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ADDENDUM #1

PROJECT: Frisco Park
418 S Avalon St.
West Memphis, AR 72301

DATE: 08-20-2019

JOB NO.: HAPC #597

This addendum contains modifications to information previously included in the Construction Documents. These changes generally are changing name of the project from 'The Park at Barton' to 'Frisco Park' and stone veneer is changed to brick in the whole project. This addendum forms a part of the Bidding Documents dated "05/22/19 Re-Issue for Permit" and modifies them as follows:

SPECIFICATIONS

All references to the project name 'The Park at Barton' are revised to 'Frisco Park'. Geotechnical report (not part of contract documents) is included for reference and convenience only.

Architecture: Cover page and table of contents are revised (see attached).

Civil: All Specification sections from McMaster & Associates are added (see attached).

DRAWINGS

Architectural:

1. Sheet CS – Coversheet
 - a) The project name is revised to *Frisco Park*.
 - b) Index of drawings are updated with civil sheets.
2. Sheet A1 – Coordination Site Plan and Details.
 - a) Both Type A buildings are mirrored to match civil.
3. Sheet A2 – Frame Details, Schedules
 - a) Details 7,8, and 9 – Exterior door frame details are revised to brick.
 - b) Details 13, 14 and 15 – Exterior window details are revised to brick.
4. Sheet A4 – Building A Plans
 - a) Details 4 and 5 are revised to show brick veneer with related notes.
5. Sheet A5 – Building A Elevations (Sheet is re-issued).
 - a) Details 1, 2, 3, and 4 – Revised notes and elevations from stone veneer to brick veneer construction.
6. Sheet A7 – Building B Elevations (Sheet is re-issued).
 - a) Details 1, 2, 3 and 4 – Revised notes and elevations from stone veneer to brick veneer construction.
7. Sheet A9 – Building A and B Sections (Sheet is re-issued).
 - a) Stone veneer is revised to show brick on all details.
 - b) Added corner trim pieces.
8. Sheet A12 – Wall Sections and Details.
 - a) Detail 1 – Revised notes and stone veneer to show brick veneer.
 - b) Detail 3 is renumbered as 2.
 - c) Detail 2 – Revised notes and stone veneer to show brick veneer.

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9. Sheet A13 – Details
 - a) Details 1, 2, 4, and 7 are revised from stone veneer to brick and corresponding notes are revised/ added.
10. Sheet A15 – Community Building Roof Plan & Elevations
 - a) Detail 2, 3, 4, and 5 are revised to show brick veneer construction and corresponding notes are updated.
11. Sheet A16 – Community Building Sections & Details
 - a) Detail 1, 2, and 3 – Revised notes and wall sections to show brick veneer.

Civil: Sheets are added to the drawing set (See attached).

Structural:

1. Sheet S1 – General notes 3.1 and 3.2 are revised.
2. Sheet S9 – Brick ledge dimensions are revised in Detail 1.
3. All sheets are re-issued with updated project name (Frisco Park).

Plumbing: All sheets are re-issued with updated project name (Frisco Park).

Fire Protection: All sheets are re-issued with updated project name (Frisco Park).

Mechanical: All sheets are re-issued with updated project name (Frisco Park).

Electrical: All sheets are re-issued with updated project name (Frisco Park).

END OF ADDENDUM #1.

Geotechnical report (reference document)

Specification Attachments:

Architecture:

000001 Cover
000002 Table of Contents

Civil:

017123 Field Engineering
017423 Cleaning
024100 Selective Site Demolition
311100 Clearing & Grubbing
312000 Earthwork
312313 Subgrade Preparation
312333 Pipeline Excavation and Backfill
312513 Silt Fence
312514 Temporary Erosion Checks
313419 Geotextile Fabric
313713 Riprap
321123 Crushed Limestone Base
321216 Asphalt Paving
321313 Concrete Accessories
321314 Concrete Placement
321315 Concrete Formwork
321723 Pavement Markings
329200 Seeding, Fertilizing, & Mulching
331100 Water Utility Distribution
333000 Sanitary Sewerage Utilities
334100 Drainage Pipes and Culverts
334900 Storm Drainage Structures

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Drawing Attachments:

Architectural: CS, A0.1, A0.2, A0.3, A0.4, A0.5, A0.6, A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18 and A19
Civil: C0.1, C0.2, C1.1, C1.2, C1.3, C2.1, C3.1, C4.1, C5.1, C5.2, C5.3, and C5.4
Structural: S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, and S15
Plumbing: P01, P02, P03, P04, P05, P06 and P07
Fire Protection: FP01, FP02, and FP03
Mechanical: M01, M02, M03 and M04
Electrical: E01, E02, E04, E05, E06, E07, E08 and E09



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**GEOTECHNICAL INVESTIGATION
FOR
PROPOSED PARK PROJECT
WEST MEMPHIS, ARKANSAS**

* * * * *

**THE PARK COMPANIES/SECDE VENTURES
DEVELOPERS
124 ONE MADISON PLAZA
MADISON, MISSISSIPPI 39110**

* * * * *

AUGUST 13, 2019

JOB NO. 16244





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August 13, 2019

Job No. 16244

Mr. Cliff Bates
The Park Companies/SECDE Ventures
124 One Madison Plaza
Madison, Mississippi 39110

Re: Geotechnical Investigation
Proposed Park Project
West Memphis, Arkansas

Dear Mr. Bates:

It is our pleasure to submit this report on the soil and foundation investigation for the proposed Park Project in West Memphis, Arkansas. The investigation consisted of field test borings, soils laboratory analyses, pavement analyses, and foundation design analyses.

Variable amounts of potentially expansive and soft soils were encountered across the site. Significant amounts of undercut and/or raising the proposed grades will be required due to the presence of these soils. We recommend that the earthwork and foundation excavations be verified by our geotechnical representative during the foundation construction phase of the project. This is the most feasible means of assuring the owners, designers, and builders that the geotechnical design intent is being achieved. In the event adverse geotechnical conditions are encountered during excavation, they can be identified and evaluated so that adequate remedial measures can be implemented during construction.

We wish to express our appreciation for the opportunity of serving you and other members of the design team. We are available for further assistance at any time during final design and construction, should you desire additional consultation.



Very truly yours,

ANDERSON ENGINEERING CONSULTANTS, INC.

Scott W. Anderson, R.E.P., P.E.
Principal Engineer



SMS/SWA/plf
16244.GEO

GEOTECHNICAL INVESTIGATION
FOR
PROPOSED PARK PROJECT
WEST MEMPHIS, ARKANSAS

* * * * *

THE PARK COMPANIES/SECDE VENTURES
DEVELOPERS
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* * * * *

BY
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AUGUST 13, 2019

JOB NO. 16244

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Important Information about Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. Always contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.*

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention.*** ***Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



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PURPOSE

The primary purposes of this geotechnical investigation were:

- a. To determine the physical and engineering properties of the soils within the area of the proposed construction with respect to their suitability for the support of the proposed facility.
- b. To make recommendations for the earthwork, pavements, and the type of foundation suited for the prevailing soil conditions within the proposed construction area.
- c. To evaluate and recommend the design procedures for the various soil, pavement, and foundation items in accordance with current engineering practices.

SCOPE

The scope of the this geotechnical investigation includes the following:

- a. The geological features in the vicinity of the project consist primarily of alluvial and terrace deposits of sands, silts, and clays. The site is located in West Memphis, Arkansas, as shown on the Vicinity Map, Plate 1.
- b. It was concluded that eight borings would be required to obtain the necessary data for design of the proposed facility. The borings were placed strategically within the building areas, as shown on the Plan of Borings, Plate 2.
- c. Field tests consisted of Standard Penetration test samples (ASTM D 1586) taken in all the borings. Logs of the borings illustrating stratigraphic and field test information are provided on Plates 3 through 10. The Field Classification System for Soil Exploration and Key to Soil Classification and Symbols are provide on Plates 11 and 12.
- d. The soils analyses were based on N-values obtained from the drilling program, visual observations, and other routine inspection/classification methods. The soils were classified basically in accordance with the Unified Soil Classification System (ASTM D 2487) shown on Plate 13, however, visual classifications may be given in some instances on the logs.
- e. A laboratory testing program was developed by the geotechnical engineer after visual observation of the samples obtained and review of the field boring logs. Laboratory tests included moisture content determination, Atterberg limits, mechanical grain size analyses, and shrinkage/swell tests. The individual test results are provided in Appendix B.
- f. The foundation analyses were based on based on AECI's current foundation design procedures using the N-values obtained during drilling, results of the laboratory tests, and the results of our in-house capacity calculations. Monolithic slabs are considered to be the most feasible foundation based on the soil conditions identified. Undercut of potentially expansive soils are recommended to reduce the swell potential of these materials. An explanation of bearing capacity calculations is provided on Plate 14.

- g. The flexible and rigid pavement sections discussed in this report are based on the design method utilizing estimated California Bearing Ratio (CBR) data derived from field/laboratory investigations and generally accepted industry standards. The proposed flexible and rigid pavement sections are provided on Plate 15.

AUTHORITY

This geotechnical investigation was authorized on June 24, 2019, by signed acceptance of AECI Proposal No. 19172 by Mr. Cliff Bates, Vice President of Development for The Park Companies/SECDE Ventures, the owner's representative for the proposed project.

PROJECT DESCRIPTION

This project will be located on three parcels of land north of West Jackson Avenue and south of Rocky Chute Road in West Memphis, Arkansas, as illustrated on the Vicinity Map, Plate 1. Five new buildings and a playground are planned for the project, as shown on the Plan of Borings, Plate 2. The proposed construction areas were covered with grass at the time of the field investigation. The topography indicates the three parcels are relatively flat with some fill required to achieve finished floor elevation at each building location. Design loads are anticipated to be light for the structures.

REGIONAL GEOLOGY

The 1993 Geologic Map of Arkansas, as prepared by the Arkansas Geologic Commission and the United States Geological Survey, indicates that the project is located within the Mississippi Embayment Physiographic region of northeastern Arkansas. This region consists of terraced sediments deposited by the ancient Mississippi River and its tributaries during the Quaternary period. These deposits generally consist of a complicated sequence of unconsolidated layers of gravels, sands, silts, and clays. The site soils were found to be consistent with the area geology. The site stratigraphy consists of approximately 5.0 to 10.0 feet of clays (CL/CH) overlying clayey to silty sand (SC), (SM). The upper 5.0 feet of clay is highly expansive fat clay (CH) with liquid limits (LL) of up to 96.

GROUNDWATER CONDITIONS

Groundwater was encountered during this investigation at approximate depths of 7.5 to 18.5 feet and could effect some excavations. The water level, though, is considered seasonal in nature and will rise and fall with fluctuations in rainfall. Thus, groundwater could be expected during construction and should be considered in design and construction of foundations, utilities, equipment pits or elevator shafts. Temporary dewatering of these types of excavations by sump/pump may be required.

Perched water could also be encountered at shallow depths above less permeable soils. This latent water condition is typically due to storage of recent rainfall or by a barrier to capillary evaporation. Perched water if encountered will most likely be brief in duration and typically in low quantities. Areas likely to contain perched water include old fill areas, paved areas, old drainage swales, old foundations/slabs, and existing utility trenches. Where perched water is encountered the contractor should expect to excavate gravity drainage ditches to divert it away from the construction area. Additionally, soft, wet and pumpable soils can be expected.

SITE DRAINAGE

The designer should also consider the topography of the site and surrounding areas during planning, design, and construction. The final grading should ensure positive drainage away from the buildings. It is strongly recommended that roof drains, condensate lines, and other potential water sources divert water away from the building, preferably to the storm sewer system, to prevent accumulation around the perimeter of the proposed structure. The subgrade soils have the ability of absorbing significant amounts of moisture, which could be detrimental as strength loss or activation of swelling clays.

Consideration should be given to control of surface water runoff during construction. The contractor should maintain a gravity drainage ditch around the perimeter of the construction areas in an effort to promote runoff. The proposed construction area should be maintained in a well drained condition to prevent water from ponding within the structural and parking areas. Saturation of the subgrade soils prior to or after fill placement could require additional amounts of undercut, especially during wet/winter months.

SEISMICITY

The seismic analysis requires the selection of appropriate site coefficients and other seismic values that can be established from the subsurface conditions, guidelines set forth by local, state, and federal codes, and historical seismic information. The structure should be designed using guidelines as set forth in the 2015 International Building Code as required by **Arkansas Act 1100-1991** (and subsequent amendments) as determined appropriate. The site soils consist primarily of clay (CL/CH) overlying silty sand (SM). The seismic values on the following pages are considered applicable to this project site based upon the site conditions and the 2015 International Building Code (IBC) seismic values for Arkansas:

IBC (2015)

Site Class	D*
Value of Site Coefficient (F_a)	1.051
Value of Site Coefficient (F_v)	1.618
Spectral Response Acceleration at Short Periods (S_s)	1.122 g
Spectral Response Acceleration at a Period of 1Second (S_1) ..	0.391 g
Peak Ground Acceleration	0.600 g

*Considering the size and function of the proposed structure the 100-foot deep boring was not performed at the site as allowed by the IBC.

FIELD INVESTIGATION

On July 24 through 26, 2019, a geotechnical drilling crew performed the drilling and sampling of eight borings within the building areas. The borings were placed strategically in an effort to obtain data from across the construction areas, as shown on the Plan of Borings, Plate 2. Standard Penetration Tests (SPT) were performed at selected intervals to determine the consistency of the subgrade soils. This testing consists of driving a split spoon sampler a total of 18.0 inches and recording the number of blows for each 6.0-inch increment. The number of blows required for the last two increments are summed to arrive at an SPT (“N”) value. A value greater than 50 blows per foot is considered refusal. The soil samples obtained from this testing were visually classified in the field by an engineering technician. The logs of the borings showing the stratigraphy at each location and N-values with depth are provided on Plates 3 through 10. The Field Classification System for Soil Exploration and Key to Soil Classifications and Symbols are provided on Plates 11 and 12 with the Unified Soil Classification System presented on Plate 13. The N-values obtained from the structural borings are summarized below:

TABLE I
SUMMARY OF N-VALUES

Depth (feet)	B1	B2	B3	B4	B5	B6	B7	B8
0.0 - 1.5	9	11	10	12	12	10	11	6
2.5 - 4.0	5	6	9	10	9	11	12	8
5.0 - 6.5	10	8	5	7	5	9	7	7
7.5 - 9.0	4	3	4	6	10	10	11	7
10.0 - 11.5	15	4	2	4	7	9	10	5
15.0 - 16.5	5	15	22	17	10	7	8	4
20.0 - 21.5	11	10	13	11	9	21	10	8

LABORATORY TESTING

Tests were performed on select samples to determine their classification and/or strength characteristics. Laboratory testing included moisture contents, Atterberg limits, mechanical grain size analyses, and shrinkage/swell index tests. The following sections describe the results of these tests. Individual test results are shown in Appendix B.

Moisture Content:

The moisture content of selected samples was determined to further evaluate the condition of the soils encountered. The near surface soils had moisture contents ranging from 21.64% to 26.02%, which is likely above optimum. Lower N-values were obtained in these soils, which is expected as the N-value typically decreases with increasing moisture content. Variable amounts of undercut should be expected. The underlying clays had an average moisture content of 30.14%, which is typical in highly plastic clays.

Atterberg Limits:

Atterberg limits were performed on representative samples to aid in classification and engineering analyses. The soils near the surface (<6.0± feet) were found to have liquid limits (LL) ranging from 40 to 96 and corresponding plasticity index (PI) values between 24 and 65. Soils with these high values are typically susceptible to shrink/swell with moisture content fluctuations. The plasticity of the soils generally decreased with depth as clayey sand (SC) and silty sand (SM) soils were encountered.

Mechanical Grain Size Analyses:

Mechanical grain size analyses were also performed to aid in classification of the materials encountered. The near surface more plastic clays contained a minimum of 77.8% fines (passing the No. 200 sieve), resulting in a classification of fat clay (CH) based on the Atterberg limit values. The amount of fines decreased with depth to less than 49.5%, resulting in a classification of clayey sand (SC). All deeper soils were non-plastic based on visual observations and would best classify as silty sand (SM).

Shrinkage/Swell Tests:

Visual inspection and laboratory plasticity tests performed on selected samples suggest that the clays present may be critical with respect to shrinkage and swell potential, and thus, they could cause some detrimental effects upon the proposed structures. Representative samples were tested at their natural moisture content to determine the potential swell if the materials become saturated. This testing resulted in a maximum swell pressure of 1802 psf and linear shrinkage of 12.2%. Considering the

highly variable moisture contents determined, potential vertical rise (PVR) values on the order of 1.5 to 2.5 inches are possible. Provided all criteria in the **EARTHWORK** section is met or exceeded, the potential for vertical rise should be maintained at tolerable limits (<0.50 inch).

EARTHWORK

It should be noted that the following sections are intended to provide the designer and contractor with guidelines for construction of the project. They are not intended to be used as a specification for construction procedures or methods. It is strongly recommended that any desired modification be reviewed by the soils engineer prior to implementation into the project specifications. Site conditions different from those indicated herein may result in alteration of these recommendations, but should be verified by the soils engineer, or his representative.

Pre-Construction Considerations:

The condition of the subgrade materials should be considered a significant factor in the early stages of project planning and construction. The conditions reflected herein are based on the data obtained from the borings and the soil condition at the time of drilling. Data obtained from the borings can be effected by seasonal fluctuations in rainfall and temperatures. Some improvement in the condition of the materials should be expected in the summer months. Construction planning and sequencing will likely be a crucial factor on the amount of undercut required for soft soil conditions. Scarification, aeration, ‘wind-rows’ and other methods to stabilize soils in-place should be explored prior to making the determination of undercut.

Though efforts have been made to outline climatic factors and their potential impact on construction, some factors also will have a significant impact. Time constraints (proposed schedule) may restrict the contractor’s ability to process wet soils. The means and methods of the contractor are not necessarily considered in the recommendations contained herein. The recommendations for site preparation are intended for a normal construction sequence. Prepared subgrade or compacted fill should not be subjected to prolonged periods of weather or construction traffic. Areas intended to be used as staging by the contractor will likely require additional processing and compaction due to distress caused by construction traffic.

It is highly recommended that the geotechnical engineer be included in pre-construction meetings. It would be prudent to perform a limited investigation (probing or test pits) to verify the soil conditions immediately prior to site work and determine if the recommendations contained herein warrant modification.

Site Preparation:

The proposed construction area should be stripped of all topsoil, organics, roots, trees, and other objectionable materials or features. A stripping depth of 6.0 to 10.0 inches should be sufficient to remove topsoil in most areas. However, deeper stripping depths may be required in low lying areas or swales. The organic and vegetative material may not be used for any part of the structural fill. However, it may be stockpiled on site and used as non-structural fill to improve seeding conditions in green areas.

The presence of potentially expansive clay (CH) will require special precautions to limit the shrink/swell potential of these materials. A minimum of 3.0 feet of properly compacted select fill should be provided beneath the bottom of the footings. Similarly, 3.0 and 1.0 feet will be required beneath floor slabs and pavements, respectively. The specified amount of fill may be provided through undercut, raising the proposed grades, or a combination thereof. The exposed subgrade should be scarified, moisture conditioned to +2% to +4% of optimum moisture content, and be recompacted to a minimum of 95% Standard compaction prior to fill placement.

Some soft soils should be expected during and upon the completion of clearing, grubbing and recommended undercut. For an estimation of soft soils, the N-values summarized in Table I and on the borings logs should be reviewed. Previous experience with similar soils types has indicated materials with an N-value exceeding 10 typically perform adequately for proof rolling with minor amounts of reworking or processing. Soils with lower values often require stabilization or undercut to be adequate. Data obtained indicates soft soils could extend to 5.0± feet below existing grades. The exposed subgrade should be proof rolled with a loaded, tandem axle dump truck in an effort to identify soft, unstable soils. Soft or yielding soils should be undercut or stabilized prior to fill placement.

The subgrade should be sufficient to provide adequate support to obtain a minimum of 98% Standard compaction on the first 8.0-inch loose lift of select fill after undercut of soft or fat clay (CH) soils. In the event soft soils extend to significant depth then an additional 18.0 to 24.0 inches of undercut could be performed to allow placement of a 'bridge lift'. The bridge lift should consist of select fill, placed in one thickened lift, and compacted to the best attainable density (approximately 95% Standard). This method should be performed such that 98% compaction is obtained on the first lift of required fill. Extremely soft soils may require additional effort, such as placement of a fabric at the base of undercut to provide additional support.

Fill Placement:

Fill materials for the project should consist of granular, non-expansive type soils with a plasticity index (PI) between 5 and 20 per ACI Section 360R. A minimum approximate dry density of 110.0 to 115.0 pcf is typical for soils meeting this criteria. On-site soils are not suitable and should not be used. Off-site fill should be approved by the soils engineer prior to their use. Fill soils should be placed in maximum 8.0-inch loose lifts, moisture conditioned to within two percentage point of optimum moisture content, and compacted to a minimum of 98% Standard compaction per ASTM D 698. At no time should the particle size of the fill material exceed half the lift thickness.

The compaction and moisture content of fill materials should be verified through field density tests. One test per lift should be performed for every 2500 square feet of building area, but could be increased to 5000 to 10,000 square feet for parking. It would be prudent to require the performance of Atterberg limits of fill materials to ensure compliance with the criteria outlined herein as borrow pit soils may vary significantly across the pit.

Excavation Criteria:

The overburden site soils may be prone to minor sloughing or cave-ins, especially if saturated. Based on OSHA regulations (29 CFR 1926, Subpart P) regarding soil classification for trench excavations, the soils encountered would best classify as Type C. In any case, OSHA regulations regarding shoring or benching of excavations should be considered during construction. Backfilling trench excavations should satisfy the criteria given previously, though ARDOT approved flowable fill may be used as an alternative for confined spaces provided it is allowed to properly cure.

Landscaping/Hardscaping:

The preferred landscaping method is to utilize green areas having a root barrier and a drainage system tied into the storm sewer system. Drip irrigation is preferred so that the amount of water can be controlled and routed away from the buildings ensuring that saturation of the foundation soils will not occur. As a general rule, the drip line of any existing or future full grown tree should not fall within the building areas. Moisture control will also be aided by having sidewalks, paving, properly drained green areas, or sloping ground surfaces for at least 5.0 feet outside the structure.

The sidewalks or paving must have positive slope away from the buildings and all joints must be sealed to prevent water infiltration. Implementation of these points will reduce the fluctuations in moisture content of the near surface soils and consequent movements of the floor slabs. It would also be prudent to capture roof drain outlets and AC unit condensate drip lines in the project storm sewer system. By doing so, the likelihood of distress from moisture variations to buildings, landscapes, and pavements is greatly decreased.

Adverse Weather Conditions:

Site grading and earthwork operations will be more difficult in wet or winter months. Should earthwork operations for the project begin in the time period of November through April, the owner should anticipate and budget for additional expenses for earthwork. Not only will more frequent and saturating rains be prevalent during these months, ambient air conditions are not conducive to drying of site soils. Efficient aeration and drying of soils is dependant upon high temperatures, low humidity, and the contractor's ability to disc or scarify the soils. Aeration and drying of wet borrow pit soils will require additional effort by the contractor and should be considered during budgeting or planning. Though these operations could limit the amount of bridge lift required, they will not reduce the specified amounts of fill required to reduce shrinkage/swell of the on-site soils.

Should the owner or contractor elect to begin earthwork in wet or winter months, undercut of soft soils will likely be the most feasible option. Mechanical stabilization of the on site soils is possible and could include the use of a geotextile fabric/grid to bridge over soft soils and provide support to subsequent fill. Chemical stabilization through lime or fly ash worked into wet soils can also be effective. However, these methods are highly dependant upon the contractor's expertise, equipment, and proper installation or mixing methods. In any case, the proposed construction area should be maintained in a well drained condition during construction. Water should not be allowed to stand or pond on areas of exposed earthwork. In anticipation of rainfall, it would be prudent for the contractor to "seal" exposed subgrades with a smooth drum roller to promote runoff. Additionally, surface drainage control features such as stormwater ponds should be installed as soon as it is practical.

FOUNDATIONS

Conventional monolithic slabs for the buildings are considered the most feasible foundation option based on the anticipated loadings, site conditions, and earthwork criteria established in the previous section. The following discussion will provide bearing capacity, settlement, and other criteria typically required for in design. For the purposes of this report, bearing capacity refers to the net allowable bearing capacity, which is defined by the ultimate bearing capacity (factored dead and live loads) reduced by an acceptable factor of safety, which for this project is considered to be 2.0. Additionally, shape, inclination, groundwater depth, and other design factors are considered minimal and no reduction in bearing capacity are necessary for these conditions.

Bearing Capacity:

Based on the results of our field investigation, bearing capacity values were developed using SPT values obtained from the drilling program utilizing our in-house design program. The foundations will have an allowable bearing capacity of 2000 psf when founded on a minimum of 3.0 feet of properly

compacted select fill. The recommended amount of select fill may be provided by undercut, raising the proposed grades, or a combination of these methods. Exterior turndowns should typically be founded at a depth of 2.0 feet below the finished floor elevation or below a local frost line of 10.0 inches. Interior footing depths may be decreased so long as they satisfy local building codes. An explanation of the bearing calculations is provided on Plate 14.

Settlement:

The settlement of the foundations must be within tolerable limits, which should be established by the structural engineer, but have not been provided prior to this investigation. The potential settlement for conventional footings may be estimated from results of Standard Penetration tests performed during drilling, bearing strata, the depth of compressible material beneath the foundations, and the applied loads. However, settlement values will vary with individual foundations due to the variations in bearing strata. Individual settlement calculations cannot be made without additional information. Thus, it may be concluded that the magnitude of total settlement for slab turndowns, at the recommended bearing capacity and depth, can be estimated not to exceed 1.00 inch. A differential settlement on the order of 0.50 inch is recommended for use in the structural design. Should the bearing capacity or loads used in design differ from those indicated herein, the amount of settlement will vary accordingly.

Undercut:

The presence of expansive soils will require mass undercut of the building area +5.0 feet in all directions. The specified amount of fill below turndowns may be accomplished by undercut, raising the proposed grades, or a combination thereof. A minimum of 3.0 feet of properly compacted fill should be provided beneath the bottom of the footings. Additional undercut could be required due to the presence of soft, unstable soils. A bridge lift may be required to provide adequate support for the required amount of fill where extensive soft soils are encountered. It is recommended that a representative of this firm be present during undercut to assist the contractor in determination of soft soils. OSHA regulations regarding trench excavation should be considered during construction, as deep excavations could be required. The width of undercut for turndowns should extend a minimum of 1.0 foot beyond any planned dimension. Backfilling should consist of select fill, placed in accordance with previously given criteria.

Other Design Considerations:

The bearing capacity and settlement discussions provided previously assume that the structural loadings are positioned such that a relatively uniform bearing pressure is exerted to the bearing strata. Eccentric, inclined or other loadings that result in a non-uniform bearing pressure will require further evaluation by this firm once specific loading conditions are established. In any case, it would be prudent to

increase the rigidity of the foundation in an effort to minimize potential differential movements. An increase in rigidity can be achieved by techniques that would increase the section modulus of the foundation members. Column and wall foundations should be designed in accordance with the requirements of the various applicable codes.

Resisting uplift loads should consider the weight of the footing and overlying soil backfill. A minimum factor of safety of 1.5 is recommended when calculating uplift resistance. For resistance of lateral forces, a net allowable passive resistance of 250 psf can be used for the portion of the footing extending below 1.5 feet. A coefficient of sliding resistance of 0.40 may be used by the designer to calculate frictional resistance for select fill along the bottom surface of the footing.

Excavation/Monitoring:

The excavations for foundations should be performed with equipment capable of providing a clean bearing surface. It would be ideal for the bottom 6.0 inches of the excavation to be excavated using a smooth plate excavator, or hand labor. Reinforcing steel and concrete should be placed as soon as possible upon completion of the geotechnical representative evaluation, as described below. All debris, standing water and mud, including saturated soils, should be removed. In no instance should concrete be placed in frozen or saturated soils. If unforeseen circumstances require excavations to remain open for an extended period, a thin “mud slab” may be placed in an effort to reduce disturbance to the bearing strata. In this case, the excavation should extend a minimum of 4.0 inches below planned depth, allowing a thin layer of concrete the same strength as required for the footings to be placed.

The performance of the foundation system will partially depend on the quality of construction. It would be prudent to have further evaluations by the soils engineer, or his representative, to verify that the design bearing value has been achieved in each foundation excavation. Furthermore, the condition of the subgrade should be evaluated to insure cleanliness and uniformity of bearing strata immediately prior to concrete placement. Bearing capacity can be verified by the use of a static cone penetrometer, or other acceptable means designated by the soils engineer.

FLOOR SLABS

Differential movement of the monolithic floor slab may be caused by a difference in the allowable gross bearing capacity, differing heave conditions, and/or variable thicknesses of compressible soils below the floors. The stiffness effect of a well compacted subgrade and/or engineered fill in conjunction with a granular base, collectively known as the soil support system, should greatly diminish the differential floor slab movements to tolerable limits. Based on the recommendations provided, the soil support system will consist of a minimum of 3.0 feet of compacted select fill overlain by a free-draining granular fill. For this condition the designer should consider a modulus of subgrade reaction (k) of

125.0 pci over the top 8.0 inches of subgrade. The floor slabs and soil support system should be designed and constructed in accordance with American Concrete Institute (ACI) Publications 302.1R-15, Guide for Concrete Floor and Slab Construction, and 360R-10, Guide to Design of Slabs-on-Ground, and other applicable codes.

Subgrade Preparation:

Initially, the recommendations in the **EARTHWORK** section, including proof rolling and moisture/compaction testing, should be followed to prepare the subgrade. However, the designer should specify that after destructive/intrusive construction activities, such as weathering, construction traffic, and utility placement, the contractor be required to restore the top 8.0 inches of subgrade to its specified moisture, density, and grade control immediately prior to slab placement. This rehabilitation should be verified through quality control testing and a rod and level survey, as directed by ACI 302.1R-15, Subsection 6.1. This will aid in prevention of post construction slab movements induced by moisture variations inherent to any soil type, especially for exposed or polished floors with no covering.

Granular Base:

As per ACI 302.1R-15, Subsection 6.1.4, the granular base should consist of a clean, densely graded granular material with a balanced fine content that produces a low-friction surface while minimizing wicking. This material should have 100% passing the 1½ inch (38 mm) sieve, 15% to 50% passing the No. 4 (4.75 mm) sieve, and less than 12% passing the No. 200 (75 µm) sieve or satisfy the requirements of ASTM D1241 with the modification allowance of less than 12% passing the No. 200 (75 µm) sieve. Additionally, the material passing the No. 200 (75 µm) sieve should be clean granular fill with less than 3% clay or friable particles. It should be noted, the ACI code states that clean/cushion/concrete sand “meeting ASTM C33/C33M, will not be adequate”. The base material should be placed and compacted with adequate quality control testing and grade control that conforms to ACI 117 with verification by rod and level survey.

Vapor Membrane:

The need for a vapor membrane depends on whether the floor slab will have a vapor sensitive covering, will have vapor sensitive items stored on the slab, or if the space above the slab will be a humidity controlled area. If the project does not have this vapor sensitivity or moisture control need, placement of a vapor membrane may not be necessary. However, if any of the above sensitivity issues apply, placement of a minimum 10-mil vapor membrane is recommended. Some floor covering systems (adhesives and flooring materials) may require a vapor membrane to maintain a specified maximum

slab moisture content as a condition of their warranty. The architect/engineer should decide on a case-by-case basis whether to place the vapor membrane above or below the granular layer. The guidelines in ACI 302.1R-15, Subsection 6.1.5, and ACI 302.2R-06, Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials, should be considered when determining the location of vapor membranes and the relation to floor finishes, project conditions, schedule, and the potential effects of slab curling and cracking.

DRIVES AND PARKING AREAS

The following pavement designs and pavement recommendations are based on numerous reasonable assumptions concerning the pavement use, site conditions, and maintenance. A minimum of 12.0 inches of properly compacted select fill should be provided beneath the bottom of the pavement section. As stated previously, varying amounts of undercut may be required due to the presence of soft or expansive soils. The base material and surface material thicknesses and construction procedures are provided in the following sections.

Flexible Pavement

Flexible pavement typically consists of asphalt cement hot mix (ACHM) as specified by Section 407 of the Standard Specifications for Highway Construction (Edition of 2014) as published by the Arkansas Department of Transportation. The design requirements for ACHM surface course; 12.5 mm (Type II) and 9.5 mm (Type III) are provided in Tables 407-1 and 407-2, respectively. ACHM is most commonly used for light to moderate traffic areas including straight drives and parking areas for light vehicles. It should not be used in traffic lanes where trucks turn, backup, or pickup trash dumpsters. Based on the CBR of 3 and a minimum of 12.0 inches of properly compacted select fill, the sections on the following page will apply for light and heavy duty sections. The recommended pavement structures are shown on Plate 15.

	<u>LIGHT</u>		<u>HEAVY</u>
<u>Material</u>	<u>Thickness (inches)</u>	<u>Material</u>	<u>Thickness (inches)</u>
12.5 mm ACHM	2.0	12.5 mm ACHM	3.0
Class 7 Base	6.0	Class 7 Base	8.0

NOTES:

- 1) Class 7 - 90% crushed stone meeting ARDOT Table 303-1.
- 2) Compaction of ACHM should not be less than 92% of theoretical design mix.
- 3) Base material compaction should not be less than 100% ASTM D 698.

Rigid Pavement Non-Reinforced

Rigid pavements or Portland Cement Concrete (PCC) pavements consists of concrete materials and construction procedures as specified by Section 501 of the Standard Specifications for Highway Construction (Edition of 2014) as published by the Arkansas Department of Transportation. The material type and design requirements including admixtures, reinforcing, dowels, jointing, curing, and finish are provided therein. Rigid (PCC) pavements are commonly used for both light and heavy duty traffic applications. Minimally, approach slabs, truck turning areas, docks, and dumpster pads should be PCC. Based on the CBR of 3 and a modulus of subgrade reaction of 125.0 pci over the 12.0 inches of properly compacted select fill, the following sections will apply for both light and heavy duty pavement sections. The recommended pavement structures are shown on Plate 15.

<u>LIGHT</u>		<u>HEAVY</u>	
<u>Material</u>	<u>Thickness (inches)</u>	<u>Material</u>	<u>Thickness (inches)</u>
PCC	5.0	PCC	7.0
Class 7 Base	4.0	Class 7 Base	4.0

NOTES:

- 1) Class 7 - 90% crushed stone meeting ARDOT Table 303-1.
- 2) PCC strength to be 4000 pci at 28 days.
- 3) PCC to be entrained with 5% air.
- 4) Load transfer, dowels, and joints per ACI, ARDOT or PCA guidelines.

Pavement Performance/Maintenance

The long term pavement performance will be directly related to several factors such as adequate edge drainage and surface drainage which does not allow water to accumulate on the pavement surface or behind the curbs and pavement edges. All pavement joints must be sealed and should be placed parallel to the overall site drainage direction. All irrigation, water, and other utility lines should be carefully monitored to insure they do not contribute to premature pavement failure by allowing water to migrate onto or under the pavements. Adequate quality control testing including proof rolling, compaction testing, thickness testing of base and ACHM as well as compaction of the ACHM is critical to successful long term pavement performance. In addition, pavements will require regular maintenance such as periodic surface sealing and crack sealing to prolong the desired performance and life.

QUALITY CONTROL TESTING

Quality control testing should be utilized in all phases of the construction. To verify that the proper performance of the proposed structures, all fill required should be compacted to a minimum of 98% Standard compaction, in accordance with ASTM D 698. The foundation excavations should be evaluated to verify that the recommended bearing capacity has not been reduced by disturbance to excavation or massive imperfections in the bearing strata. A geotechnical engineering representative should be present to evaluate the bottom of the foundation excavations prior to placement of concrete. The compaction of the pavement sections should be verified by tests after the earthwork is completed, so as not to invalidate the design criteria. Our recommendations are based upon adequate quality control testing being utilized and further evaluations and reviews during the construction phase of the project.

CONCLUSIONS AND RECOMMENDATIONS

As a result of this geotechnical investigation, the following recommendations are offered for consideration:

1. As previously discussed, monolithic foundations would serve satisfactorily for the proposed structures. It is concluded that this will be an economical type of foundation and should be designed in accordance with necessary structural and/or architectural requirement determined by the designers with the owner's ultimate approval.
2. The foundations should be designed utilizing a maximum allowable bearing capacity of 2000 psf for foundations bearing at a depth of 2.0 feet below the finished floor elevation. A minimum of 3.0 feet of properly compacted select fill should be provided beneath the bottom of the footings and floor slabs.
3. All fill required should consist of low PI, non-expansive fill and should be placed in 8.0-inch thick lifts and be compacted to 98% of Standard Proctor density as per ASTM D 698. Moisture should be controlled to within two points of optimum moisture. The select fill shall have a PI between 5 and 20 per ACI 360R. Locally available fill must meet the criteria given in the **EARTHWORK** section of this report.
4. As an additional measure, perimeter surface and subsurface drainage should be assured around the exterior of the building to intercept and drain surface runoff or seepage water from the near surface and foundation supporting soils. It would also be a prudent measure to slope backfill soils away from foundation walls and install all site drainage features as soon as it is practical.
5. The use of flexible or rigid pavements should be a function of the anticipated traffic use as determined by the designer using the recommended sections provided on pages 12 through 14 of this report. As a minimum PCC pavements should be used for turn-ins, truck lanes, and dumpster pads.

6. Quality control testing should be utilized in the construction of the foundation, undercutting, fill placement, and floor slab construction with adequate testing to verify that the design requirements have been achieved.
7. Geotechnical engineering and testing services are recommended during the foundation construction phase so that adequate compensation can be made for conditions that may occur which differ significantly from those assumed as a result of this investigation.
8. Other recommendations are given throughout the text of this report.

LIMITATIONS

The boring logs shown in this report contain information related to the types of soil or rock encountered at specific locations and times and show lines delineating the interface between these materials, as well as results of tests performed in the laboratory on representative samples. The logs also contain our field geologist's interpretation of conditions that are believed to exist in those depth intervals between the actual samples taken. Therefore, these boring logs contain both factual and interpretative information. It is not warranted that these logs are representative of subsurface conditions at other locations and times.

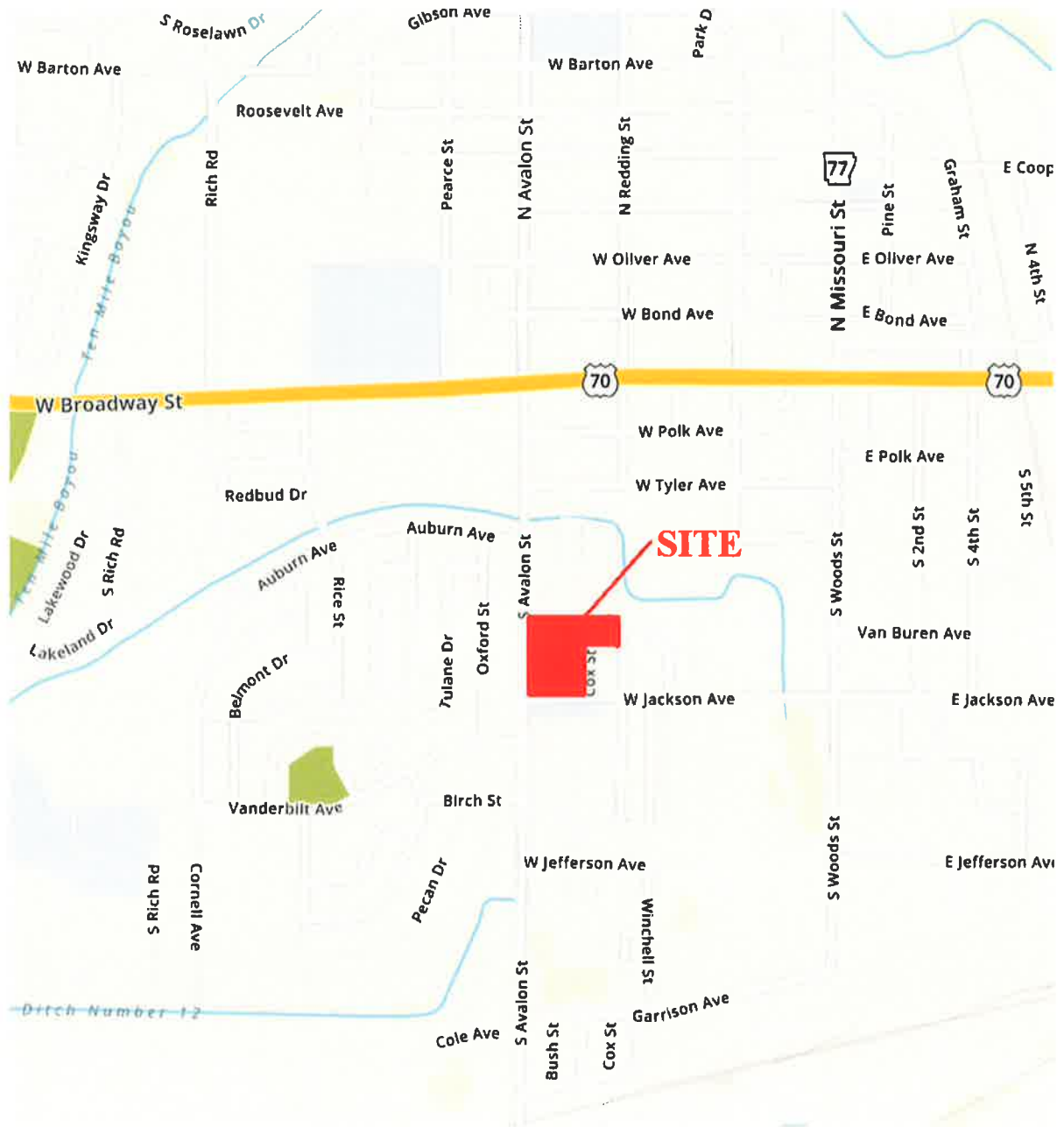
The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed at the time of our field investigation and further on the assumption that the exploratory borings are representative of the subsurface conditions throughout the site. If, during construction, different subsurface conditions from those encountered in our borings are observed, or appear to be present beneath excavations, we must be advised promptly so that we can review these conditions and provide new recommendations as becomes necessary. Recognize that both natural and manmade events may have changed site conditions since issuance of this report and further review may result. If after submission of this report structural loads or finished grades are changed from those that were assumed, we urge that we be promptly informed, and retained to review our report to determine the applicability of the conclusions and recommendations, considering the changed conditions and/or time lapse. Further, we request that our firm be retained to review those portions of the plans and specifications for this particular project that pertain to earthwork and foundations as a means to determine whether the plans and specifications are consistent with the recommendations contained in the report.

It should be understood that there is the possibility that even with the proper application of current engineering principles, conditions may exist on the site that could not be identified within the scope of this investigation or which were not reasonably identifiable from the available information. The conclusions and recommendations in this report contain all the limitations inherent to the principles and

practice of geotechnical engineering. AECI has not performed any observations, investigation, study, or testing that is not specifically listed in the scope of services. Thus, AECI shall not be liable for failing to discover any condition whose discovery required the performance of services outside of the scope of services provided in our proposal.

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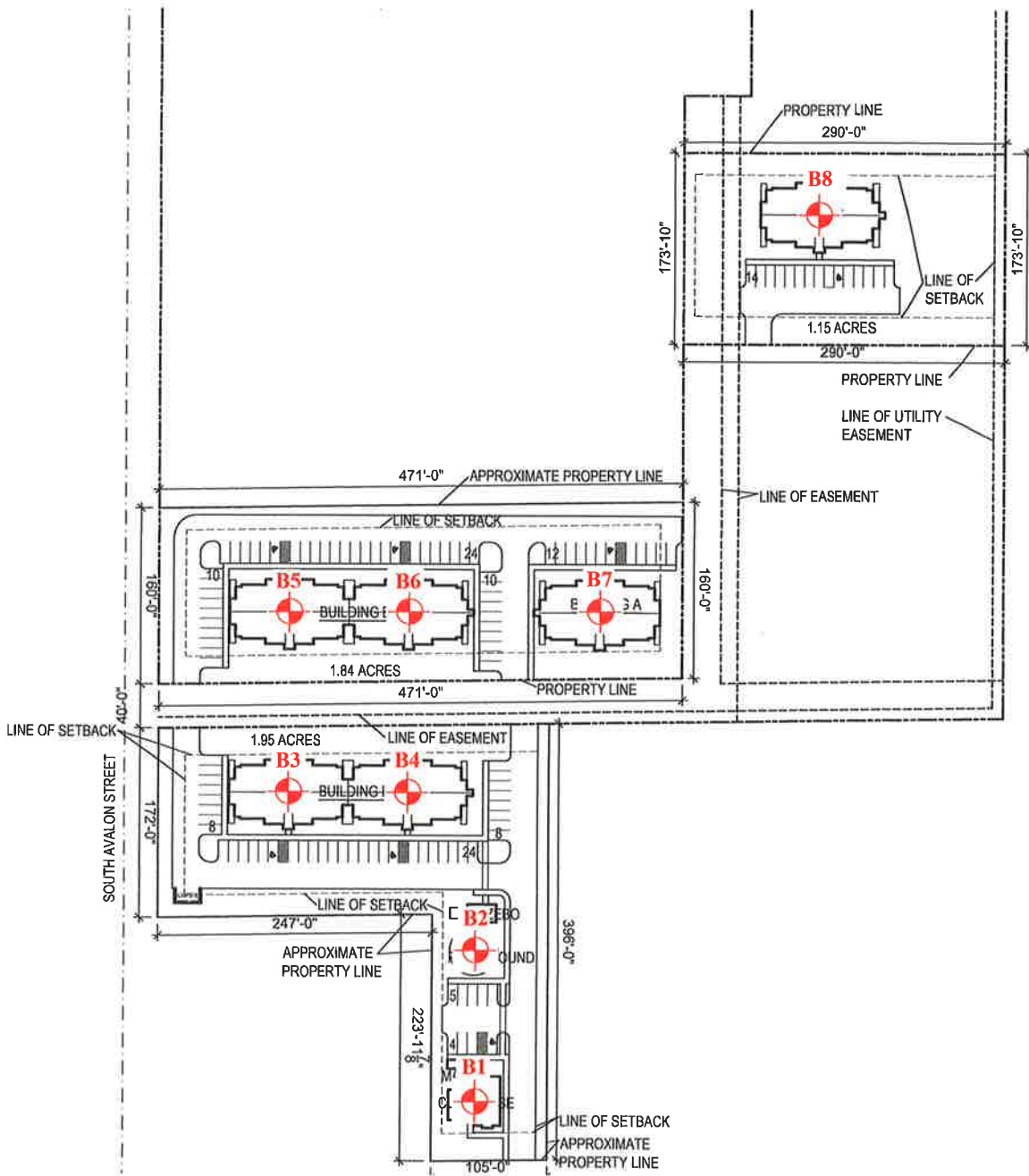
APPENDIX A
PLATES



VICINITY MAP

WEST MEMPHIS, ARKANSAS

NOT DRAWN TO SCALE.



PLAN OF BORINGS



LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/25/19 **JOB NO:** 16244
DRILLER: TARENA
 SIMCO 2800-2


BORING NO: B1
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT/SHELBY TUBE
GROUND ELEVATION: 210.0± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▽ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				5.0 INCHES OF TOPSOIL		
	P1	9		MEDIUM STIFF TO STIFF MOIST BROWN FAT CLAY (CH) PP = 1.00 KSF		
	S2			CONTINUES (CH)		
	P3	5		CONTINUES (CH) - BECOMES BROWN AND GRAY PP = 0.50 KSF		
5	P4	10		CONTINUES (CH) - BECOMES GRAY PP = 1.00 KSF		
	P5	4		VERY LOOSE TO MEDIUM DENSE MOIST GRAY SILTY SAND (SM)		
10	P6	15		CONTINUES (SM) - BECOMES WET		
				▼		
15	P7	5		CONTINUES (SM)		
20	P8	11		CONTINUES (SM)		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING CAVED AT 11.0 FEET. WATER ENCOUNTERED AT 12.0 FEET DURING DRILLING. APPROXIMATELY 2.5 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 212.5 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
FOR: WEST MEMPHIS, ARKANSAS
 THE PARK COMPANIES, SECDE VENTURES
DATE: 07/25/19 **JOB NO:** 16244
DRILLER: TARENA
 SIMCO 2800-2

BORING NO: B2
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT
GROUND ELEVATION: 210.5± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▽ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				6.0 INCHES OF TOPSOIL		
	P1	11		MEDIUM STIFF TO STIFF MOIST BROWN FAT CLAY (CH) PP = 1.25 KSF		
	P2	6		CONTINUES (CH) - BECOMES GRAY PP = 0.75 KSF		
5	P3	8		CONTINUES (CH) PP = 1.00 KSF		
	P4	3		VERY LOOSE MOIST GRAY CLAYEY SAND (SC)		
10	P5	4		CONTINUES (SC) - BECOMES WET		
						
15	P6	15		LOOSE TO MEDIUM DENSE WET BROWN SILTY SAND (SM)		
20	P7	10		CONTINUES (SM) - BECOMES GRAY		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING REMAINED OPEN. WATER ENCOUNTERED AT 12.0 FEET DURING DRILLING. WATER LEVEL AT 11.0 FEET UPON COMPLETION OF DRILLING. APPROXIMATELY 1.5 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 212.0 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/25/19 **JOB NO:** 16244
DRILLER: TARENA
 SIMCO 2800-2

BORING NO: B3
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT
GROUND ELEVATION: 212.0± msl



Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▽ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				5.0 INCHES OF TOPSOIL		
	P1	10		MEDIUM STIFF TO STIFF MOIST BROWN FAT CLAY (CH) PP = 1.00 KSF		
	P2	9		CONTINUES (CH) PP = 1.00 KSF		
5	P3	5		CONTINUES (CH) PP = 0.50 KSF		
	P4	4		VERY LOOSE MOIST BROWN CLAYEY SAND (SC)		
10	P5	2		CONTINUES (SC) - BECOMES GRAY		
				▼		
15	P6	22		MEDIUM DENSE WET BROWN SILTY SAND (SM)		
20	P7	13		CONTINUES (SM) - BECOMES GRAY		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING REMAINED OPEN. WATER ENCOUNTERED AT 14.0 FEET DURING DRILLING. APPROXIMATELY 2.5 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 214.5 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/25/19 **JOB NO:** 16244
DRILLER: TARENA
 SIMCO 2800-2

BORING NO: B4
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT/SHELBY TUBE
GROUND ELEVATION: 212.0± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube	NV Diamond Core	P Penetration Test
				▣ Core	⊠ Standard Penetration	▢ J - Jar
				∇ Static Water Table	∇ Hydrostatic Water Table	⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				7.0 INCHES OF TOPSOIL		
	P1	12		STIFF MOIST BROWN FAT CLAY (CH) PP = 1.25 KSF		
	S2			CONTINUES (CH)		
	P3	10		CONTINUES (CH) PP = 1.00 KSF		
5				-----		
	P4	7		VERY LOOSE TO LOOSE MOIST BROWN CLAYEY SAND (SC)		
	P5	6		CONTINUES (SC)		
10				-----		
	P6	4		CONTINUES (SC)		

15				 		
	P7	17		MEDIUM DENSE WET BROWN SILTY SAND (SM)		
20				-----		
	P8	11		CONTINUES (SM) - BECOMES GRAY		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING REMAINED OPEN. WATER ENCOUNTERED AT 13.5 FEET DURING DRILLING. WATER LEVEL AT 15.0 FEET UPON COMPLETION OF DRILLING. APPROXIMATELY 2.5 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 214.5 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/25/19 **JOB NO:** 16244
DRILLER: TARENA **GEOTECHNICIAN:** MOORE
 SIMCO 2800-2

BORING NO: B5
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT
GROUND ELEVATION: 213.0± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ∇ Static Water Table	NV Diamond Core ⊠ Standard Penetration ∇ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				5.0 INCHES OF TOPSOIL STIFF MOIST BROWN FAT CLAY (CH) PP = 1.25 KSF		
	P1	12		CONTINUES (CH) - BECOMES REDDISH BROWN PP = 1.00 KSF		
	P2	9				
5				LOOSE MOIST BROWN CLAYEY SAND (SC)		
	P3	5				
	P4	10		LOOSE WET BROWN SILTY SAND (SM)		
10				CONTINUES (SM)		
	P5	7				
15				CONTINUES (SM)		
	P6	10				
20				CONTINUES (SM) - BECOMES GRAY		
	P7	9				
25				BOTTOM OF HOLE AT 21.5 FEET. BORING CAVED AT 11.5 FEET. WATER ENCOUNTERED AT 7.5 FEET DURING DRILLING. WATER LEVEL AT 17.5 FEET UPON COMPLETION OF DRILLING. APPROXIMATELY 2.0 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 215.0 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/24/19 **JOB NO:** 16244
DRILLER: TARENA **GEOTECHNICIAN:** MOORE
 SIMCO 2800-2

BORING NO: B6
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT
GROUND ELEVATION: 213.0± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ∇ Static Water Table	NV Diamond Core ⊠ Standard Penetration ∇ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
				VISUAL DESCRIPTION OF STRATUM		
0	P1	10		9.0 INCHES OF TOPSOIL STIFF MOIST BROWN FAT CLAY (CH) PP = 1.00 KSF		
	P2	11		CONTINUES (CH) - BECOMES BROWN AND GRAY PP = 1.25 KSF		
5	P3	9		LOOSE TO MEDIUM DENSE MOIST BROWN SILTY SAND (SM)		
	P4	10		CONTINUES (SM)		
10	P5	9		CONTINUES (SM)		
15	P6	7	 ∇	CONTINUES (SM)		
20	P7	21		CONTINUES (SM) - BECOMES GRAY		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING CAVED AT 11.0 FEET. WATER ENCOUNTERED AT 15.0 FEET DURING DRILLING. APPROXIMATELY 2.0 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 215.0 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/24/19 **JOB NO:** 16244
DRILLER: TARENA
 SIMCO 2800-2 **GEOTECHNICIAN:** MOORE

BORING NO: B7
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT
GROUND ELEVATION: 213.0± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube	NV Diamond Core	P Penetration Test
			■ Core	⊠ Standard Penetration	▢ J - Jar	
			∇ Static Water Table	∇ Hydrostatic Water Table	⊠ No Recovery	
VISUAL DESCRIPTION OF STRATUM						
0				6.0 INCHES OF TOPSOIL		
	P1	11	▨	STIFF MOIST BROWN SANDY CLAY (CL) PP = 1.25 KSF		
	P2	12	▨	CONTINUES (CL) - BECOMES GRAY PP = 1.25 KSF		
5				-----		
	P3	7	⊠	LOOSE TO MEDIUM DENSE MOIST LIGHT BROWN SILTY SAND (SM)		
	P4	11	⊠	CONTINUES (SM)		
10						
	P5	10	⊠	CONTINUES (SM)		
			∇	Water Level		
			∇	Hydrostatic Water Table		
15						
	P6	8	⊠	CONTINUES (SM)		
20						
	P7	10	⊠	CONTINUES (SM) - BECOMES GRAY		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING CAVED AT 11.5 FEET. WATER ENCOUNTERED AT 14.0 FEET DURING DRILLING. WATER LEVEL AT 11.5 FEET UPON COMPLETION OF DRILLING. APPROXIMATELY 2.0 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 215.0 msl		

LOG OF BORING

PROJECT: PROPOSED PARK PROJECT
 WEST MEMPHIS, ARKANSAS
FOR: THE PARK COMPANIES, SECDE VENTURES
DATE: 07/24/19 **JOB NO:** 16244
DRILLER: TARENA
 SIMCO 2800-2

BORING NO: B8
LOCATION: SEE PLAN OF BORINGS
BORING TYPE: AUGER W/SPT/SHELBY TUBE
GROUND ELEVATION: 212.5± msl

Depth In Feet	Sample Type & No	N-Blows Per Foot	Graphic Symbol	LEGEND		
				S Shelby Tube ■ Core ▽ Static Water Table	NV Diamond Core ⊠ Standard Penetration ▽ Hydrostatic Water Table	P Penetration Test ⊠ J - Jar ⊠ No Recovery
VISUAL DESCRIPTION OF STRATUM						
0				6.0 INCHES OF TOPSOIL		
	P1	6		MEDIUM STIFF MOIST BROWN FAT CLAY (CH) PP = 0.75 KSF		
	S2			CONTINUES (CH)		
	P3	8		CONTINUES (CH) PP = 1.00 KSF		
5	P4	7		CONTINUES (CH) PP = 0.75 KSF		
	P5	7		CONTINUES (CH) PP = 0.75 KSF		
10	P6	5		VERY LOOSE TO LOOSE MOIST GRAY SILTY SAND (SM) WITH SOME CLAY SEAMS		
			▽	WATER LEVEL AT 12.5 FEET UPON COMPLETION OF DRILLING.		
15	P7	4		CONTINUES (SM)		
20	P8	8		CONTINUES (SM)		
25				BOTTOM OF HOLE AT 21.5 FEET. BORING CAVED AT 15.0 FEET. WATER ENCOUNTERED AT 18.5 FEET DURING DRILLING. APPROXIMATELY 2.5 FEET OF FILL IS ANTICIPATED AT THIS LOCATION. FINISHED FLOOR ELEVATION = 215.0 msl		

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

NON COHESIVE SOILS

(Silt, Sand, Gravel and Combinations)

Density

Very Loose	- 0 - 4 blows/ft.
Loose	- 4 to 10 blows/ft.
Medium Dense	- 10 to 30 blows/ft.
Dense	- 30 to 50 blows/ft.
Very Dense	- over 50

Particle Size Identification

Boulders	- 8-inch diameter or more
Cobbles	- 3 to 8-inch diameter
Gravel	- Coarse - 1 to 3-inch
	Medium - ½ to 1-inch
	Fine - ¼ to ½-inch
Sand	- Coarse - 0.6 mm to ¼-inch (dia. of pencil lead)
	Medium - 0.2 mm to 0.6 mm (dia. of broom straw)
	Fine - 0.05 mm to 0.2 mm (dia. of human hair)
Silt	- 0.06 mm to 0.002 mm (Cannot see particles)

Relative Proportions

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

COHESIVE SOILS

(Clay, Silt and Combinations)

Consistency

Very Soft	- < 2 blows/ft.
Soft	- 2 to 4 blows/ft.
Medium Stiff	• 4 to 8 blows/ft.
Stiff	- 8 to 15 blows/ft.
Very Stiff	- 15 to 30 blows/ft.
Hard	- over 30

Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	over 22

NOTES

Classification on logs are made by visual inspection.

Standard Penetration Test - Driving a 2.0-inch O.D., 1¾-inch I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30.0 inches. It is customary for AECl to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (Example: 6/8/9). The standard penetration test results can be obtained by adding the last two figures (i.e., 8 + 9 = 17 blows/ft.).

Strata Changes - In the column "Soil Descriptions" on the drill log the horizontal lines represent strata changes. A solid line (-----) represents an actually observed change, a dashed line (- - - -) represents an estimated change.

Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

KEY TO SOIL CLASSIFICATIONS AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM(1)					TERMS CHARACTERIZING SOIL STRUCTURE(2)
Major Divisions	Letter	Symbol		Name	
		Hatching	Color		
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW		RED	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP		RED	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM		YELLOW	Silty gravels, gravel-sand-silt mixtures
		GC		YELLOW	Clayey gravels, gravel-sand-clay mixtures
	SAND AND SANDY SOILS	SW		RED	Well-graded sands or gravelly sands, little or no fines
		SP		RED	Poorly-graded sands or gravelly sands, little or no fines
		SM		YELLOW	Silty sands, sand-silt mixtures
		SC		YELLOW	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML		GREEN	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL		GREEN	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL		GREEN	Organic silts and organic silt-clays of low plasticity
	SILTS AND CLAYS LL>50	MH		BLUE	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH		BLUE	Inorganic clays of high plasticity, fat clays
		OH		BLUE	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	Pt		ORANGE	Peat and other highly organic soils	

SLICKENSIDED - having inclined planes of weakness that are slick and glossy in appearance.

FISSURED - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.

LAMINATED (VARVED) - composed of thin layers of varying color and texture, usually grading from sand or silt at the bottom to clay at the top.

CRUMBLY - cohesive soils which break into small blocks or crumbs on drying.

CALCAREOUS - containing appreciable quantities of calcium carbonate, generally nodular.

WELL GRADED - having wide range in grain sizes and substantial amounts of all intermediate particle sizes.

POORLY GRADED - predominantly of one grain size (uniformly graded) or having a range of sizes with some intermediate size missing (gap or skip graded).

SYMBOLS FOR TEST DATA

M/C = 15 - Natural moisture content in percent.
 $\gamma = 95$ - Dry unit weight in pounds/cubic foot.
 $Q_u = 1.23$ - Unconfined compression strength in tons/square foot.
 $Q_c = 1.68$ (21 psi) - Confined compression strength at indicated lateral pressure.
 51-21-30 - Liquid limit, Plastic limit, and Plasticity index.
 30% FINER - Percent finer than No. 200 mesh sieve.
 30 B/F - Blows per foot, Standard Penetration test.
 ▼ - Hydrostatic water table.
 ▽ - Static water table.

TERMS DESCRIBING CONSISTENCY OF SOILS(2)

COARSE GRAINED SOILS		FINE GRAINED SOILS		
DESCRIPTIVE TERM	NO. BLOWS/FOOT STANDARD PEN. TEST	DESCRIPTIVE TERM	NO. BLOWS/FOOT STANDARD PEN. TEST	UNCONFINED COMPRESSION TONS PER SQ. FT.
Very Loose	0 - 4	Very Soft	<2	<0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Firm (medium dense)	10 - 30	Plastic (medium stiff)	4 - 8	0.50 - 1.00
Dense	30 - 50	Stiff	8 - 15	1.00 - 2.00
Very Dense	over 50	Very Stiff	15 - 30	2.00 - 4.00
		Hard	over 30	over 4.00

Field classification for "Consistency" is determined with a 0.25-inch diameter penetrometer.

(1) - From Waterways Experiment Station Technical Memorandum No. 3-357
 (2) - From "Soil Mechanics in Engineering Practice" by Terzaghi and Peck

UNIFIED SOIL CLASSIFICATION SYSTEM

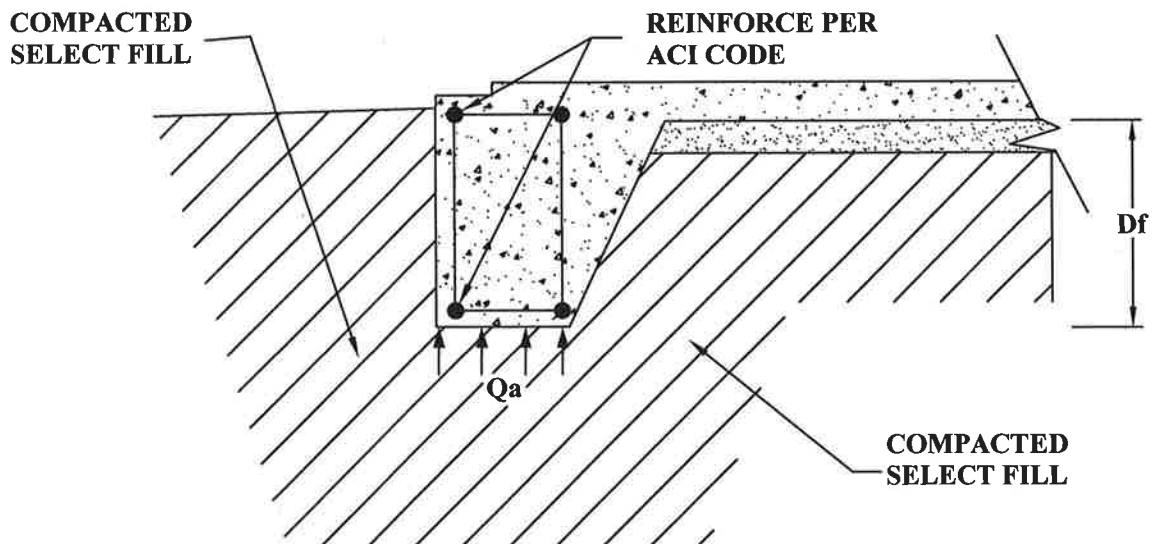
(ASTM D 2487)

Major divisions		Group Symbols	Typical Names	Laboratory Classifications Criteria				
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (more than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{D_{30}^2 \times D_{60}}{(D_{10})^3}$	Not meeting all gradation requirements for GW		
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines				
		Gravels with fines (Appreciable amount of fines)	GM*	d	Silty gravels, gravel-sand-silt mixtures	$C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{D_{30}^2 \times D_{60}}{(D_{10})^3}$	Atterberg limits below "A" line or P.I. less than 4 Atterberg limits above "A" line with P.I. greater than 7	Above "A" line with P.I. Between 4 and 7 are borderline cases requiring use of dual symbols
				u				
	Clean sands (Little or no fines)	GC	Clayey gravels, gravel-sand-clay mixtures					
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{D_{30}^2 \times D_{60}}{(D_{10})^3}$	Atterberg limits below "A" line or P.I. less than 4 Atterberg limits above "A" line with P.I. greater than 7	Not meeting all gradation requirements for SW	
			SP	Poorly graded sands, gravelly sands, little or no fines				
		Sands with fines (Appreciable amount of fines)	SM*	d	Silty sands, sand-silt mixtures	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP More than 5 percent GM, GC, SM, SC 5 to 12 percent Borderline cases requiring dual symbols **	Atterberg limits below "A" line or P.I. less than 4 Atterberg limits above "A" line with P.I. greater than 7	Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			SC	Clayey sands, sand-clay mixtures				
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Sills and clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	<p>Plasticity Chart</p>				
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					
		OL	Organic silts and organic silty clays of low plasticity					
	Sills and clays (Liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts					
		CH	Inorganic clays of high plasticity, fat clays					
		OH	Organic clays of medium to high plasticity, organic silts					
	Highly Organic soils	Pt	Peat and other highly organic soils					

*Division of GM and SM groups into subdivisions of d and u are for roads and airfield only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; u used when L.L. is greater than 24.

**Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder.

MONOLITHIC SLAB (ON SELECT FILL)



Explanation of Calculations Shown in Tables

D_f = Depth from ground surface to bottom of footing (feet)

Depth = Depth from top to bottom of soil strata (feet)

Strata H = Thickness of soil strata (feet)

N = Standard penetration N-value (blows per foot)

Q_u = Ultimate soil strength (ksf)

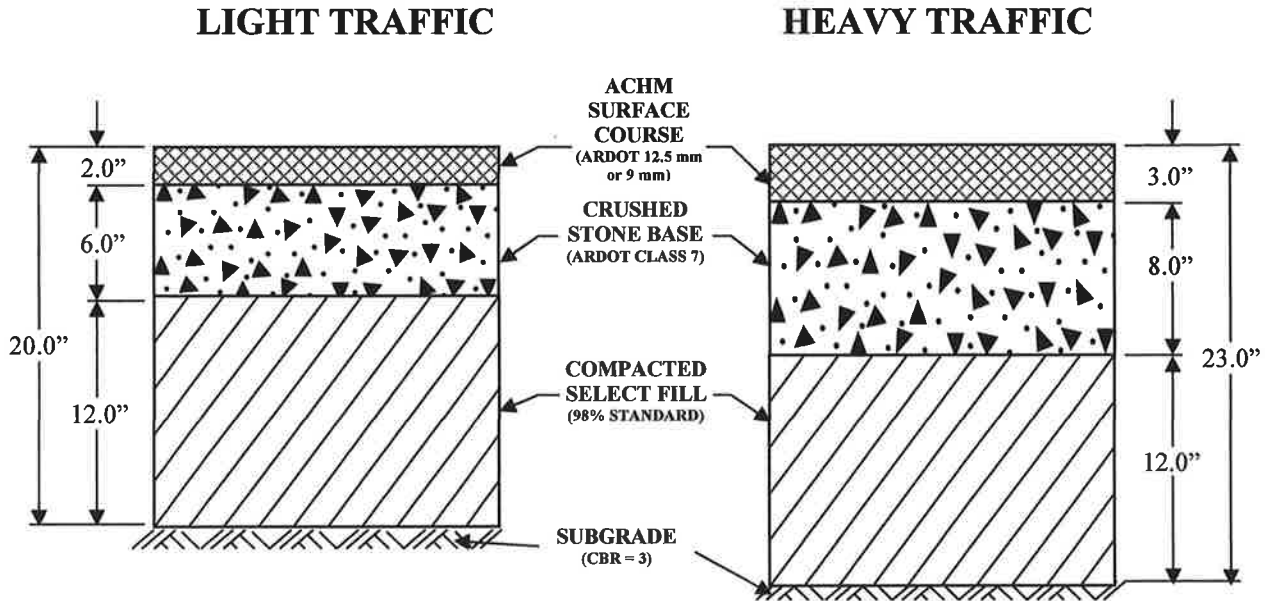
$1.25 Q_u$ = Soil Strength parameter (ksf)

$0.125 D_f$ = Depth factor (ksf)

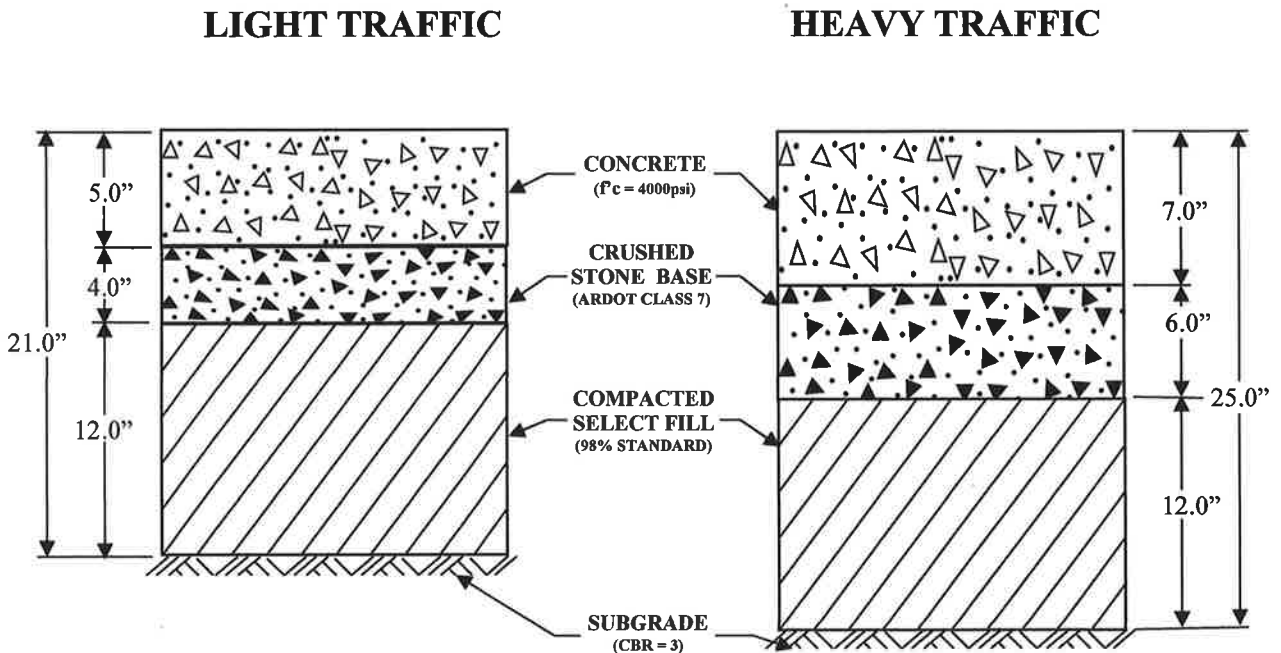
Q_a = Allowable bearing capacity = $(1.25 Q_u + 0.125 D_f) \div \text{Safety Factor}$ (ksf)

EXPLANATION OF BEARING CAPACITY CALCULATIONS

RECOMMENDED FLEXIBLE PAVEMENT STRUCTURE



RECOMMENDED RIGID PAVEMENT STRUCTURE



APPENDIX B
SUPPORTING LABORATORY DATA

**MOISTURE CONTENT DETERMINATION
ASTM D 2216**

Project: PARK PROJECT

Project No.: 16244

Location: WEST MEMPHIS, ARKANSAS

Date: 08/02/19

MOISTURE CONTENT

Sample Number	B1;P1	B1;S2	B1;P3	B1;P5	B1;P7	B2;P2	B2;P4
Tare Number	B11	F14	E20	F14	AW	BC162	FM
Tare + Wet Soil (g)	155.20	140.12	136.03	145.81	165.23	146.32	143.43
Tare + Dry Soil (g)	129.43	107.95	100.19	113.17	130.04	107.98	108.54
Tare (g)	10.32	10.97	11.18	10.99	10.93	9.76	11.81
Water (g)	25.77	32.17	35.84	32.64	35.19	38.34	34.89
Dry Soil (g)	119.11	96.98	89.01	102.18	119.11	98.22	96.73
Water Content (%)	21.64	33.17	40.27	31.94	29.54	39.03	36.07

MOISTURE CONTENT

Sample Number	B3;P1	B3;P3	B4;S2	B4;P4	B5;P2	B6;P1	B6;P2
Tare Number	E	A	109	III	F80	F1	G1
Tare + Wet Soil (g)	128.24	167.00	147.36	151.74	147.43	149.62	162.46
Tare + Dry Soil (g)	105.47	134.00	119.70	124.01	120.69	123.97	134.10
Tare (g)	11.00	11.79	11.19	11.75	11.51	11.05	11.54
Water (g)	22.77	33.00	27.66	27.73	26.74	25.65	28.36
Dry Soil (g)	94.47	122.21	108.51	112.26	109.18	112.92	122.56
Water Content (%)	24.10	27.00	25.49	24.70	24.49	22.72	23.14

MOISTURE CONTENT

Sample Number	B6;P3	B7;P1	B8;S2	B8;P3	B8;P5
Tare Number	E140	MS-2	C	E21	E18
Tare + Wet Soil (g)	167.24	149.70	134.80	153.25	183.07
Tare + Dry Soil (g)	138.95	120.79	109.03	115.08	141.62
Tare (g)	11.06	9.68	11.62	11.59	11.17
Water (g)	28.29	28.91	25.77	38.17	41.45
Dry Soil (g)	127.89	111.11	97.41	103.49	130.45
Water Content (%)	22.12	26.02	26.46	36.88	31.77

**ATTERBERG LIMIT DETERMINATION
ASTM D 4318**

Project: PARK PROJECT

Project No.: 16244

Location: WEST MEMPHIS, ARKANSAS

Date: 08/06/19

LIQUID LIMIT

Sample Number	B1;P1	B1;S2	B1;P3	B1;P5	B1;P7	B2;P2	B2;P4	
Tare Number	18	AFJ	58	XA		63	34	
Number of Blows	21	29	28	23	NON - PLASTIC	21	22	
Tare + Wet Soil (g)	23.86	23.32	26.55	24.60		18.84	25.12	
Tare + Dry Soil (g)	18.41	15.77	18.11	20.22		13.6	20.43	
Tare (g)	8.17	6.81	8.20	8.00		8.25	7.96	
Water (g)	5.45	7.55	8.44	4.38		5.24	4.69	
Dry Soil (g)	10.24	8.96	9.91	12.22		5.35	12.47	
Water Content (%)	53.22	84.26	85.17	35.84		97.94	37.61	
Liquid Limit	52	86	86	35		NP	96	37

PLASTIC LIMIT

Sample Number	B1;P1	B1;S2	B1;P3	B1;P5	B1;P7	B2;P2	B2;P4	
Tare Number	LP	E9	69	77		KNL	27	
Tare + Wet Soil (g)	20.21	17.70	18.62	27.27	NON - PLASTIC	15.72	18.22	
Tare + Dry Soil (g)	17.75	15.99	16.34	23.62		14.08	16.35	
Tare (g)	8.04	9.80	7.65	8.34		8.74	8.08	
Water (g)	2.46	1.71	2.28	3.65		1.64	1.87	
Dry Soil (g)	9.71	6.19	8.69	15.28		5.34	8.27	
Water Content (%)	25.33	27.63	26.24	23.89		30.71	22.61	
Plastic Limit	25	28	26	24		31	23	
Plasticity Index	27	58	60	11		65	14	
Classification (#40)	CH	CH	CH	CL		NP	CH	CL

LIQUID LIMIT

Sample Number	B3;P1	B3;P3	B4;S2	B4;P4	B5;P2	B6;P1	B6;P2
Tare Number	74	41	D2	JAF	48	55	25
Number of Blows	26	25	22	25	22	27	27
Tare + Wet Soil (g)	27.31	24.92	28.01	26.92	27.04	23.34	22.64
Tare + Dry Soil (g)	20.37	18.37	21.46	21.93	21.51	17.68	18.13
Tare (g)	8.00	8.10	9.96	8.13	8.02	7.55	8.22
Water (g)	6.94	6.55	6.55	4.99	5.53	5.66	8.22
Dry Soil (g)	12.37	10.27	11.50	13.80	13.49	10.13	9.91
Water Content (%)	56.10	63.78	56.96	36.16	40.99	55.87	82.95
Liquid Limit	56	64	56	36	40	56	84

PLASTIC LIMIT

Sample Number	B3;P1	B3;P3	B4;S2	B4;P4	B5;P2	B6;P1	B6;P2
Tare Number	155	42X	F28	X107	GI	008	101
Tare + Wet Soil (g)	18.02	17.33	18.52	20.08	15.38	17.01	17.63
Tare + Dry Soil (g)	16.18	15.36	17.03	18.08	14.34	15.25	16.22
Tare (g)	8.17	6.80	10.05	7.96	7.77	8.09	7.93
Water (g)	1.84	1.97	1.49	2.00	1.04	1.76	1.41
Dry Soil (g)	8.01	8.56	6.98	10.12	6.57	7.16	8.29
Water Content (%)	22.97	23.01	21.35	19.76	15.83	24.58	17.01
Plastic Limit	23	23	21	20	16	25	17
Plasticity Index	33	41	35	16	24	31	67
Classification (#40)	CH	CH	CH	CL	CL	CH	CH

**ATTERBERG LIMIT DETERMINATION
ASTM D 4318**

Project: PARK PROJECT

Project No.: 16244

Location: WEST MEMPHIS, ARKANSAS

Date: 08/06/19

LIQUID LIMIT

Sample Number	B6;P3	B7;P1	B8;S2	B8;P3	B8;P5
Tare Number		44	E6	11A	FAJ
Number of Blows		25	28	28	22
Tare + Wet Soil (g)		29.14	27.68	23.81	26.15
Tare + Dry Soil (g)		22.3	22.34	17.47	18.94
Tare (g)		8.09	9.79	8.12	8.18
Water (g)		6.84	5.34	6.34	7.21
Dry Soil (g)		14.21	12.55	9.35	10.76
Water Content (%)		48.14	42.55	67.81	67.01
Liquid Limit	NP	48	43	69	66

PLASTIC LIMIT

Sample Number	B6;P3	B7;P1	B8;S2	B8;P3	B8;P5
Tare Number		911	E3	19	23
Tare + Wet Soil (g)		14.78	21.82	16.46	17.28
Tare + Dry Soil (g)		13.44	20.02	14.76	15.59
Tare (g)		6.83	9.80	8.08	7.63
Water (g)		1.34	1.80	1.70	1.69
Dry Soil (g)		6.61	10.22	6.68	7.96
Water Content (%)		20.27	17.61	25.45	21.23
Plastic Limit		20	18	25	21
Plasticity Index		28	25	44	45
Classification (#40)	NP	CL	CL	CH	CH

MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B1;P1	Sample Depth:	0'-1.5'
Soil Description:	GRAY & BROWN CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	26.5	26.5	10.6	89.4
PAN	223.9	250.4	100.0	0.0
Percent Sample Gravel/Sand:	10.6			Sample Weight: 250.4
Percent Sample Silt/Clay:	89.4			Washing Loss: 223.9g

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/06/19
Sample No.:	B1;P3	Sample Depth:	5'-6.5'
Soil Description:	GRAY & BROWN CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	20.2	20.2	6.5	93.5
PAN	289.7	309.9	100.0	0.0
Percent Sample Gravel/Sand:	6.5			Sample Weight: 309.9
Percent Sample Silt/Clay:	93.5			Washing Loss: 289.7g

MECHANICAL GRAIN SIZE ANALYSES ASTM D 1140

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B1;P5	Sample Depth:	7.5'-9'
Soil Description:	GRAY CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	6.8	6.8	2.2	97.8
PAN	300.6	307.4	100.0	0.0
Percent Sample Gravel/Sand:		2.2	Sample Weight: 307.4	
Percent Sample Silt/Clay:		97.8	Washing Loss: 300.6g	

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/06/19
Sample No.:	B1;P7	Sample Depth:	15'-16.5'
Soil Description:	GRAY SILT		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	46.6	46.6	9.4	90.6
PAN	449.1	495.7	100.0	0.0
Percent Sample Gravel/Sand:		9.4	Sample Weight: 495.7	
Percent Sample Silt/Clay:		90.6	Washing Loss: 449.1g	

MECHANICAL GRAIN SIZE ANALYSES ASTM D 1140

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B2;P2	Sample Depth:	2.5'-4'
Soil Description:	GRAY & BROWN CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	3.5	3.5	1.4	98.6
PAN	255.3	258.8	100.0	0.0
Percent Sample Gravel/Sand:		1.4	Sample Weight: 258.8	
Percent Sample Silt/Clay:		98.6	Washing Loss: 255.3g	

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/06/19
Sample No.:	B2;P4	Sample Depth:	7.5'-9'
Soil Description:	GRAY CLAYEY SAND		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	185.9	185.9	50.5	49.5
PAN	182.4	368.3	100.0	0.0
Percent Sample Gravel/Sand:		50.5	Sample Weight: 368.3	
Percent Sample Silt/Clay:		49.5	Washing Loss: 182.4g	

**MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140**

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/08/19
Sample No.:	B3;P1	Sample Depth:	0'-1.5'
Soil Description:	GRAY & BROWN CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	21.7	21.7	9.1	90.9
PAN	216.0	237.7	100.0	0.0

Percent Sample Gravel/Sand:	9.1	Sample Weight:	237.7
Percent Sample Silt/Clay:	90.9	Washing Loss:	216.0g

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/06/19
Sample No.:	B3;P3	Sample Depth:	5'-6.5'
Soil Description:	GRAY CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	32.3	32.3	11.5	88.5
PAN	249.0	281.3	100.0	0.0

Percent Sample Gravel/Sand:	11.5	Sample Weight:	281.3
Percent Sample Silt/Clay:	88.5	Washing Loss:	249.0g

**MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140**

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/06/19
Sample No.:	B3;P6	Sample Depth:	15'-16.5'
Soil Description:	BROWNISH GRAY SILTY SAND		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	321.0	321.0	66.1	33.9
PAN	164.5	485.5	100.0	0.0
Percent Sample Gravel/Sand:	66.1			Sample Weight: 485.5
Percent Sample Silt/Clay:	33.9			Washing Loss: 164.5g

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B4;P4	Sample Depth:	5'-6.5'
Soil Description:	GRAY CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	40.3	40.3	12.8	87.2
PAN	274.5	314.8	100.0	0.0
Percent Sample Gravel/Sand:	12.8			Sample Weight: 314.8
Percent Sample Silt/Clay:	87.2			Washing Loss: 274.5g

MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/06/19
Sample No.:	B4;P8	Sample Depth:	20'-21.5'
Soil Description:	GRAY SILTY SAND		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	364.7	364.7	83.5	16.5
PAN	72.2	436.9	100.0	0.0
Percent Sample Gravel/Sand:	83.5		Sample Weight:	436.9
Percent Sample Silt/Clay:	16.5		Washing Loss:	72.2g

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B5;P2	Sample Depth:	2.5'-4'
Soil Description:	GRAY & REDDISH BROWN CLAY W/ SAND		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	74.2	74.2	17.2	82.8
PAN	357.1	431.3	100.0	0.0
Percent Sample Gravel/Sand:	17.2		Sample Weight:	431.3
Percent Sample Silt/Clay:	82.8		Washing Loss:	357.1g

MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140

Project: PARK PROJECT **Project No.:** 16244
Location: WEST MEMPHIS, ARKANSAS **Date:** 08/06/19
Sample No.: B5;P4 **Sample Depth:** 7.5'-9'
Soil Description: BROWNISH GRAY SILT

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	9.6	9.6	2.6	97.4
PAN	355.2	364.8	100.0	0.0
Percent Sample Gravel/Sand:	2.6		Sample Weight:	364.8
Percent Sample Silt/Clay:	97.4		Washing Loss:	355.2g

Project: PARK PROJECT **Project No.:** 16244
Location: WEST MEMPHIS, ARKANSAS **Date:** 08/08/19
Sample No.: B6;P1 **Sample Depth:** 0'-1.5'
Soil Description: GRAY & BROWN CLAY W/ SAND

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	68.7	68.7	22.2	77.8
PAN	241.2	309.9	100.0	0.0
Percent Sample Gravel/Sand:	22.2		Sample Weight:	309.9
Percent Sample Silt/Clay:	77.8		Washing Loss:	241.2g

MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/08/19
Sample No.:	B6;P2	Sample Depth:	2.5'-4'
Soil Description:	GRAY & BROWN CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	33.9	33.9	9.2	90.8
PAN	334.9	368.8	100.0	0.0

Percent Sample Gravel/Sand:	9.2	Sample Weight:	368.8
Percent Sample Silt/Clay:	90.8	Washing Loss:	334.9g

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/08/19
Sample No.:	B6;P3	Sample Depth:	5'-6.5'
Soil Description:	BROWNISH GRAY SANDY SILT		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	190.1	190.1	47.2	52.8
PAN	212.8	402.9	100.0	0.0

Percent Sample Gravel/Sand:	47.2	Sample Weight:	402.9
Percent Sample Silt/Clay:	52.8	Washing Loss:	212.8g

MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B7;P1	Sample Depth:	0'-1.5'
Soil Description:	GRAY & BROWN CLAY W/ SAND		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	45.6	45.6	17.9	82.1
PAN	208.9	254.5	100.0	0.0
Percent Sample Gravel/Sand:	17.9		Sample Weight:	254.5
Percent Sample Silt/Clay:	82.1		Washing Loss:	208.9g

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B8;P3	Sample Depth:	5'-6.5'
Soil Description:	GRAY & BROWN CLAY		

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	14.6	14.6	4.1	95.9
PAN	340.9	355.5	100.0	0.0
Percent Sample Gravel/Sand:	4.1		Sample Weight:	355.5
Percent Sample Silt/Clay:	95.9		Washing Loss:	340.9g

MECHANICAL GRAIN SIZE ANALYSES
ASTM D 1140

Project: PARK PROJECT **Project No.:** 16244
Location: WEST MEMPHIS, ARKANSAS **Date:** 08/08/19
Sample No.: B8;P5 **Sample Depth:** 7.5'-9'
Soil Description: GRAY & BROWN CLAY

Sieve or Screen	Weight Retained (grams)	Cumulative Weight Retained (grams)	Percent Retained	Percent Passing
#200	14.9	14.9	2.8	97.2
PAN	510.2	525.1	100.0	0.0

Percent Sample Gravel/Sand: 2.8 **Sample Weight:** 525.1
Percent Sample Silt/Clay: 97.2 **Washing Loss:** 510.2g

SHRINKAGE / SWELL INDEX TESTS

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B4;S2	Sample Depth:	2'-3'
Soil Description:	GRAY & BROWN CLAY	K PRC:	2.0

Liquid Limit:	56	Est. Specific Gravity:	2.69
Plastic Limit:	21	No. of Layers:	1
Plasticity Index:	35	No. Blows/Layer:	0

WATER CONTENT

	Before Test		After Test
Tare Number	109	Tare Number	BC164
Tare + Wet Soil	147.4 g	Tare + Wet Soil	141.0 g
Tare + Dry Soil	119.7 g	Tare + Dry Soil	115.6 g
Tare	11.2 g	Tare	21.6 g
Water Content	25.5 %	Water Content	27.1 %
Saturation	100.0 %	Saturation	100.0 %
Dry Density	101.5 pcf	Dry Density	101.4 pcf

VOID RATIO DETERMINATION

Vo	57.854 ccm	Vf	57.854 ccm
Wt of Soil + Ring	356.1 g	Wt of Soil + Ring	357.4 g
Wt of Ring	237.9 g	Wt of Ring	237.9 g
Moist Wt of Soil	118.2 g	Moist Wt fo Soil	119.5 g
Vs	35.009 ccm	Vs	35.009 ccm
Eo	0.6525	Ef	0.6525

SWELL DATA

Time	Dial (* 0.0001)	Pressure	Void Ratio
7.37	0.00	0.0	0.7367
8.00	2.00	277.2	0.7373
8.37	4.00	554.4	0.7378
10.20	5.00	693.0	0.7381
12.00	6.00	831.6	0.7384
13.08	7.00	970.2	0.7387
13.50	7.00	970.2	0.7387

Final Dial Reading: 7.00

Swell Pressure: **970 PSF**

Heave = 0.112 % = 0.0134 inches/foot

SHRINKAGE DATA

Linear Shrinkage (Bar Method):

Linear Shrinkage: **10.2 %**

Volumetric Shrinkage: **27.6 %**

SHRINKAGE / SWELL INDEX TESTS

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B1;S2	Sample Depth:	2'-3'
Soil Description:	GRAY & BROWN CLAY	K PRC:	2.0

Liquid Limit:	86	Est. Specific Gravity:	2.71
Plastic Limit:	28	No. of Layers:	1
Plasticity Index:	58	No. Blows/Layer:	0

WATER CONTENT

	Before Test		After Test
Tare Number	F14	Tare Number	BT-5
Tare + Wet Soil	140.1 g	Tare + Wet Soil	163.7 g
Tare + Dry Soil	108.0 g	Tare + Dry Soil	134.6 g
Tare	11.0 g	Tare	49.8 g
Water Content	33.2 %	Water Content	34.3 %
Saturation	100.0 %	Saturation	100.0 %
Dry Density	91.4 pcf	Dry Density	91.4 pcf

VOID RATIO DETERMINATION

Vo	57.912 ccm	Vf	57.912 ccm
Wt of Soil + Ring	346.4 g	Wt of Soil + Ring	347.4 g
Wt of Ring	233.4 g	Wt of Ring	233.4 g
Moist Wt of Soil	113.0 g	Moist Wt fo Soil	113.9 g
Vs	31.303 ccm	Vs	31.303 ccm
Eo	0.8501	Ef	0.8501

SWELL DATA

Time	Dial (* 0.0001)	Pressure	Void Ratio
12.00	0.00	0.0	0.9424
12.17	2.00	277.2	0.9430
12.35	5.00	693.0	0.9439
13.08	9.00	1247.4	0.9452
13.50	11.00	1524.6	0.9458
14.55	13.00	1801.8	0.9464

Final Dial Reading: 13.00

Swell Pressure: **1,802 PSF**

Heave = 0.208 % = 0.0250 inches/foot

SHRINKAGE DATA

Linear Shrinkage (Bar Method):

Linear Shrinkage:	12.2 %
Volumetric Shrinkage:	32.3 %

SHRINKAGE / SWELL INDEX TESTS

Project:	PARK PROJECT	Project No.:	16244
Location:	WEST MEMPHIS, ARKANSAS	Date:	08/07/19
Sample No.:	B8;S2	Sample Depth:	2'-3'
Soil Description:	GRAY & BROWN CLAY	K PRC:	2.0

Liquid Limit:	43	Est. Specific Gravity:	2.67
Plastic Limit:	18	No. of Layers:	1
Plasticity Index:	25	No. Blows/Layer:	0

WATER CONTENT

	Before Test		After Test
Tare Number	C	Tare Number	BC-165
Tare + Wet Soil	134.8 g	Tare + Wet Soil	135.7 g
Tare + Dry Soil	109.0 g	Tare + Dry Soil	111.8 g
Tare	11.6 g	Tare	22.2 g
Water Content	26.5 %	Water Content	26.6 %
Saturation	96.6 %	Saturation	97.2 %
Dry Density	96.2 pcf	Dry Density	96.2 pcf

VOID RATIO DETERMINATION

Vo	57.786 ccm	Vf	57.786 ccm
Wt of Soil + Ring	346.1 g	Wt of Soil + Ring	346.3 g
Wt of Ring	233.4 g	Wt of Ring	233.4 g
Moist Wt of Soil	112.7 g	Moist Wt fo Soil	112.9 g
Vs	33.373 ccm	Vs	33.373 ccm
Eo	0.7315	Ef	0.7315

SWELL DATA

Time	Dial (* 0.0001)	Pressure	Void Ratio
7.13	0.00	0.0	0.8219
8.00	0.00	0.0	0.8219
8.37	0.00	0.0	0.8219
10.20	0.00	0.0	0.8219
12.00	0.00	0.0	0.8219

Final Dial Reading: 0.00

Swell Pressure: **0 PSF**

Heave = 0.000 % = 0.0000 inches/foot

SHRINKAGE DATA

Linear Shrinkage (Bar Method):

Linear Shrinkage: **8.2 %**

Volumetric Shrinkage: **22.6 %**

FRISCO PARK

PROJECT MANUAL

FRISCO PARK
418 S. AVALON ST.
WEST MEMPHIS, ARKANSAS 72301

DATE: 11/20//2018 – PERMIT SET

ARCHITECT'S PROJECT NO: 597



OWNER

WEST MEMPHIS PARTNERS II, L.P.
THE PARK AT BARTON, LLC, GENERAL PARTNER
124 ONE MADISON PLAZA, SUITE 1500
MADISON, MISSISSIPPI 39110

CONTRACTOR

UNICORP, LLC
124 ONE MADISON PLAZA, SUITE 1500
MADISON, MISSISSIPPI 39110

OWNER'S GEOTECHNICAL ENGINEER

ANDERSON ENGINEERING CONSULTANTS, INC.
10205 W ROCKWOOD ROAD
LITTLE ROCK, AR 72204

OWNER'S CIVIL ENGINEER

MCMASTER & ASSOCIATES, INC.
212 WATERFORD SQUARE, SUITE 300
MADISON, MS 39110

OWNER'S SURVEYOR

MCMASTER & ASSOCIATES, INC.
212 WATERFORD SQUARE, SUITE 300
MADISON, MS 39110

ARCHITECT

HERRINGTON ARCHITECTS PC
101 RICHARD ARRINGTON JR. BLVD. S.
BIRMINGHAM, ALABAMA 35233

STRUCTURAL ENGINEER

STRUCTURAL DESIGN GROUP, INC.
700 CENTURY PARK SOUTH, STE 114
BIRMINGHAM, ALABAMA 35226

MECHANICAL/PLUMBING ENGINEER

ENGINEERING DESIGN TECHNOLOGIES, INC.
215 19TH STREET NORTH, SUITE 201
BIRMINGHAM, AL 35203

ELECTRICAL ENGINEER

CONSULTING CONSTRUCTION ENGINEERING INC
2320 HIGHLAND AVENUE, SO., STE 150
BIRMINGHAM, AL 35205

**FRISCO PARK
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REFERENCE INFORMATION

GEOTECHNICAL REPORT – THIS REPORT, DATED AUGUST 13, 2019, IS FOR REFERENCE ONLY.
THIS REPORT IS NOT PART OF THE CONTRACT DOCUMENTS AND IS INCLUDED IN THIS PROJECT
MANUAL FOR CONVENIENCE ONLY.

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FRISCO PARK

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21 0518	ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
21 0533	HEAT TRACING FOR FIRE-SUPPRESSION PIPING
21 0700	FIRE-SUPPRESSION SYSTEMS INSULATION
21 1313	WET-PIPE SPRINKLER SYSTEMS

DIVISION 22 PLUMBING (from EDT)

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22 0523	GENERAL-DUTY VALVES FOR PLUMBING PIPING
22 0533	HEAT TRACING FOR PLUMBING PIPING
22 0719	PLUMBING PIPING INSULATION
22 1116	DOMESTIC WATER PIPING
22 1119	DOMESTIC WATER PIPING SPECIALTIES
22 1316	SANITARY WASTE AND VENT PIPING
22 3300	ELECTRIC, DOMESTIC-WATER HEATERS
22 4100	RESIDENTIAL PLUMBING FIXTURES
22 4216.16	COMMERCIAL SINKS
22 4716	PRESSURE WATER COOLERS

DIVISION 23 MECHANICAL (from EDT)

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23 0518	ESCUTCHEONS FOR HVAC PIPING

FRISCO PARK

23 0593	TESTING, ADJUSTING, AND BALANCING FOR HVAC
23 0713	DUCT INSULATION
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23 3113	METAL DUCTS
23 3300	AIR DUCT ACCESSORIES
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SECTION 017123
FIELD ENGINEERING

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The Contractor shall provide and pay for field engineering services for:
 - 1. Survey work required in execution of work.
 - 2. Civil, structural, or other professional engineering services specified or required to execute the Contractor's construction method.
- B. The method of field staking for the construction of the work shall be at the option of the Contractor. The Owner shall provide the engineering surveys to establish reference points which in his judgment are necessary to enable the Contractor to proceed with his work.
- C. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal control shall be the responsibility of the Contractor.
- D. The Contractor shall be held responsible for the preservation of all stakes and marks. If any stakes or marks are carelessly or willfully disturbed by the Contractor, the Contractor shall not proceed with any work until he has reestablished such points, marks, lines and elevations as may be necessary for the prosecution of the work.
- E. The Contractor shall retain the services of a competent surveyor, registered in the State of Arkansas, to layout the work and maintain a survey during construction. The Contractor shall be solely responsible for proper location of the work.

1.2 SURVEY REFERENCE POINTS

Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.

- 1. Make no changes or relocations without prior written notice to the Engineer.
- 2. Report to the Engineer when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

1.3 PROJECT SURVEY REQUIREMENTS

- A. Establish temporary bench marks as needed, referenced to data established by survey control points. Record locations, with horizontal and vertical data, on Record Drawings.
- B. Establish lines and levels, and locate and layout, by instrumentation and similar appropriate means:
 - 1. Site improvements, including utility slopes and invert elevations.
 - 2. Batter boards for structures
- C. From time to time, verify layouts by same methods.
- D. Establish all lines and grades prior to construction of site improvements.

1.4 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.

1.5 SUBMITTALS

- A. On request of the Engineer, submit documentation of verified accuracy of field engineering work.
- B. Submit Drawings showing locations and elevations of all pipes and structures constructed. This Drawing shall be included with the Record Drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 017423

CLEANING

PART 1-GENERAL

1.1 REQUIREMENTS INCLUDED

Cleaning shall include daily "policing" of the work and surrounding areas to clear general debris waste paper, wood scraps, broken concrete, loose riprap, and other objectionable material along with the final cleanup of the site required for project acceptance.

1.2 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2- PRODUCTS (NOT USED)

PART 3-EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the Work, the site and adjacent properties, free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.2 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove all loose asphalt milling, asphalt spoils, excavation spoils, etc. from project limits.
- C. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- D. Clean debris from storm drainage pipes and inlets.
- E. Prior to final completion or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire Work is clean.

END OF SECTION

SECTION 024100

SELECTIVE SITE DEMOLITION

PART 1 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

1.01 SCOPE

- A. Removal of Structures and obstructions shall consist of the removal and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipe lines, trees and vegetation, and other obstructions which are not designated or permitted to remain, except for the obstructions to be removed and disposed of as directed. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes and pits.

PART 2 CONSTRUCTION REQUIREMENTS

2.01 GENERAL

- A. The Contractor shall remove and dispose of all buildings and foundations, structures, fences, old pavement, and other obstructions, any portions of which are within the construction limits. All designated salvageable material shall remain the property of the Owner and shall be removed, without unnecessary damage, in sections or pieces which may be readily transported and shall be stacked at specified storage areas by the Contractor within the project's limits or hauled to a designated maintenance storage yard and stacked. All materials designated not to be salvaged shall be destroyed or disposed of off the project. Basements or cavities left by structure removal shall be filled to the level of the surrounding ground and, if within the prism of construction, shall be compacted to the density of the surrounding ground.

All materials specified for salvage shall be removed, without unnecessary damage, in sections or pieces which may be readily transported and shall be stacked or stored by the Contractor at such places as may be designated within the project's limits, unless other locations are specified in the Contract.

2.02 REMOVAL OF BRIDGES, CULVERTS AND OTHER DRAINAGE STRUCTURES

- A. Bridges, culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic. Unless otherwise directed, the substructures of existing structures shall be removed to the natural stream bottom and those parts outside of the stream shall be removed one foot (1') below natural ground surface. Where such portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.

As specified, steel bridges and wood bridges shall be carefully dismantled without unnecessary damage. The dismantling shall include the stripping of all hardware and the removal of all nails. Steel members shall be match marked before dismantling unless otherwise indicated. All salvaged material shall be stored or removed as specified in Section 2-01.

If permitted, blasting or other operations necessary for the removal of an existing structure or obstruction which may damage new construction shall be completed prior to placing the new work.

Removed concrete shall be disposed of by the Contractor off the project.

2.03 REMOVAL OF PIPE

- A. All culvert pipe designated to be salvaged or relaid shall be carefully removed and every reasonable precaution taken to avoid breaking or damaging. Pipes designated to be relaid shall be removed, handled, and stored when necessary so that there will be no loss or damage

before relaying. The Contractor shall replace without extra compensation all sections lost from storage or damaged by negligence or improper methods to the extent its reuse is deemed by the Engineer to be unsatisfactory. Pipes not designated to be salvaged or relaid shall be disposed of by the Contractor offsite.

2.04 REMOVAL OF PAVEMENT, SIDEWALK, CURBS, ETC.

- A. When required on the plans or in the proposal, concrete and asphalt pavement, sidewalks, curbs, gutter, etc. shall be disposed of by the Contractor without regard to size of pieces, offsite.

2.05 MAINTENANCE OF TRAFFIC

- A. The Contractor shall maintain local access to all properties fronting along the project for the duration of the work.

END OF SECTION

SECTION 311100

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This item shall consist of the removal and satisfactory disposal of trees, **except those that may be designated to remain in place**, stumps, logs, snags, brush, weeds and other perishable or objectionable material within the limits of project site or along the length of the project as designated.
- B. When specified on the Bid Form as lump sum, this item shall include costs for incidental work required on other non-related items specifically detailed on the Plans but not listed separately on the Bid Form, which is subsidiary to the completion of that item of work in accordance with the Contract Documents.
- C. This work shall include stripping and stockpiling of topsoil, stump removal, felling of trees, clearing of brush and other operations as may be detailed herein or indicated on the Plans.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials cleared from this site, including merchantable timber, if any, shall become the property of the CONTRACTOR for his disposal unless otherwise noted elsewhere in the Specifications.
- B. The CONTRACTOR shall provide equipment of whatever nature is needed to complete the work to the satisfaction of the ENGINEER. Equipment deemed by the ENGINEER to be inadequate for the work must be removed from the site.

PART 3 - EXECUTION

3.01 GENERAL

- A. Clearing and grubbing shall be completed a satisfactory distance in advance of earthwork for site preparation, roadways, pipe laying operations etc. and such operations shall not be started until the cleared and grubbed area has been reviewed by the ENGINEER.
- B. The CONTRACTOR shall be responsible for obtaining permits for hauling, dumping, burning, disposal and other operations, as may be required by Local, State and Federal requirements.

3.02 CLEARING AND GRUBBING

- A. The area within the construction limits of the project site shall be cleared of trees, stumps, roots, logs, vegetation and other objectionable matter. Roots over 1-1/2 inches in diameter shall be grubbed out to a minimum depth of 18 inches below original ground or 12 inches below the proposal finished grade excavation areas. **Where indicated on the Plans or directed by the ENGINEER, trees that are to remain in place within the project limits, shall be protected from damage by other clearing or construction operations.**
- B. Stump holes shall be backfilled and compacted to the density required for subgrades in Section 312000 "Earthwork" where applicable.
- C. When necessary to completely remove grass and small roots from areas to be covered by earth fill, such as roadways, levees, or other site construction, such areas shall be stripped to sufficient depth to remove same, to the extent directed by the ENGINEER.
- D. Felling of trees and other clearing operations shall be conducted in a manner that prevents damage to trees that are to remain and to protect existing improvements, structures, utility lines or other items.
- E. All topsoil within the construction limits shall be stripped, stockpiled in a designated area to be approved by the ENGINEER, and replaced on slopes or as directed by the ENGINEER. Upon completion of grading, the CONTRACTORS shall place a sufficient quantity of topsoil (minimum 6") to insure grass growth on the designated area. Any excess topsoil shall be removed from the project at the CONTRACTOR'S expense.

3.03 DISPOSAL OF MATERIALS

- A. All merchantable timber shall become property of the CONTRACTOR for his disposal unless otherwise noted.
- B. Burying of stumps, trees, logs, snags or other vegetative materials will not be permissible within the project site limits, unless otherwise approved in writing by the ENGINEER.
- C. When permitted by the OWNER, on designated projects, perishable material shall be burned within cleared areas. When on site burning is not permitted, perishable material shall be completely removed from OWNER'S property to disposal areas provided by the CONTRACTOR and approved by the ENGINEER. Piles for burning shall be placed in the center of cleared areas, and shall be limited in size so that no damage to remaining trees or other vegetation will occur. The CONTRACTOR will be responsible for obtaining all permits required and for controlling fires in compliance with all Federal, State, and Local laws and regulations for burning. Sufficient watchmen and fire extinguishers shall be provided for constant care of burning material. The CONTRACTOR shall submit to the ENGINEER for review, his proposed method of burning and appropriate precautions for protection of adjacent areas. The CONTRACTOR shall notify the local firefighter unit in advance of burning operations. The CONTRACTOR shall furnish and maintain adequate firefighting equipment and personnel at the site during burning operations.

CONTRACTOR is responsible for dwellings within adjacent areas. Burning must be permitted by local ordinance and must be conducted at least 500 yards from an occupied dwellings; this restriction may be reduced to 50 yards if ENGINEER approved forced draft air

is provided for combustion. Burning within 500 yards from commercial airport property, private airfields, or marked aircraft approach corridors except when a lesser distance is authorized by airport authority. Burning must not produce a traffic hazard. Starter and auxiliary fuels must not cause excessive visible emissions (rubber tires, etc. are prohibited).

- D. Ashes resulting from burning and incombustible materials such as green roots and debris shall be removed to designated disposal areas provided by the CONTRACTOR and approved by the ENGINEER. Ashes shall not be buried.
- E. Materials which are stripped from the project site which are not suitable for reuse shall be disposed of by the CONTRACTOR at a location provided by him and approved by the ENGINEER.
- F. The cost of hauling, stockpiling and disposal of material shall be included in the Contract Price bid for clearing and grubbing.

END OF SECTION

SECTION 312000

EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This work shall consist of general grading, excavating, filling, spreading, and compacting areas to be filled in accordance with these specifications and in conformity with the lines, grades, slopes, and typical cross sections depicted by the Construction Plans.
- B. This item shall also consist of satisfactory disposing of all unsuitable materials within the construction limits of the project site. The work includes grading and subgrade construction on new roadways, drainage ditches and site work.

1.02 EXAMINATION OF SITE

- A. The CONTRACTOR shall fully familiarize himself of the surrounding area and the conditions of access under which the project is to be completed.
- B. The CONTRACTOR shall visit the site and inform himself fully as to the amount of excavation, filling and grading required under the Contract.

1.03 CLASSIFICATION OF EXCAVATION

- A. All authorized excavation shall be classified as Unclassified Excavation, regardless of the nature or manner of removal, encountered in the work except for those classes of excavation for which separate pay items or designations are provided.
- B. Borrow Excavation will consist of approved material required for the construction of embankments or other portions of the work and shall be obtained from approved sources outside the project right of way. Unless otherwise provided in the contract, the CONTRACTOR shall furnish the required borrow, make arrangements for obtaining borrow, and pay all costs involved.
- C. Structure Excavation will consist of the removal of material necessary for the construction of foundation for box culverts, and box bridges when authorized by the section covering their construction. It shall also include all necessary dewatering operations such as pumping, bailing, drainage, cribbing, or sheeting, other foundation work, and the backfilling and proper disposal of all excavated material as directed.
- D. Channel Excavation will consist of the removal of material necessary for widening or realigning an existing channel or stream. It shall also include all necessary dewatering operations such as pumping, bailing, drainage, cribbing or sheeting, other foundation work, and the backfilling and proper disposal of all excavated material as directed.
- E. Stripping Excavation will consist of the removal of all objectionable rubbish, humus and vegetable matter to a sufficient depth as directed by the Engineer. After inspection

and approval by the Engineer of cleared and grubbed areas, if any, stripping operations may proceed. Stripped materials shall be stockpiled and subsequently used as topsoil

or wasted as specified herein or as directed by the Engineer. Roots and other floatable materials removed by the stripping operations in all areas shall be disposed of by burning or as specified in the Provisions of Section 311100. Stripped materials designated to be wasted shall be hauled to disposal areas furnished by the Owner or shall be disposed of off-site at a site to be furnished by the Contractor. The Plans shall specify any off-site location to be provided by the Owner or if the Contractor must furnish the off-site area.

PART 2 – PRODUCTS

2.01 EQUIPMENT

The CONTRACTOR may use any type of earth moving, compaction and watering equipment that he may desire or has at his disposal, provided the equipment is in satisfactory condition and is of such capacity that the construction schedule can be maintained as planned by the CONTRACTOR and approved the ENGINEER in accordance with the contract time contained in the agreement. The CONTRACTOR shall furnish, operate and maintain such equipment as is necessary to control uniform density, layers of fill and cross sections.

2.02 MATERIALS

- A. Material for fills shall consist of material obtained from the excavation of on site banks; borrow pits or other approved sources. The material used shall be free from vegetable matter and other deleterious substances and shall not contain large rocks or lumps. All suitable on-site materials shall be installed in the fills or embankments behind the curb and all unsuitable material shall be disposed of as directed by the ENGINEER.
- B. Off-site material shall be classified as follows:
 - 1. Borrow Excavation material (CONTRACTOR Furnished) Material used for roadway embankment fills and backfill shall be compacted to a density of at least 98% of maximum laboratory density at moisture contents within 3 percentage points of optimum moisture contents, as determined by ASTM D-698. Borrow material shall be that required by the geotechnical report.

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

- A. All suitable materials excavated in project site construction shall be used prior of placing off-site material in the formation of fills, subgrades and shoulders as shown on the Plans.
- B. Sequence of Operations: No site construction shall be started until

sufficient clearing, grubbing and stripping within construction limits has been completed and accepted to allow earthwork to proceed without interruption.
- C. Foundation Preparation:

1. When clearing and grubbing has been completed, all stump holes remaining in areas to receive fill shall be filled with suitable material and compacted to a density at least that of the surrounding ground.
 2. Prior to placing material on any areas to receive fill, the natural ground shall be proof-rolled in the presence of the Engineer.
- D. Excavation: Excavation shall be performed at all locations indicated on the Plans, to lines, grades and cross sections shown, and shall be made in such a manner that fills can be formed in accordance with the requirements herein. All suitable material encountered within the limits indicated shall be used in the formation of fills. All material not approved for use in fill shall be disposed of offsite at a site to be furnished by the contractor. During the process of excavation, the grade shall be maintained in such condition that the grade will be well drained at all times.
1. Undercutting: When soft or other objectionable or wet material remains after clearing, grubbing and stripping operations, the CONTRACTOR will be required to undercut such material to such depth and extent as directed and backfill with suitable material. Fill material shall be placed in uniform layers and compacted as specified for fills. Undercut objectionable materials will be disposed of offsite at a site to be furnished by the contractor. Undercut depth will be as determined by the ENGINEER and shall be measured from the natural ground or finished subgrade, whichever is lower.
 2. Tolerances: Excavation and grading shall be completed such that the surface of the site shall conform to the lines and grades shown on the plans. The surface shall conform to the specified grades within 0.05 feet. Any deviation shall be corrected by further grading, filling, reshaping and compacting.
 3. Backfill in undercut areas shall be tested as specified in Section 3.03 of this specification. All costs associated with testing backfill for undercut areas shall be absorbed by the CONTRACTOR.
- E. Formation of Fill:
1. Fills for project site shall be constructed to lines, grades, cross sections and dimensions shown on the Plans.
 2. Earthfills shall be formed by distributing the materials in successive uniform horizontal layers not to exceed nine (9) inches in thickness, loose depth, for full width of the cross sections. Each layer of fill shall be compacted to a density of at least 98% of maximum laboratory density, as determined by ASTM D-698, within building limits at moisture contents within 3 percentage points of optimum and 98% of maximum laboratory density for roadways & parking areas as determined by ASTM D-698.

3. The upper surface of the fill shall be shaped so as to provide complete drainage of surface water at all times. The forming of ruts will not be permitted.
 4. Each layer of earthfill shall be compacted as required with appropriate equipment and in such a manner as to avoid laminating of individual lifts. Fill material which does not contain sufficient moisture shall be watered as needed before being rolled. The furnishing and application of water for construction of fills will not be paid for separately; such operations shall be considered as incidental in formation of fills.
 5. Construction operations shall be performed in such manner that the simultaneous rolling and placing of material in the same lane or section will not occur. To avoid uneven compaction, the hauling equipment shall traverse, as much as possible, the full width of the cross section. Each layer shall be compacted as required before material for the next layer is deposited. Load and speed restrictions shall comply with Section S-105.13 of MHS D State Aid Standard Specifications, latest edition.
 6. Fills constructed with on-site material will be considered as Unclassified Excavation, and shall not be measured separately for payment unless otherwise noted in the construction plans.
- F. Subgrades: All subgrades shall be graded to lines, grades and cross sections indicated. In cut sections where the earth is consolidated, the surface of the roadways shall be scarified to a depth of 9 inches before beginning compaction operations. All fill areas within building limits shall be compacted to a density at least 98% of maximum density as determined by ASTM D-698 (98% of maximum density for fill areas outside of building limits). In the area to be under paving, the top of the subgrade shall be of such smoothness that when tested with a 16 foot straightedge applied parallel and at the right angles to the centerline, the surface shall not be more than 0.04 feet from true grade. Any deviation in excess of these amounts shall be corrected by loosening, adding or removing materials, reshaping and recompacting by sprinkling and rolling.
1. Subgrades shall not be compacted until all utility lines within the roadways are in place. When utility lines are completed, the subgrades shall be regarded and compacted at no additional cost.
 2. At all times, the top of the subgrade shall be maintained in such condition that the surface will drain readily. In no case will vehicles be allowed to travel in a single track. If ruts are formed, the subgrade shall be reshaped and rolled.
- G. Ditch Excavation and Grading: Ditch excavation shall be performed in proper sequence with other construction. All satisfactory materials shall be placed in fills as needed. Unsatisfactory material shall be wasted in disposal areas. Ditches shall be graded to drain and shall not contain low spots which would hold water. Ditches and slopes shall be dressed to a tolerance of plus or minus 0.1 feet from indicated grade.
- H. Fine grading, shaping, and finishing: This work shall consist of

grading and finishing areas of the site and roadway where, in general, the elevation of the existing ground surface or roadbed is practically parallel with the proposed grade line. This work shall include backfilling, grading, shaping and finishing areas behind the curb and gutter to conform to the lines subgrades shown on the plans.

3.02 SEASONAL AND WEATHER LIMITS

No fill material shall be placed, spread or rolled while the ground or fill is frozen or thawing or during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until the moisture content and density of the fill are as previously specified.

3.03 TESTING

- A. CONTRACTOR shall be responsible for determining that any material utilized in fills meets project requirements and shall provide Standard Proctor density tests for on site and off site materials utilized in fills, foundations or bases. Proctors shall be run frequently as necessary to assure consistency of material and wherever changes in material are encountered.
- B. Density tests shall be performed at the following intervals:
 - 1. Subgrade Fills: For areas beneath future building locations, a minimum of one test per lift for each 2500 square feet of surface area shall be required. For areas not beneath future not beneath future building locations, a minimum of one test per lift for each 5000 square feet of surface area shall be required.
 - 2. All phases of testing shall be performed by a certified testing laboratory, which shall submit all test results to the ENGINEER for review. These phases of testing include, but are not limited to, sampling, transporting, and testing of materials. Testing shall be performed according to Section S-105-Control of Work and Section S-106-Control of Materials of the Mississippi Standard Specifications for State Aid Road and Bridge Construction, Latest Edition. Test reports must be submitted to the ENGINEER for review prior to approval of pay request. There will be no separate pay item for testing; all associated costs will be absorbed by the CONTRACTOR.

END OF SECTION

SECTION 312313

SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 SCOPE OF WORK: Subgrade preparation shall consist of the preparation of natural or excavated areas prior to the placement of subbase, base or pavement materials, or prior to the construction of curb and gutter sections. Subgrade preparation shall include scarifying, windowing, spreading, watering, drying, compacting and maintaining the top surface of a roadbed upon which the pavement structure and shoulder are constructed.

PART 2 - MATERIALS

Part 2 is omitted from this Section.

PART 3 - CONSTRUCTION REQUIREMENTS

3.01 GRADING: Subgrade upon which pavement, sidewalk, curb and gutter, driveways or other structures are to be directly placed shall be in close conformity with the specified grade and cross-section. Subgrade upon which subbase or base material is to be placed shall not vary more than one-half inch (1/2") from the specified grade and cross-section. Variations within the above specified tolerances shall be compensated so that the average grade and cross-section specified are met.

Areas where "grade only" is called for on the Plans shall be constructed to a straight grade from the finished pavement elevations shown on the Plans to the elevation of the existing ground at the extremities of the area to be graded.

3.02 COMPACTION: When pavement, base or subbase material or curb and gutter are to be placed directly on the subgrade, the top six inches (6") of subgrade material shall be compacted to a relative compaction of ninety-eight percent (98%) as determined by the Department of Transportation's Method of Test M-T-8.

All materials that will not satisfactorily compact shall be removed and replaced with suitable material and the entire width of the subgrade shall be brought to line and grade within reasonable limits and compacted to required density. Where the subgrade is of a non-uniform compacted nature, or where required, it shall be scarified to a depth of not less than six inches (6") for its full width and the material spread and compacted to required density.

All submerged roots, stumps or other perishable matter encountered in the preparation of subgrade shall be removed to a depth of not less than two feet (2') below the subgrade elevation.

After the subgrade has been prepared as specified above, it shall be maintained in such condition as to drain. If damaged by hauling or handling materials, the subgrade shall be scarified and re-compacted to required density.

The subgrade shall be in final condition for receiving the base or surface for a distance of at least five hundred feet (500') in advance of placing subsequent courses. Subsequent courses shall not be placed until the subgrade has been approved by the Engineer.

END OF SECTION

SECTION 312333

PIPELINE EXCAVATION AND BACKFILL

PART 1 – GENERAL

- 1.1 **SCOPE:** This section covers the excavation, trenching, and backfilling for utilities and appurtenances.
- 1.2 **RELATED WORK SPECIFIED ELSEWHERE:** All work requiring excavation, trenching, and backfilling.
- 1.3 **APPLICABLE PUBLICATIONS:** Where reference is made to other publications, they are referred to by basic designation only and form a part of this specification to the extent indicated by reference thereto. All referenced publications shall be the latest issue, including amendments as of the date of this specification.
- 1.4 **SUBMITTALS:**
- A. **Materials Source:** Submit name of imported materials suppliers. Provide materials from same source throughout the work. Any change of source will require approval.

PART 2 – PRODUCTS (NOT USED)

2.1 SOIL MATERIALS

- A. **Type S1 – Select Fill:** Material shall consist of select, nonorganic and debris-free silt clays (CL) or sandy clays (CL) having a plasticity index (PI) within the range of 10 to 24, a liquid limit less than 45, and a minimum of 50 percent passing the No. 200 sieve.
- B. **Type S2 – Course Aggregate: Washed Stone:** free of shale, clay, friable material, sand, debris: graded in accordance with ANSI/ASTM C33, size No. 467.
- C. **Type S3 – Pea Gravel: Natural Stone;** washed, free of clay, shale, organic matter; graded to a minimum size of 1/4 inch and a maximum size of 5/8 inch.
- D. **Type S4 – Sand:** Natural river or bank sand; washed, free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C33.
- E. **Type S5 – Crushed Stone:** Crushed Limestone, No. 610 gradation.

2.2 SOURCE QUALITY CONTROL

- A. Test and analysis of soil material will be performed in accordance with ASTM D4318 or ASTM C136.
- B. If test indicate materials do not meet specified requirements, change of material and all retesting cost will be the responsibility of the Contractor.
- C. Maximum dry density of the soil materials will be determined by ASTM D698.

2.3 STOCKPILING OF MATERIALS

- A. Stockpile materials on-site in sufficient quantities to meet project schedule and requirements.
- B. Separate differing materials with dividers or stockpile apart to prevent mixing.
- C. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- D. At the completion of the Work, remove stockpile, leave area in a clean and neat condition, and grade site to prevent free standing surface water.

PART 3 – EXECUTION

3.1 EXCAVATION

All excavation of every description and of whatever substances shall be performed to the depths indicated or as otherwise specified. All excavated materials shall be removed and disposed of off-site at the Contractor's expense. Grading shall be done as necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Sheeting and shoring shall be done as necessary for the protection of the work and for the safety of personnel. Excavation shall comprise all materials encountered, including rock and filled-in material of whatever nature is involved.

- A. The utilities shall be laid and maintained to lines and grades established by the plans and specifications with fittings at the required locations unless otherwise approved by the Engineer.
- B. Prior to excavation, investigation shall be made to the extent necessary to determine the location of existing underground structures and conflicts. Care should be exercised by the CONTRACTOR during excavation to avoid damage to existing structures.
- C. When obstructions that are not shown on the plans are encountered during the progress of work and interfere so that an alteration of the plans is required, the ENGINEER will alter the plans or order a deviation in line and grade or arrange for removal, relocation, or reconstruction of the obstructions.
- D. When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the ENGINEER, to provide clearance as required by federal, state, or local regulations or as deemed necessary by the ENGINEER to prevent future damage or contamination of either structure.

3.2 TRENCHING

A. GENERAL

- 1. Trench preparation shall proceed in advance of pipe installation for only as far as stated in the specifications.
- 2. Trenches for underground pipe-work shall be open cuts to the required lines, depths, and grades, with the side walls as nearly vertical as practical. Due to utility conflicts and confined working limits, no sloping will be allowed. To adhere to all Federal safety regulations, all trenches shall be braced with interlocking sheeting or trench box/shield. Trench widths shall be as required for proper laying and jointing of pipes and the proper placing and compacting of backfill and shall be no greater than 24" wider than the outside diameter of the

pipe at and below the top of the pipe. Excavate trenches to provide uniform and continuous bearing and support of each pipe barrel on firm undisturbed earth at every point between bell holes, with the ample bell hole cut at each joint to facilitate proper jointing and to prevent bells from bearing on the trench bottom. Machine or hand-cut trenches, except that in all cases prepare the final subgrade, before laying pipe bring the trench bottom up to proper subgrade by backfilling with approved material placed in 3-inch maximum thickness loose layers, and thoroughly compact each layer as directed to provide uniform and continuous bearing and support for the pipe barrel at every point between bell holes.

3. Shore and brace trenches and excavations as directed and as required to protect personnel, adjacent structures, and adjacent property. Where required by the conditions encountered, brace trenches and excavations with suitable interlocking sheeting. Do all necessary cribbing up required for the proper operation of trenching machines.
4. Provide and maintain in proper working order all necessary dewatering equipment for the removal of water from the excavations. Where quicksand or other water bearing strata are encountered, install and connect the necessary number of well points with pumping equipment of sufficient capacity to prevent rise of water in the excavation until the work has been installed properly and will be unaffected by submersion.
5. Do not install any work until excavations are free of water, mud, and loose earth. Do not install any work on frozen ground.
6. The CONTRACTOR shall be responsible for all work associated with dewatering. Discharge from any trench dewatering pumps shall be conducted to natural drainage channels, storm sewers, or an approved reservoir in adherence with the storm water regulations for this project.
7. Excavated material shall be placed in a manner that will not obstruct sidewalks, drive-ways, or other structures and shall be done in compliance with federal, state, or local regulations.
8. Removal of pavement and road surfaces shall be a part of the trench excavation and the amount removed shall depend upon the width of trench required for the installation of structures. The dimensions of pavement removed shall not exceed the dimensions of the opening required for installation of pipe and other structures by more than 6 inches in any direction unless required or approved by the OWNER. Methods, such as sawing, drilling, or chipping, shall be used to ensure the breakage of pavement along straight lines.
9. The width of the trench at the top of the pipe shall be that of the single-pass capabilities of normally available excavating equipment and ample to permit the pipe to be laid and joined properly and allow the backfill to be placed as specified. Trench widths at the top of the trench shall be no greater than the outside diameter of the pipe plus 24 inches. Trenches shall be of such extra width, when required, to permit the placement of interlocking sheeting or trench box/shield.
10. When excavation of rock is encountered, all rock shall be removed to provide a clearance of at least 9 inches below and on each side of all pipe and fittings. When excavation is completed, a bed of sand, crushed stone or earth that is free from stones, large clods, or frozen earth, shall be placed on the bottom of the trench to the previously mentioned depths, leveled, and tamped. These clearances and bedding procedures shall also be observed for pieces of concrete or masonry and other debris or subterranean structures, such as masonry walls, piers, or foundations that may be encountered during excavation. This installation procedure shall be followed when gravel formations containing loose boulders greater than 8 inches in diameter are encountered. In all cases, the specified clearances shall be maintained between the bottom of all pipe and

appurtenances and any part, projection, or point of rock, boulder, or stones of sufficient size and placement which, in opinion of the ENGINEER, could cause a fulcrum point.

11. Should the trench pass over a sewer or other previous excavation, the trench bottom shall be sufficiently compacted to provide support equal to that of the native soil or conform to other regulatory requirements in a manner that will prevent damage to the existing installation.
12. Trees, shrubs, fences, and all other property and surface structures shall be protected during construction unless their removal is shown in the plans and specifications or approved by the OWNER. Any cutting of tree roots and branches shall be done only as approved by the OWNER.
13. Temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered in the progress of the work shall be furnished by the CONTRACTOR. All properties that have been disturbed shall be restored as nearly as practical to their original condition.
14. Appropriate traffic control devices shall be provided in accordance with federal, state, and local regulations to regulate, warn, and guide traffic at the work site.

B. Trenching – New utility line: The following procedures shall be used in areas in which new utility lines are to be constructed.

1. The trench shall be excavated to the required alignment, depth, and width and in conformance with all federal, state and local regulations for the protection of the workmen.
2. Holes for the bells shall be provided at each joint but shall be no larger than necessary for joint assembly and assurance that the pipe barrel will lie flat on the trench bottom. Other than noted previously, the trench bottom shall be true and even in order to provide support for the full length of the pipe barrel, except that a slight depression may be provided to allow withdrawal of pipe slings or other lifting tackle.
3. When the subgrade is found to be unstable or to include ashes, cinders, refuse, organic material, or other unsuitable material, such material shall be removed, to a minimum of at least 12 inches, or to the depth ordered by the ENGINEER and replaced under the directions of the ENGINEER with clean, stable backfill material. The bedding shall be consolidated and leveled in order that the pipe may be installed properly.
4. When the bottom of the trench or the subgrade is found to consist of material that is unstable to such a degree that, in the judgment of the ENGINEER it cannot be removed, a foundation for the pipe and/or appurtenance shall be constructed using piling, timber, concrete, or other materials at the direction of the ENGINEER.

C. Trenching – Replacing utility lines: The following procedures shall be used in specified areas where existing sanitary sewer lines shall be replaced with new utility lines.

1. Trenching operations shall be conducted along the same line as the existing sewer lines.
2. The trench will be excavated to the depths of the existing sanitary sewer mains. The sewer mains shall be carefully uncovered and removed from the trench. Extreme care shall be taken to prevent disturbing the trench bottom from the trench. Extreme care shall be taken to prevent disturbing the trench bottom since new sewer line will be laid directly on the bottom in the exact location of the existing sewer.

3. If in the opinion of the ENGINEER the trench bottom has been disturbed to such an extent that its supporting ability has been destroyed the CONTRACTOR shall be responsible for providing adequate bedding material, subject to approval by the ENGINEER.

3.3 BACKFILLING:

- A. General:
 1. Do not backfill pipe and trenches and other excavations until the underground work has been inspected and approved.
 2. The trenches shall not be backfilled until they, as installed, conform to the requirements specified. Where, in opinion of the ENGINEER, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place. Except as otherwise specified for special conditions of over-depths, trenches shall be backfilled to the ground surface with material that is suitable for the compaction specified hereinafter. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved. The surface shall be restored to its original condition as near as practicable as hereinafter specified. Pavement, base course, and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, base course, and pavement for a minimum distance of 12 inches on each side of the trench.
 3. Backfilling covered in this Section includes all material extending from the bottom of bedding materials to existing grade or paving (as applicable).
- B. Backfilling for Utility Lines:
 1. After pipework has been approved, thoroughly tamp all backfill into bell holes, around pipework, and up to 6" above the top of all pipework, using hand or pneumatic tampers.
 2. Form 6" above top of pipe work up to finished grade (or paving subgrade, as the case may be), place and compact all backfill by approved methods that will cause the least possible settlement and provide the required density.
 3. Repair existing surfaces disturbed by construction activities to at least the condition that existed prior to construction activities.
 4. Within Construction Limits in which utilities are to be laid, the trenches shall be backfilled in six inch layers to 95 percent of maximum density as determined by ASTM D-698.

END OF SECTION

SECTION 312513

SILT FENCE

PART 1 GENERAL

- 1.1 **SCOPE OF WORK:** In accordance with the requirements of this Section, the Contractor shall furnish, construct and maintain a water permeable filter type fence for the purpose of removing suspended soil particles from the water passing through it in accordance with the requirements shown on the Plans and these Specifications.

PART 2. MATERIALS

- 2.1 **GEOTEXTILE FABRIC:** The fabric shall conform to the physical requirements of Type I or Type II as shown in Table I of Section 313419 of these Specifications. Unless a specific type is specified in the Plans or Contract Documents, the Contractor may select Type I or Type II.

Fabric for silt fence shall be manufactured in widths of not less than three feet. Sheets of fabric may be sewn or bonded together at the factory or other approved locations but deviation from the physical requirements will not be permitted.

- 2.2 **WOVEN WIRE BACKING:** Except as provided herein, silt fence shall be reinforced with a woven wire backing. The wire backing shall be at least 32 inches high and have no less than six horizontal wires. Vertical wires shall be spaced no more than 12 inches apart. The top and bottom wire shall be 10 gage or larger. All other wire shall be no smaller than 12-1/2 gage.

- 2.3 **POSTS:** Steel post shall be used. Steel tee posts shall be five feet long, approximately 1-3/8 inches wide, 1-3/8 inches deep and 1/8 inch thick with a nominal weight of 1.33 pounds per foot prior to fabrication. The posts shall have projections, notches or holes for fastening the wire backing or fabric to the posts.

- 2.4 **STAPLES:** Staples shall be made of nine gage wire with a minimum length of one inch after bending.

- 2.5 **MANUFACTURER'S CERTIFICATION:** The Contractor will furnish to the Engineer three copies of the manufacturer's certified test reports and certification that each lot in a shipment complies with the requirements of the Contract. All fabric, fence posts, woven wire and wire staples are subject to approval by the Engineer upon delivery to the Work Site and prior to incorporating in the Work.

PART 3. CONSTRUCTION REQUIREMENTS

- 3.1 **INSTALLATION:** Silt fences shall be constructed at the locations shown on the Plans or as directed by the Engineer.

All posts shall be installed so that no more than three feet of the post shall protrude above the ground. Extra post for bracing shall be as directed by the Engineer. The woven wire shall be securely

fastened to the wood posts with staples. When metal posts are used, the wire shall be fastened to the posts with wire or other approved means. The fabric shall be attached to the wire fence by wire or other approved means. The bottom edge of the fabric shall be buried 6 inches below ground surface to prevent undermining. When splicing of the fabric is necessary, two posts shall be installed approximately 18 inches apart and each piece of fabric shall be fastened to both posts.

The fabric will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation storage or installation.

Type II fabric may be installed without the woven wire fence backing provided all of the following conditions are met:

- (a) Post spacing is reduced to six feet or less.
- (b) The fabric has been approved by the Engineer and the manufacturer recommends its use without the woven wire backing.
- (c) Fence posts shall be inclined toward the runoff source at an angle of 20 degrees from vertical.
- (d) Fabric shall be attached to the posts in such a manner that the purpose intended is satisfied and maintained.

3.2 MAINTENANCE AND REMOVAL: The Contractor shall maintain the silt fence and the fabric shall be removed and replaced when deterioration to such an extent that it reduces the effectiveness of the silt fence. Excessive accumulations against the fence shall be removed and disposed of as directed by the Engineer and the active storm water pollution prevention plan.

Unless otherwise directed, all temporary silt fences shall be removed. Upon removal, the Contractor shall remove and dispose of any excess silt accumulations, dress the area to give a pleasing appearance and vegetate all bare areas in accordance with the contract requirements. The temporary fence materials will remain the property of the Contractor and may be used at other locations provided the materials are acceptable to the Engineer.

END OF SECTION

SECTION 312514

TEMPORARY EROSION CHECKS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This work consists of furnishing, constructing and maintaining baled hay or straw wattle erosion checks for the retention of soil along the toe of fill slopes, around inlets, swale areas, small ditches, sediment basins and other areas as directed by the Engineer in accordance with the requirements shown on the plans and these specifications. Also, the work includes removing and disposing of the erosion checks and silt accumulations as directed by the Engineer.

PART 2 – MATERIALS

2.01 VEGETATIVE MATERIALS FOR EROSION CHECKS

- A. Type I. Approved baled straw of wheat, oat, rye grain, or rice or broomsage of Bahia grass (with seed heads) which has reached maturity prior to cutting.
- B. Type II. Approved baled hay produced from Bermuda, Bahia, Fescue, Dallis Grass, any of the Lespedezas, or combinations thereof.
- C. All of the above materials shall have been properly cured prior to baling and shall be reasonably free from Johnson Grass and other obnoxious grasses and weeds. Vegetative materials shall be reasonably bright in color, dry, and shall not be musty, moldy, or of otherwise low quality. Vegetative material that is wet or that has been baled green (nor cured properly) shall be used.
- D. Unless otherwise permitted in writing by the Engineer, Type I shall be furnished and used. The Engineer may permit the use of Type II when the Contractor has furnished satisfactory evidence in writing that Type I material is not available.

PART 3 – EXECUTION

3.01 GENERAL

- A. The erosion checks shall be constructed at the locations and according to the requirements shown on the plans or as directed by the Engineer. Erosion checks required along the toe of fill slopes shall be constructed prior to grading operations at the site. For other locations, the erosion checks shall be constructed when directed by the Engineer.
- B. The soil shall be excavated at least three inches in depth to embed the baled material. After securing in place, a sufficient quantity of the excavated material shall be placed around the erosion check and compacted to prevent undermining.

3.02 MAINTENANCE AND REMOVAL

- A. The Contractor shall maintain the erosion checks and remove and dispose of silt accumulations as directed by the Engineer.

- B. When the erosion checks are no longer needed, they shall be removed and the Contractor shall dispose of the silt accumulations and treat the disturbed areas in accordance with the contract requirements.

END OF SECTION

SECTION 313419
GEOTEXTILE FABRIC

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This work consists of furnishing and installing geotextile fabric for stabilization of embankments and subgrades as shown on the plans and in conformance with these specifications.
- B. Dimensions of fabric placement shall be as indicated on the drawings.

PART 2 - MATERIALS

2.01 GENERAL

- A. Unless specified otherwise, the fabric shall be woven. The fabric shall consist only of long chain polymeric yarns of filaments such as polypropylene, poly-ethylene, polyester, polyamide or polyvinylidene-chloride and shall be formed into a stable network such that the yarns or filaments retain their relative position. The fabric shall be mildew resistant and inert to biological degradation and naturally encountered chemicals, alkalies and acids. Fabric which is not protected from sunlight after installation shall contain stabilizers and/or inhibitors to make it resistant to deterioration from direct sunlight, ultraviolet rays and heat.
- B. The edges of the fabric shall be salvaged or finished in such a manner to prevent the outer yarn or filaments from raveling. The fabric shall be free of defects or flaws which affect the required physical properties.
- C. Fabric shall be manufactured in widths of not less than six feet. Sheets of fabric may be sewn or bonded together at the factor or other approved locations but deviation from the physical requirements will not be permitted.
- D. Tests for manufacturer's certification shall be conducted with fabric as shipped by the manufacturer and acceptance testing will be conducted with fabric from the project.

2.02 GEOTEXTILE FABRIC FOR USE UNDER RIPRAP

- A. Unless otherwise specified the fabric shall conform to the physical requirements listed herein. The requirements for tensile, bursting, puncture and trapezoidal tear strengths may be reduced 50 percent (50%) when the fabric is cushioned from rock placement by a 6-inch minimum layer of sand.

TABLE I
GEOTEXTILE FABRICS
MINIMUM AVERAGE ROLL VALUE

Physical Properties	200	Test Method
Tensile Strength, lbs (Weaker principal direction)	200	ASTM D 4632 (CRE) (See Note 1)
Bursting Strength, psi.	300	ASTM D 3786, Diaphragm Bursting Tester

Puncture Strength, psi.	80	ASTM D 3787, Tension Testing Machine with Ring Clamp; Steel Bal replaced with a 5/16 inch hemispherical tip.
Trapezoidal Tear, lbs.	65	ASTM D 4533 (CRE) (See Note 1)
Retained Strength when wet, percent	100	ASTM D 4632 (CRE) and ASTM D 3786 and 3787, as above. (See Note 1)
Permeability, cm/sec. (See Note 2)	0.01	AASHTO M 288 (Appendix)
Flow Rate, gal./min./sq.ft (See Note 2)	30	AASHTO M 288 (Appendix)
Equivalent Opening Size (EOS) See Notes 2 & 3)		Miss. Test Method MT 60
Woven Fabric	70-100	
NonWoven Fabric	70+	

- Note 1: A test result shall be the average of the test values of five specimens.
Note 2: Unless designated otherwise in the plans or contract documents.
Note 3: The EOS test for nonwoven fabric may be waived by the Testing Engineer.
Note 4: All of the above strength tests except "retained strength" are to be conducted in a dry condition.

2.03 STAPLES

- A. Staples shall be made of nine gage wire with a minimum length of one inch after bending.

PART 3 - CONSTRUCTION REQUIREMENTS

3.01 GENERAL

- A. A subgrade which is to receive geotextile fabric shall be shaped and compacted to a smooth finish and free of loose material and sharp objects. An embankment site shall be cleared and graded to establish a relatively smooth surface. Trees and stumps are to be cut off at ground line and sawdust or sand placed over these areas to provide a cushion for the fabric.
- B. The fabric shall be placed as smooth as possible and free from tension, stress, folds, wrinkles or creases.
- C. Where more than one layer of fabric is required, all joints of the bottom layer shall be sewn to develop the required fabric strength perpendicular to the joint. The top layer and single layer installations of fabric may be overlapped a minimum of two feet at each joint or sewn.
- D. Fabrics which weigh less than eight ounces per square yard shall be factory or field sewn with a "J" type seam. Heavier weight fabrics shall be factory sewn with two parallel bag type seams approximately one-fourth inch apart or field sewn with an additional seam zigzagged across the two parallel seams.
- E. Securing pins with washers shall be inserted along a line through the mid-point of any overlap or

sewn seam at intervals required by the Engineer to prevent movement of the fabric until covered.

- F. The subsequent course of material shall be back-dumped in such a manner as to avoid damage to the underlying fabric. No equipment will be allowed to operate over the fabric until it is covered with a layer of material of sufficient thickness to protect the fabric installation. When the underlying soil is very unstable, the two outer one-third portions of an embankment layer shall be placed approximately 25 feet in advance of the center one-third portion to prevent excessive mudwave movements and damage to the fabric installation.
- G. The Contractor shall provide equipment necessary for placing the fabric in the position and location as detailed on the plans.

END OF SECTION

SECTION 313713

RIP-RAP

SECTION 1 – GENERAL

1.01 DESCRIPTION

- A. Scope:
Furnish all labor, materials, equipment and incidentals necessary to place rip-rap for channel slopes and ditches at locations shown on the Construction Plans and ordered by the ENGINEER.
- B. Related Work Specified Elsewhere:
 - 1. Section 312000, Earthwork.

1.02 SUBMITTALS

- A. The CONTRACTOR shall furnish representative samples of rip-rap to the ENGINEER and shall indicate the source of locations. If the source location changes during construction the CONTRACTOR shall resubmit representative samples.
- B. Shop Drawings: Submit for approval the Shop Drawings showing the areas to be covered.

SECTION 2- PRODUCTS

2.01 MATERIALS

- A. Random Rip-Rap
 - 1. Rip-Rap shall consist of hard, durable angular filed or rough unhewn quarry stone as nearly uniform in section as possible. The stone shall be dense, resistant to the action of air, water and suitable for the purpose intended. Gradation of the rip-rap shall conform to the following:

Stone Weight, Pounds	Cumulative Percent Lighter by Weight
100	100
40	50-100
20	15-30
<20	0-5

- 2. Recommended Thickness: 12-inches
 - 3. D50: 4.7" (D50= Size of rock in rip-rap of which 50 percent by weight is finer).
 - 4. Spalls and rock dust that will pass a three inch sieve shall not represent more than five percent by weight.
 - 5. Flat or needle shapes shall not be used unless the thickness of the piece is more than one-third the length.
- B. Grouted Rubble Rip-Rap:

1. Provide portland cement mortar grouted rip-rap in locations as shown on the Drawings.
2. Stone shall meet all applicable requirements listed above for random rip-rap.
3. Consistency of the grout shall be approved by the ENGINEER.

PART 3 – EXECUTION

3.01 PLACING

- A. Subgrade: The subgrade for rip-rap bedding shall be prepared to the required lines and grades. When rip-rap is below normal stream level the subgrade shall be mucked out to the grade required. All loose material shall be removed.
- B. Random Rip-Rap:
 1. The minimum total thickness of the rip-rap layer shall be 12 inches except where otherwise indicated.
 2. The stones shall be placed from the bottom of the embankment upward such that the weight of the stone is carried by the underlying material. The larger stones shall be placed in the lower courses.
 3. Open joints shall be filled with spalls.
 4. Rip-rap may be placed by equipment; however, care shall be taken in placing to obtain a good gradation of material such that the rip-rap is firm and solid. Surfaces shall be barred to the required alignment and slopes. Large voids shall be filled by hand placement of stone unless otherwise approved by the ENGINEER.
- C. Grouted Rip-Rap:
 1. Stones shall be placed as described above for random rip-rap and grouted with portland cement mortar.
 2. Unless hand mixing is specifically approved by the ENGINEER, grout shall be machine mixed for not less than 1-1/2 minutes.

END OF SECTION

SECTION 321123

CRUSHED LIMESTONE BASE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This item shall consist of furnishing all materials, labor, equipment and performing all work necessary for the construction of a limestone base course on a prepared subgrade in accordance with the lines and grades shown on the CONTRACT DRAWINGS and the requirements of these SPECIFICATIONS.
- B. Where directed, limestone base courses shall be installed for use as temporary access and as permanent gravel drives, roadways, roadway bases and shoulders, utility trench repairs, bases and site surfaces for wells, tanks, pumping stations and metering stations etc., with a compacted finished thickness as required by the Contract Drawings.

1.02 APPLICABLE DOCUMENTS

- A. The latest edition of the following publications form a part of this Specification and where referred to by basic designation only, are applicable to the extent indicated.
- B. American Association of State Highway and Transportation Officials (AASHTO)
 - 1. T96 Resistance to Abrasion of Coarse Aggregate by Use of the Los Angeles Machine.
 - 2. AASHTO T 180 (1993) Moisture-Density Relations of Soils Using a 10-lb. (4.54 kg) Rammer and an 18-in (457 mm) Drop
- C. **Arkansas Standard Specifications for Road and Bridge Construction, Latest Edition.**
- D. **AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), LATEST EDITION**

PART 2 - MATERIALS

2.01 GENERAL

- A. Crushed limestone shall meet the gradation of the following table.

CRUSHED STONE GRADATION LIMITS	
Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	90-100
3/4 inch	70-100
1/2 inch	62-90
3/8 inch	50-80
No. 4	40-65
No. 40	12-26
No. 200	5-12

- B. The portion of the crushed stone passing the No. 40 sieve shall have a liquid limit not greater than 25 and a plasticity index of not greater than 5.

2.02 SOURCE AND TESTING

- A. The limestone base material shall be obtained from a source to be furnished by the CONTRACTOR and reviewed by the Engineer. The CONTRACTOR shall designate his proposed source and shall submit certified test results to the Engineer for approval prior to starting the placement of the material on the project.
- B. Testing shall be completed as specified herein and as directed by the Engineer. Tests shall be completed by a certified laboratory approved by the Engineer and results shall be submitted in duplicate to the Engineer. Testing shall be an absorbed cost item.

PART 3 – CONSTRUCTION REQUIREMENTS

3.01 GENERAL REQUIREMENTS

- A. Subgrade: Prior to placing base course material, the subgrade surface shall be checked by the ENGINEER. Any ruts or soft yielding places that appear by reason of poor drainage conditions, hauling or from any other cause shall be corrected, rolled to required compaction and shaped before the base course is placed thereon.
- B. Placing and Spreading: Base course material may be spread in one or two equal lifts. The base material shall be deposited and spread in a uniform layer without appreciable segregation of the material. Addition of water or drying will be required as needed to produce a material which can be compacted to the required density.
- C. Compacting: Base course compaction may be performed with sheepsfoot, pneumatic or steel-wheeled rollers, or a combination of rollers; however, if the equipment and product selected by the CONTRACTOR proves to be unsatisfactory, the ENGINEER may order the CONTRACTOR in writing to make the necessary revisions. Compaction equipment found to be in poor condition by the ENGINEER may be ordered replaced. Final rolling shall be accomplished with a pneumatic or steel-wheeled roller.
 - 1. Each layer of base material shall be rolled and compacted to a density of 100% of standard Proctor density at moisture contents within 2 percentage points of the optimum water content..
 - 2. Irregularities or depressions that develop under rolling shall be corrected by loosening the material at such places and adding or removing materials. During the rolling operations the shape of the base course shall be maintained by blading.
- D. Surface and Thickness Requirements: the surface of the completed base shall present a uniform appearance and smooth surface without sharp breaks or depressions which will hold water. The finished grade and typical section shall be as close to that shown on the CONTRACT DRAWINGS as can be constructed with proper and expert manipulation of a motor grader to within plus or minus one half (.5) inch of true grade. The thickness of the completed base course shall not vary more than one half (0.5) inch from that shown on the DRAWINGS.

3.02 MAINTENANCE

- A. The base material shall be maintained by watering, light blading and rolling, when required, in order to prevent loss of material and in order to preserve the line, grades and cross sections of the construction.
- B. Maintenance shall continue until acceptance of the project. Provide additional material as directed by the Engineer to fill low areas as needed to maintain grades.

3.03 SUBMITTAL DATA

- A. Submit certified gradation test results for review. Designate source of supply. Submit subgrade compaction analyses to the Engineer.

END OF SECTION

SECTION 321216

ASPHALT PAVING

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This item shall include furnishing of all labor, materials, equipment and incidentals required for paving of roads and parking areas in accordance with the Contract Drawings and these Specifications.
- B. Paving shall be performed with machinery equipped with a 40 foot ski attachment for grade control.
- C. Any required adjustments of existing utilities will be performed by Owner.
- D. Dimensions shall be as indicated on the Drawings.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All materials for asphalt paving and related work shall comply with Mississippi Standard Specifications for State Aid Road and Bridge Construction, 1989 Edition as follows:
 - 1. Plant mix pavements General Section 401
 - 2. Base course Section 301
 - 3. Tack coat Section 407
 - 4. Binder course Section 403
 - 5. Surface course Section 403
- B. As used in this specification, the following abbreviations shall apply:
 - 1. BB- Black Base
 - 2. TC- Tack Coat
 - 3. BC- Binder Course
 - 4. SC- Surface Course
- A. The term “course” used in this Section shall be understood to mean a layer of specified thickness shown on the plans and for which quantities are estimated on the plans and in the proposal as the basis for bidding. A course may, in some cases consist of a single layer, and, in other cases, may consist of two or more layers depending on the finished thickness specified.

PART 3 – EXECUTION

3.01 BASE COURSE (BLACK BASE): Number BB-1

- A. General: Where indicated on the Drawings this work shall consist of the construction of a base course in one or more courses composed of mineral aggregates mixed in a central mixing plant with bituminous materials in the proportions specified and placed hot. The base course shall be constructed on a prepared subgrade foundation in accordance with these specifications and in close conformity with the thickness, lines, grades and sections as shown on the plans.
- B. The base course shall comply with Section 301, Plant Mix Bituminous Base Course, of the Mississippi Standard Specifications for State Aid Road and Bridge Construction, 1989 Edition. Bituminous black base shall be BB-1, Type 6.
- C. The Contractor will have the testing lab furnish to the Engineer, for approval, prior to placing any base material, a job mix formula for the project.
- D. The job mix formula shall be set within the master range as indicated below. The job mix formula shall be maintained within the job mix tolerance and shall not exceed the limits of the ranges.
 - 1. The job mix temperatures shall be between 250 degrees Fahrenheit minimum and 350k0 degrees Fahrenheit maximum unless otherwise specified.
 - 2. The job mix formula as approved shall be considered as tentative until a sufficient amount of the mixture has been processed through the plant, spread and compacted.
 - 3. Extractions shall be made on samples of each mixture, produced by a plant, before any mixture is placed on the project.
 - 4. After the job mix formula is approved, the mixture furnished to the project shall remain unchanged, within the tolerances specified for the mixture, throughout the duration of the job. No change in properties or proportions of any ingredient of the mix shall be made without written permission of the Engineer.
- E. The gradation of the mixture shall meet the following Design Master range requirements:

Sieve Size	Percentage Passing Sieve (by Weight)	Tolerances for job Mix Formula
1-1/2 inch	100	±6%
1 inch	83-100	±6%
¾ inch	-----	-----
½ inch	56-95	±6%
3/8 inch	-----	-----
No. 4	29-70	±5%
No. 8	19-54	±5%
No. 30	8-30	±4%
No. 50	4-20	±4%
No. 200	2-10	±1.5%
Min. % A.C. by wt of Mix	4	±0.4%

- F. Bituminous Materials shall be petroleum asphalt cement grade AC-30, unless otherwise specified.
- G. Mineral Filler shall meet requirements of Section 703.16 of the Mississippi State Aid Specifications. Mineral filler may be used as necessary to obtain desired properties; however, excessive use shall not be permitted in the mix.

- H. Weather Limitations: Base course shall be placed on a dry unfrozen surface and only when the air temperature meets the limitation requirements of 401.03 of the Mississippi State Aid Specifications.
- I. Density: The average lot density of all bituminous base courses shall not be less than 92.0 percent nor more than 95.0 percent of the maximum density based on AASHTO T-209. When borderline results are obtained on density tests, it shall be the Contractor's responsibility to furnish and use the appropriate number, type, and size of rollers as necessary to consistently obtain the required density. When the furnished compactive effort does not produce the required density, the Contractor shall make such approved adjustments as necessary to obtain the required density. Pavement samples obtained for determining density and/or correlation of the nuclear density gauge which have a thickness less than eight inches greater than the maximum size aggregate permitted by the job-mix formula will not be used as a representative sample.
- J. Lower layers of base course shall not exceed four inches in compacted thickness (plus the allowable tolerance). The top layer shall have a maximum compacted thickness of three inches (plus the allowable tolerance).
- K. Surface tolerance shall conform to the designated grade and cross section within the tolerances set forth in Section 301.03.2 of Mississippi State Aid Specifications.

3.02 TACK COAT (Required Full Width)

- A. General: This work shall consist of preparing and treating an existing bituminous or concrete surface with bituminous material in accordance with these specifications and in close conformity with the lines shown on the plans or established by the Engineer. A tack coat shall be applied, for full width of the course to be superimposed on a previously prepared, bonded, and bituminized road surface or base or concrete surface or base. The tack coat may be omitted from a previously primed road when deemed by the Engineer to be unnecessary.
- B. Tack coat is to be applied between each lift or course of asphalt pavement unless otherwise specified by the Engineer.
- C. A tack coat shall be applied over the base course and shall consist of 0.05 to 0.10 gallons per square yard of bituminous material of the same A.C. grade as specified for the base course mix designs specified in Section 407 of Mississippi Standard Specifications for State Aid Road and Bridge Construction, 1989 Edition.
- D. Tack coat shall not be applied during wet or cold weather, after sunset or to a wet surface and only on as much pavement as can be covered with additional courses in the same day. The surface to receive tack coat shall be prepared in accordance with Section 401.03.0 of Mississippi State Aid Specifications.
- E. Separate Payment for tack coat shall not be made. The tack coat shall be an absorbed item.

3.03 BINDER COURSE, NUMBER BC-1

- A. This work shall consist of the construction of a binder course, thickness indicated on the drawings, in accordance with Contract Drawings, and Mississippi Standard Specifications for State Aid Road and Bridge Construction, 1989 Edition, Section 403, Hot Bituminous Pavement.
- B. A job mix formula shall be submitted to the Engineer, for approval, prior to placing any binder course. See paragraph C of this Section.

- C. The gradation of the aggregates for the mixture shall meet the following Design MasterRange requirements.
- D. At least 20% of the total combined aggregate by weight shall be limestone or slag.
- E. The gradation of the mixture shall meet the following Design Master range requirements.

Sieve Size	Percentage Passing Sieve (by Weight)	Tolerances For Job Mix Formula
¾ inch	100	±6%
½ inch	82-100	±6%
3/8 inch	71-91	±6%
4 inch	40-73	±5%
No. 8	26-58	±5%
No. 30	9-30	±4%
No. 50	6-20	±4%
No. 200	2-10	±1.5%
Min. % A.C. by wt of Mix	4.0	±0.4%

- F. Bituminous materials shall be petroleum asphalt cement grade AC- 30, unless otherwise specified.
- G. Density: The average lot density of all bituminous base courses shall not be less than 92.0 percent nor more than 95.0 percent of the maximum density based on AASHTO T-209. When borderline results are obtained on density tests, it shall be the Contractor's responsibility to furnish and use the appropriate number, type, and size of rollers as necessary to consistency obtain the required density. When the furnished compactive effort does not produce the required density, the Contractor shall make such approved adjustments as necessary to obtain the required density. Pavement samples obtained for determining density and/or correlation of the nuclear density gauge which have a thickness less than three-eighths inch greater than the maximum size aggregate permitted by the job-mix formula will not be used as a representative sample.
- H. Mineral filler shall meet requirements of Section 703.16 of Mississippi State Aid Specifications. Mineral filler may be used as necessary to obtain desired properties; however, excessive use shall not be permitted in the mix.
- I. Tests for stability determination, if required, will be made in accordance with Section 401.02.2.1, Mississippi State Aid Specifications.
- J. Weather Limitations: Binder course shall be placed on a dry unfrozen surface and only when the air temperature meets the limitation requirements of 401.03 of the Mississippi State Aid Specifications.
- K. Surface Tolerances: Surface tolerances shall conform to the designated grades and cross-section, within the tolerances set forth in Section 403.03.2. Surface Tolerances of Mississippi State Aid Specifications.

3.04 SURFACE COURSE, NUMBER SC-1

- A. This work shall consist of the construction of a surface course, thickness

indicated on the drawings, in accordance with Contract Drawings, Mississippi Standard Specifications for Aid Road and bridge Construction, 1989 Edition, Section S-403, Hot Bituminous Pavement. Hot Bituminous surface course shall be SC-1, Type 8.

- B. A job formula shall be submitted to the Engineer, for approval, prior to placing any surface course. See Paragraph C of this Section
- C. The gradation of the aggregates for the mixture shall meet the following Design Master range requirements.
- D. 20 to 30% of the total combined aggregate by weight shall be limestone or slag of which 30 to 65% shall pass the No. 8 sieve.
- E. The gradation of the mixture shall meet the following Design Master range requirements.

Sieve Size 1	Percentage Passing Sieve (by Weight)	Tolerances For Job Mix Formula
½ inch	100	±6%
3/8 inch	87-100	±6%
No. 4	54-80	±5%
No. 8	32-63	±5%
No. 30	12-23	±4%
No. 50	6-20	±4%
No. 200	2-10	±1.5%
Min. % A.C. by wt of Mix	4.0	±0.4%

- F. Bituminous materials shall be petroleum asphalt cement grade AC-30, unless otherwise specified.
- G. Density: The average lot density of all bituminous base course shall not be less than 92.0 percent nor more than 95.0 percent of the maximum density based on AASHTO T-209. When borderline results are obtained on density tests, it shall be the Contractor's responsibility to furnish and use the appropriate number, type, and size of rollers as necessary to consistently obtain the required density. When the furnished compactive effort does not product the required density, the Contractor shall make such approved adjustments as necessary to obtain the required density. Pavement samples obtained for determining density and/or correlation of the nuclear density gauge which have a thickness less than three-eighths inch greater than the maximum size aggregate permitted by the job-mix formula will not be used as a representative sample.
- H. Mineral filler shall meet requirements for Section 703.16 of Mississippi State Specifications. Mineral filler may be used as necessary to obtain desired properties; however, no more than 3% of mineral filler by wt. of the total aggregate blend shall be permitted in the mix.
- I. Tests for stability determination, if required, will be made in accordance with Section 401.02.2.1, Mississippi State Aid Specifications.
- J. Weather Limitations: Surface course shall be placed on a dry unfrozen surface and only when the air temperature meets the limitation requirements of 401.03 of the Mississippi State Aid Specifications.

- K. Surface Tolerances: Surface tolerances shall conform to the designated grades and cross-section, within the tolerances set forth in Section 403.03.2, Surface Tolerances of Mississippi State Aid Specifications.

3.05 PRE-ROLLING

- A. Prior to application of base course, the sub-base shall be pre-rolled as may be required to determine possible presence of underlying soil failures.

3.06 TESTING

- A. The Contractor shall have the certified testing laboratory furnish test reports for applicable properties of each required asphalt mix. The asphalt mixture quality tests shall include an asphalt extraction to determine asphalt content and aggregate gradation, determination of maximum theoretical specific gravity (Rice Method), calculation of laboratory air voids, and determination of Marshall stability and flow properties. One set of asphalt mixture quality tests shall be conducted for each half-day of production. A minimum of five (5) field density tests (cores or nuclear gauge) shall be conducted for each day's production. The test results shall be submitted to the ENGINEER prior to approval of any pay request.
- B. Results of all testing shall be submitted to the Engineer in triplicate.
- C. Any prior use testing or certification costs shall be borne by the Contractor. Testing of the plant mix in the laboratory shall be paid for by the Contractor.

END OF SECTION

SECTION 321313

CONCRETE ACCESSORIES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Scope:
 - 1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install concrete accessories.
 - 2. The types of concrete accessories required include the following:
 - a. Construction joints.
 - b. Expansion joints and fillers.
 - c. Control joints.
- B. General: All joints subject to hydrostatic pressure shall be provided with continuous water stop.
- C. Related Work Specified Elsewhere:
 - 1. Section 321313, Concrete Formwork.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. ACI301, Specifications for Structural Concrete for Buildings, Chapter 6, Joints and Embedded Items.
 - 2. ASTM A 36, Structural Steel.
 - 3. ASTM D 1752, Preformed Expansion Joint Fillers for Concrete paving and Structural Construction.
 - 4. ASTM B 164, Nickel-Copper Alloy Rod and Bar.
- C. All manufactured items shall be installed in accordance with manufacture's instructions.

1.03 SUBMITTALS

- A. Samples: Submit for approval the following samples:
 - 1. Cork expansion joint fillers.
 - 2. Multi-polymer plastic bearing strips.
- B. Shop Drawings: Submit for approval the following:
 - 1. Manufacturer's specifications and installation instructions for all materials required.
 - 2. Layout of all construction joint locations prior to the submittal of steel reinforcing drawings.
 - 3. Detail for joining polyvinyl chloride to steel water-stops.

PART 2 – PRODUCTS

2.01 WATER-STOPS

Adequate water stops of metal, rubber, or plastic shall be placed as shown on the plans. Where movement at the joint is provided for, the water stops shall be of a type permitting movement without injury. They shall be spliced, welded, or soldered to form continuous water-tight joints.

2.02 PERFORMED EXPANSION JOINT FILLER

Provide performed expansion joint filler complying with ASTM D 1752, Type II, cork. Joint sealant shall be approved by the Engineer.

2.03 CONCRETE CONSTRUCTION JOINT ROUGHENER

- A. Provide a water soluble non-flammable, surface-retardant roughener.
- B. Product and Manufacturer: Provide one of the following:
 - 1. Rugasol-S by Sika Chemical Corporation, for horizontal joints only.
 - 2. EAC-S by Preco Industries, Ltd., for horizontal joints only.
 - 3. Tuf-Cote (Deep Etch) by Preco Industries Ltd., for vertical joints.
 - 4. Or equal.

2.04 EPOXY BONDING AGENT

- A. Provide an epoxy-resin bonding agent, two component, polyamide type.
- B. Product and Manufacturer: Provide one of the following:
 - 1. Sikadur Hi-Mod by Sika Chemical Corporation
 - 2. Epoxite Binder (Code #2390) by A.C. Horn, Inc.
 - 3. Or equal.

2.05 PERFORMED BEARING STRIPS

- A. Provide a multipolymer plastic bearing strip with a coefficient of friction less than .01. Bearing strip to be 1/8 inch thick by nine inches wide.
- B. Product and Manufacturer:
 - 1. Korolath bearing strips by Koro Corporation.
 - 2. Or equal.

2.06 ANCHOR BOLTS

- A. These shall conform to ASTM A675, Grade 50. Anchor bolts shall be galvanized on all exposed surfaces in accordance with ASTM A153.
- B. Set all anchor bolts by template, rigidly secure the bolts in place to prevent their displacement, and verify all bolt locations before placing concrete, so that the bolt locations in the completed foundations in the completed foundations will conform accurately to the bolt setting dimensions indicated on the foundation drawings.

PART 3 – EXECUTION

3.01 INSPECTION

Examine conditions under which joints are to be installed, and notify ENGINEER in writing of unsatisfactory conditions existing. Do not proceed with the Work until unsatisfactory conditions or deficiencies have been corrected in a manner acceptable to ENGINEER.

3.02 CONSTRUCTION JOINTS

- A. Comply with ACI 301, Chapter 6, and as specified below.
- B. Locate and install construction joints as shown.
- C. Horizontal Joints:
 - 1. Roughen concrete at the interface of construction joints in accordance with instructions of the manufacturer of joint roughener. Immediately before placing fresh concrete, thoroughly clean the existing contact surface using a stiff brush or other tools and a stream of water under pressure. The surface shall be clean and wet, but free from pools of water at the moment the fresh concrete is placed.
 - 2. Remove laitance, waste mortar or other substance which may prevent complete adhesion.
 - 3. Place a 2-inch thick coat of mortar, of similar proportions to the mortar in the concrete, over the contact surface of the old concrete. Place fresh concrete before the mortar has attained its initial set.
- D. Vertical Joints:
 - 1. Apply roughener to the form in a thin, even film by brush, spray or roller in accordance with the manufacturer's instructions. After roughener is dry, concrete may be placed.
 - 2. When concrete has been placed and the form removed, wash loosened material off with high pressure water spray to obtain roughened surface subject to approval by ENGINEER.
- E. Place two layers of 1/8 inch thick bearing strips on concrete bearing surface prior to placing concrete slab to provide sliding bearing as shown.

3.03 EXPANSION JOINTS

- A. Comply with ACI 301, Chapter 6, and as specified below.
- B. Locate and install expansion joints as shown. Install cork filler and sealant in accordance with manufacturer's instructions.

3.04 BONDING WITH EPOXY ADHESIVE

- A. Use adhesive for the following:
 - 1. Bonding of fresh concrete to concrete cured at least 28 days or to existing concrete.
 - 2. Bonding of horizontal construction joints where these are required by the Drawings or approved by ENGINEER for foundation mats that are five feet thick or greater.

- B. Handle and store epoxy adhesive in compliance with the manufacturers printed instructions, including safety precautions.
- C. Mix the epoxy adhesive in complete accordance with the instructions of the manufacturer.
- D. Before placing fresh concrete, thoroughly roughen and clean hardened concrete surfaces and coat with epoxy grout not less than 1/16-inch thick. Place fresh concrete while the epoxy material is still tacky, without removing the in-place grout coat, and as directed by the epoxy manufacturer.

END OF SECTION

SECTION 321314

CONCRETE PLACEMENT

PART 1 – GENERAL

- 1.01 SCOPE:** This work consists of furnishing and placing Portland cement concrete for specified concrete structures in accordance with these specifications and in reasonable close conformity with the lines, grades, and dimensions shown on the plans or established by the ENGINEER.

The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required to provide cast-in-place concrete for concrete structures as shown and specified.

PART 2 – PRODUCTS

2.01 CONCRETE:

- A. Strength: Unless noted otherwise on the construction plans, concrete shall develop at least 3,000 psi (4000 psi for dumpster slabs) compressive strength in 28 days, and have a 4" maximum slump.

- A. Materials: All materials for asphalt paving and related work shall comply with Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition as follows:

Portland Cement	Section 701.01 and Section 701.02
Admixtures	Section 713.02
Fly Ash	Section 714.05
Fine Aggregate	Section 703.02
Coarse Aggregate	Section 703.03
Lightweight Aggregate and their Concrete Making Properties	Section 703.19 and 804.02.7.3
Curing Materials	Section 713.01
Joint Materials	Section 707.01, 707.02, and 707.07
Structural Steel Joints and Bearing Devices	Section 717.01
Steel Copper	Section 716.07.2
Bronze Bearing Devices	Section 716.06
Self-Lubricating Bearing Plates	Section 716.08
Bearing Pads	Section 714.10
Wire Rope or Cable for Pre-stressed Concrete	Section 700.01 and 711.03
Sprayed Finish for Concrete Surface	Section 714.12
Reinforcing Steel	Section 711.02

- B. Use, Care, and Handling: The use, care, and handling of materials shall conform to the applicable requirements of Section 501.03.10 of the Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition, and specific requirements of Sections 804.02.4 and 804.02.5. Unless otherwise authorized, only fine aggregate or coarse aggregate of one type and from the same source shall be used in the construction of any one unit of a structure.

- C. Properties of aggregates used in the mix design shall conform to Section 703 of the Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition.

- D. In general, a mixture shall be used which contains the minimum quantity of water consistent with the required workability of water consistent with the required workability and shall be such that:
1. The mortar clings to the coarse aggregate;
 2. The concrete is not sufficiently fluid to segregate when transported to the place when deposited in forms and vibrated;
 3. The concrete shall settle into place when deposited in forms and vibrated;
 4. The mortar shall show no free water when removed from the mixer; and
 5. The upper layer of the set concrete shall show a cement film on the surface but shall be free from laitance.
- E. Air Entered Concrete:
1. When air-entered concrete is specified or permitted, it shall be produced by addition at the mixer of an approved air-entering agent.
 2. Air-entered concrete shall contain at least three and not more than six percent air.
 3. Tests will be made on fresh representative samples of concrete. All tests will be subject to check test at the request of the CONTRACTOR.
 4. The quantity of air-entraining admixture shall be as recommended by the manufacturer and approved by the ENGINEER. However, no adjustment in compensation will be made when the CONTRACTOR is required to use larger or smaller quantities of the agent in order to produce the specified air content.
 5. The CONTRACTOR shall follow an approved procedure and use an approved automatic dispenser for adding the admixture to each batch. He shall maintain an adequate supply of admixture in the supply tank of the dispensing equipment and will be responsible for uniform operation of the equipment at all times during progress of the work.
- F. Admixtures and Additives
1. Admixture may be used with written permission from the ENGINEER or where provided for elsewhere in the contract. Subject to these provisions, admixtures to minimize segregation, to improve workability, to reduce the quantity of mixing water, to retard or accelerate setting time, or to accelerate development of strength may be used at the dose rate approved by the ENGINEER (Reference Section 713.02 of the Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition). Admixtures may not be used to replace cement.
 2. Admixtures containing chlorides will not be permitted unless specifically approved by the ENGINEER.
 3. Should the CONTRACTOR request and obtain permission to use admixtures for his own benefit, he shall furnish and incorporate them in the concrete mixture at his expense.
 4. Admixtures shall be dispensed in liquid form. Dispense for admixtures shall have sufficient quantity to measure at one time the full quantity required for each batch. All admixtures, except super-plasticizers, shall be dispersed uniformly into the mixing water. Unless liquid admixtures are mixed with pre-measured water for the batch, adequate provisions shall be made for discharging the admixture or additive uniformly into the flow of mixing water in such a manner as to uniformly disperse them into the water beginning to end of its flow into the mixer. As a check on the efficiency of the dispersing equipment, the ENGINEER may at his discretion make multiple air-content or other checks of any batch of concrete to

determine the uniformity of dispersion. Equipment for measure shall be designed for convenient confirmation of the accuracy of measurement.

5. When more than one liquid admixture is used, each shall be dispersed by separate equipment and not intermixed unless otherwise permitted in writing by the ENGINEER.

PART 3 – EXECUTION

3.01 MIXING

- A. Unless otherwise authorized, concrete shall be machine mixed.
- B. When air-entered or other admixtures are added at the mixer, the CONTRATOR shall provide separate approved scales for each admixture to be proportioned by weight, and accurate measures for each admixture to be proportioned by volume. The quantities to be introduced will be approved by the ENGINEER.
- C. All equipment necessary for construction of the applicable component of a concrete structure shall be available when required, in first class working condition, and approved by the ENGINEER before construction of the component will be permitted to start.
- D. Except when hand-mixing is specifically authorized, all concrete shall be mixed in a mechanically operated batch mixer of approved size and type.
- E. As soon as practicable after award of the contract, the CONTRACTOR shall furnish the ENGINEER the exact locations of the sources of the materials he proposes to use and sample shall be submitted as required. A design of the mix will be made and the proportions officially designated. The designated proportions shall be used so long as the materials retain the same physical characteristics, included specific gravity, and so long as they continue to meet the requirements herein specified, subject only to slight changes in the relative quantities of fine and coarse aggregates for the purpose of adjusting for free moisture.
- F. Concrete shall be mixed only in the quantity required for immediate use. Concrete which has developed initial set shall not be used. Concrete which has partially hardened shall not be retempered or remixed.
- G. The first batch of materials placed in the mixture shall contain an excess of cement, sand, and water sufficient to coat the inside of the drum without reducing the required mortar content of the mix.
- H. The entire contents of an individual drum shall be emptied before materials for a succeeding batch are placed therein. Upon cessation of mixing for an extended period, the mixer shall be thoroughly cleaned.
- I. Ready-mix concrete
 1. Ready-mix concrete shall be understood to mean concrete manufactured for delivery to the site of the work in a plastic state and delivered as herein after specified.
 2. Ready-mix concrete shall be of the same design and meet the same requirements set out for concrete mixed at the site.
 3. Mixers may either be stationary mixers or truck mixers. Agitators may be either truck mixers or truck agitators.

4. Each mixer and agitator shall be examined daily for changes in condition such as accumulation of concrete or mortar, excessive wear, etc., which may impair its capability. When such condition develops, approval of the unit will be withdrawn until the condition is corrected.
5. Each stationary mixer, truck mixer, and truck agitator shall have attached in a prominent place a metal plate showing the manufacturer's rated capacity and the speeds for mixing and for agitating.
6. The maximum size of the batch, the mixing speed, and the agitating speed shall those designed by the manufacturer for the equipment.
7. Stationary mixers: Shall be equipped with an approved device for timing each batch and shall have a timing device which will not permit the batch to be discharged until the specified mixing time has elapsed. The mixer shall have a regulator to control the mixing speed. These appliances shall be in proper working condition at all times when the mixer is in operation. Mixer drums shall be watertight, and the blades in the drum shall not be less than 85% of their designed size.
8. Truck mixers and Truck Agitators: Truck mixers and truck agitators, unless otherwise authorized in writing by the ENGINEER, shall be of the revolving drum type and shall be watertight. Truck mixers shall be so constructed that the concrete can be mixed at the prescribed rate to insure a uniform distribution of the material throughout the mass. Truck mixers and truck agitators shall be constructed so that the concrete can be agitated at the prescribed rate until delivered to the work. The mixing blades in the drum shall not be less than 85% of their designed size.

Except as subsequently provided, the truck mixer shall be equipped with a tank for carrying mixing water. Only the prescribed quantity of water shall be placed in the tank unless the tank is equipped with a device by which the quantity added can be readily verified. The prescribed quantity of water may be measured directly into the batch at the batching plant, in which case a tank will not be required on the truck. Truck mixers and truck agitators shall be equipped with approved automatic revolution counters which record either:

- a. Revolutions of the drums or blades when revolved at the mixing speed recommended by the manufacturer, or
- b. Revolutions of the drums or blades at any speed. In this case, the truck mixers shall remain at the batch plant until the required number of revolutions at mixing speed has been attained.

The counters shall be designed so as to prevent unauthorized resetting or tampering and located so as to provide safe and convenient inspection.

The capability of a truck mixer or truck agitator to produce to produce or deliver uniformly mixed concrete shall be determined at the commencement of work and repeated as deemed necessary.

9. Non-Agitator Trucks: Bodies of non-agitating hauling equipment shall be smooth, watertight containers and shall be capable of discharging the concrete at a satisfactorily controlled rate without segregation. The unit shall be constructed so as to deliver the concrete to the work in a thoroughly mixed an uniform mass and to discharge the concrete at or near the bottom of the container unless discharge is accomplished by tilting the body, in which case the surface of the load shall be retarded by a suitable baffle. Covers shall be provided when needed for protection.
10. Limits of Mixing and Agitating
 - a. Stationary Plants: The mixing time shall be that which will provide a satisfactory homogenous mixture. Unless otherwise specified in writing by the testing ENGINEER, the mixing time shall be not less than 50 seconds at the manufacturer's designated mixing speed. When deemed necessary to insure a satisfactory mix, the ENGINEER may designate in writing a

required mixing time. Four seconds shall be added to the specified mixing time if the timing starts the instant the skip reaches its maximum raised position. Mixing time will end when the discharge chute opens. Transfer time in multiple drum mixers will be included in the mixing time. The contents of an individual mixer drum shall be emptied before a succeeding batch is placed therein.

- b. Truck Mixers: Each batch shall be mixed for not less than 70 nor more than 100 revolutions at the speed designated by the manufacturer. Additional mixing, if any, shall be at the speed designated by the manufacturer as agitating speed. All materials, including mixing water, shall be in the mixer drum before actuating or documenting the revolutions of mixing. The mixing operation shall begin within 15 minutes after cement has been added to the aggregate or prior to the truck leaving the batching plant, whichever occurs first.

When the prescribed water is added at the batching plant and it is found that the slump requirements at the delivery site are not met, the ENGINEER or his representative may authorize controlled small quantities of water to be added to the batch to increase the slump to the specified requirements, provided necessary mixing is performed and all of these operations are performed within 45 minutes after the initial mixing is begun. In such case the ENGINEER may authorize or required for subsequent batches that a minimum of 75% of the mixing water be introduced at the plant and the remaining water be added at the job site to reduce loss by evaporation and that additional mixing be performed to insure thorough incorporation of the added water into the mix. The additional mixing shall be approved by the ENGINEER.

- c. Partial Mixing at the Central Plant: When a truck mixer is used for transportation, the mixing time at the stationary mixer may be reduced to 30 seconds provided the mixing is completed in the truck mixer. The mixing in the truck mixer shall be 50 to 80 revolutions at mixing speed.
- d. Truck Agitators: When a stationary mixer is used for complete mixing and truck agitators are used to transport the fully mixed concrete, the truck agitator shall be operated at the rate of rotation designed by the manufacturer from the time the mixed concrete is deposited into the agitator and until discharge at the site of the work.
- e. Time of Hauling and Placing Mixed Concrete: Concrete transported in a truck mixer or truck agitator shall be placed in its final position in the forms within 1 ½ hours after introduction of the mixing water to the cement and aggregate, whichever occurs first; except that in abnormal weather or under other conditions contributing the quick stiffening or unusually slow stiffening of the concrete, the ENGINEER may make a determination of a lesser or greater time for placement considering all factors affecting initial set of the concrete. When mixed concrete is transported in approved non-agitating trucks, the concrete shall be discharged at the work site within 30 minutes after the introduction of the mixing water to the cement and aggregate.

The maximum volume of mixed concrete transported in any transportation device shall not exceed the manufacturer's maximum operating capacity for the device.

- 11. Hand Mixing: When hand-mixing is authorized, it shall be done on a watertight platform and in such a manner as to insure a uniform distribution of the materials throughout the mass. Mixing shall be continued until a homogenous mixture of the required consistency is obtained.

12. Conveying Concrete: Ample and satisfactory equipment or means of conveying concrete from the mixer to the forms shall be provided.
13. Delivery: The plant supplying concrete shall have sufficient capacity and transporting apparatus to insure continuous delivery at the rate required. The rate of delivery shall be such as to provide for the proper continuity in handling, placing, and furnishing of the concrete. The rate shall be such that the interval between batches shall not exceed 20 minutes. The methods of delivering and handling the concrete shall be that which will facilitate placing with minimum rehandling and without damage to the structure or the concrete.

3.02 HANDLING AND PLACING CONCRETE

- A. Prior to placing concrete, all reinforcement shall have been accurately placed in the position shown on the plans and fastened as set out in Section 805, MS Standard Specifications for Road and Bridge Construction, 1990 Edition. All sawdust, chips, and other construction debris and extraneous matter shall have been removed from the interior of the forms. Temporary struts, braces, and stays holding the forms in correct shape and alignment shall be removed when the concrete placing has reached an elevation rendering their service unnecessary. These temporary members shall be entirely removed from the forms and shall not be buried in the concrete.
- B. All concrete shall be placed and finished during daylight hours unless otherwise specifically authorized by the ENGINEER. No concrete shall be placed until the forms and reinforcement have been inspected and approved.
- A. Except as provided for truck mixers and truck agitators, concrete shall be placed in the forms within 30 minutes after the time that the cement is first added to the mix.
- B. Concrete shall be placed so as to avoid segregation of materials and displacement of reinforcement. The use of troughs, chutes, and pipes over 25 feet in length for gravity conveyance of concrete to the forms, will not be permitted except when authorized by the ENGINEER and subject to the production of quality concrete.
- C. Only approved mechanical conveyors will be permitted.
- D. Open troughs and chutes shall be metal or metal lined. The use of aluminum pipes, chutes or other devices made of aluminum that come into direct contact with the concrete shall not be used. Where steep slopes are required, the chutes shall be equipped with baffles or be in short sections that change the direction of movement.
- E. All chutes, troughs, and pipes shall be kept clean and free from coatings and hardened concrete by thoroughly flushing with water after each run. Water used for flushing shall be discharged clear of the structure.
- F. When placing operations involve dropping the concrete more than five feet, it shall be deposited through sheet metal or other approved pipes to prevent segregation and unnecessary splashing. The pipes shall be made in sections to permit discharging and rising as the placement progresses. A non-jointed pipe may be used if sufficient openings of the proper size are provided to allow for the flow of the concrete into the shaft. As far as practicable, the pipes shall be kept full of concrete during placing, and their ends shall be kept buried in the newly placed concrete.

G. Except as hereinafter provided, concrete shall be placed in horizontal layers not more than 12 inches thick. When, with the ENGINEER'S approval, less than the complete length of a layer is placed in one operation, it shall be terminated in a vertical bulkhead. Each layer shall be placed and compacted before the preceding layer has taken its initial set and shall be compacted so as to avoid the formation of a construction joint with the preceding layer.

H. Consolidation

Concrete, during and immediately after depositing, shall be thoroughly consolidated by the use of approved mechanical vibrators and suitable spading tools. Hand spading alone will be permitted on small structural members such as railing and small culvert headwalls. Mechanical vibration of concrete shall be subject to the following:

a. The vibration shall be internal unless special authorization of other methods is given by the ENGINEER or as provided.

b. In general, vibrators shall be a type and design approved by the ENGINEER. They shall be capable of vibration frequencies of at least 4500 impulses per minute.

For lightweight concrete, the vibrator shall be an internal type operated at 10,000 rpm, unless otherwise approved by the ENGINEER. Excessive vibration will not be permitted.

c. The intensity of vibration shall be such as to visibly affect a mass of concrete of one inch slump over a radius of at least 18 inches.

d. The CONTRACTOR shall provide sufficient vibrators to properly compact each batch immediately after it is placed in the forms.

e. Vibrators shall be manipulated so as to thoroughly work the concrete around the reinforcement and embedded fixtures and into the corners and angles of the forms.

Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The vibrators shall be inserted into and withdrawn out of the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but shall not be continued so as to cause segregation. Vibration shall be continued at any one point to the extent that localized areas of grout are formed.

f. Vibration shall not be applied directly or through the reinforcement to sections of layers of concrete which have taken initial set. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation, and vibrators shall not be used to transport concrete in the forms.

g. Vibration shall be supplemented by spading as necessary to insure smooth surfaces, in corners, and in locations impossible to reach with vibrators.

h. These provisions shall apply to the filler concrete for steel grid floors except that the vibrator shall be applied to the steel.

- i. These provisions shall apply to precast piling, concrete cribbing, and other precast members except that, if approved by the ENGINEER, the manufacturer's methods of vibrations may be used.

When hand spading is used for consolidation, a sufficient number of workmen with spading tools shall be provided. They will be required to flush a thin layer of mortar to all surfaces and thoroughly and satisfactorily consolidate the concrete.

The entire operation of depositing and consolidating the concrete shall be conducted so that the concrete shall be smooth and dense and free from honeycomb or pockets of segregated aggregate.

I. Discontinuance of Placing

- a. When placing is temporarily discontinued, the concrete, after becoming firm enough to retain its form, shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete. To avoid visible joints insofar as possible upon exposed faces, the top surface of the concrete adjacent to the forms shall be smoothed with a trowel. Where a "feather edge" might be produced at a construction joint, such as in the sloped top surface of a wing wall, an inset form work shall be used in the preceding layer. Work shall not be discontinued within 18 inches thick. In the case and if permitted by the ENGINEER, the construction joint may be made at the under side of the coping.

- b. Immediately following the discontinuance of placing concrete, all accumulations of mortar splashed on the reinforcement and the surface of the forms shall be removed. Dried mortar chips and dust shall not be puddle into the unset concrete. If the accumulations are not removed prior to the concrete becoming set, care shall be exercised not to break or injure the concrete-steel bond at and near the surface of the concrete while cleaning the reinforcement. After initial set the forms shall not be jarred, and no strain shall be placed on the ends of projecting reinforcement until the concrete has sufficiently set to insure against any damage by such jarring or strain.

- J. Place concrete by methods which will completely fill entire form and encase reinforcing and other embedded items without honeycombing and air pockets. Deposit concrete as near as practicable to its final position, in layers at such a rate that at all times during placing, concrete will be plastic; no pouring planes will occur; and no thin sheets of concrete will adhere and harden on reinforcing and other embedded items before they are embedded in final concrete body. Spade and vibrate concrete so that it will flow together and completely fill all void spaces.

- K. DO NOT cast any large stones, brick, or pieces of previously hardened concrete into concrete work; place any concrete on frozen ground, mud, topsoil, or other unsuitable materials.

- L. Top surface of each pier shall be level plane, and finished pier top elevations shall not vary more than 1/4" from those specified.

M. Cold Weather Placing:

- a. No Portland cement concrete, mortar, or grout shall be placed when the atmospheric temperature is below 35°F without written permission from the ENGINEER. When the CONTRACTOR proposes to place concrete during seasons when there is a probability of temperatures lower than 40°F, he shall have available on the project the approved facilities necessary to enclose

uncured concrete and to keep the temperature of the air inside the enclosure within the ranges and for the minimum periods specified herein.

- b. When there are indications of temperatures of less than 40°F during the first four days after placement of concrete, the ENGINEER may not permit placement or he may stipulate conditions under which the concrete maybe placed and protected. Concrete required to be protected from cold temperatures will be required to be maintained between 50°F and 100°F for at least three additional days.
- c. When directed by the ENGINEER, the CONTRACTOR shall use heating equipment such as stoves, salamanders, or steam equipment as deemed necessary to protect the concrete. When dry heat is used, means of maintaining atmospheric moisture shall be provided. When directed by the ENGINEER, one or more of the aggregates and/or missing water shall be heated to a temperature of at least 70°F but more than 150°F at the time of mixing. The aggregates may be heated by steam or dry heat or by placing in the mixing water which has been heated to a temperature of not more than 175°F provided the resulting temperature of the aggregates and mixing water is at least 70°F and not more than 150°F. Frozen aggregates shall not be placed in the mixing water. The temperature of the concrete shall be at least 60°F and not more than 80°F at the time of placing. In case of extremely cold temperatures, the ENGINEER may raise the minimum temperatures for water, aggregates, and mixed concrete. When either aggregates of water are heated above 100°F, the aggregates and water shall be combined first in the mixer before the cement is added to avoid flash set.
- d. The use of salt or other chemical admixtures in lieu of heating will not be permitted.
- e. Before placing concrete, all ice or frost shall be removed from the forms and reinforcement.
- f. In the case of concrete placed directly on or in the ground, such as far footings or bottom slabs, protection and curing during cold weather may be provided as set for concrete pavement under 501.03.20.3 of the MS Standard Specifications for Road and Bridge Construction, 1990 Edition.
- g. CONTRACTOR shall assume all risk and added cost connected with the placing and protecting of concrete during cold weather. Permission given by the ENGINEER to place during such time will no way relieve the CONTRACTOR of responsibility for satisfactory results. Should it be determined at anytime that the concrete placed under such conditions is unsatisfactory; it shall be removed and replaced with satisfactory concrete by the CONTRACTOR with out extra compensation.

N. Hot Weather Placing

- a. The manufacture, placement, and protection of concrete during hot weather requires special attention to insure that uniform slump ranges and satisfactory placement qualities are maintained, that surface cracking is held to a minimum, and that design strengths are produced.
- b. When the atmospheric temperature is 95°F or above, the CONTRACTOR shall use such controls as are deemed by the ENGINEER to be necessary to produce and place concrete in as cool and uniform condition as practicable to safeguard

against improper placement characteristics or temporary or permanent damage. The ENGINEER may require any or all, but not limited to, the following precautions depending upon his determination as to the severity of the hot or arid conditions with respect to the work being performed.

1. Provide or require an adequate sprinkling system and sprinkle coarse aggregate stockpiles as necessary to keep the aggregates in a saturated condition in order to minimize variation of absorption of mixing water and to cool the aggregates by evaporation.
 2. Protect mixing water lines from the sun by adequate covering.
 3. Paint transporting containers with light colored, heat-reflective paints, or cool the surfaces of these containers by water spraying, fogging, or other effective methods.
 4. Provide for proper spacing of trucks delivering fresh concrete to the project site so that the concrete will be placed in the work after on the minimum necessary elapsed time.
 5. Fog spray with water the forms and foundations to receive the green concrete in order to reduce absorption and to cool by evaporation.
 6. Fog spray with water or otherwise protect from excessive temperatures reinforcing steel and structural steel against which fresh concrete is to be placed.
 7. Apply water spray to membrane curing surfaces after the curing compound has set in order to maintain lower daytime temperatures in the concrete.
- c. In order to minimize the number and extent of precautions required for hot weather concreting, the CONTRACTOR may use approved chemical admixtures for set retarding purposes. However, the use of set-retarding admixtures will not relieve the CONTRACTOR of the necessity of taking other precautions deemed necessary to protect the green concrete.
- d. Unless otherwise specified, additives or admixtures shall be used only with the authority of the Testing ENGINEER and subject to the conditions set forth on such authority.
- e. Unless otherwise provided in the contract, the furnishing and use of additives or admixtures and the other precautions necessary to provide satisfactory concrete shall be considered subsidiary to the furnishing and placement of the concrete, and all additional costs related thereto and risks resulting there from shall be borne by the CONTRACTOR.

3.03 CURING

- A. Concrete surfaces shall be protected from premature drying by covering as soon as possible with a satisfactory curing material. When wetted burlap is used, it shall not be less than two thicknesses of Class 3 burlap or its equivalent, and the burlap shall be kept continuously and thoroughly wet. Careful attention shall be given to the proper curing and protection of concrete, and curing by the wetting methods shall continue for a period of at least seven days after placing the concrete. If high-early strength cement is used, this period may be reduced to four days.

- B. Surfaces to have Class 2 rubbed and sprayed finish and bridge deck surfaces when the atmospheric temperature is 90°F or above shall be cured only by the wetting method. The curing of concrete bridges with membrane curing will be permitted only under the conditions specified herein.
- A. Surfaces on which curing is to be by liquid membrane shall be given the required surface finish prior to the application of curing compound. During the finishing period the concrete shall be protected by the water method of curing. Concrete surfaces cured by the liquid membrane method shall receive two applications of curing compound. The first application shall be applied immediately after the finishing is completed and accepted. Prior to applying the first application, the concrete shall be thoroughly wetted with water and the liquid membrane applied just as the surface film of water disappears. The second application shall be applied immediately after the first application is set. The rate of the application of curing compound will be as prescribed by the ENGINEER with a minimum spreading rate per application of one gallon per 200 square feet of concrete surface. The coating shall be protected against marring for at least 10 days after the application of the curing compound. The coating on bridge decks shall receive attention and may require additional protection as required by the ENGINEER. All membrane marred or otherwise disturbed shall be given an additional coating. Should the surface coating be subjected repeatedly to injury, the ENGINEER may require that the water curing method be applied at once.
- B. When using curing compound, the compound should be thoroughly mixed within an hour before use. If the use of curing compound results in a streaked or blotched appearance, the method shall be stopped and water curing applied until the cause of defective appearance is corrected.
- C. Other precautions to insure the development to insure the development of strength shall be taken as directed.
- D. Adequate tarpaulins of ample size shall be on the project and used as necessary to protect the work in case of rain or other emergencies.
- E. Conditions governing the placement of concrete and the requirements for the placement, protection and curing of concrete during cold or hot weather shall conform to the limitations, conditions, and requirements stipulated in 804-03-16, of the MS Standard Specifications for Road and Bridge Construction, 1990 edition, as applicable.

3.04 PATCHING: As soon as practicable after form removal, first remove loose materials from honeycombs, void spaces, other defects, and holes left by removal of form tie devices, and then fill and patch these areas with cement-sand grout. Force grout in place, and finish it flush with and to match adjacent concrete surfaces.

3.05 FINISHING:

A. Surface finishes of exposed concrete surfaces shall be classified as follows:

- Class 1 Ordinary Surface Finish
- Class 2 Rubbed or Spray Finish
- Class 3 Tooled Finish
- Class 4 Sand-Blast Finish
- Class 5 Wirebrush or Scrubbed Finish
- Class 6 Floated Surface Finish

B. Class 1, Ordinary Finish

1. Immediately following the removal of forms, all fins and irregular projections shall be removed from all surfaces except from those which are not to be exposed or not to be waterproofed. On all surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other defects shall be thoroughly cleaned, and after having been kept saturated with water for at least three hours shall be carefully pointed and trued with a mortar of cement and fine aggregate mixed in the proportions used in the class of the concrete being finished. Mortar used in pointing shall be not more than one hour old. The mortar patches shall be cured as specified in Section 08100-3.02. All construction and expansion joints shall be left carefully tooled and free of mortar and concrete. The joint filler shall be left exposed for its full length with clean and true edges.
2. The resulting surfaces shall be true and uniform. All surfaces which cannot be repaired to the satisfaction of the ENGINEER shall be given a Class 2 Rubbed Finish.

