



City of Phoenix

INVITATION FOR BID  
IFB-25-0529  
TRAFFIC SIGNAL HEADS AND LED INDICATIONS

City of Phoenix  
Finance Central Procurement  
251 W Washington St, 8th Floor.  
Phoenix, AZ 85003

RELEASE DATE: March 13, 2025  
DEADLINE FOR QUESTIONS: March 28, 2025  
RESPONSE DEADLINE: April 11, 2025, 2:00 pm

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- B - Submittals - Conflict of Interest and Transparency
- C - Submittals - References
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# 1. Introduction

## 1.1. Summary

The City of Phoenix ("City") intends to establish a term contract with multiple contractors, for Traffic Signal Heads and LED Indications. These contracts will allow the Street Transportation Department and Traffic Services Division ("Department") to maintain the traffic signal infrastructure throughout the City, thereby supporting the safe movement of vehicular, non-vehicular, and pedestrian traffic.

## 1.2. Background

The Street Transportation Department Traffic Services Division will be the main users of this contract. The Department is involved in traffic operations, traffic maintenance, and safety. The traffic signal components and LED indications are used at all intersections, as well as High Intensity Activated CrossWalk (HAWK) installations, school zone installations, and other warning devices throughout the signalized infrastructure.

## 1.3. Contact Information

### **Alvaro De Loera**

Senior Buyer

251 W Washington St, 8th Floor.

Phoenix, AZ 85003

Email: [alvaro.de.loera@phoenix.gov](mailto:alvaro.de.loera@phoenix.gov)

Phone: [\(602\) 534-2743](tel:(602)534-2743)

## 1.4. Timeline

### **Schedule of Events**

The City reserves the right to change dates, times, and locations, as necessary. All times are Phoenix local time. The City does not always hold a Pre-Offer Conference or Site Visit.

To request a reasonable accommodation or alternative format for any public meeting, please contact the Procurement Officer (Alvaro De Loera) at (602) 534-2743/Voice or 711/TTY, or [alvaro.de.loera@phoenix.gov](mailto:alvaro.de.loera@phoenix.gov), no later than two (2) weeks prior to the meeting.

<b>Solicitation Issue Date</b>	March 13, 2025
<b>Pre-Offer Conference (Non-Mandatory)</b>	March 21, 2025, 10:00am <a href="https://cityofphoenix.webex.com/cityofphoenix/j.php?MTID=m5f42781217914eddc5bb9bdb293d001e">https://cityofphoenix.webex.com/cityofphoenix/j.php?MTID=m5f42781217914eddc5bb9bdb293d001e</a>

<b>Written Inquiries Due Date</b>	March 28, 2025, 2:00pm
<b>Question Response Deadline</b>	April 4, 2025, 2:00pm
<b>Offer Due Date</b>	April 11, 2025, 2:00pm



## 2. Instructions

### 2.1. Description – Statement of Need

The City of Phoenix invites sealed offers for traffic signal heads and LED indications for a five-year contract commencing on or about July 1, 2025, in accordance with the specifications and provisions contained herein or the “Effective Date” which is upon award by City Council, conditioned upon signature and recording by the City Clerk’s department, as required by the Phoenix City Code, whichever is later.

This solicitation is available through Arizona Relay Service 7-1-1. Please call TTY 800-367-8939 for assistance.

Notwithstanding the foregoing, this Agreement will terminate upon the earliest occurrence: by reaching the end of the term including any extensions exercised, or termination pursuant to the provisions of this Agreement.

### 2.2. City's Vendor Self-Registration and Notification

Vendors must be registered in the City’s procurePHX Self-Registration System at <https://www.phoenix.gov/procure> to respond to solicitations and access procurement information. The City may, at its sole discretion, reject any offer from an Offeror who has not registered.

### 2.3. Preparation of Offer

All forms provided in Submittal Section must be completed and submitted with the Offer. The signed and completed Conflict of Interest and Transparency form must be included or your Offer may be deemed non-responsive.

It is permissible to copy Submittal forms if necessary. Erasures, interlineations, or other modifications of the Offer must be initialed in original ink by the authorized person signing the Offer. No offer will be altered, amended or withdrawn after the specified offer due date and time. The City is not responsible for Offeror’s errors or omissions.

All time periods stated as a number of days will be calendar days.

It is the responsibility of all Offerors to examine the entire solicitation and seek clarification of any requirement that may not be clear and to check all responses for accuracy before submitting an offer. Negligence in preparing an offer confers no right of withdrawal after due date and time. Offerors are strongly encouraged to:

- A. Consider applicable laws and/or economic conditions that may affect cost, progress, performance, or furnishing of the products or services.
- B. Study and carefully correlate Offeror’s knowledge and observations with the solicitation and other related data.
- C. Promptly notify the City of all conflicts, errors, ambiguities, or discrepancies that Offeror has discovered in or between the solicitation and other related documents.
- D. The City does not reimburse the cost of developing, presenting or providing any response to this solicitation. Offers submitted for consideration should be prepared simply and

economically, providing adequate information in a straightforward and concise manner. The Offeror is responsible for all costs incurred in responding to this solicitation. All materials and documents submitted in response to this solicitation become the property of the City and will not be returned.

- E. Offerors are reminded that the specifications stated in the solicitation are the minimum level required and that offers submitted must be for products or services that meet or exceed the minimum level of all features specifically listed in this solicitation. Offers offering less than any minimum specifications or criteria specified are not responsive and should not be submitted.
- F. Offer responses submitted for products considered by the seller to be acceptable alternates to the brand names or manufacturer's catalog references specified herein must be submitted with technical literature and/or detailed product brochures for the City's use to evaluate the products offered. Offers submitted without this product information may be considered as non-responsive and rejected. The City will be the sole judge as to the acceptability of alternate products offered.
- G. Prices will be submitted on a per unit basis by line item, when applicable. In the event of a disparity between the unit price and extended price, the unit price will prevail unless obviously in error.

## 2.4. Fixed Offer Price Period

All offers shall be firm and fixed for a period of 180 calendar days from the solicitation opening date.

## 2.5. Obtaining a Copy of the Solicitation and Addenda

Interested Offerors may download the complete solicitation and addenda from <https://solicitations.phoenix.gov/>. Any interested Offerors without internet access may obtain this solicitation by calling the Procurement Officer or picking up a copy during regular business hours at the City of Phoenix, Finance Department, Central Procurement Division, 251 W Washington Street, 8th Floor, Phoenix, AZ. It is the Offeror's responsibility to check the website, read the entire solicitation, and verify all required information is submitted with their Offer.

## 2.6. Exceptions

Offeror must not take any exceptions to any terms, conditions or material requirements of this solicitation. Offers submitted with exceptions may be deemed non-responsive and disqualified from further consideration in the City's sole discretion. Offerors must conform to all the requirements specified in the solicitation. The City encourages Offerors to send inquiries to the Procurement Officer rather than including exceptions in their Offer.

## 2.7. Inquiries

All questions that arise relating to this solicitation should be directed via email to the Procurement Officer and must be received by the due date indicated in the Schedule of Events. The City will not consider questions received after the deadline.

No informal contact initiated by Offerors on the proposed service will be allowed with members of City's staff from date of distribution of this solicitation until after city council awards the contract. All questions concerning or issues related to this solicitation must be presented in writing.

