fabric-side facing outward, to limit mortar clogging.

A new masonry veneer, consisting of ASTM C-216 face brick, Grade SW, is installed over this, largely to match the existing appearance. Horizontal 9-gage stainless steel wire seismic joint reinforcing is embedded within the horizontal joints spaced 18” apart vertically.

The new masonry should be cleaned and sealed with a penetrating water repellent, such as ProSoCo Weather-Seal Siloxane.

In contrast to the Option 1 approach, the uppermost, stucco-clad wall band would also be replaced with this new brick veneer, rather than a metal cladding.

This approach would also require new galvanized steel ledgers directly above the abutting low roofs, with through-wall flashings, to drain water from behind the brick veneer over these roofs.

Similarly, new galvanized steel ledgers would be needed to support the brick veneer above the newly retrofitted cornice. These ledgers would also be flashed with a double-layer through-wall flashing to drain water from behind the brick veneer over the cornice cap.

Finally, this work would also require new sheet metal copings at the stairwell roof parapets. The existing EPDM membrane would be extended over the new parapet tops over continuous 24-gage stainless steel cleats, and new 16 oz. copper copings would secure over this.

Detailing around windows would be similar to Figure V-3.8(1).

3.10. Brick Chimney

3.10.0 General

This subsection pertains to the relatively tall brick chimney above the main roof, near the inside corner where the west wing joins the main portion of the building. As the “structural” and “weather-integrity” issues affecting this chimney are intricately related and inseparable, all recommendations related to this chimney are addressed holistically in section VI-2.5. The sole purpose of section VI-3.10 is to refer the reader to section VI-2.5 for both “structural” and “weathering” information.

3.11. North Courtyard Walls, Metal-Clad

3.11.0 General

This subsection pertains to two small wall portions on the building’s north side, one to each side of the stair tower, at floor level 2. These walls were not part of the building’s original construction.

3.11.1 Basis of Recommendations

Please see subsection IV-3.11.1, which applies fully to this Option 3 approach as well.

3.11.2 Recommended Corrective Actions

Please follow recommendations of subsection IV-3.11.2, which apply fully to this Option 3 approach as well.

3.12. Windows

3.12.0 General

This subsection pertains to all exterior windows.

3.12.1 Basis of Recommendations

Please see subsection IV-3.12.1, which applies fully to this Option 3 approach as well.

3.12.2 Recommended Corrective Actions

Please follow recommendations of subsection IV-3.12.2, which apply to this Option 3 approach as well.

In brief, the work consists of complete replacement of all windows with a new curtain-wall system with operable sashes integrated as needed to match the current window configurations.

Figure VI-3.12(1) depicts typical window installation details above and below the new pre-cast concrete panels, and represents most conditions on this building.

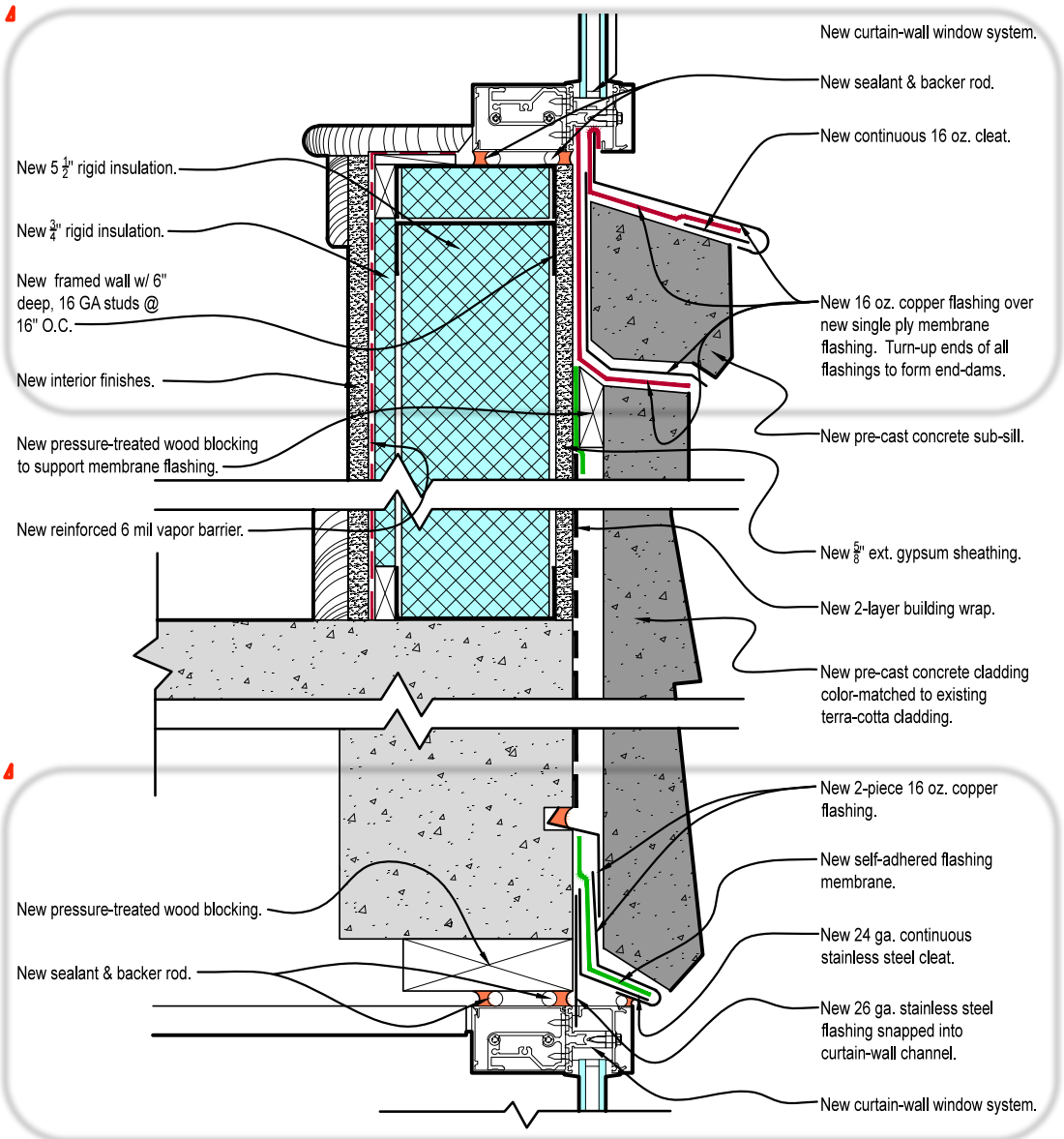

Fig. VI-3.12(1): Window Head & Sill Installation at Typical Cladding Panel Loc.

3.13. Roofs

3.13.0 General

This subsection pertains to four roof areas, including the large main roof, a small roof atop the stair-tower, and two small roof areas atop the metal-clad additions on the building's north side. The portico roof is addressed separately with the portico in subsection V-5.6.

3.13.1 Basis of Recommendations

Please see subsection IV-3.13.1, which applies fully to this Option 3 approach as well.

3.13.2 Recommended Corrective Actions

Please follow recommendations of subsection IV-3.13.2, which apply to this Option 3 approach as well.