C. Class 2, Rubbed or Spray Finish

1. Rubbed Finish

- a. After removal of forms, the Class 1 finish shall be completed and the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for at least three hours. Surfaces shall be rubbed with a medium course Carborundum stone using a small amount of mortar on its face. The mortar shall be composed of cement and sand mixed in proportions used in the concrete being finished. Rubbing shall be continued until all form marks, projections, and irregularities have been removed, all voids are filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place at this time.
- b. After all concrete above the surface being treated has been cast; the final finish shall be obtained by rubbing with a fine carborundum stone and water. This rubbing shall continue until the entire surface is of a smooth texture and uniform color.
- c. After the final rubbing is complete and the surface has dried, it shall be rubbed with burlap to remove loose powder and objectionable marks.

2. Spray Finish

- a. Prior to the spray finish, the concrete shall be given a Class 1 finish in accordance with Section 08100-3.05-B, supplement if necessary with a grout meeting the requirements of 714.11, of the MS Standard Specifications for Road and Bridge Construction, 1990 edition, with fine aggregate modified to require 100 percent passing the No. 16 Sieve.
- b. Grout shall be applied with burlap pads or float sponges, and as soon as the grout has dried the surface shall be brushed to remove all loose grout and the surface left smooth and free of air holes. Surfaces to be sprayed shall be free of efflorescence, flaking coatings dirt, oil, and other foreign substances. Prior to application of the spray finish, the surfaces shall be free of mixture, as determined by sight and touch, and in a condition consistent with the manufacturer's published recommendations.

- c. The spray finish shall be applied with heavy duty spray equipment capable of maintaining a constant pressure as necessary for proper application. The material shall be applied as recommended by the manufacturer except the rate of application shall not be less than one gallon per 50 square feet of surface area without prior written approval of the ENGINEER.
- d. The completed finish shall be tightly bonded to the structure and present a uniform appearance and texture equal to or better than a rubbed finish. If necessary, additional coats shall be sprayed to produce the desired surface texture and uniformity. Upon failure to adhere positively to the structure without chipping or cracking or to attain the desired surface appearance, the coatings shall be completely removed and the surface given a rubbed finish in accordance with Section 08100-3.05-C, or other approved methods shall be used to obtain the desired surface finish to the satisfaction of the ENGINEER without additional cost to the OWNER.

D. Class 3, 4, and Finishes

If required, specifications for these finishes will be contained in the special provisions.

E. Class 6, Floated Surface Finish

After the concrete has been deposited in place, it shall be consolidated and the surface shall be struck off by means of a strike board and floated with a wooden or cork float. An edging tool shall be used on edges and expansion joints. The surface shall not vary more than 1/8 inch under a 10-foot straightedge. The surface shall have a granular or matte texture which will not be slick when wet.

F. Required Finishes for Various Surfaces

Unless otherwise specified, the top surface of sidewalks, the top horizontal surfaces of footings, and top slabs of box bridges, box culverts, or other structures shall be given a Class 6 finish. All formed concrete surfaces shall be given a Class 1 finish, except on surfaces which are completely enclosed, such as the inside surfaces of cells of box girders, the removal of fins and form marks and the rubbing of mortared surfaces to a uniform color will not be required. In reference to finishing, exposed surfaces are surfaces or faces which may be seen after the backfill has been placed. Exposed surfaces requiring Class 2 finish shall be finished at least one foot below the ground line or the low water elevation, whichever is higher.

The Class 2 finish shall be made upon a Class 1 finish. After the removal of forms the Class 1 finish shall be completed and the rubbing of concrete shall be started as soon as the condition of the concrete will permit.

3.06 FIELD QUALITY CONTROL DURING CONSTRUCTION

A. Quality Control Testing During Construction:

1. Perform sampling and testing for field quality control during the placement of concrete, as directed by the ENGINEER. Sampling & testing shall be performed by a certified technician and laboratory. At a minimum, testing shall consist of:
 - a. Sampling Fresh Concrete: ASTM C 172
 - b. Slump: ASTM C 143; one test for each set of compressive strength test specimens (minimum of one per day). Maximum Slump = 4"
 - c. Air Content: ASTM C 231; one test for each set of compressive strength test specimens (minimum of one per day).

- d. Compressive Strength Tests: ASTM C 39; one set of compression cylinders (four per set) for each 30 cubic yards or fraction thereof and for each additional 100 cubic yards thereafter, of each mix design placed in any one day; one specimen tested at three days, one specimen tested at seven days, one specimen tested at 28 days, and one backup specimen.
 - 1) Adjust mix if test results are unsatisfactory and resubmit for ENGINEER'S approval.
 - 2) Concrete which does not meet the strength requirements is subject to rejection and removal from the Work, or to other such corrective measures as directed by the ENGINEER, at the expense of the CONTRACTOR.
 - e. Compression Test Specimens: ASTM C 31; make one set of four standard cylinders for each compressive strength test, unless otherwise directed. Cast, store and cure specimens as specified in ASTM C 31.
 - f. Concrete Temperature: Test hourly when air temperature is 40°F and below, and when 80°F and above; and each time a set of compression test specimens is made.
2. The testing laboratory shall submit certified copies of test results directly to the ENGINEER and the CONTRACTOR within 24 hours after tests are made. Test results must be submitted to the ENGINEER for review prior to approval of any pay request.

END OF SECTION

SECTION 321315

CONCRETE FORMWORK

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Scope: CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install the concrete formwork. The Work also includes providing openings in formwork to accommodate the Work under this and other Sections and building into framework all items such as sleeves, anchor bolts, inserts and all other items to be embedded in concrete for which placement is not specifically provided under other Sections.
- B. Coordination:
 - 1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the formwork.
 - 2. Notify other CONTRACTORS in advance of the construction of the framework to provide the other CONTRACTORS with sufficient time for the installation of items included in their contracts that must be installed with the formwork.

1.02 QUALITY ASSURANCE

- A. CONTRACTOR shall examine the substratum and the conditions under which concrete formwork is to be performed, and notify the ENGINEER in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the ENGINEER.
- B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - a. ACI 347, Recommended Practice for Concrete Formwork.
- C. Allowable Tolerances: Construct formwork to provide completed concrete surfaces complying with tolerances specified in ACI 347, Chapter 3.3, except as otherwise specified.
- D. All items for permanent or temporary facilities shall be used in accordance with manufacturer's instructions.

1.03 SUBMITTALS

Shop Drawings: Submit for information purposes copies of manufacturer's data and installation instructions for proprietary materials, including form coatings, manufactured form systems, ties and accessories.

1.04 PRODUCTIVITY DELIVERY, STORAGE, AND HANDLING

- A. On delivery to job site, place materials in area protected from weather.
- B. Store materials above ground on framework or blocking. Cover wood for forms with protective waterproof covering. Provide for adequate air circulation or ventilation.
- C. Handle materials to prevent damage.

PART 2 – PRODUCTS

2.01 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise shown or specified, construct formwork for exposed concrete surfaces with plywood, metal-framed plywood-faced or other panel type materials accepted to ENGINEER, to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to joint system shown or specified. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces that will be unexposed in the finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber that is dressed on at least two edges and one side.
- C. Form Ties:
 - 1. Provide factory-fabricated, removable or snap off metal form ties, designed to prevent form deflection, and to prevent spalling of concrete surfaces upon removal. Materials used for tying forms, will be subject to approval of the ENGINEER.
 - 2. Unless otherwise shown, provide ties so that portion remaining within concrete after removal of exterior parts is at least one-inch from the outer concrete surface. Unless otherwise shown, provide form ties that will leave a hole no larger than one-inch diameter in the concrete surface.
 - 3. Ties for exterior walls and walls subject to hydrostatic pressure shall have water stops.
 - 4. Provide wood or plastic cones for ties, where concrete is exposed in the finish structure and in the interior of tanks.
 - 5. Provide stainless steel form ties for planned exposed tie hole locations, where shown on the Drawings. When used, tie break back point shall be at least one inch from outer concrete surface.
 - 6. Wire ties are not acceptable.
- D. Forms Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede the wetting surfaces to be cured with water or curing compounds. For concrete surfaces which will be in contact with potable water, the form coating shall be a mineral oil base coating.

2.02 DESIGN OF FORMWORK

- A. Design, erect, support, brace and minimum formwork so that it shall safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system or in-place construction that has attained adequate strength for this purpose. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Design forms and falsework to include values of live load, dead load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of structure during construction.
- C. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations, using wedges or jacks or a combination thereof. Provide trussed supports when adequate foundations for shores and struts cannot be secured.
- D. Support form facing materials by structural members spaced sufficiently close to prevent significant deflection. For forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities and within allowable tolerances. For long span members

without intermediate supports, provide camber in formwork as required for anticipated deflections resulting from weight and pressure of fresh concrete and construction loads.

- E. Design formwork to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials.
- F. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

PART 3 – EXECUTION

3.01 INSPECTION

Examine conditions under which formwork is to be installed, and notify ENGINEER in writing of unsatisfactory conditions existing. Do not proceed with the Work until unsatisfactory conditions or deficiencies have been corrected in a manner acceptable to ENGINEER.

3.02 FORM CONSTRUCTION

- A. All forms shall be built mortar-tight and sufficiently rigid to prevent distortion due to pressure of the concrete and other loads incident to the construction operations. Forms shall be constructed and maintained so as to prevent warping and the opening of joints due to shrinkage. The forms shall be substantial and unyielding and shall be so designed that the finished concrete will conform to the proper dimensions and contours. The design of the forms shall take into account the effect of vibration of concrete as it is placed.
- B. Forms shall have sufficient strength to carry safely the load of concrete with a construction live load of at least 50 pounds per square foot; be stiff enough to prevent any appreciable bulging, sagging or moving out of position; be tight enough to prevent any appreciable loss of mortar; and be arranged so that they can be safely and easily removed without damaging concrete. Construct and erect forms with the fewest practicable number of joints, and to insure straight, plumb, level, and smooth concrete surfaces with all angles sharp and true to line. Use form oil and wetting as required to accomplish these results
- C. Construct forms complying with ACI 347; to the exact sizes, shapes, lines and dimensions shown as required to obtain accurate alignment, location and grades; to tolerances specifies; and to obtain level and plumb work in finish structures. Provide for openings, offsets, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes. Finish shall be as determined by approved mock-up or sample panel, if specified.
- D. Fabricate forms for easy removal without damaging concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and assure ease of removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms in locations as inconspicuous as possible, consistent with requirements of the Work. Form

intersecting planes of openings to provide true, clean-out corners, with edge grain of plywood not exposed as form for concrete.

- F. Minimum requirements for slab overhang forms shall be 3/4- inch plywood supported on 2"x 6" S4S wood timbers placed flat-wise on 16-inch centers. Adjustable brackets for support of slab overhang forms shall be spaced at a minimum distance of 3'0" center to center unless specifically approved otherwise. Grade points for forms shall coincide with the location of the adjustable form brackets.
- G. Metal ties or anchorages within the forms shall be so constructed as to permit their removal, without injury to the concrete, to a depth of at least the reinforcing steel clearance shown on the plans. Nippers shall be used for green concrete. All fittings for metal ties shall be designed so that upon their removal the cavities which are left will be the smallest practicable size. The cavities shall be filled with cement mortar and the surface left sound, smooth, even, and uniform in color.
- H. Forms shall be set and maintained to the lines designated until the concrete is sufficiently cured for form removal. Forms shall remain in place for periods which shall be determined as hereinafter specified. If forms are deemed to be unsatisfactory in any way, either before or during the placing of concrete, the ENGINEER will order the work stopped until the defects have been corrected.
- I. Access to the lower portions of forms for narrow walls and columns shall be provided for cleaning our extraneous material immediately before placing the concrete.
- J. All forms shall be treated with approved oil saturated with water immediately before placing the concrete. For rail members or other members with exposed faces, the forms shall be treated only with an approved oil to prevent the adherence of concrete. Any material which will adhere to or discolor the concrete shall not be used.
- K. When metal forms are used they shall be kept free from rust, grease, or other foreign matter which will discolor the concrete. They shall be of sufficient thickness and so connected that they will remain true to shape and line, and shall conform in all respects as herein prescribed for mortar tightness, filleted corners, beveled projections, etc. They shall be constructed so as to insure easy removal without injury to concrete. All inside bolt and rivet heads shall be countersunk.
- L. All chamfer strips shall be dressed, straight, and of uniform width and shall be maintained as such at all times.
- M. Falsework:
 - 1. The CONTRACTOR shall submit to the ENGINEER four copies of structural design analysis and detail drawings which show the method of falsework or centering. These designs and detail plans shall be prepared and bear the seal of a Registered Professional Engineer with experience in falsework design.
 - 2. Falsework plans shall include falsework elevations together with all other dimensions and details which is considered necessary for construction. Other pertinent data needed is size and spacing of all falsework members and minimum bearing requirements for false piles.
 - 3. Erect falsework and support, brace and maintain it to safely support vertical, lateral and asymmetrical loads applied until such loads can be supported by in-place concrete structures. Construct falsework so that adjustments can be made for take-up and settlement. Upon completion of falsework erection, the Registered Professional Engineer shall certify that the erected falsework is capable of supporting the load for construction.
 - 4. Falsework piling shall be spaced and driven so that the bearing value of each pile is sufficient to support the load that will be imposed upon it. The bearing value of the piles should be calculated according to the appropriate formula given in Section 803

of the Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition.

5. For designing falsework and centering, a weight of 150 pounds per cubic foot shall be assumed for green concrete. All falsework shall be designed and constructed to provide the necessary rigidity and to support the loads without appreciable settlement or deformation. Carefully inspect falsework and formwork during and after concrete placement operations to determine abnormal deflection or signs of failure; make necessary adjustments to produce finished Work of required dimensions. The CONTRACTOR may be required to employ screw jackets or hardwood wedges to take up slight settlement in the falsework either before or during the placing of concrete. An allowance shall be made for anticipated compressibility of falsework and for the placement of shims, wedges, or jacks to produce the permanent structural camber shown on the plans. If during construction, any weakness develops and the falsework shows any undue settlement or distortion, the work shall be stopped, the part of the structure affected removed, and the falsework strengthened before work is resumed. Falsework which cannot be founded on a satisfactory footing shall be supported on piling, which shall be spaced, driven, and removed (reference Section 804.03.15 of the Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition) in manner approved by the ENGINEER.
6. All structures built across a public street or highway on which maintenance of traffic is required, shall have falsework so arranged that a vertical clearance of at least 13'-6", and unless otherwise specified, a horizontal clearance of at least the width of the traveled way shall be provided at all times. If the vertical clearance is less than 13'-6" or the horizontal clearance is less than the full crown width of the roadways, the CONTRACTOR shall install and maintain appropriate safety devices, clearance signs, and warning lights, and shall notify the ENGINEER sufficiently in advance of restricting the clearance for him to advise both the Traffic Control and Safety and the Maintenance Divisions.

N. Forms for Exposed Concrete:

1. Shall be of uniform thickness with a smooth inside surface of an approved type.
2. Joints shall be closely fitted to eliminate fins, stone pockets, or other variations in the surface of the concrete which would mar a smooth and uniform texture.
3. Do not use metal cover plates for patching holes or defects in forms.
4. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.
5. Use extra studs, walers and bracing to prevent bowing of forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material that will produce bow.
6. Assemble forms so they may be readily removed without damage to exposed concrete surfaces.
7. Form molding shapes, recesses and projections with smooth-finish materials, and install in forms with sealed joints to prevent displacement.

O. Corner Treatment:

1. Form exposed corners of beams, walls, foundations, bases and columns to produce smooth, solid, unbroken lines, except as otherwise shown. Except as specified below for reentrant or internal corners, exposed corners shall be chamfered.
2. Form chamfers with 3/4-inch by 3/4-inch strips, unless otherwise shown, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and mitter chamfer strips at changes in direction.

3. Reentrant or internal corners and unexposed, buried corners may be formed either square or chamfered.
- P. Openings and Built-In Work:
1. Provide openings in concrete formwork shown or required by other Sections or other contracts. Refer to paragraph 1.01B herein for the requirements of coordination.
 2. Accurately place and securely support items to be built into forms.
- Q. Cleaning and Tightening: Thoroughly clean and forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is to be placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.03 FORM COATINGS

- A. Coat form contact surfaces with a non-staining form-coating compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces which will be bonded to fresh concrete. Apply in compliance with manufacturer's instructions.
- B. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.04 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into the formwork, anchorage devices and other embedded items, shown, specified or required by other Sections and other contracts. Refer to paragraph 1.01B herein for the requirements of coordination. Use necessary setting, drawings, diagrams, instructions and directions.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support screeds.

3.05 FIELD QUALITY CONTROL

- A. Before concrete placement, CONTRACTOR shall check the formwork, including lines, ties, tie cones, and form coatings. He shall make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems.
- B. During concrete placement CONTRACTOR shall check formwork and related supports to ensure that forms are not displaced and that completed Work shall be within specified tolerances.
- C. If CONTRACTOR finds that forms are unsatisfactory in any way, either before or during placing of concrete shall be postponed or stopped until the defects have been corrected, and reviewed by the ENGINEER.

3.06 REMOVAL OF FORMS

- A. Conform to the requirements of ACI 301, Chapter 4 and ACI 347, Chapter 3.6.2.3, except as specified below.
- B. Form facing material shall remain in place a minimum of five days after concrete placement unless otherwise approved by ENGINEER.

- C. Do not remove supporting forms or shoring until the members have acquired sufficient strength to safely support their weight and the load upon them. Results of suitable control tests may be used as evidence that the concrete has attained sufficient strength.
- D. The time for removal of all forms will be subject to the ENGINEER'S approval.
- E. In the determination of the time for the removal of falsework, forms, and housing and the discontinuous of heating, consideration shall be given to the location and character of the structure, the weather and other conditions influencing the setting of the concrete, and the materials used in the mix. No forms or supports shall be removed prior and approval by the Engineer. During cold weather, removal of housing and the discontinuous of heating shall be in accordance with Section 804.03.16.1 of the Mississippi Standard Specifications for Road and Bridge Construction, 1990 Edition.
- F. At the CONTRACTOR'S option and with approval of the ENGINEER, the time for removal of forms may be determined by cylinder tests, in which case the CONTRACTOR shall furnish facilities for testing the cylinders. The facilities shall include an approved concrete testing machine of sufficient capacity and calibrated by an acceptable commercial laboratory. Tests shall be conducted in the presence of the ENGINEER'S representative to witness and record strengths obtained on each break or performed by a certified testing laboratory.
- G. Methods of form removal likely to cause overstressing of the concrete shall not be used. Forms and supports shall be removed in a manner that will permit the concrete to uniformly and gradually take the stresses due to its own weight. Centers shall be gradually and uniformly lowered in a manner that will avoid injurious stresses in any part of the structure.
- H. As soon as concrete for railings, ornamental work, parapets, and vertical faces which required a rubbed finish has attained a safe strength, the forms shall be carefully removed without marring the surfaces and corners, the required finishing performed, and the required curing continued.
- I. Prior to final acceptance of the work, the CONTRACTOR shall remove all falsework, forms, excavated material, or other material placed in the stream channel during construction. Falsework piles may be cut or broken off at least one foot below the mud-line or ground line unless the plans specifically indicate that they are to be pulled and completely removed from the channel.

3.07 PERMANENT SHORES

- A. Provide permanent shores as defined in ACI 347 Chapter 3.7.
- B. Reshores will not be permitted.

3.08 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in the Work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.

- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces. Form surfaces shall be subject to the ENGINEER'S approval.

The shape, strength, and rigidity, water-tightness, and surface smoothness of reused forms shall be maintained at all times. Warped or bulged lumber shall be resized before being reused. Forms which are unsatisfactory in any respect shall not be reused

END OF SECTION

SECTION 321723

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section consists of requirements necessary when furnishing Traffic Markings as required by the project Drawings and detailed in these Specifications and MDOT Specifications.
- B. Dimensions shall be as indicated on the Drawings.
- C. Where reference is made to Mississippi Department of Transportation Specifications (MDOT), it is intended to be in accordance with **Mississippi Standard Specifications for Road and Bridge Construction, Mississippi Department of Transportation , Current Edition.**

PART 2 - MATERIALS

2.01 DESCRIPTION

- A. All materials for Traffic Markings and related work shall comply with Mississippi Standard Specifications for Road and Bridge Construction, MDOT, Current Edition as follows:

2.02 THERMOPLASTIC TRAFFIC MARKINGS

- A. All thermoplastic traffic markings shall conform to the requirements of the **Current Edition of the Mississippi Standard Specifications for Road and Bridge Construction, Thermoplastic Traffic Markings**, except as amended herein.

- 1.
 - a. 4" or 6" Continuous White Per LF
 - b. 4" or 6" Continuous Yellow Per LF
 - c. 4" or 6" Skip White Per LF
 - d. Stop Bar (White) Per LF
 - e. Traffic Legend Per SF
 - f. Traffic Detail Per LF

2.03 PAINTED TRAFFIC MARKINGS

- A. All painted traffic markings shall conform to the requirements of the **Current Edition of the Mississippi Standard Specifications for Road and Bridge Construction, Section 625, Painted Traffic Markings**, except as amended herein.

- 1.
 - a. 4" or 6" Continuous White Per LF
 - b. 4" or 6" Continuous Yellow Per LF
 - c. 4" or 6" Skip Yellow Per LF
 - d. Stop Bar (White) Per LF
 - e. Traffic Legend Per SF
 - f. Handicap Symbol Per Each

END OF SECTION

SECTION 329200

SEEDING, FERTILIZING, AND MULCHING

PART 1 – GENERAL

This section consists of furnishing all labor, supervision, materials, tools, incidentals and equipment, and performing all top soiling tilling, fertilizer, seeding, watering, and otherwise establishing, protecting, and maintaining seeded areas as required by the Construction Plans and these Specifications.

PART 2 – PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall be well-graded soil of good uniform quality, without detrimental admixture of subsoil, refuse and foreign material, and reasonably free of hard clods, stones, cement, brick, slag, concrete, sticks or other undesirable material harmful to plant life.
- B. Topsoil shall have a pH value of not less than 4.5 nor more than 8.0, and shall meet the following gradation requirements:

Sieve Size	
Percent Passing No. 10 Sieve, by weight	95-100
Percent Passing No. 270 Sieve, by weight	40-85
Silt (.05-.005mm)	20-65
Clay (passing .005mm)	10-35

2.02 LIME

Lime shall be ground limestone containing not less than 85% of total carbonates and shall be ground to such fineness that 95% will pass through a No. 8 mesh sieve and 50% will pass through a No. 100 mesh sieve.

2.03 FERTILIZER

Fertilizer shall be water soluble commercial fertilizer 13-13-13. Containers shall be kept dry until use.

2.04 TEMPORARY SEED

Seeds with a minimum pure live seed content of 90 percent shall be used. They shall be of the best grade and of known vitality, purity, and germination and shall be delivered in containers bearing seed tags as required by law showing percentages of germination content and purity of seed as well as percentages of weed seed content.

All seeds shall be free of wild onion, Canadian thistle, Johnson grass, crab grass or other seeds of noxious weeds. Seed which has become wet, moldy or otherwise damaged in transit or storage will not be acceptable.

Purity, Germination and Planting Schedule

<u>Name</u>	<u>Percent Purity</u>	<u>Percent Germination</u>	<u>Mix (Dry Wt. Lbs. Per Acre)</u>
Spring and Summer Seeding (March to September 1)			
Hulled Bermuda	95	90	20
Tall Fescue	95	95	<u>20</u>
Total			40
Fall and Winter Seeding (September 1 to March 1)			
Unhulled Bermuda	95	90	20
Rye	95	85	15
Tall Fescue	95	90	<u>15</u>
Total			50

2.05 LEGUMINOUS INNOCULANTS

Inoculation media containing live nitrogen-fixing bacteria shall be supplied with all legume seed. The inoculants shall be standard, pure culture of nitrogen-fixing bacteria. Each kind of legume will require a cultural bacterium that is adapted to that particular kind of seed. The bacteria shall be supplied in convenient containers of a proper size to treat the amount of seed to be planted. The legume seeds shall be treated according to the directions, and before the expiration data for use of the media as shown on the container.

2.06 MULCH

Mulch shall be Class I vegetative material consisting of approved baled straw from cereal grain or common native hay crops in accordance with Section 215 and 715 of the MDOT Standard Specifications. The mulch shall have been cured properly prior to baling and shall be reasonably free of foreign grasses and weeds. All straw material shall be approved by the ENGINEER prior to use.

2.07 WATER

Water shall be free from oil, acid, alkali, salt and other substances harmful to growth of grass, and shall be from a source approved prior to use.

PART 3 – EXECUTION

3.01 GENERAL

All areas disturbed during construction shall be seeded and mulched. Suitable equipment for proper preparation and treatment of the ground surface and for handling and placing all required materials shall be on hand and in good condition and shall be approved by the ENGINEER before the operations are started. The types and amounts of seed to be used will depend on the planting dates and shall be in accordance with the planting schedule.

3.02 ORDER OF WORK

The order of work operations shall be as follows:

- 1) Ground preparation;
- 2) Applying commercial fertilizer and Lime;
- 3) Sowing seed;
- 4) Cleaning up; and
- 5) Mulching.

3.03 PROTECTION

The CONTRACTOR shall be responsible for maintaining and protecting seeded, sodded and mulch areas until final acceptance of the project. He shall take every precaution to prevent necessary foot and vehicular traffic and shall repair and restore damaged areas immediately without extra compensation.

3.04 GOUND PREPARATION

Topsoil can be obtained from on-site or off-site locations. The topsoil used by the CONTRACTOR shall meet all specifications required and shall be approved by the ENGINEER. The topsoil shall be evenly spread on tilled areas to a uniform depth of at least four inches (4") (maximum depth six inches (6") after compaction. Spreading shall be performed so that turfing can proceed with a minimum of soil preparation or tilling. After preplanting fertilization is completed, the topsoil shall be compacted by rolling with a cultipacker or by other approved means. Previously established grades shall be maintained on the areas to be treated in a true and even condition; necessary repairs shall be made to previously graded areas by means of graders or other approved equipment. After the areas required to be treated have been brought to the grades shown, the soil shall be tilled to a depth of at least four inches (4") by plowing, disking, harrowing, or other approved operations until the condition of the soil is acceptable. The work shall be performed only during periods when, in the opinion of the ENGINEER, beneficial results are likely to be obtained. When drought, excessive moisture, or other unsatisfactorily conditions prevail, the work shall be stopped when directed. Undulations or irregularities in the surface shall be leveled before the next specified operation.

3.05 APPLICATION OF FERILIZER AND LIMESTONE

1. Fertilizer

Fertilizer shall be distributed uniformly at a rate of 1,000 pounds per acre over areas to be seeded and shall be incorporated into the soil to a depth of at least four inches (4").

2. Lime

Immediately following or simultaneously with the incorporation of fertilizer, limestone shall be distributed uniformly at a rate of 2,000 pounds per acre, and shall be incorporated into soil to depth of at least four inches (4").

3.06 SOWING SEED

All seeds shall be as indicated in the planting schedule. No seeding shall be done during windy weather or when the ground is frozen, excessively wet or otherwise in a non-tillable condition. Full use shall be taken of time and weather conditions best suited for seeding and such time of seeding shall be subject to the approval of the ENGINEER. The seed shall be sown uniformly in the specified amounts preferably by approved mechanical seeders and immediately rolled with a culti-packer or other satisfactory equipment; or covered lightly with soil by the use of a garden rake or other approved methods. All seeds shall be planted using strip markers or similar means to insure that succeeding seeded strips shall slightly overlap.

3.07 FINISHING AND CLEANING UP

After seeding operations and prior to mulching, the surface shall be cleared of all stones or other objects larger than two inches (2") in diameter and of all wire, roots, brush or other objects that may interfere with subsequent mowing operations.

3.08 MULCHING

- A. The rate of application of mulching material shall be two (2) tons per acre. Mulching may be performed by hand or mechanical methods. Mulching shall be placed uniformly on designate areas within twenty-four (24) hours after completion of seeding operations. Placement shall begin on the windward side areas and from tops of slopes. The mulch shall be loose enough in its final positions to allow air to circulate but the mulch shall be compact enough in its final position to partially shade the ground and reduce erosion. The mulch shall be anchored by a mulch stabilizer or other approved means. Mulch shall be punched into a minimum depth of one inch. Anchoring shall be performed along the contour of the ground surface.
- B. The use of wet vegetative materials will not be permitted and baled material shall be loose and broken thoroughly before it is placed.

3.09 MAINTENANANCE

Seeding areas shall be maintained until all work or designate portions thereof have been completed and accepted. Tall grass and weeds that tend to smother the desired grass species shall be mowed, and any damage resulting from these operations shall be repaired. The CONTRACTOR at his own expense shall reseed, mulch and fertilize as necessary to establish vegetative cover. He shall maintain care of seeded areas for sixty (60) days after completion of treatment of the entire project.

END OF SECTION

SECTION 331100

WATER UTILITY DISTRIBUTION

SECTION 1 – GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, material, labor, and equipment and perform all operations necessary to construct a complete underground water distribution system as shown on the Plans, as hereinafter specified and as directed by the Engineer.
- B. The work shall include the furnishing and installation of water mains, water services, fittings, valves, fire hydrants, and all other related appurtenances, ready for operations, including connections to all new and existing service lines and to the existing water supply. The pipe and accessories shall be installed in accordance with the requirements of these Specifications at the locations and depths indicated on the Plans.
- C. Water main shall be of Polyvinyl Chloride (PVC) or Ductile Iron (DI) as specified below.
- D. All connections to existing water mains shall be performed in the presence of a representative from the water association.
- E. The specifications of the Arkansas Department of Health shall govern all construction procedures of the water distribution system.
- F. The Contractor shall be responsible for obtaining all information, permits, meters, deposits, etc. required for connection to a water main of a public utility company.

1.02 CONTRACTOR'S EQUIPMENT

The contractor shall provide and maintain the principle equipment necessary to execute the work in an orderly and safe manner. The equipment shall consist of approved units designed or selected to perform and expedite all of the work and incidental items of construction.

1.03 CONFLICTS WITH OTHER UTILITIES

- A. Where the location of the water line is not clearly defined by dimensions on the Plans or unless otherwise directed by the Engineer, water mains shall be laid at least ten (10) feet horizontally and eighteen (18) inches vertically from any sanitary sewer or manhole (water over sewer).
- B. At locations where the water and sewer line must cross each other, the above requirements may be waived if pipe segments are centered to provide maximum spacing of the joints of both water and sewer lines and a vertical separation of at least eighteen (18) inches (water over sewer) is maintained. Where gravity-flow sewers cross above water lines, the sewer pipe, for a distance of ten (10) feet each side of the crossing, shall be either ductile iron pressure pipe without any joint closer horizontally than eight (8) feet to the crossing or shall be fully encased in concrete.

1.04 PROTECTION OF PROPERTY

- A. GENERAL: Existing power lines, telephone lines, trees, shrubbery, fences, water mains, gas mains, sewers, cables, conduits, ditches, embankments and other structures in the vicinity of the work, not authorized to be removed, shall be supported and protected from injury by the Contractor during the construction and until completion of the work affecting them. The Contractor shall be liable for damages done to such existing facilities and structures, as herein provided, and shall hold the Owner harmless from liability or expense for injuries, damages or repairs to such facilities. No additional compensation will be allowed for any operations of the Contractor in completing the work near, over, under or around existing utilities unless otherwise specified.
- B. UNDERGROUND UTILITIES: The type, size, location and number of known underground utilities have been shown on the Plans; however, no guarantee is made as to the true type, size, location or number of such utilities. It shall be the responsibility of the Contractor to verify the existence and location of underground utilities along the route of the work. The omission from, or the inclusion of utility locations on the Plans is not to be considered as **the nonexistence of** or a **definite location of** existing underground utilities. The Contract unit prices bid shall provide full and complete compensation for operations necessary to complete the work in accordance with the Plans and Specifications in working near, over, under or around existing utilities unless specified otherwise.
- C. RELOCATION OF EXISTING UTILITIES
1. The Contractor shall notify the Owner or Owners of the existing utilities, whether above the ground or underground, prior to proceeding with trench excavation whenever such trenching operations are within ten (10) feet of any existing utility.
 2. In the event that during construction it is determined that underground utilities, including sanitary sewers, water mains, gas mains, telephone cables, storm sewers, etc., and above ground utility facilities require relocation, the Contractor shall notify the utility Owner well in advance of his approach to such utility so that arrangements for such relocation by the Owner or the Owners of the affected utilities can be completed without delay to the Contractor's work.
 3. Should a utility be damaged from trenching operations, the Contractor shall immediately notify the Owner of the utility, necessary Emergency Operations Agency, local Law Enforcement Agency, and the project Owner and Engineer. **The Contractor shall not attempt to make repairs unless so authorized, in writing, by the affected utility owner. Duplicate copies of written authorization given to the Contractor to make repairs shall be filed with the Engineer and shall be so worded as to hold harmless The Owner and Engineer of responsibility relative to the sufficiency of the repairs.**
- D. LANDSCAPE VEGETATION: Reasonable care shall be taken during construction to avoid damage to landscape vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees, which receive damage to branches, shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

1.05 RAILROAD AND HIGHWAY CROSSING

Work incidental to the construction of sewer lines under streets, railroads, highways, driveways or parking areas shall be done in strict compliance with the regulations prescribed by the Owners of these properties and shall be done with extreme care to safeguard life and property. After the necessary permits and agreements for these crossings have been approved and executed, the Contractor shall confer with the representatives of the Railroad Company, the State Highway Department, the City or County, or the Owner of these properties and arrange schedules and the manner for constructing the work in accordance therewith. In general, the sewer pipe will be installed in steel casing or steel lined tunnels at all railroad, street and highway crossings unless otherwise specified.

1.06 MAINTENANCE

The Contractor shall be responsible for, without any extra compensation, the maintenance of all water mains and appurtenances to the lines and grades established for the construction, for the stabilities of all backfills and the finished grades above the water mains and appurtenances, and for the repair and replacement of all the items which were damaged or removed during the construction.

1.07 WARRANTY

The Contractor shall warrant all materials of construction and repair and all workmanship for a period of one (1) year from the date of final acceptance of the work. Should defects or failures occur during the period of warranty, the Contractor shall promptly take whatever steps are necessary to return the work to first class condition.

SECTION 2 – MATERIALS

2.01 GENERAL

All pipe and other materials shall be new and of first quality with certified tests for pipe and pipe fittings made at the manufacturers plant to assure conformance with these technical specifications. Two certified copies of each test result shall be furnished to the Engineer. The types and classes of materials incorporated into the work shall be designated by the Engineer. The Contractor shall not construe or interpret the several kinds of materials described herein as being equal in their application for the project.

2.02 WATER FOR CONSTRUCTION AND TESTING

The Contractor shall be responsible for all water needed in constructing the work, flushing the completed system, testing, and other incidental needs. All water used shall be from an approved source free of pollution and shall be of a satisfactory bacteriological quality.

2.03 WATER PIPE AND FITTINGS

- A. **DUCTILE IRON PIPE AND FITTINGS:** Ductile iron pipe shall be cement-mortar lined, Class 50 and shall conform to ANSI Specifications A 21.51 (AWWA C151). The working pressure shall be rated at 200 PSI plus surge allowance of 100 PSI. Wall thickness shall be at least that specified by ANSI A21.50 and AWWA C150 for the specified laying conditions.
 - 1. Joints for ductile iron pipe shall be “slip-on” type, compression type with molded rubber gasket, unless otherwise specified conforming to ANSI A21.11 and AWWA C111. Rubber gaskets and lubricants shall meet applicable requirements of ANSI A21.11 and AWWA A21.11. Joints for fittings, valves, and specials shall be mechanical joints and shall conform to AWWA C111. Material requirements

for pipe ends, glands, bolts and nuts, and gaskets for mechanical joints, where required or indicated, shall conform to AWWA C111 and ANSI A21.11.

2. Fittings shall be ductile iron and shall conform to ANSI A21.10, AWWA C110 and ANSI A21.11, AWWA C111. All fittings shall have a working pressure of 250 PSI. The minimum wall thickness of the fittings shall be determined consistent with trench conditions 'B' and not less than five (5) feet of cover.

B. PVC PLASTIC PIPE AND FITTINGS: PVC water pipe four (4) inches to twelve (12) inches shall conform to ASTM 2241 and AWWA C-900 and shall be gasket bell end, C-900, Class 150. PVC pipe shall conform with the outside diameter dimensions of ductile iron pipe to facilitate mechanical joint, ductile iron fittings conforming to AWWA C-110 and shall have cement-mortar lining conforming to AWWA C104/A21.4. PVC water pipe three (3) inches and smaller in diameter shall conform to the latest edition of ASTM D-2241 and shall be made from Type 1120 material. Joints shall be solvent weld in accordance with the latest edition

1. Joints shall be push-on joints as specified in ASTM D 3139 and shall be made in accordance with the manufacturers recommendations.
2. Rubber gaskets for push-on joints shall meet the requirements of ASTM F 477. All lubricants shall be non-toxic and not allow the growth of bacteria nor contribute to the taste or odor of water systems flushed in accordance of AWWA Standard B601.

*NOTE: All PVC pipe shall bear the National Sanitation Foundation seal for potable water.

C. VALVES:

1. Gate Valves: **AWWA C-509 NRS Resilient Seat – Mueller, M&H or approved equal.** Gate valves shall comply with the latest edition of AWWA C-500, non-rising, iron body, and shall open counter-clockwise, and shall have a 250 psig maximum working pressure and tested to a static pressure of 500 psig. Gate valves shall be equipped with mechanical joint connections unless otherwise specified.
2. Check Valves: **AWWA C-508 Swing Type Spring and Lever – Mueller, M&H or approved equal.** Check valves shall comply with the latest edition of AWWA C-500, iron body, bronze mounted, swing type, spring and lever loaded with bronze disc facing, and shall have a 175 psig maximum working pressure and tested to a pressure of 350 psig. Check valves shall be equipped with mechanical joint connections unless otherwise specified.
3. Tapping Valves: **AWWA C-509 T-2360 Resilient Wedge Tapping Valves – Mueller, M&H or approved equal.**

D. FIRE HYDRANTS: **Mueller Super Centurion 250 (A423)(3'-0") (Bury 6" MJ Shoe) or approved equal.** Fire hydrants must be meet all the applicable parts of AWWA C-502, shall have 5-1/4" main valve opening three way (two hose nozzles and one pumper nozzle), and have a 250 psig maximum working pressure and tested to a static pressure of 500 psig.

- E. VALVE BOXES: **Vulcan V-8462 Cast Iron.** Contractor shall supply boxes with the correct base for valves and in correct length for field conditions. The word water shall be cast into the valve box cover. Each valve box will be surrounded by a 24 inch precast conical concrete pad w/7 inch throat by **Russell Foundry or approved equal.**
- F. BLOW OFF ASSEMBLY: A blow-off Assembly shall be required at the end of all water mains and as shown on the Plans. Where a blow-off assembly is required, the water main shall be capped with a **Ductile Iron Mechanical Joint Tapped Cap (w/megalug)** and reduced to two (2) inches. The typical blow-off assembly will include one (1) **2" Mueller Locking Ball Valve**, four (4) **2" Galvanized Threaded Bends**, **2" Galvanized Threaded Pipe**, and one (1) **Oversized Black Plastic Meter Box.**
- G. STEEL AND PVC CASING: Steel casing shall meet the specifications of ASTM A-252, Grade 2 or better. Minimum wall thickness for steel casing shall be as follows (casing size (outside diameter), minimum wall thickness): 12" or less, no minimum wall thickness; 12" to 18", 0.188"; 18" or greater, 0.250". Minimum wall thickness of casing used in railroad crossings shall be 0.25". The minimum yield point shall be 35,000 psi.

<u>Pipe Size</u>	<u>Inside Diameter Of Casing</u>	<u>Maximum Skid Support Spacing</u>
14"	20"-20"	11'
12"	18"-20"	13.7'
10"	16"-18"	12.2'
8"	14"-16"	10.5'
6"	10"-12"	8.8'
4"	8"-10"	6.8'
3"	6"-8"	4'
2"	4"-6"	3'
3/4"	2"-4"	2'

*The maximum skid support spacing shall be used for PVC pipes.

- H. WATER SERVICE ASSEMBLY:
1. Service Clamp: **Bronze Series Service Saddles-Double Strap – Mueller, Smith-Blair or approved equal.** Service Clamps shall meet all the applicable parts of AWWA C-800, brass body, and have a 250 psig maximum working pressure.

2. Service Line: **Polyethylene CL-200**. All service line shall meet all the latest editions of ANSI\AWWA. All service lines shall be encased in PVC pipe under roadway in sizes specified on the plans.
 3. Transition Fitting: **Mueller 110 Compression Connection or approved equal**.
 4. Curb Stop: **Mueller 300 Ball Straight Service Valve or approved equal**. Curb Stops shall be quarter turn check-lock wing.
 5. Meter Couplings: **Mueller Straight Meter Coupling or approved equal**.
 6. Water Meter: **Sensus SR (To Be Approved by the Water Association)**
 7. Standard Black Plastic Meter Box w/ Reader Lid: **NDS 12" Standard Box w/ 2 Holes (Touch Read)**.
 8. Corporation Stop: **Mueller Ground Key Corporation Valve or approved equal**. Corporation Stops shall be made of bronze conforming to ASTM B 61 or ASTM B 62 and shall be suitable for the working pressure of the system. Threaded ends for the inlet and outlet end of the corporation stop shall conform to AWWA C800. Corporation Stops shall include two (2) $\frac{3}{4}$ inch inserts.
 9. Touch Read Device: **Sensus (To Be Approved by the Water Association)**.
- I. TRACER WIRE: Tracer Wire shall be used with all water mains with a test cap located a maximum of 500 feet apart. Tracer wire shall be **#12 insulated solid copper type THHN or THWN VW-1 600V** gasoline and oil resistant wire and test caps shall be Blue for water.

SECTION 3 – EXECUTION

3.01 PIPE LAYING

- A. Water pipe shall not be laid in the same trench with other utilities.
- B. PVC pipe shall be installed in accordance with the latest edition of ASTM D-2321 assuming the use Class IV native material or better. Ductile iron pipe shall be installed in accordance with the latest edition of AWWA C-151 using a sand-clay bedding material with a maximum liquid limit (LL) of 30 and a plasticity index (PI) of less than 10 and native material as backfill. Select bedding and backfill for PVC or ductile iron pipe shall be called for by the Engineer and specified as to location on the Plans
- C. Water pipe, fittings, and appurtenances shall be laid to the line and grade as shown on the Plans. Extra depth shall not be measured unless noted on the Plans.
- D. The inside of the bells and the outside of the spigots shall be thoroughly cleaned before they are placed. The inside of the pipe shall be swabbed to ensure that the pipe is clean and free of obstructions and foreign matter until the work is completed. Blocking and wedging between bell and spigots shall not be permitted. The pipe shall be laid in a manner so that the full length of each pipe and all fittings are fully supported and solidly rest on the pipe bedding.
- E. Where pipe laying ceases at the end of the day or for any cause during the day, the end of the pipe shall be securely closed in order to prevent the entrance of water, mud, or other objectionable matter.

- F. Pipe shall not be laid in a trench where water is present.
- G. The minimum depth of cover over water mains shall be 36 inches.

3.02 INSTALLATION OF FITTINGS, VALVES, HYDRANTS, AND SPECIALS

- A. Fittings, valves, valve boxes, hydrants, and other appurtenances shall be set at the location indicated on the Plans. Omission of these items shall be corrected by the Contractor without extra cost to the Owner. The addition of these items not shown on the Plans or requested by the Owner, which are installed for the convenience of the Contractor and without the expressed consent and agreement of the Owner, shall not be allowed for payment but shall be considered as absorbed items to the Contractor.
- B. All valves shall be provided with a valve box and a precast concrete valve pad as specified above in Section 2-03 E. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut with the cover flush with the finished ground surface.
- C. Hydrants shall be located as shown on the Plans and in a manner that will provide complete accessibility and will prevent damage from vehicles. Hydrants shall stand plumb and shall have their pumper connections at right angles to the curb line. The center of hose nozzles shall be eighteen (18) inches above the top of the ground surface or top of curb. If necessary, hydrant extensions shall be furnished at no additional cost to the Owner unless otherwise noted in the Plans.
 - 1. Each fire hydrant shall be set truly vertical and securely braced with concrete or stone blocks until it is self-standing. It shall be set on well-compacted soil surrounded by 2'0" x 2'0" x 8" of crushed stone or clean gravel to permit free draining of the hydrant.
 - 2. All fire hydrants shall connect to the main with a flanged fitting connected to a non-rising stem flanged by a six (6) inch mechanical joint end gate valve to the specifications listed above in Section 2-03-C-1, and with the associated valve box and the precast concrete valve pad. Ductile iron shall be used from valve to fire hydrant with retainer glands.

3.03 CONNECTION TO EXISTING MAINS

- A. Connections to existing water mains shall be made by installing tapping sleeves and valves unless otherwise indicated on the Plans. If so directed, cut-ins shall be made by the Contractor in order to connect the new main with existing water mains. The Contractor shall furnish labor, materials and service required for excavating, cutting the existing mains, removal and relocation of sections of old pipe, de-watering the trench, connecting to the new main with the existing and setting of the necessary fittings, specials, and valves as shown on the Plans.

- B. Contractor shall provide temporary blocking and bracing, properly placed, to prevent movement and blowing off of pipe, valves or fittings due to water pressure in the main. Connections shall be made in a manner to cause the least inconvenience to water customers and traffic.
- C. When the interruption of water service in the existing system is necessary, the contractor shall notify the City of West Memphis at least forty-eight (48) hours in advance. Interruptions of water service shall not exceed over night or through the weekend unless approved by the City of West Memphis.

3.04 THRUST BLOCKING

- A. Thrust blocks shall be provided for all dead-ends (plugs & caps), tees, and bends, either vertically or horizontally, on water lines four (4) inches in diameter or larger.
- B. Concrete shall be used to form the thrust block and shall meet Class 3000 PSI concrete.
- C. Blocking shall be placed so that the fitting joints will be accessible for repair.

3.05 BORING AND JACKING FOR CASING AT RAILROAD AND STREET CROSSINGS

- A. Pipe in steel or PVC casing (see Plans for material required) shall be used where bored and jacked encased water line street or railroad crossings area called for in the Plans. All work incidental to the construction of railroad and street crossings shall be done in strict compliance with the requirements prescribed by the Owner(s) of the impacted properties upon which the work is to be performed and shall be done with extreme care to safeguard life and property. After the necessary permits and agreements have been approved and executed, the Contractor shall contact the representatives of the Owners of the railroad or roadway properties and arrange schedules for constructing the work in accordance with the Plans and these Specifications.
- B. **DRY BORING:** The casing or carrier pipe is to be installed by drilling a hole if a size not larger than one (1) inch around the outside circumference of the casing or carrier pipe.
 - 1. Water bearing sands and mucky soils will be well pointed as necessary prior to commencing the bore.
 - 2. All bores will be accomplished with the auger inside the casing or carrier pipe with the cutting edges positioned just ahead of the pipe.
 - 3. Care should be exercised at all times to keep the auger properly positioned within the encasement of carrier pipe and to maintain sufficient forward pressure upon the encasement or carrier pipe to quickly run through any pockets of loose soil.
 - 4. All boring will be carefully observed for comparison between the amount of cuttings removed from the hole and the diameter of the bore together with the distance the auger has traveled in the bore. An excessive amount of cuttings removed from the bore indicates caving or spalling of the bore wall and the bore will be stopped until a method for completing the bore is found acceptable to the owners of the railroad and/or street properties has been agreed upon.
 - 5. An acceptable fluid may be introduced by gravity flow approximately three (3) feet back of the forward end of the casing or carrier pipe to lubricate the cuttings

in order to facilitate the removal thereof; however, the intemperate use of such fluid causing undue flow back and erosion of the bore shall not be allowed.

C. BORING WITH DRILLING FLUID: The use of either a gel-forming colloidal drilling fluid or the use of polymer surfactant mixture is permitted only if acceptable by the owner of the property and with prior approval from the Engineer. The drilling fluid shall be used to lubricate the cutters or reamers, as a binder to bind the cuttings into plugs of appropriated length and to form a filter cake around the circumference of the bore in order to prevent cave-ins or spalling, to maintain the arch and also to lubricate the bore for easy removal of masses or plugs of cuttings from the bore by using compressed air. Liquids other than the drilling fluids described in Methods A and B shall not be permitted. All bores accomplished with the use of a drilling fluid will be made as follows:

1. METHOD "A": The casing or carrier pipe shall be installed by drilling a hole of a size not larger than 1" around the outside circumference of the casing or carrier pipe with an open type bit that leaves the cuttings in place. A gel-forming colloidal drilling fluid consisting of at least 10% by weight of an accepted type of gel-forming substance, when boring is sandy subsoils, fine sands, water bearing sand or any soils which easily spall or cave consisting of at least 5% by weight of an accepted type of gel-forming substance, when boring in dense consolidated soils will be used to consolidate the cuttings, seal the wall of the bore and furnish lubrication for subsequent removal of the cuttings and installation of the casing immediately thereafter. The percentage of the gel-forming agent will be increased as required by soil conditions. When boring sandy subsoils, fine sands, water bearing sands or any soil, which easily spalls or caves the bore entrance will be plugged or dammed in order to retain the drilling fluid and the cuttings within the bore until immediately before the casing or carrier pipe is installed. Water bearing sands and mucky soils will be well pointed as necessary prior to commencing the bore. When drilling through dense consolidated soils the cuttings may be partially removed from the hole in approximately three (3) foot plugs by use of compressed air or by retraction of the cutter or reamer. No cutter or reamer shall have holes therein larger than 5/16" in diameter through which drilling fluid is forced during boring.
2. METHOD "B": The casing or carrier pipe shall be installed by drilling a hole a size not larger than 1" around the outside circumference of the casing or carrier pipe with an open type bit leaves that leaves the cuttings in place. Drilling fluid composed of water and a polysurfactant of approximately 61% diesel fuel, 15% sodium carboxyl methyl cellulose of same quality as Drispace, 21.5% water and 2.5% anionic surfactant will be used to consolidate the cuttings, seal the wall of the bore and furnish lubrication for subsequent removal of the cuttings and installation of the casing or carrier pipe immediately thereafter. When boring sandy subsoils, fine sands, water bearing sands or any soil, which easily spalls or caves the bore entrance will be plugged or dammed in order to retain the drilling fluid and the cuttings within the bore until immediately before the casing or carrier pipe is installed. Water bearing sands and mucky soils will be well pointed as necessary prior to commencing the bore. When drilling through dense consolidated soils the cuttings may be partially removed from the hole in approximately three (3) foot plugs by use of compressed air. The polymer-surfactant mixture or drilling fluid when used in dense consolidated soils will consist of not less than 2% of polymer-surfactant by volume and when used in sandy subsoils, fine sands or any other soil which easily caves will consist of at

least 4% of polymer-surfacent by volume. The percentage of polymer-surfacent will be increased as required by soil conditions.

3.06 HYDROSTATIC TESTING

After backfilling, subject all pipe work to pressure and leakage tests. Piping may be tested in sections between valves as the work progresses. Admit water slowly into the section to be tested, and expel all air through openings at all high points in the piping, as required. After all air has been expelled apply a hydrostatic pressure of 150 PSI measured at the lowest point in the piping section involved. Maintain the test pressure at least two hours. No pipe installation will be accepted unless and until the leakage, evaluated on a basis of 150 PSI, meets the AWWA Standard C600-93, Section 4, Hydrostatic Testing, for leakage. The duration of the leakage test shall be a minimum of 4 hours. Furnish approved testing equipment, consisting of a suitable pump to apply and maintain test pressure, accurate pressure gauges, suitable equipment to measure volume of water pumped, and other necessary equipment, and conduct all tests in the Engineer's presence, as approved. Determine leakage by measuring the volume of water pumped to maintain the required test pressure for the duration of the leakage test. If the measured leakage exceeds the maximum specified allowable leakage, locate and repair the leaks, and repeat the tests on sections of pipe involved until all tests have been approved. The following formula will be used to determine the allowable leakage:

$$L = \frac{S \times D \times \text{SQRT}(P)}{133,200}$$

L=allowable leakage (gph)

S= length of pipe tested (ft)

D= nominal diameter of pipe (in)

P= average test pressure during leakage test (psig)

3.07 DISINFECTION

- A. Before acceptance of potable water operation, each unit of completed water distribution line and water service line shall be disinfected meeting ANSI/AWWA C651. After pressure tests have been made, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material.
- B. The chlorinating material shall be either liquid chlorine, calcium hypochlorite, or sodium hypochlorite, as specified in this section and the chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduced into the water lined in an approved manner.
- C. The treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 10 ppm of chlorine throughout the line at the end of the retention period.
- D. Valves on the lines being disinfected shall be opened and closed several times during the contact period, and then the line shall be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm.
- E. After completion of the construction and disinfection of water distribution mains, the Contractor shall arrange for at least one sample to be collected by the county sanitarian, consulting Engineer or waterworks superintendent from every dead end line and every major looped line for bacteriological examination. Water being collected for testing shall not have chlorine residual higher than is normally maintained in other parts of the distribution system. No chlorine shall be present, which is a result of line disinfection. No coliform bacteria and no confluent growth indication shall constitute a satisfactory sample when analyzed by the

Arkansas Department of Public Health Laboratory or a laboratory certified by the Arkansas State Department of Health. Tests must indicate the absence of pollution for at least (2) full days.

- F. Water for testing, disinfection, and flushing will be furnished by the Owner from existing water facilities, without cost to the Contractor, the Contractor shall furnish all piping and equipment to convey the water to the new pipe lines.
- G. Corporation stops shall match those of the customer service connections. Provide these as required for testing and disinfection, and after that use leave them in place with their outlets plugged. Customer service corporation stops may also be used for testing and sterilizing.

3.08 FINAL CLEAN-UP

- A. In areas where the water main trenches have been backfilled, the Contractor shall dress the disturbed area to the approval of the Owner, and shall dispose of waste materials and debris resulting from his operations. The Contractor shall fill and smooth holes and ruts and shall repair miscellaneous and unclassified ground damage done by him and shall restore the ground to such a stable and suitable condition as may be reasonably required, consistent with the condition of the ground prior to construction. All clean-up work shall be completed by the Contractor at no additional cost.
- B. In the presence of the representative for the City of West Memphis, the Engineer, and the representative for the Contractor, a final "walk-thru" inspection shall be made to ensure all work set out in the Plans and Specifications has been completed. Application for final payment shall not be processed until this has been completed.

END OF SECTION

SECTION 333000

SANITARY SEWERAGE UTILITIES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, material, labor, and equipment and perform all operations necessary to construct a complete sanitary sewer system as shown on the drawings, as hereinafter specified and as directed by the Engineer.
- B. The work shall include excavation, trenching and backfilling; furnishing and installing trench sheeting and bracing; furnishing and installing pipe, specials, services, manholes and related appurtenances; storage and protection of materials; testing, clean-up and other operations necessary to complete the work in accordance with the Plans and Specifications.
- C. Inspection is defined as the visual observation of materials, equipment, or construction work, on an intermittent basis, to determine that the work is in conformance with the Plans and Specifications. Such inspection does not constitute acceptance of the work, nor shall it be construed to relieve the Contractor in any way from his responsibility for the means and methods of construction or for safety on the construction site.

1.02 CONTRACTOR'S EQUIPMENT

The contractor shall provide and maintain the principle equipment necessary to execute the work in an orderly and safe manner. The equipment shall consist of approved units designed or selected to perform and expedite all of the work and incidental items of construction.

1.03 CONFLICTS WITH OTHER UTILITIES

- A. Where the location of the water line is not clearly defined by dimensions on the drawings or unless otherwise directed by the Engineer, water mains shall be laid at least ten (10) feet horizontally and eighteen (18) inches vertically from any sanitary sewer or manhole (water over sewer).
- B. At locations where the water and sewer line must cross each other, the above requirements may be waived if pipe segments are centered to provide maximum spacing of the joints of both water and sewer lines and a vertical separation of at least eighteen (18) inches (water over sewer) is maintained. Where gravity-flow sewers cross above water lines, the sewer pipe, for a distance of ten (10) feet each side of the crossing, shall be either ductile iron pressure pipe without any joint closer horizontally than eight (8) feet to the crossing or shall be encased in steel casing.
- C. Where sewer construction conflicts with underground utilities, which are indicated to remain in place, the Contractor shall be fully responsible for protecting these facilities and for restoring the portions of these lines, which are damaged or severed as a result of his operations. Where existing lines in conflict are indicated to be removed by others, the Contractor shall cooperate with the Owner of these utilities to the end that these conflicts may be removed prior to excavation for the sewers.

1.04 PROTECTION OF PROPERTY

- A. GENERAL: Existing power lines, telephone lines, trees, shrubbery, fences, water mains, gas mains, sewers, cables, conduits, ditches, embankments and other structures in the vicinity of the work, not authorized to be removed, shall be supported and protected from injury by the Contractor during the construction and until completion of the work affecting them. The Contractor shall be liable for damages done to such existing facilities and structures, as herein provided, and shall hold the Owner harmless from liability or expense for injuries, damages or repairs to such facilities. No additional compensation will be allowed for any operations of the Contractor in completing the work near, over, under or around existing utilities unless otherwise specified.
- B. UNDERGROUND UTILITIES: The type, size, location and number of known underground utilities have been shown on the Drawings; however, no guarantee is made as to the true type, size, location or number of such utilities. It shall be the responsibility of the Contractor to verify the existence and location of underground utilities along the route of the work. The omission from, or the inclusion of utility locations on the Drawings is not to be considered as the nonexistence of or a definite location of existing underground utilities. The Contract unit prices bid shall provide full and complete compensation for operations necessary to complete the work in accordance with the Drawings and Specifications in working near, over, under or around existing utilities unless specified otherwise.
- C. RELOCATION OF EXISTING UTILITIES
1. The Contractor shall notify the Owner or Owners of the existing utilities, whether above the ground or underground, prior to proceeding with trench excavation whenever such trenching operations are within ten (10) feet of any existing utility.
 2. In the event that during construction it is determined that underground utilities, including sanitary sewers, water mains, gas mains, telephone cables, storm sewers, etc., and above ground utility facilities require relocation, the Contractor shall notify the utility Owner well in advance of his approach to such utility so that arrangements for such relocation by the Owner or the Owners of the affected utilities can be completed without delay to the Contractor's work.
 3. Should a utility be damaged from trenching operations, the Contractor shall immediately notify the Owner of the utility, necessary Emergency Operations Agency, local Law Enforcement Agency, and the project Owner and Engineer.
- The Contractor shall not attempt to make repairs unless so authorized, in writing, by the affected utility owner. Duplicate copies of written authorization given to the Contractor to make repairs shall be filed with the Engineer and shall be so worded as to hold harmless The Owner and Engineer of responsibility relative to the sufficiency of the repairs.**
- D. LANDSCAPE VEGETATION: Reasonable care shall be taken during construction to avoid damage to landscape vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees, which receive damage to branches, shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

1.05 RAILROAD AND HIGHWAY CROSSING

Work incidental to the construction of sewer lines under streets, railroads, highways, driveways or parking areas shall be done in strict compliance with the regulations prescribed by the Owners of these properties and shall be done with extreme care to safeguard life and property. After the necessary permits and agreements for these crossings have been approved and executed, the Contractor shall confer with the representatives of the Railroad Company, the State Highway Department, the City or County, or the Owner of these properties and arrange schedules and the manner for constructing the work in accordance therewith. In general, the sewer pipe will be installed in steel casing or steel lined tunnels at all railroad, street and highway crossings unless otherwise specified.

1.06 MAINTENANCE

The Contractor shall be responsible for, without any extra compensation, the maintenance of all sewers and structures to the lines and grades established for the construction, for the stabilities of all backfills and the finished grades above the sewers and around the structures, and for the repair and replacement of all the items which were damaged or removed during the construction.

1.07 WARRANTY

The Contractor shall warrant all materials of construction and repair and all workmanship for a period of one (1) year from the date of final acceptance of the work. Should defects or failures occur during the period of warranty, the Contractor shall promptly take whatever steps are necessary to return the work to first class condition.

PART 2 – MATERIALS

2.01 GENERAL

All pipe and other materials shall be new and of first quality with certified tests for pipe and pipe fittings made at the manufacturers plant to assure conformance with these technical specifications. Two certified copies of each test result shall be furnished to the Engineer. The types and classes of materials incorporated into the work shall be designated by the Engineer. The Contractor shall not construe or interpret the several kinds of materials described herein as being equal in their application for the project.

2.02 WATER FOR CONSTRUCTION AND TESTING

The Contractor shall be responsible for all water needed in constructing the work, flushing the completed system, testing, and other incidental needs. All water used shall be from an approved source relatively free of pollution and shall be of a satisfactory bacteriological quality.

2.03 SEWER PIPES AND FITTINGS

- A. **DUCTILE IRON PIPE AND FITTINGS:** Ductile iron pipe shall be Class 50 and shall conform to ANSI Specifications A 21.15(AWWA C150) and A 21.51 (AWWA C151). Ductile iron pipe and fittings shall be coated outside with a standard bituminous coating. Pipe shall be lined inside with a factory-applied polyethylene lining twenty (20) mils in thickness or with field applied coal-tar epoxy lining twenty-four (24) mils in thickness. Rubber gasket joints for slip

joint ductile iron pipe shall conform to the requirements of AWWA C-111. Fittings shall conform to AWWA C-110. Jointing shall be completed in accordance with the manufacturer's specifications. Minimum thicknesses for ductile iron pipe are as follows:

<u>Diameter</u>	<u>Minimum Wall Thickness</u>
12"	0.31"
10"	0.29"
8"	0.27"
6"	0.25"

- B. PVC PLASTIC PIPE AND FITTINGS: PVC sewer pipe and fittings shall be solid wall in accordance with ASTM D-3034 with SDR 26 minimum wall thickness and 13 foot laying lengths. Joints between pipes and fittings shall be integral bell push-on type with elastomeric gaskets conforming to ASTM D3212. Elastomeric seals shall conform to ASTM Standard Specification F477. SOLVENT WELD SHALL NOT BE PERMITTED. Depth of bury for SDR 26 or heavier pressure pipe shall not exceed limits acceptable to the Engineer. Jointing shall be completed in accordance with manufacturer's specifications. Sewer Services shall have SDR 26 wall thickness.

*NOTE: Each pipe and fitting shall have plainly and permanently marked thereon: pipe class, date of manufacturer, and manufacturer's name or trademark. The marking shall be stamped or painted with waterproof paint.

2.04 MANHOLES

- A. Precast concrete manholes shall consist of reinforced riser sections, an eccentric cone section being thirty-six (36) inches high and tapering uniformly to twenty-eight (28) inches inside diameter at the top, and a base section conforming with details as shown on the STANDARD SANITARY SEWER DETAILS SHEET included in the plans. Precast flat top sections will be required for manholes where the rim elevation is more than three (3) feet above the finished ground elevation and shall be installed with no additional payment.
- B. Precast reinforced concrete sections shall meet the requirements of the latest edition of ASTM C-478, and shall not have more than two (2) holes for the purpose of handling.
- C. Joints for precast sections shall be concrete pipe type and shall be sealed with preformed joint compound. Preformed joint compound shall be "Butyl-Tite" as manufactured by Blue Ridge Rubber Company, Fletcher, North Carolina; "Kent, Ohio; or equal and shall meet Federal Specification SS-S00210(210-A) SS-S-00219 and AASHTO Specification M-198.
- D. Manhole frames and covers shall meet the requirements of ASTM Designation A-48 for "Gray Iron Castings, Class 25". They shall be of the size and style shown on the plans.
- E. Manhole steps shall be ten (10) inch plastic encased steel aligned vertically along the inside wall of the manhole.
- F. Flexible manhole pipe connectors shall be Kor-N-Seal as manufactured by NPC Systems, Inc. or approved equal and shall meet ASTM C-923.
- G. Precast manholes shall be lined with three (3) coats of coal tar epoxy to a dry film thickness of 24 mils. The lining shall comply with the following specification.

2.05 LINING FOR CONCRETE PIPE AND MANHOLES

- A. GENERAL: All interior barrel and joint surface areas, which will be exposed to sewer liquids and gases, shall be prepared, coated, and cured as necessary to complete the installation of a coal tar epoxy lining in each concrete pipe section and manhole section, at the concrete pipe manufacturer's plant. Before coating work has begun, the Contractor shall submit to the Engineer the proposed coating supplier's complete materials, data sheets, and application specifications specifically prepared for the particular application.
- B. MATERIALS: Materials used in the application of the coating shall comply with the requirements specified herein and are subject to the review of the Engineer. Protective coatings shall be either Porter Coatings' Tasset C-200, Tnemec 46H-413, Koppers Bituminastic Number 300-M, or approved equal, used with the manufacturer's recommended epoxy structural paste adhesives, primers and thinners.
- C. PREPARATION: Specifically, surface preparation shall consist of sandblasting and cleaning the barrel of the pipe and the joint surface areas on which coatings will be applied. Under no circumstances shall the lining be applied on "green" concrete. All surfaces to be coated shall be essentially free of voids, cracks, inclusions or other structural defects. Any such defects shall be corrected by bagging or brushing the wet formed concrete and/or cement grouting the cured section. All grouting must be allowed to thoroughly cure before any coating is applied. The surfaces to be prepared and coated shall be smooth or lightly profiled. These surfaces shall not be extremely rough or deeply textured nor shall they bear exposed aggregate. All mortar fins, concrete splatter and other protrusions shall be removed by appropriate means. Prior to applying specified coatings, the concrete surface shall be clean and properly prepared as specified herein and shall be dry to the extent that the surfaces to be coated are visibly dry and the concrete contains no greater than ten (10) percent moisture as determined by measurement with a suitable moisture meter. Surfaces to be coated shall be clean and dry. All grease, oil, salts and other foreign matter shall be removed by steam or detergent cleaning. Any such areas shall be allowed to thoroughly dry before any further surface preparation is performed. All surfaces to be coated shall be uniformly brush-sandblasted to the extent that all loose or unsound concrete and laitance are removed. All necessary precautions shall be employed to avoid excessive sandblasting so that a uniformly blasted concrete surface is produced that is clean and lightly etched. All blasted concrete surfaces shall be patched with an epoxy structural paste adhesive, if required, and have the prime coat applied within eight (8) hours and before surface contamination or moisture absorption can occur. In order to avoid damaging previously applied coatings, work shall be scheduled such that complete concrete units are sandblasted and coated. The pipe surface areas to be lined shall be blown off with air to remove all sand, dust and other loose materials immediately prior to application of the lining compound. The lining compound shall not be applied when the ambient temperature is below forty (40) degrees Fahrenheit. The compound shall not be applied under adverse atmospheric conditions that will cause detrimental blistering, pinholing, or porosity of the film.
- D. APPLICATION: The coating shall be applied by the airless spray method, in three (3) coats, consisting of a primer, four (4) mils minimum dry film thickness, followed by two (2) coats each with a minimum dry film thickness of ten (10) mils, for a total minimum dry film thickness of twenty-four (24) mils.

- E. The complete coating system shall be free of excessive runs, sags, drips, cracks, crazing, alligatoring, blisters, inclusions, excessive or deficient film thickness, voids, pinholes or other damaged area defects. Any such deficiencies shall be corrected by removal and recoating. Depending upon air circulation and relative humidity conditions, the coating system should be cured sufficiently hard so that the pipe can be handled with minimal damage. Surface temperature shall be determined with an appropriate dial thermometer. Pipe moisture content shall be determined by an appropriate moisture meter to assure proper condition of the surface before applying coatings. The primer and finish coats shall be inspected for continuity, pinholes, bore areas and holidays, with a non-destructive field-calibrated sparking holiday detector. Dry film thickness shall be determined with a non-destructive dry film gauge. All instruments shall be as recommended by the coating supplier. Excessive runs, sags, dips, cracks, crazing, alligatoring, blisters and inclusions shall be completely removed by suitable scraping, chipping, or grinding. Loose or poorly bonded coating and improperly cured coating shall be completely removed to a sound substrate by grinding or sandblasting. Excessive film thickness shall be reduced to below 24.0 mils by grinding or sandblasting. All deficient areas shall be wiped free of all surface contamination using clean rags soaked in specified thinner and the cleaned areas shall be allowed to dry. The deficient area shall then be thoroughly abraded and the abrasion shall be "feathered" out slightly beyond the perimeter of the affected area. Small areas may be abraded by hand or power tool sanding using medium grit garnet or sandpaper. Extensive areas may be abraded by uniform brush sandblasting. All necessary precautions shall be employed, including temporary shielding where required to protect adjacent coatings from damage during sandblasting operations. All abraded areas shall be thoroughly swept clean and the specified coating applied the same day and before contamination can occur. The prepared areas shall then be primed and finish coated as specified, except that all coating may be applied unthinned and by brush. All coating shall be "feathered" out to the edge of the abraded area. The pipe shall be visually inspected at the job site before installation.

2.06 BEDDING AND BACKFILL

- A. Type A - Pipe Bedding, Haunching, and Backfill Material:
1. Bedding and Haunching material shall consist of Type S2 Material as specified in section 312333 of the Specifications.
 2. Initial Backfill shall consist of Type S1 Material as specified in Section 312333 of the Specifications.
- B. Type B - Pipe Bedding, Haunching, and Backfill Material:
1. Bedding and Haunching material shall consist of Type 5 Material as specified in section 312333 of the Specifications.
 2. Initial Backfill shall consist of S1 Material as specified in section 312333 of the Specifications.

901-S-501.03 – CONSTRUCTION REQUIREMENTS

3.01 REMOVAL OF PAVEMENT, SIDEWALKS, DRIVEWAYS, AND CURBS

- A. Whenever the wastewater improvements are to be located along or across an improved surface, the width of the trench shall be as nearly as possible to the maximum width as specified in Section 3-01 of these Specifications. Where brick, asphalt, or concrete

pavement, sidewalk, driveway, or curbing is cut, the width of the cut shall exceed the actual width of the top of the trench by twelve inches on each side or a total of twenty-four (24) inches. Exposed surfaces of Portland cement or asphaltic concrete shall be cut with a pavement saw before breaking. Care shall be taken in cutting to insure that straight joint is sawed. The Contractor shall repair any damage that occurs outside the specified limits as shown on the Plans at no additional expense. The Contractor shall maintain all crossings until completion. All areas that are to be replaced shall be restored to the original state before construction began. Special care shall be given to returning these specified areas to their original compaction, gradation, and structure thickness. The Contractor shall be responsible for written approvals from all public works departments impacted before construction begins and before final payment is made.

3.02 EXCAVATION AND TRENCHING

- A. Excavation of every description and of whatever substances encountered shall be performed to the depths indicated on the Plans or as otherwise specified. Excavation shall be by open cut method unless tunneling or boring is specified as per the Plans or with approval of the Engineer and/or Owner.
- B. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Excavated materials not required or not suitable for backfill shall be removed and/or wasted as directed by the Engineer and/or Owner at no additional expense. Grading shall be performed to prevent surface runoff from entering the excavated trench. Any accumulated water shall be removed by pumping or by methods approved by the Engineer and/or Owner.
- C. Materials suitable for bedding/backfill encountered during excavation shall be stockpiled separately. Sandy material shall be stockpiled in a manner to prevent mixing with clay material for use in backfilling.
- D. Excavation for manholes shall be done in a manner to facilitate the construction as per the Plans.
- E. The minimum net trench width for sewer pipe at and below the top of the pipe shall be the pipe outside diameter plus twelve (12) inches and in no case shall the net trench width be more than the pipe outside diameter plus twenty-four (24) inches. The width of the trench above this level may be as wide as necessary for sheeting, bracing, and shoring or for ensuring safe working conditions.
- F. The bottom of the trench shall be carefully graded and aligned as per the Plans and shall be conformed to the shape of the sewer pipe to ensure the pipe has continuous support for the entire length.
- G. No more than four hundred (400) feet of trench shall be opened in advance of the completed sewer and no more than one hundred (100) feet of unfilled trench shall be left open without the authority from the Engineer and/or Owner.
- H. Tunneling or Boring shall be permitted where indicated on the Plans.

3.03 SHEETING, SHORING, AND BRACING

- A. Sheeting, shoring, and bracing shall be furnished, placed and maintained by the Contractor as may be required to support the sides of the excavation. The Contractor shall be fully responsible for the sufficiency of such supports to prevent movement, which can injure

personnel, delay work, or cause damage to adjacent pavements, buildings, or other structures.

- B. Sheeting, shoring, and bracing which are not ordered by the Engineer to be left in place shall be removed in such a manner as not to endanger the constructed sewer or other structures, utilities or property. Voids left or caused by the withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specifically adapted to the purpose, by watering, or otherwise as may be directed.

3.04 DEWATERING

- A. The Contractor shall provide and maintain dewatering equipment for the removal of surface and ground water that enters excavated trenches. Excavated trenches shall be kept dry until the pipe placement has reached sufficient completion as to prevent damage from hydrostatic pressure or flotation. Excavation for trenches or other concrete sewer structures that extend below static ground water shall be dewatered by lowering and maintaining the ground water level a minimum of eighteen (18) inches below the bottom of the excavation.
- B. The Contractor will be held responsible for the carrying capacity of pipe, which may be used for drainage purposes and shall be kept free and clean of sediment and restrictions.
- C. Dewatering shall be performed by the Contractor at his own expense.

3.05 STEEL SHEET PILING

- A. Steel sheet piling shall be driven at locations shown on the Plans. Piling shall be in such a condition that it can be interlocked and driven in an appropriate manner
- B. The Contractor shall be responsible for adequately bracing the units against lateral forces. Piling shall be driven before final adjacent excavations are made.
- C. Pile driving equipment used shall be maintained in first class condition and shall operate efficiently in the space provided. Equipment shall be subject to the review of the Engineer.
- D. No separate payment will be made for this item.

3.06 PIPE BEDDING AND HAUNCHING INSTALLATION

- A. The specified granular bedding material shall be placed on the trench bottom to full trench width and shall extend six (6) inches minimum below the pipe bottom.
- B. Haunching material shall consist of the specified granular bedding material and shall extend up the sides of the pipe to a height equal to fifty (50) percent of the pipe diameter, also being the springline of the pipe. Haunching materials should be worked in around the pipe by hand

to provide uniform support adjacent to the pipe and shall be installed on 6" thick loose lifts and compacted to ninety (90) percent of the maximum dry density as determined by ASTM D-698, or fifty (50) percent relative density as determined by ASTM D-4259 and ASTM D-4254. Compaction equipment should not contact and damage the pipe. The compaction equipment and procedures should be acceptable with the select granular materials used.

- C. This item shall be paid for per linear foot of sewer pipe as an absorbed item for the designated depths specified in the Summary of Quantities.

3.07 SEWER PIPE PLACEMENT

- A. Sewer lines shall be accurately laid to the alignment, grade and elevations as per the approved Plans. The contractor shall provide suitable equipment for the safe handling, transporting, and installation of piping materials in a manner that will prevent damage. Each joint of pipe and all fittings shall be inspected for defects prior to installation and removed if any are found. Under no circumstances shall sewer pipe be laid in frozen ground.
- B. The Contractor shall begin laying pipe at the lowest points and continue laying up-grade with no breaks between manholes with the pipe spigots facing down-grade. The pipe shall be laid using the bedding method required to accommodate the trench conditions encountered. The entire length of pipe shall be fully supported without groove or bell ends bearing on the trench bottom, with water-tight joints. Whenever work ceases, the unfinished end of the pipe line shall be securely closed with a tight-fitted plug or cover.
- C. The Contractor shall adhere to the pipe and gasket manufactures instructions when jointing the pipe. All surfaces of each joint and jointing material shall be dry and free of sediment prior to any pipe jointing. Immediately after jointing, secure the laid pipe with tamped backfilled on either side.
- D. If dissimilar pipes are encountered, approved adaptor couplings shall be used for jointing. The completed joint shall be encased with a three (3) inch thick concrete collar and shall extend six (6) inches each side of the joint. No separate payment for adaptor couplings or concrete collars shall be made.

3.08 INITIAL BACKFILL MATERIAL AND PLACEMENT

- A. Initial backfill shall be considered as the material beginning at the springline of the pipe (top of haunching material hereinbefore specified) and extending no less than twelve (12) inches above the top of the pipe. The material shall be placed in six (6) inch lifts and compacted to ninety-five (95) percent of maximum dry density as determined by ASTM D-698, or fifty (50) percent relative density as determined by ASTM D-4259 and ASTM D-4254, before any other backfill is placed. Compaction equipment should not contact and damage the pipe.
- B. Select backfill material shall be considered as material hauled in from off-site. Testing costs incurred for tests required by the Engineer, associated with verifying that onsite or offsite material meets this specification shall be paid by the Contractor.
- C. Tamping: The backfill shall be placed in equal thickness lifts, each lift being thoroughly compacted to the density required. Each lift of the backfill material shall have proper moisture content to permit compaction to this density.

In areas where street paving, sidewalks, driveways and other restoration work is required, the backfill above the twelve (12) inch cover (initial backfill) level shall be compacted to the subgrade level or as directed and maintained to eliminate voids and future settlement. The backfill shall be placed in six (6) inch lifts and compacted to ninety-eight (98) percent of maximum dry density in these locations and other locations as shown on the Plans.

1. In open fields or undeveloped areas, the backfill above the twelve (12) inch cover (initial backfill) level may be placed in twelve (12) inch lifts and compacted to a density not less than the surrounding earth. The top of the completed filled trench shall be mounded slightly above natural ground to allow for settlement.
2. Cultivable areas shall be restored by the replacement of the stockpiled topsoil stripping to a depth of at least twelve (12) inches

3.09 ALIGNMENT

- A. The Contractor shall utilize a commercial grade laser beam specifically manufactured to aid in maintaining grade and alignment of pipelines during installation. The primary unit shall be mounted on a heavy-duty base and firmly anchored in the downstream manhole of the reach under construction. The maximum distance shall not exceed four hundred (400) feet per set-up unless otherwise approved by the Engineer.
- B. Each joint of pipe shall be installed using the methods and procedures in accordance with the manufacturer's recommendations and instructions. Care shall be exercised in order to prevent misalignment of the projected beam.

3.10 MANHOLE CONSTRUCTION

- A. All manholes shall be made up of precast concrete sections conforming to the latest edition of ASTM C-478, unless otherwise specified in the Plans. Precast manholes shall be built to the correct dimensions and installed at the correct elevations as per the Plans. All joints between precast sections shall be sealed with the hereinbefore-specified material. All lift holes and pipe entrances shall be sealed with non-shrink mortar to provide a watertight construction. Mortar shall not be used to seal precast section joints. The Contractor shall provide twenty-eight (28) inches inside diameter brick, precast concrete, or cast-in-place concrete spacer rings between the manhole rim and the precast eccentric cone section in order to set the rim to the correct elevation. Grout spacers and rim shall be secured to the manhole using masonry mortar. The above specified manhole steps shall be permanently installed on twelve (12) inch (minimum) to sixteen (16) inch (maximum) vertical centers.
- B. Pipe sections connecting manholes shall be no longer than four (4) feet to insure that a joint is provided in each line within four (4) feet of the inside face of each manhole. The above specified flexible manhole connector shall be installed and inspected to ensure a watertight connection and to allow differential settlement of the pipe and manhole wall to take place.
- C. The Contractor shall provide an invert in each manhole bottom to allow flow from incoming pipes to outgoing pipes, constructed of brick and mortar, with full pipe channels smoothly shaped and finished to prevent splashing and turbulent flow. Generally, the manhole floor outside the flowline shall be smooth and shall gently slope toward the outgoing invert at one (1) inch per foot minimum.
- D. Drop manhole connections shall be installed in locations indicated on the Plans and any other locations where the vertical difference in elevation between the inflow invert(s) and the outflow invert is equal or greater than twenty-four (24) inches.
- E. After installation, manholes shall be inspected for water-tightness at section joint locations, pipe locations, and any other areas of possible leaks, prior to placing in service. Any leaks are to be repaired at the Contractor's expense.

3.11 SERVICE LINE AND CONNECTIONS

- A. Sewer services shall be installed at points indicated on the Plans and at other locations as the Engineer and/or Owner may designate during construction. All service lines and connections shall be in accordance with the hereinbefore-specified materials and on the Sanitary Sewer Details sheet.
- B. Sewer services shall be laid on a minimum grade of one-eighth (1/8) inches per foot from the main to the proper location at each lot as per the Sanitary Sewer Details sheet. The minimum depth of cover over the service line at the property or easement line shall be three (3) feet unless otherwise directed by the Engineer or specified in the Plans. The ends of the sewer service shall be permanently marked with a six (6) foot metal fence post protruding three (3) feet above the existing ground with the top six (6) inches painted green. Before the final payment is issued, the Engineer and/or Owner shall inspect all service locations to verify that all have been adequately marked.
- C. Service lines and fittings shall be six (6) inch diameter of the hereinbefore-specified material unless otherwise directed by the Engineer or specified in the Plans.

3.12 SEWER TESTING

- A. GENERAL: Prior to putting the sewer system in service, all sewer lines shall be tested. If a test is required in accordance with an ASTM Specification or other publication, a copy of the publication shall be kept on site in good condition for the Contractors and Engineer's use during testing. If leaks are discovered, the Contractor is responsible for the repair and retesting of the line until satisfactory test results are obtained. The materials specified on the Plans shall govern what types of test are required and are as follows:
 - 1. PVC PLASTIC PIPE: Satisfactory results from a Deflection test and an Air Test are required. An Exfiltration test may be required if the Engineer deems necessary. An infiltration test will be required where the crown of the entire reach of sewer being tested lies three (3) feet or more under the existing water table.
 - 2. DUCTILE IRON PIPE: A satisfactory Air Test is required. An Exfiltration test may be required if the Engineer deems necessary. An infiltration test will be required where the crown of the entire reach of sewer being tested lies three (3) feet or more under the existing water table.
- B. Air Test: Air Test shall be conducted in accordance with one of the following standards.
 - 1. ASTM F1417: "Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air."
 - 2. UNI-B-6: "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe." Published by the Uni-Bell PVC Pipe Association.
- C. Deflection Test: All PVC sewer main shall be tested with a five (5) percent mandrel and deficient sections shall be uncovered, re-bed, re-backfilled, and re-tested until satisfactory

test results are obtained. The mandrel test shall not be performed until the PVC sewer main has been installed in place for a minimum of thirty (30) days.

- D. Exfiltration Test: Exfiltration Test shall be conducted by blocking off manhole openings except those connecting with the reach being tested, filling the line and measuring the water required to maintain a constant level in the manholes. A reach shall be considered as the distance between two (2) manholes. Manholes shall be considered sections of equivalent diameter pipe. The pipe shall be filled with enough water to maintain at least four (4) feet of hydrostatic head above the top of pipe on the high end of the section being tested and at least four (4) feet of standing head at the lower end thereof with a maximum hydrostatic head of fifteen (15) feet allowed. The total allowable exfiltration shall not exceed two-hundred (200) gallons per inch of nominal diameter per mile of pipe per twenty-four (24) hours for each reach tested. For purposes of determining maximum allowable leakage, exfiltration tests shall be maintained on each for a minimum of two (2) hours and as much longer as necessary, in the opinion of the Engineer and/or Owner to locate all leaks. Any leaks found that exceeds the maximum allowable shall be repaired and retested by the Contractor at no additional cost. The Contractor shall provide, at his own expense, necessary piping between the reach to be tested and the source of water supply together with equipment, materials, and labor required for the test. The methods used and the time conducting exfiltration tests shall be acceptable to the Engineer and/or Owner.

- E. Infiltration Test: The total allowable infiltration shall not exceed two-hundred (200) gallons per inch of nominal diameter per mile of pipe per twenty-four (24) hours for each reach tested. A reach shall be considered as the distance between two (2) manholes. Manholes shall be considered sections of equivalent diameter pipe. Any leaks found that exceeds the maximum allowable shall be repaired and retested by the Contractor at no additional cost. The Contractor shall provide, at his own expense, necessary piping between the reach to be tested and the source of water supply together with equipment, materials, and labor required for the test.

3.13 FLUSHING

- A. The completed gravity flow system shall be free of mud, siltation, and other foreign material deposited during construction. Flushing shall commence at the upstream end of the completed system and continue downstream manhole to manhole. Only water from an approved source shall be permitted.

- B. Water used in flushing shall not be permitted to enter into the existing system but shall be disposed of in a manner acceptable to the Owner. Flushing shall not be required in those sections of installed pipe and manholes where an exfiltration test was required and as adequately cleaned the mains.

3.14 CLEAN-UP

- A. After backfill is completed, the Contractor shall dispose of surplus material, dirt, and rubbish from the site. Surplus dirt shall be disposed of in Contractor furnished and approved disposal areas or in on site areas as directed by the Engineer and/or Owner.

- B. After work is completed, the Contractor shall remove all tools and equipment used and shall leave the entire site in a clear and clean condition.

END OF SECTION

SECTION 334100

DRAINAGE PIPES AND CULVERTS

SECTION 1 – GENERAL

1.01 DESCRIPTION

This item shall consist of furnishing all materials, labor, tools, equipment, and incidentals and performing all work necessary for the installation of pipe culverts, curb inlets, catch basins, and concrete headwalls and other specials in accordance with the Contract Documents. The work shall include all excavation, grading, backfill and other incidentals necessary for the installation of drainage structures as specified herein.

1.02 APPLICABLE DOCUMENTS

A. The following publications form a part of this Specification and where referred to by basic designation only, are applicable to the extent indicated. Reference is to the later edition of each unless specified otherwise.

1. American Society for Testing and Materials (ASTM):

- a. C-76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- b. C443 Joints for Circular Concrete Sewer and Culvert Pipe.
- c. C478 Precast Reinforced Concrete Manhole Sections.
- d. F667 Standard Specifications for Large Diameter Corrugated Polyethylene Pipe and Fittings.

2. American Association of State Highway and Transportation Officials (AASHTO):

- a. M190 Bituminous Coated Corrugated Metal Culvert Pipe & Pipe Arches.
- b. M36 Corrugated Metal Culvert Pipe, Aluminum Coated.
- c. M294 Standard Specification for Corrugated Polyethylene Pipe, 12" to 24" diameter.

3. American Concrete Institute (ACI):

- a. ACI 301 Specifications for Structural Concrete for Buildings.
- b. ACI 318 Building Code Requirements for Reinforced Concrete.

B. Local Building Codes: Any City, County and State Codes applying to the work.

C. Standard Specifications for State Aid Road and Bridge Construction, Latest Edition, as referenced herein.

1.03 SUBMITTALS

A. Certified Test Reports: Before delivery of materials and equipment, certified copies of the reports of all tests specified herein or elsewhere shall be submitted to the ENGINEER for review. The testing shall have been performed in a laboratory meeting the ENGINEERS approval. Test reports shall be accompanied by notarized certificates from the manufacturer certifying that the tested material and equipment is of the same type, quality, manufacture and made as that proposed to be supplied.

- B. Concrete Pipe: Certified copies of test reports shall include strength tests of concrete pipe. Strength tests for concrete piping shall be the three edge bearing tests. Test reports shall be furnished prior to installation of piping.
- C. Shop Drawings: CONTRACTOR shall supply shop drawings as specified herein or as directed by the ENGINEER. Review of shop drawings by the ENGINEER shall be required prior to incorporation of the subject item into the work.

SECTION 2 – PRODUCTS

- 2.01 REINFORCED CONCRETE PIPE:** Shall conform to ASTM C76, Class III, Wall B minimum, unless otherwise specified. Joints shall be rubber gasket or bituminous plastic. Jointing shall be in conformance with the manufacturer's recommendations, applicable ASTM Standards, and MSHD Standards.
- 2.02 CORRUGATED METAL PIPE:** Pipe shall be bituminous coated on inside and outside. Manufacture of pipe and galvanizing shall conform to AASHTO M190, Type A. Joints shall be fully bituminous coated coupling bands and conform to AASHTO M36. Bands shall not be less than 7 inches wide for pipe diameters from 8 inches to 30 inches, inclusive; and 12 inches wide for pipe with diameters from 36 inches to 60 inches, inclusive. Jointing shall be completed in accordance with the manufacturer's recommendations and applicable ASTM/AASHTO Standards. Corrugated metal pipe shall have 14 gauge wall thickness, unless otherwise specified.
- 2.03 ALUMINIZED STEEL PIPE:** Pipe shall be aluminized, Type II, and have smooth interior wall (Manning "n" roughness value = 0.012) shall be aluminized on inside and outside. Manufacture of pipe and galvanizing shall conform to AASHTO specifications. Joints shall be aluminized, Type II, coupling bands and conform to AASHTO specifications. Bands shall not be less than 7 inches wide for pipe diameters from 8 inches to 30 inches, inclusive; and 12 inches wide for pipe with diameters from 36 inches to 60 inches, inclusive. Jointing shall be completed in accordance with the manufacturer's recommendations and applicable ASTM/AASHTO Standards. Aluminized steel pipe shall have 14 gauge thicknesses, unless otherwise specified. Bedding material shall be required for all HDPE pipes, to the dimensions detailed on the construction plans.
- 2.04 CORRUGATED POLYETHYLENE PIPE:** High Density Polyethylene Pipe (HDPE), shall have a full circular cross-section, and shall be corrugated on the exterior and smooth lined on the interior and shall be manufactured in accordance with requirements of AASHTO M 294 and AASHTO MP7, latest editions. Pipe and fittings shall be manufactured from virgin PE compounds which conform to the requirements of cell class 335400C as defined and described in ASTM D 3350. All HDPE delivered and used shall be certified through the Plastics Pipe Institute (PPI) Third Party Certification Program, and shall bear the Third Part Administered PPI seal. Bedding material shall be required for all HDPE pipe, to the dimensions detailed on the construction plans.
- 2.05 CONCRETE:**
 - A. Cement, reinforcement, forms, jointing and other incidentals shall be as specified in the Section S-600 of the Standard Specifications for State Aid Road and Bridge Construction of the State of Mississippi, latest edition
 - B. All concrete work shall be in accordance with the provisions of "Building Code Requirements for Reinforced Concrete," ACI 318 and ACI 301. Any questions

regarding acceptable concrete practice shall be decided by reference to ACI 301 and to ACI Standards listed in Chapter 4 of ACI 318.

2.06 CONTRACTOR'S RESPONSIBILITY

- A. The CONTRACTOR shall be responsible for the condition of all excavations made by him. All slides and cave-ins shall be removed without extra compensation, at whatever time and under whatever circumstances they may occur.

2.07 INCIDENTAL MATERIALS

- A. Masonry brick shall conform to the standard specifications for sewer brick, made from clay or shale, ASTM C-32, Grade MS.
- B. Mortar: Portland Cement Mortar shall consist of one (1) part Portland Cement complying with ASTM C- 150, Type 1, and three (3) parts mortar sand and sufficient water mix mortar to proper consistency.
- C. Gray iron casting shall conform to the standard specifications for gray iron castings ASTM A-48, Class 25.
- D. Manhole Steps: Steps for manholes shall be cast aluminum alloy meeting the requirements of the Aluminum Association (Alloy AA-514) and Federal Specifications G4A.
- E. Foundations: Shall be either poured in place reinforced concrete as detailed, or precast sections set on undisturbed earth or select bedding, where ordered by the ENGINEER or detailed on the drawings. Concrete shall be Class "B" as specified in Section Section S-600 of the Standard Specifications for State Aid Road and Bridge Construction of the State of Mississippi, latest edition
- F. Flared End Section: Shall be of the same class and type of pipe installed where specified.
- G. Bedding Material: Bedding Material for storm drainage pipe shall be Type S1 Material unless otherwise specified.

SECTION 3 – EXCAVATION

3.01 EXCAVATION

- A. General: The CONTRACTOR shall perform all excavation of every description and of whatever substances encountered, to the depths indicated or as otherwise specified.
- B. During excavation, material suitable for backfilling in the opinion of the ENGINEER shall be stock piled in an orderly manner a sufficient distance from the banks of trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or not suitable for backfill shall be removed and wasted as approved by the ENGINEER. Such grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved method.

3.02 TRENCHES

- A. The trenches shall be if the necessary width for the proper laying of the pipe. The bottom of the trenches shall be accurately graded and shaped to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portion of the pipe where it is necessary to excavate for pipe bells or joints.
- B. Depressions for joints shall be dug after the trench bottom has been graded in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable. Depressions shall only be of such length, depth and width as required for properly making the particular type of joint.
- C. Care shall be exercised not to excavate below the depth indicated. Over excavated depths shall be backfilled with loose, granular, moist earth, and thoroughly tamped.
- D. The width of the trench at and below the top of the pipe and the trench wall shall not exceed the pipe O.D. plus 24 inches.
- E. The bottom of the trench shall be rounded so that at least the bottom quadrant of the pipe shall rest firmly on undisturbed soil for as nearly the full length of the barrel as proper jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipe lying by men skilled in this type of work. The pipe bed shall be prepared to the ENGINEER'S complete satisfaction.
- F. Whenever unstable soil that is incapable of properly supporting the pipe is encountered in the bottom of the trench, such soil shall be removed for the full width of the trench and to the depth required. The trench shall be backfilled to the proper grade with an aggregate composed of coarse sand, fine gravel or other suitable material approved by the ENGINEER. The backfill shall be thoroughly compacted and shaped to form a bed for the pipe.

3.03 DEWATERING/SHORING: The CONTRACTOR shall perform all pumping, well pointing, or shoring necessary to perform the excavation and to maintain excavation in dry state during the work. This shall be an absorbed cost and shall not be measured for separate payment.

3.04 BACKFILLING

- A. General: The trenches shall not be backfilled until the system as installed conforms to the requirements specified. The trenches shall be carefully backfilled with the excavated materials, approved for backfilling. CONTRACTOR shall ensure that proper backfill and compaction is achieved beneath and around pipe haunches.
- B. Backfill material shall be Type S1 material. Backfill shall be carefully rammed and compacted in places.

- C. Trenches within roadways shall be backfilled to the top of the subgrade or the ground surface in 6 inch loose layers, and each layer shall be compacted to a density at least 98% of maximum density as determined by AASHTO Method T-99. The surface shall be graded to conform to the surrounding ground surface.
- D. Trenches in open areas shall be backfilled to a point one (1) foot above the top of the pipe in 6 inch loose layers. Each layer shall be compacted to a density of at least 98% of the maximum density as determined by AASHTO T-99. The remainder of the backfill above 1 foot level shall be properly and carefully compacted to the density of the adjacent earth, and the surface shall be mounded over the trench and left in a uniform and neat condition satisfactory to the ENGINEER.
- E. Trenches improperly backfilled in the opinion of the ENGINEER shall be reopened to the depth required for proper inspection, then refilled and recompacted as specified. There shall be no extra compensation for such corrective work.

3.05 PIPE LAYING

- A. Pipe laying shall proceed upgrade with the spigot ends of bell and spigot pipe and tongue ends of tongue and groove pointing in the direction of flow in the case of concrete pipe. Corrugated metal pipe shall be laid with outside laps of circumferential joints pointing upstream and with longitudinal laps on the side. Corrugated polyethylene pipe shall be installed in accordance with ASTM recommended practice D-2321 and in accordance with manufacturer's recommendations.
- B. Each pipe shall be laid true to line and grade in such a manner as to form a close concentric joint with the adjoining pipe and to avoid sudden off sets of the flow line. As the work progresses, the interior of the pipe shall be cleared of all dirt and superfluous materials of every description.
- C. Trenches shall be kept free of water and pipe shall be laid when the condition of the trench or the weather is unsuitable for such work.
- D. Pipe shall be plugged or sealed at the end of work day to inhibit the entrance of foreign objects into the line.

3.06 JOINTS

- A. Concrete Pipe: Joints shall be rubber gasket complying with ASTM C-443 or bituminous plastic sealer in accordance with MSHD Standard Section 707.04 as specified herein.
 - 1. All rubber gaskets shall be extruded or molded and cured in such a manner that any cross section will be dense, homogeneous, and free of porosity, blisters, pitting, and other imperfections. The gaskets shall be extruded or molded to the specified size within a tolerance of $\pm 6\%$ on any dimension, measured at any cross section. The rubber gasket shall be fabricated from a high grade rubber compound. The basic polymer shall be natural rubber, synthetic rubber or a blend of both acceptable to the purchaser.

2. Bituminous plastic sealer shall be composed of a steam refined petroleum asphalt or of a refined coal tar, dissolved in a suitable solvent and stiffened with a mineral filler consisting essentially of short fiber asbestos. The sealer shall be smooth uniform mixture, not thickened or livered; it shall show no separation which cannot be easily overcome by stirring. The material shall be of such consistency and properties that it can readily applied with a towel, a putty knife, or a caulking gun without pulling or drawing. The material, when applied to pipe surfaces, shall exhibit good adhesive and cohesive properties and shall have only slight shrinkage after curing. The material shall be capable of being exposed to below freezing temperatures without incurring damage.
- B. Aluminized Steel Pipe: Joints shall be made with coupling bands. Bands shall be aluminized on inside and outside and shall be seated and made up tightly in accordance with the recommendations of the pipe manufacturer. The exterior surface of all bands and any other defects shall receive a field coat of bituminous paint.
- C. Corrugated Polyethylene Pipe: Joints shall be made with split couplings corrugated to engage the pipe corrugations, and shall engage a minimum of 4 corrugations, 2 on each side of joint. A neoprene gasket shall be utilized with the couplings to provide a soil tight joint.

3.07 CONSTRUCTION OF CONCRETE HEADWALLS

- A. General: Construction of concrete headwalls shall be of reinforced concrete and conform to dimensions, grades and details shown of the Drawings. Forms of exposed surfaces of headwalls shall be provided with liners and chamfers strips. Chamfers shall be 3/4".
- B. Exposed surfaces of parapets and wing walls shall be given a rubbed finish with a medium coarse carborundum stone.
- C. The structures shall be cured for a minimum of 7 days. The structures shall be kept wet by the use of wetted burlap or may be cured with membrane curing compound.
- D. The headwalls shall be carefully backfilled to a density at least that of the surrounding ground. All costs involved in excavation and backfilling shall be in the Contract Unit Price for headwalls.

3.08 CONSTRUCTION OF CATCH BASINS, CURB INLETS AND STORM MANHOLES

- A. Brick masonry and concrete work for catch basins and inlets shall be constructed in conformity with the details shown on the Construction Plans.
- B. Where irons or other fittings enter the brick work, they shall be placed as the work is laid up, thoroughly bonded, accurately spaced and lined. Upon completion of the masonry and settings of castings and fittings, the inside and outside surfaces of the brick masonry shall be neatly plastered

with mortar to the thickness of one half (1/2) inch. Plastering shall be finished to a uniform, smooth surface and neatly pointed to all fittings.

- C. The concrete or brick and mortar shall be carefully constructed around the inlet and outlet pipes so as to prevent leakage and form a neat connection.
- D. Basins, inlets and manholes may be constructed partially or totally of precast reinforced concrete manhole sections and specials. All precast units shall comply with ASTM C-478 and joints shall be preformed plastic joints. Preformed plastic joint compound shall be "Butyl-Tite" as manufactured by Blue Ridge Rubber Company, Fletcher, North Carolina; "Kent -Seal" as manufactured by Hamilton Kent Manufacturing Company of Kent, Ohio; or equal. Preformed plastic joint compound shall meet Federal Specifications SS-S-SS-00219 and AASHTO M-198.

3.09 CLEAN_UP

After backfill of pipe and structures is completed, the area shall be graded to conform with the surrounding ground or to grade indicated, as applicable. The CONTRACTOR shall dispose of all surplus material, dirt and rubbish. Surplus material shall be deposited at locations and in a manner approved by the ENGINEER.

3.10 INSPECTION

- A. Prior to final approval of the system, the CONTRACTOR and ENGINEER shall conduct a thorough inspection of the entire installation. Any indications of defects on material or workmanship or any obstruction to the flow in the pipe system shall be corrected.
- B. All defects shall be corrected by the CONTRACTOR without additional compensation and in a manner acceptable to the ENGINEER.

- 3.11 MAINTENANCE:** The **CONTRACTOR** shall be responsible, until final acceptance and without extra compensation, for the maintenance of all sewers and structures to the lines and grades established for the construction, for the stability of all backfills and the finished grades above the sewers and around the structures, and for the repair and replacement of all items which were damaged or removed during the construction. Restoration of pavement, base courses, driveways, curb and gutter, sidewalks and other items shall conform to the requirements specified in other sections of the Specifications.

END OF SECTION

SECTION 334900

STORM DRAINAGE STRUCTURES

PART 1 GENERAL

1.1 DESCRIPTION

This item shall consist of furnishing all materials, labor, tools, equipment, and incidentals and performing all work necessary for the installation of precast inlets, precast manholes, precast junction boxes, and other specials in accordance with the Construction Plans. The work shall include all excavation, grading, backfill and other incidentals necessary for the installation of drainage structures as specified herein.

1.2 APPLICABLE DOCUMENTS

- A. The following publications form a part of this Specification and where referred to by basic designation only, are applicable to the extent indicated. Reference is to the later edition of each unless specified otherwise.
1. American Society for Testing and Materials (ASTM):
 - a. C-76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 - b. C443 Joints for Circular Concrete Sewer and Culvert Pipe.
 - c. C478 Precast Reinforced Concrete Manhole Sections.
 - d. F667 Standard Specifications for Large Diameter Corrugated Polyethylene Pipe and Fittings.
 2. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M190 Bituminous Coated Corrugated Metal Culvert Pipe & Pipe Arches.
 - b. M36 Corrugated Metal Culvert Pipe, Aluminum Coated.
 - c. M294 Standard Specification for Corrugated Polyethylene Pipe, 12" to 24" diameter.
 3. American Concrete Institute (ACI):
 - a. ACI 301 Specifications for Structural Concrete for Buildings.
 - b. ACI 318 Building Code Requirements for Reinforced Concrete.
- B. Local Building Codes: Any City, County and State Codes applying to the work.
- C. Standard Specifications for State Aid Road and Bridge Construction, Latest Edition, as referenced herein.

1.3 SUBMITTALS

- A. Certified Test Reports: Before delivery of materials and equipment, certified copies of the reports of all tests specified herein or elsewhere shall be submitted to the ENGINEER for review. The testing shall have been performed in a laboratory meeting the ENGINEERS approval. Test reports shall be accompanied by notarized certificates from the manufacturer certifying that the tested material and equipment is of the same type, quality, manufacture and made as that proposed to be supplied.
- B. Shop Drawings: CONTRACTOR shall supply shop drawings as specified herein or as directed by the ENGINEER. Review of shop drawings by the ENGINEER shall be required prior to incorporation of the subject item into the work.

PART 2 PRODUCTS

2.1 CONCRETE:

- A. Cement, reinforcement, forms, jointing and other incidentals shall be as specified in Section S-600 of the Standard Specifications for State Aid Road and Bridge Construction of the State of Mississippi, latest edition
- B. All concrete work shall be in accordance with the provisions of "Building Code Requirements for Reinforced Concrete," ACI 318 and ACI 301. Any questions regarding acceptable concrete practice shall be decided by reference to ACI 301 and to ACI Standards listed in Chapter 4 of ACI 318.

2.2 CONTRACTOR'S RESPONSIBILITY

- A. The CONTRACTOR shall be responsible for the condition of all excavations made by him. All slides and cave-ins shall be removed without extra compensation, at whatever time and under whatever circumstances they may occur.

2.3 INCIDENTAL MATERIALS

- A. Masonry brick shall conform to the standard specifications for sewer brick, made from clay or shale, ASTM C-32, Grade MS.
- B. Mortar: Portland Cement Mortar shall consist of one (1) part Portland Cement complying with ASTM C-150, Type 1, and three (3) parts mortar sand and sufficient water mix mortar to proper consistency.
- C. Gray iron casting shall conform to the standard specifications for gray iron castings ASTM A-48, Class 25. Grate tops for all grate inlets shall be "Bee Hive" type by East Jordan Iron Works, Inc. or equal.
- D. Manhole Steps: Steps for manholes shall be cast aluminum alloy meeting the requirements of the Aluminum Association (Alloy AA-514) and Federal Specifications G4A.
- E. Foundations: Shall be either poured in place reinforced concrete as detailed, or precast sections set on undisturbed earth or select bedding, where ordered by the ENGINEER or detailed on the drawings. Concrete shall be Class "B" as specified in Section S-600 of the Standard Specifications for State Aid Road and Bridge Construction of the State of Mississippi, latest edition
- F. Flared End Section: Shall be of the same class and type of pipe installed where specified.
- G. Bedding Material: Bedding Material for storm drainage structures shall be Type S5 Material in accordance with 312333 and the Drawings. The thickness of bedding material beneath the structure shall be at least six inches.

PART 3 EXECUTION

3.1 EXCAVATION AND BACKFILL

- A. General: The CONTRACTOR shall perform all excavation of every description and of whatever substances encountered, to the depths indicated or as otherwise specified.
- B. All excavated materials shall be removed and disposed off of-site at the Contractor's expense. Such grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved method.
- C. Backfill shall consist of Type S1 material placed in six inch lifts to 95% of maximum density as determined by ASTM D-698.

3.2 CONSTRUCTION OF GRATE INLETS, CURB INLETS AND STORM MANHOLES

- A. Brick masonry and concrete work for inlets shall be constructed in conformity with the details shown on the Construction Plans.
- B. Where irons or other fittings enter the brick work, they shall be placed as the work is laid up, thoroughly bonded, accurately spaced and lined. Upon completion of the masonry and settings of castings and fittings, the inside and outside surfaces of the brick masonry shall be neatly plastered with mortar to the thickness of one half (1/2) inch. Plastering shall be finished to a uniform, smooth surface and neatly pointed to all fittings.
- C. The concrete or brick and mortar shall be carefully constructed around the inlet and outlet pipes so as to prevent leakage, form a neat connection and allow for positive drainage across the inlet.
- D. Basins, inlets and manholes shall be constructed totally of precast reinforced concrete manhole sections and specials. All precast units shall comply with ASTM C-478 and joints shall be preformed plastic joints. Preformed plastic joint compound shall be "Butyl-Tite" as manufactured by Blue Ridge Rubber Company, Fletcher , North Carolina; "Kent -Seal" as manufactured by Hamilton Kent Manufacturing Company of Kent, Ohio; or equal. Preformed plastic joint compound shall meet Federal Specifications SS-S-SS-00219 and AASHTO M-198.

3.3 CLEAN-UP

After backfill of pipe and structures is completed, the area shall be graded to conform with the surrounding ground or to grade indicated, as applicable. The CONTRACTOR shall dispose of all surplus material, dirt and rubbish off of the site.

3.4 INSPECTION

- A. Prior to final approval of the system, the CONTRACTOR and ENGINEER shall conduct a thorough inspection of the entire installation. Any indications of defects on material or workmanship or any obstruction to the flow in the pipe system shall be corrected.
- B. All defects shall be corrected by the CONTRACTOR without additional compensation and in a manner acceptable to the ENGINEER.

3.5 MAINTENANCE

The CONTRACTOR shall be responsible, until final acceptance and without extra compensation, for the maintenance of all sewers and structures to the lines and grades established for the construction, for the stability of all backfills and the finished grades above the sewers and around the structures, and for the repair and replacement of all items which were damaged or removed during the construction.

3.6 WARRANTY

The Contractor shall warrant all materials of construction and repair and all workmanship for a period of one (1) year from the date of final acceptance of the work. Should defects or failures occur during the period of warranty, the Contractor shall promptly take whatever steps are necessary to return the work to first class condition.

END OF SECTION

CODE SUMMARY

NOTE: REFERENCES NOTED ARE BASED ON THE INTERNATIONAL BUILDING CODE UNLESS NOTED OTHERWISE.

1. APPLICABLE CODES

BUILDINGS COMPRISING THIS PROJECT HAVE BEEN DESIGNED ACCORDING TO THE FOLLOWING ADOPTED REGULATIONS AND CODE OF ORDINANCES ENFORCED BY THE CITY OF WEST MEMPHIS, ARKANSAS, AND FEDERAL REGULATIONS:

2012 ARKANSAS FIRE PREVENTION CODE: VOL. 1	2014 ARKANSAS ENERGY CODE (AEC)
2012 ARKANSAS FIRE PREVENTION CODE: VOL. 2 - COMMERCIAL	2009 - ICC A117.1
2012 ARKANSAS FIRE PREVENTION CODE: VOL. 3 - RESIDENTIAL	LIFE SAFETY CODES AS REFERENCED BY AFPC
2006 ARKANSAS STATE PLUMBING CODE	MOST CURRENT NFPA STANDARDS
2010 ARKANSAS STATE MECHANICAL CODE	2010 - ADA STANDARDS FOR ACCESSIBLE DESIGN (COMMUNITY BUILDING)
2017 NATIONAL ELECTRICAL CODE (NEC)	FAIR HOUSING ACCESSIBILITY GUIDELINES
2006 ARKANSAS STATE GAS CODE	UNIFORM FEDERAL ACCESSIBILITY STANDARDS

2. PROJECT DESCRIPTION

A. THIS PROJECT CONSISTS OF A NEW APARTMENT COMPLEX. THE STRUCTURE IS GENERALLY WOOD STUD FRAMING WITH BRICK VENEER EXTERIOR WALLS ON A POST-TENSIONED CONCRETE SLAB. THE PROJECT CONSISTS OF 2 THREE STORY RESIDENTIAL BUILDINGS, 2 TWO-STORY BUILDINGS, A COMMUNITY BUILDING, A GAZEBO, A MAIL KIOSK, AND A BUS STOP AS FOLLOWS:

BUILDING TYPE	BLDG DESCRIPTION	OCCUPANCY (AFPC 304, 310.4)	CONST. TYPE (IBC 601)	SPRINKLERED
A	APARTMENT	R2	V-B	SPRINKLERED
B	APARTMENT	R2	V-B	SPRINKLERED
C	COMMUNITY BLDG.	B	V-B	UNSPRINKLERED

36' MAX HT. PER CITY OF WEST MEMPHIS. AFPC STATES 60' MAX WITH SPRINKLERS

BUILDING TYPE	AREA ALLOWED (IBC TABLE 503, 506.2)	AREA PROVIDED PER STORY	STORIES ALLOWED & HEIGHT ALLOWED	STORIES PROVIDED & HEIGHT PROVIDED
A	7,000 SF	5,500 SF	3' 36' max ht.**	2 27'-3'***
B	7,000 SF	10,942 SF**	3' 36' max ht.**	3 35'-8 3/4'***
C	9,000 SF	1,634 SF	1 36' max ht.**	1 19'-4"

*AFPC 2012 TABLE 503, SECTIONS 504.2 AND 506.1 ALLOW AN INCREASE IN BOTH THE MAXIMUM BUILDING HEIGHTS AND AREAS WHEN BUILDING IS SPRINKLERED. BUILDING C IS NOT SPRINKLERED.
 ** AREA IS BASED ON AFPC 506.3 AND IS THE FOOTPRINT, PER LEVEL, AS FORMED BY THE OUTSIDE FACE OF THE EXTERIOR WALLS.
 *** ALLOWABLE STORIES AND MAXIMUM HEIGHT BASED ON WEST MEMPHIS ZONING REQUIREMENTS. HEIGHTS PROVIDED ARE THE MEAN ROOF HEIGHTS.

3. FIRE RESISTANCE REQUIREMENTS

- A. FIRE RESISTANCE RATINGS PER AFPC (TABLE 601):
 A.A. NO FIRE RATED SEPARATIONS ARE REQUIRED AT THE COMMUNITY BUILDING.
 A.B. FIRE SEPARATIONS FOR APARTMENT BUILDINGS AS FOLLOWS:

STRUCTURAL ELEMENT	RATING (IN HOURS)	
STRUCTURAL FRAME, COLUMNS, GIRDERS, TRUSSES	0	TABLE 601
EXTERIOR BEARING WALLS	0	TABLE 601
INTERIOR BEARING WALLS	0	TABLE 601
EXTERIOR NON-BEARING WALLS	0	TABLE 602 WITH MIN. FIRE SEPARATION OF 10'. CONSTRUCTION TYPE V-B; GROUP R
INTERIOR NON-BEARING WALLS	0	TABLE 601 PAR 602.5 - MAY BE OF ANY MATERIAL PERMITTED BY CODE
FLOOR CONSTRUCTION INCLUDING SUPPORTING BEAMS & JOISTS	0	TABLE 601
ROOF CONSTRUCTION INCLUDING SUPPORTING BEAMS & JOISTS	0	TABLE 601
UNPROTECTED EXTERIOR WALL OPENINGS	NL	TABLE 705.8 UNPROTECTED OPENINGS ALLOWED - EACH ELEVATION PER STORY MAY HAVE MAX OF 25% UNPROTECTED OPENING.
VERTICAL FLAME BARRIERS	N/A	PAR 705.8.5. EXCEPTION 1- NOT REQUIRED FOR BUILDINGS THAT ARE 3 STORIES OR LESS IN HEIGHT.
FIRE WALLS	N/A	TABLE 706.4 TYPE V CONSTRUCTION PERMITTED TO HAVE A 2-HR FIRE RESISTANCE RATING
FIRE PARTITIONS (SEPARATING DWELLING UNITS)	1	PAR 708.3 UL DESIGN #U340 (1 HR)
DRAFTSTOPPING	REQ'D	PAR 718.4.2 EXCEPTION 3. NOT TO EXCEED 3,000 SF OR ABOVE EVERY TWO DWELLING UNITS, WHICHEVER SMALLER PAR 708.4, EXCEPTION 5, REQ'D ABOVE FIRE PARTITION.
CONCEALED SPACES	N/A	PAR 718.3.2. DRAFTSTOPPING SHALL BE PROVIDED IN FLOOR/CEILING SPACES AND IN LINE WITH FIRE PARTITION SEPARATING DWELLING UNITS.
SMOKE BARRIERS	N/A	PAR 709.4. NOT REQUIRED FOR TYPE V-B CONSTRUCTION.
HORIZONTAL ASSEMBLIES	1	PAR 711.3 REQUIRED AT FLOOR/CEILING AND ROOF/CEILING ASSEMBLIES - (UL DESIGN L501/L563/P531)
PENETRATIONS	REQ'D	PAR 714.3.1.2 RATING OF NOT LESS THAN THE REQ'D FIRE-RESISTANCE RATING OF THE WALL PENETRATED (UL DESIGN #W-L-7042 (1HR))
OPENING PROTECTIVES	REQ'D	TABLE 716.5. DOORS IN A 1-HR RATED FIRE BARRIER EXIT ENCLOSURE REQ'D TO BE 1-HR RATED.
FIREBLOCKING	REQ'D	PAR 718.2 SHALL BE INSTALLED TO CUT OFF CONCEALED DRAFT OPENING (BOTH VERTICAL AND HORIZONTAL) AND SHALL FORM AN EFFECTIVE BARRIER FLOORS, BETWEEN THE TOP STORY, AND THE ATTIC SPACE ABOVE.

4. EGRESS REQUIREMENTS

A. OCCUPANT LOAD (AFPC TABLE 1004.1.2):

BUILDING TYPE	AREA PER OCCUPANT	MAX. AREA PER UNIT	MAX. OCCUPANT (AFPC 1004.1.2)	MAX. OCCUPANT LOAD PROVIDED
A	200 GROSS	1,234 SF	20 PPL/SF	6/UNIT
B	200 GROSS	1,234 SF	20 PPL/SF	5/UNIT
C	100 GROSS	1671 SF	49 PPL/SF	16

B. EGRESS CALCULATIONS:

MAX TRAVEL DIST TO DOORWAY (AFPC 1014.3)	MAX DISTANCE TO DOORWAY PROVIDED	MAX. COMMON PATH OF EGRESS DIST (AFPC 1016.2)	MAX. COMMON PATH OF EGRESS PROVIDED
125 FT - R-2	54'	250 FT	106'
75 FT - B	41'	200 FT	41'

C. AFPC 1009.4 EXCEPTION 1. STAIRWAYS SERVING AN OCCUPANT LOAD OF LESS THAN 50 SHALL HAVE A WIDTH OF NOT LESS THAN 36 INCHES.

EGRESS WIDTH REQ'D (AFPC 1005.3.2)	EGRESS WIDTH PROVIDED	MINIMUM CORRIDOR WIDTH REQ'D WITHIN UNIT (1018.2)	CORRIDOR WIDTH PROVIDED
A, B 32 INCHES	36 INCHES	36 INCHES	45 INCHES
C 32 INCHES	36 INCHES	36 INCHES	45 INCHES

5. PARKING

- A. 1.5 SPACE PER DWELLING UNIT = 64 X 1.5 = 96 SPACES
 1 GUEST SPACE PER EVERY 4 DWELLING UNITS = 16 SPACES
 1 SPACE/300 SF OF CLUBHOUSE = 6 SPACES REQUIRED
 118 TOTAL REQUIRED SPACES
 2% OF 118 PARKING SPACES (PAR 1106.2) = 3 REQ'D - 6 SPACES PROVIDED

6. ACCESSIBILITY REQUIREMENTS

A. PARKING

- 1 ACCESSIBLE SPACE REQUIRED @ CLUBHOUSE (TABLE 1106.1)
 2. 1 VAN ACCESSIBLE SPACE REQUIRED PER 6 STANDARD ACCESSIBLE SPACES (AFPC PAR 1106.5). 4 OF THE 8 HC SPACES ARE VAN ACCESSIBLE SPACES

B. ACCESSIBLE ROUTE: ACCESSIBLE ROUTE NOT REQUIRED AT SECOND FLOOR WITH NO ELEVATOR SERVICE (AFPC 1104.4, EXCEPTION 2)

C. DWELLING UNITS TYPE A REQ'D: 64 TOTAL, 5 TYPE A PROVIDED, 19 TYPE B PROVIDED, 2 SENSORY IMPAIRED
 2% (IBC 1107.6.2.2.1) = 64 * .02 = 2
 5% (UFAS 4.1.4.11) = 64 * .05 = 3.2
 7% (AUSH) = 64 * .07 = 4.48
 BALANCE OF GROUND FLOOR DWELLING UNITS DESIGNED AS TYPE B (PAR 1107.6.2.2; EXCEPTIONS: 1107.7.1, 1107.1.2, 1107.1.4)

SENSORY IMPAIRED 2% (UFAS) = 64 * .02 = 1.28

DISPERSION AFPC 1107.6.2.2.1 TYPE A UNITS SHALL BE DISPERSED AMONG THE UNIT TYPES

ELEVATOR ACCESS NOT PROVIDED - SEE IBC 1107.7.1

GENERAL NOTES

- VERIFY THAT DRAWINGS ARE THE LATEST ISSUE PRIOR TO COMMENCING CONSTRUCTION.
- PERFORM WORK PER ALL STATE, FEDERAL AND CITY CODES. NOTIFY ARCHITECT OF ANY CONFLICTS.
- VERIFY ALL DIMENSIONS, GRADES, BOUNDARIES, CONSTRUCTION AND OTHER CONDITIONS.
- APPLY, INSTALL, CONNECT, ERECT, CLEAN, AND/OR CONDITION ALL MANUFACTURED ARTICLES, MATERIALS, AND/OR EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.
- LARGE SCALE DRAWINGS TAKE PRECEDENCE OVER SMALL SCALE. DETAILS TAKE PRECEDENCE OVER OTHER DRAWINGS.
- WHERE DISCREPANCIES ARE FOUND, OBTAIN WRITTEN CLARIFICATION FROM THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
- DO NOT SCALE DRAWINGS. OBTAIN CLARIFICATION FROM THE ARCHITECT BEFORE CONTINUING WITH CONSTRUCTION.
- SET ALL DOOR FRAMES 4" FROM ADJACENT WALL (MEASURED TO INSIDE FACE OF JAMB) AND 4" FROM ADJACENT WALL UNLESS OTHERWISE NOTED OR DIMENSIONED.
- PROVIDE TEMPERED GLASS AT LOCATIONS 18" OR LESS FROM FLOOR LINE OR ADJACENT TO ANY DOOR SWING.
- PROVIDE BLOCKING IN PARTITIONS FOR ALL MILLWORK AND WALL-ATTACHED ITEMS.
- PROVIDE APPROVED FIRESTOPPING SYSTEM AT ALL PENETRATIONS OF FIRE-RATED ASSEMBLIES.

TABULATION OF AREA - THE PARK AT BARTON						
BUILDINGS	RESIDENTIAL AREA (SF)			TOTAL AREA PER BREEZEWAY	TOTAL AREA OF BUILDING	TOTAL AREA OF ALL BUILDINGS
	NET	GROSS	# OF UNITS PER BUILDING			
BUILDING A (2 BUILDINGS) (3-BED/2 BATH END UNIT)	1,163	1,234	8	824	10,674	21,348
BUILDING B (2 BUILDINGS) (3-BED/2 BATH END UNIT)	1,163	1,234	24	1,648	29,365	58,730
BUILDING C (1 BUILDING) COMMUNITY BUILDING	1,526	1,643 +256 PORCH	1	-	1,890	1,890
GAZEBO	-	416	1	-	416	416
MAIL KIOSK	-	120	1	-	120	120
BUS STOP	-	255	1	-	255	255
TOTAL						82,512
02 BUILDING A	16 UNITS (2 HC UNITS)					
02 BUILDING B	48 UNITS (3 HC UNITS)					
01 BUILDING C						
01 GAZEBO						
06 BUILDINGS TOTAL	64 UNITS TOTAL (5 HC UNITS)					

FRISCO PARK

A MULTI-FAMILY HOUSING COMMUNITY

OWNER
 WEST MEMPHIS PARTNERS II, L.P.
 MADISON, MS

DEVELOPER
 TCCM DEVELOPMENT, LLC
 MADISON, MS

CONTRACTOR
 UNICORP, LLC
 MADISON, MS

OWNER'S SURVEYOR/CIVIL ENGINEER
 MCMMASTER & ASSOCIATES, INC.
 MADISON, MS

LANDSCAPE ARCHITECT
 (NOT DETERMINED)

GEOTECHNICAL ENGINEER
 (NOT DETERMINED)

ARCHITECT
 HERRINGTON ARCHITECTS, P.C.
 BIRMINGHAM, AL

STRUCTURAL ENGINEER
 STRUCTURAL DESIGN GROUP, INC.
 BIRMINGHAM, AL

MECHANICAL AND PLUMBING ENGINEER
 ENGINEERING DESIGN TECHNOLOGIES, INC.
 BIRMINGHAM, AL

ELECTRICAL ENGINEER
 CONSULTING CONSTRUCTION ENGINEERING, INC.
 BIRMINGHAM, AL

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CIVIL DRAWINGS "C" WERE PROVIDED BY MCMMASTER & ASSOCIATES, INC. (OWNER'S CIVIL ENGINEER).

THESE DRAWINGS ARE BOUND WITH THE ARCHITECTURAL DRAWINGS FOR CONVENIENCE ONLY. NEITHER THE ARCHITECT NOR HIS CONSULTANTS ARE RESPONSIBLE FOR INFORMATION INCLUDED IN THE CIVIL DRAWINGS OR FOR THEIR ACCURACY, INCLUDING ANY POSSIBLE ERRORS OR OMISSIONS.



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DATE	PERMIT SET
1 11/20/18	PERMIT SET
2 05/22/19	RE-ISSUED FOR PERMIT
3 08/20/19	ADDENDUM 1

PROJECT NUMBER

597

PROJECT

Frisko Park

418 S. Avalon Street
 West Memphis, AR 72301

SHEET NUMBER

CS

CAD FILE NUMBER
 C:\Users\Mkabal\Documents\097 - Barton_MASTER_emeals.rvt

DEMOLITION NOTES

- DEMOLITION AND REMOVAL OPERATIONS SHALL COMMENCE ONLY AFTER ALL EROSION AND SEDIMENTATION CONTROL MEASURES ARE IN PLACE AND FUNCTIONAL.
- PROVIDE NEAT AND STRAIGHT SAWCUTS OF EXISTING PAVEMENT ALONG ALL LIMITS OF PAVEMENT DEMOLITION.
- ALL DEMOLISHED MATERIALS BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DESIGNATED. DISPOSE OF OFF THE OWNER'S PROPERTY IN A LEGAL MANNER.
- ALL PAVEMENT, BASE COURSE, SIDEWALKS, CURBS, BUILDINGS, FOUNDATIONS, ETC., IN THE AREA TO BE REMOVED SHALL BE REMOVED TO FULL DEPTH. EXISTING BASE COURSE MATERIALS MAY BE WORKED INTO THE NEW PAVEMENT OR BUILDING SUBGRADE PROVIDED THAT THE GRADATION, CONSISTENCY, COMPACTION, SUBGRADE CONDITION, ETC., ARE IN ACCORDANCE WITH THE SPECIFICATIONS. BASE COURSE MATERIALS SHALL NOT BE WORKED INTO THE SUBGRADE OF AREAS TO RECEIVE PLANTING.
- CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED FOR EXECUTION OF THE WORK.
- THE CONTRACTOR SHALL USE WATER SPRINKLING AND OTHER SUITABLE METHODS AS NECESSARY TO CONTROL DUST AND DIRT CAUSED BY THE DEMOLITION WORK.
- ALL ITEMS OF CONSTRUCTION REMAINING AND NOT SPECIFICALLY MENTIONED THAT INTERFERE WITH THE NEW CONSTRUCTION SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER.
- CONTRACTOR SHALL PROVIDE PROTECTION TO ALL STREETS, FENCES, TREES, UTILITIES AND STRUCTURES THAT ARE TO REMAIN. CONTRACTOR-CAUSED DAMAGE SHALL BE REPAIRED TO MATCH AT NO ADDITIONAL COST TO THE OWNER.
- CAVITIES LEFT BY STRUCTURE REMOVAL SHALL BE BACKFILLED WITH SATISFACTORY MATERIAL AND COMPACTED 98% OF MAXIMUM DENSITY PER ASTM D698 OR PER GEOTECHNICAL RECOMMENDATIONS IN THE DOCUMENTS.
- CONTRACTOR SHALL LOCATE AND MARK ALL EXISTING UTILITIES PRIOR TO COMMENCING WORK. COORDINATE WITH LOCAL UTILITY COMPANIES PRIOR TO UTILITY DISCONNECT.
- NOTIFY LOCAL UTILITY LOCATOR SERVICE OF INTENDED DEMOLITION OPERATIONS. SEE GENERAL UTILITY NOTE #4.
- EXISTING INFORMATION/TOPOGRAPHIC SURVEY WAS PREPARED BY SORRELL-SMITH ENGINEERING CONSULTANTS, LLC, DATED JUNE, 2019.
- PAVEMENT MARKINGS TO BE REMOVED SHALL BE PAINTED OVER TO MATCH PAVEMENT OR REMOVED WITH WIRE BRUSHINGS.
- EXCEPT AS SHOWN, NO TREES SHALL BE REMOVED AND/OR VEGETATION DISTURBED WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER.
- TREE PROTECTION SHALL CONSIST OF THE FOLLOWING STEPS:
 - CONTRACTOR SHALL HIRE A LICENSED LANDSCAPE CONTRACTOR TO OVERSEE TREE PROTECTION.
 - PRIOR TO ANY GRADING OPERATIONS, LOCATE TREES TO BE PROTECTED AND NEATLY CUT ROOTS TO A DEPTH OF 30" AT THE DIMENSIONED LIMITS SHOWN USING A UTILITY TRENCHING MACHINE.
 - TREAT EXPOSED ROOTS WITH A HORTICULTURAL TREE PRUNING PROTECTION PRODUCT.
 - PRUNE TREE LIMBS BY THE SAME PROPORTIONAL PERCENTAGE AS TREE ROOTS REMOVED (I.E., 25% OF ROOTS REMOVED SHALL RESULT IN 25% OF TREE LIMBS REMOVED).
 - INSTALL A CONSTRUCTION FENCE TO THE LIMITS SHOWN AT LEAST 4' IN HEIGHT.
 - BEGIN CLEARING AND GRADING OPERATIONS.

GENERAL UTILITY NOTES

- WATER AND SEWER CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH ALL LOCAL CODES AND SPECIFICATIONS.
- THE CONTRACTOR SHALL PAY ALL CONNECTION/TAP FEES (I.E. METER, ETC.) AND OBTAIN ALL PERMITS.
- ALL EXISTING UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE AND ARE BASED ON TOPOGRAPHIC SURVEYS AND RECORD DRAWINGS FROM THE FIELD. ADDITIONAL UTILITIES MAY BE PRESENT. SHOULD UNCHARTED UTILITIES BE ENCOUNTERED DURING EXCAVATION OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER AS SOON AS POSSIBLE FOR INSTRUCTIONS.
- THE CONTRACTOR SHALL NOTIFY THE LOCAL ONE-CALL SYSTEM AND ANY UTILITY INDIVIDUALLY AT LEAST 3 WORKING DAYS PRIOR TO ANY EXCAVATION AND/OR DEMOLITION.
- MAINTAIN 10-FOOT HORIZONTAL AND 18-INCH VERTICAL SEPARATION BETWEEN SANITARY SEWER AND WATER SUPPLY LINES.
- CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS OF ALL EXISTING UTILITIES INCLUDING IRRIGATION. TAKE CARE TO PROTECT UTILITIES THAT ARE TO REMAIN. REPAIR DAMAGE ACCORDING TO LOCAL STANDARDS AND AT THE CONTRACTOR'S EXPENSE. COORDINATE ALL CONSTRUCTION WITH THE APPROPRIATE UTILITY COMPANY. RELOCATE IRRIGATION LINES AS NECESSARY FOR CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE SEQUENCING OF CONSTRUCTION FOR ALL UTILITY LINES SO THAT WATER LINES AND UNDERGROUND ELECTRIC DO NOT CONFLICT WITH SANITARY SEWERS OR STORM SEWERS. INSTALL UTILITIES PRIOR TO FINAL PAVEMENT CONSTRUCTION.
- BACKFILL UTILITY TRENCHES UNDER PAVEMENT AREAS AND IN LAWN AREAS WITH SATISFACTORY FILL MATERIAL COMPACTED TO AT LEAST 98% OF MAXIMUM PER ASTM D698.
- ADJUST ALL EXISTING CASTINGS TO MATCH PROPOSED FINISH GRADE.
- THRUST BLOCK ALL WATERLINE FITTINGS WITH CONCRETE (2,500 P.S.I. MIN.) POURED AGAINST UNDISTURBED EARTH TO SUSTAIN 120 PERCENT TEST PRESSURE SPECIFIED FORM THRUST BLOCKING SO AS TO NOT EMBED JOINTS, BOLTS, VALVE BOXES OR OPERATING NUTS.
- EXCESS MATERIAL SHALL BE DISPOSED OF BY THE CONTRACTOR OFF OF THE OWNER'S PROPERTY AT NO ADDITIONAL COST IN A LEGAL MANNER.
- ALL SANITARY SEWER PIPE SHALL BE CLASS SDR 26 PVC UNLESS NOTED OTHERWISE.
- ALL WATER MAINS SHALL BE C-900 P.V.C. UNLESS NOTED OTHERWISE.
- ALL FIRE HYDRANT ASSEMBLIES SHALL BE INSTALLED BETWEEN 3' AND 7' FROM PAVED SURFACE.
- FIRE HYDRANT AND WATER MAINS TO BE INSTALLED AND UNDER PRESSURE BEFORE ANY COMBUSTIBLE CONSTRUCTION IS STARTED.
- NEOPRENE COUPLINGS WITH STAINLESS STEEL BAND AND SHEAR RINGS ARE REQUIRED FOR JOINING DIFFERENT TYPES OF SANITARY SEWER PIPES.
- THE CONTRACTOR SHALL EXCAVATE FOR NEW SEWER ELEVATIONS SHOWN ON THE PLANS. THE CONTRACTOR SHALL TAKE EVERY NECESSARY PRECAUTION TO PROTECT EXISTING SEWER DURING CONSTRUCTION OPERATIONS. ALL EXCAVATION, SHORING AND BRACING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL EXPLORE AHEAD 200 FEET SO ADJUSTMENTS CAN BE MADE IN THE ALIGNMENT OF THE PIPE IN CASE OF CONFLICTS WITH EXISTING STRUCTURES, UTILITIES AND PIPING.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING PIPE FROM FLOATING. IF PIPE FLOATS DURING CONSTRUCTION, THE CONTRACTOR SHALL RELAY PIPE TO GRADE AT HIS EXPENSE.
- THE CONTRACTOR SHALL FIELD VERIFY LOCATION AND INVERT OF SANITARY SEWER FOR CONNECTION TO EXISTING OR PROPOSED SEWER SYSTEM.
- BEDDING REQUIREMENTS SPECIFIED HEREIN ARE TO BE CONSIDERED AS MINIMUMS FOR RELATIVELY DRY, STABLE EARTH CONDITIONS. ADDITIONAL BEDDING SHALL BE REQUIRED IN WET OR WEAK AREAS. THE CONTRACTOR SHALL HAVE RESPONSIBILITY TO PROVIDE SUCH ADDITIONAL BEDDING AS MAY BE REQUIRED TO PROPERLY CONSTRUCT THE WORK.
- PROVIDE AS-BUILT DRAWINGS WHICH INCLUDE AT LEAST TWO DIMENSIONS TO EACH VALVE AND MANHOLE FROM KNOWN SITE FEATURES. DRAWINGS SHALL INCLUDE VERTICAL AND HORIZONTAL INFORMATION ON ALL NEW UTILITIES AS WELL AS EXISTING UTILITIES ENCOUNTERED.

LAYOUT & PAVING NOTES

- THE CONTRACTOR SHALL CHECK EXISTING GRADES, DIMENSIONS, AND INVERTS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER PRIOR TO BEGINNING WORK.
- THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES, INCLUDING IRRIGATION LINES, TAKE CARE TO PROTECT UTILITIES THAT ARE TO REMAIN, AND REPAIR CONTRACTOR CAUSED DAMAGE ACCORDING TO CURRENT LOCAL STANDARDS AND AT THE CONTRACTOR'S EXPENSE COORDINATES ALL CONSTRUCTION WITH THE APPROPRIATE UTILITY COMPANY.
- THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL CODES, OBTAIN ALL PERMITS, AND PAY ALL FEES PRIOR TO BEGINNING WORK.
- PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING PAVEMENT AND NEW PAVEMENT. FIELD ADJUSTMENT OF FINAL GRADES MAY BE NECESSARY. INSTALL ALL UTILITIES PRIOR TO INSTALLATION OF PAVEMENT.
- THE CONTRACTOR SHALL PROTECT ALL TREES TO REMAIN, IN ACCORDANCE WITH THE SPECIFICATIONS DO NOT OPERATE OR STORE HEAVY EQUIPMENT, NOR HANDLE, NOR STORE MATERIALS WITHIN THE DRIP-LINES OF TREES OR OUTSIDE THE LIMIT OF GRADING.
- CONCRETE WALKS AND PADS SHALL HAVE A BROOM FINISH. ALL CONCRETE SHALL BE 4,000 P.S.I. UNLESS OTHERWISE NOTED. CURB RAMPS, SIDEWALK SLOPES, AND DRIVEWAY RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ALL CURRENT LOCAL REQUIREMENTS. IF APPLICABLE, THE CONTRACTOR SHALL REQUEST INSPECTION OF SIDEWALK AND RAMP FORMS PRIOR TO PLACEMENT OF CONCRETE.
- ALL DAMAGE TO EXISTING ASPHALT PAVEMENT TO REMAIN WHICH RESULTS FROM NEW CONSTRUCTION SHALL BE REPLACED WITH LIKE MATERIALS AT CONTRACTOR'S EXPENSE.
- DIMENSIONS ARE TO THE EDGE OF PAVEMENT, EDGE OF CONCRETE, OR TO THE FACE OF BUILDING, UNLESS OTHERWISE NOTED.
- COORDINATES ARE FOR FACE OF BUILDINGS, CENTER LINES OF DRIVEWAYS, CENTER OF SANITARY SEWER MANHOLES, AND CENTER AT FACE OF CURB INLETS, UNLESS OTHERWISE NOTED.
- EXCESS MATERIAL SHALL BE DISPOSED OF BY THE CONTRACTOR OFF THE PROPERTY AT NO ADDITIONAL COST IN A LEGAL MANNER.
- MAINTAIN ONE SET OF AS-BUILT DRAWINGS ON THE JOB SITE FOR DISTRIBUTION TO THE ARCHITECT/ENGINEER UPON COMPLETION.
- PARKING STRIPES SHALL BE 4-INCH WHITE PAVEMENT PAINT.
- STOP BARS, DETAIL STRIPES, FIRE LANES AND CROSSWALKS SHALL BE THERMOPLASTIC PAVEMENT MARKING MATERIAL.
- CONTRACTION JOINTS SHALL BE CONSTRUCTED TO A DEPTH OF AT LEAST ¼ THE CONCRETE THICKNESS, AND SHALL DIVIDE CONCRETE ROUGHLY INTO SQUARES WITH MAXIMUM 6' SEGMENTS, UNLESS OTHERWISE SPECIFIED.
- CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY CONSISTING OF THE FOLLOWING:
 - AN AS-BUILT SURVEY SHALL BE PREPARED, SIGNED AND SEALED BY A SURVEYOR REGISTERED IN THE STATE IN WHICH THIS PROJECT RESIDES AND SUBMITTED TO THE ARCHITECT IN THE HARD COPY AND ELECTRONIC FORMAT PRIOR TO COMPLETION OF THIS PROJECT. THE AS-BUILT SURVEY SHALL BE PREPARED USING THE SAME HORIZONTAL AND VERTICAL DATUM AS THE ORIGINAL SURVEY.
 - THE AS-BUILT SURVEY SHALL DEPICT ALL BUILDINGS, CURB LINES, EDGES OF PAVEMENT AND ALL SIDEWALKS AND PARKING.
 - THE AS-BUILT SURVEY SHALL LOCATE ALL UNDERGROUND UTILITIES INCLUDING DRAINAGE AND SANITARY STRUCTURES, WATER VALVES, AND HYDRANTS THROUGHOUT THE PROJECT LIMITS.
 - THE AS-BUILT SURVEY SHALL ALSO INCLUDE ALL ACCESSIBLE PATHS, ALL PEDESTRIAN RAMPS AND LANDINGS AND ALL ACCESSIBLE PARKING AREAS INCLUDING AISLES AND DROP-OFF/PICK-UP AREAS. DIMENSIONS FULL LENGTH AND WIDTH OF ALL PEDESTRIAN RAMPS AND LANDINGS, SHOW ELEVATIONS AND SLOPES, INCLUDING LONGITUDINAL AND CROSS SLOPES FOR ALL ACCESSIBLE AREAS.

STORMWATER POLLUTION PREVENTION NOTES

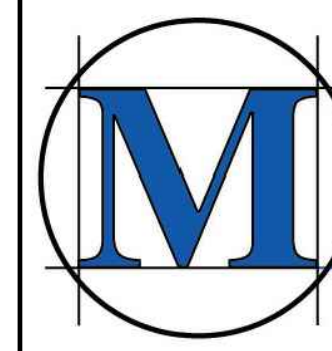
- REFER TO EROSION CONTROL PLAN FOR ADDITIONAL REQUIREMENTS.
- THE CONSTRUCTION ACTIVITY ANTICIPATED ON THIS PROJECT INCLUDES CLEARING, GRUBBING, GRADING, TOPSOILING, AND SEEDING.
- THE APPROXIMATE TOTAL AREA OF THE SITE IS 5.6239 ACRES. THE APPROXIMATE TOTAL AREA OF GRADING PROPOSED IS 5.6239 ACRES.
- THE ANTICIPATED FILL MATERIAL WILL CONSIST OF ON-SITE SOIL AND/OR OFF-SITE SOIL BORROW MATERIALS.
- THE RECEIVING WATER/STORM SEWER OPERATOR IS THE CITY OF WEST MEMPHIS, AND THE STATE OF ARKANSAS.
- CONSTRUCTION SHALL BE SEQUENCED TO MINIMIZE EXPOSURE TIME OF CLEARED SURFACE AREA. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN PLACE AND FUNCTIONAL PRIOR TO EARTH MOVING OPERATIONS. ALL CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY, AND AT MAXIMUM 7 CALENDAR DAYS IN DRY PERIODS AND WITHIN 24 HOURS OF ANY RAINFALL EXCEEDING 0.5 INCH PER 24 HOUR PERIOD.
- THE CONTRACTOR SHALL DESIGNATE IN WRITING THE NAME AND PHONE NUMBER OF THE INDIVIDUAL RESPONSIBLE FOR EROSION AND SEDIMENT CONTROLS.
- PRE-CONSTRUCTION VEGETATIVE GROUND COVER SHALL NOT BE REMOVED MORE THAN 20 CALENDAR DAYS PRIOR TO GRADING. ALL GRADED AREAS EXPECTED TO REMAIN UNFINISHED AND UNWORKED FOR MORE THAN 30 CALENDAR DAYS SHALL BE COVERED WITH TEMPORARY GRASS, SOD, STRAW, MULCH OR FABRIC MATS. PERMANENT SOIL STABILIZATION SHALL BE INSTALLED WITHIN 7 CALENDAR DAYS OF FINAL GRADING.
- THE CONTRACTOR SHALL MAINTAIN RECORDS OF EROSION CONTROL INSPECTIONS AND REPAIRS FOR A MINIMUM OF 3 YEARS AFTER COMPLETION OF CONSTRUCTION.
- MULCHING SHALL CONSIST OF LOOSE HAY OR STRAW APPLIED AT THE RATE OF 2 TONS/ACRE.
- THE CONTRACTOR SHALL REMOVE SEDIMENT FROM TRAPS, SILT FENCES, SEDIMENT PONDS, ETC. AS NECESSARY AND WHEN CAPACITY HAS BEEN REDUCED BY 50%.
- STOCKPILES SHALL BE STABILIZED AND PROTECTED FROM EROSION.

GRADING, DRAINAGE AND EROSION CONTROL NOTES

- NO TREES SHALL BE REMOVED NOR VEGETATION DISTURBED EXCEPT AS NECESSARY FOR GRADING PURPOSES AND ONLY AS APPROVED BY THE ARCHITECT/ENGINEER.
- IT IS THE OWNER'S INTENT TO PRESERVE ALL THE EXISTING SITE VEGETATION OUTSIDE THE LIMITS OF GRADING.
- ALL TREES, INCLUDING YOUNG SAPPLINGS, PINES, AND UNDERSTORY SPECIES ARE TO BE PROTECTED AND SAVED IF THEY FALL OUTSIDE THE LIMITS OF GRADING, EVEN IF THEY ARE NOT LOCATED OR IDENTIFIED ON THE SURVEY.
- SELECTIVE CLEARING BEYOND THE LIMITS OF GRADING SHALL CONSIST OF REMOVAL OF HONEYSUCKLE, HERBACEOUS SHRUBS, POISON IVY, AND NOXIOUS WEEDS. GRASS SHALL BE SOWN ON THE WHOLE SITE AFTER PREPARATION, AS NOTED IN THE SPECIFICATIONS.
- TOPSOIL SHALL BE STRIPPED FROM ALL CUT AND FILL AREAS, STOCKPILED AND REDISTRIBUTED OVER-GRADED AREAS TO A MINIMUM DEPTH OF 6 INCHES. STOCKPILES SHALL BE FREE DRAINING AND PROVIDE EROSION AND SEDIMENTATION CONTROLS AROUND STOCKPILES. IMPORTED TOPSOIL TO A MINIMUM DEPTH OF 6 INCHES IS REQUIRED IN ALL AREAS BETWEEN BUILDING AND SIDEWALKS.
- ALL GRADED AREAS SHALL BE SEEDDED AND MULCHED WITHIN 7 DAYS AFTER GRADING IS COMPLETED.
- CONSTRUCT TEMPORARY EROSION CONTROL AS SHOWN ON THE DRAWING PRIOR TO BEGINNING GRADING OPERATIONS.
- ALL DRAINAGE STRUCTURES, PIPES WITHIN THE LIMITS OF CONSTRUCTION, AND DETENTION PONDS SHALL HAVE SEDIMENT REMOVED PRIOR TO FINAL ACCEPTANCE.
- SILT BARRIERS SHALL BE CLEANED OF ACCUMULATED SEDIMENT WHEN APPROXIMATELY 50% FILLED.
- ALL LOCATIONS OF TEMPORARY EROSION CONTROL DEVICES SHALL BE SUBJECT TO ADJUSTMENT AS DIRECTED BY THE ARCHITECT/ENGINEER.
- WHEN THE TEMPORARY EROSION CONTROL DEVICES ARE NO LONGER REQUIRED FOR THE INTENDED PURPOSE (IN THE ARCHITECT/ENGINEER'S OPINION), THEY SHALL BE REMOVED.
- REPLACE DAMAGED AND WORN OUT SILT BARRIERS AS DIRECTED BY THE ARCHITECT/ENGINEER.
- THE CONTRACTOR SHALL PROTECT ALL TREES DESIGNATED TO REMAIN. DO NOT OPERATE OR STORE HEAVY EQUIPMENT, NOR HANDLE/STORE MATERIALS, WITHIN THE DRIP LINES OF TREES.
- TOP OF GRATE ELEVATIONS FOR CURB INLETS ARE GIVEN TO THE CENTER OF THE INLETS AT THE FACE OF CURB. THE GRATES SHALL SLOPE LONGITUDINALLY WITH THE PAVEMENT GRADE. ADJUST THE CASTING TO FALL ALONG THE CURB LINE.
- THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES, PROTECT UTILITIES TO REMAIN, AND REPAIR CONTRACTOR-CAUSED DAMAGE ACCORDING TO LOCAL STANDARDS AT CONTRACTOR'S EXPENSE.
- NOTIFY LOCAL UTILITY LOCATOR SERVICE OF INTENDED EXCAVATION/UTILITY TRENCHING OPERATIONS.
- IN THE EVENT OF ANY DISCREPANCIES FOUND IN THE DRAWINGS OR IF PROBLEMS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.
- THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND OBTAIN ALL PERMITS.
- SPOT ELEVATIONS AND CONTOURS REPRESENT PROPOSED FINISHED GRADE AND TOP OF DIRT ELEVATIONS UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL VERIFY EXISTING ELEVATIONS AND INVERTS PRIOR TO BEGINNING WORK.
- EXCESS MATERIAL SHALL BE DISPOSED OFF BY THE CONTRACTOR OFF THE OWNER'S PROPERTY AT NO ADDITIONAL COST IN A LEGAL MANNER.
- CONTOUR LINES AND SPOT ELEVATIONS ARE THE RESULT OF A DETAILED ENGINEERING GRADING DESIGN AND REFLECT A PLANNED INTENT WITH REGARD TO DRAINAGE. SHOULD THE CONTRACTOR HAVE ANY QUESTION OF THIS INTENT OR ANY PROBLEMS WITH CONTINUITY OF GRADES, THE ARCHITECT/ENGINEER SHALL BE CONTACTED PRIOR TO BEGINNING WORK.
- EXISTING MANHOLE CASTINGS TO REMAIN SHALL BE RESET TO MATCH NEW GRADE.
- ALL CURBS AND SIDEWALKS SHALL BE BACKFILLED WITH TOPSOIL, AND SEEDDED AND MULCHED, UNLESS OTHERWISE NOTED.
- ALL PIPES SHALL BE BACKFILLED WITH SATISFACTORY MATERIAL COMPACTED TO 98% OF MAXIMUM PER ASTM D698.
- ALL STORM DRAINAGE PIPE SHALL BE R.C.P UNLESS OTHERWISE NOTED, AND COMPLETELY WRAPPED WITH TYPE V FILTER FABRIC AT ALL JOINTS. FILTER FABRIC SHALL BE 18" WIDE AND OVERLAP 8". LIFT HOLES SHALL BE GROUTED AND SEALED WATER TIGHT AND COVERED WITH FILTER FABRIC. PIPE LENGTHS SHOWN ARE APPROXIMATE.
- ALL CUT AND FILL SLOPES TO BE 3:1 MAXIMUM, UNLESS OTHERWISE NOTED.
- ALL HEADWALLS SHALL HAVE A MINIMUM 10'x20'x1.5' RIP-RAP APRON INSTALLED USING 8" MIN. DIAMETER STONE, UNLESS OTHERWISE SPECIFIED.
- SATISFACTORY TOPSOIL IS DEFINED AS SOIL BEING FREE OF SUBSOIL, CLAY LUMPS, STONES, AND OTHER OBJECTS OVER 1 INCH IN DIAMETER, OR CONTAMINANTS.
- AFTER STRIPPING TOPSOIL, PROOFROLL SUBGRADE WITH A LOADED DUMP TRUCK WITH A MINIMUM WEIGHT OF 20 TONS TO DEMONSTRATE STABILITY. ADDITIONAL EXCAVATION, DRYING BY PROCESSING, TREATMENT OF THE EXISTING SOILS WITH AN ADMIXTURE, OR A COMBINATION OF THESE APPROACHES, MIGHT BE REQUIRED TO ACHIEVE STABLE CONDITIONS.
- FINISH GRADES TOLERANCES ARE 0.10 FOOT ABOVE OR BELOW DESIGN ELEVATIONS.
- PROVIDE TEMPORARY SEEDING ON STOCKPILES AND ALL OTHER AREAS OF THE SITE THAT WILL REMAIN UNDISTURBED FOR 30 DAYS OR MORE.
- MAXIMUM SLOPES IN ALL DIRECTIONS OF HANDICAP PARKING SPACES/AISLES SHALL BE 2%.

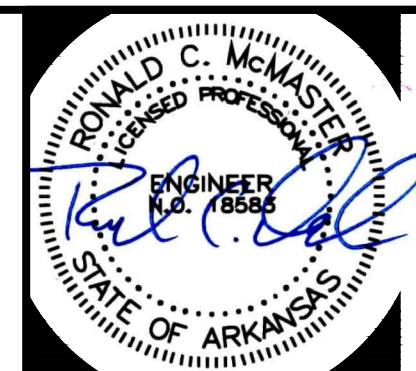
Revisions				Project No.	Designed By	
#	Date	Nature	By	App'd.	M-2651-1	R.C.M.
					Date	Drawn By
					8-20-19	D.P.
					Scale	Checked By
					SEE ABOVE	R.C.M.

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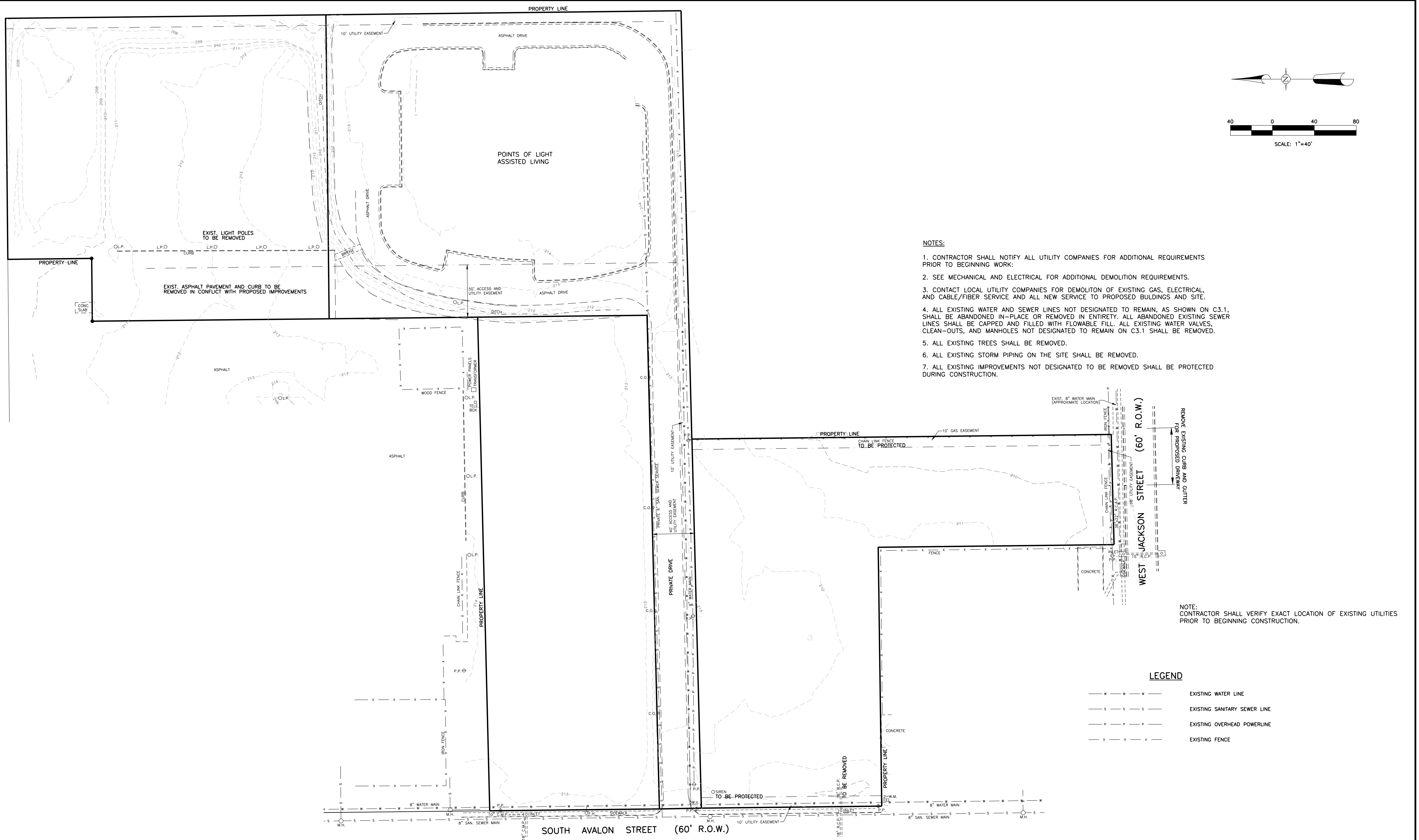
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GENERAL NOTES

C0.1



- NOTES:**
1. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES FOR ADDITIONAL REQUIREMENTS PRIOR TO BEGINNING WORK;
 2. SEE MECHANICAL AND ELECTRICAL FOR ADDITIONAL DEMOLITION REQUIREMENTS.
 3. CONTACT LOCAL UTILITY COMPANIES FOR DEMOLITION OF EXISTING GAS, ELECTRICAL, AND CABLE/FIBER SERVICE AND ALL NEW SERVICE TO PROPOSED BUILDINGS AND SITE.
 4. ALL EXISTING WATER AND SEWER LINES NOT DESIGNATED TO REMAIN, AS SHOWN ON C3.1, SHALL BE ABANDONED IN-PLACE OR REMOVED IN ENTIRETY. ALL ABANDONED EXISTING SEWER LINES SHALL BE CAPPED AND FILLED WITH FLOWABLE FILL. ALL EXISTING WATER VALVES, CLEAN-OUTS, AND MANHOLES NOT DESIGNATED TO REMAIN ON C3.1 SHALL BE REMOVED.
 5. ALL EXISTING TREES SHALL BE REMOVED.
 6. ALL EXISTING STORM PIPING ON THE SITE SHALL BE REMOVED.
 7. ALL EXISTING IMPROVEMENTS NOT DESIGNATED TO BE REMOVED SHALL BE PROTECTED DURING CONSTRUCTION.

NOTE:
CONTRACTOR SHALL VERIFY EXACT LOCATION OF EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION.

LEGEND

- W — W — W — EXISTING WATER LINE
- S — S — S — EXISTING SANITARY SEWER LINE
- P — P — P — EXISTING OVERHEAD POWERLINE
- X — X — X — EXISTING FENCE

Revisions				
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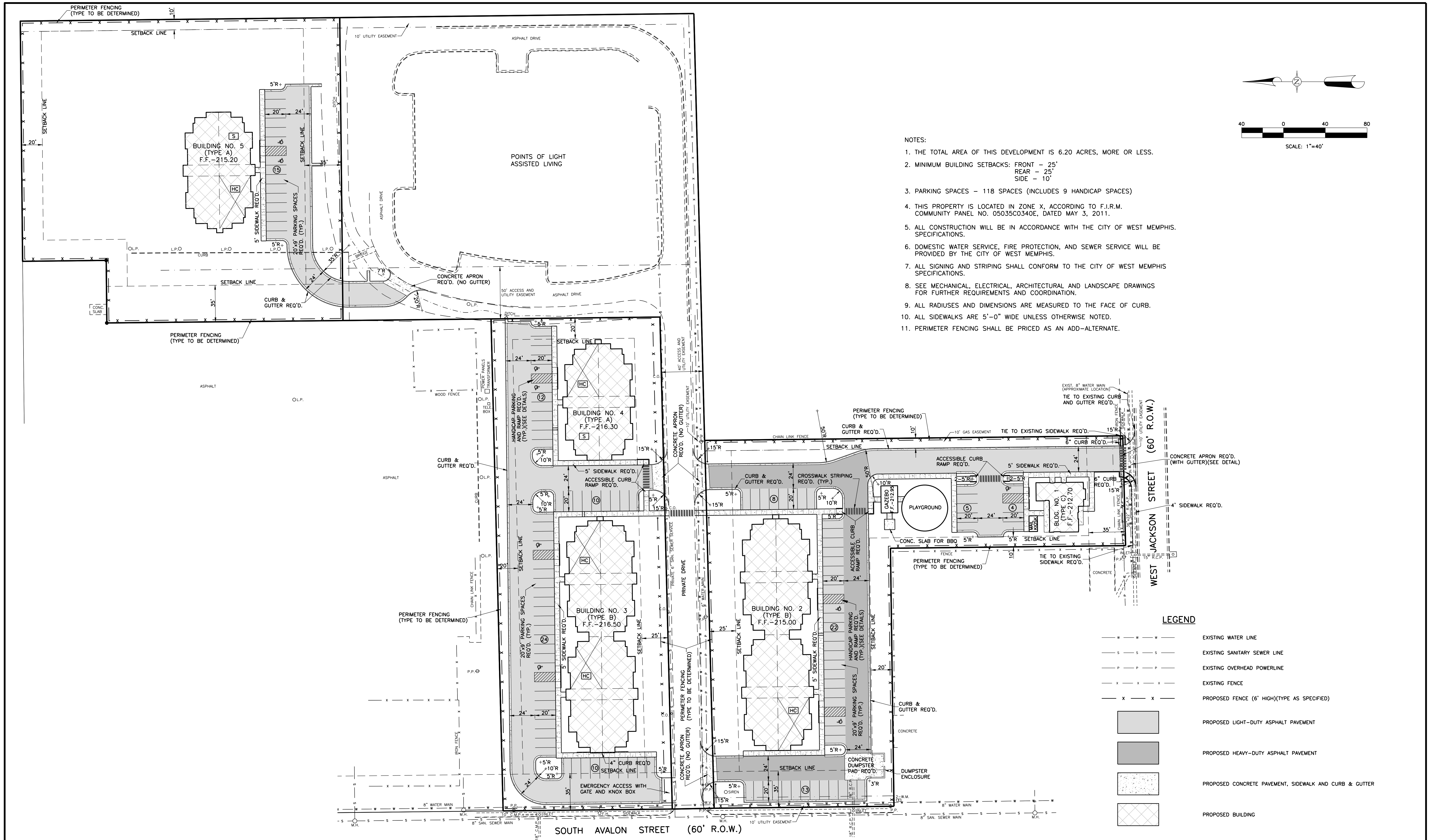
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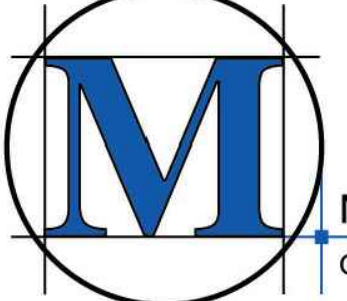
EXIST. CONDITIONS AND DEMO PLAN
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Revisions			
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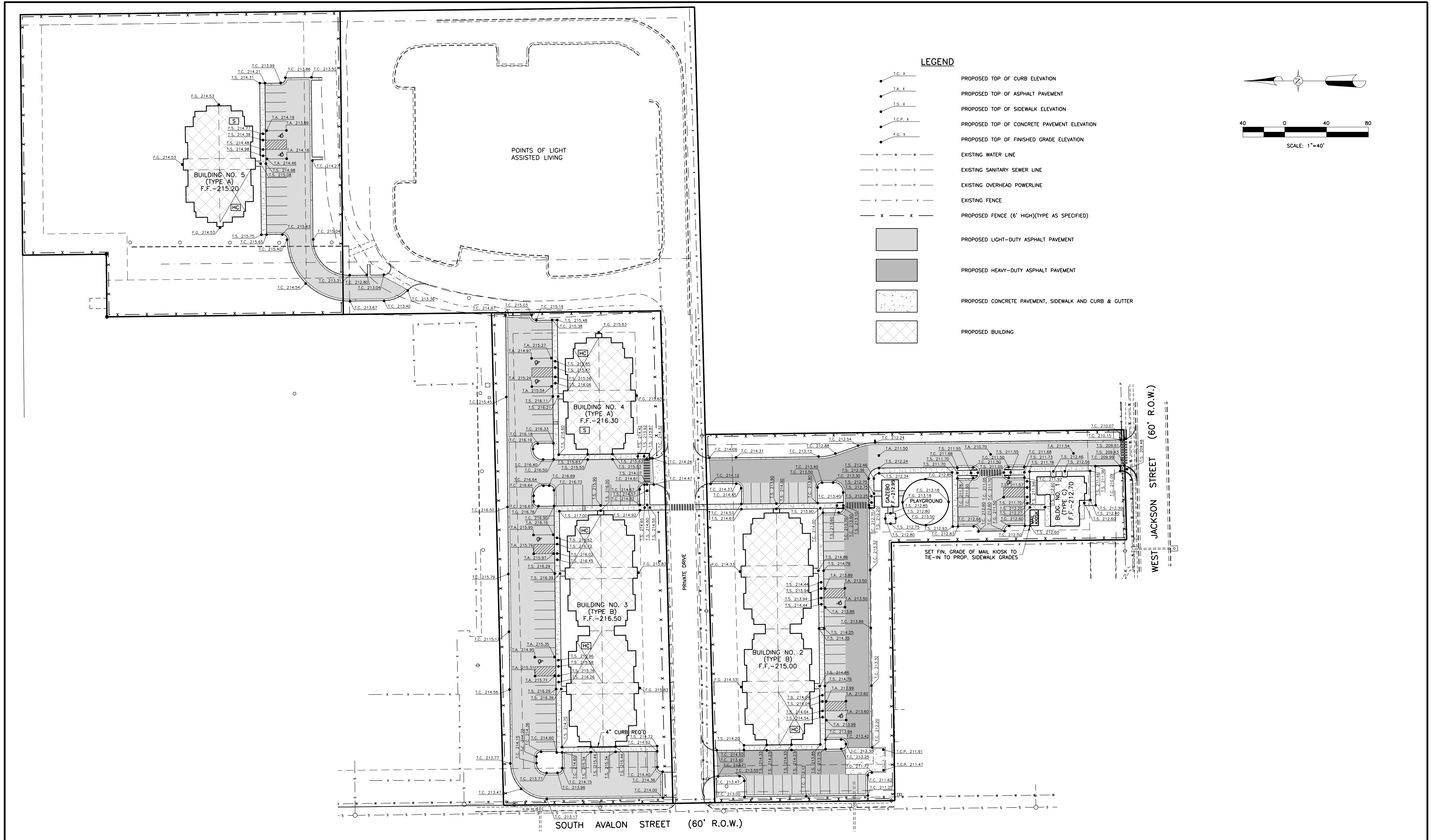


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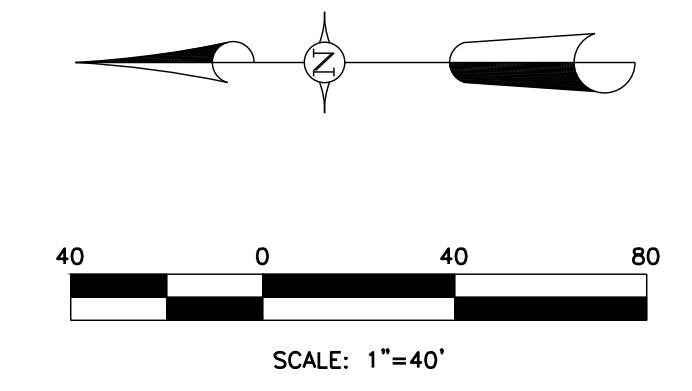
SITE PLAN

C1.1



LEGEND

- T.C. x — PROPOSED TOP OF CURB ELEVATION
- T.A. x — PROPOSED TOP OF ASPHALT PAVEMENT
- T.S. x — PROPOSED TOP OF SIDEWALK ELEVATION
- T.C.P. x — PROPOSED TOP OF CONCRETE PAVEMENT ELEVATION
- F.G. x — PROPOSED TOP OF FINISHED GRADE ELEVATION
- W — W — W — EXISTING WATER LINE
- S — S — S — EXISTING SANITARY SEWER LINE
- P — P — P — EXISTING OVERHEAD POWERLINE
- x — x — x — EXISTING FENCE
- x — x — x — PROPOSED FENCE (6' HIGH)(TYPE AS SPECIFIED)
- [Light Gray Box] PROPOSED LIGHT-DUTY ASPHALT PAVEMENT
- [Dark Gray Box] PROPOSED HEAVY-DUTY ASPHALT PAVEMENT
- [Stippled Box] PROPOSED CONCRETE PAVEMENT, SIDEWALK AND CURB & GUTTER
- [Cross-hatched Box] PROPOSED BUILDING



Revisions				
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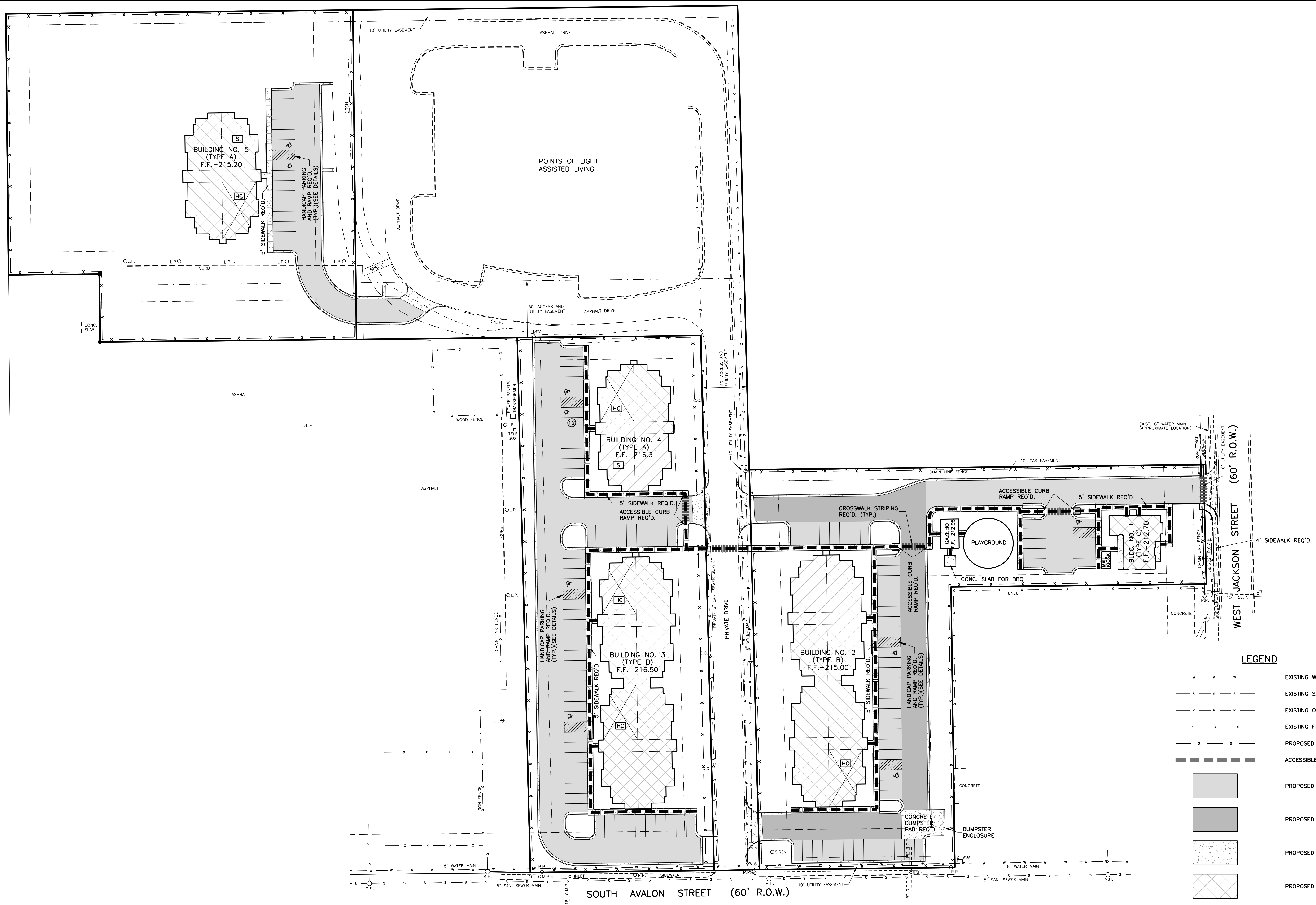
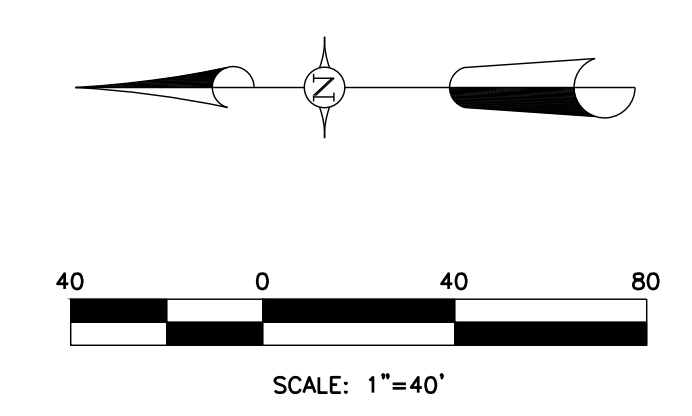
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SPOT ELEVATIONS
C1.2



LEGEND

	EXISTING WATER LINE
	EXISTING SANITARY SEWER LINE
	EXISTING OVERHEAD POWERLINE
	EXISTING FENCE
	PROPOSED FENCE (6' HIGH)(TYPE AS SPECIFIED)
	ACCESSIBLE ROUTE
	PROPOSED LIGHT-DUTY ASPHALT PAVEMENT
	PROPOSED HEAVY-DUTY ASPHALT PAVEMENT
	PROPOSED CONCRETE PAVEMENT, SIDEWALK AND CURB & GUTTER
	PROPOSED BUILDING

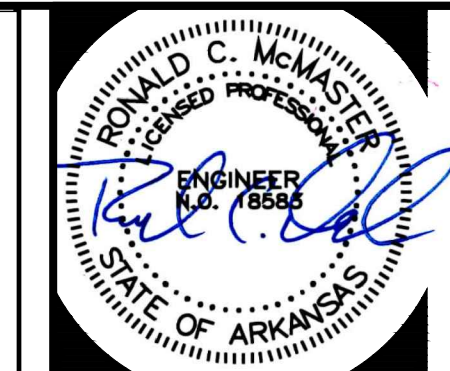
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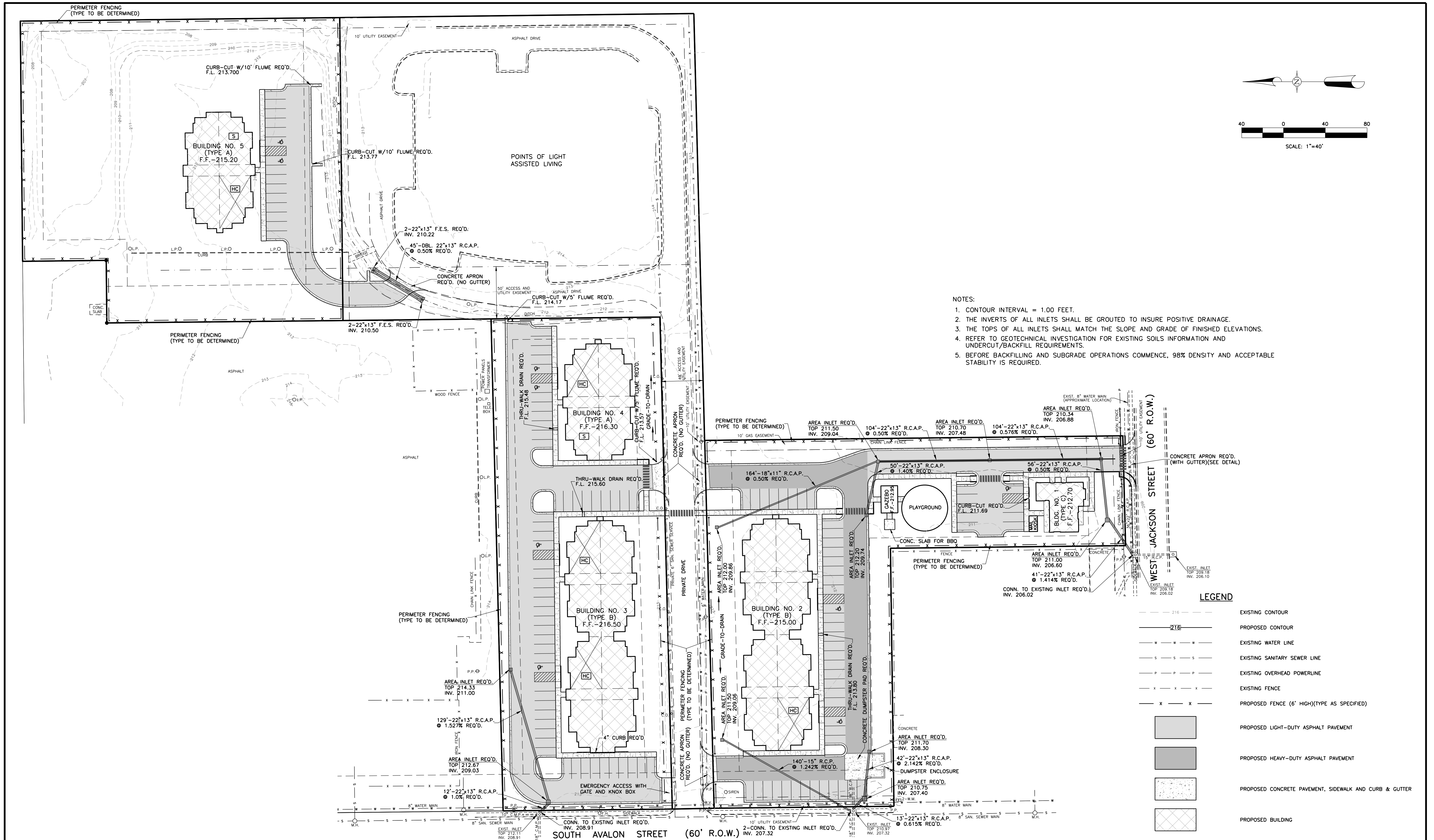
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ACCESSIBLE ROUTE
C1.3



Revisions		
#	Date	Nature

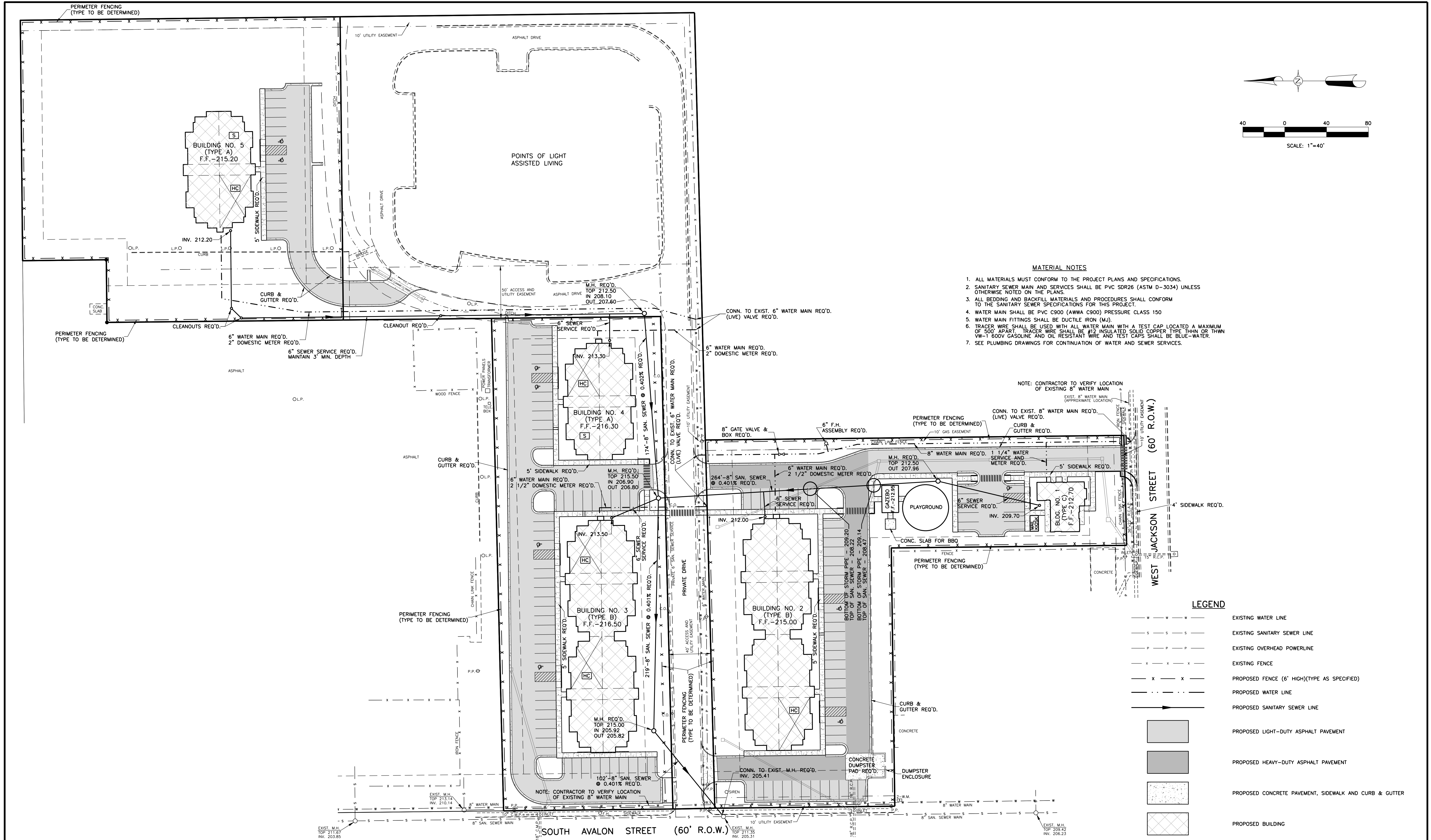
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GRADING AND DRAINAGE
C2.1



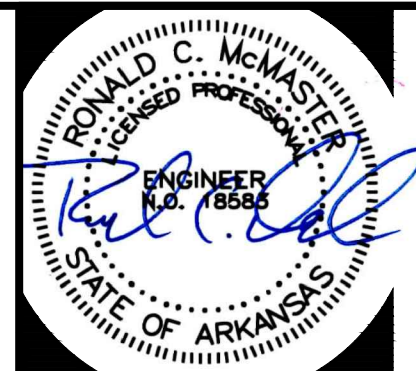
Revisions			
#	Date	Nature	App'd.

Project No.	M-2651-1	Designed By	R.C.M.
Date	8-20-19	Drawn By	D.P.
Scale	SEE ABOVE	Checked By	R.C.M.

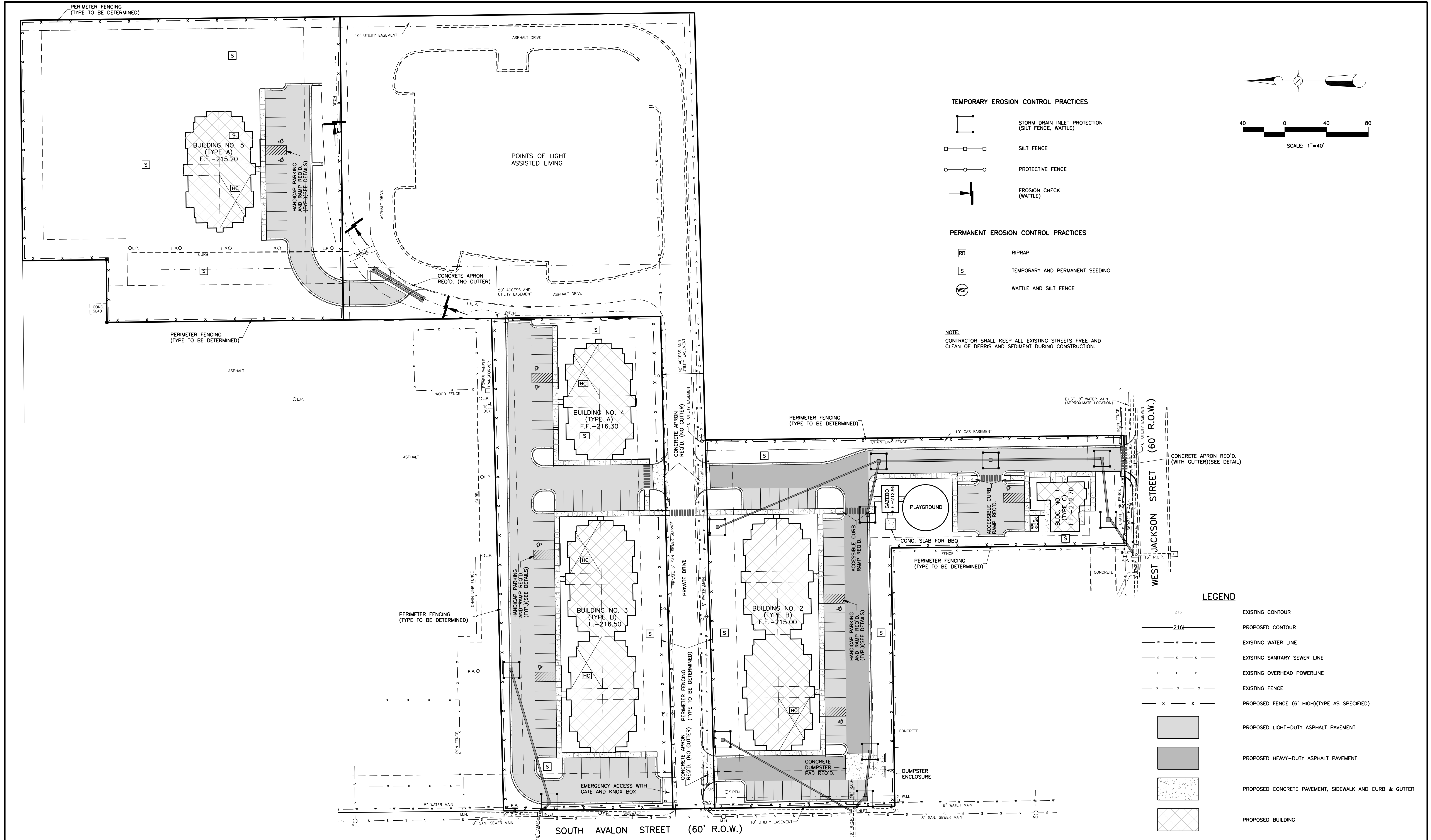
FRISCO PARK
 418 S. AVALON STREET
 WEST MEMPHIS, AR 72301



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 SUITE 300
 MADISON, MS 39110
 601.605.1090



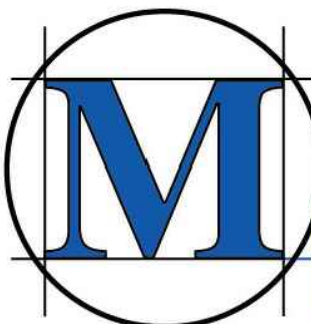
UTILITY PLAN
C3.1



Revisions				
#	Date	Nature	By	App'd.

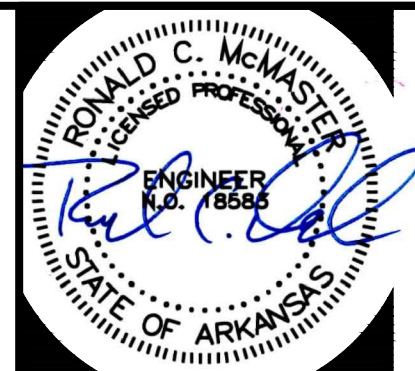
Project No.	M-2651-1	Designed By	R.C.M.
Date	8-20-19	Drawn By	D.P.
Scale	SEE ABOVE	Checked By	R.C.M.

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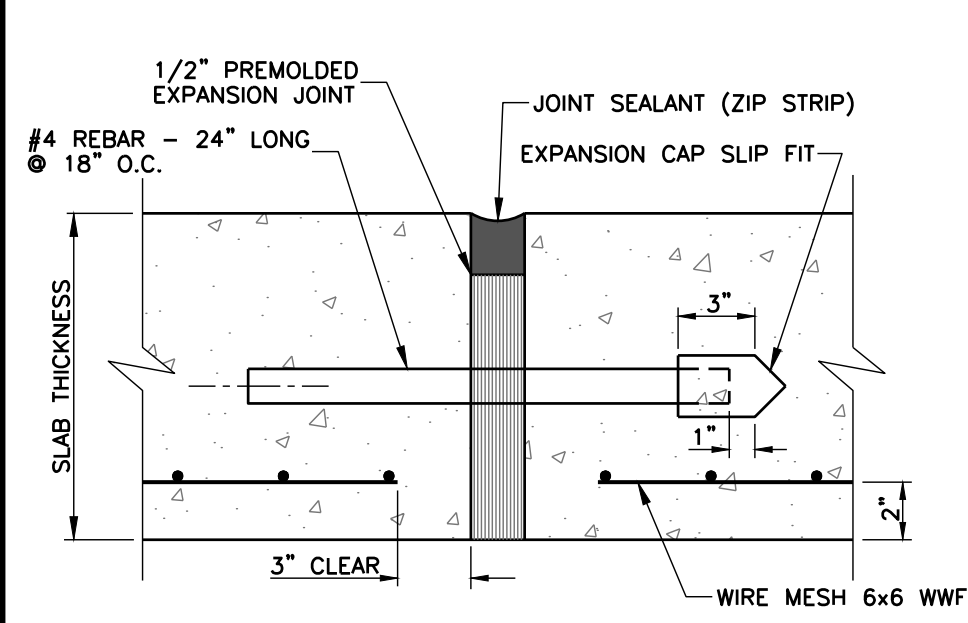
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EROSION CONTROL PLAN

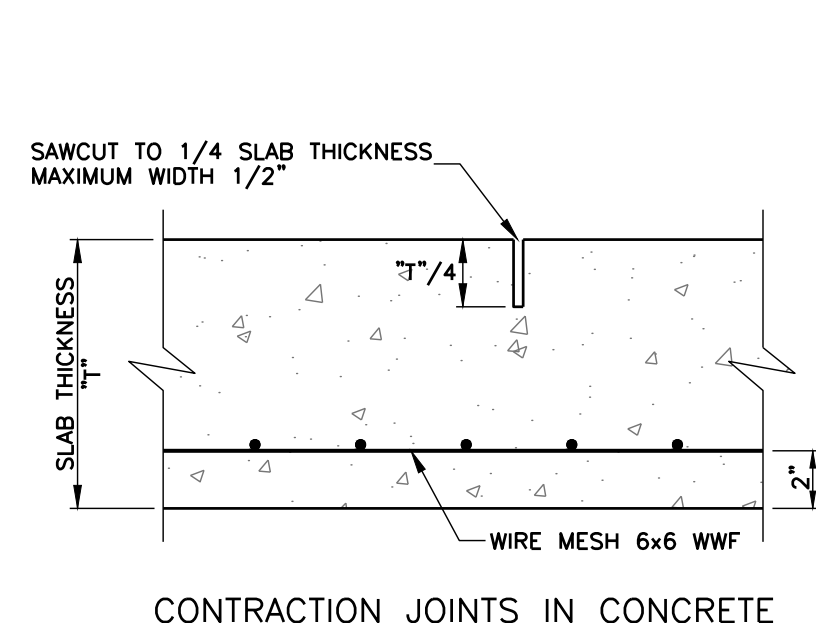
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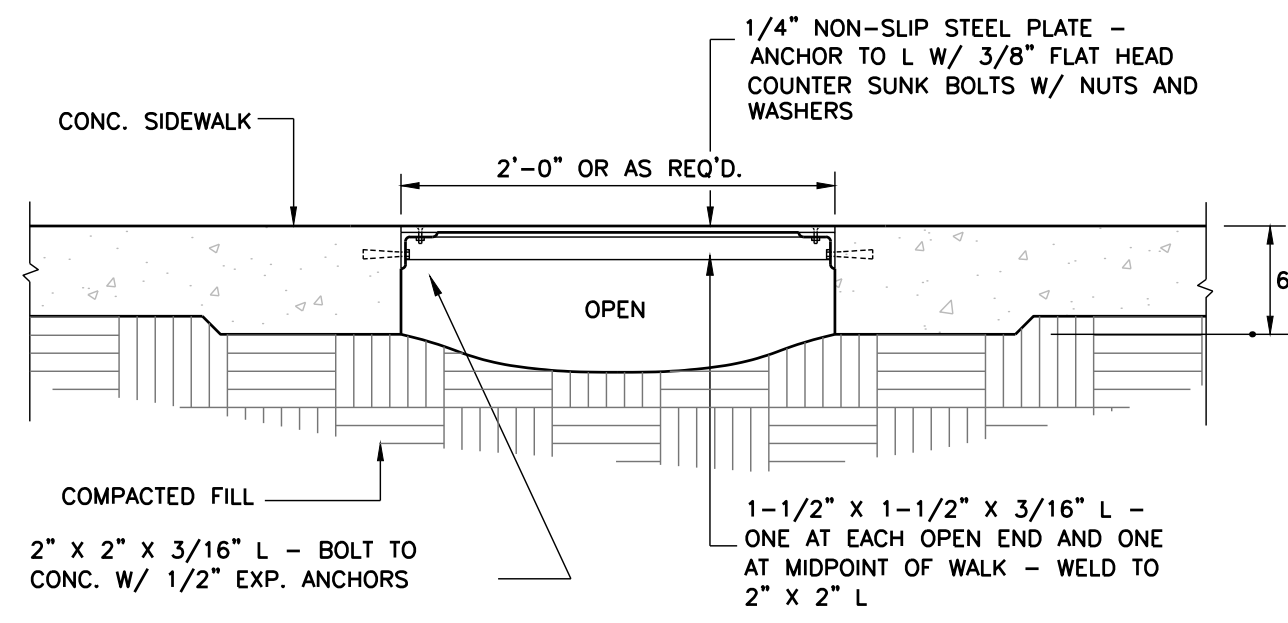
EXPANSION JOINTS IN CONCRETE

CONCRETE JOINT DETAILS

N.T.S.