The Procurement Officer will answer written inquiries in an addendum and publish any addendums on the Procurement Website.

## 2.8. Addenda

The City of Phoenix will not be responsible for any oral instructions made by any employees or officers of the City of Phoenix regarding this solicitation. Any changes will be in the form of an addendum. The Offeror must acknowledge receipt of any/all addenda by signing and returning the document with the Offer submittal.

## 2.9. Business in Arizona

The City will not enter contracts with Offerors (or any company(ies)) not granted authority to transact business, or not in good standing, in the state of Arizona by the Arizona Corporation Commission, unless the Offeror asserts a statutory exception prior to entering a contract with the City.

## 2.10. Licenses

If required by law for the operation of the business or work related to this Offer, Offeror must possess all valid certifications and/or licenses as required by federal, state or local laws at the time of submittal.

## 2.11. Certifications

By signature in the Offer section of the Offer and Acceptance page(s), Offeror certifies:

- The submission of the Offer did not involve collusion or other anti-competitive practices.
- The Offeror must not discriminate against any employee, or applicant for employment in violation of Federal or State Law.
- The Offeror has not given, offered to give, nor intends to give at any time hereafter, any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted Offer.

## 2.12. Submission of Offer

Offers must be in possession of the Department on or prior to the exact time and date indicated in the Schedule of Events. Late offers will not be considered. The prevailing clock will be the City Department's clock.

Offers must be submitted electronically by email to [procurement@phoenix.gov](mailto:procurement@phoenix.gov) and the following information should be noted in the email:

- A. Offeror's Name
- B. Offeror's Address (as shown on the Certification Page)
- C. Solicitation Number

- D. Solicitation Title
- E. Offer Opening Date
- F. Due to file size limitations for electronic transmission (for sending or receiving), Offers sent by email may need to be sent in parts with multiple emails. It is the responsibility of the Offeror to ensure that the Offer (including all parts if sent in multiple emails) is timely and to confirm that there are no technical reasons that any offer submitted electronically may be delayed. The date and time on the email(s) as received/stamped by the City's inbox will provide proof of submission and verification whether the Offer was received on or prior to the exact time and date indicated in the Schedule of Events.
- G. Any original documents (such as bonds, guaranties, powers of attorney), if required by the solicitation, must be separately delivered to and received by the City on or prior to the exact time and date indicated in the Schedule of Events, with a clear indication of the Offer for which it is attributed.

### 2.13. Withdrawal of Offer

At any time prior to the solicitation due date and time, an Offeror (or designated representative) may withdraw the Offer by submitting a request in writing and signed by a duly authorized representative. If Offeror withdraws the Offer electronically by email to the Procurement Officer, the request to withdraw must be in the form of a letter attached to the email that includes either an image of the duly authorized representative's signature or an electronic signature from a verifiable source, such as Adobe Sign, DocuSign or a similar verifiable software program.

### 2.14. Offer Results

Offers will be opened on the offer due date, time and location indicated in the Schedule of Events, at which time the name of each Offeror, and the prices may be read. Offers and other information received in response to the solicitation will be shown only to authorized City personnel having a legitimate interest in them or persons assisting the City in the evaluation. Offers are not available for public inspection until after the City has posted the award recommendation on the City's website.

The City will post a preliminary offer tabulation on the City's website, <https://solicitations.phoenix.gov/Awards> within five business days of the offer opening. The City will post the information on the preliminary tabulation as it was read during the offer opening. The City makes no guarantee as to the accuracy of any information on the preliminary tabulation. Once the City has evaluated the offers, the City will post an award recommendation on the website. By signing and submitting its Offer, each Offeror agrees that this posting of the award recommendation to the City's website effectively serves as the Offeror's receipt of that notice of award recommendation. The City has no obligation to provide any further notification to unsuccessful Offerors.

### 2.15. Pre-Award Qualifications

Offeror must have been in operation a minimum of five years. The Offeror's normal business activity during the past five years will have been for providing the goods or services in this solicitation.

Upon notification of an intent to award, the Offeror will have ten calendar days to submit a complete certificate of insurance in the minimum amounts and the coverages as required in the Insurance Requirements of this agreement. Insurance requirements are non-negotiable.

## 2.16. Award of Contract

Unless otherwise indicated, award(s) will be made to the most responsive, responsible Offeror(s) who are regularly established in the service, or providing the goods, contained in this solicitation and who have demonstrated the ability to perform in an acceptable manner.

- A. In accordance with the City of Phoenix Code, Chapter 43, Section 43-12, Competitive Sealed Bidding, award(s) shall be made to the lowest responsible and responsive offeror(s) whose offer conforms in all material respects to the requirements set forth in this solicitation. The City reserves the right to award a contract by individual line items, by group, all or none, or any other combination most advantageous to the City. The City further reserves the right to make multiple awards if determined to be in its best interest.
- B. Factors that may be considered by the City include:
  - 1. Technical capability of the Offeror to accomplish the scope of work required in the Solicitation. This may include performance history on past and current government or industrial contracts; and,
  - 2. Demonstrated availability of the necessary manpower (both supervisory and operational personnel) and necessary equipment to accomplish the scope of work in the Solicitation; and,
  - 3. Safety record; and,
  - 4. Offeror history of complaints and termination for convenience or cause.
- C. Notwithstanding any other provision of this solicitation, the City reserves the right to: (1) waive any immaterial defect or informality; or (2) reject any or all offers or portions thereof; or (3) reissue a solicitation.
- D. A response to a solicitation is an offer to contract with the City based upon the terms, conditions, and specifications contained in the City's solicitation. Offers do not become contracts until they are executed by the Chief Procurement Officer or Department Director. A contract has its inception in the award, eliminating a formal signing of a separate contract. For that reason, all of the terms, conditions and specifications of the procurement contract are contained in the solicitation, and in any addendum or contract amendment.

## 2.17. Solicitation Transparency Policy

Commencing on the date and time a solicitation is published, potential or actual Offerors or respondents (including their representatives) shall only discuss matters associated with the solicitation with the Mayor, any members of City Council, the City Manager, any Deputy City Manager, or any department director directly associated with the solicitation (including in each case their assigned staff, except for the designated Procurement Officer) at a public meeting, posted under Arizona Statutes, until the resulting contract(s) are awarded to all offers or

responses are rejected and the solicitation is cancelled without any announcement by the Procurement Officer of the City's intent to reissue the same or similar solicitation.

As long as the solicitation is not discussed, Offerors may continue to conduct business with the City and discuss business that is unrelated to the solicitation with the City staff. Offerors may not discuss the solicitation with any City employees or evaluation panel members.

Offerors may discuss their proposal or the solicitation with the Mayor or one or more members of the Phoenix City Council, provided such meetings are scheduled through the Procurement Officer, and are posted as open meetings with the City Clerk at least 24 hours prior to the scheduled meetings. The City Clerk will be responsible for posting the meetings. The posted notice shall identify the participants and the subject matter, as well as invite the public to participate.

With respect to the selection of the successful Offerors, the City Manager and/or City Manager's Office will continue the past practice of exerting no undue influence on the process. In all solicitations of bids and proposals, any direction on the selection from the City Manager and/or City Manager's Office and Department Head (or representative) to the proposal review panel or selecting authority must be provided in writing to all prospective Offerors.