4. EXTERIOR MASONRY SUB-ELEMENTS

4.0. General

This section of the report addresses issues related to the various exterior masonry sub-elements, such as the stone and terra-cotta water tables, stone window sills, marble panels, etc. It is divided into 8 subsections, each of which pertains to a specific primary element. Where appropriate, each subsection contains preliminary drawings depicting the described work. In addition, Figures VI-4.0(1-7) show the exterior elevations which reference the locations of specific details in the various subsections.

Fig. VI-4.0(1): South Elevation

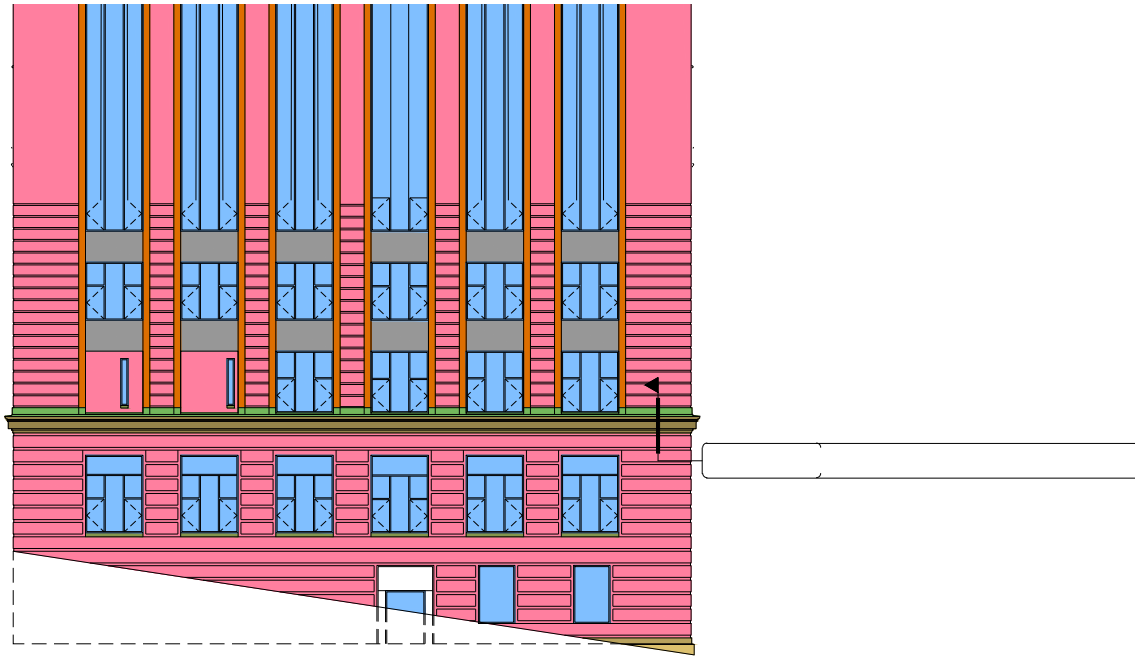

Fig. VI-4.0(2): West Elevation