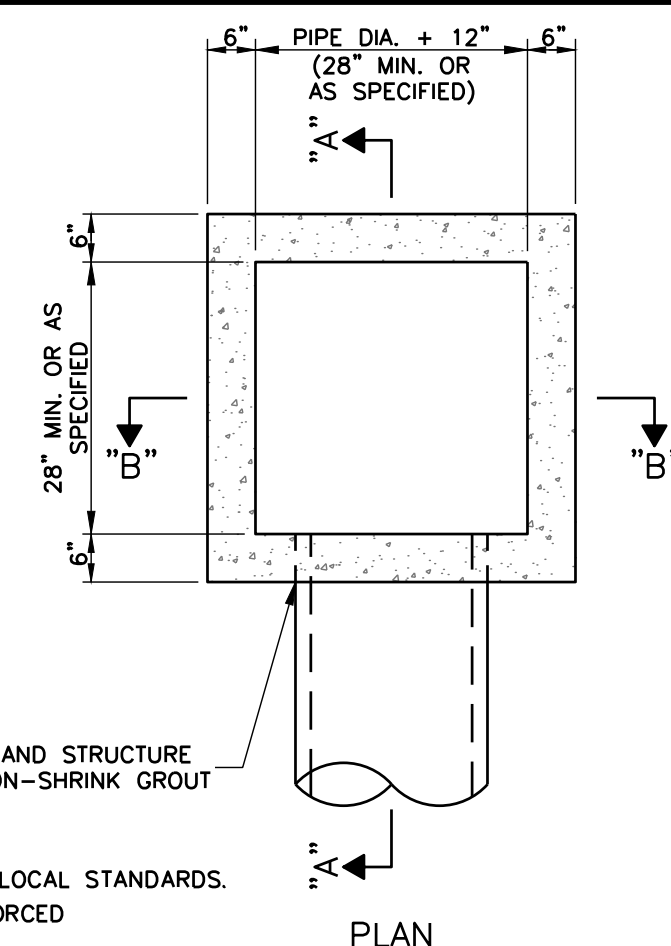


CONTRACTION JOINTS IN CONCRETE

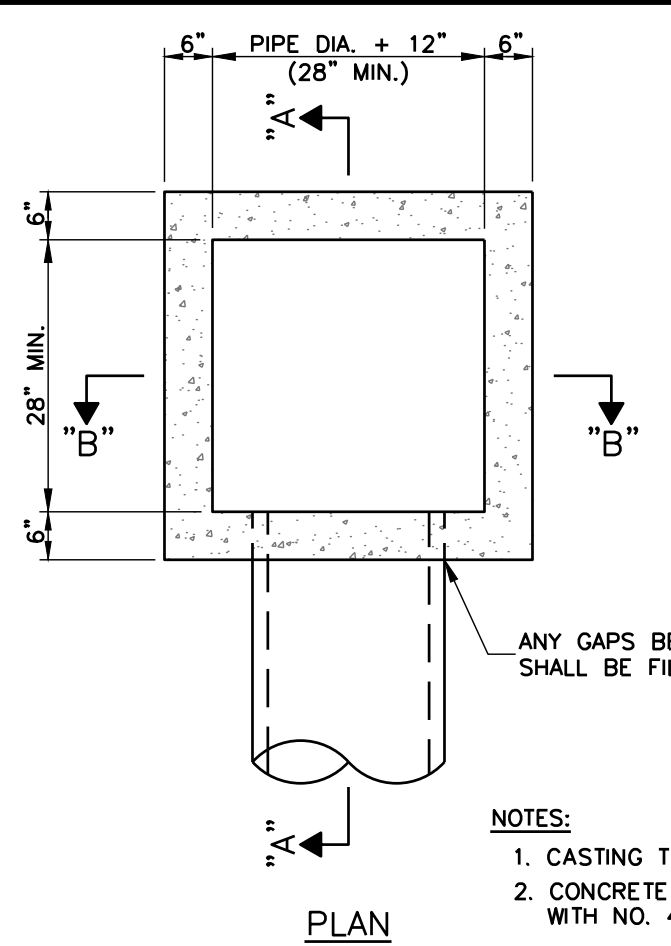


THRU-WALK DRAIN

N.T.S.

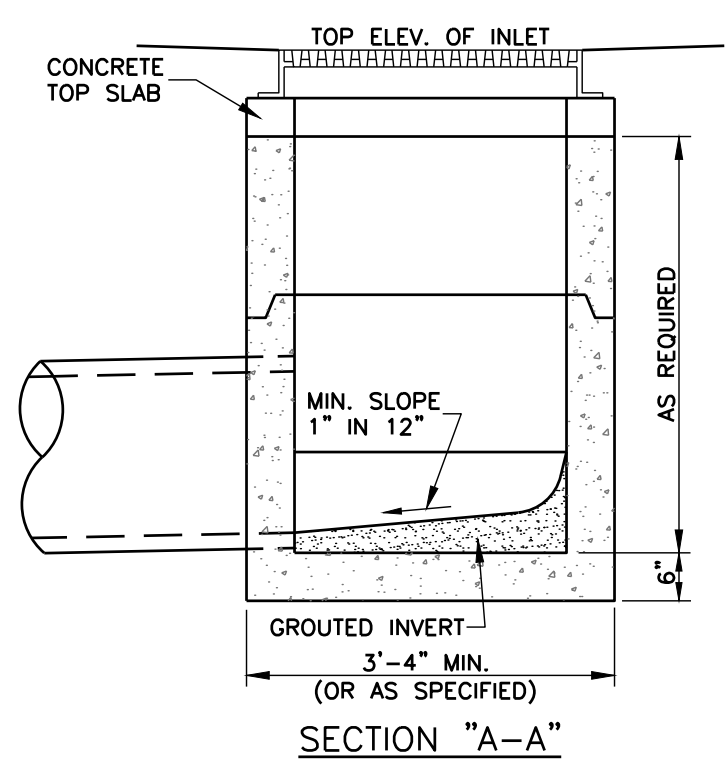


PLAN

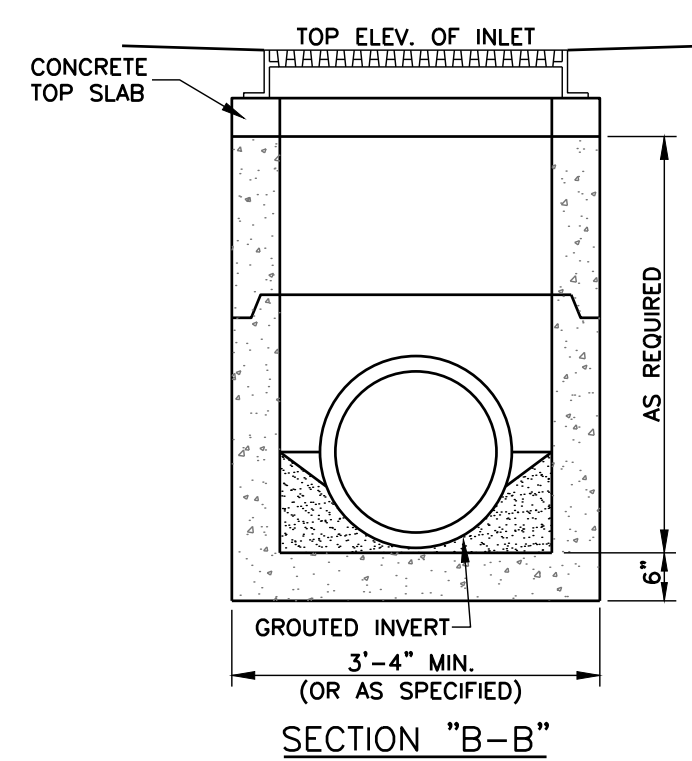


PLAN

- NOTES:
1. CASTING TYPE SHALL COMPLY WITH ALL PROJECT AND LOCAL STANDARDS.
 2. CONCRETE TO BE 4,000 P.S.I. AT 28 DAYS AND REINFORCED WITH NO. 4, GRADE 60 BARS.



SECTION "A-A"

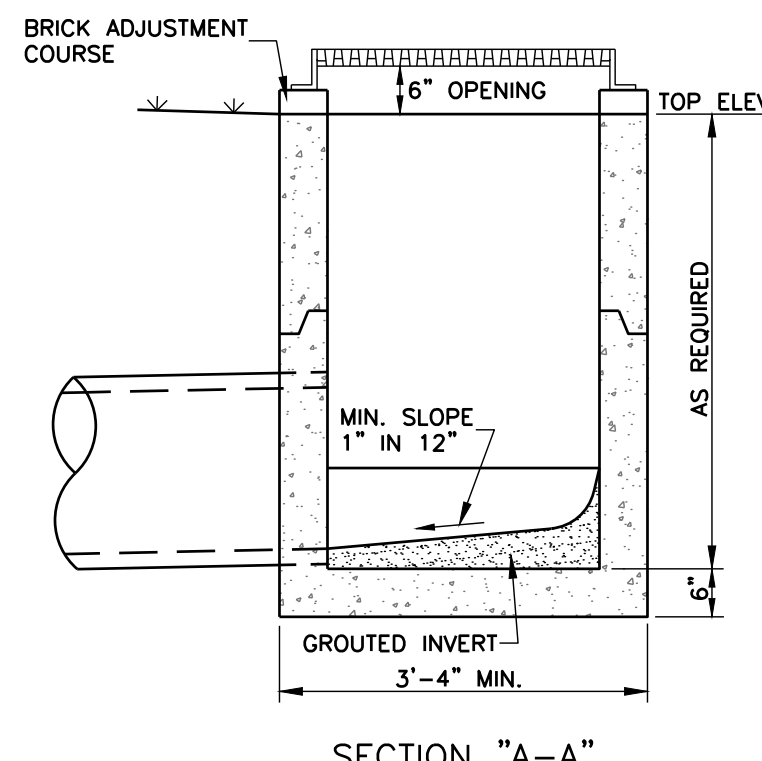


SECTION "B-B"

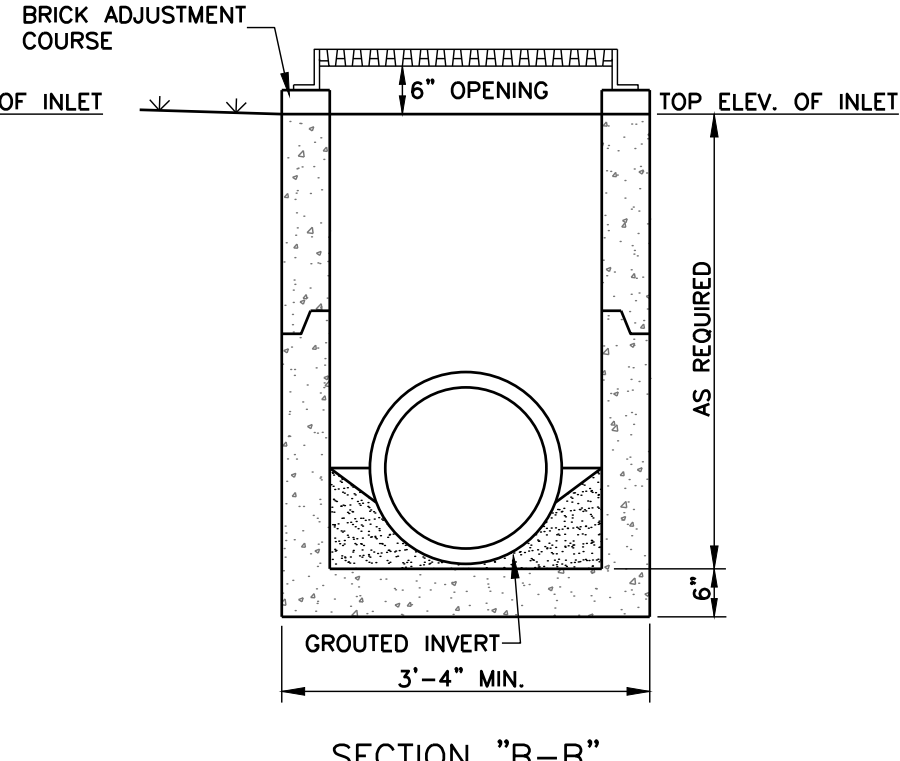
SINGLE PRECAST AREA INLET DETAILS

(LOCATED IN PAVEMENT)

N.T.S.



SECTION "A-A"

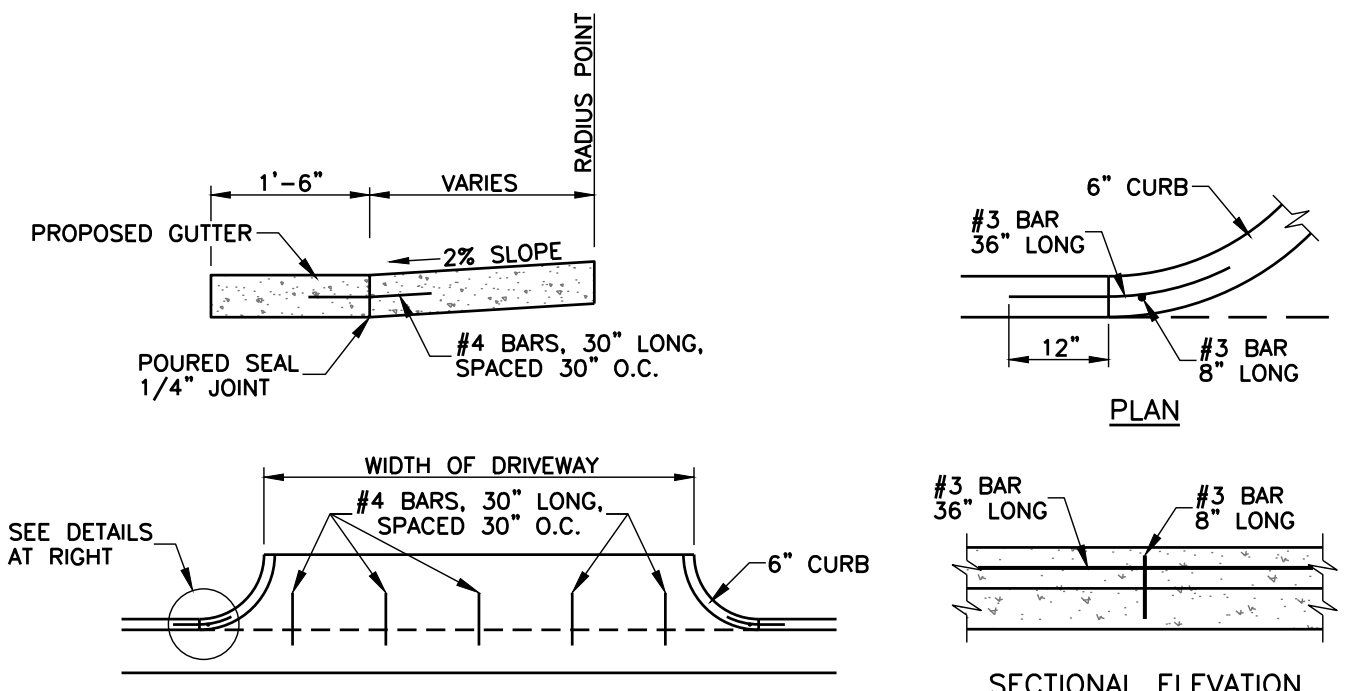


SECTION "B-B"

SINGLE PRECAST AREA INLET DETAILS

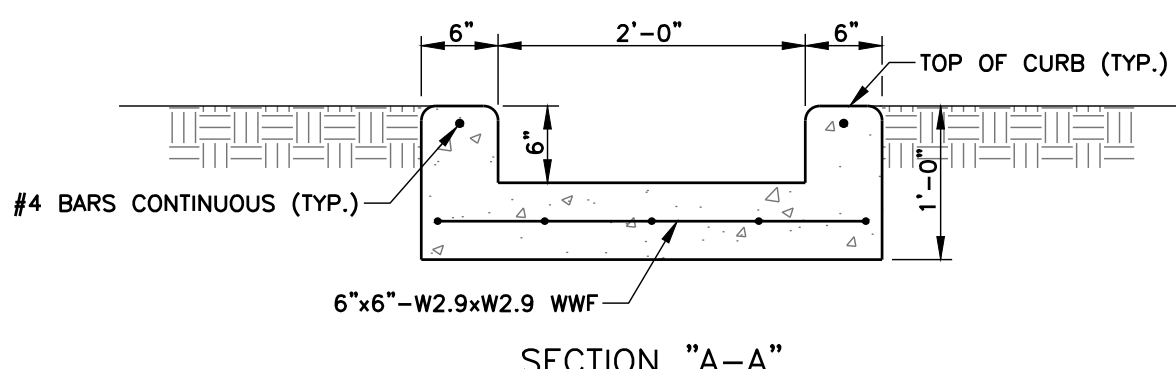
(LOCATED IN OPEN AREAS)

N.T.S.

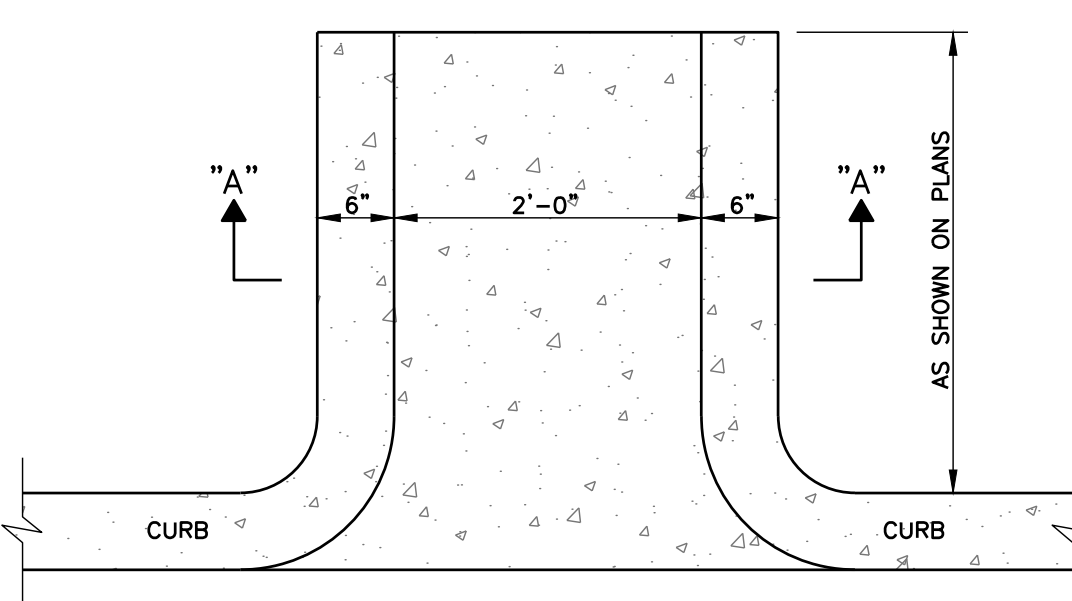


CONCRETE APRON DETAIL

- NOTE:
1. A 1/2" WIDE EXPANSION JOINT IS REQUIRED AT THE END OF THE CURB RETURN. A LONGITUDINAL CONTRACTION JOINT IS REQUIRED FOR ALL DRIVEWAYS EXCEEDING 20' IN WIDTH.



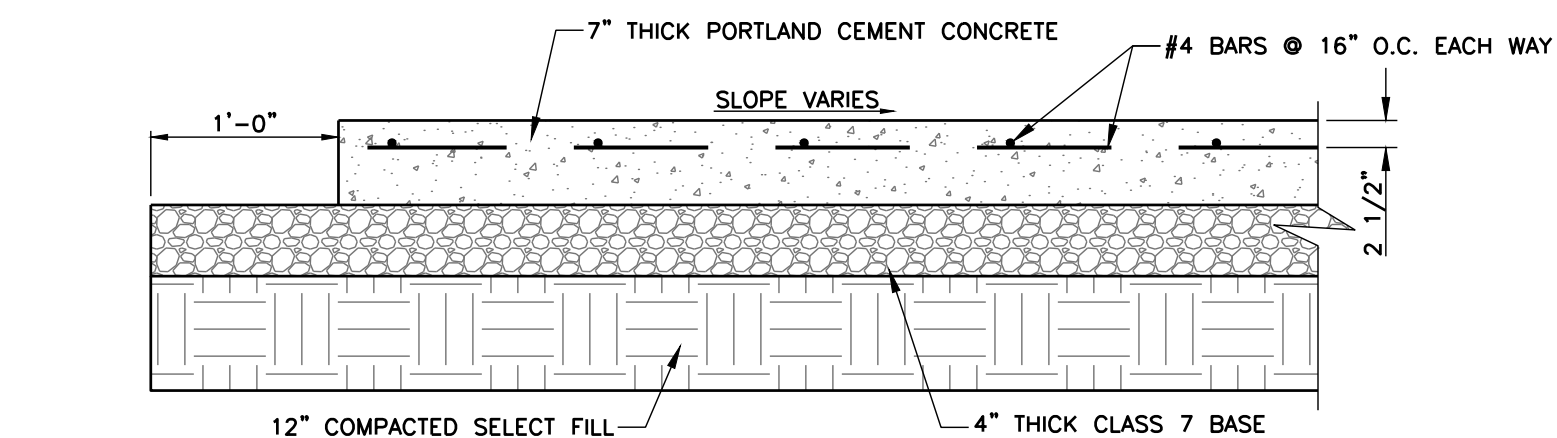
SECTION "A-A"



PLAN VIEW

CURB-CUT WITH FLUME DETAILS

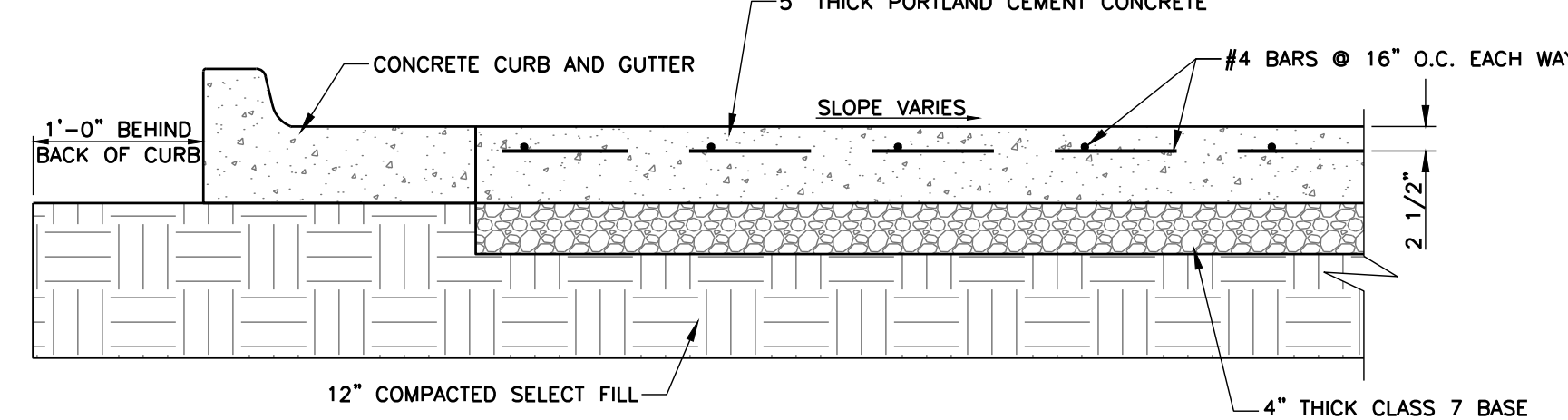
N.T.S.



PORTLAND CEMENT CONCRETE PAVEMENT SECTION (DUMPSTER PAD)

N.T.S.

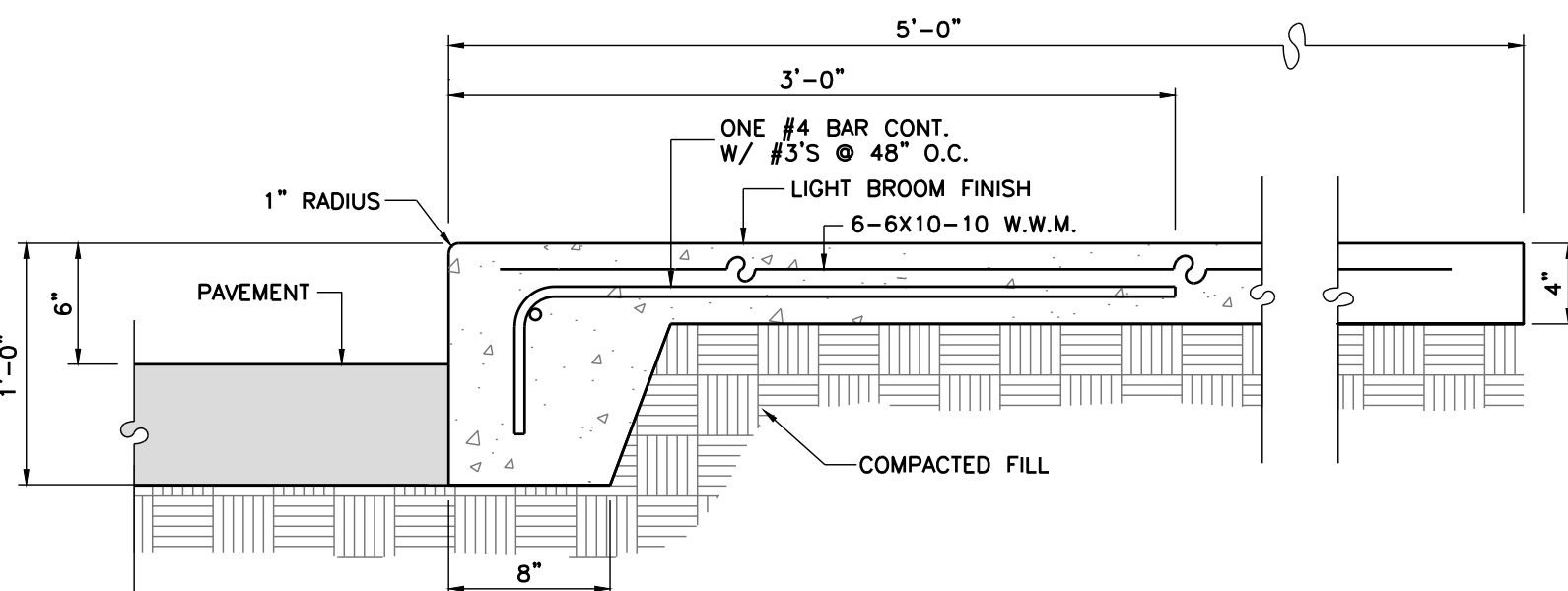
- NOTE: (PER GEOTECHNICAL REPORT) MAXIMUM JOINT SPACING SHALL BE 15'-0"



PORTLAND CEMENT CONCRETE PAVEMENT SECTION

N.T.S.

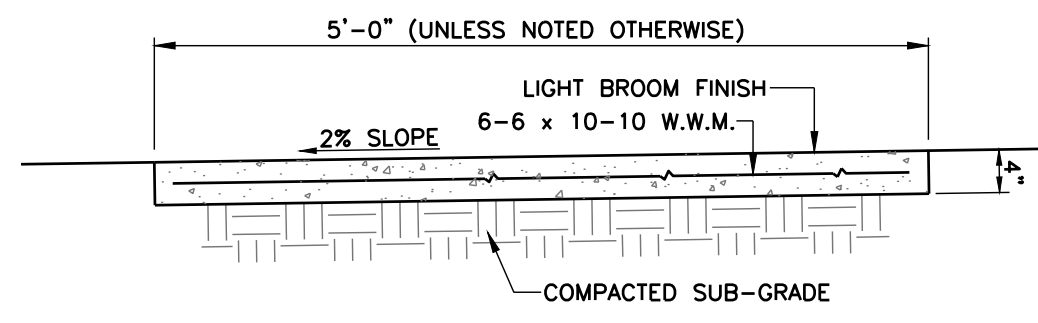
- NOTE: (PER GEOTECHNICAL REPORT) MAXIMUM JOINT SPACING SHALL BE 15'-0"



PARKING CURB AND SIDEWALK DETAIL

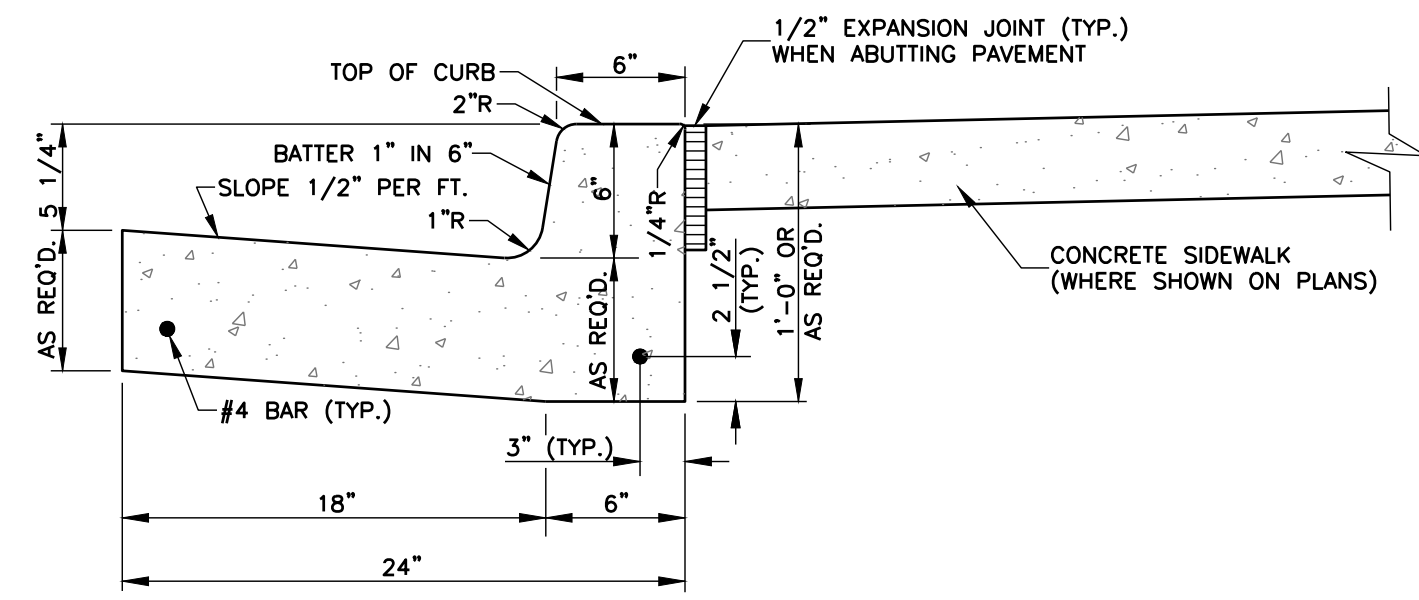
N.T.S.

- NOTES:
1. PROVIDE CONTRACTION JOINTS AT 5'-0" O.C. AND EXPANSION JOINTS AT 48'-0" O.C., AND AT INTERSECTION OF WALKS.
 2. CONTRACTION JOINTS SHALL BE A MINIMUM OF 1" OF DEPTH AND A MAXIMUM OF 1/4 DEPTH OF THE PAVEMENT. EDGES SHALL BE TOOLED TO A 1/4" RADIUS.
 3. EXPANSION JOINTS SHALL BE 1/2" IN WIDTH AND FILLED WITH PREMOULDED EXPANSION JOINT FILLER TO WITHIN 1/2" OF THE SURFACE. EDGES SHALL BE TOOLED TO A 1/4" RADIUS AND SEALED FLUSH WITH AN APPROVED SEALANT.
 4. MAX. SLOPE IN RUN OF SIDEWALKS TO BE 3% MAX. CROSSLOPE TO BE 2%.
 5. SPECIFICATIONS FOR ALL CONCRETE AND REINFORCEMENT ARE AS FOLLOWS:
CONCRETE: 4,000 PSI IN 28 DAYS
REINFORCING STEEL: PER ASTM A-615, GRADE 60
 6. PROVIDE FULL DEPTH EXPANSION JOINT IN ALL LOCATIONS WHERE SIDEWALK ABUTTS CURBS, INLETS, WALLS, FOUNDATIONS, AND OTHER FIXED OBJECTS.

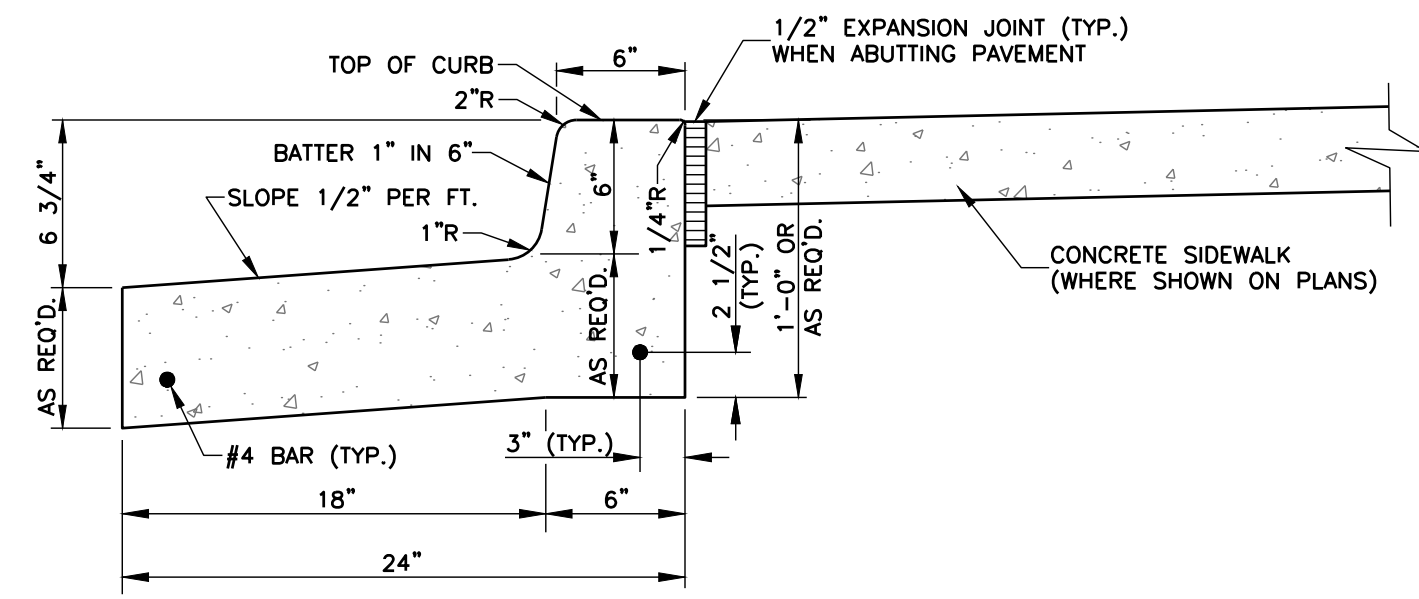


CONCRETE SIDEWALK DETAIL

N.T.S.



NORMAL GUTTER



PITCHED GUTTER

CONCRETE CURB AND GUTTER DETAIL

N.T.S.

- NOTES:
1. CONCRETE SHALL BE 4,000 P.S.I. MINIMUM.
 2. PROVIDE CONTRACTION JOINTS AT 10'-0" O.C. AND EXPANSION JOINTS AT 40'-0" O.C.
 3. CONTRACTION JOINTS SHALL BE A MINIMUM OF 1" OF DEPTH AND A MAXIMUM OF 1/4 DEPTH OF THE PAVEMENT. EDGES SHALL BE TOOLED TO A 1/4" RADIUS.
 4. EXPANSION JOINTS SHALL BE 1/2" IN WIDTH AND FILLED WITH PREMOULDED EXPANSION JOINT FILLER TO WITHIN 1/2" OF THE SURFACE. EDGES SHALL BE TOOLED TO A 1/4" RADIUS AND SEALED FLUSH WITH AN APPROVED SEALANT.
 5. CONTRACTOR TO FIELD VERIFY TYPE OF GUTTER PITCH USED.

- PAVEMENT SECTION NOTES:
1. CLASS 7 - 90% CRUSHED STONE MEETING AASHTO TABLE 303-1.
 2. COMPACTION OF ACHM SHOULD NOT BE LESS THAN 92% OF THEORETICAL DESIGN MIX.
 3. BASE MATERIAL COMPACTION SHOULD NOT BE LESS THAN 100% ASTM D 698.

ASPHALT PAVEMENT SECTION

N.T.S.

(PER GEOTECHNICAL REPORT)

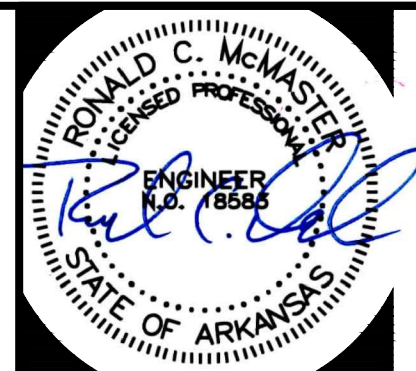
Revisions			
#	Date	Nature	By

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Scale	SEE ABOVE	Checked By	R.C.M.

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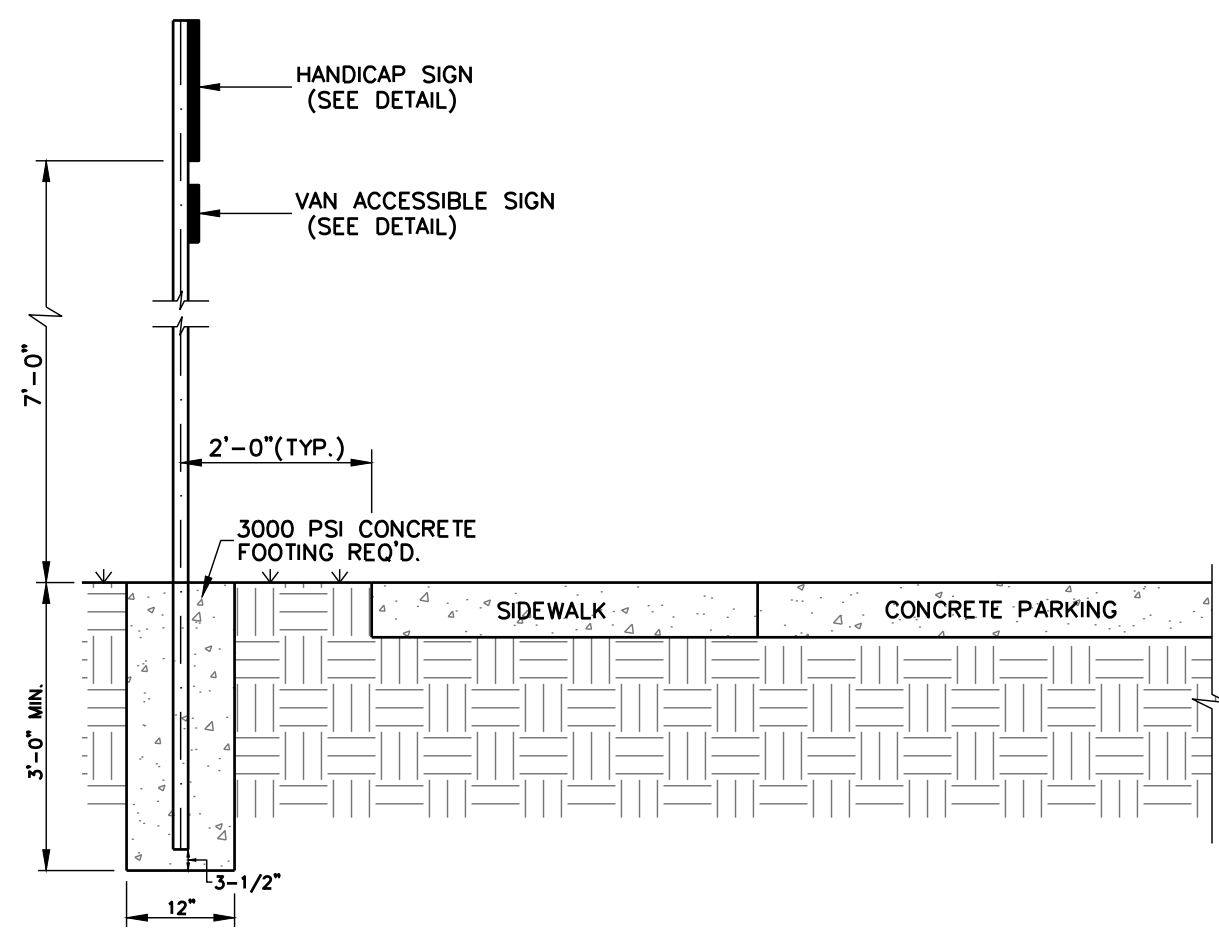


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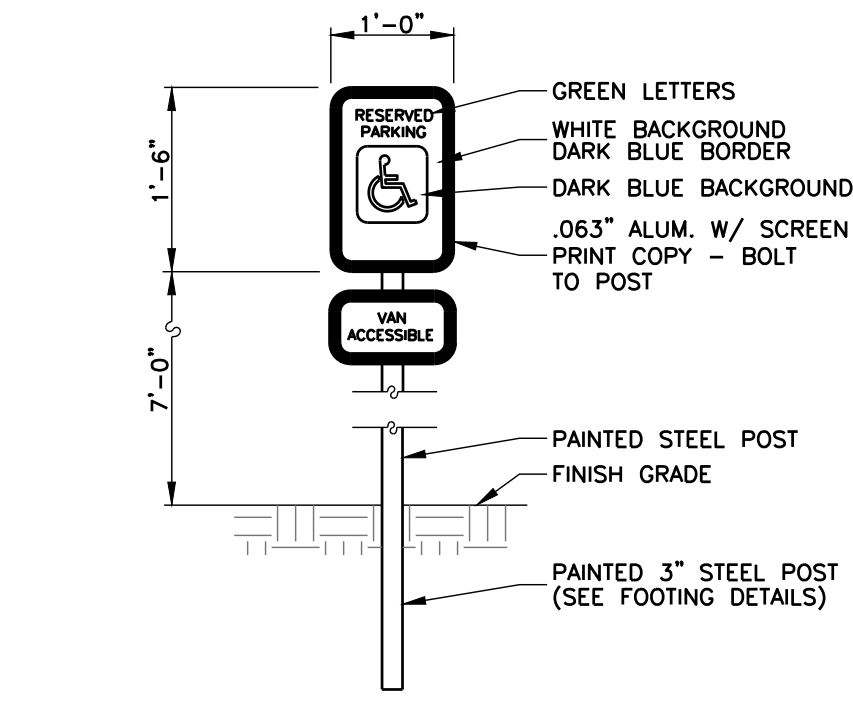


MISCELLANEOUS DETAILS

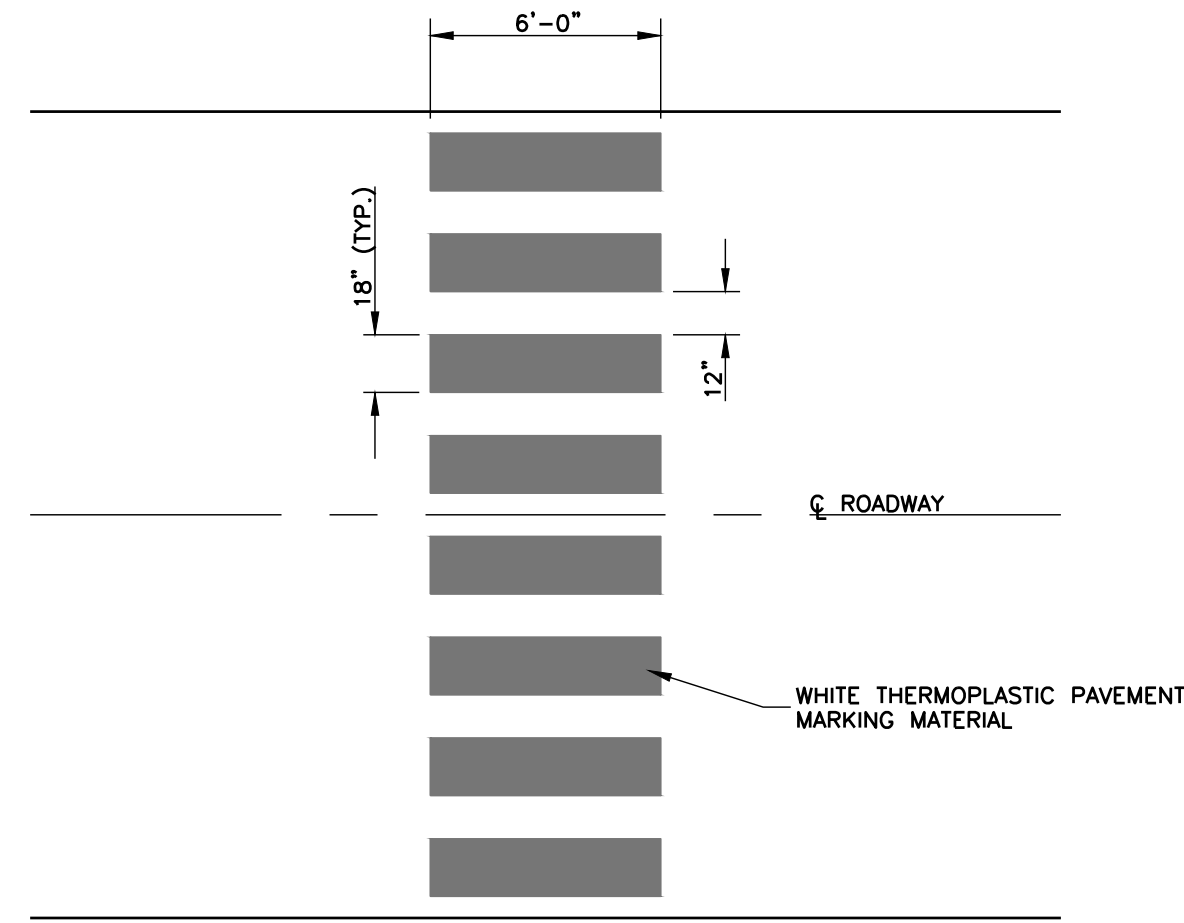
C5.1



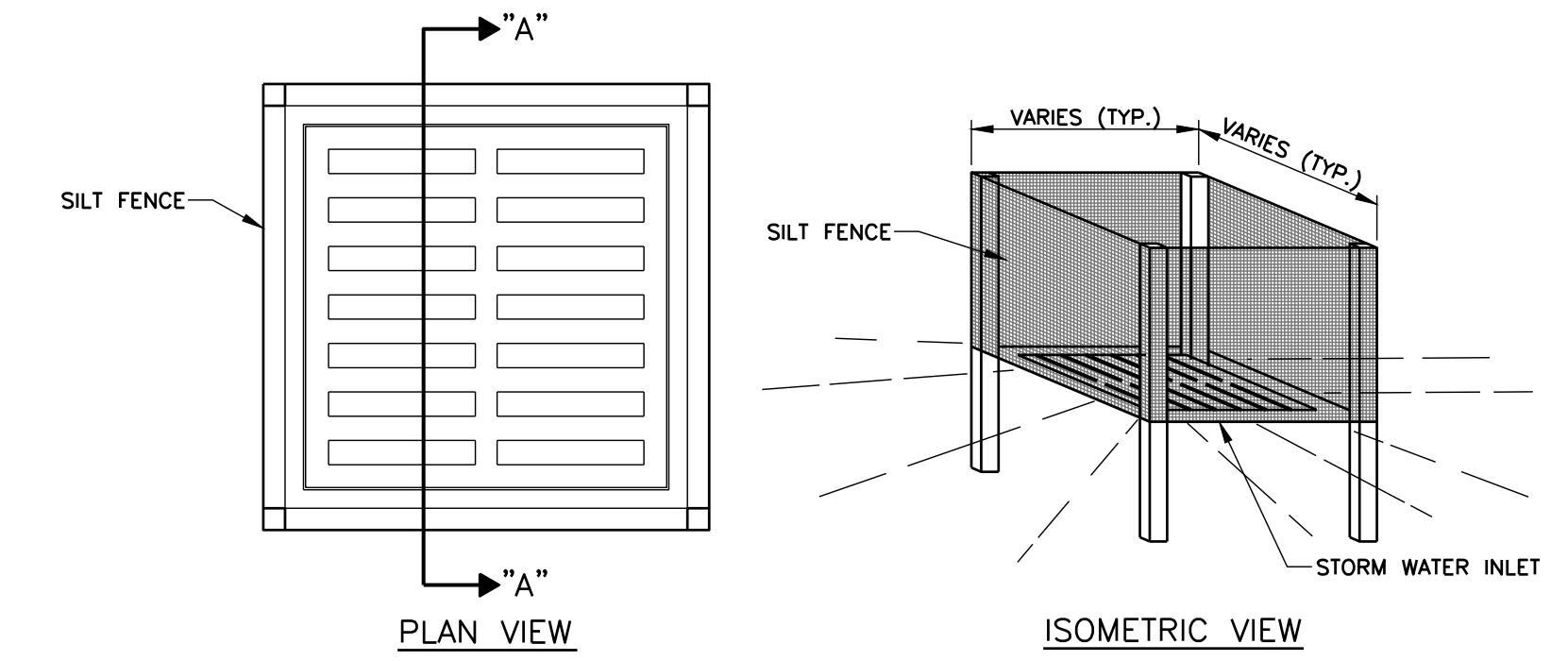
FOOTING DETAIL FOR HANDICAP PARKING SIGN
N.T.S.



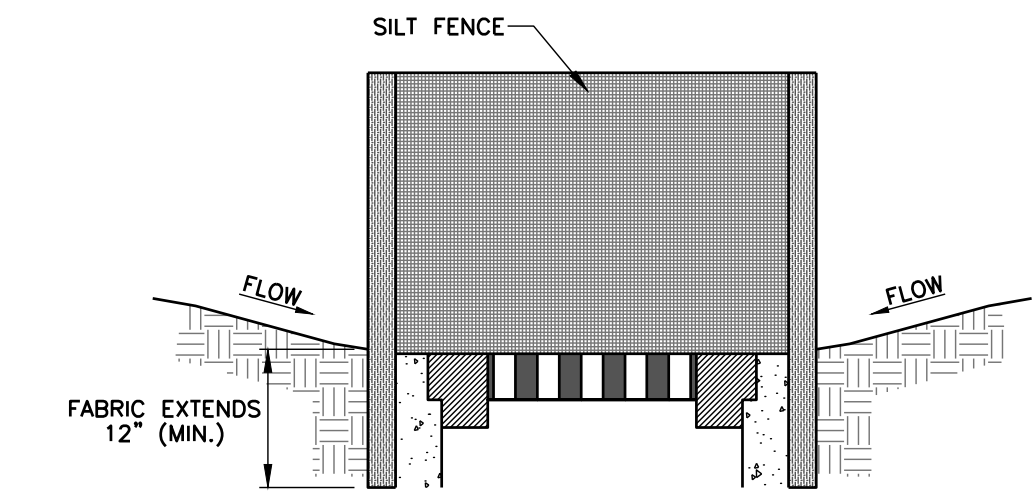
SIGN AT HANDICAP PARKING SPACE
N.T.S.



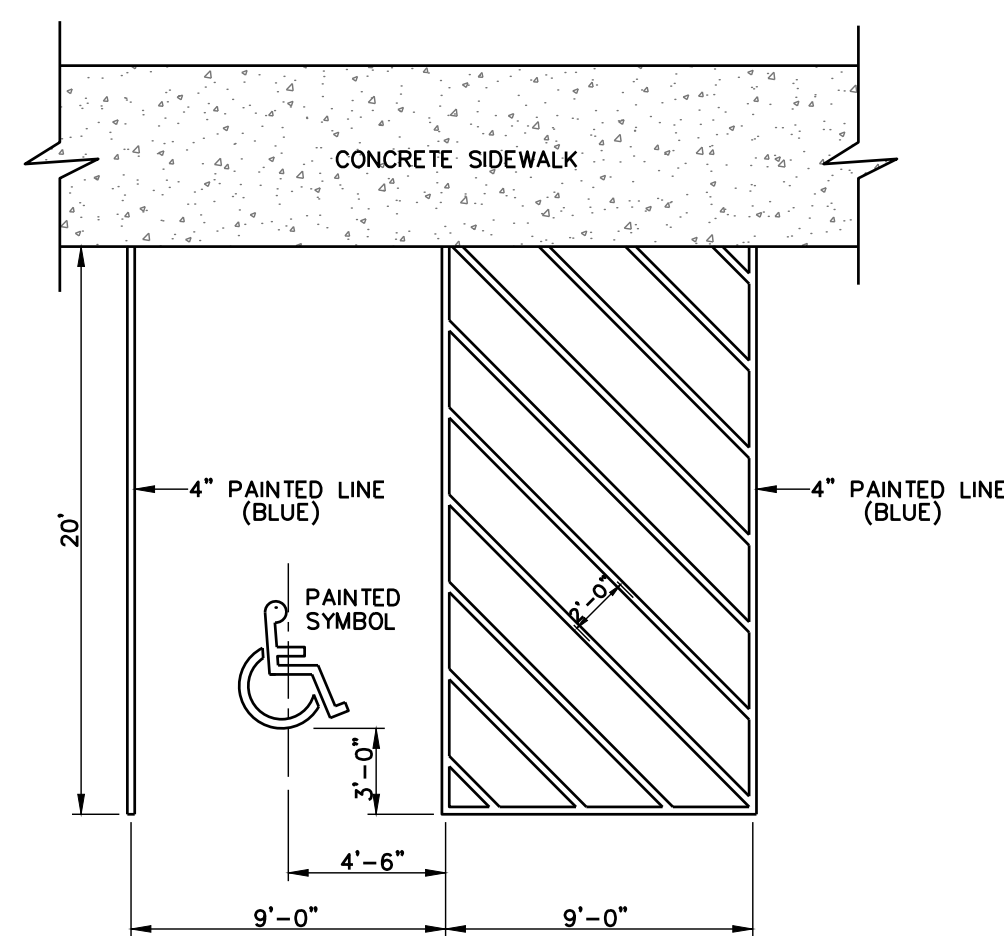
CROSSWALK DETAIL
N.T.S.



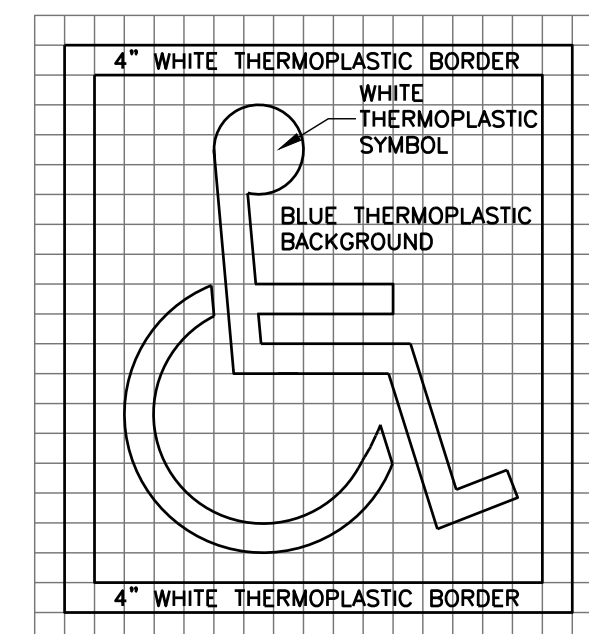
PLAN VIEW
ISOMETRIC VIEW



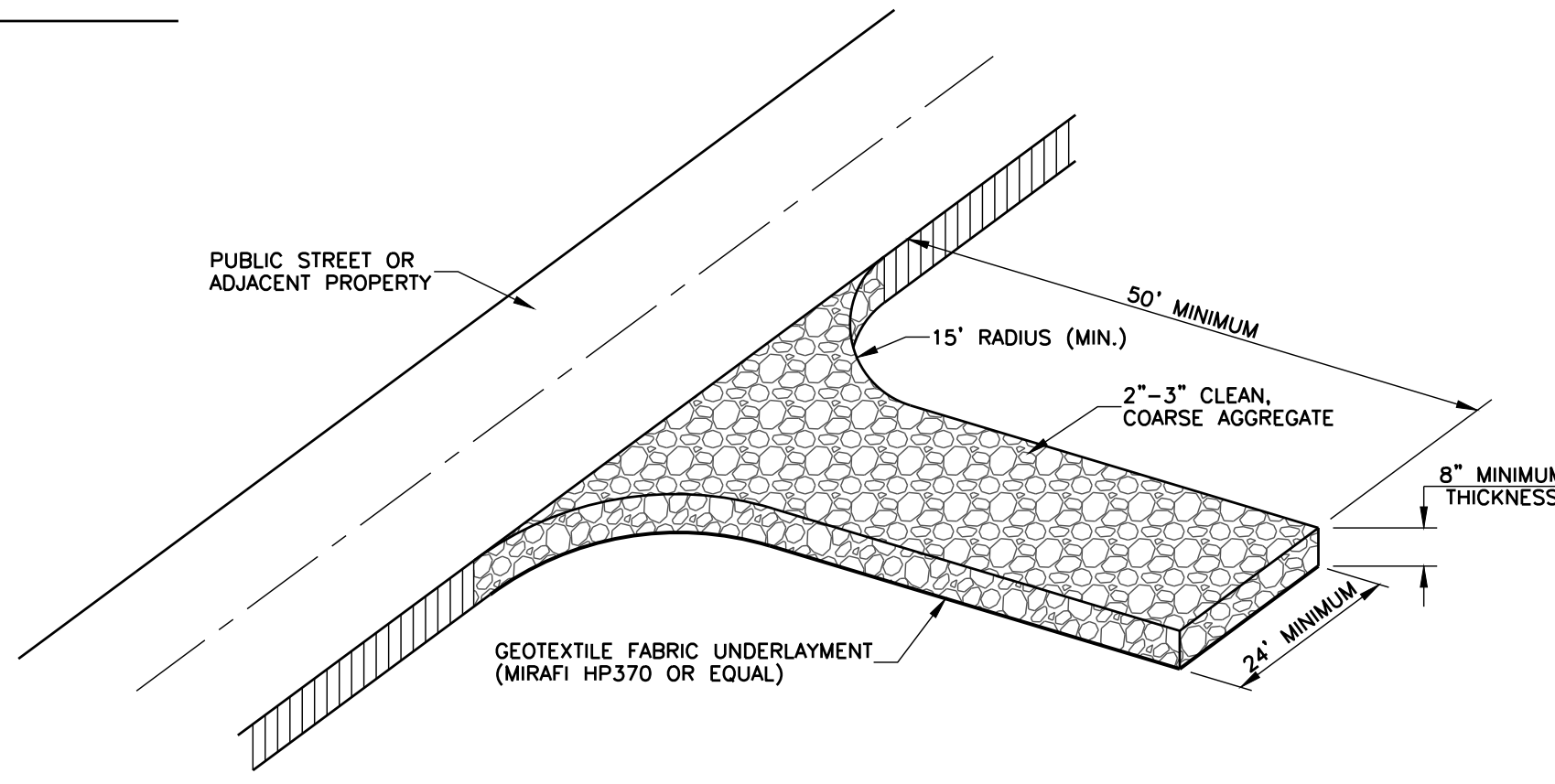
SECTION "A-A"
SILT FENCE INLET PROTECTION DETAILS
N.T.S.



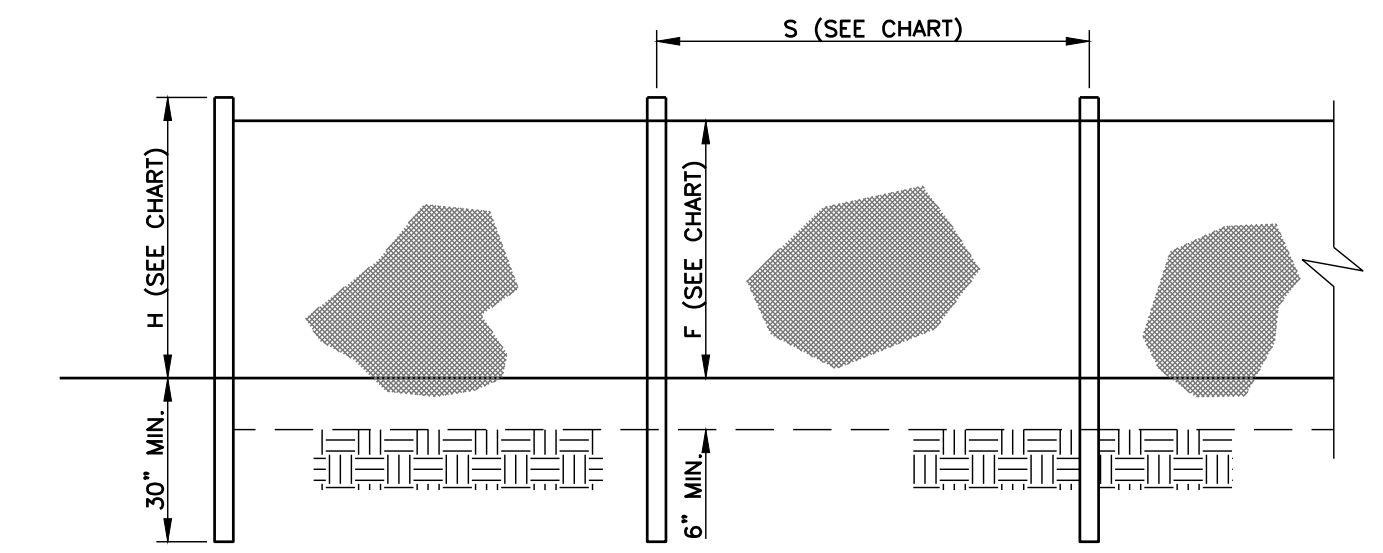
HANDICAP PARKING DETAILS
N.T.S.



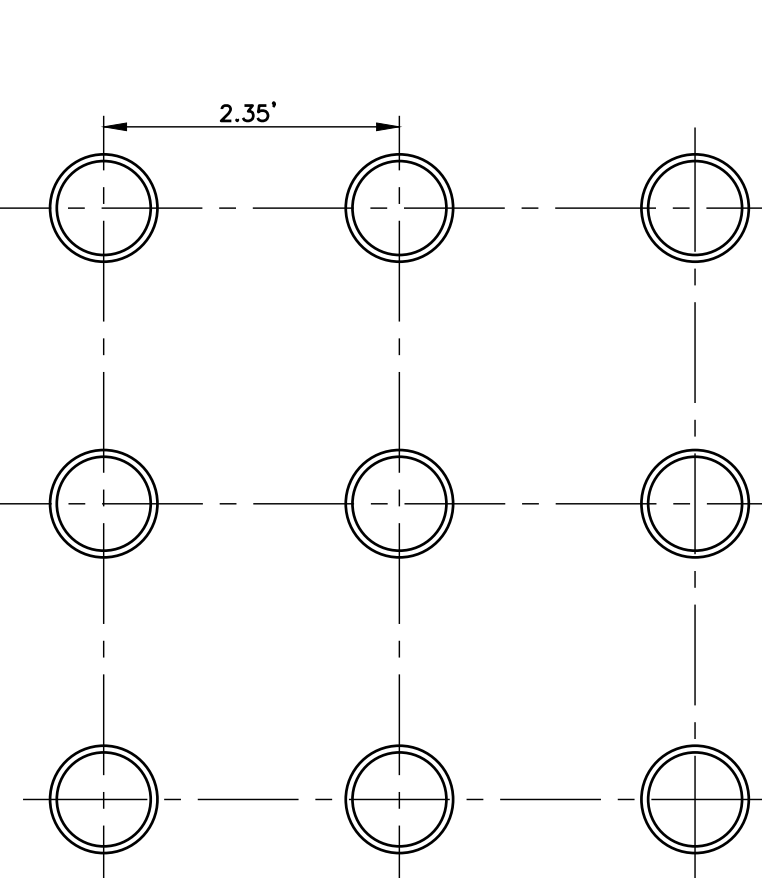
TYPICAL THERMOPLASTIC ACCESSIBLE SYMBOL FOR PAVEMENT
N.T.S.



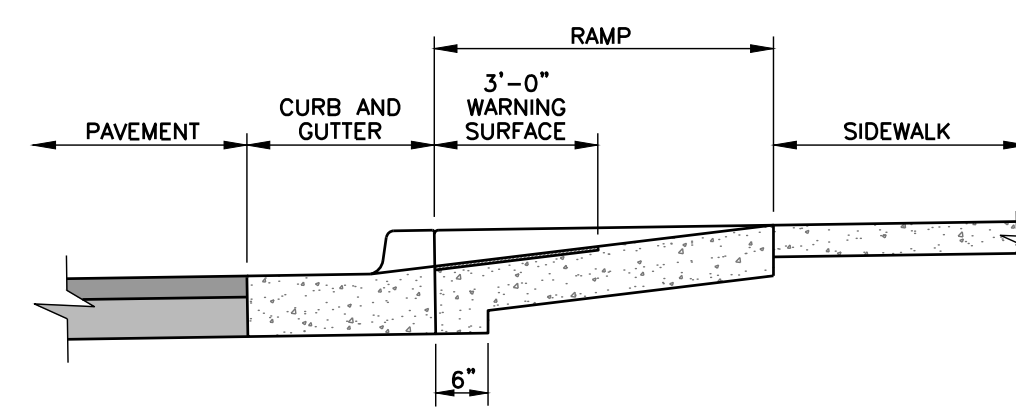
ISOMETRIC VIEW
CONSTRUCTION ENTRANCE DETAIL
N.T.S.



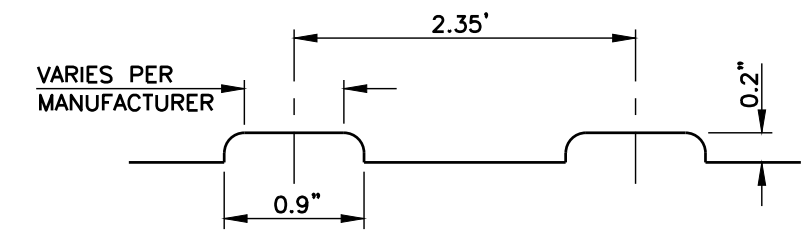
ELEVATION



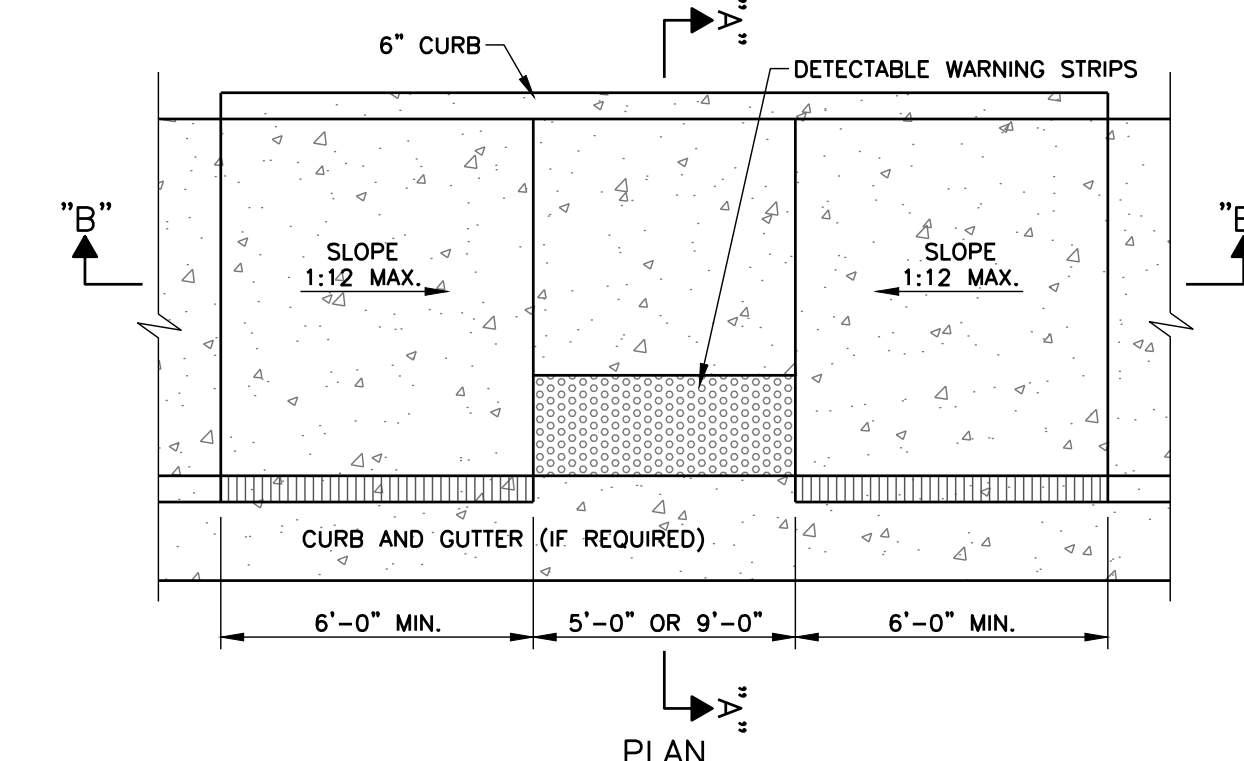
SQUARE PATTERN



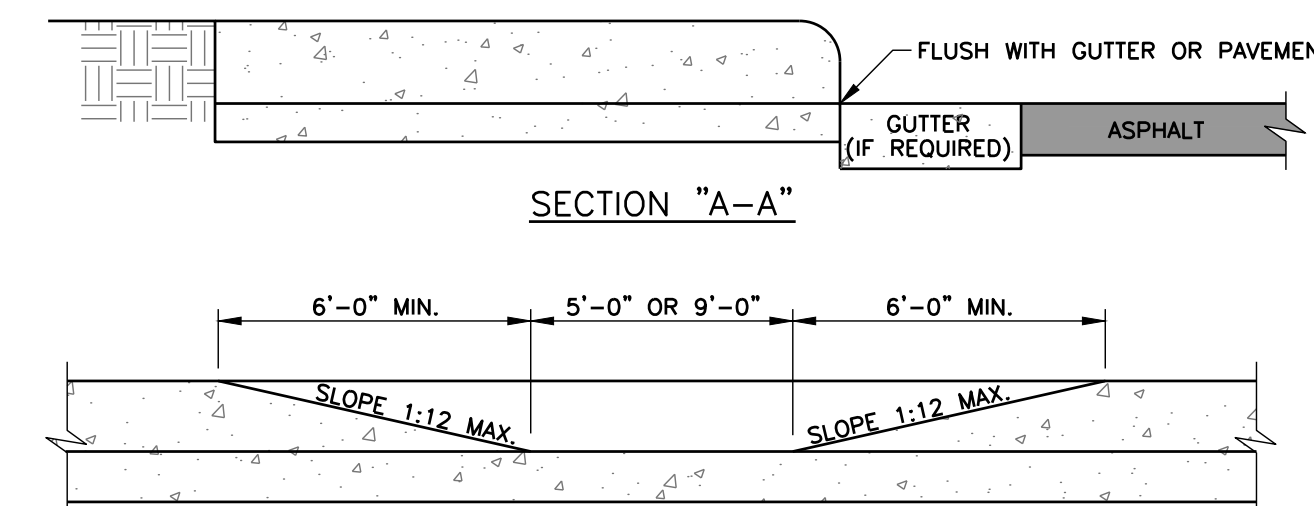
TYPICAL DETECTABLE WARNING INSTALLATION



TRUNCATED DOME PROFILE



PLAN



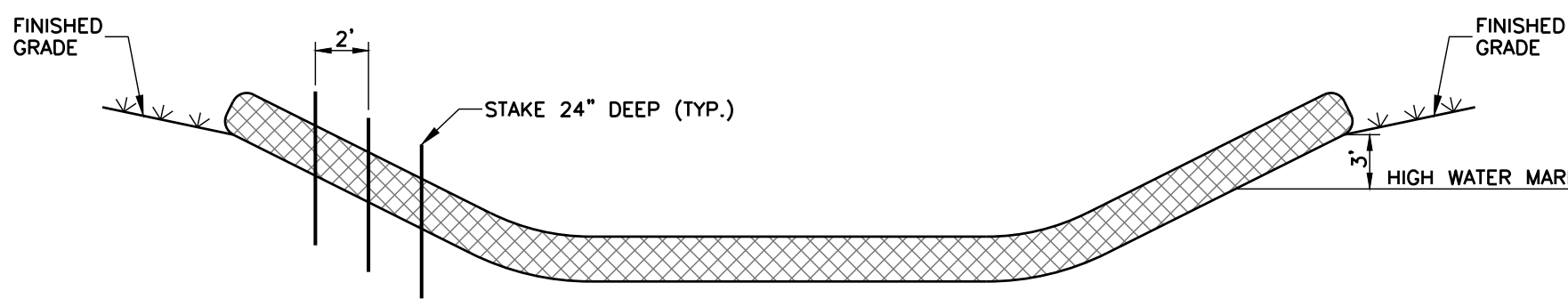
SECTION "A-A"



SECTION "B-B"

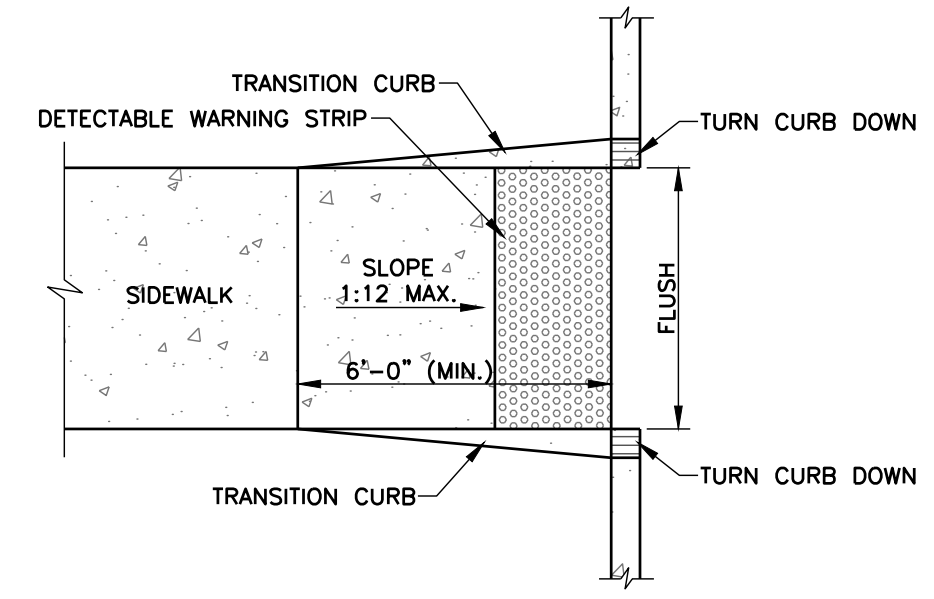
NOTE: SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE SLOPE OF THE RAMP.

ACCESSIBLE RAMP IN SIDEWALK
N.T.S.



WATTLE INSTALLATION CRITERIA:
MAY BE INSTALLED FLAT ON THE GROUND OR ENTRENCHED.
MAY BE INSTALLED OVER BARE SOIL OR OVER EROSION CONTROL BLANKETS AND ON STEEP SLOPES.
SHOULD REMAIN IN PLACE UNTIL VEGETATION IS FULLY ESTABLISHED AND CAN SURVIVE ON ITS OWN.
TYPICALLY SECURED TO THE SUBGRADE SOIL USING A 1-INCH BY 1-INCH WOOD STAKE. STAKES SHOULD BE PLACED EVERY TWO FEET ACROSS THE LENGTH OF THE SEDIMENT TUBE. STAKES SHOULD BE INTERTWINED WITH OUTER MESH ON THE DOWNSTREAM SIDE AND DRIVEN INTO THE GROUND A MINIMUM OF 24 INCHES.
WATTLES PLACED IN SWALES OR CHANNEL BOTTOMS SHOULD CONTINUE UP THE SIDE SLOPES THREE FEET ABOVE THE ANTICIPATED HIGH WATER MARK AND PERPENDICULAR TO THE FLOW OF WATER.

WATTLE INSTALLATION DETAIL
N.T.S.



ACCESSIBLE CURB RAMP DETAIL
N.T.S.

POST SIZE, MATERIAL AND SPACING CHART	WITHOUT BACKING		WITH BACKING	
	MIN. LENGTH - L	MIN. HEIGHT - H	MIN. LENGTH - L	MIN. HEIGHT - H
MIN. SPACING - S	4'-0"	2'-0"	4'-0"	2'-0"
MIN. FABRIC WIDTH	36"	36"	36"	36"
MIN. FABRIC WIDTH	36"	36"	36"	36"
TENSILE STRENGTH (LBS. MIN. #1)	WARP - 130	FILL - 100	WARP - 310	FILL - 300
FOUNDATION (IN MARK)	20	20	20	20
APPS. (APPROXIMATE OPENING SIZE)	#30	#30	#70	#70
FLOW RATE (GAL./MIN./SQ. FT.)	4	4	18	18
TRANSPIRENT STABILITY (ASTM D-483)	70	70	90	90
WEATHERING (IN ACCORDANCE WITH ASTM D-4855)	250	250	400	400
BURNING (ASTM D-1708)	250	250	400	400
MIN. FABRIC WIDTH (INCHES) - F=48"	36	36	36	36

- NOTES:**
- USE SILT FENCE WITHOUT BACKING UNLESS OTHERWISE NOTED.
 - SILT FENCE SHALL BE INSTALLED USING A MECHANICAL TRENCHING MACHINE.
 - FABRIC, IN AREAS WHERE ROCK PROHIBITS PROPER EMBEDMENT, SHALL BE SECURED BY PLACING CLEAN CRUSHED STONE OR SAND ALONG THE BASE OF THE FENCE, 20 POUNDS OF STONE OR SAND PER FOOT, MINIMUM.
 - FILTER FABRIC SHALL BE FASTENED TO POSTS WITH A MINIMUM OF FIVE WIRES OR PLASTIC ZIP TIES WITH A MINIMUM OF 50 LBS. TENSILE STRENGTH.
 - CONTRACTOR SHALL PERIODICALLY REMOVE ACCUMULATED SEDIMENT WHEN SEDIMENT DEPTH REACHES 12".

SILT FENCE INSTALLATION DETAILS
N.T.S.

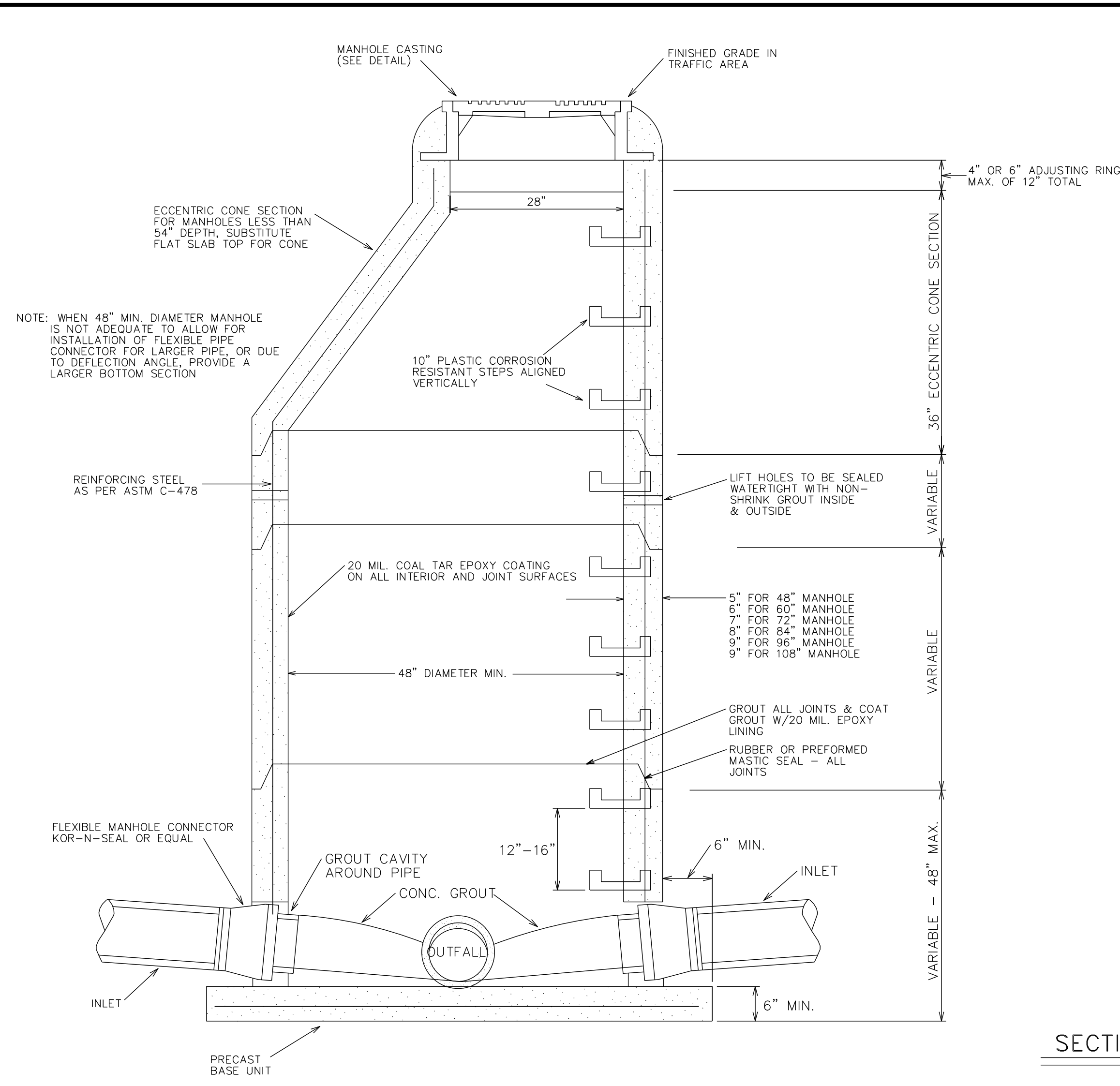
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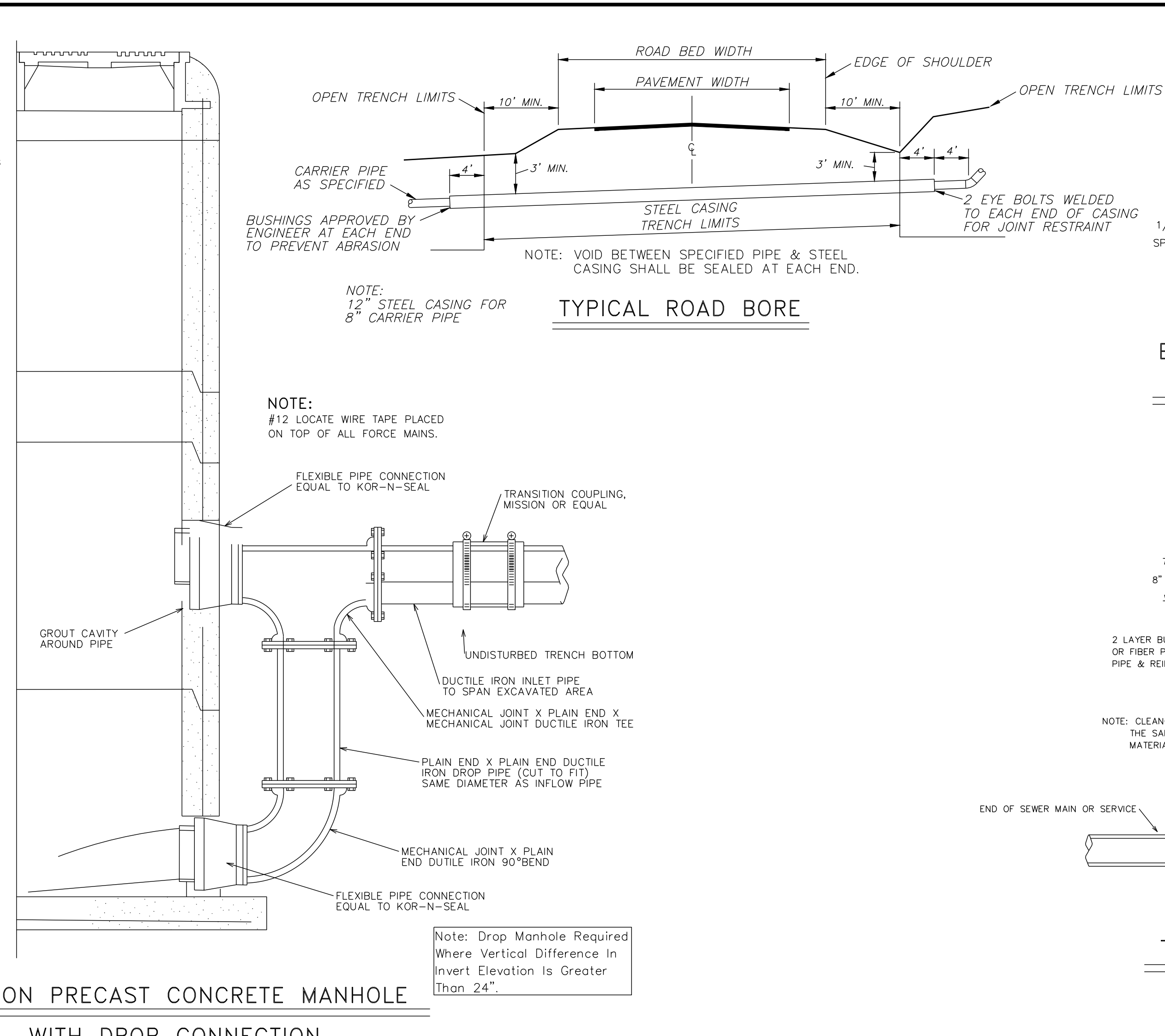
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MISCELLANEOUS DETAILS
C5.2

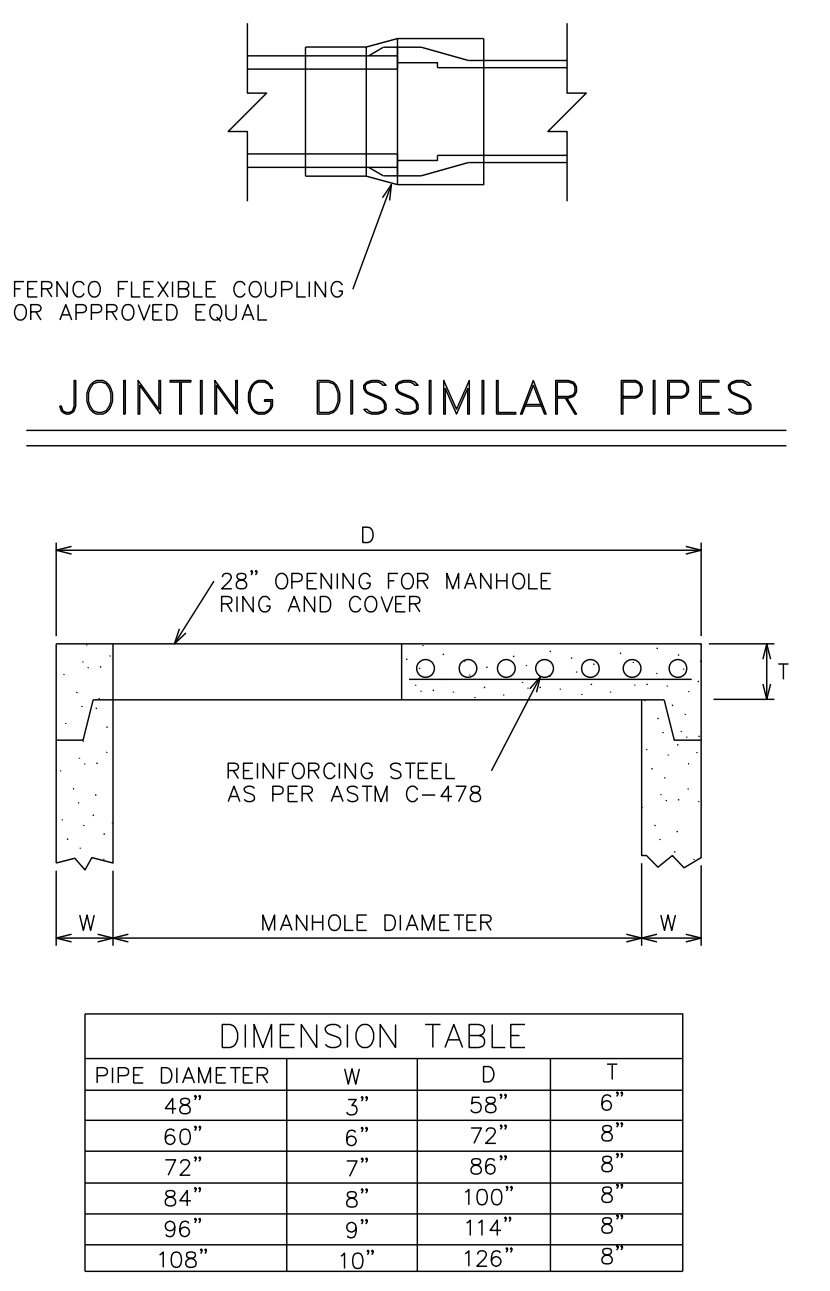
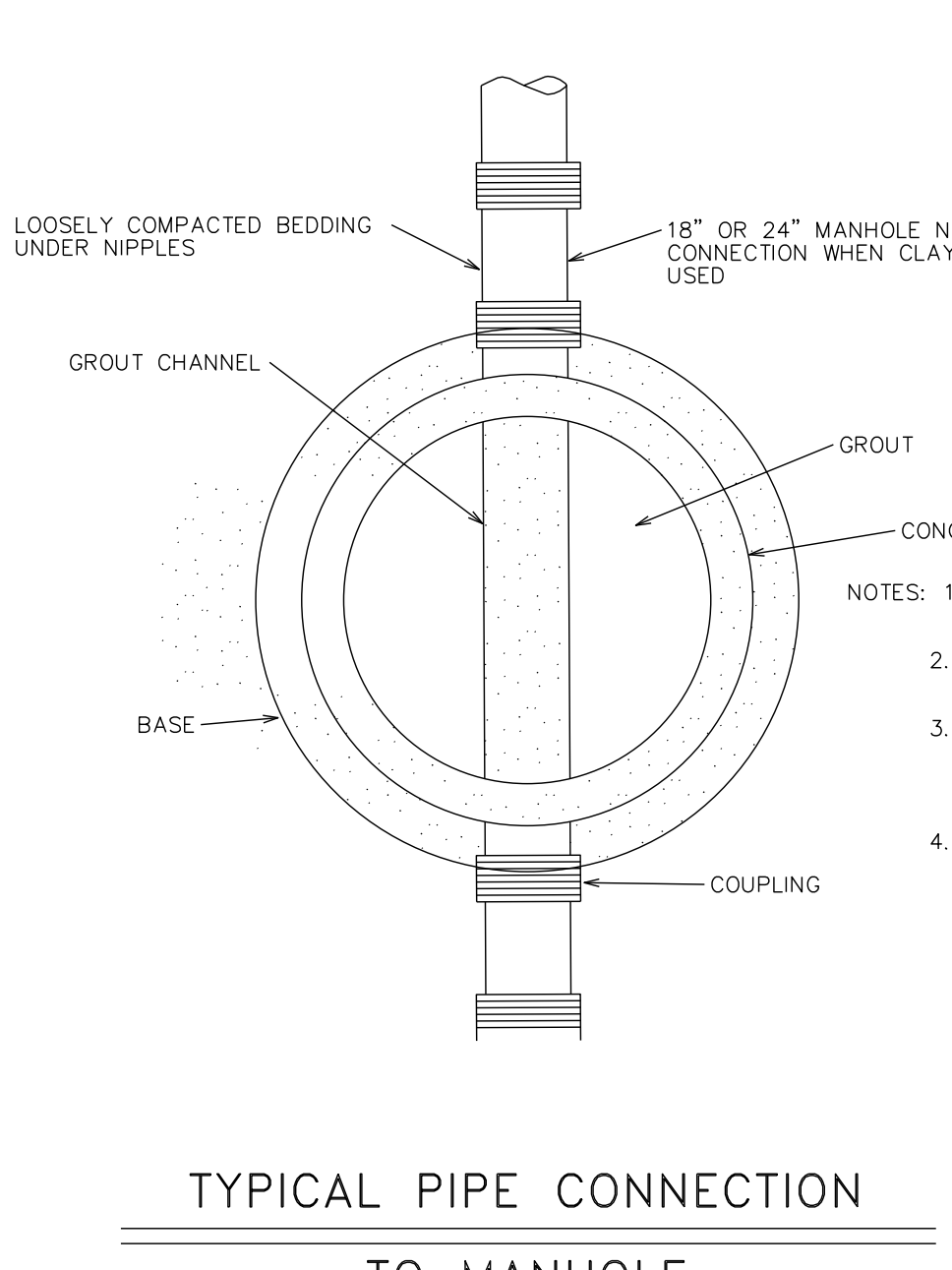
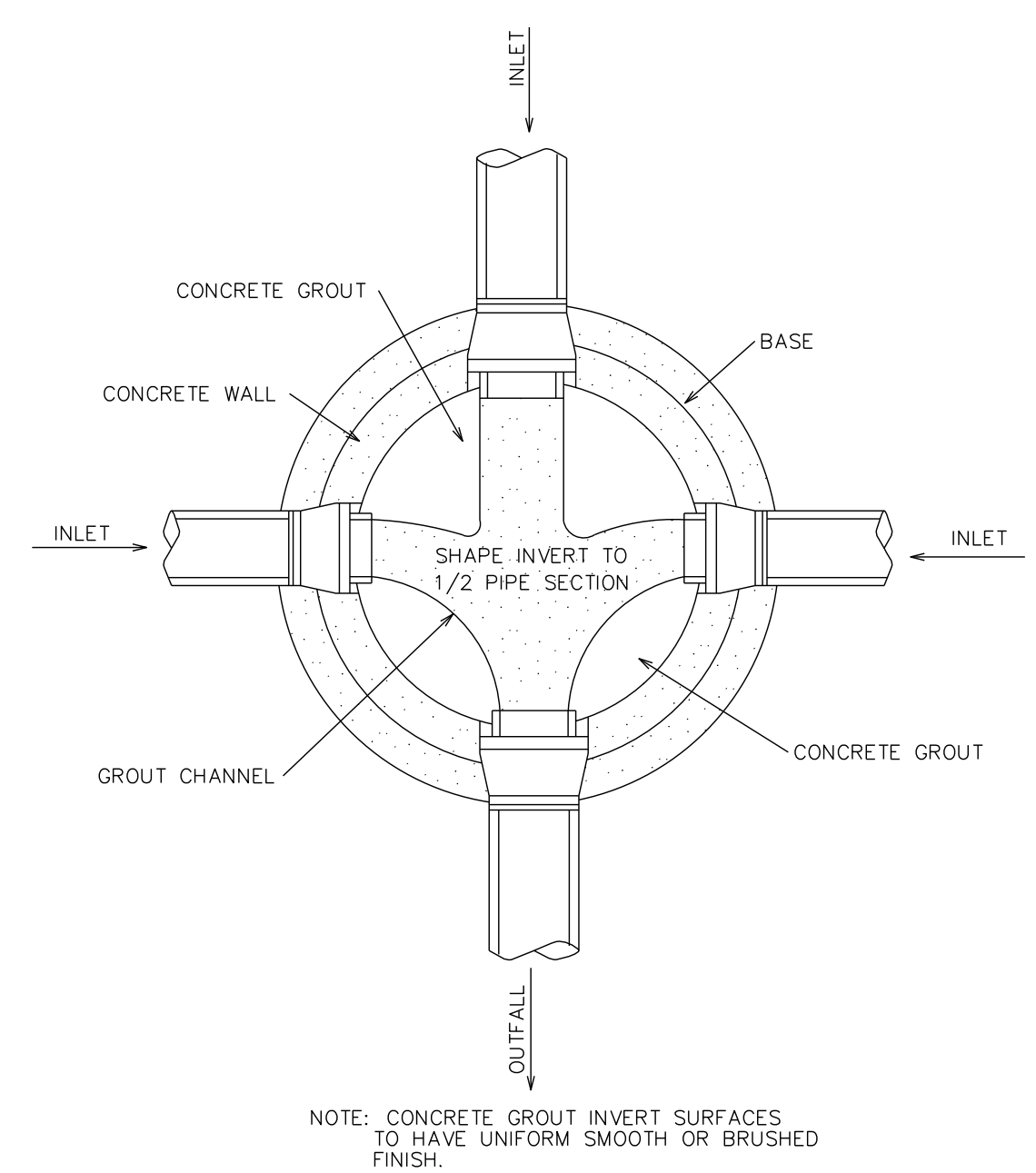
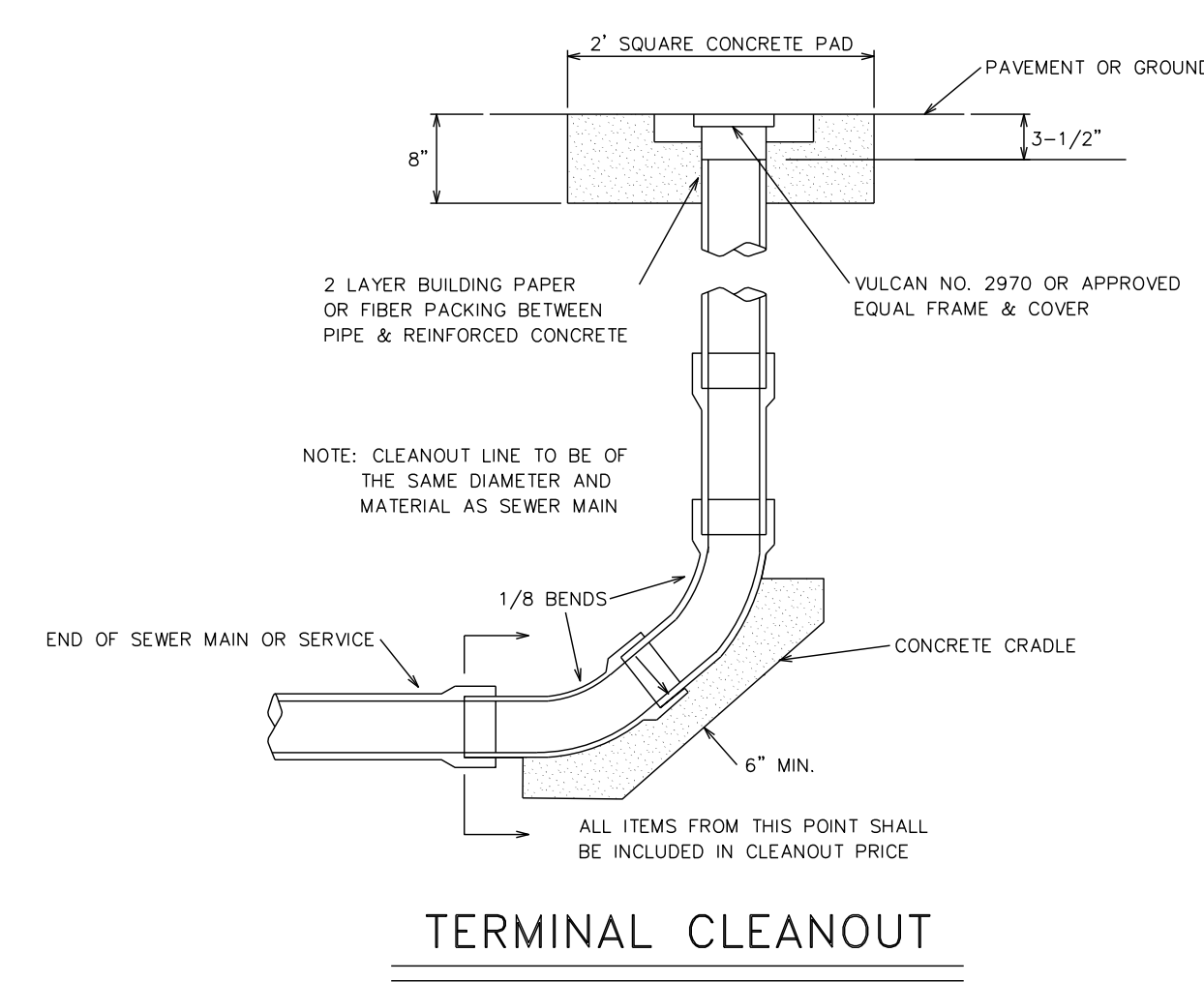
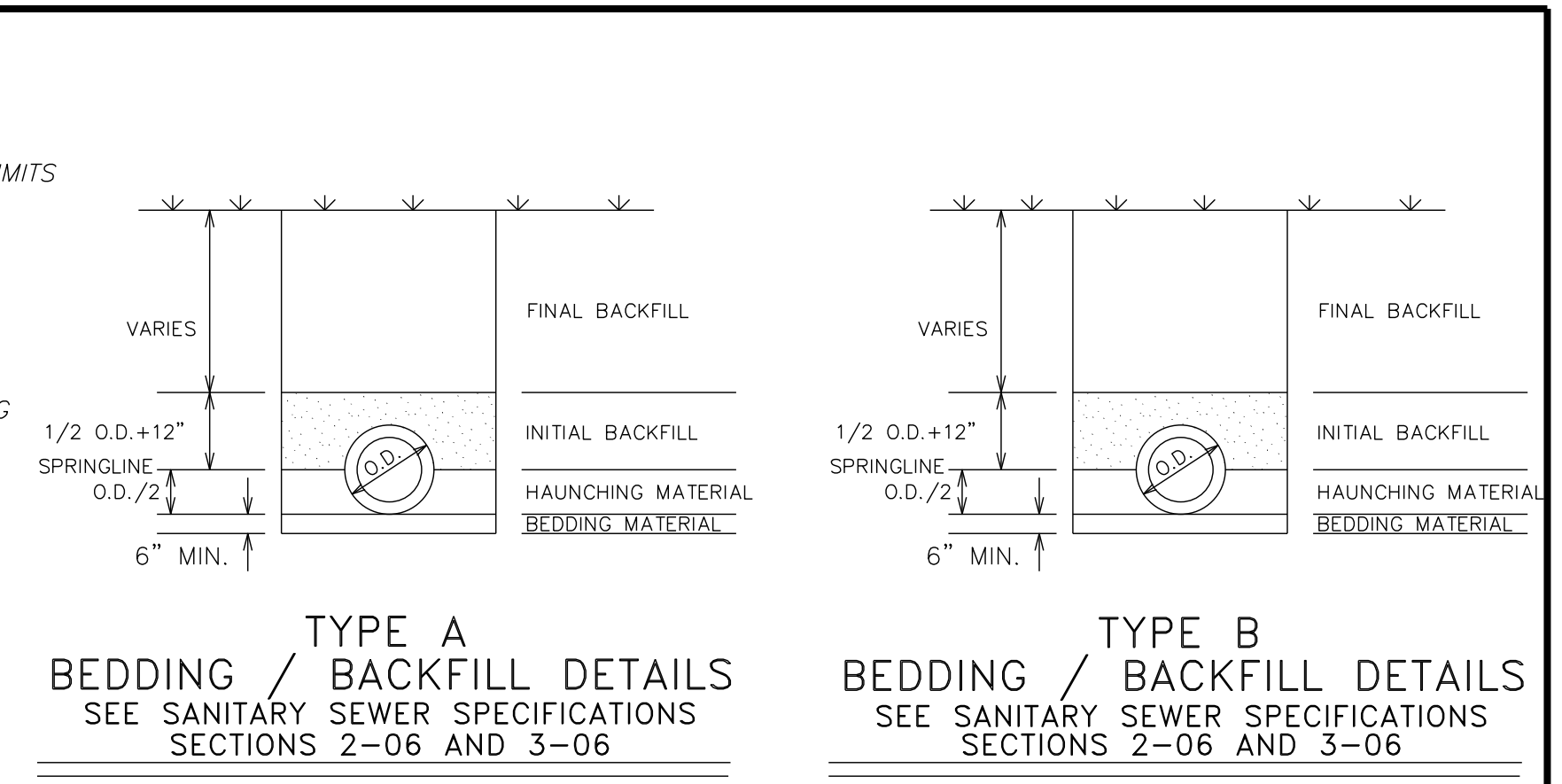


SECTION PRECAST CONCRETE MANHOLE



SECTION PRECAST CONCRETE MANHOLE WITH DROP CONNECTION

(NOTE : INTERIOR STYLE DROP MANHOLE WILL BE ALLOWED)

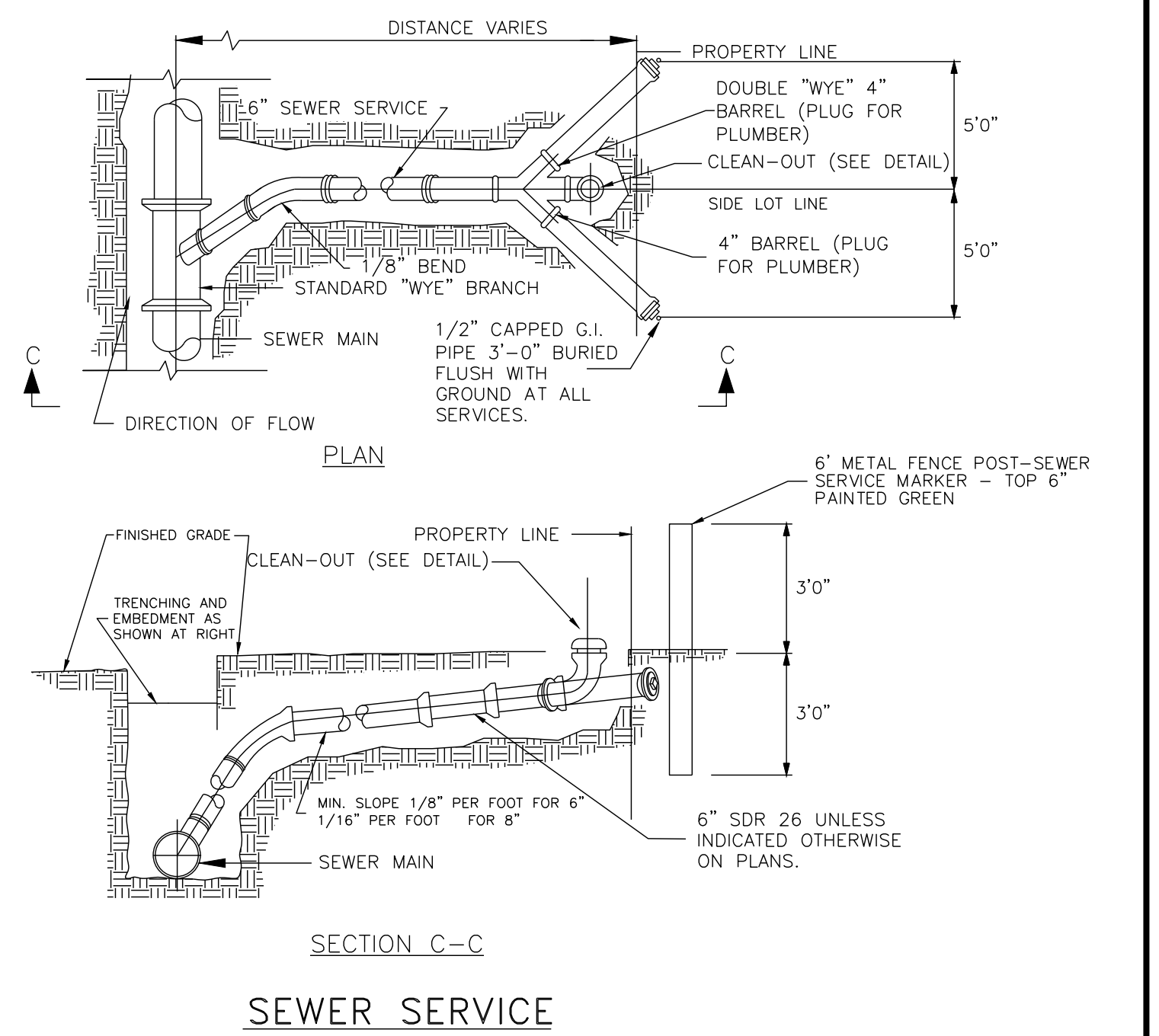
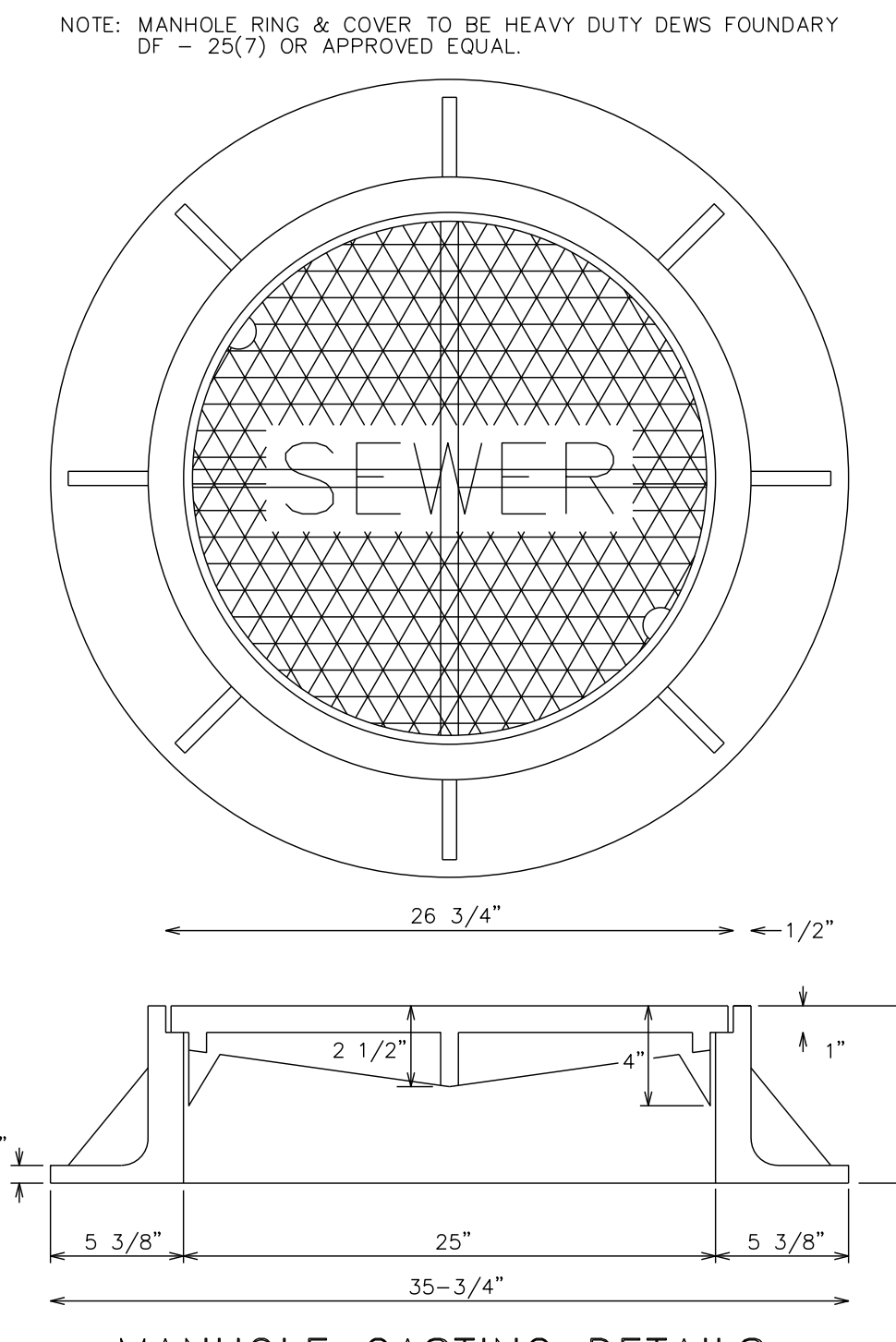


MANHOLE CASTING DETAILS

FLAT SLAB MANHOLE TOP

DIMENSION TABLE

PIPE DIAMETER	W	D	T
48"	3"	58"	6"
60"	6"	72"	8"
72"	7"	86"	8"
84"	8"	100"	8"
96"	9"	114"	8"
108"	10"	126"	8"



SEWER SERVICE CONNECTION DETAIL

Revisions

#	Date	Nature	By	App'd.

Project No. M-2651-1

Designed By R.C.M.

Date 8-20-19

Drawn By D.P.

Scale SEE ABOVE

Checked By R.C.M.

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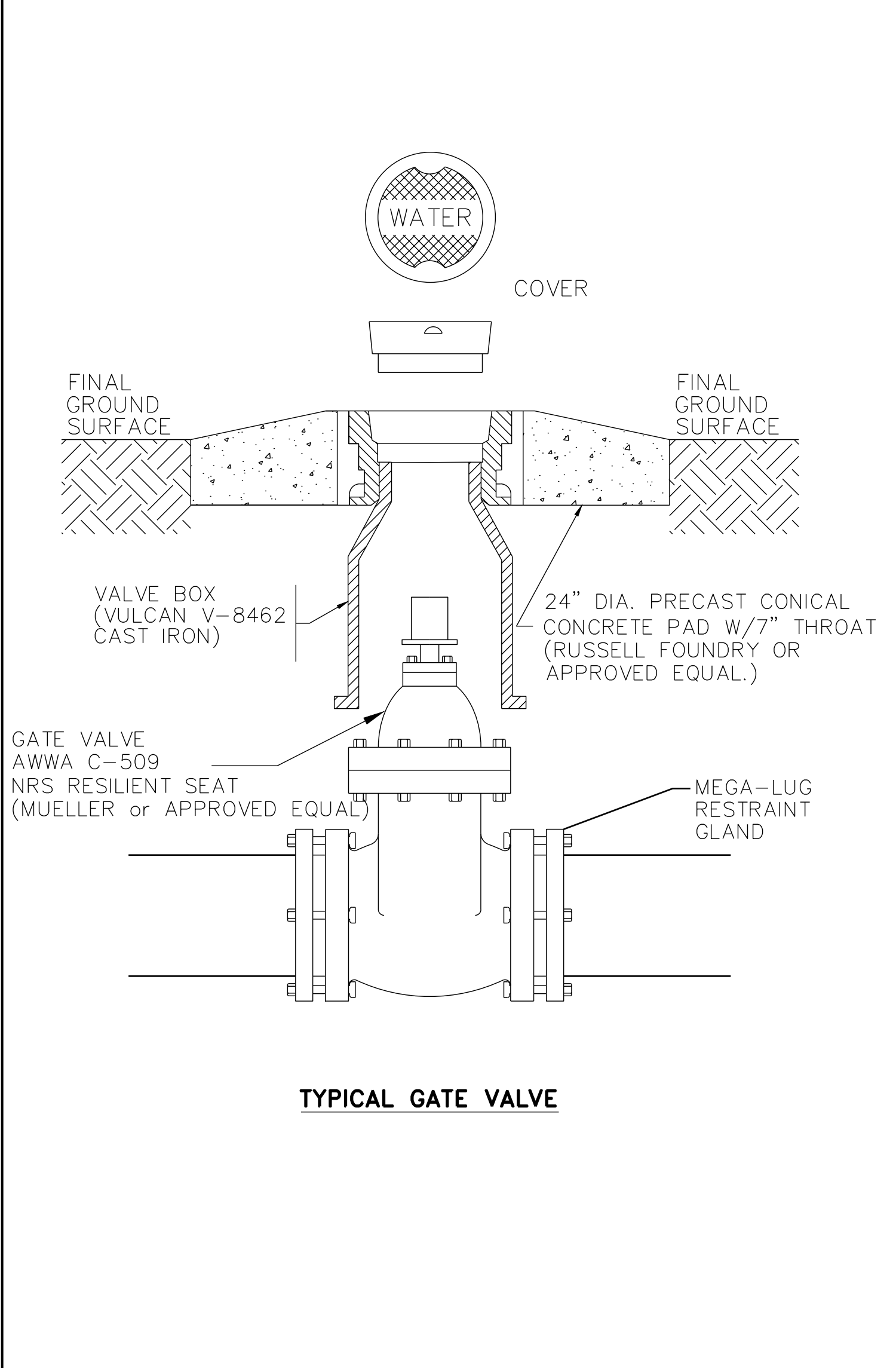
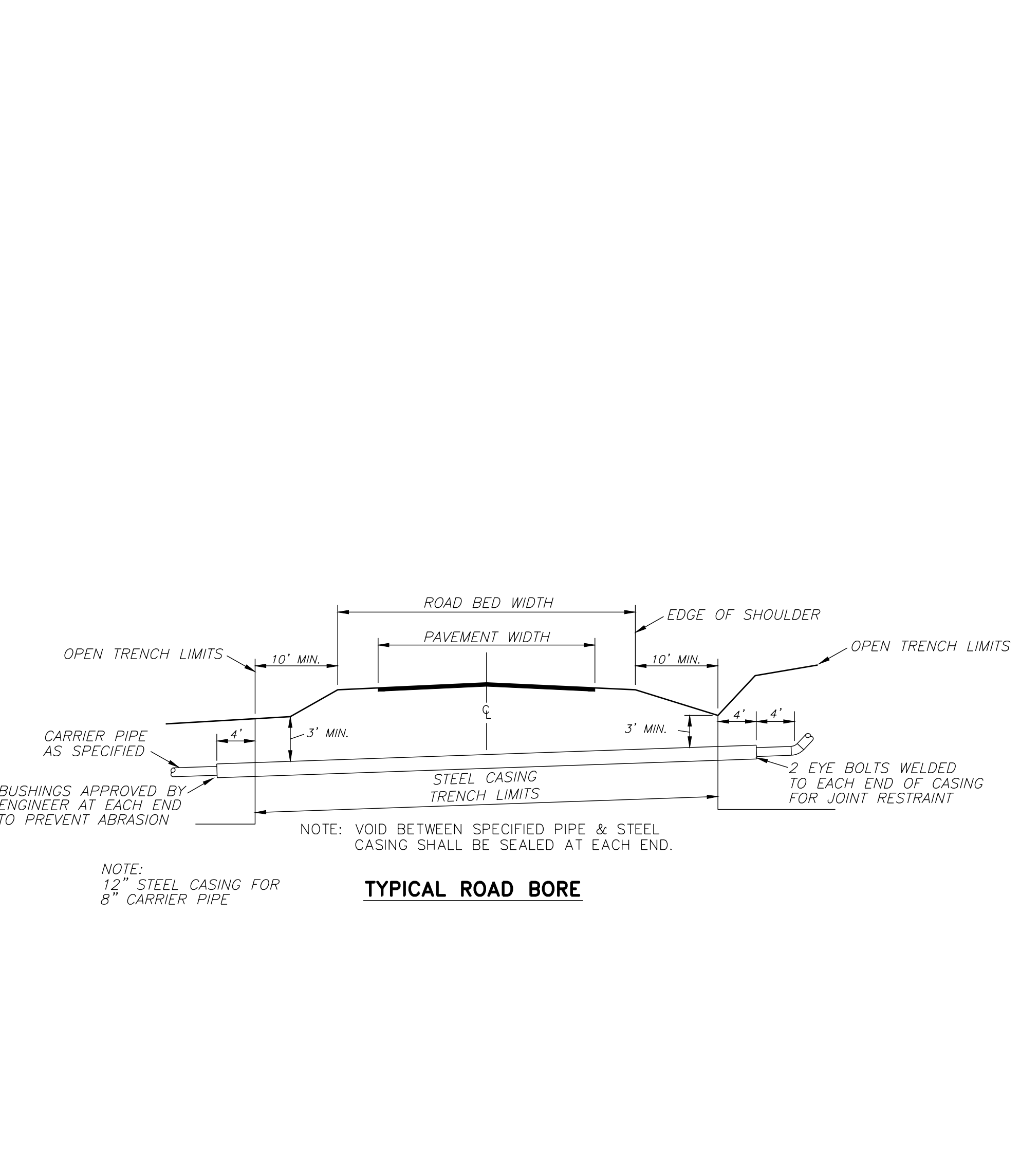
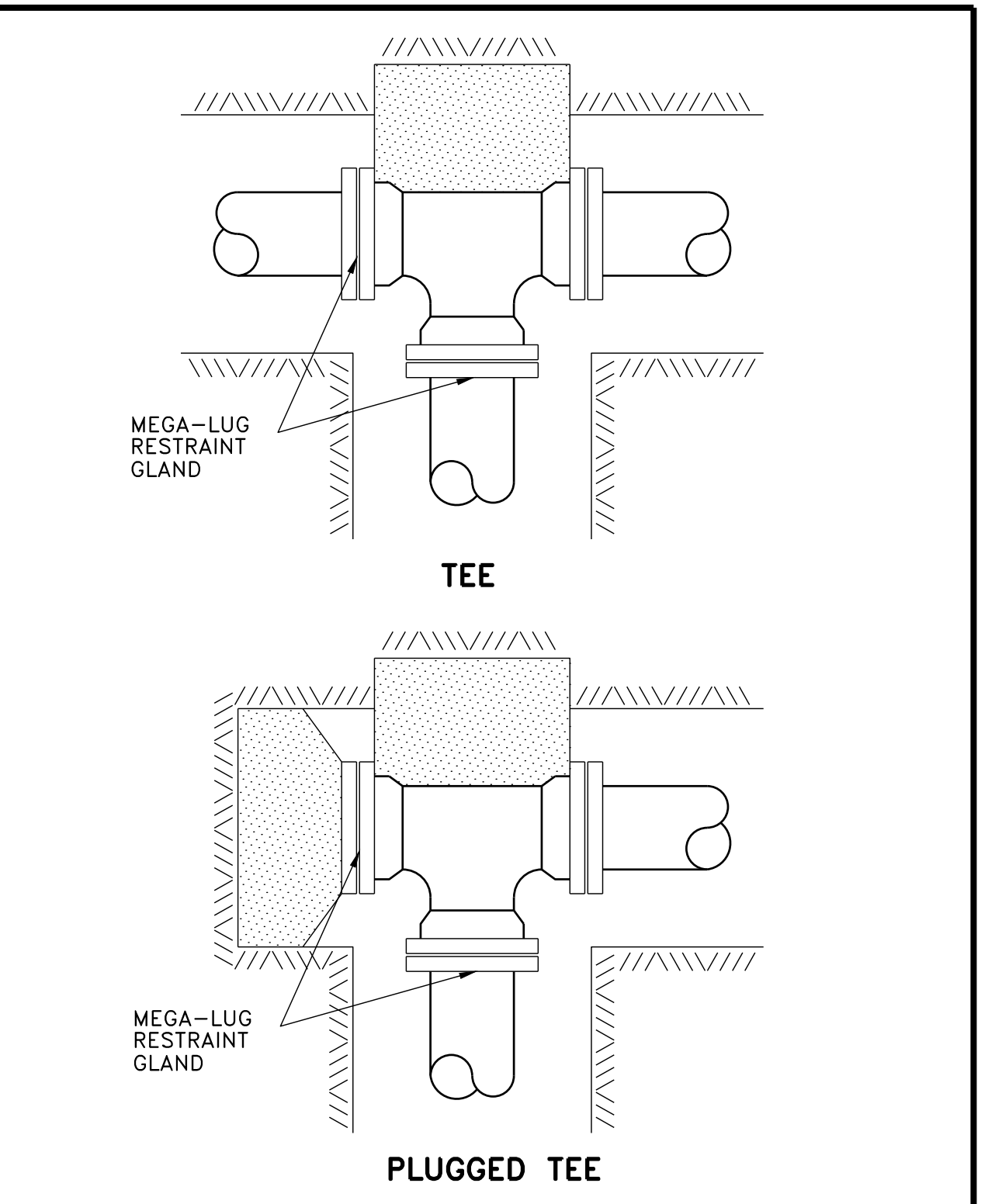
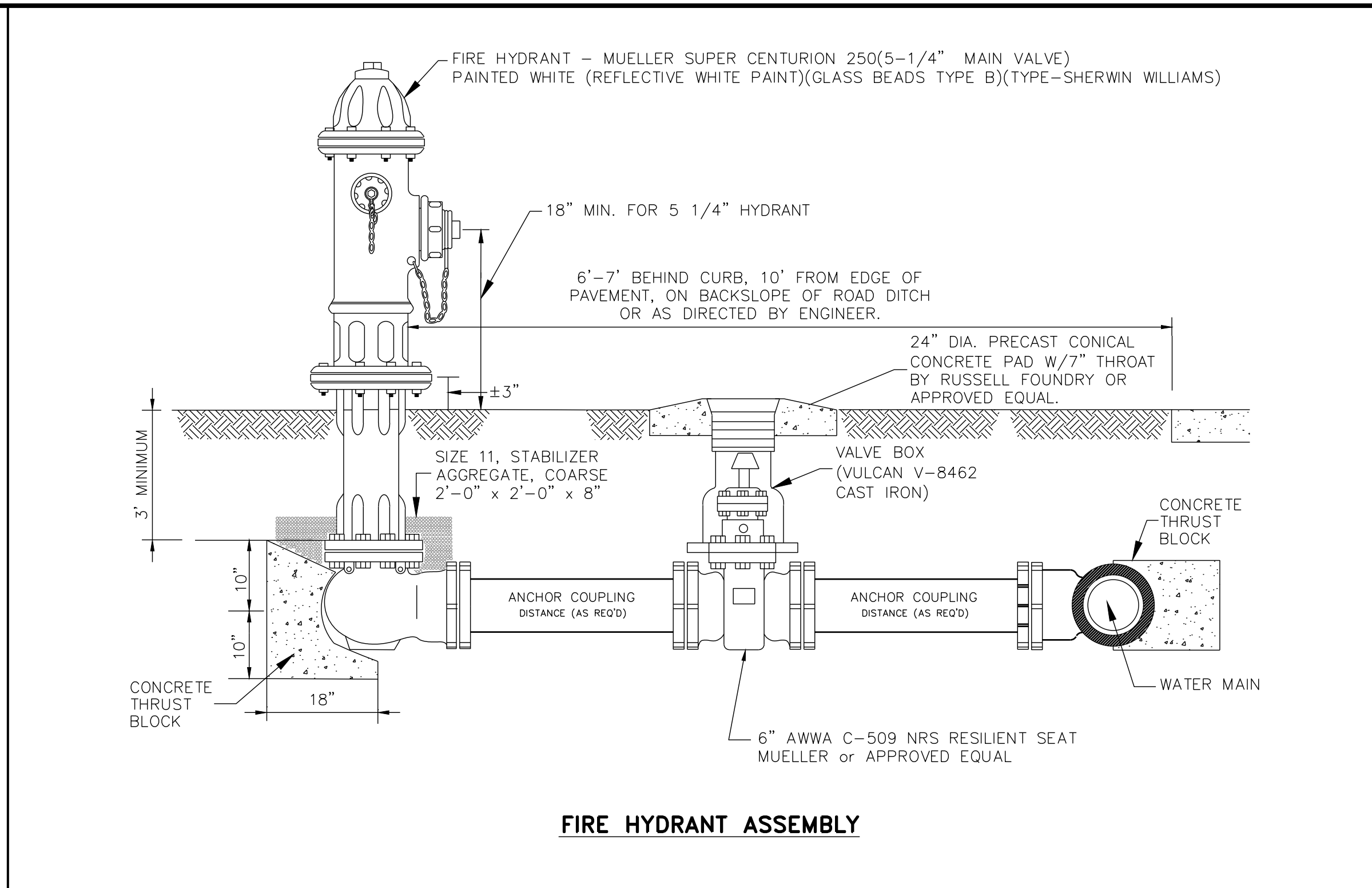
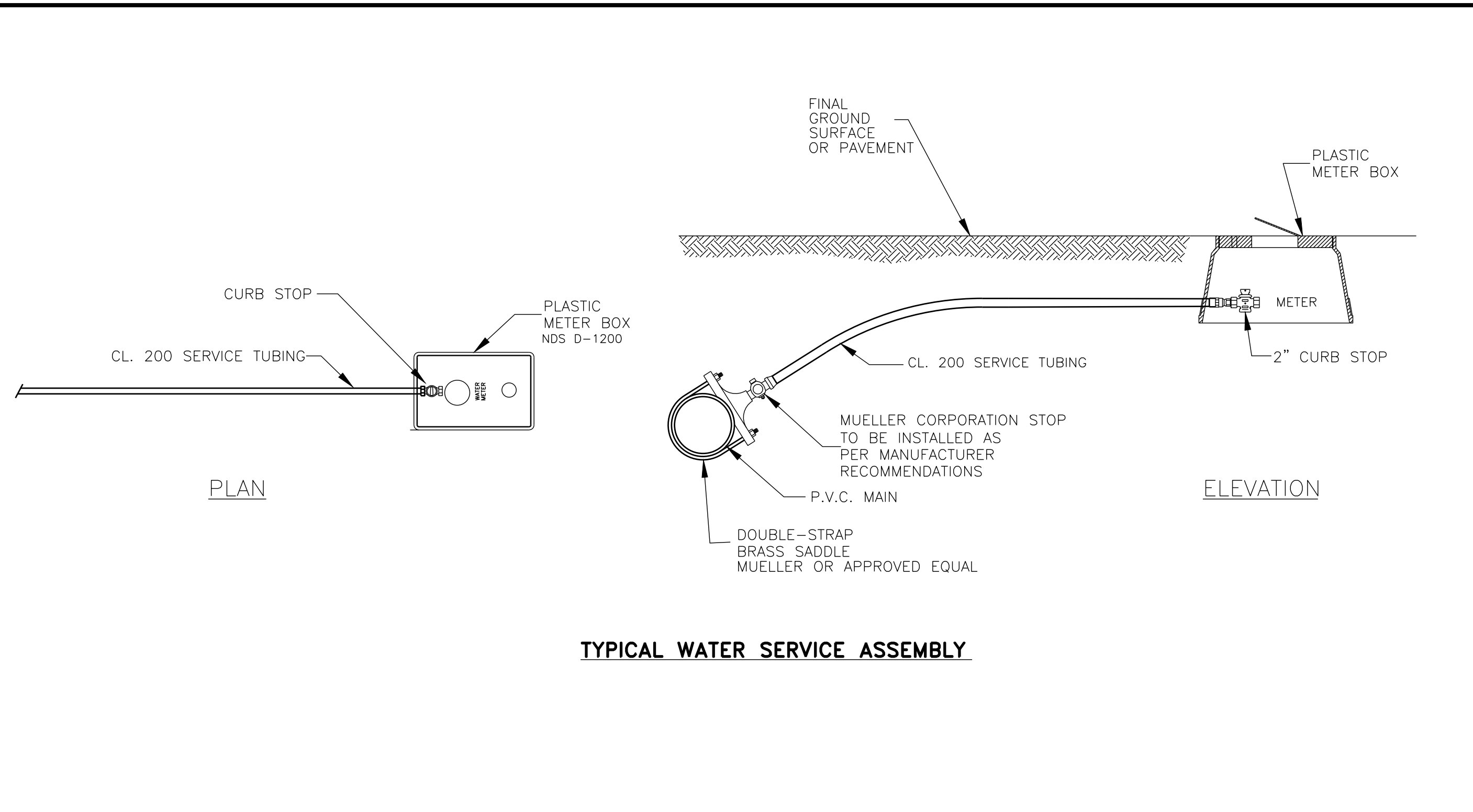
M. MASTER & ASSOCIATES, INC.
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RONALD C. McMASTERS
REGISTERED PROFESSIONAL ENGINEER
STATE OF ARKANSAS

SEWER DETAILS

C5.3



TYPICAL SERVICE ASSEMBLY
CONNECTIONS TO PVC WATER MAINS
ALL METER AND TAP FEES SHALL BE PAID BY THE CONTRACTOR

ITEM NO.	DESCRIPTION	SPECIFICATIONS
1	P.V.C. MAIN	C-900 P.V.C., CLASS 150 MINIMUM
2	SERVICE CLAMP	DOUBLE BRASS STRAP MUELLER OR APPROVED EQUAL
3	CORPORATION STOP	MUELLER (BRASS) OR APPROVED EQUAL
4	SERVICE LINE W/ SPECIFIED P.V.C. CASING UNDER ROADWAY	POLYETHYLENE CL-200
5	TRANSITION FITTING P.V.C.	MUELLER OR APPROVED EQUAL
6	CURB STOP	MUELLER BRASS w/ LOCK OR APPROVED EQUAL
7	METER COUPLINGS	MUELLER OR APPROVED EQUAL
8	WATER METER	METER (TO BE APPROVED BY CITY)
9	STANDARD BLACK PLASTIC METER BOX WITH READER LID.	NDS D-1200 NDS 12" STD BOX W/ 2 HOLES (TOUCH READ) TO BE APPROVED BY CITY)
10	TOUCH READ DEVICE	

*SEE PLANS FOR MATERIAL SIZES

VERTICAL BEND

90° BEND

TYPICAL BLOCKING ON WATER MAIN
(3000 PSI CONCRETE REQUIRED)

BEARING AREA IN SQ. FT.

NOMINAL PIPE DIAMETER (IN)	DEAD-END OR TEE	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4	2.0	2.0	2.0	2.0	2.0
6	2.0	2.0	2.0	2.0	2.0
8	3.0	3.0	2.0	2.0	2.0
12	5.0	5.0	4.0	3.0	3.0
16	8.0	12.0	6.0	4.0	4.0

4			6.0 (.22)	4.0(.15)	4.0(.15)
6			14.0(.52)	6.0 (.22)	4.0 (.15)
8			27.0(1.0)	9.0(.33)	6.0(.22)
12			68.0(2.5)	22.0(.80)	9.0(.33)
16			90.0 (3.33)	52.0(1.9)	18.0(.67)

VOLUME OF BLOCKS INCLUDING SOIL LOAD CU. FT. (CU. YDS.)

Revisions				
#	Date	Nature	By	App'd.

Project No.	M-2651-1	Designed By	R.C.M.
Date	8-20-19	Drawn By	D.P.
Scale	SEE ABOVE	Checked By	R.C.M.

FRISCO PARK
418 S. AVALON STREET
WEST MEMPHIS, AR 72301

M-MASTER & ASSOCIATES, INC.
CIVIL ENGINEERS & LAND SURVEYORS

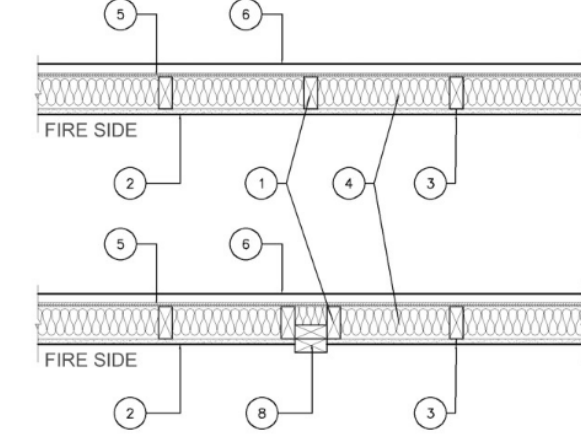
212 WATERFORD SQUARE
SUITE 300
MADISON, MS 39110
601.605.1090

WATER DETAILS
C5.4

Design No. U356

July 11, 2018

Bearing Wall Rating - 1 Hr Rating Exposed to Fire on Interior Face Only
Finish Rating - 23 Min. or 25 Min



1. **Wood Studs** -- Nom 2 by 4 in. spaced 16 in. OC with two 2 by 4 in. top and one 2 by 4 in. bottom plates. Studs laterally-braced by wood structural panel sheathing (Item 5). When **Mineral and Fiber Boards*** (Item 5A) are considered as bracing for the studs, the load is restricted to 76% of allowable axial load. Walls effectively fire stopped at top and bottom of wall.
2. **Gypsum Board*** -- Any 5/8 in. thick UL Classified Gypsum Board that is eligible for use in Design Nos. L501, G512 or U305. Nom 5/8 in. thick, 4 ft wide, applied vertically and nailed to studs and bearing plates 7 in. OC with 6d cement-coated nails, 1-7/8 in. long with 1/4 in. diam head.

3. **Joints and Fastener Heads** -- (Not Shown) -- Gypsum board joints covered with tape and joint compound. Fastener heads covered with joint compound.
4. **Batts and Blankets*** -- Mineral fiber or glass fiber insulation, 3-1/2 in. thick, pressure fit to fill wall cavities between studs and panels. Mineral fiber insulation to be uncuffed and to have a min density of 3 pcf. Glass fiber insulation to be cuffed with aluminum foil or kraft paper and to have a min density of 0.9 pcf (min R-13 thermal insulation rating).

See **Batts and Blankets*** (BKNV) Category in the Building Materials Directory and **Batts and Blankets*** (BZJZ) Category in the Fire Resistance Directory for names of Classified Compans.

4A,4B,4C,4D -- NOT USED

5. **Wood Structural Panel Sheathing** -- Min 7/16 in. thick, 4 ft wide wood structural panels, min grade "C-D" or "Sheathing". Installed with long dimension of sheet (strength axis) or face grain of plywood parallel with or perpendicular to studs. Vertical joints centered on studs. Horizontal joints backed with nom 2 by 4 in. wood blocking. Attached to studs on exterior side of wall with 6d cement coated box nails spaced 6 in. OC at perimeter of panels and 12 in. OC along interior studs.
5A -- NOT USED

6. **Exterior Facings** -- Installed in accordance with the manufacturer's installation instructions. One of the following exterior facings is to be applied over the sheathing:

A - G NOT USED

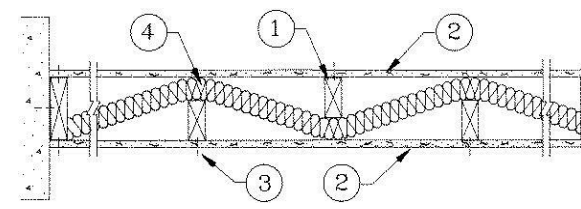
H. **Fiber-Cement Siding** -- Fiber-cement exterior sidings including smooth and patterned panel or lap siding.

I. NOT USED
6A. NOT USED
7. NOT USED
8. NOT USED
* Bearing the UL Classification Mark.

Design No. U340

May 23, 2007

Bearing Wall Rating -- 1 Hr.
Finish Rating -- See Item 2



HORIZONTAL SECTION

1. **Wood Studs** -- Nom 2 by 4 in. alternating on opposite sides of nom 2 by 6 in. wood plates. Spaced 24 in. OC, max on each side of wood plates, staggered 12 in. OC on opposite side.

2. **Gypsum Board*** -- 5/8 in. thick wallboard, paper or vinyl faced with beveled, square, taped and rounded edges. Wallboard nailed to each stud 7 in. OC with 6d cement coated nails, 1-7/8 in. long, 0.0915 in. shank diam and 1/4 in. diam head. As an alternate, No. 6 bugle head drywall screws, 1-7/8 in. long, may be substituted for the 6d cement coated nails. When used in widths other than 48 in., wallboard to be installed horizontally.

When Steel Framing Members* (Item 5) are used, wallboard attached to furring channels with 1 in. long Type S bugle-head steel screws spaced 12 in. OC.

See Gypsum Board* (CKNX) category for names of Classified companies.

2A. **Wall and Partition Facings and Accessories*** -- (As an alternate to Item 2, not shown) - Nominal 5/8 in. thick, 4 ft wide panels, applied vertically to studs and bearing plates on one side of the assembly with 1-5/8 in. long Type S screws spaced 12 in. OC at perimeter of panels and 8 in. OC in the field. Horizontal joints of vertically applied panels need not be backed by studs. Panel joints covered with paper tape and two layers of joint compound. Screw heads covered with two layers of joint compound. Batts and Blankets placed in stud cavity as described in Item 4B. Not evaluated for use with Steel Framing Members, Furring Channels or Fiber, Sprayed.

QUIET SOLUTION INC -- Type QuietRock QR-530 (finish rating 23 min).

2B. Gypsum Board* -- (As an alternate to Item 2) -- 5/8 in. thick gypsum panels, with beveled, square, or tapered edges, applied either horizontally or vertically. Gypsum panels fastened to framing with 1-1/4 in. long Type W coarse thread gypsum panel steel screws spaced a max 8 in. OC, with last screw 1 in. from edge of board. When used in widths of other than 48 in., gypsum boards are to be installed horizontally.

AMERICAN GYPSUM CO -- Type AG-C.

3. **Joints and Nailheads** -- Wallboard joints covered with tape and joint compound. Nail heads covered with joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to entire surface of Classified veneer baseboard. Joints reinforced.

4. **Batts and Blankets*** -- (Optional) -- 3-1/2 in. max. thickness glass or mineral fiber batt insulation applied to studs. See Batts and Blankets (BZJZ) category for list of Classified companies.

4A. NOT USED

4B. **Batts and Blankets*** -- (Required for use with Wall and Partition Facings and Accessories, Item 2A) -- Glass fiber insulation, nom 3-1/2 in. thick, min. density of 0.80 pcf, with a flame spread of 25 or less and a smoke developed of 50 or less, friction-fitted to completely fill the stud cavities. See Batts and Blankets Category (BKNV) for names of manufacturers.

5. NOT USED
5A. NOT USED
5B. NOT USED

6. **Wall and Partition Facings and Accessories*** -- (Optional, Not shown) -- Nominal 1/2 in. thick, 4 ft wide panels, for optional use as an additional layer on one or both sides of the assembly. Panels attached in accordance with manufacturer's recommendations. When the QR-510 panel is installed between the wood framing and the UL Classified gypsum board, the required UL Classified gypsum board layer(s) is/are to be installed as indicated as to fastener type and spacing, except that the required fastener length shall be increased by a minimum of 1/2 in. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board.

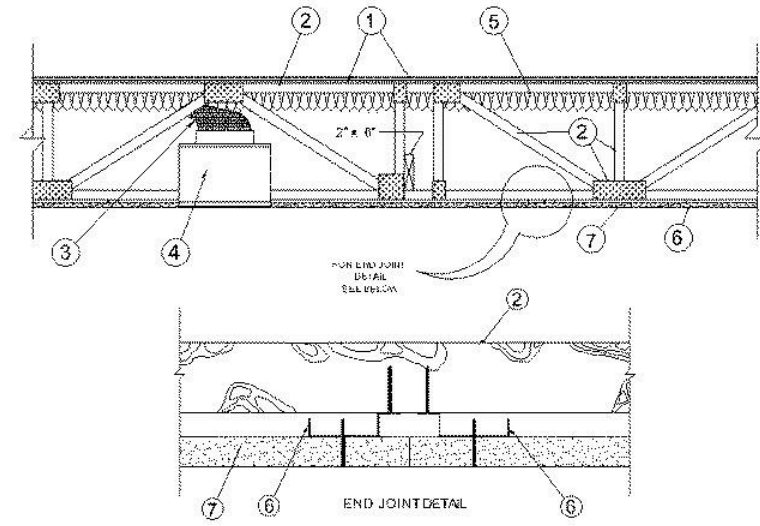
QUIET SOLUTION INC -- Type QuietRock QR-510.

*Bearing the UL Classification Mark

Design No. L563

March 14, 2006

Unrestrained Assembly Rating - 1 Hr
Finish Rating - 25 Min (See Items 5 or 5A)



1. **Flooring System** -- The flooring system shall consist of one of the following:

System No. 1 THRU 3
NOT USED

System No. 4
Subflooring -- Min Nom 23/32 in. thick wood structural panels installed perpendicular to trusses with end joints staggered. Plywood or panels secured to trusses with construction adhesive and No. 6d ringed shank nails spaced 12 in. OC along each truss. Staples having equal or greater withdrawal and lateral resistance strength may be substituted for the 6d nails.

Vapor Barrier - (Optional) -- Nom 0.030 in. thick commercial asphalt saturated felt.

Floor Mat Materials* - (Optional) -- Min 3/8 in. to max 3/4 in. thick floor mat material loose laid over the subfloor.

UNITED STATES GYPSUM CO -- LEVELROCK® Brand Sound Reduction Board

Alternate Floor Mat Materials* - (Optional) -- Nom 1/4 in. thick floor mat material loose laid over the subfloor.
UNITED STATES GYPSUM CO -- LEVELROCK® Brand Floor Underlayment SRM-25

Alternate Floor Mat Materials* - (Optional) -- Nom 3/8 in. thick floor mat material loose laid over the subfloor.

SOLUTIA INC -- Type SC50

Finish Flooring - Floor Topping Mixture* -- Min 3/4 in. thickness of floor topping mixture installed having a min compressive strength of 1500 psi. Refer to manufacturer's instructions accompanying the material for specific mix design.

UNITED STATES GYPSUM CO -- LEVELROCK® Brand 2500, LEVELROCK® Brand RH

System No. 5 thru 14
NOT USED

2. **Trusses** -- Parallel chord trusses, spaced a max of 24 in. OC, fabricated from nom 2 by 4 lumber, with lumber oriented vertically or horizontally. Min truss depth is 12 in. Truss members secured together with min 0.036 0356 in. thick galvanized steel plates. Plates have 5/16 in. long teeth projecting perpendicular to the plane of the plate. The teeth are in pairs facing each other (made by the same punch), forming a split tooth type plate. Each tool has a chisel point on its outside edge. These points are diagonally opposite each other for each pair. The top half of each tooth has a twist for stiffness. The pairs are repeated on approx. 7/8 in. centers with four rows of teeth per inch of plate width.

3. **Air Duct*** -- Any UL Class 0 or Class 1 flexible air duct installed in accordance with the instructions provided by the damper manufacturer.
4. **Ceiling Damper*** - (Optional) -- For use with min 18 in. deep trusses Max plenum box size nom 19 in. long by 19 in. wide and 11-7/8 in. high fabricated from galv steel. Aggregate damper openings shall not exceed 256 sq in. per 100 sq ft of ceiling area. Damper installed in accordance with the manufacturers installation instructions provided with the damper.

AIRE TECHNOLOGIES INC -- Models: CRD model 50 w/Boot, CRD model 50EA w/Boot, CRD model 55 w/Boot, CRD model 55 EA w/Boot.

LLOYD INDUSTRIES INC -- Model CRD 50-BT, CRD 50-EA-BT, CRD 55-BT, CRD 55 EA-BT

4A. Alternate Ceiling Damper* - (Optional) -- For use with min 18 in. deep trusses Max plenum box size nom 13 in. long by 13 in. wide and 11-7/8 in. high fabricated from galv steel. Aggregate damper openings shall not exceed 100 sq in. per 100 sq ft of ceiling area. Damper installed in accordance with the manufacturers installation instructions provided with the damper.

LLOYD INDUSTRIES INC -- Model CRD 50-BT-6, CRD 50-EA-BT-6, CRD 55-BT-6, CRD 55 EA-BT-6

4B. Alternate Ceiling Damper* - (Optional) -- For use with min 18 in. deep trusses Max size ceiling outlet in plenum box nom 12 in. long by 12 in. wide. Plenum box fabricated from galv steel. Aggregate damper openings shall not exceed 144 sq in. per 100 sq ft of ceiling area. Installed in accordance with the manufacturers installation instructions provided with the damper.

AIRE TECHNOLOGIES INC -- Models: CRD model 50 w/Boot, CRD model 50EA w/Boot, CRD model 55 w/Boot, CRD model 55 EA w/Boot.

LLOYD INDUSTRIES INC -- Model CRD 50-95BT, CRD 50-EA-95BT, CRD 55-95BT, CRD 55 EA-95BT

4C. Alternate Ceiling Damper* - (Optional) - For use with min 18 in. deep trusses. Max size ceiling outlet in plenum box nom 16 in. long by 16 in. wide. Aggregate damper openings shall not exceed 256 sq in. per 100 sq ft of ceiling area. Damper installed in accordance with the manufacturers installation instructions provided with the damper.

CROWN PRODUCTS CO INC -- Models CRD50-FGPB-4.2-CP, -6.0-CP, CRD50-FGPB-4.2-EA-CP, -6.0-EA-CP.

LLOYD INDUSTRIES INC -- Models CRD 50-FGPB-4.2, -4.2 NI, -6.0, -6.0 NI; CRD50-EA-FGPB-4.2, -4.2 NI, -6.0, -6.0 NI.

5. **Batts and Blankets*** -- Glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. When the resilient channels (Item 6) are used, the insulation shall be a max of 3-1/2 in. thick, and shall be secured against the subflooring with staples at 12 in. OC or held suspended in the concealed space with 0.090 in. diam galv steel wires attached to the wood trusses at 12 in. OC. When the resilient channels are spaced a max of 12 in. OC or when the Steel Framing Members (Item 6A) are used, there is no limit in the overall thickness of insulation, and the insulation can be secured against the subflooring, held suspended in the concealed space or draped over the resilient channels (or Steel Framing Members) and gypsum panel membrane. The finished rating has only been determined when the insulation is secured to the subflooring.

5A. NOT USED

6. **Resilient Channels** -- Formed from min 0.020 in. thick galv steel, 1/2 in. deep by 2 in. wide at the base and 1-1/4 in. wide at the face, spaced 16 in. OC perpendicular to trusses. When insulation (Items 5 or 5A) is applied over the resilient channel/gypsum panel ceiling membrane, the resilient channel spacing shall be reduced to 12 in. OC. Channels secured to each truss with 1-1/4 in. long Type S bugle head steel screws. Channels overlapped 4 in. at splices. Two channels, spaced 6 in. OC, oriented opposite each gypsum panel end joint as shown in the above illustration. Additional channels shall extend min 6 in. beyond each side edge of panel.

6A. NOT USED

7. **Gypsum Board*** -- Nom 5/8 in. thick, 48 in. wide gypsum panels. When resilient channels (Item 6) are used, gypsum panels installed with long dimension perpendicular to resilient channels. Gypsum panels secured with 1 in. long Type S bugle head steel screws spaced 12 in. OC and located a min of 1/2 in. from side joints and 3 in. from end joints. When insulation (Items 5) is applied over the resilient channel/gypsum panel ceiling membrane the screw spacing shall be reduced to 8 in. OC. End joints secured to both resilient channels as shown in end joint detail.

CANADIAN GYPSUM COMPANY -- Types C, IP-X2, IPC-AR

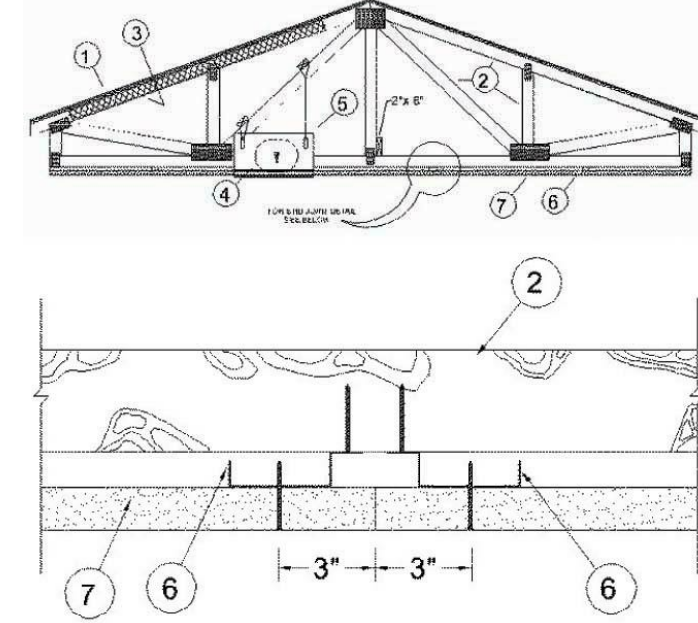
UNITED STATES GYPSUM CO -- Types C, IP-X2, IPC-AR

USG MEXICO S A DE C V -- Types C, IP-X2, IPC-AR

Design No. P531

September 29, 2005

Unrestrained Assembly Rating-1 Hr.
Finish Rating-25 Min



1. **Roofing System** -- Any UL Class A, B or C Roofing System (TGFU) or Prepared Roof Covering (TFWZ) acceptable for use over nom 15/32 in. thick wood structural panels, min. grade "C-D" or "Sheathing". Nom 15/32 in. thick wood structural panels secured to trusses with construction adhesive and No. 6d ringed shank nails. Nails spaced 12 in. OC along each truss. Staples having equal or greater withdrawal and lateral resistance strength may be substituted for the 6d nails.

2. **Trusses** -- Pitch or Parallel chord trusses, spaced a max of 24 in. OC, fabricated from nom 2 by 4 lumber, with lumber oriented vertically or horizontally. Truss members secured together min 0.0356 in. thick galv steel plates. Plates have 5/16 in. long teeth projecting perpendicular to the plane of the plate. The teeth are in pairs facing each other (made by the same punch), forming a split tooth type plate. Each tool has a chisel point on its outside edge. These points are diagonally opposite each other for each pair. The top half of each tooth has a twist for stiffness. The pairs are repeated on approximately 7/8 in. centers with four rows of teeth per inch of plate width. Where the truss intersects with the interior face of the exterior walls, the min truss depth shall be 5-1/4 in. with a min roof slope of 3/12 and a min. area in the plane of the truss of 21 sq/ft. Where the truss intersects with the interior face of the exterior walls, the min truss depth may be reduced to 3 in. if the batts and blankets (Item 3) are used as shown in the above illustration (Alternate Insulation Placement) and are firmly packed against the intersection of the bottom chords and the plywood sheathing.

3. **Joints and Nailheads** -- Wallboard joints covered with paper tape and joint compound. Nailheads covered with joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced.
4. **Steel Corner Fasteners** -- (Optional) -- For use at wall corners. Channel shaped, 2 in. long by 1 in. high on the back side with two 1/8 in. wide flats protruding into the 5/8 in. wide channel, fabricated from 24 gauge galv steel. Fasteners applied only to the end or cut edge (not along tapered edges) of the wallboard, no greater than 2 in. from corner of wallboard, max spacing 16 in. OC. Nailed to adjacent stud through tab using one No. 6d cement coated nail per fastener. Corners of wallboard shall be nailed to top and bottom plate using No. 6d cement coated nails.

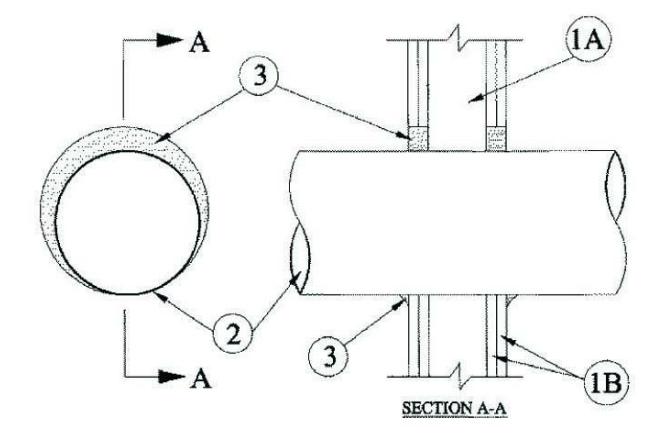
5. NOT USED

*Bearing the UL Classification Marking.

System No. W-L-7042

November 30, 2000

F Ratings -- 1 and 2 Hr (See Items 1 and 3)
T Rating -- 0 Hr



1. **Wall Assembly** -- The 1 or 2 hr fire rated wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features.

A. **Studs** -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced 24 in. OC.
B. **Gypsum Board*** -- For 1 hr assembly, one layer of min 5/8 in. thick wallboard as required in the individual Wall and Partition Design.

The hourly F and T Ratings of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrant** -- Galv steel duct to be installed concentrically or eccentrically within the firestop system. The annular space between the duct and periphery of opening shall be minimum 0 in. (point contact) and max 1-1/2 in. Duct to be rigidly supported on both sides of wall assembly.

3. **Fill, Void or Cavity Material*** -- Sealant -- Min 5/8 in. and 1-1/4 in. thickness of fill material applied within annulus, flush with both surfaces of wall assembly for 1 or 2 hr rated walls, respectively. At the point contact location between duct and wallboard, a min 1/2 in. diam bead of sealant shall be applied at the wallboard/duct interface on both surfaces of wall assembly.

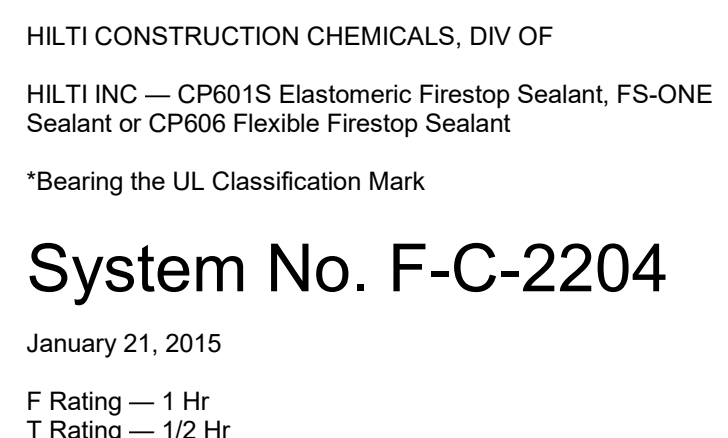
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP601S Elastomeric Firestop Sealant, FS-ONE Sealant or CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

System No. F-C-2204

January 21, 2015

F Rating -- 1 Hr
T Rating -- 1/2 Hr



1. **Floor -- Ceiling Assembly** -- The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below.

A. **Flooring System** -- Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Rectangular cutout in flooring to accommodate the bathtub drain piping (Item 2) to be max 8 in. by 12 in. (203 by 305 mm). Cutout to be patched on underside of subfloor using one layer of min 3/4 in. (19 mm) thick plywood or min 5/8 in. (16 mm) thick gypsum board (Item 1C) sized to lap min 2 in. (51 mm) beyond each edge of rectangular cutout. Patch split into two pieces at opening and hole-sawed for bathtub drain piping. Diam of opening hole sawed through patch to accommodate drain piping (Item 2) to be 1 in. (25 mm) larger than outside diam of drain piping and positioned such that the annular space between drain piping and periphery of opening is min 0 in. (point contact) to max 1 in. (25 mm). Two pieces positioned around drain piping, with cut edges tightly butted, and screw-attached to underside of subfloor with 1-1/4 in. (32 mm) long steel screws spaced max 6 in. (152 mm) OC.

B. **Wood Joists*** -- Nom 10 in. (154 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.
C. **Gypsum Board*** -- Nom 5/8 in. (16 mm) thick, 4 ft (122 cm) wide as specified in the individual Floor-Ceiling Design.

2. **Drain Piping** -- Nom 1-1/2 in. (38 mm, or smaller) diam Schedule 40 acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) pipe and drain fittings cemented together and provided with ABS or PVC bathtub waste/overflow fittings. Annular space shall be min 0 in. (point contact) to max 1 in. (25 mm). Two pieces positioned around drain piping, with cut edges tightly butted, and screw-attached to underside of subfloor with 1-1/4 in. (32 mm) long steel screws spaced max 6 in. (152 mm) OC.

3. **Fill, Void or Cavity Materials*** -- Min 5/8 in. (16 mm) depth or fill material applied within the annulus, flush with both surfaces of plywood or gypsum board patch.

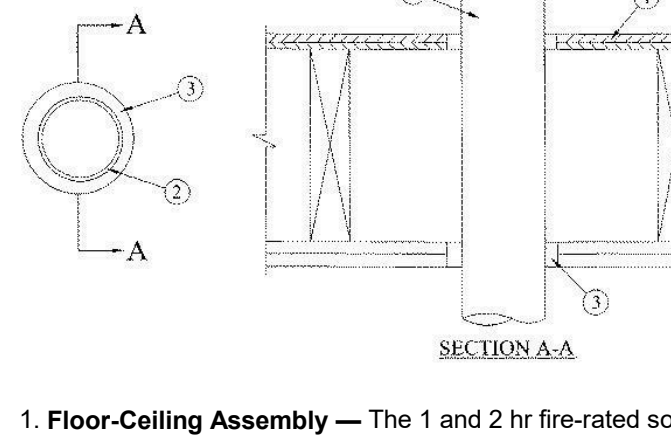
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE Sealant or FS-ONE-MAX Intumescent Sealant

*Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. F-C-2160

April 06, 2018

F Rating -- 1 and 2 Hr
T Rating -- 1 and 2 Hr



1. **Floor-Ceiling Assembly** -- The 1 and 2 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:

A. **Flooring System** -- Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Diam of opening shall be 2 in. (51 mm) larger than the nom diam of through penetrant (Item 2).
B. **Wood Joists*** -- Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.

C. **Gypsum Board*** -- Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide as specified in the individual Floor-Ceiling Design.
D. **Furring Channels (Not Shown)** -- Resilient galv steel furring installed perpendicular to wood joists between first and second layers of wallboard (Item 1D). Furring channels spaced max 24 in. (610 mm).

E. **Gypsum Board*** -- Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of wallboard nailed to wood joists. Second layer of wallboard screw-attached to furring channels. Diam of opening shall be 2 in. (51 mm) larger than the nom diam of through penetrant (Item 2).

1.1 **Chase Wall** -- (Optional, not Shown) -- The through penetrants (Item No. 2) may be routed through a fire-rated or non-rated single, double or staggered wood stud/gypsum wall board chase wall. The chase wall shall be constructed to include the following construction features:

A. **Studs** -- Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
B. **Sole Plate** -- Nom 2 by 6 in. (51 by 152 mm) or parallel nom 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening shall be 2 in. (51 mm) larger than the nom diam of through penetrant (Item 2).

C. **Top Plate** -- The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening shall be 2 in. (51 mm) larger than the nom diam of through penetrant (Item 2).

D. **Gypsum Board*** -- One or two layers of min 1/2 in. (14 mm) gypsum board.

2. **Through Penetrants** -- One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be min 1/2 in. (13 mm) and max 1-1/8 in. (29 mm). Pipe or conduit to be rigidly supported on both sides of floor ceiling assembly. The following types and sizes of nonmetallic pipes or conduits may be used:

A. **Polyvinyl Chloride (PVC) Pipe** -- Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** -- Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

3. **Fill, Void or Cavity Materials*** -- Sealant -- Fill Material forced into annular space to fill space to max extent possible. Sealant shall be installed flush with top surface of floor or sole plate and bottom surface of ceiling or lower top plate.

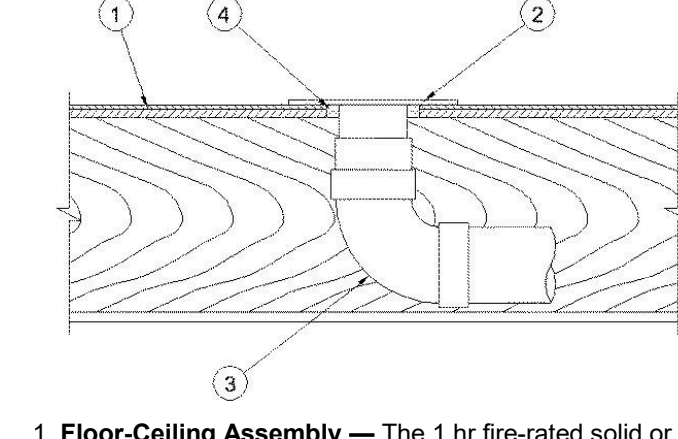
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

*Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. F-C-2263

January 18, 2017

F Rating -- 1 Hr
T Rating -- 1 Hr



1. **Floor-Ceiling Assembly** -- The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:

A. **Flooring System** -- Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture*** as specified in the individual Floor-Ceiling Design. Max diam of floor opening shall be 5 in. (127 mm).
B. **Wood Joists*** -- Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members*** with bridging as required and with ends firestopped.

C. **Gypsum Board*** -- Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide as specified in the individual Floor-Ceiling Design.
D. **Closest Flange** -- Acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) closet stub sized to accommodate drain pipe. Closet flange installed over drain piping within floor opening with flange secured to plywood floor with steel screws. Annular space between closet flange and periphery of opening shall be 1/4 in. (6 mm).

E. **Drain Piping** -- Nom 4 in. (102 mm) diam (or smaller) Schedule 40 acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) drain pipe and 90 degree elbow for use in vented (drain, waste or vent) piping systems. Pipe installed concentrically within firestop system.

F. **Fill, Void or Cavity Materials*** -- Sealant -- Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the bottom surface of floor.

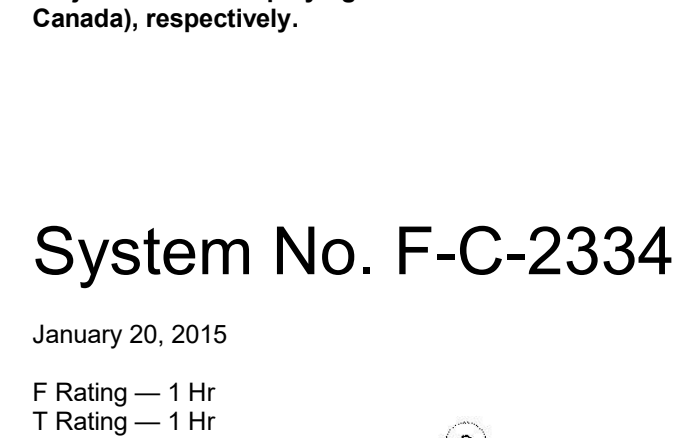
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP 606 Flexible Firestop Sealant, FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

*Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. F-C-2334

January 20, 2015

F Rating -- 1 Hr
T Rating -- 1 Hr

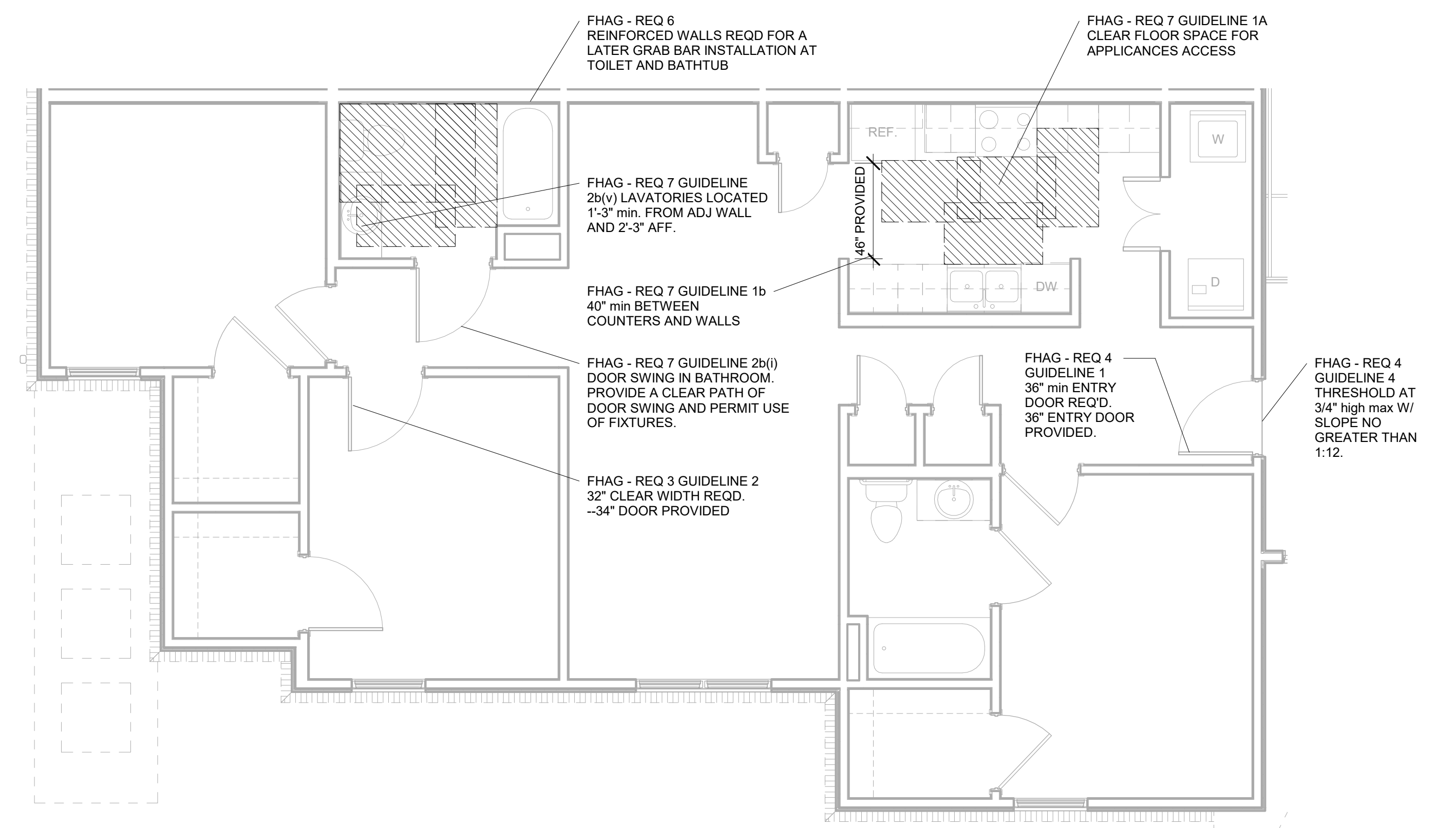


1. **Floor-Ceiling Assembly** -- The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs

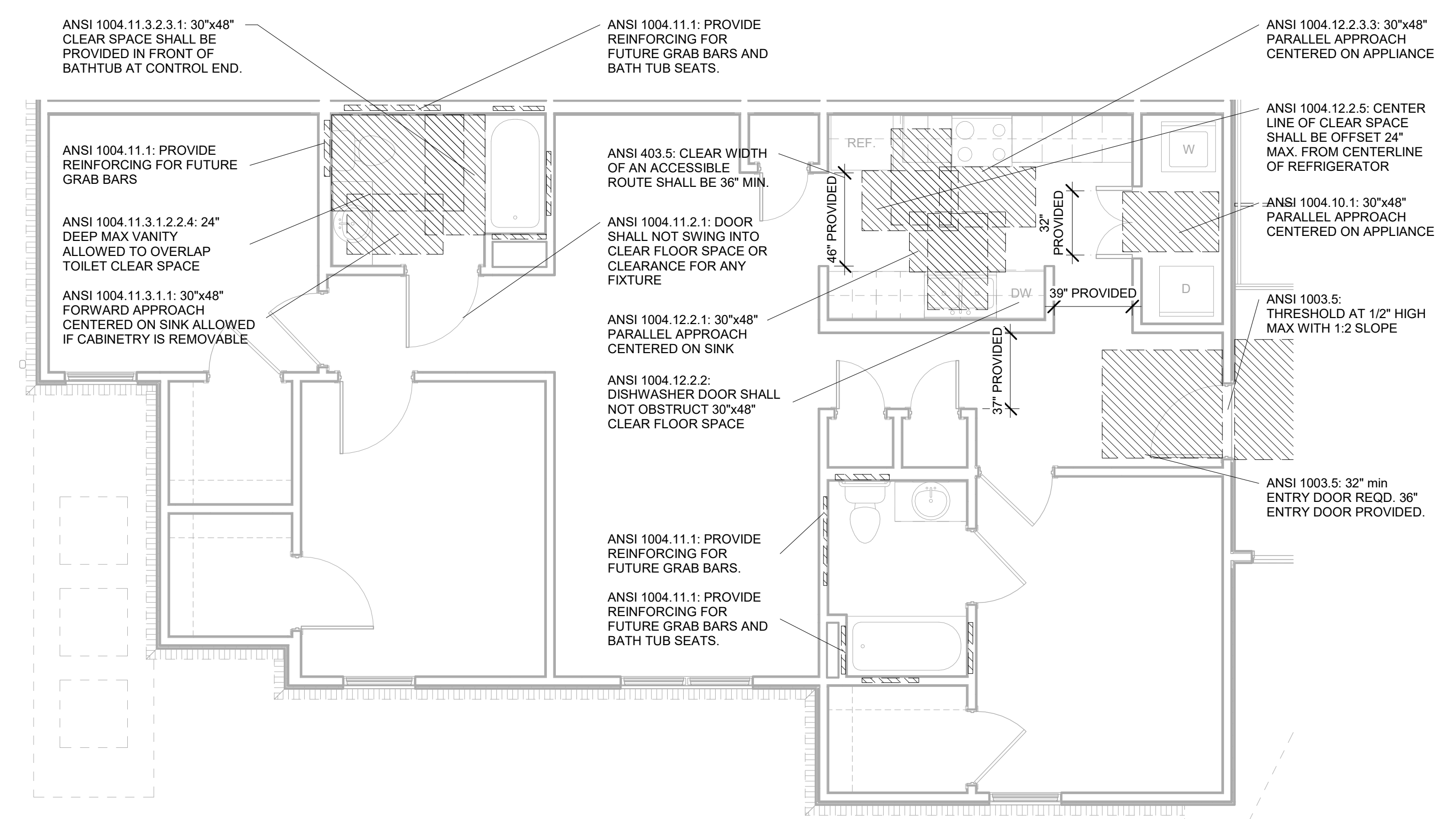


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NOTE: TYPICAL UNITS COMPLY WITH
FAIR HOUSING AND ANSI TYPE B
AT ALL LEVEL 1 UNITS



2 3-BED FHAG REQUIREMENTS
A0.3 1/4" = 1'-0"



1 3-BED ANSI TYPE B REQUIREMENTS
A0.3 1/4" = 1'-0"

DATE

1	11/20/18	PERMIT SET
2	05/22/19	RE-ISSUED FOR PERMIT

PROJECT NUMBER
597
PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

SHEET NUMBER

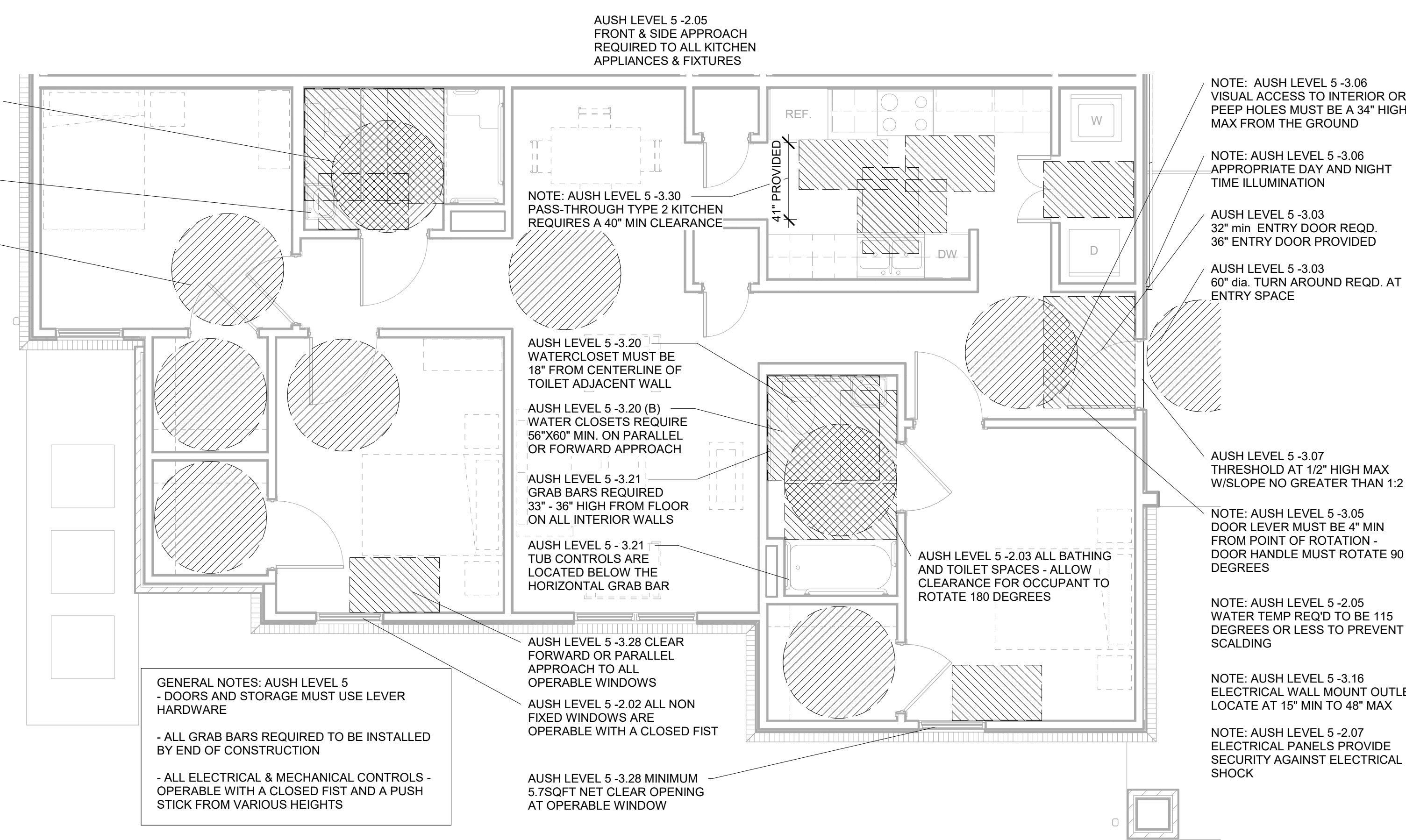
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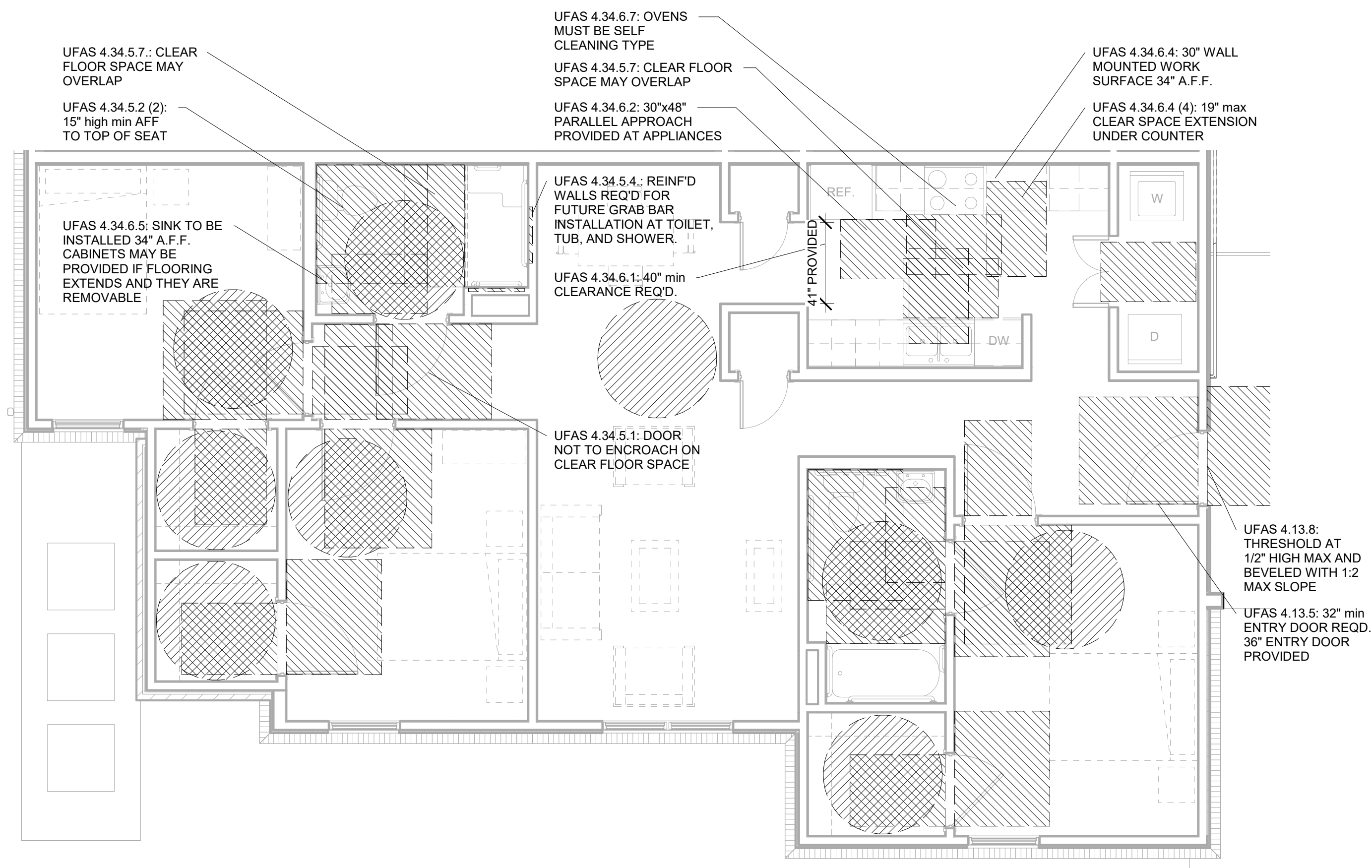


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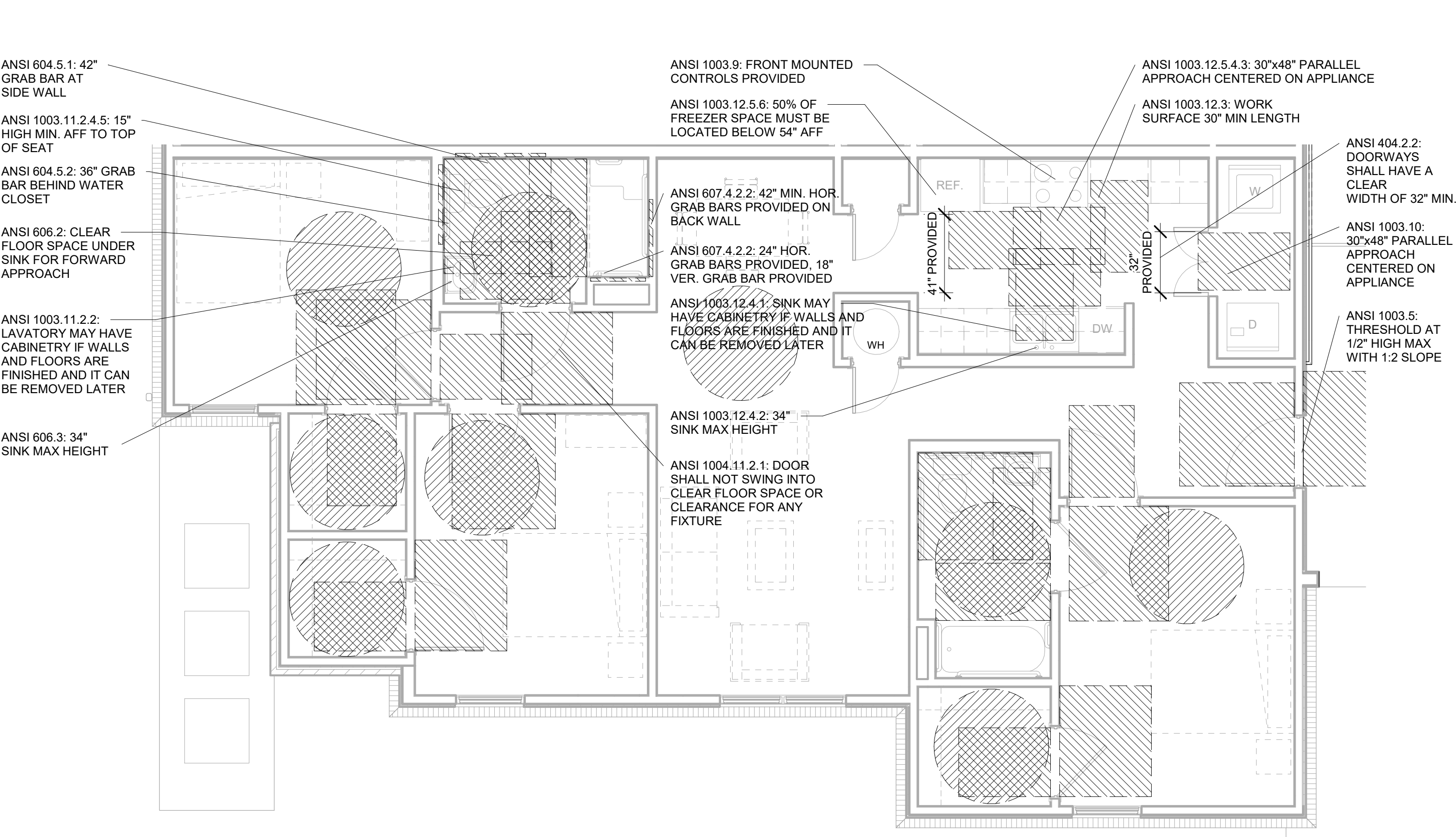
NOTE: HC UNITS COMPLY WITH AUSH, UFAS AND ANSI TYPE A.



2
 A0.4 3-BED AUSH REQUIREMENTS
 1/4" = 1'-0"



3
 A0.4 3-BED UFAS REQUIREMENTS
 1/4" = 1'-0"



1
 A0.4 3-BED ANSI TYPE A REQUIREMENTS
 1/4" = 1'-0"

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A0.4

CAD FILE NUMBER
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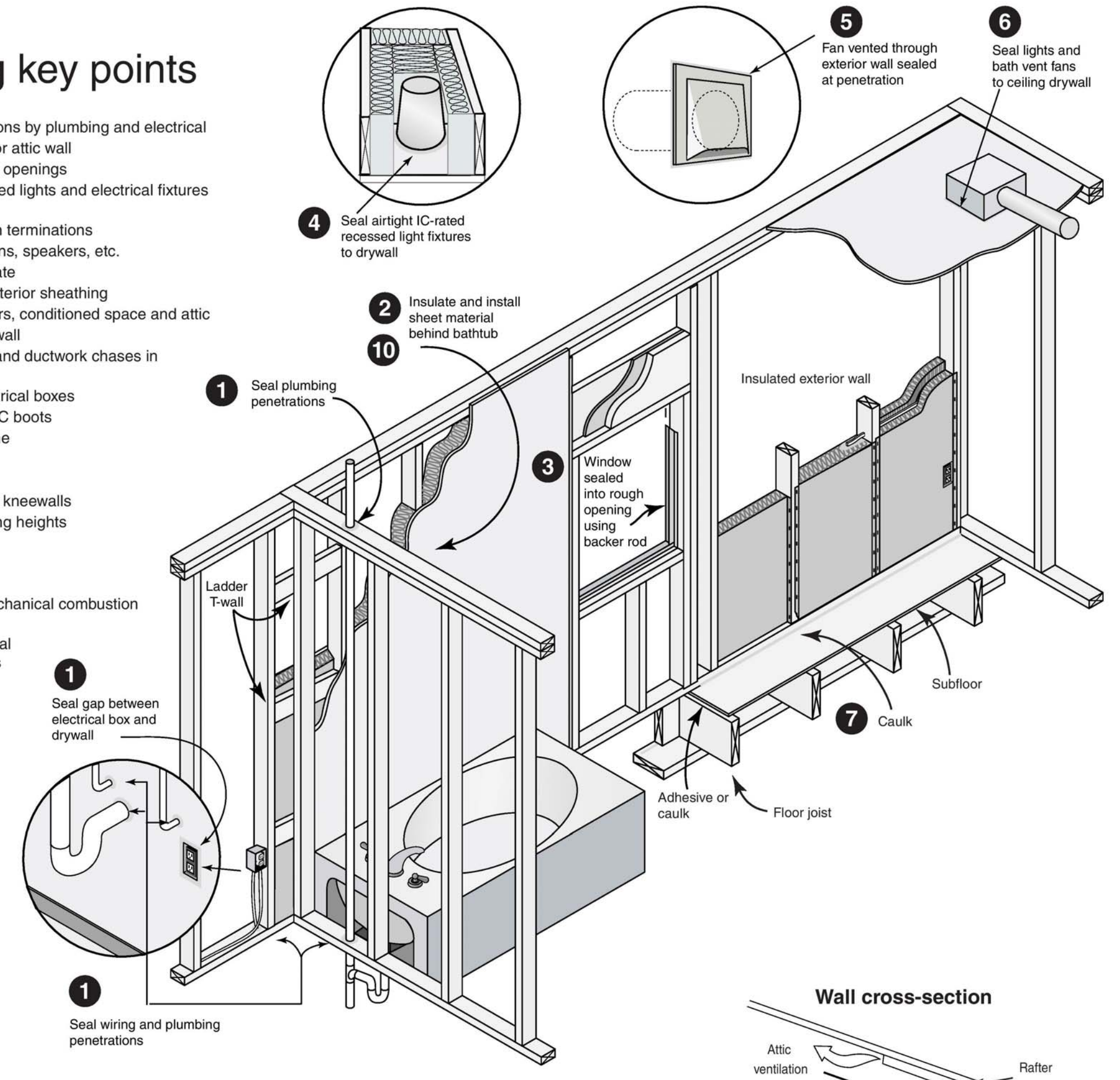


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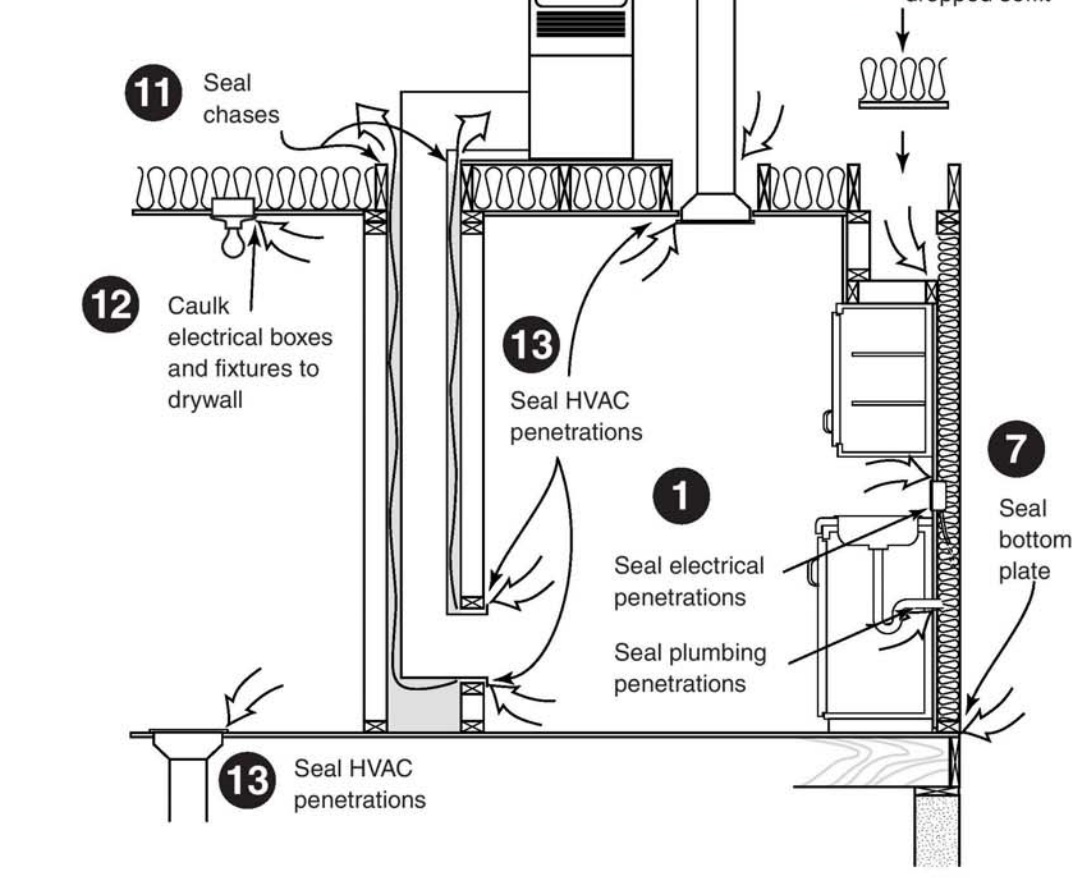
Appendix

Air sealing key points

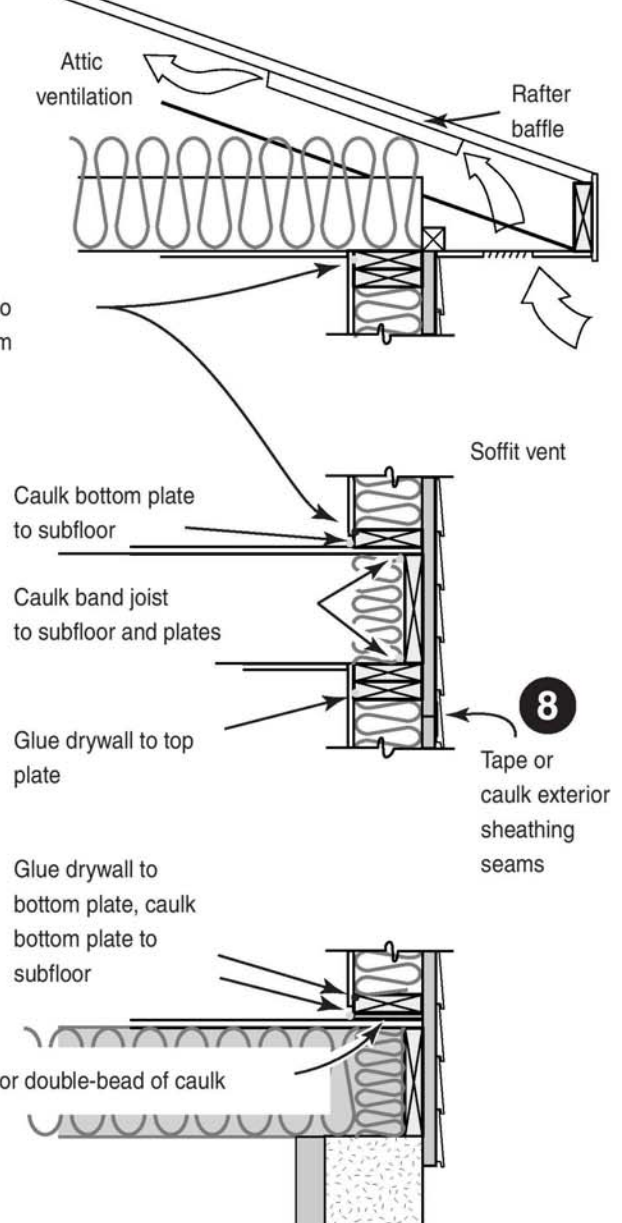
1. Plate and wall penetrations by plumbing and electrical
2. Tub/shower on outside or attic wall
3. Window and door rough openings
4. Airtight, IC-rated recessed lights and electrical fixtures exposed to attic
5. Exterior wall exhaust fan terminations
6. Ceiling mounted bath fans, speakers, etc.
7. Bottom plate and top plate
8. Seams between rigid exterior sheathing
9. Band area between floors, conditioned space and attic
10. Garden tub on exterior wall
11. Mechanical equipment and ductwork chases in attics, crawlspaces
12. Ceiling/crawlspace electrical boxes
13. Ceiling/crawlspace HVAC boots
14. Shower and tub drain line
15. Fireplace inserts
16. Attic kneewall doors
17. Joist cavities under attic kneewalls
18. Transition between ceiling heights (e.g., 10' to 8')
19. Attic scuttle hole
20. Attic pull-down stairs
21. Wall penetrations of mechanical combustion closets
22. Thresholds at mechanical combustion closet doors
23. Band joist exposed to exterior
24. Band area exposed to unconditioned space (such as basement or garage)
25. Exterior wall penetrations for refrigeration lines, condensate line, etc.