This policy is intended to create a level playing field for all Offerors, assure that contracts are awarded in public, and protect the integrity of the selection process. OFFERORS THAT VIOLATE THIS POLICY SHALL BE DISQUALIFIED. After official Notice is received by the City for disqualification, the Offeror may follow the Protest process, unless the Solicitation is cancelled without notice of intent to re-issue.

"To discuss" means any contact by the Offeror, regardless of whether the City responds to the contact. Offerors that violate this policy will be disqualified until the resulting contract(s) are awarded, or all offers or responses are rejected and the solicitation is cancelled without any announcement by the Procurement Officer of the City's intent to reissue the same or a similar solicitation. The City interprets the policy as continuing through a cancellation of a solicitation until Council award of the contract, as long as the City cancels with a statement that the City will rebid the solicitation.

## 2.18. Protest Process

Offeror may protest the contents of a solicitation no later than seven days before the solicitation deadline when the protest is based on an apparent alleged mistake, impropriety or defect in the solicitation. Protests filed regarding the solicitation may be addressed by an amendment to the solicitation or denied by the City. If denied, the opening and award will proceed unless the City determines that it is in the City's best interests to set new deadlines, amend the solicitation, cancel or re-bid.

Therefore, unless otherwise notified by a formal amendment, the Protester must adhere to all solicitation dates and deadlines, including timely filing of an offer, regardless of filing a protest.

Offeror may protest an adverse determination issued by the City regarding responsibility and responsiveness, within seven days of the date the Offeror was notified of the adverse determination.

Offeror may protest an award recommendation if the Offeror can establish that it had a substantial chance of being awarded the contract and will be harmed by the recommended award. The City will post recommendations on the City's website to award the contract(s) to an Offeror(s). Offeror must submit award protests within seven days after the posting of the award recommendation, with exceptions only for good cause shown, within the City's full and final discretion.

All protests will be in writing, filed with the Procurement Officer identified in the solicitation and include the following:

- Identification of the solicitation number;
- The name, address and telephone number of the protester;
- A detailed statement describing the legal and factual grounds for the protest, including copies of relevant documents;
- The form of relief requested; and
- The signature of the protester or its authorized representative.

The Procurement Officer will render a written decision within a reasonable period after the protest is filed. The City will not request City Council authorization to award the contract until the protest process is complete. All protests and appeals must be submitted in accordance with the City's Procurement Code, (Phoenix City Code, Ch. 43) and any protests or appeals not submitted within the time requirements will not be considered. Protests must be filed with the Procurement Officer.

## 2.19. Public Record

All Offers submitted in response to this solicitation will become the property of the City and become a matter of public record available for review pursuant to Arizona State law. If an Offeror believes that a specific section of its Offer response is confidential, the Offeror will isolate the pages marked confidential in a specific and clearly labeled section of its Offer response. An Offeror may request specific information contained within its Offer is treated by the Procurement Officer as confidential provided the Offeror clearly labels the information "confidential." To the extent necessary for the evaluation process, information marked as "confidential" will not be treated as confidential. Once the procurement file becomes available for public inspection, the Procurement Officer will not make any information identified by the Offerors as "confidential" available to the public unless necessary to support the evaluation process or if specifically requested in accordance with applicable public records law. When a public records request for such information is received, the Procurement Officer will notify the Offeror in writing of any request to view any portion of its Offer marked "confidential." The Offeror will have the time set forth in the notice to obtain a court order enjoining such disclosure. If the Offeror does not provide the Procurement Officer with a court order enjoining release of the information during the designated time, the Procurement Officer will make the information requested available for inspection.

## 2.20. Late Offers

Late Offers must be rejected, except for good cause. If a late Offer is submitted, the Department will document the date and time of the submittal of the late Offer, keep the Offer and notify the Offeror that its Offer was disqualified for being a late Offer.

## 2.21. Right to Disqualify

The City reserves the right to disqualify any Offeror who fails to provide information or data requested or who provides materially inaccurate or misleading information or data. The City further reserves the right to disqualify any Offeror on the basis of any real or apparent conflict of interest that is disclosed by the Offer submitted or any other data or information available to the City. This disqualification is at the sole discretion of the City. By submission of a solicitation response, the Offeror waives any right to object now or at any future time, before any agency or body including, but not limited to, the City Council of the City or any court as to the exercise by the City of such right to disqualify or as to any disqualification by reason of real or apparent conflict of interest determined by the City. The City reserves the right to replace the disqualified Offeror.

## 2.22. Determining Responsiveness and Responsibility

Offers will be reviewed for documentation of any required minimum qualifications, and completeness and compliance with the solicitation requirements. The City reserves sole discretion to determine responsiveness and responsibility.

**Responsiveness:** Nonresponsive Offers will not be considered in the evaluation process. The solicitation states criteria that determine responsiveness, and the solicitation includes terms and conditions that if included or excluded from Offers will render an Offer nonresponsive.

**Responsibility:** To obtain true economy, the City must conduct solicitations to minimize the possibility of a subsequent default by the Offeror, late deliveries, or other unsatisfactory performance that may result in additional administrative costs. It is important that the Offeror be a responsible Offeror. Responsibility includes the Offeror's integrity, skill, capacity, experience, and facilities for conducting the work to be performed.

## 2.23. Equal Low Offer

Contract award will be made by putting the names of the tied Offerors in a cup for a blind drawing limited to those bidders with tied Offers. If time permits, the Offerors involved will be given an opportunity to attend the drawing. The drawing will be witnessed by at least three persons, and the contract file will contain the names and addresses of the witnesses.



### **3. Scope of Work**

#### **3.1. Overview**

The City of Phoenix seeks to enter into a contract, with one or more contractors to supply traffic signal head housing and Light Emitting Diode (LED) indication components on an as-needed basis, for five years beginning on or about July 1, 2025. The traffic signal head and LED indication components shall meet the minimum specifications listed in this section. Supplemental traffic signal standard detail information is listed in Exhibit A

#### **3.2. Traffic Signal Heads**

##### **3.2.1 Material**

- A. All signal head sections, and housing door assemblies shall be constructed with polycarbonate.

##### **3.2.2 Assembly**

- A. Assemble each traffic signal head with one or more individual LED vehicle signal display sections assembled or connected to create a one-way signal face with multiple possible industry standard configurations of red, yellow, and green ball or arrow sections equipped with a back plate.
- B. Fasten signal head assemblies together to form a complete signal face so that any section may be rotated on a vertical axis and oriented at any angle with respect to an adjacent section.
- C. Signal head components shall include a one-piece 5" aluminum non-louvered backplate and 10" tunnel visors. Each section shall contain LED modules and four lens clips that fit securely together to prevent the entrance of dirt and moisture.
- D. Signal head assembly, 8": The product's overall height shall be 29 ½" to 30 ½", including the back plate.
- E. Signal head assembly, 12": The product shall be fastened together to produce a single unit.

##### **3.2.3 Lens Clips**

- A. shall secure an LED or incandescent traffic signal lens with diameters of nominal 8" and 12" (200 mm and 300 mm, respectively), as well as undersized LED modules, in the traffic signal door.
- B. shall be universally designed to fit most makes and models of modern traffic signal head door housings with round lenses.
- C. shall be made of a material that functions in cold temperatures (without becoming brittle and cracking) and in hot temperatures (without losing its securement properties), ranging from - 40 degrees to +176 degrees Fahrenheit.