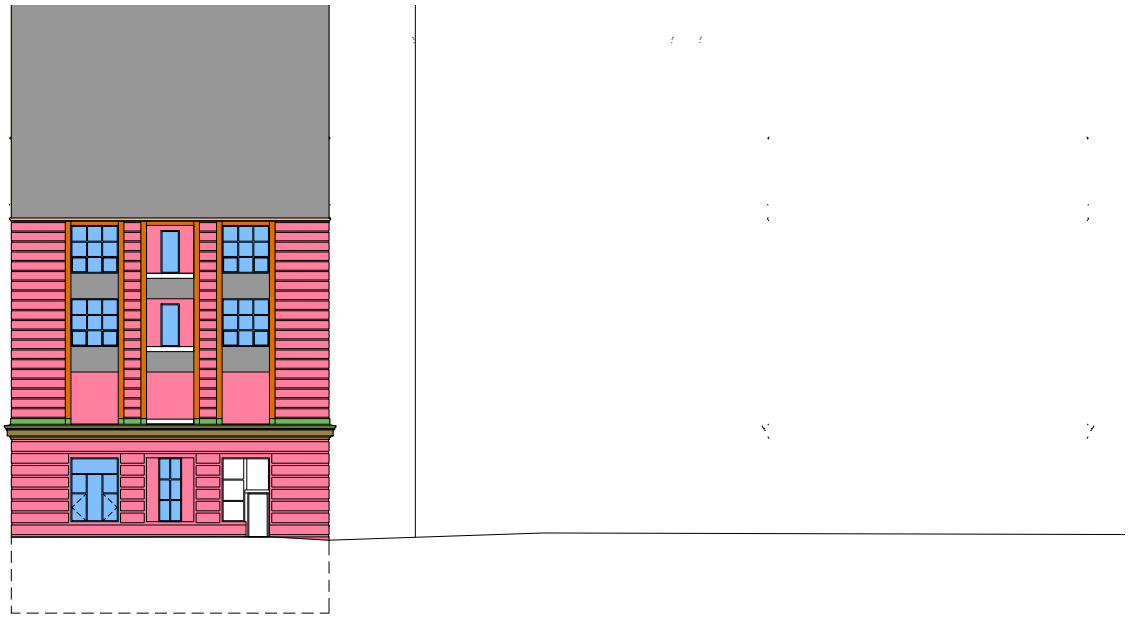

Fig. VI-4.0(3): North Elevation

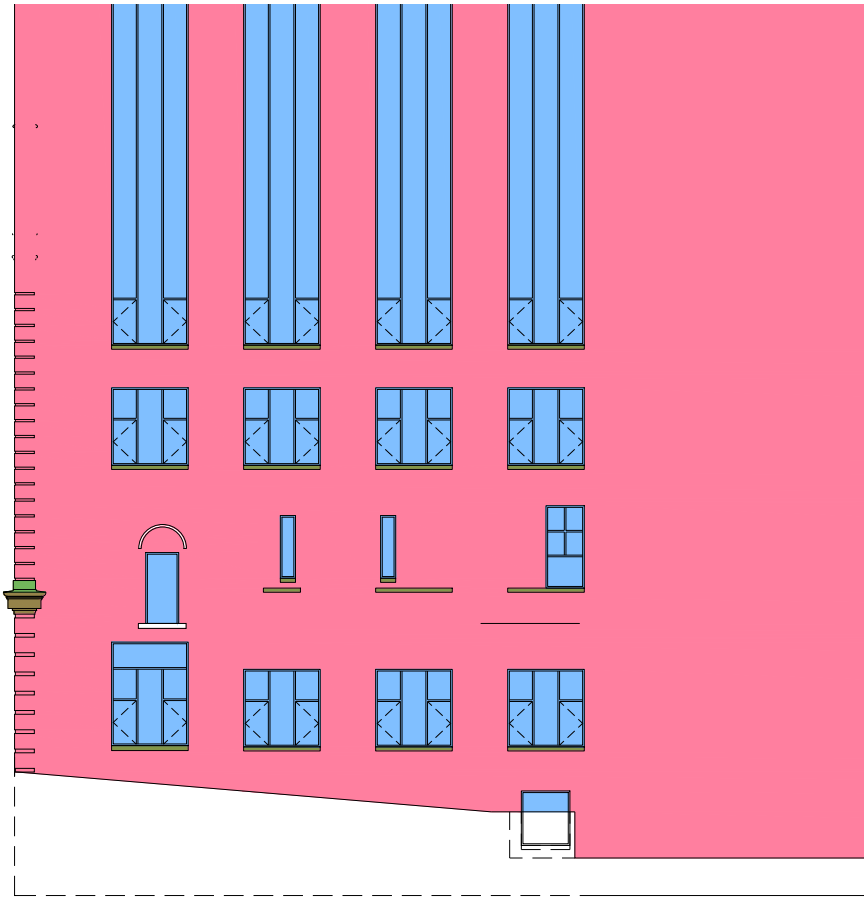

Fig. VI-4.0(4): North Courtyard: West-Facing Wall

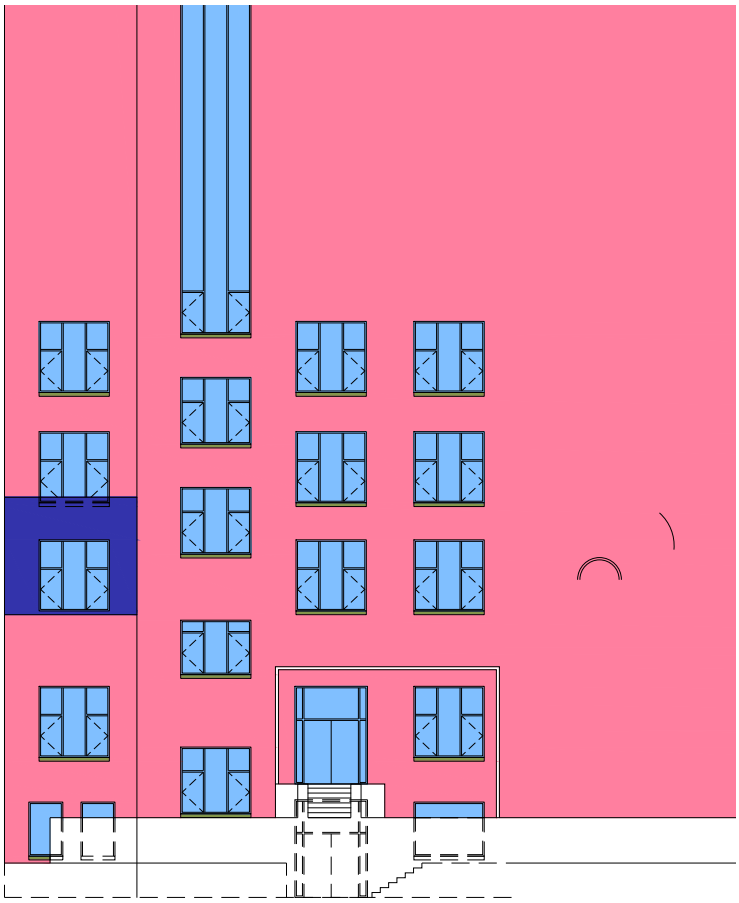

Fig. VI-4.0(5): North Courtyard: North-Facing Wall

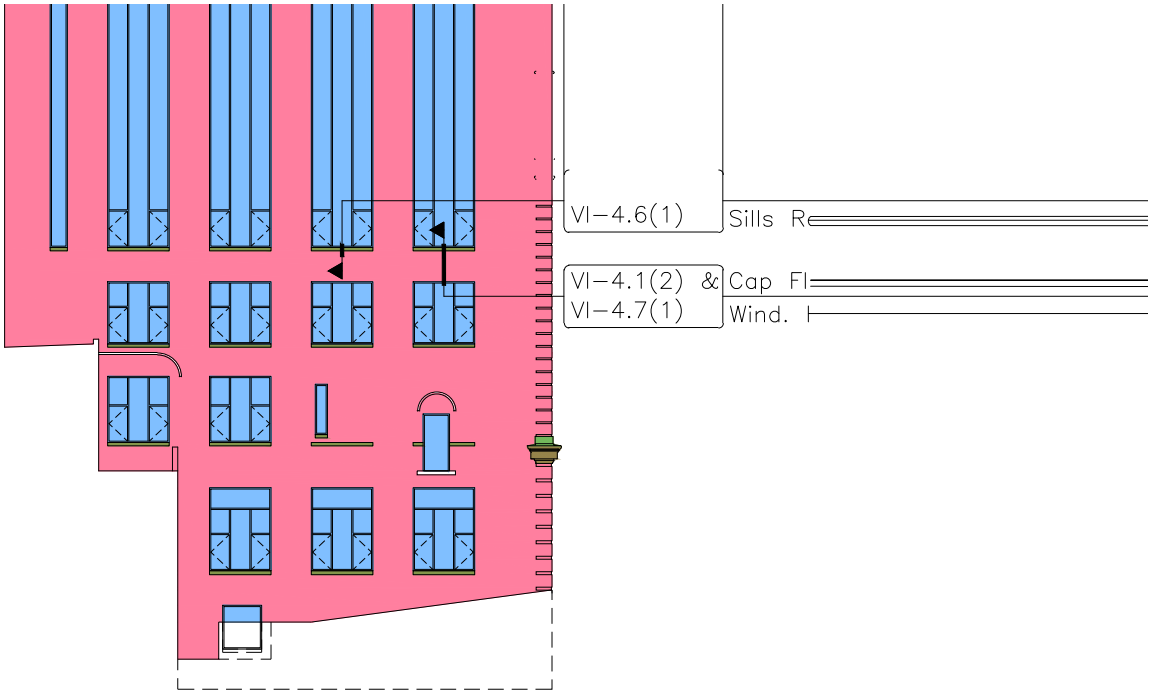

Fig. VI-4.0(6): North Courtyard: East-Facing Wall

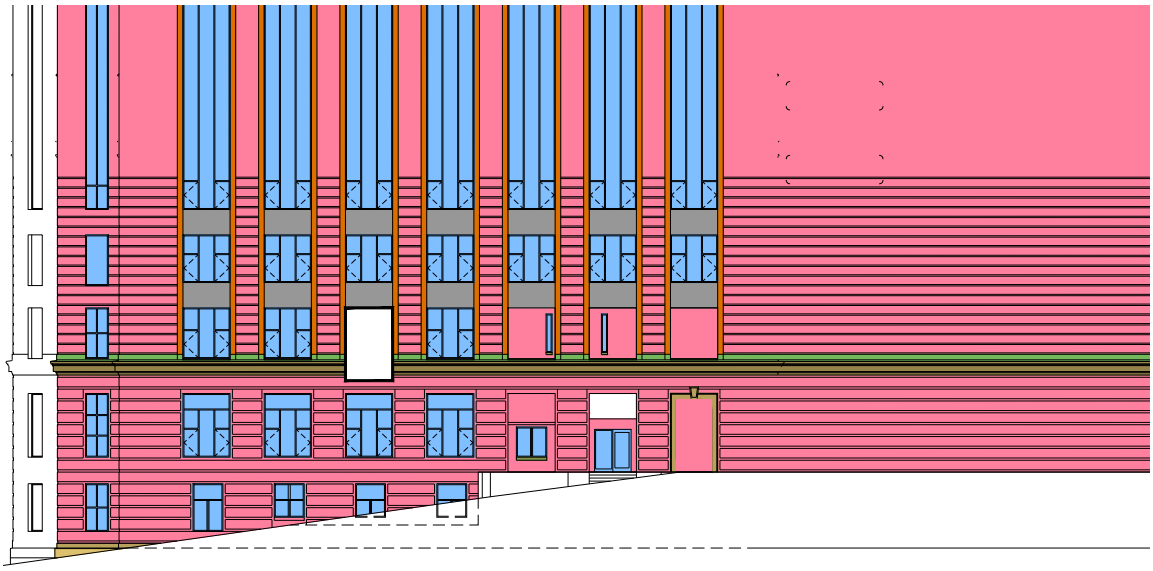

Fig. VI-4.0(7): East Elevation

4.1. Lower Stone Water Table at Level 2

4.1.0 General

This subsection pertains to the stone water table that extends at level 2 around the building's more public façades on the west, south, east, and north sides, but not in the north courtyard.