Chases and common by-passes



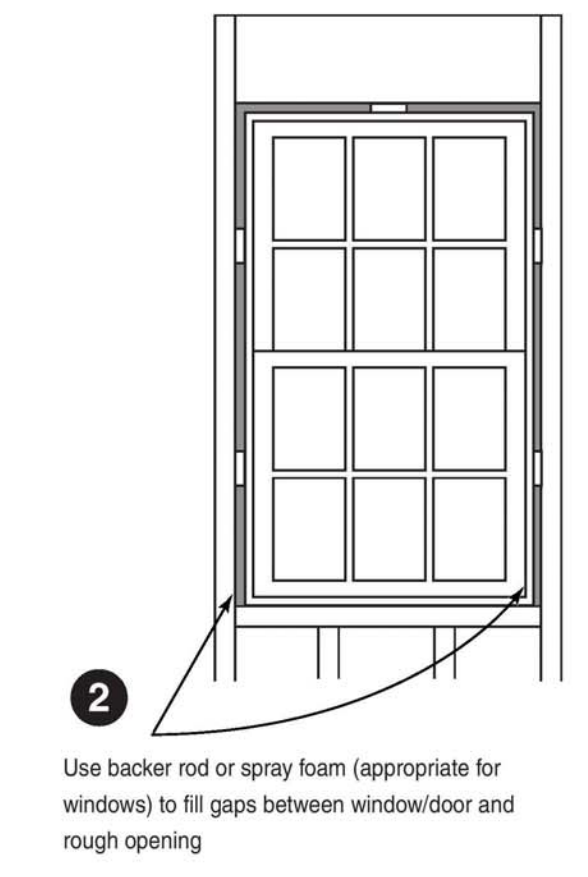
Wall cross-section



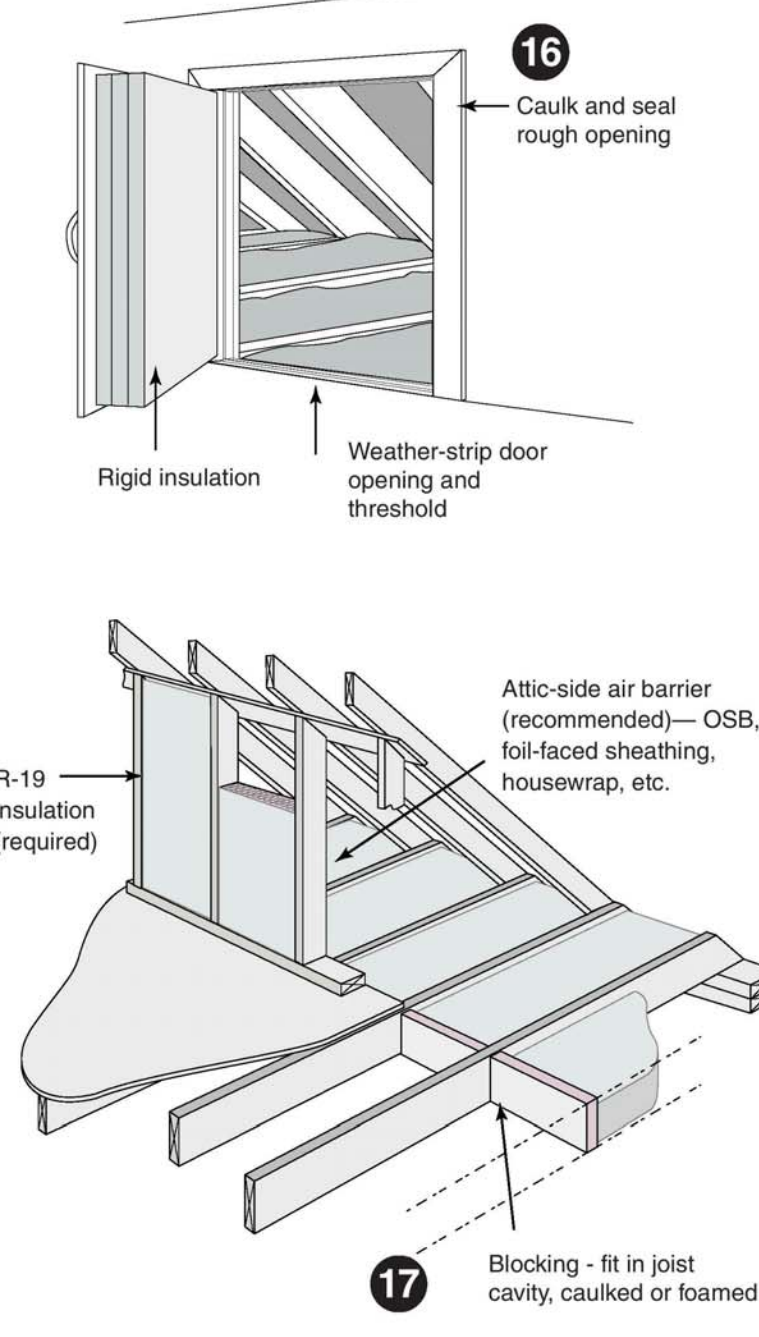
Appendix

Air sealing key points continued

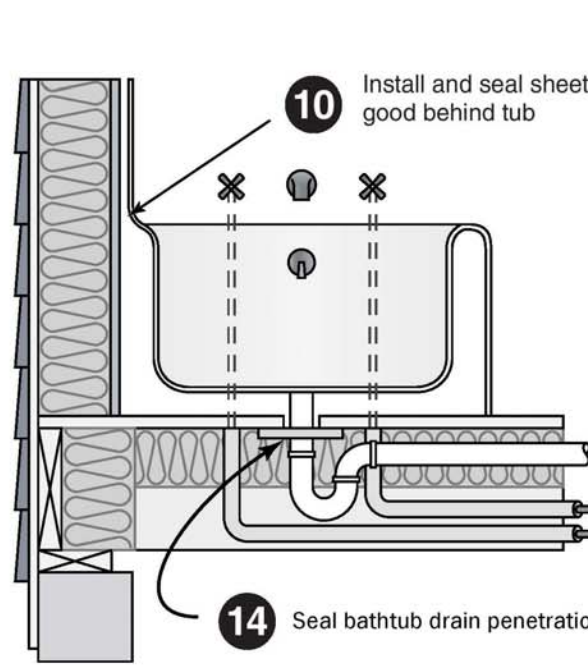
Window rough opening



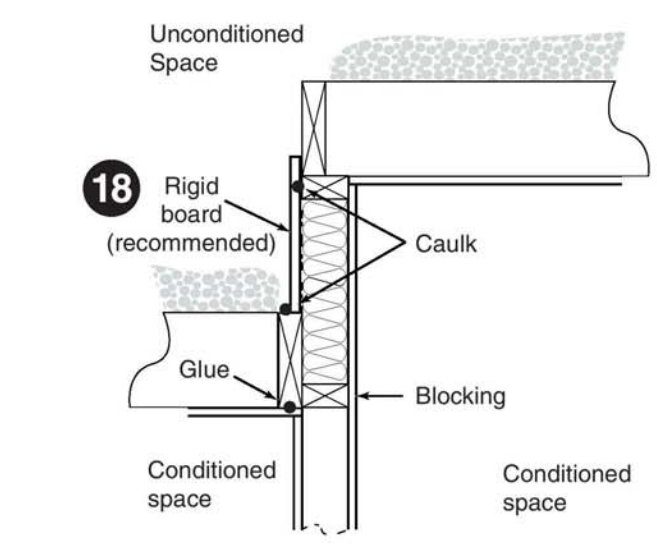
Attic knee-walls



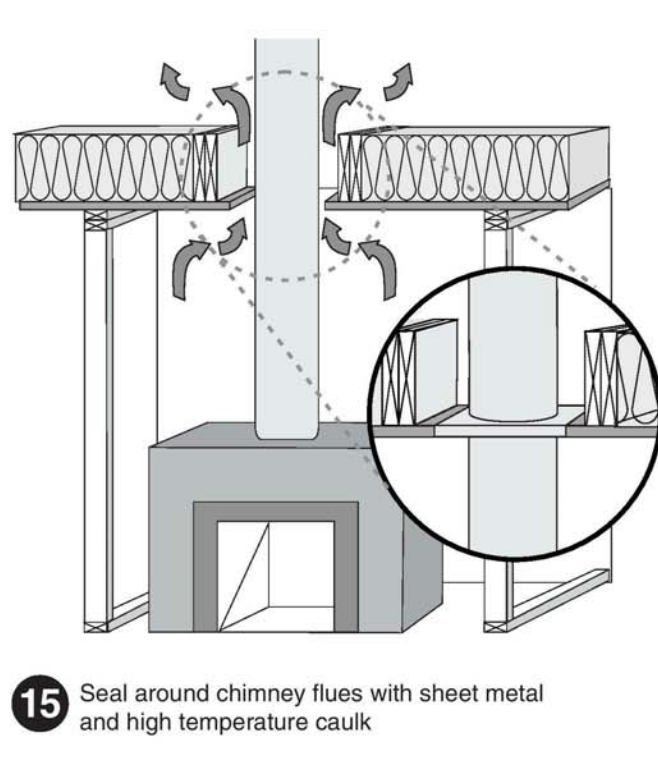
Shower/tub drain rough opening



Two-level attic

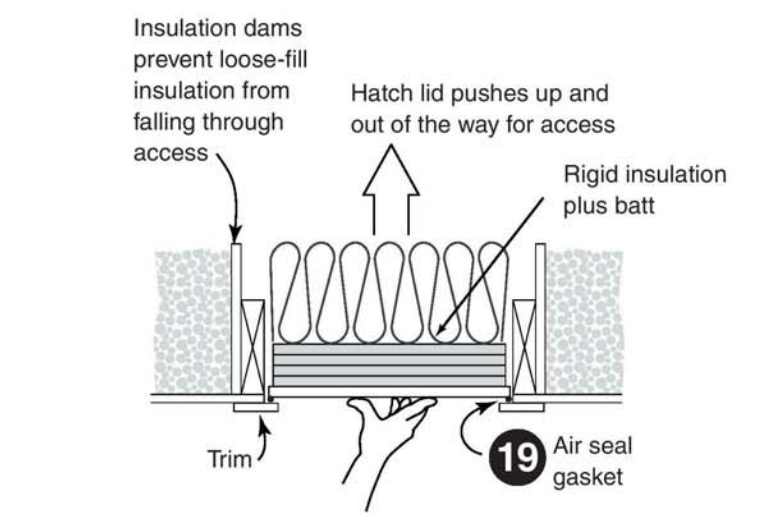


Combustion chase penetrations

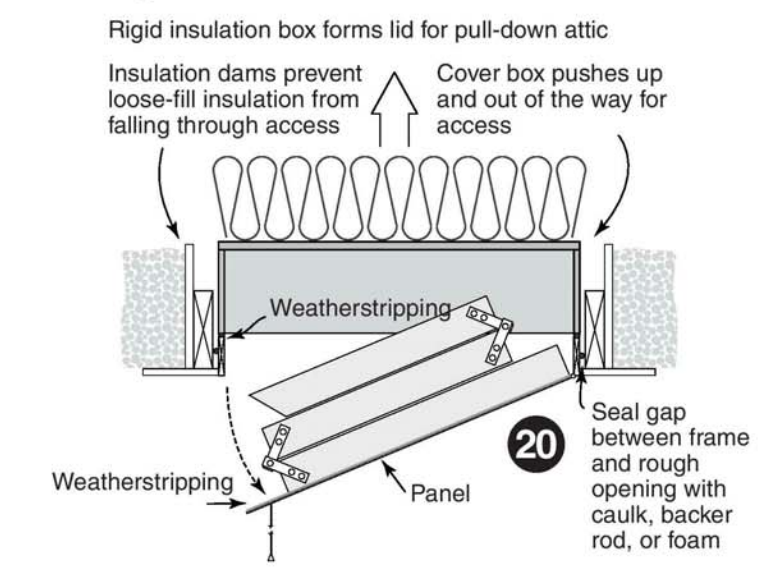


Disclaimer:
This document is intended solely to help graphically demonstrate the air leakage provisions of section 502.1.4 of the 2000 IECC. It does not cover all airsealing locations or techniques. Other code provisions may be applicable as well.

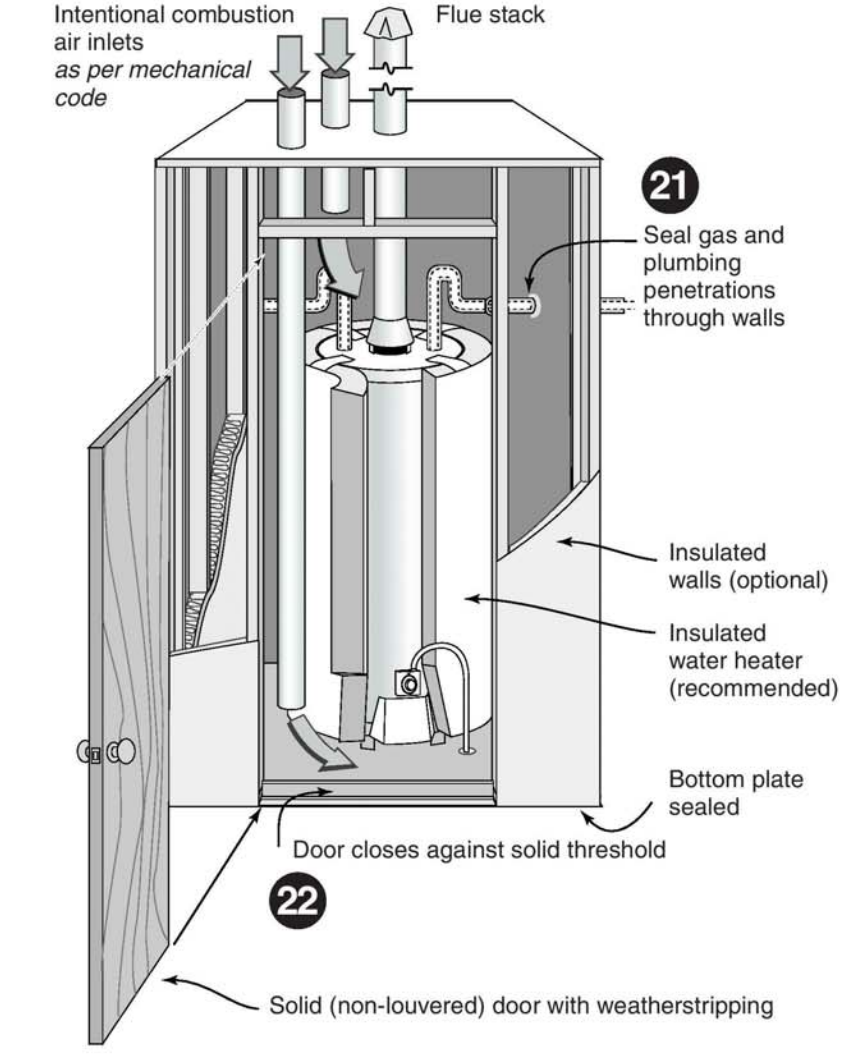
Attic scuttle



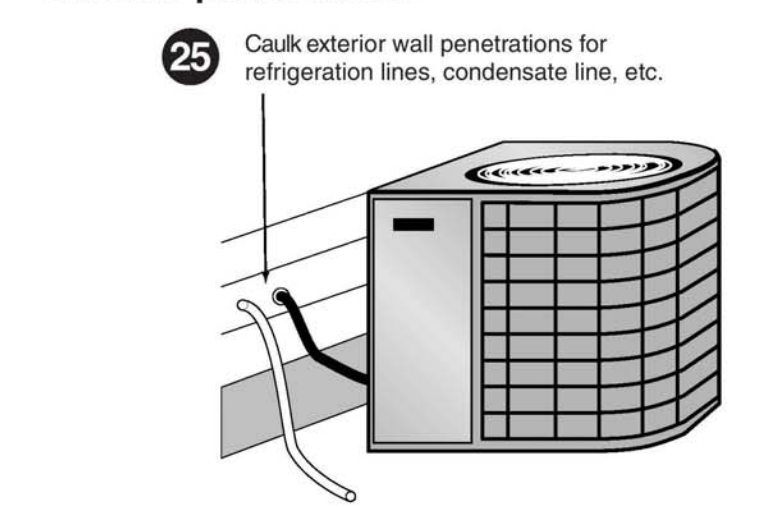
Attic pull-down stairs



Combustion closet



Exterior penetrations



DATE	1 11/20/18	PERMIT SET
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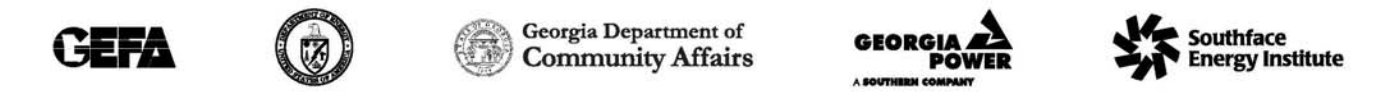
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A0.5

CAD FILE NUMBER
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Poster prepared for inclusion in Georgia Energy Code
Prepared by Southface Energy Institute
www.southface.org

TYVEK INSTALLATION GUIDELINES ARE INCLUDED IN THIS SET OF CONTRACT DOCUMENTS FOR CONVENIENCE ONLY. THE ARCHITECT IS NOT RESPONSIBLE FOR INFORMATION INCLUDED IN THESE DRAWINGS OR FOR THEIR ACCURACY, INCLUDING ANY POSSIBLE ERRORS OR OMISSIONS.

INSTALLATION GUIDELINES for DuPont™ Flashing Systems™ with integral flanged windows AFTER weather-resistive barrier is installed.

DuPont™ FlexWrap™ and DuPont™ StraightFlash™ are highly engineered flashing tapes designed to be compatible with Tyvek® Weatherization Systems products. For optimal weather-resistive protection, we suggest you use Tyvek® HomeWrap®, Tyvek® StuccoWrap® or Tyvek® CommercialWrap®, DuPont™ Tyvek® Tape, and Tyvek® Wrap Caps.

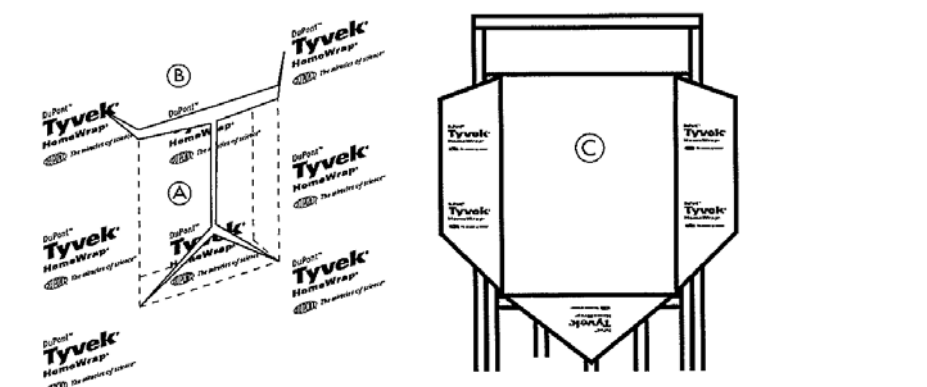
GENERAL INSTRUCTIONS:

- DuPont™ FlexWrap™ and StraightFlash™ should be installed on clean, dry surfaces. Wipe surfaces to remove moisture, dirt, grease and other debris that could interfere with adhesion.
- Apply pressure along entire surface for a good bond.
- Remove all wrinkles and bubbles by smoothing surface and repositioning as necessary.
- DO NOT STRETCH DuPont™ FlexWrap™ WHEN INSTALLING.
- DuPont™ FlexWrap™ performs best when installed at temperatures above 40°F (4°C).
- For additional guidelines and suggested caulks, please call 1-800-44-TYVEK (800-448-9835).

STEP 1

PREPARE WEATHER-RESISTIVE BARRIER FOR WINDOW OR DOOR INSTALLATION:

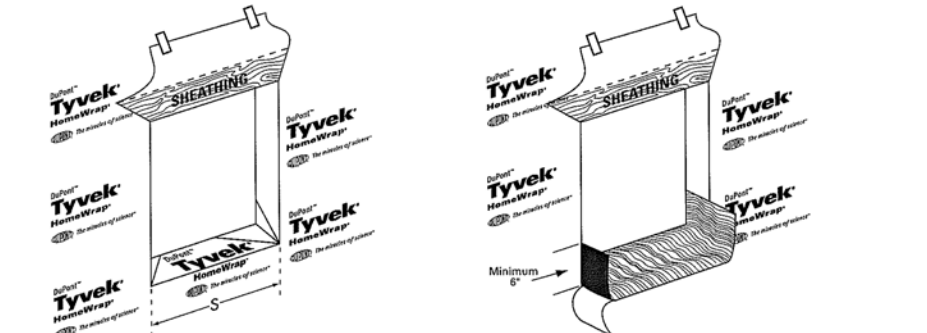
- Make a modified "L-Cut" in the weather-resistive barrier. Begin with a horizontal cut across the top of the window frame. (For roundtop windows, the cut should begin 2" above the mull joint [see D]). From the center cut straight down about two-thirds of the way then angling the cut to each corner (see A).
- Cut a flap above the rough opening to expose sheathing or framing members and allow head flashing installation. Head flashing should adhere to exposed sheathing or framing members.
- Flip side and bottom flaps into rough opening and secure. Flip head flap up and temporarily secure.



FOR RECTANGULAR WINDOWS

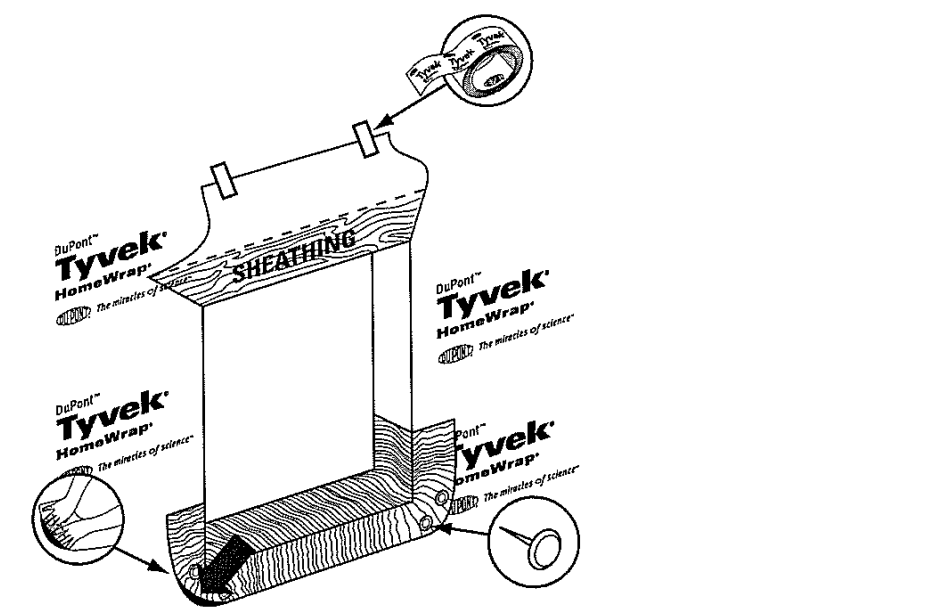
STEP 2

- Cut DuPont™ FlexWrap™ at least 12" longer than width of rough opening sill (S).
- Remove first piece of release paper, cover horizontal sill by aligning inside edge of sill, and adhere into rough opening across sill and up jambs (min. 6"). Cover horizontal sill by aligning FlexWrap™ edge with inside edge of sill.
- Remove second release paper.



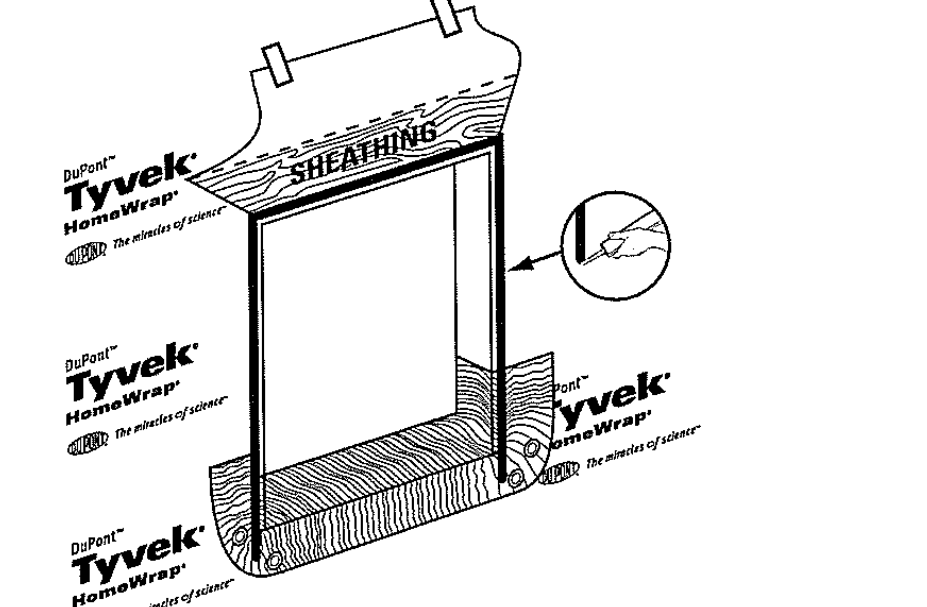
STEP 3

- Fan DuPont™ FlexWrap™ at bottom corners onto face of wall.
- Firmly press sill flashing to ensure full adhesion.
- SECURE FANNED EDGES WITH MECHANICAL FASTENERS. (i.e. CapNails, staples, screws, etc.)



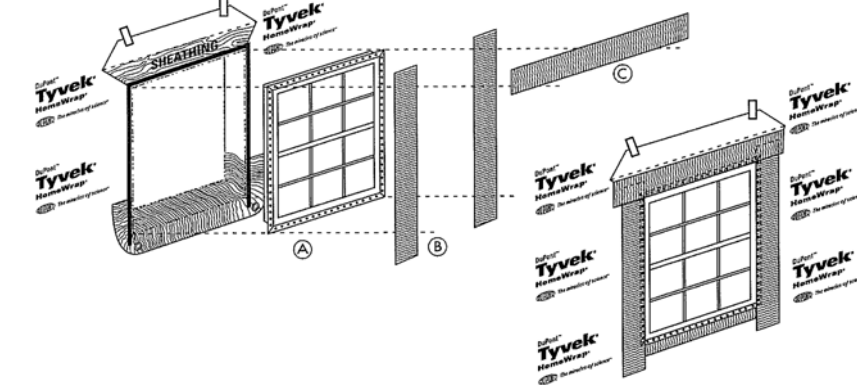
STEP 4

- Apply continuous bead of caulk to wall or back side of window mounting flange across jambs and head, but leave bottom sill flange uncaulked.
- DO NOT APPLY CAULK ACROSS BOTTOM SILL FLANGE.



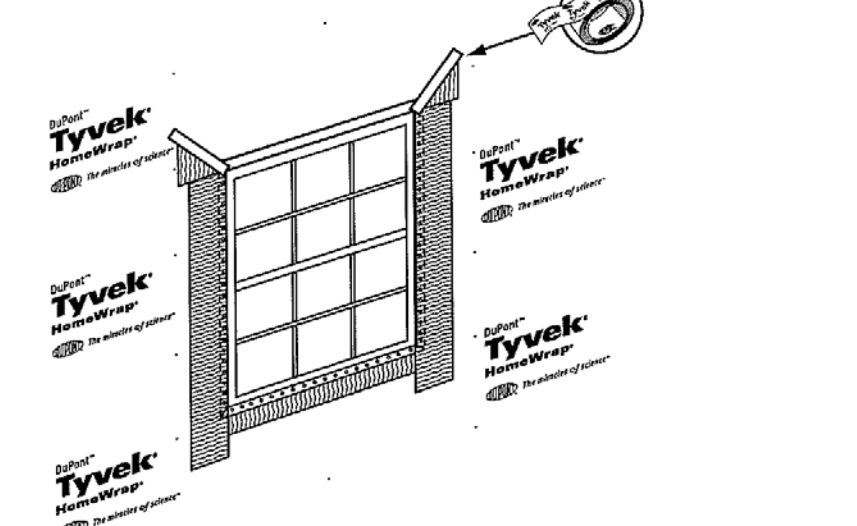
STEP 5

- Install window/door according to manufacturer's instructions. (illustration A)
- Cut two pieces of DuPont™ StraightFlash™ or FlexWrap™ for jamb flashing extending 1" above window head flange and below bottom edge of sill flashing. Remove release paper and press tightly along sides of window frame. (illustration B)
- Cut a piece of DuPont™ StraightFlash™ or FlexWrap™ for head flashing, which extends beyond outer edges of jamb flashings. Remove release paper and install completely covering mounting flange and adhering to exposed sheathing or framing members. (illustration C)



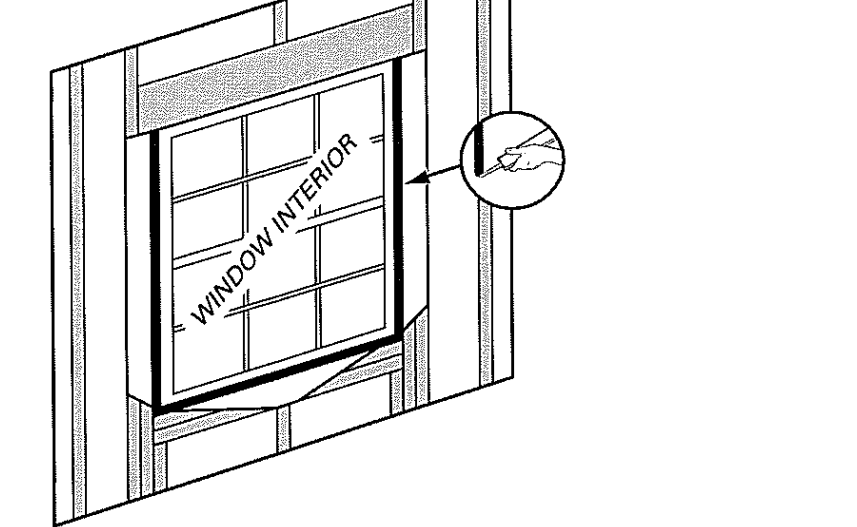
STEP 6

- Flip down upper flap of weather-resistive barrier so it lays flat across head flashing.
- Tape along all cuts in weather-resistive barrier and across head of the window with DuPont™ Tyvek® Tape.



STEP 7

- Caulk (using backer rod if necessary) to seal rear of window/ door frame to inside of rough opening across bottom and a minimum of 12" up the sides to form a back dam. To air seal around the window opening, caulk completely around the back edge of the window perimeter.



STEPS 8, 9 AND 10 NOT USED

BUILDING CODE REPORTS
National Evaluation Report NER-642. Meets the ASTM E1677 Type 1 Air Retarder when installed according to Tyvek® Weatherization Systems best practices. See installation instructions on label.

TECHNICAL SPECIFICATIONS
Tyvek® used in construction products is made from 100% flash spunbonded high density polyethylene fibers which have been bonded together by heat and pressure, without binders or fillers, into a tough, durable sheet structure. Additives have been incorporated into the polyethylene to provide ultraviolet light resistance. DuPont suggests that Tyvek® be covered within four months (120 days) of installation. DuPont™ FlexWrap™ and StraightFlash™ are made from a synthetic rubber adhesive and a laminate of polyethylene film, elastic fiber, synthetic rubber adhesive, polyurethane adhesive, and a top sheet of flash spunbonded high density polyethylene fibers. Additives have been incorporated into these materials to provide ultraviolet light resistance. DuPont suggests that DuPont™ FlexWrap™ and StraightFlash™ be covered within four months (120 days) of installation.

PRODUCT GUARANTEE
DuPont will replace any Tyvek® Weatherization System product damaged during installation by weather or normal handling if it is installed according to procedures published by DuPont. If you have any questions, call DuPont™ Tyvek® Weatherization Systems at 1-800-44-TYVEK. If DuPont™ FlexWrap™ and StraightFlash™ product fails to meet published material specifications at the time of shipment, or contains defects created during its production, DuPont will replace defective material at no charge.

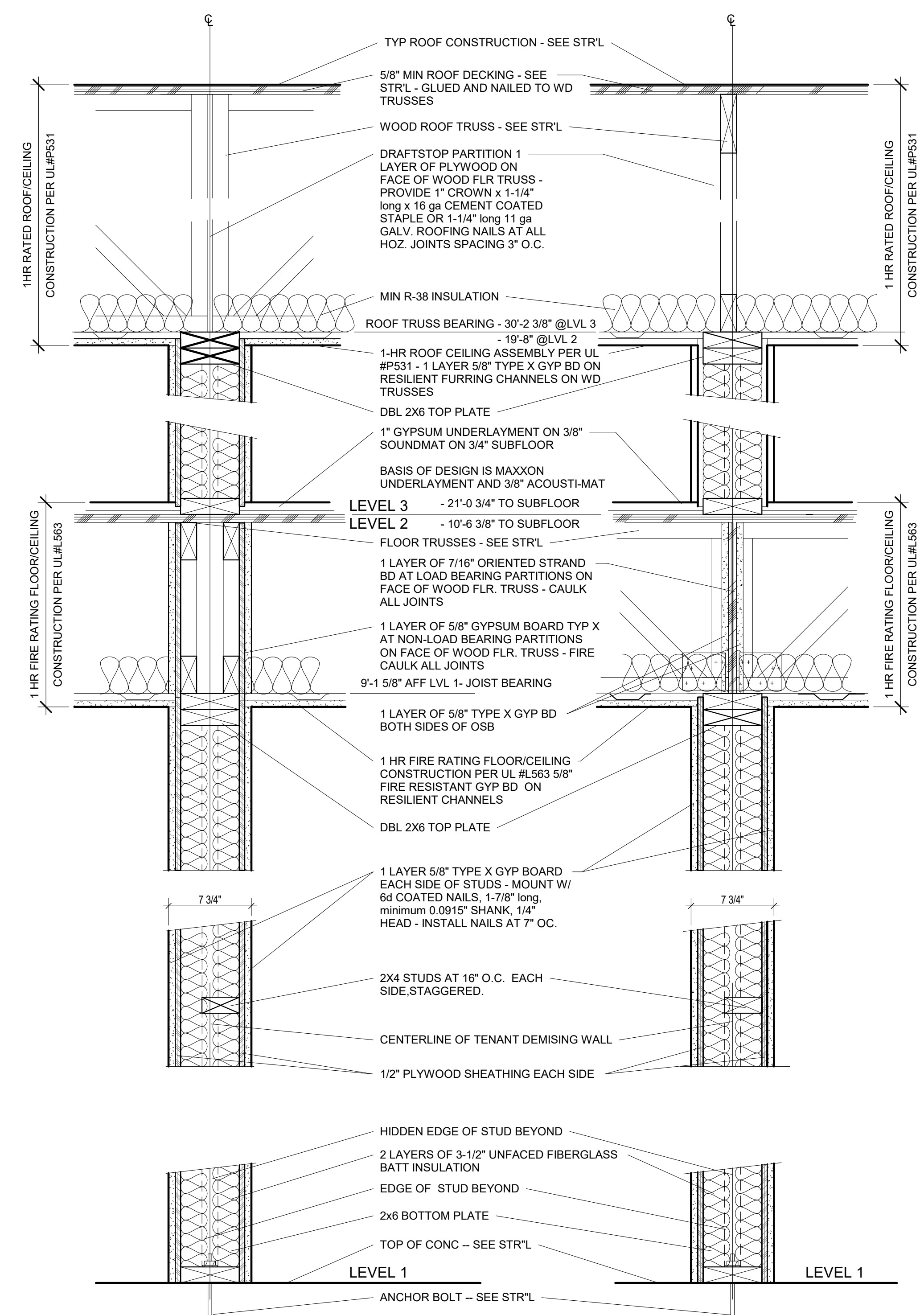
WARNING
Tyvek® is slippery and should not be used in any application where it will be walked on. In addition, because it is slippery, DuPont recommends using kickjacks or scaffolding for exterior work above the first floor. If ladders must be used, extra caution must be taken to use them safely by following the requirements set forth in ANSI Standards 14.1, 14.2 and 14.5 for ladders made of wood, aluminum, and fiberglass, respectively. Tyvek® is combustible and should be protected from a flame and other high heat sources. Tyvek® will melt at 275°F (135°C) and if the temperature of Tyvek® reaches 750°F (400°C), it will burn and the fire may spread and fall away from the point of ignition. For more information, call 1-800-44-TYVEK. DuPont™ FlexWrap™ and StraightFlash™ are combustible and should be protected from flame and other high heat sources. DuPont™ FlexWrap™ and StraightFlash™ will not support combustion if the heat source is removed. However, if burning occurs, ignited droplets may fall away from the point of ignition. For more information, call 1-800-44-TYVEK.

NOTE

To Achieve greater potential energy savings and weather-resistance, any tears, breaks, holes, etc. created during normal construction should be repaired by taping or patching with Tyvek® weather resistive barriers. When installed in conjunction with other building materials, DuPont™ FlexWrap™ and StraightFlash™ should be properly shingled with these materials, such that water is diverted to the exterior of the wall system. Tyvek® products are weather resistive barriers not the primary water barrier (the outer facade is the primary barrier). Contamination of any Tyvek® weather-resistive barriers and building papers with building site chemicals which increase their wettability (e.g., surfactants) will adversely affect their water-resistance and therefore, their contribution to the overall water-resistance of the wall system. Tyvek® StuccoWrap®, DuPont™ FlexWrap™ and StraightFlash™ are suggested for use as outlined in this brochure. DuPont™ FlexWrap™ and StraightFlash™ are not suggested for use on roof windows. For superior protection against bulk water penetration DuPont suggests a system combining a quality exterior facade, a good secondary weather-resistive membrane and an exterior sheathing, appropriate flashing materials and details; and high quality windows and doors with particular attention to proper installation of each component. In a system where no exterior sheathing is used and Tyvek® is installed directly over the wall studs, exterior facade materials should be selected to ensure maximum protection against water intrusion. Careful workmanship and proper installation of each component is very important.

DuPont believes this information to be reliable and accurate. The information may be subject to revision as additional experience and knowledge is gained. It is the user's responsibility to determine the proper construction materials needed. Because conditions are outside of our control, DUPONT MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, AND ASSUMES NO LIABILITY WHATSOEVER AS TO THE PERFORMANCE OF THE PRODUCTS FOR A PARTICULAR USE. This information is not intended to be used by others for advertising, promotion or other publication for commercial purposes.

For more information:
1-800-44-TYVEK
www.Tyvek.com



- D2** TENANT DEMISING WALL - 1 HR PARTITION TYPE "D2" UL# U340 1-1/2" = 1-0
2012 IBC 1207.2 REQUIRES STC 50 MIN RATING AT DEMISING WALL ASSEMBLIES. PROVIDED STC 50 RATING
FBC 1207.3 REQUIRED IIC 50 MIN RATING AT FLOOR/CEILING ASSEMBLIES. PROVIDED ICC 58 RATING (PER SOUND SYSTEM 1; REFERENCE UNITED STATES GYPSUM COMPANY CATALOG IG 1503 / 2-04)
- D1** TENANT DEMISING WALL - 1HR PARTITION TYPE "D1" UL# U340 1-1/2" = 1-0
2012 IBC 1207.2 REQUIRES STC 50 MIN RATING AT DEMISING WALL ASSEMBLIES. PROVIDED STC 50 RATING
FBC 1207.3 REQUIRED IIC 50 MIN RATING AT FLOOR/CEILING ASSEMBLIES. PROVIDED ICC 58 RATING (PER SOUND SYSTEM 1; REFERENCE UNITED STATES GYPSUM COMPANY CATALOG IG 1503 / 2-04)



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DATE
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PROJECT NUMBER
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CAD FILE NUMBER
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- GENERAL SITE NOTES:**
- ALL BUILDING LOCATIONS, SITE DIMENSIONS, SITE UTILITY LOCATIONS, TOPOGRAPHY, CONTOURS AND OTHER SITE INFORMATION ARE PROVIDED BY McMASTER AND ASSOCIATES.
 - PROJECT INTENT IS TO PROVIDE ACCESSIBLE ROUTE VIA SIDEWALKS TO ALL AMENITIES PENDING VERIFICATION OF SITE TOPOGRAPHY. PROVIDE NEW SIDEWALKS 5'-0" WIDE, MIN 3500PSI REINFORCED CONCRETE IN ACCORDANCE WITH THE QUALIFIED ALLOCATION PLAN. EXPANSION JOINTS AT 25' MAX. CONTROL JOINTS AT 5' TYP.
 - PROVIDE CROSSWALKS WITH 4" WIDE PAINTED STRIPES WHERE ACCESSIBLE ROUTE CROSSES DRIVEWAYS. PROVIDE ACCESSIBLE RAMPS WHERE SIDEWALKS INTERSECT DRIVEWAY ALONG ACCESSIBLE ROUTE. MAX SLOPE 1" PER 1". SOD ALL DISTURBED AREAS TO MATCH EXISTING.
 - PROVIDE A NEW DEVELOPMENT SIGN WITH FAIR HOUSING LOGO. PROVIDE NEW DUMPSTER ENCLOSURE ON REINFORCED CONCRETE PAD WITH INTEGRAL DRAINS.
 - DUMPSTER ENCLOSURE MUST BE 6' HIGH MIN. ON ALL 4 SIDES.
 - OWNERS LANDSCAPE ARCHITECT WILL PROVIDE A LANDSCAPE PLAN AT A FUTURE DATE. LANDSCAPING TO INCLUDE: 32 TREES (1 PER 2 UNITS) 384 SHRUBS (6-1 GALLON PER 1 UNIT)
 - SITE IS NOT IN A FLOOD PLAIN AND DOES NOT CONTAIN WETLANDS PER THE OWNER'S CIVIL ENGINEER AND SITE SURVEY.

- DATE**
- 11/20/18 PERMIT SET
 - 05/22/19 RE-ISSUED FOR PERMIT
 - 08/20/19 ADDENDUM 1

PROJECT NUMBER
597

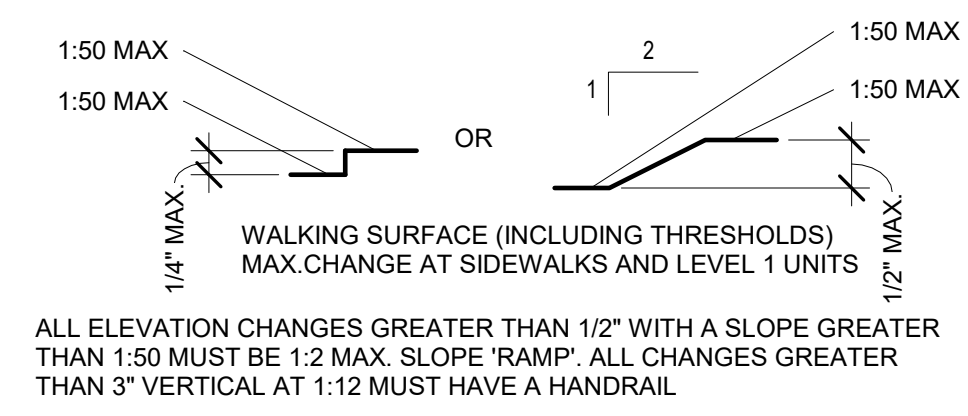
PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

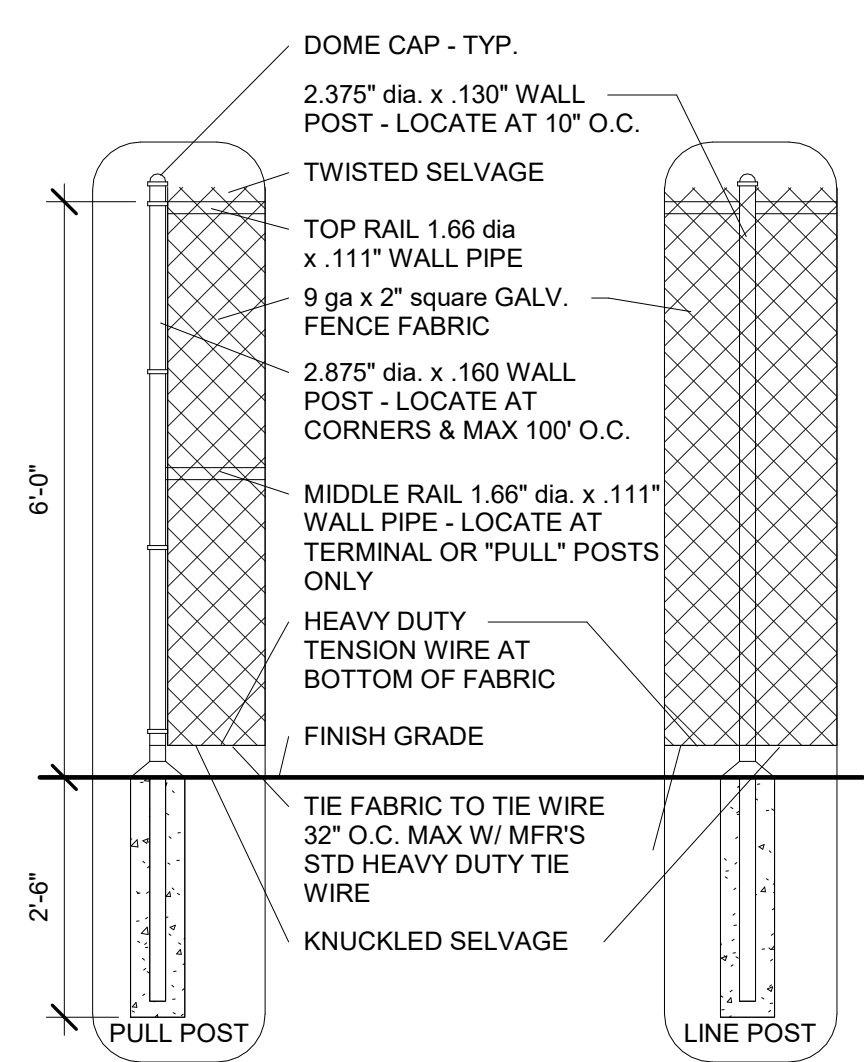
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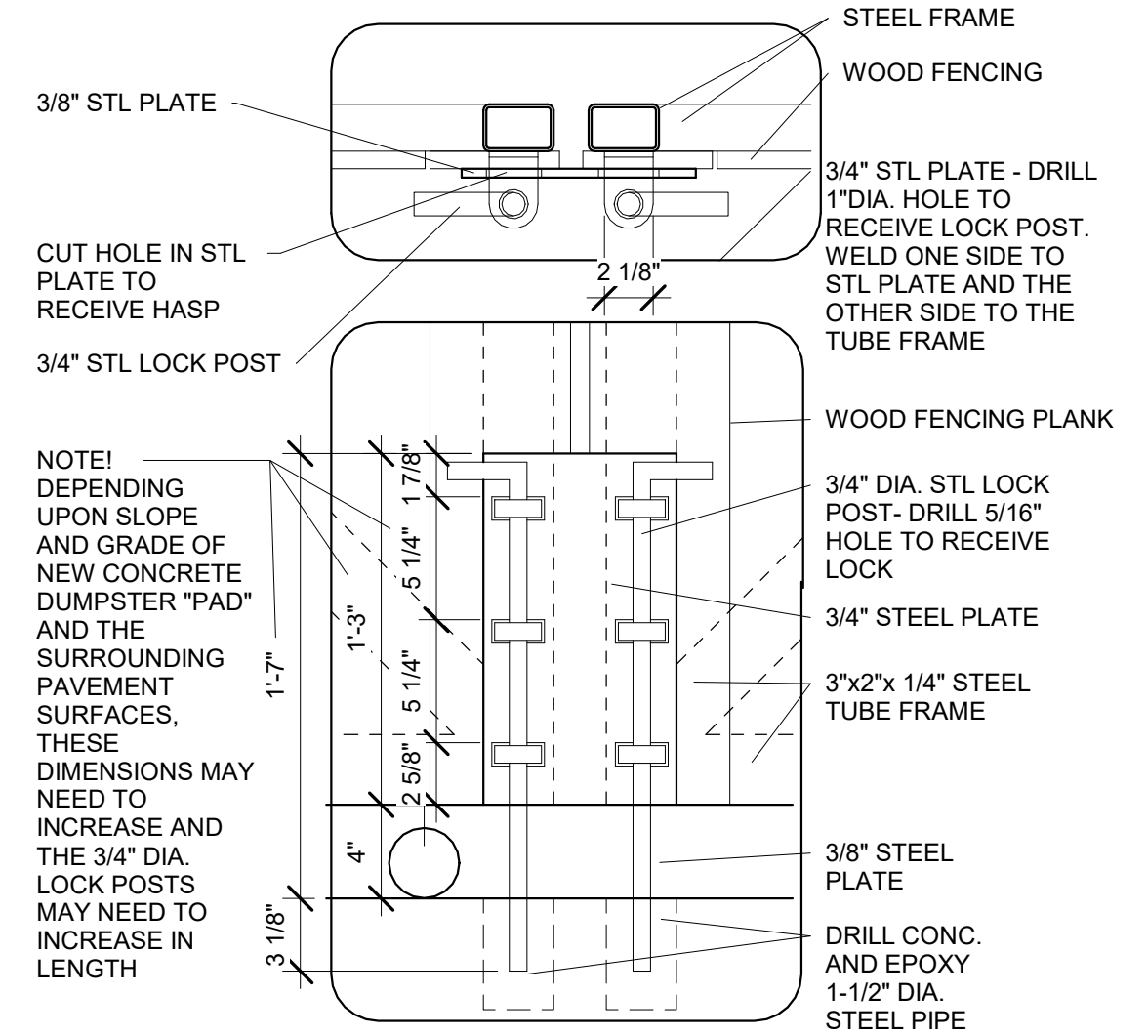
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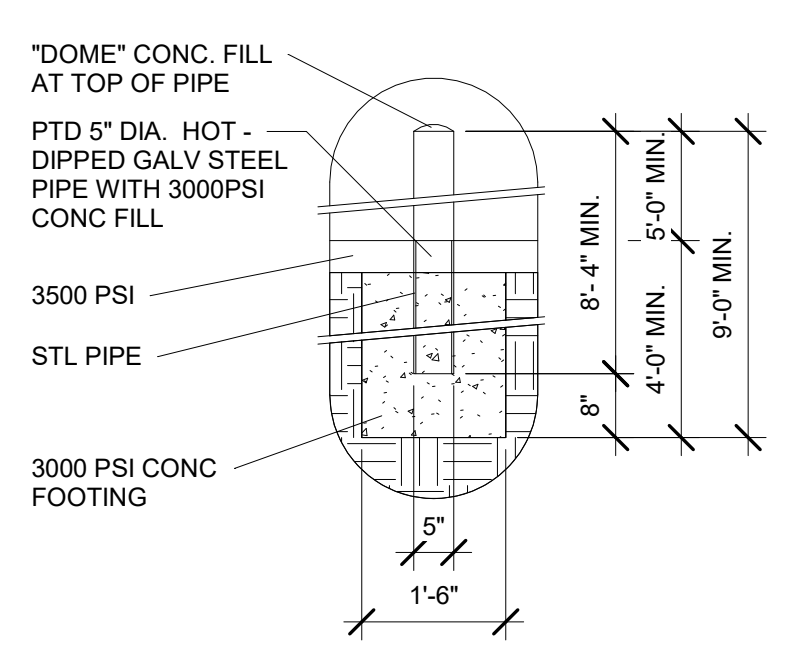
7 WALKING SURFACE MAXIMUM CHANGE
1/2" = 1'-0"



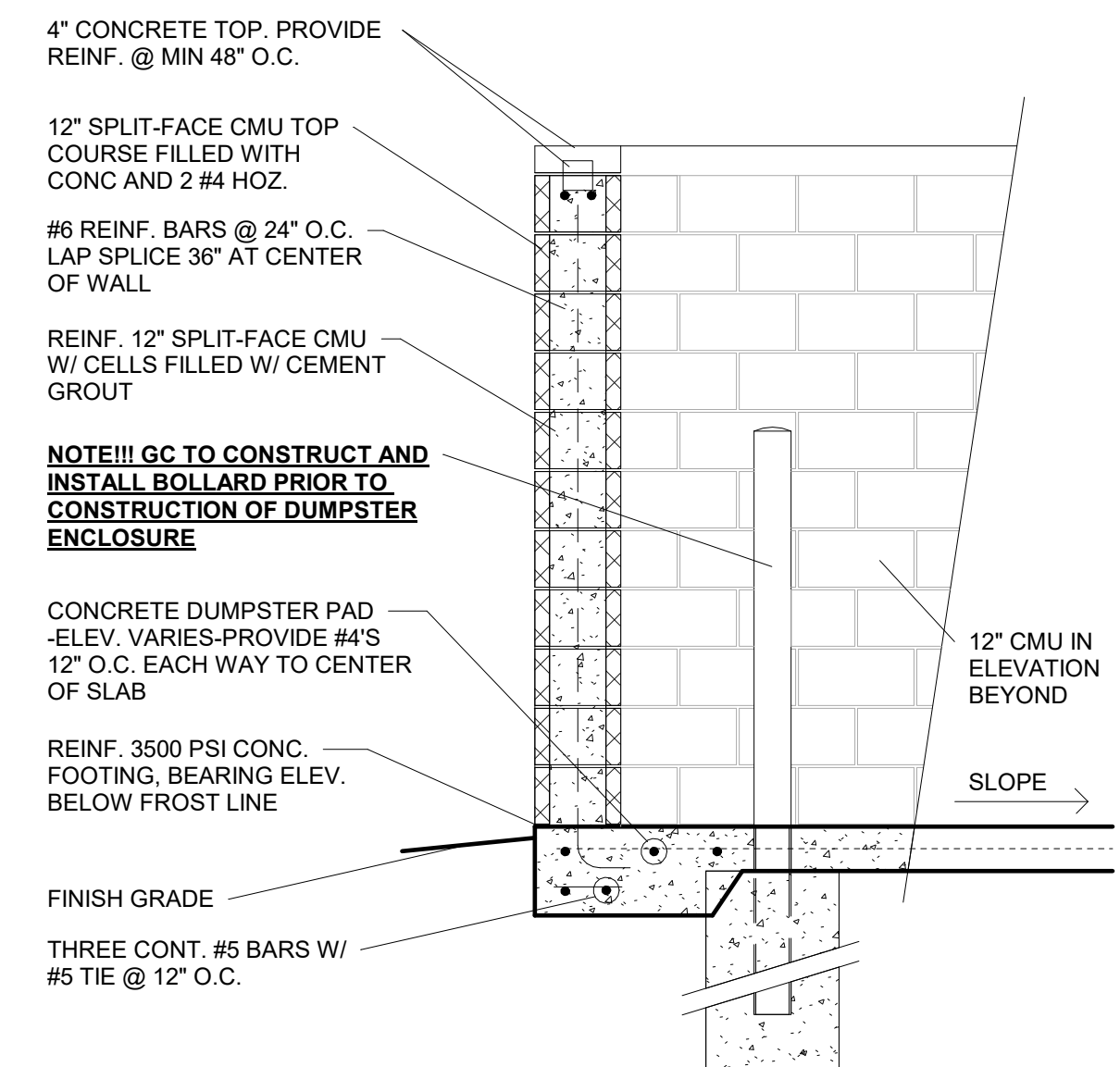
8 CHAIN LINK FENCE
1/2" = 1'-0"



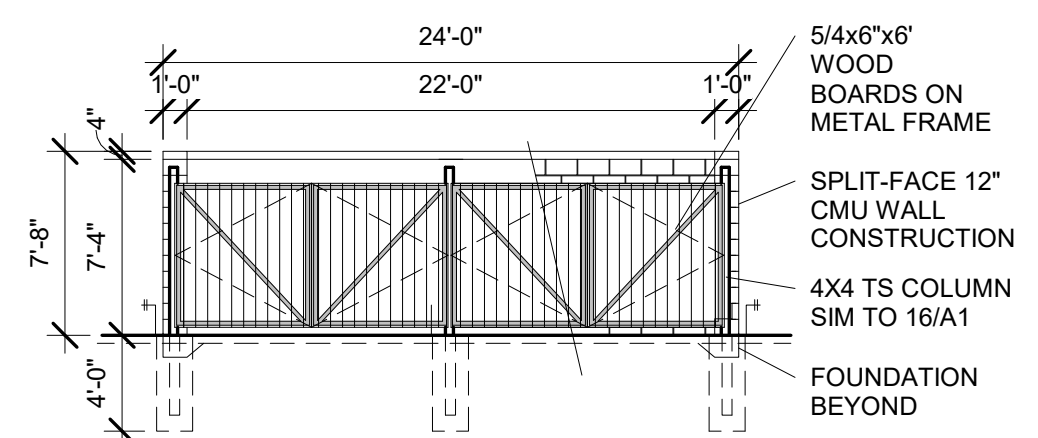
5 GATE DETAILS
1 1/2" = 1'-0"



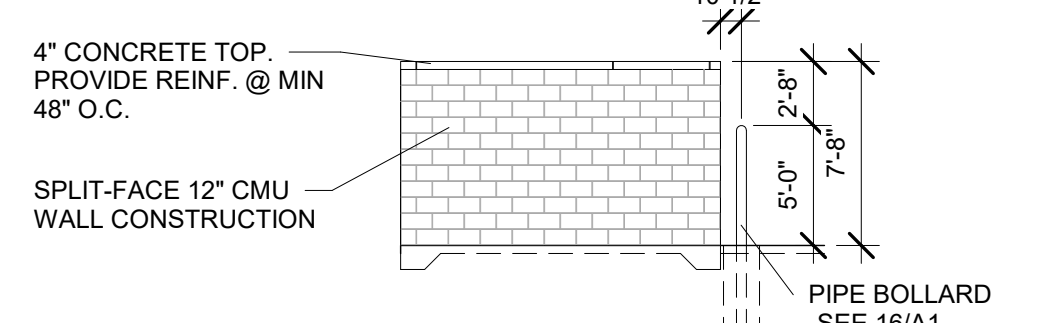
9 BOLLARD DETAIL
1/2" = 1'-0"



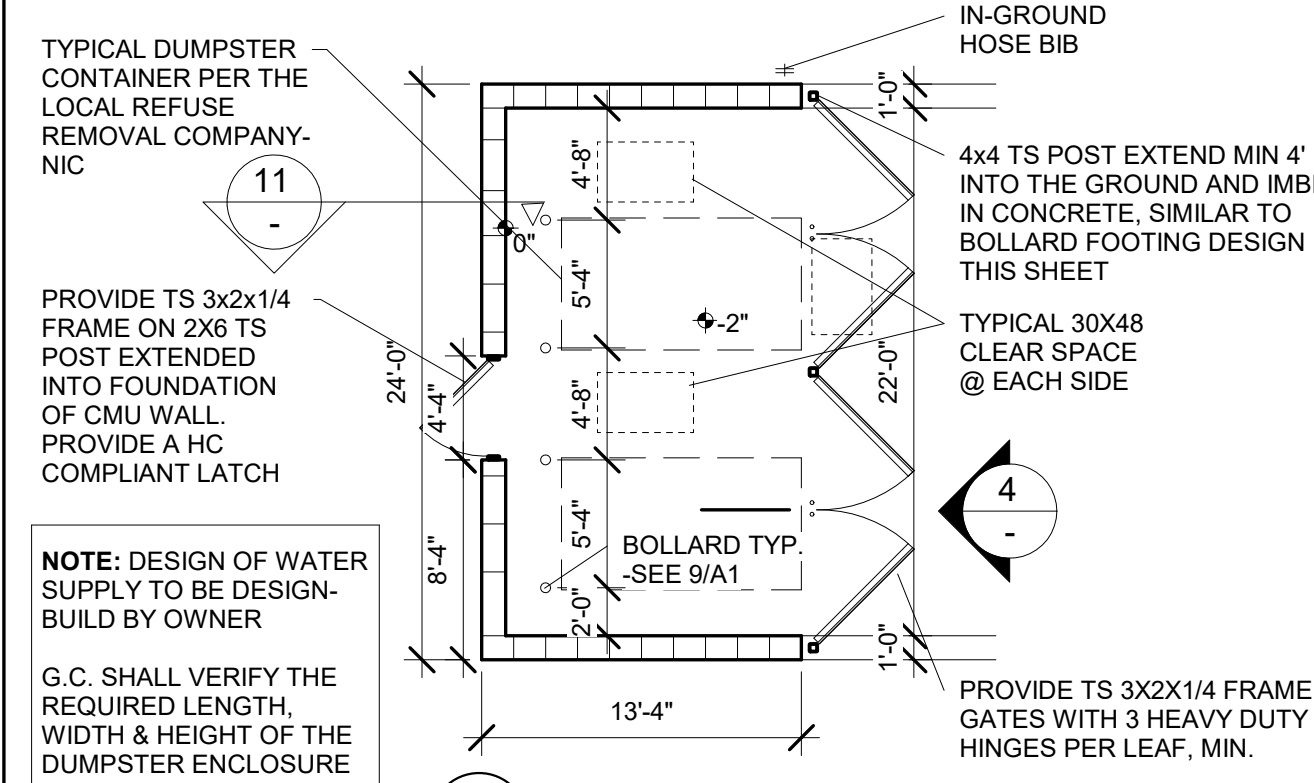
6 DUMPSTER ENCLOSURE SECTION
1/2" = 1'-0"



4 DUMPSTER ENCLOSURE - FRONT ELEV.
1/8" = 1'-0"



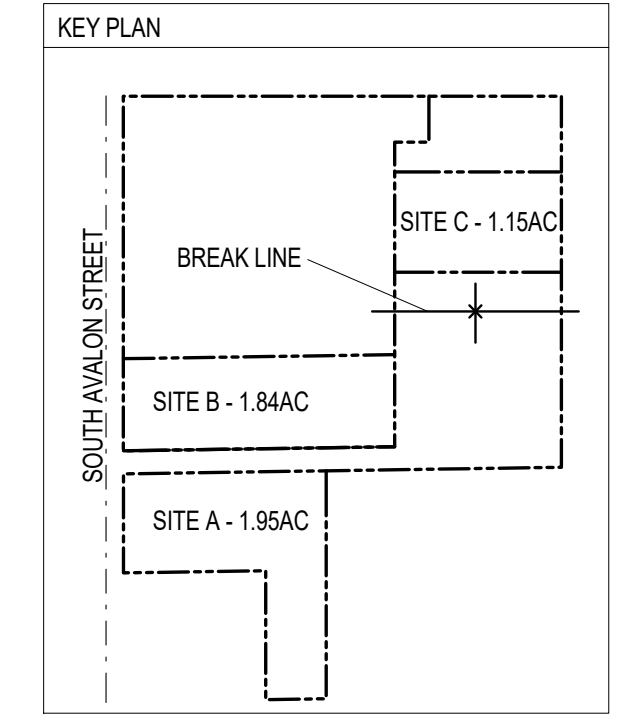
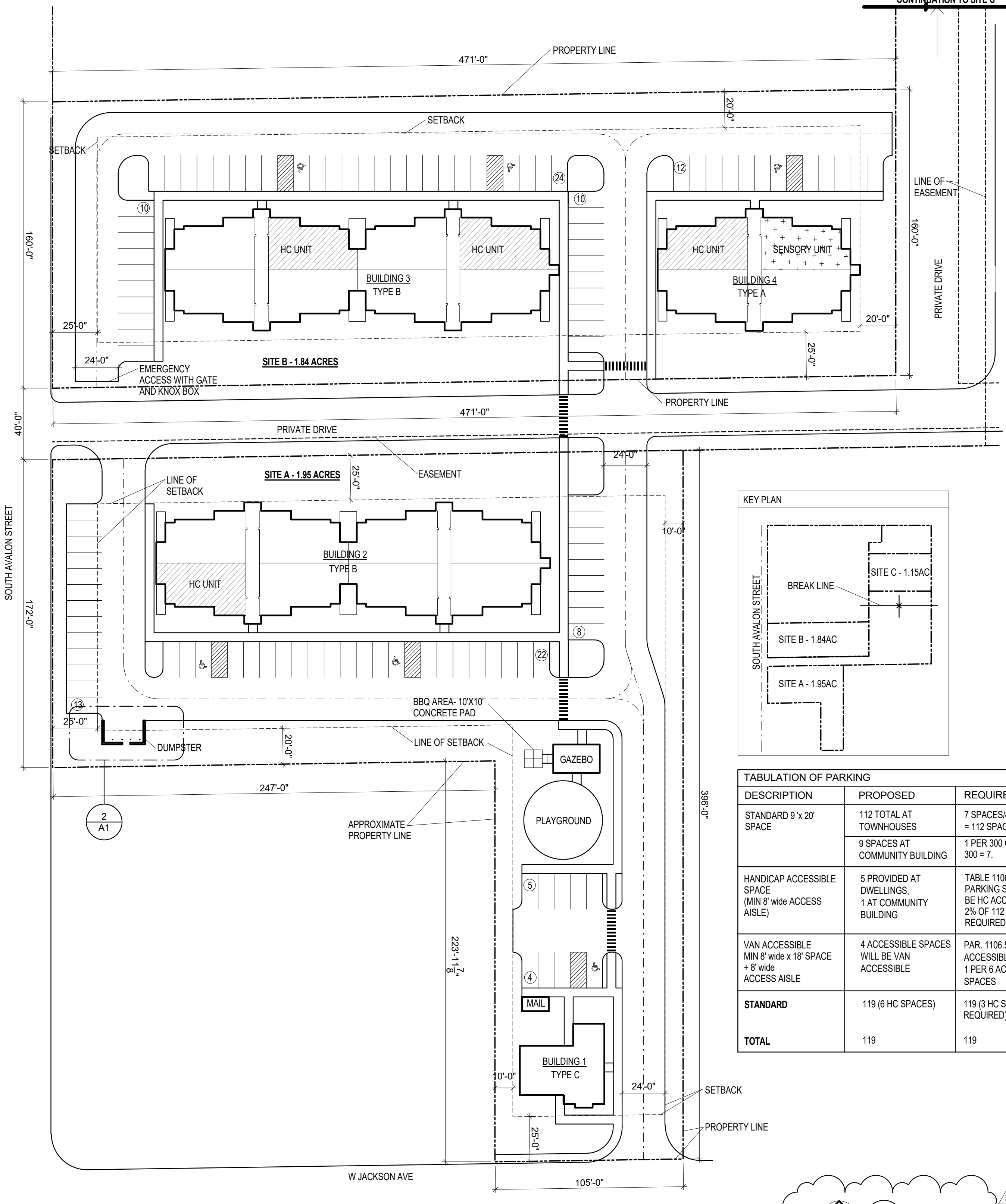
3 DUMPSTER ENCLOSURE - SIDE ELEV.
1/8" = 1'-0"



11 TYPICAL DUMPSTER CONTAINER PER THE LOCAL REFUSE REMOVAL COMPANY-NIC
1/8" = 1'-0"

NOTE: DESIGN OF WATER SUPPLY TO BE DESIGN-BUILD BY OWNER

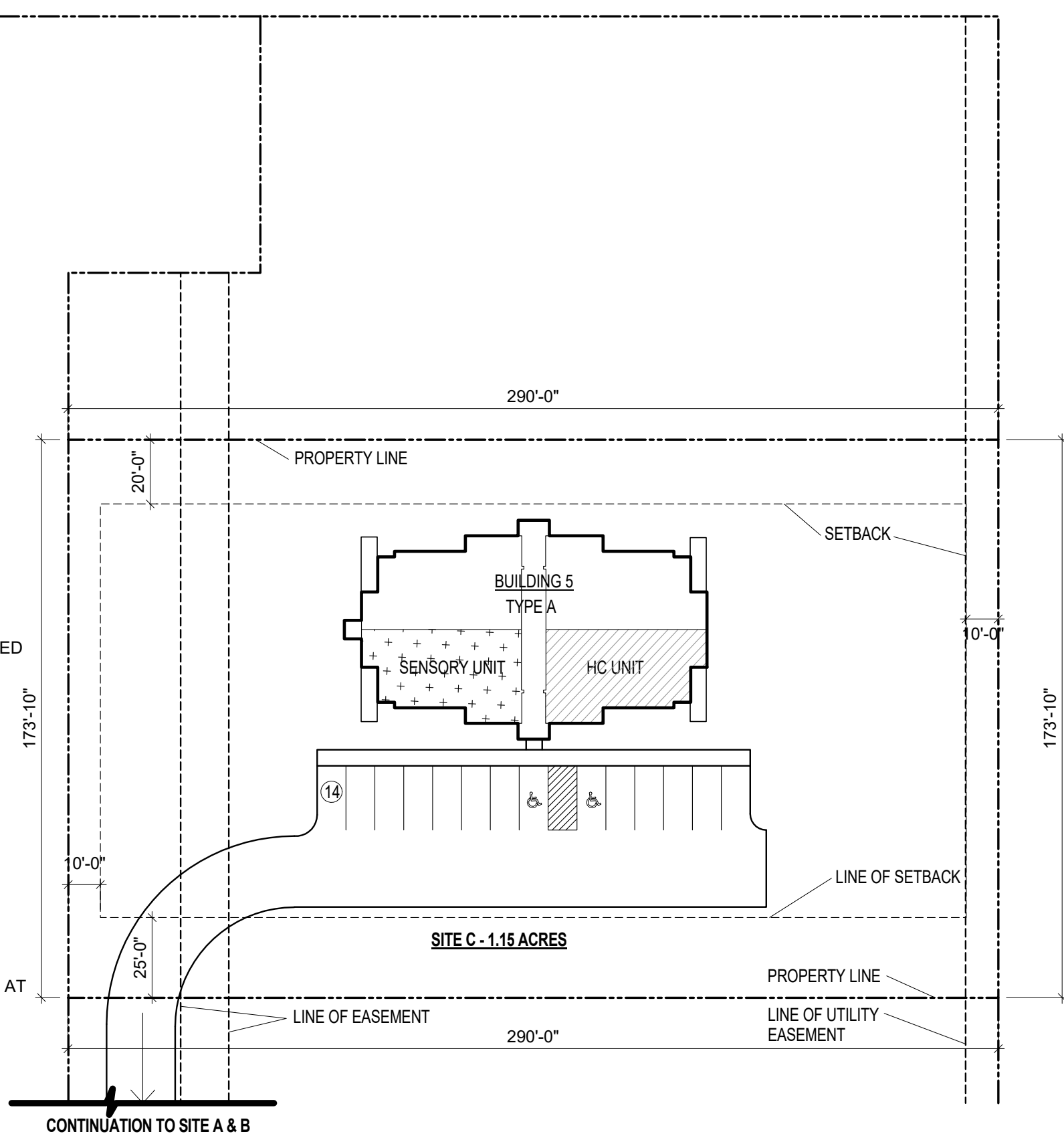
G.C. SHALL VERIFY THE REQUIRED LENGTH, WIDTH & HEIGHT OF THE DUMPSTER ENCLOSURE WITH THE LOCAL REFUSE REMOVAL COMPANY PRIOR TO CONSTRUCTION



TABULATION OF PARKING

DESCRIPTION	PROPOSED	REQUIRED
STANDARD 9' x 20' SPACE	112 TOTAL AT TOWNHOUSES = 112 SPACES 9 SPACES AT COMMUNITY BUILDING	7 SPACES/4 DWELLINGS = 112 SPACES 1 PER 300 GSF. 1914 / 300 = 7.
HANDICAP ACCESSIBLE SPACE (MIN 8' wide ACCESS AISLE)	5 PROVIDED AT DWELLINGS, 1 AT COMMUNITY BUILDING	TABLE 1106.1 2% PARKING SPACES TO BE HC ACCESSIBLE 2% OF 112 = 3 REQUIRED
VAN ACCESSIBLE (MIN 8' wide x 18' SPACE + 8' wide ACCESS AISLE)	4 ACCESSIBLE SPACES WILL BE VAN ACCESSIBLE	PAR. 1106.5 VAN ACCESSIBLE SPACES- 1 PER 6 ACCESSIBLE SPACES 2 REQUIRED
STANDARD	119 (6 HC SPACES)	119 (3 HC SPACES REQUIRED)
TOTAL	119	119

1 SITE PLAN
1" = 40'-0"



2 DUMPSTER ENCLOSURE
1/8" = 1'-0"

2 DUMPSTER ENCLOSURE
1/8" = 1'-0"



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DOOR SCHEDULE

1/4" = 1'-0"

- ALL DOORS SHALL HAVE LEVER TYPE HARDWARE SEE PLAN FOR DOOR SWING.
- SEE FLOOR PLANS FOR ACTIVE LEAF LOCATIONS.
- ALL EXTERIOR DOORS TO HAVE DEADBOLTS WITH INTERIOR THUMB LATCH
- PROVIDE 3/4" MIN. CLEARANCE OPENING WIDTH AT ALL ENTRY DOORS
- SLIDING GLASS DOORS ARE PROHIBITED

EXTERIOR
1 3/4" HOLLOW METAL GALVANIZED 6-PANEL DOOR W/ SPLIT-JAMB METAL FRAME AT RATED DOORS & SPLIT-JAMB WOOD FRAME AT NON-RATED DOORS
1 3/4" HOLLOW METAL INSULATED FULL LITE DOOR W/ CLEAR TEMP. GLASS - W/ SPLIT-JAMB WOOD FRAME
1 3/4" HOLLOW METAL INSULATED FULL LITE DOOR W/ CLEAR TEMP. GLASS - W/ SPLIT-JAMB WOOD FRAME
1 3/8" 6-PANEL PAINT-GRADE HOLLOW CORE WOOD DOOR W/ SPLIT-JAMB WOOD FRAME
1 3/8" FLUSH PAINT-GRADE HOLLOW CORE WOOD DOOR W/ SPLIT-JAMB WOOD FRAME
1 3/8" FLUSH PAINT-GRADE HOLLOW CORE WOOD DOOR W/ SPLIT-JAMB WOOD FRAME

INTERIOR
1 3/8" 6-PANEL PAINT-GRADE HOLLOW CORE WOOD DOOR W/ SPLIT-JAMB WOOD FRAME
1 3/8" HOLLOW METAL INSULATED FULL LITE DOOR W/ CLEAR TEMP. GLASS - W/ SPLIT-JAMB WOOD FRAME

WINDOW SCHEDULE

1/4" = 1'-0"

- ALL UNITS SHOWN ARE VINYL AS SELECTED BY ARCHITECT
- GLASS TO HAVE A U-VALUE OF 0.55 OR LESS, SHGC OF 0.29 OR LESS AND VT RATING OF 0.52 OR MORE
- LOW-E GLASS REQ'D
- AT BUILDINGS A & B, LEVEL 1 SILL HEIGHT IS 2'-0"; AT LEVELS 2 & 3, SILL HEIGHT IS 3'-0 1/2".

WINDOW TYPES
SINGLE HUNG (A)
FIXED (B)
CASEMENT (A1)

FRAME DETAILS (A)

FRAME DETAILS (B)

FRAME DETAILS (C)

DOOR IN DRAFTSTOP PARTITION

1 1/2" = 1'-0"

19 DOOR IN DRAFTSTOP PARTITION
1 1/2" = 1'-0"

15 EXT. WINDOW HEAD AT BRICK
3" = 1'-0"

18 EXT. WINDOW HEAD AT SIDING
3" = 1'-0"

17 EXT. WINDOW JAMB AT SIDING
3" = 1'-0"

16 EXT. WINDOW SILL AT SIDING
3" = 1'-0"

14 EXT. WINDOW JAMB AT BRICK
3" = 1'-0"

13 EXT. WINDOW SILL AT BRICK
3" = 1'-0"

12 EXT. DOOR HEAD AT SIDING
3" = 1'-0"

11 EXT. DOOR JAMB AT SIDING
3" = 1'-0"

10 EXT. DOOR SILL AT SIDING
3" = 1'-0"

9 EXT. DOOR HEAD AT BRICK
3" = 1'-0"

8 EXT. DOOR JAMB AT BRICK
3" = 1'-0"

7 EXT. DOOR SILL AT BRICK
3" = 1'-0"

6 INT. DOOR HEAD
3" = 1'-0"

5 INT. DOOR JAMB
3" = 1'-0"

4 TYP SEALANT DETAIL
3" = 1'-0"

3 DOOR STRIKE DETAIL
1/4" = 1'-0"

2 DOOR STOP DETAIL
1 1/2" = 1'-0"

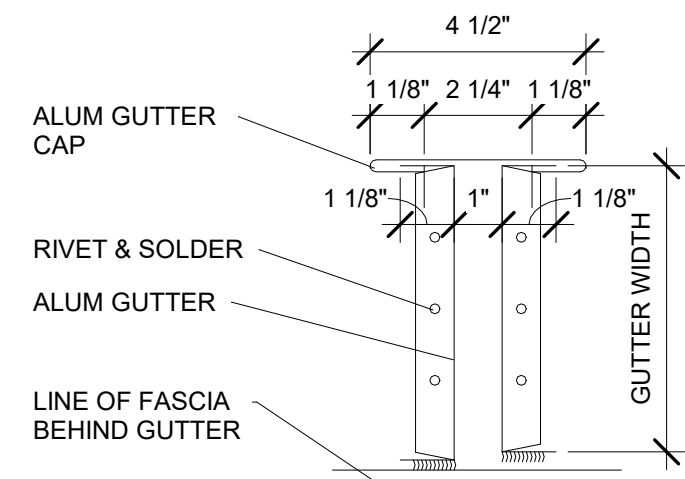
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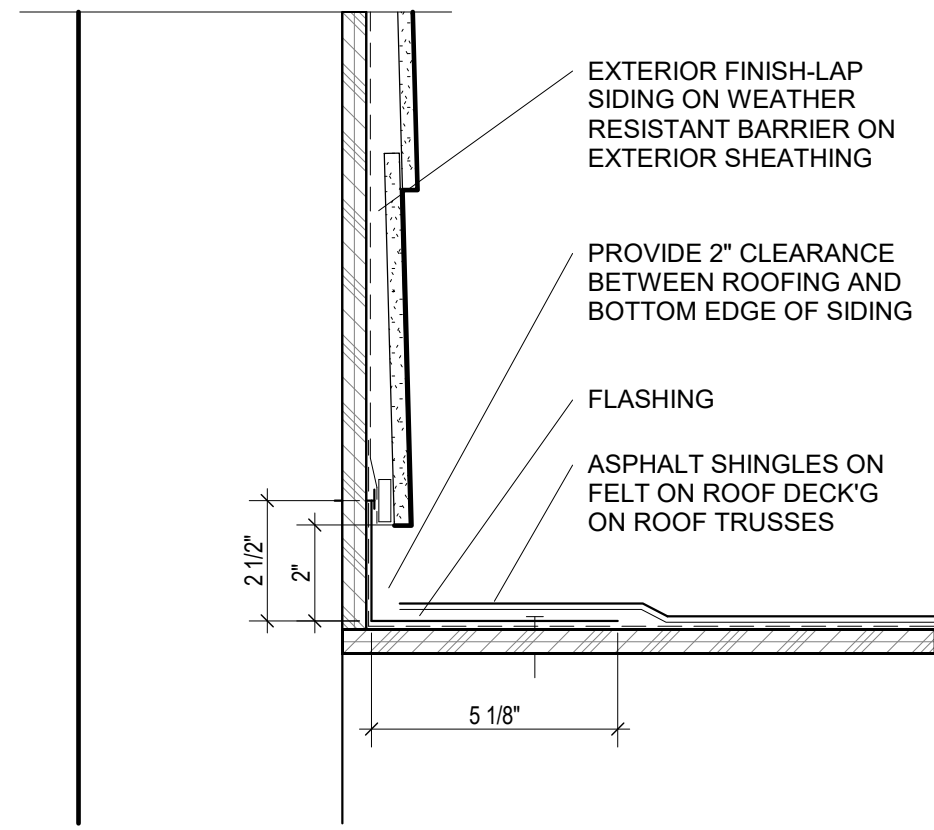
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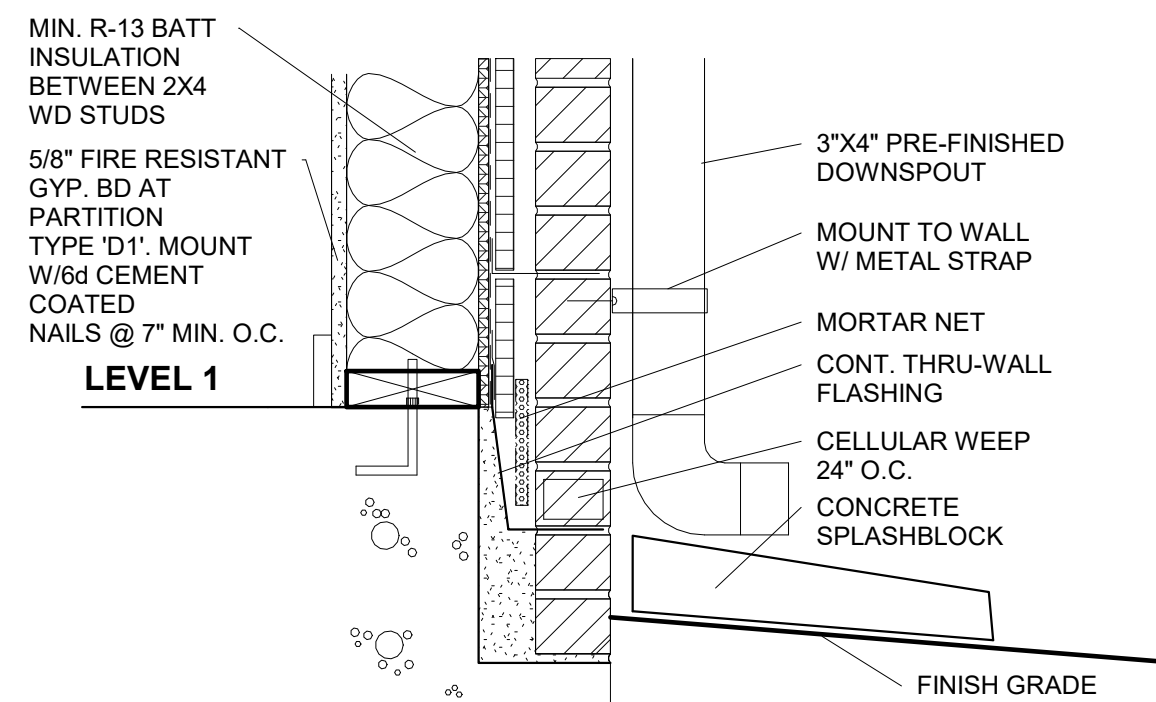
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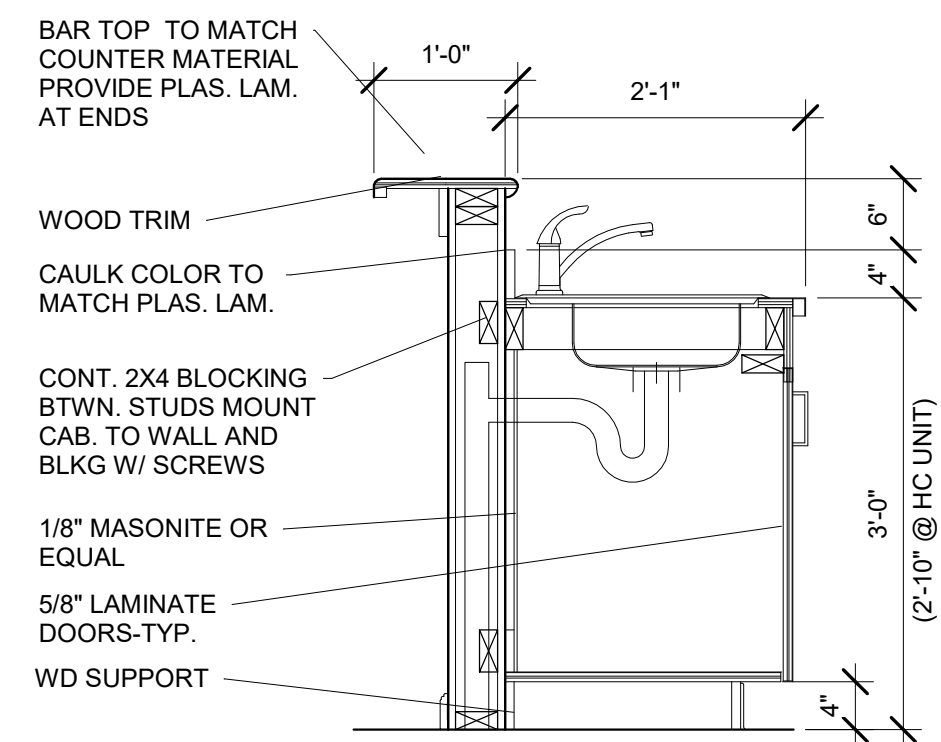
17 GUTTER EXPANSION JOINT
A3 3" = 1'-0"



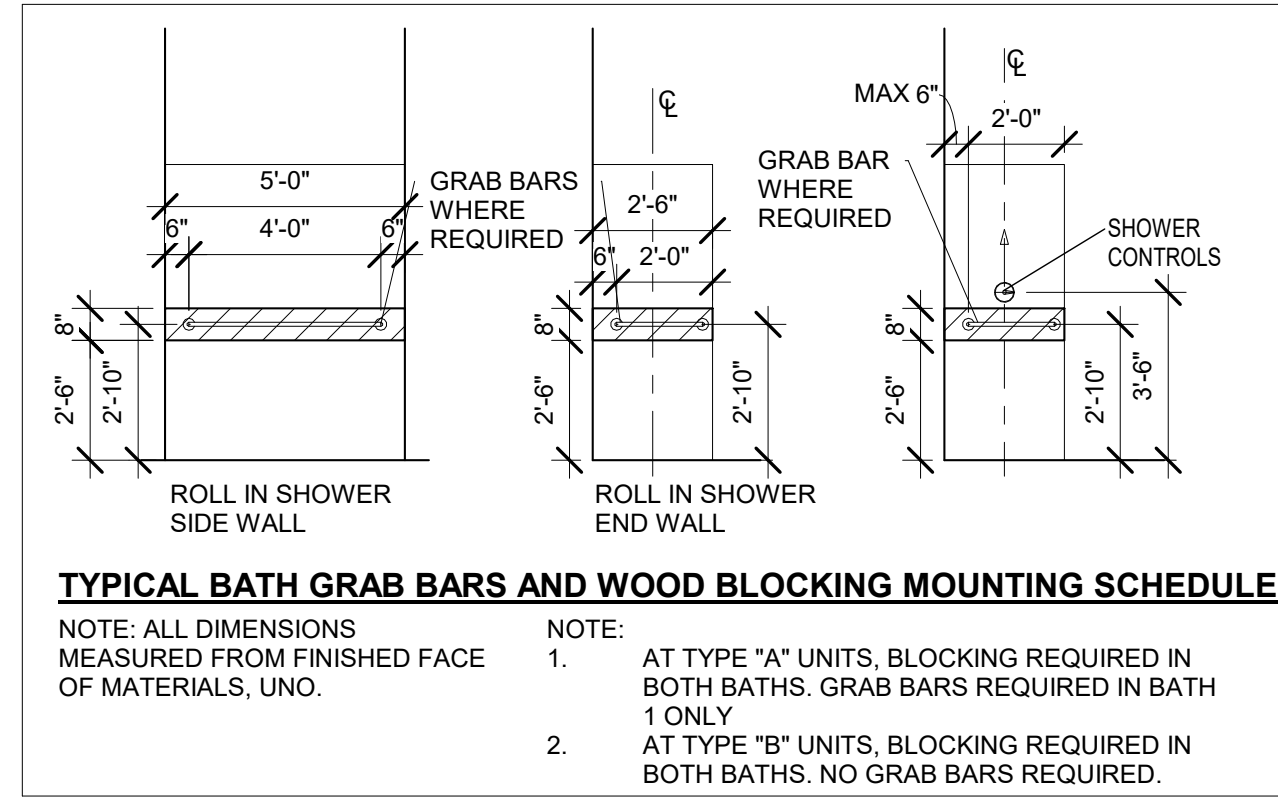
16 ROOF/WALL FLASHING
A3 3" = 1'-0"



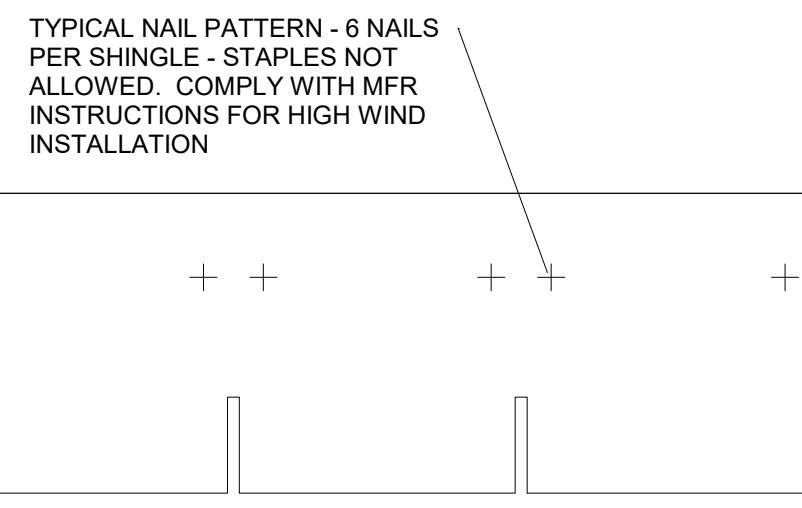
15 TYP. DOWNSPOUT & SPLASHBLOCK
A3 1 1/2" = 1'-0"



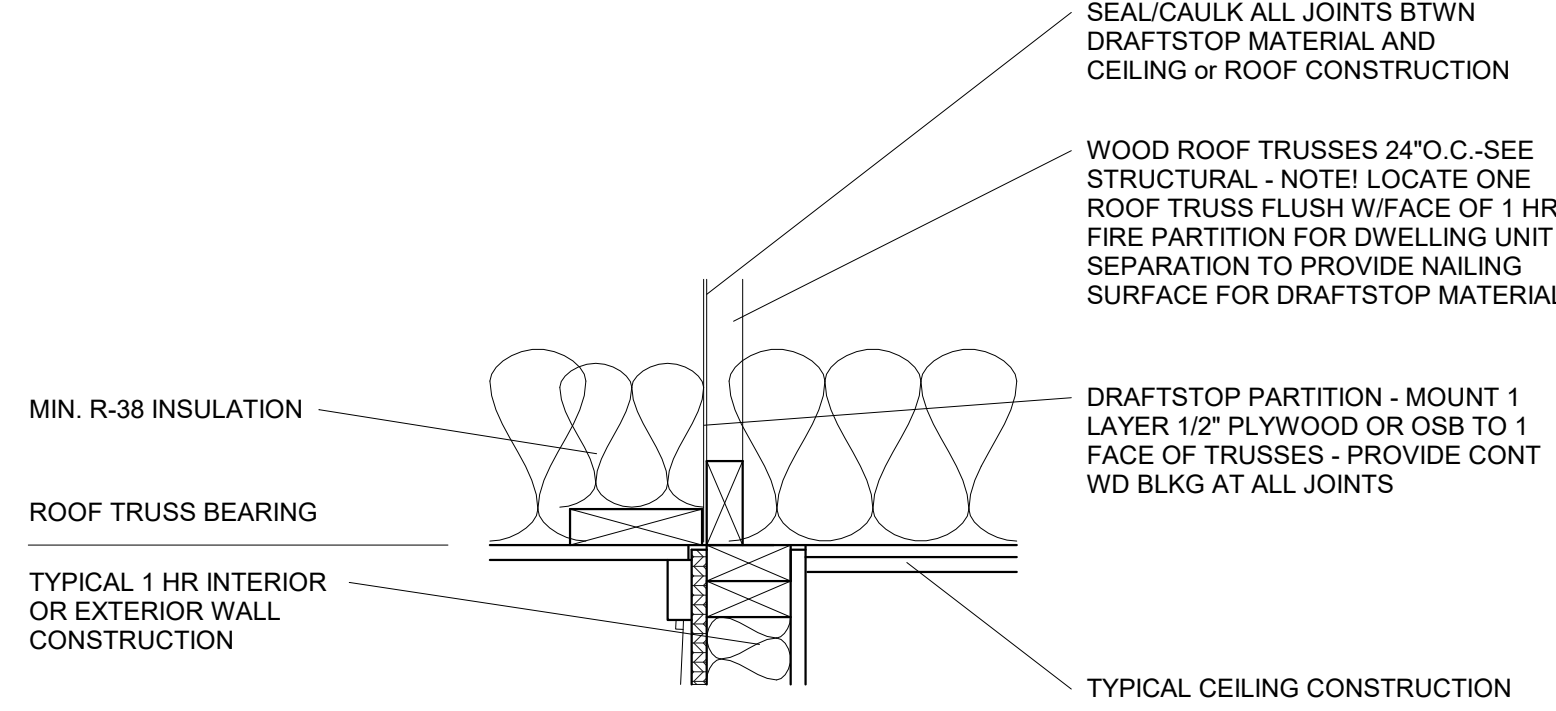
14 KITCHEN CABINET - BAR
A3 3/4" = 1'-0"



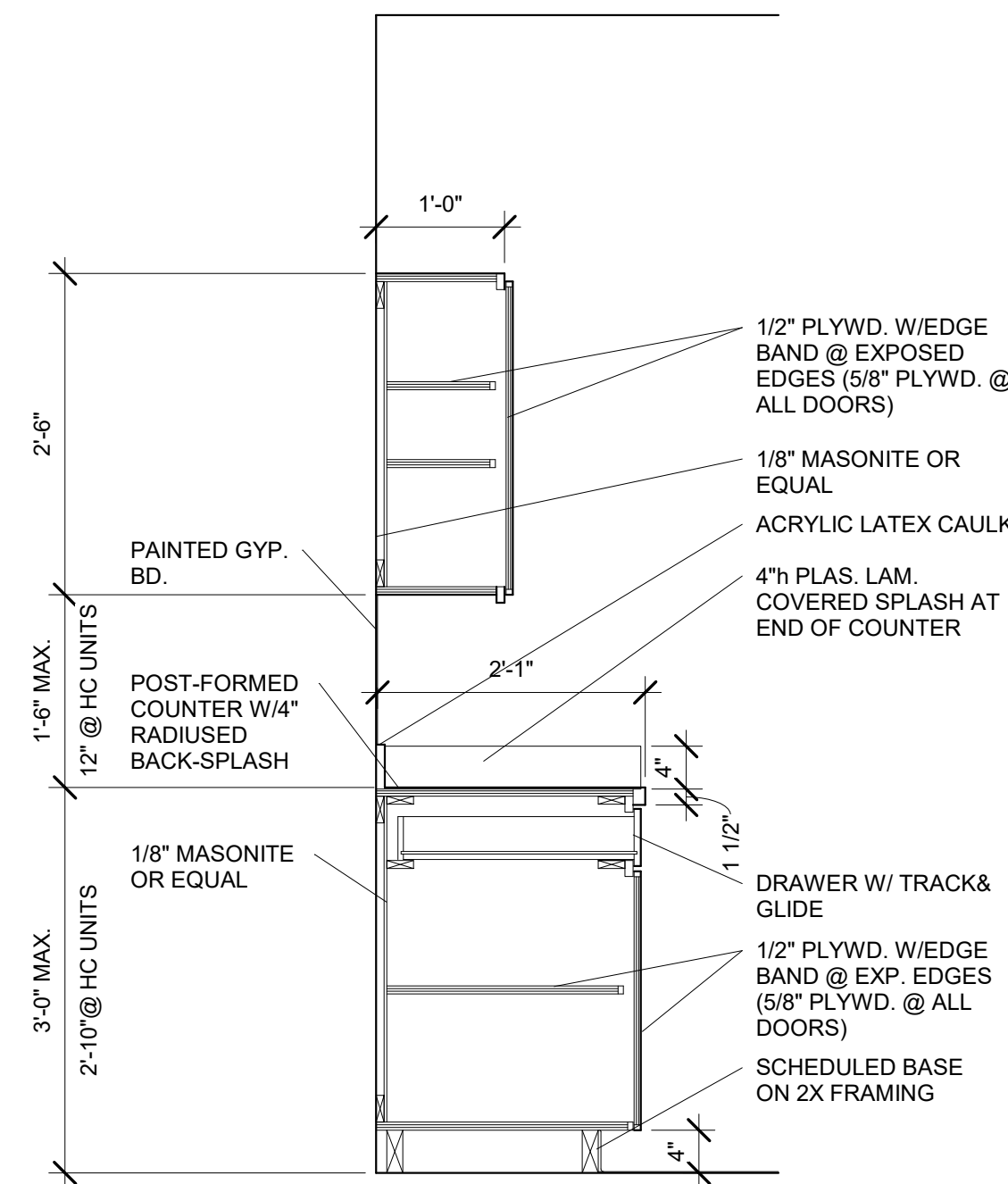
13 TYPICAL GRAB BAR MOUNTING SCHEDULE FOR ROLL-IN SHOWER
A3 1/4" = 1'-0"



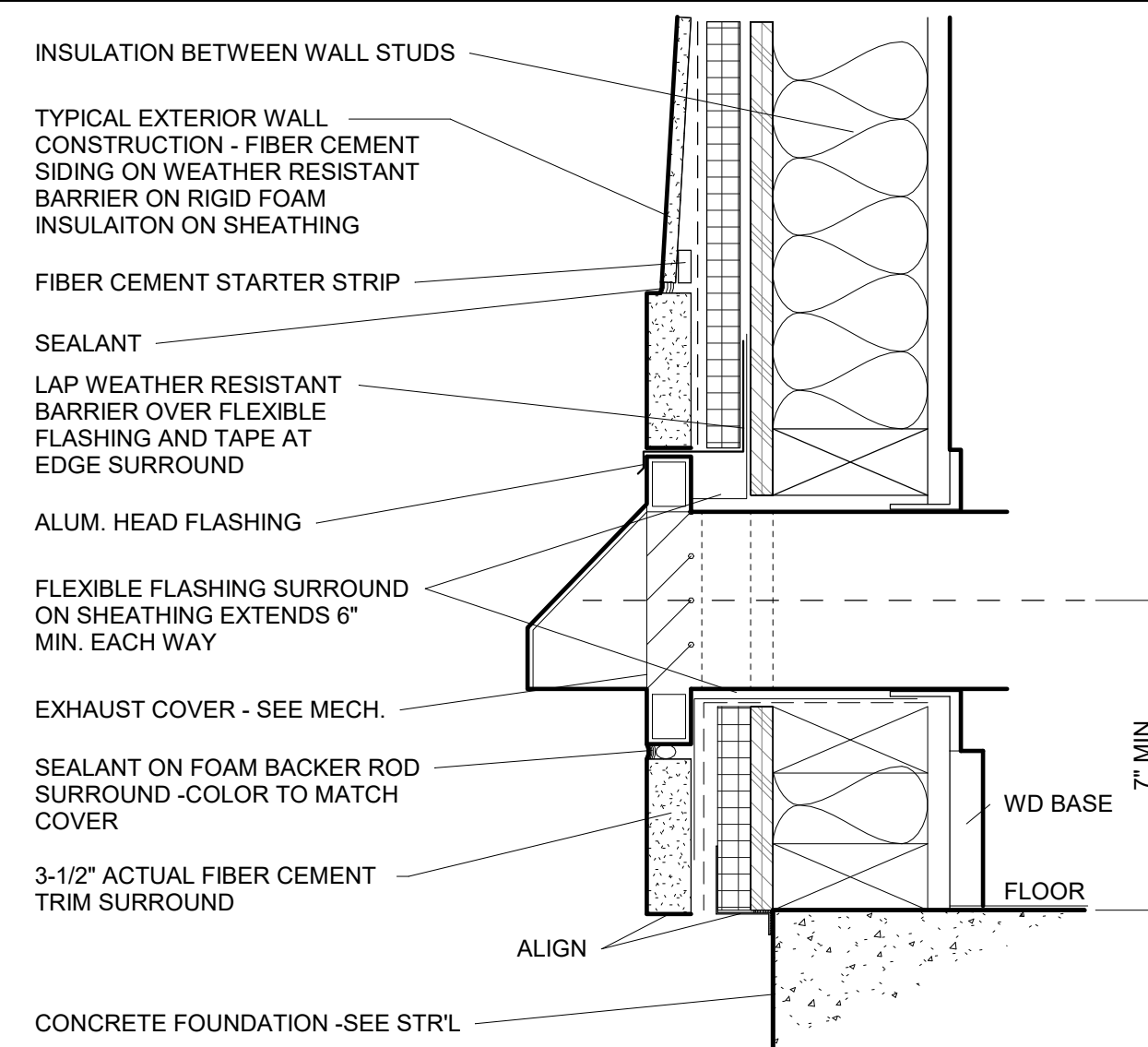
12 SHINGLE NAILING PATTERN
A3 1 1/2" = 1'-0"



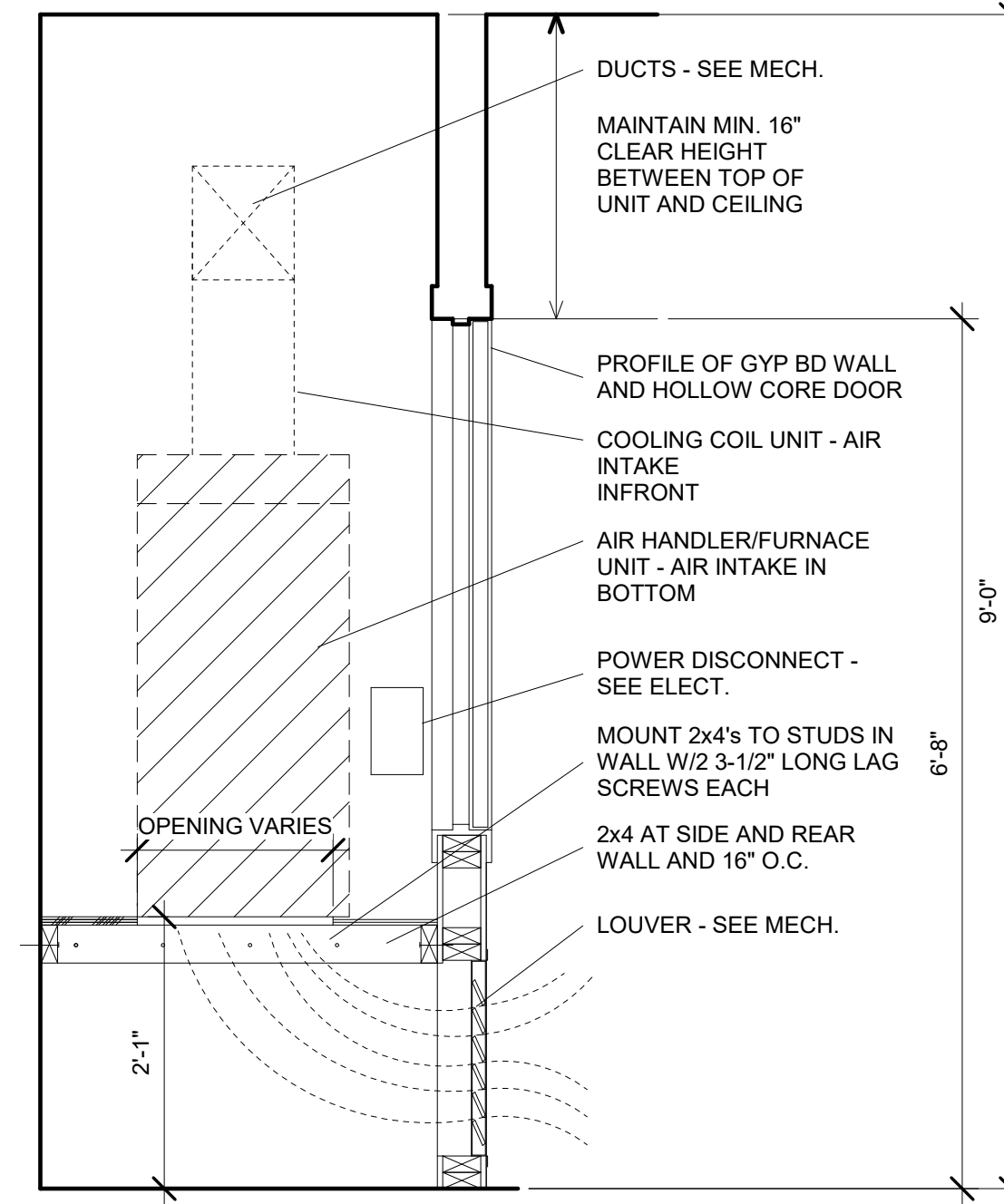
11 DRAFTSTOP PARTITION AT 1HR WALL
A3 1 1/2" = 1'-0"



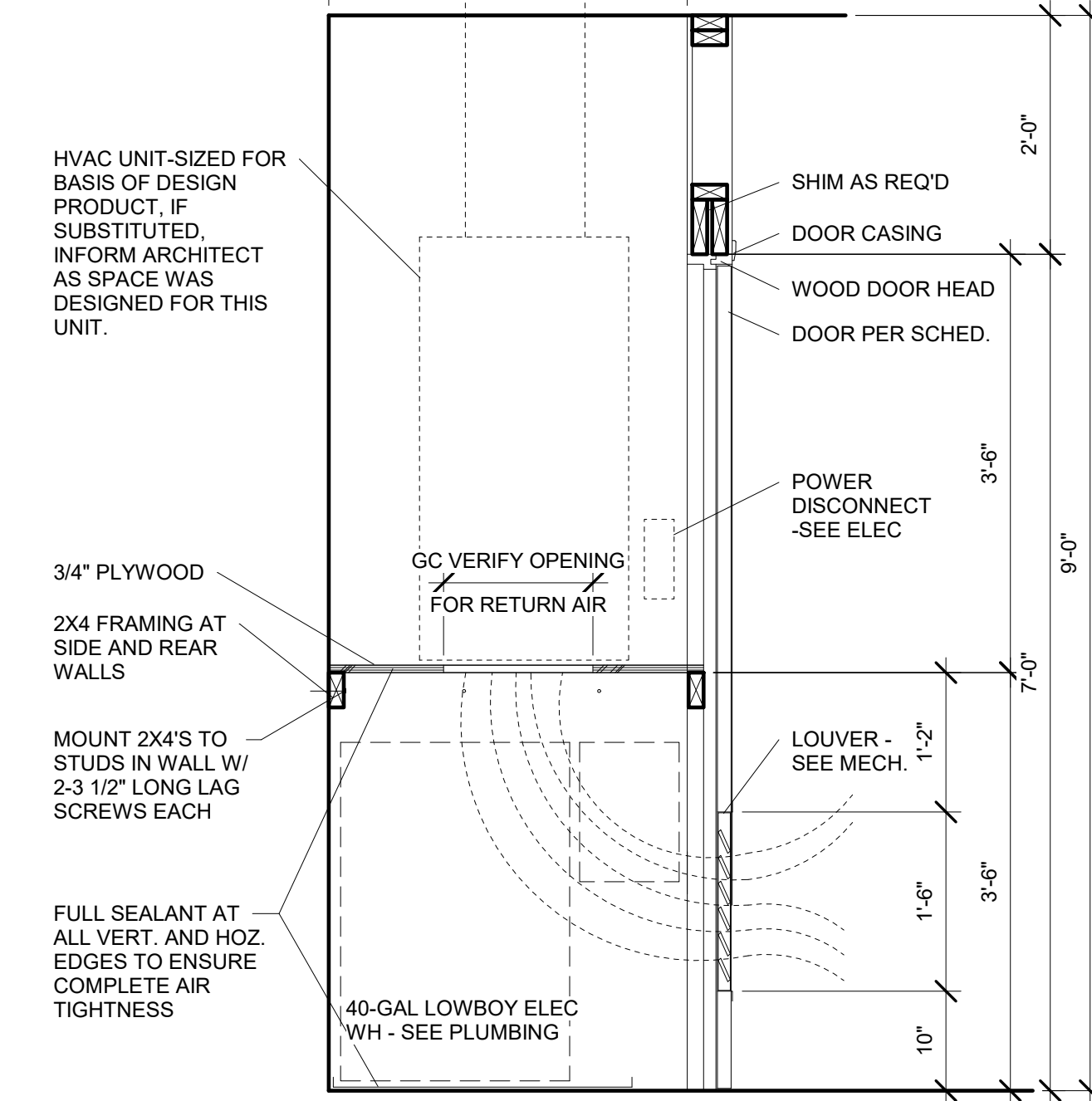
10 KITCHEN CABINET
A3 3/4" = 1'-0"



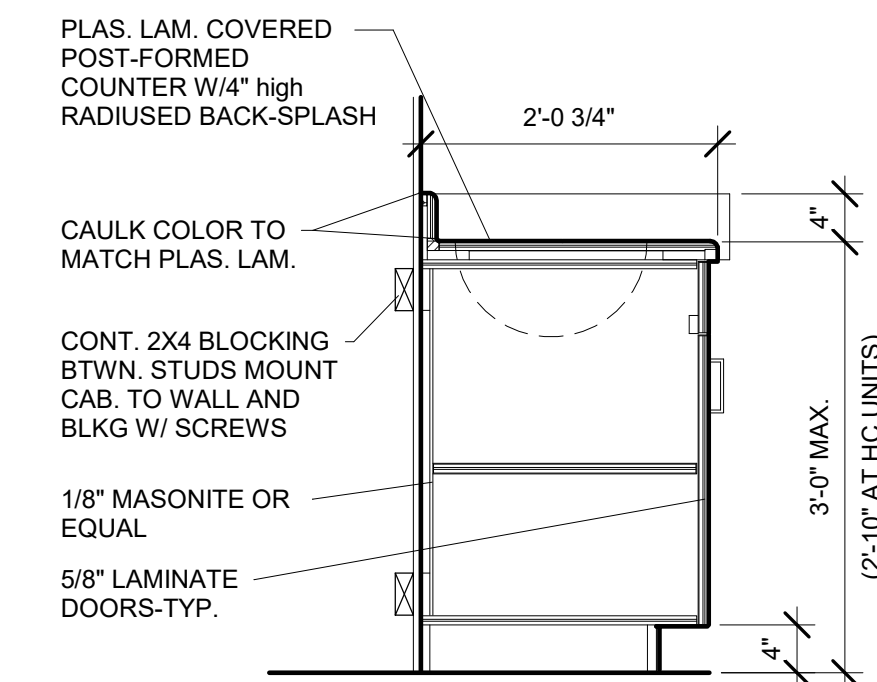
9 EXHAUST DETAIL
A3 3" = 1'-0"



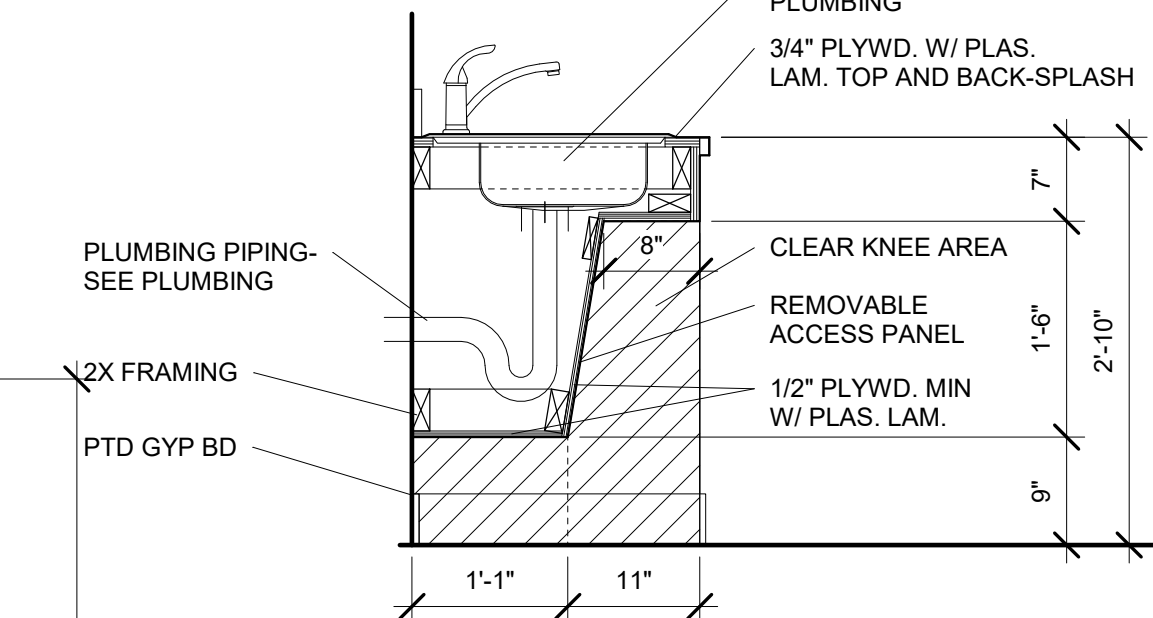
8 MECHANICAL CLOSET SECTION
A3 3/4" = 1'-0"



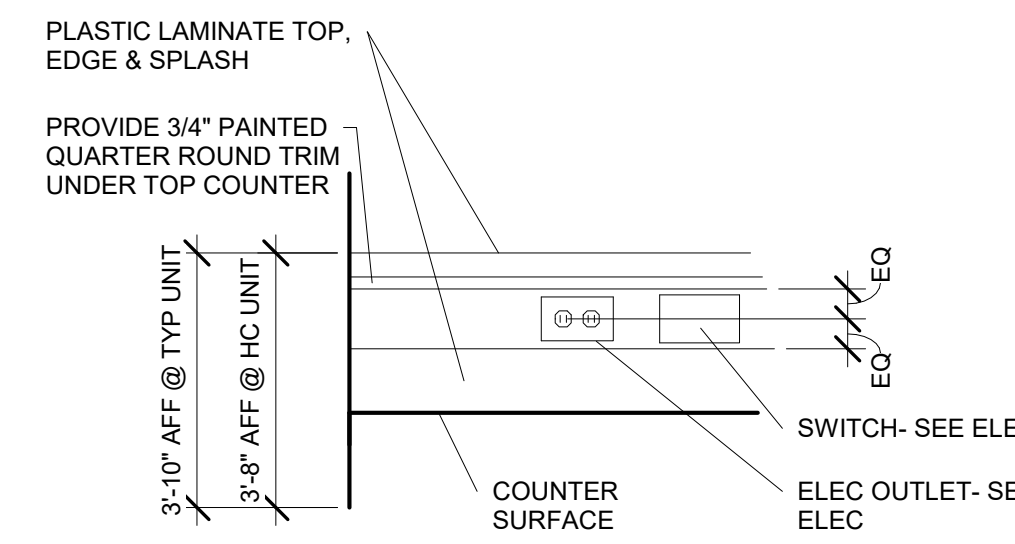
7 MECHANICAL CLOSET WITH WATER HEATER
A3 3/4" = 1'-0"



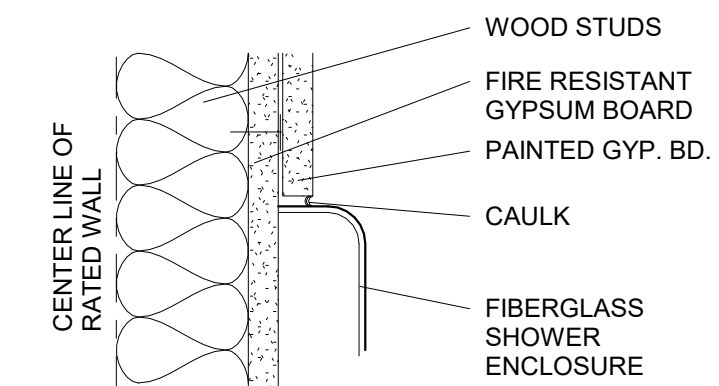
6 LAVATORY CABINETS
A3 3/4" = 1'-0"



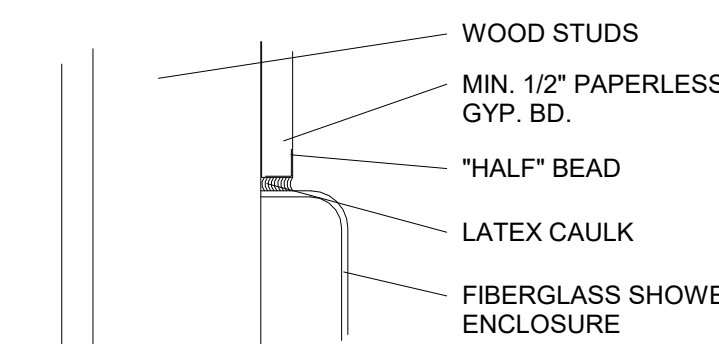
5 HC KITCHEN SINK
A3 3/4" = 1'-0"



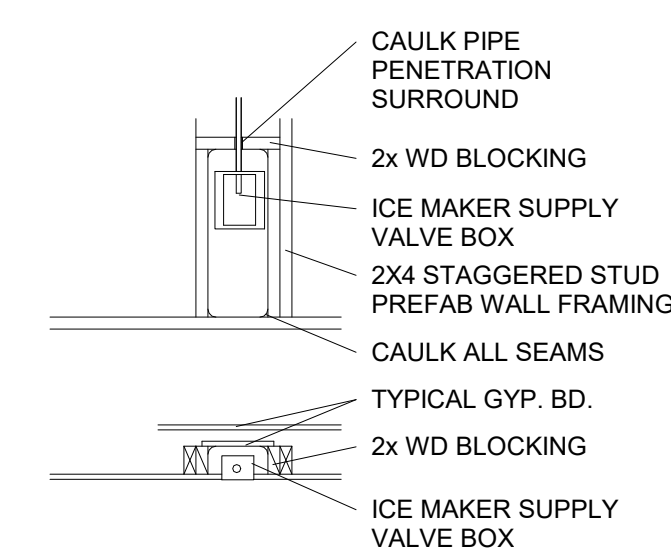
4 ELEC. OUTLET LOCATION
A3 1/4" = 1'-0"



3 SHOWER ENCLOSURE AT RATED WALL
A3 3" = 1'-0"



2 SHOWER ENCLOSURE AT TYPICAL INTERIOR WALL
A3 3" = 1'-0"



1 ICE MAKER SUPPLY
A3 1/2" = 1'-0"



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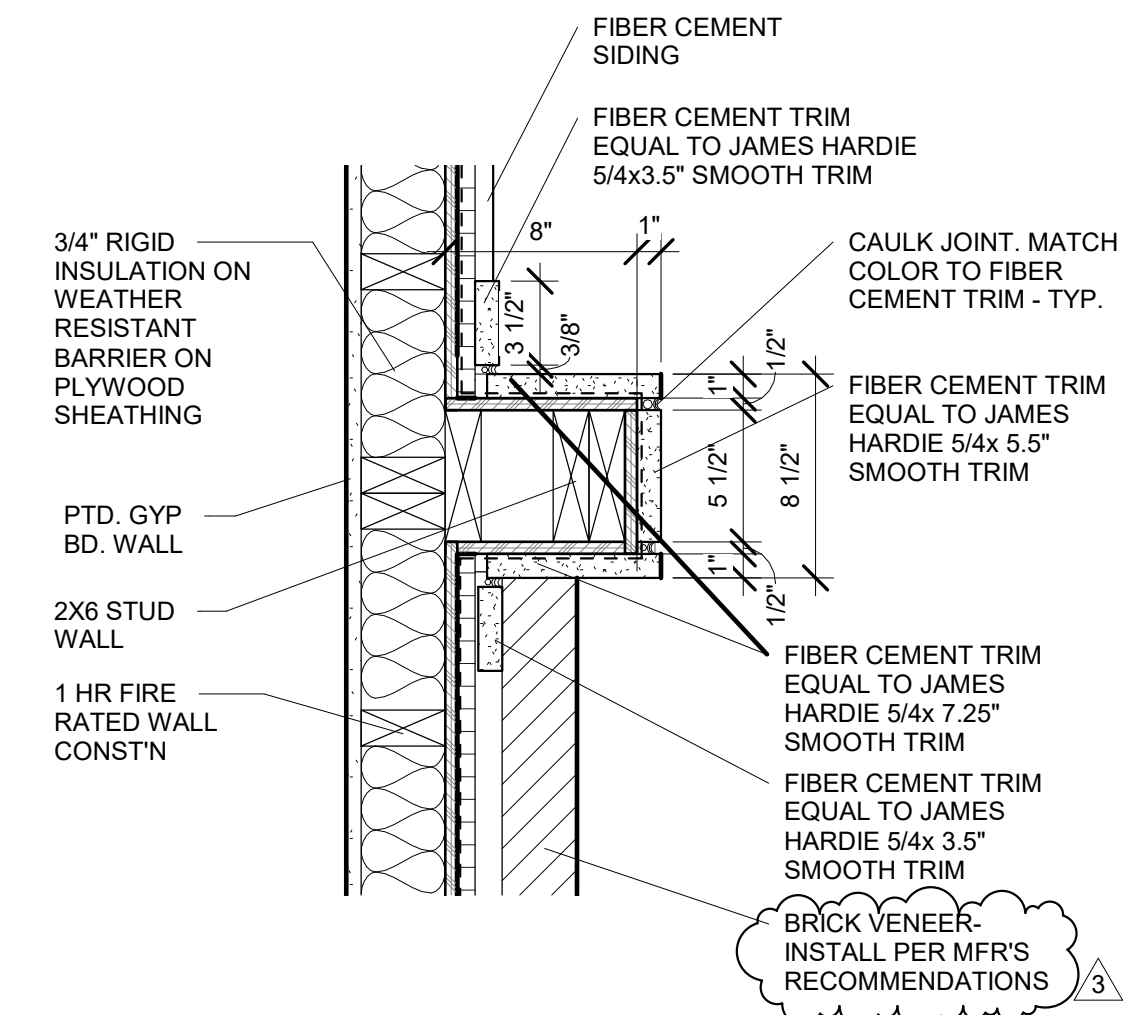
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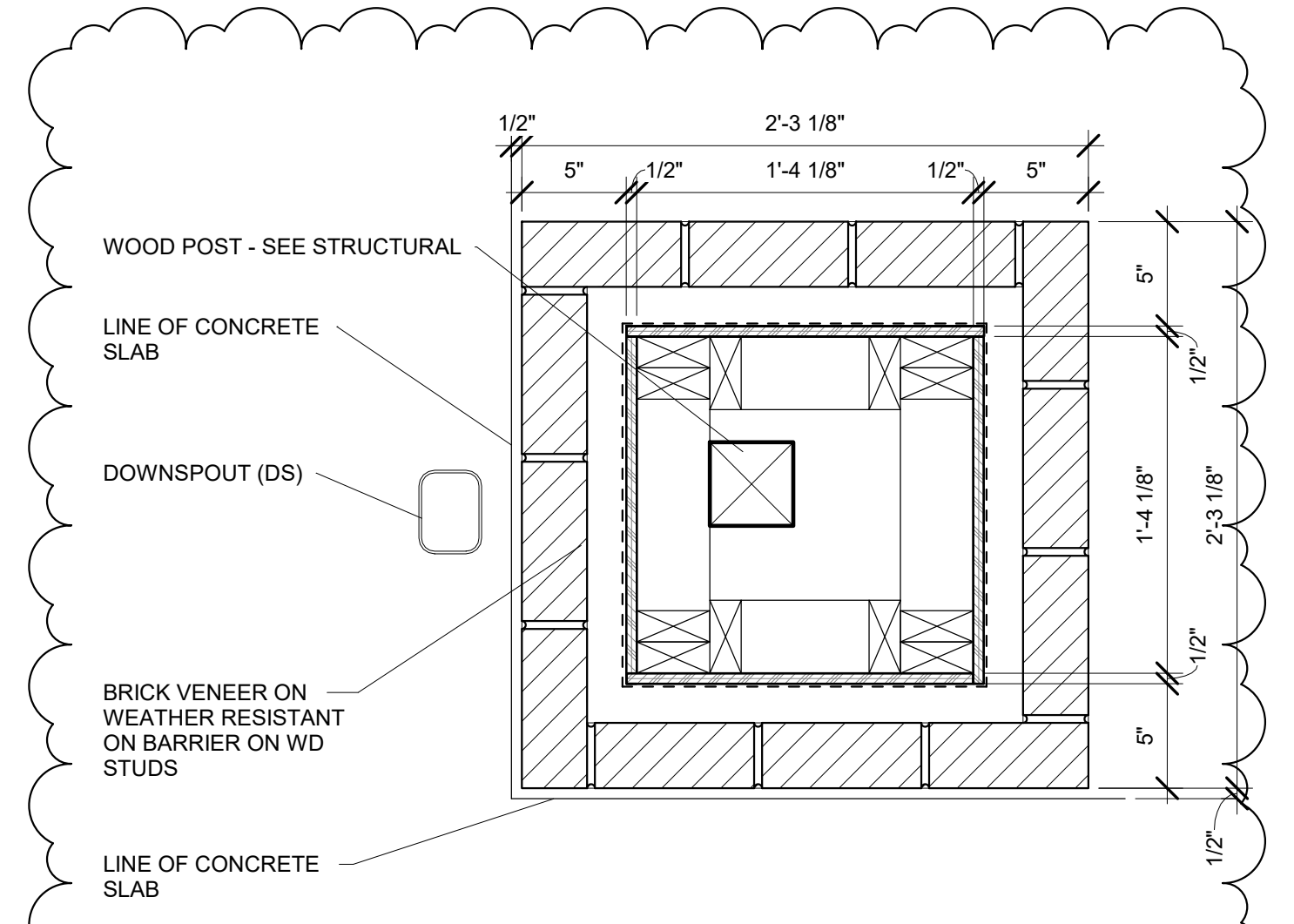
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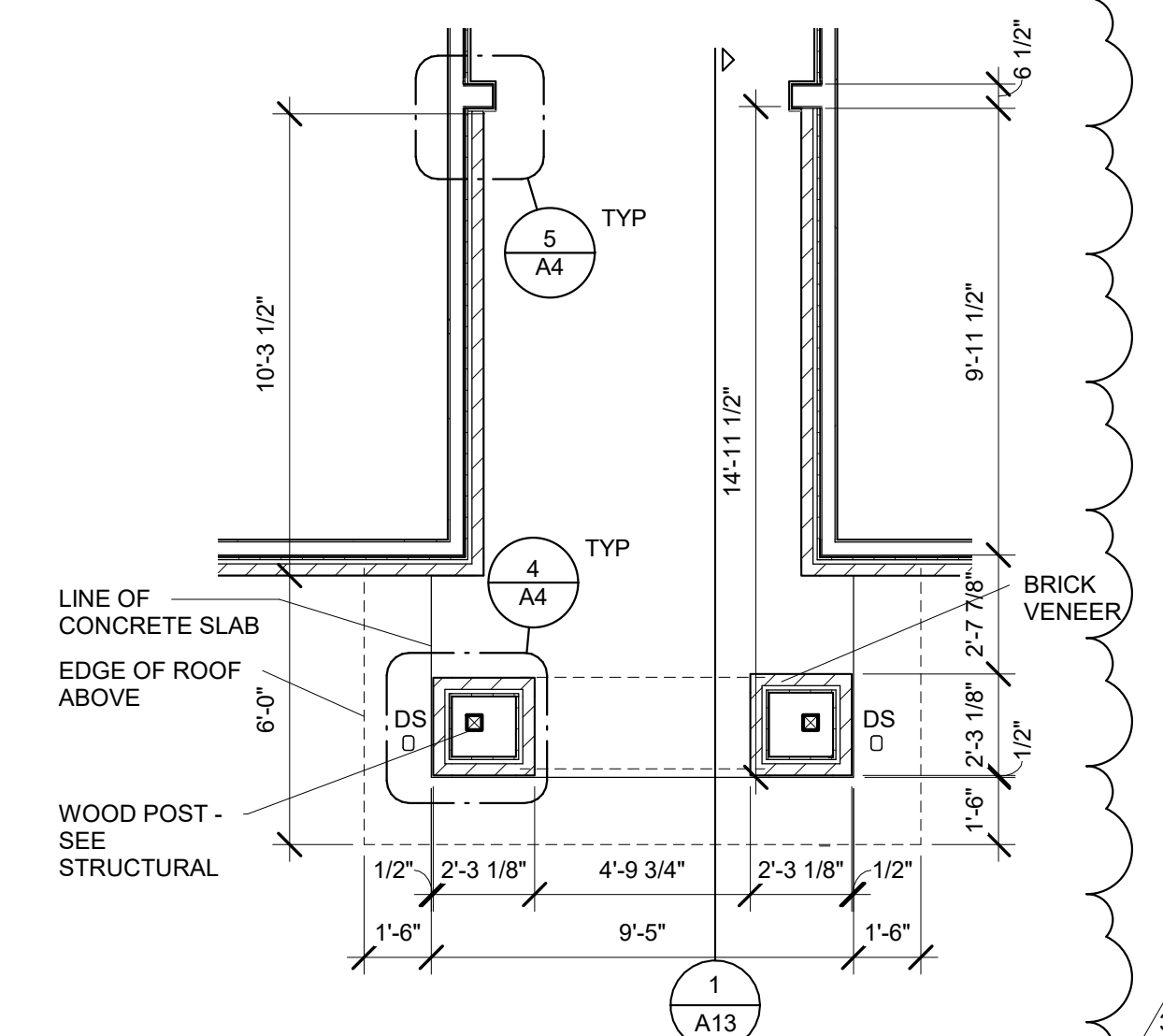
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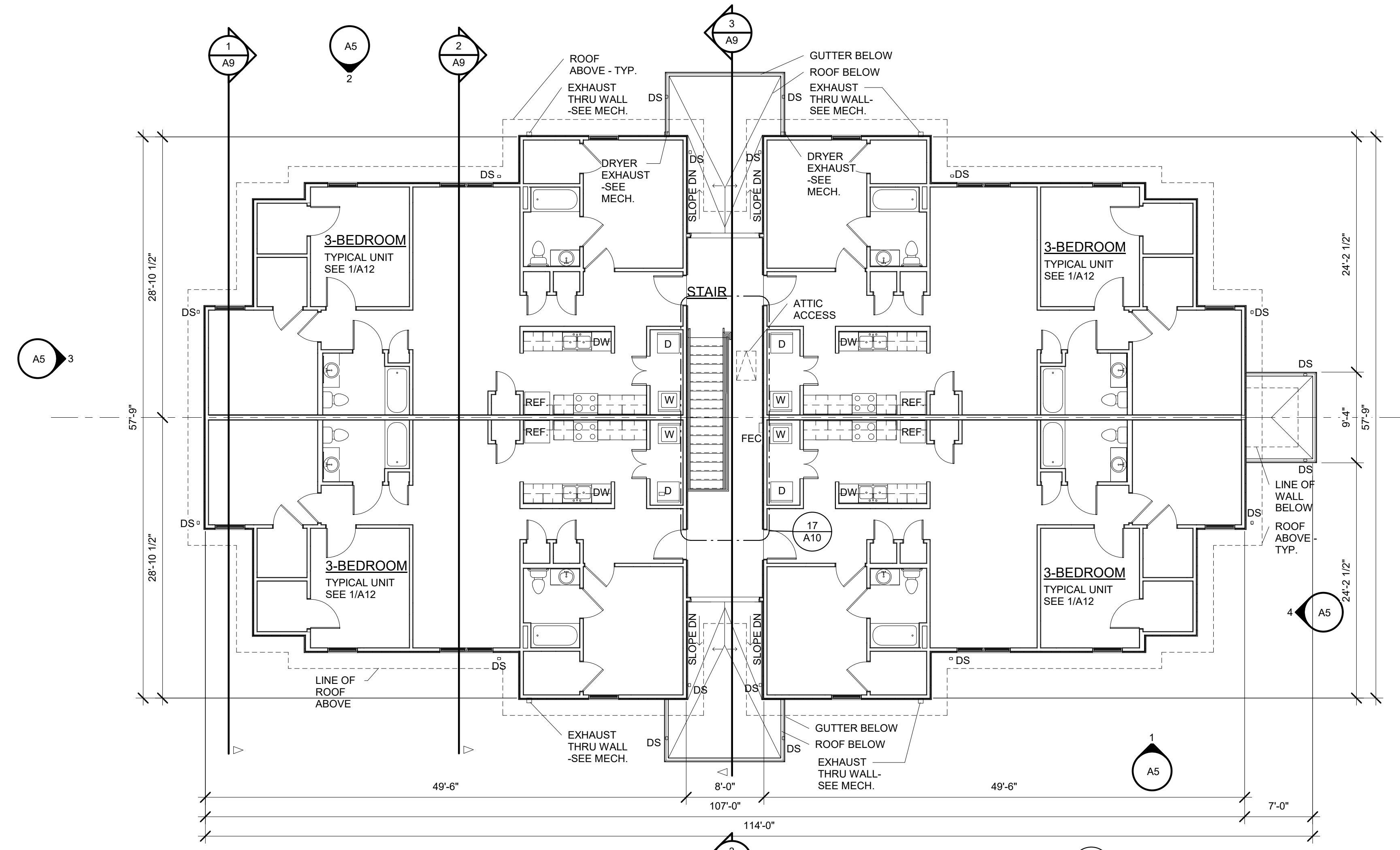
5 BREEZEWAY ENTRY
1 1/2" = 1'-0"



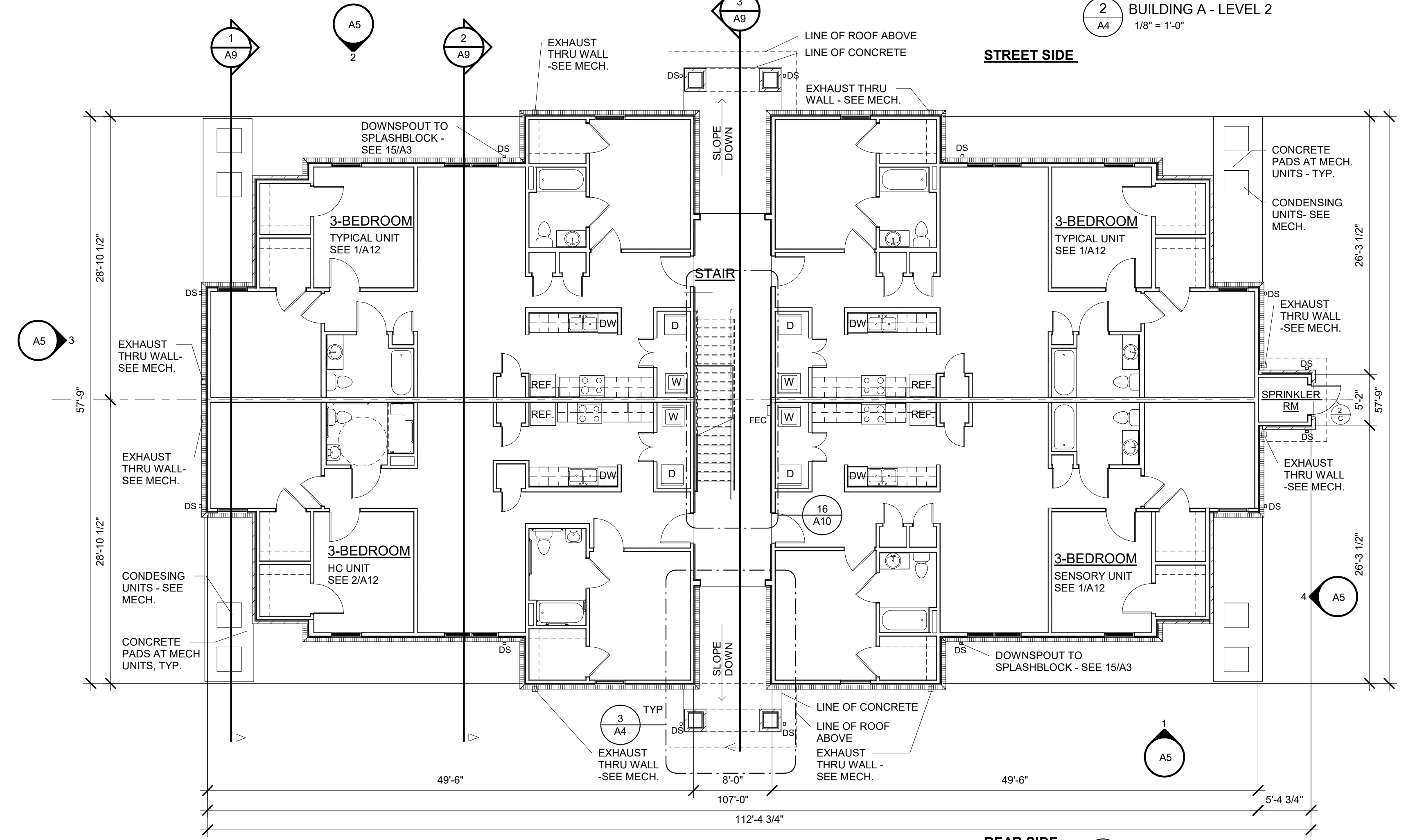
4 COLUMN DETAIL
1 1/2" = 1'-0"



3 CANOPY ENLARGED PLAN
1/4" = 1'-0"



2 BUILDING A - LEVEL 2
1/8" = 1'-0"



1 BUILDING A - LEVEL 1
1/8" = 1'-0"

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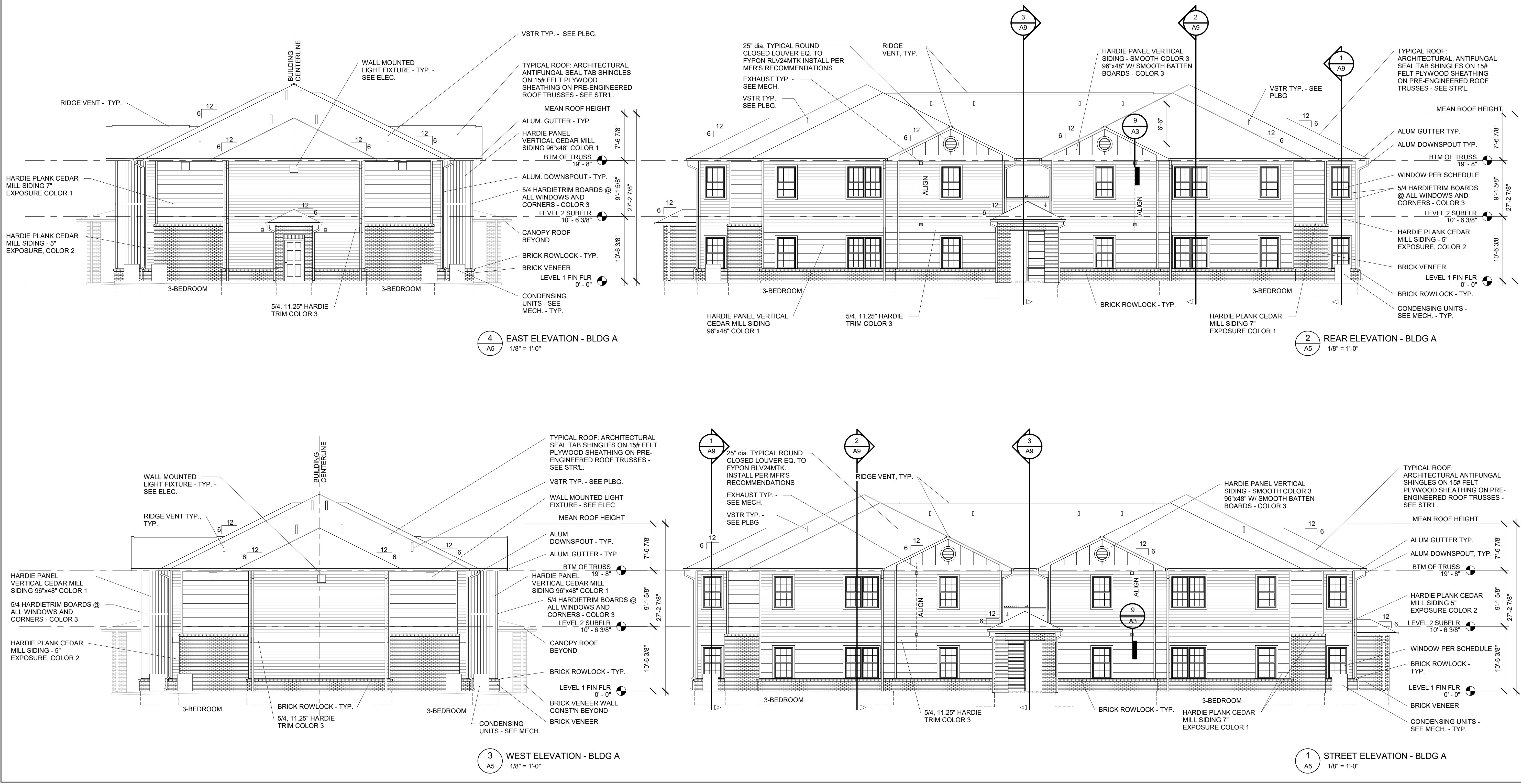
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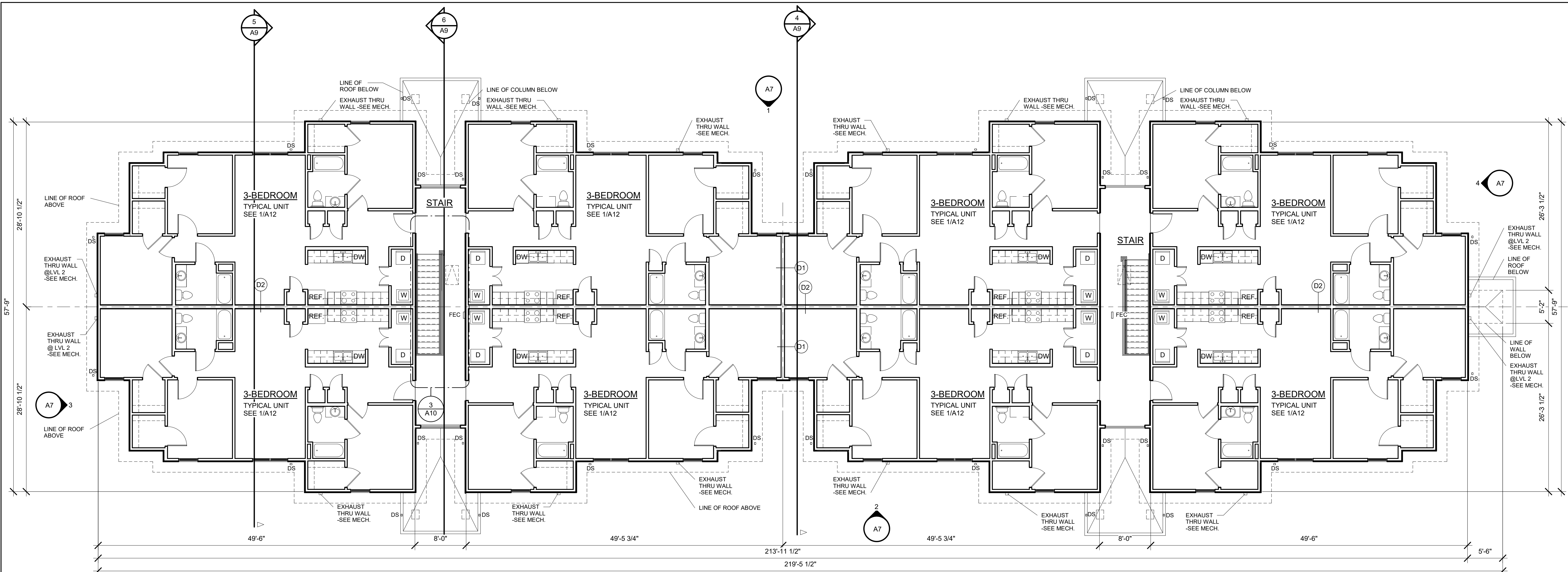
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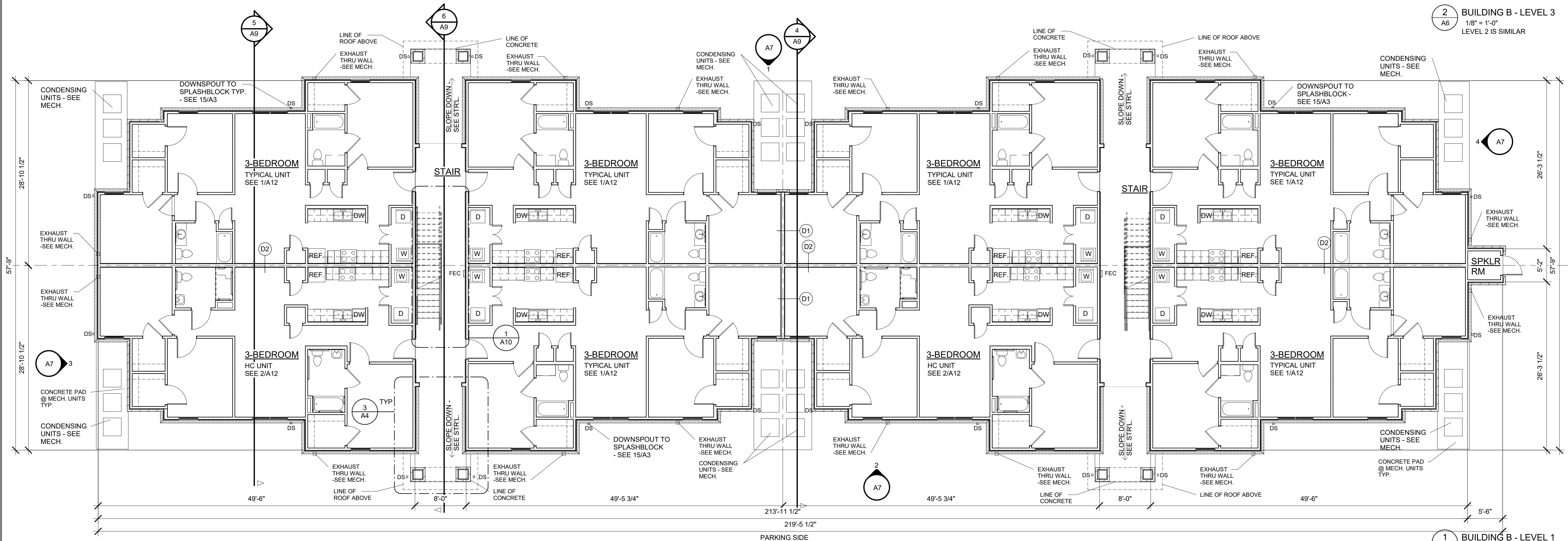
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2 BUILDING B - LEVEL 3
1/8" = 1'-0"
LEVEL 2 IS SIMILAR



1 BUILDING B - LEVEL 1
1/8" = 1'-0"

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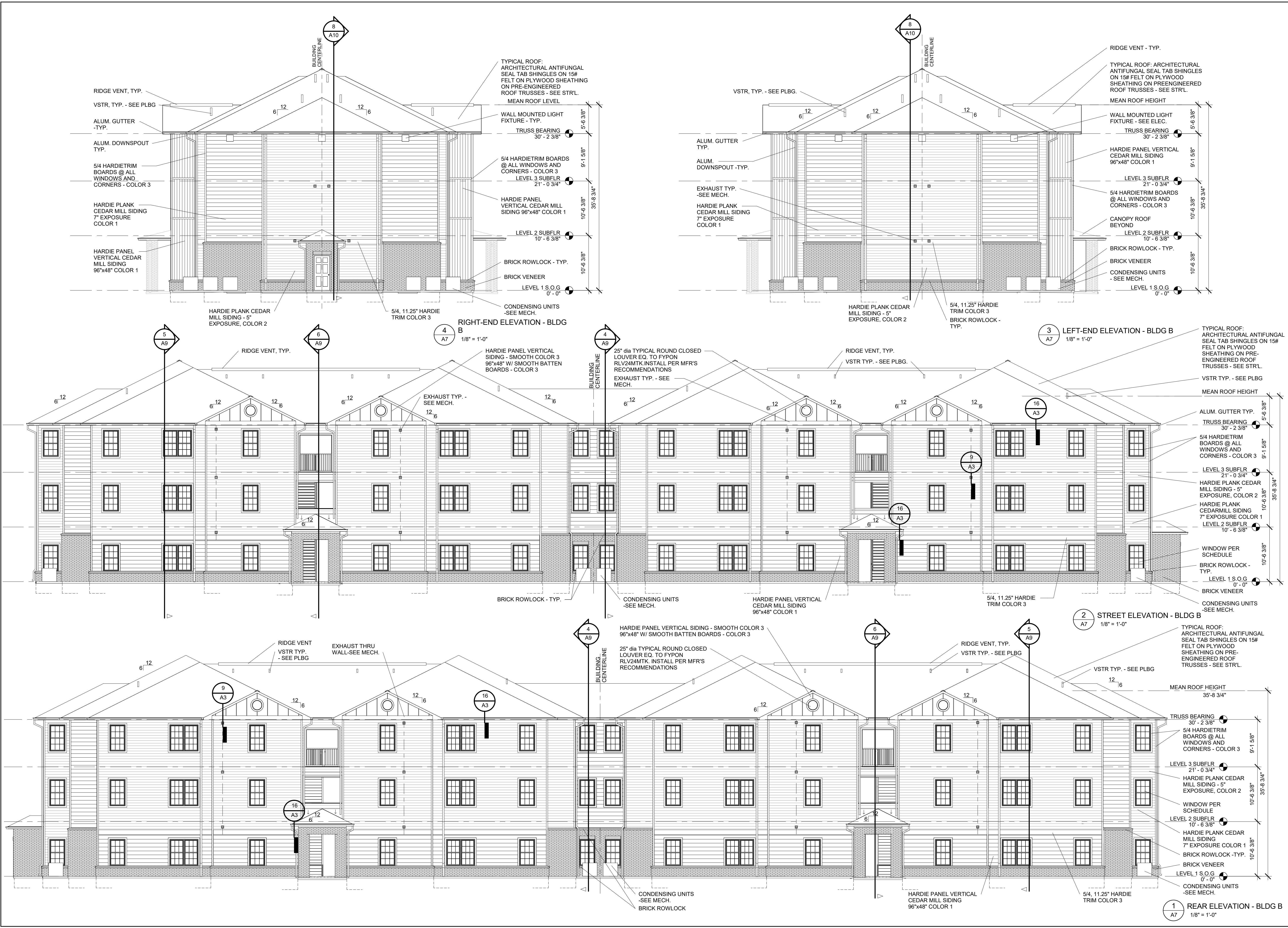
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GENERAL NOTES

1. VENTILATION & DRAINAGE CALCULATIONS ARE ON FILE @ HAPC.

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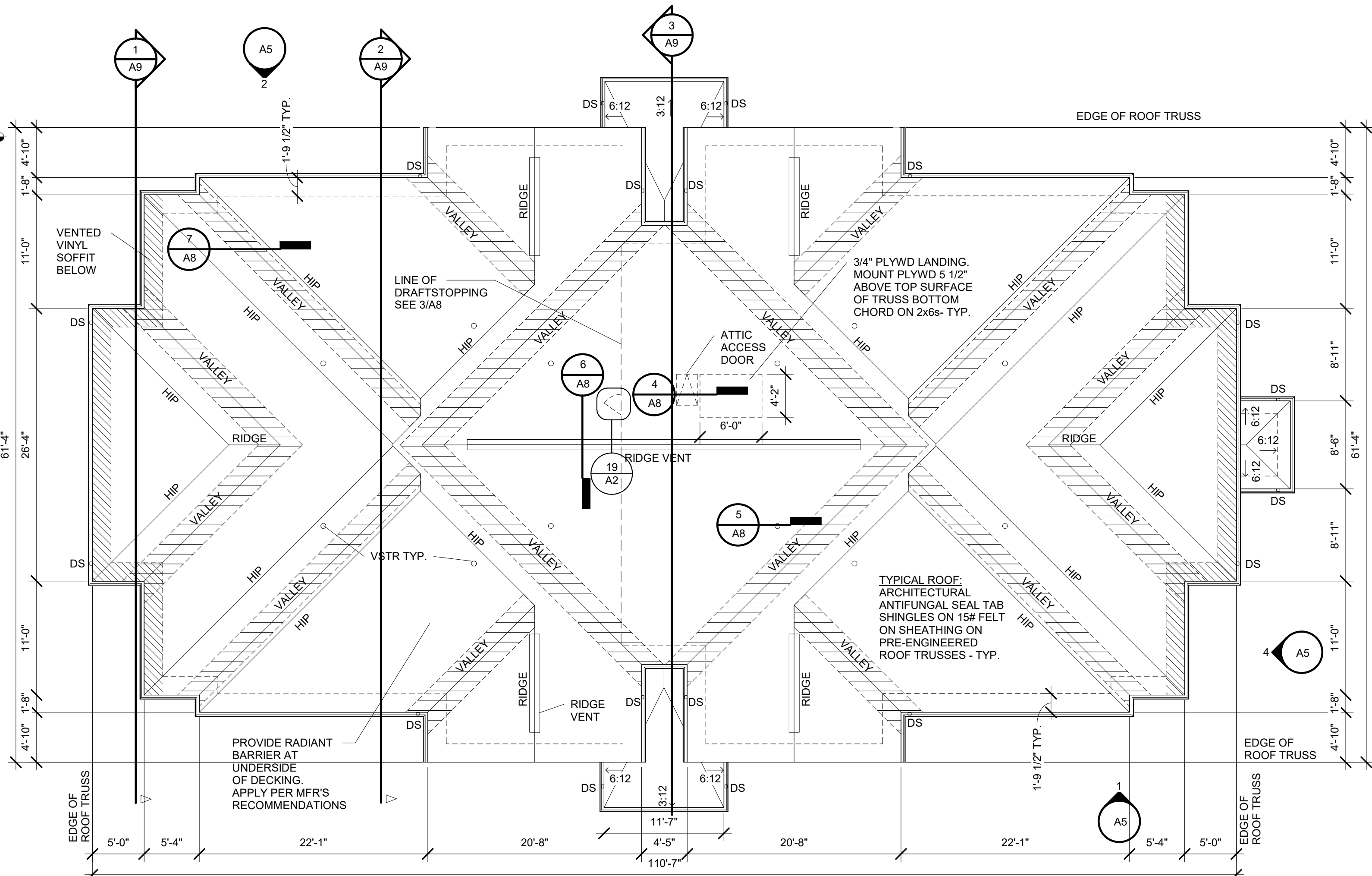
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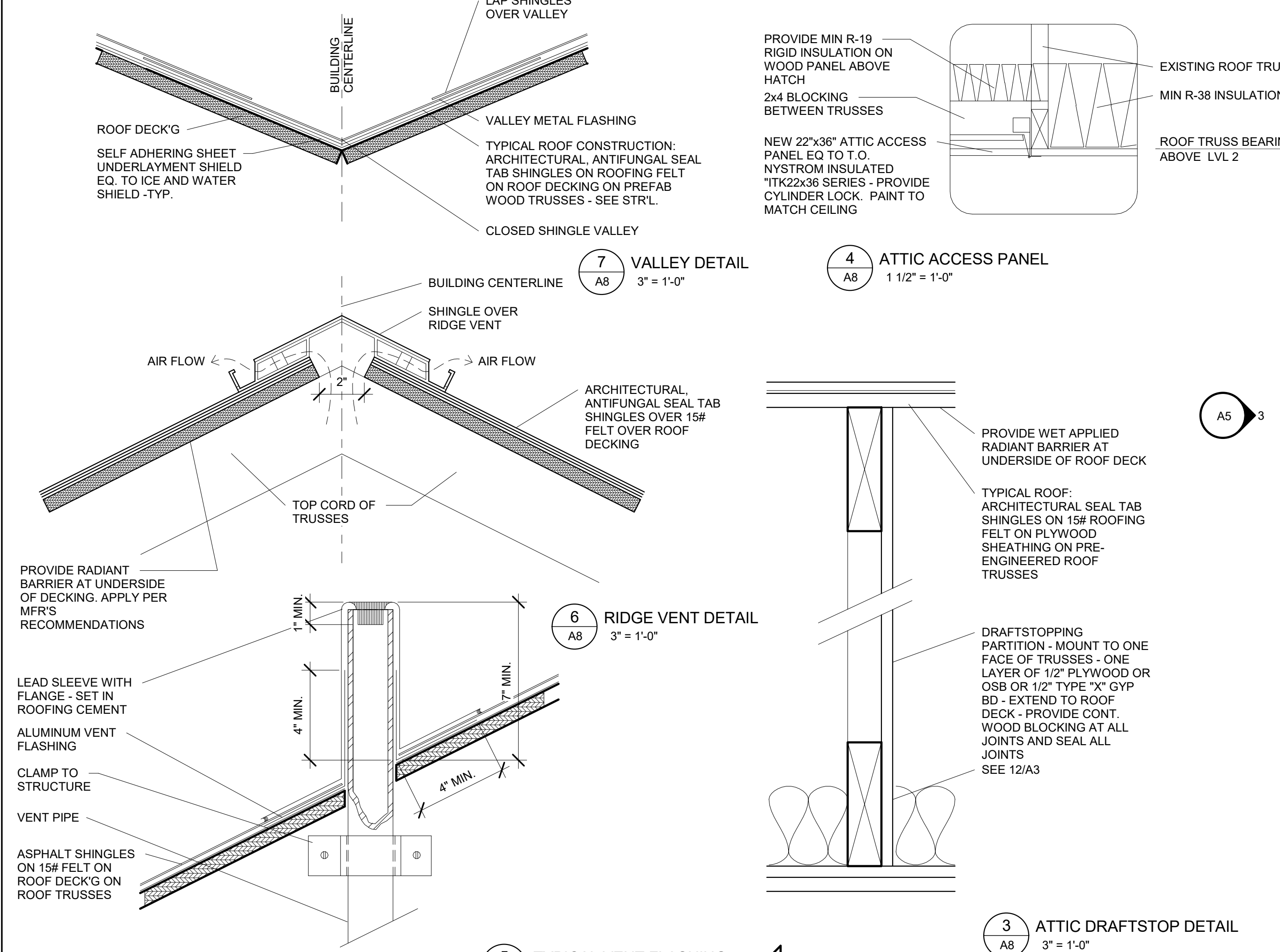
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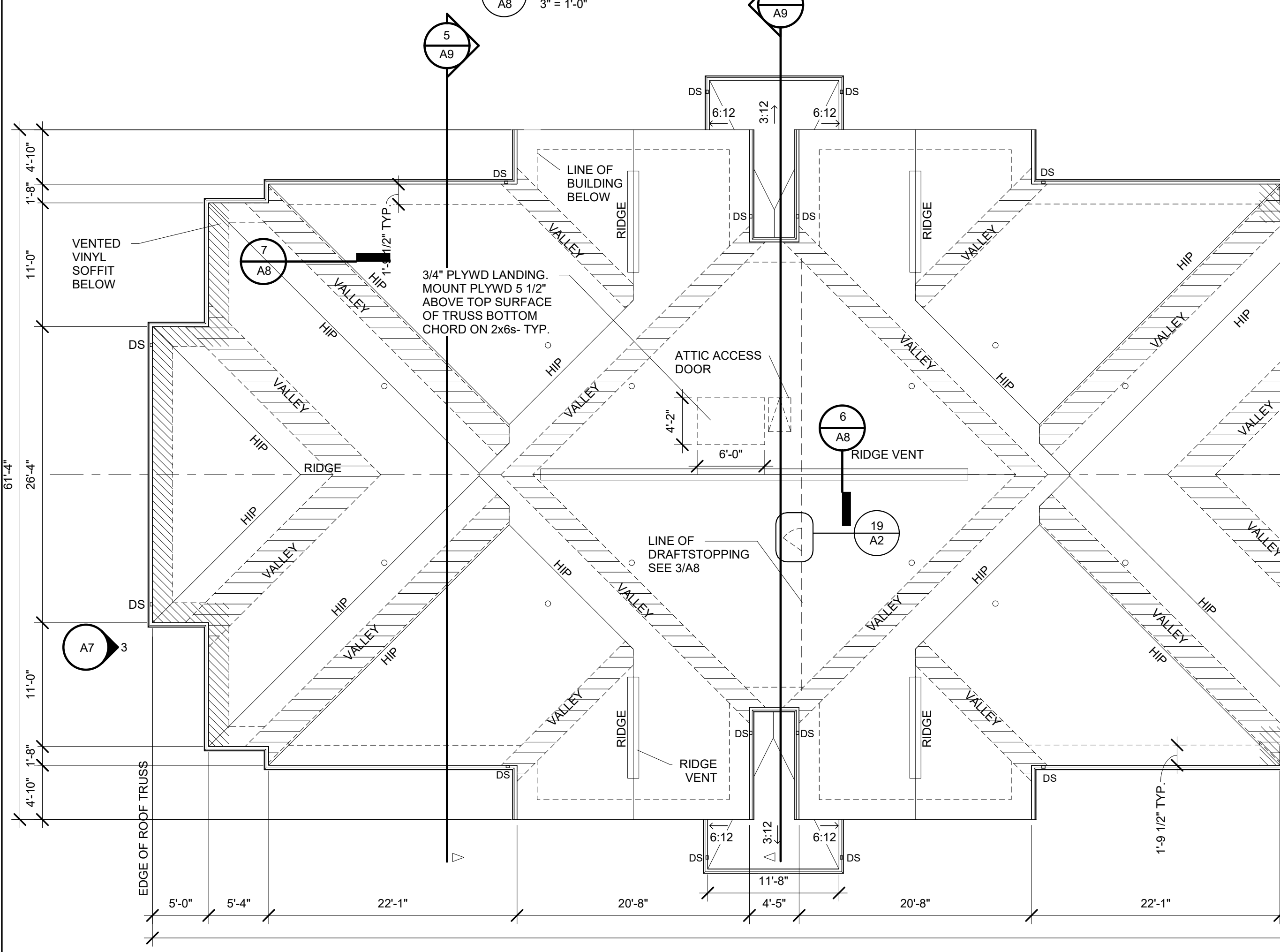


2 BUILDING A - ROOF PLAN
1/8" = 1'-0"



5 TYPICAL VENT FLASHING
3" = 1'-0"

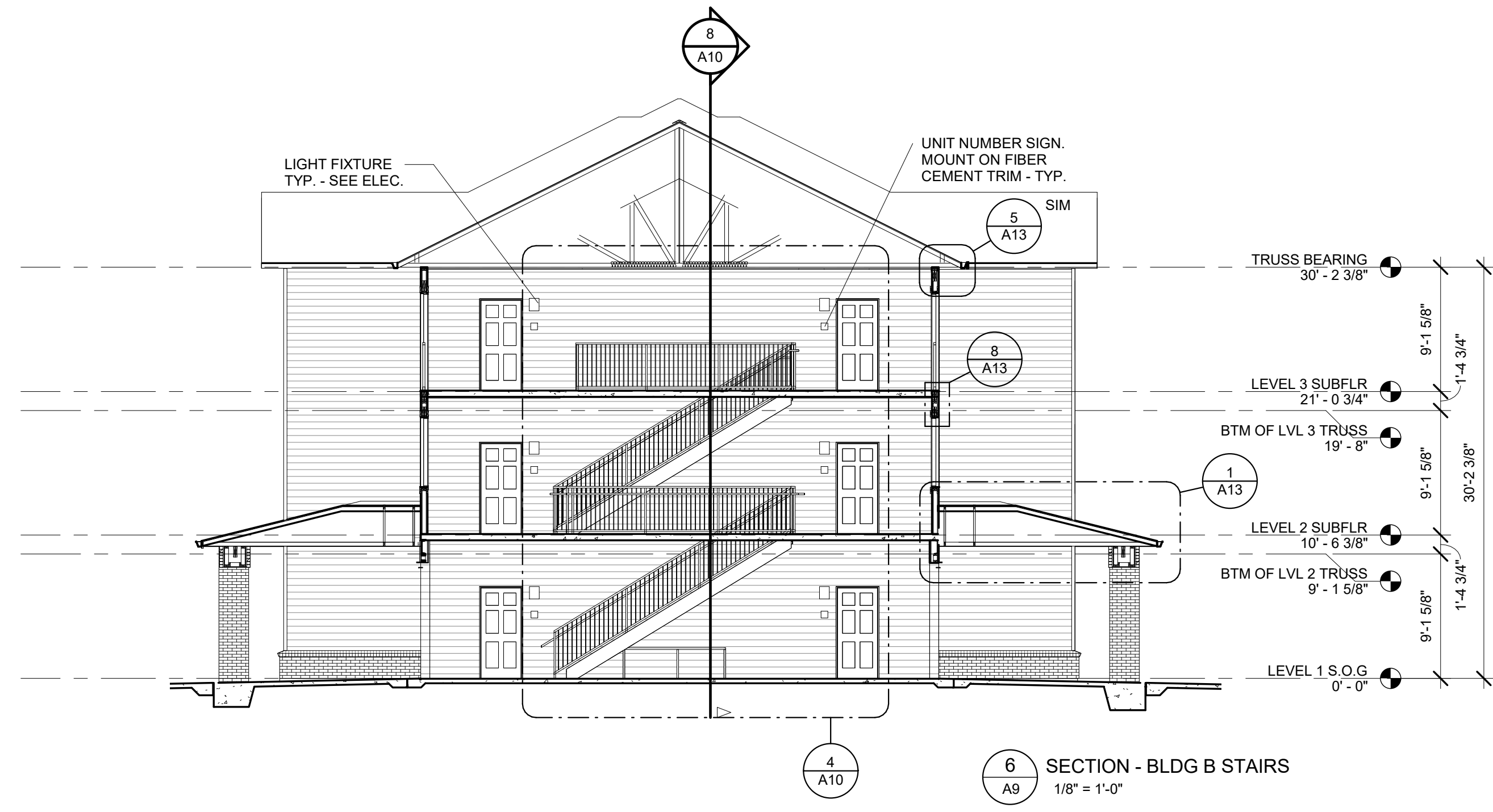
3 ATTIC DRAFTSTOP DETAIL
3" = 1'-0"



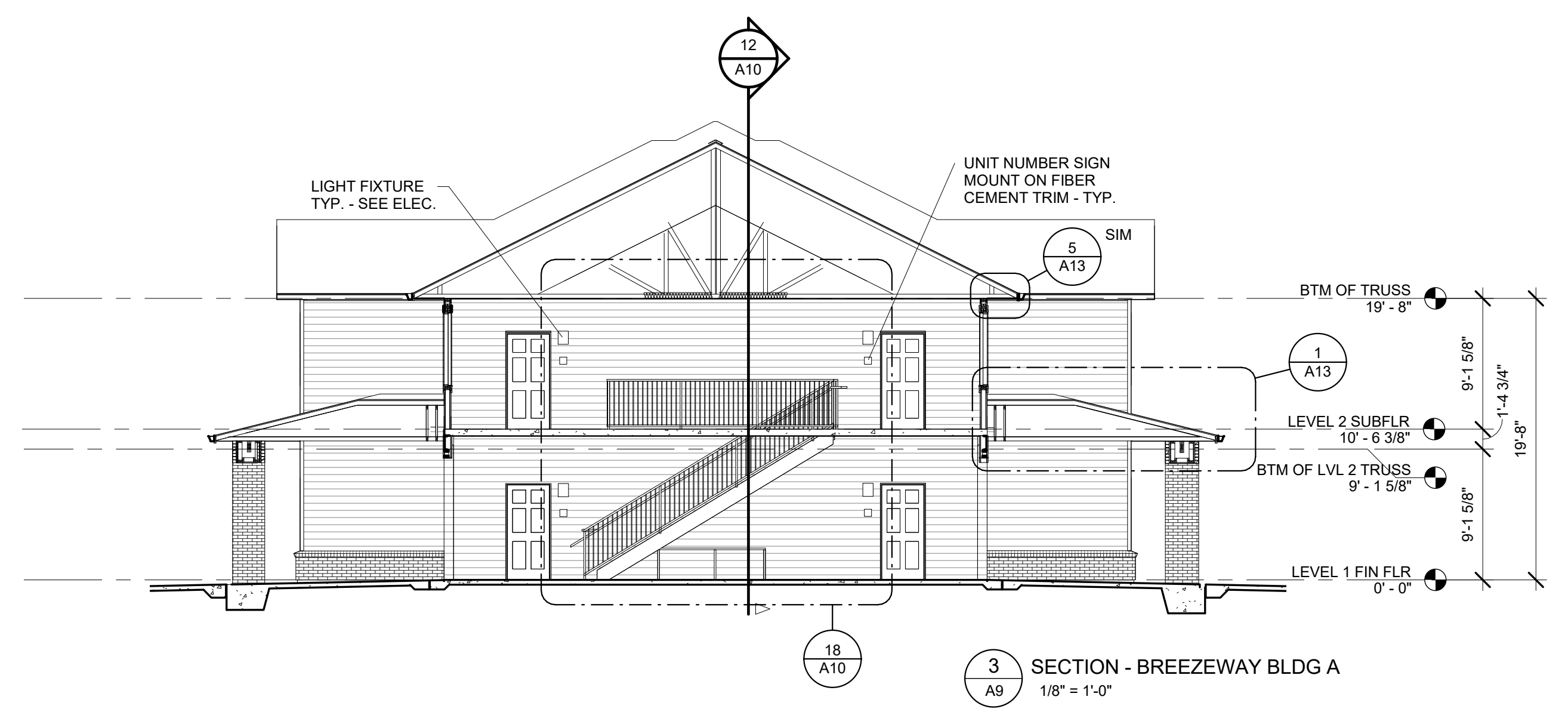
1 BUILDING B - ROOF PLAN
1/8" = 1'-0"



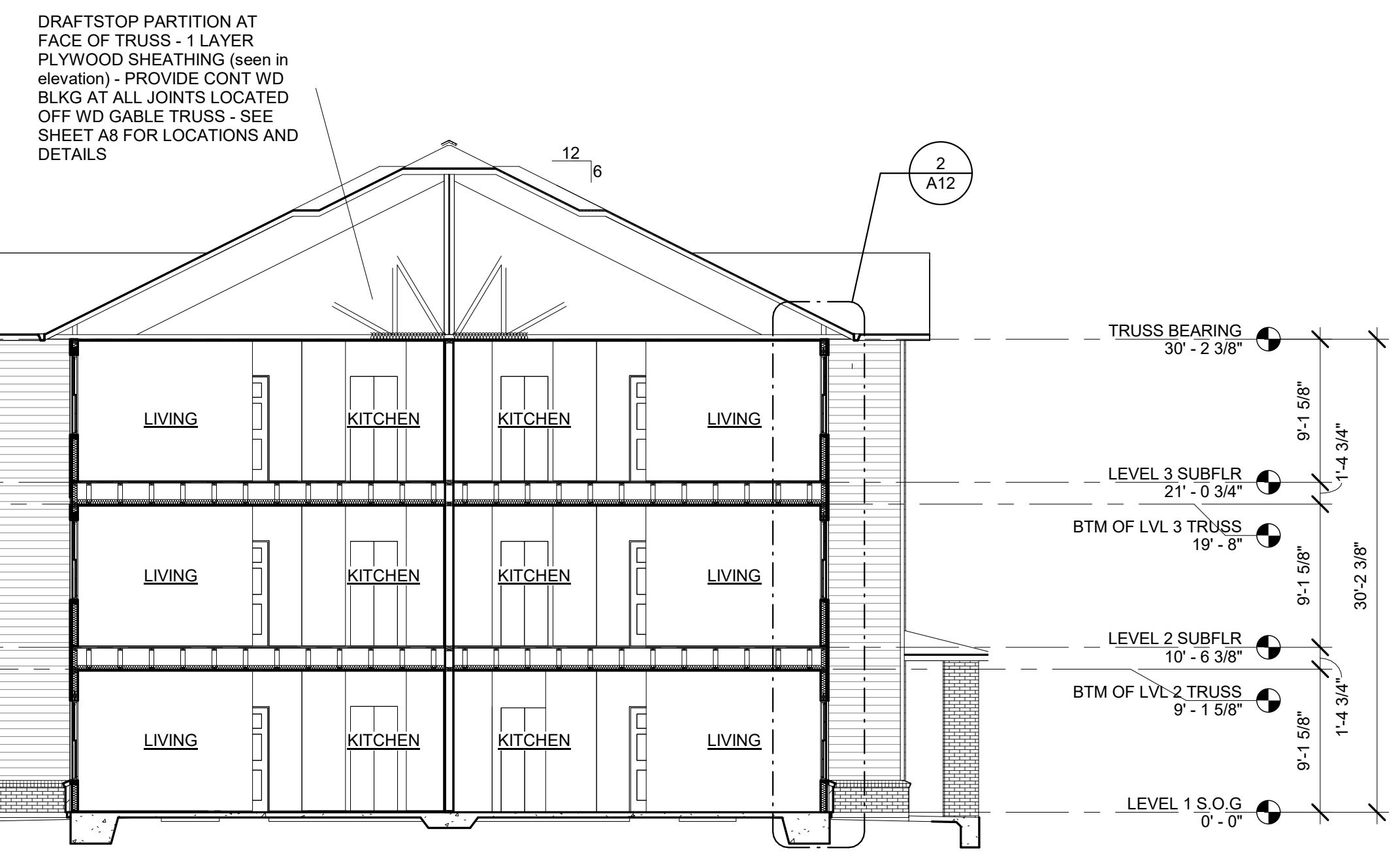
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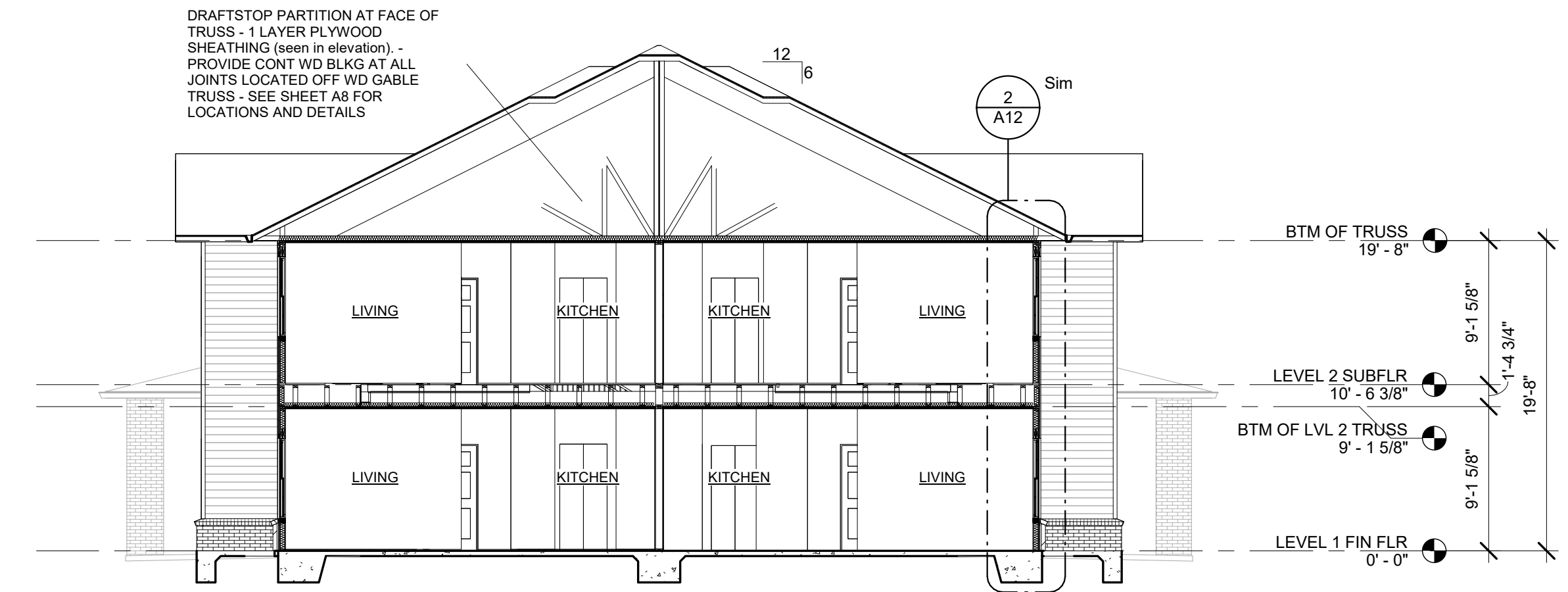
6 SECTION - BLDG B STAIRS
1/8" = 1'-0"



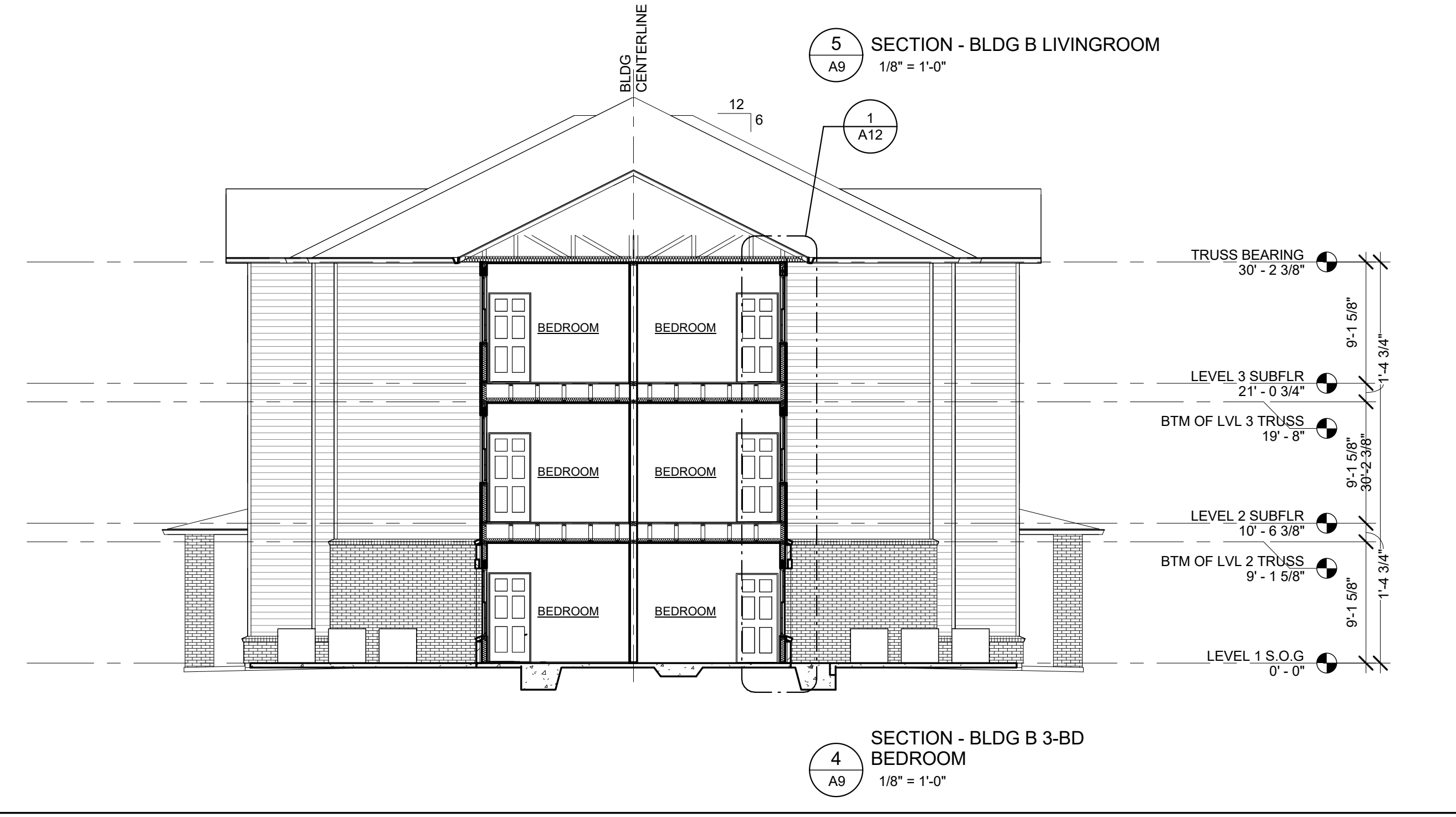
3 SECTION - BREEZEWAY BLDG A
1/8" = 1'-0"



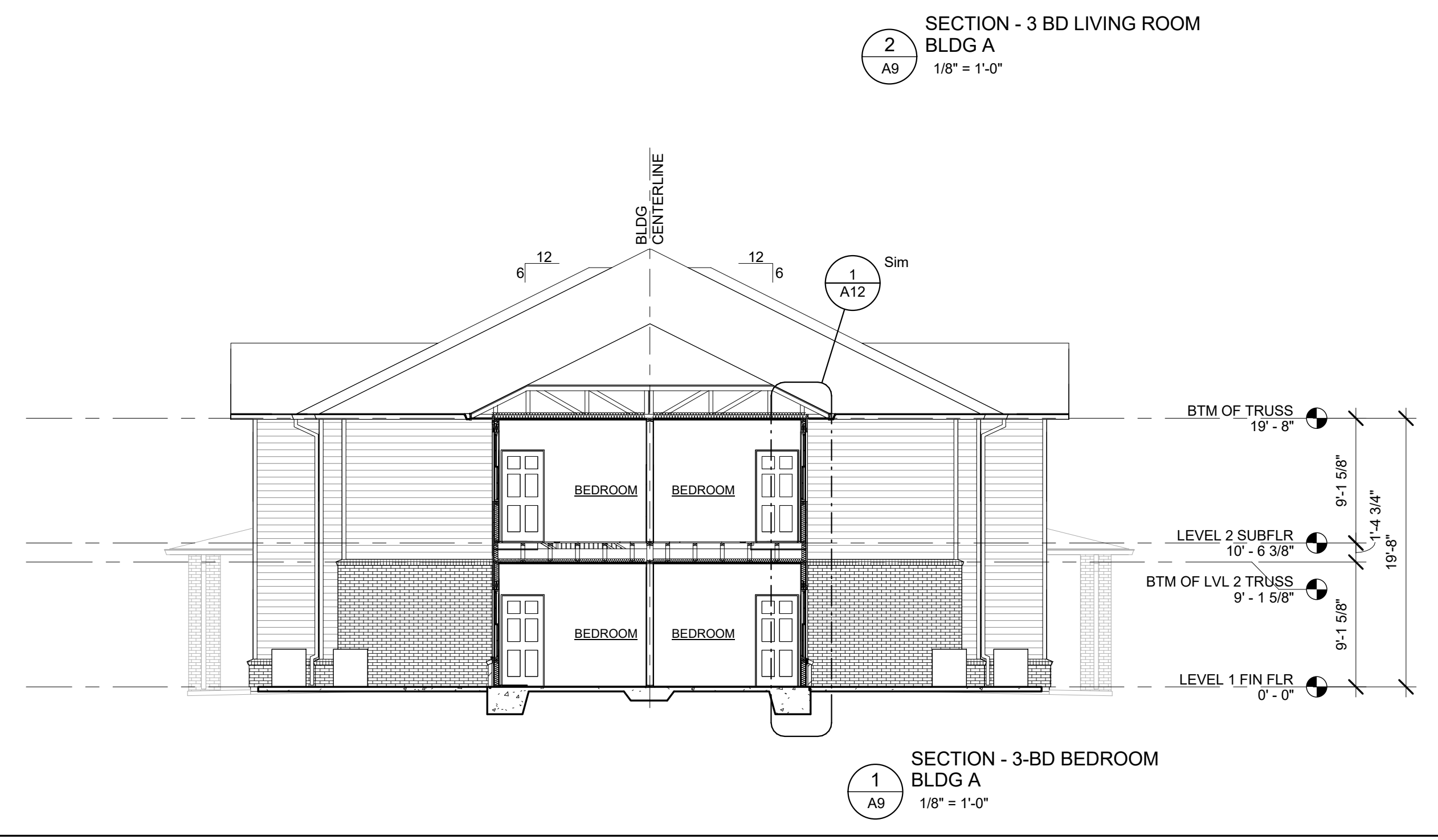
5 SECTION - BLDG B LIVINGROOM
1/8" = 1'-0"



2 SECTION - 3 BD LIVING ROOM
BLDG A
1/8" = 1'-0"



4 SECTION - BLDG B 3-BD
BEDROOM
1/8" = 1'-0"



1 SECTION - 3-BD BEDROOM
BLDG A
1/8" = 1'-0"

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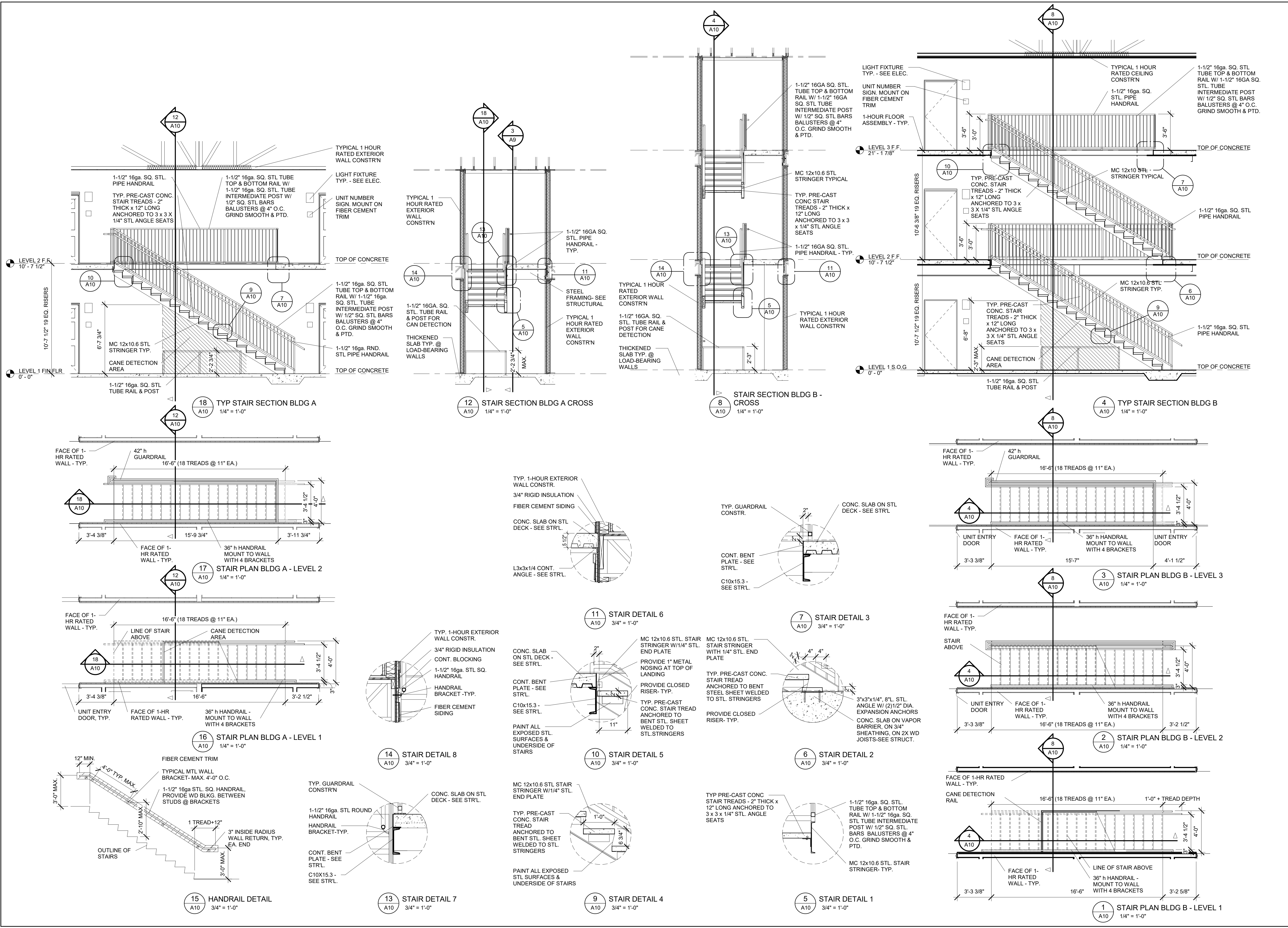
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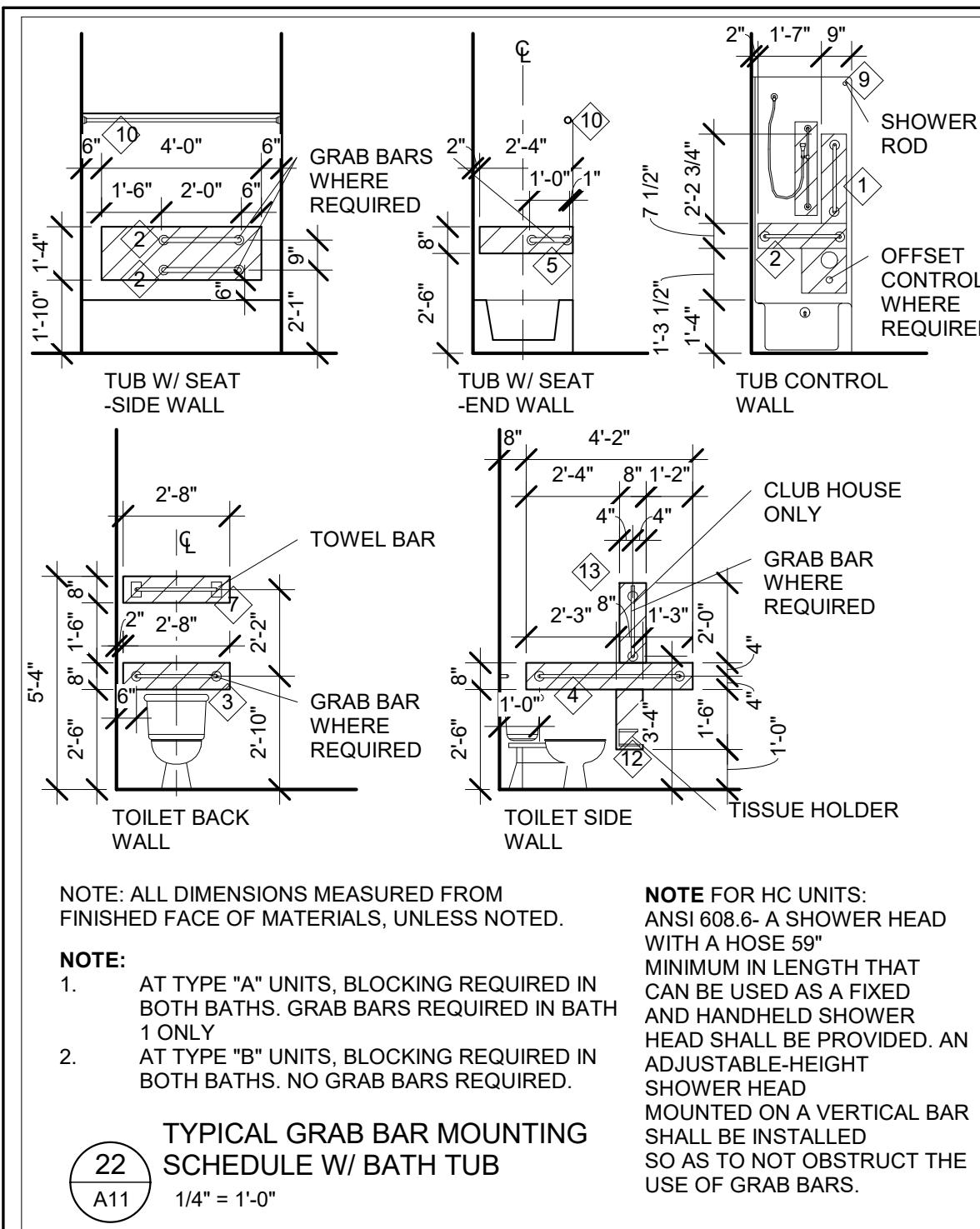


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TOILET ACCESSORIES SCHEDULE - RESIDENTIAL

MARK	DESCRIPTION	EQUAL TO	MOUNTING HEIGHT - TYP
1	18" GRAB BAR	PAMEX #BGBSS-1218C	58" AFF
2	24" GRAB BAR	PAMEX #BGBSS-1224C	24" 3/4" AFF
3	36" GRAB BAR	PAMEX #BGBSS-1236C	34" AFF
4	42" GRAB BAR	PAMEX #BGBSS-1242C	34" AFF
5	12" GRAB BAR	PAMEX #BGBSS-1212C	34" AFF
6	48" GRAB BAR	PAMEX #BGBSS-1248C	34" AFF
7	24" TOWEL BAR	PAMEX #BE2-15824	54" AFF
8	MIRROR	BOBRICK #B-106x1830	SEE ELEV
9	TISSUE DISPENSER	PAMEX #BE2-41	20" AFF
10	CURTAIN ROD	PAMEX #BSR-511	78" AFF

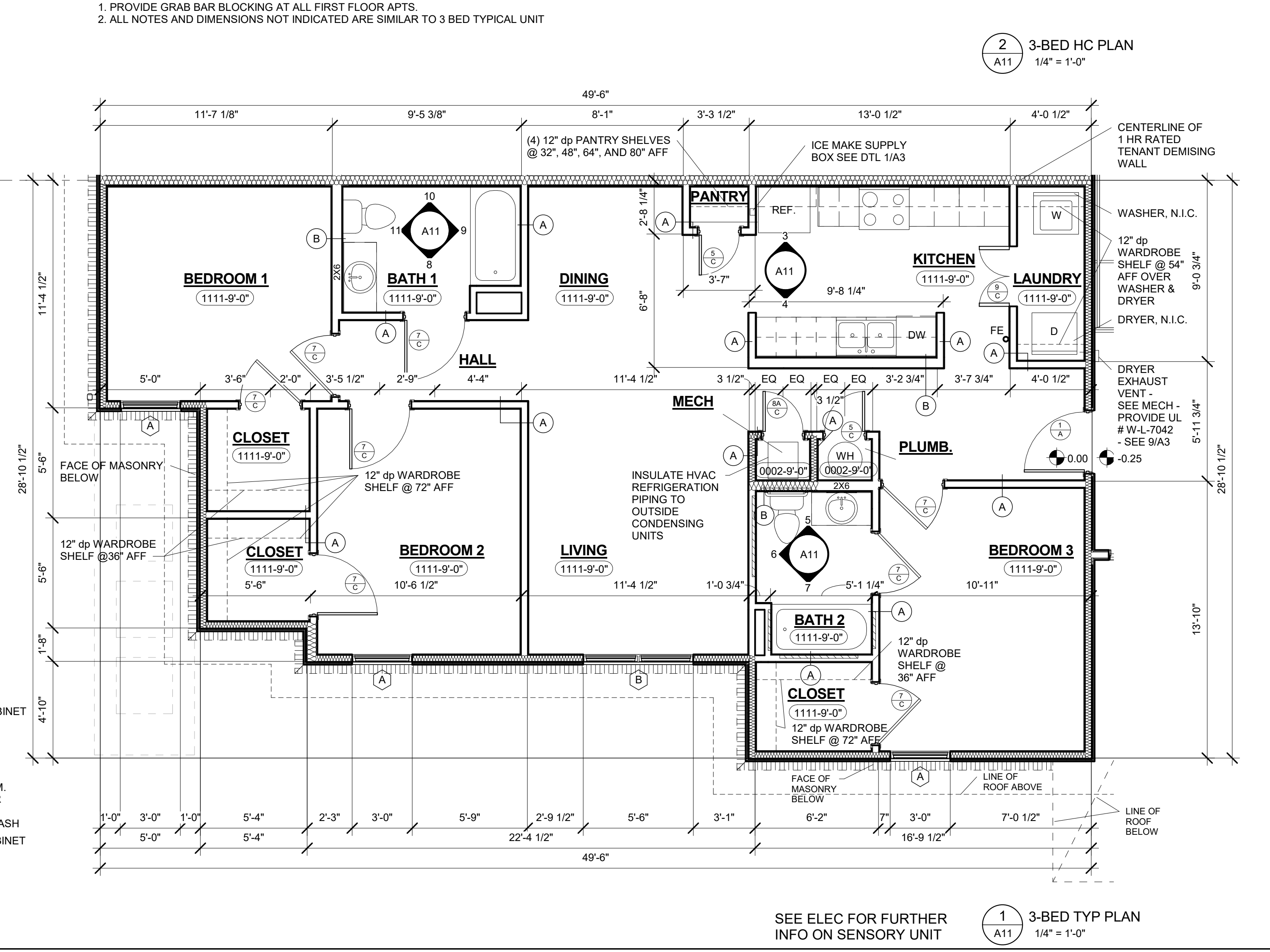
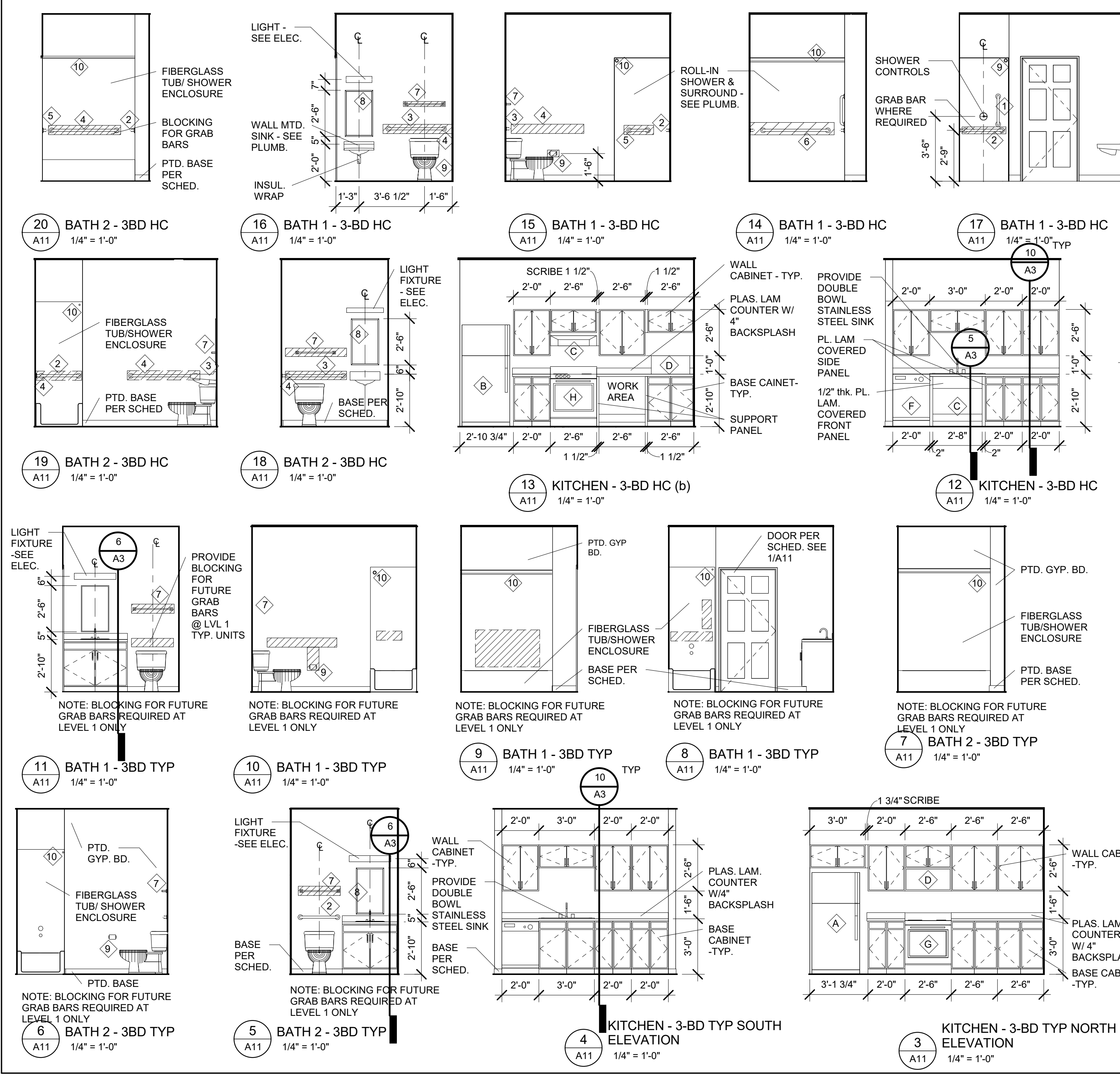
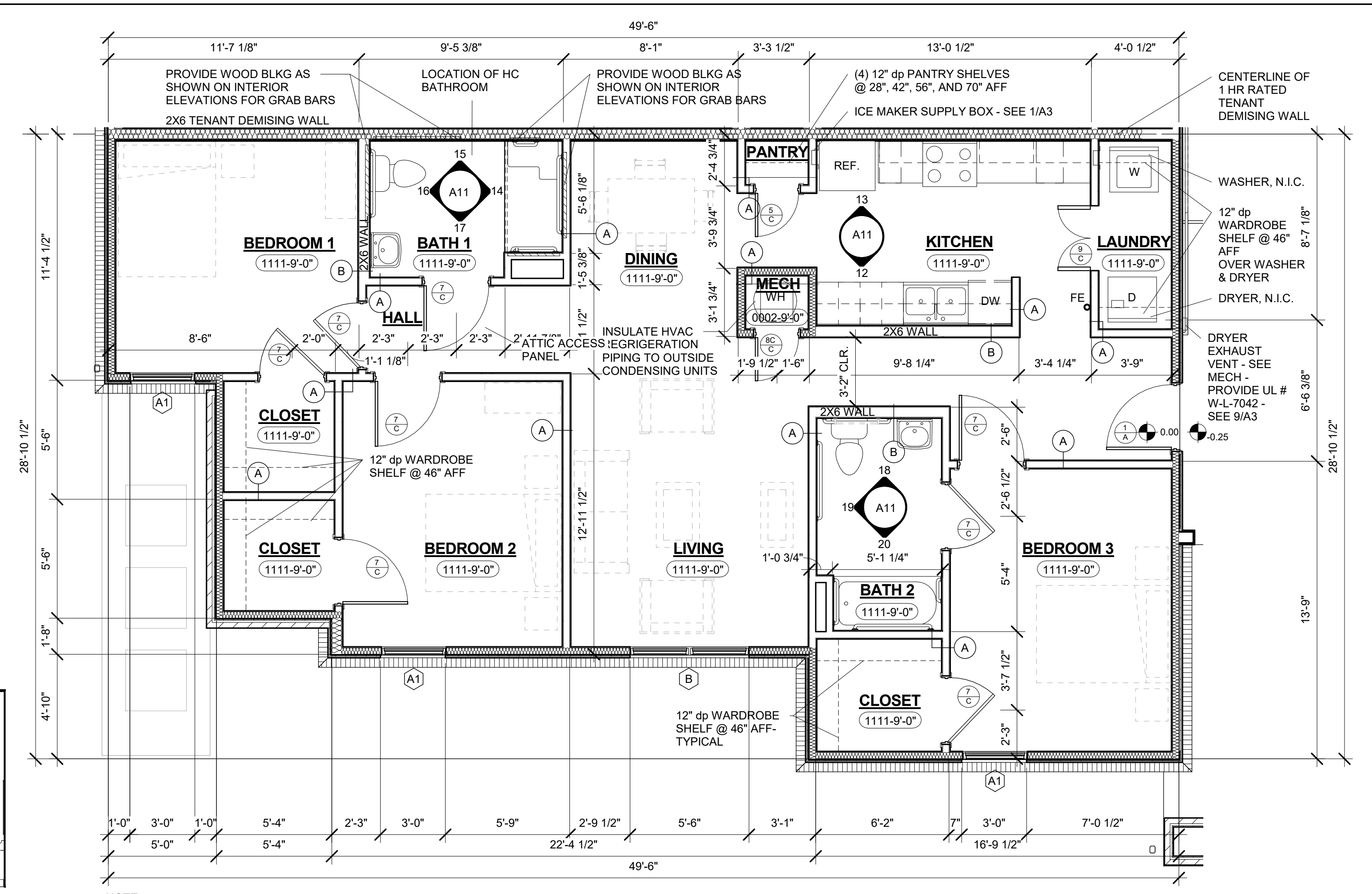
* SEE ELEVATIONS FOR DIFFERENT MOUNTING HEIGHTS
NOTE: PROVIDE GRAB BARS IN TYPE "A" UNIT BATH 1 ONLY

RESIDENTIAL EQUIPMENT SCHEDULE

MODELS LISTED BELOW ARE AS MANUFACTURED BY GENERAL ELECTRIC - EQUAL PRODUCTS BY WESTINGHOUSE, HOTPOINT, & SEARS ARE ACCEPTABLE. PROVIDE EQUIPMENT IN MANUFACTURER'S STANDARD "BLACK" COLOR. PROVIDE ENERGY STAR EQUIPMENT WHERE POSSIBLE.