- D. shall firmly hold lenses with varying thicknesses of gasket materials and prevent rotation and vibration of the traffic signal lens.
- E. shall surpass Institute of Traffic Engineers (ITE) wind loads for traffic signals without damage to the lens clips. The Contractor shall make available third-party test reports upon request.
- F. shall allow for the easy removal and installation of a traffic signal lens without the use of tools.

### 3.2.4 Section Housing

Provide one-piece, polycarbonate housings for each section complete with a top, a bottom, and sides, and with black color impregnated into the material.

- A. Equip each section housing with a rectangular polycarbonate door meeting the minimum requirements of ASTM B 85
- B. Provide two hinge lugs on the left of each housing section and with latch screw lugs on the right side of the housing.
- C. Provide openings in both the top and bottom of the housing to accommodate standard 1-1/2" pipe fittings.
- D. Provide a Shurlock boss in the bottom opening having 72 clean, sharp teeth that provide full engagement, angled at 90 degrees, and having a depth of 5/64".
- E. Provide two indentations in the top opening designed to receive a Shurlock ring to provide positive positioning of the head when mounted from a mast arm or span wire hanger.
- F. Provide a means of positive alignment when indexing each section by using mating bosses and recesses.
- G. When used with Shurlock fittings, the radial angular grooves of the Shurlock boss, must provide positive positioning of the entire signal head and eliminate rotation or misalignment of the signal.
- H. Provide each housing section with a minimum of four mounting points, two on each side, to secure the back plate to the signal head.
- I. Plumbizer shall be made of steel or aluminum.
- J. Plumbizer shall be located in the center of a 4-section head, or between the yellow and red on a 3-section head.

### 3.2.5 Housing Door

- A. Provide housing doors consisting of a one-piece, polycarbonate housing door for each signal section with black color impregnated into the material.
- B. Provide two hinge lugs on the left of each door and latch paws on the right side of each door.

- C. Provide a large enough opening in hinge lugs to accommodate hinge pins without cracking hinge lugs for both section housing and door housing.
- D. Provide hinge pins that are easily removable without the need for special tools.
- E. Provide a corrosion-resistant, stainless steel latch screw and wing nut on the right side of the housing to allow opening and closing of the signal door without the use of any tools.
- F. Form the inside of the door with a gasket groove and provide a weather-proof and mildew-resistant resilient polyethylene gasket that seats against a raised bead on the housing when the door is closed to make a positive weatherproof and dustproof seal.
- G. Install four lens clips per housing door.
- H. On the outer face of the door and equally spaced about the circumference of the lens opening, provide four tapped holes to accommodate the signal head visor.
- I. Provide four 18-8 Type 304 stainless steel truss head screws to attach the signal head visor.

### 3.2.6 Doghouse Signal Head

- A. The doghouse framework shall be a complete rigid assembly consisting of either 1 ½" iron pipe with a threaded hub and threaded elbow or cast tri-stud two-way bracket assembly. The angle-elevated plumbizer shall be installed between the top of the framework and the red section on top of the doghouse assembly. The bottom bracket tying the green left-turn arrow section and the green ball section together shall either be a flat aluminum spanner with closers or a monostud two-way bottom. The center-to-center measurement between the vertical left-turn arrow faces and the ball signals faces shall be 17".
- B. The plumbizer for the doghouse style traffic signal heads shall be angled, elevated plumbizer shall be steel or aluminum, installed between the bottom of the red section and the center hub section of the doghouse framework. The plumbizer shall extend to the right when facing the signal head. The inside surface of the plumbizer shall be cast or machined smooth with no sharp edges.
- C. Five-section doghouse clusters; the doors shall open outward. Hinges are located on the outside of each section, so they open away from the adjacent section. Refer to Exhibit B for internal wiring of the signal head.

### 3.2.7 Signal Head Visors

- A. Equip each signal section face with a tunnel-style (open bottom) visor that is approximately 10" long.
- B. Provide visors blanked, formed, and welded from .050"-thick 3105-H25 aluminum alloy or polycarbonate.

- C. Design and fabricate the visors with attaching ears (slotted tabs) to facilitate installation. Construct the visor so it can be installed or removed from the signal head without removing the attaching screws or opening the housing door.
- D. Construct the visor so the axis of the visor does not deviate more than 3.5 degrees or less than 3 degrees downward from horizontal.

### 3.2.8 Terminal Blocks

Each complete signal head will be equipped with a six-position, twelve-terminal, barrier-type strip terminal block phenolic terminal block.

- A. The terminal blocks are to be located in the bottom of the amber/yellow ball section vertically arrayed signal head assemblies and in the red ball section of five-section mast arm mounted side by side arrayed signal head assemblies.
- B. The white, red, yellow, and green signal section leads will be attached to the same side of the terminal strip.
- C. LEDs will be terminated on the terminal block with no more than two conductors per terminal.

### 3.2.9 Color and Finish

- A. Signal Head Color: All vehicle signal heads shall impregnate a black color into the material of all polycarbonate surfaces, including the inside and outside of the signal housing, the door, and the visors.
- B. Back Plate Finish: The back plates are to be finished with a low gloss two-part high solids enamel paint with ultraviolet inhibitors. Powder coating is an acceptable alternative.

### 3.2.10 Mounting Hardware

- A. For mast arm-mounted signal head assemblies, install an elevator plumbizer below the red section of the signal head as shown on the Plans.
- B. When signal head assemblies are equipped with an elevator plumbizer, provide the top and bottom sections of the assemblies with a neoprene gasket closure in the 1 ½" openings.
- C. Cast the elevator plumbizer from steel or aluminum, resulting in smooth castings, or machine the plumbizer to remove all sharp edges.

### 3.2.11 Construction Requirements for Pedestrian Signal Housing Heads

- A. General - The international symbol LED count-down pedestrian signal heads shall consist of a single-section aluminum housing, an LED module, and a swing-down door with an integral blank-out egg crate visor. When the housing, LED module, door and visor assembly, and mounting hardware are fully assembled it shall provide a weatherproof and dustproof enclosure and shall meet or exceed current ITE standards.