4.1.1 Basis of Recommendations

Please see subsection IV-4.1.1, which applies fully to this Option 3 approach as well.

In addition, please note that although the existing water table could be restored and reused in this approach, it would need to be removed to allow other work to proceed, and it would probably be less costly, as well as technically preferable, to replace this water table with a new, pre-cast concrete one, generally similar to the proposed new cornice.

4.1.2 Recommended Corrective Actions

Replacement of this water table with a pre-cast concrete one is recommended. Figure VI-4.1(1) depicts the general scope of this work where the water table occurs by an existing or new concrete column or wall, which represents most conditions on the building. The work would be nearly identical where new steel-framed walls occur, except the specific integration of the through-wall flashing with the back-up wall would be slightly different, and this flashing would lap under the 2-layer building wrap over the exterior gypsum sheathing. Where window sills occur, the flashing cap atop the water table would integrate with the new curtain-wall window system, generally as shown in Figure VI-4.1(2).

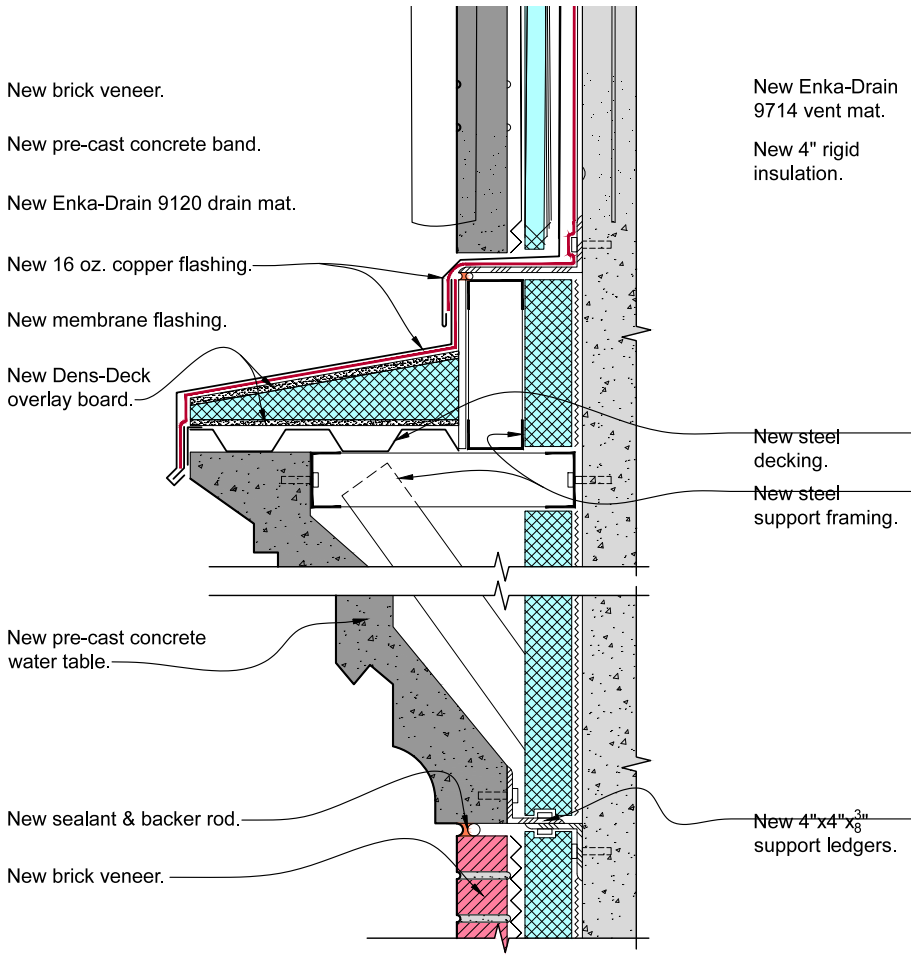

Fig. VI-4.1(1): Water Table Reconstruction

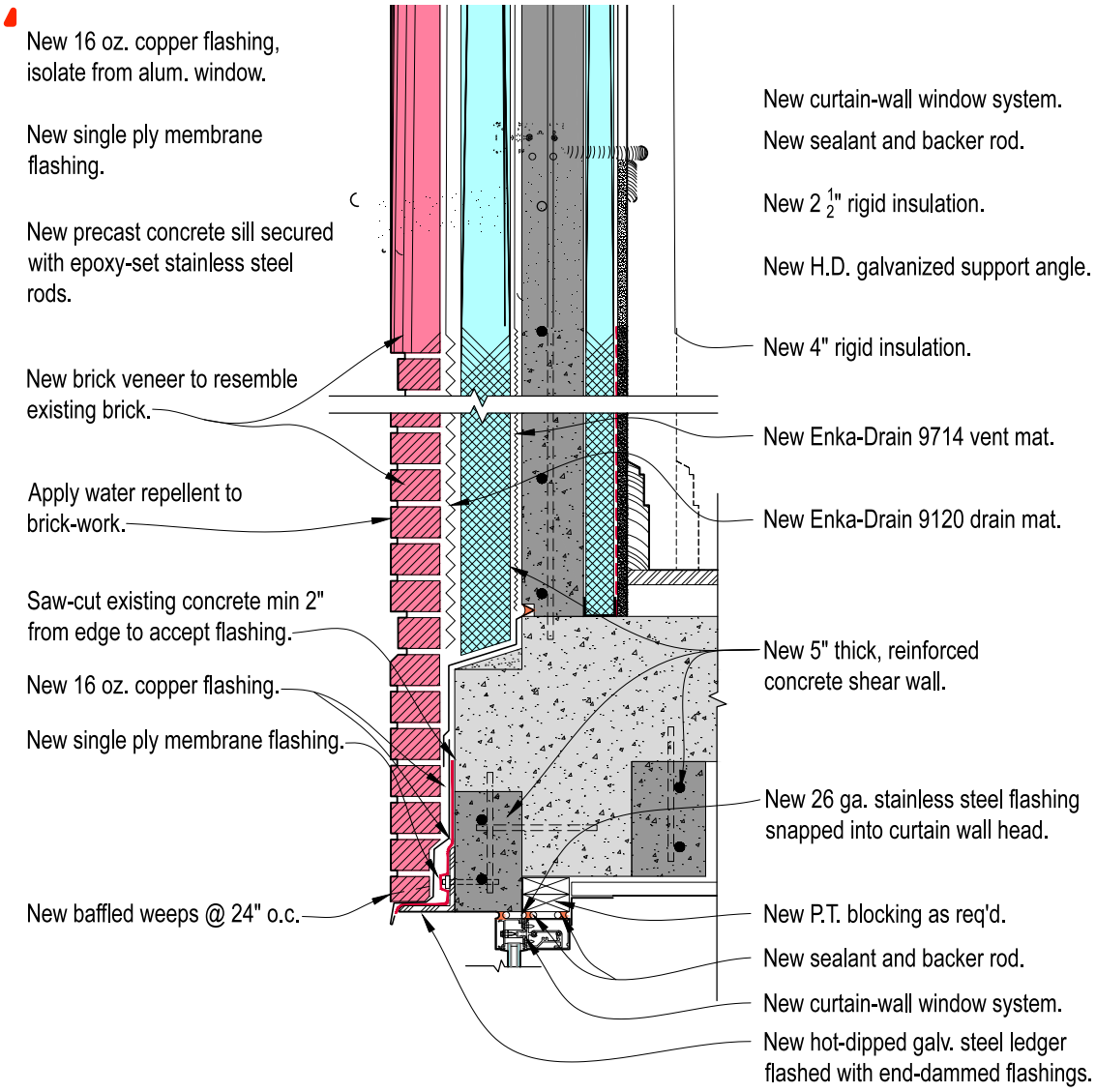

Fig. VI-4.1(2): Integration of Water Table Cap Flashing with Window Sills

4.2. Terra-Cotta Window Bay Surrounds

4.2.0 General

This subsection pertains to the multi-colored terra-cotta border elements that surround all vertical window bays at levels 2-5 around the building's public façades on the west, south, east, and north sides, but not in the north courtyard.

4.2.1 Basis of Recommendations

Please see subsection IV-4.2.1, which applies fully to this Option 3 approach as well.

4.2.2 Recommended Corrective Actions