A	ENERGY STAR REFRIGERATOR	GIE18C7H
B	ENERGY STAR REF (HC)	GIE18ETH
C	ENERGY STAR RECIRC. HOOD (HC)	JN327R
D	MICROW. OVEN - COUNTERTOP - OVER-THE-RANGE	JNM3163DJ
E	ENERGY STAR DISHWASHER	GSD3300K
F	ENERGY STAR DISHWASHER (HC)	GDT255SGL
G	RANGE	JBS1600M
H	RANGE (HC SELF-CLEANING)	JBS4600M

ANY SUBSTITUTIONS FOR THE PRODUCTS LABELED 'ENERGY STAR' ABOVE WILL NOT BE ACCEPTED IF NOT 'ENERGY STAR' QUALIFIED



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- LEGEND**
- WALL/PARTITION TYPE - SEE PARTITION SCHEDULE SHEET A2
 - DOOR & FRAME MARK - SEE DOOR SCHEDULE SHEET A2
 - RECHARGEABLE FIRE EXTINGUISHER AND CABINET
 - RECHARGEABLE FIRE EXTINGUISHER
 - FLOOR DRAIN - SEE PLUMBING
 - THERMOSTAT - MOUNT HEIGHT @ 46" A.F.F. ON CENTER
 - FLOOR FINISH MATERIAL TRANSITION
 - IMVB - ICE MAKER VALVE BOX
 - WMVB - WASHING MACHINE VALVE BOX
 - WATER HEATER - SEE PLBG

- FINISH SCHEDULE**
- | FLOOR | BASE | WALLS | CEILING | CEILING HEIGHT |
|-------|----------------------------|------------------|---|----------------|
| 1 | 0 - SEALED CONCRETE (CONC) | 1 - VINYL PLANK | 0 - UNFINISHED GYP BD | 9'-0" |
| 2 | 2 - CARPET (CPT) | 1 - PAINTED WOOD | 2 - UNFINISHED GYP BD | |
| 3 | 3 - CERAMIC TILE (TILE) | 2 - CERAMIC TILE | 3 - PAINTED EXT. GRADE GYP SOFFIT BOARD | |

- GENERAL NOTES**
- ALL DIMENSIONS ARE TO FACE OF STUD, UNLESS NOTED.
 - ALL INTERIOR ELEVATIONS, DIMENSIONS ARE TO THE FACE OF FINISH MATERIAL
 - ALL INTERIOR PARTITIONS ARE GYPSUM BOARD ON WOOD STUDS UNLESS NOTED. SEE PARTITION SCHEDULE, A2
 - PROVIDE PAPERLESS GYP BD AT WALLS & CEILINGS OF BATHROOMS AND LAUNDRY ROOMS, AND AT ALL WINDOW HEAD/JAMB/SILLS.
 - PROVIDE W/D BLOCKING BTWN STUDS FOR MOUNTING WALL CABINETS.

DATE
1 11/20/18 PERMIT SET
2 05/22/19 RE-ISSUED FOR PERMIT

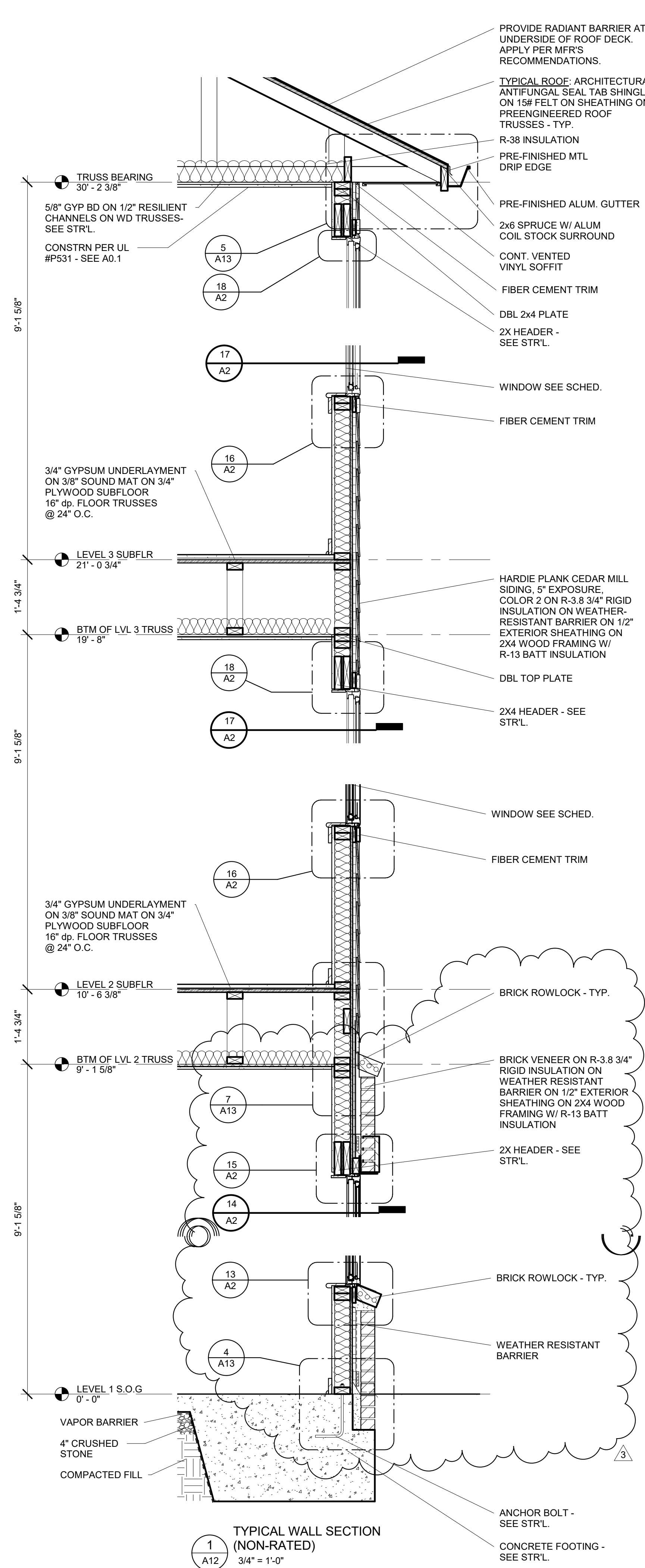
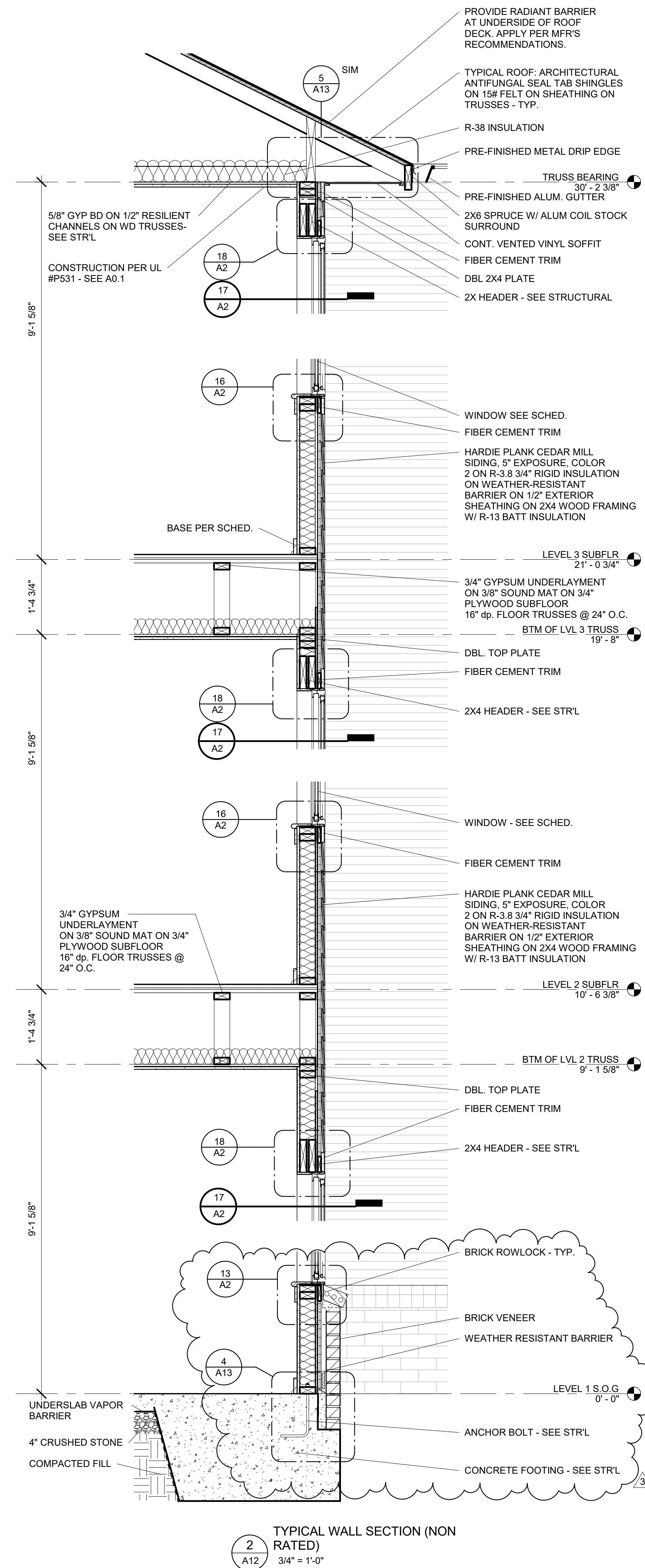
PROJECT NUMBER
597

PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

SHEET NUMBER
A11

CAD FILE NUMBER
C:\Users\MKekala\Documents\097_Barton_MASTER_emekala_vt



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DATE	PERMIT SET
1 11/20/18	PERMIT SET
2 05/22/19	RE-ISSUED FOR PERMIT
3 08/20/19	ADDENDUM 1

PROJECT NUMBER
597
 PROJECT
Frisco Park

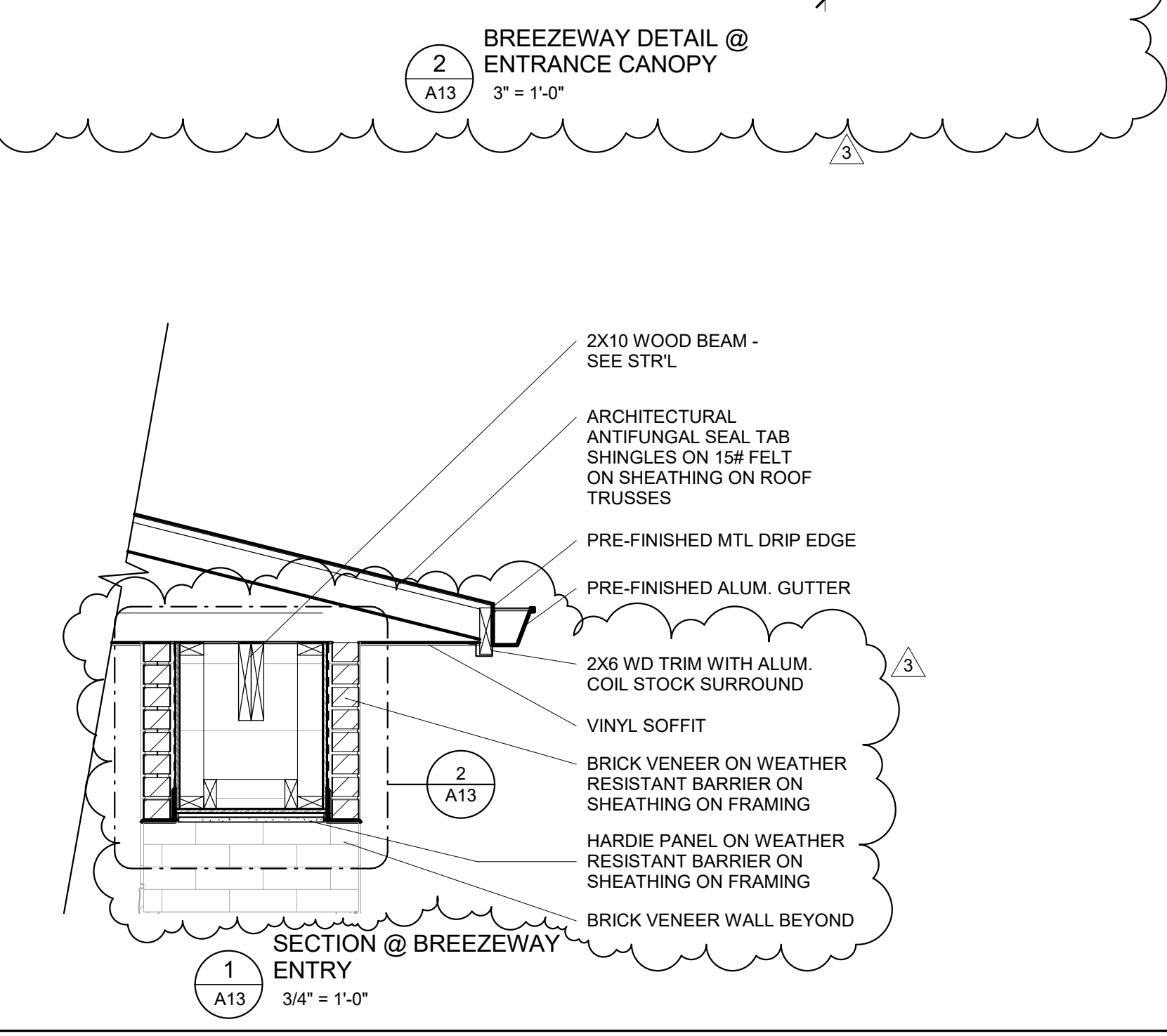
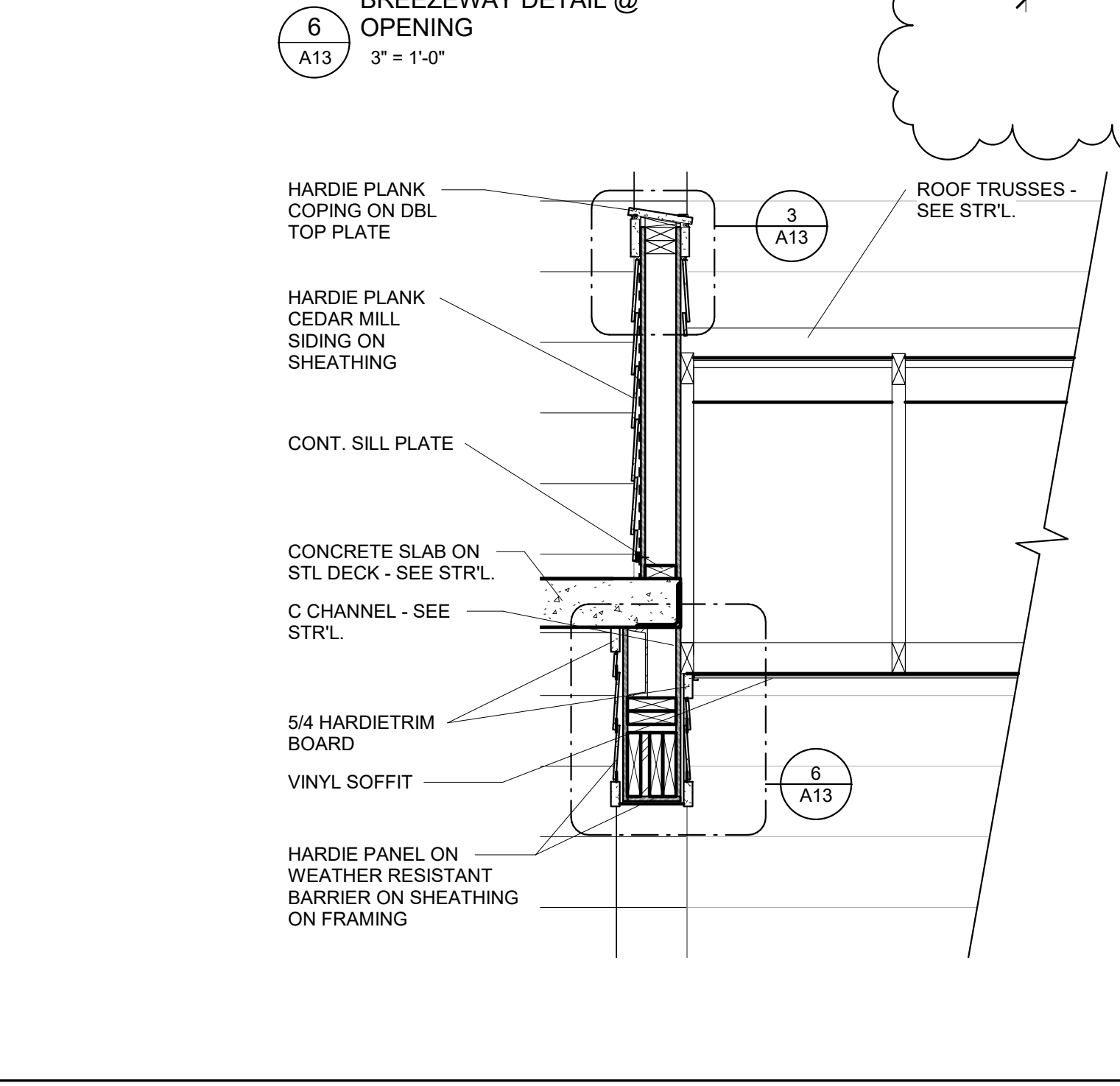
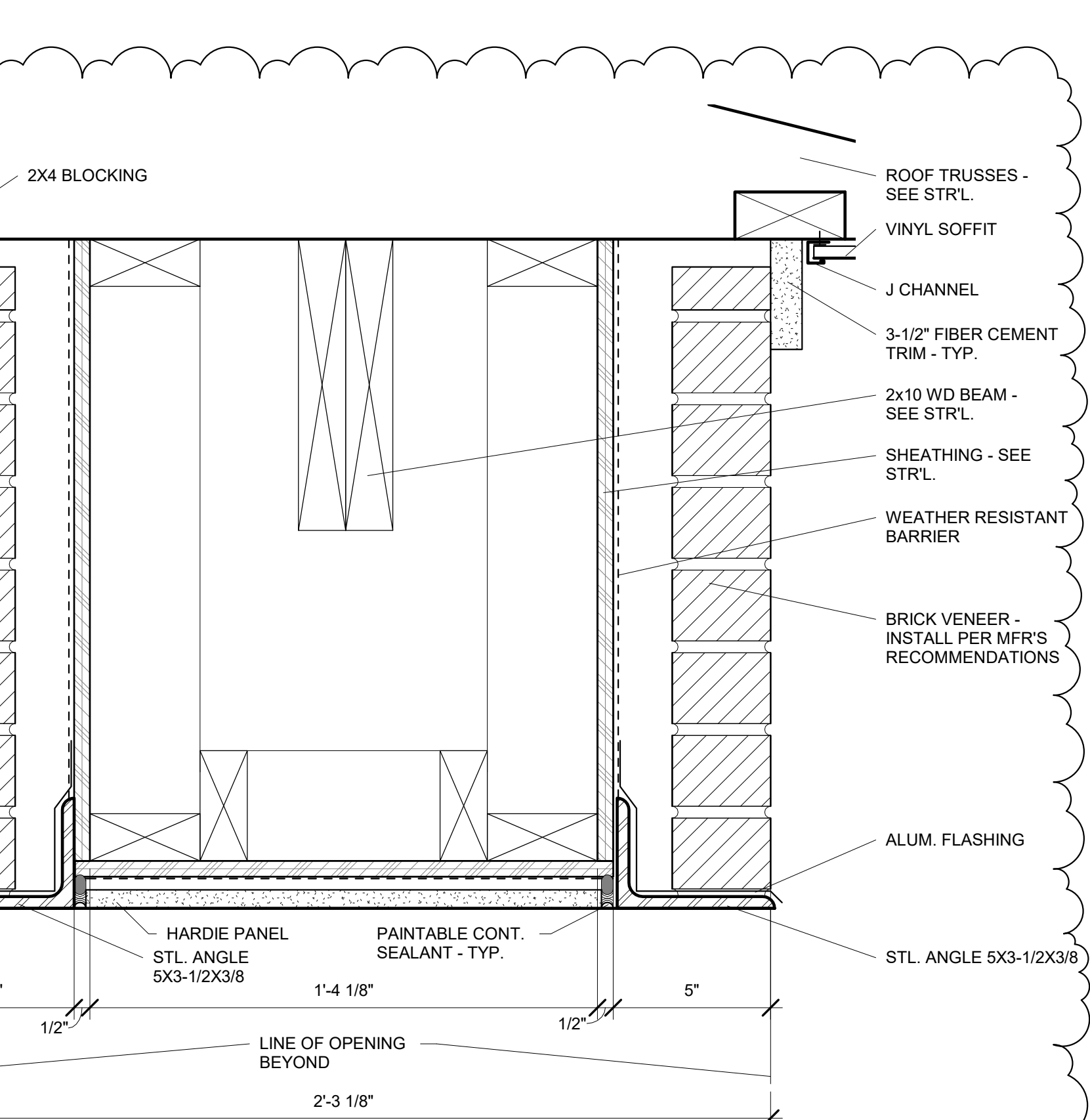
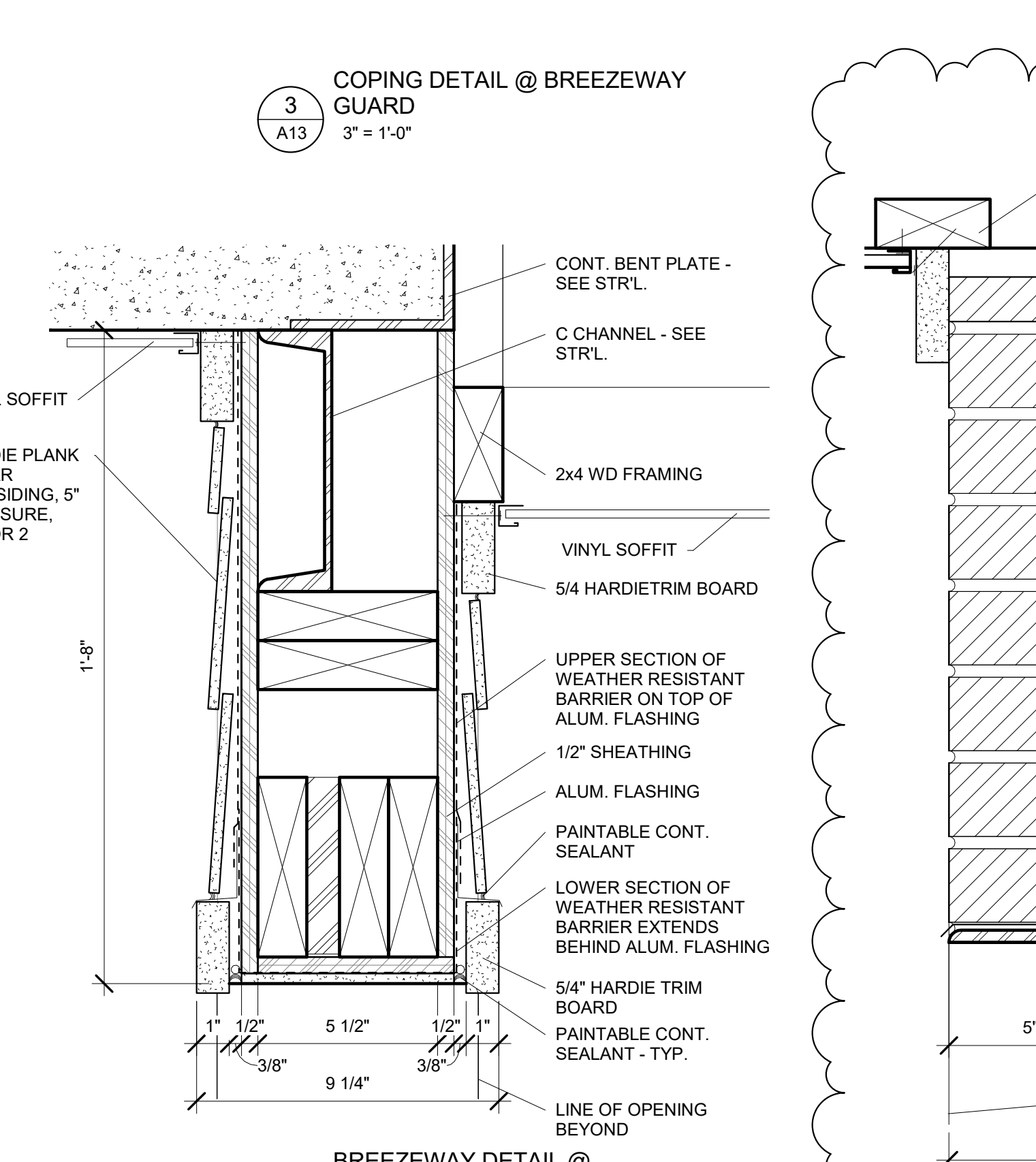
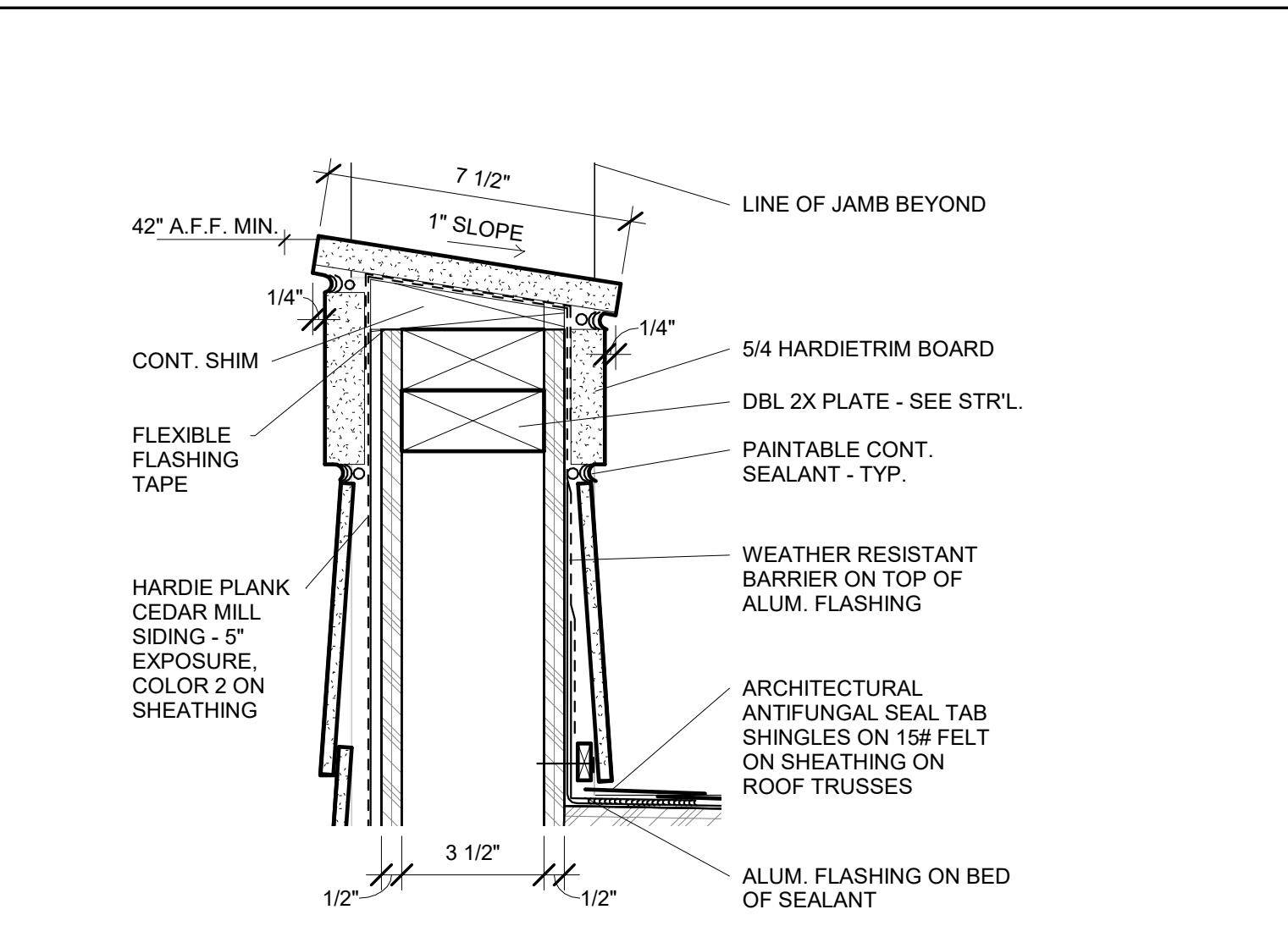
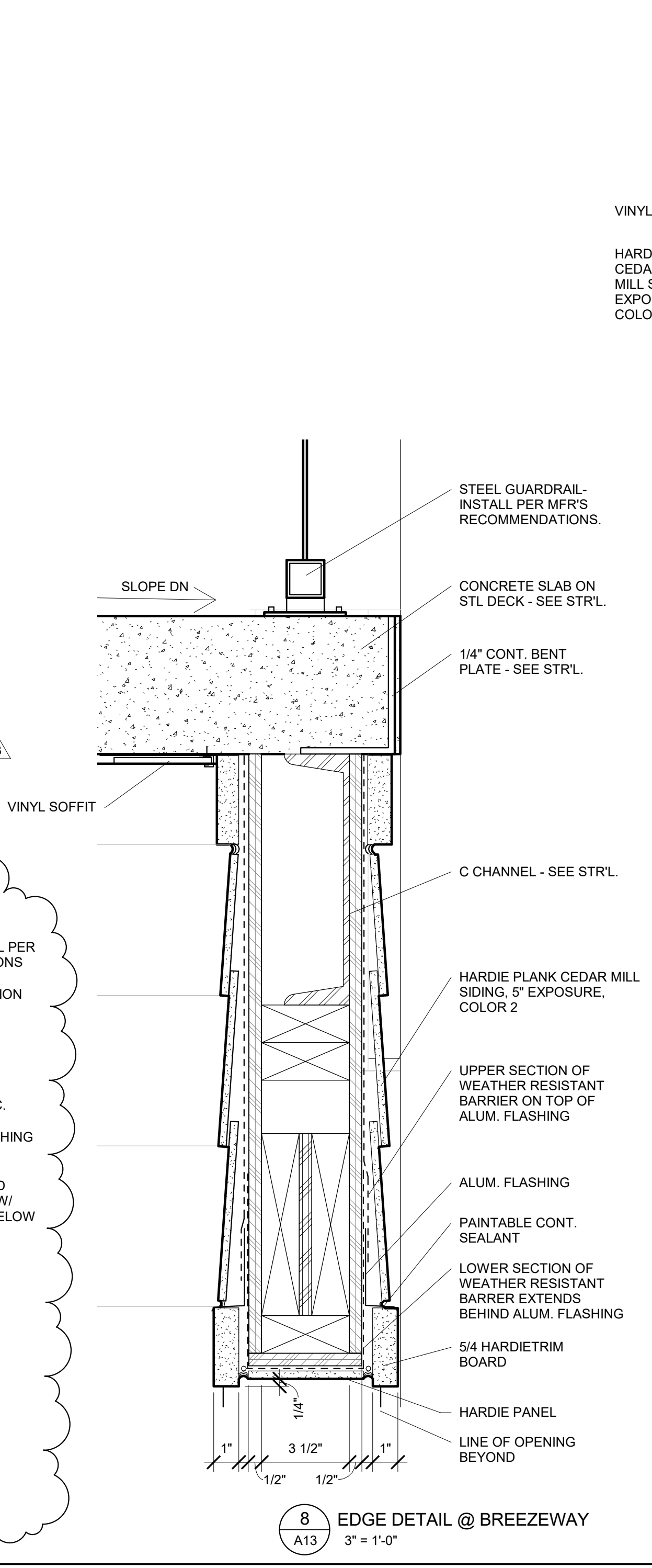
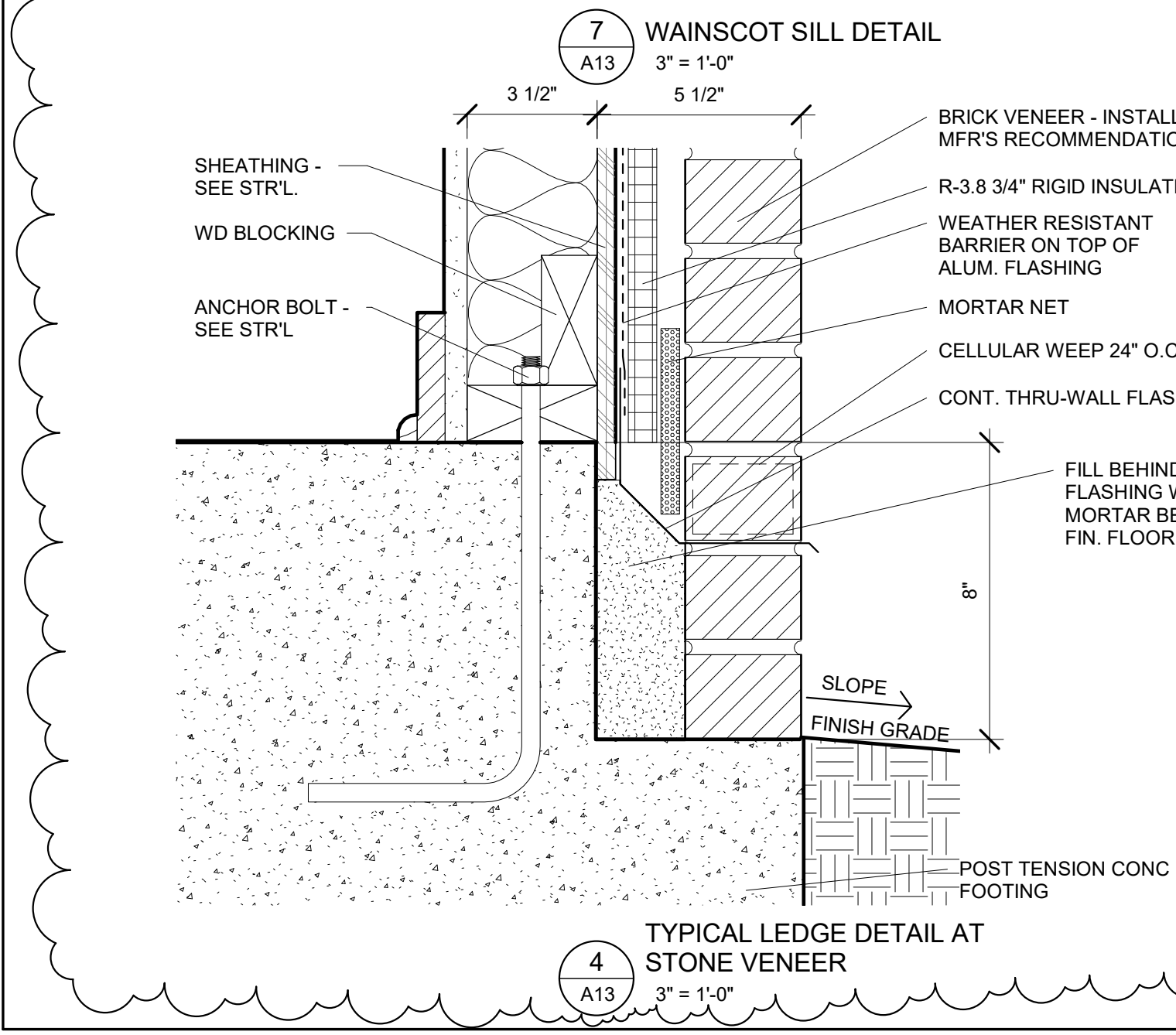
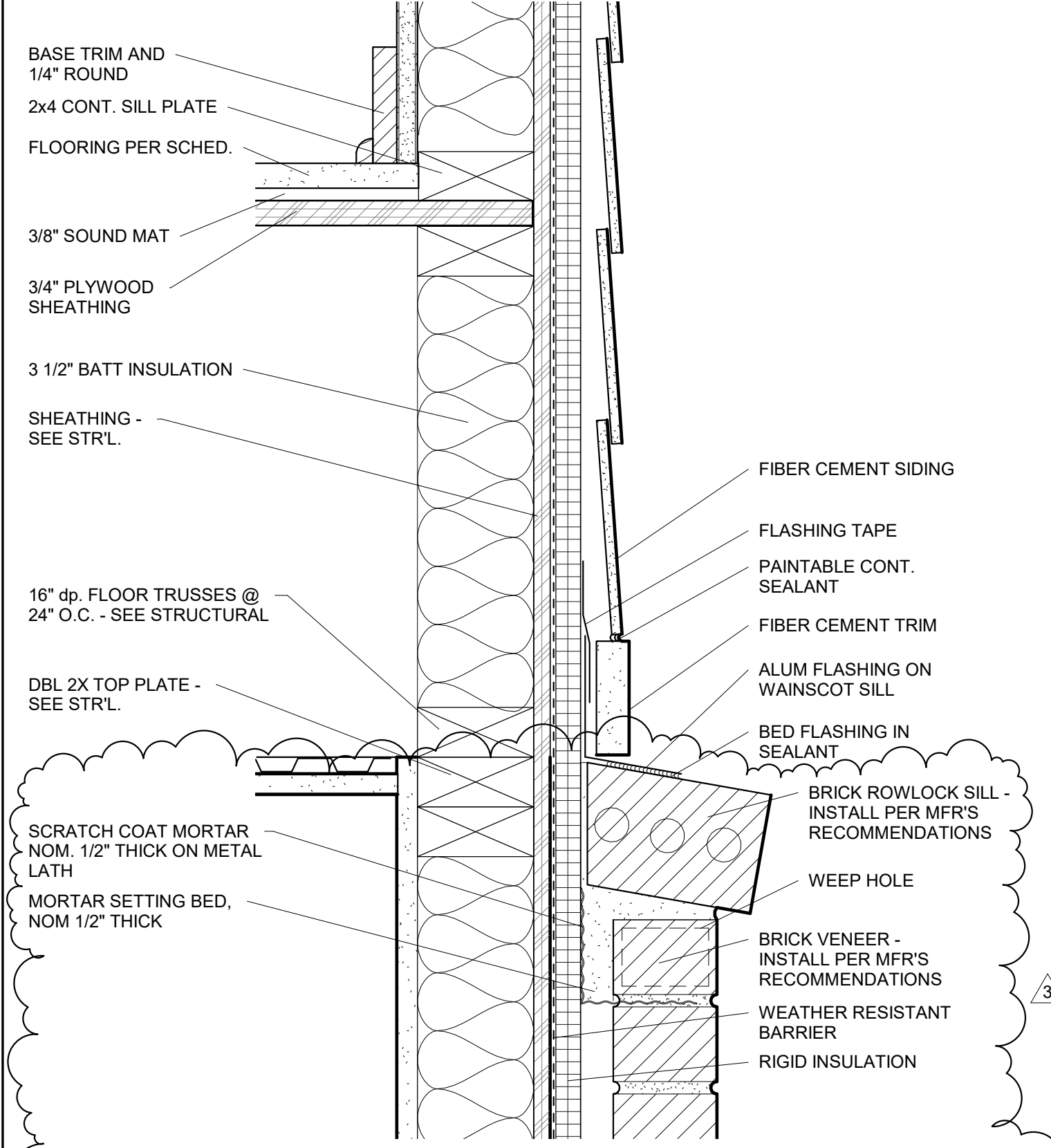
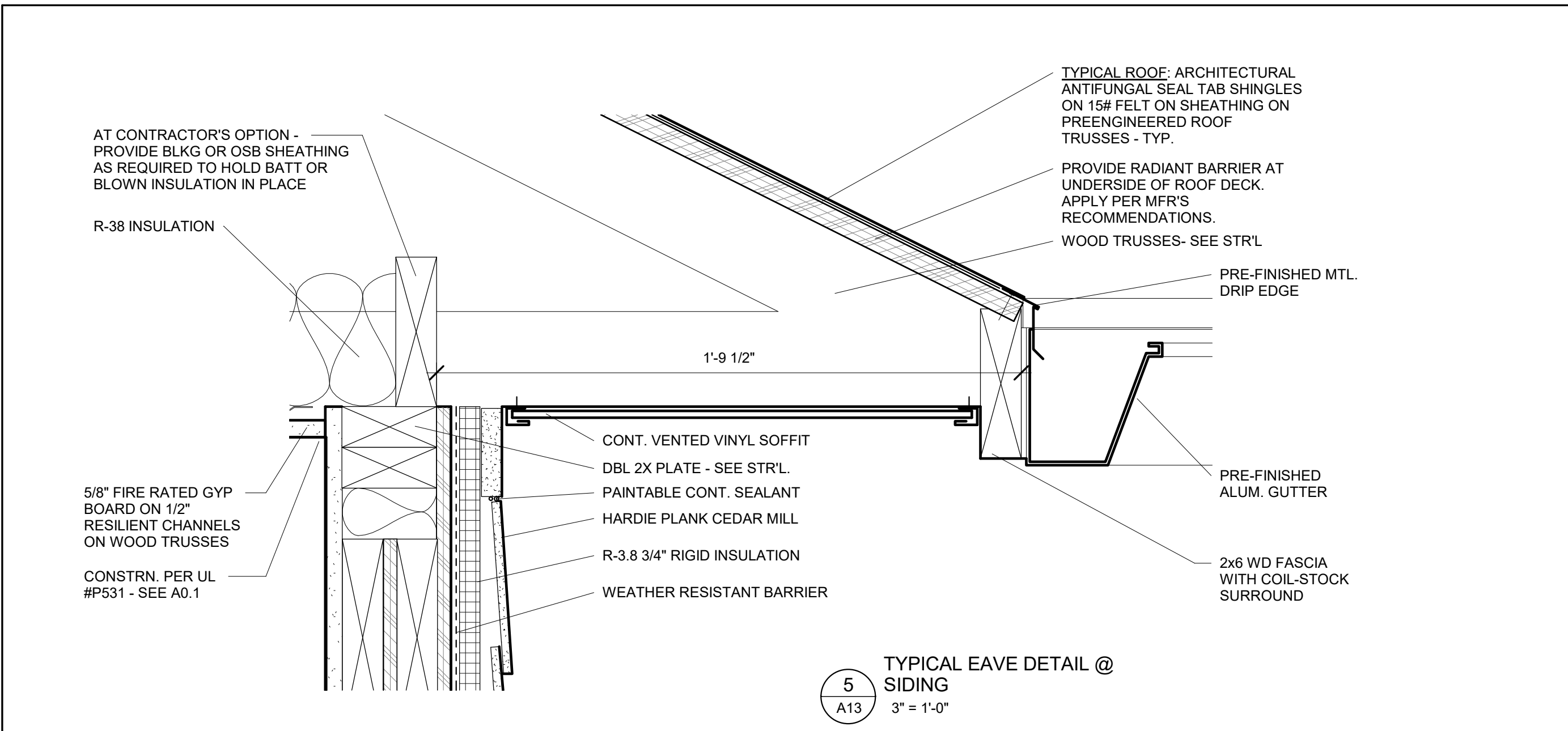
418 S. Avalon Street
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SHEET NUMBER
A12

CAD FILE NUMBER
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DATE	PERMIT SET
1 11/20/18	PERMIT SET
2 05/22/19	RE-ISSUED FOR PERMIT
3 08/20/19	ADDENDUM 1

PROJECT NUMBER
597

PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

SHEET NUMBER

A13

CAD FILE NUMBER
C:\Users\DMekala\Documents\597_Barton_MASTER_emeala.rvt



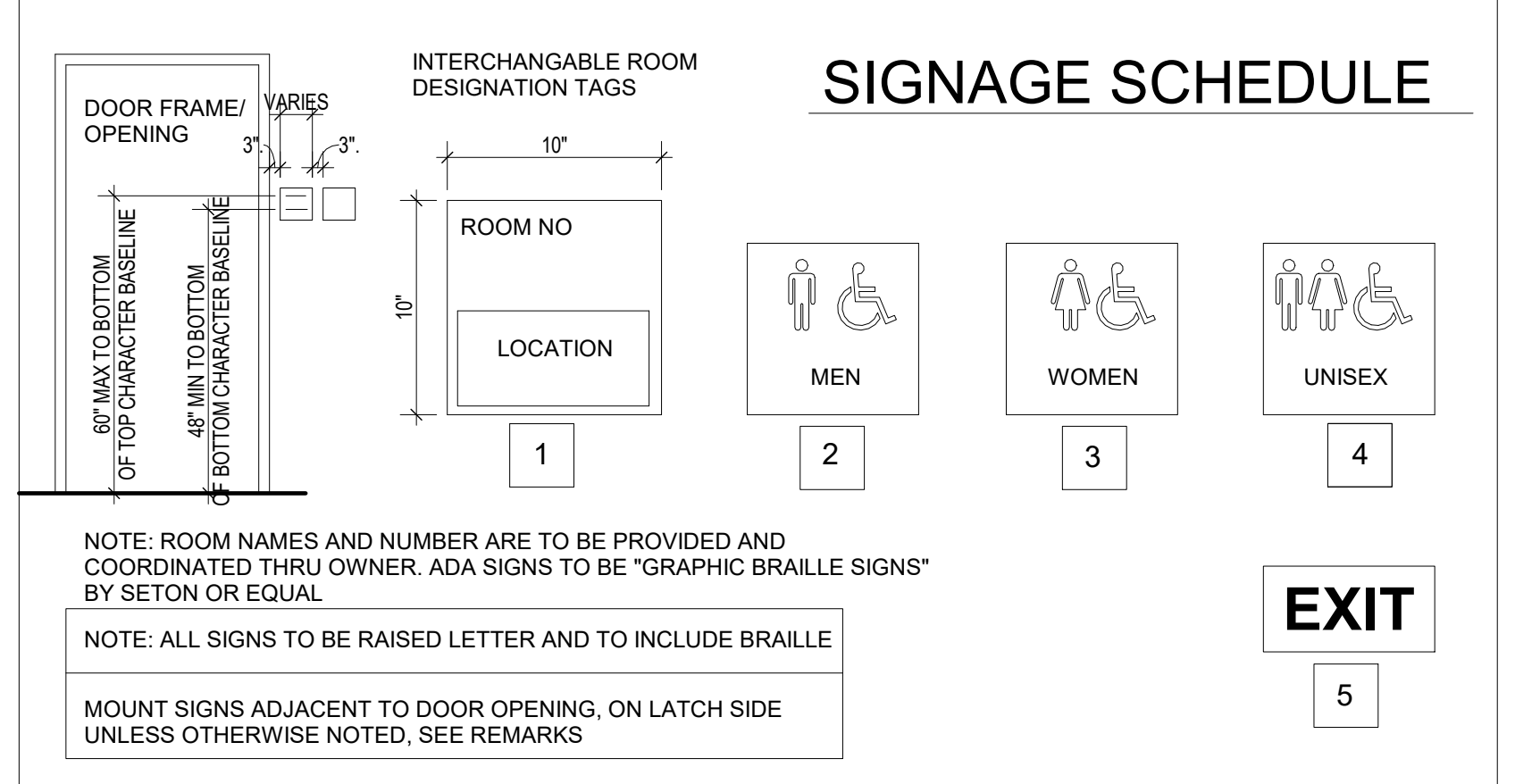
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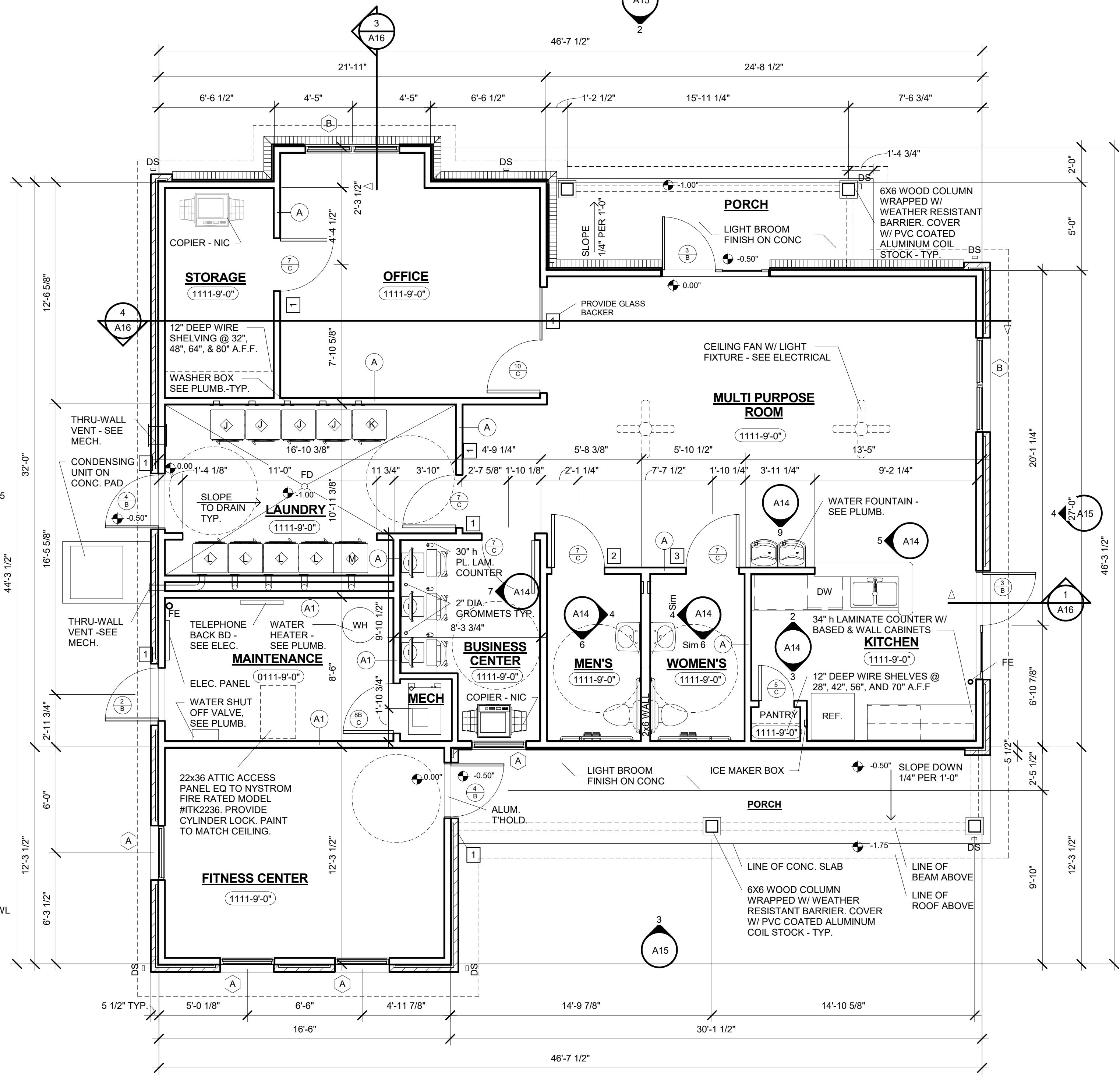
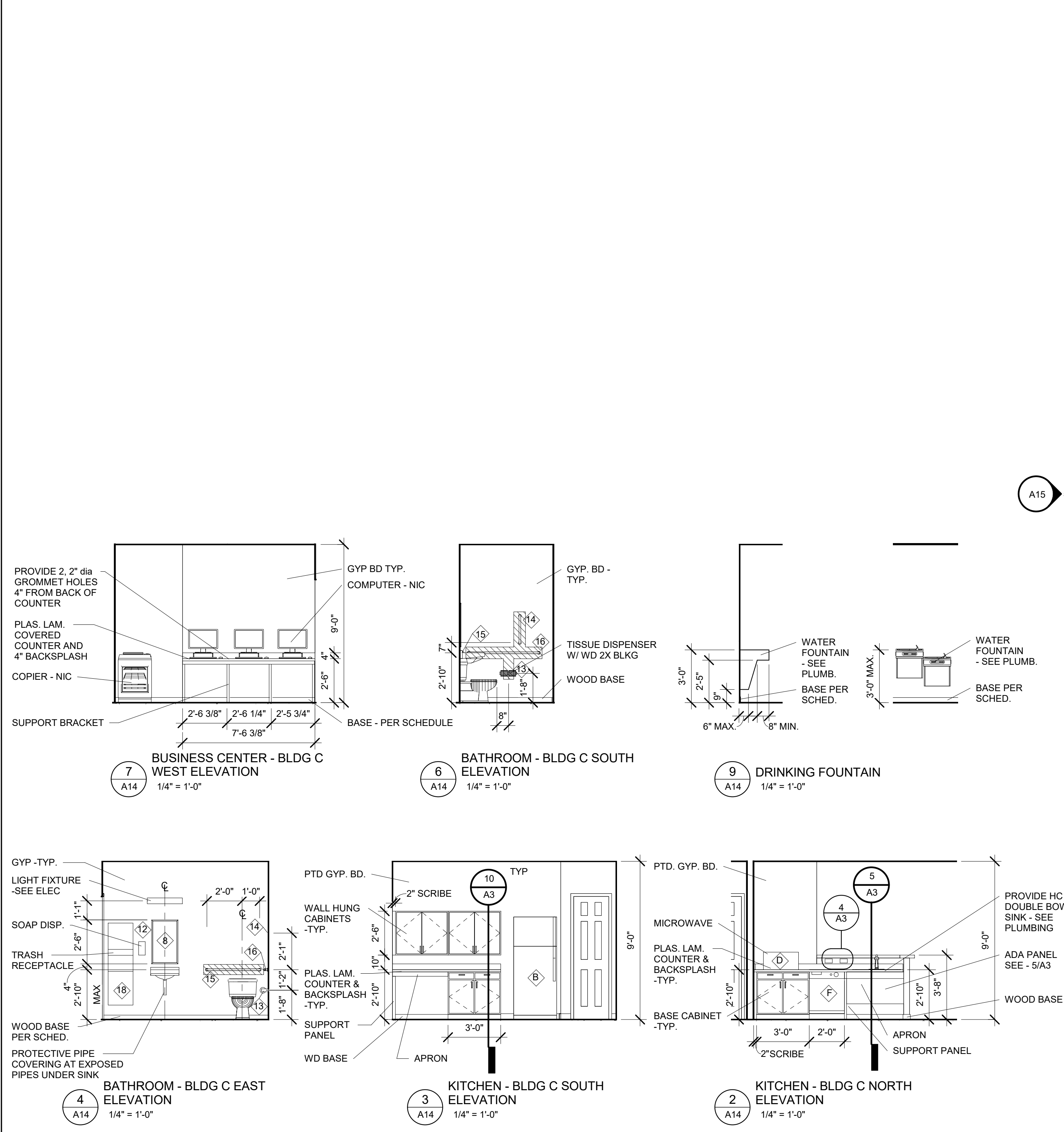
MARK	DESCRIPTION	EQUAL TO	MOUNTING HEIGHT - TYP
8	MIRROR	BOBRICK #B-166x1830	SEE ELEV
11	FOLDED TOWEL DISP	AJW #U180	SEE ELEV
12	SOAP DISPENSER	AJW #U124	SEE ELEV
13	TISSUE DISPENSER	AJW #U805	SEE ELEV
14	18" GRAB BAR	AJW #UG3-A	58" AFF
15	36" GRAB BAR	AJW #UG3-A	34" AFF
16	42" GRAB BAR	AJW #UG3-A	34" AFF
17	24" GRAB BAR	AJW #UG3-A	54" AFF
18	TRASH RECEPTACLE/TOWEL DISPENSER	BOBRICK B-3942	54" AFF

MARK	DESCRIPTION	EQUAL TO
B	ENERGY STAR REF (HC)	GIE18ETH
D	MICROW, OVEN - COUNTERTOP - OVER-THE-RANGE	JNM3163DJ
F	ENERGY STAR DISHWASHER (HC)	GDT2255SGL
L	WASHER	GTW490ACJ
K	WASHER (HC)	GTW400SCM
L	DRYER	GTX42EASJ
M	DRYER (HC)	GFD40ESCMWW

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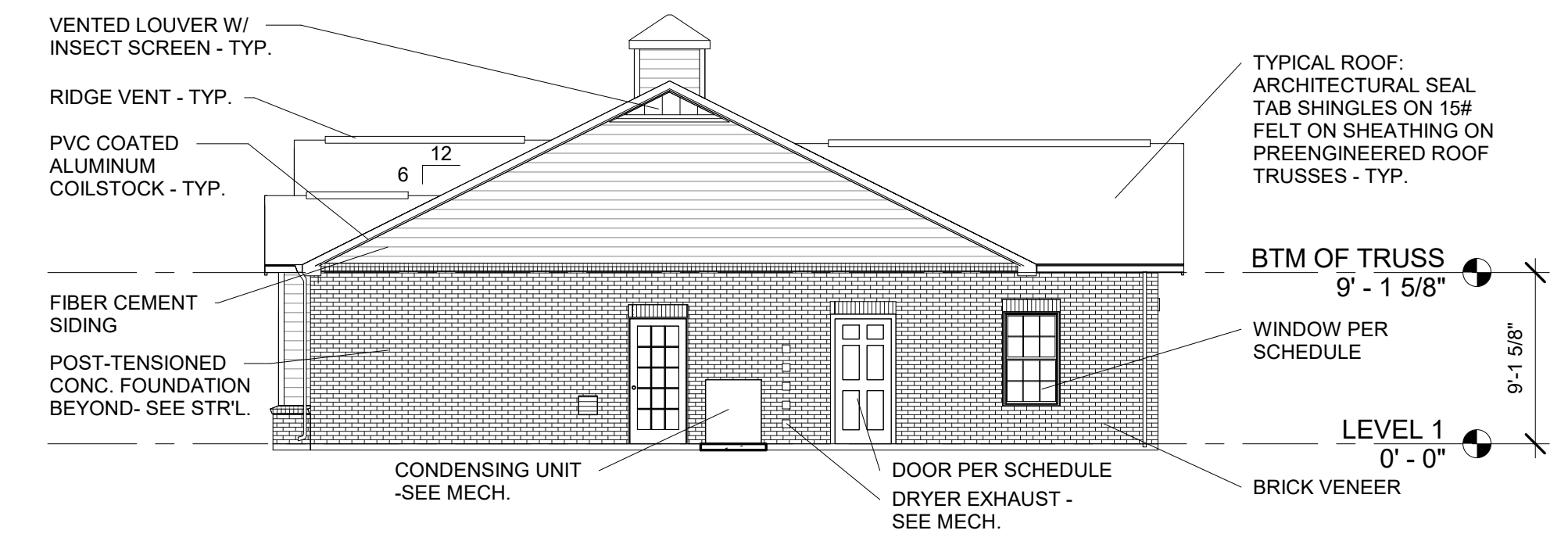
8 SIGNAGE SCHEDULE
A14 1/4" = 1'-0"



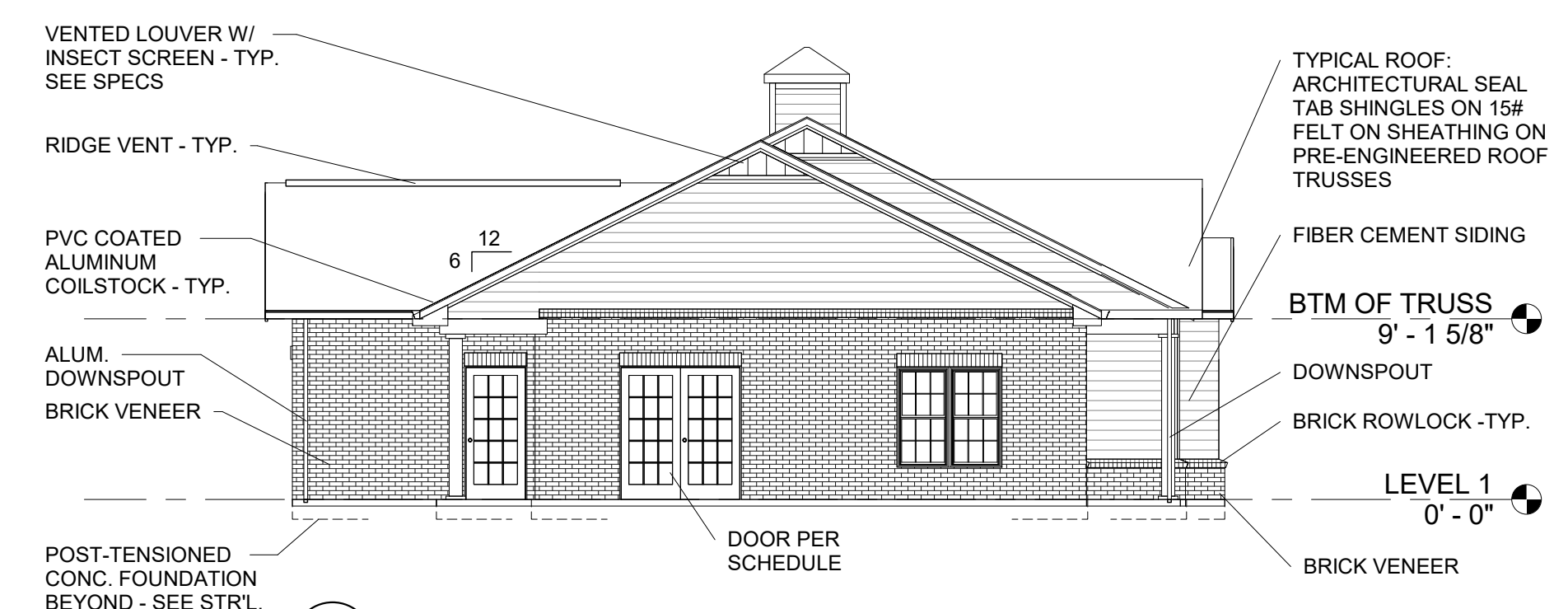
1 BUILDING C - LEVEL 1
A14 1/4" = 1'-0"



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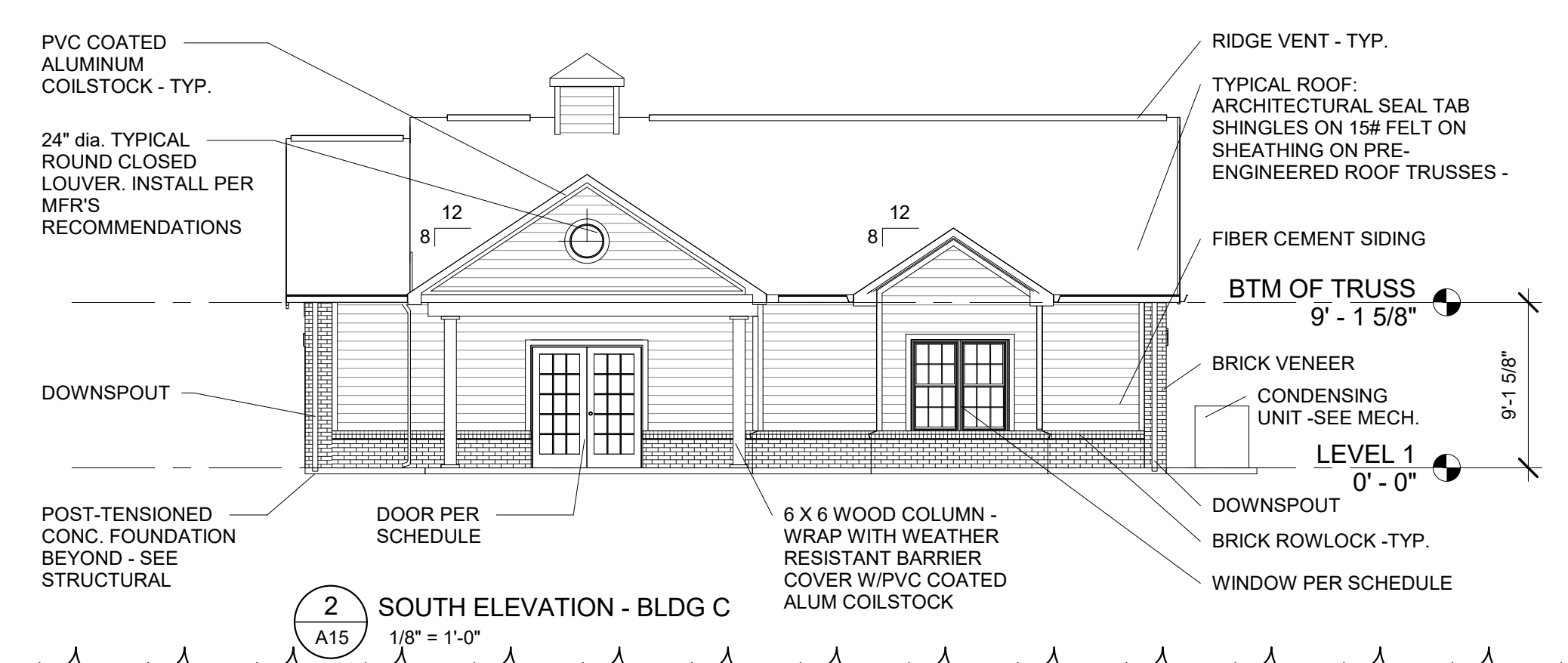
5 EAST ELEVATION 2 - BLDG C
1/8" = 1'-0"



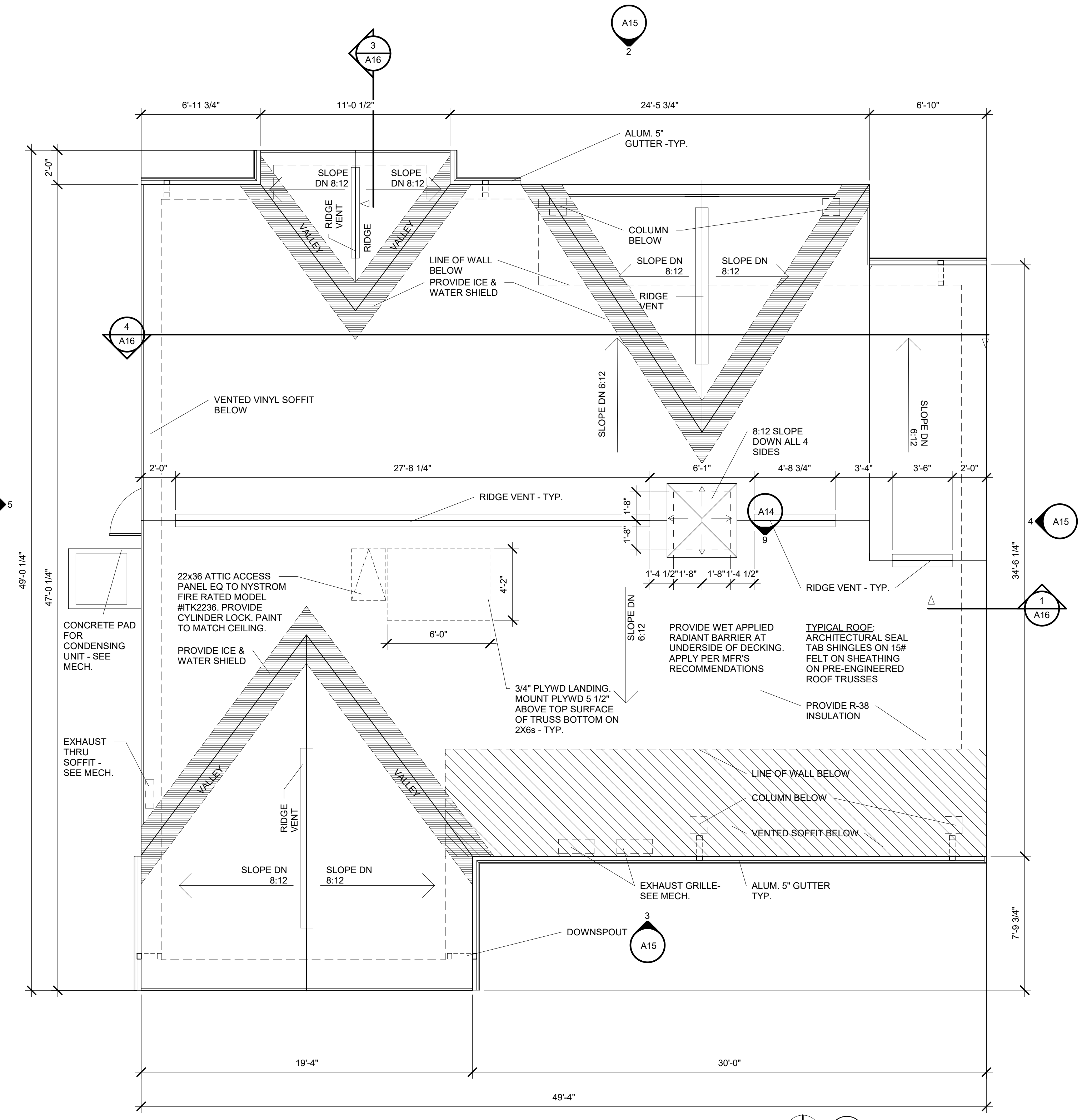
4 WEST ELEVATION - BLDG C
1/8" = 1'-0"



3 NORTH ELEVATION - BLDG C
1/8" = 1'-0"



2 SOUTH ELEVATION - BLDG C
1/8" = 1'-0"



1 BUILDING C - ROOF PLAN
1/4" = 1'-0"

DATE	PERMIT SET
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3 08/20/19	ADDENDUM 1

PROJECT NUMBER
597

PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

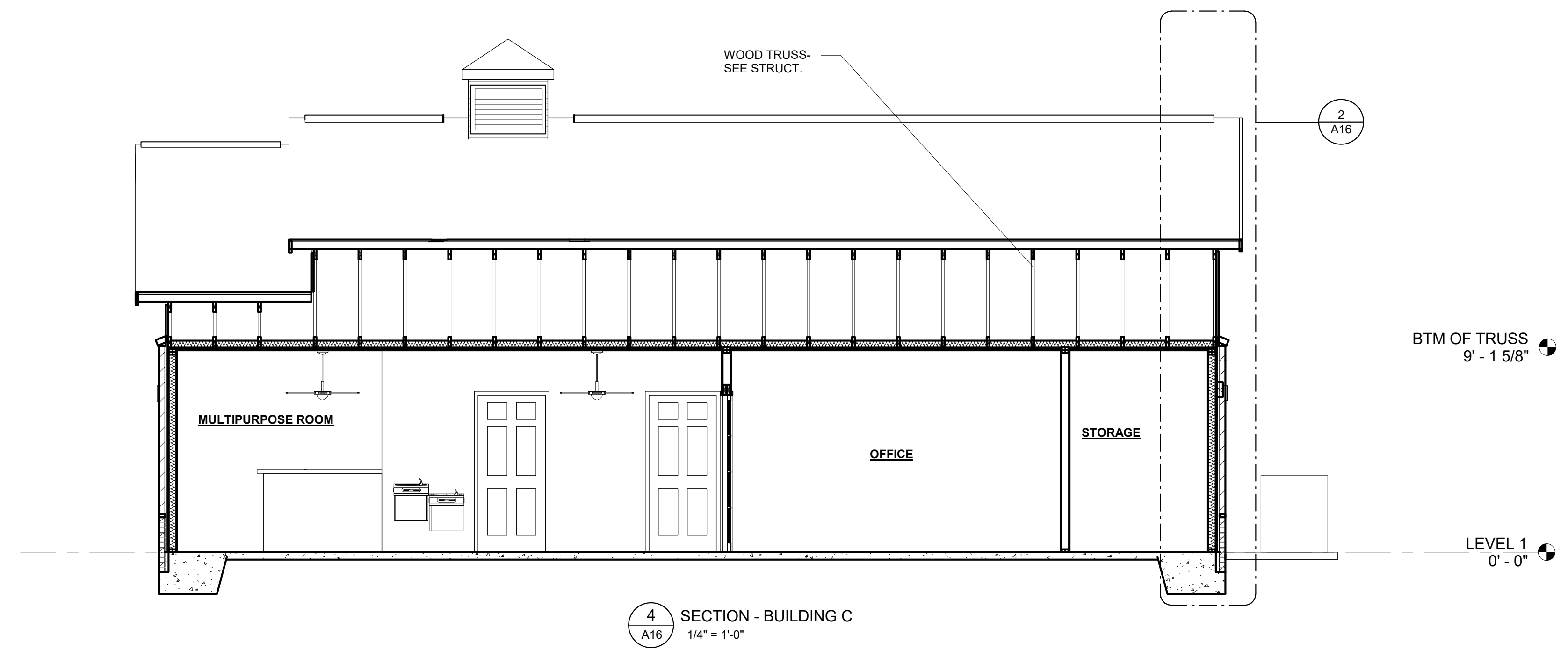
SHEET NUMBER

A15

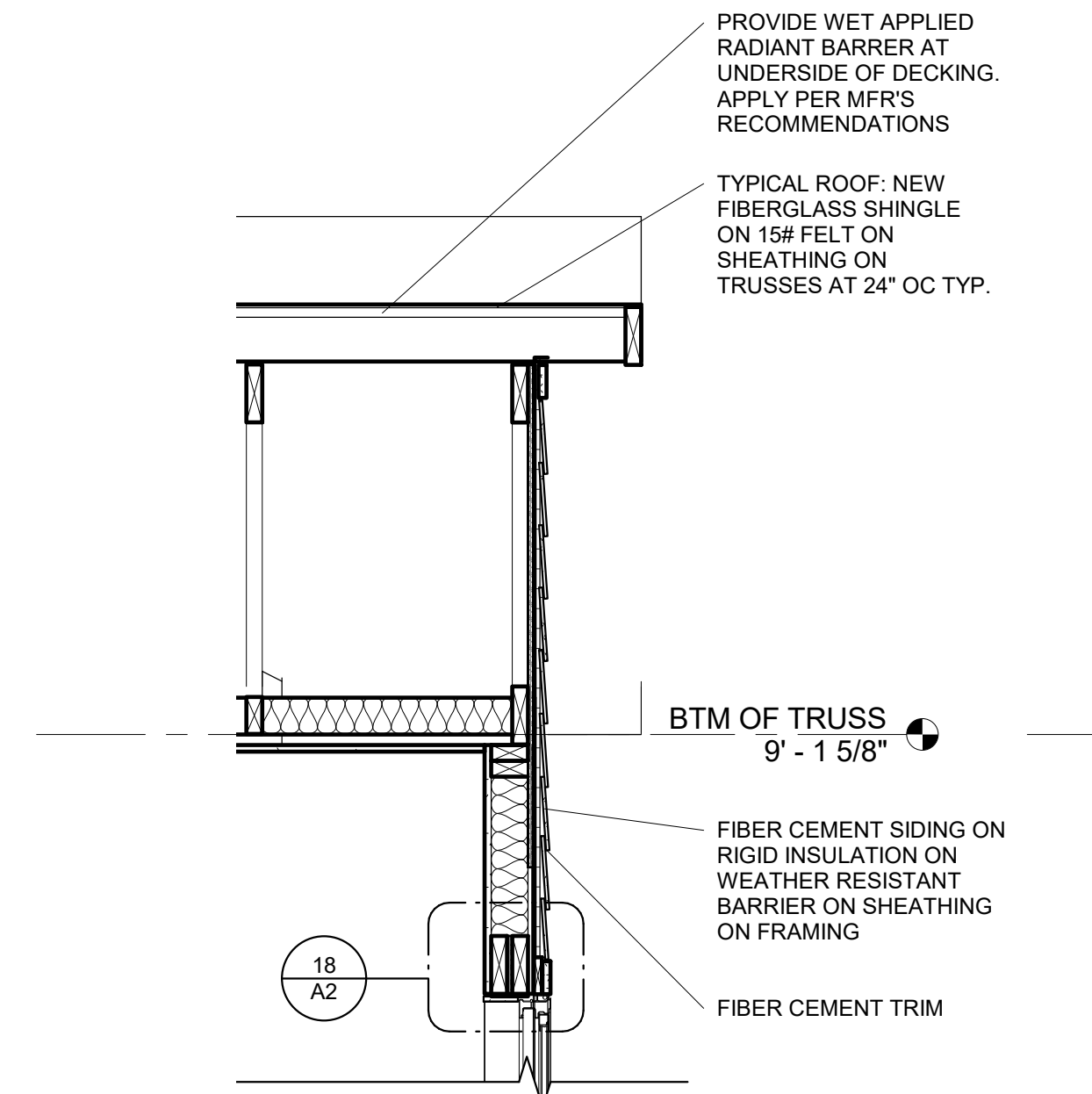
CAD FILE NUMBER
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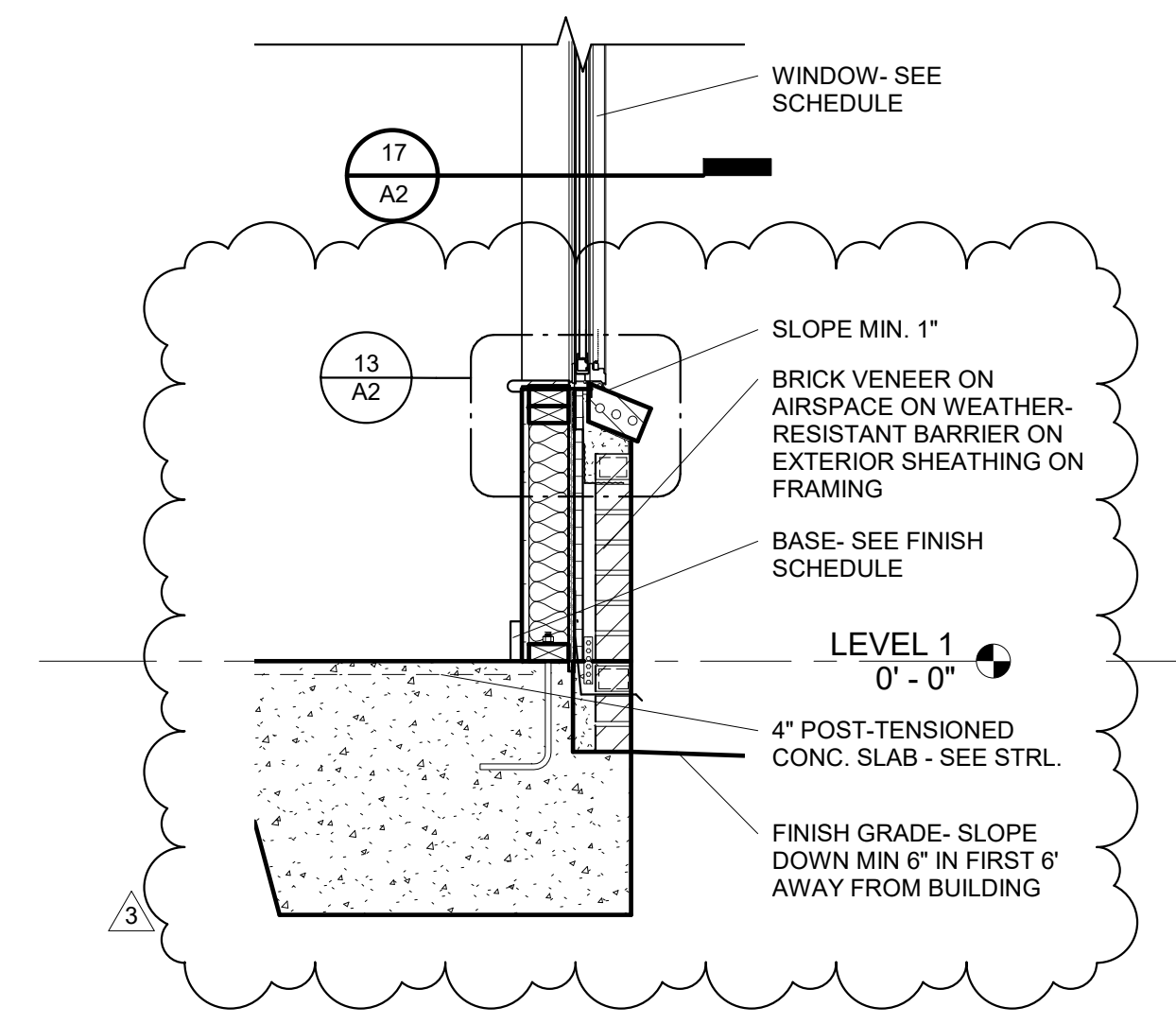
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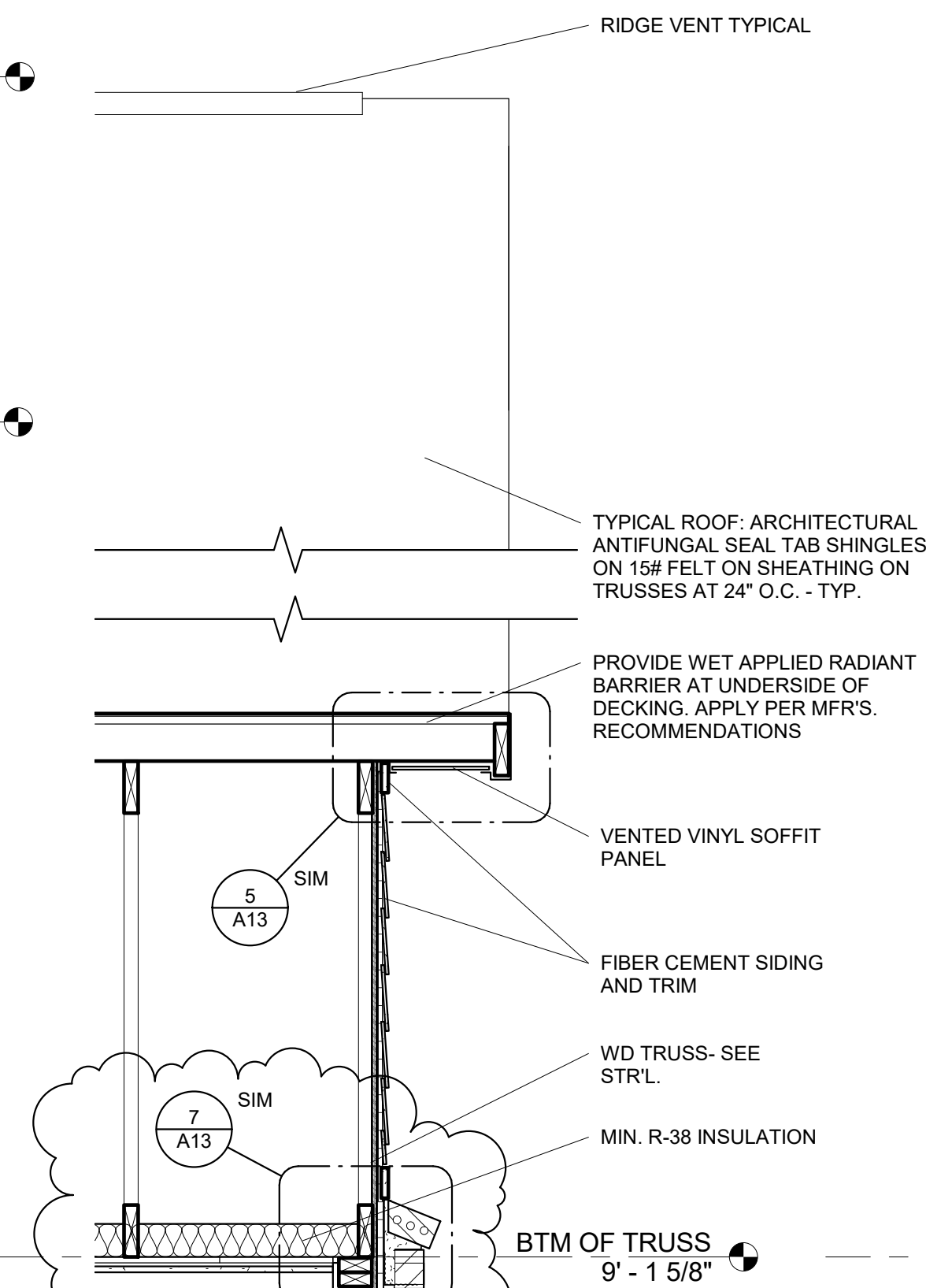
4 SECTION - BUILDING C
A16 1/4" = 1'-0"



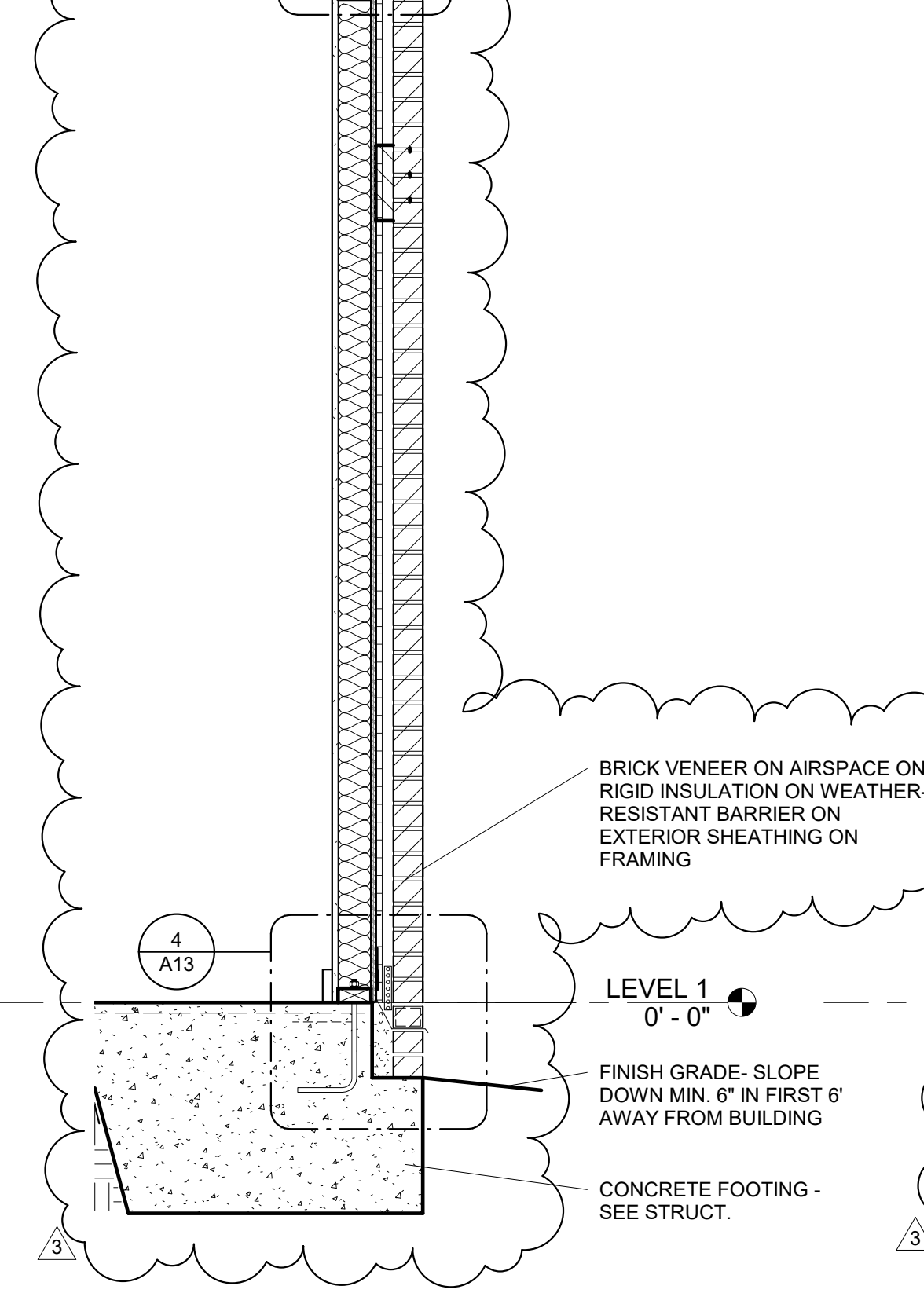
3 WALL SECTION - CLUBHOUSE @ WINDOW
A16 3/4" = 1'-0"



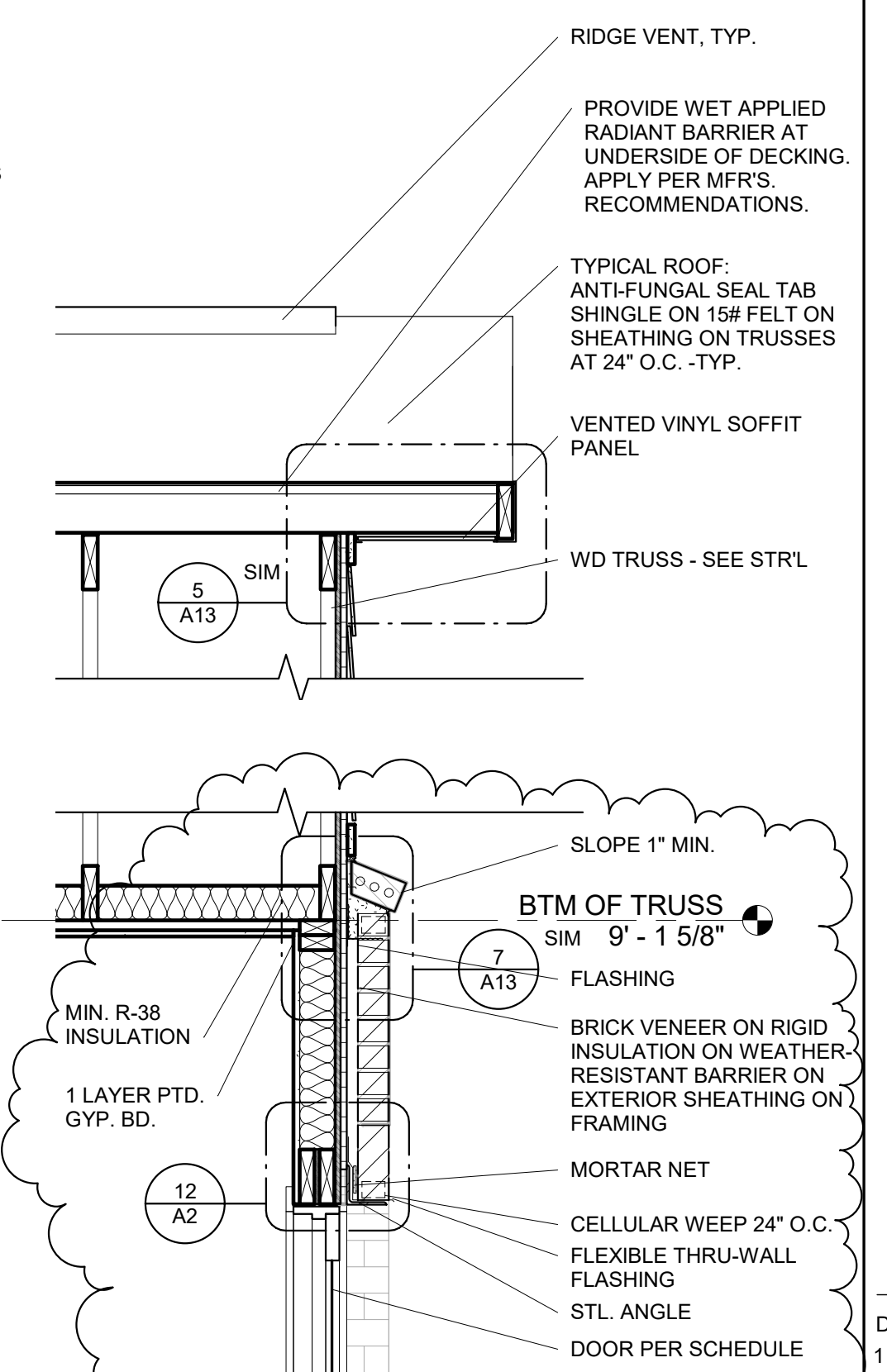
3 WALL SECTION - CLUBHOUSE @ DOOR
A16 3/4" = 1'-0"



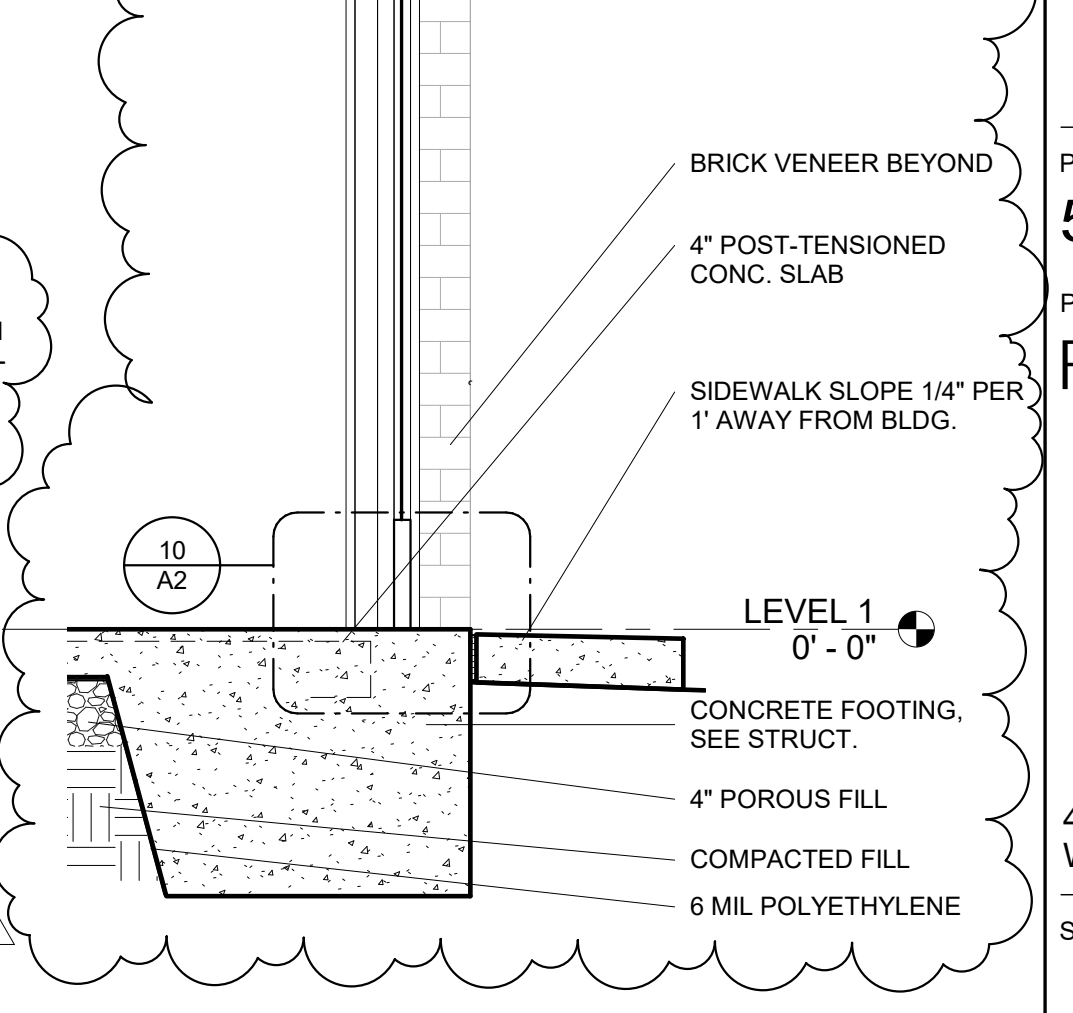
2 TYPICAL WALL SECTION - BUILDING C
A16 3/4" = 1'-0"



2 TYPICAL WALL SECTION - BUILDING C
A16 3/4" = 1'-0"



1 WALL SECTION - CLUBHOUSE @ DOOR
A16 3/4" = 1'-0"



1 WALL SECTION - CLUBHOUSE @ DOOR
A16 3/4" = 1'-0"

DATE	DESCRIPTION
1 11/20/18	PERMIT SET
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3 08/20/19	ADDENDUM 1

PROJECT NUMBER
597
PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

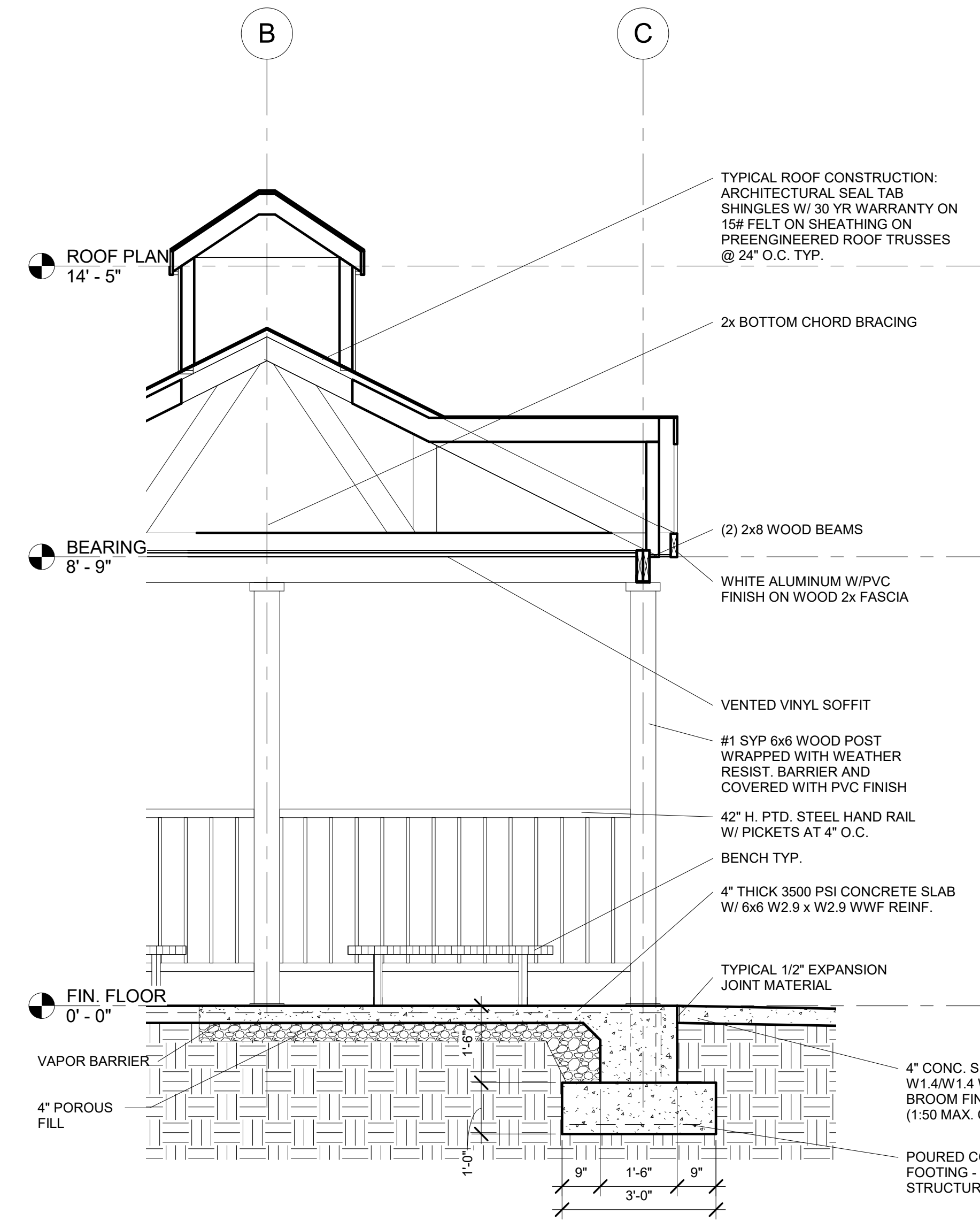
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A16

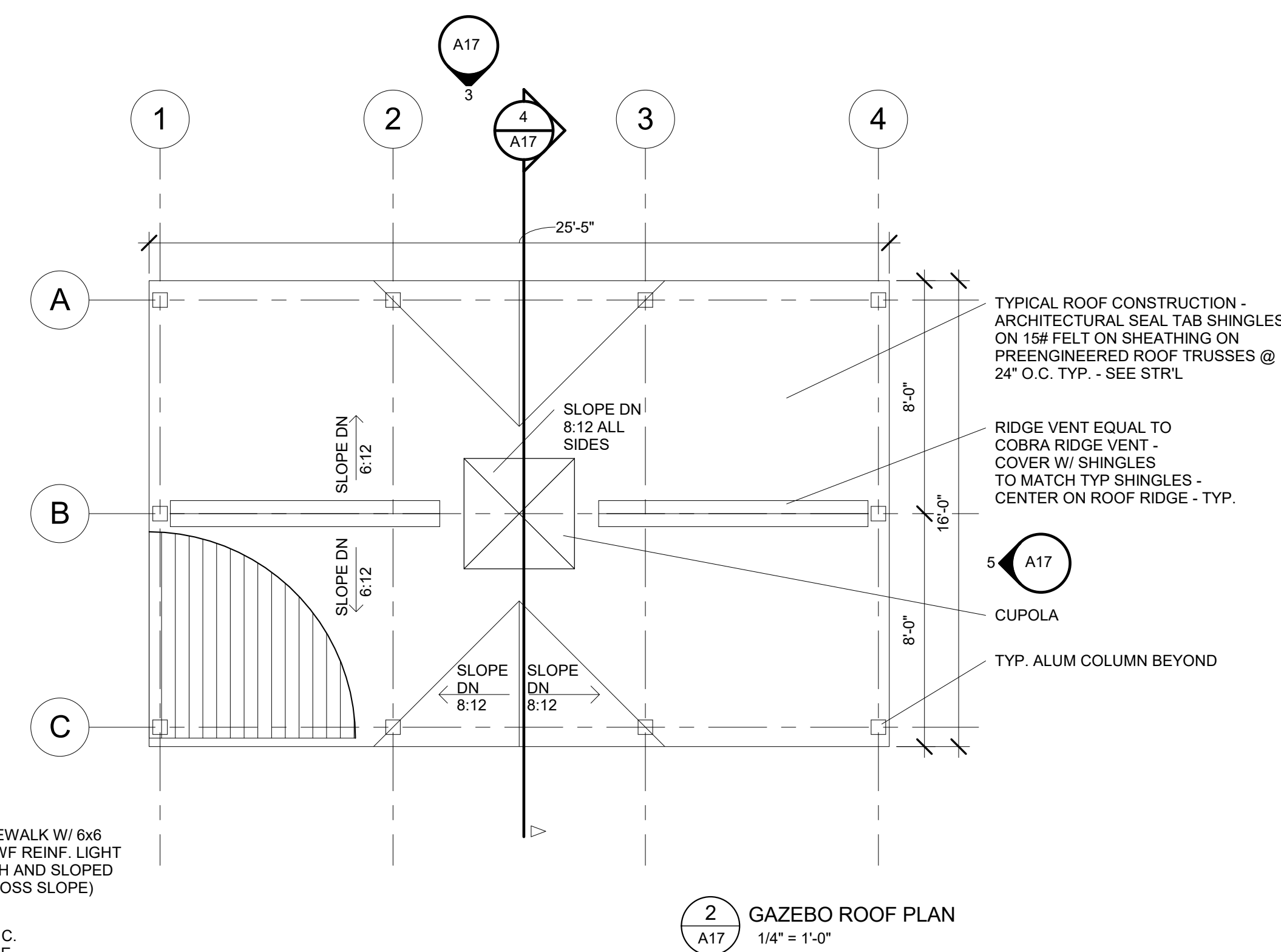
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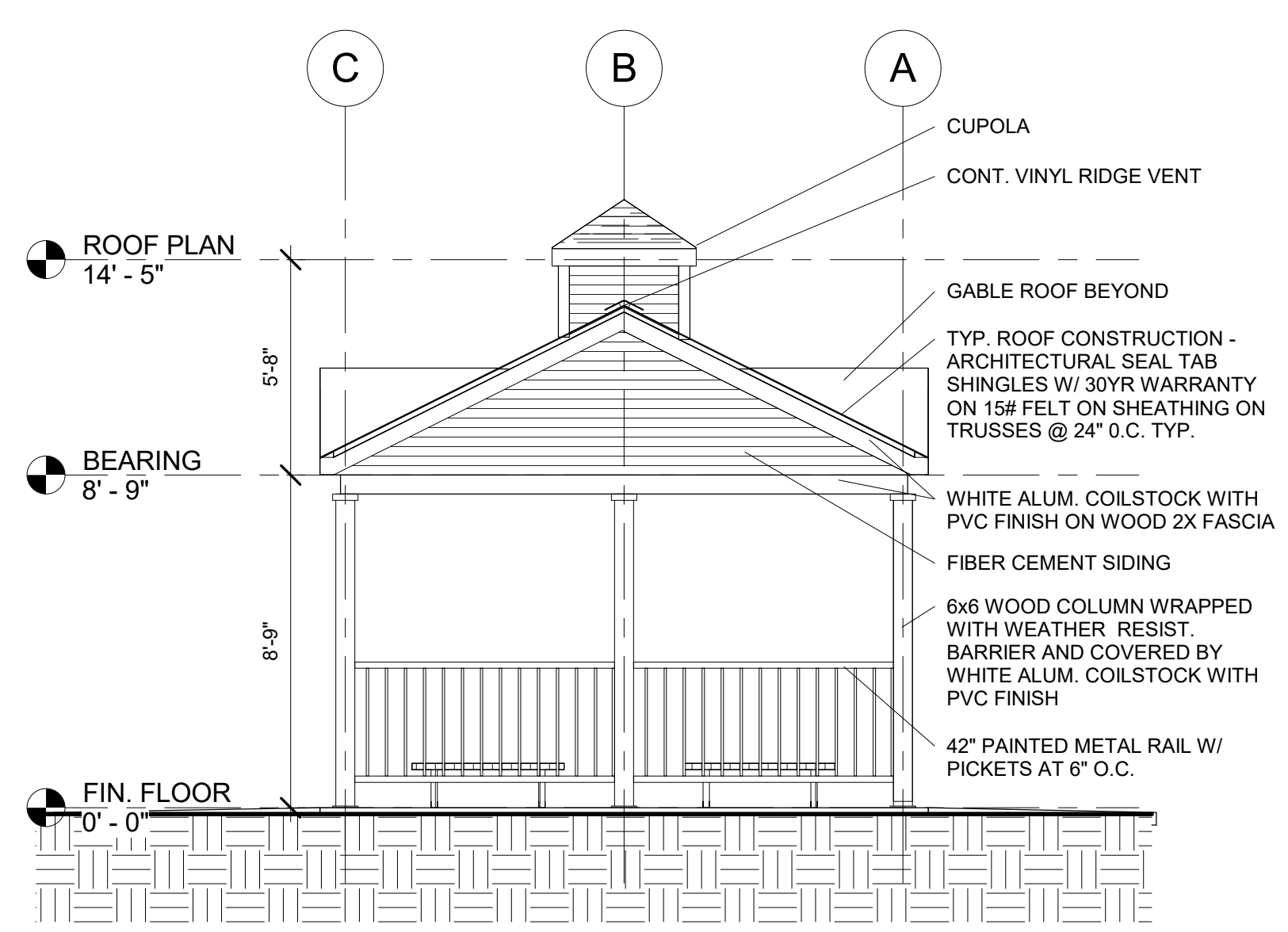
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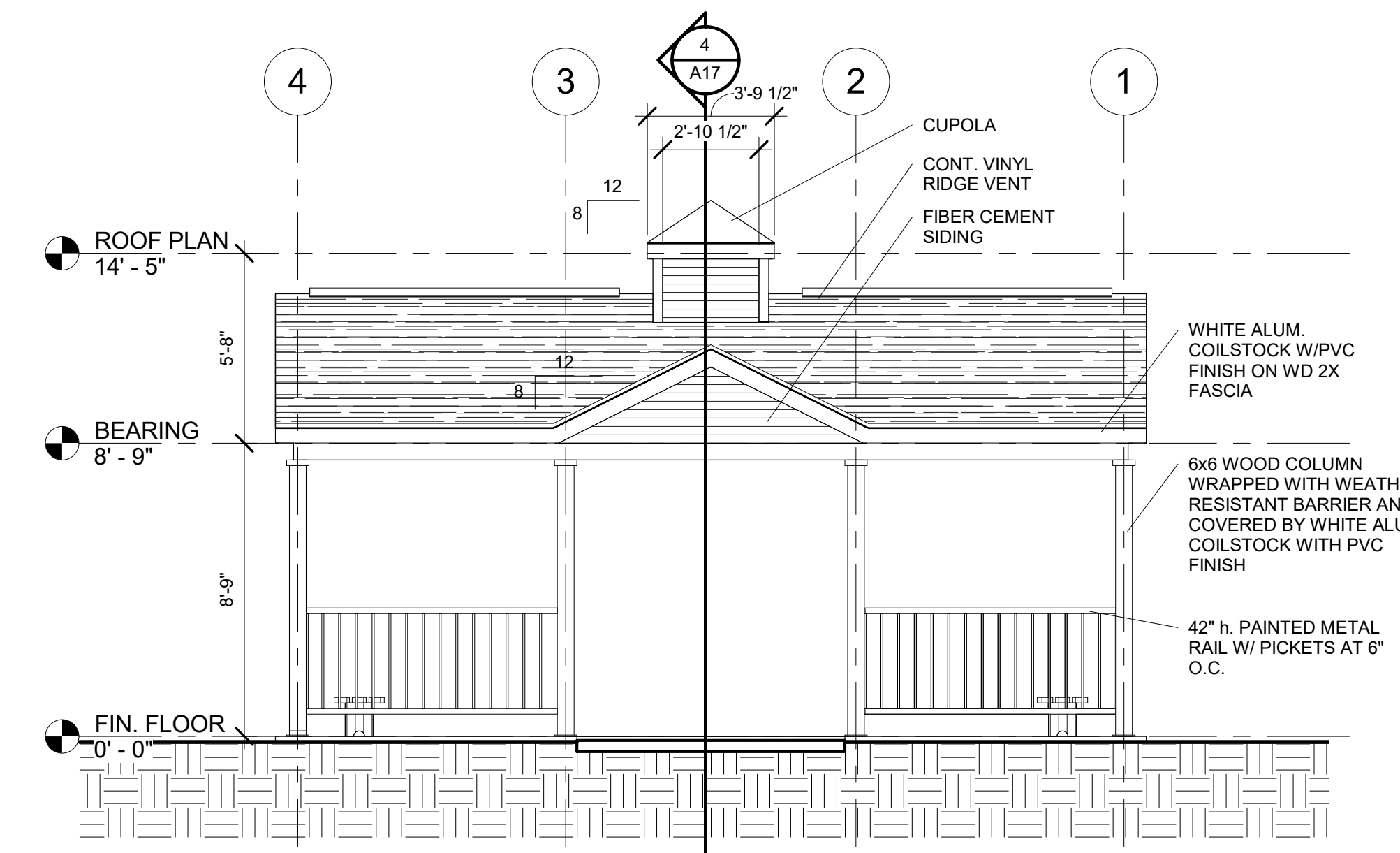
4 SECTION - GAZEBO
1/2" = 1'-0"



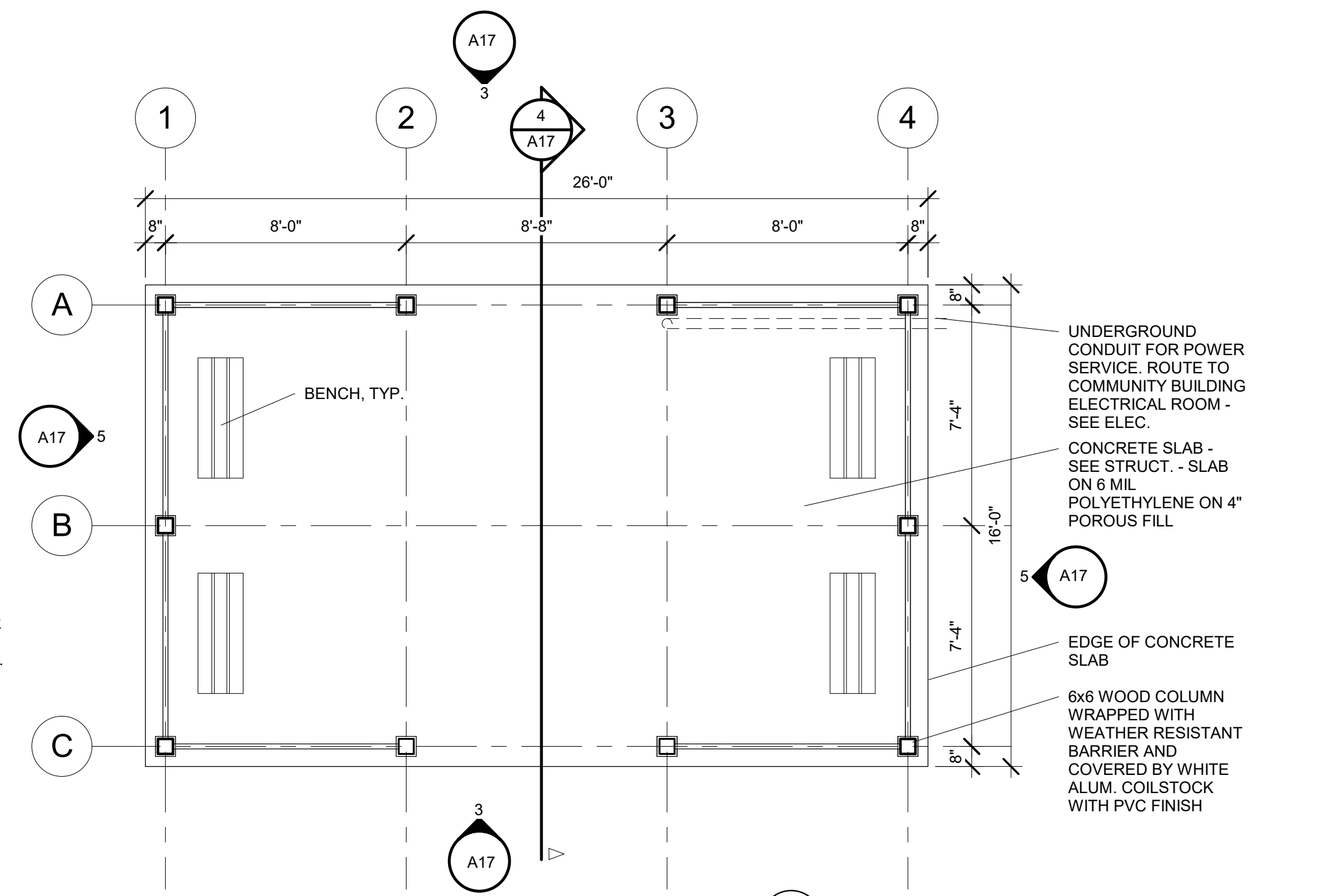
2 GAZEBO ROOF PLAN
1/4" = 1'-0"



5 GAZEBO-WEST
ELEVATION/EAST ELEVATION
O.H.
1/4" = 1'-0"



3 GAZEBO-NORTH
ELEVATION/SOUTH ELEVATION
O.H.
1/4" = 1'-0"



1 GAZEBO FLOOR PLAN
1/4" = 1'-0"
TOTAL AREA = 416 SF

DATE
1 11/20/18 PERMIT SET
2 05/22/19 RE-ISSUED FOR PERMIT

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PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

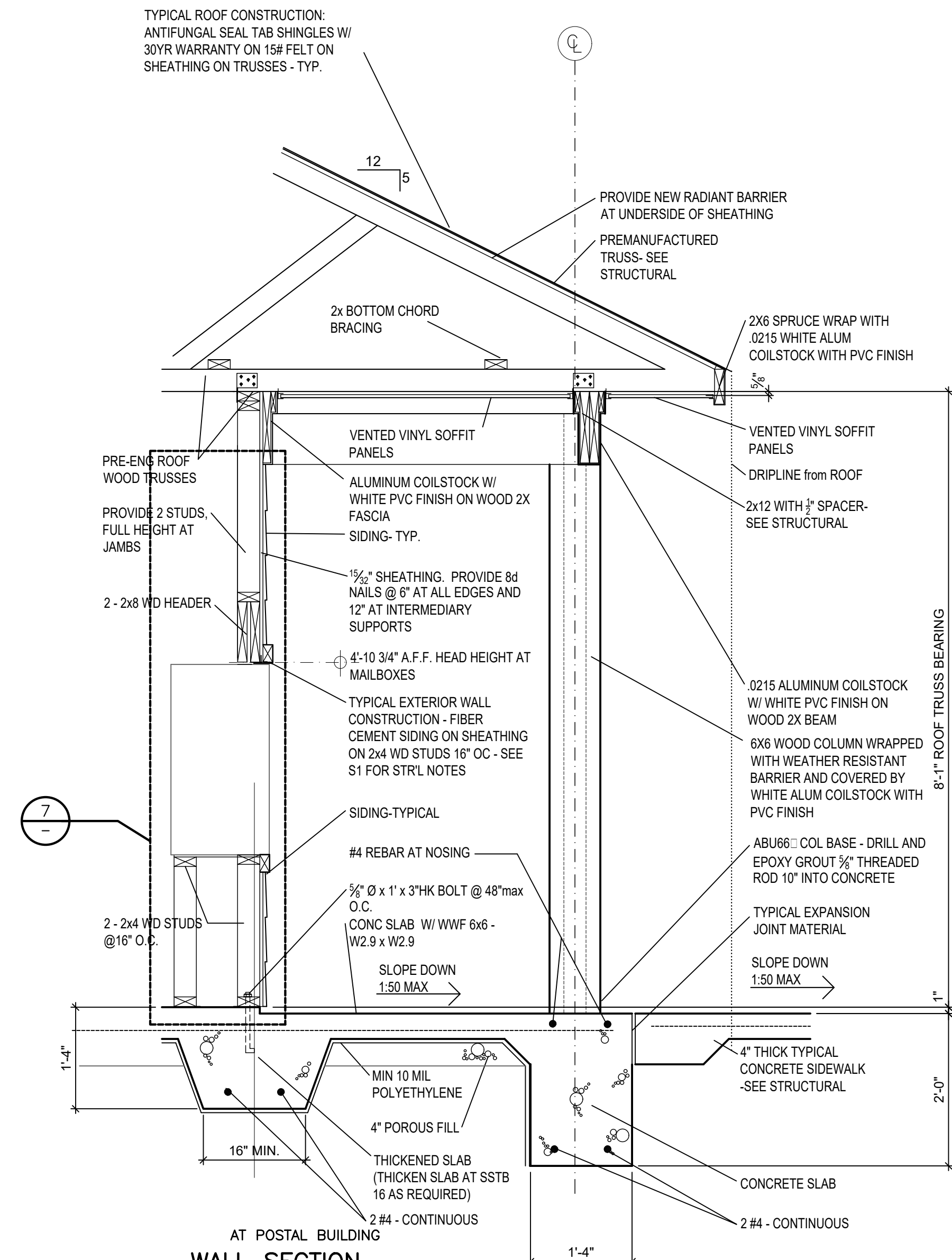
SHEET NUMBER

A17

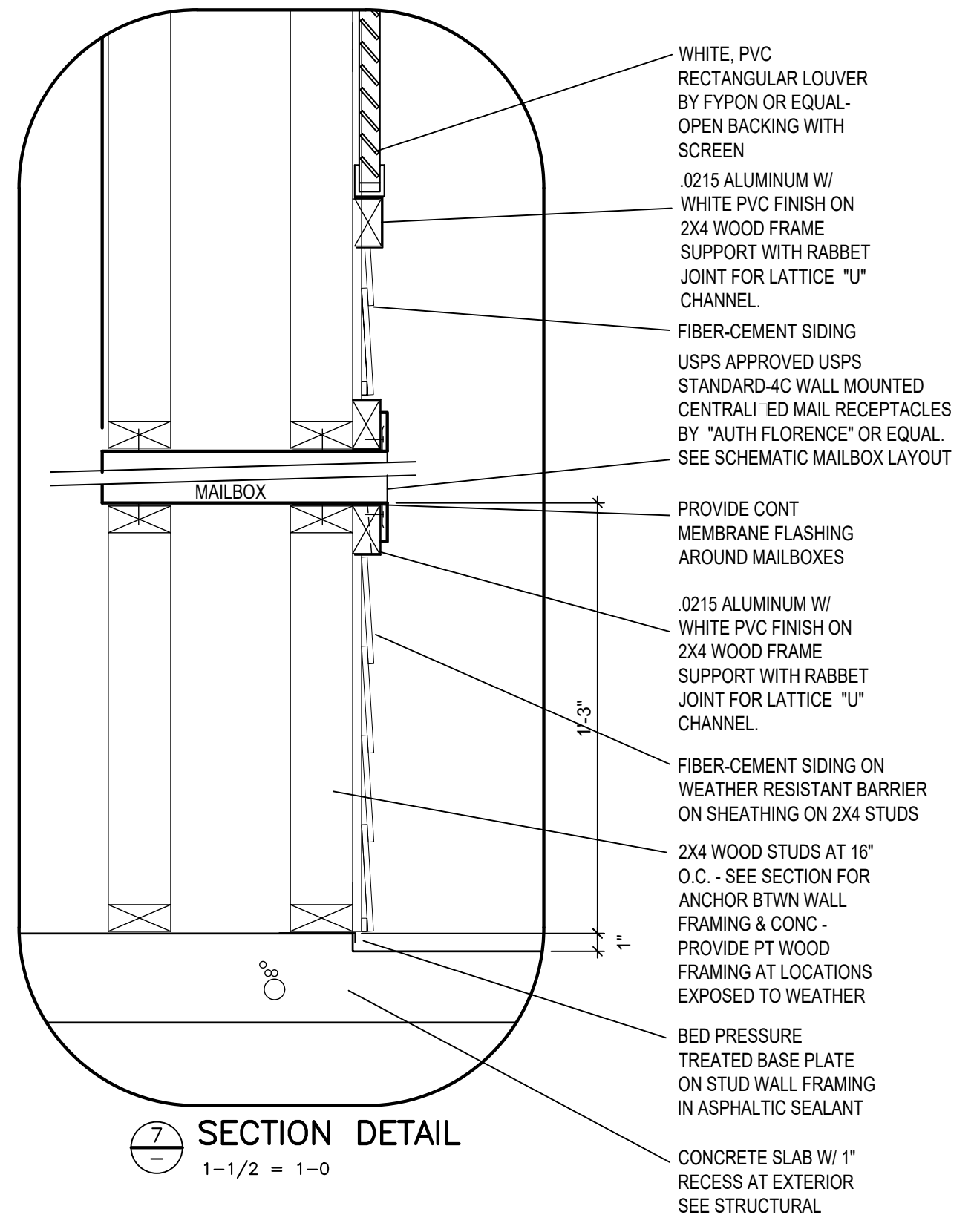
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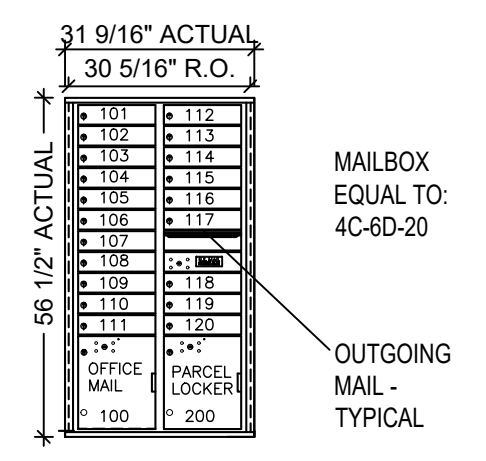
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WALL SECTION
AT POSTAL BUILDING
3/4 = 1-0



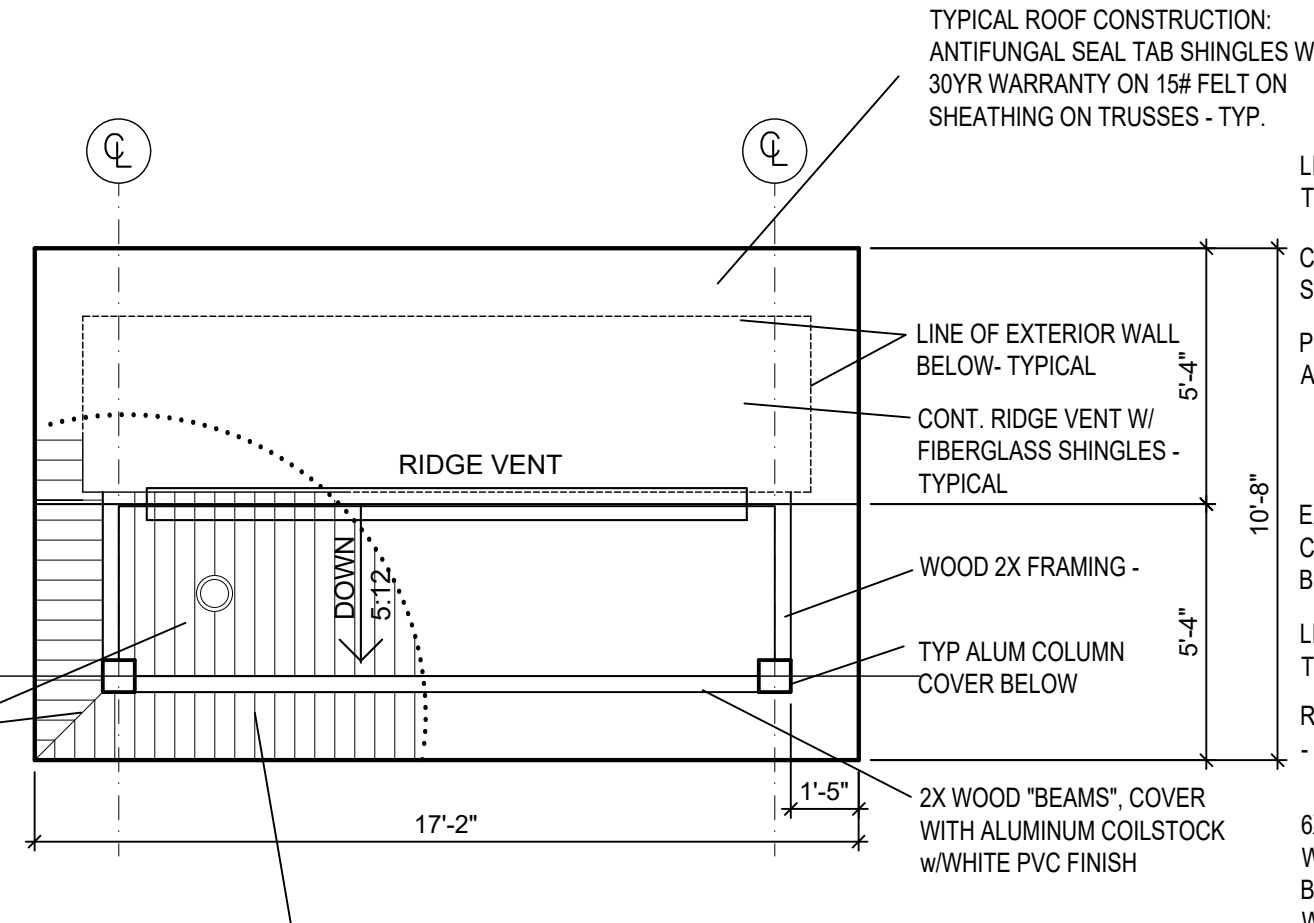
SECTION DETAIL
1-1/2 = 1-0



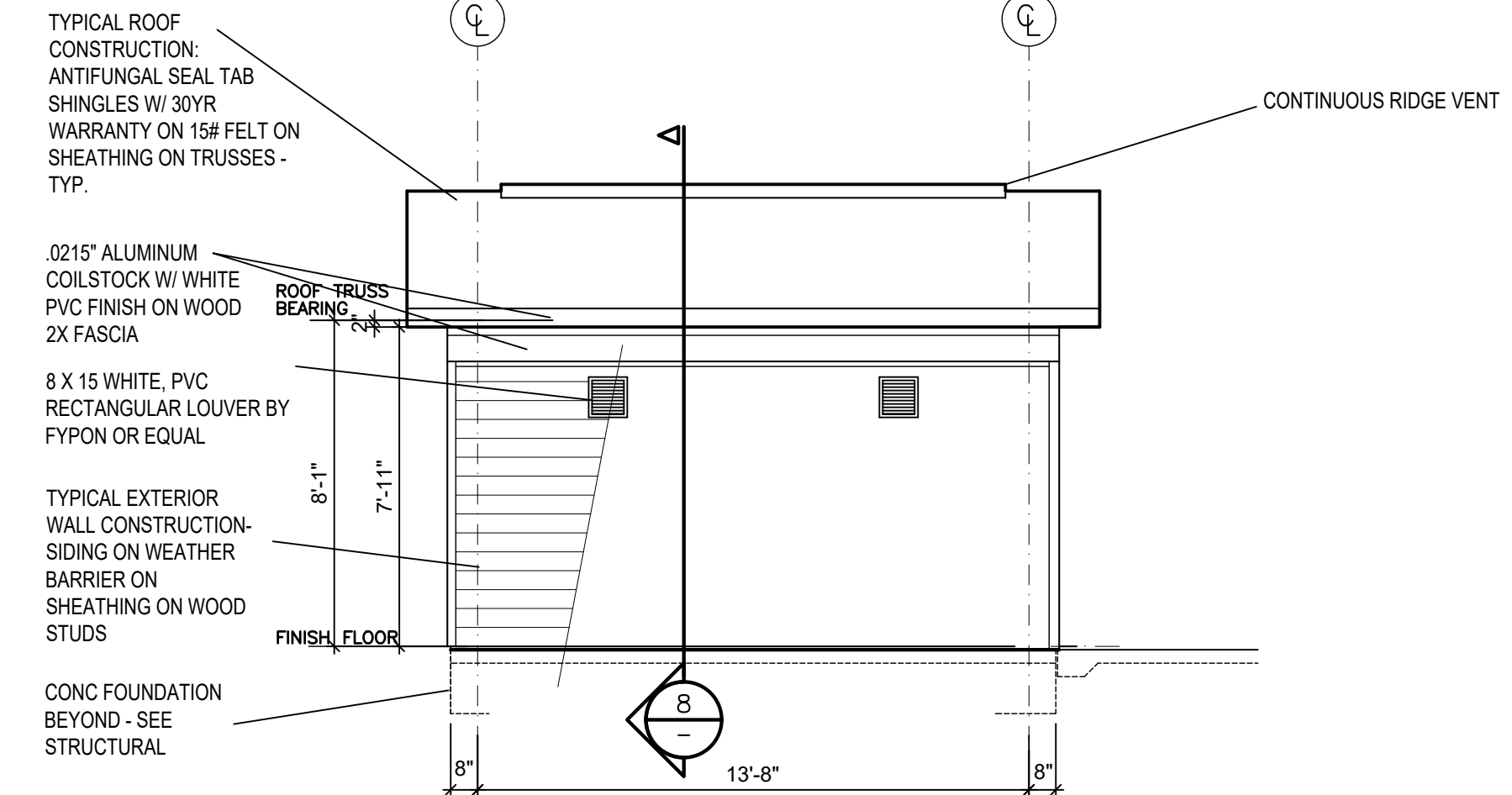
FRONT ELEVATION
FRONT LOADING ALUMINUM CABINETS
SCHEMATIC - MAILBOXES
NTS

SCHEMATIC MAILBOX LAYOUT IS BASED ON "USPS Standard-4C Wall Mounted Centralized Mail Receptacles" FRONT LOADING UNITS. PROVIDE 64 INDIVIDUAL BOXES MINIMUM 3 1/2" x 12" wide x 15" tall; 1 BOX 10 5/8" x 12" wide FOR OFFICE MAIL. PROVIDE 7 PARCEL BOXES of various size and ONE 6 1/2" x 15 7/8" x 12" wide for OUTGOING MAIL BOX. SCHEMATIC INDICATES ARRANGEMENT AND NUMBER OF COMPARTMENTS IN EACH CABINET.

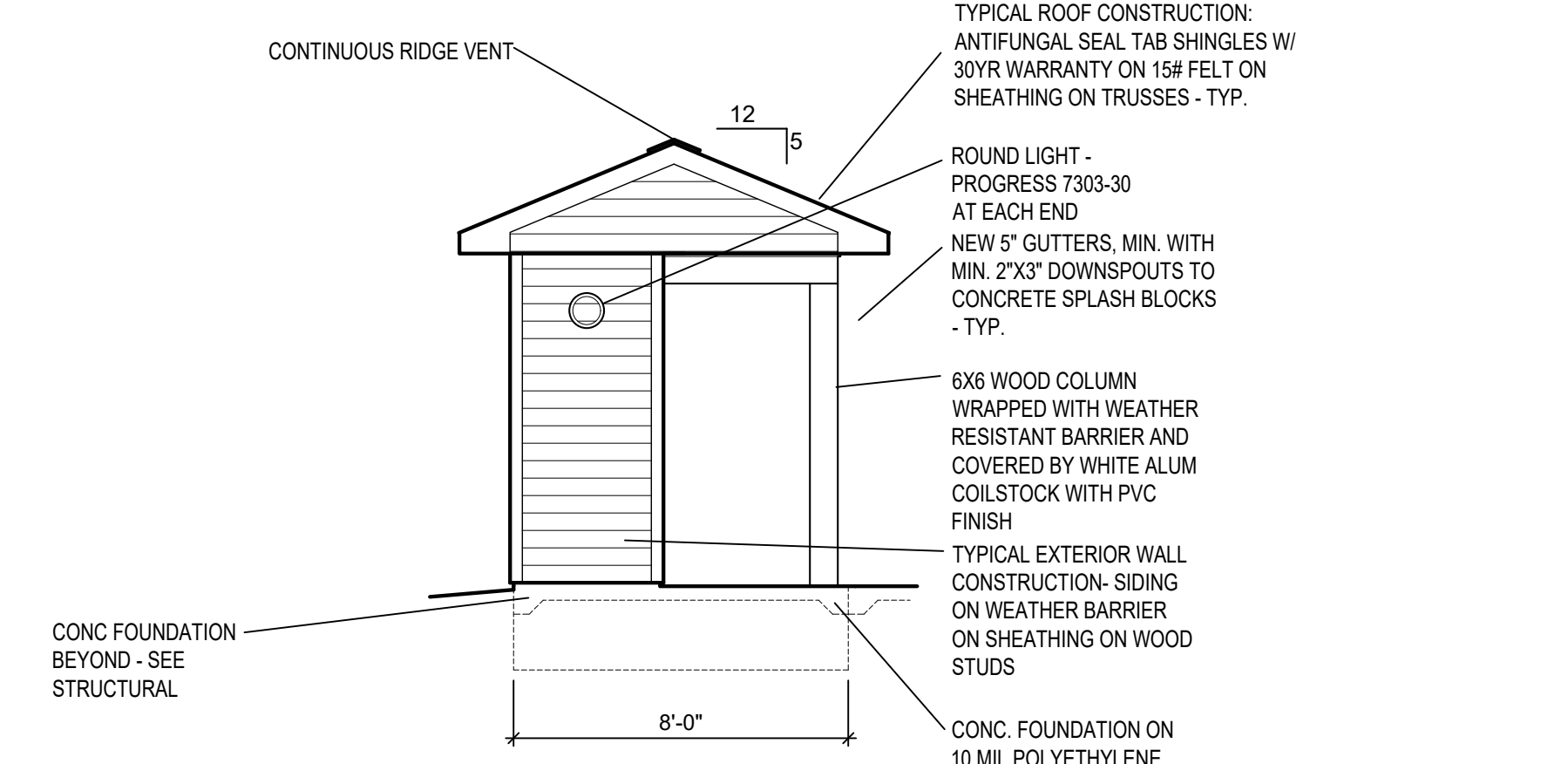
NOTE: NUMBERING SEQUENCE SHOWN IS SCHEMATIC AND CONCEPTUAL. CONFIRM NUMBER SEQUENCE THROUGH SUBMITTAL PRIOR TO FABRICATING POSTAL BOX UNITS.



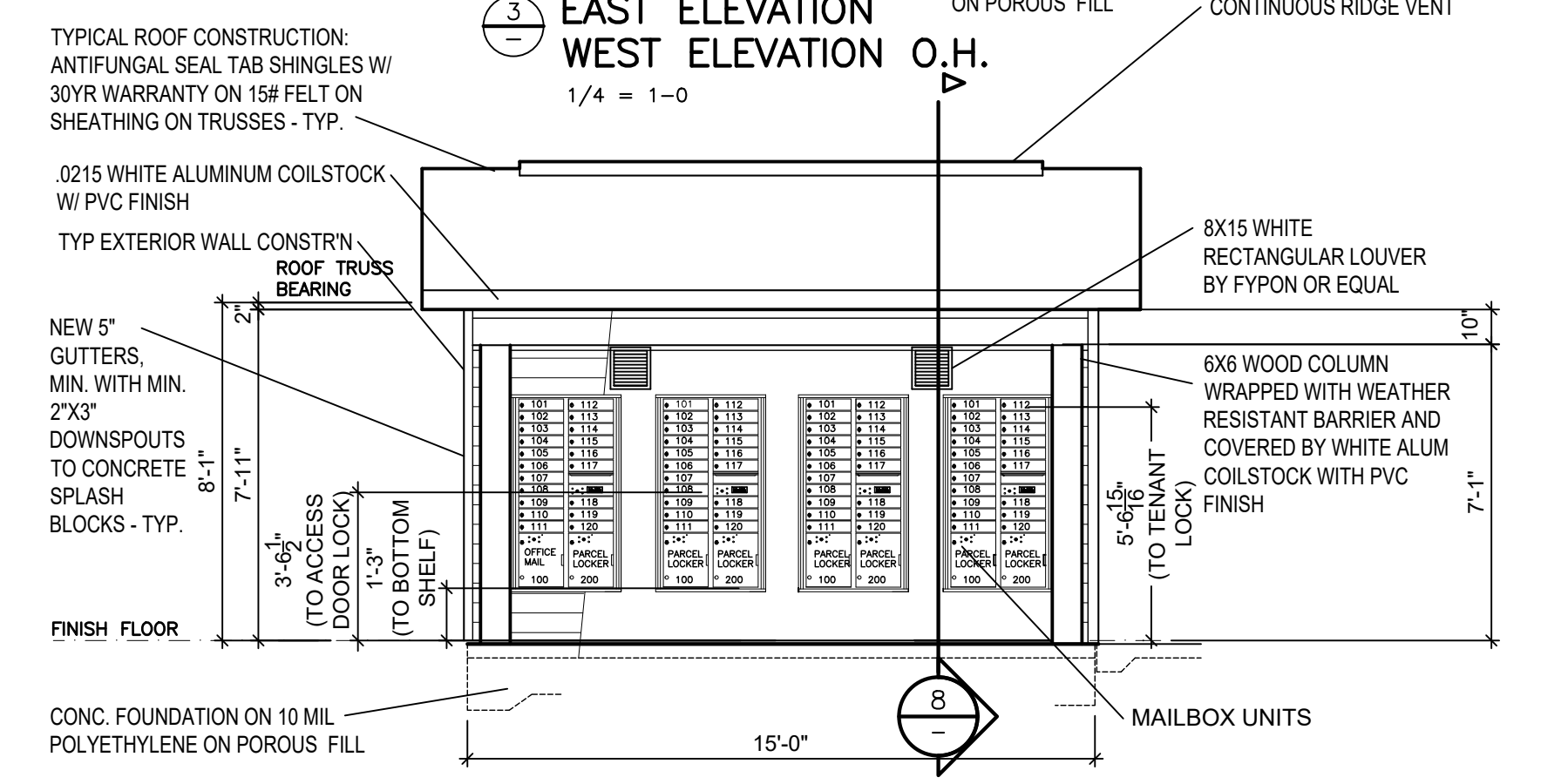
ROOF AND SOFFIT PLAN
1/4 = 1-0



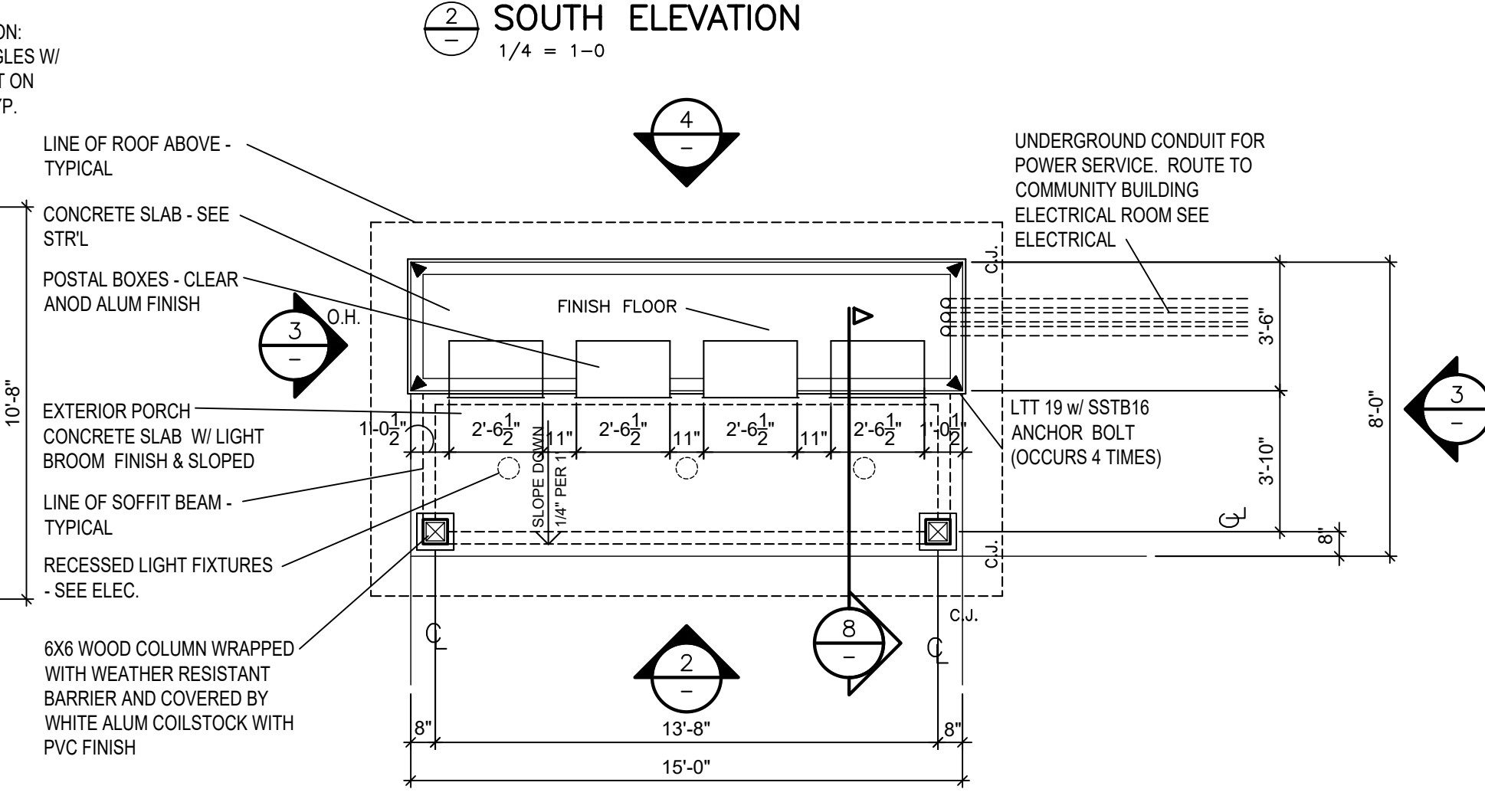
NORTH ELEVATION
1/4 = 1-0



EAST ELEVATION WEST ELEVATION O.H.
1/4 = 1-0



SOUTH ELEVATION
1/4 = 1-0



POSTAL BUILDING PLAN
1/4 = 1-0

NOTE: DIMENSIONS ARE TO EDGE OF CONC SLAB OR CENTERLINE OF COLUMN.

ENCLOSED AREA	55 GSF
COVERED AREA (PORCH)	65 GSF
TOTAL AREA	120 GSF

COORDINATE LOCATION ON SITE WITH SHEET A1, CIVIL, & LANDSCAPE

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Frisco Park

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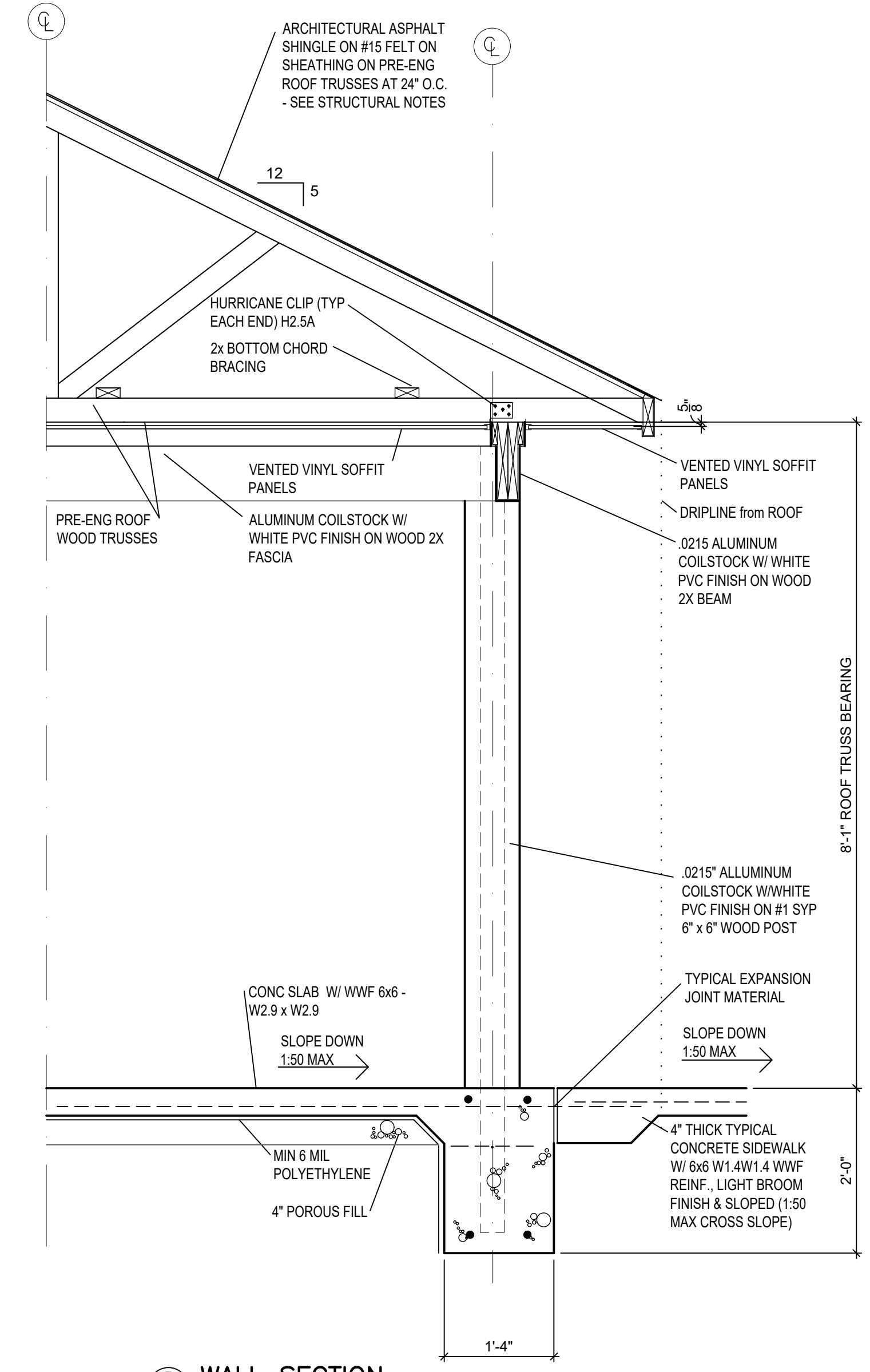
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A18

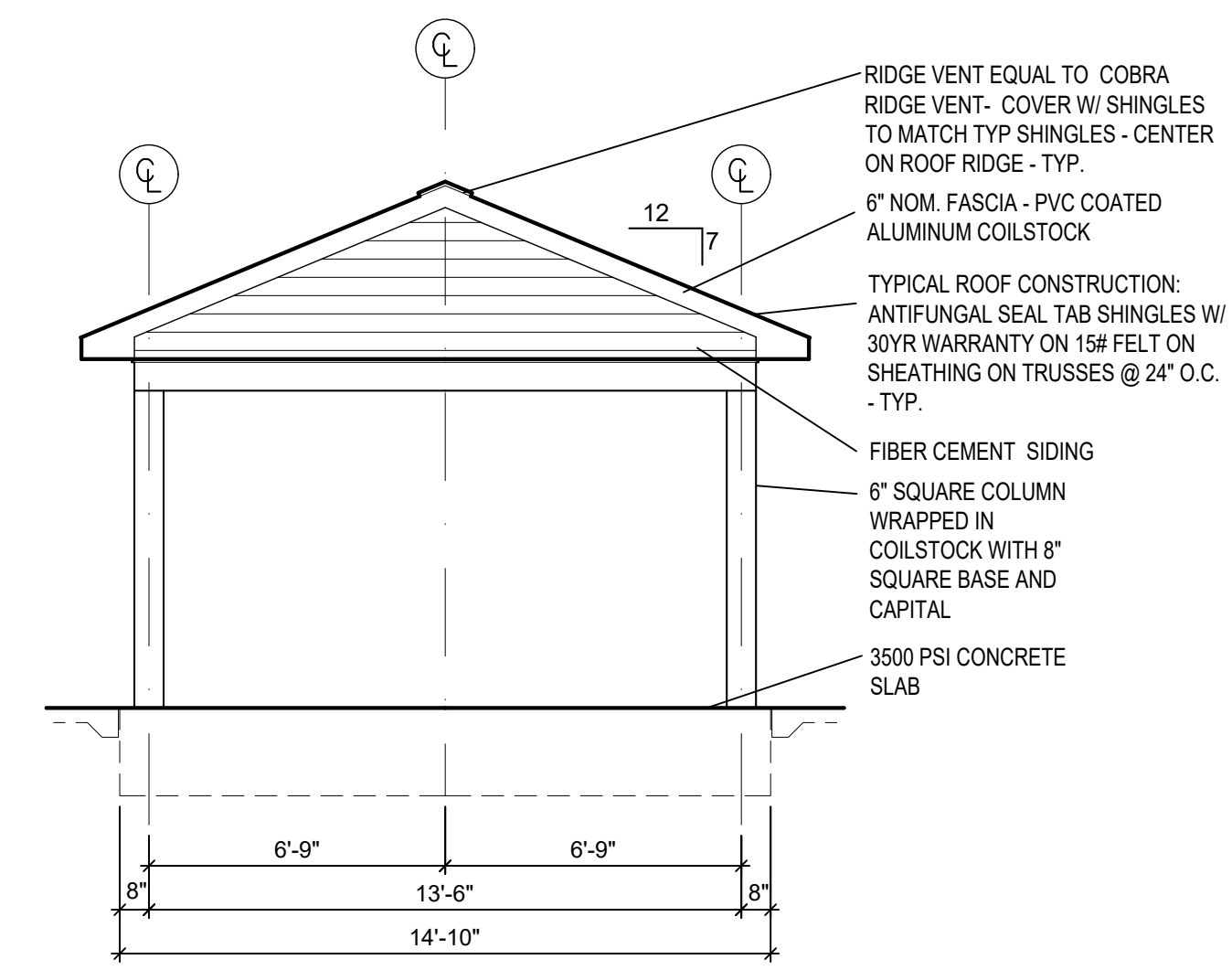
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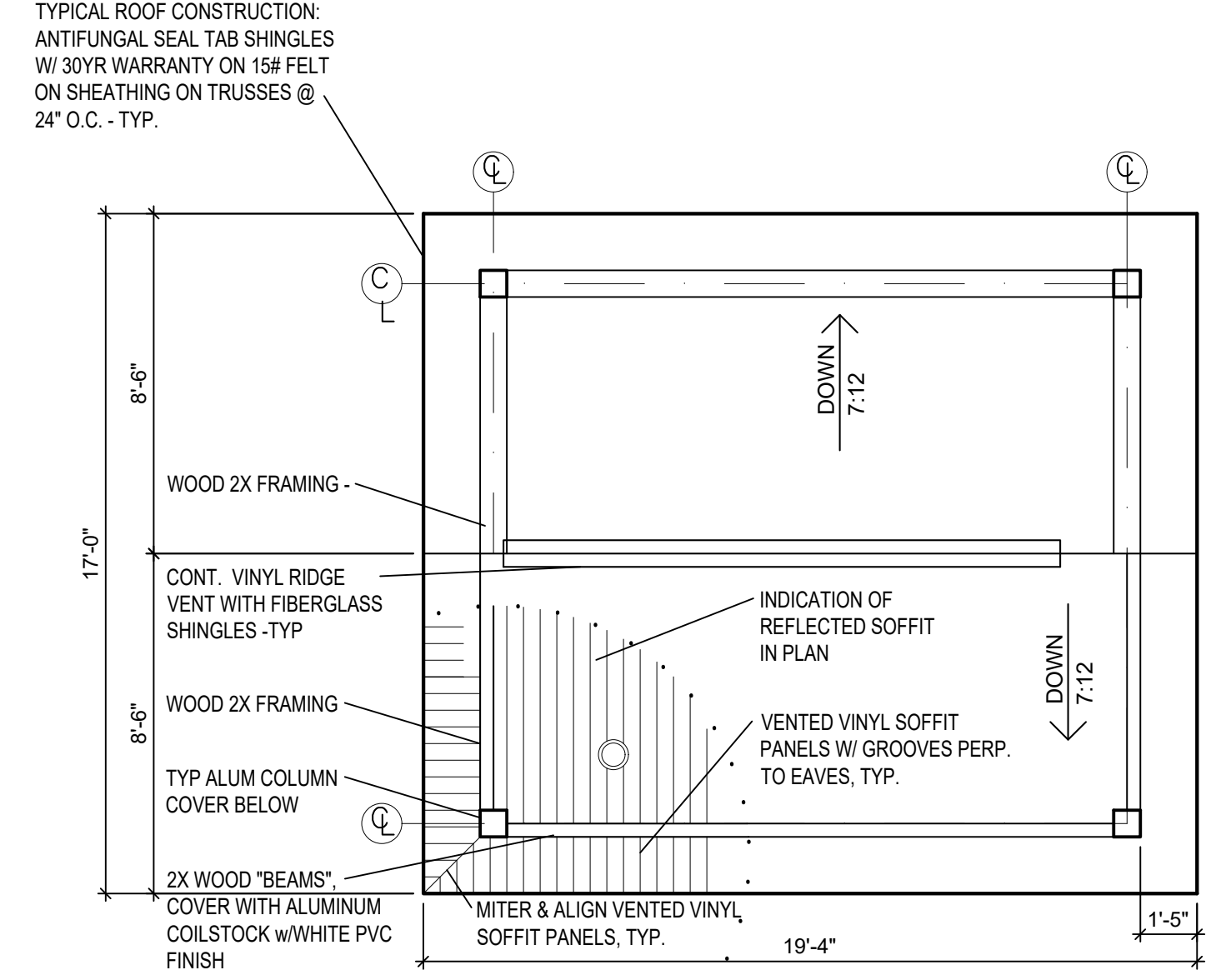
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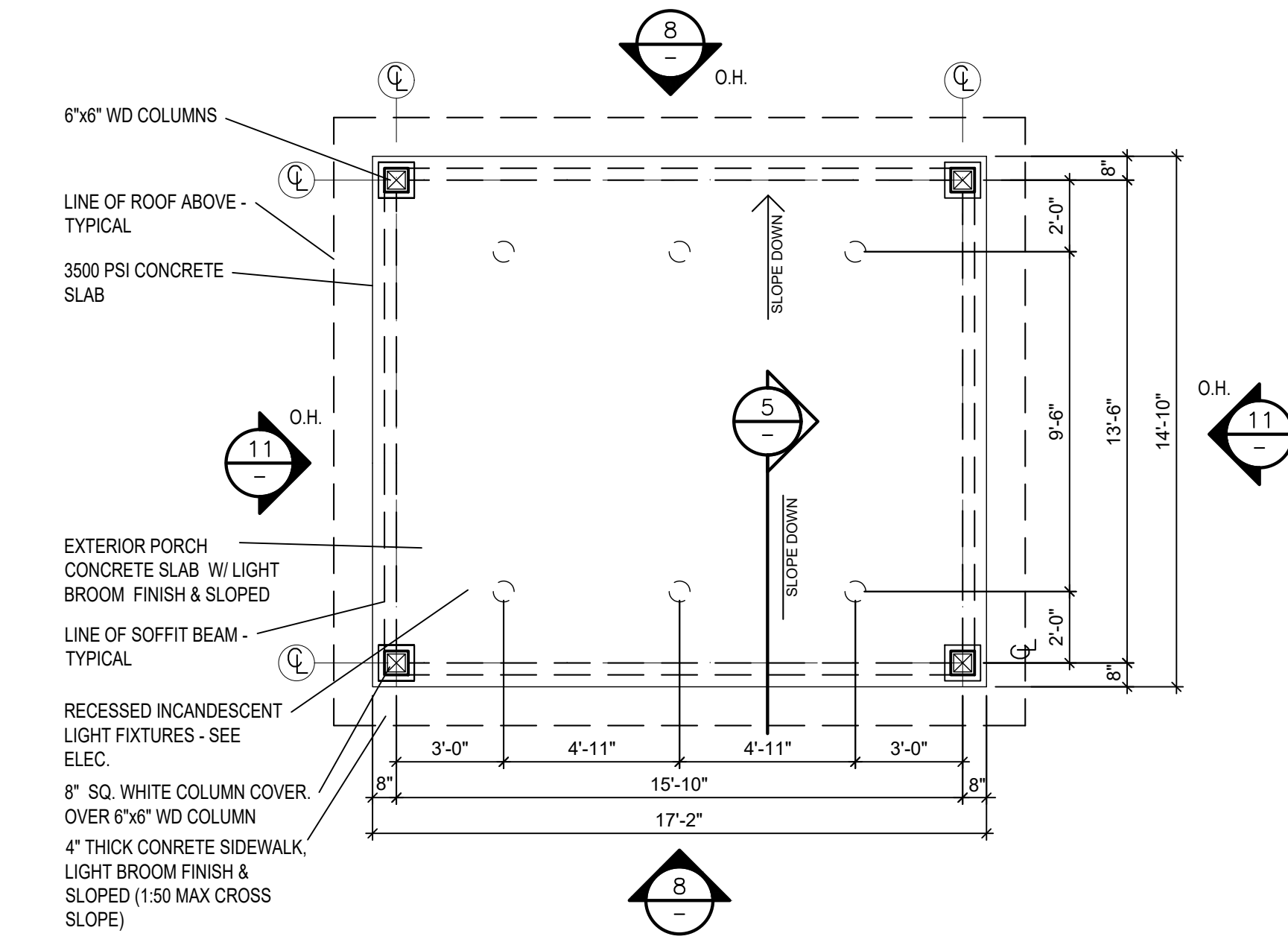
5 WALL SECTION
3/4 = 1-0



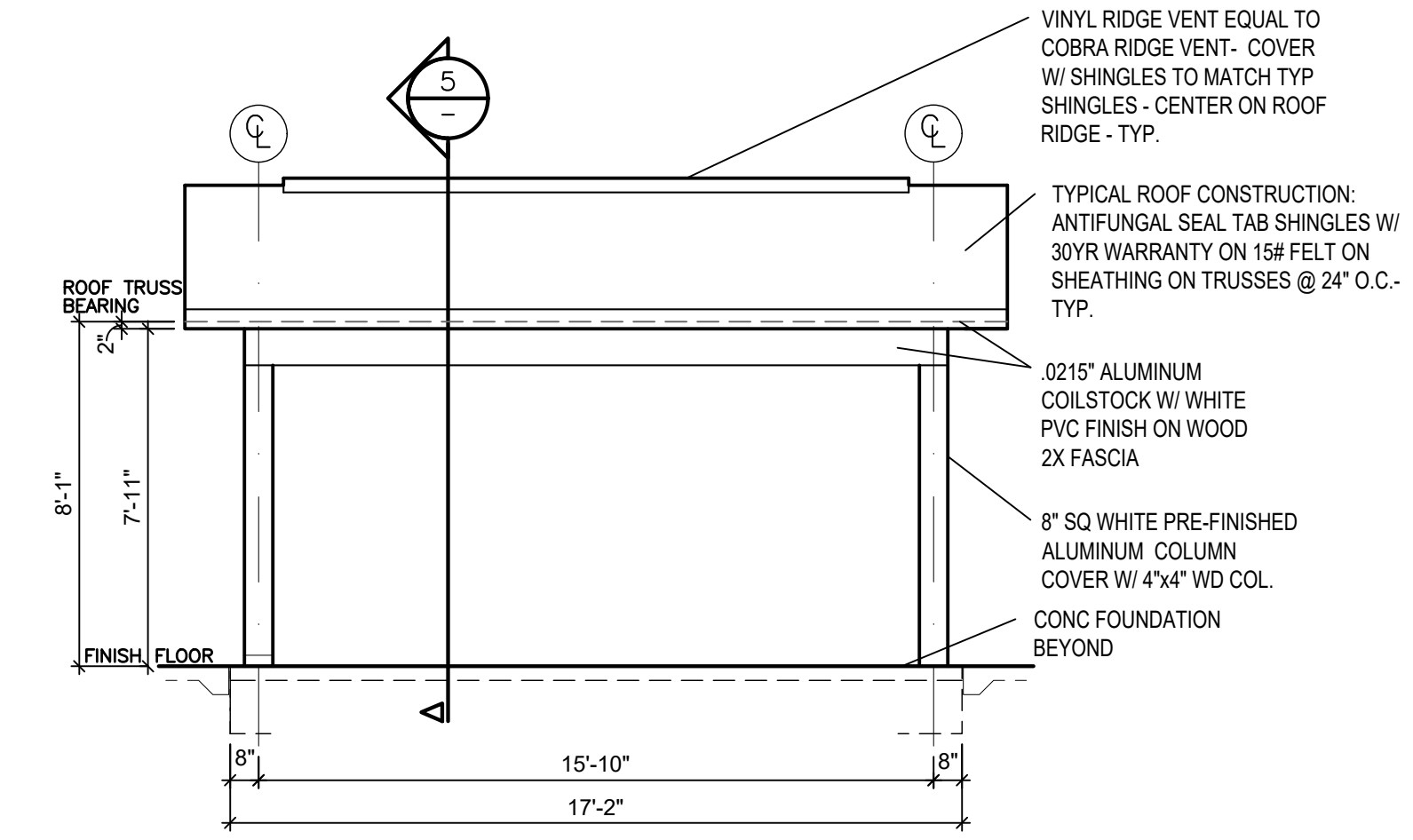
11 EAST ELEVATION
WEST ELEVATION O.H.
1/4 = 1-0



10 NEW ROOF AND SOFFIT PLAN
1/4 = 1-0



9 NEW BUS STOP PLAN
1/4 = 1-0
TOTAL AREA 255 GSF
NOTE: DIMENSIONS ARE TO
EDGE OF CONC SLAB OR TO
CENTERLINE OF COLUMN



8 NORTH ELEVATION
SOUTH ELEVATION O.H.
1/4 = 1-0

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1 11/20/18 PERMIT SET
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597
PROJECT
Frisco Park

418 S. Avalon Street,
West Memphis, AR 72301

SHEET NUMBER

A19

CAD FILE NUMBER
N:\Projects\597\02-Dwg\04-CD\Revit\Revit
Files\Arch\A21-Bus Stop.dwg

GENERAL NOTES

1.0 DESIGN CRITERIA

- CODES AND SPECIFICATIONS:
 - GENERAL BUILDING CODE: 2012 ARKANSAS FIRE PREVENTION CODE, VOL. 2 - BUILDING CODE.
 - CONCRETE: BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318-11)
 - STRUCTURAL STEEL: SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, AMERICAN INSTITUTE OF STEEL CONSTRUCTION (ANSI/AISC 360-10)
 - STEEL DECK: STEEL DECK INSTITUTE DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS, AND ROOF DECKS NO.30, LATEST EDITION.
 - TIMBER: NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION, AMERICAN FOREST AND PAPER ASSOCIATION, LATEST EDITION.

- DESIGN GRAVITY LOADS (PSF):
 - DEAD LOADS: ANY CHANGES IN CONSTRUCTION MATERIALS FROM THOSE SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS SHALL BE REPORTED BY THE GENERAL CONTRACTOR TO THE STRUCTURAL ENGINEER FOR VERIFICATION OF LOAD-CARRYING CAPACITY OF THE STRUCTURE.

APARTMENTS	40
CORRIDORS ABOVE 1ST FLOOR	40
BALCONIES, EXTERIOR STAIRS, EXITS	40
STAIRS, EXITS	100
 - FLOOR LIVE LOADS: LIVE LOAD REDUCTIONS AS DETERMINED BY IBC SECTION 1607.10 HAVE BEEN TAKEN WHERE PERMITTED.

ROOF LIVE LOADS: WHERE PERMITTED ROOF LIVE LOADS ARE REDUCED FROM THE BASE VALUE SHOWN BELOW IN ACCORDANCE WITH IBC SECTION 1607.12.	20
ROOF SNOW LOADS: GROUND SNOW LOAD (Pg)	15.0
IMPORTANCE FACTOR (I)	1.0
EXPOSURE FACTOR (Ce)	0.9
THERMAL FACTOR (Ct)	1.0

- DESIGN LATERAL LOADS:
 - WIND LOADS: ULTIMATE DESIGN WIND SPEED (3-SECOND GUST) 115 MPH
NOMINAL WIND SPEED (3-SECOND GUST) 90 MPH
RISK CATEGORY II
WIND EXPOSURE CATEGORY II
ENCLOSURE CATEGORY C
INTERNAL PRESSURE COEFFICIENTS +/- 0.18
SEE TYPICAL DETAILS FOR COMPONENT AND CLADDING LOADS
 - SEISMIC DETAILS: SEISMIC IMPORTANCE FACTOR 1.0
MAPPED SPECTRAL RESPONSE ACCELERATIONS: SS 1.31
SI -0.395
SITE CLASS D
SPECTRAL RESPONSE COEFFICIENTS: 0.790
SD1 -0.424
SEISMIC DESIGN CATEGORY D
BASIC SEISMIC-FORCE-RESISTING SYSTEM LIGHT-FRAMED WALLS SHEATHED WITH WOOD STRUCTURAL PANELS RATED FOR SHEAR RESISTANCE
DESIGN BASE SHEAR VARIES
SEISMIC RESPONSE COEFFICIENT CS -0.1224
RESPONSE MODIFICATION FACTOR R 6.5
ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE PROCEDURE

2.0 GENERAL CONDITIONS

- THE STRUCTURAL DRAWINGS AND SPECIFICATIONS ARE A PORTION OF THE CONSTRUCTION DOCUMENTS. THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL REFERENCE AND COORDINATE WITH OTHER DISCIPLINE'S DRAWINGS. ANY DISCREPANCIES OR OMISSIONS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT AND STRUCTURAL DESIGN GROUP.
- ALL REPORTS, PLANS, SPECIFICATIONS, COMPUTER FILES, FIELD DATA, NOTES, AND OTHER DOCUMENTS AND INSTRUMENTS PREPARED BY STRUCTURAL DESIGN GROUP AS INSTRUMENTS OF SERVICE SHALL REMAIN THE PROPERTY OF STRUCTURAL DESIGN GROUP. STRUCTURAL DESIGN GROUP SHALL RETAIN ALL COMMON LAW, STATUTORY, AND OTHER RESERVED RIGHTS, INCLUDING THE COPYRIGHT THEREOF.
- STRUCTURAL DESIGN GROUP MAY CONSIDER TRANSFERRING COMPUTER AIDED DRAFTING FILES TO THE GENERAL CONTRACTOR'S SUBCONTRACTORS, ON A CASE BY CASE BASIS, FOR THEIR CONVENIENCE IN PREPARING SHOP FABRICATION DRAWINGS AT A COST OF \$75 PER SHEET. FILES CAN BE TRANSFERRED UPON COMPLETION OF A CAD FILE TRANSFER AGREEMENT AND RECEIPT OF FULL PAYMENT.
- CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS AND SITE CONDITIONS PRIOR TO FABRICATION/CONSTRUCTION. NOTIFY STRUCTURAL ENGINEER AND ARCHITECT OF ANY DISCREPANCIES PRIOR TO FABRICATION/CONSTRUCTION.
- ALL DETAILS SHOWN ARE TYPICAL. SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS, UNLESS NOTED.
- VERIFY ALL DIMENSIONS AND DETAILS SHOWN ON THESE DRAWINGS. ANY DISCREPANCIES OR OMISSIONS FOUND SHALL BE REPORTED TO THE ENGINEER AND OTHER DESIGN PROFESSIONALS AS APPROPRIATE FOR RESOLUTION PRIOR TO PROCEEDING WITH ANY RELATED WORK.
- THESE DRAWINGS DO NOT INCLUDE PROVISIONS TO SATISFY JOB SITE SAFETY REQUIREMENTS. CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING SAFETY DURING CONSTRUCTION AND FOR CONFORMANCE TO ALL APPLICABLE OSHA STANDARDS. JOBSITE VISITS BY ENGINEER SHALL NOT CONSTITUTE APPROVAL, AWARENESS OR LIABILITY FOR ANY HAZARDOUS CONDITIONS.
- STRUCTURAL DESIGN GROUP IS NOT RESPONSIBLE FOR CONSTRUCTION MEANS AND METHODS, SAFETY PROCEDURES, CONSTRUCTION SUPERVISION OR SITE SAFETY, AND DOES NOT HAVE THE AUTHORITY TO STOP WORK FOR THESE ITEMS.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR BRACING AND SHORING ALL EXCAVATIONS, Dewatering of EXCAVATION FROM EITHER SURFACE WATER, GROUND WATER OR SEEPAGE, TEMPORARY AND EXISTING STRUCTURES, AND PARTIALLY COMPLETED PORTIONS OF THE WORK TO ASSURE THE SAFETY OF ANY PERSON COMING IN CONTACT WITH THE WORK.
- THE STRUCTURAL INTEGRITY OF THE BUILDING IS DEPENDENT UPON COMPLETION ACCORDING TO THE PLANS AND SPECIFICATIONS. THE STRUCTURAL ENGINEER OF RECORD ASSUMES NO LIABILITY FOR THE STRUCTURE DURING CONSTRUCTION. THE METHOD OF CONSTRUCTION AND SEQUENCE OF OPERATIONS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL SUPPLY ANY NECESSARY BRACING, GUYS, ETC. TO PROPERLY BRACE THE STRUCTURE AGAINST WIND, DEAD AND LIVE LOADS UNTIL THE BUILDING IS COMPLETED ACCORDING TO THE PLANS AND SPECIFICATIONS. ANY QUESTIONS REGARDING TEMPORARY BRACING REQUIREMENTS SHOULD BE FORWARDED TO A STRUCTURAL ENGINEER FOR REVIEW.
- MECHANICAL UNITS AND ANY OTHER EQUIPMENT SUPPORTED BY THE STRUCTURE WITH WEIGHTS IN EXCESS OF 200 LBS SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION.
- WHERE NOTED IN DRAWINGS AND SPECIFICATIONS TO INSTALL PRODUCTS PER THE MANUFACTURER'S RECOMMENDATIONS IT SHALL BE REQUIRED THAT THE CONTRACTOR FOLLOWS THE MANUFACTURER'S RECOMMENDATIONS.

3.0 FOUNDATIONS

- GEOTECHNICAL REPORT: FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL REPORT BY ANDERSON ENGINEERING CONSULTANTS, INC., TITLED "GEOTECHNICAL INVESTIGATION FOR PROPOSED PARK PROJECT, WEST MEMPHIS, ARKANSAS, JOB NO. 16244" DATED AUGUST 13, 2019, ALONG WITH ANY SUPPLEMENTAL CORRESPONDENCE. THE GENERAL CONTRACTOR SHALL OBTAIN A COPY OF THE GEOTECHNICAL REPORT FROM THE OWNER AND FOLLOW ALL REQUIREMENTS AND RECOMMENDATIONS. GEOTECHNICAL RECOMMENDATIONS SHALL TAKE PRECEDENCE OVER THE ITEMS THAT FOLLOW IN THIS SECTION OF THE STRUCTURAL GENERAL NOTES.

MAXIMUM ALLOWABLE BEARING PRESSURE PER GEOTECHNICAL REPORT (PSF):	
COLUMN FOOTINGS	2000
CONTINUOUS WALL FOOTINGS	2000
- ALL FOUNDATION BEARING SURFACES SHALL BE REVIEWED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING CONCRETE TO INSURE THEIR COMPLIANCE WITH PRESSURES NOTED. ALL FOOTING ELEVATIONS ARE ESTIMATED AND MAY BE ADJUSTED IN THE FIELD BY THE GEOTECHNICAL ENGINEER.
- COMPACTED FILL WITHIN THE BUILDING AREA (AND EXTENDING 5'-0" OUTSIDE THE EXTERIOR BUILDING LINE) SHALL MEET THE REQUIREMENTS OF THE GEOTECHNICAL ENGINEER.
- SUBGRADE AND GRANULAR FILL SUPPORTING SLABS ON GRADE SHALL BE AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER AND COMPACTED UNDER THE DIRECT SUPERVISION OF THE GEOTECHNICAL ENGINEER OR HIS APPROVED REPRESENTATIVE. SEE SPECIFICATIONS FOR VAPOR RETARDER BENEATH SLABS ON GRADE.
- NO EXCAVATION SHALL BE CLOSER THAN AT A SLOPE OF 2:1 (TWO HORIZONTAL TO ONE VERTICAL) TO A FOOTING.

4.0 CONCRETE

- CONCRETING OPERATIONS SHALL COMPLY WITH ACI STANDARDS.
- CONCRETE STRENGTH AND DURABILITY REQUIREMENTS: MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS (PSI), TYPE OF CONCRETE, MAXIMUM WATER/CEMENTitious RATIO, AIR CONTENT, SLUMP, AND CONCRETE TYPE.

STRENGTH TYPE	MAX W/C	AIR	SLUMP	USE
3500 NORMAL WT.	0.50	----	3" to 5"	UNLESS NOTED
3000 NORMAL WT.	0.50	4-6%	3" to 5"	CONCRETE ON METAL DECK

CONCRETE MIX DESIGN SHALL BE WORKABLE WITH LOWEST TOTAL WATER PER CUBIC YARD USING LARGEST PRACTICAL MAXIMUM SIZE OF COURSE AGGREGATE.
- REINFORCING BARS: ASTM A615 GRADE 60.
- REINFORCING STEEL SHOWN IN SECTIONS AND DETAILS ARE A SCHEMATIC INDICATION THAT REINFORCING EXISTS. SEE SCHEDULES, SECTION NOTES AND GENERAL NOTES FOR ACTUAL REINFORCING REQUIRED.
- REINFORCING BAR PLACING ACCESSORIES IN ACCORDANCE WITH ACT MANUAL OF STANDARD PRACTICE. WHERE CONCRETE IS EXPOSED IN FINISHED BUILDING, PROVIDE ACCESSORIES WITH RUSTPROOF LEGS. WHERE CONCRETE IS SAND-BLASTED OR BUSH-HAMMERED, PROVIDE ACCESSORIES OF STAINLESS STEEL.
- DETAIL REINFORCEMENT IN ACCORDANCE WITH ACT 315. REINFORCEMENT SHALL NOT BE WELDED UNLESS NOTED OR APPROVED BY THE ENGINEER.
- ALL SPLICES SHALL BE CLASS "B" TENSION LAP SPLICE, UNLESS NOTED.
- ALL REINFORCING MARKED "CONTINUOUS" SHALL BE SPLICED WITH CLASS "B" TENSION LAP SPLICE, UNLESS NOTED.
- PROVIDE CORNER BARS AT ALL CORNERS OF CONTINUOUS REINFORCING IN FOOTINGS, SLABS OR WALLS. CORNER BARS SHALL BE LONG ENOUGH TO PROVIDE A CLASS "B" LAP SPLICE OF REINFORCING BARS.
- CONCRETE COVERAGE OF REINFORCEMENT, UNLESS NOTED:

FOOTINGS	2" TOP & 3" BOTTOM & SIDES
SLAB FACES NOT EXPOSED TO WEATHER OR EARTH	3/4"
SLAB FACES EXPOSED TO WEATHER	
A. #5 AND LESS	-1-1/2"
B. #6 AND GREATER	-2"
POST-TENSIONED SLAB FACES EXPOSED TO WEATHER	-1"

NOTE: SLAB ON GRADE WWR OR REINFORCEMENT EACH WAY SHALL BE 2" CLEAR FROM TOP OF SLAB. SEE EARTH SUPPORTED SLABS SECTION BELOW.
- WELDED WIRE REINFORCEMENT (WWR): ASTM A485. MINIMUM LAP AND EMBEDMENT TO BE THE GREATER OF ONE CROSS WIRE SPACING PLUS 2 INCHES OR 6 INCHES.
- EARTH SUPPORTED SLABS:

4" THICK, REINFORCED WITH 6X6 W2.9/W2.9 WWR FLAT SHEETS SUPPORTED 2" CLEAR OF TOP OF SLAB, UNLESS NOTED. WWR TO BE CHAINED AT 36 INCHES EACH WAY MINIMUM.