- B. Housing - The pedestrian signal housing shall be a one-piece cast aluminum housing with two equally spaced mounting lugs integrally cast into the top and bottom to facilitate the installation of the stainless-steel pins and wing nut assemblies which serve as the door hinges and latches. The top and bottom of the housing shall be cast with a standard 1-1/2" opening complete with reinforcing ribs for transferring stress across the housing surface. As a minimum, the bottom opening shall be cast with a standard signal hardware configuration having 72 serrated teeth for maintaining a positive orientation of the signal face. The nominal dimensions (plus or minus 1/2") of the pedestrian signal housing shall be 19" wide, 18 1/2" high, and 8 1/2" in depth, including the door and visor.
- C. Door Assembly - The door assembly shall consist of a diecast, one-piece, corrosion-resistant aluminum alloy frame with two cast lugs on the bottom and two cast latch slots on the top of each door. The door assembly shall be attached to the housing using stainless steel detent spring pins on the bottom and stainless-steel captive wing nut and eyebolt assemblies which will drop into the latch slots on the top allowing the door assembly to be opened from the top and hinged down for installation or servicing without the use of any tools.
- D. Visor - A blank out egg crate visor shall be used to prevent or minimize the effects of sun phantom and reduce vandalism of the message module. The egg crates shall consist of a series of 1" squares rotated 45 degrees to form diamonds which will then be bisected by horizontal louvers. The material for the egg crate shall be black-impregnated polycarbonate, ultraviolet stabilized, and flame retardant. The material shall be, nominally, 0.030" thick and 1 1/2" deep for each louver slat. The visor assembly shall have a substantial exterior framework which will allow the visor to be securely attached to the door frame with stainless steel screws. The door frame and visor, when mated together, will comprise the door assembly.
- E. Message Lens - The LED message module shall display the international symbols when the signal is illuminated. The size and color of the international symbols shall conform to the latest ITE standards. The "hand" will be Portland Orange in color and the "walking man" will be Lunar/white in color. The entire area around the legend will be blacked out and will be free of any light projecting through in any area other than the legend. The lens material shall be 0.250" polycarbonate with a textured finish for even light distribution. The lens shall be fitted with a one piece EPDM gasket providing a waterproof and dustproof seal when the door assembly is closed.
- F. Wiring - The "hand" indication will have one lead orange in color and one lead white in color. The "walking man" indication will have one lead blue in color and one lead white in color. The white leads will be connected together as a common on the three-position barrier type terminal block mounted on the aluminum mounting plate.
- G. Painting - All exterior surfaces of the pedestrian head housing, door frame, and side of pole mounting hardware shall be sandblasted, cleaned, and chemically sealed prior to the application of an electrostatically applied, oven cured powder coat finish. The housing,

door frame, and mounting hardware shall be a high gloss black, and the visor frame shall be a low luster flat black.

- H. Warranty - The entire pedestrian signal head, including the housing, door frame and visor, shall be warranted for two years from the date of receipt at our facility against defects in workmanship and/or material. This will not include the LED module.

### 3.3. LED Vehicle Signal Display

3.3.1 The LED vehicle traffic signal module shall be qualified, before it is eligible for purchase, by the following method:

- A. Compliance, the LED Vehicle traffic signal module shall comply with the most current Institute of Traffic Engineers (ITE) specification for LED vehicle traffic control signal heads:
  1. LED Circular Signal Supplement
  2. LED Vehicle Arrow Supplement

### 3.3.2 LED Countdown Pedestrian Signal Module Requirements

- A. The LED pedestrian traffic signal module shall be qualified, before it is eligible for purchase, by the following method:
  1. Compliance, the LED pedestrian traffic signal module shall comply with the most current Institute of Traffic Engineers (ITE) specification for LED pedestrian traffic signal module specification.

### 3.3.3 LED Warranty

- A. Products warranty shall be for a minimum period of 5 years from date of receipt by the City of Phoenix for vehicle signal modules and five years for pedestrian signal modules. Any LED vehicle signal module or pedestrian traffic signal module that fails within the specified warranty period due to workmanship, materials or manufacturing defect shall be replaced at no cost to the City of Phoenix.
- B. Performance shall be warranted for a period of 5 years from date of receipt by the City of Phoenix for vehicle signal modules and five years for pedestrian signal modules. This shall include repair or replacement of any LED vehicle signal module or pedestrian traffic signal module that falls below 85% of the minimum intensity level within the warranty period.

### 3.3.4 LED Testing

- A. As per the ITE specification, the manufacturer/vendor shall make available a process to test compliance for minimum intensity values in a controlled independent laboratory anytime during the warranty period. If you have any questions regarding the specifications and/or the qualifications requirements, please contact is the Procurement Officer at (602) 534-2743.

### **3.4. Shipping and Delivery**

Pricing in the proposal shall be all inclusive of shipping and handling. All shipping costs shall be paid for by the manufacturer/contractor. Contractor shall deliver the orders within 6-8 weeks, upon receiving purchase order receipt.

## 4. Standard Terms and Conditions

### 4.1. Definition of Key Words Used in the Solicitation

**Shall, Will, Must:** Indicates a mandatory requirement. Failure to meet these mandatory requirements may result in the rejection of Offer as non-responsive.

**Should:** Indicates something that is recommended but not mandatory. If the Offeror fails to provide recommended information, the City may, at its sole option, ask the Offeror to provide the information or evaluate the Offer without the information.

**May:** Indicates something that is not mandatory but permissible.

For purposes of this solicitation, the following definitions will apply:

"A.R.S." Arizona Revised Statute

"Buyer" or "Procurement Officer" City of Phoenix staff person responsible for the solicitation. The City employee or employees who have specifically been designated to act as a contact person or persons to the Contractor, and responsible for monitoring and overseeing the Contractor's performance under this contract.

"City" The City of Phoenix

"Contractor" The individual, partnership, or corporation who, as a result of the competitive process, is awarded a contract by the City of Phoenix.

"Contract" or "Agreement" The legal agreement executed between the City of Phoenix, AZ and the Contractor.

"Days" Means calendar days unless otherwise specified.

"Chief Procurement Officer" The contracting authority for the City of Phoenix, AZ, authorized to sign contracts and amendments thereto on behalf of the City of Phoenix, AZ.

"Employer" Any individual or type of organization that transacts business in this state, that has a license issued by an agency in this state and employs one or more employees in this state. Employer includes this state, any political subdivision of this state and self-employed persons. In the case of an independent contractor, employer means the independent contractor and does not mean the person or organization that uses contract labor. (A.R.S. 23-211).

"Offer" Means a response from a Supplier, Contractor, or Service Provider to a solicitation request that, if awarded, binds the Supplier, Contractor, or Service Provider to perform in accordance with the contract. Same as bid, proposal, quotation or tender.

"Offeror" Any Vendor, Seller or Supplier submitting a competitive offer in response to a solicitation from the City. Same as Bidder or Proposer.

"Solicitation" Means an Invitation for Bid (IFB), Request for Proposal (RFP), Request for Quotations (RFQ), Request for Qualifications (RFQu) and request for sealed Offers, or any other type of formal procurement which the City makes public through advertising, mailings, or some other method of communication. It is the process by which the City seeks information, proposals, Offers, or quotes from suppliers.



“Suppliers” Firms, entities or individuals furnishing goods or services to the City.

“Vendor or Seller” A seller of goods or services.

## 4.2. Contract Interpretation

- A. **Applicable Law:** This Contract will be governed by the law of the State of Arizona, and suits pertaining to this Contract will be brought only in Federal or State courts in Maricopa County, State of Arizona.
- B. **Contract Order of Precedence:** In the event of a conflict in the provisions of the Contract, as accepted by the City and as they may be amended, the following will prevail in the order set forth below:
1. Federal terms and conditions, if any
  2. Special terms and conditions
  3. Standard terms and conditions
  4. Amendments
  5. Statement or scope of work
  6. Specifications
  7. Attachments
  8. Exhibits
  9. Instructions to Contractors
  10. Other documents referenced or included in the Solicitation
- C. **Organization – Employment Disclaimer:** The Agreement resulting hereunder is not intended to constitute, create, give rise to or otherwise recognize a joint venture agreement or relationship, partnership or formal business organization of any kind, and the rights and obligations of the parties will be only those expressly set forth in the agreement. The parties agree that no persons supplied by the Contractor in the performance of Contractor’s obligations under the agreement are considered to be City’s employees and that no rights of City civil service, retirement or personnel rules accrue to such persons. The Contractor will have total responsibility for all salaries, wage bonuses, retirement, withholdings, workmen’s compensation, occupational disease compensation, unemployment compensation, other employee benefits and all taxes and premiums appurtenant thereto concerning such persons, and will save and hold the City harmless with respect thereto.
- D. **Severability:** The provisions of this Contract are severable to the extent that any provision or application held to be invalid will not affect any other provision or application of the contract which may remain in effect without the invalid provision or application.