Please see subsection IV-4.2.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of replacing all existing terra-cotta window bay surrounds with new terra-cotta pieces.

4.3. Upper Terra-Cotta Water Table at Level 5

4.3.0 General

This subsection pertains to the wide horizontal band that separates the 4th and 5th level windows.

4.3.1 Basis of Recommendations

Please see subsection IV-4.3.1, which applies fully to this Option 3 approach as well.

4.3.2 Recommended Corrective Actions

Recommended work of this section is similar to the corresponding work in the Option 1 Restoration approach, as described in subsection IV-4.3.2.

In brief, the work consists of replacing the entire band with new pre-cast concrete and terra-cotta pieces, along with installation of new, continuous steel support ledgers above the level 4 windows and above the adjacent brick, and below the new pre-cast concrete water table, as well as installation of new flashing caps and through-wall flashings.

Figure VI-4.3(1) depicts the general scope of this work where this water table occurs by an existing or new concrete column or wall, which represents most conditions on the building.

The work would be nearly identical where new steel-framed walls occur, except the specific integration of the through-wall flashing with the back-up wall would be slightly different, and this flashing would lap under the 2-layer building wrap over the exterior gypsum sheathing.

Where window sills occur, the flashing cap atop the water table would integrate with the new curtain-wall window system, generally as shown in Figure VI-4.3(2).

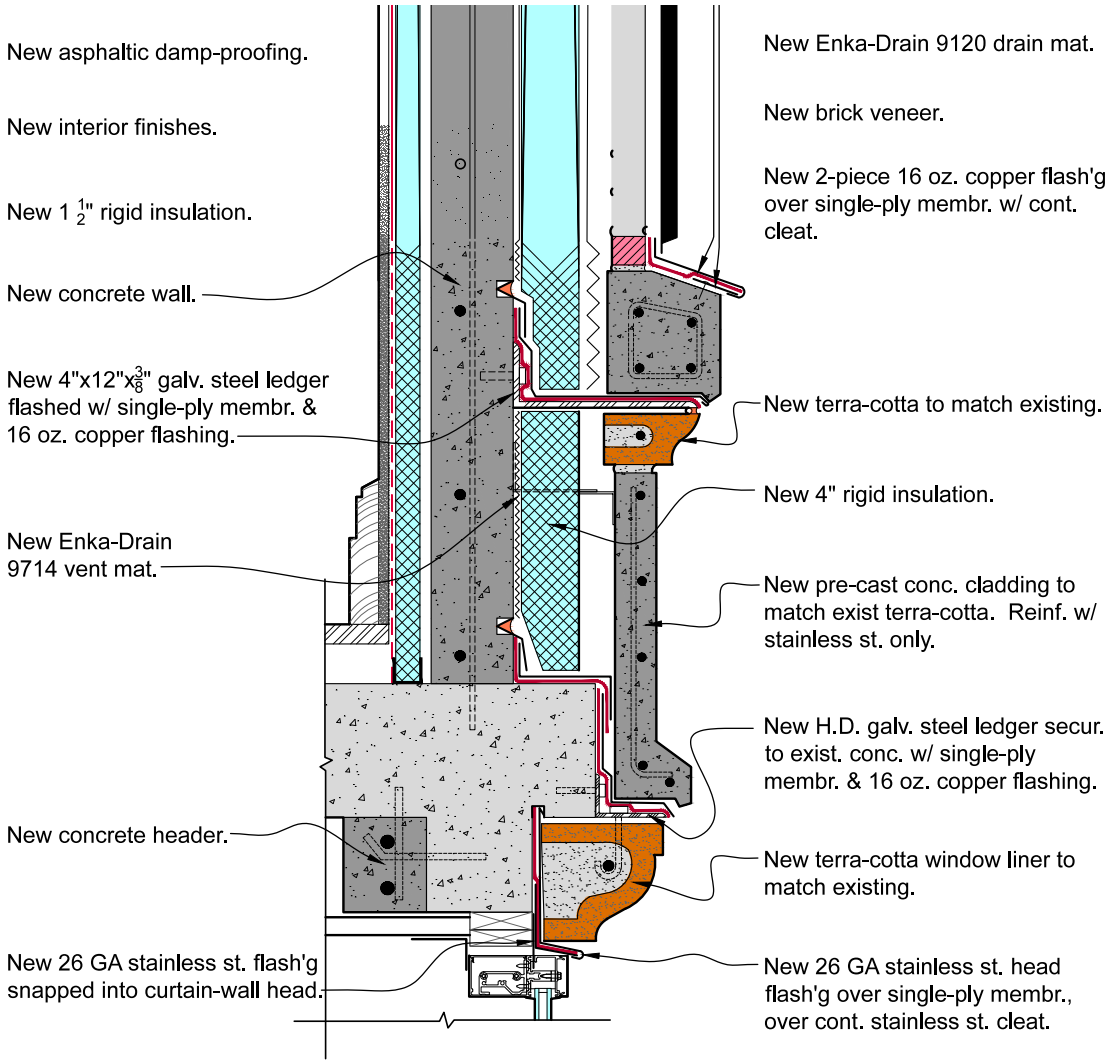

Fig. VI-4.3(1): Terra-Cotta Water Table Band Replacement Abv. Level 4 Windows

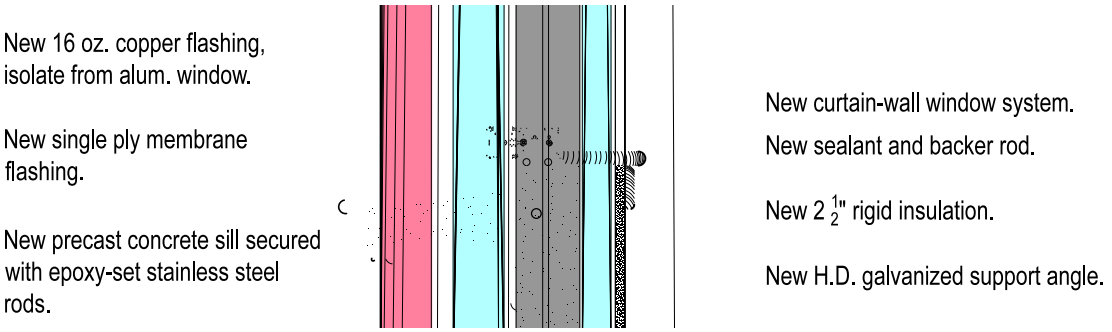

Fig. VI-4.3(2): Integration of Water Table Cap Flashing with Window Sills

4.4. Marble Panels at Level 5

4.4.0 General

This subsection pertains to four flat marble panels embedded within the level 5 brickwork.