EARTH SUPPORTED SLABS SHALL BE MOIST CURED FOR A MINIMUM OF SEVEN DAYS. SEE SPECIFICATIONS, CURING COMPOUNDS, UNLESS NOTED. SHALL BE A MINIMUM OF CLEAR, WATERBORNE, MEMBRANE-FORMING CURING COMPOUND MEETING ASTM C 309, TYPE 1, CLASS B, SELF-RESTRAINING, CERTIFIED BY CURING COMPOUND MANUFACTURER TO NOT INTERFERE WITH BONDING OF FLOOR COVERING.

PROVIDE 244 X 6'-0" BARS MID DEPTH OF SLAB AT REINFRANT CORNERS.
- CONDUIT OR PIPE SHALL BE CAST IN THE SLAB WITHOUT THE WRITTEN APPROVAL OF STRUCTURAL DESIGN GROUP.

5.0 POST-TENSIONING

- STRESSING OF TENDONS MAY COMMENCE WHEN CONCRETE HAS A COMPRESSIVE STRENGTH EQUAL TO 75% OF THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH.
- POST-TENSIONING TENDONS: UNBONDED, MONO-STRAND TENDON SYSTEM. LOW RELAXATION STRANDS SHALL CONFORM TO ASTM A416, LATEST REVISION, WITH A GUARANTEED MINIMUM ULTIMATE STRENGTH OF 270,000 PSI.
- TENDON DIAMETER: SLAB TENDONS-----0.5" DIAMETER
- DRILLED CONCRETE ANCHORS, POWER DRIVEN ANCHORS AND CORING OF SLABS WILL NOT BE PERMITTED WITHOUT CONSENT OF THE STRUCTURAL ENGINEER. ALL OPENINGS AND/OR SLEEVES MUST BE SHOWN ON THE SHOP DRAWINGS. ANY ADDITIONAL OPENINGS NOT SHOWN ON THE APPROVED DRAWINGS WILL REQUIRE APPROVAL FROM THE STRUCTURAL ENGINEER PRIOR TO PLACEMENT.
- THE POST-TENSIONING SUPPLIER SHALL DESIGN AND FURNISH ALL ADDITIONAL REINFORCING BARS REQUIRED FOR SUPPORT OF TENDONS AND ANCHORAGES AND TO RESIST BURSTING, SPLITTING, AND SPALLING INDUCED BY TENDON ANCHORAGES, SHIFTING OF BEAM STIRRUPS FOR TENDON SUPPORT WILL NOT BE ALLOWED.
- THE POST-TENSIONING SUPPLIER SHALL SUBMIT TO THE ENGINEER, FOR RECORD, CALCULATIONS TO SUBSTANTIATE THE STRESSING PROCEDURE. CALCULATIONS SHALL BEAR THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED.
- STRESSING RECORDS: STRESSING OPERATIONS SHALL BE OBSERVED BY THE TESTING LABORATORY. A RECORD OF ALL STRESSING FORCES AND FIELD MEASURED ELONGATIONS SHALL BE SUBMITTED TO THE ENGINEER WITHIN 24 HOURS.
- CUT TENDONS AND PACK ALL POST-TENSIONING POCKETS WITH NON-SHRINK GROUT AFTER REVIEW AND ACCEPTANCE OF STRESSING RECORDS.
- CONTRACTOR SHALL SUBMIT FOR APPROVAL TO THE ENGINEER DETAILED CALCULATIONS AND PROCEDURES FOR THE REMEDIAL WORK REQUIRED.

6.0 STRUCTURAL STEEL

- FABRICATE AND ERECT ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC "SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS". FABRICATOR SHALL BE QUALIFIED PER AISC QUALITY CERTIFICATION PROGRAM AND DESIGNATED AN AISC-CERTIFIED PLANT, CATEGORY STD.
- THE STEEL FRAME IS "NON-SELF-SUPPORTING". ADEQUATE TEMPORARY SUPPORT MUST BE PROVIDED BY THE CONTRACTOR UNTIL REQUIRED CONNECTIONS OR ELEMENTS ARE IN PLACE.
- STRUCTURAL STEEL: ASTM A992 FOR WIDE FLANGE BEAMS AND COLUMNS; A36 FOR S, M AND HP SHAPES AND CHANNELS; ASTM A36 FOR STIFFENER PLATES, BASE PLATES, COLUMN CAP PLATES, BEAM CONNECTION PLATES AND STEEL ANGLES.
- WELDED CONNECTIONS: E70XX ELECTRODES, MINIMUM SIZE FILLET WELD 3/16". WELDING QUALIFICATION, PROCEDURES AND PERSONNEL SHALL BE CERTIFIED ACCORDING TO AWS D1.1, THE STRUCTURAL WELDING CODE - STEEL.
- ANCHOR BOLTS: ASTM A307.
- CONNECTIONS:
 - BEARING TYPE A325-N IN ACCORDANCE WITH RCSC (LRFD OR ASD VERSION) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A990 BOLTS". BOLTS THROUGH 4" WIDE BEAM FLANGES SHALL BE 5/8" DIAMETER. OTHER BOLTS SHALL BE 3/4" DIAMETER.
 - USE SNUG TIGHT BEARING CONNECTIONS FOR ALL BOLTED CONNECTIONS.
 - BOLTS SHOWN IN SECTIONS AND DETAILS ARE A SCHEMATIC INDICATION THAT BOLTS MAY BE USED. ACTUAL NUMBER, UNLESS SPECIFIED, TO BE IN ACCORDANCE WITH AISC.
 - ALL STRUCTURAL STEEL CONNECTIONS NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE DESIGNED TO RESIST FORCES INDICATED, BY THE CONTRACTOR.
- WHERE BEAM REACTIONS ARE SHOWN ON THE DRAWINGS, THE CONNECTIONS SHALL DEVELOP THE REACTIONS SHOWN. WHERE CONNECTIONS ARE SUBJECT TO ECCENTRICITY, SUCH ECCENTRICITY SHALL BE TAKEN INTO ACCOUNT WHEN DESIGNING AND DETAILING THE CONNECTION.
 - WHERE BEAM REACTIONS OR DESIGN FORCES ARE NOT SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL DESIGN THE CONNECTIONS TO SUPPORT A REACTION EQUAL TO ONE-HALF THE TOTAL UNIFORM LOAD CAPACITY FROM THE ASD TABLE OF ALLOWABLE UNIFORM LOADS ON BEAMS, MULTIPLIED BY A FACTOR OF 1.2 FOR GIVEN SHEAR, SPAN, AND GRADE OF STEEL.
 - DESIGN CALCULATIONS FOR THE CONNECTIONS DESIGNED BY THE CONTRACTOR SHALL BE SUBMITTED FOR THE FILES OF THE ARCHITECT AND ENGINEER. CALCULATIONS SHALL BEAR THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED. SHOP DRAWINGS UNCHECKED CONNECTIONS FOR WHICH CALCULATIONS HAVE NOT BEEN RECEIVED WILL BE RETURNED UNACKED AS AN INCOMPLETE SUBMITTAL.
- ALL STRUCTURAL STEEL, INCLUDING EXPOSED BOLTS, NUTS, WASHERS OR ANCHOR RODS, EXPOSED TO WEATHER IN THE FINAL CONFIGURATION OF THE STRUCTURE SHALL BE HOT-DIP GALVANIZED, UNLESS NOTED. PER ASTM A 123/A 123M, VENT HOLES SHALL BE FILLED AND GROUND SMOOTH AFTER GALVANIZING. DAMAGE TO GALVANIZING SHALL BE PAINTED WITH GALVANIZING REPAIR PAINT, SSPC-PAINT 20. SEE 051200 SPECIFICATIONS FOR PAINT REQUIREMENTS FOR STEEL THAT IS GALVANIZED AND PAINTED.
- STEEL STAIRS AND ASSOCIATED EMBEDS NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE DESIGNED TO RESIST THE PROJECT DESIGN LOADS INDICATED ABOVE, BY THE CONTRACTOR, UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED. STAIRS SHALL BE DESIGNED IN ACCORDANCE WITH THE MAAM STEEL STAIR MANUAL AND AISC, AND AS LISTED BELOW. CALCULATIONS SHALL BEAR THE SEAL OF THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED AND SHALL BE INCLUDED WITH THE STAIR SHOP DRAWINGS.
 - STAIR FRAMING SHALL BE CAPABLE OF WITHSTANDING STRESSING RESULTING FROM RAILING LOADS IN ADDITION TO LOADS SPECIFIED ABOVE.
 - LIMIT DEFLECTION OF TREADS, PLATFORMS, AND STRING MEMBERS TO L/360 OR 1/4 INCH, WHICHEVER IS LESS.
 - DESIGN OF STAIR FRAMING SHALL ALSO COMPLY WITH AISC'S "STEEL DESIGN GUIDE SERIES 11; FLOOR VIBRATIONS DUE TO HUMAN ACTIVITY."
- ALL HANDRAILS, GUARDRAILS, AND EMBEDS NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE DESIGNED IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE NOTED ABOVE, BY THE CONTRACTOR, UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED. CALCULATIONS SHALL BEAR THE SEAL OF THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED AND SHALL BE SUBMITTED FOR THE FILES OF THE ARCHITECT AND SHALL BE INCLUDED WITH THE SHOP DRAWINGS.

7.0 STEEL DECK

- DECK PROPERTIES AND ATTACHMENTS SHALL BE IN ACCORDANCE WITH THE STEEL DECK INSTITUTE.
- FORM DECK: 3 1/2" THICK CONCRETE SLAB ON NON-COMPOSITE STEEL FORM DECK, 18 GAGE, 2" DEEP (5-1/2" TOTAL SLAB THICKNESS). REINFORCED WITH 4X4 W2.9/W2.9 WWR DRAPED, 8" CLEAR COVER TO TOP OF SLAB AT SUPPORTS AND FLAT ON THE TOP OF THE DECK AT MID-SPAN BETWEEN SUPPORTS. STEEL DECK SHALL BE FASTENED TO SUPPORTS WITH 5/8" PUDDLE WELDS AT 6" O/C AT ALL SUPPORTS.
- WELDED CONNECTIONS: E60XX ELECTRODES; WELDING QUALIFICATION, PROCEDURES AND PERSONNEL SHALL BE CERTIFIED ACCORDING TO AWS D1.3, THE STRUCTURAL WELDING CODE - SHEET STEEL.
- NO CONDUIT OR PIPE SHALL BE CAST IN THE SLAB WITHOUT THE WRITTEN APPROVAL OF STRUCTURAL DESIGN GROUP.

8.0 WOOD CONSTRUCTION

- ALL SAWN LUMBER IN CONTACT WITH SOIL, MASONRY OR CONCRETE, OR EXPOSED TO WEATHER TO HAVE A PRESERVATIVE PRESURE TREATMENT IN ACCORDANCE WITH AMERICAN WOOD PROTECTION ASSOCIATIONS (AWPA) STANDARD U1 (CURRENT EDITION).
- CUT ENDS OR ALL TREATED LUMBER SHALL BE FIELD TREATED WITH AN APPROVED PRESERVATIVE IN ACCORDANCE WITH THE TREATMENT MANUFACTURERS INSTRUCTIONS AND AWPA STANDARD M4-08.
- ALL LUMBER SHALL BE KILN DRIED TO A MAXIMUM MOISTURE CONTENT OF 19 PERCENT, INCLUDING PRESERVATIVE TREATED LUMBER.
- ALL SCREWS, BOLTS, AND NAILS FOR USE WITH PRESERVATIVE TREATED WOOD SHALL BE HOT-DIPPED ZINC-COATED GALVANIZED STEEL OR STAINLESS STEEL. FASTENERS TO BE HOT-DIPPED GALVANIZED SHALL MEET THE REQUIREMENTS OF ASTM A 153, CLASS D FOR 3/8" DIAMETER OR SMALLER AND CLASS C FOR FASTENERS WITH DIAMETERS OVER 3/8".
- FASTENERS OTHER THAN NAILS AND TIMBER RIVETS SHALL BE PERMITTED TO BE OF MECHANICALLY DIPPED ZINC-COATED STEEL WITH COATING WEIGHTS IN ACCORDANCE WITH ASTM B 695, CLASS 55, MINIMUM.
- METAL CONNECTORS SHOWN IN DOCUMENTS ARE SIMPSON STRONG TIE CONNECTORS. SUBSTITUTION WITH EQUAL HARDWARE BY OTHER MANUFACTURERS IS ACCEPTABLE.
- ALL CONNECTORS (JOIST HANGERS, ETC.) FOR USE WITH PRESERVATIVE TREATED WOOD SHALL BE GALVANIZED OR SHALL BE STAINLESS STEEL. HARDWARE TO BE HOT-DIPPED PRIOR TO FABRICATION SHALL MEET ASTM A 653, G-185 COATING. HARDWARE TO BE HOT-DIPPED AFTER FABRICATION SHALL MEET ASTM A 123.
- FASTENER AND HARDWARE SELECTION: HOT-DIPPED GALVANIZED MATERIAL SHALL NOT BE USED IN CONTACT WITH STAINLESS STEEL MATERIAL.
- ALL NAIL SIZES INDICATED IN DOCUMENTS ARE BASED ON COMMON WIRE NAILS. SUBSTITUTION OF DIFFERENT STYLE NAILS IS ACCEPTABLE BASED ON ACTUAL DIAMETER WITH.
- AT A MINIMUM, ALL WOOD FRAMING CONNECTIONS TO COMPLY WITH "TABLE 2304.9.1- FASTENING SCHEDULE" OF THE INTERNATIONAL BUILDING CODE.
- WOOD SILL PLATES (NON-SHEAR WALLS): ANCHOR TO FOUNDATION WITH 3" DIAMETER X 7" EMBED ANCHOR BOLTS AT 6'-0" MAX SPACING OR Wx33" TITEN SCREWS AT 32" MAX SPACING, PROVIDE STANDARD GALVANIZED WASHERS.
- WOOD SILL PLATES (PART OF SHEAR WALLS): ANCHOR TO FOUNDATION WITH 5/8" DIAMETER X 7" EMBED ANCHOR BOLTS AT 32" MAX SPACING. PROVIDE Wx33" SQUARE GALVANIZED PLATE WASHERS.

8.13 LEAD HOLES FOR LAG SCREWS

- CLEARANCE HOLE FOR SHANK WILL BE SAME DIAMETER AS SHANK AND HAVE THE SAME DEPTH OF PENETRATION AS THE LENGTH OF THE UNTHREADED SHANK.
 - LEAD HOLE FOR THREADED PORTION SHALL HAVE A DIAMETER OF 60% OF SHANK AND A LENGTH EQUAL TO OR GREATER THAN THE LENGTH OF THE THREADED PORTION.
 - THE THREADED PORTION OF THE LAG SCREW SHALL BE INSERTED BY TURNING WITH A WRENCH, NOT BY DRIVING WITH A HAMMER. SOAP OR OTHER LUBRICANT SHALL BE USED ON THE LAG SCREW IN THE LEAD HOLES TO FACILITATE INSERTION AND PREVENT DAMAGE OF THE LAG SCREW.
- DESIGN, FABRICATE AND ERECT WOOD TRUSSES IN ACCORDANCE WITH THE "DESIGN SPECIFICATION FOR METAL PLATE CONNECTED WOOD TRUSSES" OF THE TRUSS PLATE INSTITUTE. TRUSS ERECTION PLANS AND CALCULATIONS DESIGNED BY THE CONTRACTOR SHALL BE SUBMITTED FOR THE REVIEW OF THE STRUCTURAL ENGINEER. CALCULATIONS SHALL BEAR THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED.
 - TRUSS MANUFACTURER SHALL DESIGN FOR THE FOLLOWING SUPERIMPOSED LOADS:

ROOF TOP CHORD DEAD LOAD	10 PSF
ROOF BOTTOM CHORD DEAD LOAD	10 PSF
ROOF TOP CHORD LIVE LOAD	20 PSF
FLOOR TOP CHORD DEAD LOAD	8 PSF
FLOOR BOTTOM CHORD DEAD LOAD	8 PSF
FLOOR TOP CHORD LIVE LOAD	40 PSF
FLOOR TRUSS MAXIMUM LIVE LOAD DEFLECTION	L/480

- DESIGN WOOD TRUSSES TO RESIST THE WIND UPLIFT LOADING FROM THE COMPONENT AND CLADDING WIND LOAD TABLE PROVIDED IN THE TYPICAL DETAILS.
- IN ADDITION TO THE ABOVE LOADS, WOOD TRUSSES SHALL BE DESIGNED FOR CONCENTRATED LOADS HUNG FROM OR SUPPORTED ON TRUSSES. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND SPECIFICATIONS FOR LOADING INFORMATION AND LOCATION. LOADING AS REQUIRED BY OTHER SUBCONTRACTORS, SUCH AS FIRE PROTECTION, SHALL BE COORDINATED BY THE GENERAL CONTRACTOR.
- TRUSS DESIGNER DESIGN FLOOR TRUSSES FOR A MAXIMUM TOTAL HANGING DEAD LOAD OF 200 LBS PER TRUSS (ADD HANGER) LOAD MAY BE APPLIED AT ANY POINT ALONG THE TOP OR BOTTOM CHORD. GC COORDINATE LOAD SPACING AS REQUIRED.
- ALL TRUSS TO TRUSS CONNECTIONS SHALL BE DESIGNED BY THE TRUSS MANUFACTURER FOR THE LOADS INDICATED.
- FLOOR TRUSS MANUFACTURER PROVIDE 21" MINIMUM WIDTH DUCT OPENING IN WEB AT TRUSS MIDSPAN. COORDINATE WITH MECHANICAL FOR WIDTH AND LOCATION OF DUCT RUNS.
- INSTALL 2x6 STRONGBACKS AT FLOOR TRUSS 1/3 POINTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- ALL TEMPORARY AND PERMANENT BRACING MEMBERS AND CONNECTIONS REQUIRED FOR WOOD TRUSSES SHALL BE DESIGNED AND DETAILED ON THE WOOD TRUSS MANUFACTURER'S ERECTION PLANS. BRACING MEMBERS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR ACCORDING TO THE TRUSS MANUFACTURER'S ERECTION PLANS AND "GUIDE TO GOOD PRACTICE FOR HANDLING, INSTALLING, RESTRAINING, AND BRACING OF METAL PLATE CONNECTED WOOD TRUSSES" BY BCST, 2008.
- TEMPORARY BRACING SHALL NOT IMPOSE ANY FORCE ON THE SUPPORTING STRUCTURE. PERMANENT BRACING FORCES SHALL BE TRANSFERRED TO THE ROOF DIAPHRAGM BY THE BRACING DESIGN PROVIDED BY THE TRUSS MANUFACTURER.
- ROOF SHEATHING: 1/2" APA STRUCTURAL I OR II RATED SHEATHING EXPOSURE 1, WITH PLY CLIPS AT ALL UNSUPPORTED EDGES PER THE MANUFACTURER'S RECOMMENDATIONS. PANEL IDENTIFICATION INDEX 32/16. LONG DIMENSION OF PANEL PERPENDICULAR TO SUPPORTS.
- ROOF SHEATHING NAILING, UNLESS NOTED: 8D NAILS AT 6 INCHES AT ALL FOUR PANEL EDGES AND 12 INCHES AT INTERMEDIATE SUPPORTS.
- FLOOR SHEATHING: 3/4" PLYWOOD APA STRUCTURAL RATED SHEATHING EXPOSURE 1, TONGUE AND GROOVE EDGES. PANEL IDENTIFICATION INDEX 48/24. LONG DIMENSION OF PANEL PERPENDICULAR TO SUPPORTS. GLUE AND NAIL TO SUPPORTING MEMBERS, 10D NAILS AT 6 INCHES AT ALL FOUR PANEL EDGES AND 12 INCHES AT INTERMEDIATE SUPPORTS.
- PLYWOOD, GYPSUM SHEATHING AND WALLBOARD, NOT PART OF SHEAR WALLS, SHALL BE ATTACHED TO STUDS IN ACCORDANCE WITH "TABLE 2304.9.1- FASTENING SCHEDULE" OF THE INTERNATIONAL BUILDING CODE.
- WOOD PANEL SHEAR WALLS: 15/32" PLYWOOD OR OSB, UNLESS NOTED, APA RATED STRUCTURAL I SHEATHING EXPOSURE 1. LONG DIMENSION OF PANEL PARALLEL TO STUDS. ALL PLYWOOD EDGES SHALL BE BACKED WITH TWO-INCH NOMINAL OR WIDER FRAMING. SEE DETAILS.
- WOOD PANEL SHEAR WALL NAILING: SEE TYPICAL DETAILS ON SHEET S9.
- MANUFACTURED WOOD BEAMS: MICRO-LAMINATED WOOD BEAMS TO BE AS MANUFACTURED BY LEVEL OF BOISE, IDAHO, OR APPROVED EQUAL, AND HAVE AN ALLOWABLE BENDING STRESS: (Fb) = 2600 PSI OR GREATER FOR 12 INCH DEPTH, AN ALLOWABLE SHEAR PARALLEL TO GRAIN (Fv) = 285 PSI OR GREATER AND A MODULUS OF ELASTICITY (E) = 2,000,000 PSI OR GREATER. FOR DEPTHS GREATER THAN 12 INCHES, ADJUST (Fb) BY (12)/D(0.136). SIZES ARE SHOWN ON THE PLANS AND DETAILS.
- BUILT UP BEAMS - MANUFACTURED WOOD BEAMS: MULTIPLE MICROLAMS ARE TO BE FASTENED TOGETHER WITH A MINIMUM OF 2 ROWS OF 16d NAILS AT 12 INCHES (STAGGERED); NAILS TO BE SPACED 3 INCHES FROM THE TOP AND BOTTOM OF BEAMS.
- AT ALL ROOF MICROLAM AND 2x HEADER BEARINGS, PROVIDE 2x STUD DIRECTLY UNDER BEARING. AT MICROLAM FLOOR HEADERS, PROVIDE (2) 2x STUDS DIRECTLY UNDER BEARING. MAINTAIN STUD CONTINUITY TO FOUNDATION. LOCATE BETWEEN DOUBLE TOP PLATE AND BOTTOM PLATE AT FLOOR FRAMING LEVEL AS REQUIRED.
- FLOOR JOISTS AND BEAMS SHALL BE LATERALLY BRACED AT MAXIMUM INTERVALS OF 8'-0" BY SOLID BRIDGING OR TRANSVERSE BEAMS AND THE ENDS AT POINTS OF BEARING SHALL BE LATERALLY SUPPORTED TO PREVENT ROTATION.
- WINDOW AND DOOR HEADERS ARE TO BE (2) 2x10 UNLESS NOTED.
- BUILT UP BEAMS - DIMENSIONED LUMBER: NAIL INDIVIDUAL PLEES TOGETHER WITH TWO ROWS OF 10d NAILS AT 16" STAGGERED.
- WOOD STUDS FOR LOAD BEARING WALLS: SEE SCHEDULE ON SHEET S9.
- WOOD FRAMING MEMBERS: #2 SOUTHERN PINE UNLESS NOTED.
- VERTICAL STUDS INTERRUPTED BY WALL OPENINGS SHALL BE LOCATED EQUALLY ON EACH SIDE OF THE OPENING. SIMILAR STUDS SHALL BE LOCATED BETWEEN THE DOUBLE TOP PLATE AND BOTTOM PLATE AT THE FLOOR FRAMING LEVEL.
- SHEETS OF DRYWALL SHOULD BE LAID FLAT ON THE FLOOR. MAXIMUM HEIGHT OF DRYWALL SHOULD BE 10". SHOULD DRYWALL SLEEPS BE USED TO KEEP THE DRYWALL OFF OF THE FLOOR SHEATHING, A MINIMUM OF FOUR SETS OF SLEEPERS SHOULD BE USED. LONG DIRECTON OF DRYWALL MUST BE PARALLEL TO THE TRUSSES WITH SLEEPERS BEING PLACED PERPENDICULAR TO THE TRUSSES.

9.0 POST-INSTALLED REINFORCING, ANCHORS AND FASTENERS

- POST-INSTALLED ANCHORS AND/OR REINFORCING SHALL ONLY BE USED WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER-OF-RECORD PRIOR TO INSTALLING POST-INSTALLED ANCHORS AND/OR REINFORCING IN PLACE OF MISSING OR MISPLACED CAST-IN-PLACE ANCHORS AND/OR REINFORCING.
- THE BELOW PRODUCTS ARE THE DESIGN BASIS FOR THIS PROJECT. PRODUCT DIAMETER AND EMBEDMENT SHALL BE SHOWN IN THE DETAILS.
 - FOR ANCHORING INTO CONCRETE
 - MECHANICAL ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACT 355.2 AND ICC-ES AC109 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. PRE-APPROVED PRODUCTS INCLUDE:
 - SIMPSON STRONG-TIE "TITEN-HD" (ICC-ES ESR-2713)
 - SIMPSON STRONG-TIE "STRONG-BOLT 2" (ICC-ES ESR-3037)
 - SIMPSON STRONG-TIE "TORQ-CUT" (ICC-ES ESR-2705)
 - SIMPSON STRONG-TIE "TITEN-HD ROD HANGER" (ICC-ES ESR-2713)
 - HILTI KWIK HUS-EZ AND KWIK HUS E2-1 SCREW ANCHORS (ICC ESR-3027)
 - HILTI KWIK BOLT-TZ EXPANSION ANCHORS (ICC ESR-1917)
 - HILTI KWIK BOLT 3 EXPANSION ANCHORS (UNCRACKED CONCRETE ONLY) (ICC ESR-2302)
 - HILTI HDA UNDERCUT ANCHORS (ICC ESR 1546)
 - HILTI HSL-3 EXPANSION ANCHORS (ICC ESR 1545)

- ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACT 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACT 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE DRILL BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACT 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACT 318-11 D.9.2.4. PRE-APPROVED PRODUCTS INCLUDE:
 - SIMPSON STRONG-TIE "AT-XP" (ICC-ES ESR-2653)
 - SIMPSON STRONG-TIE "SET-XP" (ICC-ES ESR-2508)
 - SIMPSON STRONG-TIE "ET-HP" (ICC-ES ESR-3372)
 - HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HIT-Z ROD (ICC ESR-3187)
 - HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT SYSTEM WITH HAS-E THREADED ROD OR CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3187.
 - HILTI HIT-HY 500-SD EPOXY ADHESIVE ANCHORING SYSTEM WITH HAS-E THREADED ROD OR CONTINUOUSLY DEFORMED REBAR (ICC ESR-2322) FOR SLOW CURE APPLICATIONS
- POWER-ACTUATED FASTENERS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ICC-ES AC70. PRE-APPROVED PRODUCTS INCLUDE:
 - SIMPSON STRONG-TIE "GAS ACTUATED PINS" (ICC-ES ESR-2811)
 - SIMPSON STRONG-TIE "POWER ACTUATED PINS" (ICC-ES ESR-2138)
 - HILTI "UNIVERSAL KNURLED SHANK FASTENERS" 4-U (ICC ESR-2269)

- REFER TO THE PROJECT BUILDING CODE AND/OR EVALUATION REPORT FOR SPECIAL INSPECTIONS AND PROOF LOAD REQUIREMENTS.
- SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE LISTED BELOW MAY BE SUBMITTED BY THE CONTRACTOR TO THE EOR FOR REVIEW. SUBSTITUTIONS WILL ONLY BE CONSIDERED FOR PRODUCTS HAVING A RESEARCH REPORT RECOGNIZING THE PRODUCT FOR THE APPROPRIATE APPLICATION OF THE PROJECT BUILDING CODE. SUBSTITUTION REQUESTS SHALL INCLUDE CALCULATIONS PREPARED & SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATE THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE EQUIVALENT ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE AND INSTALLATION TEMPERATURE.
- INSTALL ANCHORS PER THE MANUFACTURER PRINTED INSTRUCTIONS, OR AS INCLUDED IN THE ANCHOR PACKAGING.
- OVERHEAD ADHESIVE ANCHORS MUST BE INSTALLED USING THE MANUFACTURER INSTRUCTIONS.
- THE CONTRACTOR SHALL ARRANGE AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ON-SITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED. THE STRUCTURAL ENGINEER OF RECORD SHALL OBTAIN CONFIRMATION THAT ALL OF THE CONTRACTOR'S PERSONNEL WHO INSTALL ANCHORS ARE TRAINED PRIOR TO THE COMMENCEMENT OF INSTALLING ANCHORS.
- ANCHOR CAPACITY IS DEPENDANT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS.
- EXISTING REINFORCING BARS AND/OR CONDUIT IN THE CONCRETE STRUCTURE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. CARE SHALL BE TAKEN IN PLACING POST-INSTALLED ANCHORS AND/OR REINFORCING TO AVOID CONFLICTS WITH EXISTING REBAR AND/OR CONDUIT. UNLESS NOTED ON THE DRAWINGS THAT THE BARS CAN BE CUT, THE CONTRACTOR SHALL REVIEW THE EXISTING STRUCTURAL DRAWINGS AND SHALL UNDERTAKE TO LOCATE THE POSITION OF THE REINFORCING BARS AT THE LOCATIONS OF THE CONCRETE ANCHORS, BY HILTI FERROSCAN, GPR, X-RAY, CHIPPING OR OTHER MEANS.

10.0 INSPECTIONS

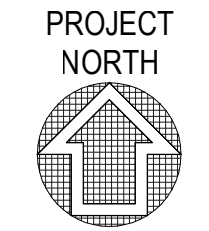
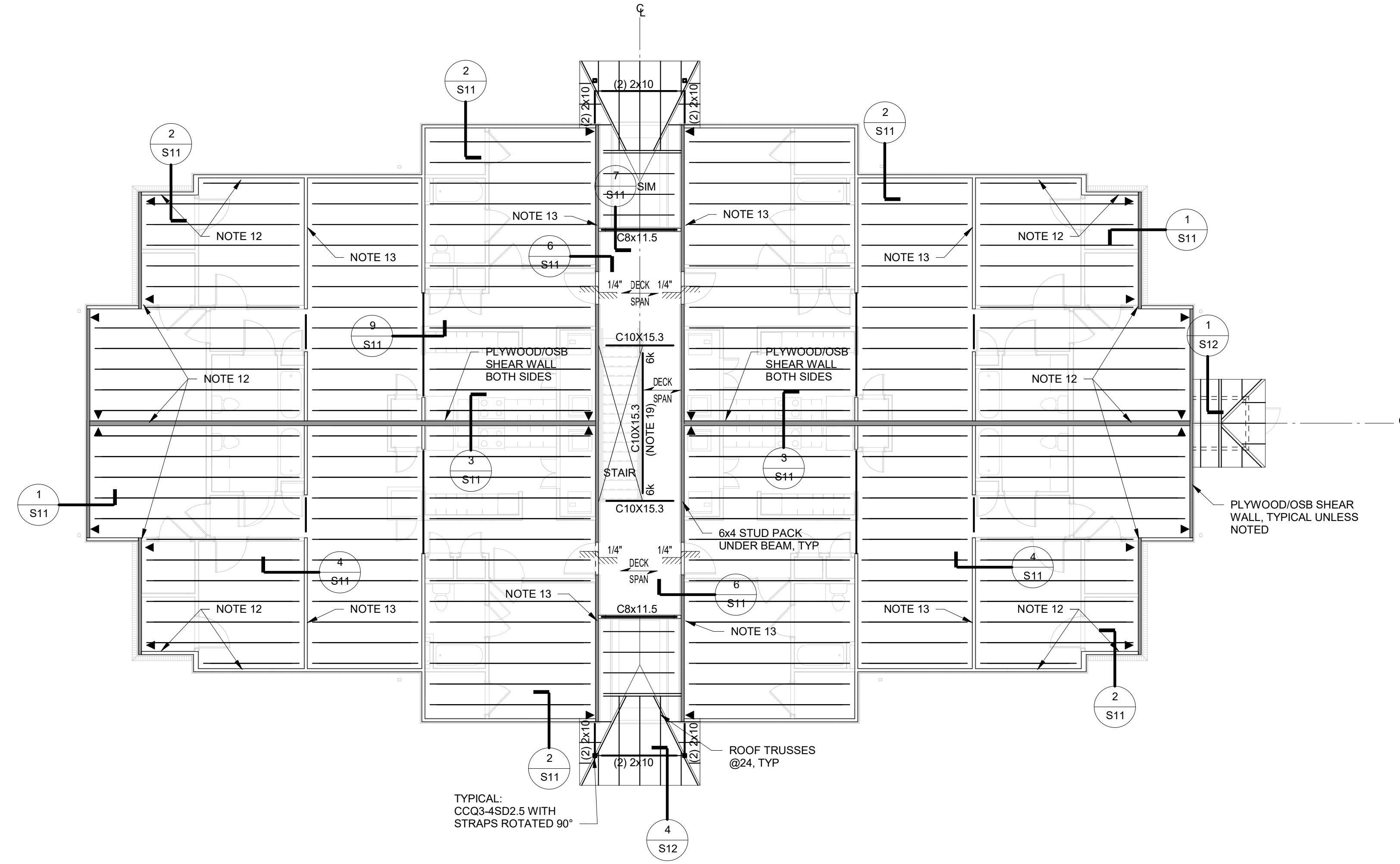
- OWNER SHALL RETAIN THE SERVICES OF INDEPENDENT AGENCIES TO PERFORM THE CONSTRUCTION MATERIAL TESTING AND CODE REQUIRED SPECIAL INSPECTIONS, AS CONSTRUCTION PROGRESSES. FORWARD COPIES OF INSPECTION REPORTS TO STRUCTURAL ENGINEER FOR REVIEW. SOGCANNOT ISSUE A CERTIFICATED OF SATISFACTORY COMPLETION WITHOUT REVIEWING THESE REPORTS AND FINAL CERTIFICATES ISSUED BY EACH OF THE INDEPENDENT AGENCIES.
- STRUCTURAL OBSERVATION BY SOG IS VISUAL OBSERVATION OF THE IN PLACE STRUCTURE FOR GENERAL CONFORMANCE TO THE APPROVED STRUCTURAL PORTIONS OF THE CONSTRUCTION DOCUMENTS AT THE TIME OF THE OBSERVATION AND SHALL NOT BE CONSTRUED AS INSPECTION OR APPROVAL OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING TESTING AND SPECIAL INSPECTIONS PER THE REQUIREMENTS IN THE PROJECT MANUAL.
- OBSERVATION BY THE ENGINEER OF RECORD'S OFFICE DOES NOT REPLACE INSPECTIONS AND TESTING BY THE TESTING AGENCY OR SPECIAL INSPECTOR.

11.0 SHOP DRAWINGS (SUBMITTALS)

- SUBMIT ALL SHOP DRAWINGS ELECTRONICALLY. ELECTRONIC COPIES WILL BE RETURNED TO THE ARCHITECT. REPRODUCTIONS REQUIRED BY THE CONTRACTOR ARE THE RESPONSIBILITY OF THE CONTRACTOR AND SHOULD BE MADE AFTER THE ELECTRONIC COPIES ARE RETURNED.
- ALL SHOP DRAWINGS SHALL BE ACCOMPANIED BY A PROPERLY COMPLETED SUBMITTAL CHECKLIST, WHERE REQUIRED BY THE RELEVANT SPECIFICATION SECTION.
- WHERE SHOP DRAWINGS, CALCULATIONS, OR SUBMITTALS ARE CALLED FOR IN THE PROJECT DOCUMENTS (DRAWINGS AND SPECIFICATIONS) AND ARE NOT PROVIDED BY THE CONTRACTOR, THE CONTRACTOR ASSUMES TOTAL RESPONSIBILITY FOR THE DESIGN AND ASSOCIATED WORK.
- ENGINEER'S SHOP DRAWING REVIEW IS LIMITED TO REVIEW FOR GENERAL CONFORMANCE WITH THE DESIGN INTENT REFLECTED IN THE STRUCTURAL PORTION OF THE CONTRACT DOCUMENTS. THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE DRAWINGS, SPECIFICATIONS OR OTHER PROJECT CONTRACT DOCUMENTS. NO RESPONSIBILITY IS ASSUMED OR IMPLIED FOR THE CORRECTNESS OF DIMENSIONS OR DETAILS. THIS REVIEW DOES NOT AUTHORIZE CHANGES TO THE CONTRACT SUM UNLESS STATED IN A SEPARATE WRITTEN FORM OR CHANGE ORDER. CONTRACTOR SHALL CONFIRM AND

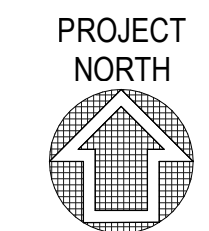
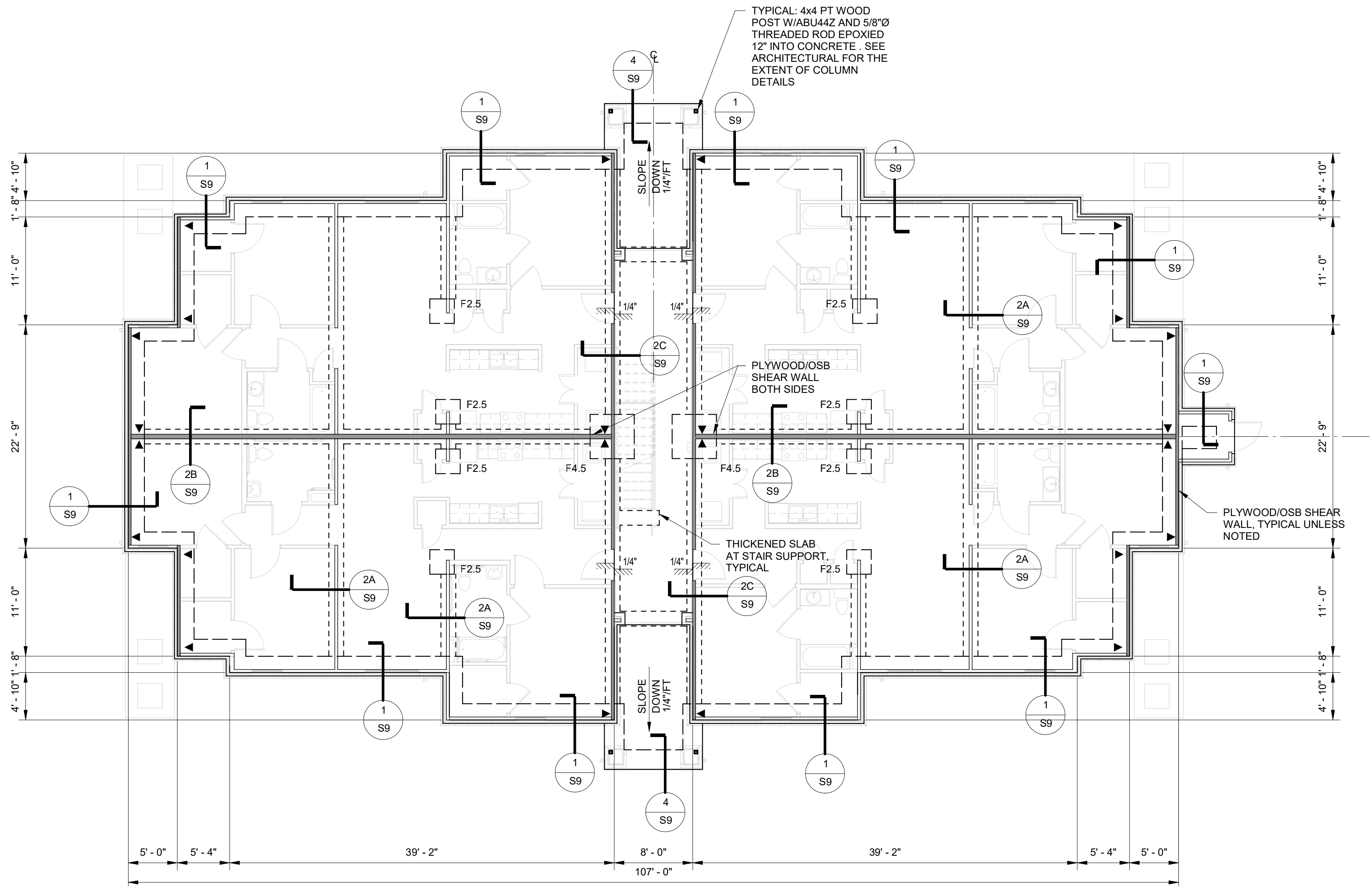
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BUILDING A - LEVEL 2 FRAMING PLAN

- 1/8" = 1'-0"
- FLOOR SYSTEM: PREFABRICATED 4x2 16" FLOOR TRUSSES AT 24". UNLESS NOTED.
 - FLOOR SHEATHING: 3/4" PLYWOOD. SEE GENERAL NOTES. GLUE AND NAIL TO TRUSSES.
 - FINISH SUB-FLOOR ELEVATION 10'-6 3/8" ABOVE FIRST FINISH FLOOR.
 - BREEZEWAY ELEVATION 10'-7 1/4" ABOVE FIRST FINISH FLOOR.
 - FLOOR TRUSS BEARING ELEVATION 9'-1 5/8" ABOVE FIRST FINISH FLOOR.
 - POSITION TRUSSES TO AVOID HVAC UNITS AND DUCTS.
 - DIMENSIONS SHOWN ARE TO FACE OF STUD.
 - DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 - ▲ DENOTES ANCHOR AT END OF SHEARWALL. FOR DETAIL, SEE SHEET S8.
 - DENOTES SHEAR WALL. SEE SHEET S8 FOR SHEAR WALL DETAILS.
 - PROVIDE 18" WIDE x 12" DEEP OPENING ON MECHANICAL CLOSET. FOR LOCATION, SEE ARCHITECTURAL.
 - PROVIDE (2) MSTC40 STRAPS TO DOUBLE STUDS SUPPORTING GIRDER TRUSS ABOVE. CENTER ON FLOOR FRAMING EXTEND TO DOUBLE STUDS BELOW. GC OPTION TO USE (2) FSC ANCHORS.
 - PROVIDE HDU4 ANCHORS INTO TRIPLE 2x4 STUDS ABOVE AND BELOW FLOOR FRAMING.
 - UNLESS NOTED, PROVIDE DOUBLE 2x STUDS UNDER ALL BEAM BEARING POINTS.
 - BUILDING SYMMETRICAL ABOUT CENTERLINES, EXCEPT FOR PUMP ROOM.
 - BREEZEWAY FRAMING: 3-1/2" CONCRETE ON 2.00'18 GALVANIZED NON-COMPOSITE FORM DECK (5-1/2" TOTAL SLAB THICKNESS). REINFORCE WITH 4x4-W2.9xW2.9 WWR DRAPED AND FIBER MESH. PROVIDE C8x11.5 CHANNEL FRAMING AT PERIMETER, UNLESS NOTED. ALL FRAMING TO BE HOT DIPPED GALVANIZED AFTER FABRICATION. REPAIR ANY BREAKS IN GALVANIZING WITH ZINC RICH PRIMER PRIOR TO PAINTING.
 - STEEL PAN STAIRS TO BE DESIGNED BY THE STEEL FABRICATOR, TYPICAL.
 - BEAM REACTIONS ARE INDICATED AT ENDS OF BEAMS AS "X" WHERE "X" IS THE MAGNITUDE OF THE WORKING LOAD SHEAR REACTION IN KIPS.
 - PROVIDE 1/4"x3"x5-1/2" BENT CLOSURE PLATE AT STAIR OPENING BEAMS, TYPICAL.



BUILDING A - LEVEL 1 FOUNDATION PLAN

- 1/8" = 1'-0"
- FINISHED FLOOR ELEVATION VARIES. SEE ARCHITECTURAL DRAWINGS.
 - SLAB CONSTRUCTION: 4" THICK, POST TENSIONED, CAST IN PLACE SLAB. SEE GENERAL NOTES.
 - DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 - DIMENSIONS SHOWN ARE TO FACE OF STUD.
 - APPLY PLYWOOD/OSB SHEATHING TO ALL EXTERIOR WALLS FROM SLAB ON GRADE TO ROOF TRUSS BEARING.
 - DENOTES SHEAR WALL. SEE SHEET S8 FOR SHEAR WALL DETAILS.
 - ▲ DENOTES ANCHOR AT END OF SHEARWALL.
 - F2.5 DENOTES FOOTING 2'-6"x2'-6"x1'-0" DEEP REINFORCED WITH #5 EACH WAY BOTTOM.
 - F4.5 DENOTES FOOTING 4'-6"x4'-6"x2'-0" DEEP REINFORCED WITH #5 EACH WAY TOP AND BOTTOM.
 - BUILDING SYMMETRICAL ABOUT CENTERLINES, EXCEPT FOR PUMP ROOM.

DATE	PERMIT SET
1 11/20/18	PERMIT SET
2 5/22/19	REISSUED FOR PERMIT

PROJECT NUMBER
597
 PROJECT
Frisco Park

418 S. Avalon Street
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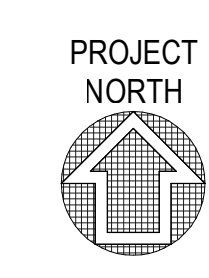
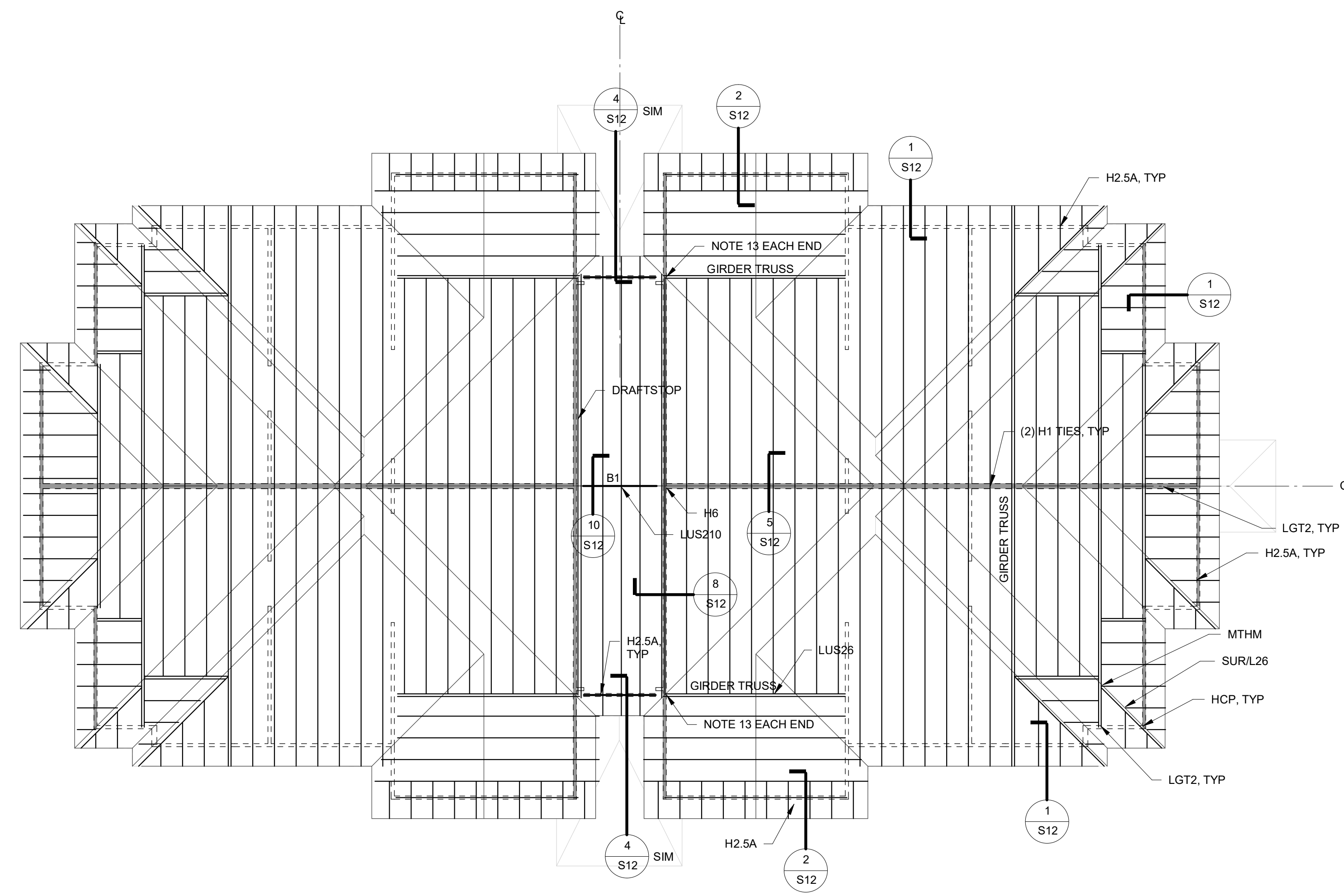
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S2

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BUILDING A - ROOF FRAMING PLAN
 1/8" = 1'-0"

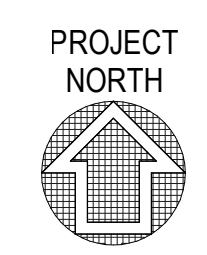
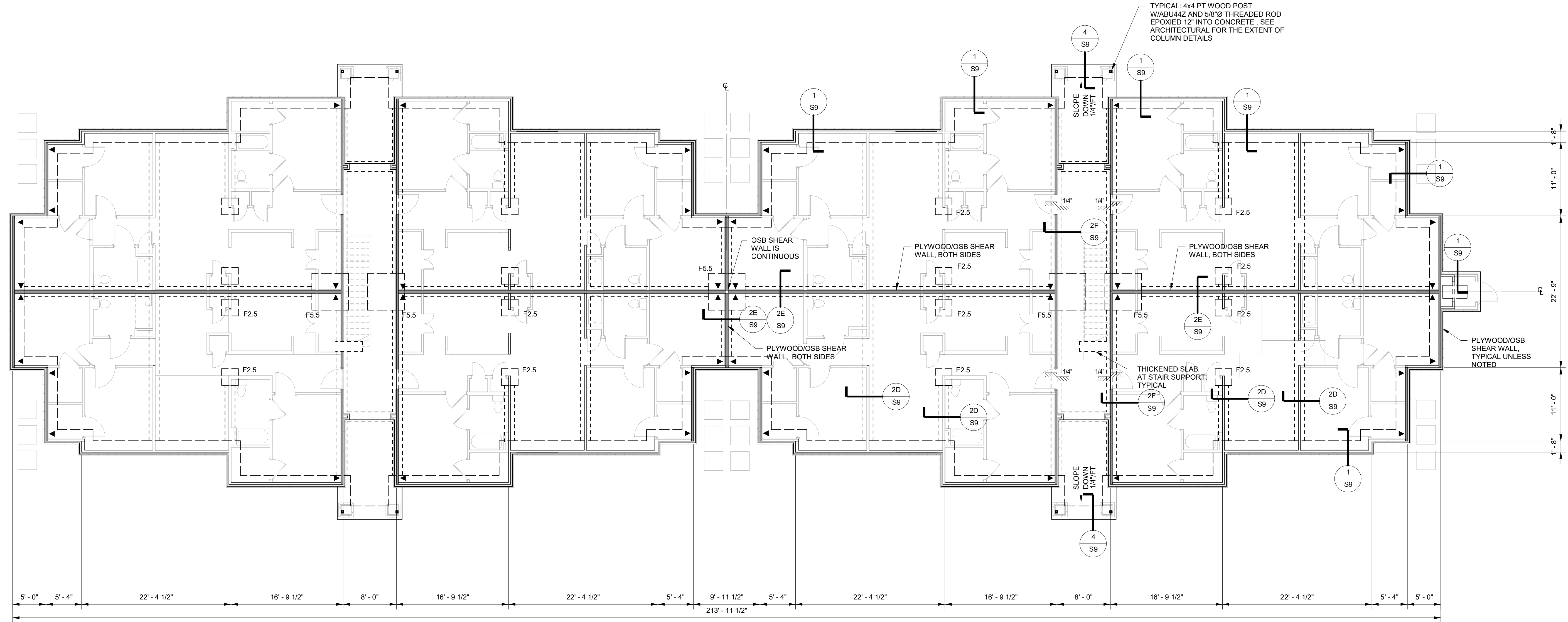
1. ROOF SYSTEM - PREFABRICATED ROOF TRUSSES AT 24". SEE GENERAL NOTES. TRUSS LAYOUTS AND PROFILES BY OTHERS.
2. ROOF SHEATHING: 1/2" OSB OR PLYWOOD. SEE GENERAL NOTES.
3. TRUSS BEARING ELEVATION 19'-8", ABOVE FIRST FINISH FLOOR.
4. DETAILS AND ANCHORS SHOWN ARE TYPICAL FOR ENTIRE BUILDING.
5. FOR DIMENSIONS SEE FOUNDATION PLAN.
6. ALL HORIZONTAL FRAMING LUMBER TO BE #2 SYP UNLESS NOTED, OR LUMBER WITH EQUAL OR GREATER STRUCTURAL PROPERTIES.
7. ALL EXTERIOR WALLS SHALL BE LOAD BEARING.
8. GIRDER TRUSSES SHALL NOT BEAR ABOVE OPENINGS IN WALL. PROVIDE DOUBLE STUDS AT BEARING.
9. AT DRAFTSTOP TRUSSES, PROVIDE VERTICAL MEMBERS AT 16" IN ADDITION TO REQUIRED WEB MEMBERS. FOR DOOR INFORMATION, SEE ARCHITECTURAL DRAWINGS. FOR LOCATION, SEE ARCHITECTURAL DRAWINGS.
10. 'B1' DENOTES (2) 1 3/4x9 1/4 LVL. PROVIDE DOUBLE STUD AND (2) H6 ANCHOR AT BEARING.
11. SHEARWALLS ARE SHOWN ON FLOOR BELOW. PROVIDE ADDITIONAL TRUSS ABOVE SHEARWALLS AND AT DRAFTSTOP AS REQUIRED.
12. AT VAULTED CEILING TRUSSES, PROVIDE CONTINUOUS BOTTOM CHORD FROM EXTERIOR BEARING WALL TO INTERIOR BEARING WALL. ATTACH MEMBER(S) TO BOTTOM CHORD AS REQUIRED TO FORM VAULTED CEILING. THIS IS DONE TO ELIMINATE ARCH EFFECT AND HORIZONTAL DISPLACEMENT.
13. PROVIDE TRIPLE STUDS AT TRUSS BEARING. PROVIDE MGT ANCHOR ABOVE DOUBLE TOP PLATE. PROVIDE HDL4 BELOW DOUBLE TOP PLATE.
14. BUILDING SYMMETRICAL ABOUT CENTERLINES.
15. EXTEND DRAFTSTOP SHEATHING TO ROOF SHEATHING.
16. PROVIDE DOUBLE STUDS AT MGT AND LGT ANCHORS.
17. PROVIDE (2) 2x FRAMING AT ATTIC ACCESS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.

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SHEET NUMBER
S3



BUILDING B - LEVEL 1 FOUNDATION PLAN

- 1/8" = 1'-0"
1. FINISHED FLOOR ELEVATION VARIES. SEE ARCHITECTURAL DRAWINGS.
 2. SLAB CONSTRUCTION: 4" THICK, POST TENSIONED, CAST IN PLACE SLAB. SEE GENERAL NOTES.
 3. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 4. DIMENSIONS SHOWN ARE TO FACE OF STUD.
 5. APPLY PLYWOOD/OSB SHEATHING TO ALL EXTERIOR WALLS FROM SLAB ON GRADE TO ROOF TRUSS BEARING.
 6. [Symbol] DENOTES SHEAR WALL. SEE SHEET S8 FOR SHEAR WALL DETAILS.
 7. [Symbol] DENOTES ANCHOR AT END OF SHEARWALL.
 8. F2.5 DENOTES FOOTING 2'-6"x2'-6"x1'-0" DEEP REINFORCED WITH #5 EACH WAY BOTTOM. F5.5 DENOTES FOOTING 5'-6"x5'-6"x2'-0" DEEP REINFORCED WITH #6 EACH WAY TOP AND BOTTOM.
 9. BUILDING SYMMETRICAL ABOUT CENTERLINES, EXCEPT FOR PUMP ROOM.

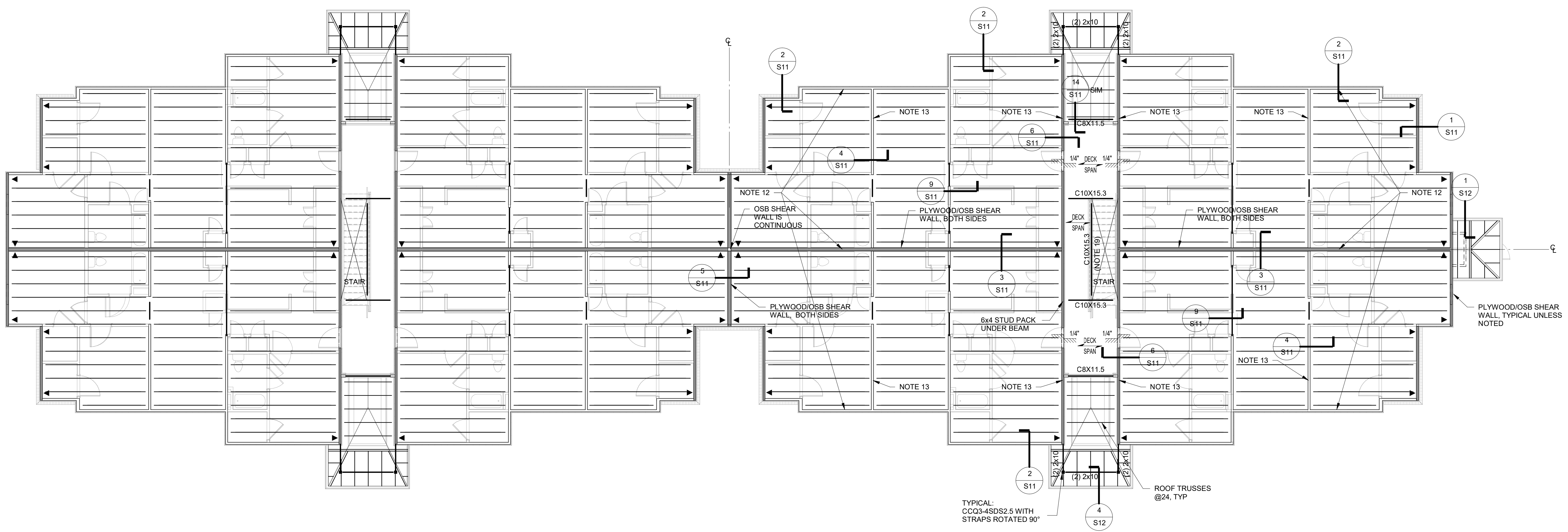
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PROJECT NUMBER
597
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Frisco Park

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SHEET NUMBER
S4

CAD FILE NUMBER
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BUILDING B - LEVEL 2 FRAMING PLAN

1/8" = 1'-0"

1. FLOOR SYSTEM: PREFABRICATED 4x2 16" FLOOR TRUSSES AT 24", UNLESS NOTED.
2. FLOOR SHEATHING: 3/4" PLYWOOD, SEE GENERAL NOTES. GLUE AND NAIL TO TRUSSES.
3. FINISH SUB-FLOOR ELEVATION 10'-6 3/8" ABOVE FIRST FINISH FLOOR.
4. BREEZEWAY ELEVATION 10'-7 1/4" ABOVE FIRST FINISH FLOOR.
5. FLOOR TRUSS BEARING ELEVATION 9'-1 5/8" ABOVE FIRST FINISH FLOOR.
6. POSITION TRUSSES TO AVOID HVAC UNITS AND DUCTS.
7. DIMENSIONS SHOWN ARE TO FACE OF STUD.
8. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
9. ▲ DENOTES ANCHOR AT END OF SHEARWALL. FOR DETAIL, SEE SHEET S8.
10. ■ DENOTES SHEAR WALL. SEE SHEET S8 FOR SHEAR WALL DETAILS.
11. PROVIDE 18" WIDE x 12" DEEP OPENING ON MECHANICAL CLOSET. FOR LOCATION, SEE ARCHITECTURAL.
12. PROVIDE (2) MSTC40 STRAPS TO DOUBLE STUDS SUPPORTING GIRDER TRUSS ABOVE. CENTER ON FLOOR FRAMING EXTEND TO DOUBLE STUDS BELOW. GC OPTION TO USE (2) FSC ANCHORS.
13. PROVIDE HDU4 ANCHORS INTO TRIPLE 2x4 STUDS ABOVE AND BELOW FLOOR FRAMING.
14. UNLESS NOTED, PROVIDE DOUBLE 2x STUDS UNDER ALL BEAM BEARING POINTS.
15. BUILDING SYMMETRICAL ABOUT CENTERLINES, EXCEPT FOR PUMP ROOM.
16. BREEZEWAY FRAMING: 3'-1/2" CONCRETE ON 2.0C18 GALVANIZED NON-COMPOSITE FORM DECK (5'-1/2" TOTAL SLAB THICKNESS). REINFORCE WITH 4x4-W2.9xW2.9 WWR DRAPED AND FIBER MESH. PROVIDE C8x11.5 CHANNEL FRAMING AT PERIMETER, UNLESS NOTED. ALL FRAMING TO BE HOT DIPPED GALVANIZED AFTER FABRICATION. REPAIR ANY BREAKS IN GALVANIZING WITH ZINC RICH PRIMER PRIOR TO PAINTING.
17. STEEL PAN STAIRS TO BE DESIGNED BY THE STEEL FABRICATOR, TYPICAL.
18. BEAM REACTIONS ARE INDICATED AT ENDS OF BEAMS AS "X" WHERE "X" IS THE MAGNITUDE OF THE WORKING LOAD SHEAR REACTION IN KIPS.
19. PROVIDE 1/4"x3"x5-1/2" BENT CLOSURE PLATE AT STAIR OPENING BEAMS, TYPICAL.

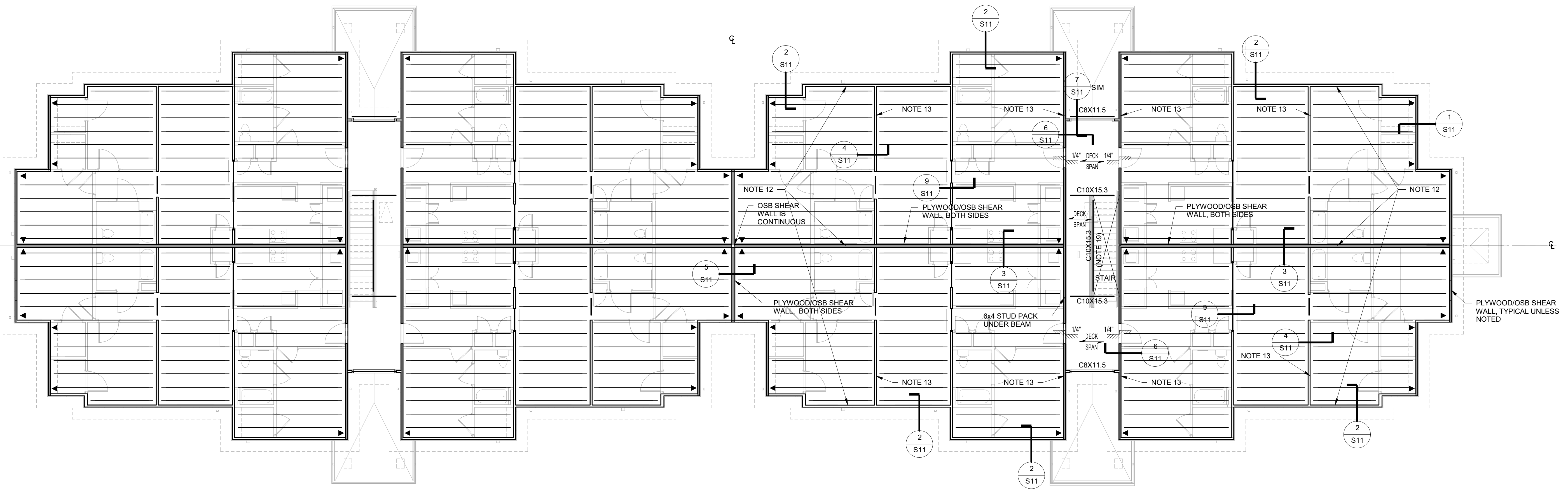
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SHEET NUMBER
S5

CAD FILE NUMBER
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BUILDING B - LEVEL 3 FRAMING PLAN

1/8" = 1'-0"

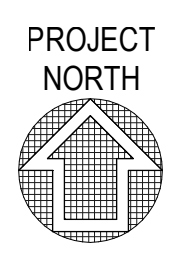
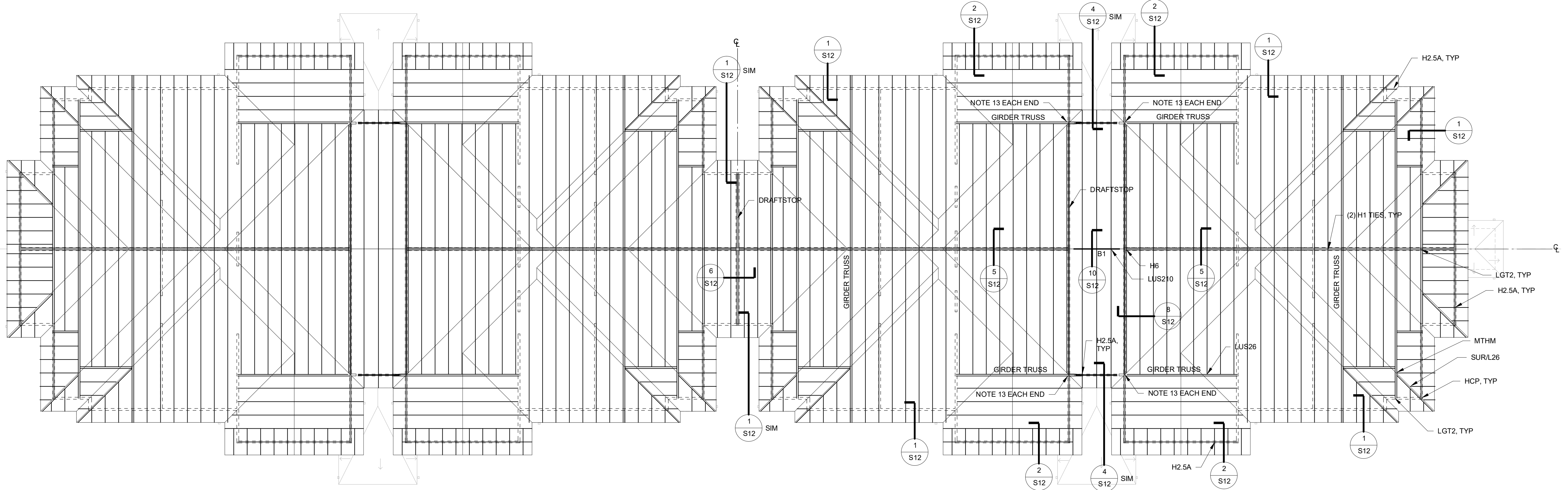
1. FLOOR SYSTEM: PREFABRICATED 4x2 16" FLOOR TRUSSES AT 24", UNLESS NOTED.
2. FLOOR SHEATHING: 3/4" PLYWOOD, SEE GENERAL NOTES. GLUE AND NAIL TO TRUSSES.
3. FINISH SUB-FLOOR ELEVATION 21'-0 3/4" ABOVE FIRST FINISH FLOOR.
4. BREEZEWAY ELEVATION 21'-4 5/8" ABOVE FIRST FINISH FLOOR.
5. FLOOR TRUSS BEARING ELEVATION 19'-8" ABOVE FIRST FINISH FLOOR.
6. POSITION TRUSSES TO AVOID HVAC UNITS AND DUCTS.
7. DIMENSIONS SHOWN ARE TO FACE OF STUD.
8. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
9. ▲ DENOTES ANCHOR AT END OF SHEARWALL. FOR DETAIL SEE SHEET S8.
10. ■ DENOTES SHEAR WALL. SEE SHEET S8 FOR SHEAR WALL DETAILS.
11. PROVIDE 18" WIDE x 12" DEEP OPENING ON MECHANICAL CLOSET. FOR LOCATION, SEE ARCHITECTURAL.
12. PROVIDE (2) MSTC40 STRAPS TO DOUBLE STUDS SUPPORTING GIRDER TRUSS ABOVE. CENTER ON FLOOR FRAMING EXTEND TO DOUBLE STUDS BELOW. GC OPTION TO USE (2) FSC ANCHORS.
13. PROVIDE HDU4 ANCHORS INTO TRIPLE 2x4 STUDS ABOVE AND BELOW FLOOR FRAMING.
14. UNLESS NOTED, PROVIDE DOUBLE 2x STUDS UNDER ALL BEAM BEARING POINTS.
15. BUILDING SYMMETRICAL ABOUT CENTERLINES, EXCEPT FOR PUMP ROOM.
16. BREEZEWAY FRAMING: 3-1/2" CONCRETE ON 2.0C18 GALVANIZED NON-COMPOSITE FORM DECK (5-1/2" TOTAL SLAB THICKNESS), REINFORCE WITH 4x4-W2.9xW2.9 WWR DRAPED AND FIBER MESH, PROVIDE C8x11.5 CHANNEL FRAMING AT PERIMETER, UNLESS NOTED. ALL FRAMING TO BE HOT DIPPED GALVANIZED AFTER FABRICATION. REPAIR ANY BREAKS IN GALVANIZING WITH ZINC RICH PRIMER PRIOR TO PAINTING.
17. STEEL PAN STAIRS TO BE DESIGNED BY THE STEEL FABRICATOR. TYPICAL.
18. BEAM REACTIONS ARE INDICATED AT ENDS OF BEAMS AS "XX" WHERE "X" IS THE MAGNITUDE OF THE WORKING LOAD SHEAR REACTION IN KIPS.
19. PROVIDE 1/4"x3"x5-1/2" BENT CLOSURE PLATE AT STAIR OPENING BEAMS, TYPICAL.

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SHEET NUMBER
S6



BUILDING B - ROOF FRAMING PLAN

1/8" = 1'-0"

1. ROOF SYSTEM: PREFABRICATED ROOF TRUSSES AT 24". SEE GENERAL NOTES. TRUSS LAYOUTS AND PROFILES BY OTHERS.
2. ROOF SHEATHING: 1/2" OSB OR PLYWOOD, SEE GENERAL NOTES.
3. TRUSS BEARING ELEVATION 30'-2 3/8", ABOVE FIRST FINISH FLOOR.
4. DETAILS AND ANCHORS SHOWN ARE TYPICAL FOR ENTIRE BUILDING.
5. FOR DIMENSIONS SEE FOUNDATION PLAN.
6. ALL HORIZONTAL FRAMING LUMBER TO BE #2 SYP UNLESS NOTED, OR LUMBER WITH EQUAL OR GREATER STRUCTURAL PROPERTIES.
7. ALL EXTERIOR WALLS SHALL BE LOAD BEARING.
8. GIRDER TRUSSES SHALL NOT BEAR ABOVE OPENINGS IN WALL. PROVIDE DOUBLE STUDS AT BEARING.
9. AT DRAFTSTOP TRUSSES, PROVIDE VERTICAL MEMBERS AT 16" IN ADDITION TO REQUIRED WEB MEMBERS. FOR DOOR INFORMATION, SEE ARCHITECTURAL DRAWINGS. FOR LOCATION, SEE ARCHITECTURAL DRAWINGS.
10. B1 DENOTES (2) 1 3/4"x9 1/4" LVL. PROVIDE DOUBLE STUD AND (2) H6 ANCHOR AT BEARING.
11. SHEARWALLS ARE SHOWN ON FLOOR BELOW. PROVIDE ADDITIONAL TRUSS ABOVE SHEARWALLS AND AT DRAFTSTOP AS REQUIRED.
12. AT VAULTED CEILING TRUSSES, PROVIDE CONTINUOUS BOTTOM CHORD FROM EXTERIOR BEARING WALL TO INTERIOR BEARING WALL. ATTACH MEMBER(S) TO BOTTOM CHORD AS REQUIRED TO FORM VAULTED CEILING. THIS IS DONE TO ELIMINATE ARCH EFFECT AND HORIZONTAL DISPLACEMENT.
13. PROVIDE TRIPLE STUDS AT TRUSS BEARING. PROVIDE MGT ANCHOR ABOVE DOUBLE TOP PLATE. PROVIDE HDU4 BELOW DOUBLE TOP PLATE.
14. BUILDING SYMMETRICAL ABOUT CENTERLINES.
15. EXTEND DRAFTSTOP SHEATHING TO ROOF SHEATHING.
16. PROVIDE DOUBLE STUDS AT MGT AND LGT ANCHORS.
17. PROVIDE (2) 2x FRAMING AT ATTIC ACCESS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.

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PROJECT

Frisco Park

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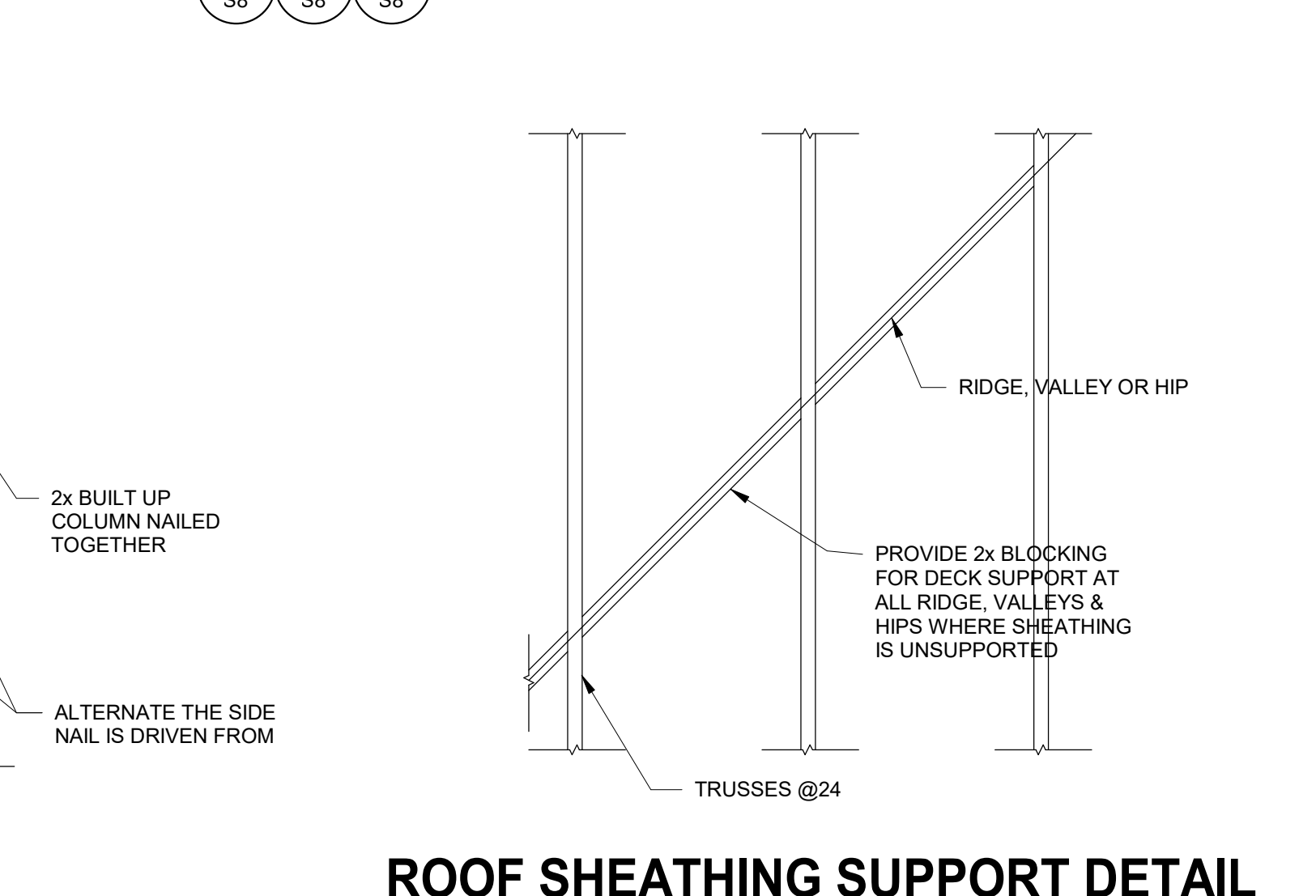
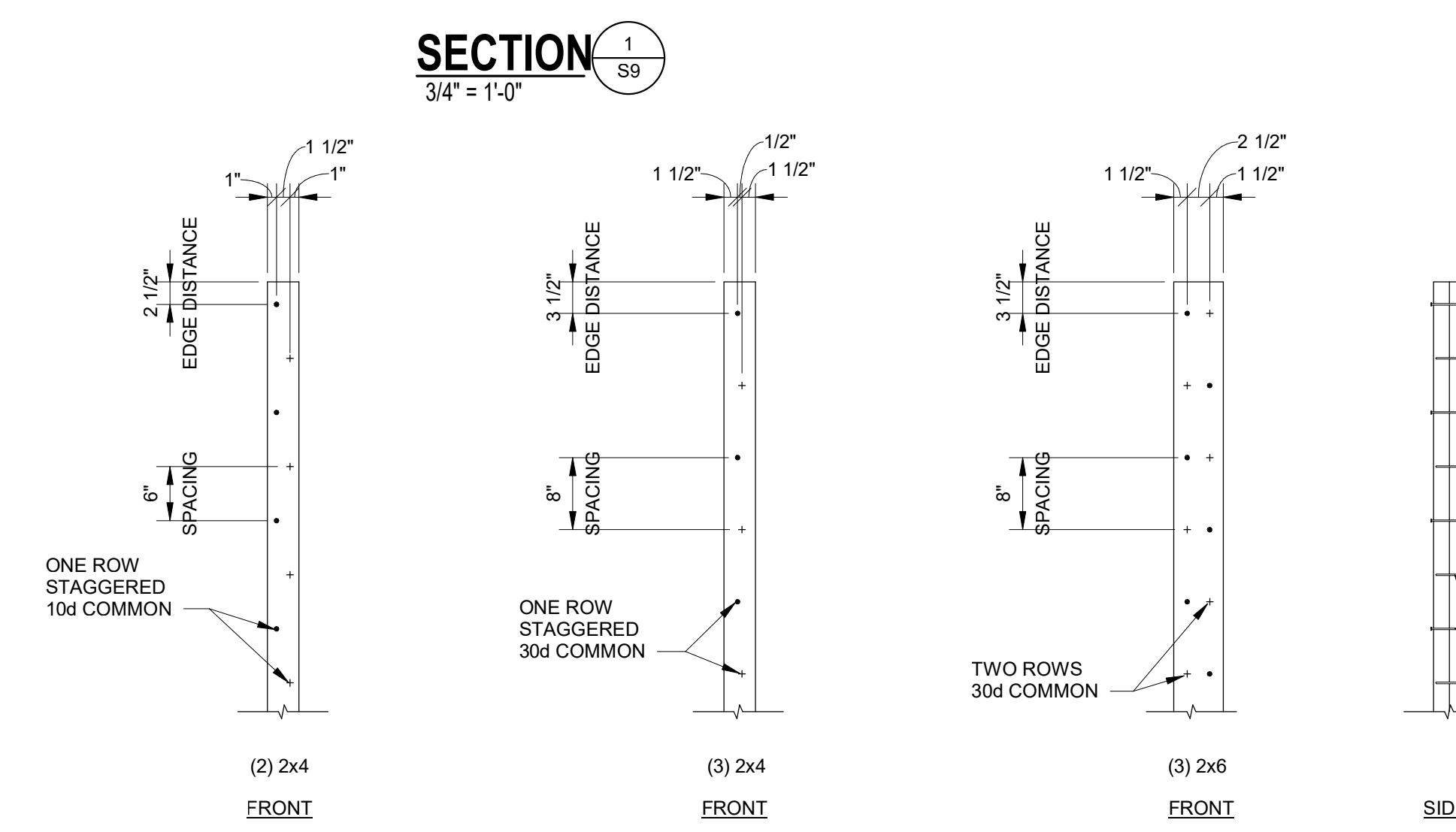
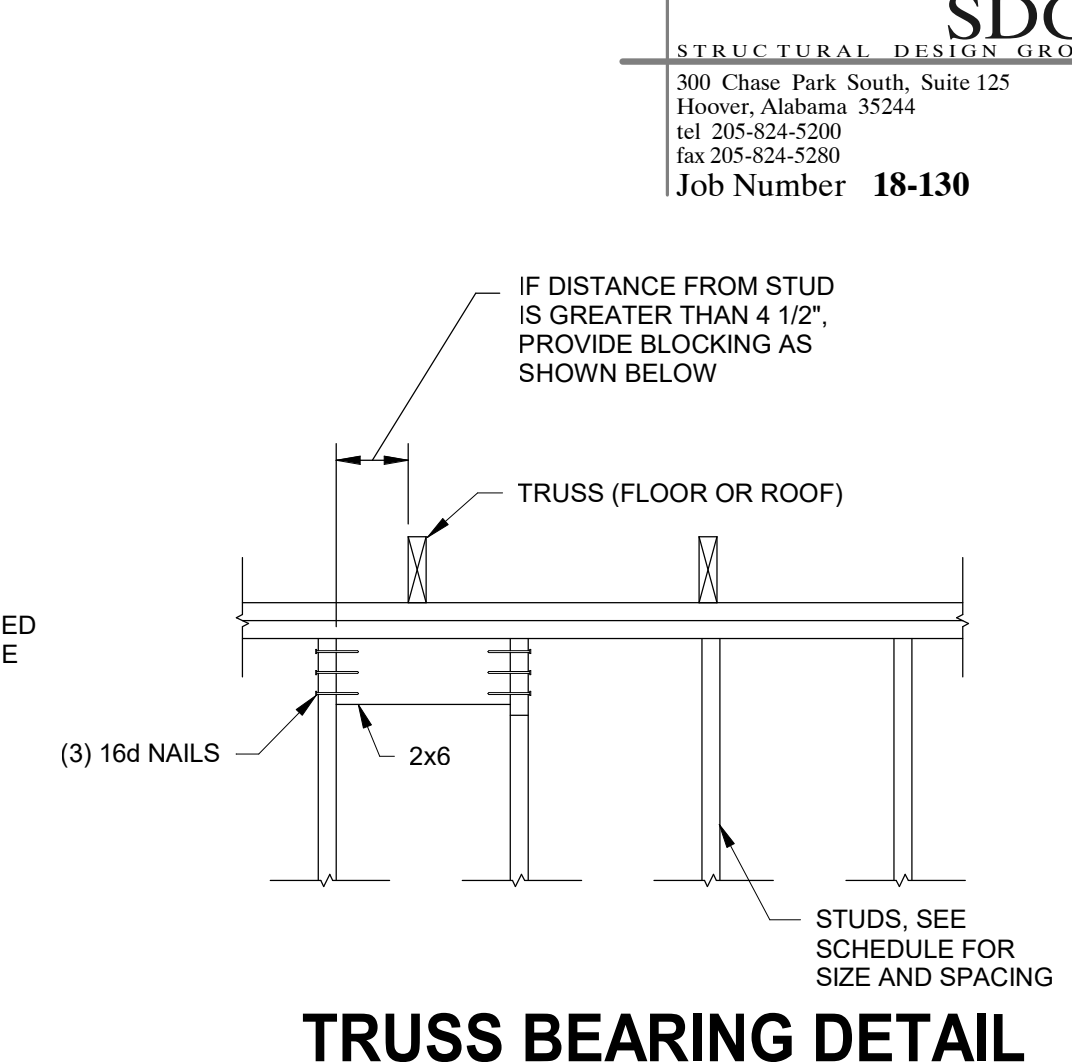
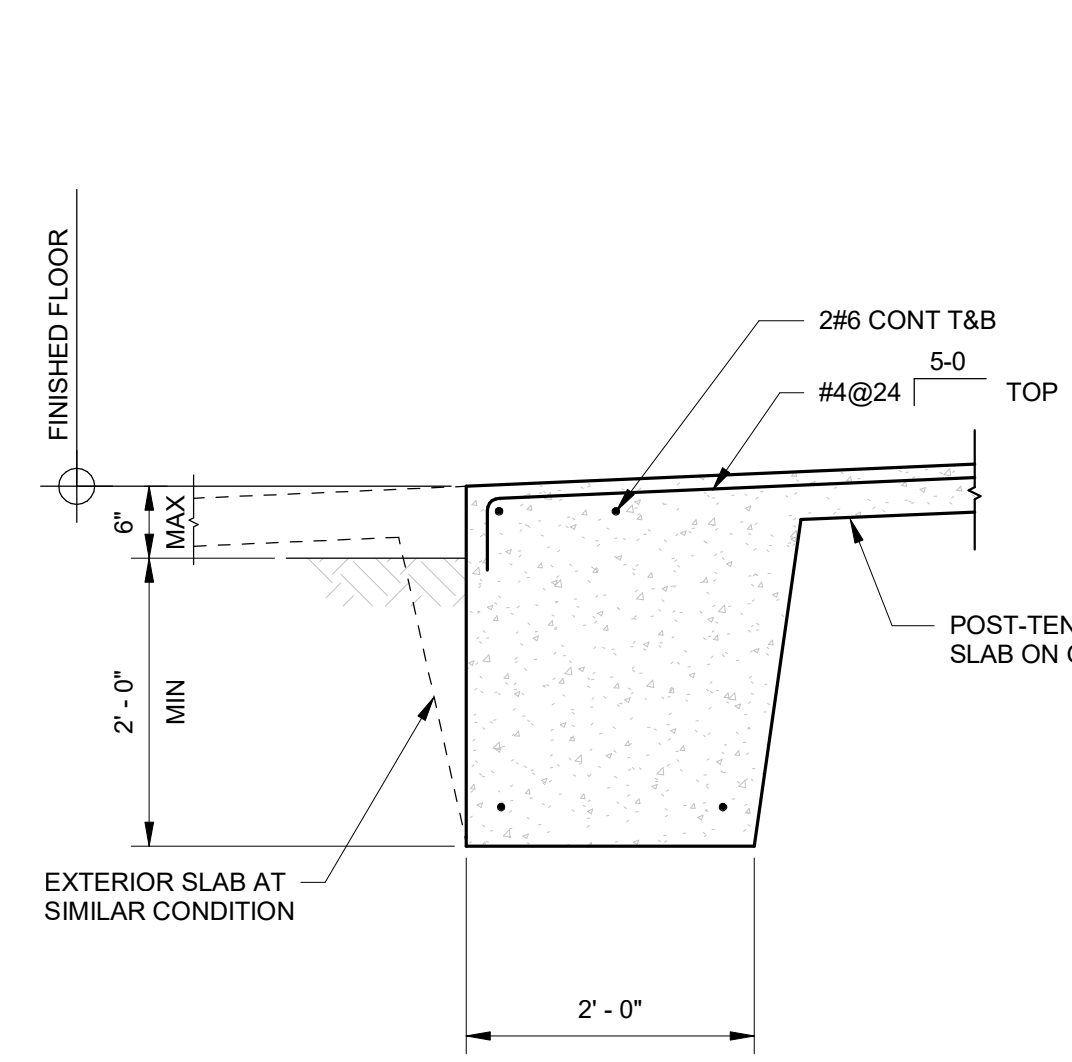
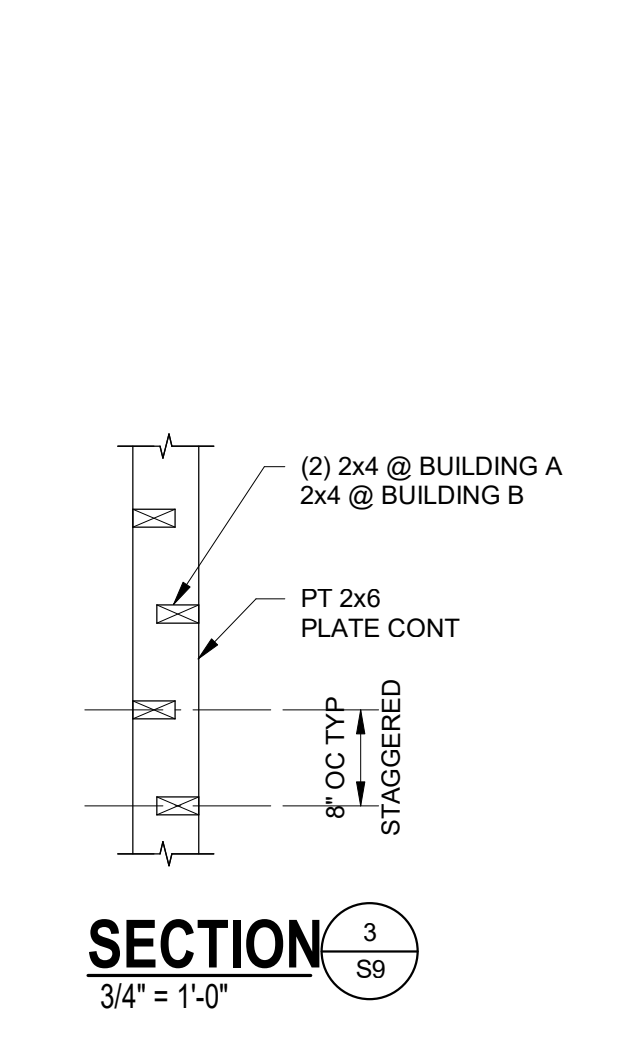
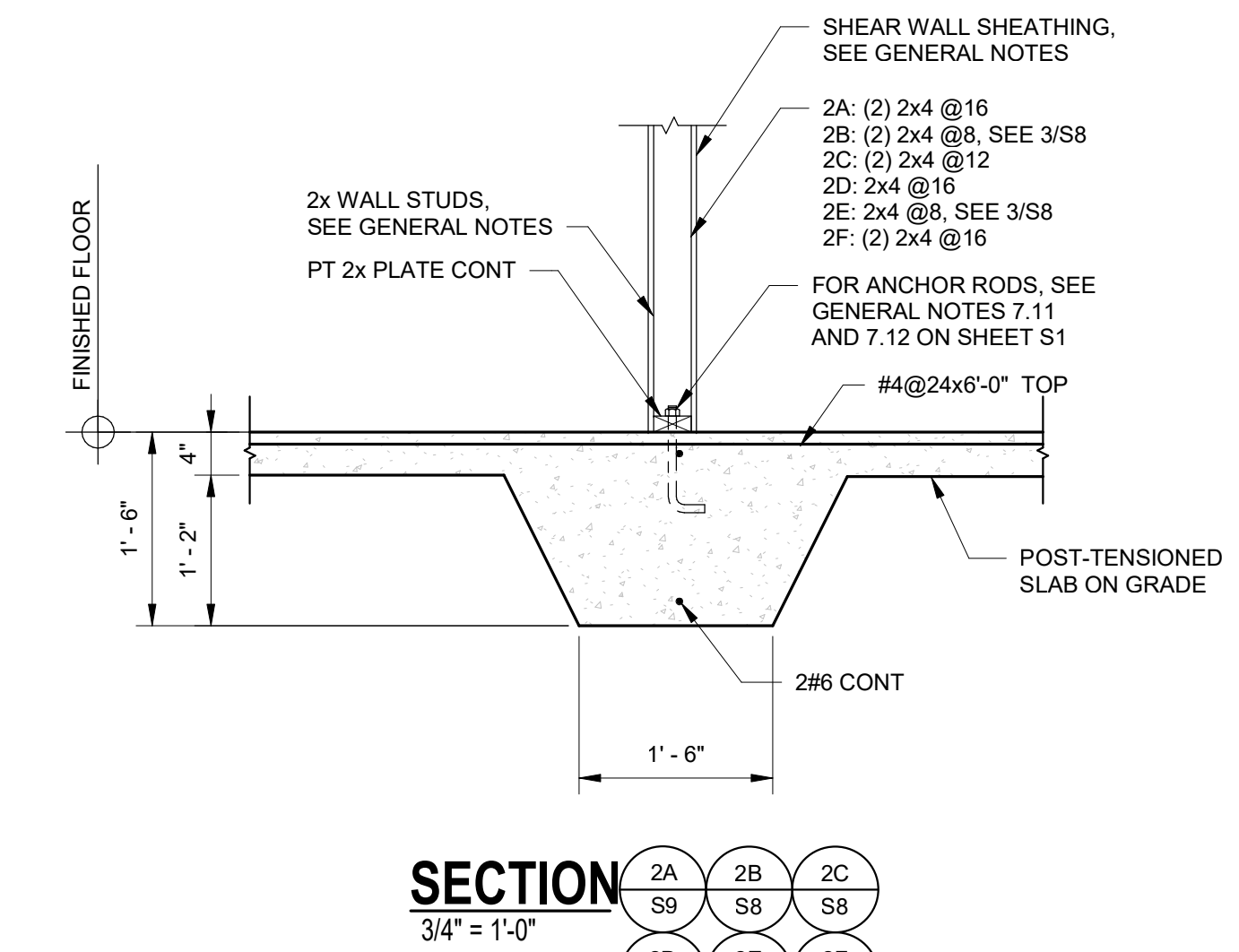
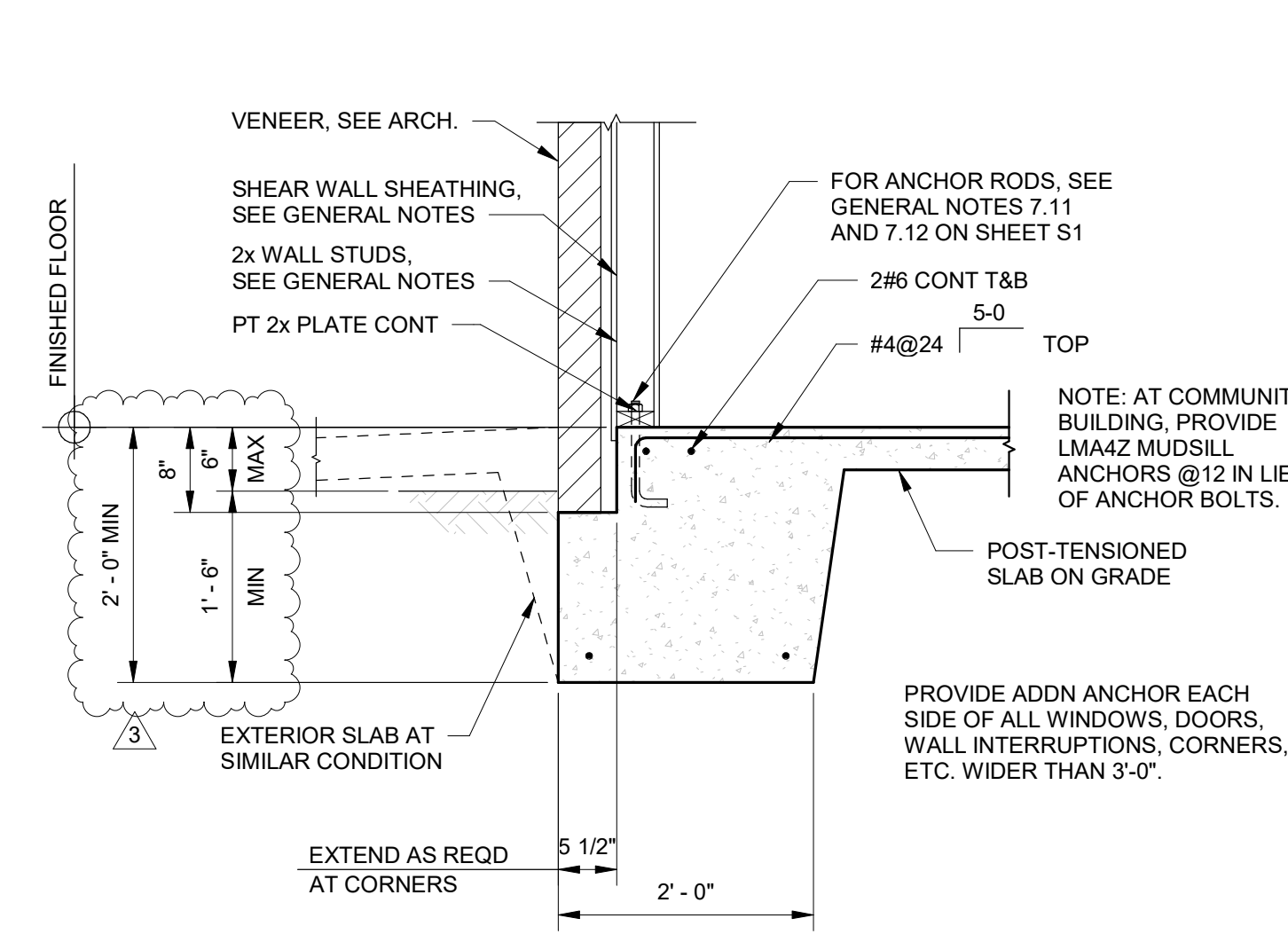
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MASONRY LINTEL SCHEDULE

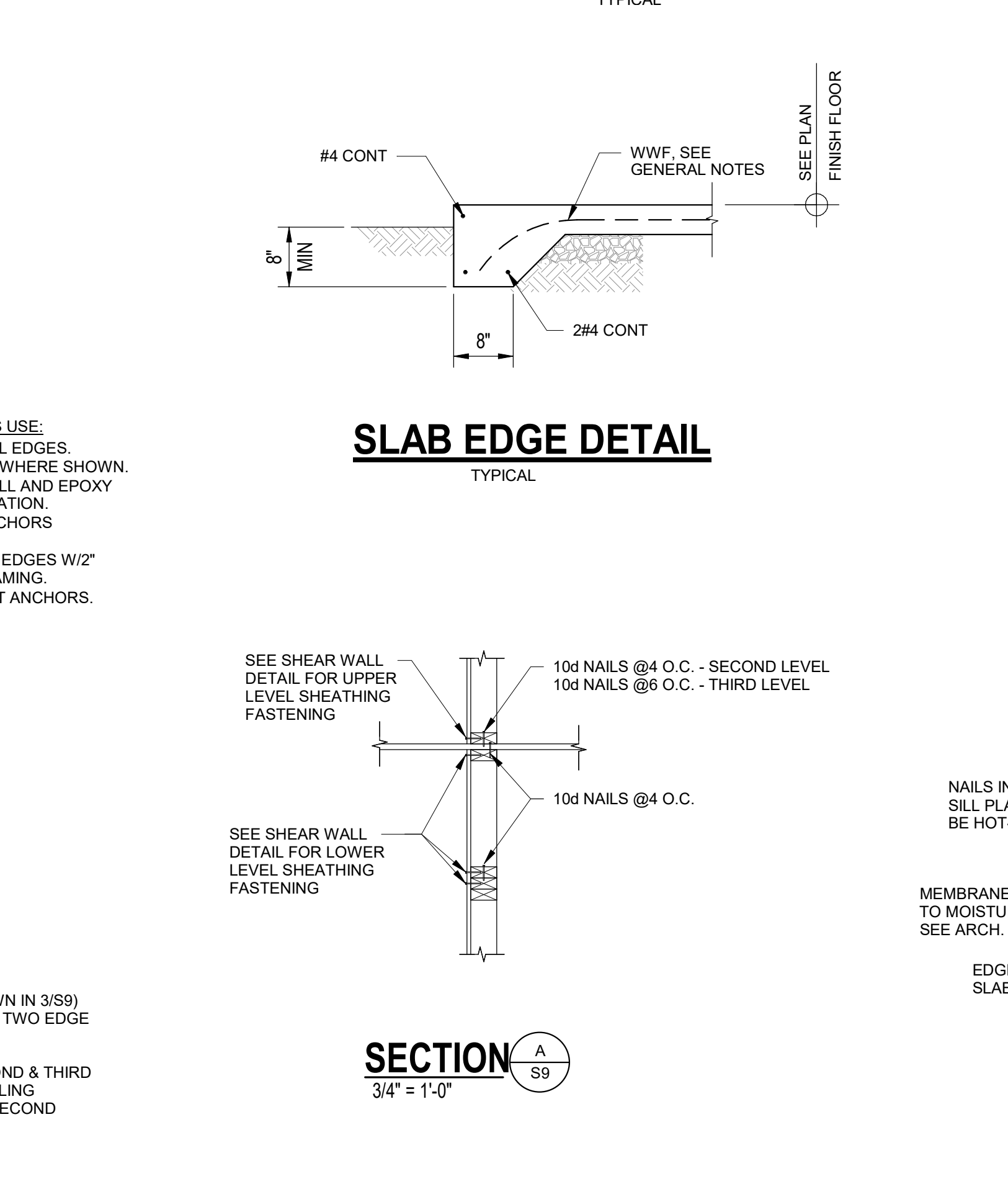
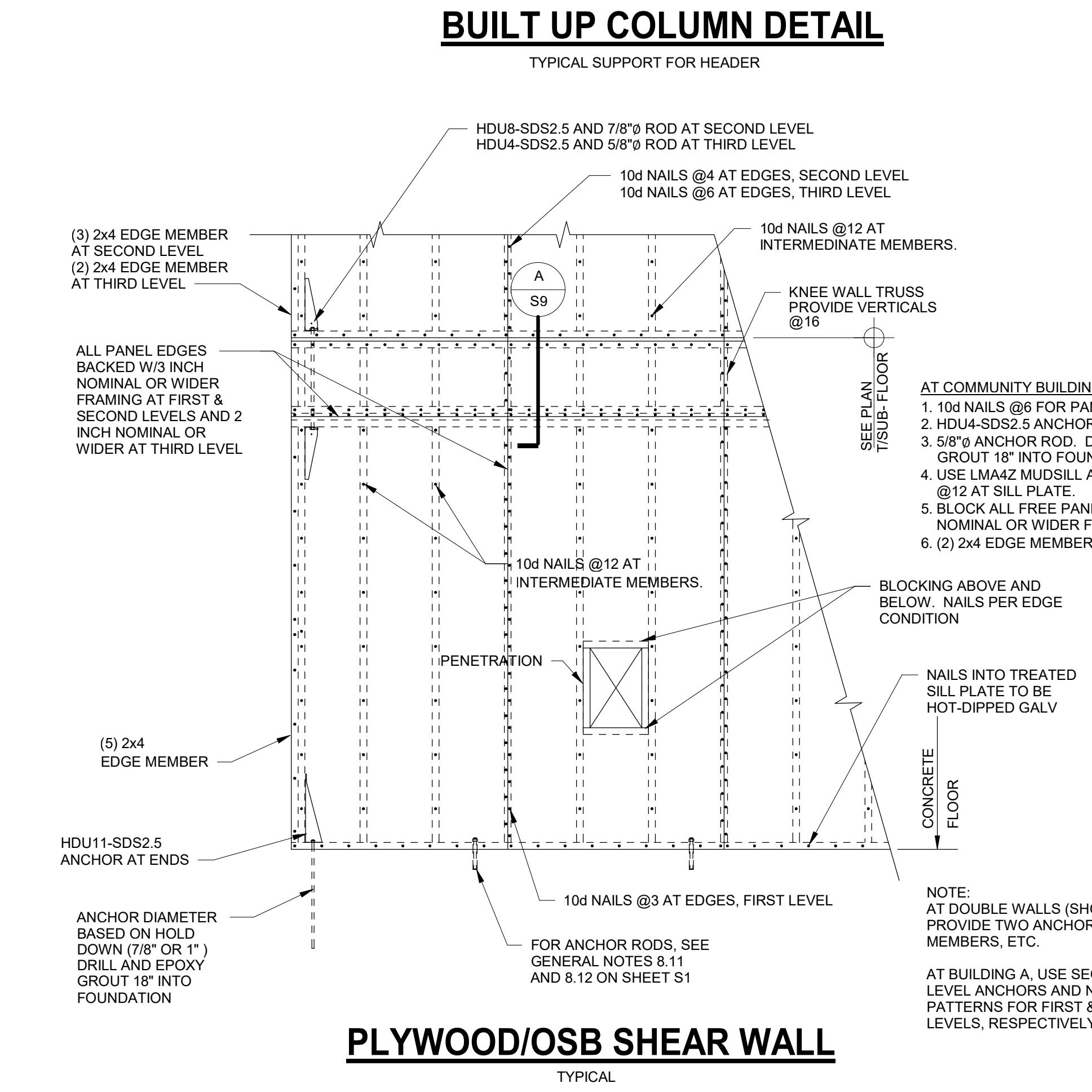
MAXIMUM OPENING WIDTH	STEEL FOR EACH 4" OF WALL THICKNESS
2'-0"	L3 1/2x3 1/2x3/8
4'-0"	L3 1/2x3 1/2x3/8
6'-0"	L3 1/2x3 1/2x3/8
8'-0"	L5x3 1/2x3/8
10'-0"	L5x5x3/8
14'-0"	L7x4x3/8

PROVIDE 8" MINIMUM BEARING FOR ALL LINTELS. ROLL ANGLE TO RADIUS AS REQUIRED.

STUD SCHEDULES LOAD BEARING WALLS

BUILDING A	
FIRST LEVEL EXTERIOR	(2) 2x4 @ 16 *
FIRST LEVEL INTERIOR	2x4 @ 16 *
SECOND LEVEL EXTERIOR	2x4 @ 16
SECOND LEVEL INTERIOR	2x4 @ 16
BUILDING B	
FIRST LEVEL EXTERIOR	(2) 2x4 @ 16 *
FIRST LEVEL INTERIOR	(2) 2x4 @ 16 *
SECOND LEVEL EXTERIOR	(2) 2x4 @ 16 *
SECOND LEVEL INTERIOR	2x4 @ 16 *
THIRD LEVEL EXTERIOR	2x4 @ 16
THIRD LEVEL INTERIOR	2x4 @ 16
BUILDING C	
EXTERIOR	2x4 @ 16
INTERIOR	2x4 @ 16

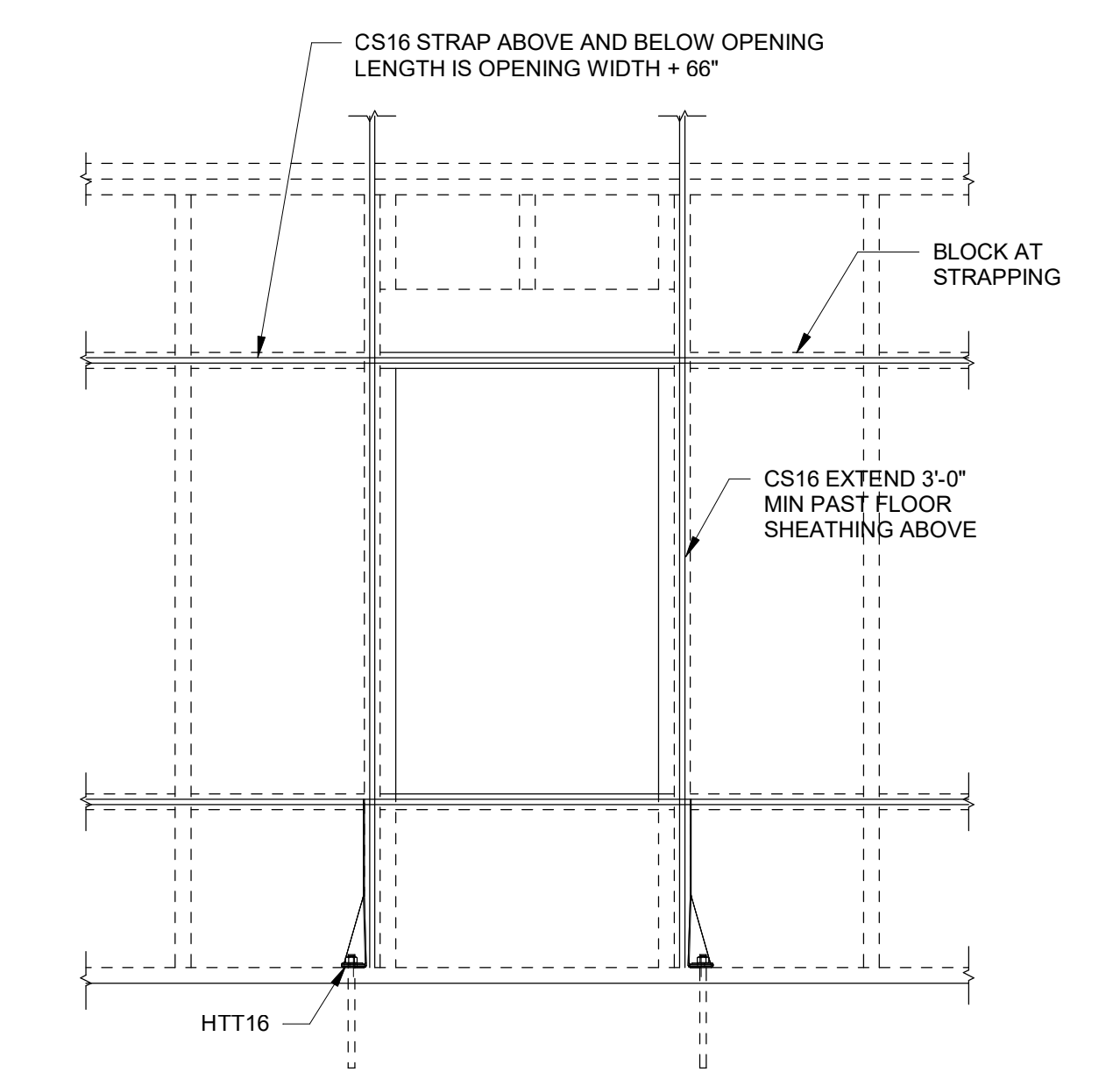
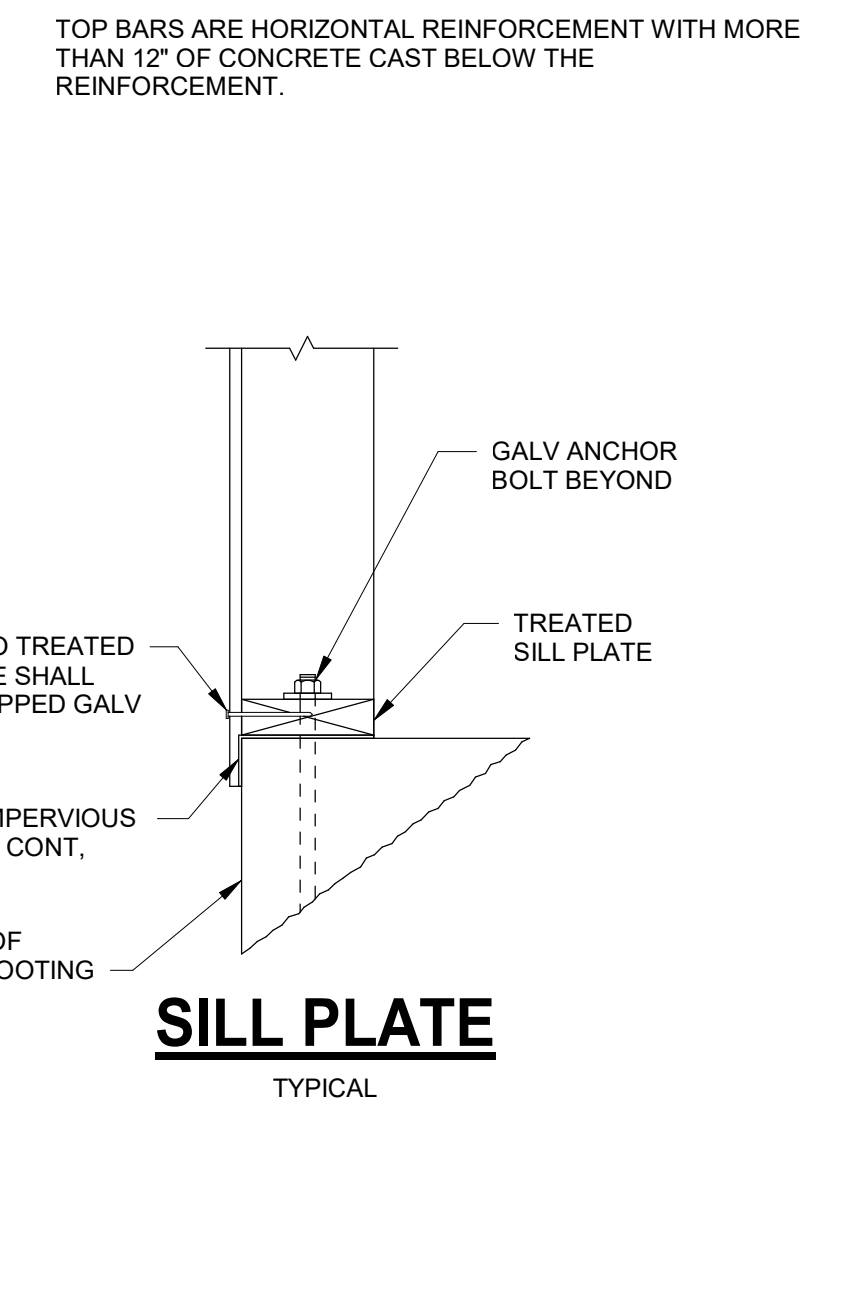
NOTE: BREEZEWAY WALLS ARE CONSIDERED EXTERIOR WALLS.
* PROVIDE (2) 2x4 WALL STUDS AT SHEAR WALLS AND AT BLOCKING FOR ALL SHEAR WALL SHEATHING PANEL EDGES.



TENSION LAP SPLICE LENGTHS

BAR SIZE	f _c = 3000 PSI			
	TOP BARS		OTHER BARS	
	A	B	A	B
#3	22"	28"	17"	22"
#4	29"	37"	22"	29"
#5	36"	47"	28"	36"
#6	43"	56"	33"	43"
#7	63"	81"	48"	63"

TOP BARS ARE HORIZONTAL REINFORCEMENT WITH MORE THAN 12" OF CONCRETE CAST BELOW THE REINFORCEMENT.



- PLYWOOD/OSB SHEAR WALL OPENINGS**
- DETAIL APPLIES TO FIRST LEVEL OF A THREE STORY BUILDING.
 - DETAIL APPLIES AT DOOR AND WINDOW OPENINGS.
 - CENTER HORIZONTAL STRAPS ON OPENING.
 - APPLY STRAPS OVER FACE OF SHEATHING.
 - ATTACH HTT16 TO FOUNDATION WITH 5/8" THREADED ROD DRILLED AND EPOXY GROUTED 12" INTO CONCRETE.

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3 8/20/19	ADDENDUM 1

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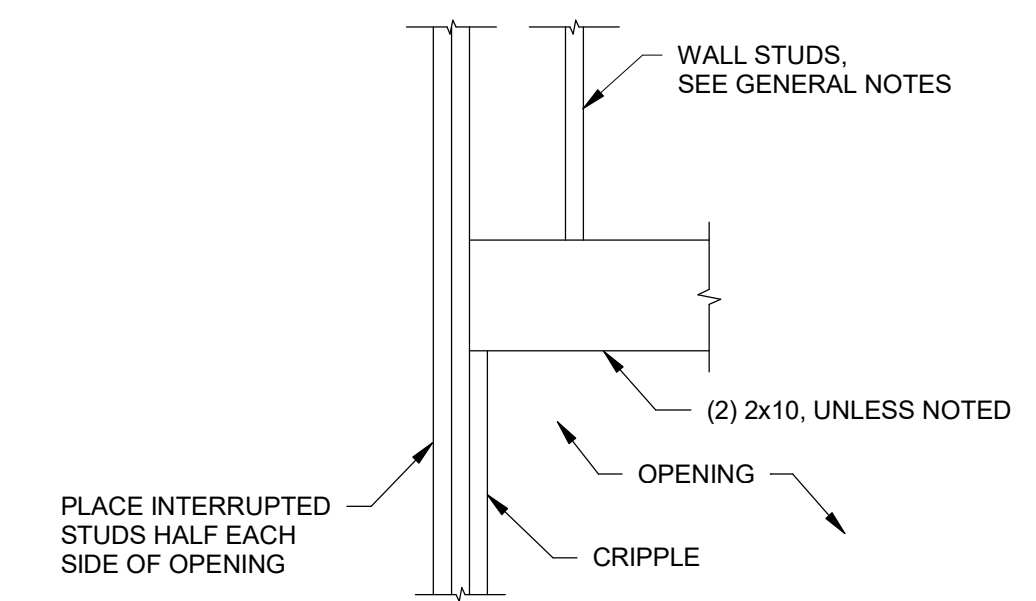
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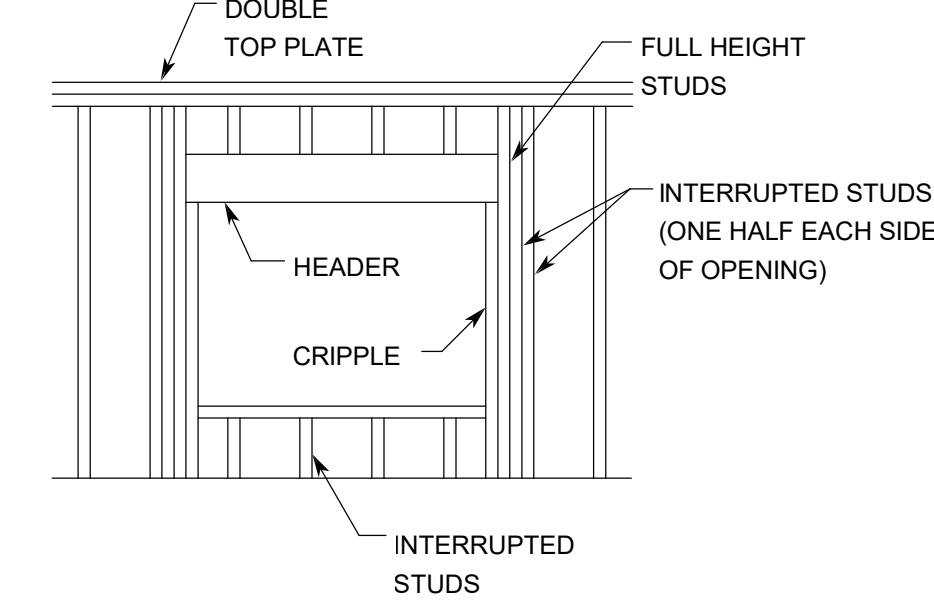
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OPENING FRAMING

TYPICAL
FOR LOAD BEARING WALLS WITH OPENINGS WIDER THAN 2'-8"



STUD PLACEMENT AT OPENINGS

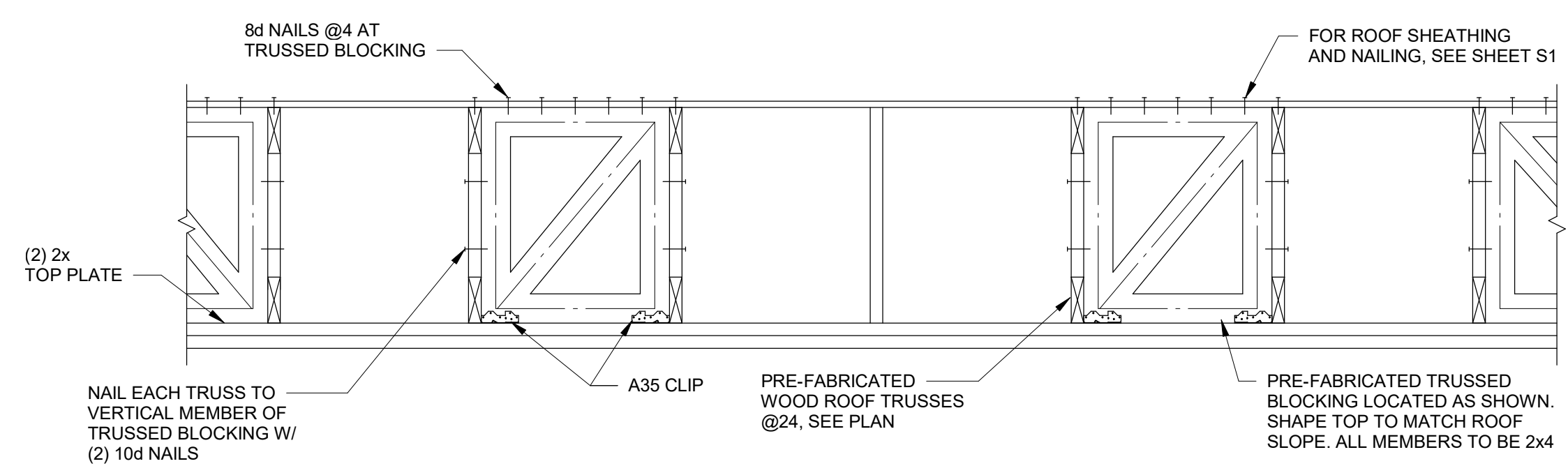
TYPICAL

COMPONENTS AND CLADDING WIND LOADS FOR WALLS (PSF)			
	EFFECTIVE WIND AREA (FT ²)	115 MPH WIND SPEED	
INT ZONE	10	36.0	-39.1
	20	34.4	-37.5
	50	32.3	-35.3
	100	30.6	-33.7
	500	26.9	-29.9
EDGE ZONE	10	36.0	-48.2
	20	34.4	-45.0
	50	32.3	-40.7
	100	30.6	-37.5
	500	26.9	-29.9

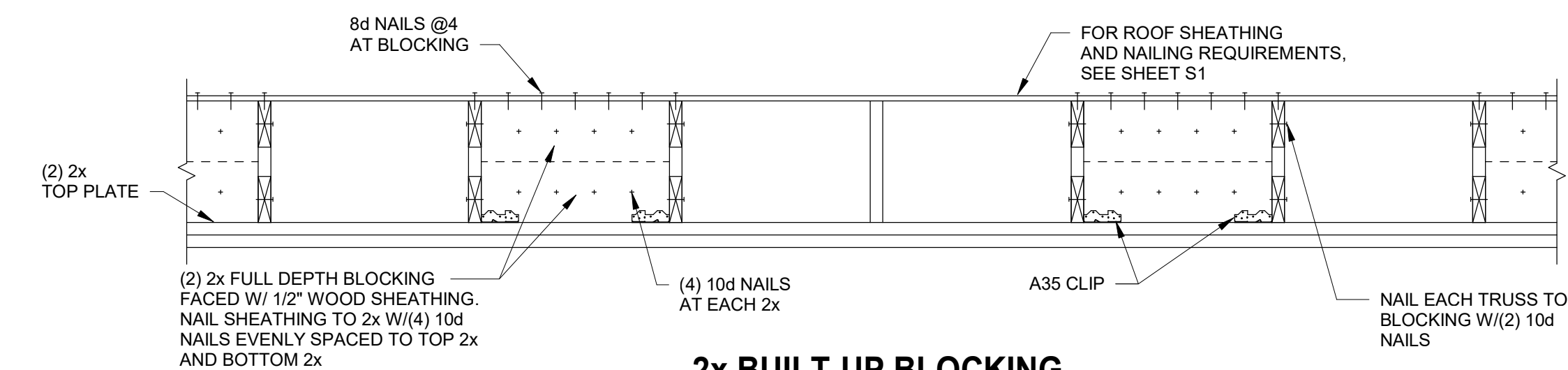
- NOTES:
- WIDTH OF EDGE STRIP a=5'-9".
 - VALUES SHOWN ABOVE HAVE BEEN ADJUSTED FOR BUILDING HEIGHT AND EXPOSURE ACCORDING TO ASCE 7-10 STANDARD FIGURE 30.5-1 AND IMPORTANCE FACTOR.
 - PLUS AND MINUS SIGNS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE BUILDING SURFACES.
 - EFFECTIVE WIND AREA IS THE SPAN LENGTH MULTIPLIED BY AN EFFECTIVE WIDTH THAT NEED NOT BE LESS THAN ONE-THIRD THE SPAN LENGTH.
 - WIND PRESSURES IN THESE TABLES SHALL BE MULTIPLIED BY 0.6 TO OBTAIN NOMINAL WIND PRESSURES.

COMPONENTS AND CLADDING WIND LOADS FOR ROOF (PSF)			
	EFFECTIVE WIND AREA (FT ²)	115 MPH WIND SPEED	
INT ZONE (1)	10	20.8	-33.0
	20	18.9	-32.1
	50	16.5	-30.9
	100	16.0	-29.9
EDGE ZONE (2)	10	20.8	-57.4
	20	18.9	-52.8
	50	16.5	-46.7
	100	16.0	-42.1
CORNER ZONE (3)	10	20.8	-84.8
	20	18.9	-79.3
	50	16.5	-72.0
	100	16.0	-66.5

- NOTES:
- WIDTH OF EDGE STRIP a=5'-9".
 - VALUES SHOWN ABOVE HAVE BEEN ADJUSTED FOR BUILDING HEIGHT AND EXPOSURE ACCORDING TO ASCE 7-10 STANDARD FIGURE 30.5-1 AND IMPORTANCE FACTOR.
 - PLUS AND MINUS SIGNS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE BUILDING SURFACES.
 - EFFECTIVE WIND AREA IS THE SPAN LENGTH MULTIPLIED BY AN EFFECTIVE WIDTH THAT NEED NOT BE LESS THAN ONE-THIRD THE SPAN LENGTH.
 - CONSIDER 5 PSF MINIMUM DEAD LOAD FOR UPLIFT CALCULATIONS FOR ROOF JOISTS AND 2 PSF MINIMUM DEAD LOAD FOR UPLIFT CALCULATIONS FOR ROOF DECK.
 - WIND PRESSURES IN THESE TABLES SHALL BE MULTIPLIED BY 0.6 TO OBTAIN NOMINAL WIND PRESSURES.
 - RIDGE AND HIPS ARE CONSIDERED TO BE EDGE ZONES.



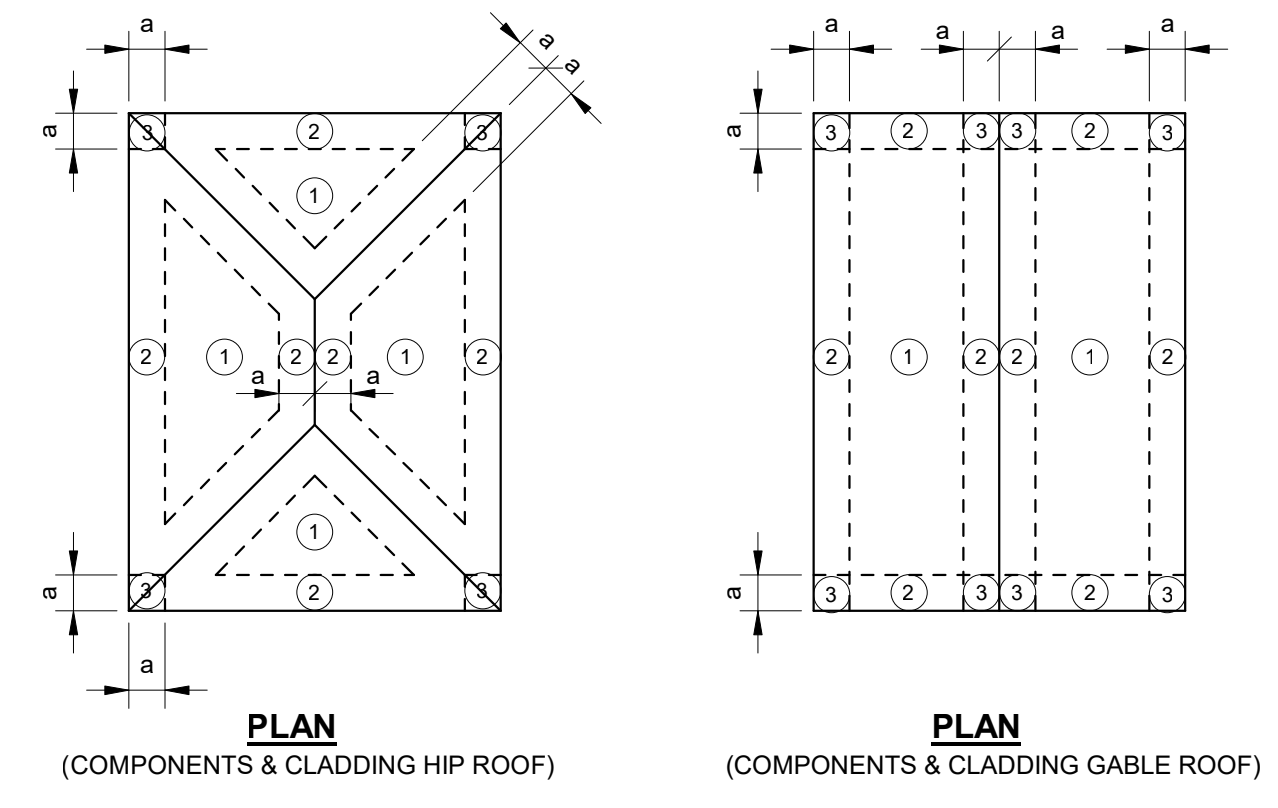
TRUSSED BLOCKING



2x BUILT-UP BLOCKING

TRUSS BLOCKING AT EXTERIOR WALL

TYPICAL
NOTE: CONTRACTORS OPTION TO USE EITHER TRUSSED BLOCKING OR 2x BUILTUP BLOCKING AT AREAS WHERE TRUSS HEEL HEIGHT EXCEEDS THAT WHICH TYPICAL 2x SOLID DEPTH BLOCKING IS PRACTICAL.



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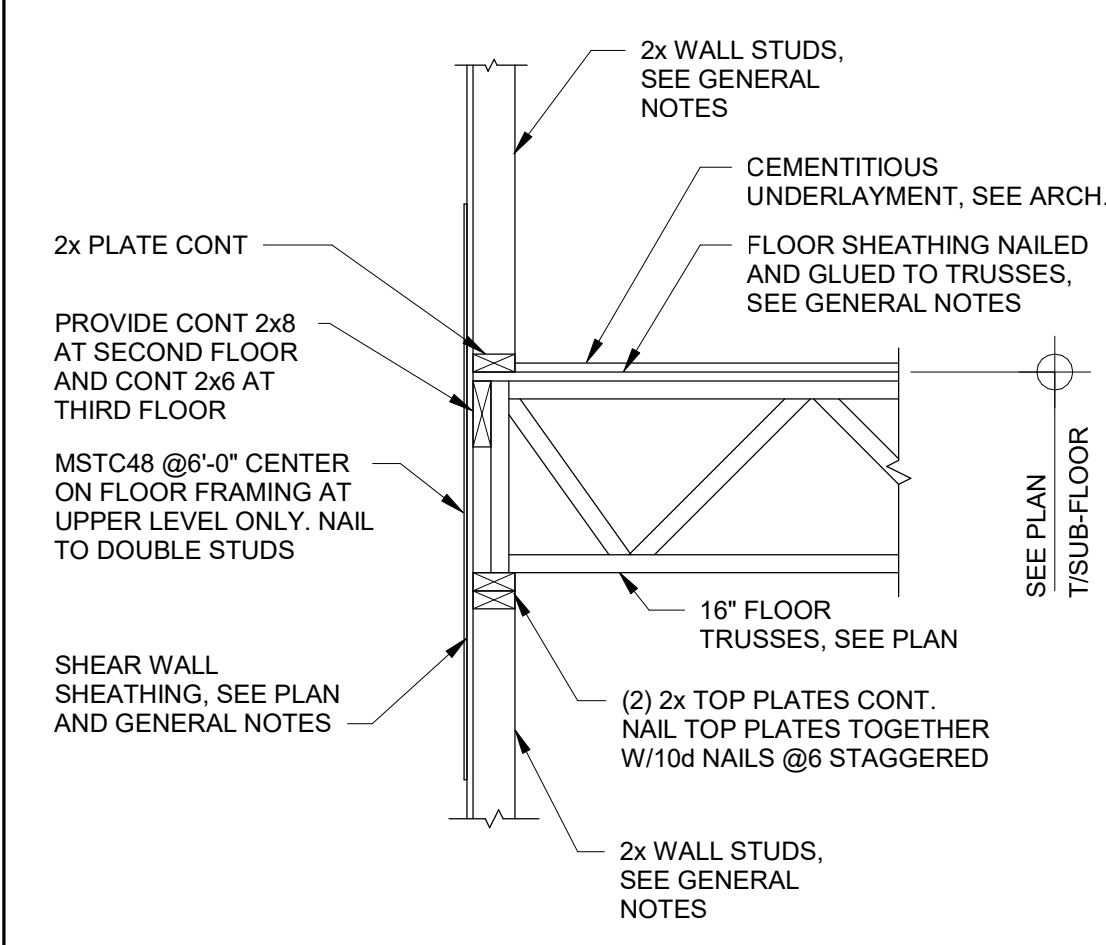
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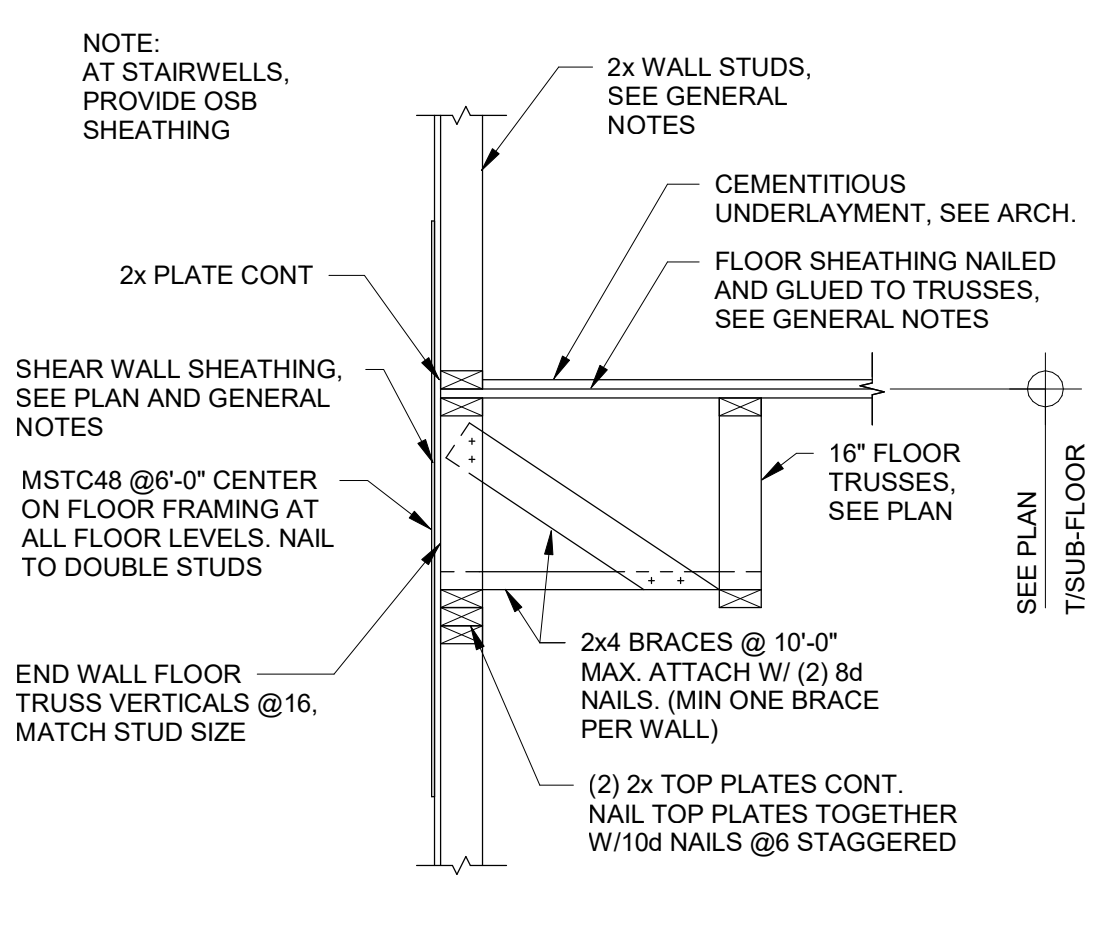
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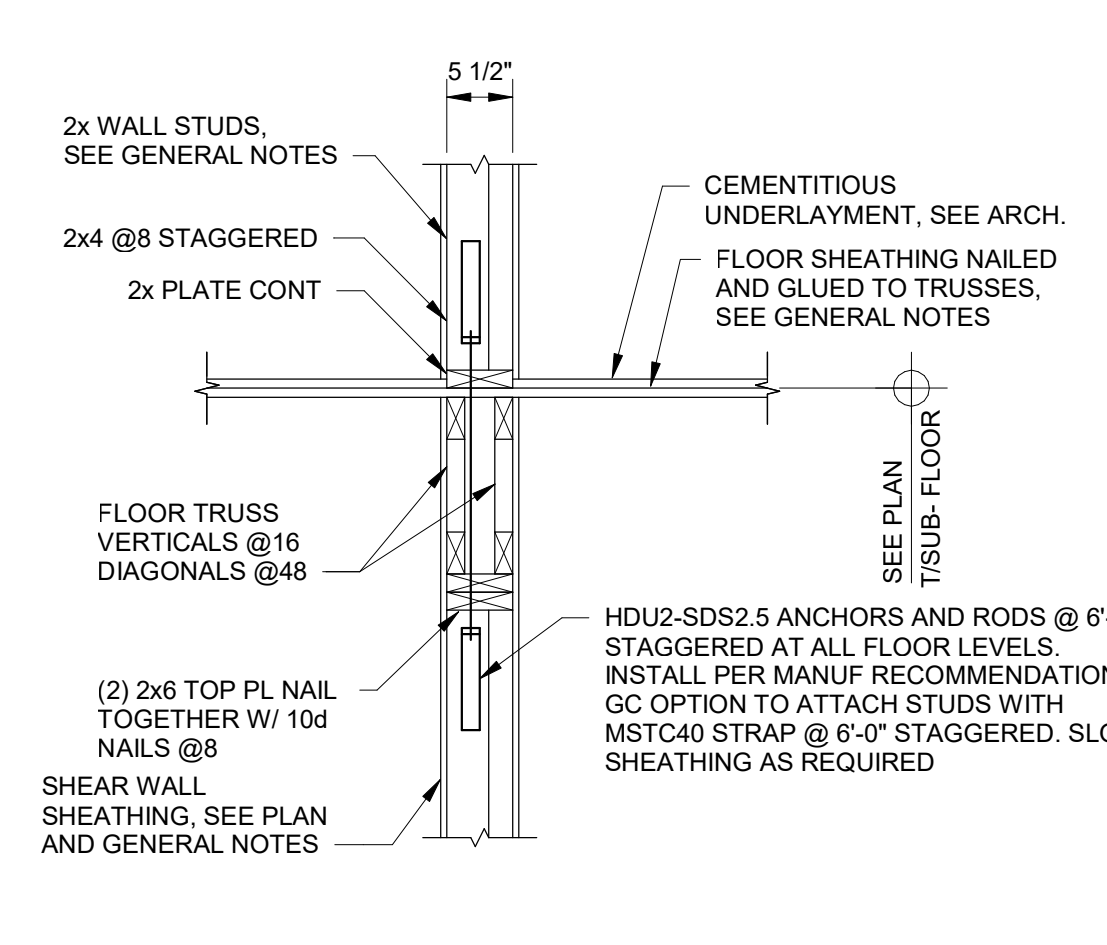
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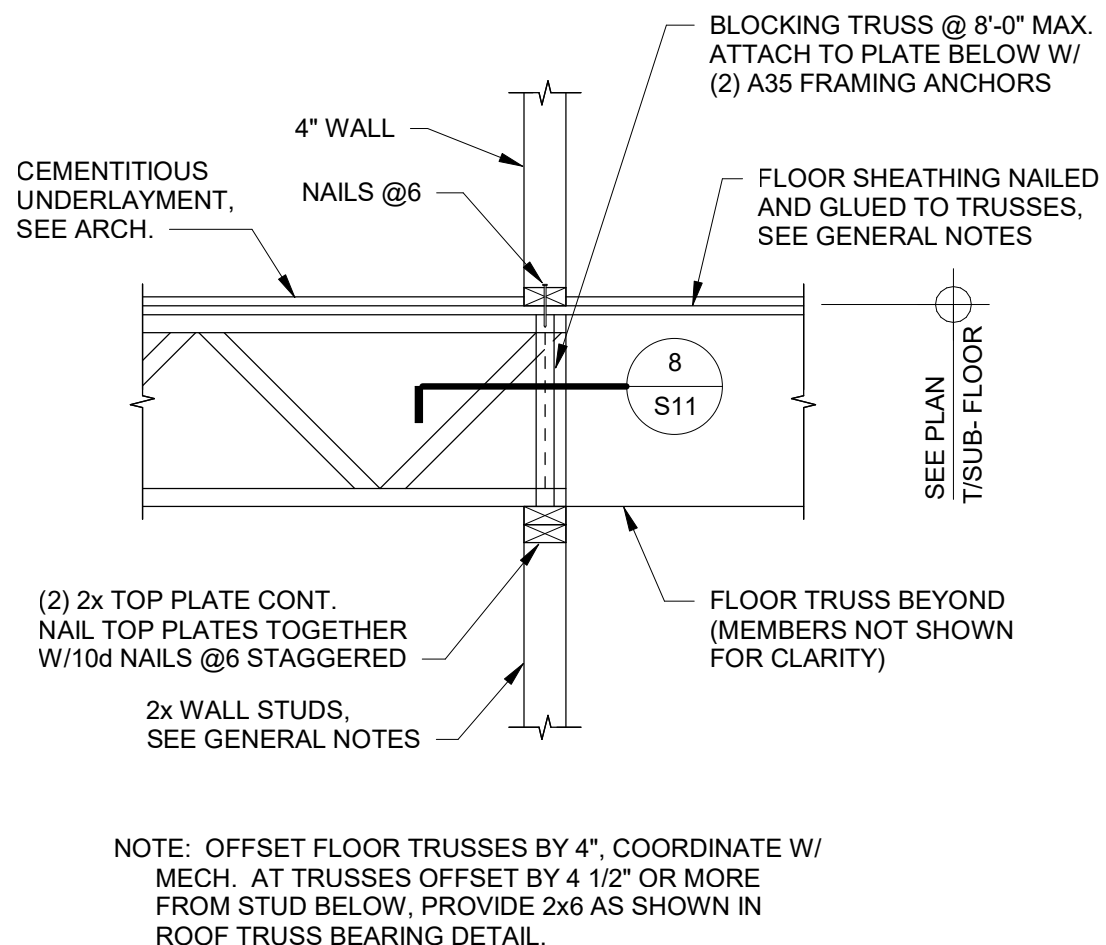
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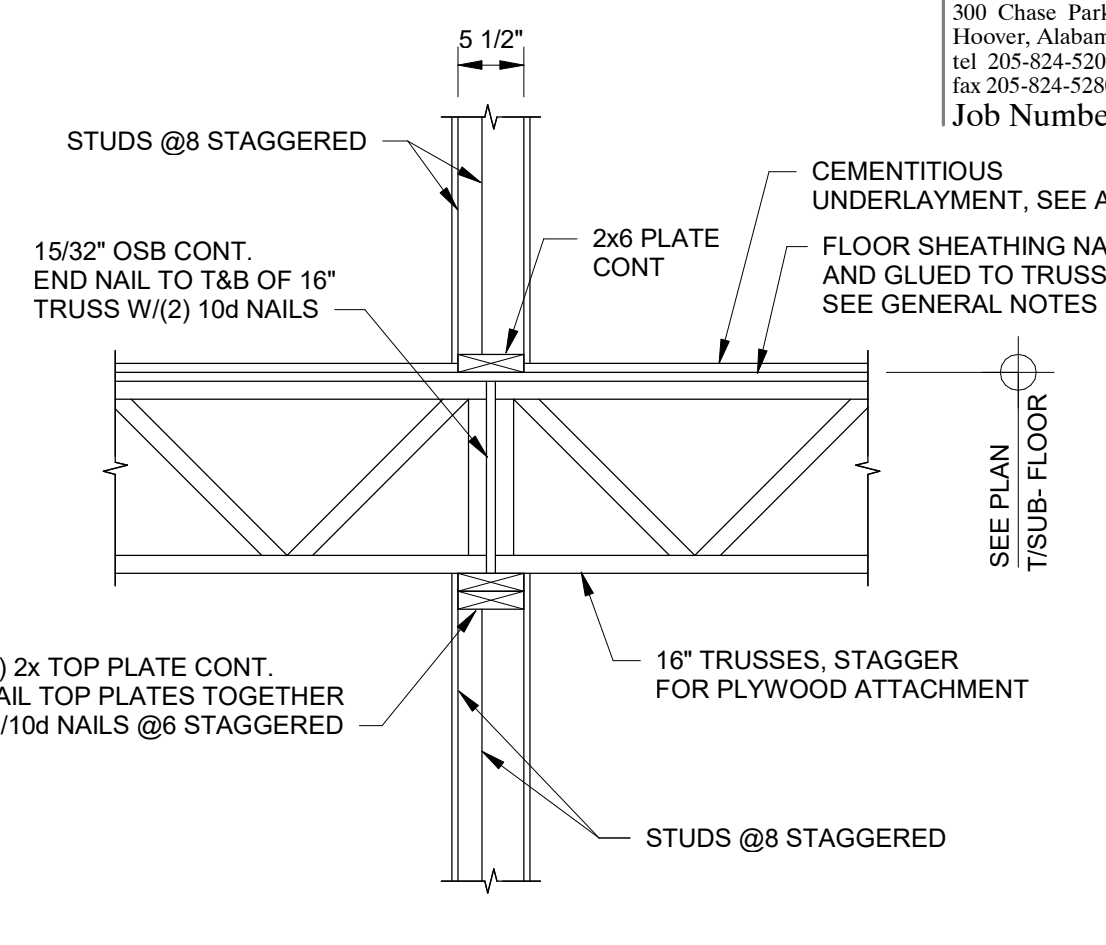
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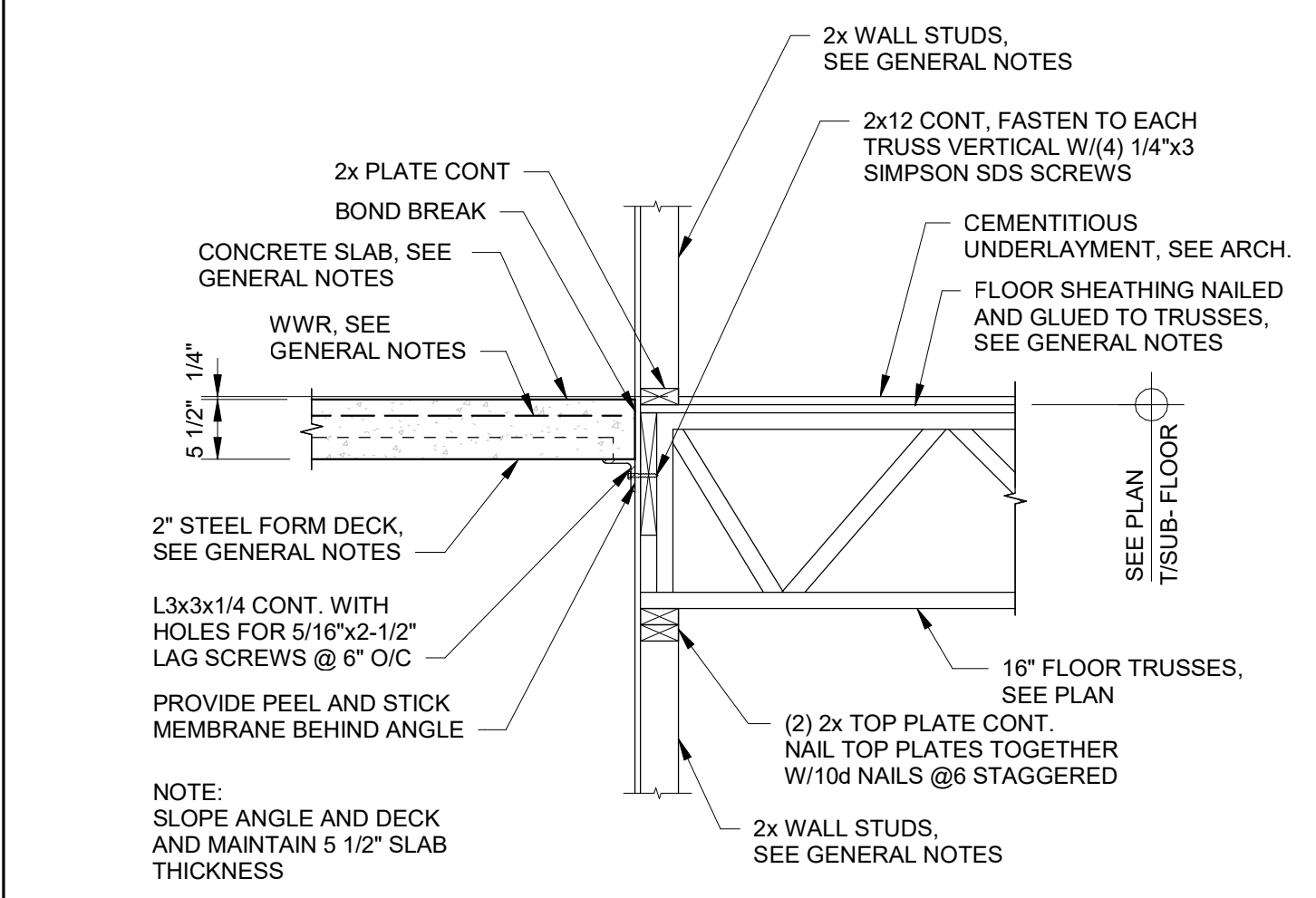
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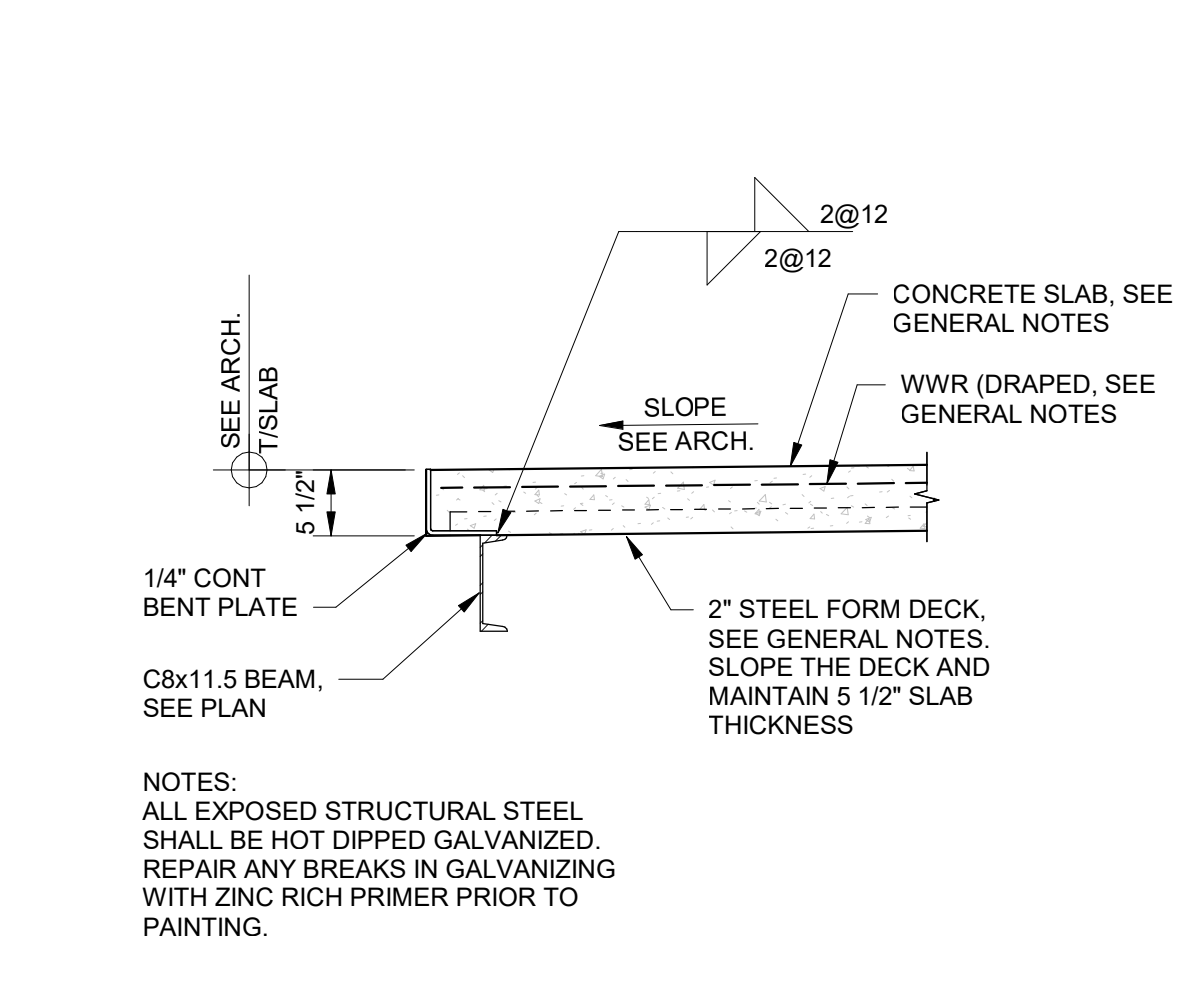
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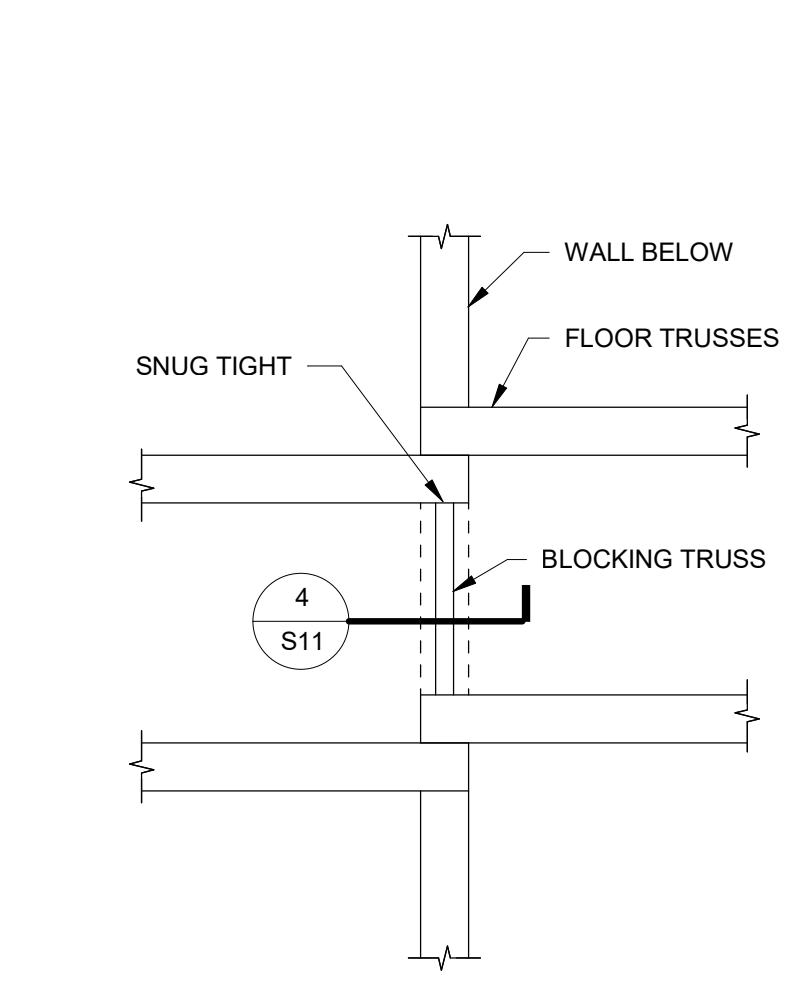
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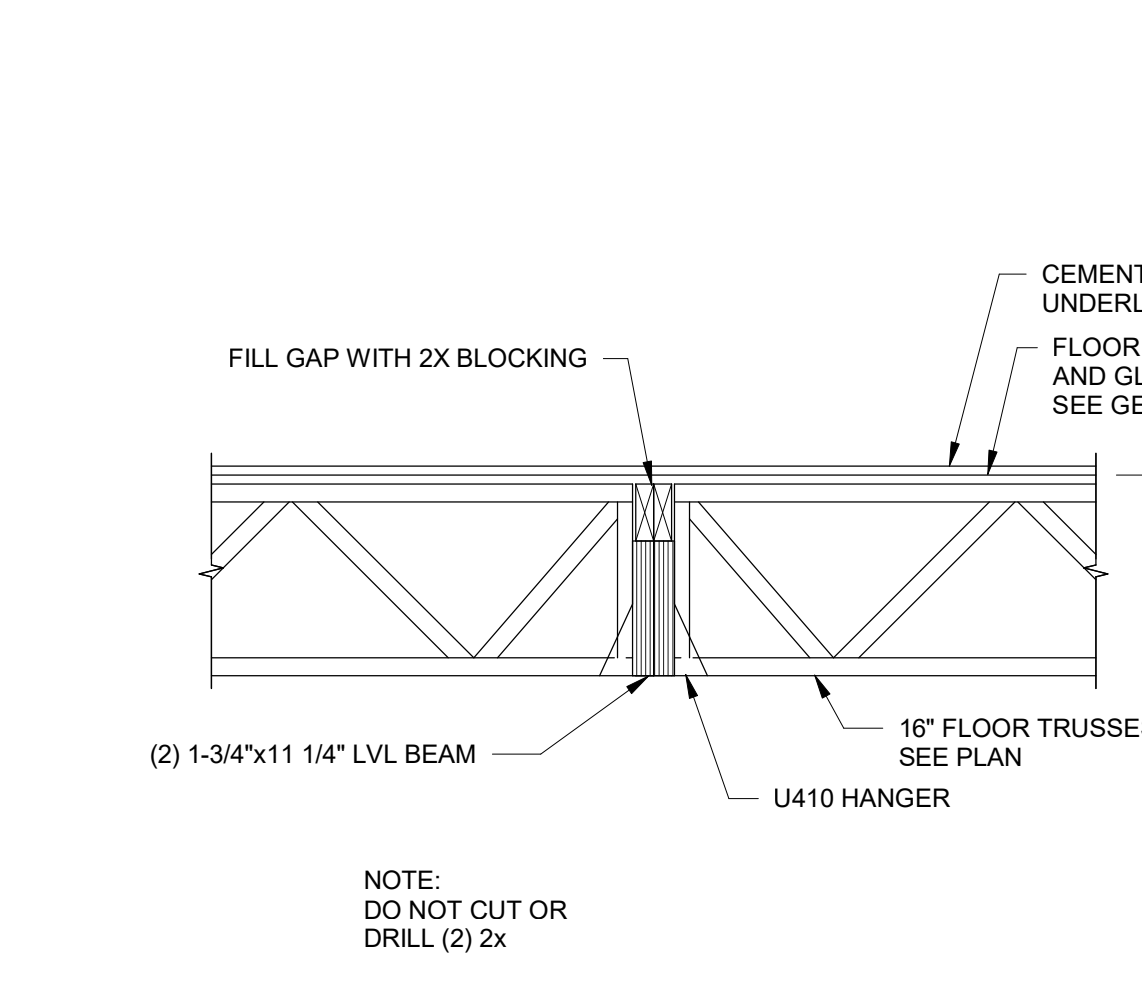
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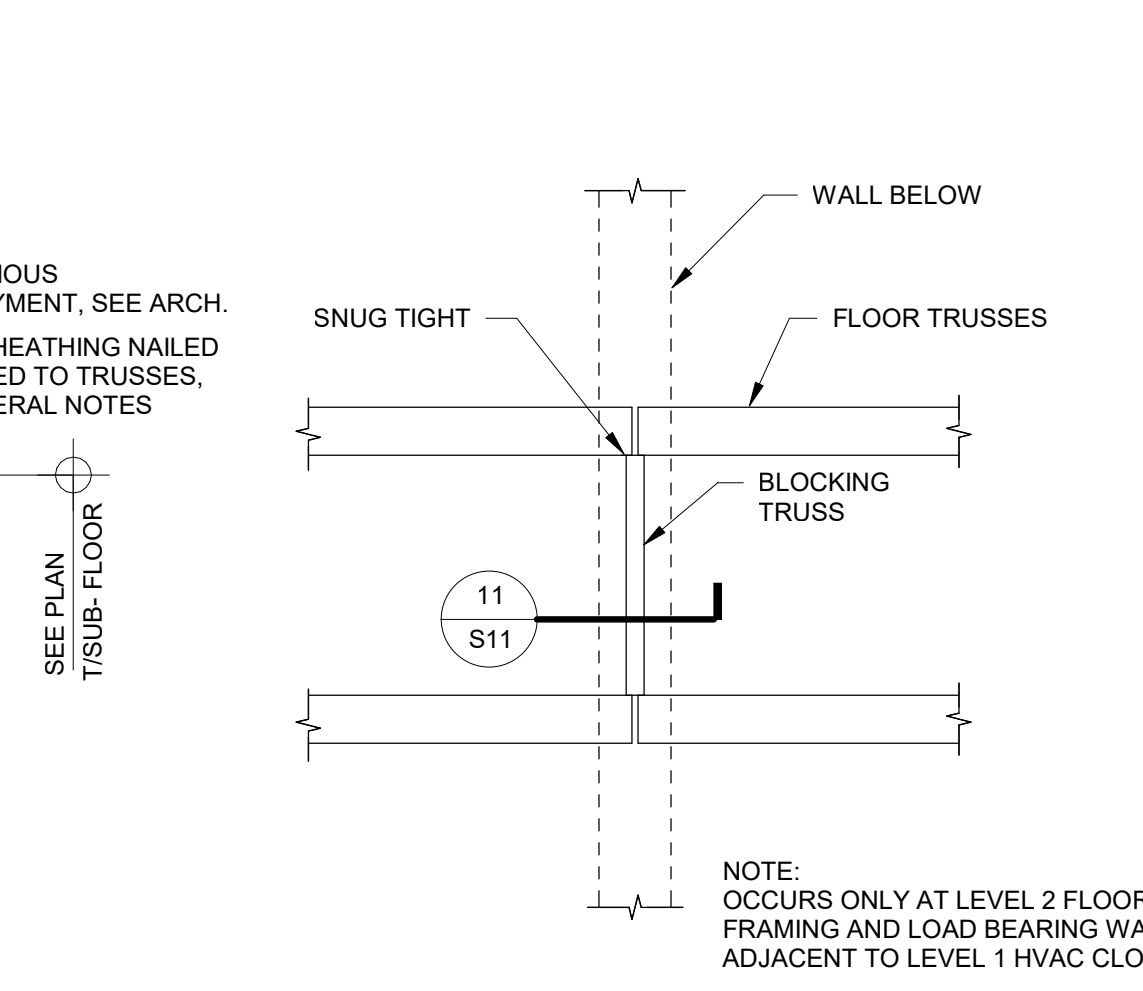
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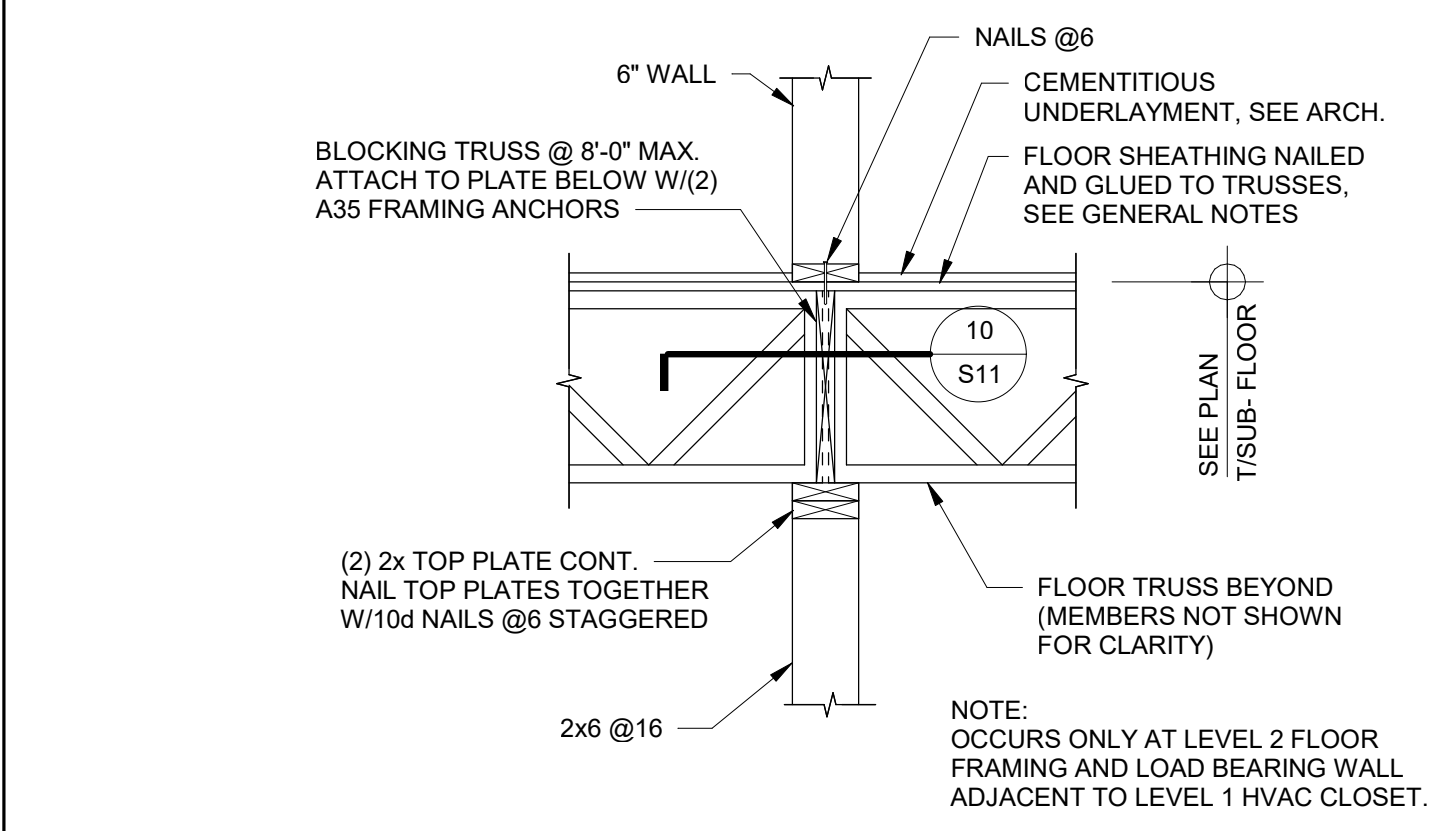
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3/4" = 1'-0"



SECTION 9
3/4" = 1'-0"



SECTION 10
3/4" = 1'-0"



SECTION 11
3/4" = 1'-0"

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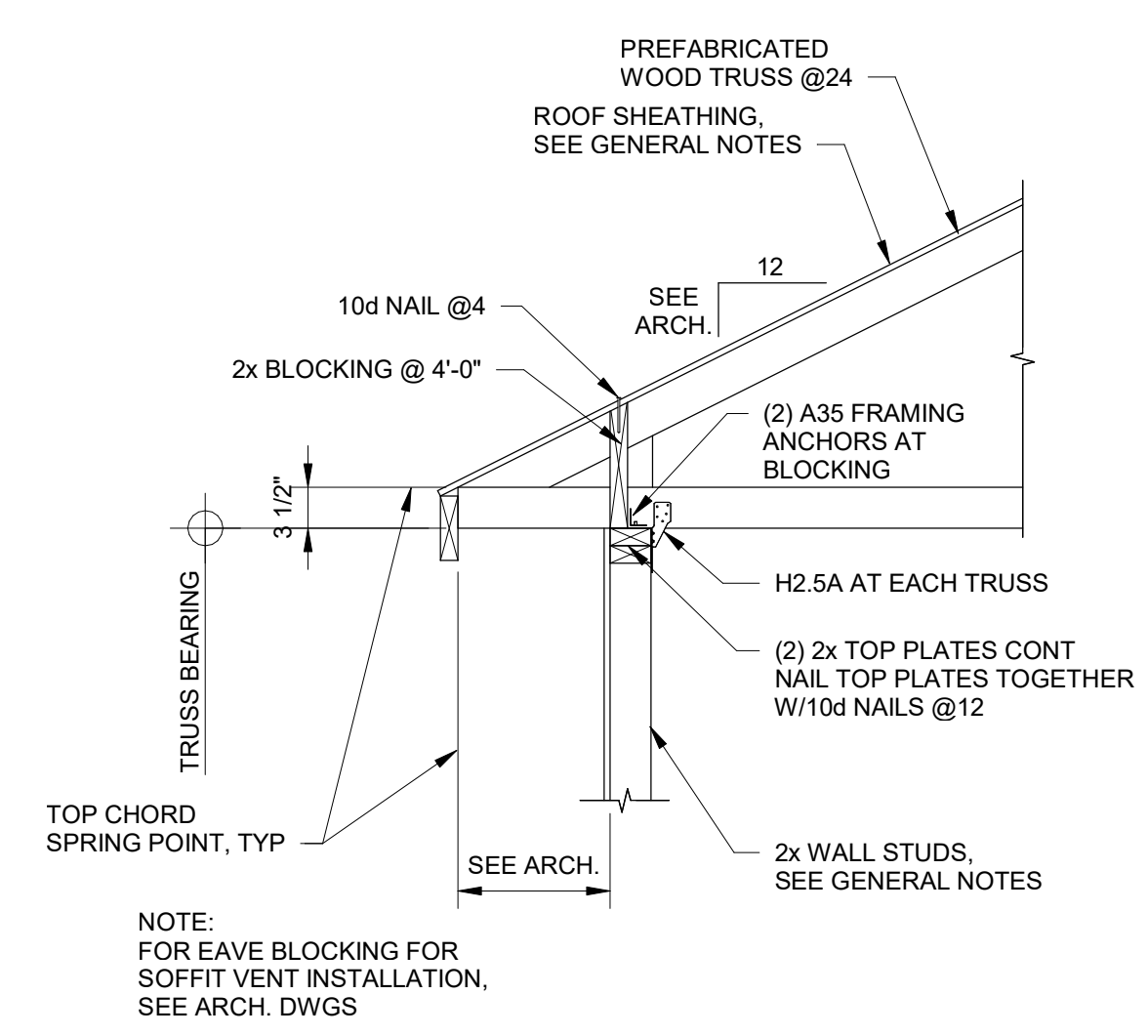
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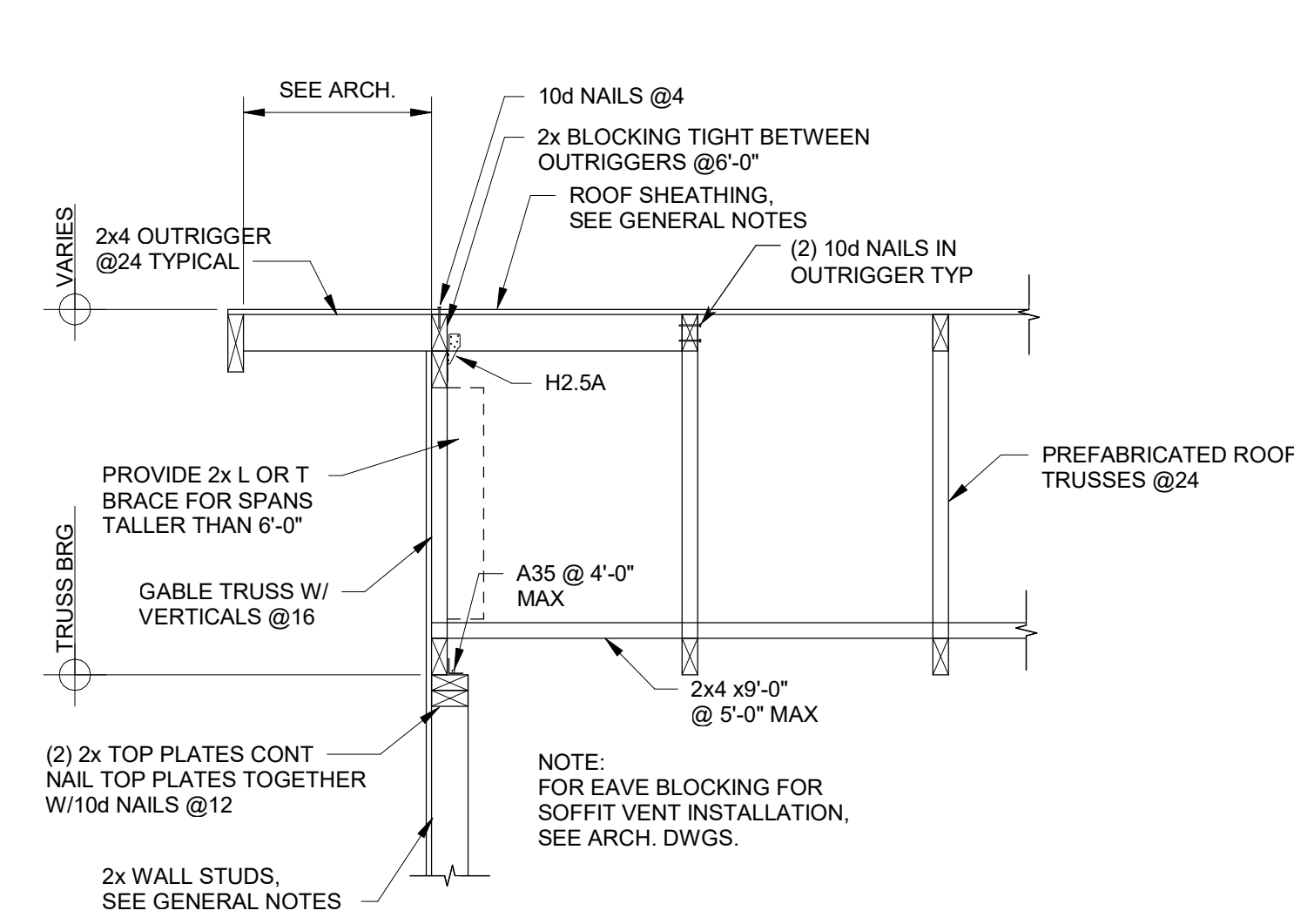
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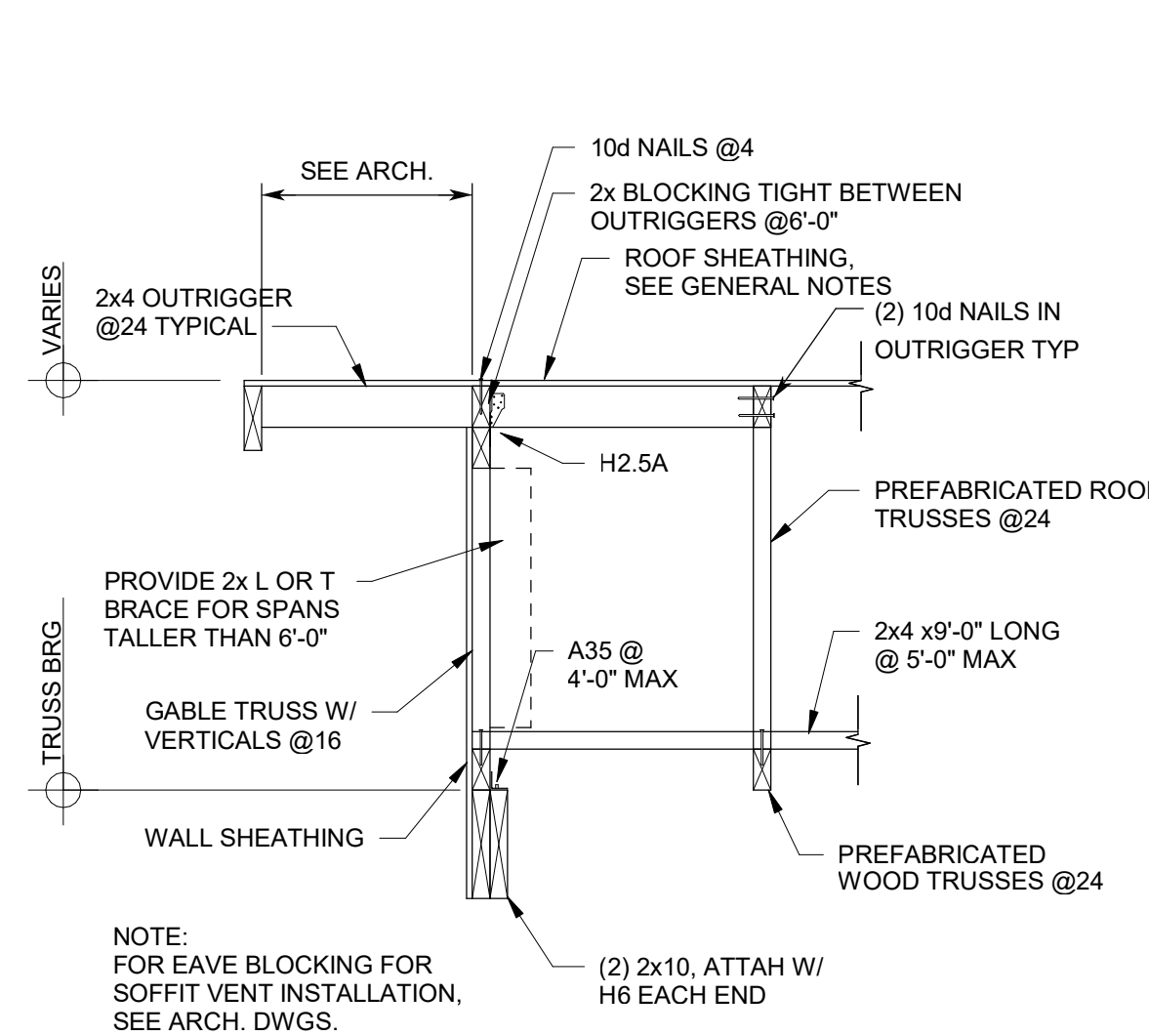
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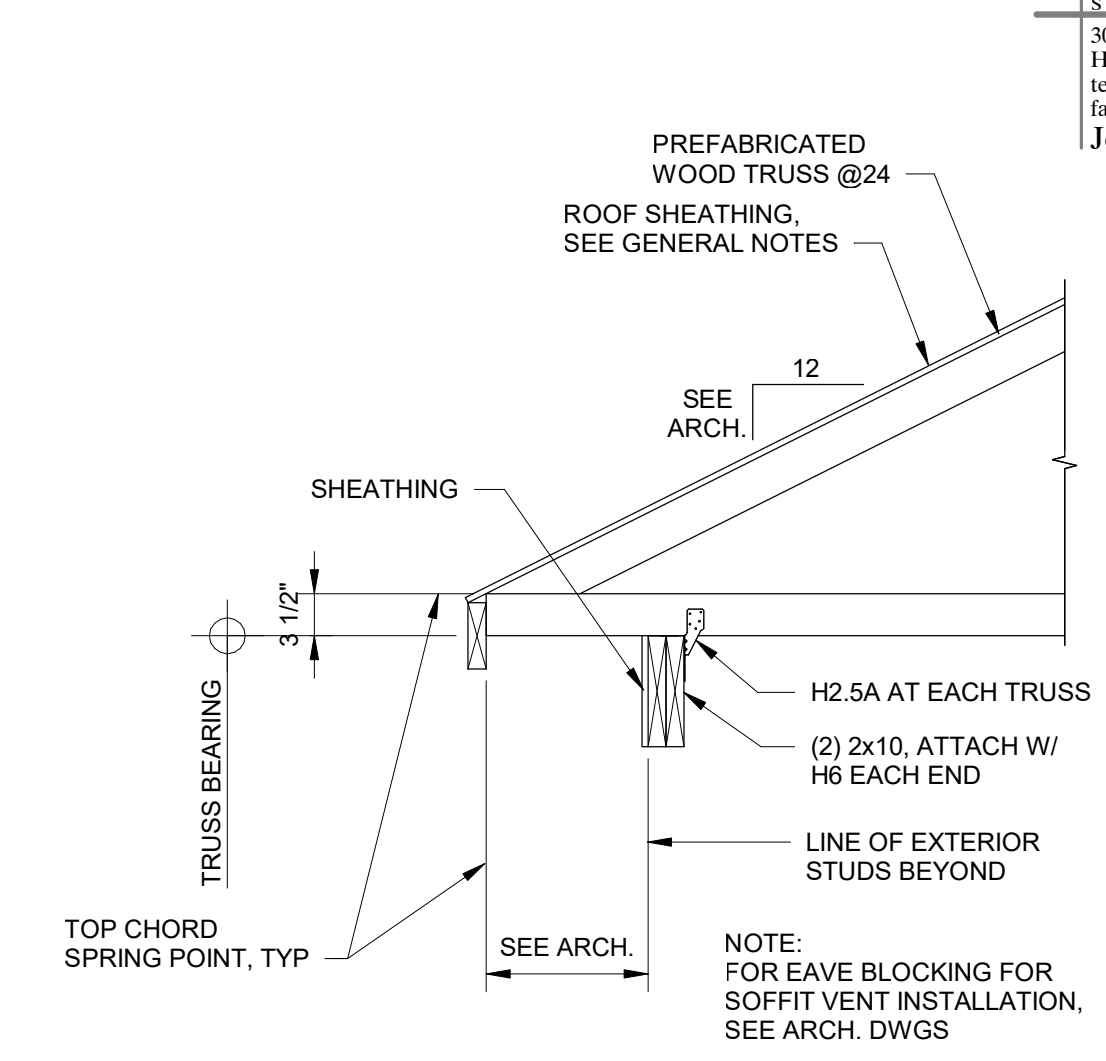
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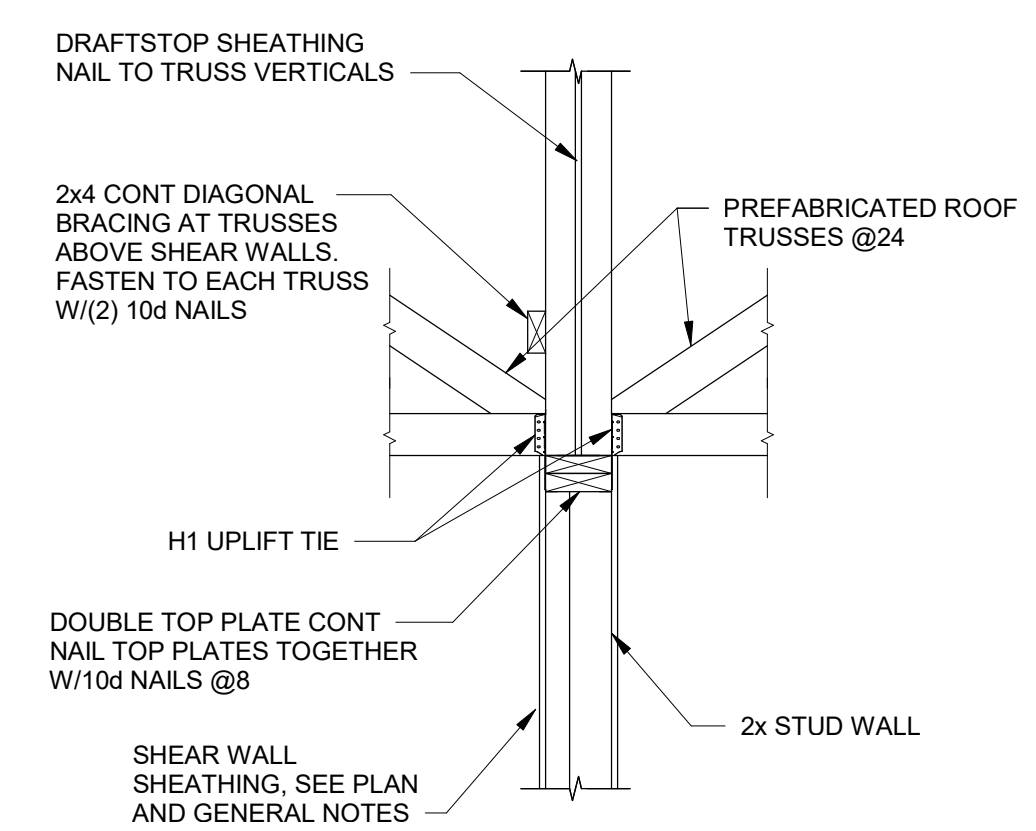
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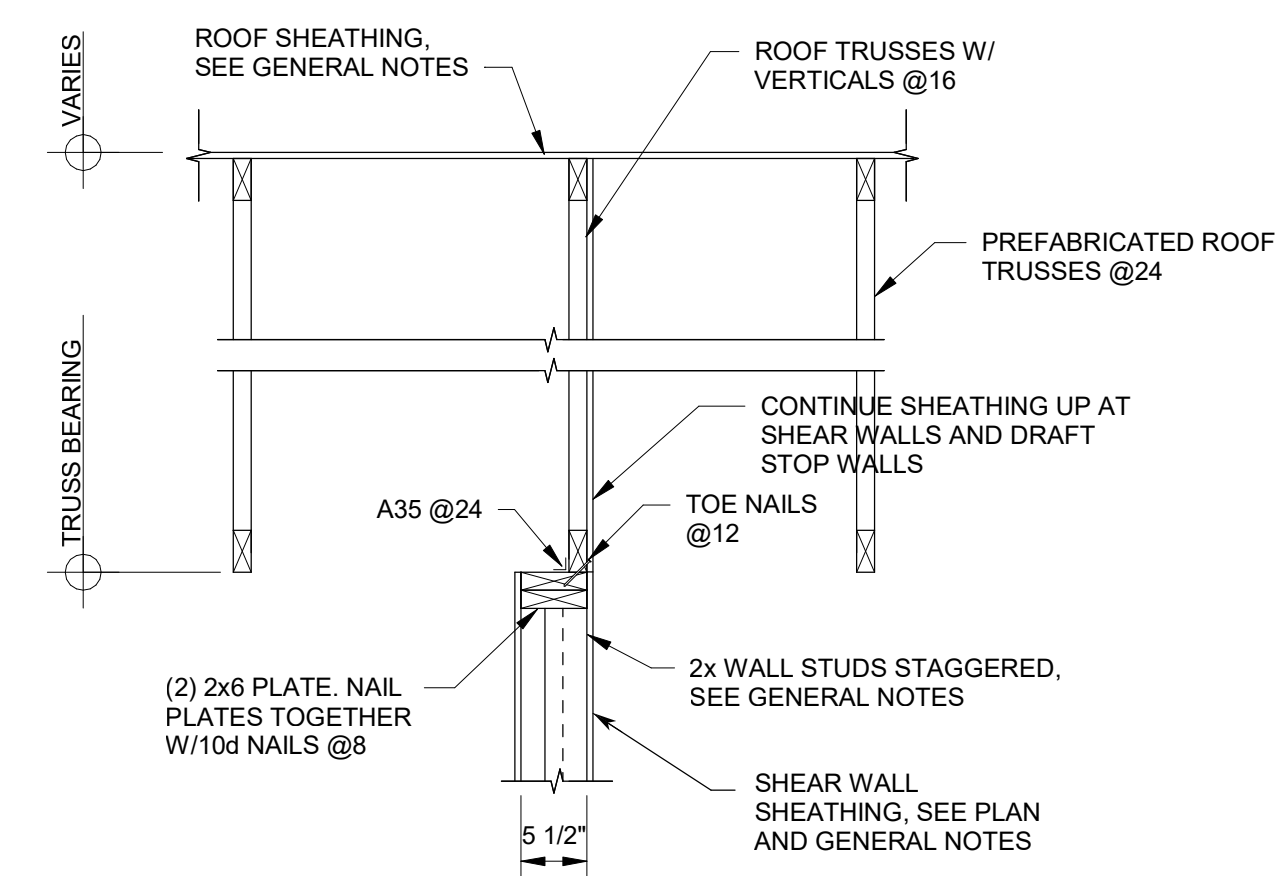
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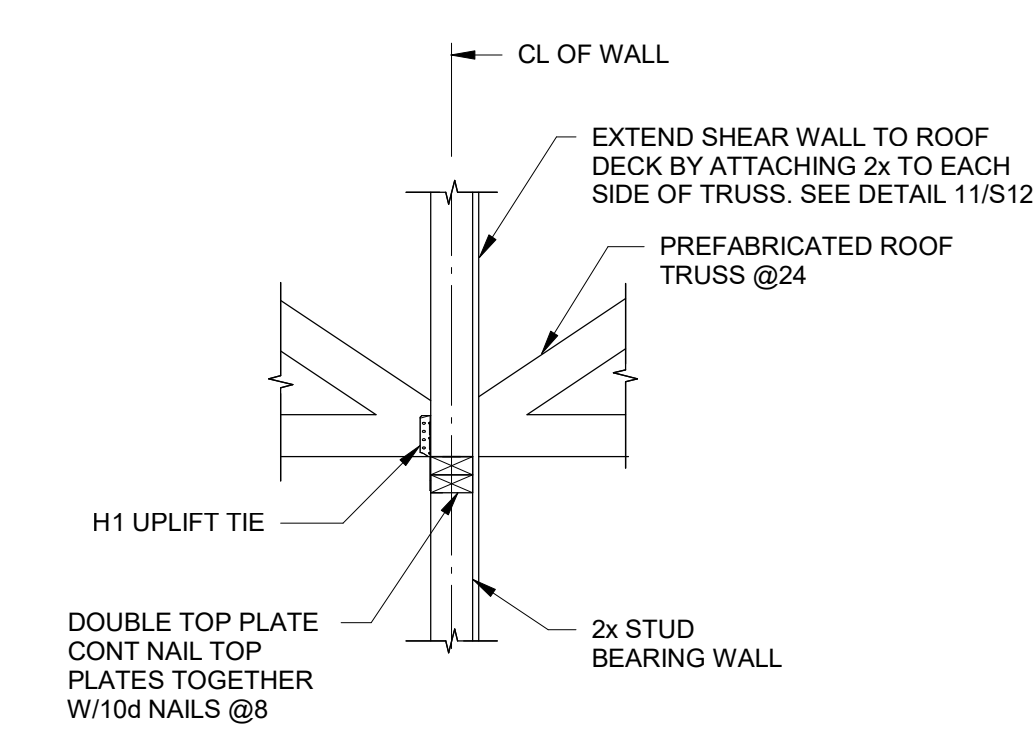
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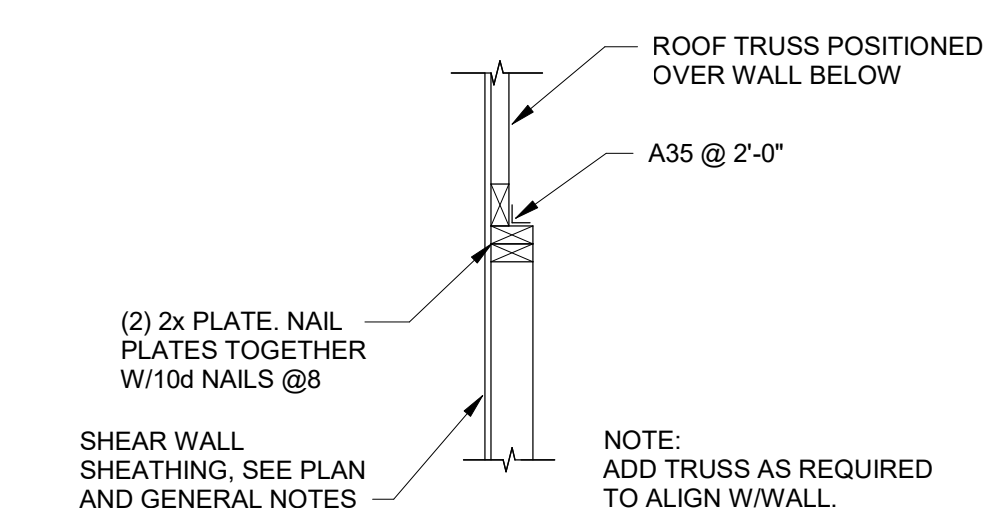
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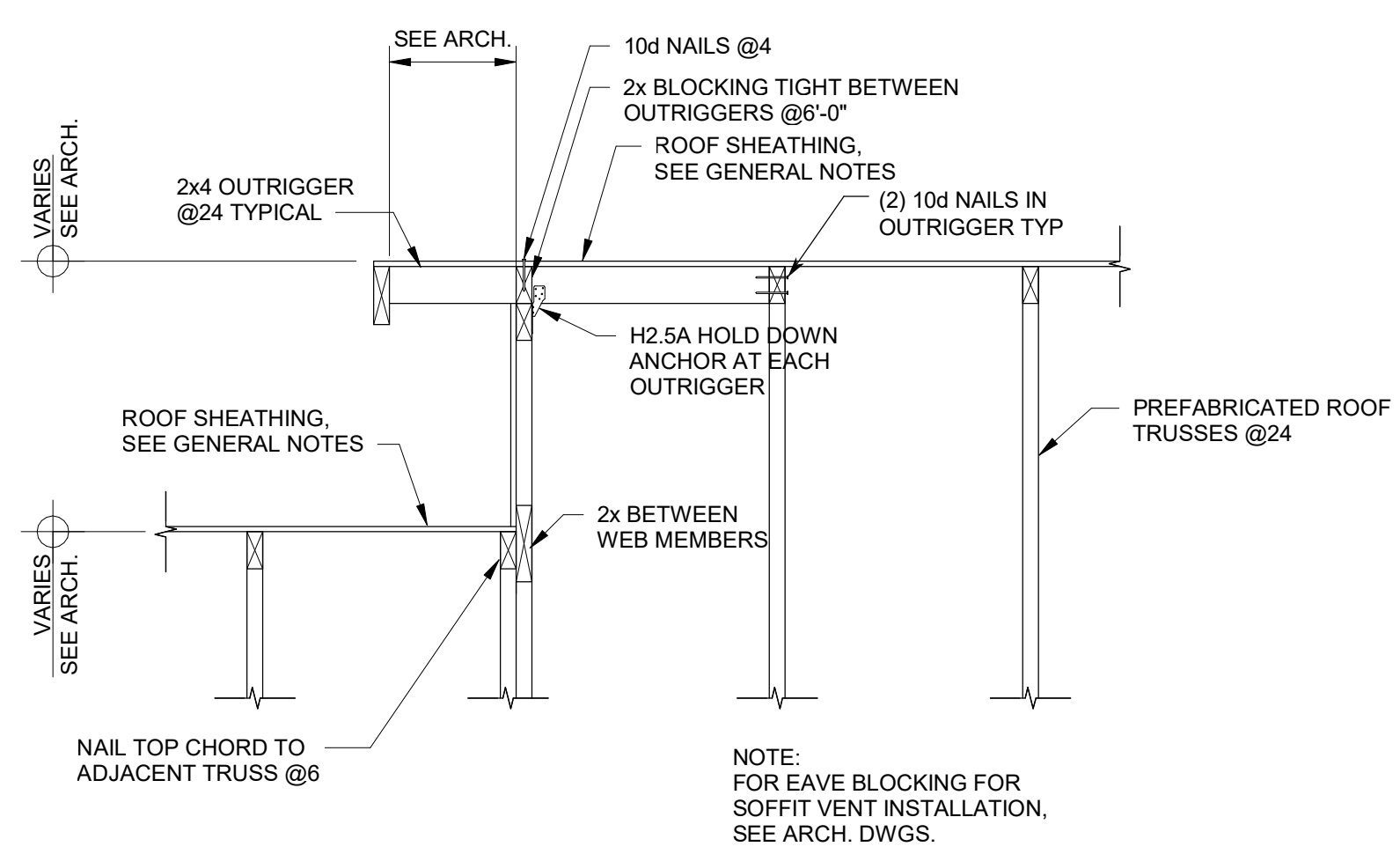
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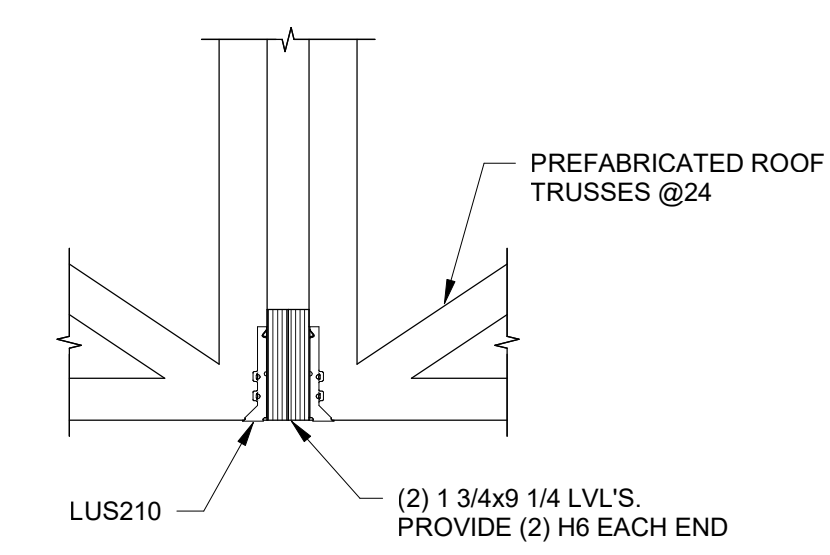
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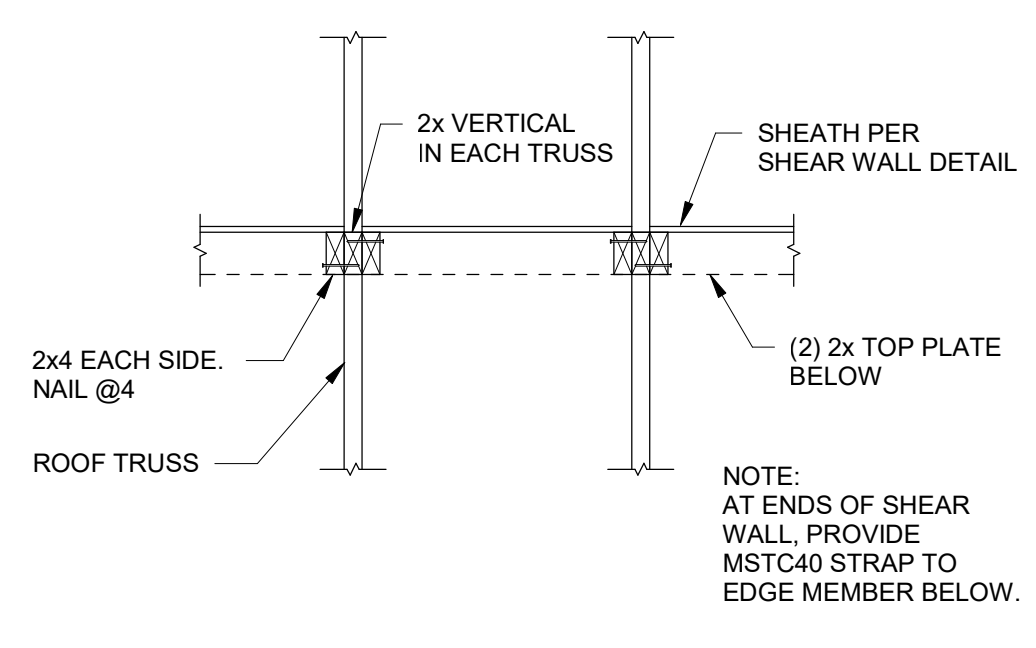
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SECTION 9
 3/4" = 1'-0"