- E. **Non-Waiver of Liability:** The City of Phoenix as a public entity supported by tax monies, in execution of its public trust, cannot agree to waive any lawful or legitimate right to recover monies lawfully due it. Therefore, any Contractor agrees that it will not insist upon or demand any statement whereby the City agrees to limit in advance or waive any right the City might have to recover actual lawful damages in any court of law under applicable Arizona law.
- F. **Parol Evidence:** This Agreement is intended by the parties as a final expression of their agreement and is intended also as a complete and exclusive statement of the terms of this agreement. No course of prior dealings between the parties and no usage in the trade will be relevant to supplement or explain any term used in this Contract. Acceptance or acquiescence in a course of performance rendered under this contract will not be relevant to determine the meaning of this Contract even though the accepting or acquiescing party has knowledge of the nature of the performance and opportunity to object.

#### 4.3. Contract Administration and Operation

- A. **Records:** All books, accounts, reports, files and other records relating to the contract will be subject at all reasonable times to inspection and audit by the City for five years after completion of the contract. Such records will be produced at a City of Phoenix office as designated by the City. Confidentiality will be maintained, and City will not violate any proprietary or other confidentiality agreements Contractor has in place.
- B. **Discrimination Prohibited:** Contractor agrees to abide by the provisions of the Phoenix City Code Chapter 18, Article V as amended. Any Contractor, in performing under this contract, will not discriminate against any worker, employee or applicant, or any member of the public, because of race, color, religion, sex, national origin, age or disability nor otherwise commit an unfair employment practice. The supplier and/or lessee will take action to ensure that applicants are employed, and employees are dealt with during employment without regard to their race, color, religion, sex, or national origin, age or disability and adhere to a policy to pay equal compensation to men and women who perform jobs that require substantially equal skill, effort and responsibility, and that are performed within the same establishment under similar working conditions. Such action will include but not be limited to the following: Employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training; including apprenticeship. The supplier further agrees that this clause will be incorporated in all subcontracts with all labor organizations furnishing skilled, unskilled and union labor, or who may perform any such labor or services in connection with this contract. Contractor further agrees that this clause will be incorporated in all subcontracts, job-contractor agreements or subleases of this agreement entered into by supplier/lessee.
- C. **Equal Employment Opportunity and Pay:** In order to do business with the City, Contractor must comply with Phoenix City Code, 1969, Chapter 18, Article V, as amended,

Equal Employment Opportunity Requirements. Contractor will direct any questions in regard to these requirements to the Equal Opportunity Department, (602) 262-6790.

1. **For a Contractor with 35 employees or fewer:** Contractor in performing under this Agreement shall not discriminate against any worker, employee or applicant, or any member of the public, because of race, color, religion, sex, national origin, age, or disability, nor otherwise commit an unfair employment practice. The Contractor will ensure that applicants are employed, and employees are dealt with during employment without regard to their race, color, religion, sex, national origin, age, or disability. Such action shall include but not be limited to the following: employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training; including apprenticeship. The Contractor further agrees that this clause will be incorporated in all subcontracts related to this Agreement that involve furnishing skilled, unskilled and union labor, or who may perform any such labor or services in connection with this Agreement. Contractor further agrees that this clause will be incorporated in all subcontracts, Contractor agreements or subleases of this agreement entered into by supplier/lessee.
2. **For a Contractor with more than 35 employees:** Contractor in performing under this Agreement shall not discriminate against any worker, employee or applicant, or any member of the public, because of race, color, religion, sex, national origin, age, or disability, nor otherwise commit an unfair employment practice. The Contractor will ensure that applicants are employed, and employees are dealt with during employment without regard to their race, color, religion, sex, national origin, age, or disability, and shall adhere to a policy to pay equal compensation to men and women who perform jobs that require substantially equal skill, effort, and responsibility, and that are performed within the same establishment under similar working conditions. Such action shall include but not be limited to the following: employment, promotion, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training; including apprenticeship. The Contractor further agrees that this clause will be incorporated in all subcontracts with all labor organizations furnishing skilled, unskilled and union labor, or who may perform any such labor or services in connection with this contract. Contractor further agrees that this clause will be incorporated in all subcontracts, job-Contractor agreements or subleases of this Agreement entered into by supplier/lessee. The Contractor further agrees not to discriminate against any worker, employee or applicant, or any member of the public, because of sexual orientation or gender identity or expression and shall ensure that applicants are employed, and employees are dealt with during employment without regard to their sexual orientation or gender identity or expression.

3. **Documentation:** Suppliers and lessees may be required to provide additional documentation to the Equal Opportunity Department affirming that a nondiscriminatory policy is being utilized.
  4. **Monitoring:** The Equal Opportunity Department shall monitor the employment policies and practices of suppliers and lessees subject to this article as deemed necessary. The Equal Opportunity Department is authorized to conduct on-site compliance reviews of selected firms, which may include an audit of personnel and payroll records, if necessary.
- D. **Legal Worker Requirements:** The City of Phoenix is prohibited by A.R.S. § 41-4401 from awarding a contract to any Contractor who fails, or whose subcontractors fail, to comply with A.R.S. § 23-214(A). Therefore, Contractor agrees that:
1. Contractor and each subcontractor it uses warrants their compliance with all federal immigration laws and regulations that relate to their employees and their compliance with A.R.S. § 23-214, subsection A.
  2. A breach of a warranty under paragraph 1 will be deemed a material breach of the contract that is subject to penalties up to and including termination of the contract.
  3. The City of Phoenix retains the legal right to inspect the papers of any Contractor or subcontractor employee who works on the contract to ensure that the Contractor or subcontractor is complying with the warranty under paragraph 1.
- E. **Health, Environmental, and Safety Requirements:** The Contractor's products, services and facilities will be in full compliance with all applicable Federal, State and local health, environmental and safety laws, regulations, standards, codes and ordinances, regardless of whether or not they are referred to by the City. At the request of City representatives, the Contractor will provide the City:
1. Environmental, safety and health regulatory compliance documents (written safety programs, training records, permits, etc.) applicable to services provided by the Contractor in this contract.
  2. A list of all federal, state, or local (EPA, OSHA, Maricopa County, etc.) citations or notice of violations issued against their firm or their subcontractors including dates, reasons, dispositions and resolutions.
  3. The City will have the right, but not the obligation to inspect the facilities, transportation vehicles or vessels, containers and disposal facilities provided by the Contractor or subcontractor. The City will also have the right to inspect operations conducted by the Contractor or subcontractor in the performance of this agreement. The City further reserves the right to make unannounced inspections of the Contractor's facilities (during normal business hours).
- F. **Compliance with Laws:** Contractor agrees to fully observe and comply with all applicable Federal, State and local laws, regulations, standards, codes and ordinances when

performing under this Contract regardless of whether they are being referred to by the City. Contractor agrees to permit City inspection of Contractor's business records, including personnel records to verify any such compliance. Because the contractor will be acting as an independent contractor, the City assumes no responsibility for the Contractor's acts.