4.4.1 Basis of Recommendations

Please see subsection IV-4.4.1, which applies fully to this Option 3 approach as well.

4.4.2 Recommended Corrective Actions

Please see subsection V-4.4.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of removing, restoring, and reinstallation of the existing marble panels, all of which occur over existing concrete columns.

4.5. Cornice-Parapet Band at Roof Level

4.5.0 General

This subsection pertains to the entire height of the multi-part band above the level 5 windows and brickwork.

4.5.1 Basis of Recommendations

Please see subsection IV-4.5.1, which applies fully to this Option 3 approach as well.

4.5.2 Recommended Corrective Actions

Please see subsection V-4.5.2, which applies nearly fully to this Option 3 approach as well.

In brief, the work consists of complete replacement of this band with a new pre-cast concrete cornice and cladding supported with new steel framing. It differs from the Option 2 approach only where it occurs over steel-framed walls, which only exist in small areas. In other regards, the work would be essentially identical to Option 2.

Figure VI-4.5(1) depicts the general nature of the recommended replacement cornice, where it occurs over existing concrete columns, which represents the majority of the building's perimeter.

The work would be nearly identical where new steel-framed walls occur, except the specific integration of the through-wall flashing with the back-up wall would be slightly different, and this flashing would lap under the 2-layer building wrap over the exterior gypsum sheathing.

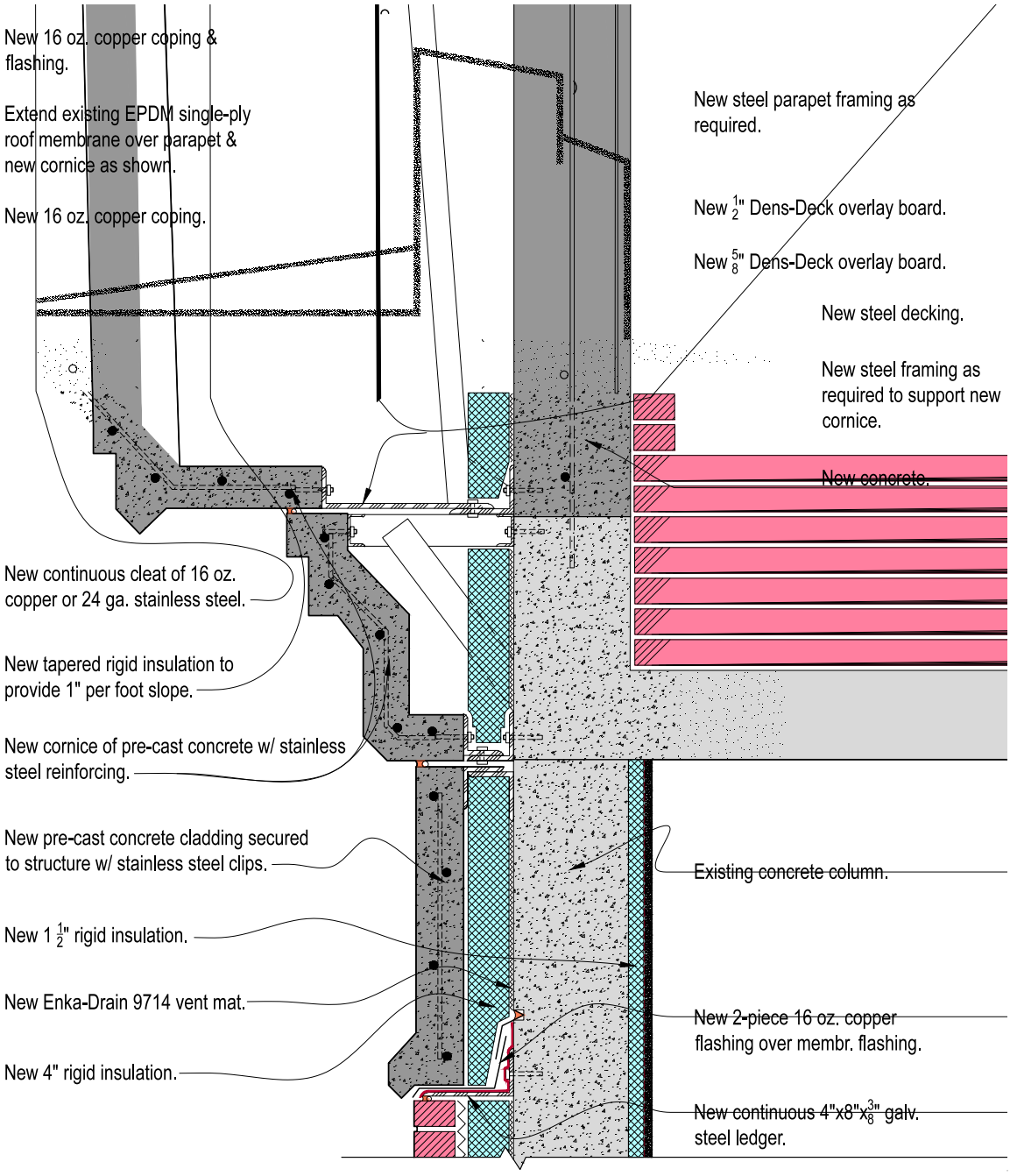

Fig. VI-4.5(1): General Configuration of New Cornice Over Existing Conc. Col's.

4.6. Stone Window Sills

4.6.0 General

This subsection pertains to the stone sills which occur along the full height of three vertical window bands at the building's SE corner, along levels 0 and 1 on the east and west elevations, at level 1 of the north ends of both wings, and at nearly all windows facing the courtyard.

4.6.1 Basis of Recommendations

Please see subsection IV-4.6.1, which applies fully to this Option 3 approach as well. In addition, this Option 3 approach envisions removing all existing exterior cladding. Consequently, it would probably be less costly to fabricate new pre-cast concrete sills, rather than trying to save the existing stone sills.

4.6.2 Recommended Corrective Actions

Please see subsection V-4.6.2, which applies nearly fully to this Option 3 approach as well.

In brief, the work consists of replacing these sills with new pre-cast concrete sills with membrane and copper flashings atop and below these.

Figure VI-4.6(1) depicts the general nature of the recommended work, as it would occur per Option 2. Option 3 differs from this only in that the new concrete wall shown below the window sill would in most locations be replaced with a steel-framed wall with exterior gypsum sheathing.