SECTION 10
 3/4" = 1'-0"



SECTION 11
 3/4" = 1'-0"

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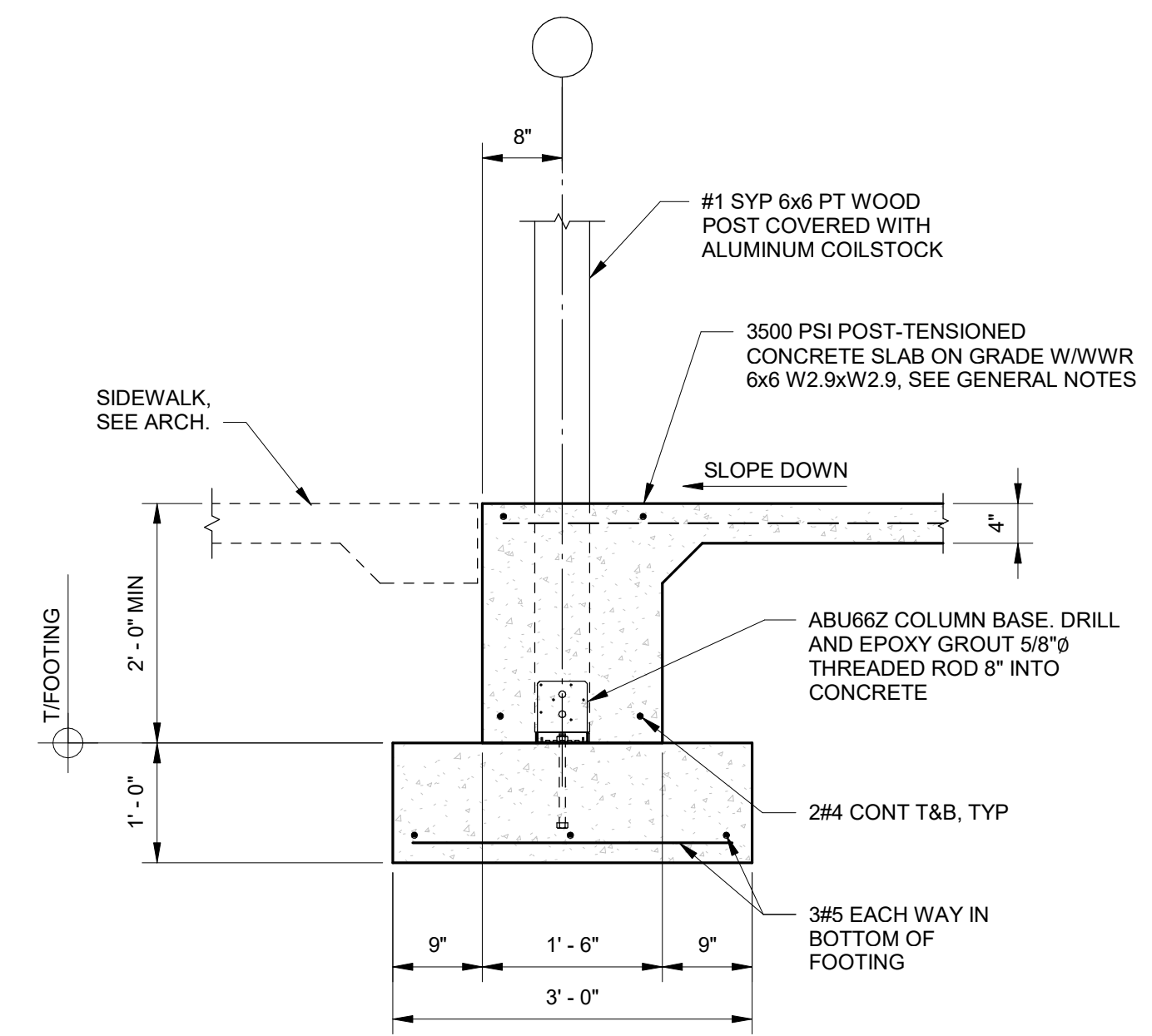
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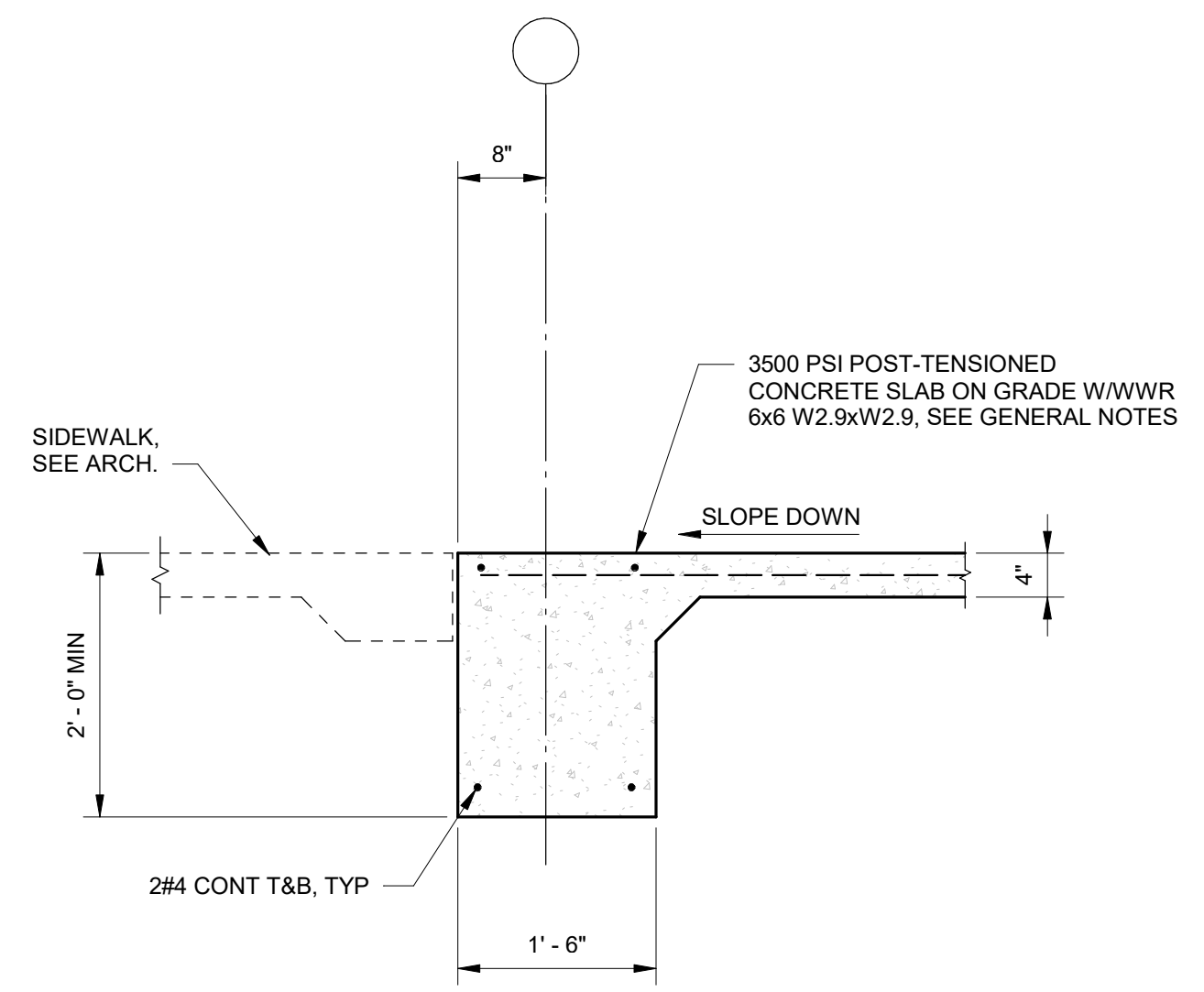
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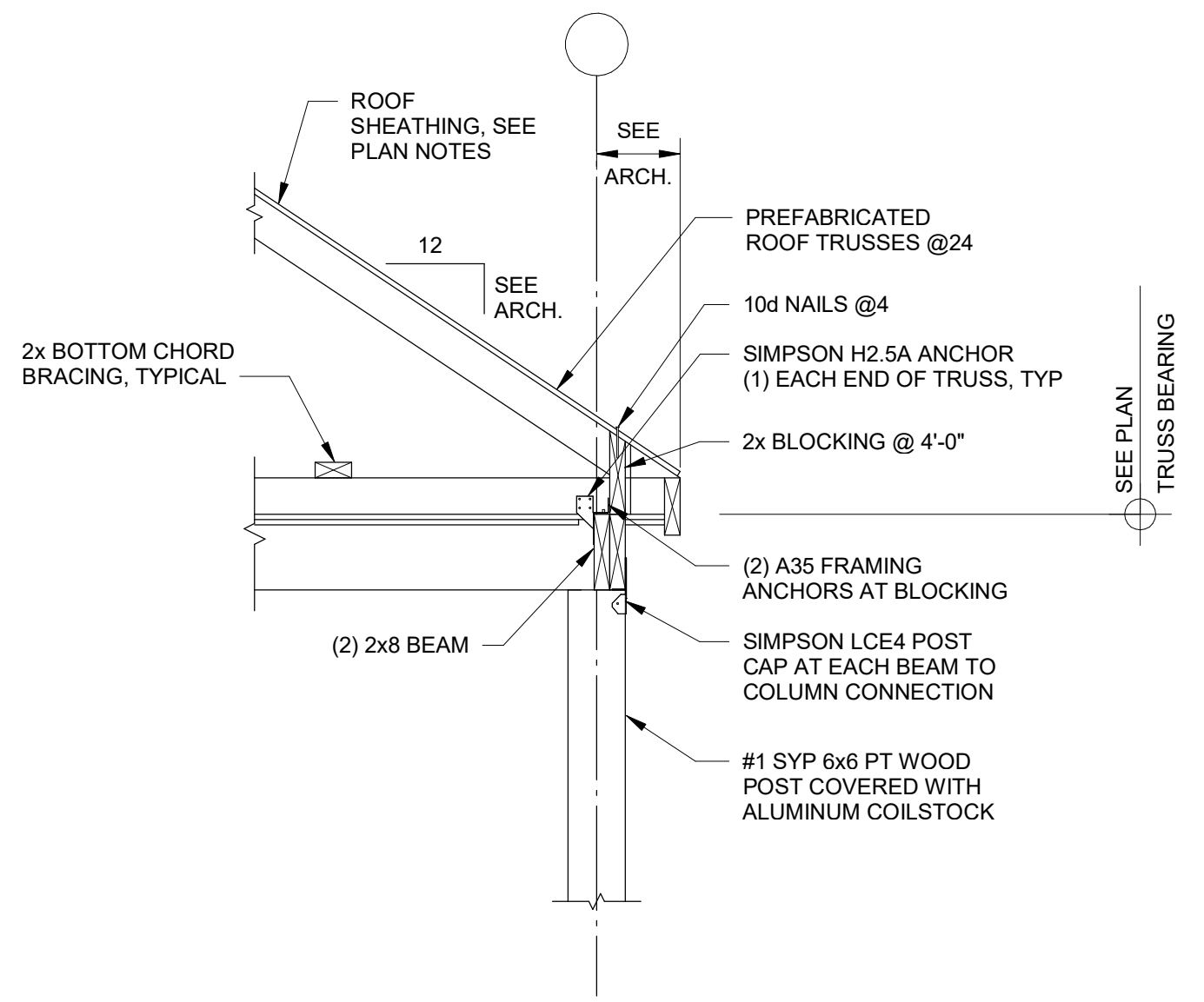
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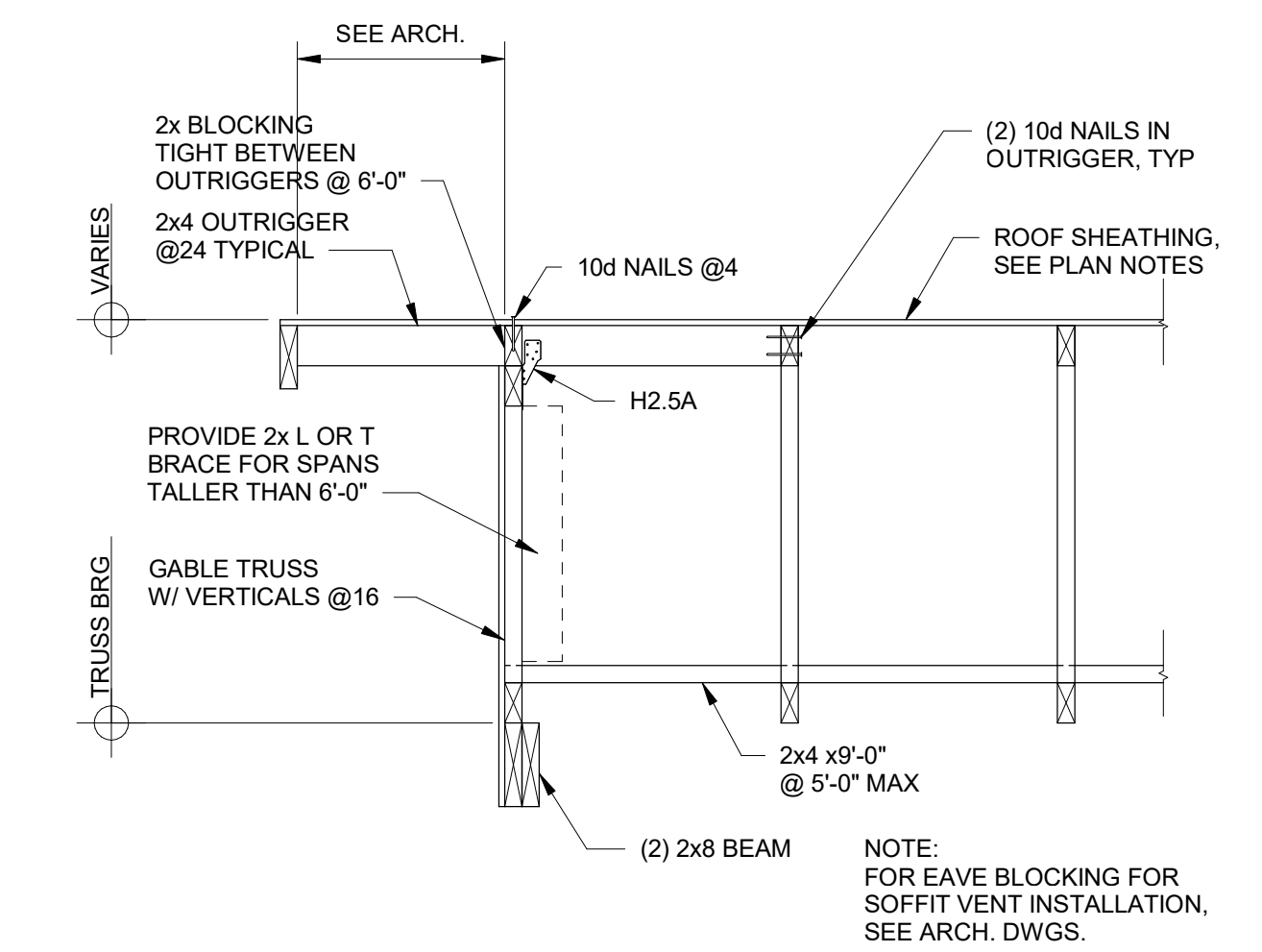
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S13



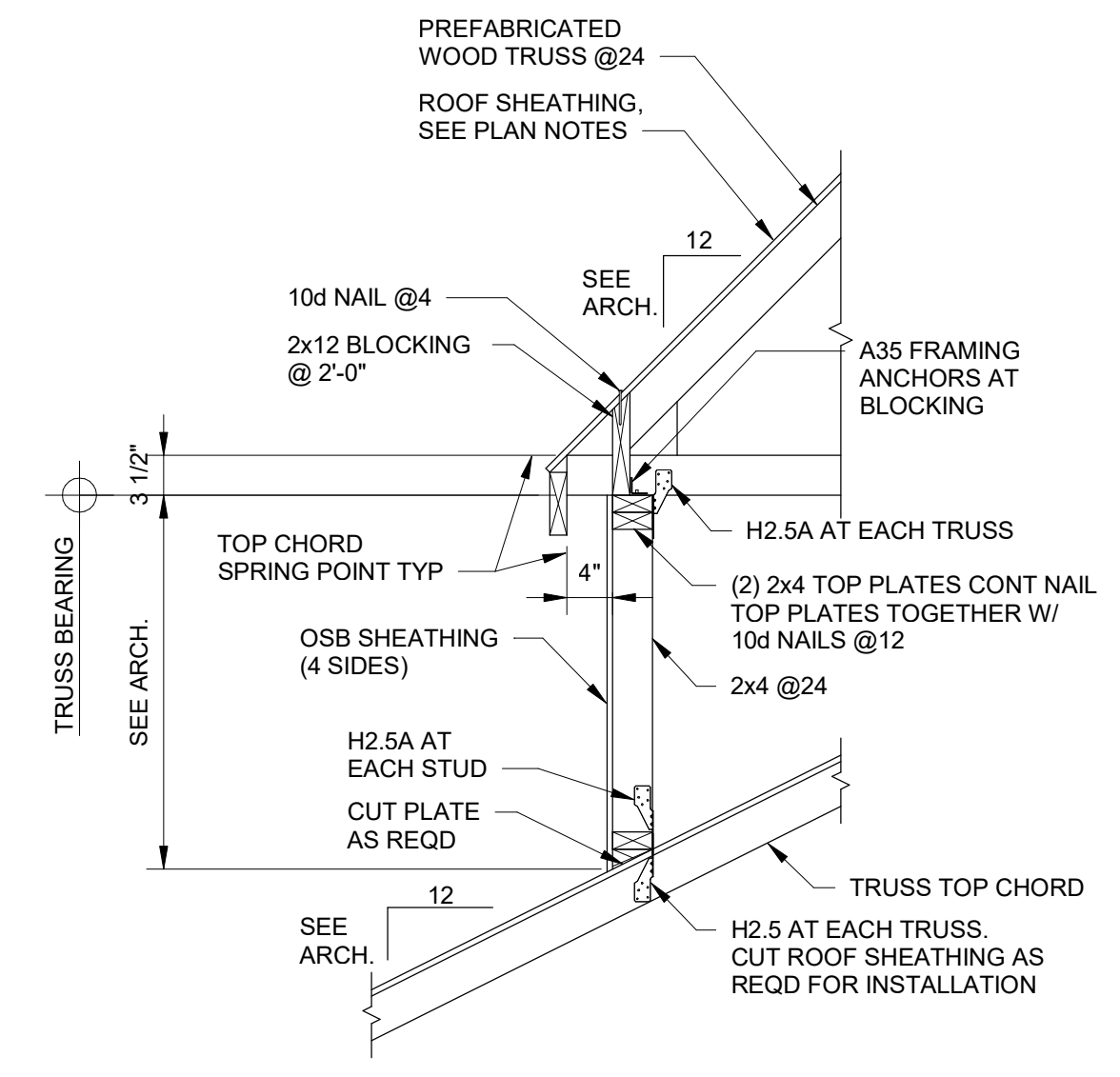
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S13



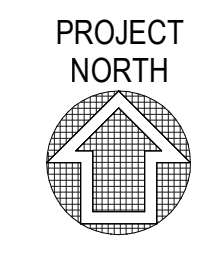
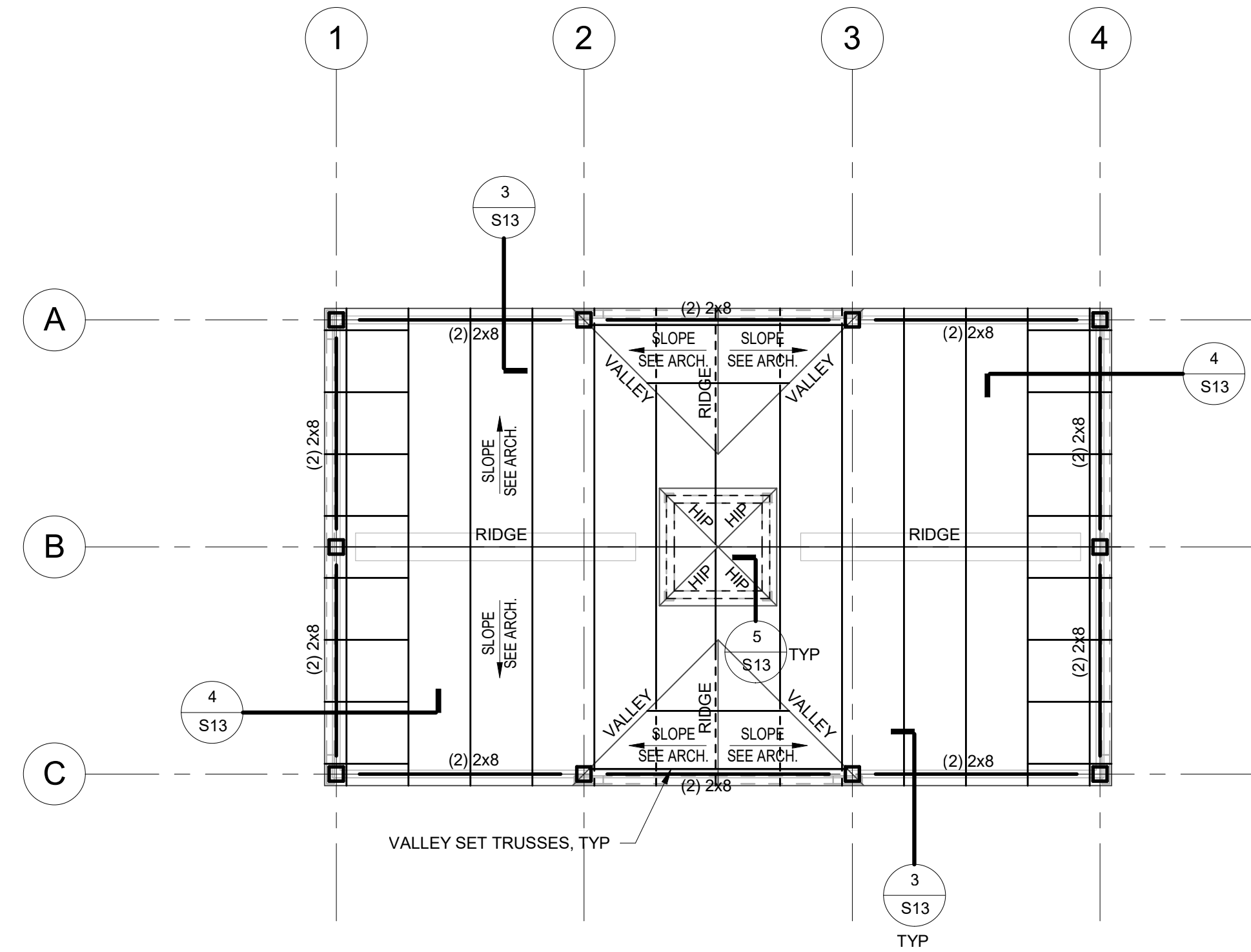
SECTION 3
3/4" = 1'-0"
S13



SECTION 4
3/4" = 1'-0"
S13

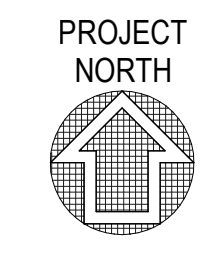
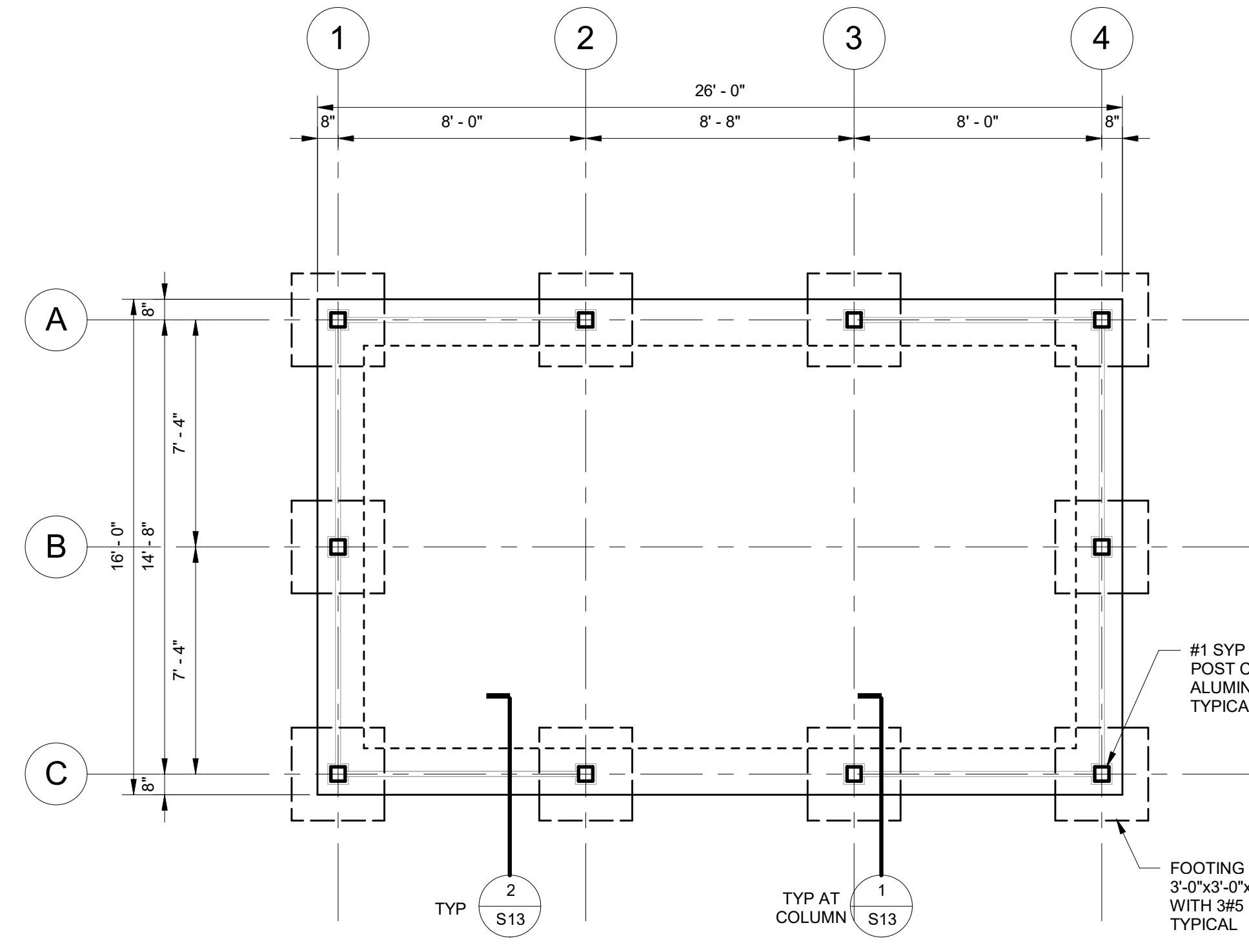


SECTION 5
3/4" = 1'-0"
S13



GAZEBO - ROOF FRAMING PLAN

- 1/4" = 1'-0"
- ROOF SYSTEM: PREFABRICATED ROOF TRUSSES AT 24". SEE GENERAL NOTES.
 - ROOF SHEATHING: 1/2" APA STRUCTURAL I OR II RATED SHEATHING, EXPOSURE 1, WITH PLY CLIPS AT ALL UNSUPPORTED EDGES PER THE MANUFACTURER'S RECOMMENDATIONS. PANEL IDENTIFICATION INDEX 32/16. LONG DIMENSION OF PANEL PERPENDICULAR TO SUPPORTS.
 - TRUSS BEARING ELEVATION TO 8'-3" ABOVE FINISH FLOOR, UNLESS NOTED.
 - TRUSSES BEAR ON ALL WALLS AND BEAMS SHOWN.
 - DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 - ANCHORS SHOWN ARE TYPICAL.
 - FOR ROOF SLOPES, SEE ARCHITECTURAL DRAWINGS.
- ROOF SHEATHING NAILING, UNLESS NOTED: 8d NAILS @6 INCHES AT ALL FOUR PANEL EDGES AND 12 INCHES AT INTERMEDIATE SUPPORTS.



GAZEBO - FOUNDATION PLAN

- 1/4" = 1'-0"
- FINISH FLOOR (TOP OF SLAB) REFERENCE ELEVATION 0'-0"
 - SLAB CONSTRUCTION: 4" THICK, POST-TENSIONED, CAST IN PLACE SLAB. SEE GENERAL NOTES.
 - DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 - DIMENSIONS SHOWN ARE TO EDGE OF SLAB/FACE OF STUD.

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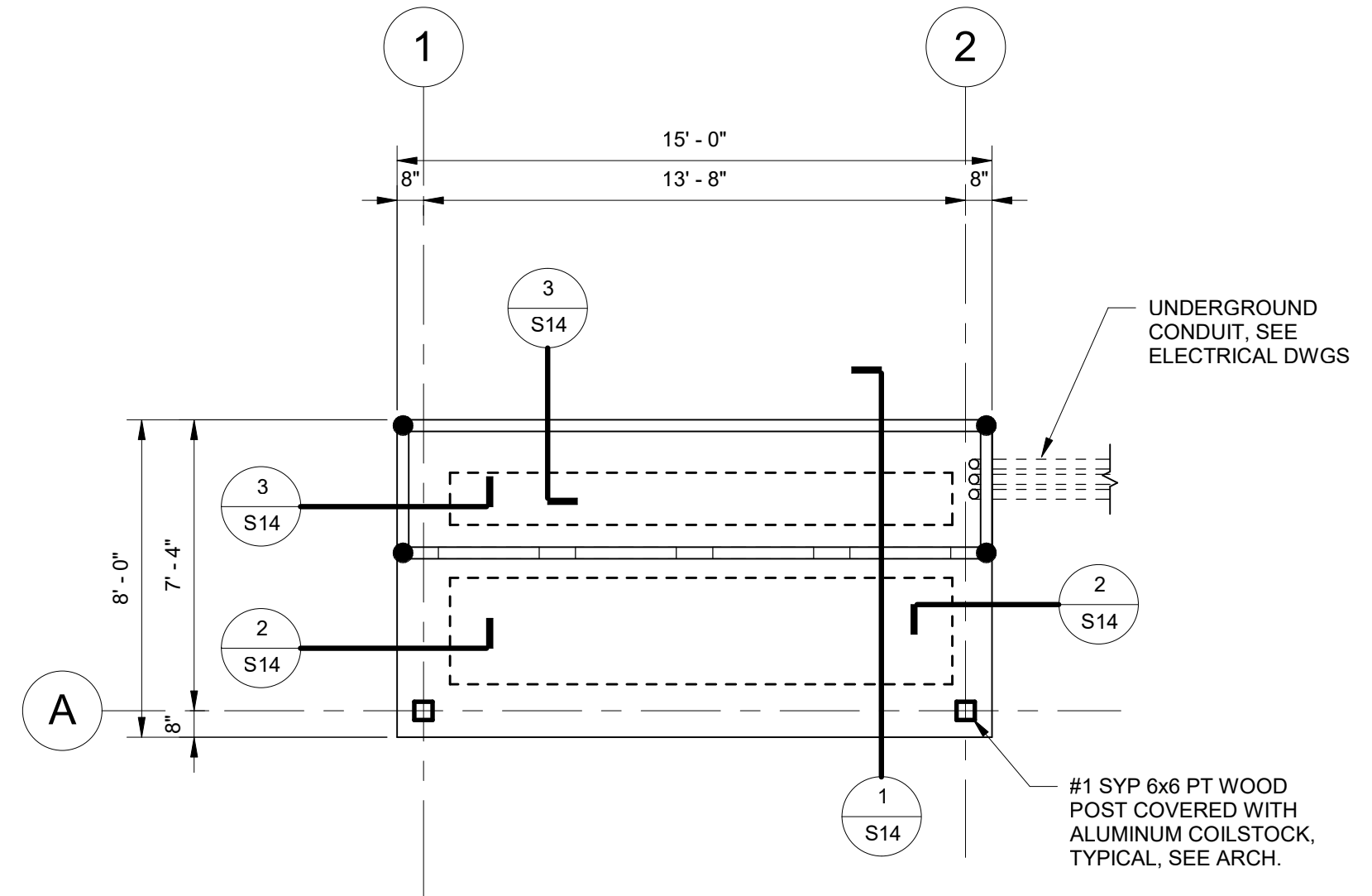
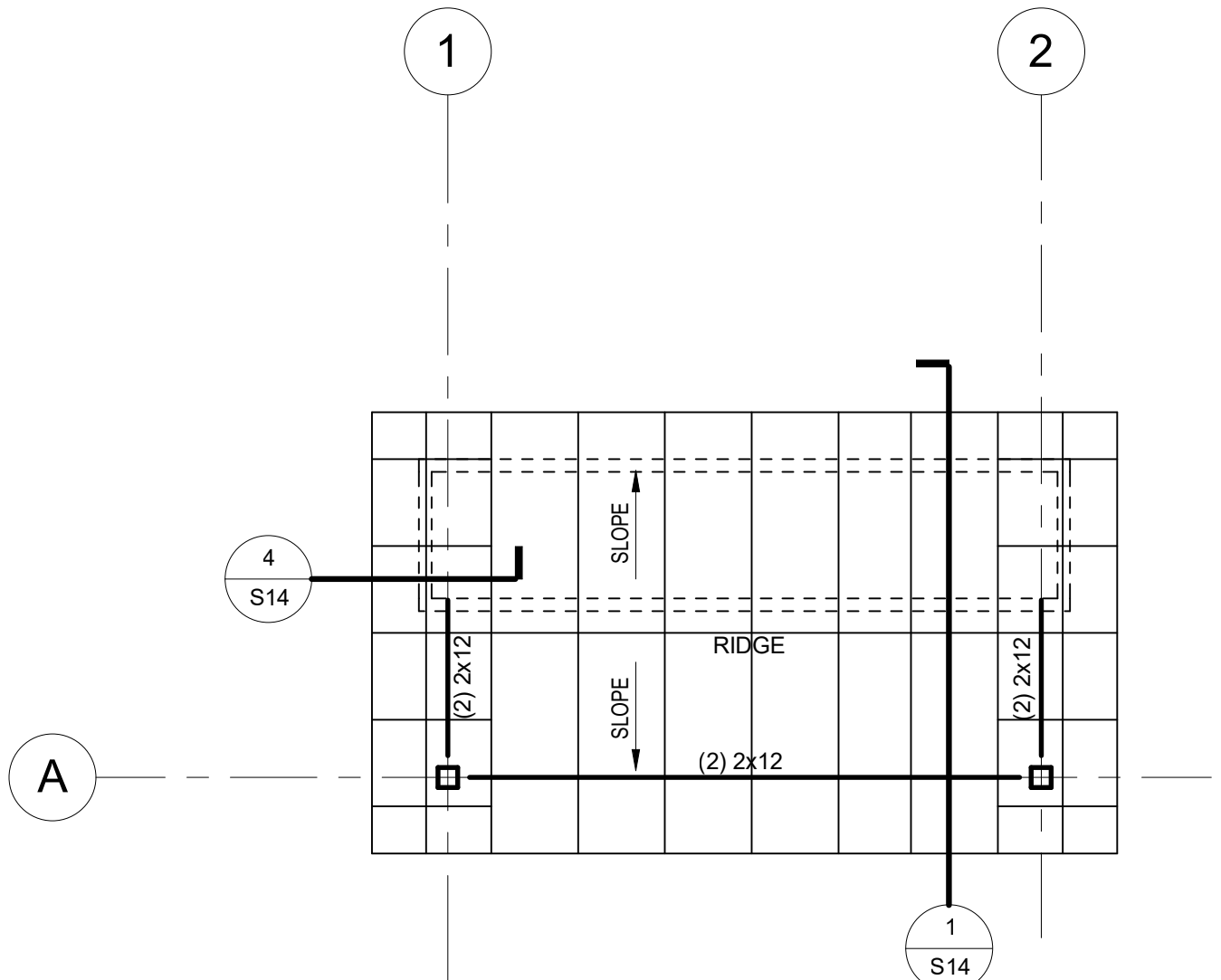
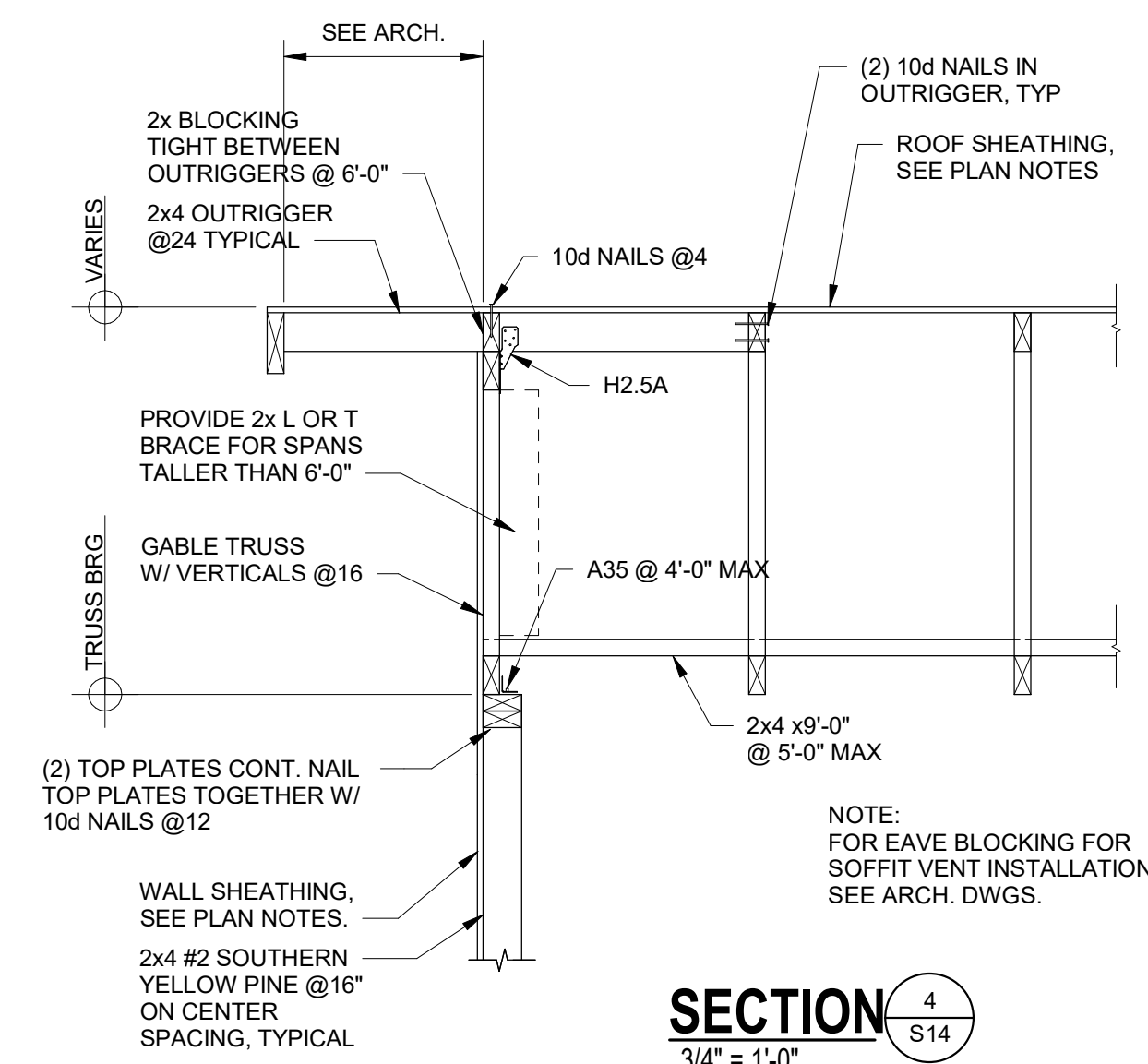
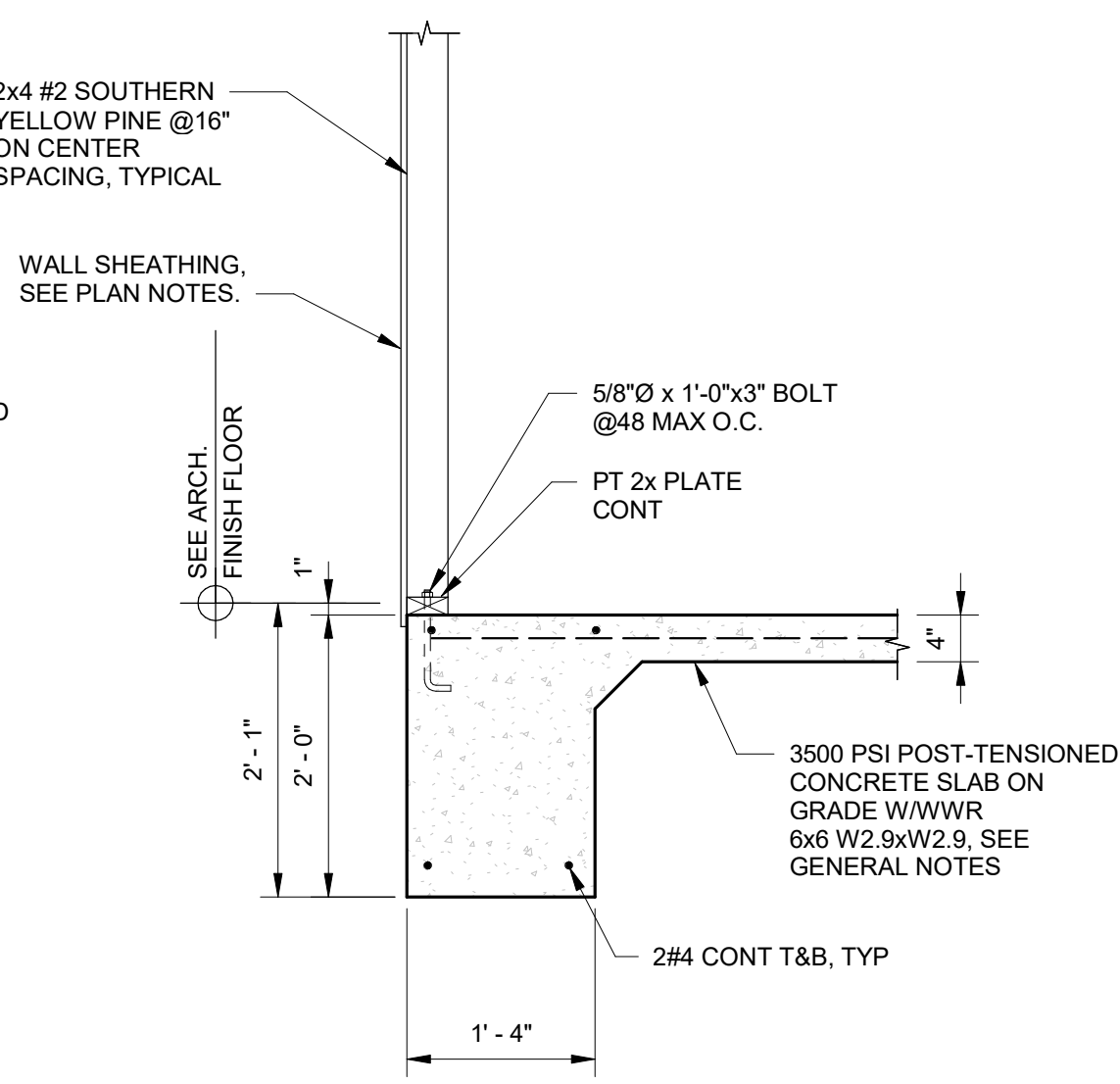
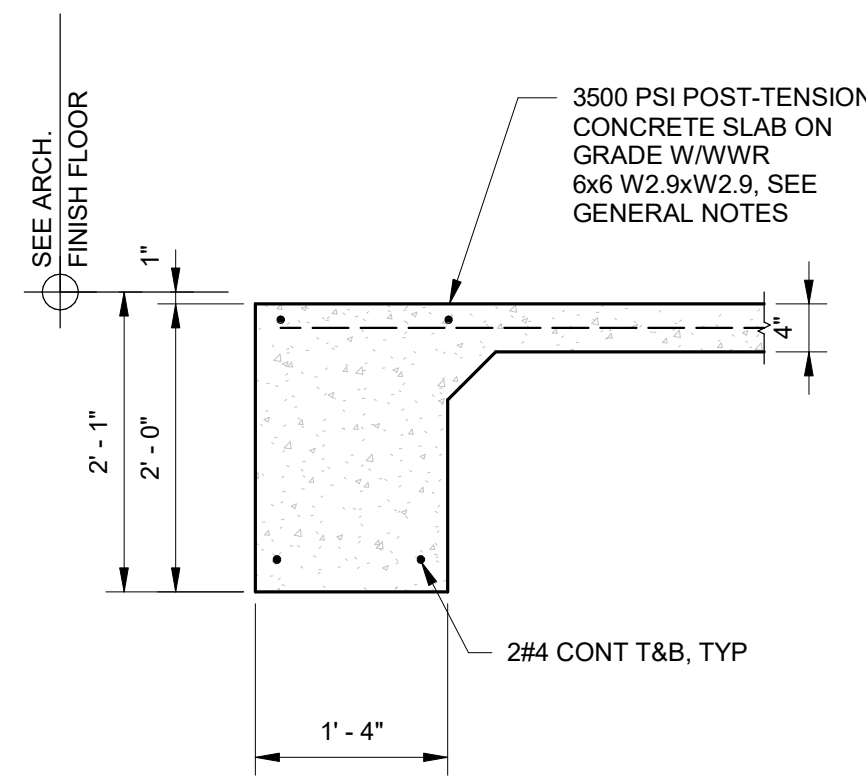
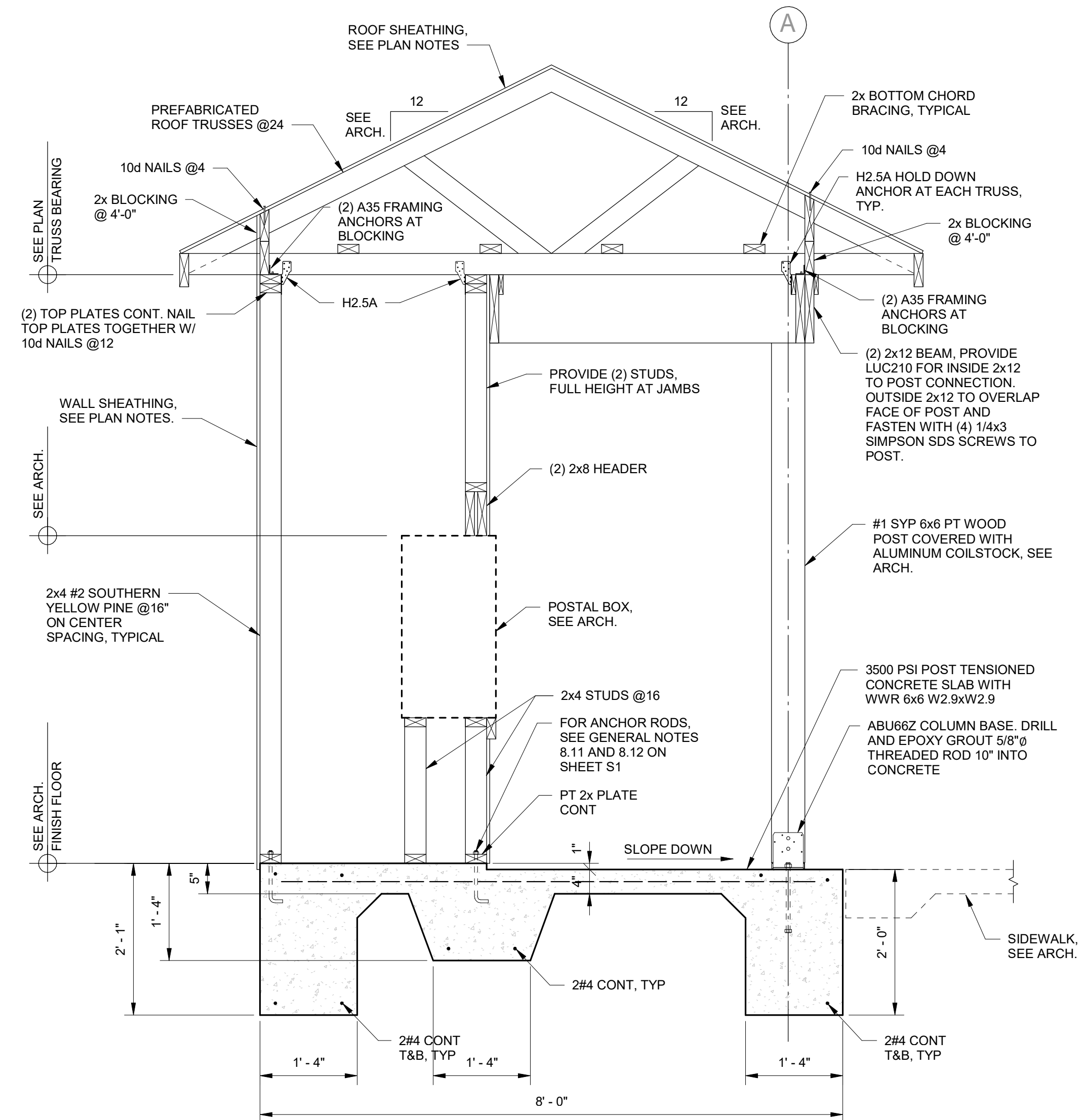
PROJECT
Frisco Park

418 S. Avalon Street
West Memphis, AR 72301

SHEET NUMBER

S13

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POSTAL BUILDING - ROOF FRAMING PLAN
1/4" = 1'-0"

1. ROOF SYSTEM: PREFABRICATED ROOF TRUSSES AT 24". SEE GENERAL NOTES.
 2. ROOF SHEATHING: 1/2" APA STRUCTURAL I OR II RATED SHEATHING, EXPOSURE 1, WITH PLY CLIPS AT ALL UNSUPPORTED EDGES PER THE MANUFACTURER'S RECOMMENDATIONS. PANEL IDENTIFICATION INDEX 32/16. LONG DIMENSION OF PANEL PERPENDICULAR TO SUPPORTS.
 3. TRUSS BEARING ELEVATION TO 8'-1" ABOVE FINISH FLOOR, UNLESS NOTED.
 4. TRUSSES BEAR ON ALL WALLS AND BEAMS SHOWN.
 5. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 6. ANCHORS SHOWN ARE TYPICAL.
 7. FOR ROOF SLOPES, SEE ARCHITECTURAL DRAWINGS.
- ROOF SHEATHING NAILING, UNLESS NOTED: 8d NAILS @6 INCHES AT ALL FOUR PANEL EDGES AND 12 INCHES AT INTERMEDIATE SUPPORTS.
- EXTERIOR WALL SHEATHING: 7/16" OSB OR 15/32" PLYWOOD, UNLESS NOTED, APA RATED SHEATHING EXPOSURE 1. LONG DIMENSION OF PANEL PARALLEL TO STUDS. ALL PLYWOOD EDGES SHALL BE BACKED WITH TWO-INCH NOMINAL OR WIDER FRAMING. FASTEN WITH 8d NAILS @ 6" AT ALL PANEL EDGES AND 12" AT INTERMEDIATE SUPPORTS, TYPICAL.

POSTAL BUILDING - FOUNDATION PLAN
1/4" = 1'-0"

1. FINISH FLOOR (TOP OF SLAB) REFERENCE ELEVATION 0'-0"
2. SLAB CONSTRUCTION: 4" THICK, POST-TENSIONED CAST IN PLACE SLAB. SEE GENERAL NOTES.
3. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
4. DIMENSIONS SHOWN ARE TO EDGE OF SLAB/FACE OF STUD.
5. ● DENOTES LTT19 HOLD DOWN ANCHOR W/STB16 ANCHOR BOLT (OCCURS 4 TIMES).

DATE
1 11/20/2018 PERMIT SET
2 5/22/2019 REISSUED FOR PERMIT

PROJECT NUMBER
597
PROJECT
Frisco Park

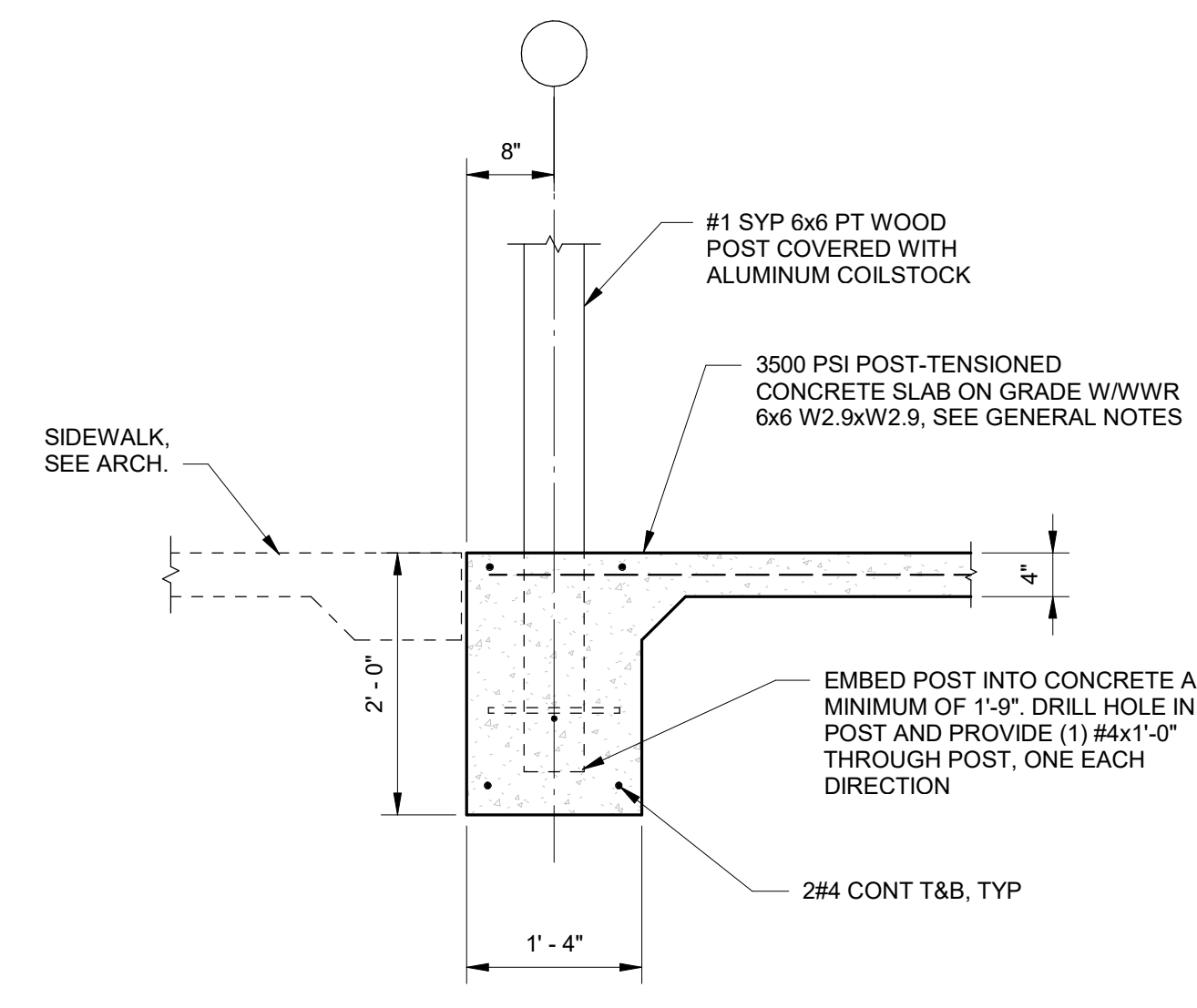
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West Memphis, AR 72301

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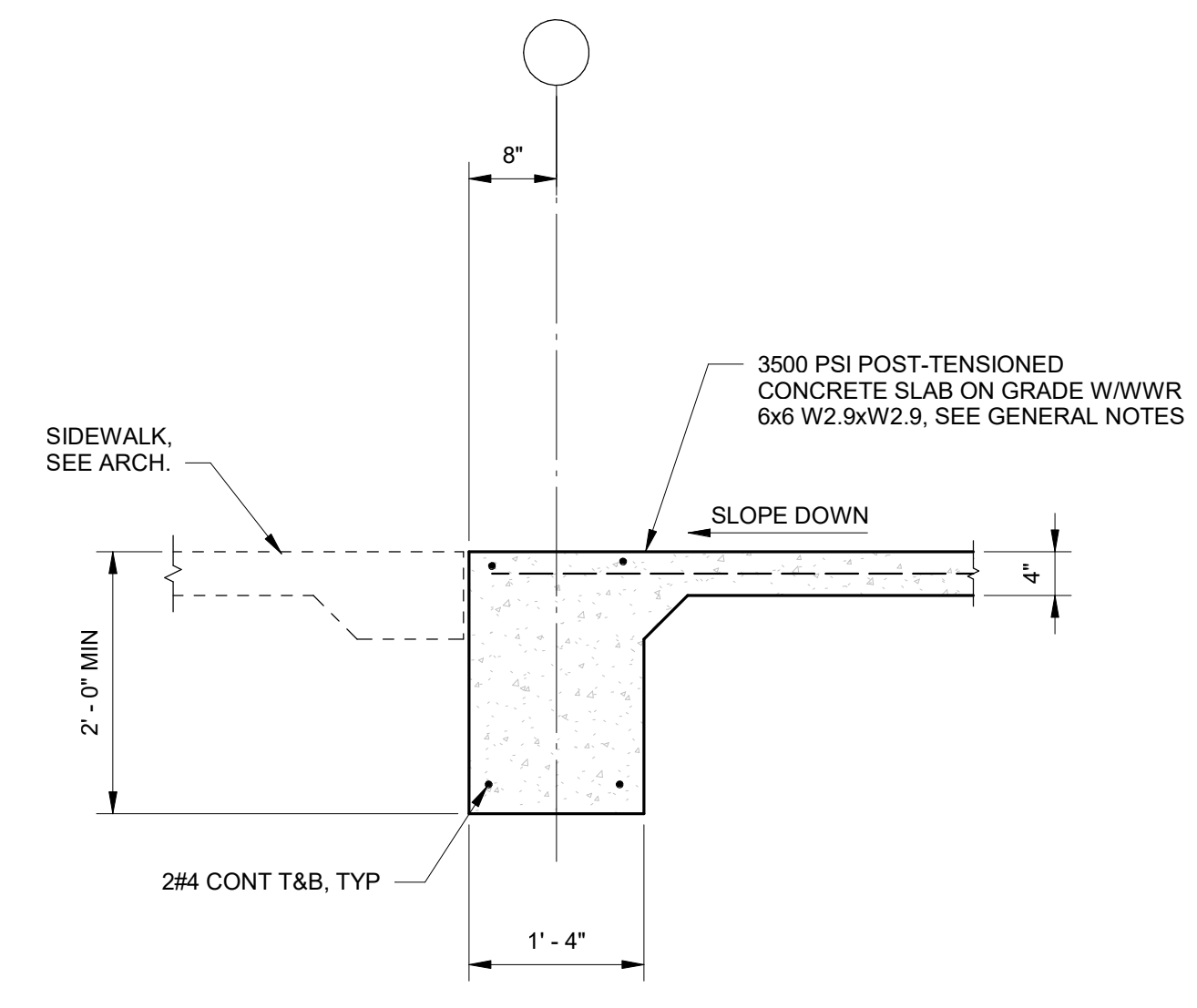
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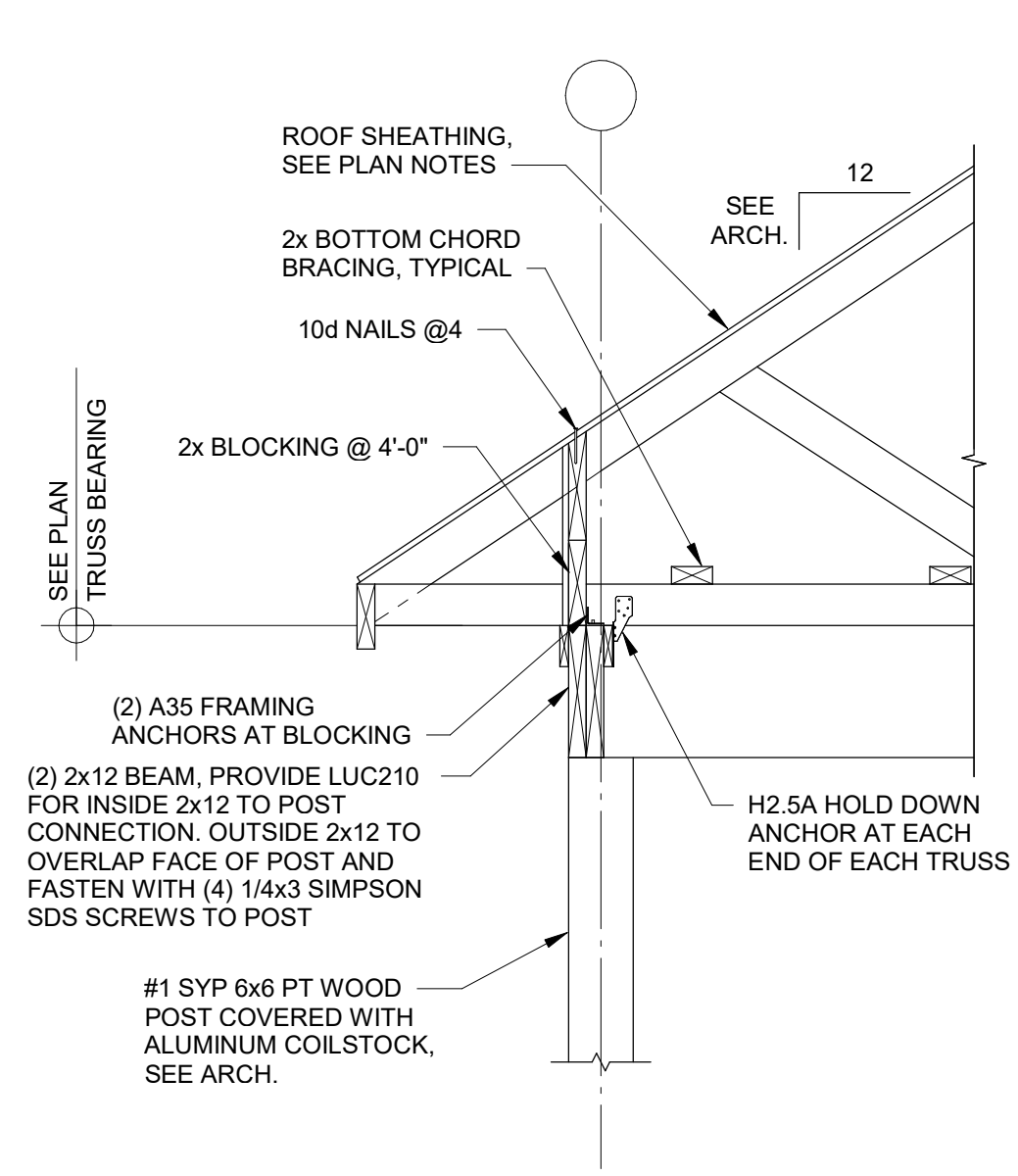
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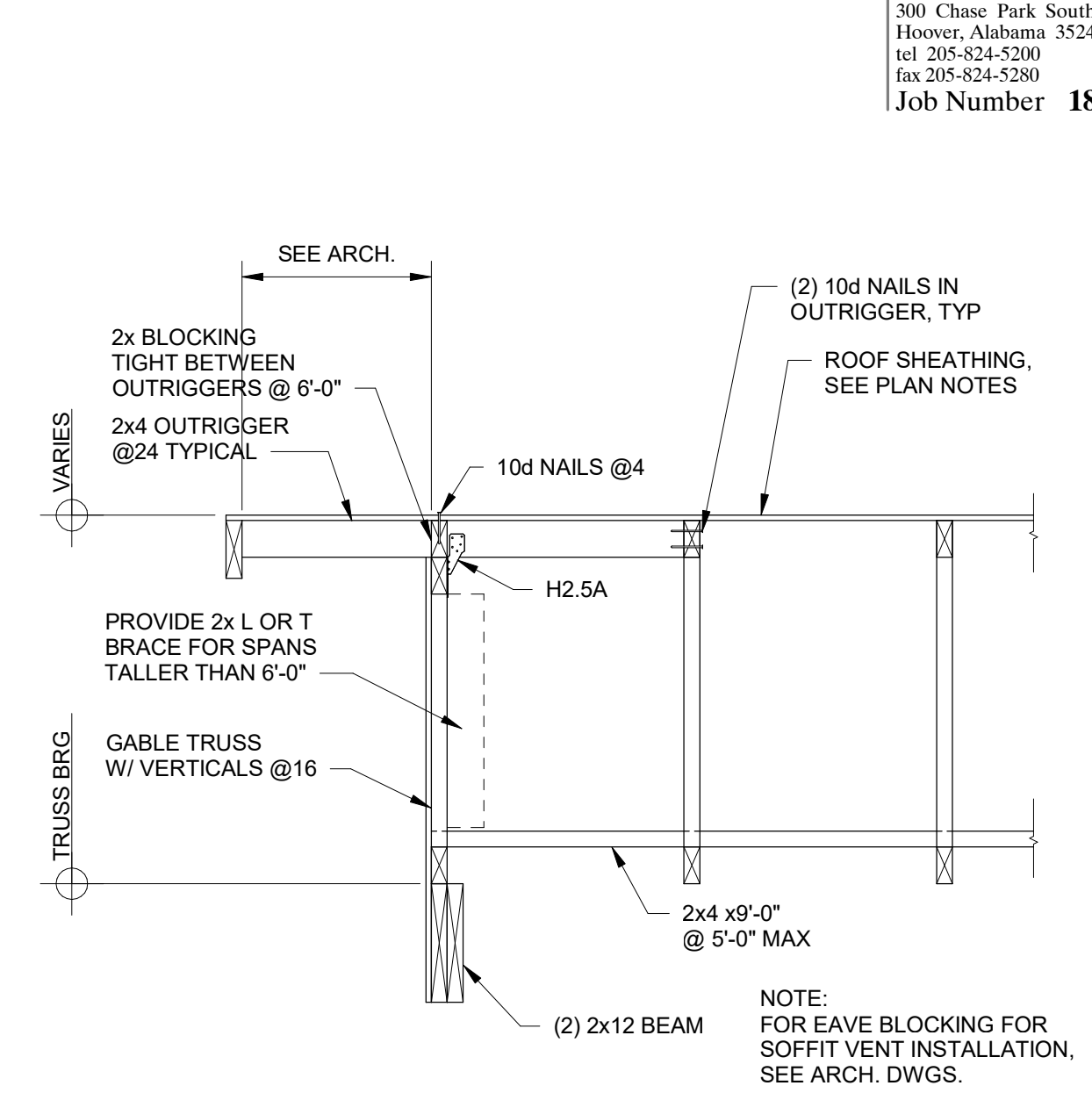
SECTION 1
 3/4" = 1'-0"



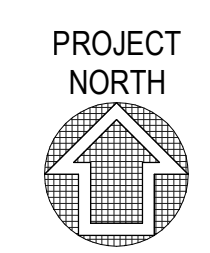
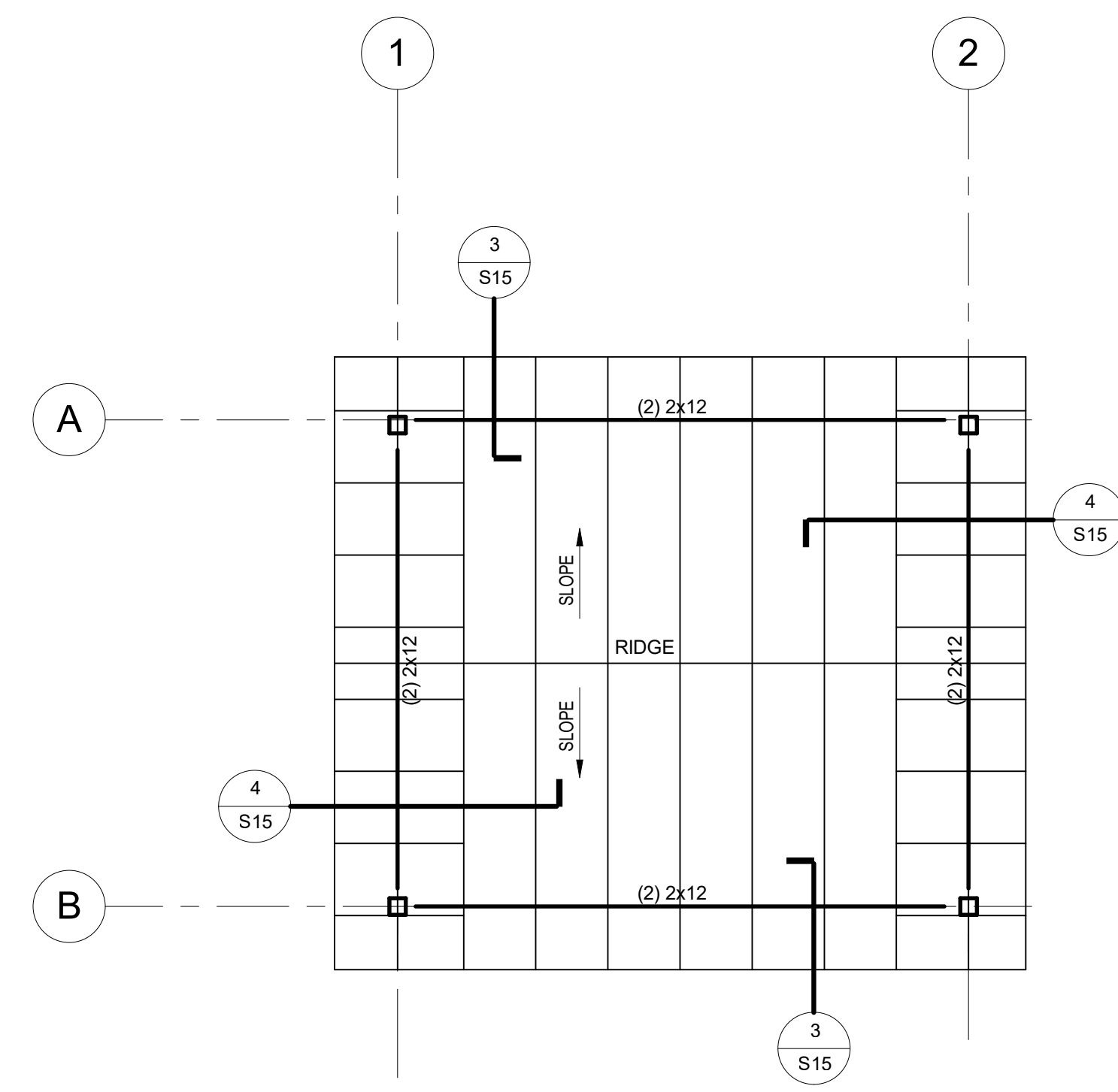
SECTION 2
 3/4" = 1'-0"



SECTION 3
 3/4" = 1'-0"

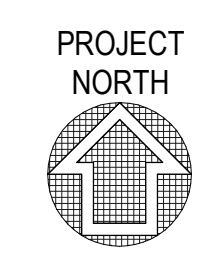
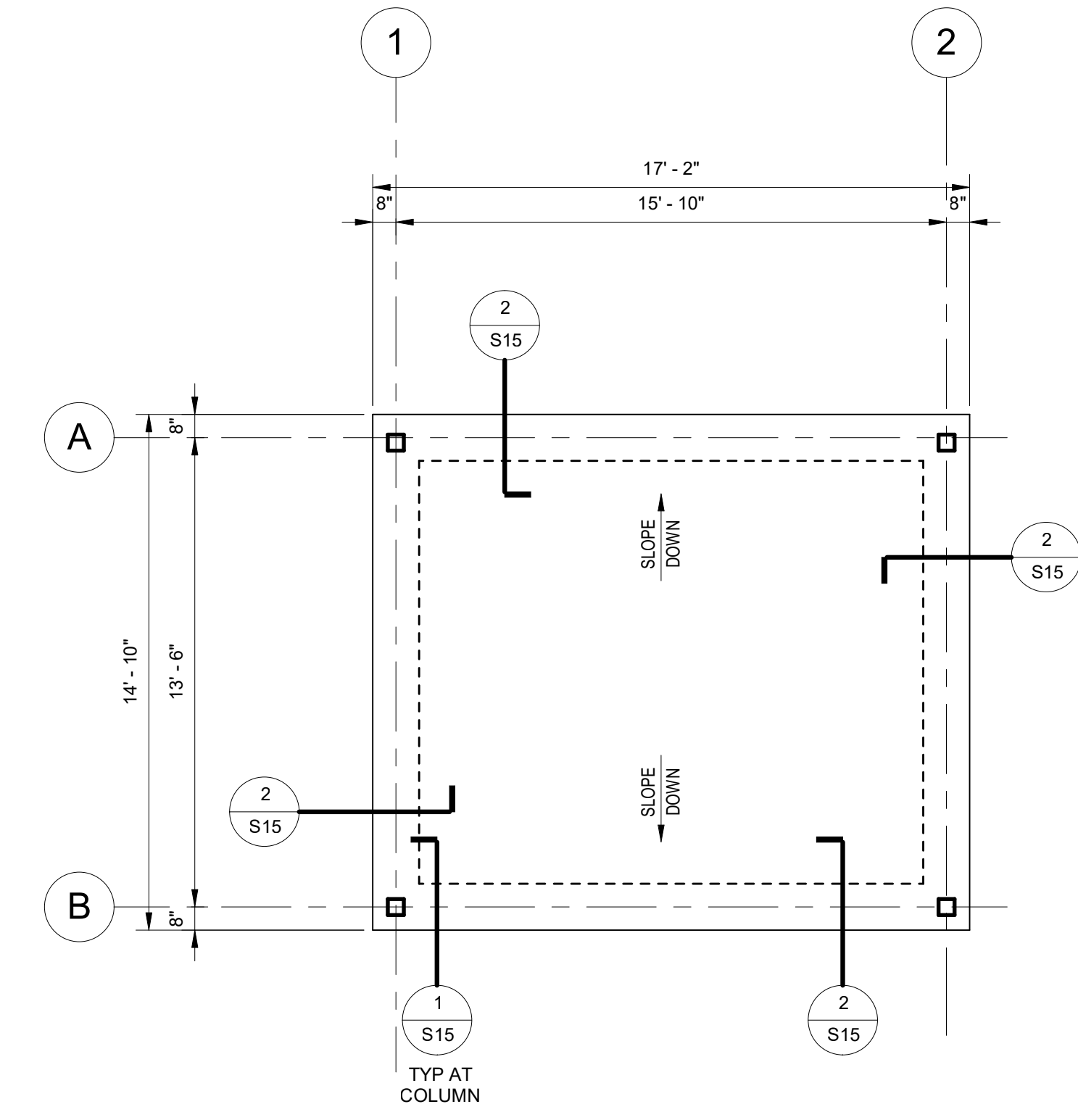


SECTION 4
 3/4" = 1'-0"



BUS STOP - ROOF FRAMING PLAN

- 1/4" = 1'-0"
1. ROOF SYSTEM: PREFABRICATED ROOF TRUSSES AT 24". SEE GENERAL NOTES.
 2. ROOF SHEATHING: 1/2" APA STRUCTURAL I OR II RATED SHEATHING, EXPOSURE 1, WITH PLY CLIPS AT ALL UNSUPPORTED EDGES PER THE MANUFACTURER'S RECOMMENDATIONS. PANEL IDENTIFICATION INDEX 32/16. LONG DIMENSION OF PANEL PERPENDICULAR TO SUPPORTS.
 3. TRUSS BEARING ELEVATION TO 8'-1" ABOVE FINISH FLOOR, UNLESS NOTED.
 4. TRUSSES BEAR ON ALL WALLS AND BEAMS SHOWN.
 5. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 6. ANCHORS SHOWN ARE TYPICAL.
 7. FOR ROOF SLOPES, SEE ARCHITECTURAL DRAWINGS.
- ROOF SHEATHING NAILING, UNLESS NOTED: 8d NAILS @6 INCHES AT ALL FOUR PANEL EDGES AND 12 INCHES AT INTERMEDIATE SUPPORTS.



BUS STOP - FOUNDATION PLAN

- 1/4" = 1'-0"
1. FINISH FLOOR (TOP OF SLAB) REFERENCE ELEVATION 0'-0".
 2. SLAB CONSTRUCTION: 4" THICK, POST-TENSIONED, CAST IN PLACE SLAB. SEE GENERAL NOTES.
 3. DETAILS SHOWN ARE TYPICAL FOR THE ENTIRE BUILDING.
 4. DIMENSIONS SHOWN ARE TO EDGE OF SLAB/FACE OF STUD.

DATE

1	11/20/2018	PERMIT SET
2	5/22/2019	REISSUED FOR PERMIT

PROJECT NUMBER
597
 PROJECT
Frisco Park

418 S. Avalon Street
 West Memphis, AR 72301

SHEET NUMBER

S15

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PLUMBING LEGEND SYMBOLS AND ABBREVIATIONS

---	DOMESTIC COLD WATER		BALL VALVE	ABV	ABOVE
-----	EXISTING DOMESTIC COLD WATER TO BE REMOVED		VALVE IN VERTICAL	AFF	ABOVE FINISHED FLOOR
-----	EXISTING DOMESTIC COLD WATER TO REMAIN		CAP ON END OF PIPE	INV	INVERT
-----	DOMESTIC HOT WATER		CLEANOUT - FLOOR TYPE	BFF	BELOW FINISHED FLOOR
-----	EXISTING DOMESTIC HOT WATER TO BE REMOVED		CLEANOUT - WALL TYPE	CW	COLD WATER
-----	EXISTING DOMESTIC HOT WATER TO REMAIN		P-TRAP	DN	DOWN
-----	DOMESTIC HOT WATER RETURN		PIPE TURNING DOWN	EX	EXISTING
-----	EXISTING DOMESTIC HOT WATER RETURN TO BE REMOVED		PIPE TURNING UP	HW	HOT WATER
-----	EXISTING DOMESTIC HOT WATER RETURN TO REMAIN		TEE DOWN	WS	WASTE STACK
-----	SANITARY VENT		TEE UP	VS	VENT STACK
-----SD-----	EXISTING SANITARY VENT TO BE REMOVED		TIE NEW INTO EXISTING	AC	ABOVE CEILING
-----	EXISTING SANITARY VENT TO REMAIN		PLUMBING FIXTURE NUMBER	WHA	WATER HAMMER ARRESTOR
-----	STORM DRAINAGE		RISER NUMBER	BFG	BELOW FINISHED GRADE
-----	EXISTING STORM DRAINAGE TO BE REMOVED		WATER HAMMER ARRESTOR	TMV	THERMOSTATIC MIXING VALVE
-----	EXISTING STORM DRAINAGE TO REMAIN		PLUG TYPE CLEANOUT	TP	TRAP PRIMER
-----	SANITARY WASTE		BALANCING VALVE		
-----	EXISTING SANITARY WASTE TO BE REMOVED		CHECK VALVE		
-----	EXISTING SANITARY WASTE TO REMAIN		GATE VALVE		
-----	SHEET MATCH LINE		REDUCED PRESSURE ZONE BFP		
-----	CONSTRUCTION DUST PARTITION		THERMOSTATIC MIXING VALVE		
-----	GAS LINE		FLOOR SINK		
-----	EXISTING GAS LINE		FLOOR DRAIN		

DRAWING GENERAL NOTES:

- CONTRACTOR SHALL VERIFY EXISTING CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.
- SPACE ABOVE CEILING IS LIMITED. CAREFUL COORDINATION WITH LIGHTING, ELECTRICAL, MECHANICAL, FIRE PROTECTION, STRUCTURAL AND ARCHITECTURAL WORK IS CRITICAL FOR COMPLETE PIPING INSTALLATION. CONTRACTOR SHALL PROVIDE NECESSARY OFFSETS IN NEW AND EXISTING PIPING AND ELECTRICAL CONDUIT AS REQUIRED TO ACCOMMODATE NEW WORK. CONTRACTOR SHALL ALLOW FOR ANY CONFLICTS ENCOUNTERED.
- PIPING LAYOUTS ARE DIAGRAMMATIC AND DO NOT SHOW ALL ELEMENTS OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CHANGES ON DIRECTION, ELEVATION AND MINOR OFFSETS NECESSARY FOR COMPLETE INSTALLATION OF ELEMENTS SHOWN.
- ALL WASTE PIPING SHOWN IS BELOW THE FINISHED FLOOR UNLESS OTHERWISE NOTED. ALL VENT PIPING SHOWN IS ABOVE THE CEILING UNLESS OTHERWISE NOTED.
- COORDINATE ACCESS DOOR LOCATIONS WITH GENERAL CONTRACTOR AND ARCHITECT.

PLUMBING GENERAL NOTES:

- ALL HORIZONTAL PRESSURE PIPING SHALL BE RUN ABOVE CEILING ON THE PLAN ON WHICH SHOWN UNLESS OTHERWISE NOTED.
- ALL HORIZONTAL GRAVITY PIPING SHALL BE RUN BELOW FLOOR ON THE PLAN ON WHICH SHOWN UNLESS OTHERWISE INDICATED. ALL HORIZONTAL VENT PIPING SHALL BE RUN ABOVE FLOOR ON THE PLAN ON WHICH SHOWN UNLESS OTHERWISE INDICATED. VENT PIPING IS SHOWN OFFSET FOR CLARITY.
- THE LOCATION OF FLOOR DRAINS SHALL BE COORDINATED WITH THE LOCATION OF THE EQUIPMENT BEING SERVED PRIOR TO INSTALLATION.
- COORDINATE ROUTING OF PIPING TO AVOID CONFLICTS WITH STRUCTURAL, MECHANICAL, AND ELECTRICAL WITHIN THE BUILDING PRIOR TO INSTALLATION. ROUTE PIPING IN JOIST SPACE AS MUCH AS POSSIBLE.
- COORDINATE WITH ARCHITECTURAL SITE PLAN FOR THE LOCATION AND ORIENTATION OF THE BUILDINGS.
- ALL WATER PIPING (HOT AND COLD) IN EXTERIOR WALLS SHALL BE INSULATED PER THE SPECIFICATIONS AND INSTALLED ON THE WARM SIDE OF THE WALL TO PREVENT FREEZING. ALL HOT WATER PIPING SHALL BE INSULATED.
- SANITARY WASTE AND VENT PIPING AND FITTING SHALL BE PVC SCHEDULE 40. ALL JOINTS SHALL BE PRIMED PRIOR TO SOLVENT CEMENT BEING APPLIED. SEE SPECIFICATION SECTION 15411 FOR ADDITIONAL REQUIREMENTS.
- WATER DISTRIBUTION PIPING SHALL BE EITHER COPPER TUBING AND FITTING WITH SOLDER JOINT OR PEX PIPING WITH METAL TYPE WITH CRIMP RING. SEE SPECIFICATION SECTION 221116 FOR ADDITIONAL REQUIREMENTS.

ELECTRIC WATER HEATER SCHEDULE

EQUIPMENT NO.	MANUFACTURER AND MODEL NO.	SERVICE	ENERGY FACTOR	ENTERING WATER TEMP (°F)	LEAVING WATER TEMP (°F)	RECOVERY RATE (GPH)	STORAGE CAPACITY (GAL)	TANK DIMENSIONS		ELECTRICAL		REMARKS	
								HEIGHT (INCHES)	DIAMETER (INCHES)	HEATING ELEMENTS	VOLTS/PH/HZ		
EWH-1	AO SMITH MODEL ENT-40	DOMESTIC HOT WATER	0.95	55°	110°	30	38	32	24	4.5	1	240/ 1 /60	TALL UNIT W/ TOP CONNECTIONS
EWH-2	AO SMITH MODEL DRE-52-24	DOMESTIC HOT WATER	0.95	55°	120°	164	50	56	22	18.0	2	240/ 1 /60	TOTAL HEATER KW: 36
EWH-3	AO SMITH MODEL ENJB-40W	DOMESTIC HOT WATER	0.95	55°	110°	30	38	32	24	4.5	1	240/ 1 /60	LOW BOY W/ SIDE CONNECTIONS

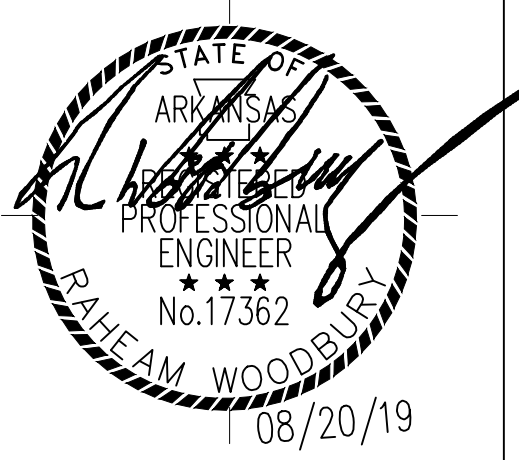
PLUMBING FIXTURE CONNECTION SCHEDULE

EQUIPMENT NO.	DESCRIPTION	HOT WATER	COLD WATER	WASTE	VENT	REMARKS
WC-1	WATER CLOSET	---	1/2"	4"	3"	FLOOR MOUNTED, TANK TYPE, 1.28 GPF MANSFIELD ALTO ROUND FRONT BOWL W/ CENTOCO 700 ROUND SEAT WITH METAL HINGES
WC-2	WATER CLOSET, ADA COMPLIANT	---	1/2"	4"	3"	FLOOR MOUNTED, TANK TYPE, 1.28 GPF MANSFIELD ALTO SMARTHEIGHT ROUND FRONT BOWL W/ CENTOCO 700 ROUND SEAT WITH METAL HINGES
LV-1	LAVATORY	1/2"	1/2"	1-1/2"	1-1/2"	COUNTER TOP MOUNTED, BRIGGS ALTIMA ROUND, 19" W/ 4" CENTERS, AND OVERFLOW. PEERLESS P136LF SERIES FAUCET, 1.5 GPM FLOW, WITHOUT POP-UP DRAIN, AND ADA LEVER HANDLES. MCGUIRE 170 STOPS AND 8902 P-TRAP. FLEXIBLE S.S. BRAID SUPPLY LINES.
LV-2	LAVATORY ADA COMPLIANT	1/2"	1/2"	1-1/2"	1-1/2"	COUNTER TOP MOUNTED, BRIGGS ALTIMA ROUND, 19" W/ 4" CENTERS, AND OVERFLOW. PEERLESS P136LF SERIES FAUCET, 1.5 GPM FLOW, WITHOUT POP-UP DRAIN, AND ADA LEVER HANDLES. MCGUIRE 170 STOPS AND 8902 P-TRAP. FLEXIBLE S.S. BRAID SUPPLY LINES. ADA COMPLIANT TRAP AND SUPPLY WRAP EQUAL TO TRUEBRO LAV GUARD.
LV-3	LAVATORY	1/2"	1/2"	1-1/2"	1-1/2"	WALL MOUNTED, BRIGGS MILTON 6620 W/ 4" CENTERS, OVERFLOW AND CONCEAL ARM CARRIER, PEERLESS P136LF SERIES FAUCET, 1.5 GPM FLOW, WITHOUT POP-UP DRAIN, AND ADA LEVER HANDLES. MCGUIRE 170 STOPS AND 8902 P-TRAP. ZURN Z-1231 CARRIER, FLEXIBLE S.S. BRAID SUPPLY LINES.
TS-1	BATHTUB WITH SHOWER AND WALL SURROUND	1/2"	1/2"	1-1/2"	1-1/2"	STERLING 71370110 TUB UNIT, 60"x30"x72", SMOOTH FINISH, GRAB BAR, AND ROD. PEERLESS PTT188750 TUB/SHOWER CONTROL VALVE WITH DELTA PRESSURE BALANCE MIX VALVE, BLADE HANDLE, SPOUT, AND SHOWER HEAD. 1.5 GPM SHOWER HEAD MAXIMUM.
TS-2	BATHTUB WITH SHOWER AND WALL SURROUND ADA COMPLIANT	1/2"	1/2"	1-1/2"	1-1/2"	STERLING 71370110 TUB UNIT, 60"x30"x72", SMOOTH FINISH, GRAB BAR, SEAT AND ROD. PEERLESS PTT188750 TUB/SHOWER CONTROL VALVE WITH DELTA PRESSURE BALANCE MIX VALVE, BLADE HANDLE, SPOUT, HAND HELD SHOWER HEAD W/ 24" SLIDE BAR. 1.5 GPM SHOWER HEAD MAXIMUM.
SH-1	ROLL-IN SHOWER AND WALL SURROUND ADA COMPLIANT	1/2"	1/2"	1-1/2"	1-1/2"	AQUATIC 1623BSTD ADA SHOWER UNIT, 62"x32-1/4"x76-7/8", GRAB BARS, SEAT AND ROD. PEERLESS PTT188750 TUB/SHOWER CONTROL VALVE W/ DELTA PRESSURE BALANCE MIX VALVE, BLADE HANDLE, SPOUT, HAND HELD SHOWER HEAD W/ 24" SLIDE BAR. 1.5 GPM SHOWER HEAD MAXIMUM.
SK-1	TWO COMPARTMENT SINK COORDINATE GARBAGE DISPOSAL AND DRAIN LOCATIONS.	1/2"	1/2"	1-1/2"	1-1/2"	DAYTON O23317 TYPE 304, 22 GAUGE STAINLESS STEEL SINK, 6" DEEP COMPARTMENTS W/ 4 PUNCH FOR DISHWASHER AIR GAP. PEERLESS P115LF W/ LEVER HANDLE & SPRAY. LK-99 TAILPIECE W/ CONTINUOUS WASTE & P-TRAP. JONES STEPHENS AIR GAP UNIT. FLEXIBLE STAINLESS STEEL BRAID SUPPLY LINES.
SK-2	TWO COMPARTMENT SINK ADA COMPLIANT COORDINATE GARBAGE DISPOSAL AND DRAIN LOCATIONS AT ADA UNITS.	1/2"	1/2"	1-1/2"	1-1/2"	DAYTON GE23321 TYPE 304, 22 GAUGE STAINLESS STEEL SINK, REAR CENTER DRAIN, 5" DEEP COMPARTMENTS W/ 4 PUNCH FOR DISHWASHER AIR GAP. PEERLESS P115LF W/ LEVER HANDLE & SPRAY. LK-99 TAILPIECE W/ CONTINUOUS WASTE & P-TRAP. JONES STEPHENS AIR GAP UNIT. FLEXIBLE STAINLESS STEEL BRAID SUPPLY LINES.
IMVB-1	ICE MAKER VALVE BOX	--	1/2"	--	--	OATEY 12K W/ QUARTER TURN VALVE AND WATER HAMMER ARRESTER
WMVB-1	WASHING MACHINE VALVE BOX	1/2"	1/2"	2"	2"	OATEY 38943, POLYSTYRENE BOX, WITH QUARTER TURN VALVES AND WATER HAMMER ARRESTERS.
DWVB-1	DISHWASHER VALVE BOX	1/2"	--	--	--	OATEY 38202, POLYSTYRENE BOX, WITH SINGLE LEVER VALVE AND WATER HAMMER ARRESTER
ACDB-1	CONDENSATE DRAIN BOX	--	--	2"	2"	GUY GRAY OR APPROVED EQUAL. PROVIDE TRAP GUARD.
WH-1	WALL HYDRANT	--	1/2"	--	--	ZURN Z1320-C, NON-FREEZING WITH LOCKING BOX AND VACUUM BREAKER.
EWC-1	ELECTRIC WATER COOLER- ADA COMPLIANT	--	1/2"	2"	2"	BI-LEVEL ELKAY EZTLR8LC W/ PUSH BAR AT FRONT, 8.0 GPH, SAFETY BUBBLER GUARD AND WALL CARRIER. 120/1/60; 370 WATTS; FLA - 4.0. PROVIDE P-TRAP W/ CLEANOUT, ANGLE STOP, AND SUPPLY LINE.
LS-1	LAUNDRY TUB/SINK	--	1/2"	2"	2"	FIAT TATI LAUNDRY TUB W/ FAUCET (4" CENTERS, BLADE HANDLES, SWING SPOUT, AERATOR AND HOSE ADAPTOR) AND DRAIN/SUPPLY KIT.

PLUMBING SPECIALITY SCHEDULE

MARK NO.	FIXTURE TYPE	MANUFACTURER'S MODEL NO.	MOUNT	MOUNT HEIGHT	WASTE SIZE	VENT SIZE	C.W. SIZE	H.W. SIZE	MIXED WATER SIZE	NOTES
HD-1	HUB DRAIN	3"x4" SCHEDULE 40 REDUCER AT 3" PVC PIPING	FLOOR	-	3"	2"	-	-	-	SCHEDULE 40 PVC PIPING AND FITTINGS
C.O.	FLOOR CLEANOUT	JAY R. SMITH MODEL 4100 SERIES OR APPROVED EQUAL	FLOOR	-	4"	-	-	-	-	COORDINATE TYPE WITH FLOOR FINISH MATERIAL
W.C.O.	WALL CLEANOUT	JAY R. SMITH MODEL 4400 OR APPROVED EQUAL	WALL	-	4"	2"	-	-	-	7" DIA. STAINLESS STEEL COVER
BFP-1	BACKFLOW PREVENTER	ZURN MODEL 350XL, DUAL CHECK VALVE TYPE	-	-	-	-	2"	-	-	55 GPM FLOW W/ 6 PSI PRESSURE DROP PROVIDE W/ LEAD-FREE STRAINER
BFP-2	BACKFLOW PREVENTER	ZURN MODEL 350XL, DUAL CHECK VALVE TYPE	-	-	-	-	1-1/4"	-	-	29 GPM FLOW W/ 5 PSI PRESSURE DROP PROVIDE W/ LEAD-FREE STRAINER
BFP-3	BACKFLOW PREVENTER	ZURN MODEL 350DA, DUAL CHECK VALVE TYPE	-	-	-	-	2-1/2"	-	-	105 GPM FLOW W/ 9 PSI PRESSURE DROP PROVIDE W/ LEAD-FREE STRAINER
PRV-1	PRESSURE REDUCING VALVE	ZURN MODEL 500XL	-	-	-	-	2"	-	-	55 GPM FLOW W/ 7 PSI PRESSURE DROP SET LEAVING PRESSURE TO 60 PSI
PRV-2	PRESSURE REDUCING VALVE	ZURN MODEL 500XL	-	-	-	-	1-1/4"	-	-	29 GPM FLOW W/ 6 PSI PRESSURE DROP SET LEAVING PRESSURE TO 50 PSI
PRV-3	PRESSURE REDUCING VALVE	ZURN MODEL 500XL	-	-	-	-	2-1/2"	-	-	105 GPM FLOW W/ 7 PSI PRESSURE DROP SET LEAVING PRESSURE TO 60 PSI
LI-1	LINT INTERCEPTORS	ZURN Z1185 SIZE 7 OR APPROVED EQUAL	FLOOR	-	3"	2"	-	-	-	PROVIDE W/ VENT CONNECTION & ACCESS TOP EXTENSION AS REQUIRED
TP-1	TRAP PRIMER	PPP MODEL OR APPROVED EQUAL	SEE DETAIL	-	-	-	1/2"	-	-	TRAP PRIMER TO BE POLISHED BRONZE.

EQUALS BY J.R. SMITH OR ZURN WILL BE ACCEPTED



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 www.herringtonarchitects.com

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 RE-ISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

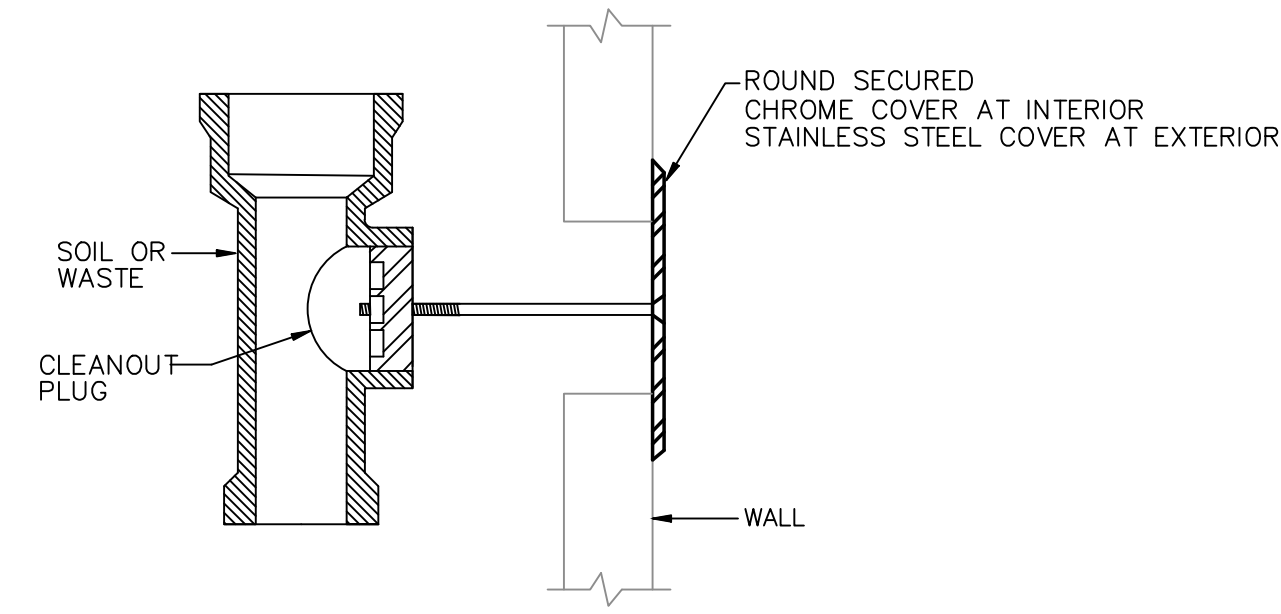
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597
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 Frisco Park

418 S. Avalon Street,
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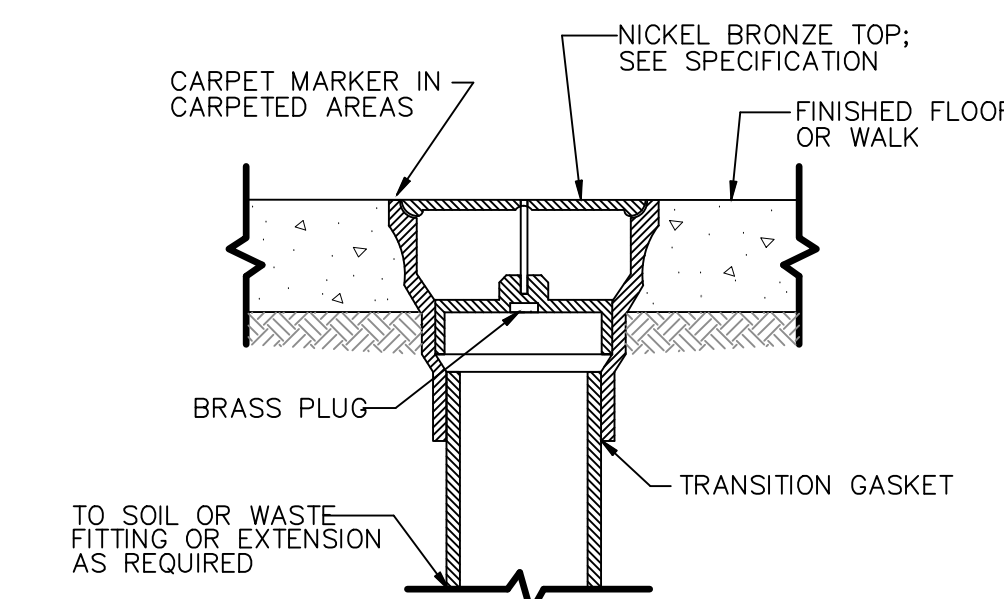
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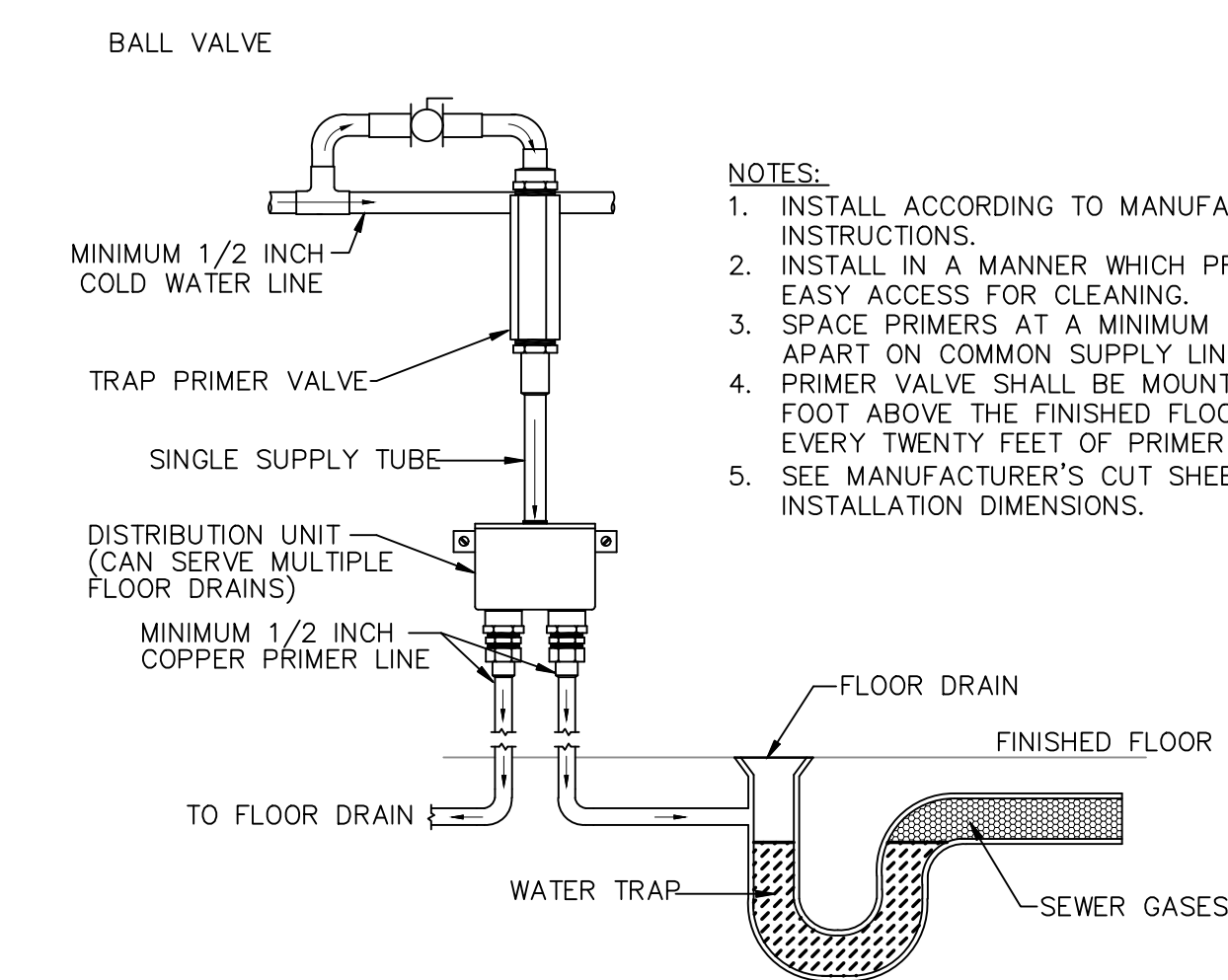
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4 WALL CLEANOUT
 P02 / NO SCALE

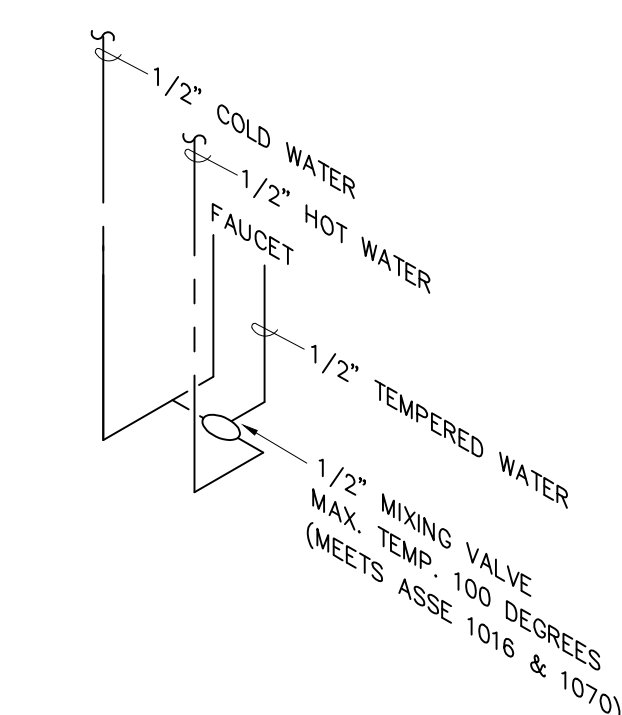


5 FLOOR CLEANOUT
 P02 / NO SCALE

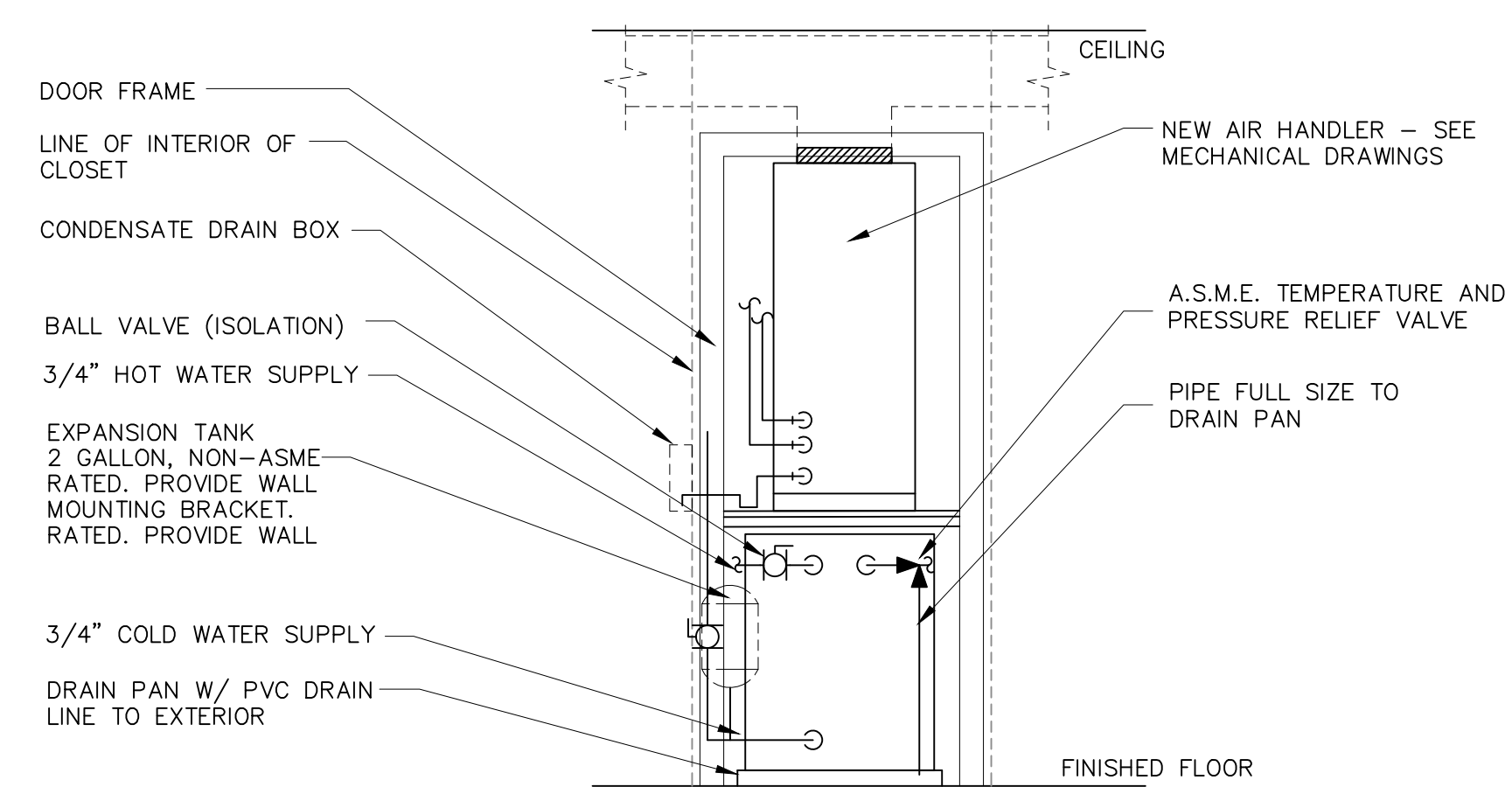


- NOTES:**
1. INSTALL ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
 2. INSTALL IN A MANNER WHICH PROVIDES EASY ACCESS FOR CLEANING.
 3. SPACE PRIMERS AT A MINIMUM OF 40 FEET APART ON COMMON SUPPLY LINE.
 4. PRIMER VALVE SHALL BE MOUNTED ONE FOOT ABOVE THE FINISHED FLOOR FOR EVERY TWENTY FEET OF PRIMER LINE.
 5. SEE MANUFACTURER'S CUT SHEETS FOR INSTALLATION DIMENSIONS.

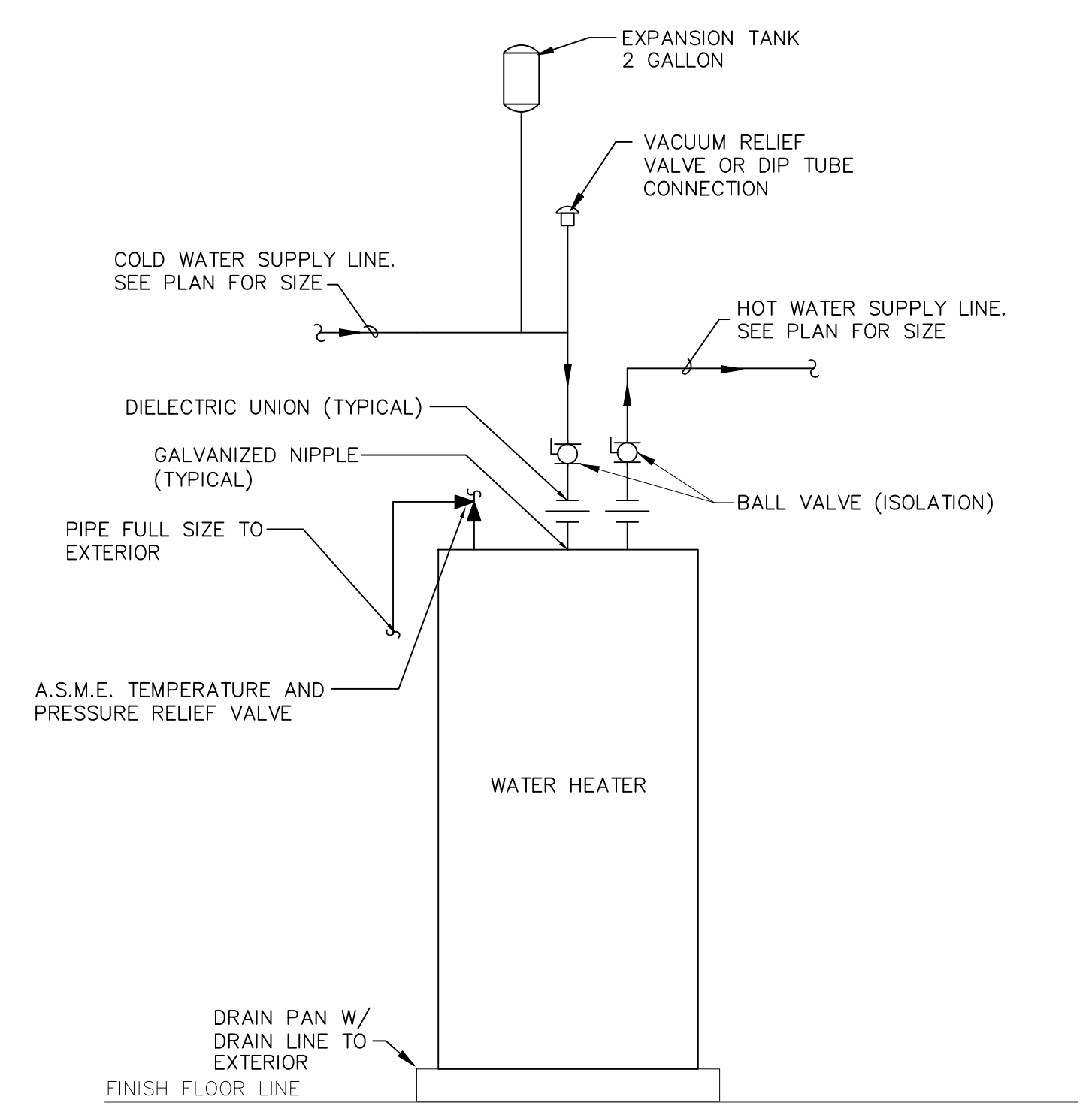
1 TRAP PRIMER W/DISTRIBUTION UNIT
 P02 / NO SCALE



2 TYPICAL LAVATORY MIXING VALVE (COMMUNITY CENTER)
 P02 / SCALE: NONE



10 TYPICAL MECHANICAL CLOSET DETAIL @ HC UNIT TYPE
 P02 / NO SCALE



3 WATER HEATER (FLOOR MOUNTED)
 P02 / NO SCALE

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 RE-ISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

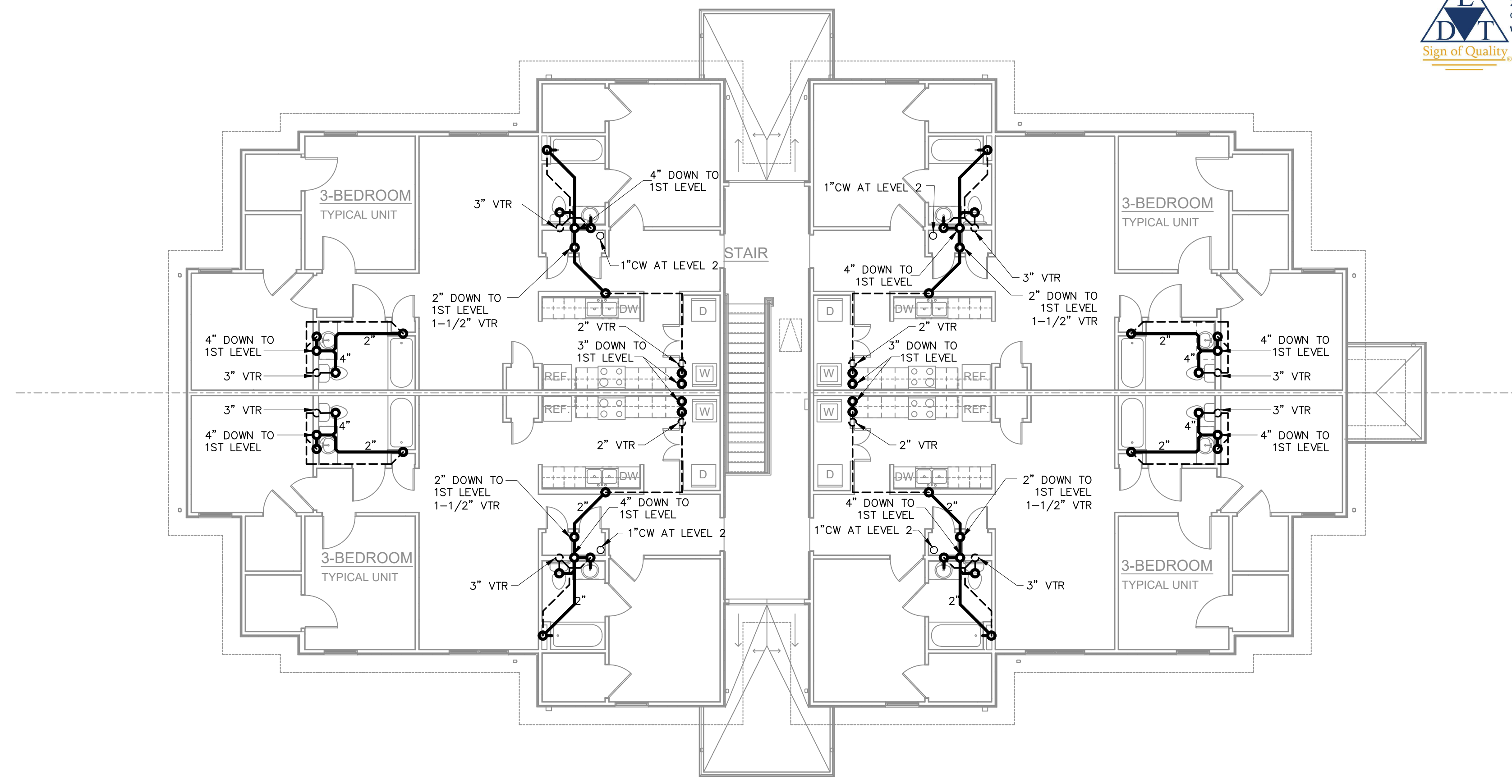
PROJECT NUMBER
597
 PROJECT
 Frisco Park

418 S. Avalon Street,
 West Memphis, AR 72301

SHEET NUMBER

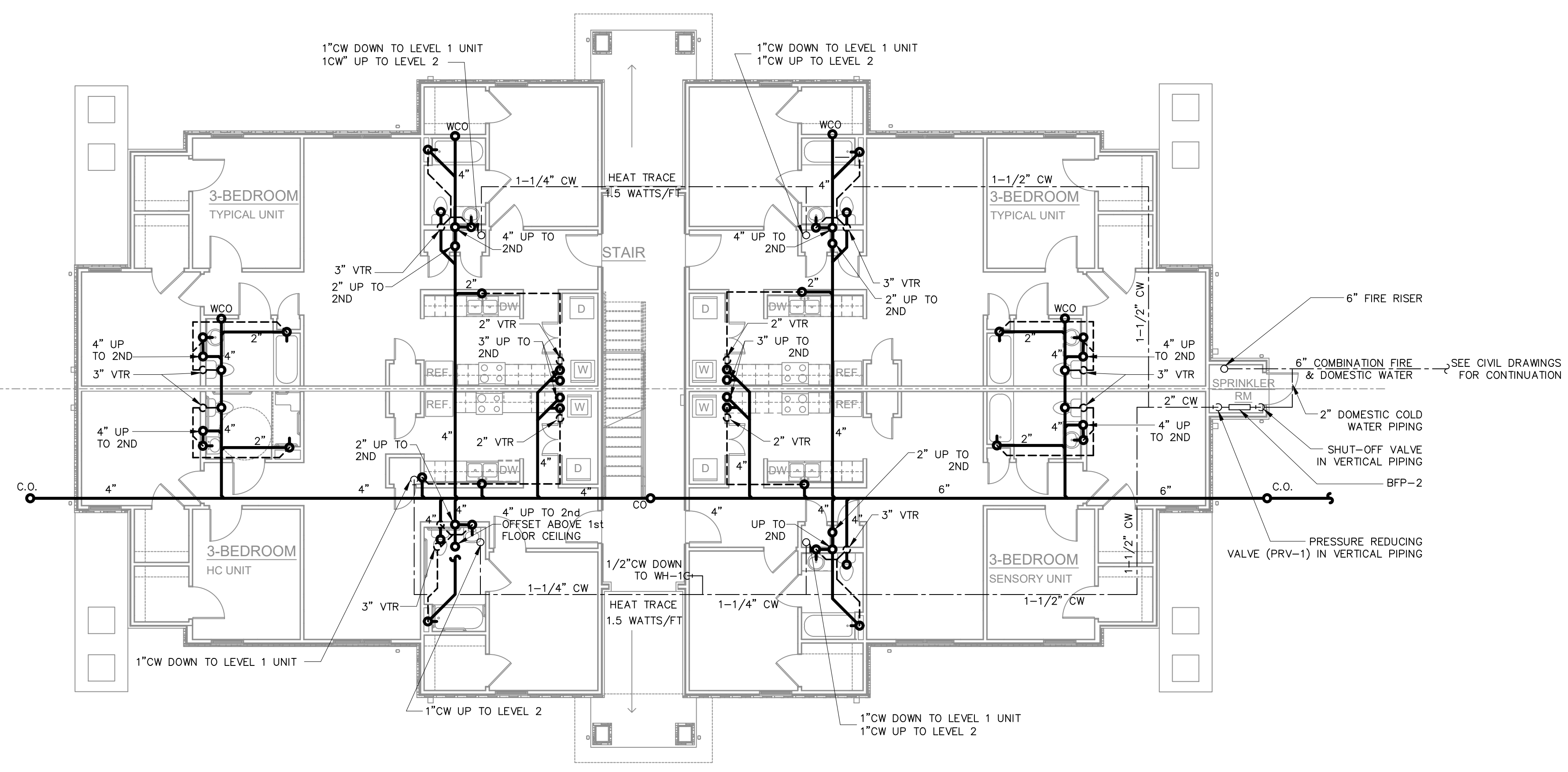
P02

CAD FILE NUMBER



2 BUILDING A - LEVEL 2
 1/8" = 1'-0"

NOTE: SEE 1/4" SCALE UNIT PLANS FOR PLUMBING FIXTURE TAGS



1 BUILDING A - LEVEL 1
 1/8" = 1'-0"

NOTE: SEE 1/4" SCALE UNIT PLANS FOR PLUMBING FIXTURE TAGS

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 RE-ISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

PROJECT NUMBER
597

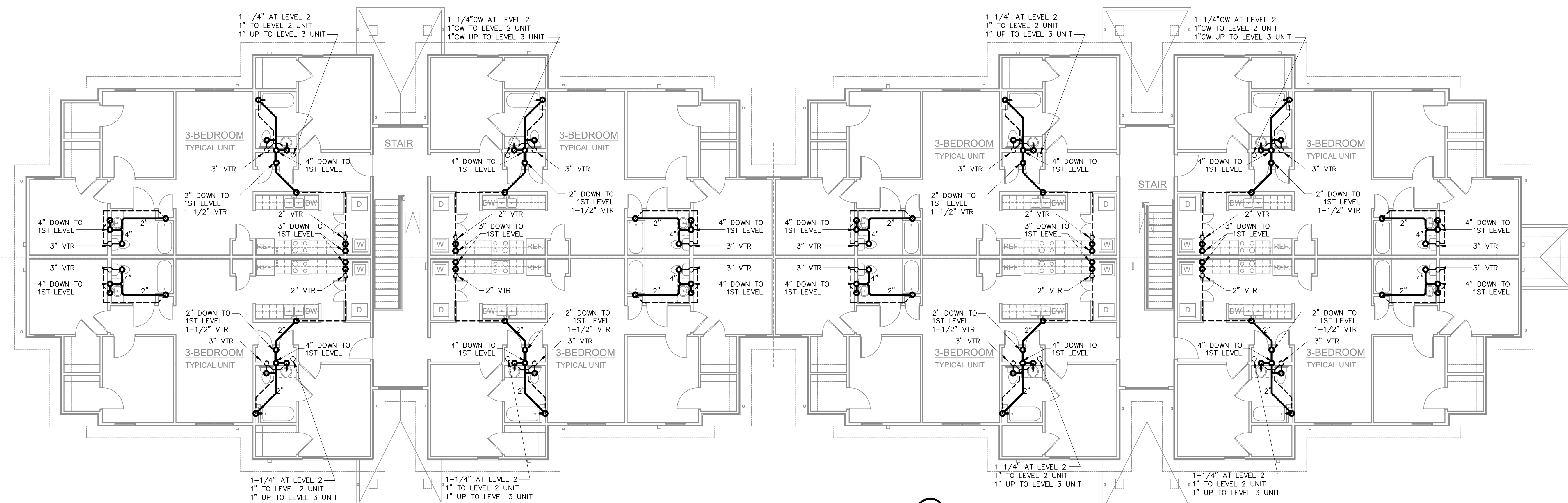
PROJECT
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SHEET NUMBER

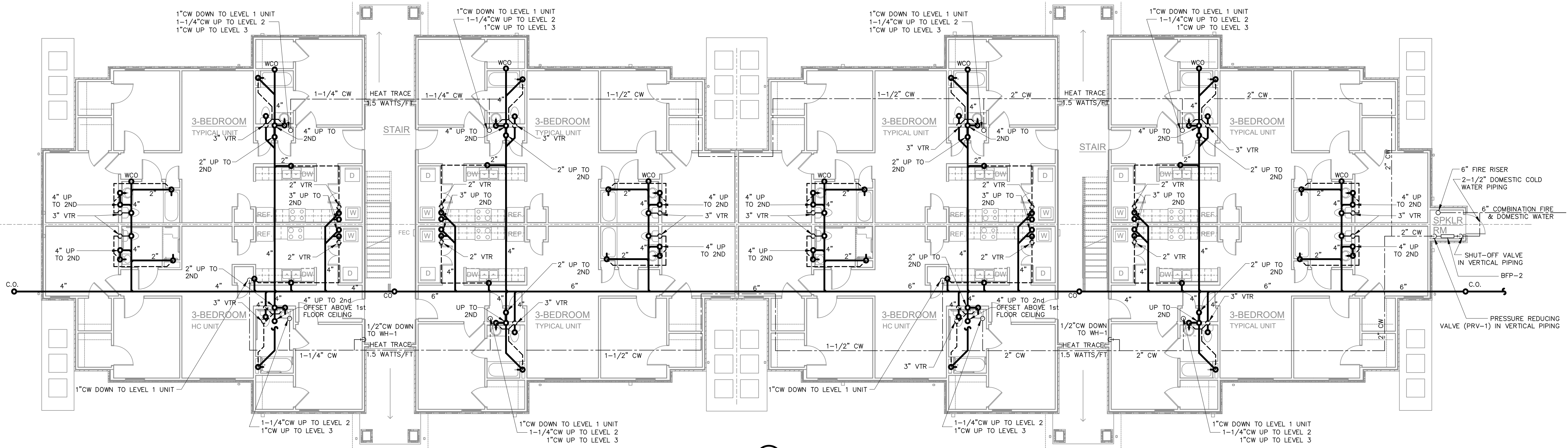
P03

CAD FILE NUMBER



2 BUILDING B - LEVEL 2 & 3
 18" x 12"

NOTE: SEE 1/4" SCALE UNIT PLANS FOR PLUMBING FIXTURE TAGS



1 BUILDING B - LEVEL 1
 18" x 12"

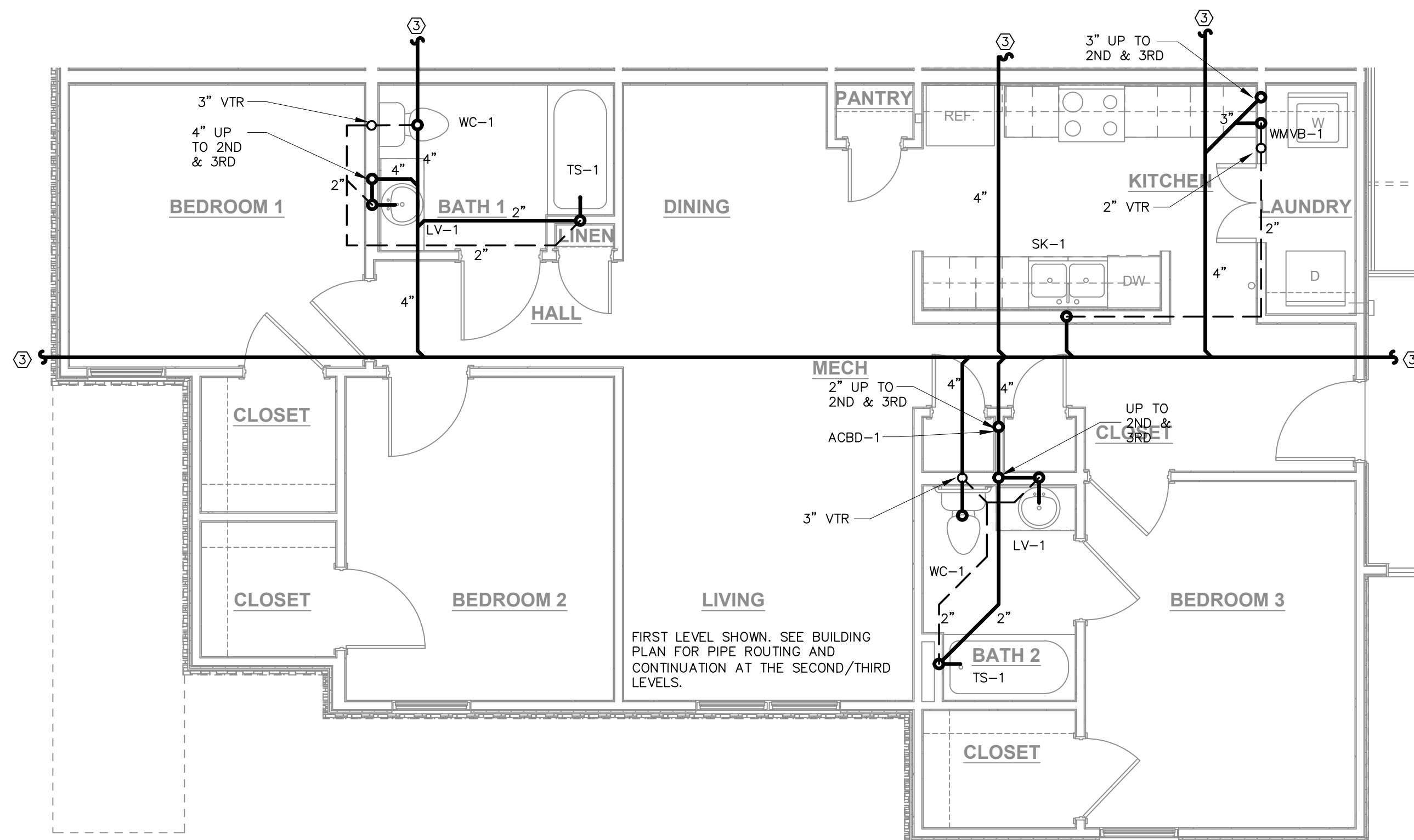
NOTE: SEE 1/4" SCALE UNIT PLANS FOR PLUMBING FIXTURE TAGS

DATE
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 2 05/22/19 RE-ISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

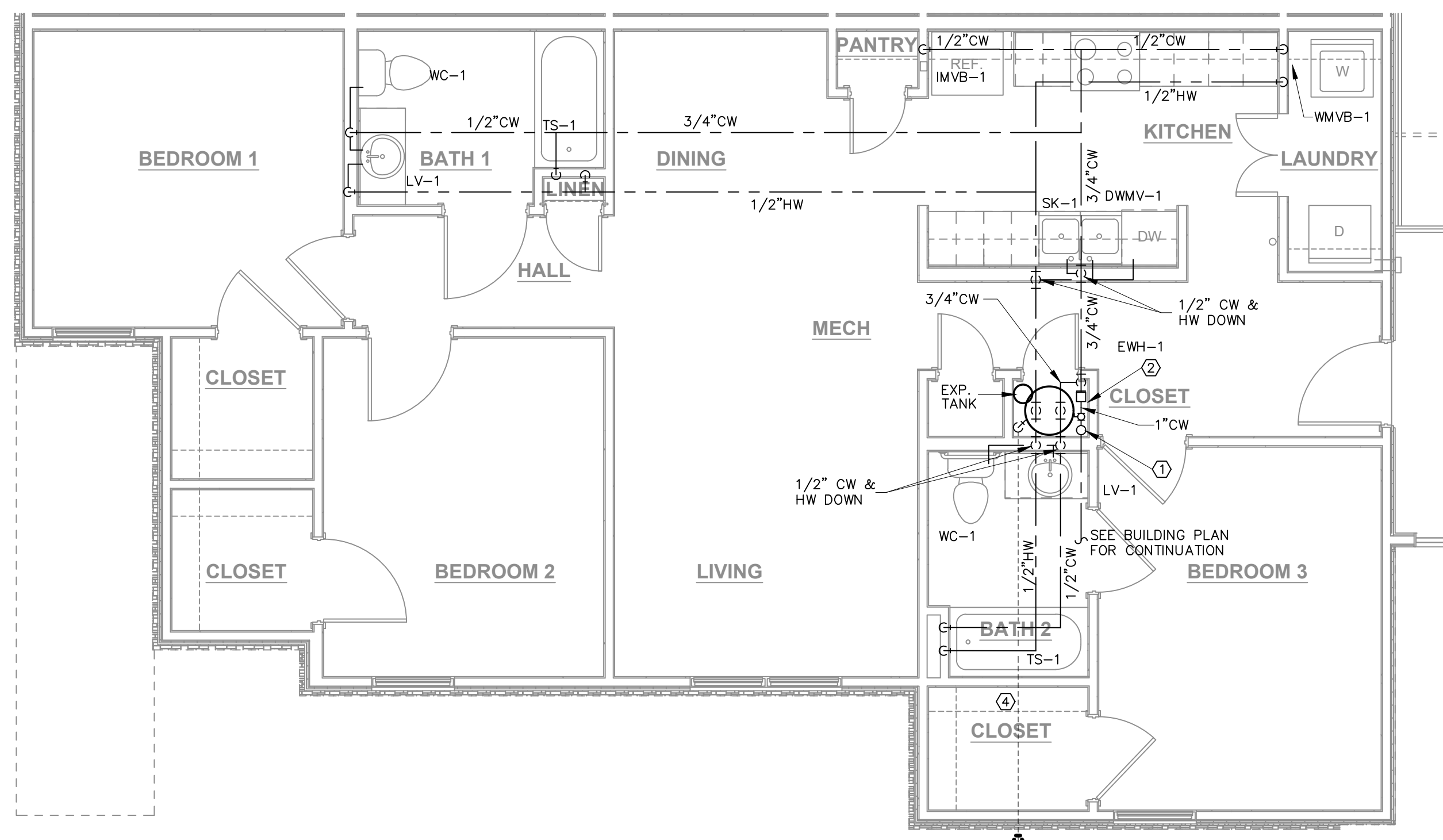
PROJECT NUMBER
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 PROJECT
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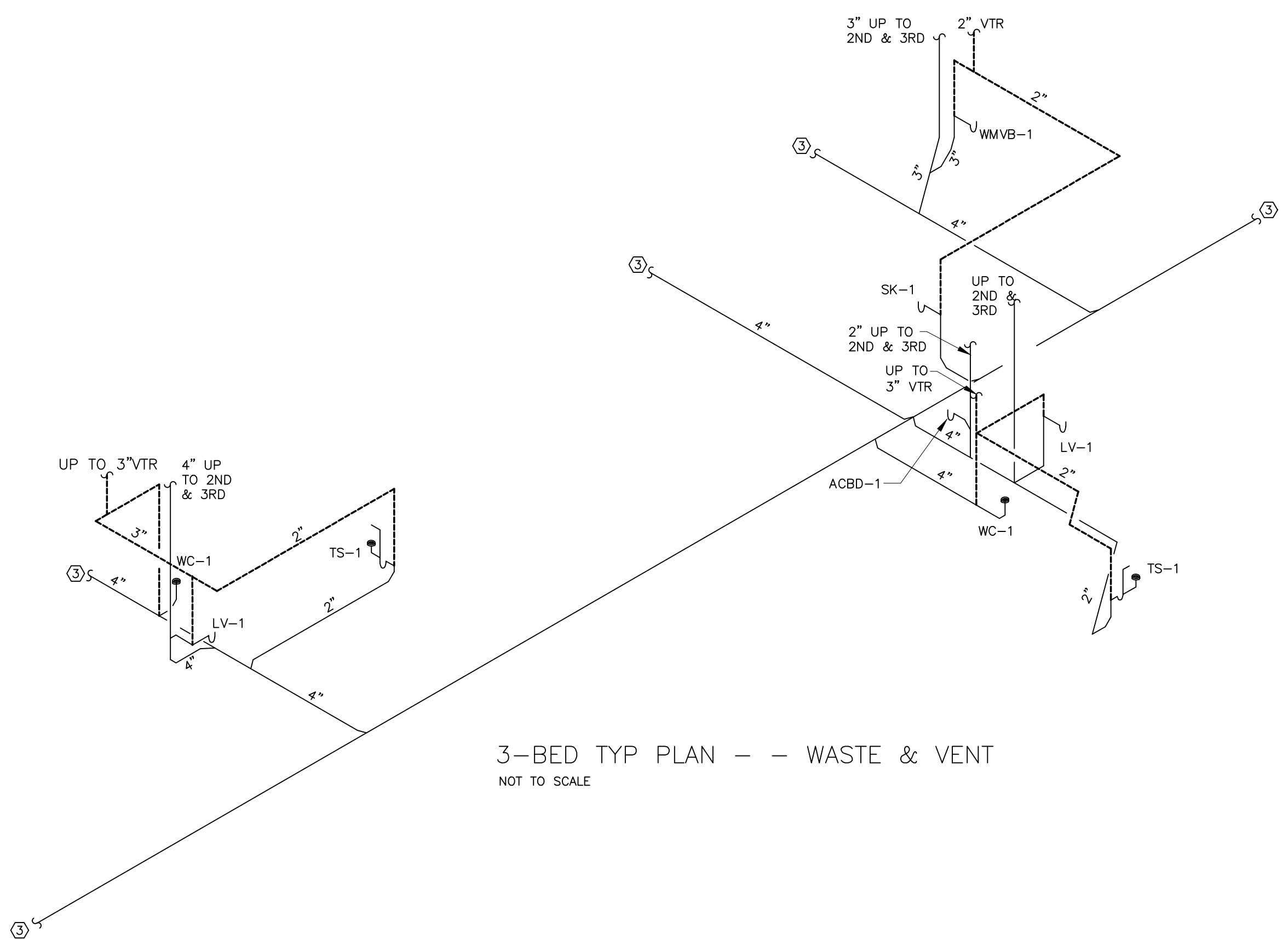
SHEET NUMBER
P04
 CAD FILE NUMBER



2 3-BED TYP PLAN - WASTE & VENT
 1/4" = 1'-0"



1 3-BED TYP PLAN - COLD & HOT WATER
 1/4" = 1'-0"



3-BED TYP PLAN - WASTE & VENT
 NOT TO SCALE

GENERAL NOTES:

1. ROUTE DOMESTIC WATER PIPING WITHIN THE CEILING/FLOOR ASSEMBLY OR ATTIC WITHIN THE INSULATED ENVELOPE OF THE BUILDING.

DRAWING KEYNOTES:

- ① COLD WATER PIPING UP TO SECOND AND THIRD FLOOR AT BUILDING A; UP TO SECOND FLOOR AT BUILDING B.
- ② SHUT-OFF VALVE AND SUB-METER AT UNIT. MOUNT ABOVE THE WATER HEATER FOR ACCESS/MAINTENANCE.
- ③ SEE BUILDING PLANS AND CIVIL DRAWINGS FOR CONTINUATION.
- ④ 1" PVC WATER HEATER DRAIN PAN PIPING (SLOPED) BELOW THE SLAB TO THE EXTERIOR.

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 RE-ISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

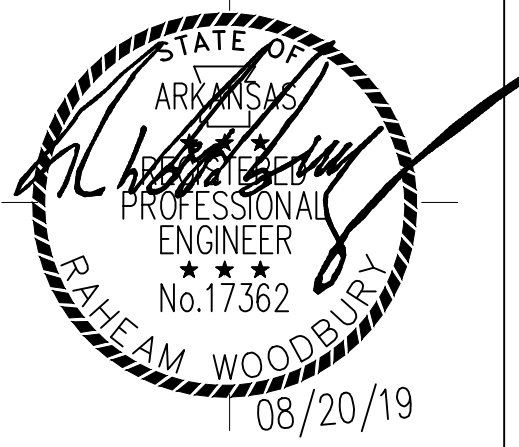
PROJECT NUMBER
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SHEET NUMBER

P05

CAD FILE NUMBER



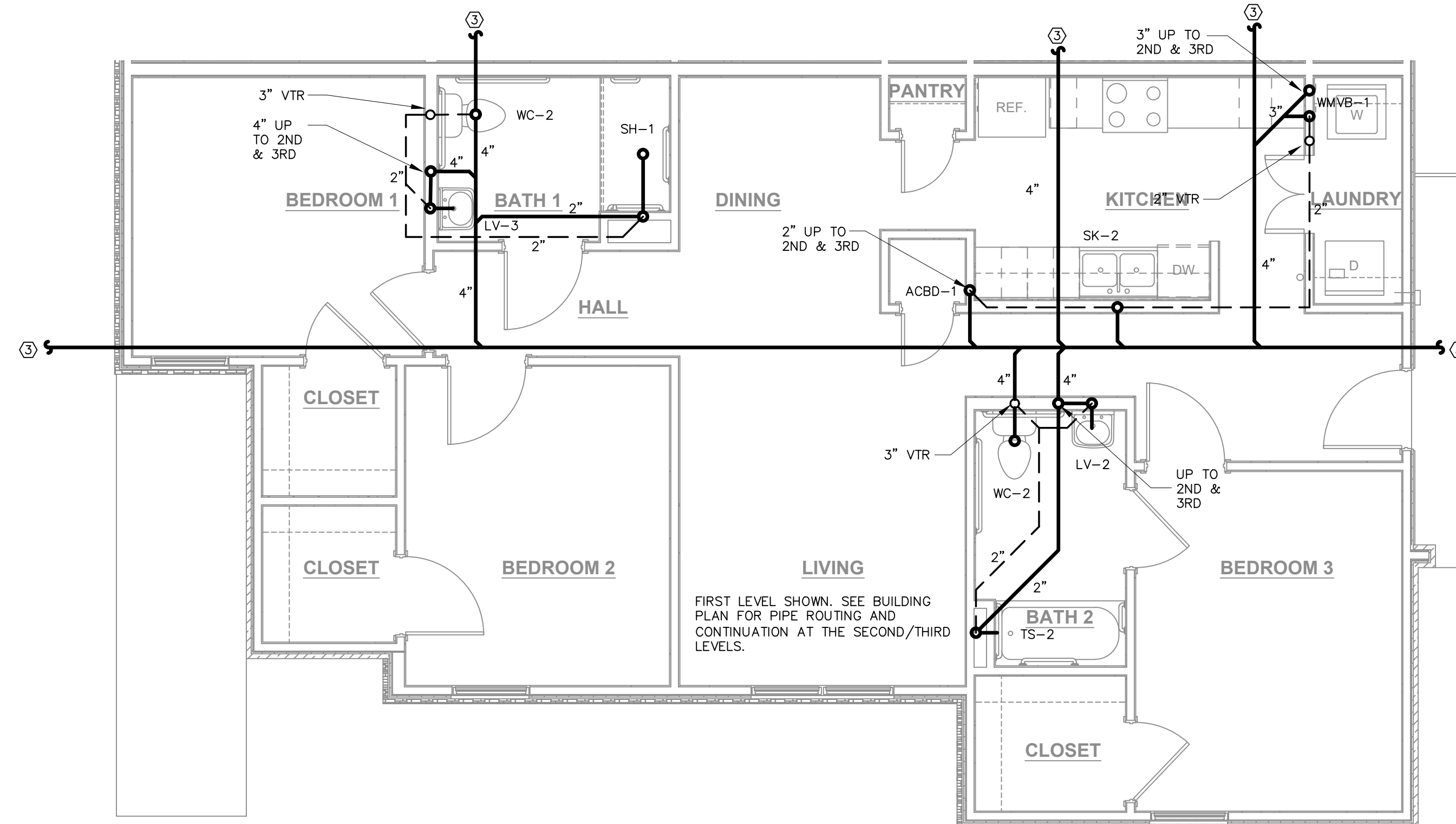
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GENERAL NOTES:

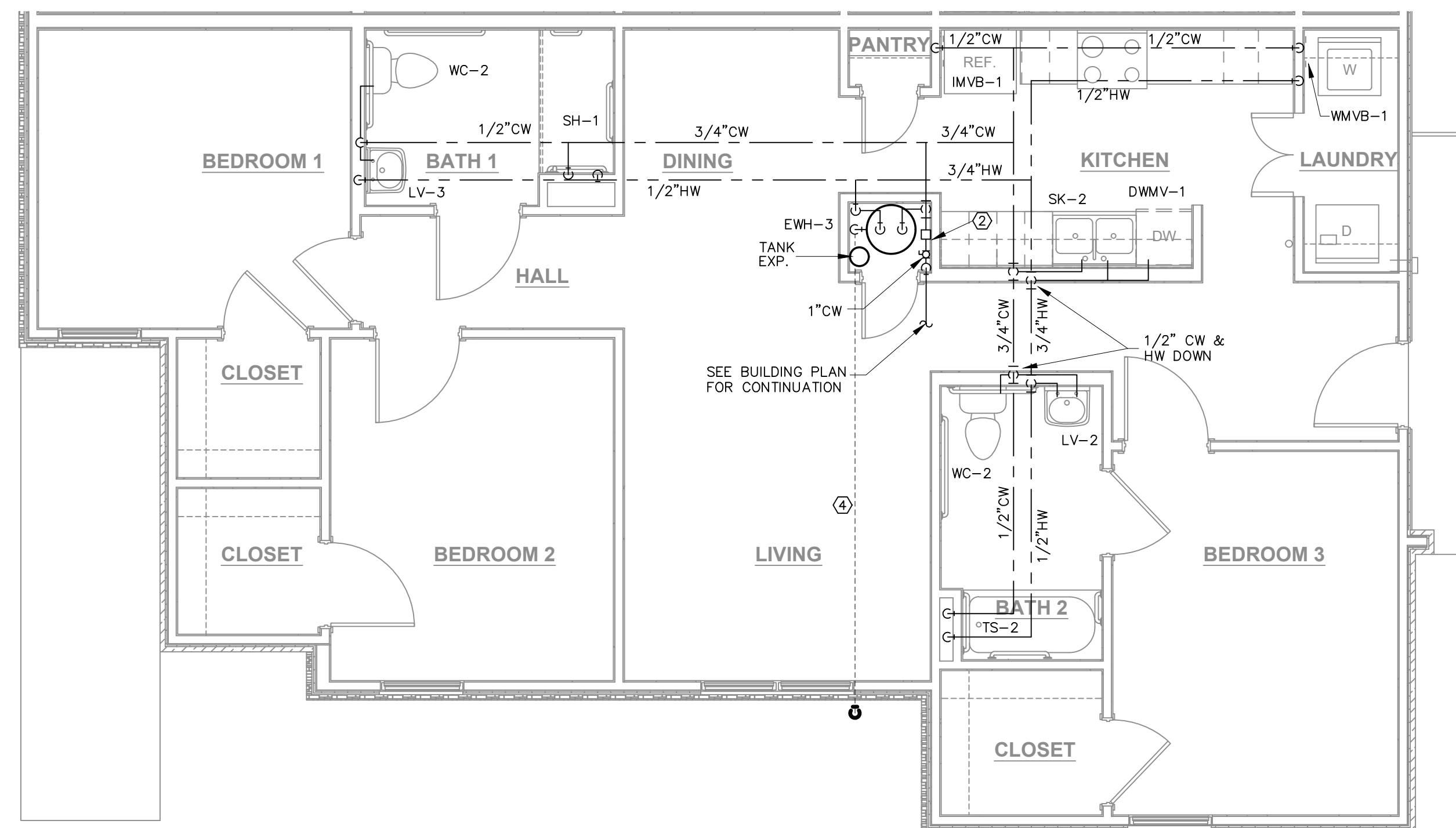
1. ROUTE DOMESTIC WATER PIPING WITHIN THE CEILING/FLOOR ASSEMBLY OR ATTIC WITHIN THE INSULATED ENVELOPE OF THE BUILDING.

DRAWING KEYNOTES:

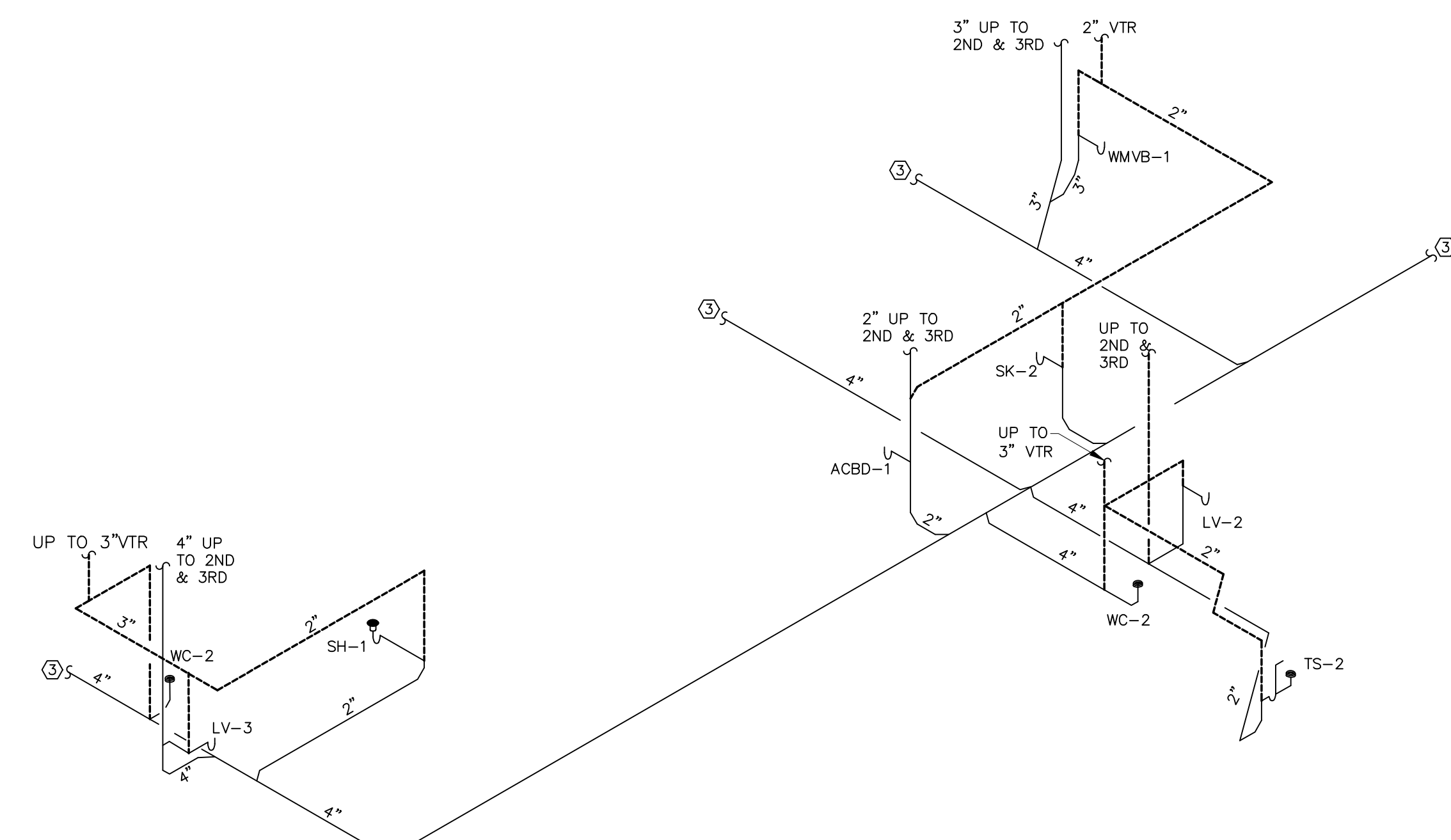
- ① COLD WATER PIPING UP TO SECOND AND THIRD FLOOR AT BUILDING A; UP TO SECOND FLOOR AT BUILDING B.
- ② SHUT-OFF VALVE AND SUB-METER AT UNIT. MOUNT ABOVE THE WATER HEATER FOR ACCESS/MAINTENANCE.
- ③ SEE BUILDING PLANS AND CIVIL DRAWINGS FOR CONTINUATION.
- ④ 1" PVC WATER HEATER DRAIN PAN PIPING (SLOPED) BELOW THE SLAB TO THE EXTERIOR.



2 3-BED HC PLAN - WASTE & VENT
 P06 1/4" = 1'-0"



1 3-BED HC PLAN - COLD & HOT WATER
 P06 1/4" = 1'-0"



3-BED HC PLAN - WASTE & VENT
 NOT TO SCALE

DATE
 1 11/20/18 PERMIT SET
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 3 08/20/19 ADDENDUM 1

PROJECT NUMBER

597

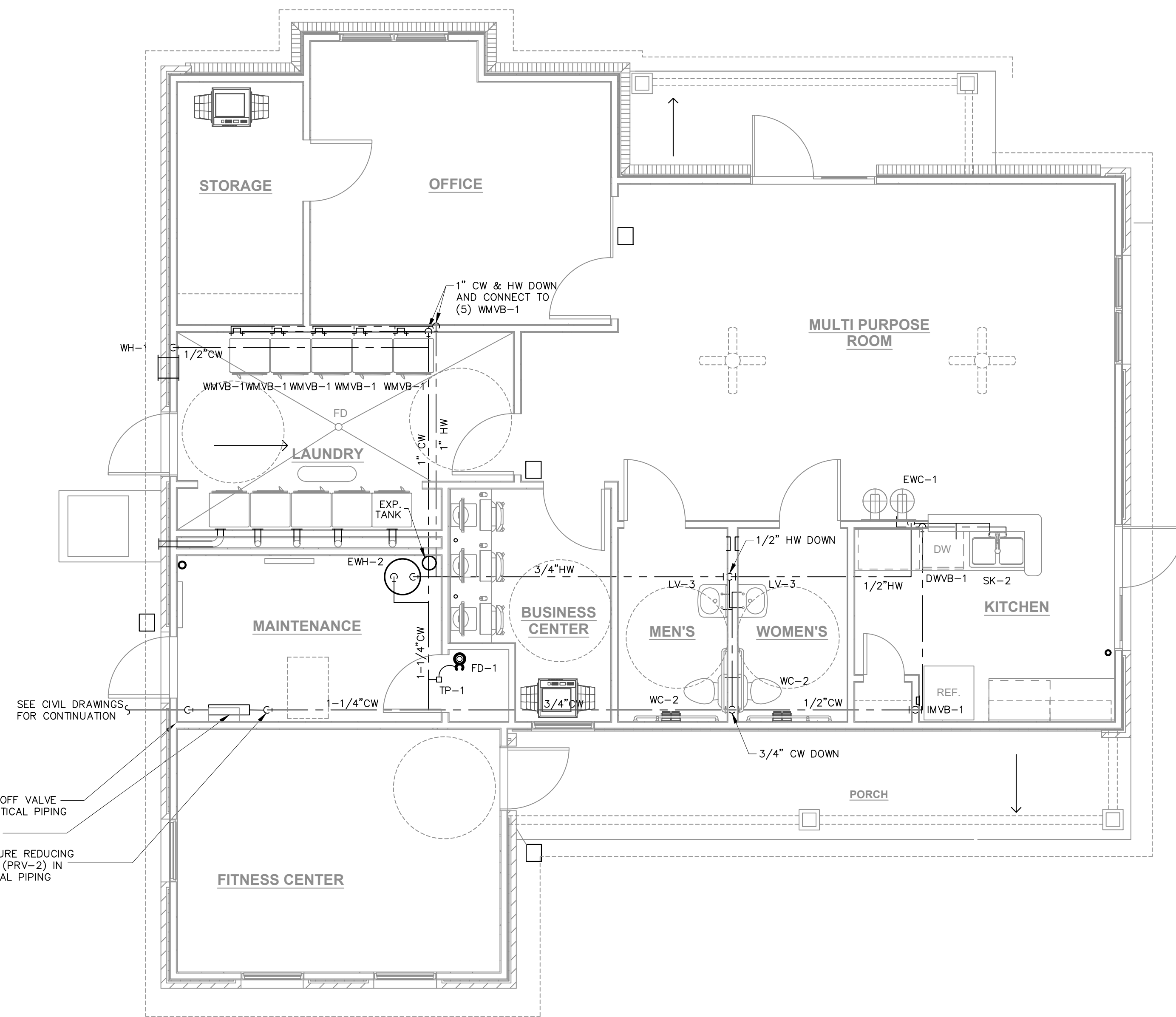
PROJECT
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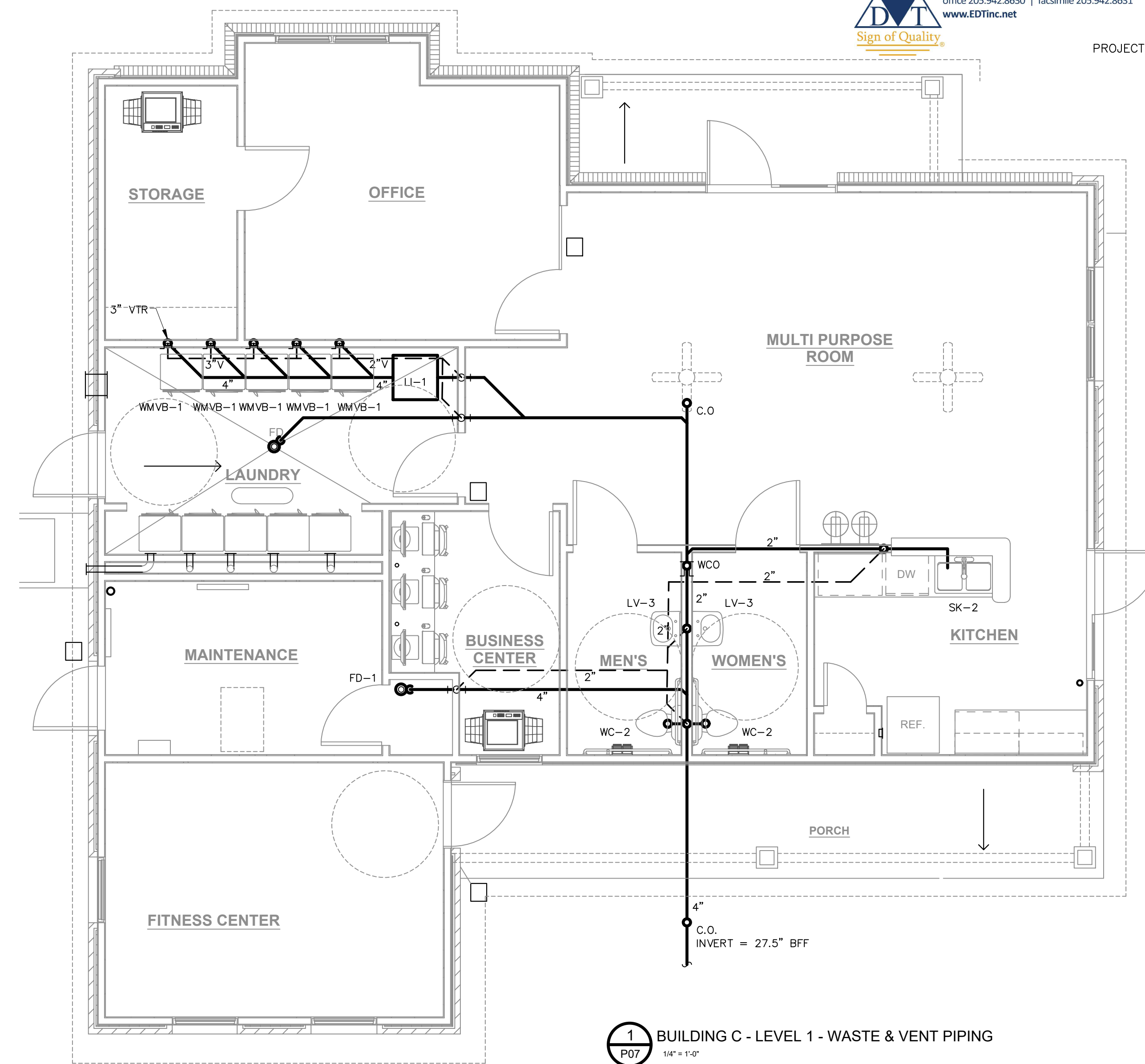
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P06

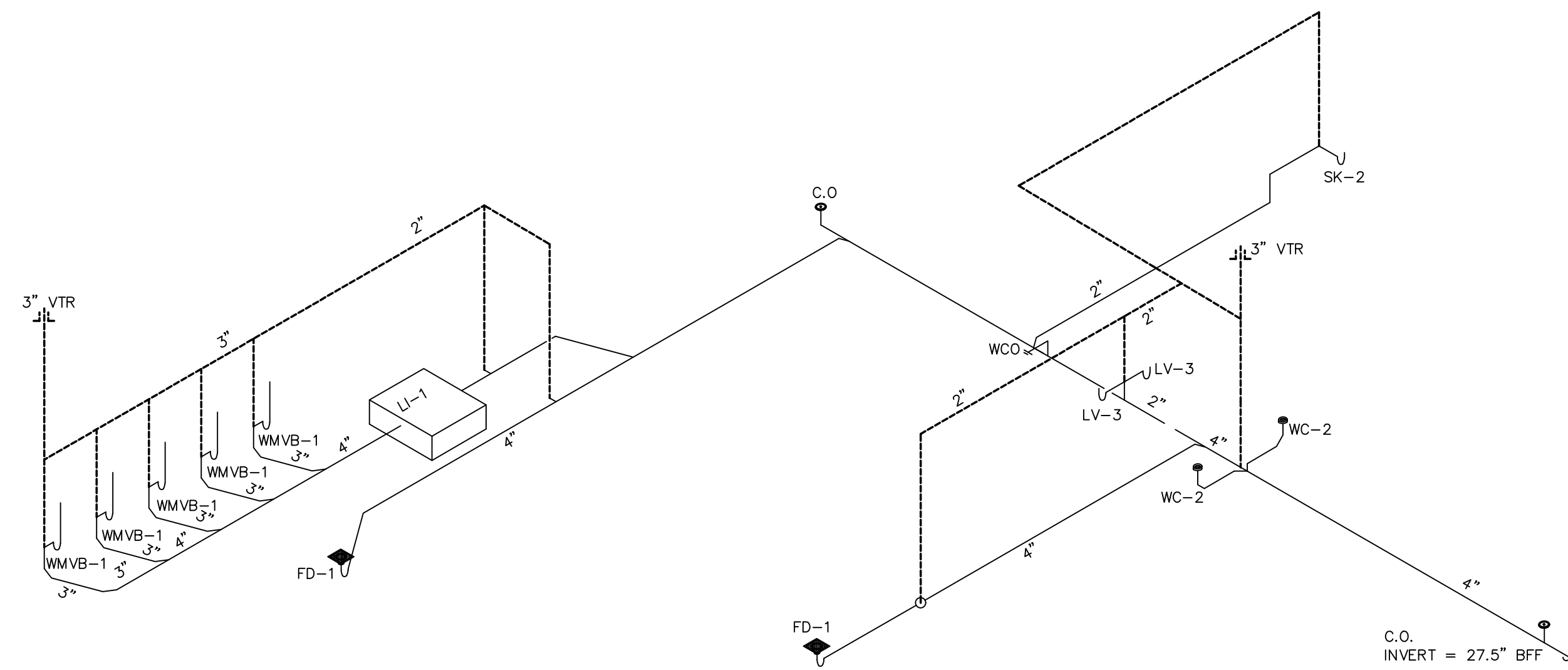
CAD FILE NUMBER



2 BUILDING C - LEVEL 1 - COLD & HOT WATER
 P07 1/4" = 1'-0"



1 BUILDING C - LEVEL 1 - WASTE & VENT PIPING
 P07 1/4" = 1'-0"



3 BUILDING C - LEVEL 1 - WASTE & VENT RISER DIAGRAM
 P07 NOT TO SCALE

SEE CIVIL DRAWINGS FOR CONTINUATION

SHUT-OFF VALVE IN VERTICAL PIPING
 BFP-2

PRESSURE REDUCING VALVE (PRV-2) IN VERTICAL PIPING

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 RE-ISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

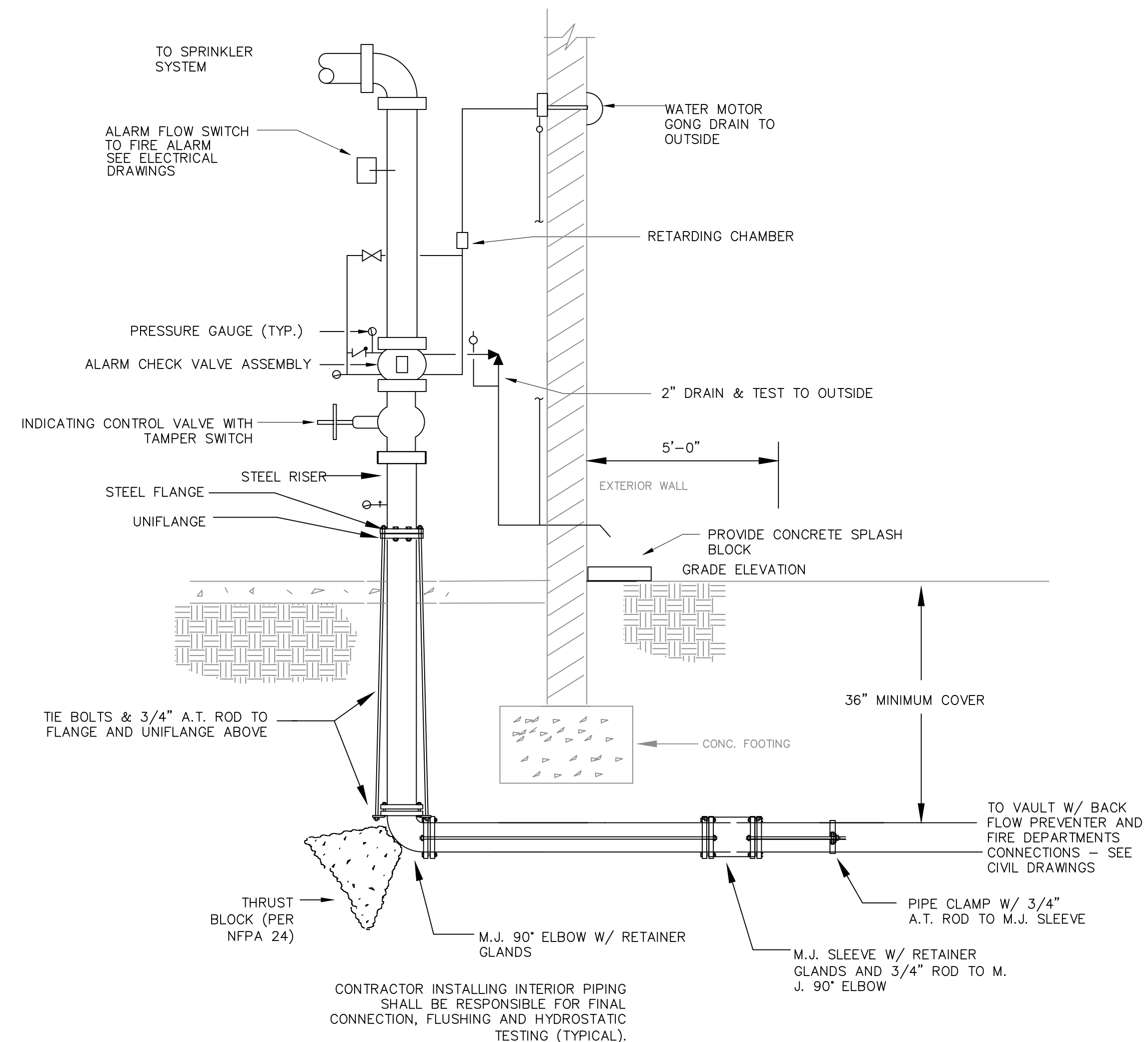
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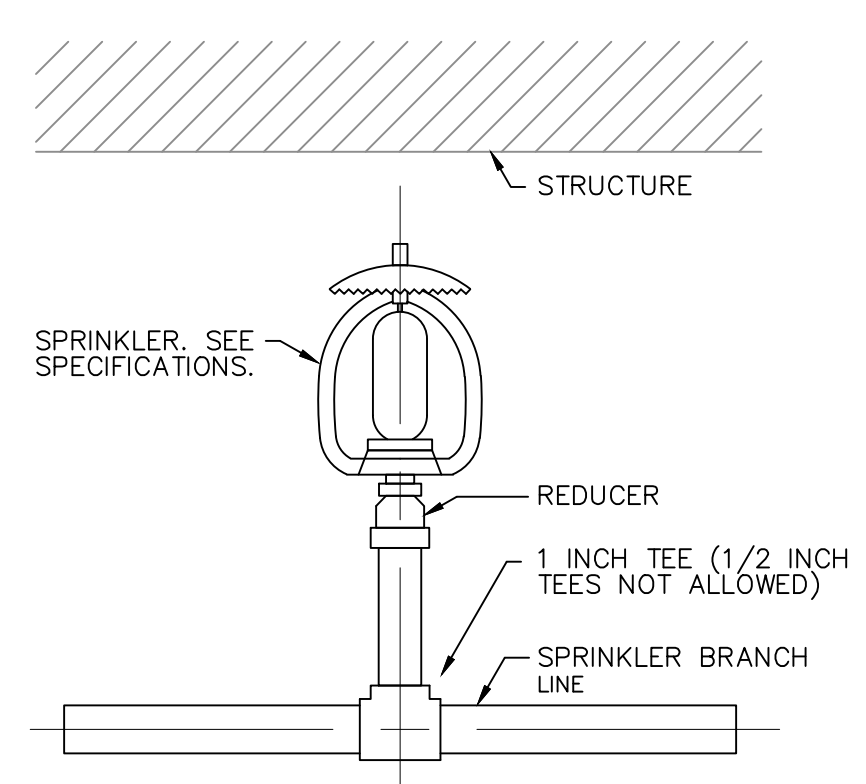
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P07

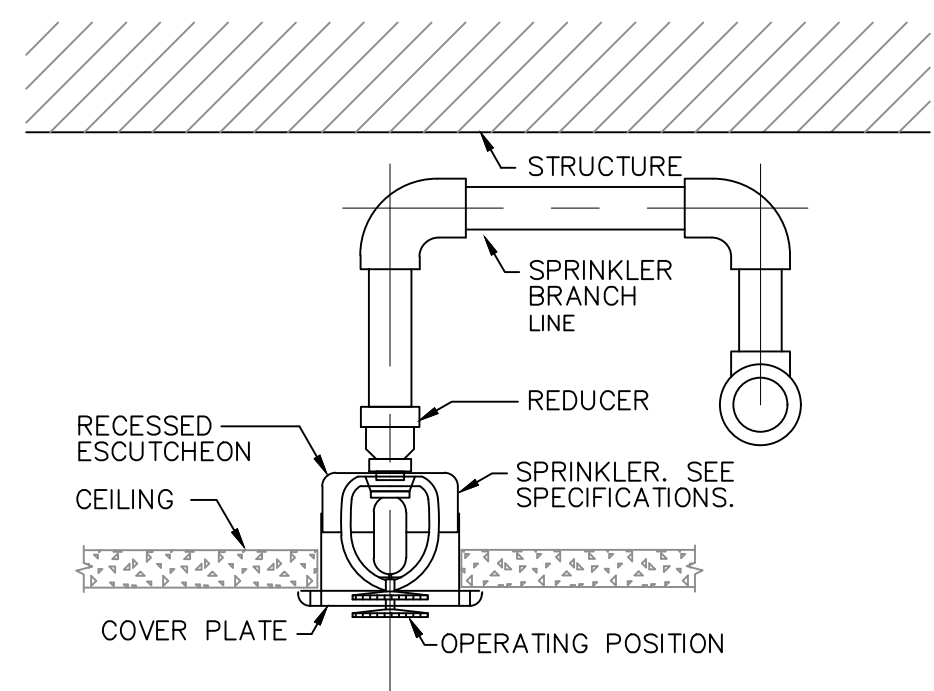
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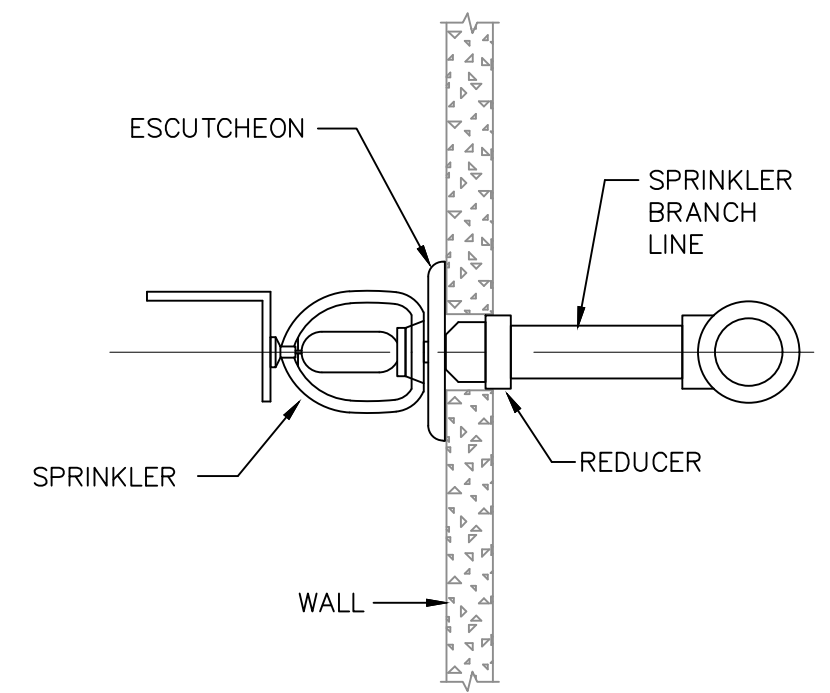
1 FIRE PROTECTION ENTRANCE DETAIL VALVE
 FP01 NO SCALE



2 UPRIGHT SPRINKLER HEAD
 FP01 NO SCALE



3 CONCEALED SPRINKLER HEAD
 FP01 NO SCALE



4 SIDEWALL SPRINKLER HEAD
 FP01 NO SCALE

GENERAL NOTES:

- 1 FIRE PROTECTION LAYOUTS SHOWN ON PLANS ARE FOR INFORMATIONAL PURPOSES ONLY. IT IS THE INTENT OF THESE DRAWINGS TO INDICATE AREAS OF COVERAGE, TYPES OF SPRINKLER HEADS AND FINISHES TO BE USED, TYPES OF FIRE PROTECTION SYSTEMS TO BE INSTALLED AND LOCATIONS OF MAJOR EQUIPMENT AND COMPONENTS. THE FIRE PROTECTION CONTRACTOR SHALL DESIGN A FULL AND COMPLETE FIRE PROTECTION SYSTEM BASED ON HYDRAULIC INFORMATION, LAYOUT OF PIPING SYSTEM AS COORDINATED WITH OTHER TRADES AND SPECIFIC COMPONENTS USED IN FIRE PROTECTION SYSTEM. ALL DESIGNS SHALL BE PER NFPA-13R.
- 2 PIPING LAYOUT SHOWN IS DIAGRAMMATIC AND NOT INTENDED TO SHOW ALL OFFSETS AND CHANGES IN ELEVATION NECESSARY FOR COMPLETE INSTALLATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO SUBMITTING BID.
- 3 CONTRACTOR SHALL PROVIDE NECESSARY OFFSETS IN NEW PIPING AND ELECTRICAL CONDUIT AS REQUIRED TO ACCOMMODATE NEW WORK. CONTRACTOR SHALL ALLOW FOR ANY CONFLICTS ENCOUNTERED.
- 4 REFER TO ARCHITECT'S REFLECTED CEILING PLAN FOR LOCATION OF LIGHTS, DIFFUSERS, GRILLES AND ALL OTHER CEILING MOUNTED DEVICES. COORDINATE WITH THE REFLECTED CEILING PLAN TO DETERMINE ACTUAL LOCATION OF SPRINKLERS.
- 5 ALL NEW FIRE PROTECTION PIPING SHALL BE INSTALLED AS CLOSE TO STRUCTURE ABOVE AS POSSIBLE.
- 6 ALL UNUSED FIRE PROTECTION PIPING, WHETHER NEW OR EXISTING, SHALL BE REMOVED. ALL SPRINKLER HEADS INSTALLED UNDER THIS CONTRACT SHALL BE NEW.
- 7 SPACE ABOVE CEILING IS LIMITED. CAREFUL COORDINATION WITH LIGHTING, ELECTRICAL, PLUMBING, STRUCTURE, AND ARCHITECTURAL TRADES IS CRITICAL TO COMPLETE INSTALLATION.
- 8 COORDINATION SHOP DRAWINGS SHALL BE PREPARED FOR THE ENTIRE PROJECT DRAWN TO 1/4" = 1'-0" SCALE (MINIMUM). DRAWINGS SHALL BE FULLY DIMENSIONED, INCLUDING ELEVATIONS OF DUCTWORK, PIPING, MAJOR HANGER SUPPORTS, PNEUMATIC TUBING AND MAJOR ELECTRICAL CONDUIT (2" AND LARGER). CEILING COORDINATION PLANS SHALL ALSO SHOW CEILING GRID, LIGHTING LAYOUT, SPRINKLER LAYOUT AND MECHANICAL GRILLES.
- 9 GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COLLECTION VERIFICATION AND SUBMITTAL OF SHOP DRAWINGS TO OWNER, ARCHITECT AND ENGINEER.
- 10 SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH NFPA 72.
- 11 WHERE REFERENCED SYSTEM SHALL COMPLY WITH NFPA 70.
- 12 ALL SPRINKLERS WITHIN THE SCOPE OF THIS PROJECT SHALL BE QUICK RESPONSE TYPE. SPRINKLER HEADS USED SHALL COMPLY WITH REQUIREMENTS OF NFPA-13R (APARTMENT BUILDINGS)
- 13 CONTRACTOR SHALL PROVIDE TEST AND DRAIN CONNECTION IN ACCORDANCE WITH NFPA-13R. DRAIN SHALL DISCHARGE TO A LOCATION CAPABLE OF ACCEPTING FULL FLOW UNDER NORMAL SYSTEM PRESSURE WITHOUT CAUSING WATER DAMAGE.

CONTRACTOR SHALL PROVIDE FIELD CONDUCTED FLOW TEST FOR THE SYSTEM DESIGN:

LOCATION: _____

STATIC PRESSURE: _____

RESIDUAL PRESSURE: _____

FLOWING: _____ G.P.M.

DATE OF TEST: _____

TIME OF DAY: _____

SPRINKLER NOTES:

1. PROVIDE SPRINKLER COVERAGE FOR BUILDING IN ACCORDANCE WITH 13R SYSTEM FOR THE APARTMENT BUILDINGS AND SPECIFICATION REQUIREMENTS.
2. ROUTE WET SYSTEM MAIN PIPING OUTSIDE ELECTRICAL AND TELECOM ROOMS. SPRINKLERS IN ELECTRICAL AND TELECOM ROOMS SHALL BE SUPPLIED BY PIPING THAT TERMINATES IN THE ROOM AND DOES NOT PASS DIRECTLY OVER ELECTRICAL PANELS (TYPICAL FOR ALL).
3. SEE CIVIL DRAWINGS FOR LOCATION AND PIPING ARRANGEMENT OF FDC AND BACKFLOW PREVENTER. FIRE PROTECTION CONTRACTOR SHALL COORDINATE EXACT LOCATION PRIOR TO INSTALLATION.
4. ALL BRANCH LINES SHALL BE RUN IN JOIST SPACE WHERE POSSIBLE. COORDINATE WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS.
5. WET SYSTEM PIPING SHALL BE INSTALLED WITHIN THE HEATED ENVELOPE OF THE BUILDING EXCEPT AT APARTMENT BUILDING BREEZEWAY CROSSING - THE WET SYSTEM PIPING SHALL BE HEAT TRACED FOR FREEZE PROTECTION.
6. FIRE STOP AND SEAL ALL PENETRATIONS IN RATED WALLS IN ACCORDANCE WITH SPECIFICATIONS.
7. ALL MATERIALS, WORKMANSHIP AND TESTING SHALL MEET THE REQUIREMENTS OF APPLICABLE STATE/LOCAL CODES.
8. PROVIDE DRY-SIDEWALL/DRY-PENDENT SPRINKLERS FOR PROTECTION OF EXTERIOR BALCONIES AND GROUND FLOOR PATIOS WHERE REQUIRED BY 2018 IBC.

FIRE PROTECTION LEGEND

- FP— FIRE PROTECTION PIPING
- ⚡ FLOW SWITCH
- ⊗ INSPECTOR'S TEST VALVE
- ⊕ VALVE WITH TAMPER SWITCH
- PENDENT SPRINKLER HEAD
- CONCEALED SPRINKLER WITH WHITE COVER PLATE
- ◐ SEMI-RECESSED SPRINKLER HEAD
- UPRIGHT SPRINKLER HEAD

OCCUPANCY GUIDELINES

LIGHT HAZARD:
 ADMINISTRATION AREAS
 SEMINAR ROOMS
 LOBBIES
 WAITING AREAS
 LABORATORIES
 RESTROOMS
 CORRIDORS
 STAIRWAYS

ORDINARY HAZARD GROUP 1
 STORAGE ROOM - EQUAL OR LESS THAN 100 SF
 ELECTRICAL ROOMS
 TELEPHONE AND DATA ROOMS

ORDINARY HAZARD GROUP 2
 ELECTRICAL SWITCH GEAR AND TRANSFORMER ROOMS
 STORAGE ROOM OVER 100 SF
 CENTRAL MECHANICAL EQUIPMENT ROOMS
 ELEVATOR EQUIPMENT ROOMS

FIRESTOP NOTES:

1. PROVIDE THROUGH-PENETRATION FIRESTOP SYSTEMS FOR PIPING AND CONDUIT PENETRATIONS THROUGH FIRE-RESISTANCE-RATED ASSEMBLIES:
 - A. FLOORS
 - B. ROOFS
 - C. WALLS AND PARTITIONS
2. FIRESTOP SYSTEMS PROVIDED SHALL RESIST SPREAD OF FIRE, RESIST PASSAGE OF SMOKE AND OTHER GASES, AND MAINTAIN ORIGINAL FIRE-RESISTANCE RATING OF ASSEMBLY PENETRATED. WHERE RATING OF EXISTING BUILDING COMPONENT PENETRATED IS NOT KNOWN CONTACT ARCHITECT FOR DETERMINATION.
3. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF SMOKE WALLS WHERE PROVIDED.