- G. **Lawful Presence Requirement:** Pursuant to A.R.S. §§ 1-501 and -502, the City of Phoenix is prohibited from awarding a contract to any natural person who cannot establish that he or she is lawfully present in the United States. In order to establish lawful presence, this person must produce qualifying identification and sign a City-provided affidavit affirming that the identification provided is genuine. This requirement will be imposed at the time of contract award. In the event the prevailing responder is unable to satisfy this requirement, the City will offer the award to the next-highest scoring responder. The law does not apply to fictitious entities such as corporations, partnerships and limited liability companies.
- H. **Continuation During Disputes:** Contractor agrees that notwithstanding the existence of any dispute between the parties, insofar as is possible, under the terms of the contract, the Contractor will continue to perform the obligations required of Contractor during the continuation of any such dispute unless enjoined or prohibited by an Arizona Court of competent jurisdiction.
- I. **Emergency Purchases:** The City reserves the right to purchase from other sources those items which are required on an emergency basis and cannot be supplied immediately from stock by the Contractor.

#### 4.4. Costs and Payments

- A. **General:** Any prompt payment terms offered must be clearly noted by the Contractor on all invoices submitted to the City for the payment of goods or services received. The City will make every effort to process payment for the purchase of material or services within thirty to forty-five calendar days after receipt of a correct invoice, unless a good faith dispute exists to any obligation to pay all or a portion of the account. Payment terms are specified in the Offer.
- B. **Payment Deduction Offset Provision:** Contractor acknowledges that the City Charter requires that no payment be made to any Contractor as long as there is an outstanding obligation due to the City. Contractor agrees that any obligation it owes to the City will be offset against any payment due to the Contractor from the City.
- C. **Late Submission of Claim by Contractor:** The City will not honor any invoices or claims which are tendered one year after the last item of the account accrued.
- D. **Discounts:** If applicable, payment discounts will be computed from the date of receiving acceptable products, materials and/or services or correct invoice, whichever is later to the date payment is mailed.

- E. **No Advance Payments:** Advance payments are not authorized. Payment will be made only for actual services or commodities that have been received, unless addressed specifically in the Scope of work for subscription services.
- F. **Fund Appropriation Contingency:** The Contractor recognizes that any agreement entered into will commence upon the day first provided and continue in full force and effect until termination in accordance with its provisions. The Contractor and the City herein recognize that the continuation of any contract after the close of any given fiscal year of the City, which ends on June 30th of each year, will be subject to the approval of the budget of the City providing for or covering such contract item as an expenditure therein. The City does not represent that said budget item will be actually adopted, said determination being the determination of the City Council at the time of the adoption of the budget.
- G. **Maximum Prices:** The City will not be invoiced at prices higher than those stated in any contract resulting from this Offer. Contractor certifies, by signing this Offer that the prices offered are no higher than the lowest price the Contractor charges other buyers for similar quantities under similar conditions, as applicable and shown by quotes for like services and goods. Contractor further agrees that any reductions in the price of the goods or services covered by this Offer and occurring after award will apply to the undelivered balance. The Contractor will promptly notify the City of such price reductions.
- H. **F.O.B. Point:** All prices are to be quoted F.O.B. destination, unless specified elsewhere in this solicitation.

#### 4.5. Contract Changes

- A. **Contract Amendments:** Contracts will be modified only by a written contract amendment signed by persons duly authorized to enter into contracts on behalf of the Contractor. No verbal agreement or conversation with any officer, agent, or employee of the City either before or after execution of the contract, will affect or modify any of the terms or obligations contained or to be contained in the contract. Any such verbal agreements or conversation shall be considered as unofficial information and in no way binding upon the City or the Contractor. All agreements shall be in writing and contract changes shall be by written amendment signed by both parties.
- B. **Assignment - Delegation:** No right or interest in this contract nor monies due hereunder will be assigned in whole or in part without written permission of the City, and no delegation of any duty of Contractor will be made without prior written permission of the City, which may be withheld for good cause. Any assignment or delegation made in violation of this section will be void.
- C. **Non-Exclusive Contract:** Any contract resulting from this solicitation will be awarded with the understanding and agreement that it is for the sole convenience of the City. The City reserves the right to obtain like goods or services from another source when necessary.

#### 4.6. Risk of Loss and Liability

- A. **Title and Risk of Loss:** The title and risk of loss of material or service will not pass to the City until the City actually receives the material or service at the point of delivery; and such loss, injury, or destruction will not release seller from any obligation hereunder.
- B. **Acceptance:** All material or service is subject to final inspection and acceptance by the City. Material or service failing to conform to the specifications of this contract will be held at Contractor's risk and may be returned to the Contractor. If so returned, all costs are the responsibility of the Contractor. Noncompliance will conform to the cancellation clause set forth in this document.
- C. **Force Majeure:** Except for payment of sums due, neither party will be liable to the other nor deemed in default under this contract if and to the extent that such party's performance of this contract is prevented by reason of force majeure. The term "force majeure" means an occurrence that is beyond the control of the party affected and occurs without its fault or negligence. Force majeure will not include late performance by a subcontractor unless the delay arises out of a force majeure occurrence in accordance with this force majeure term and condition. If either party is delayed at any time in the progress of the work by force majeure, the delayed party will notify the other party in writing of such delay, as soon as is practical, of the commencement thereof and will specify the causes of such delay in such notice. Such notice will be hand-delivered or mailed certified-return receipt and will make a specific reference to this provision, thereby invoking its provisions. The delayed party will cause such delay to cease as soon as practicable and will notify the other party in writing when it has done so. The time of completion will be extended by contract modification for a period of time equal to the time that results or effects of such delay prevent the delayed party from performing in accordance with this contract.
- D. **Loss of Materials:** The City does not assume any responsibility, at any time, for the protection of or for loss of materials, from the time that the contract operations have commenced until the final acceptance of the work by the City.
- E. **Contract Performance:** Contractor will furnish all necessary labor, tools, equipment, and supplies to perform the required services at the City facilities designated, unless otherwise specifically addressed in the scope, or elsewhere in this Agreement. The City's authorized representative will decide all questions which may arise as to the quality and acceptability of any work performed under the contract. If, in the opinion of the City's authorized representative, performance becomes unsatisfactory, the City will notify the Contractor. The Contractor will have 30 days from that time to correct any specific instances of unsatisfactory performance, unless a different amount of time is specified in the agreement. In the event the unsatisfactory performance is not corrected within the time specified, the City will have the immediate right to complete the work to its satisfaction and will deduct the cost to cover from any balances due or to become due the Contractor. Repeated incidences of unsatisfactory performance may result in cancellation of the agreement for default.

- F. **Damage to City Property:** Contractor will perform all work so that no damage to the building or grounds results. Contractor will repair any damage caused to the satisfaction of the City at no cost to the City. Contractor will take care to avoid damage to adjacent finished materials that are to remain. If finished materials are damaged, Contractor will repair and finish to match existing material as approved by the City at Contractor's expense.

#### 4.7. City's Contractual Rights

Whenever one party to this contract in good faith has reason to question the other party's intent to perform, the former party may demand that the other party give a written assurance of this intent to perform. In the event that a demand is made and no written assurance is given within five days, the demanding party may treat this failure as an anticipatory repudiation of this contract.