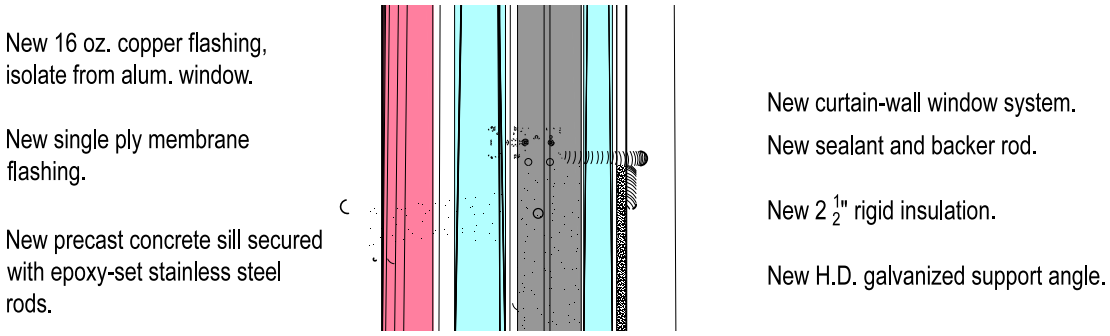

Fig. VI-4.6(1): Replacement of Window Sills

4.7. Steel Window-Head Lintels

4.7.0 General

This subsection pertains to the steel lintels above windows that do not have terra-cotta panels above them. These occur along the full height of three vertical window bands at the SE corner, at levels 0 and 1 on the east and west elevations, at level 1 of the north ends of both wings, and at all windows facing the courtyard.

4.7.1 Basis of Recommendations

Please see subsection IV-4.7.1, which applies fully to this Option 3 approach as well. In addition, this Option 3 approach envisions removing all existing exterior cladding. Consequently, the window-head lintels would be replaced with galvanized steel ledgers.

4.7.2 Recommended Corrective Actions

Please see subsection V-4.7.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of replacing these lintels with new, hot-dipped galvanized steel ledgers flashed with 2-layer flashings, generally as shown in Figure VI-4.7(1). Baffled weeps spaced 24" apart should be included for drainage above the ledgers.

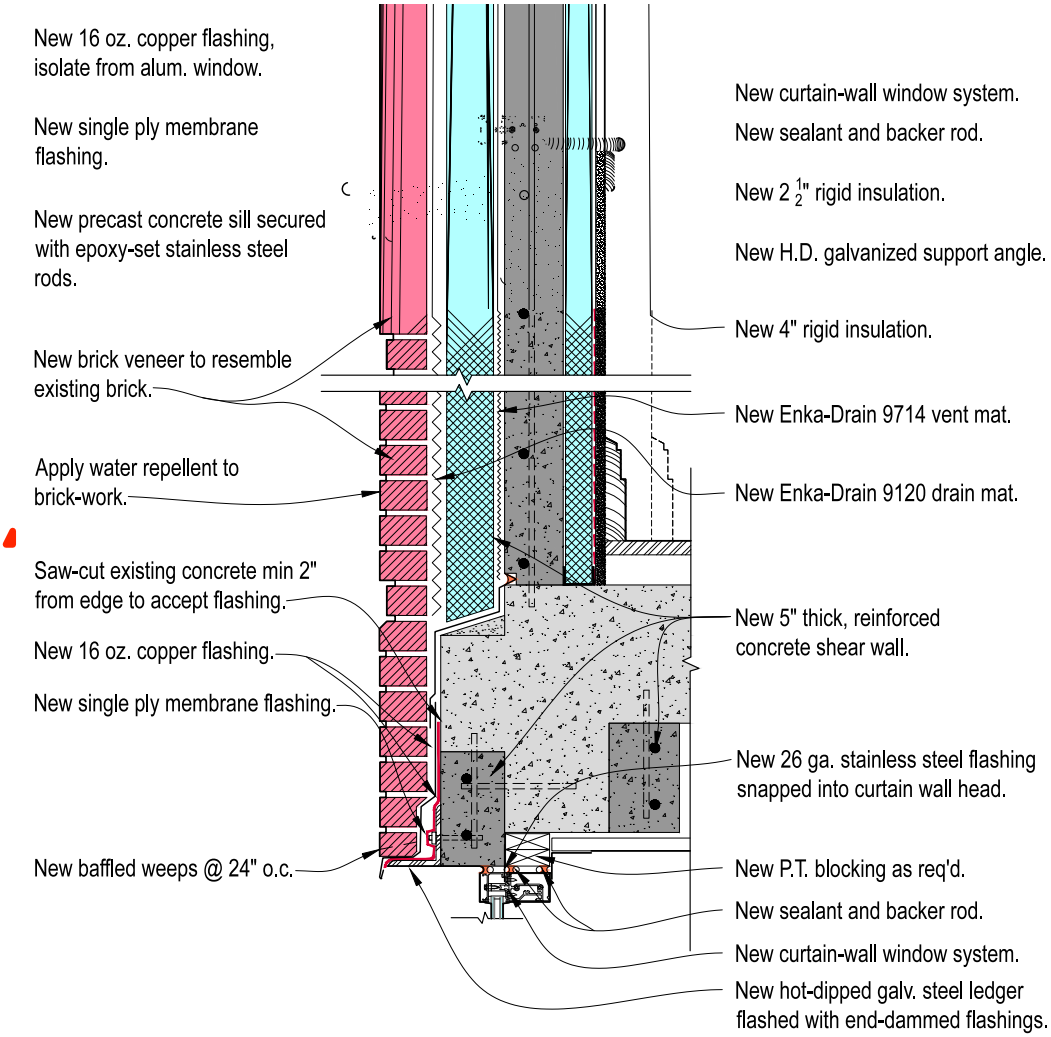

Fig. VI-4.7(1): Window-Head Lintel Replacement and Flashing

5. ENTRY PORTICO

5.0. General

This section pertains to all elements that comprise the entry portico. It is subdivided into 7 subsections, each of which addresses the portico's various components, such as its support base, stairs, columns, etc. As the Option 3 work at the portico is essentially identical in nearly all regards to the Option 1 portico work, no new details are needed, and Figure VI-5.0(1) references specific details from the Option 1 approach without repeating them in this section.