DATE
 1 11/20/18 PERMIT SET
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 3 08/20/19 ADDENDUM 1

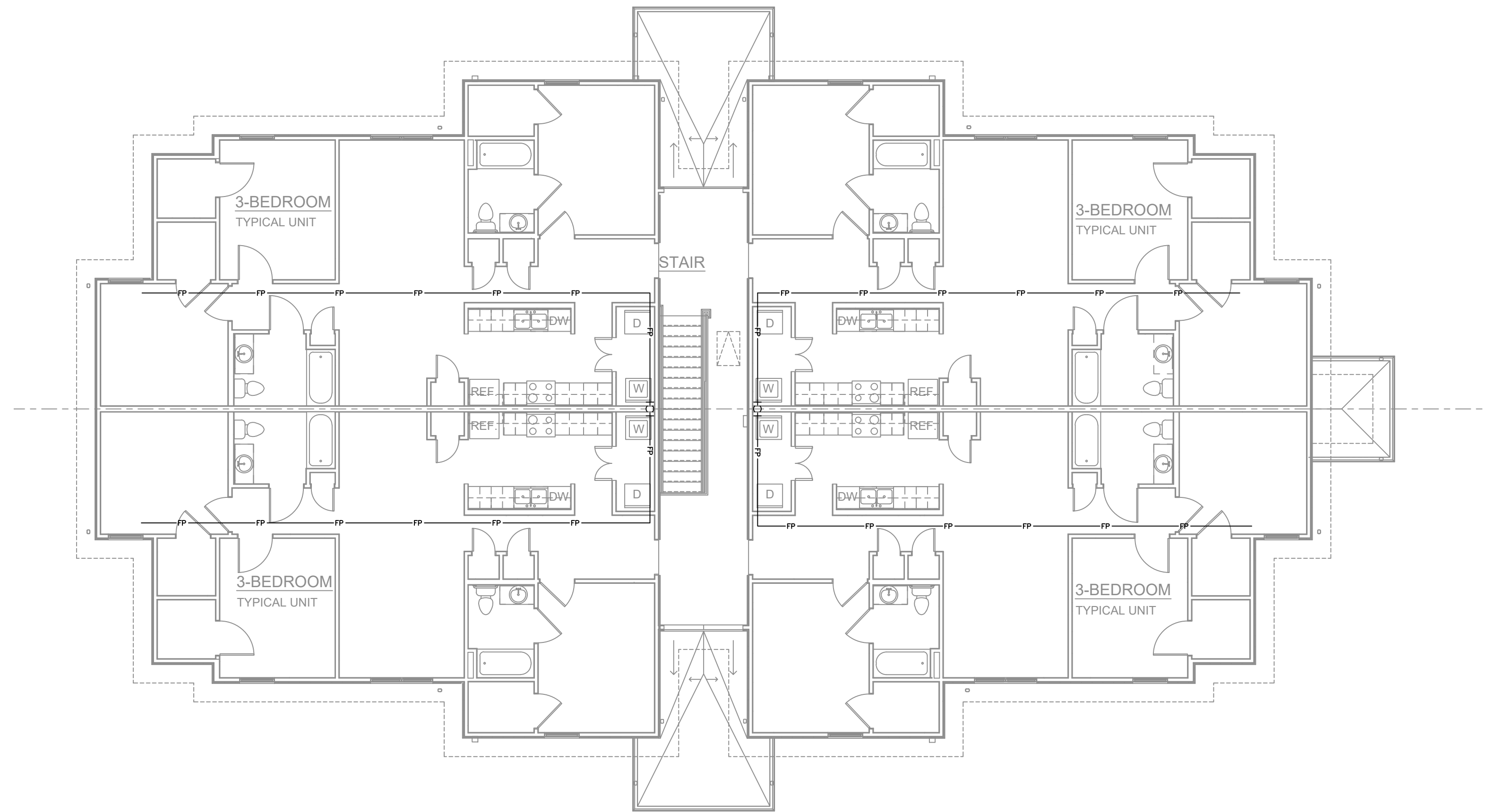
PROJECT NUMBER
597
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 Frisco Park

418 S. Avalon Street,
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SHEET NUMBER
FP01
 CAD FILE NUMBER

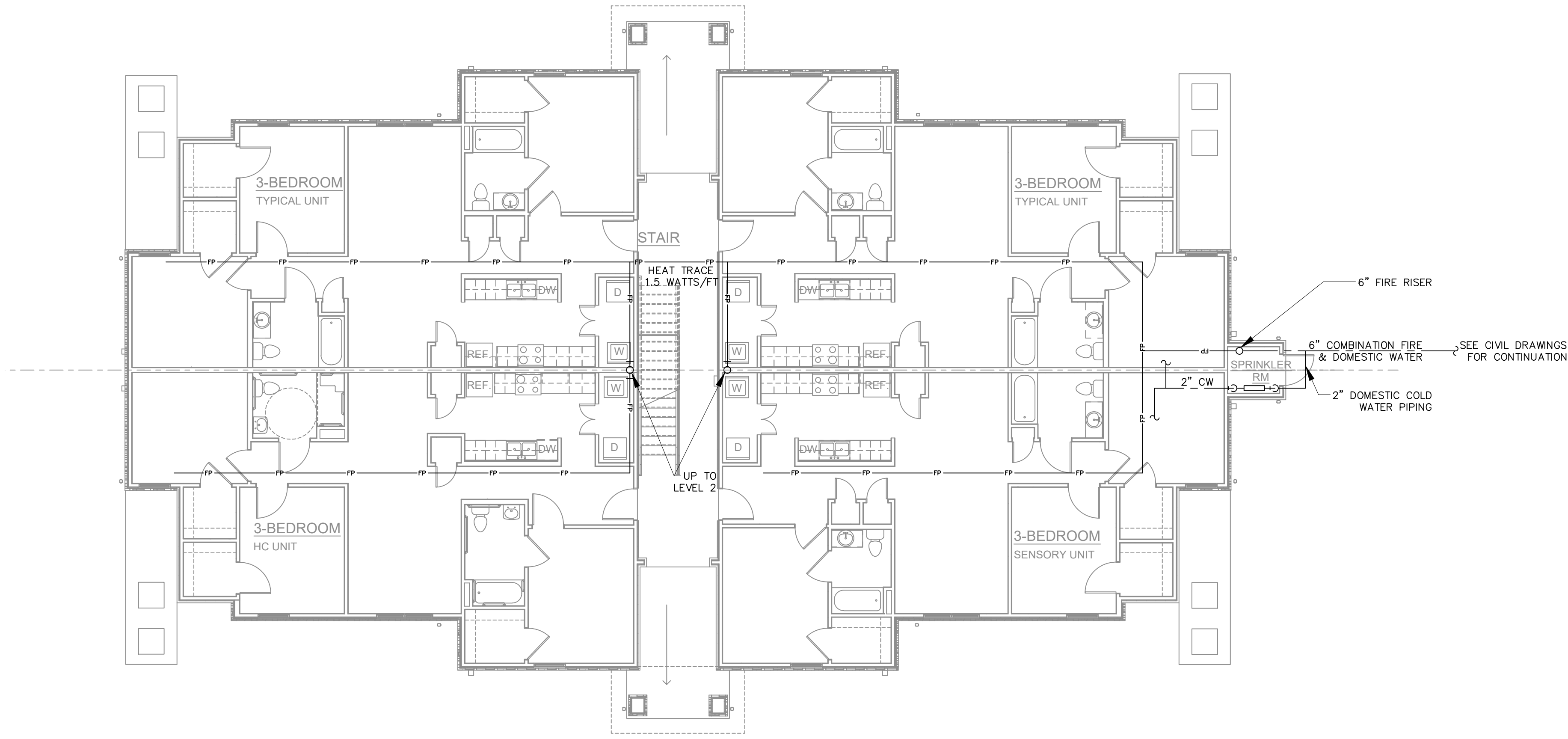


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2 BUILDING A - LEVEL 2
 FP02 1/8" = 1'-0"

THE SPRINKLER MAINS SHOWN ON THIS DRAWING ARE A SUGGESTED PIPING LAYOUT. THE FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR DESIGNING THE ENTIRE FIRE PROTECTION SPRINKLER PIPING LAYOUT AND PIPE SIZES IN ACCORDANCE WITH THE HYDRAULIC CALCULATION. THE SYSTEM SHALL BE DESIGNED TO PROVIDE FIRE PROTECTION FOR ENTIRE BUILDING.



1 BUILDING A - LEVEL 1
 FP02 1/8" = 1'-0"

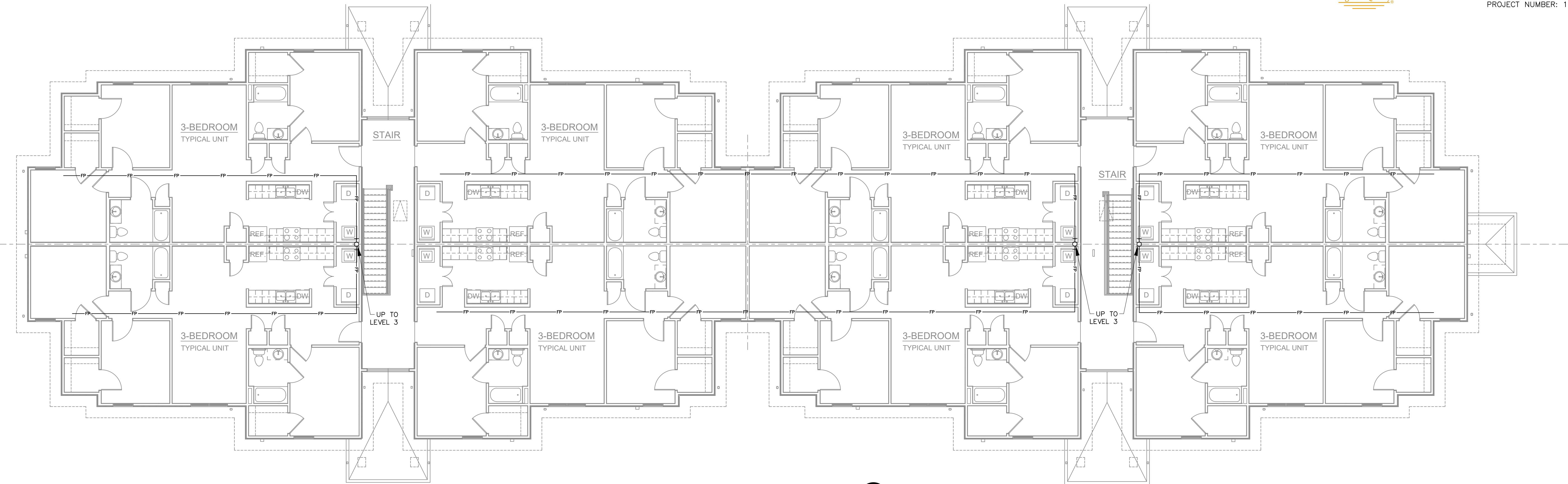
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 PROJECT
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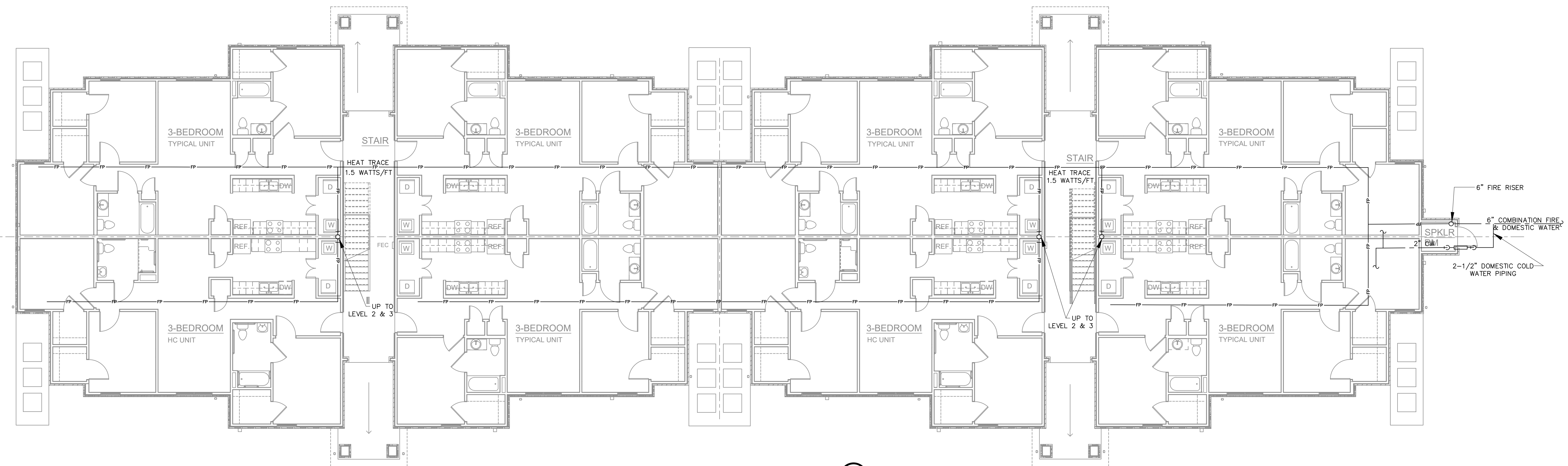
418 S. Avalon Street,
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SHEET NUMBER
FP02
 CAD FILE NUMBER



2 BUILDING B - LEVEL 2 & 3
 FP03 1/8" = 1'-0"

THE SPRINKLER MAINS SHOWN ON THIS DRAWING ARE A SUGGESTED PIPING LAYOUT. THE FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR DESIGNING THE ENTIRE FIRE PROTECTION SPRINKLER PIPING LAYOUT AND PIPE SIZES IN ACCORDANCE WITH THE HYDRAULIC CALCULATION. THE SYSTEM SHALL BE DESIGNED TO PROVIDE FIRE PROTECTION FOR ENTIRE BUILDING.



1 BUILDING B - LEVEL 1
 FP03 1/8" = 1'-0"

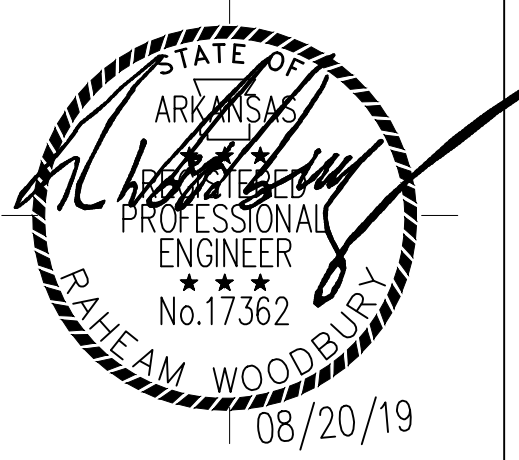
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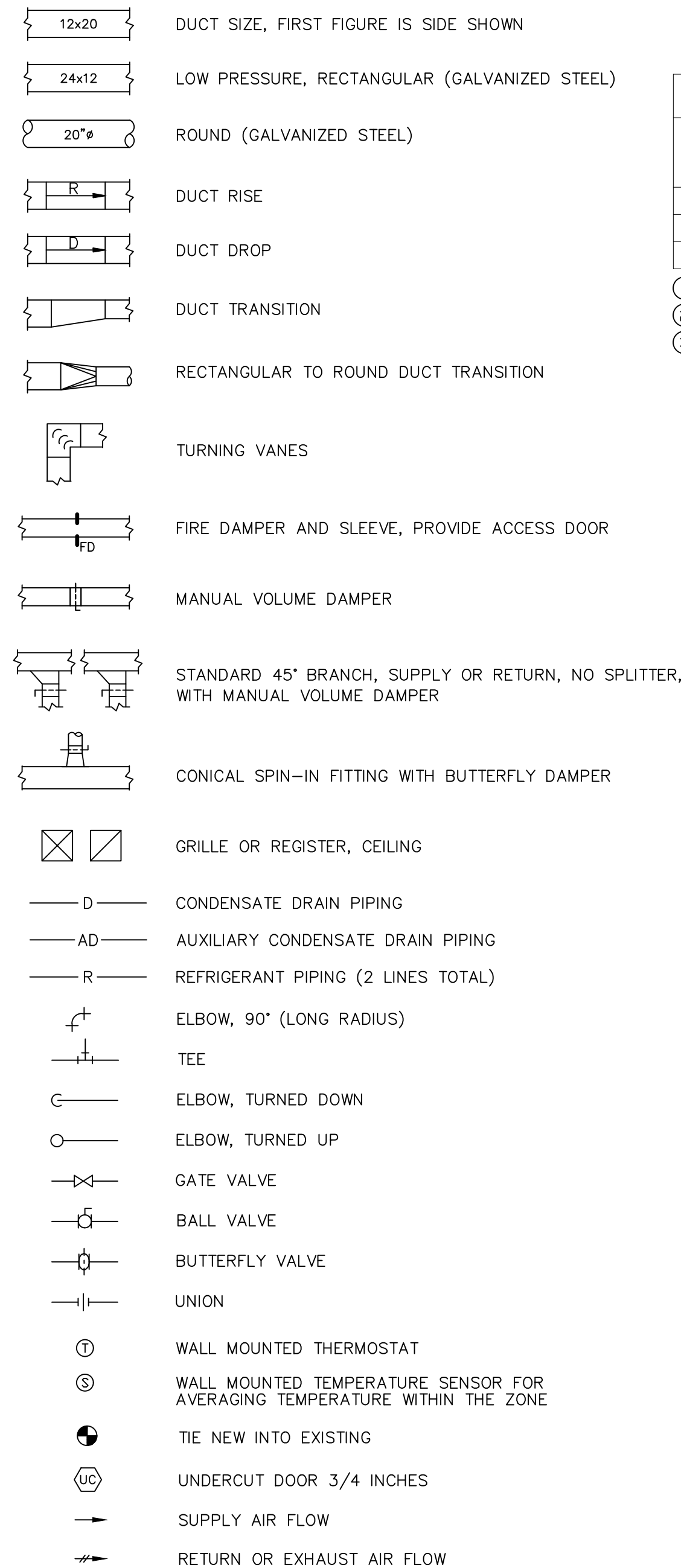
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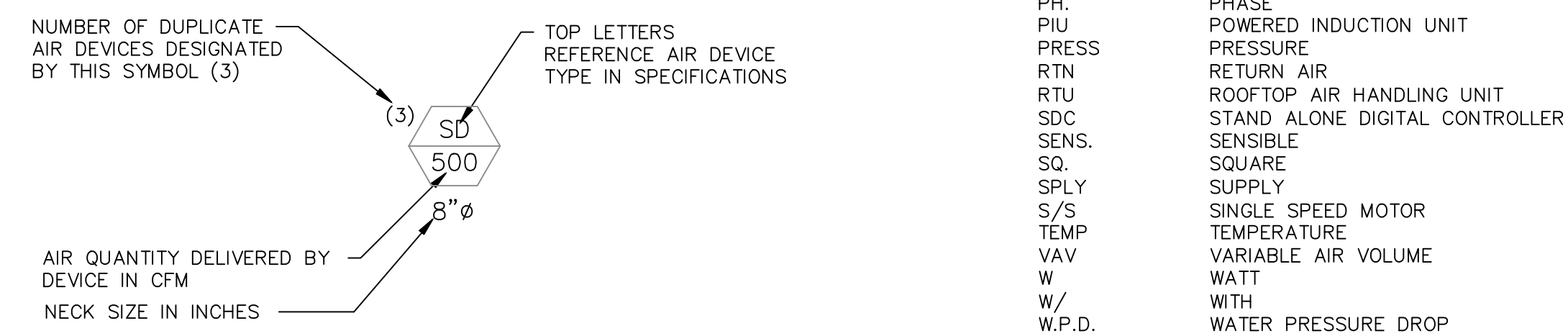
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HVAC LEGEND



NOTE: THIS LEGEND IS FOR REFERENCE ONLY. ALL SYMBOLS WHICH APPEAR WITHIN THE LEGEND MAY NOT APPLY TO THIS PROJECT.

AIR DEVICE LEGEND



INDOOR / OUTDOOR DESIGN CONDITIONS			
OUTDOOR SUMMER	INDOOR SUMMER	OUTDOOR WINTER	INDOOR WINTER
94.0°F DB / 77.0°F WB	75°F DB / 63°F WB 50% TO 55% RELATIVE HUMIDITY	21.0°F DB / 19.5 °F WB	70°F DB / 59°F WB

SPLIT SYSTEM HEAT PUMP UNITS

MARK	SERVING AREA	NOMIN. CFM	NOMIN. TONNAGE	O.A. CFM	ESP IN. WG.	FAN MOTOR HP	COOLING				HEATING @ 47°F			SUPP. ELECT. HEAT, KW	MOTOR FLA	MCA	MOCP	WEIGHT (LBS)	DESIGN BASIS	REMARKS			
							TOTAL CAP. MBH	SENS. CAP. MBH	MIN. SEER	ENTERING AIR DB (F)	WB (F)	LEAVING AIR DB (F)	WB (F)								CAPACITY MBH	ENTERING AIR DB (F)	MIN. HSPF
AHU-1	3 BEDROOM BLDG	1000	2.5	NATURAL	0.5	1/2	29.4	22.5	15.0	75	63	56	57	27.0	70.0	9.0	7	2.8	42	45	95	RHEEM RHM36175EAC	①②③④⑤⑥
AHU-2	CLUBHOUSE	1990	5.0	300	0.7	3/4	58.0	42.4	15.0	77.9	65.2	56	57	56.0	62.7	9.0	15	4.9	82	90	160	RHEEM RHM60245EAC	①②③④⑤⑥

- ① ELECTRICAL CHARACTERISTICS: 240/1/60
- ② VERTICAL UNIT
- ③ PROVIDE WITH INTERNAL FILTER RACK AND FILTER (MERV 8)
- ④ PROVIDE WITH SINGLE POINT POWER CONNECTION AND SINGLE STAGE OF ELECTRIC HEAT
- ⑤ PROVIDE WITH MANUFACTURER'S "ENERGY STAR" COMPLIANT PROGRAMMABLE THERMOSTAT (COMFORTstat MODEL CP2810)
- ⑥ COMPATIBLE WITH R-410A REFRIGERANT

SPLIT SYSTEM OUTDOOR UNIT (HEAT PUMP)

MARK	TYPE	SERVICE	DESCRIPTION	TOTAL COOLING CAPACITY MBH	CONDENSER AMBIENT TEMP, °F	TOTAL HEATING CAPACITY MBH	CONDENSER AMBIENT TEMP, °F	FAN MOTOR HP	COMPRESSOR RLA (AMPS)	COMPRESSOR LRA (AMPS)	MCA	MOCP	WEIGHT (LBS)	DESIGN BASIS	REMARKS
HP-1	DIRECT EXP.	AHU-1	HEAT PUMP	29.4	95	27.0	47	1/5	12.8	67.8	18	25	160	RHEEM RP1730AJV	①②
HP-2	DIRECT EXP.	AHU-2	HEAT PUMP	58.0	95	56.0	47	1/5	23.7	152.5	31	50	235	RHEEM RP1760AJV	①②

- ① ELECTRICAL CHARACTERISTICS: 240/1/60
- ② PROVIDE WITH R-410A REFRIGERANT

VENTILATION FAN SCHEDULE

MARK	CFM	TYPE	SONES	STATIC PRESS. IN. WG	MAX. RPM	MOTOR WATTS	DRIVE	SERVING LOCATION	INTERLOCK	WEIGHT (LBS)	DESIGN BASIS	REMARKS
EF-1	50	CENTRIFUGAL	1.5	0.1	-	17.5	DIRECT	BATHROOMS	WALL SWITCH	10	NUTONE 50NT	①②③
EF-2	70	CENTRIFUGAL	1.5	0.1	-	17.5	DIRECT	COMM. BLDG. RESTRM	LIGHTS	10	NUTONE 80NT	①③④

- ① ELECTRICAL CHARACTERISTICS: 120/1/60
- ② PROVIDE WITH BACKDRAFT DAMPER, PLASTIC GRILLE, CEILING RADIATION DAMPER (FIRE DAMPER)
- ③ "ENERGY STAR" COMPLIANT
- ④ PROVIDE WITH BACKDRAFT DAMPER AND PLASTIC GRILLE

GENERAL NOTES

- THE INTENT OF THESE DRAWINGS ARE SUCH THAT THE CONTRACTOR SHALL INCLUDE ALL LABOR, MATERIAL, EQUIPMENT, TRANSPORTATION, PERMITS, FEES, LICENSES AND PROPER SUPERVISION NECESSARY TO INSTALL AND COMPLETE THE NECESSARY WORK AS SHOWN ON THE DRAWING.
- WORK NOT SPECIFICALLY COVERED ON THE DRAWINGS, BUT THAT IS REASONABLY INFERRABLE AS BEING NECESSARY TO PRODUCE THE INTENDED RESULTS SHALL BE QUOTED AND/OR PERFORMED AS IF SPECIFICALLY DETAILED HEREIN.
- THE DRAWINGS ARE INDICATIVE OF THE CHARACTER AND SCOPE OF WORK AND ARE NOT INTENDED TO SHOW ALL THE DETAILS.
- CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL MECHANICAL EQUIPMENT, DUCTWORK, ETC. TO FIT WITHIN THE SPACE ALLOWED BY THE ARCHITECTURAL AND STRUCTURAL CONDITIONS. CUTTING OR OTHERWISE ALTERING ANY STRUCTURAL MEMBERS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE ARCHITECT.
- DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS. WHERE INTERNAL INSULATION IS CALLED FOR, DIMENSIONS SHALL BE INCREASED BY THE THICKNESS OF INSULATION.
- PORTIONS OF THE DUCTS VISIBLE THROUGH GRILLES AND REGISTERS IN FINISHED AREAS SHALL BE PAINTED FLAT BLACK.
- WHERE DUCTWORK IS LINED, NO THERMAL INSULATION IS REQUIRED. WHERE UNLINED DUCT AND LINED DUCT CONNECT, THE INSULATION SHALL OVERLAP LINED SECTION AT LEAST 4".
- EXACT LOCATION OF ALL CEILING DIFFUSERS, GRILLES, AND REGISTERS SHALL BE COORDINATED WITH THE ARCHITECT.
- CONTRACTOR TO COORDINATE VOLTAGE AND PHASE OF EACH EQUIPMENT WITH ELECTRICAL CONTRACTOR BEFORE ORDERING.
- COORDINATE THE LOCATION OF ALL PENETRATIONS OF THE STRUCTURE WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.
- ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE ADEQUATE ACCESS TO ALL EQUIPMENT.
- VERIFY CONDITIONS IN FIELD PRIOR TO BEGINNING WORK.
- PROVIDE NECESSARY OFFSETS IN PIPING, ELECTRICAL CONDUIT, AND DUCTWORK AS REQUIRED TO ACCOMMODATE NEW WORK. CONTRACTOR SHALL ALLOW FOR ANY CONFLICTS ENCOUNTERED.
- MOUNT THERMOSTATS 44" (CENTER OF THERMOSTAT) ABOVE FINISHED FLOOR. COORDINATE EXACT LOCATION WITH ARCHITECT.
- DRYER EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF MINIMUM 26 GAUGE GALVANIZED STEEL. THE INTERIOR SHALL BE SMOOTH WITH NO PROJECTIONS AND JOINTS RUNNING IN THE DIRECTION OF AIR FLOW. PROVIDE GRAVITY BACKDRAFT DAMPER AT TERMINATION OF EXHAUST DUCT.
- COORDINATE WITH ARCHITECTURAL SITE PLAN FOR THE LOCATION AND ORIENTATION OF THE BUILDINGS.
- AT THE EXPOSED, EXTERIOR REFRIGERANT PIPING INSULATION, PROVIDE UV PROTECTIVE COATING OR PVC JACKET.

DIFFUSER, GRILLE & REGISTER

MARK	USE	LENGTH IN.	HEIGHT IN.	CONN. DIA.	FACE SIZE	NC MAX.	AIRFLOW MAX. CFM	AIRFLOW PATTERN	DESIGN BASIS	REMARKS
SG1	SUPPLY	-	-	-	8x4	25	70	2 WAY	LIMA 602	①②
SG2	SUPPLY	-	-	-	12x6	25	160	2 WAY	LIMA 602	①②
SG3	SUPPLY	-	-	-	12x8	25	255	2 WAY	LIMA 602	①②
RG1	RETURN	18	18	-	18x18	25	1000	-	LIMA 60GH	①②
RG2	RETURN	12	12	-	12x12	25	460	-	LIMA 60GH	①②

- ① PROVIDE STANDARD WHITE FINISH
- ② CEILING GRILLE

ELECTRIC UNIT HEATER

MARK	AREA SERVED	TYPE	FAN MOTOR HP	AIRFLOW CFM	KW	DESIGN BASIS	REMARKS
EUH-1	FIRE RISER ROOM	WALL MTD.	--	245	2.0	MARKEL 3450 SERIES	①②

- ① PROVIDE WITH UNIT MOUNTED THERMOSTAT, TAMPER PROOF COVER, AND SURFACE MOUNTED SLEEVE. MOUNT HEATER 12" ABOVE FINISHED FLOOR.
- ② ELECTRICAL CHARACTERISTICS: 240/1/60

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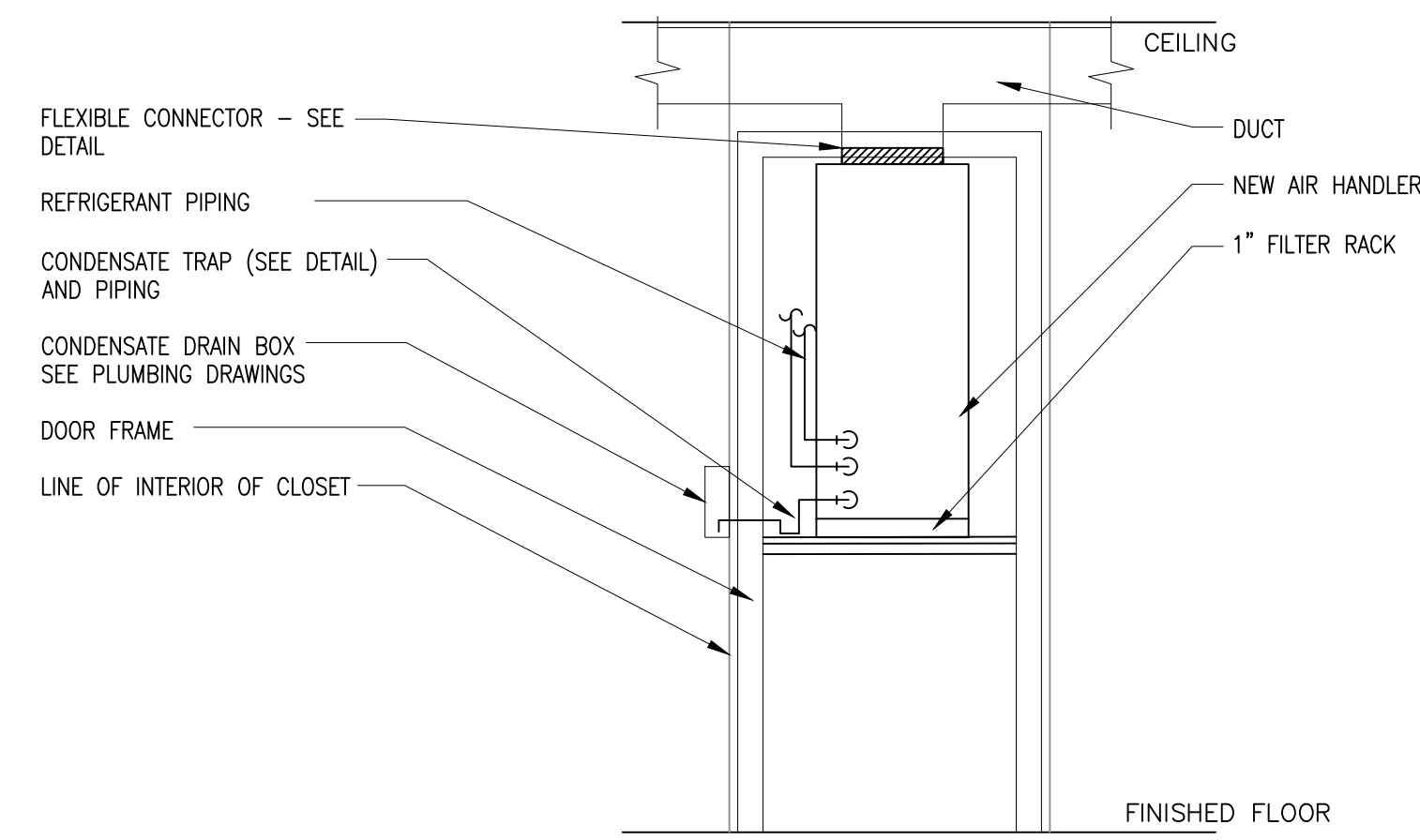
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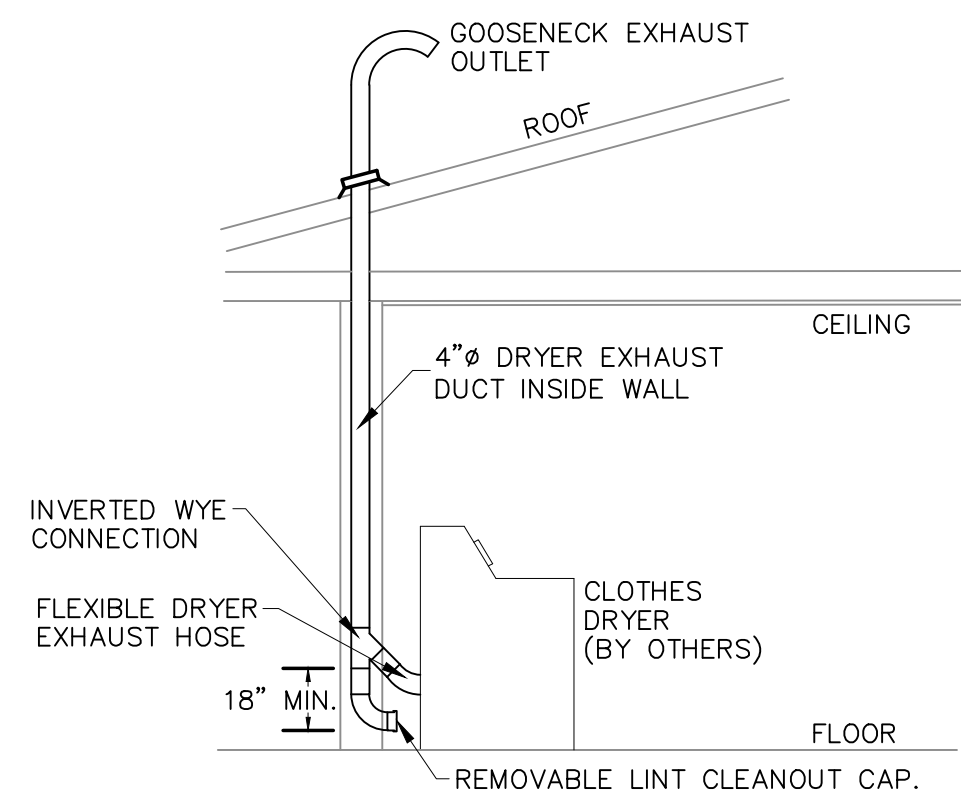
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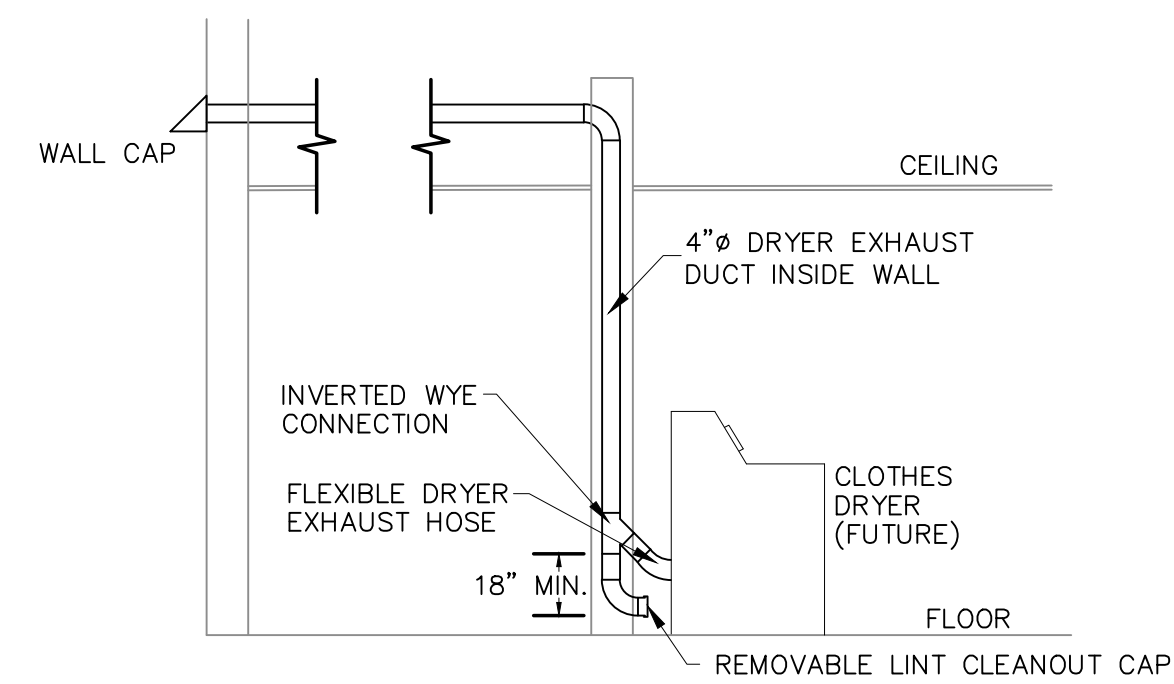
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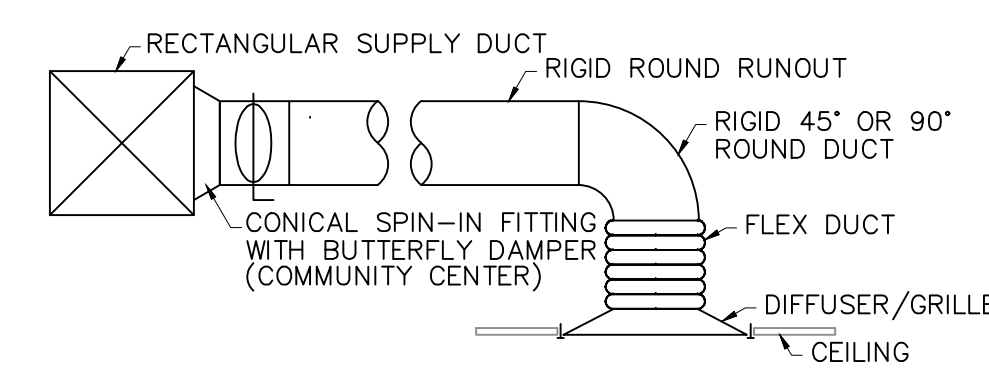
10 TYPICAL MECHANICAL CLOSET DETAIL
 M02 NO SCALE



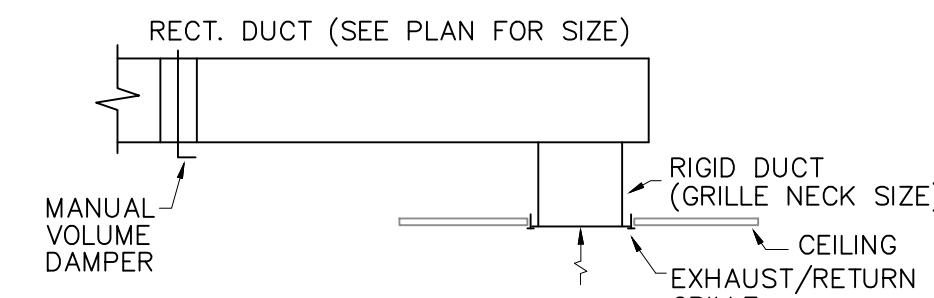
11 CLOTHES DRYER EXHAUST DETAIL
 M02 NO SCALE



12 CLOTHES DRYER EXHAUST DETAIL
 M02 NO SCALE

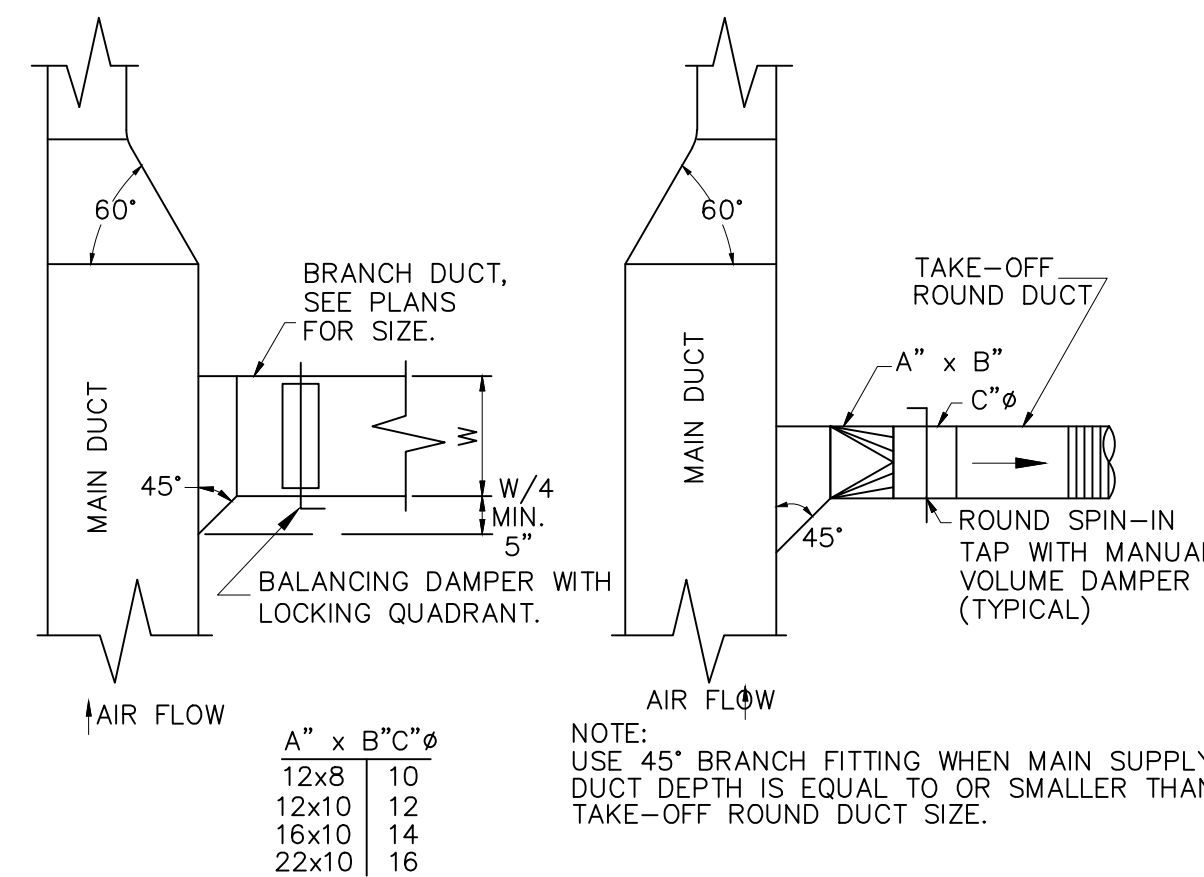


5 TYPICAL DIFFUSER RUN-OUT DETAIL
 M02 NO SCALE

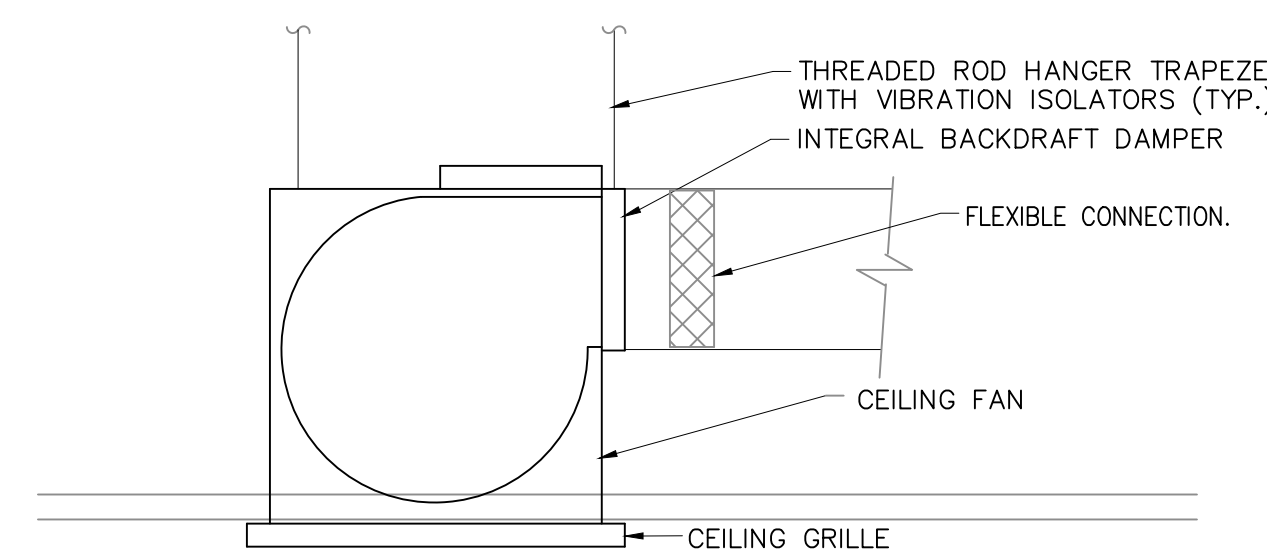


NOTE: TYPICAL FOR RECTANGULAR RUNOUTS

6 TYPICAL RETURN AND EXHAUST RUN-OUT DETAIL
 M02 NO SCALE

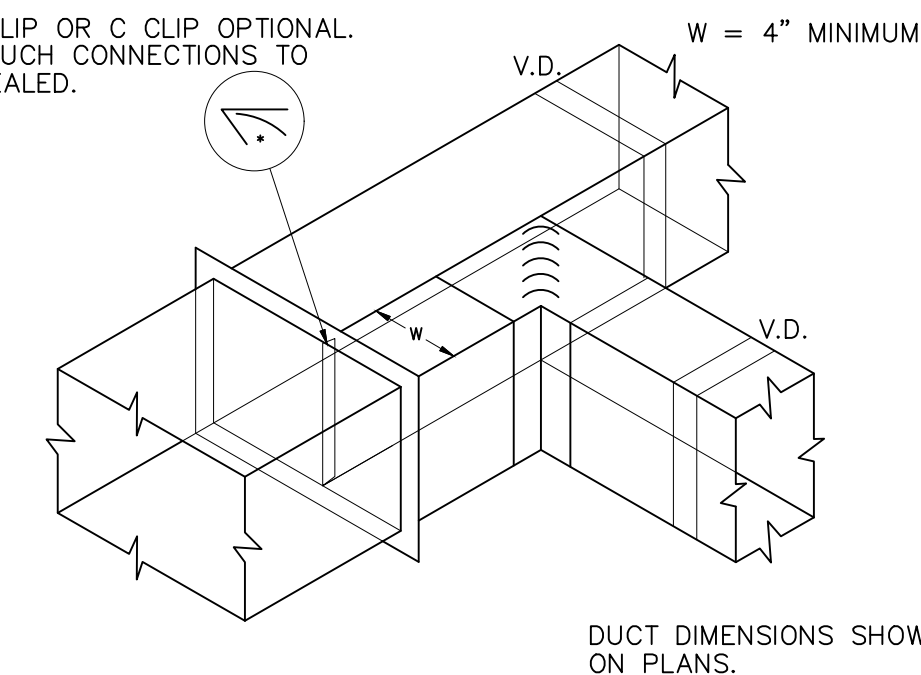


7 TYPICAL DUCT TAKEOFF DETAIL
 M02 NO SCALE

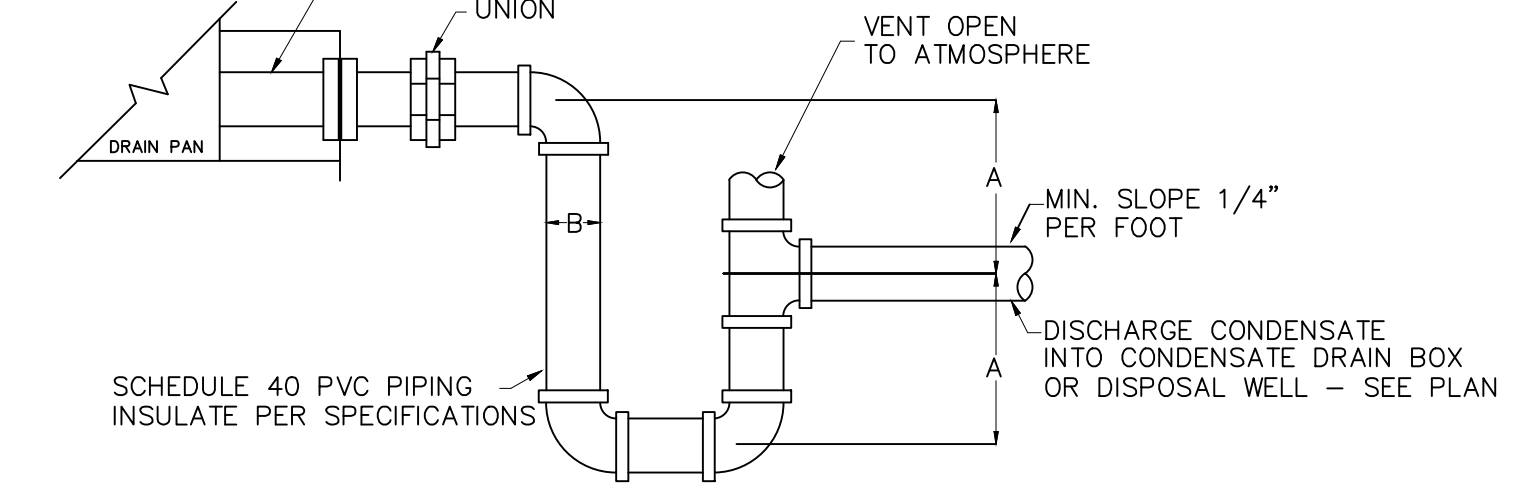


8 TYPICAL CEILING MOUNTED FAN INSTALLATION DETAIL
 M02 NO SCALE

* S CLIP OR C CLIP OPTIONAL. ALL SUCH CONNECTIONS TO BE SEALED.

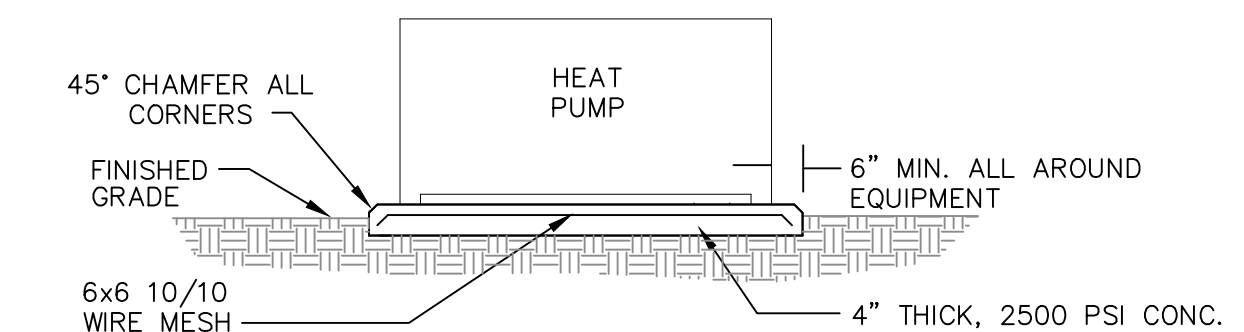


9 TYPICAL DUCT TAKE-OFF DETAIL
 M02 NO SCALE

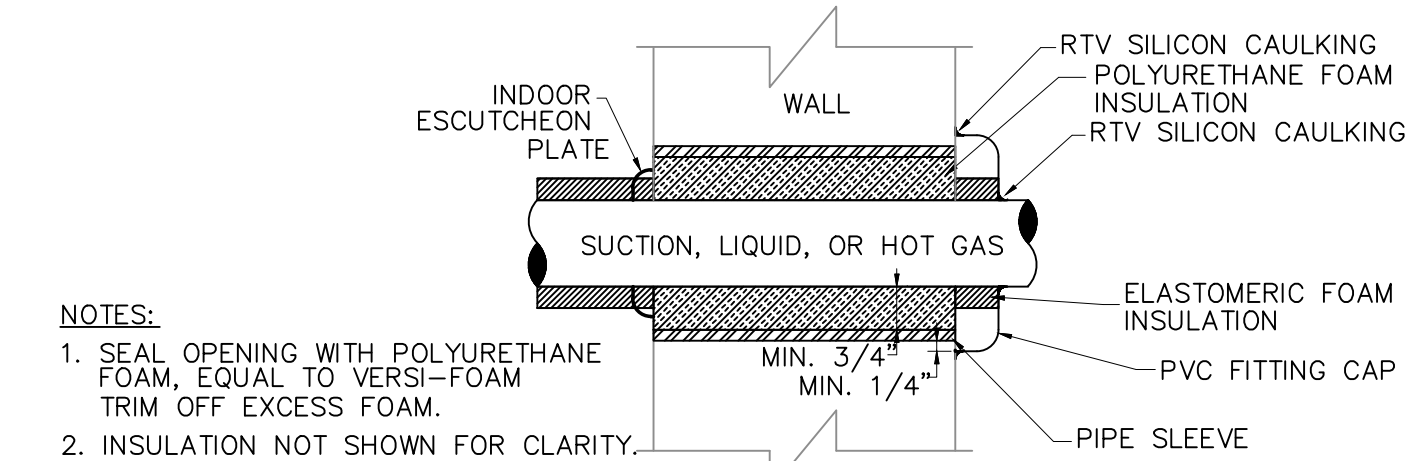


A=B+1/2 FAN STATIC PRESSURE.
 B=3/4" FOR UNITS LESS THAN 2000 C.F.M.

1 AIR CONDITIONING UNIT DRAIN TRAP DETAIL
 M02 NO SCALE



2 TYPICAL CONDENSING UNIT PAD DETAIL
 M02 NO SCALE

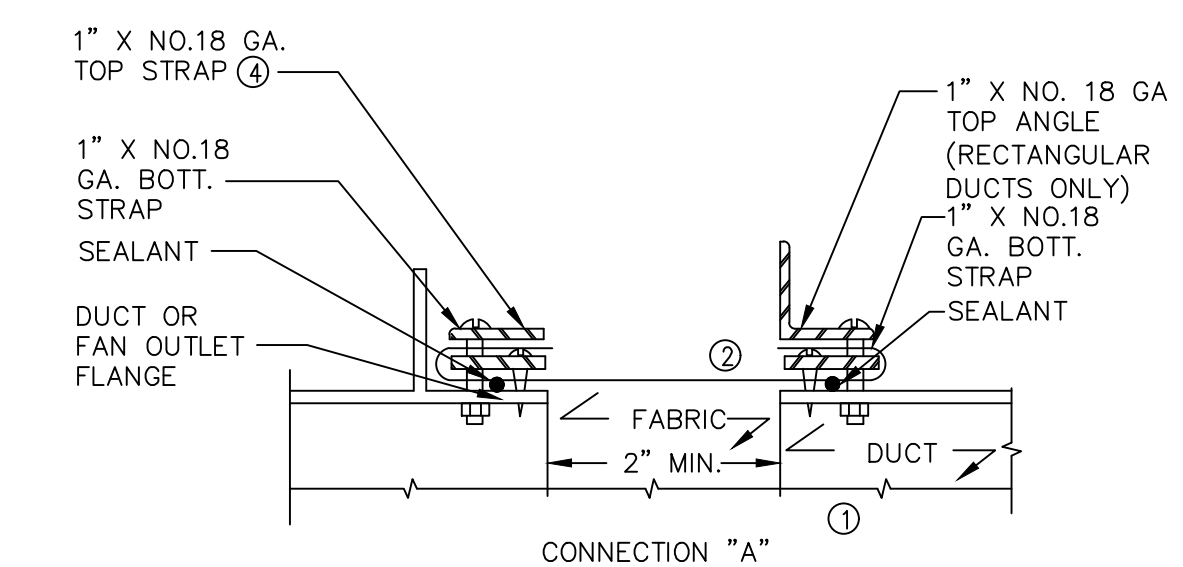


NOTES:

1. SEAL OPENING WITH POLYURETHANE FOAM, EQUAL TO VERSI-FOAM TRIM OFF EXCESS FOAM.
2. INSULATION NOT SHOWN FOR CLARITY.

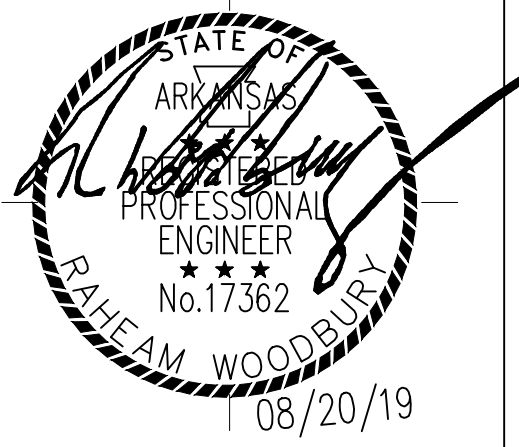
NOTE: OMIT ELASTOMERIC INSULATION ON LIQUID LINE.

3 TYPICAL REFRIGERANT PIPING WALL PENETRATION DETAIL
 M02 NO SCALE



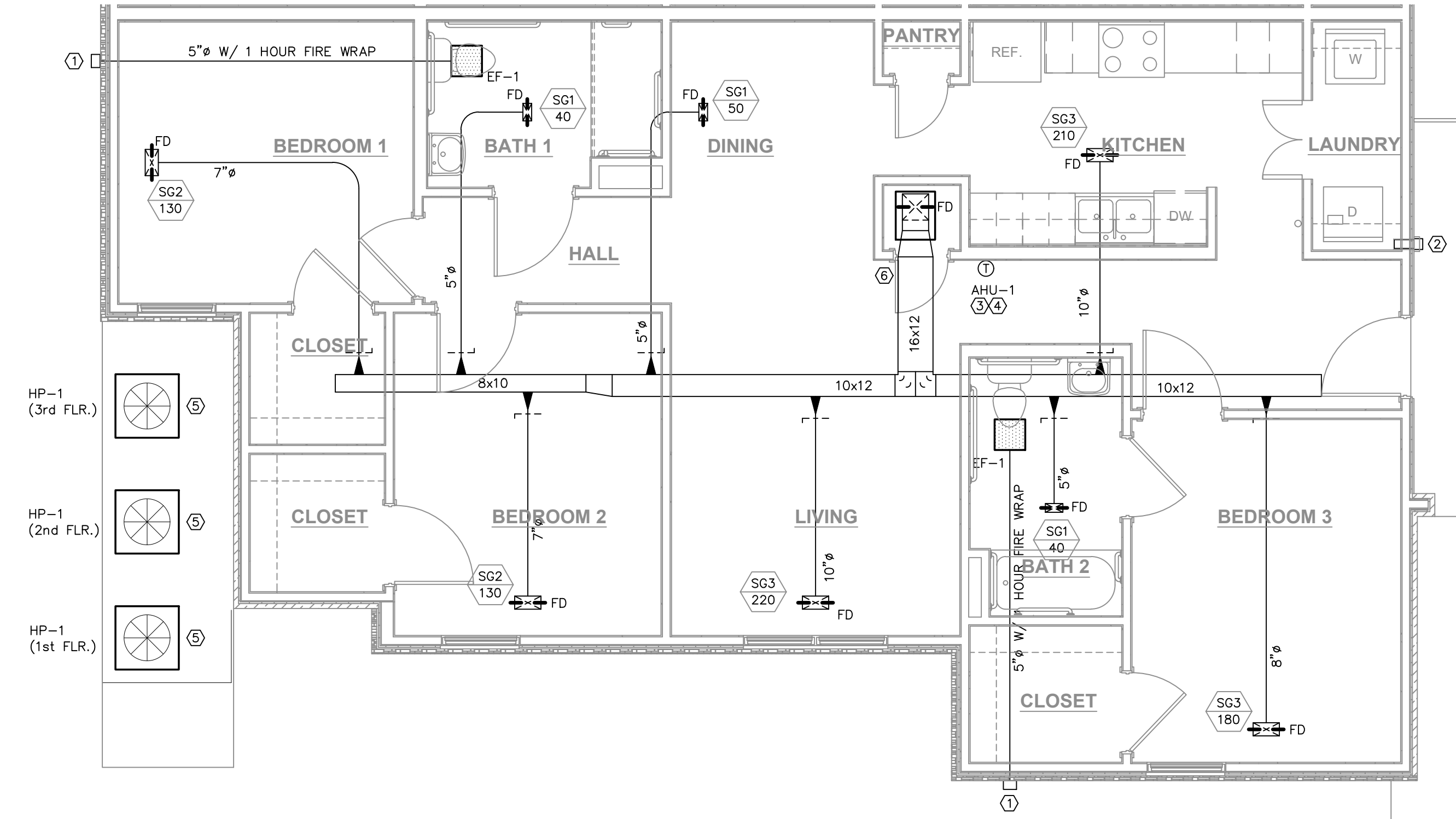
1. USE FLEXIBLE CONNECTION "A" FOR RECTANGULAR DUCTS WITH GREATEST DIMENSION 31" OR LARGER, & FOR ALL ROUND DUCTS. USE CONNECTION "B" FOR RECTANGULAR DUCTS. WITH GREATEST DIMENSION LESS THAN 31".
2. FABRIC FOR FLEXIBLE CONNECTIONS SHALL BE VENTGLAS AS MANUFACTURED BY VENTFABRICS, INC. MAKE COLLAR FROM ONE CONTINUOUS PIECE OF FABRIC, SEWED ONE CORNER ONLY.
3. FOR ROUND DUCT ONLY USE 1" x NO.18 GA. TOP STRAP.
4. USE 1" x 1" x NO.18 GA. TOP ANGLE AT LOCATIONS OTHER THAN CONNECTIONS TO EQUIPMENT.

4 FLEXIBLE DUCT CONNECTION DETAIL
 M02 NO SCALE

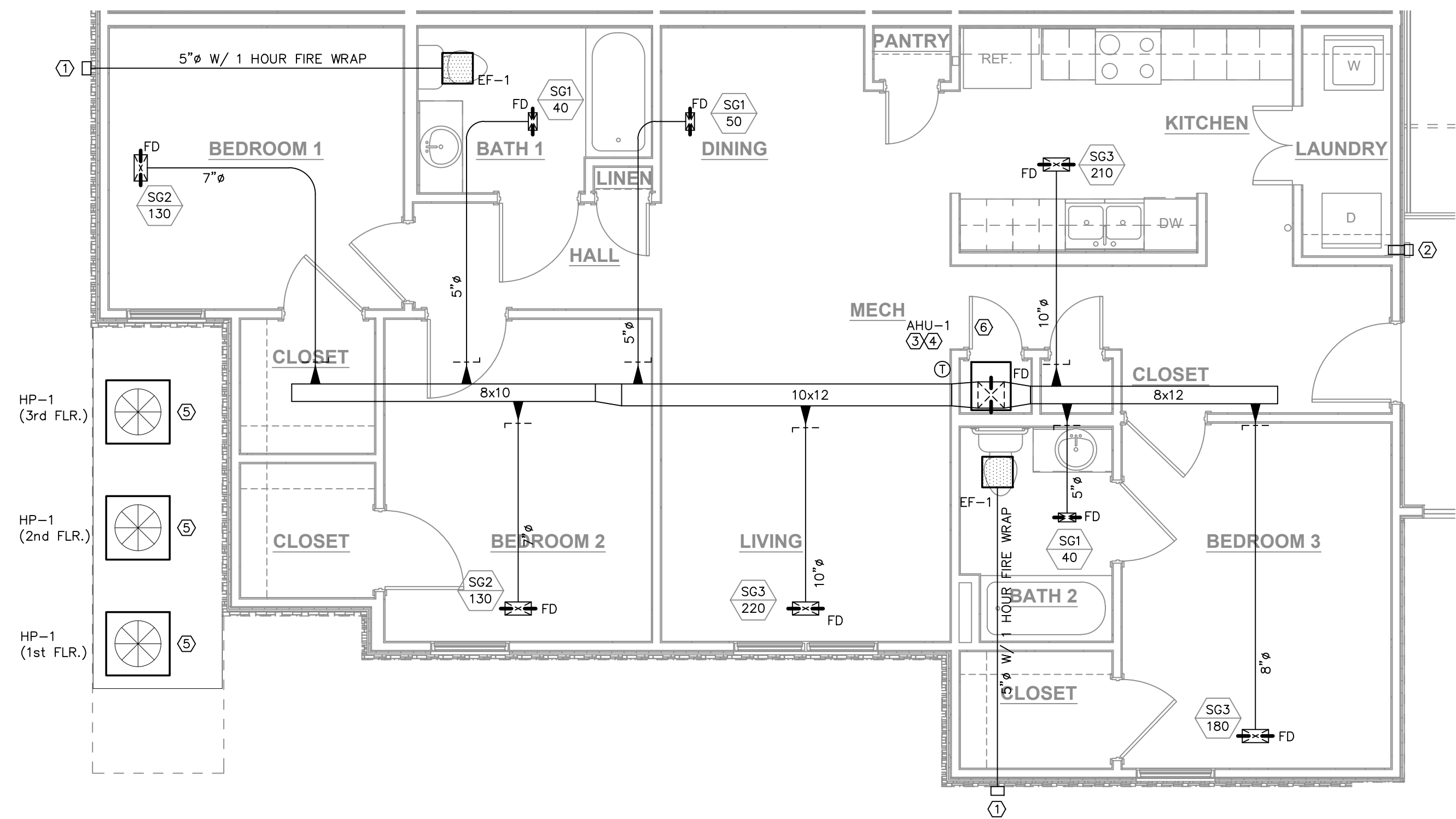


- GENERAL NOTE:**
1. AT DUCTWORK WALL AND CEILING PENETRATIONS, SEAL ANNULAR SPACE BETWEEN THE DUCTWORK AND GYPSUM BOARD TO PREVENT AIR LEAKAGE.
 2. SEE ARCHITECTURAL DRAWINGS FOR BUILDING CONFIGURATIONS.
 3. PROVIDE DAMPERS AT SUPPLY GRILLES AND SUPPLY DUCTWORK PENETRATING THE RATED FLOOR/CEILING ASSEMBLY.

- DRAWING KEYNOTES:**
- ① EXHAUST WALL CAP WITH BIRD SCREEN AT BUILDING A - 1st & 2nd FLOOR; BUILDING B - 1st FLOOR; SOFFIT (EAVE) ELBOW WITH GRILLE (AUTONE MODEL 430 OR 431 LESS BACKDRAFT DAMPER) OR EQUAL AT BUILDING A - 3rd FLOOR; BUILDING B - 2nd FLOOR.
 - ② 4" DRYER VENT AND ROUTE TO EXTERIOR WALL WITH 4" WALL CAP WITH INTEGRAL BACKDRAFT DAMPER - SEE DETAIL.
 - ③ SET AHU ON A SUPPORT PLATFORM (NON-COMBUSTIBLE CONSTRUCTION) - SEE ARCHITECTURAL DRAWINGS.
 - ④ ROUTE CONDENSATE DRAIN LINE TO CONDENSATE DRAIN BOX - SEE PLUMBING.
 - ⑤ HEAT PUMP UNIT. SET UNIT ON CONCRETE EQUIPMENT PAD. SEE DETAIL. COORDINATE ALL HEAT PUMP UNIT PAD LOCATIONS WITH ARCHITECTURAL UNIT PLANS.
 - ⑥ RETURN AIR THROUGH LOUVERED DOOR - SEE ARCHITECTURAL DRAWINGS.



2 3-BED HC PLAN
 M03 1/4" = 1'-0"



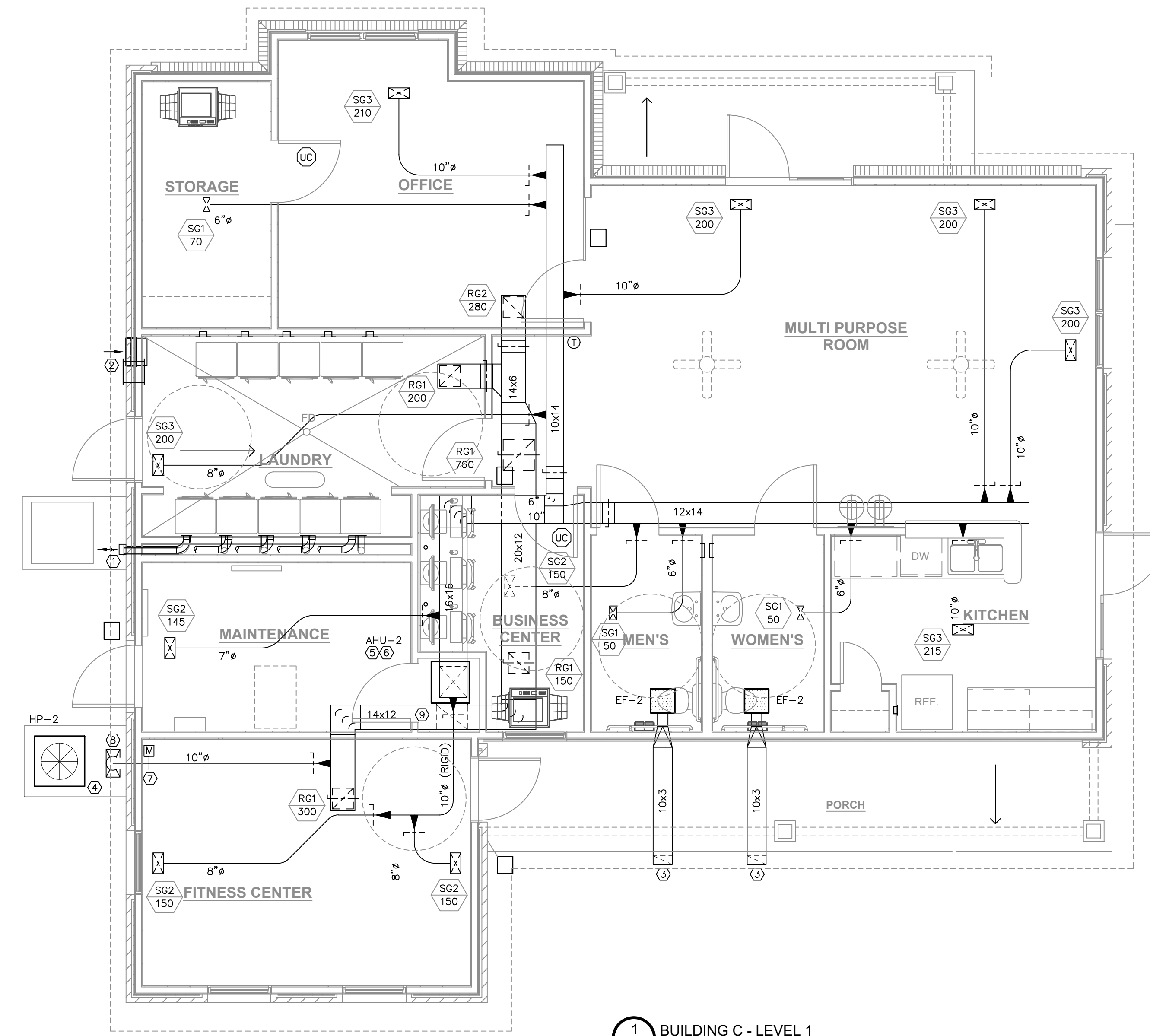
1 3-BED TYP PLAN
 M03 1/4" = 1'-0"

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1 BUILDING C - LEVEL 1
 M04 1/4" = 1'-0"

DRAWING KEYNOTES:

- ① 4" DRYER VENT WITH 4" WALL CAP WITH INTEGRAL BACKDRAFT DAMPER. (5 STACKED)
- ② 16x16 MAKE-UP AIR LOUVER FOR THE DRYER. LOUVER EQUAL TO RUSKIN ELF6375X WITH INSECT SCREEN. MOUNT 8" A.F.F.
- ③ SOFFIT (EAVE) ELBOW WITH GRILLE. NUTONE MODEL 430 OR 431 (LESS BACKDRAFT DAMPER) OR EQUAL.
- ④ HEAT PUMP UNIT. SET UNIT ON CONCRETE EQUIPMENT PAD. SEE DETAIL. COORDINATE ALL HEAT PUMP UNIT PAD LOCATIONS WITH ARCHITECTURAL UNIT PLANS.
- ⑤ SET AHU ON A 18" HIGH RETURN PLENUM (NON-COMBUSTIBLE CONSTRUCTION). PROVIDE 3" AUXILIARY DRAIN PAN W/ MOISTURE SENSOR FOR UNIT SHUT-DOWN.
- ⑥ ROUTE CONDENSATE DRAIN LINE TO CONDENSATE DRAIN BOX - SEE PLUMBING.
- ⑦ OUTSIDE AIR DUCT CONNECT TO AHU'S RETURN DUCT. PROVIDE MANUAL AND MOTORIZED DAMPER. MOTORIZED DAMPER TO OPEN UPON STARTING OF AHU FAN AND CLOSED UPON STOPPING OF AHU FAN.
- ⑧ 12x20 OUTSIDE AIR SOFFIT VENT W/ INSECT SCREEN
- ⑨ CONNECT RETURN DUCT TO PLENUM BELOW THE AHU

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LIGHTING	
	RECESSED OR SURFACE MOUNTED LIGHT FIXTURE - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	RECESSED OR SURFACE MOUNTED LIGHT FIXTURE CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	SUSPENDED OR SURFACE MOUNTED LIGHT FIXTURE - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	SUSPENDED OR SURFACE MOUNTED LIGHT FIXTURE CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	RECESSED OR SURFACE MOUNTED LIGHT FIXTURE - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	RECESSED OR SURFACE MOUNTED LIGHT FIXTURE CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	WALL MOUNTED LIGHT FIXTURE - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	RECESSED OR SURFACE MOUNTED WALL WASH LIGHT FIXTURE - SEE LUMINAIRE SCHEDULE AND RESPECTIVE DETAILS - PROVIDE ALL MOUNTING HARDWARE AS REQUIRED.
	WALL MOUNTED SINGLE FACE EXIT SIGN WITH DIRECTIONAL CHEVRONS AS INDICATED BY ARROWS - CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE.
	WALL MOUNTED DOUBLE FACE EXIT SIGN WITH DIRECTIONAL CHEVRONS AS INDICATED BY ARROWS - CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE.
	CEILING MOUNTED SINGLE FACE EXIT SIGN WITH DIRECTIONAL CHEVRONS AS INDICATED BY ARROWS - CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE.
	CEILING MOUNTED DOUBLE FACE EXIT SIGN WITH DIRECTIONAL CHEVRONS AS INDICATED BY ARROWS - CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE.
	WALL MOUNTED 2 HEAD EMERGENCY LIGHT - CONNECTED TO EMERGENCY POWER SOURCE OR WITH BATTERY BACK-UP - SEE LUMINAIRE SCHEDULE.
	SITE LIGHTING FIXTURE (2 HEAD SHOWN) - 1, 2, 3, OR 4 HEAD AS SHOWN ON PLANS. PROVIDE POLE BASE AS SHOWN IN DETAILS OR AS RECOMMENDED BY THE MANUFACTURER.
	CEILING FAN - SEE LUMINAIRE SCHEDULE - PROVIDE APPROPRIATE OUTLET BOX (SOLB MINIMUM) FOR REQUIRED MOUNTING.

SWITCHES	
S	SWITCH OUTLET - A.C. TYPE, SINGLE POLE, 20A, 125/277V.
S3	SWITCH OUTLET - A.C. TYPE, THREE-WAY, 20A, 125/277V.
S4	SWITCH OUTLET - A.C. TYPE, FOUR-WAY, 20A, 125/277V.
S _o	SWITCH OUTLET - A.C. TYPE, SINGLE POLE, 20A, 125/277V. CONTROLS LIGHTING FIXTURE 'o' IN RESPECTIVE ROOM.
SD	DIMMER SWITCH OUTLET - A.C. TYPE, SINGLE POLE, 20A, 125/277V. PRESET SLIDE BAR WITH ON-OFF TOGGLE SWITCH - SEE SPECIFICATIONS. COLOR TO BE SELECTED BY THE ARCHITECT.
SP	SWITCH OUTLET WITH PILOT LIGHT - A.C. TYPE, SINGLE POLE, 20A, 125/277V.
R/L S	RAISE-STOP-LOWER SWITCH. SEE PLANS FOR COMPLETE DESCRIPTION.
NOTE: LIGHT SWITCHES ARE TO BE INSTALLED ON STRIKE SIDE OF DOOR UNLESS SPECIFICALLY NOTED OTHERWISE. VERIFY ALL DOOR SWINGS WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN.	

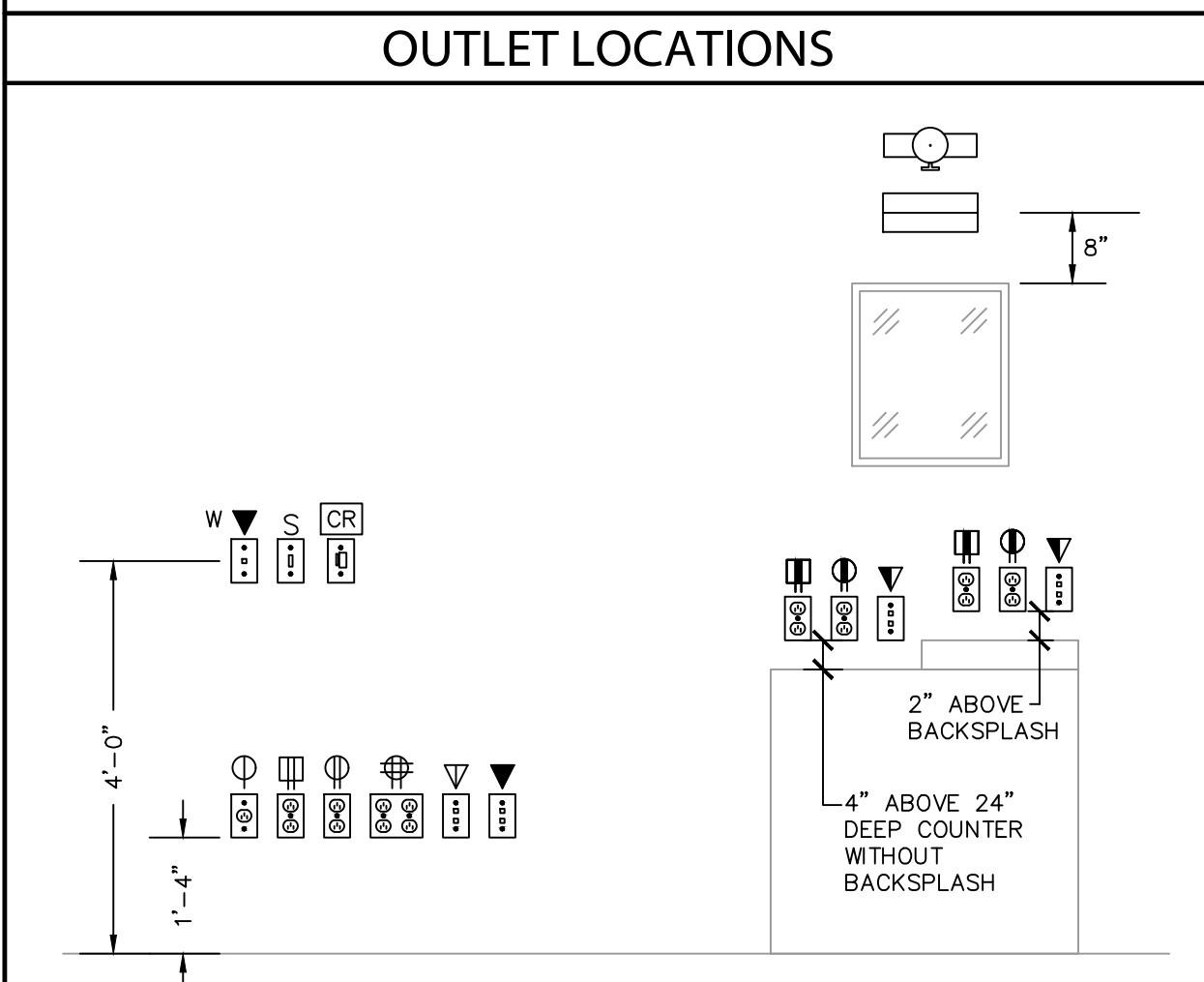
POWER	
	RECEPTACLE PANEL - SURFACE MOUNTED - SEE PLANS FOR DESIGNATION AND SCHEDULE. SEE SPECIFICATIONS FOR CHARACTERISTICS.
	RECEPTACLE PANEL - FLUSH MOUNTED - SEE PLANS FOR DESIGNATION AND SCHEDULE. SEE SPECIFICATIONS FOR CHARACTERISTICS.
	DISTRIBUTION OR POWER PANEL - SURFACE MOUNTED - SEE PLANS FOR DESIGNATION AND SCHEDULE. SEE SPECIFICATIONS FOR CHARACTERISTICS.
	FUSED DISCONNECT SWITCH (SIZE AS SHOWN ON PLANS) - 600V OR 240V - HEAVY DUTY TYPE - FUSED AS SHOWN OR AS RECOMMENDED BY THE MANUFACTURER. SEE SPECIFICATIONS. FURNISH AND INSTALL NAMEPLATES PER DETAILS.
	NON-FUSED DISCONNECT SWITCH (SIZE AS SHOWN ON PLANS) - 600V OR 240V - HEAVY DUTY TYPE. SEE SPECIFICATIONS. FURNISH AND INSTALL NAMEPLATES PER DETAILS.
	ENCLOSED CIRCUIT BREAKER (SIZE AS SHOWN ON PLANS) - SURFACE MOUNTED - SEE SPECIFICATIONS FOR CHARACTERISTICS. FURNISH AND INSTALL NAMEPLATES PER DETAILS.
	HORSE POWER RATED SWITCH WITH THERMAL OVERLOAD UNITS. FURNISH AND INSTALL NAMEPLATES PER DETAILS.

RECEPTACLES	
	WALL OUTLET - DUPLEX RECEPTACLE, 15A, 125V., 3 WIRE (GROUNDING TYPE), SEE SPECIFICATIONS.
	WALL OUTLET - MOUNTED ABOVE COUNTER - DUPLEX RECEPTACLE, 15A, 125V., 3 WIRE (GROUNDING TYPE), SEE SPECIFICATIONS.
	WALL OUTLET - DUPLEX RECEPTACLE WITH GROUND FAULT INTERRUPTER, 15A, 125V., 3 WIRE (GROUNDING TYPE), SEE SPECIFICATIONS.
	WALL OUTLET - WEATHERPROOF DUPLEX RECEPTACLE WITH GROUND FAULT INTERRUPTER, 15A, 125V., 3 WIRE (GROUNDING TYPE), SEE SPECIFICATIONS.
	WALL OUTLET - MOUNTED ABOVE COUNTER - DUPLEX RECEPTACLE WITH GROUND FAULT INTERRUPTER, 15A, 125V., 3 WIRE (GROUNDING TYPE), SEE SPECIFICATIONS.
	WALL OUTLET - SINGLE RECEPTACLE, 15A, 125V., 3 WIRE (GROUNDING TYPE), SEE SPECIFICATIONS.
	WALL OUTLET - SPECIAL PURPOSE RECEPTACLE. SEE PLANS FOR DESCRIPTION, LOCATION, AND CHARACTERISTICS.
	WALL OUTLET - SINGLE RECEPTACLE, 50A, 250V., 3 OR 4 WIRE (GROUNDING TYPE) NEMA 14-50R. MATCH CORD SET SUPPLIED WITH EQUIPMENT.
	WALL OUTLET - SPLIT WIRED DUPLEX RECEPTACLE, 15A, 125V., 3 WIRE (GROUNDING TYPE), BOTTOM RECEPTACLE IS SWITCHED. SEE SPECIFICATIONS.
	WALL OUTLET - JUNCTION BOX, SEE DRAWINGS FOR LOCATION.
	CEILING OUTLET - JUNCTION BOX WITH FLEX CONNECTION TO EQUIPMENT. SEE DRAWINGS FOR LOCATION.
	CEILING OUTLET - JUNCTION BOX, SEE DRAWINGS FOR LOCATION.
	○ RISER - UP (SEE PLANS FOR LOCATION).
	● RISER - DOWN (SEE PLANS FOR LOCATION).

AUXILIARY	
	VOICE/DATA ROUGH-IN - DOUBLE GANG OUTLET BOX WITH SINGLE GANG MUD PLATE - SEE DETAILS.
	VOICE/DATA ROUGH-IN - MOUNTED ABOVE COUNTER - DOUBLE GANG OUTLET BOX WITH SINGLE GANG MUD PLATE - SEE DETAILS.
	WALL TELEPHONE ROUGH-IN - SINGLE GANG OUTLET BOX WITH SINGLE GANG MUD PLATE - SEE DETAILS.
	WALL TELEPHONE ROUGH-IN - MOUNTED AT 48" A.F.F. - SINGLE GANG OUTLET BOX WITH SINGLE GANG MUD PLATE - SEE DETAILS.
	CABLE TV ROUGH-IN - SINGLE GANG OUTLET BOX WITH SINGLE GANG MUD PLATE - SEE DETAILS.
	CABLE TV ROUGH-IN - MOUNTED ABOVE COUNTER - SINGLE GANG OUTLET BOX WITH SINGLE GANG MUD PLATE - SEE DETAILS.
	120 VOLT STAND ALONE COMBINATION CO AND SMOKE DETECTOR WITH 9 VOLT BATTERY BACK-UP. BRK MODEL #9120B OR PRE-APPROVED EQUAL.
	120 VOLT STAND ALONE SMOKE DETECTOR WITH 177 CANDELLA STROBE AND 9 VOLT BATTERY BACK-UP. BRK MODEL #7010BSL OR PRE-APPROVED EQUAL. STROBE DEVICE SHALL BE INTERLOCKED AS REQUIRED WITH DETECTOR.
	120 VOLT STAND ALONE CARBON MONOXIDE DETECTOR WITH 9 VOLT BATTERY BACK-UP. BRK MODEL #C05120BN OR PRE-APPROVED EQUAL.
	WALL MOUNTED T-STAT ROUGH-IN - COORDINATE LOCATION, MOUNTING HEIGHT, AND ORIENTATION WITH THE MECHANICAL CONTRACTOR.
	DOOR BELL COMBINATION LIGHT/CHIME. HOUSING DEVICE, INC. #ADA 120. SEE ADA/DOOR/PHONE ALERT DETAIL.
	DOOR BELL PUSHBUTTON: EDWARDS #147-1 WITH STAINLESS STEEL COVERPLATE. SEE ADA/DOOR/PHONE ALERT DETAIL.
	DOOR BELL DEACTIVATION DEVICE. COORDINATE WITH SUPPLIER.
	4'-0" WIDE x 8'-0" HIGH x 3/4" THICK PLYWOOD BACKBOARD. WALL MOUNTED 6" AFF TO BOTTOM. MOUNT BACKBOARD WITH LABEL LEGIBLE FROM ROOM SIDE. PLYWOOD SHALL COVER ALL SIDES OF ROOM AS SHOWN ON PLANS.

ABBREVIATIONS			
JR	NEMA JR ENCLOSURE	EX	EXISTING TO REMAIN
RT	RAINTIGHT ENCLOSURE	XR	EXISTING DEVICE TO BE REMOVED
WP	WEATHERPROOF	XRR	EXISTING DEVICE TO BE RELOCATED
UON	UNLESS OTHERWISE NOTED	XRL	EXISTING DEVICE RELOCATED
EM	EMERGENCY	XRP	EXISTING DEVICE TO BE REPLACED
NL	NIGHT LIGHT	EP	EXPLOSION PROOF
AFF	ABOVE FINISHED FLOOR	R.G.S.	RIGID GALVANIZED STEEL
AFG	ABOVE FINISHED GRADE		
WG	WIRE GUARD		
NIC	NOT IN CONTRACT		

BRANCH CIRCUITS	
	BRANCH CIRCUIT - ROUTED ABOVE CEILING OR IN WALL (SEE SPECIFICATIONS)
	BRANCH CIRCUIT - ROUTED IN FLOOR (SEE SPECIFICATIONS)
	HOMERUN TO PANELBOARD - ANY CIRCUIT WITHOUT FURTHER DESIGNATION IS 2 NO. 12, 1#12 GRN, 3/4" C.
	4 NO. 12, 1#12 GRN, 3/4" C.
	6 NO. 12, 1#12 GRN, 3/4" C. AS PER N.E.C.
	BRANCH CIRCUIT - EXPOSED (SEE SPECIFICATIONS).
	EQUIPMENT HOMERUN - ANY CIRCUIT WITHOUT FURTHER DESIGNATION IS 2#12, 1#12 GRN, 3/4" C.
	3#12, 1#12 GRN, 3/4" C. AS PER N.E.C.
	EMPTY CONDUIT WITH NYLON PULL STRING
	FEEDER - OVERHEAD
	FEEDER - UNDERGROUND
BRANCH CIRCUIT WIRING FOR LIGHTING AND POWER IS SHOWN SCHEMATICALLY. EACH ELECTRICAL DEVICE IS TO BE INSTALLED WITH AN INDIVIDUAL CONDUIT CONNECTION. FOR EXAMPLE:	
	REQUIRED INSTALLATION
	REQUIRED INSTALLATION
NOTE: MINIMUM CONDUIT SIZE SHALL BE 3/4" C.	



OUTLET LOCATION NOTES:

- ALL DIMENSIONS ARE TO BOTTOM OF BOX
- WHERE OUTLETS ARE SHOWN TO BE MOUNTED ABOVE COUNTER (AC), THE E.C. SHALL REFERENCE THE ARCHITECTURAL AND/OR CASEWORK DRAWINGS AND ROUGH-IN EACH DEVICE 6" ABOVE THE COUNTER SURFACE TO THE BOTTOM OF THE BOX.
- SYMBOLS ON DRAWINGS AND MOUNTING HEIGHTS AS INDICATED ARE APPROXIMATE ONLY. THE EXACT LOCATIONS AND MOUNTING HEIGHTS MUST BE DETERMINED ON THE JOB AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH ALL TRADES TO SECURE CORRECT INSTALLATION; I.E. OVER COUNTERS, IN OR ABOVE BACK SPLASHES, IN STOP WALLS, AND OTHER SPECIFIC CONSTRUCTION FEATURES. MOUNT ALL RECEPTACLES VERTICAL WITH GROUND SLOT FACING UP.

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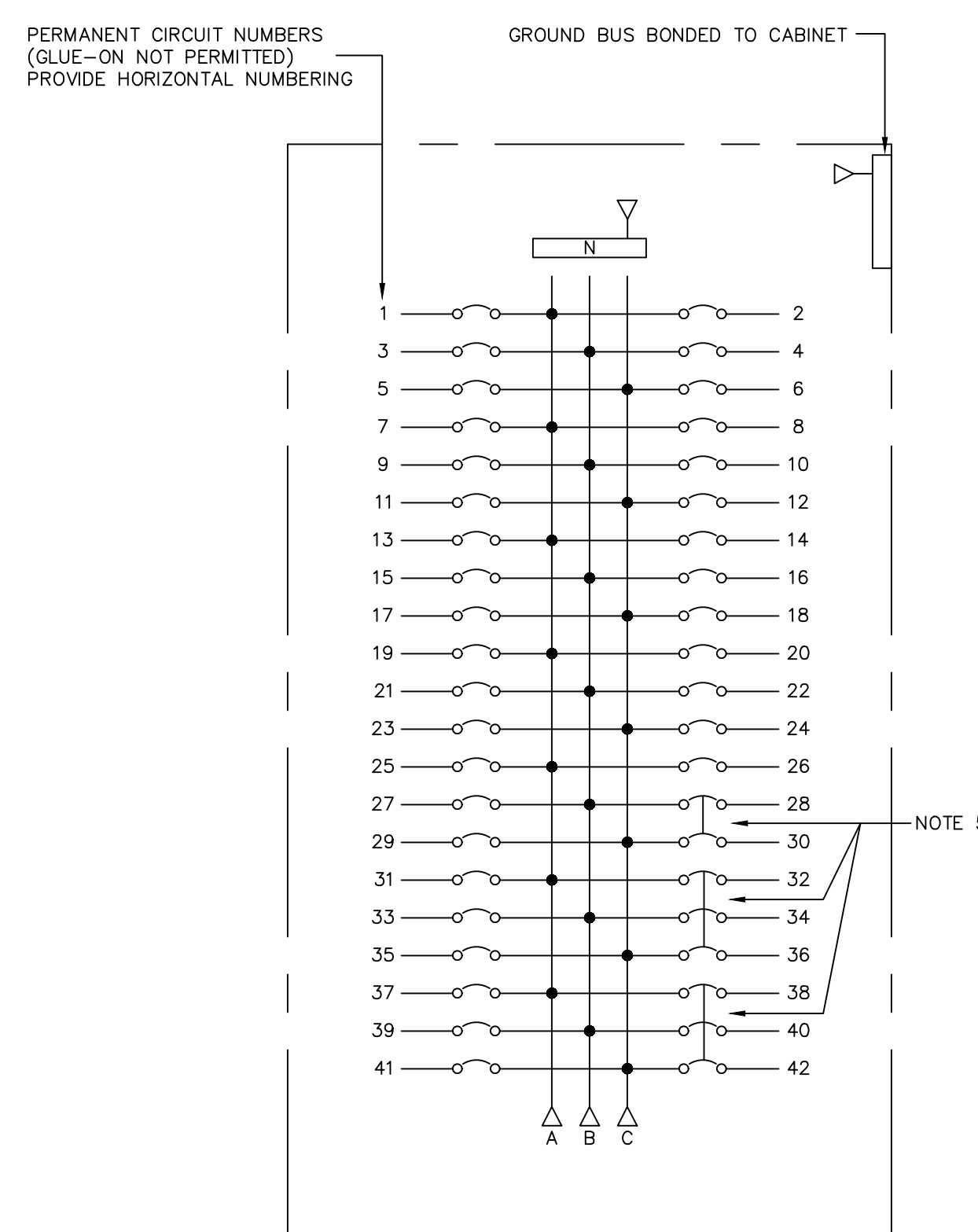
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 West Memphis, AR 72301

SHEET NUMBER

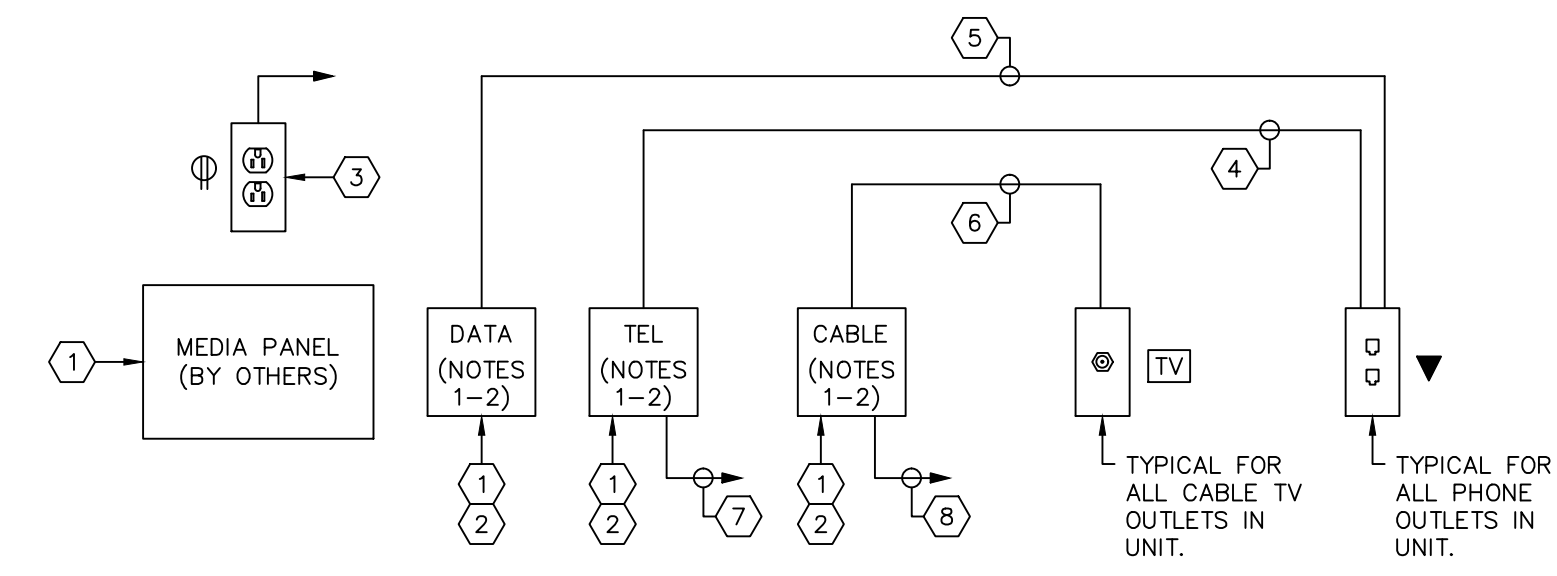
E01

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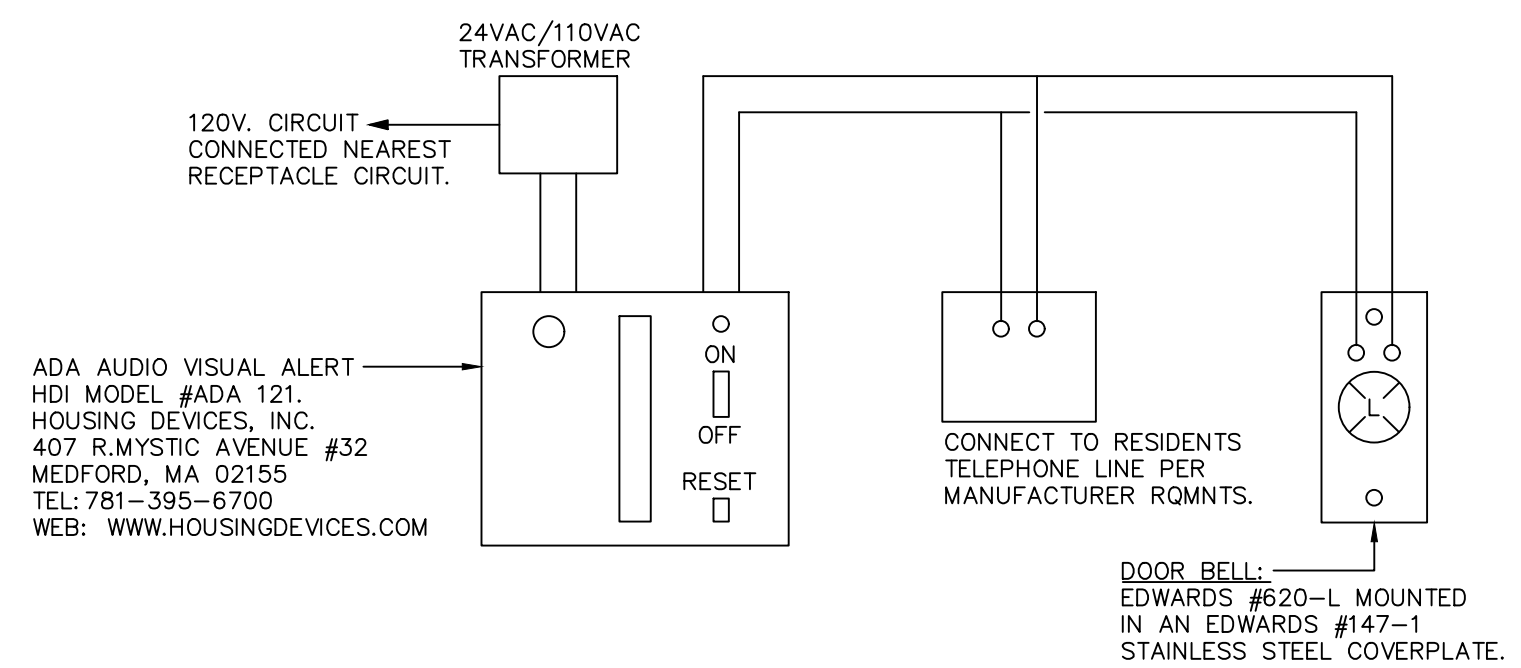
DETAIL: PANELBOARD
 TYPICAL CONNECTION AND NUMBERING SEQUENCE - NO SCALE

- PANEL NOTES:**
- ALL PANELS TO HAVE DOOR-IN-DOOR (HINGED TRIM) CONSTRUCTION.
 - FOR SURFACE MOUNTED PANELS INSTALL ALL NAMEPLATES (PER DETAILS) USING MACHINE SCREWS. FOR FLUSH PANELS IN FINISHED SPACES, INSTALL NAMEPLATES TO INSIDE OF DOOR USING 2 PART EPOXY (12HR)
 - FOR ALL FLUSH PANELS, FURNISH AND INSTALL 4EA. 1" EMPTY CONDUITS TO ABOVE NEAREST ACCESSIBLE CLG. LABELS AS SPARES AND PROVIDE REQUIRED FIRESTOP, PULLWIRE, AND CONDUIT END CAP.
 - ALL PANELS TO HAVE WELDED METAL DIRECTORY CARD HOLDERS.
 - ALL MULTI-POLE BREAKER SHALL HAVE A COMMON TRIP MECHANISM FOR SIMULTANEOUS OPERATION.



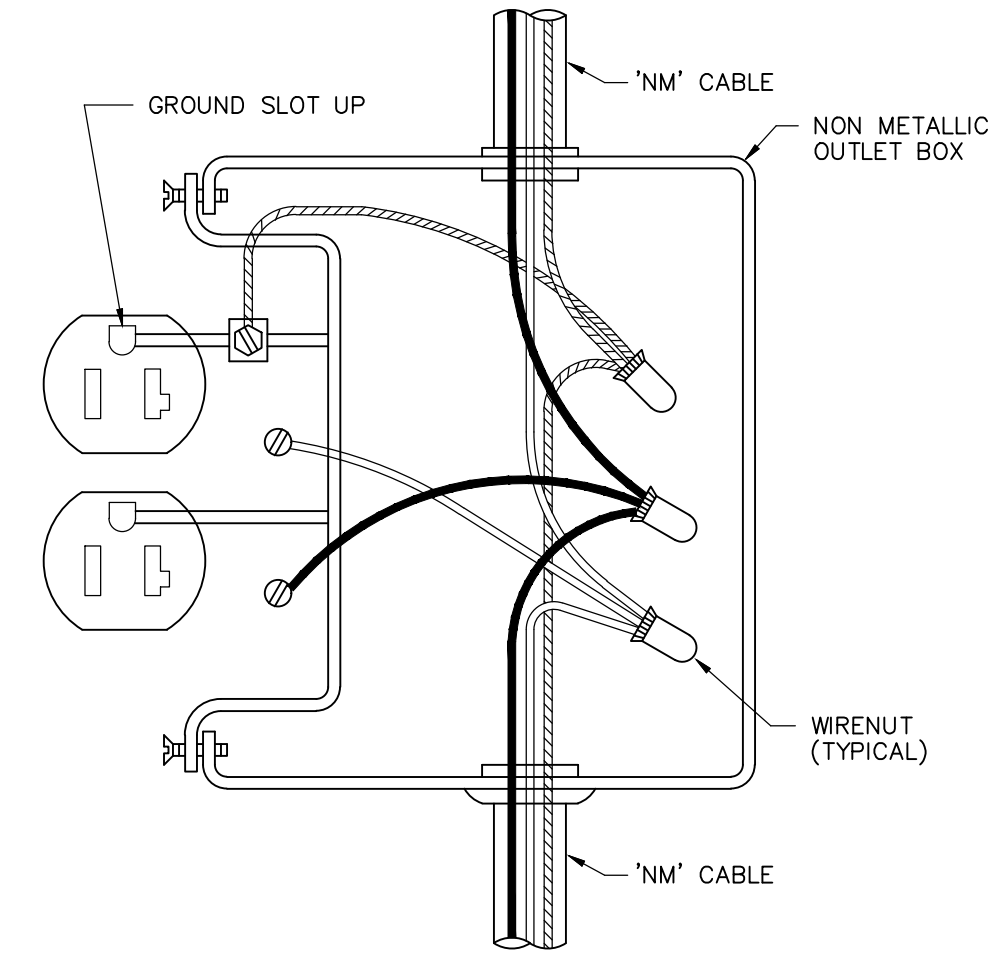
- HOUSE TELEPHONE/DATA AND CABLE TV NOTES:**
- MEDIA PANEL, CABLE/TEL/DATA JUNCTION BOXES TO BE LOCATED IN LAUNDRY ROOM UP HIGH ON WALL. VERIFY EXACT LOCATION WITH THE OWNER/GENERAL CONTRACTOR.
 - DOUBLE GANG OUTLET BOX WITH SINGLE GANG COVERPLATE. COVERPLATES TO BE LABELED AS SHOWN.
 - RECEPTACLE WITH 120 VOLT POWER FOR MEDIA PANEL. VERIFY EXACT LOCATION WITH THE GENERAL CONTRACTOR PRIOR TO ROUGHING. CONNECT TO NEAREST 120 VOLT RECEPTACLE CIRCUIT WITH 2#12G-MC CABLE.
 - TELEPHONE CABLE FROM TELEPHONE JUNCTION BOX TO TELEPHONE OUTLET(S) IN UNIT. TERMINATE AS REQUIRED AT BOTH ENDS AS DIRECTED BY RESPECTIVE UTILITY. CABLE SHALL BE SUPPORTED AS REQUIRED. TYPICAL FOR ALL PHONE OUTLETS IN UNIT.
 - DATA CABLE FROM DATA JUNCTION BOX TO TELEPHONE OUTLET(S) IN UNIT. TERMINATE AS REQUIRED AT BOTH ENDS AS DIRECTED BY RESPECTIVE UTILITY. CABLE SHALL BE SUPPORTED AS REQUIRED. TYPICAL FOR ALL PHONE OUTLETS IN UNIT.
 - TV CABLE FROM CABLE JUNCTION BOX TO TV OUTLET(S) IN UNIT. TERMINATE AS REQUIRED AT BOTH ENDS AS DIRECTED BY RESPECTIVE UTILITY. CABLE SHALL BE SUPPORTED AS REQUIRED. TYPICAL FOR ALL TV OUTLETS IN UNIT.
 - TELEPHONE CABLE TO SERVICE BOX ON HOUSE. VERIFY EXACT LOCATION WITH RESPECTIVE UTILITY AND TERMINATE AS REQUIRED.
 - TV CABLE TO SERVICE BOX ON HOUSE. VERIFY EXACT LOCATION WITH RESPECTIVE UTILITY AND TERMINATE AS REQUIRED.

HOUSE TELEPHONE/DATA AND CABLE TV SCHEMATIC
 SCALE: NONE

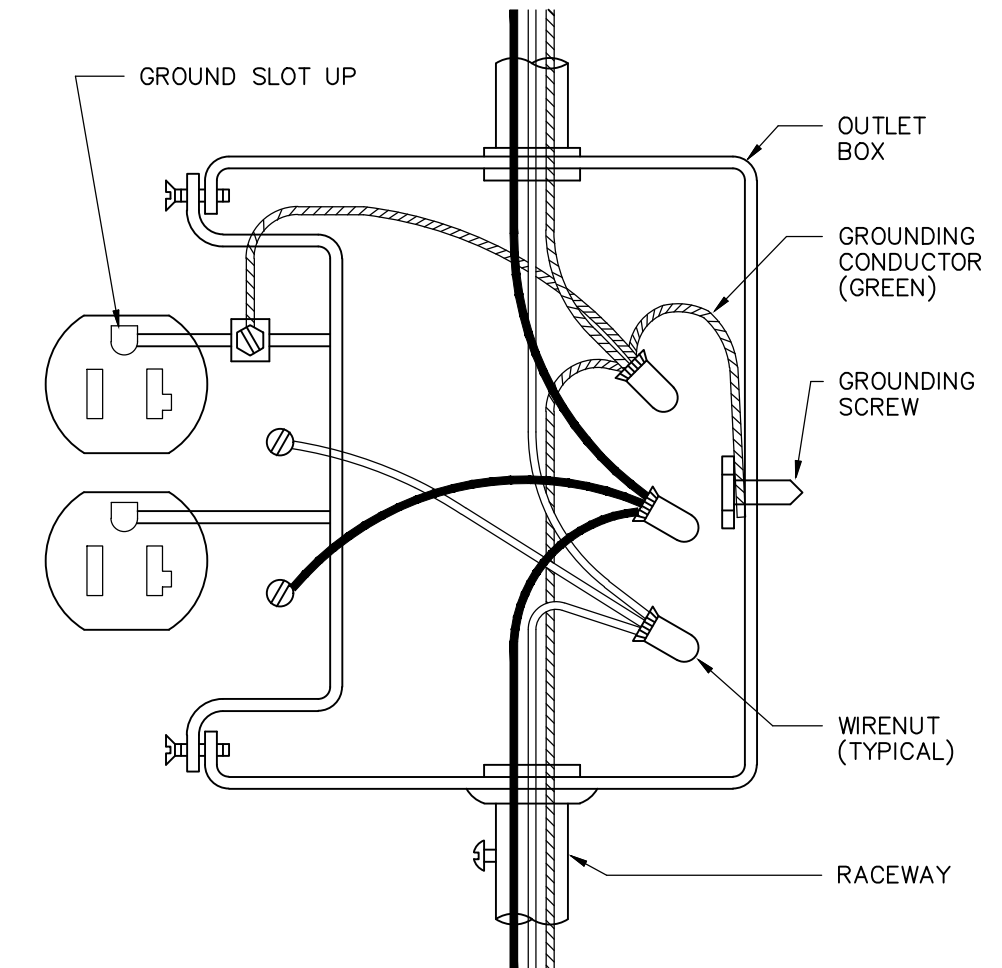


- ADA DOOR/PHONE ALERT SYSTEM NOTES:**
- DIAGRAM SHOWN IS DIAGRAMMATIC ONLY. CONTRACTOR TO OBTAIN EXACT WIRING REQUIREMENTS FROM THE MANUFACTURER PRIOR TO ANY WORK.
 - PROVIDE CONTROLS IN EACH BEDROOM TO DEACTIVATE THE SIGNAL.
 - SYSTEM TO BE PROVIDED AT SENSORY IMPAIRED UNITS ONLY. SEE ARCHITECTURAL SITE PLAN FOR LOCATION(S).

ADA DOOR/PHONE ALERT SYSTEM
 SCALE: NONE



'NM' CABLE RECEPTACLE INSTALLATION DETAIL
 NOT TO SCALE



EMT CONDUIT OR 'MC' CABLE RECEPTACLE INSTALLATION DETAIL
 NOT TO SCALE

LIGHTING FIXTURE SCHEDULE - HOUSES

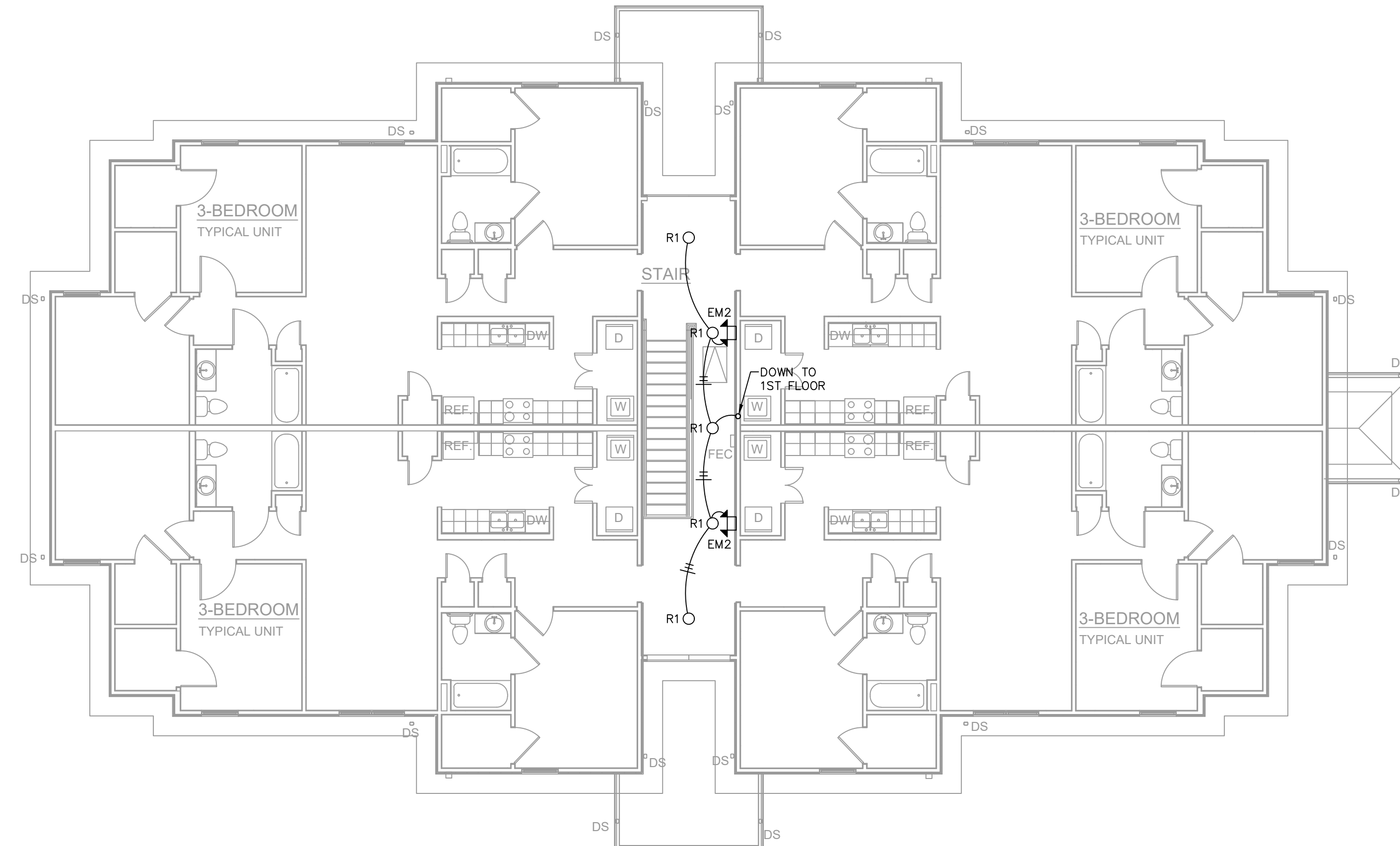
TYPE	DESCRIPTION	MOUNTING		MANUFACTURER	CATALOG NUMBER	LAMPS			BALLAST / DRIVER		TOTAL WATTS
		TYPE	HEIGHT			QTY	TYPE	VOLTS	QTY	TYPE	
A	SURFACE MOUNTED L.E.D. DISK WITH FROSTED LENS. FIXTURE TO BE ENERGY STAR RATED.	SURFACE	CEILING	SUNSET LIGHTING	TF9908-30	1	900 LUMENS	120		N/A	15
B	SURFACE MOUNTED ROUND RESIDENTIAL LUMINAIRE WITH DROP LENS AND 2 LAMPS. PROVIDE ENERGY STAR RATED L.E.D. LAMPS	SURFACE	CEILING	KICHLER	209N	2	15 WATT L.E.D. A-19	120		SELF	40
C	STEM MOUNTED CEILING FAN WITH LIGHT KIT, 3 SPEED, 5 BLADE, 52" WIDE SPAN, WHITE FINISH.	PENDANT	8'-6" AFF TO BOTTOM	EMERSON	FAN_CFT12WW	3	20 WATT L.E.D. CANDELABRA	120		SELF	100

LIGHTING FIXTURE SCHEDULE - COMMUNITY BUILDING

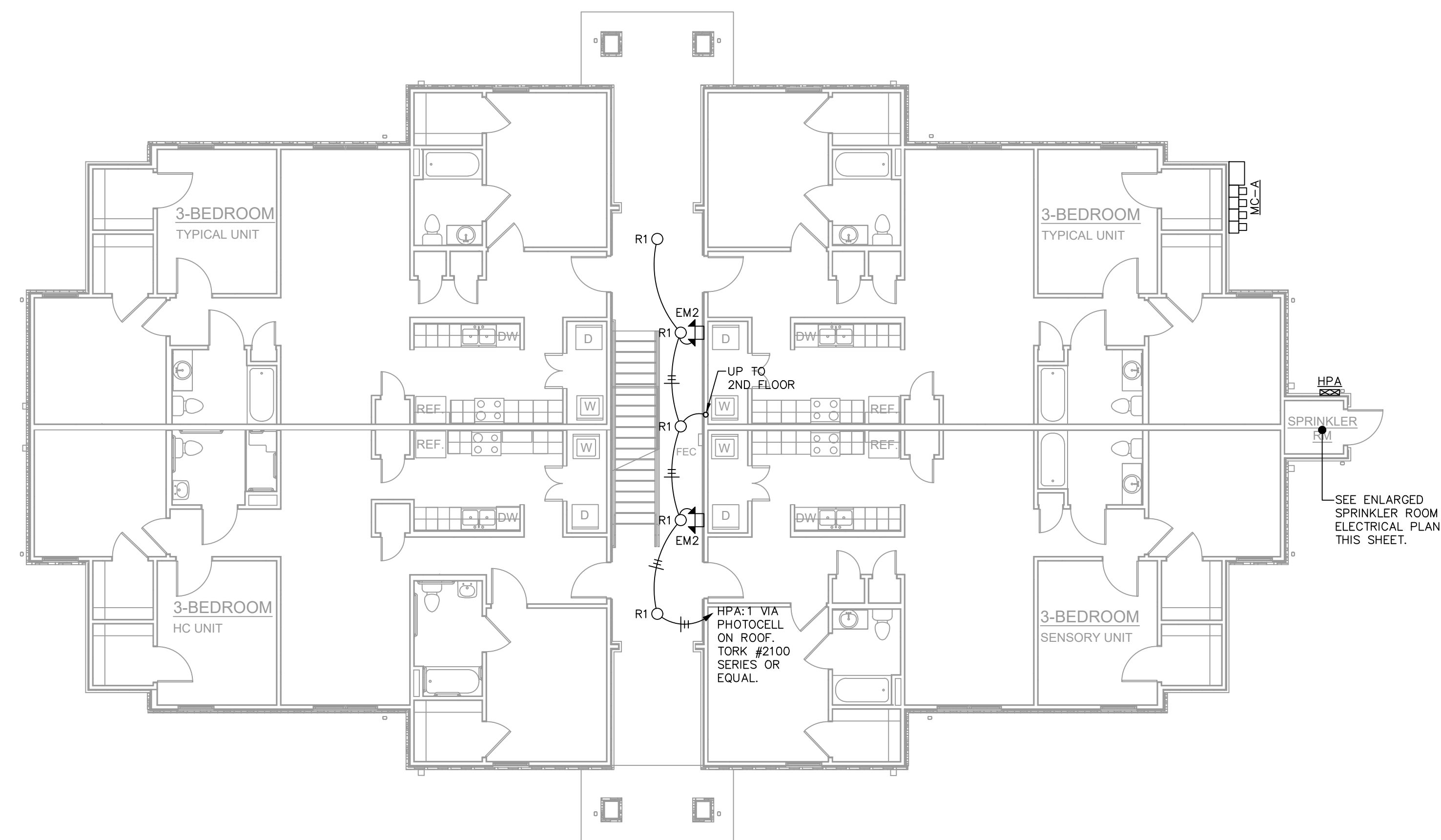
TYPE	DESCRIPTION	MOUNTING		MANUFACTURER	CATALOG NUMBER	LAMPS			BALLAST / DRIVER		TOTAL WATTS
		TYPE	HEIGHT			QTY	TYPE	VOLTS	QTY	TYPE	
CF	STEM MOUNTED CEILING FAN, 3 SPEED, 5 BLADE, 52" WIDE SPAN, WHITE FINISH.	PENDANT	8'-6" AFF TO BOTTOM	EMERSON	FAN_CFT72	N/A	N/A	120			75
R1	SURFACE MOUNTED L.E.D. DISK WITH FROSTED LENS. FIXTURE TO BE ENERGY STAR RATED.	SURFACE	CEILING	KICHLER PROGRESS SUNSET LIGHTING	APPROVED EQUAL APPROVED EQUAL TF9908-30	1	900 LUMENS	120		N/A	15
R2	SURFACE MOUNTED L.E.D. DISK WITH FROSTED LENS. FIXTURE TO BE ENERGY STAR RATED.	SURFACE	CEILING	SUNSET LIGHTING	TF9908-30	1	900 LUMENS	120		N/A	15
S1	1x4 SURFACE MOUNTED FLUORESCENT WRAPAROUND WITH PRISMATIC LENS, WHITE END CAPS, AND AN ELECTRONIC BALLAST	SURFACE	CEILING	SIMKAR	SY920-232-SR-B11-120	2	F32T8/REB35	120	1	ELECTRONIC	64
S2	4'-0" FLUORESCENT STRIP FIXTURE WITH WIREGUARD	SURFACE	CEILING	LITHONIA	C232-GEB10-IS-WG	2	F32T8/REB35	120	1	ELECTRONIC	64
W1	2'-0" FLUORESCENT VANITY LIGHT	WALL	SEE ARCHITECT DRAWINGS	NUVO LIGHTING	60-3209	3	13 WATT GU24	120	1	ELECTRONIC	39
W2	WALL MOUNTED LIGHT FIXTURE	WALL	8" ABOVE DOOR TO BOTTOM	LITHONIA	TWS-26TRT-120	1	28 WATT TRT	120	1	ELECTRONIC	28
EX1	L.E.D. EXIT SIGN WITH SELF CONTAINED BATTERY	WALL	8'-0" AFF	MORRIS	73010					FURNISHED WITH UNIT	5
EM1	UNITARY TWIN HEAD EMERGENCY LIGHT WITH INTEGRAL BATTERY	WALL	8'-0" AFF	MORRIS	73424					FURNISHED WITH UNIT	5
EM2	UNITARY TWIN HEAD EMERGENCY LIGHT WITH INTEGRAL BATTERY U.L. LISTED FOR WET LOCATION	WALL	8'-0" AFF	MORRIS	73308					FURNISHED WITH UNIT	5
FL	GRADE MOUNTED HORIZONTAL FLOOD LIGHT	GROUND	STANCHION	RAB LIGHTING	EZLED785F	1	8859 LUMENS	120	1	DRIVER	89

FIXTURE DESIGNATION LEGEND:
 R = RECESSED S = SURFACE P = PENDANT W = WALL CH = CHAIN HUNG
 PL = POLE BL = BOLLARD GR = GROUND CV = COVE

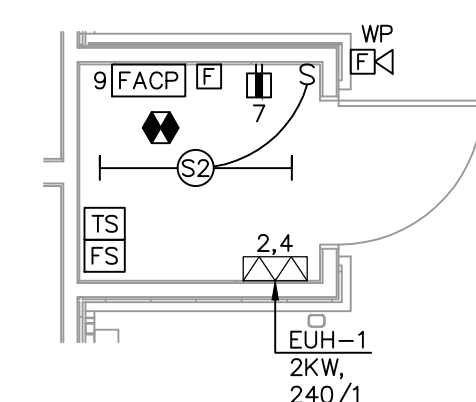
- GENERAL NOTES:**
- MANUFACTURER CATALOG NUMBERS ARE SHOWN FOR GENERAL DESCRIPTIVE PURPOSES AND TO ESTABLISH A STANDARD OF QUALITY. MANUFACTURERS LISTED AS "EQUAL" DOES NOT ENSURE NOR GUARANTEE APPROVAL OF ANY PRODUCT BY THE LISTED MANUFACTURER. FOR APPROVAL, FIXTURES MUST PROVIDE EQUAL PERFORMANCE RELATIVE TO DELIVERY OF LIGHTING, ENERGY USE, AND BE OF SIMILAR DESIGN AND CONSTRUCTION. REQUESTS FOR PRIOR APPROVAL OF FIXTURES NOT LISTED IN THIS SCHEDULE **MUST** BE RECEIVED BY THE ENGINEER A MINIMUM OF 10 DAYS PRIOR TO BID (SEE SPECIFICATIONS) FOR REVIEW BY THE ARCHITECT/ENGINEER. MANUFACTURERS APPROVAL THROUGH THIS PROCESS WILL BE LISTED IN AN ADDENDUM PRIOR TO BID. FIXTURES NOT LISTED IN AN ADDENDUM ARE NOT APPROVED.
 - CONTRACTOR SHALL PROVIDE LUMINAIRES COMPLETE WITH ALL OPTIONS AND ACCESSORIES REQUIRED FOR A COMPLETE INSTALLATION. ALL PRODUCTS SHALL BE U.L. LISTED.
 - PROVIDE PROPER LAMP FOR REFLECTOR ASSEMBLY SPECIFIED AND AS RECOMMENDED BY LUMINAIRE MANUFACTURER.
 - PROVIDE FLUORESCENT LAMPS WITH LOW MERCURY CONTENT, COMPLIANT WITH FEDERAL EPA TCLP REQUIREMENTS, AKA "ECO", "ALTO", OR "ECLUX".
 - VERIFY CONSTRUCTION AND TYPE CEILINGS TO BE INSTALLED AND PROVIDE LUMINAIRES IN APPROPRIATE CONFIGURATION WITH ALL HARDWARE AND ACCESSORIES REQUIRED FOR A COMPLETE AND PROPER INSTALLATION.
 - PROVIDE LUMINAIRES WITH JOINING PLATES, END CAPS, CANOPIES, MOUNTING HARDWARE, ETC., AS REQUIRED FOR COMPLETE INSTALLATION.
 - EXIT LIGHTS SHALL BE PROVIDED WITH GREEN LETTERS REQUIRED BY LOCAL CODE AUTHORITY. FURNISH WITH CHEVRON DIRECTIONAL INDICATORS AS INDICATED AND/OR AS REQUIRED.
 - PROVIDE DEVICES FOR SECURING LAY-IN TYPE LUMINAIRES TO CEILING GRID TO COMPLY WITH ARTICLE 410 OF THE NATIONAL ELECTRICAL CODE.
 - FURNISH LINEAR LUMINAIRES IN CONTINUOUS ROWS OR PATTERNS AS INDICATED ON DRAWINGS. PROVIDE WITH CORNER, ANGLE, AND END PIECES AS REQUIRED FOR A COMPLETE FINISHED INSTALLATION.
 - FURNISH LUMINAIRES IN MECHANICAL SPACES COMPLETE WITH PENDANT STEMS OR CHAIN HANGERS AS REQUIRED TO MOUNT BELOW PIPING, DUCT, CONDUIT, ETC., MAINTAIN MINIMUM 7'-6" UNIFORM MOUNTING HEIGHT FOR ALL LUMINAIRES THROUGHOUT EACH AREA.
 - PENDANT MOUNTED LUMINAIRES WITH AIRCRAFT CABLE SUSPENSION SYSTEMS SHALL BE FURNISHED WITH ADJUSTABLE CABLE GRP HARDWARE. CABLE SIZE SHALL BE SELECTED BY MANUFACTURER TO PROVIDE ADEQUATE SUPPORT OF LUMINAIRE SPECIFIED.



BUILDING A - LEVEL 2 - ELECTRICAL
 SCALE: 1/8" = 1'-0"



BUILDING A - LEVEL 1 - ELECTRICAL
 SCALE: 1/8" = 1'-0"



ENLARGED SPRINKLER ROOM - ELECTRICAL
 SCALE: 1/4" = 1'-0"

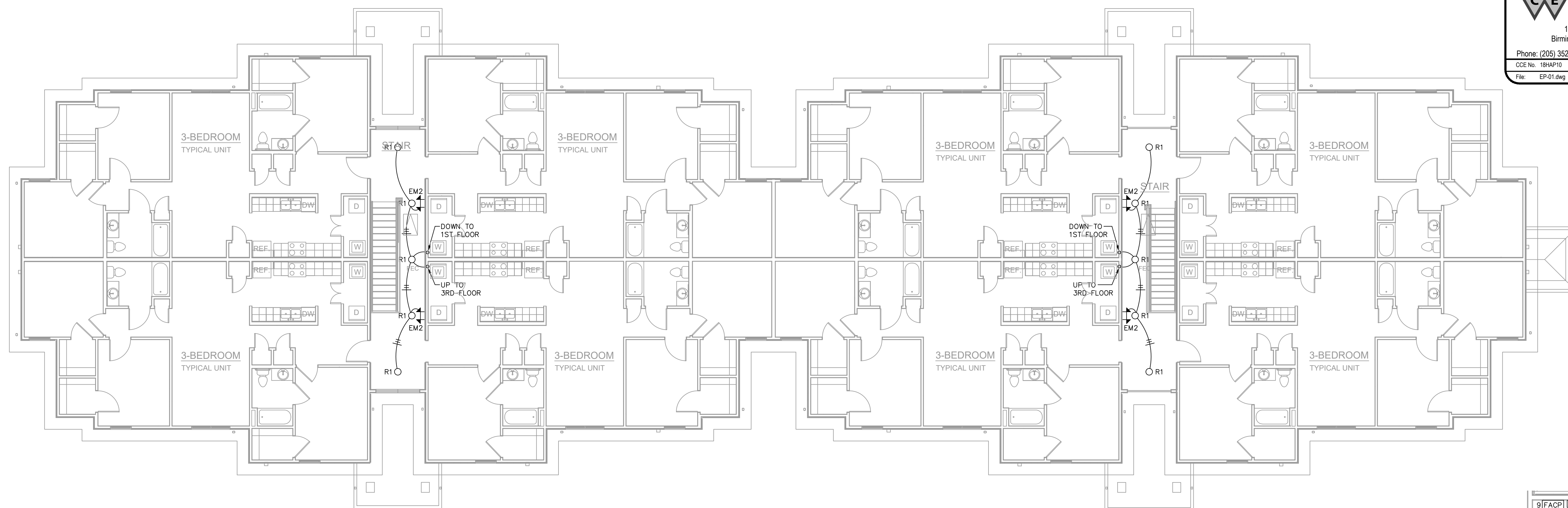
DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 REISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

PROJECT NUMBER
597
 PROJECT
Frisco Park

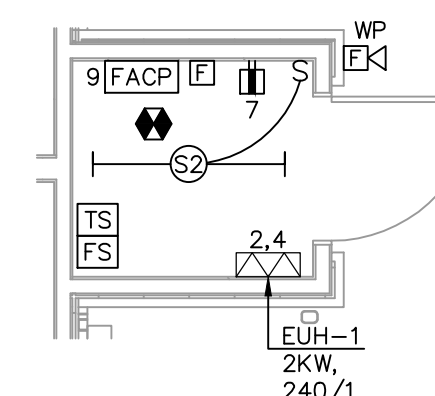
418 S. Avalon Street,
 West Memphis, AR 72301
 SHEET NUMBER

E04

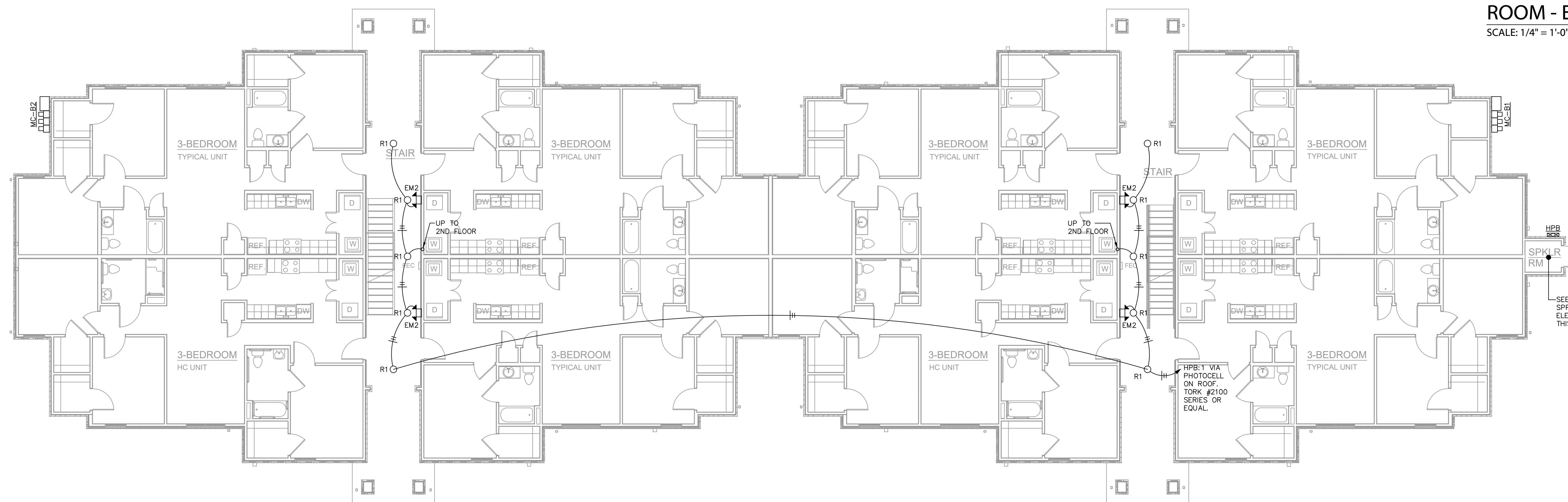
CAD FILE NUMBER



BUILDING B - LEVEL 2 & 3 - ELECTRICAL
 SCALE: 1/8" = 1'-0"



ENLARGED SPRINKLER ROOM - ELECTRICAL
 SCALE: 1/4" = 1'-0"



BUILDING B - LEVEL 1 - ELECTRICAL
 SCALE: 1/8" = 1'-0"

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 REISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

PROJECT NUMBER

597

PROJECT

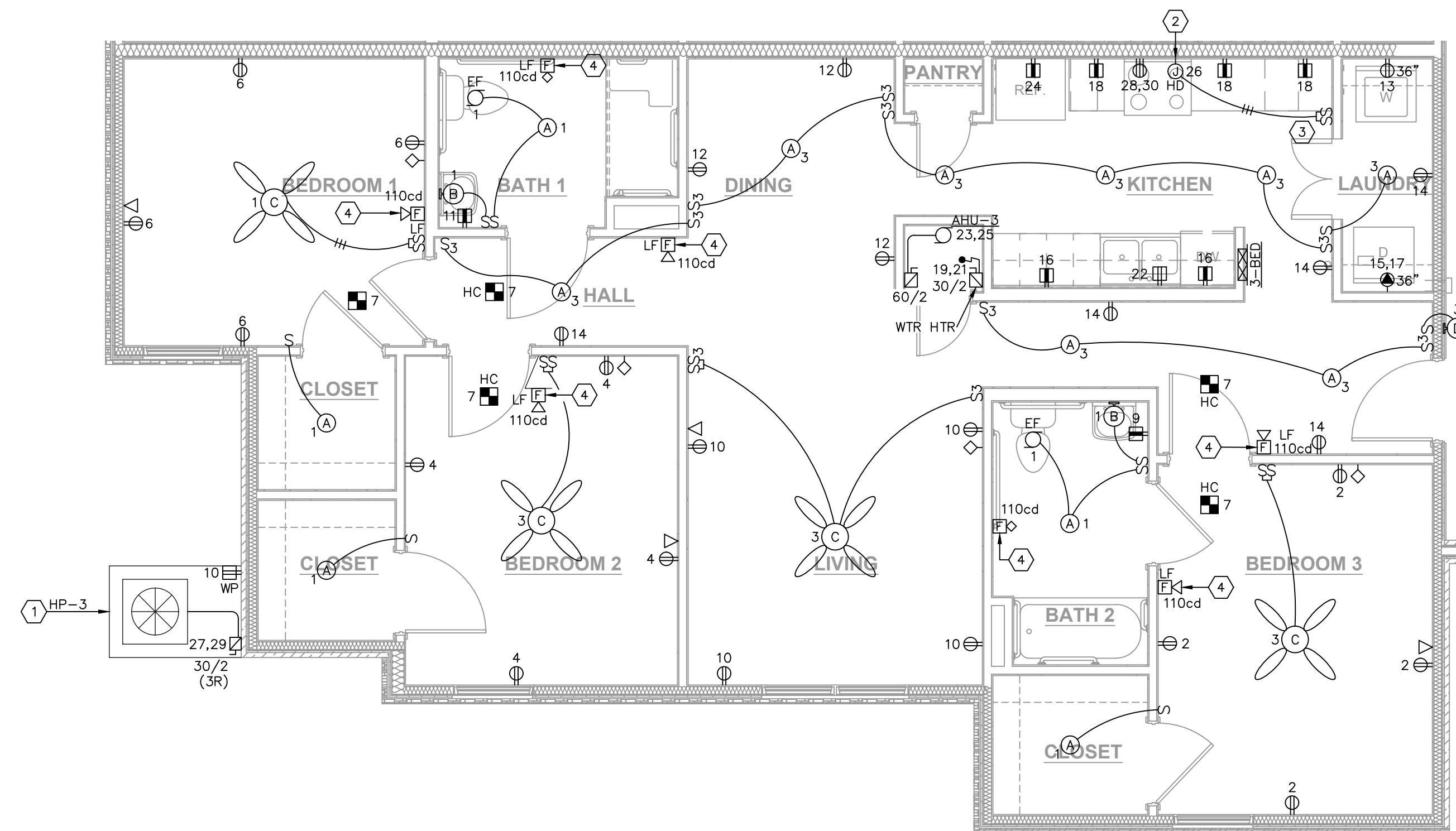
Frisco Park

418 S. Avalon Street,
 West Memphis, AR 72301

SHEET NUMBER

E05

CAD FILE NUMBER



3 BED HC UNIT PLAN - ELECTRICAL
 SCALE: 1/8" = 1'-0"

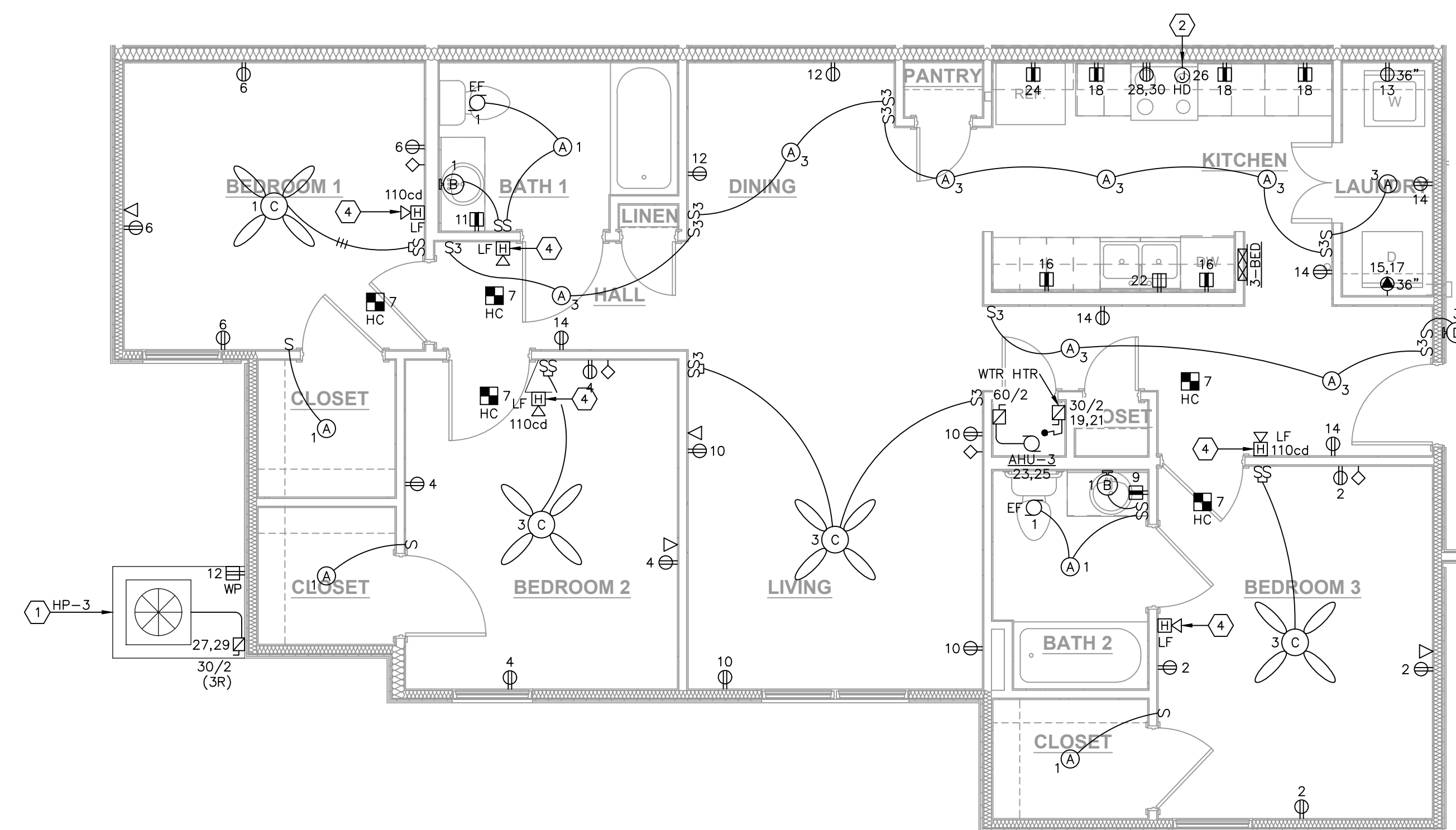
GENERAL NOTES THIS SHEET:

- A. CIRCUITS SERVING ANY RECEPTACLE, LIGHT, SMOKE DETECTOR, OR ANY OTHER 120 VOLT SINGLE PHASE DEVICE SHALL BE SERVED BY AN ARC FAULT BREAKER PER NEC 210.12.
- B. SMOKE DETECTORS LOCATED WITHIN EACH UNIT SHALL BE INTERLOCKED SO THAT ANY DEVICE SENSING SMOKE ACTIVATES ALL SMOKE DETECTORS WITHIN THE UNIT. THE INITIATING SMOKE DETECTOR SHALL BE EQUIPPED WITH A LATCHING ALARM INDICATOR.
- C. ALL GENERAL PURPOSE AND GFI RECEPTACLES LOCATED WITHIN EACH UNIT SHALL BE TAMPER PROOF PER NEC 406.12.
- D. UNLESS NOTED OTHERWISE ALL WIRING SHALL BE 2#12, 1#12G-MC CABLE. NM (ROMEX) WIRING MAY BE USED WHERE ALLOWED BY CODE.
- E. NUMBERING SHOWN AT WIRING DEVICES, LIGHT FIXTURES, AND SMOKE DETECTORS ARE BRANCH CIRCUIT NUMBERS FOR RESPECTIVE PANEL WITH-IN UNIT.
- F. ALL CEILING MOUNTED JUNCTION BOXES SHALL BE RATED TO SUPPORT CEILING FANS WITH LIGHT KITS (50LB MINIMUM).
- G. ALL LIGHT FIXTURES LOCATED IN TRAY CEILING AREAS SHALL BE CENTERED. REFER TO ARCHITECTS REFLECTED CEILING PLANS AS REQUIRED.
- H. PROVIDE NEC REQUIRED WORK SPACE CLEARANCE FOR ALL PANELS AND DISCONNECT SWITCHES.
- I. ALL FIRE ALARM DEVICES DESIGNATED WITH 'LF' SHALL BE LOW FREQUENCY PER NFPA 72.

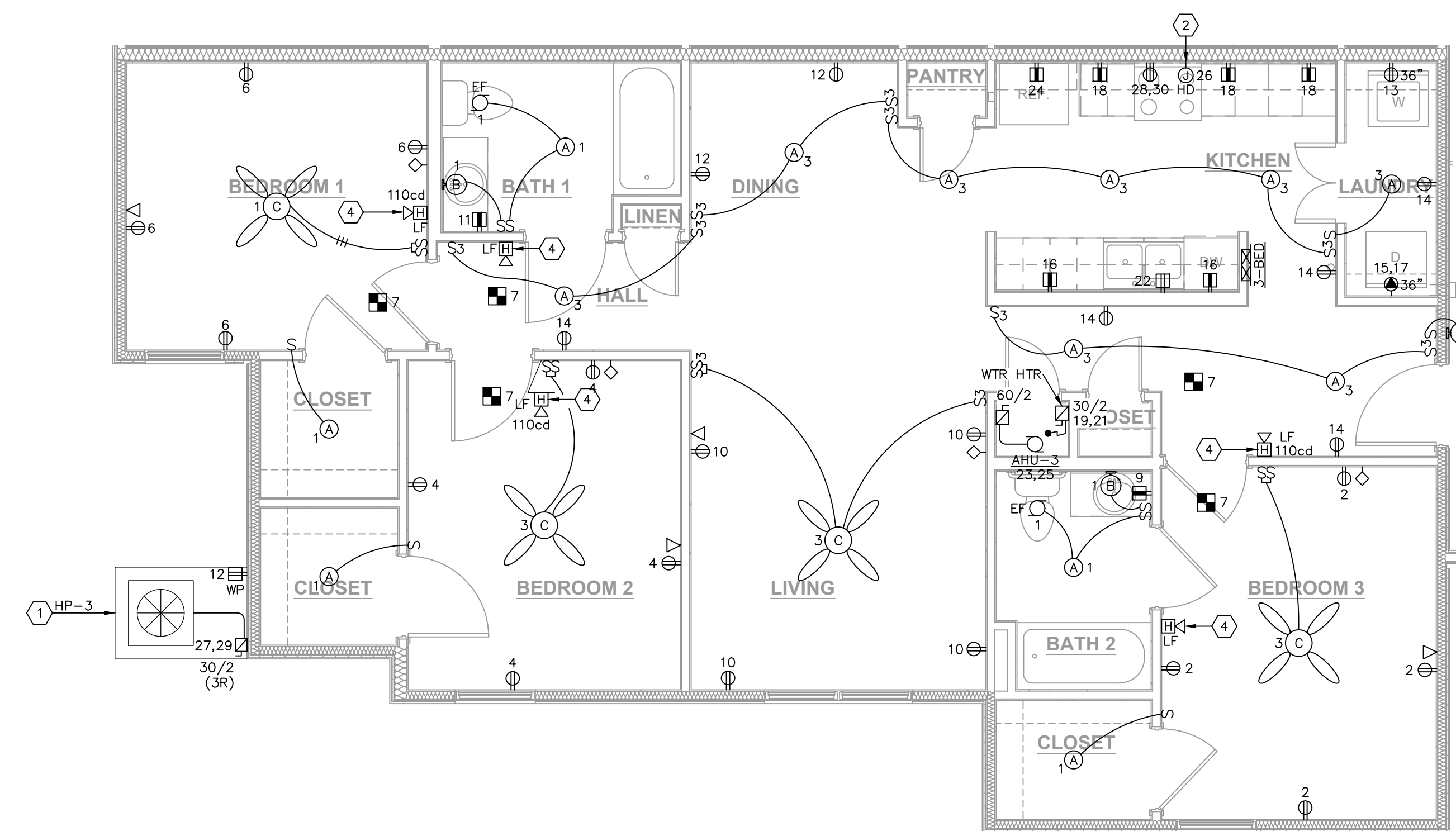
PLAN NOTES THIS SHEET:

- 1. PROVIDE WEATHERPROOF SEAL/TITE FLEXIBLE CONDUIT CONNECTION FROM DISCONNECT SWITCH TO HEAT PUMP. CONDUIT SHALL BE ROUTED ADJACENT TO REFRIGERANT PIPING.
- 2. JUNCTION BOX WITH CONNECTION TO HOOD LIGHT AND FAN. VERIFY EXACT LOCATION PRIOR TO ANY ROUGHING.
- 3. SWITCHES FOR HOOD LIGHT AND FAN. VERIFY EXACT LOCATION PRIOR TO ROUGH-IN.
- 4. TYPICAL AT BUILDING 'B' ONLY.

PANEL:		PANEL AMPS:		VOLTAGE:		MOUNTING:		FLUSH:						
3-BED		125		120 / 240, 1 PHASE 3 WIRE 60 HZ		NEMA RATING:		NEMA 1						
TYPE:		MAIN TYPE:		AIC RATING:		LOCATION:		UNIT						
PQL		100%		<10,000		FED FROM:		METER CENTER						
		SOLID NEUTRAL:		100%		BREAKER FEATURES:		GFI = GROUND FAULT CIRCUIT INTERRUPTER; ST = SHUNT TRIP; TH = TIE HANDLE						
		GROUND BUS:		100%		AF = ARC FAULT CIRCUIT INTERRUPTER; LO = LOCK-ON DEVICE								
ONE SECTION PANEL	CKT NO	BREAKER	LOAD TYPE	DESCRIPTION	WIRE SIZE	CKT LOAD	LINE		WIRE SIZE	DESCRIPTION	LOAD TYPE	BREAKER	CKT NO	
							L1	L2						
	1	20/1 AF	LTG	BEDROOMS, BATHROOM	#12	500	1220	720	#12	BEDROOM	RCPT	20/1	AF 2	
	3	20/1 AF	LTG	LIVING, KITCHEN, HALL	#12	500	1220	720	#12	BEDROOM	RCPT	20/1	AF 4	
	5	20/1 AF	SPARE				720	720	#12	BEDROOM	RCPT	20/1	AF 6	
	7	15/1 AF	MSC	SMOKE DETECTORS	#12	250		250		SPARE		20/1	AF 8	
	9	15/1	MSC	BATHROOM	#12	180	900	720	#12	LIVING	RCPT	20/1	AF 10	
	11	15/1	MSC	BATHROOM	#12	180		540	#12	HALL / DINING	RCPT	20/1	AF 12	
	13	15/1	LAUN	WASHER	#12	1500	1860	360	#12	KITCHEN	RCPT	20/1	AF 14	
	15		LAUN	DRYER	#10	2500		3500	#12	APPLIANCE	KIT	20/1	AF 16	
	17	30/2	LAUN	DRYER	#10	2500	3500	1000	#12	APPLIANCE	KIT	20/1	AF 18	
	19		WTR HTR	WATER HEATER	#10	2250		2250		SPARE		15/1	AF 20	
	21	30/2	WTR HTR	WATER HEATER	#10	2250	3750	1500	#12	DISHWASHER	KIT	15/1	AF 22	
	23		HTG	INDOOR HVAC UNIT	#8	3912		5352	#12	REFRIGERATOR	KIT	15/1	AF 24	
	25	40/2	HTG	INDOOR HVAC UNIT	#8	3912	4412	500	#12	HOOD LIGHT, FAN	KIT	15/1	AF 26	
	27		HTG	INDOOR HVAC UNIT	#8	1680		6930	5250	3#6, 1#10G	RANGE	KIT	50/2	AF 28
	29	30/2	HTG	INDOOR HVAC UNIT	#10	1680	6930	5250	1#10G	RANGE	KIT	50/2	AF 30	
PHASE TOTALS							23292	20042						



3 BED SENSORY UNIT PLAN - ELECTRICAL
 SCALE: 1/8" = 1'-0"



3 BED UNIT PLAN - ELECTRICAL
 SCALE: 1/8" = 1'-0"

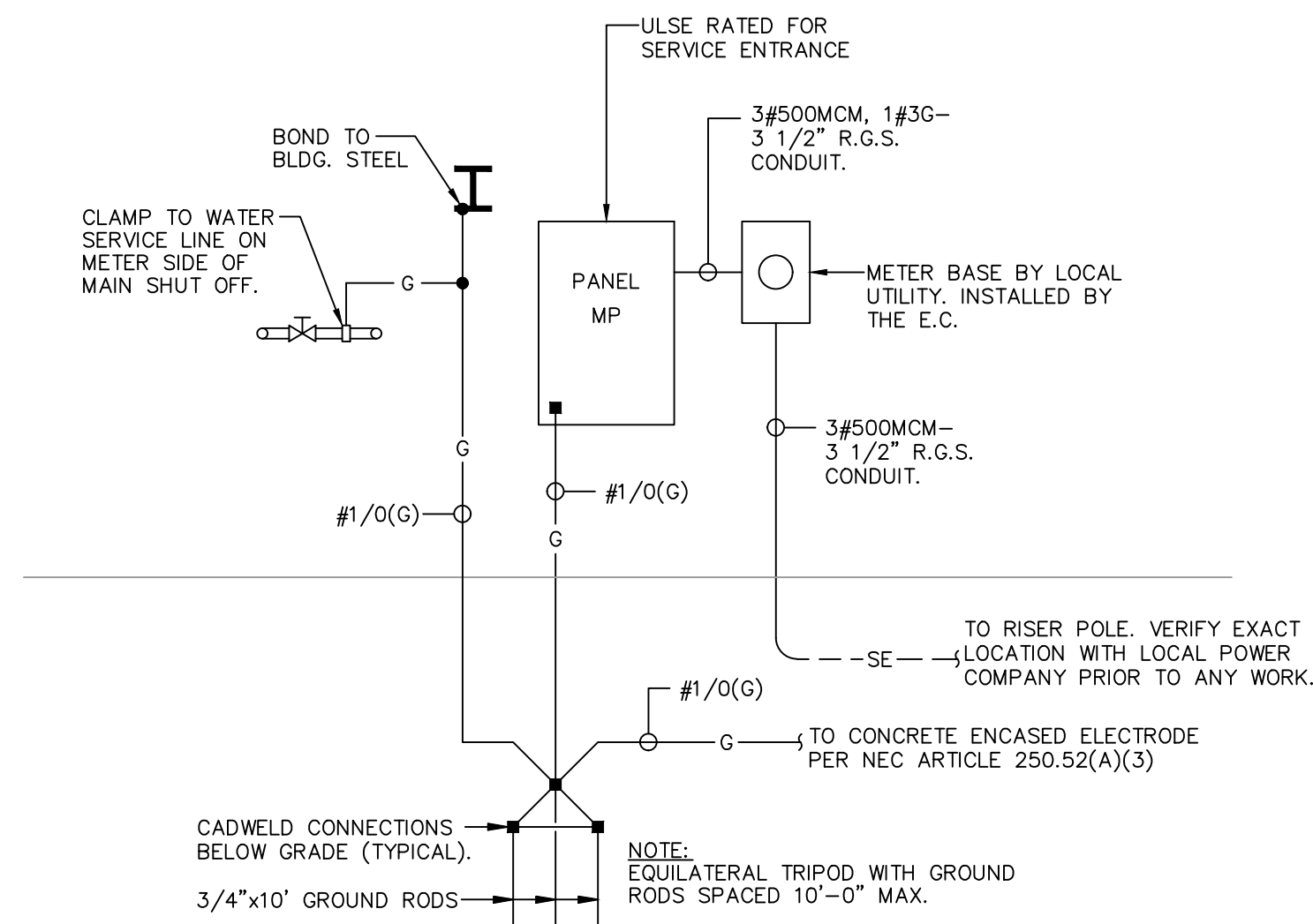
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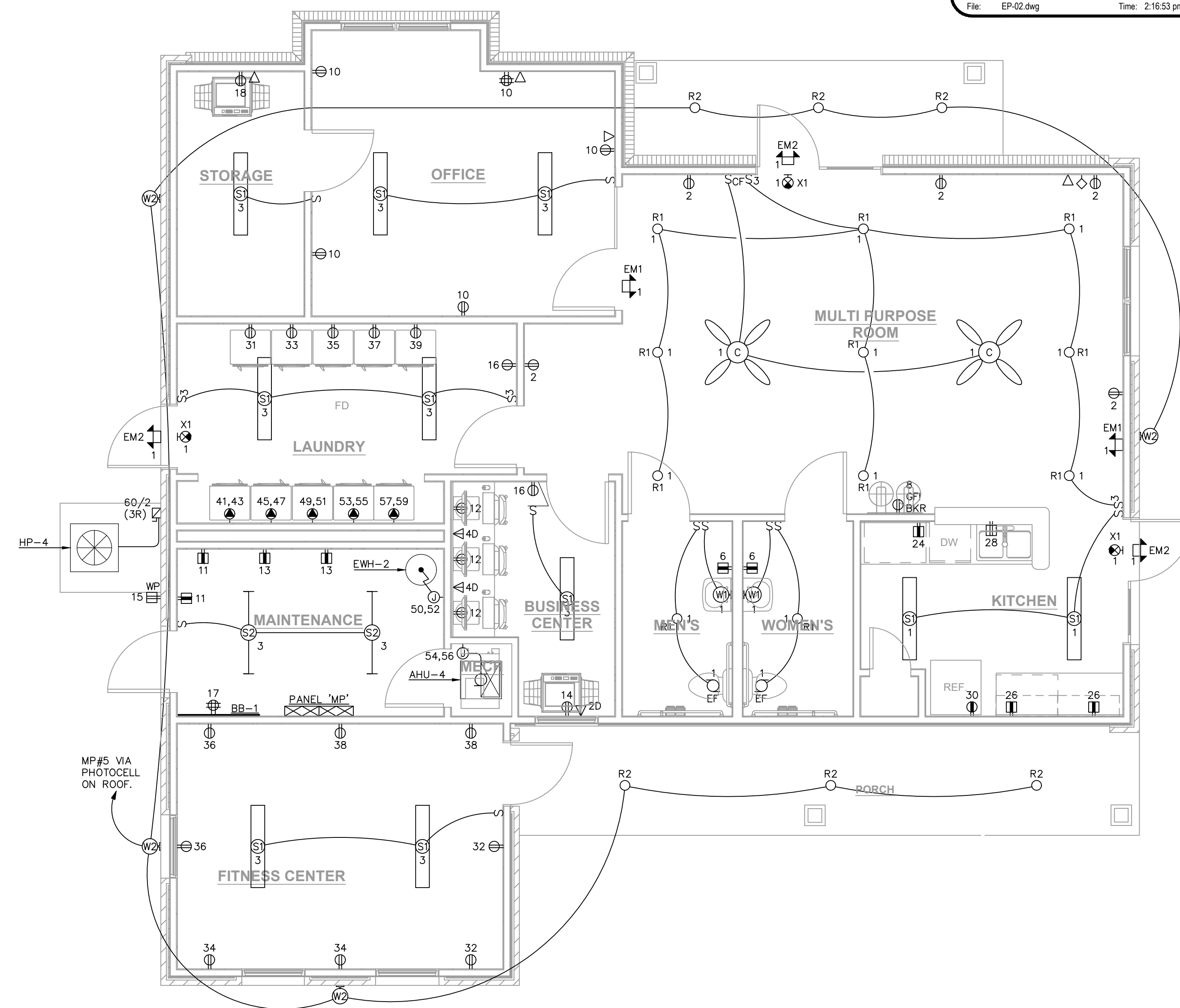
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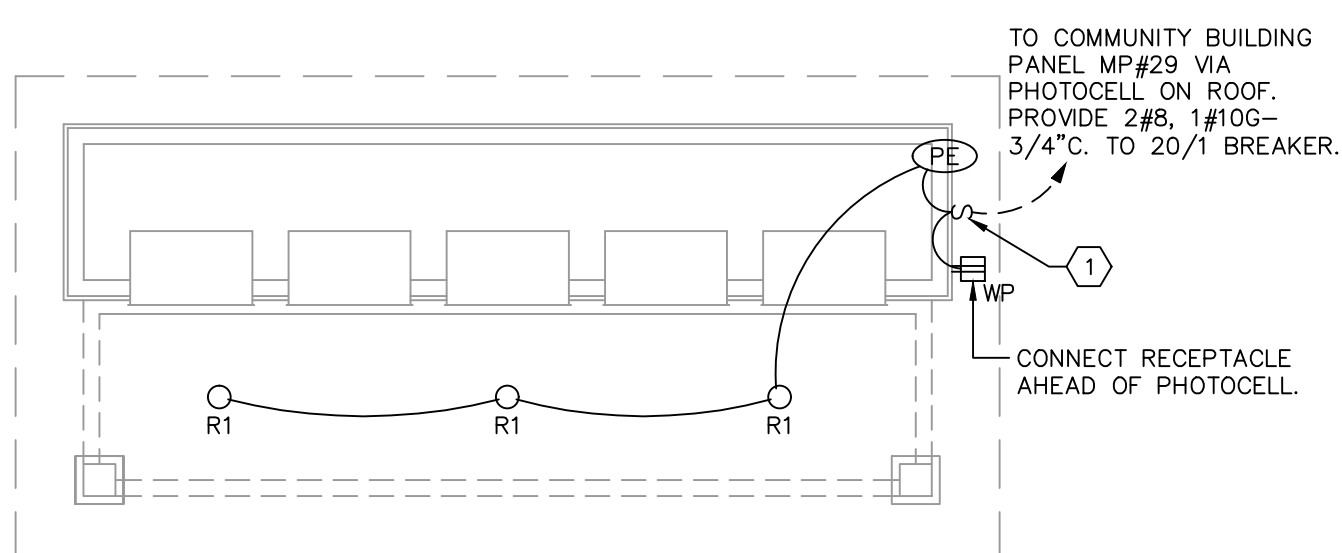


SINGLE LINE DIAGRAM - COMMUNITY BUILDING
 SCALE: NONE

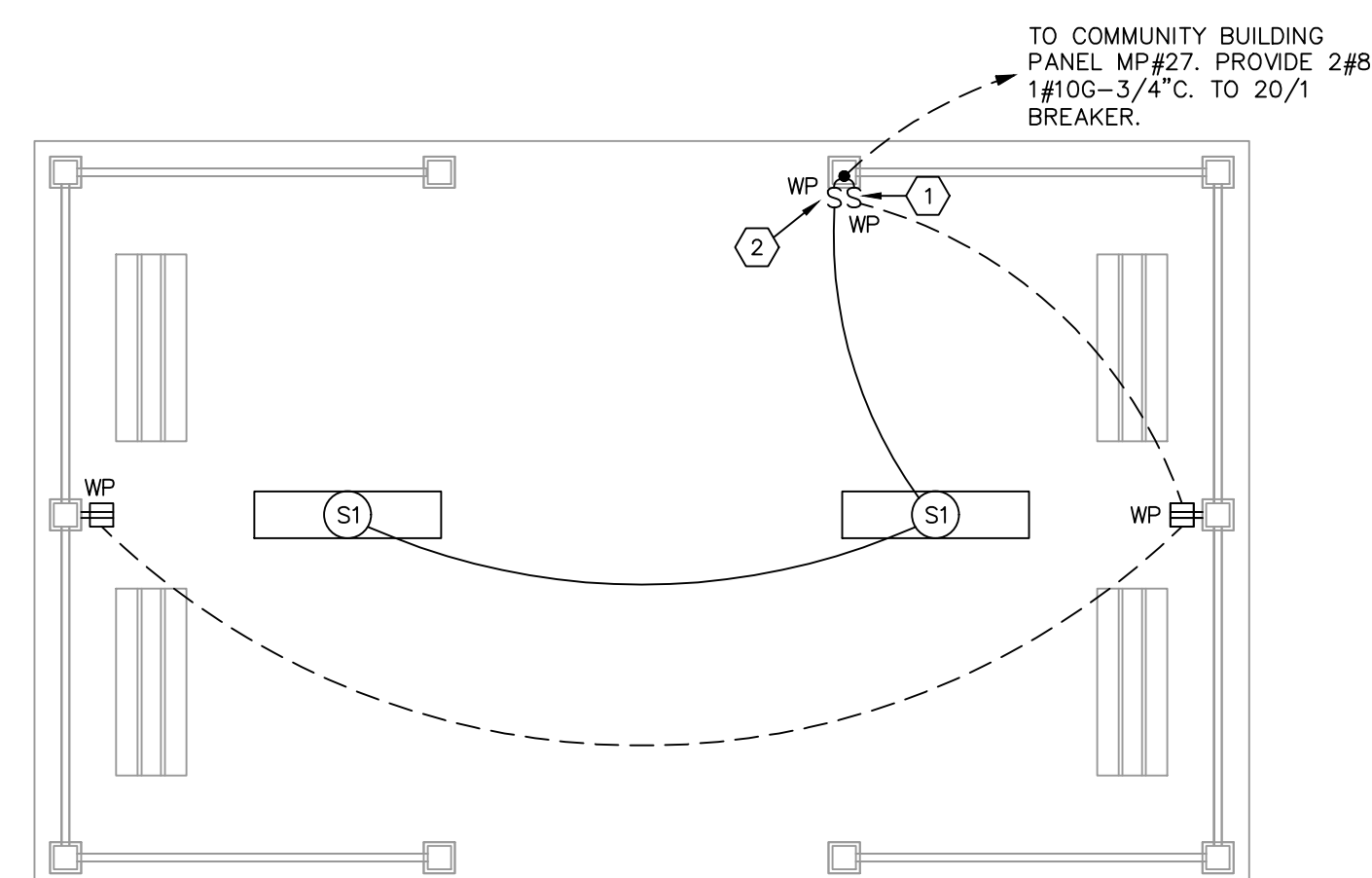
PANEL:		PANEL AMPS:		VOLTAGE:		MOUNTING:		SURFACE					
MP		400		120 / 240, 1 PHASE 3 WIRE 60 HZ		NEMA RATING:		NEMA 1					
TYPE:		MAIN BKR RATING:		AIC RATING:		LOCATION:		MAINTENANCE ROOM					
BQL		400		42,000		FED FROM:		SERVICE TRANSFORMER					
SOLID NEUTRAL:		100%		BREAKER FEATURES:		GFI = GROUND FAULT CIRCUIT INTERRUPTER; ST = SHUNT TRIP;		TH = TIE HANDLE					
GROUND BUS:		100%		AF - ARC FAULT CIRCUIT INTERRUPTER; LO = LOCK-ON DEVICE									
CKT NO	BREAKER	LOAD TYPE	DESCRIPTION	WIRE SIZE	CKT LOAD	LINE L1	L2	CKT LOAD	WIRE SIZE	DESCRIPTION	LOAD TYPE	BREAKER	CKT NO
1	20/1	LTG	MULTI-PURPOSE ROOM	#12	1450	2170		720	#12	MULTI-PURPOSE ROOM	RCPT	20/1	2
3	20/1	LTG	LOBBY, OFFICE	#12	825			1545	#12	MULTI-PURPOSE ROOM	RCPT	20/1	4
5	20/1	LTG	EXTERIOR	#12	900	1620		720	#12	KITCHEN RESTROOM	RCPT	20/1	6
7	20/1		SPARE					250	#12	WATER COOLER	RCPT	20/1	8
9	20/1		SPARE			1080		1080	#12	OFFICE	RCPT	20/1	10
11	20/1	RCPT	MAINTENANCE	#12	540			1080	#12	BUSINESS CENTER	RCPT	20/1	12
13	20/1	RCPT	MAINTENANCE	#12	540	1540		1000	#12	BUSINESS CENTER COOPER	MSC	20/1	14
15	20/1	RCPT	MAINTENANCE	#12	540			1080	#12	BUSINESS CENTER LAUNDRY	RCPT	20/1	16
17	20/1	RCPT	TELEPHONE BACKBOARD	#12	360	1360		1000	#12	OFFICE COOPER	MSC	20/1	18
19	20/1		SPARE								20/1	20	
21	20/1		SPARE			0					20/1	22	
23	20/1		SPARE			750		750	#12	APPLIANCE	KIT	20/1	24
25	20/1		SPARE			1500		1500	#12	APPLIANCE	KIT	20/1	26
27	20/1	MISC	GAZEBO	#8	500	1700		1200	#12	DISHWASHER	KIT	20/1	28
29	20/1	MISC	MAIL KIOSK	#8	500	1250		750	#12	REFRIGERATOR	KIT	20/1	30
31	20/1	LAUN	WASHER	#12	1200			2200	#12	FITNESS ROOM	MSC	20/1	32
33	20/1	LAUN	WASHER	#12	1200	2200		1000	#12	FITNESS ROOM	MSC	20/1	34
35	20/1	LAUN	WASHER	#12	1200			2200	#12	FITNESS ROOM	MSC	20/1	36
37	20/1	LAUN	WASHER	#12	1200	2200		1000	#12	FITNESS ROOM	MSC	20/1	38
39	20/1	LAUN	WASHER	#12	1200			1200		SPACE			40
41	30/2	LAUN	DRYER	3#10,	2500	2500				SPACE			42
43	30/2	LAUN	DRYER	1#10G-1"C,	2500			2500		SPACE			44
45	30/2	LAUN	DRYER	3#10,	2500	2500				SPACE			46
47	30/2	LAUN	DRYER	1#10G-1"C,	2500			2500		SPACE			48
49	30/2	LAUN	DRYER	3#10,	2500	11500		9000	3#6,	WATER HEATER	WTR HTR	50/2	50
51	30/2	LAUN	DRYER	1#10G-1"C,	2500			11500	9000	1#10G-1"C,	WTR HTR	50/2	52
53	30/2	LAUN	DRYER	3#10,	2500	11000		8500	3#2, 1#8G-1 1/2"C,	INDOOR HVAC UNIT	HTG	90/2	54
55	30/2	LAUN	DRYER	1#10G-1"C,	2500			11000	8500		HTG	90/2	56
57	30/2	LAUN	DRYER	3#10,	2500	6220		3720	3#6,	OUTDOOR HVAC UNIT	HTG	50/2	58
59	30/2	LAUN	DRYER	1#10G-1"C,	2500			6220	3720	1#10G-1"C,	HTG	50/2	60
PHASE TOTALS					48640	45725							



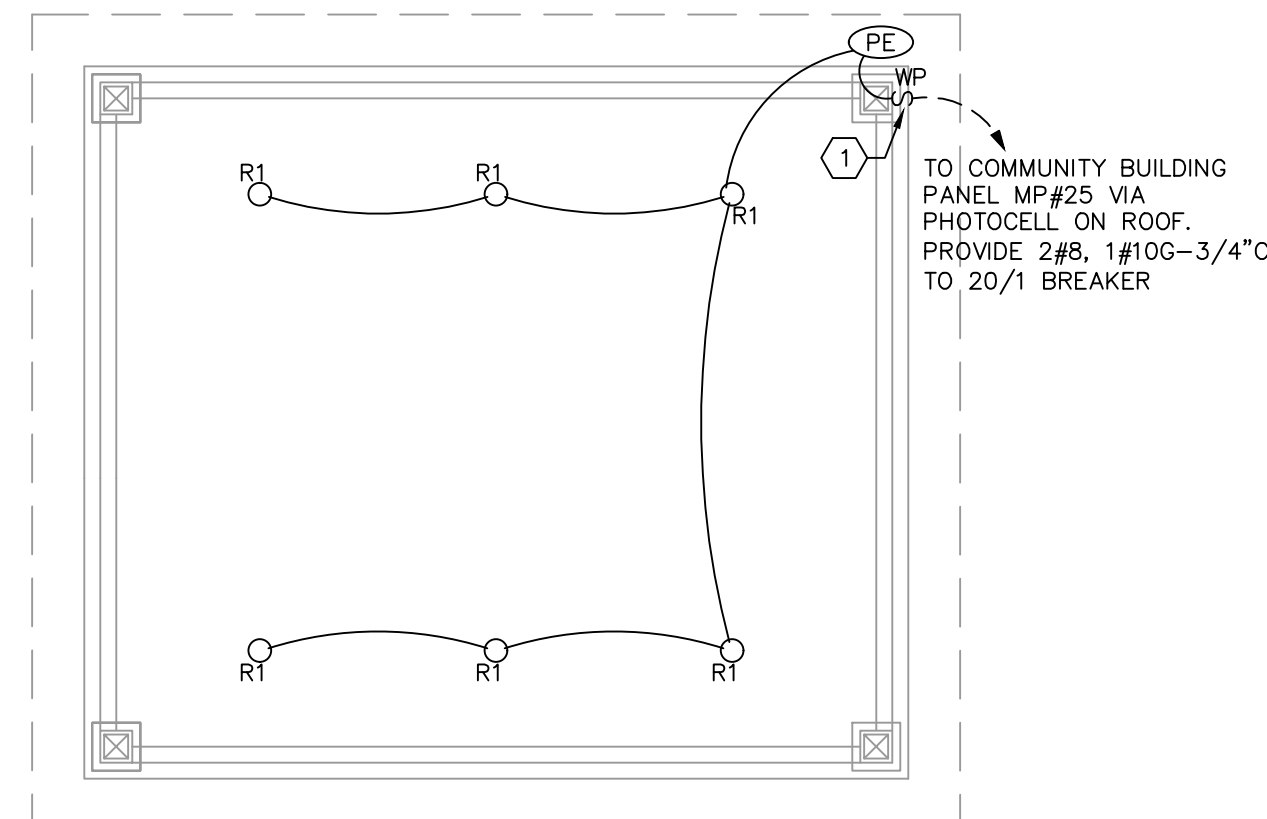
COMMUNITY BUILDING PLAN - ELECTRICAL
 SCALE: 1/4" = 1'-0"



MAIL KIOSK PLAN - ELECTRICAL
 SCALE: 1/4" = 1'-0"



GAZEBO PLAN - ELECTRICAL
 SCALE: 1/4" = 1'-0"



BUS STOP PLAN - ELECTRICAL
 SCALE: 1/4" = 1'-0"

GENERAL NOTES THIS SHEET:

- UNLESS NOTED OTHERWISE, ALL BRANCH CIRCUITS SHOWN SHALL HOMERUN TO PANEL 'MP'.
- ALL EXIT SIGNS AND EMERGENCY LIGHTS SHALL BE CONNECTED TO THE CIRCUIT SHOWN AHEAD OF THE SWITCHLEG FOR CONTINUOUS POWER.
- THE ELECTRICAL CONTRACTOR SHALL REFER TO THE ARCHITECT'S REFLECTED PLAN FOR EXACT LOCATION OF EACH FIXTURE. DO NOT SCALE DRAWINGS FOR FIXTURE PLACEMENT.
- UNLESS NOTED OTHERWISE ALL WIRING SHALL BE 2#12, 1#12G-MC CABLE.
- PROVIDE NEC REQUIRED WORK SPACE FOR PANELS AND DISCONNECT SWITCHES.
- PROVIDE NAME PLATE SECURED TO EACH DISCONNECT SWITCH IDENTIFYING UNIT IDENTIFICATION, PANEL, CIRCUIT NUMBER(S), AND BREAKER SIZE. VERIFY EXACT LOCATION OF EACH WITH THE MECHANICAL AND PLUMBING CONTRACTOR(S) PRIOR TO ANY ROUGH-IN.

PLAN NOTES THIS SHEET:

- HP RATED, NEMA 3R, LOCKABLE SWITCH.
- WEATHERPROOF, 1 HOUR ROTARY TYPE TIMER SWITCH.

DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 REISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

PROJECT NUMBER

597

PROJECT

Frisco Park

418 S. Avalon Street,
 West Memphis, AR 72301

SHEET NUMBER

E07

CAD FILE NUMBER



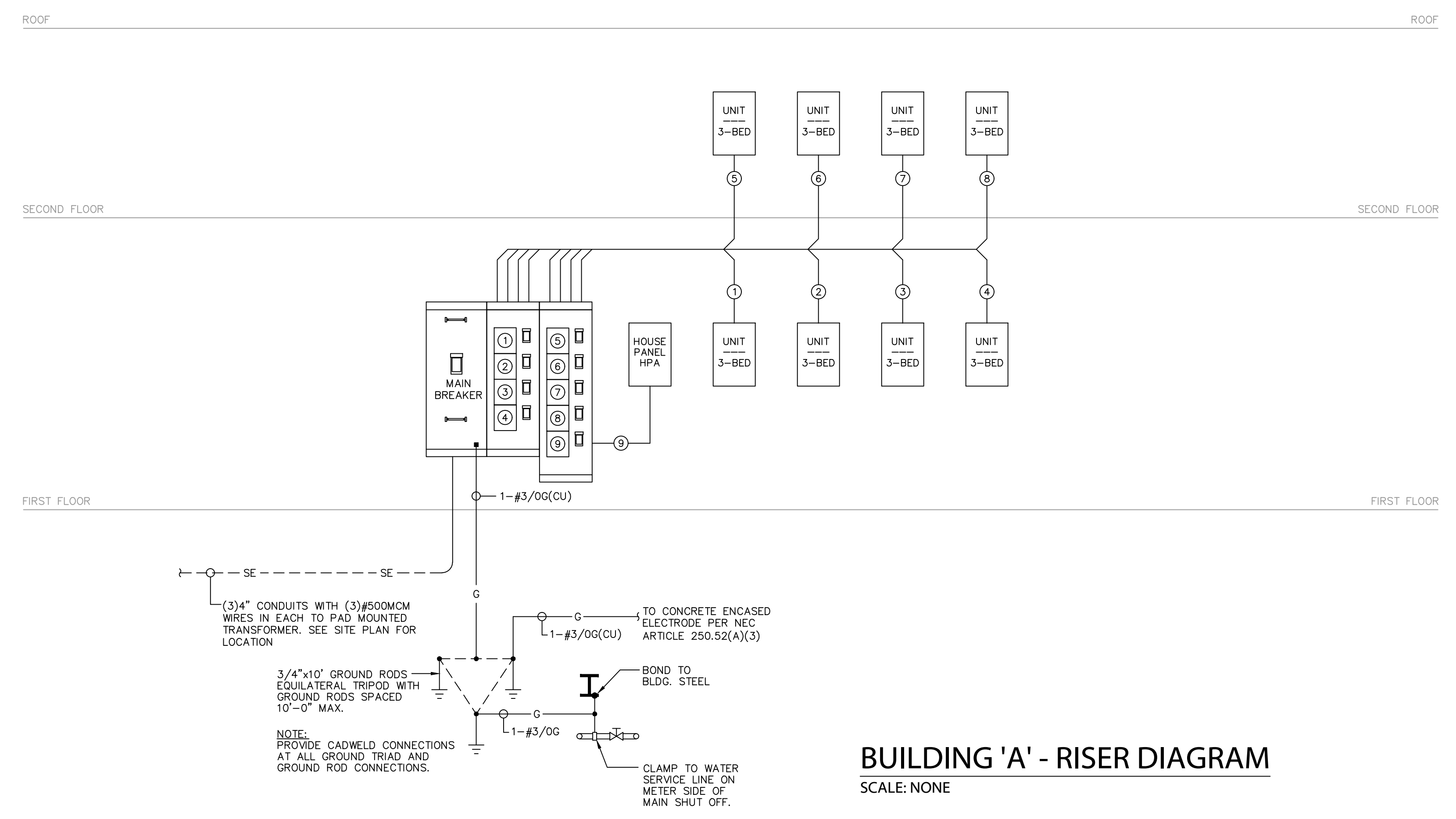
PANEL:	HP*	PANEL AMPS:	100	VOLTAGE:	120 / 240, 1 PHASE, 3 WIRE, 60 HZ	MOUNTING:	SURFACE
TYPE:	PQL	MAIN TYPE:	M.L.O.	A/C RATING:	10,000	NEHA RATING:	NEHA 3R
		MAIN BREAKER RATING:	N/A	CALC FAULT CURRENT:	<10,000	LOCATION:	EXTERIOR
		SOLID NEUTRAL:	100%	BREAKER FEATURES:	GF = GROUND FAULT CIRCUIT INTERRUPTER; ST = SHUNT TRIP; TH = TIE HANDLE	FED FROM:	METER CENTER
		GROUND BUS:	100%		AF = ARC FAULT CIRCUIT INTERRUPTER; LO = LOCK-ON DEVICE		

ONE SECTION PANEL	CKT NO	BREAKER	LOAD TYPE	DESCRIPTION	WIRE SIZE	CKT LOAD	LINE		CKT LOAD	WIRE SIZE	DESCRIPTION	LOAD TYPE	BREAKER	CKT NO
							L1	L2						
	1	20/1	LTG	BREEZEWAY LIGHTS	#12	500	1500		1000	#12	SPRINKLER RISER ROOM HEATER	HTG	20/2	2
	3	20/1	MSC	SPRINKLER ROOM LTG. RCPT	#12	500		1500	1000					4
	5	20/1	LO	FIRE ALARM CONTROL PANEL	#12	250	1250		1000	#8	SITE LIGHTING	LTG	20/2	6
	7	20/1		SPARE				1000	1000			LTG	20/2	8
	9	20/1		SPARE				1000	1000	#8	SITE LIGHTING	LTG	20/2	10
	11	20/1		SPARE				1000	1000			LTG	20/2	12
	13			SPACE				1000	1000	#8	SITE LIGHTING	LTG	20/2	14
	15			SPACE				1000	1000			LTG	20/2	16
	17			SPACE				0						18
PHASE TOTALS							4750	4500						

MC-A		MAIN BREAKER RATING:	800 AMP	BUSS RATING:	800 AMP	MOUNTING:	WALL MOUNTED
TYPE:	METER CENTER	MAIN LUGS ONLY:	N/A	VOLTS:	120 / 240	ENCLOSURE:	NEHA 3R
		SOLID NEUTRAL:	100%	1 PHASE, 3 WIRE, 60 HZ:		LOCATION:	EXTERIOR
		GROUND BUS:	100%	A/C RATING:	22,000	FED FROM:	PAD MOUNT TRANSFORMER

METER NO.	CIRCUIT BREAKER			FEEDER SIZE NO. & SIZE (1 SER. CABLE WITH COPPER CONDUCTORS)	LOAD DESCRIPTION		CONN. KVA (Note 1)	DESIGN KVA (Note 3)	DESIGN AMPS (Note 5)	NOTES	
	AMPS	POLE	VOLTS		UNIT TYPE	UNIT NUMBER					
1	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
2	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
3	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
4	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
5	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
6	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
7	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
8	125	2	240	3#1, 1#6G	3-BED		40.49	28.24	117.68	125 AMP METER SOCKET	
9	100	2	240	3#2, 1#6G	HOUSE PANEL		10.00	10.00	41.67	125 AMP METER SOCKET	
TOTAL LOADS							333.90	149.28	621.98		
							(Note 2)	(Note 4)	(Note 6)		

NOTES:
 1 CONNECTED KVA IS THE SUM OF PART 'A' AND PART 'B' 100% COOLING LOAD TAKEN FROM THE SINGLE DWELLING UNIT LOAD CALCULATION.
 2 TOTAL CONNECTED KVA IS THE SUM OF THE CONNECTED KVA FOR ALL APARTMENTS SERVED BY THIS METER CENTER.
 3 DESIGN KVA IS THE SUM OF PART 'A' PARTIAL DEMAND AND PART 'B' A/C LOAD TAKEN FROM THE SINGLE UNIT LOAD CALCULATION.
 4 TOTAL DESIGN KVA IS THE SUM OF THE DESIGN KVA FOR ALL APARTMENTS SERVED BY THIS METER CENTER MULTIPLIED BY THE DEMAND FACTOR FROM TABLE 220-84 OF THE NEC PLUS THE TOTAL LOAD OF THE HOUSE PANEL.
 5 DESIGN AMPS IS CALCULATED USING THE DESIGN KVA AND SERVICE VOLTAGE TO THE APARTMENT (120/240, 1 PHASE, 3 WIRE).
 6 TOTAL DESIGN AMPS IS CALCULATED USING THE TOTAL CONNECTED KVA AND SERVICE VOLTAGE TO THE METER CENTER (120/240, 1 PHASE, 3 WIRE) MULTIPLIED BY THE DEMAND FACTOR FROM TABLE 220-84 OF THE NEC.
 7 FEEDERS ARE SIZED FOR COPPER CONDUCTORS AT 75°C. ALUMINUM CONDUCTORS MAY BE USED AT THE CONTRACTOR'S OPTION. CONDUCTORS SHALL BE UPSIZED AS REQUIRED TO MEET THE AMPACITY OF THE FEEDER.



DATE
 1 11/20/18 PERMIT SET
 2 05/22/19 REISSUED FOR PERMIT
 3 08/20/19 ADDENDUM 1

PROJECT NUMBER
597
 PROJECT
Frisco Park

418 S. Avalon Street,
 West Memphis, AR 72301
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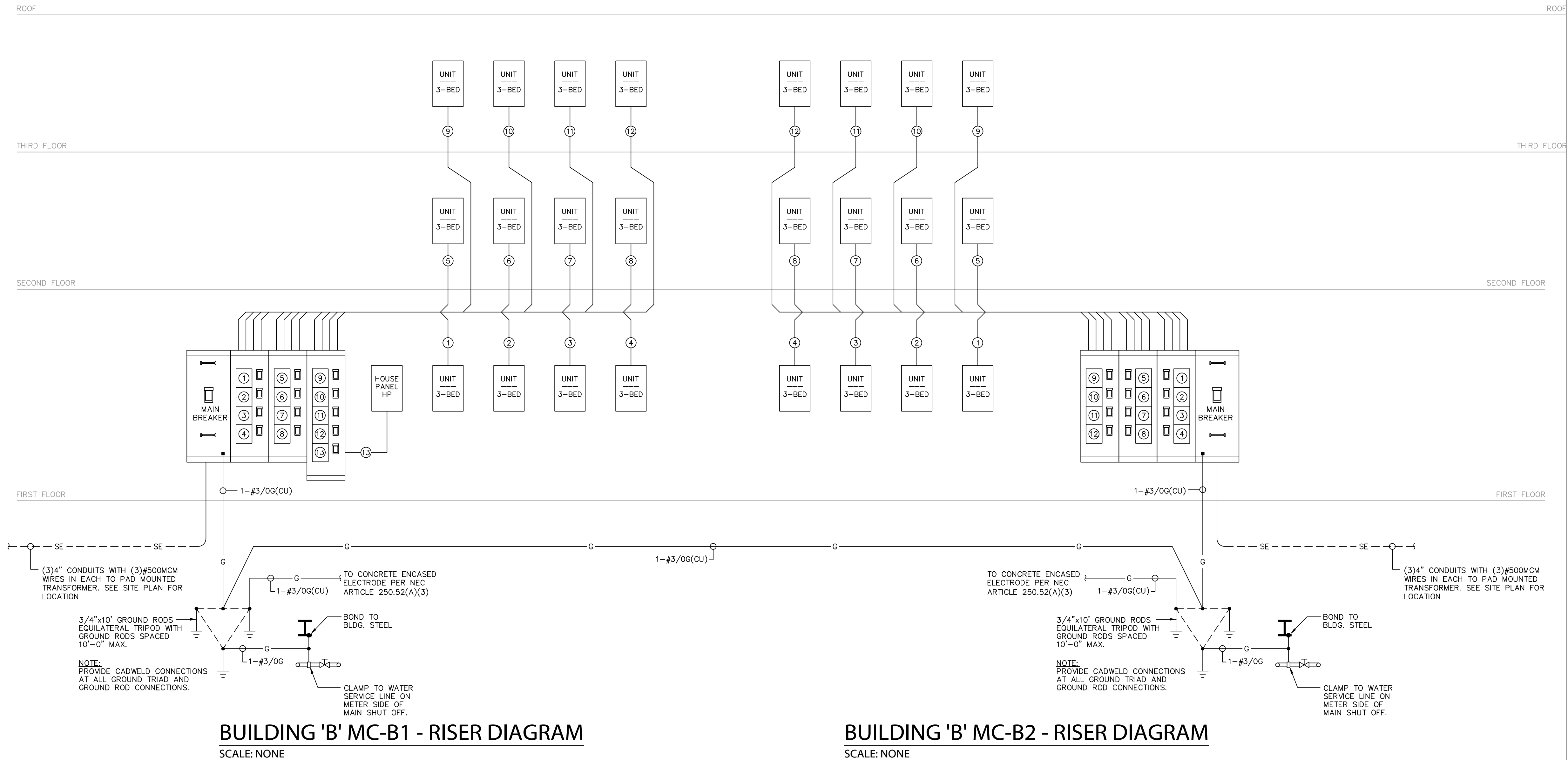
E08

CAD FILE NUMBER

PANEL:	HP*	PANEL AMPS:	100	VOLTAGE:	120 / 240, 1 PHASE, 3 WIRE, 60 HZ	MOUNTING:	SURFACE							
TYPE:	PQL	MAIN TYPE:	NA	AIC RATING:	10,000	NEMA RATING:	NEMA 3R							
		SOLID NEUTRAL:	100%	CALC FAULT CURRENT:	<10,000	LOCATION:	EXTERIOR							
		GROUND BUS:	100%	BREAKER FEATURES:	GFI = GROUND FAULT CIRCUIT INTERRUPTER, ST = SHUNT TRIP, TH = TIE HANDLE AF = ARC FAULT CIRCUIT INTERRUPTER, LO = LOCK-ON DEVICE	FED FROM:	METER CENTER							
ONE SECTION PANEL	CKT NO	BREAKER	LOAD TYPE	DESCRIPTION	WIRE SIZE	CKT LOAD	LINE	CKT LOAD	WIRE SIZE	DESCRIPTION	LOAD TYPE	BREAKER	CKT NO	
	1	20/1	LTG	BREEZEWAY LIGHTS	#12	500	L1 1500 L2 1000	1000	#12	SPRINKLER RISER ROOM HEATER	HTG	20/2	2	
	3	20/1	MISC	SPRINKLER ROOM L.T.S, RCPT	#12	500	1500	1000			HTG		4	
	5	20/1	LO	MISC	FIRE ALARM CONTROL PANEL	#12	250	1250	1000	#8	SITE LIGHTING	LTG	20/2	6
	7	20/1		SPARE			1000	1000	1000	#8	SITE LIGHTING	LTG	20/2	8
	9	20/1		SPARE			1000	1000	1000				10	
	11	20/1		SPARE			1000	1000	1000				12	
	13			SPACE			1000	1000	1000	#8	SITE LIGHTING	LTG	20/2	14
	15			SPACE			1000	1000	1000					16
	17			SPACE			0	1000	1000					18
PHASE TOTALS						4750	4500							

MC-B1		MAIN BREAKER RATING:	1000 AMP	BUSS RATING:	1000 AMP	MOUNTING:	WALL MOUNTED	
TYPE:		MAIN LUGS ONLY:	NA	VOLTS:	120 / 240	ENCLOSURE:	NEMA 3R	
METER CENTER		SOLID NEUTRAL:	100%	1 PHASE, 3 WIRE, 60 HZ		LOCATION:	EXTERIOR	
		GROUND BUS:	100%	AIC RATING:	22,000	FED FROM:	PAD MOUNT TRANSFORMER	
METER CENTER	METER NO.	CIRCUIT BREAKER	FEEDER SIZE NO. & SIZE	LOAD DESCRIPTION	CONN. KVA	DESIGN KVA	DESIGN AMPS	NOTES
	1	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	2	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	3	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	4	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	5	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	6	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	7	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	8	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	9	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	10	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	11	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	12	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	13	100 2 240	3#2, 1#6G	HOUSE PANEL	10.00	10.00	41.67	125 AMP METER SOCKET
TOTAL LOADS					495.84	209.20	871.65	
					(Note 2)	(Note 4)	(Note 5)	
NOTES:								
1 CONNECTED KVA IS THE SUM OF PART 'A' AND PART 'B' 100% COOLING LOAD TAKEN FROM THE SINGLE DWELLING UNIT LOAD CALCULATION								
2 TOTAL CONNECTED KVA IS THE SUM OF THE CONNECTED KVA FOR ALL APARTMENTS SERVED BY THIS METER CENTER								
3 DESIGN KVA IS THE SUM OF PART 'A' PARTIAL DEMAND AND PART 'B' A/C LOAD TAKEN FROM THE SINGLE UNIT LOAD CALCULATION								
4 TOTAL DESIGN KVA IS THE SUM OF THE DESIGN KVA FOR ALL APARTMENTS SERVED BY THIS METER CENTER MULTIPLIED BY THE DEMAND FACTOR FROM TABLE 220-84 OF THE NEC PLUS THE TOTAL LOAD OF THE HOUSE PANEL								
5 DESIGN AMPS IS CALCULATED USING THE DESIGN KVA AND SERVICE VOLTAGE TO THE APARTMENT (120/240, 1 PHASE, 3 WIRE)								
6 TOTAL DESIGN AMPS IS CALCULATED USING THE TOTAL CONNECTED KVA AND SERVICE VOLTAGE TO THE METER CENTER (120/240, 1 PHASE, 3 WIRE) MULTIPLIED BY THE DEMAND FACTOR FROM TABLE 220-84 OF THE NEC								
7 FEEDERS ARE SIZED FOR COPPER CONDUCTORS AT 75°C. ALUMINUM CONDUCTORS MAY BE USED AT THE CONTRACTORS OPTION. CONDUCTORS SHALL BE UPSIZED AS REQUIRED TO MEET THE AMPACITY OF THE FEEDER								

MC-B2		MAIN BREAKER RATING:	1000 AMP	BUSS RATING:	1000 AMP	MOUNTING:	WALL MOUNTED	
TYPE:		MAIN LUGS ONLY:	NA	VOLTS:	120 / 240	ENCLOSURE:	NEMA 3R	
METER CENTER		SOLID NEUTRAL:	100%	1 PHASE, 3 WIRE, 60 HZ		LOCATION:	EXTERIOR	
		GROUND BUS:	100%	AIC RATING:	22,000	FED FROM:	PAD MOUNT TRANSFORMER	
METER CENTER	METER NO.	CIRCUIT BREAKER	FEEDER SIZE NO. & SIZE	LOAD DESCRIPTION	CONN. KVA	DESIGN KVA	DESIGN AMPS	NOTES
	1	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	2	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	3	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	4	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	5	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	6	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	7	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	8	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	9	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	10	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	11	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	12	125 2 240	3#1, 1#6G	3-BED	40.49	28.24	117.68	125 AMP METER SOCKET
	TOTAL LOADS					485.84	199.20	829.98
					(Note 2)	(Note 4)	(Note 5)	
NOTES:								
1 CONNECTED KVA IS THE SUM OF PART 'A' AND PART 'B' 100% COOLING LOAD TAKEN FROM THE SINGLE DWELLING UNIT LOAD CALCULATION								
2 TOTAL CONNECTED KVA IS THE SUM OF THE CONNECTED KVA FOR ALL APARTMENTS SERVED BY THIS METER CENTER								
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