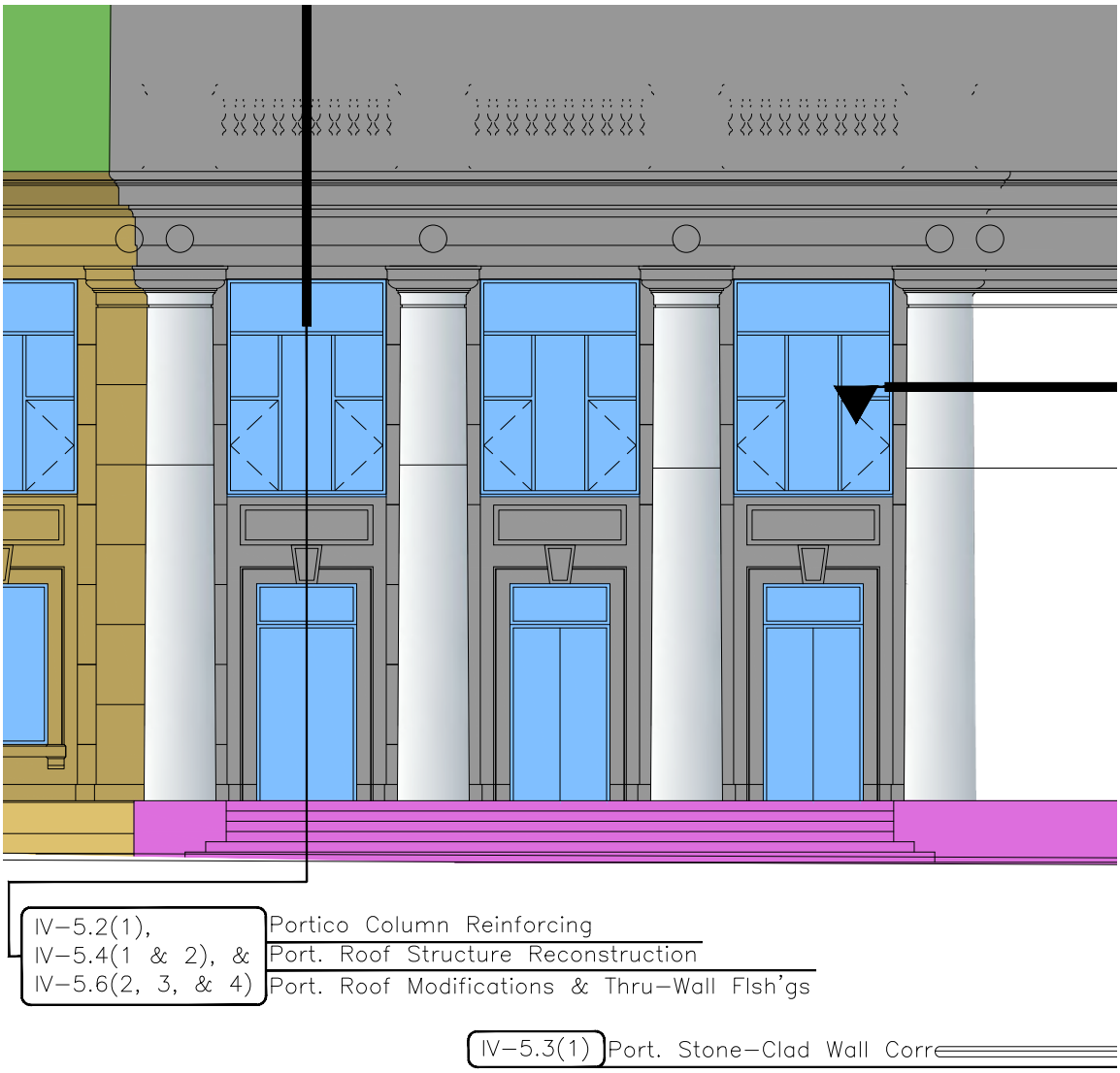

Figure VI-5.0(1): Portico South Elevation

5.1. Support Base For Portico Entry and Stairs

5.1.0 General

This subsection pertains to the portico's support base, including its support structure, granite paving, granite stairs, and granite-clad column plinths.

5.1.1 Basis of Recommendations

Please see subsection IV-5.1.1, which applies fully to this Option 3 approach as well.

5.1.2 Recommended Corrective Actions

Please see subsection IV-5.1.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of performing additional evaluation as part of the next phase of corrective work, which will hopefully allow examination of the concealed portions below the portico entry paving.

5.2. Marble Columns

5.2.0 General

This subsection pertains to the portico's four marble columns and associated capitals.

5.2.1 Basis of Recommendations

Please see subsection IV-5.2.1, which applies fully to this Option 3 approach as well.

5.2.2 Recommended Corrective Actions

Please see subsection IV-5.2.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of core-drilling and reinforcing the columns, injecting cracks with epoxy, restoring or replacing the stone column capitals and capping them with 2-layer flashing caps, and cleaning and polishing the eroded column surfaces.

5.3. Stone Cladding on Exterior Building Wall

5.3.0 General

This section pertains to the stone cladding along the building's exterior wall, but only where it occurs under the portico roof. While this cladding wraps the entire base of the south façade, it forms the structural support for the N-S stone beams of the portico roof. Consequently, at the portico, this cladding is used in a structural fashion.

5.3.1 Basis of Recommendations

Please see subsection IV-5.3.1, which applies fully to this Option 3 approach as well.

5.3.2 Recommended Corrective Actions

Please see subsection IV-5.3.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of replacing the existing damaged cladding with a new, color-matched, pre-cast concrete cladding over new reinforced concrete support columns and walls, along with new flashings, sealant joints, etc., as described in subsection IV-5.3.2.

5.4. Portico Roof Structure

5.4.0 General

This section pertains to the elements comprising the portico's roof structure, including the entablature beam, embedded concrete beam above the entablature, stone crossbeams, steel lintels, stone water table, concrete roof slab, stone ceiling panels, and related elements.

5.4.1 Basis of Recommendations

Please see subsection IV-5.4.1, which applies fully to this Option 3 approach as well.

5.4.2 Recommended Corrective Actions

Please see subsection IV-5.4.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of replacing the entire portico roof structure with a new structure of cast-in-place concrete beams, steel decking and framing, pre-cast concrete cladding, new flashings, etc. as described in subsection IV-5.4.2.

5.5. Stone Railing

5.5.0 General

This section pertains to the stone elements comprising the portico roof's perimeter railing.

5.5.1 Basis of Recommendations

Please see subsection IV-5.5.1, which applies fully to this Option 3 approach as well.

5.5.2 Recommended Corrective Actions

Please see subsection IV-5.5.2, which applies fully to this Option 3 approach as well.

In brief, this work consists of replacing the entire railing with a new one of pre-cast concrete capped with new flashings, etc. as described in subsection IV-5.5.2.

5.6. Portico Roof, Drains, and Associated Flashings

5.6.0 General

This section pertains to the portico's roof membrane, drains, and associated flashings.

5.6.1 Basis of Recommendations

Please see subsection IV-5.6.1, which applies fully to this Option 3 approach as well.

5.6.2 Recommended Corrective Actions

Please see subsection IV-5.6.2, which applies nearly fully to Option 3 as well. It differs only in that rather than retrofitting through-wall flashings in the existing brick above the portico roof, such flashings, consisting of single-ply membrane capped with 16 oz. copper, would cap over new steel ledgers supporting the new brick veneer. In all other respects, the work would be identical.

In brief, this work consists of replacing the existing portico roof membrane, installing through-wall flashings under the railings, adding two new overflow drains, etc. per subsection IV-5.6.2.

6. INTERIOR ARCHITECTURAL ELEMENTS

6.0. General

This section addresses issues related to the interior architectural elements including the wall, floor and ceiling construction and finishes.

6.1. Interior Faces of Exterior Building Walls

6.1.0 General

This subsection pertains to the interior architectural elements affected by the seismic retrofit and exterior wall renovation, which primarily impacts interior faces of exterior walls.

6.1.1 Basis of Recommendations

Please see subsection IV-6.1.1, which applies fully to this Option 3 approach as well.

6.1.2 Recommended Corrective Actions

Please see subsection IV-6.1.2, which applies fully to this Option 3 approach as well.

7. MECHANICAL SYSTEMS

7.0. General

This section addresses issues related to the building's mechanical systems, including heating, ventilation, plumbing and fire sprinkler systems.

7.1. General Mechanical Systems

7.1.0 General

This subsection pertains to the mechanical systems affected by the work on the exterior walls and mechanical systems affected by other seismic retrofit work.

7.1.1 Basis of Recommendations

Please see subsection IV-7.1.1, which applies fully to this Option 3 approach as well.

7.1.2 Recommended Corrective Actions

Please see subsection IV-7.1.2, which applies fully to this Option 3 approach as well.