- A. **Non-Exclusive Remedies:** The rights and remedies of the City under this Contract are non-exclusive.
- B. **Default in One Installment to Constitute Breach:** Each installment or lot of the agreement is dependent on every other installment or lot and a delivery of non-conforming goods or a default of any nature under one installment or lot will impair the value of the whole agreement and constitutes a total breach of the agreement as a whole.
- C. **On Time Delivery:** Because the City is providing services which involve health, safety and welfare of the general public, delivery time is of the essence. Delivery must be made in accordance with the delivery schedule promised by the Contractor.
- D. **Default:** In case of default by the Contractor, the City may, by written notice, cancel this contract and repurchase from another source and may recover the excess costs by (1) deduction from an unpaid balance due; (2) collection against the Solicitation and/or Performance Bond, or (3) a combination of the aforementioned remedies or other remedies as provided by law.
- E. **Covenant Against Contingent Fees:** Seller warrants that no person or selling agent has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employers or bona fide established commercial or selling agencies maintained by the seller for the purpose of securing business. For breach or violation of this warranty, the City will have the right to annul the contract without liability or in its discretion to deduct from the contract price a consideration, or otherwise recover the full amount of such commission, brokerage or contingent fee.
- F. **Cost Justification:** In the event only one response is received, the City may require that the Contractor submit a cost proposal in sufficient detail for the City to perform a cost/price analysis to determine if the Offer price is fair and reasonable.
- G. **Work Product, Equipment, and Materials:** All work product, equipment, or materials created or purchased under this contract belongs to the City and must be delivered to the City at City's request upon termination of this contract. Contractor agrees to assign to City



all rights and interests Contractor may have in materials prepared under this contract that are “works for hire” within the meaning of the copyright laws of the United States, including any right to derivative use of the material.

#### 4.8. Contract Termination

A. **Gratuities:** The City may, by written notice to the Contractor, cancel this contract if it is found that gratuities, in the form of entertainment, gifts or otherwise, were offered or given by the Contractor or any agent or representative of the Contractor, to any officer or employee of the City making any determinations with respect to the performing of such contract. In the event this contract is canceled by the City pursuant to this provision, the City will be entitled, in addition to any other rights and remedies, to recover or withhold from the Contractor the amount of the gratuity.

B. **Conditions and Causes for Termination:**

1. This contract may be terminated at any time by mutual written consent, or by the City, with or without cause, upon giving thirty-day written notice to Contractor. The City at its convenience, by written notice, may terminate this contract, in whole or in part. If this contract is terminated, the City will be liable only for payment under the payment provisions of this contract for services rendered and accepted material received by the City before the effective date of termination. Title to all materials, work-in-process and completed but undeliverable goods, will pass to the City after costs are claimed and allowed. The Seller will submit detailed cost claims in an acceptable manner and will permit the City to examine such books and records as may be necessary in order to verify the reasonableness of any claims.
2. The City reserves the right to cancel the whole or any part of this contract due to failure of Contractor to carry out any term, promise, or condition of the contract. The City will issue a written notice of default to Contractor for acting or failing to act as in any of the following:
  - In the opinion of the City, Contractor provides personnel who do not meet the requirements of the contract;
  - In the opinion of the City, Contractor fails to perform adequately the stipulations, conditions or services/specifications required in this contract;
  - In the opinion of the City, Contractor attempts to impose on the City personnel or materials, products or workmanship, which is of an unacceptable quality;
  - Contractor fails to furnish the required service and/or product within the time stipulated in the contract;
  - In the opinion of the City, Contractor fails to make progress in the performance of the requirements of the contract and/or gives the City a positive indication that Contractor will not or cannot perform to the requirements of the contract.

- C. **Contract Cancellation:** All parties acknowledge that this contract is subject to cancellation by the City of Phoenix pursuant to the provision of Section 38-511, Arizona Revised Statutes.

#### 4.9. Notice

All notices, consents, approvals, and other communications ("Notice") between the City and Contractor that are required to be given under this Contract shall be in writing and given by (1) personal delivery, (2) email with return receipt requested (read receipt), (3) facsimile transmittal with delivery confirmation, (4) prepaid delivery to any commercial air courier or express delivery service, or (5) registered or certified mail, postage prepaid and return receipt requested, through the United States Postal Service.

Notices to the City shall be sent to: City of Phoenix Finance Department, Procurement Division [Procurement@phoenix.gov](mailto:Procurement@phoenix.gov).

Notice to Contractor shall be sent to the person at the mailing address, email address, or fax number listed by Contractor in its Offer in Submittal Forms - Offer Page.

#### 4.10. Integration

This Agreement constitutes and embodies the full and complete understanding and agreement of the parties hereto and supersedes all prior understandings, agreements, discussions, proposals, bids, negotiations, communications, and correspondence, whether oral or written. No representation, promise, inducement or statement of intention has been made by any party hereto which is not embodied in this Agreement, and no party will be bound by or liable for any statement of intention not so set forth.

#### 4.11. State and Local Transaction Privilege Taxes

In accordance with applicable state and local law, transaction privilege taxes may be applicable to this transaction. The state and local transaction privilege (sales) tax burden and legal liability to remit taxes are on the Contractor that is conducting business in Arizona and the City of Phoenix. Any failure by the Contractor to collect applicable taxes from the City will not relieve the Contractor from its obligation to remit taxes. It is the responsibility of the prospective bidder to determine any applicable taxes. The City will look at the price or offer submitted and will not deduct, add or alter pricing based on speculation or application of any taxes, nor will the City provide advice or guidance. If you have questions regarding your tax liability, please seek advice from a tax professional prior to submitting your Offer. You may also find information at <https://www.phoenix.gov/finance/plt> or <https://www.azdor.gov/Business>. Once your Offer is submitted, the Offer is valid for the time specified in this Solicitation, regardless of mistake or omission of tax liability. If the City finds over payment of a project due to tax consideration that was not due, the Contractor will be liable to the City for that amount, and by contracting with the City, the Contractor agrees to remit any overpayments back to the City for miscalculations on taxes included in an offer price.

#### 4.12. Tax Indemnification

Contractor will pay all federal, state and local taxes applicable to its operation and any persons employed by the Contractor, and require the same of all subcontractors. Contractor will hold the City harmless from any responsibility for taxes, damages and interest, if applicable, contributions

required under federal, and/or state and local laws and regulations and any other costs including transaction privilege taxes, unemployment compensation insurance, Social Security and Worker's Compensation, and require the same of all subcontractors.

#### 4.13. Tax Responsibility Qualification

Contractor may be required to establish, to the satisfaction of City, that any and all fees and taxes due to the City or the State of Arizona for any License or Transaction Privilege taxes, Use Taxes or similar excise taxes, are currently paid (except for matters under legal protest). Contractor agrees to a waiver of the confidentiality provisions contained in the City Finance Code and any similar confidentiality provisions contained in Arizona statutes relative to State Transaction Privilege Taxes or Use Taxes. Contractor agrees to provide written authorization to the City Finance Department and to the Arizona State Department of Revenue to release tax information relative to Arizona Transaction Privilege Taxes or Arizona Use Taxes in order to assist the Department in evaluating Contractor's qualifications for and compliance with contract for duration of the term of contract.

#### 4.14. No Israel Boycott

If this Contract is valued at \$100,000 or more and requires Contractor (a company engaging in for-profit activity and having ten or more full-time employees) to acquire or dispose of services, supplies, information technology, or construction, then Contractor must certify and agree that it does not and will not boycott goods or services from Israel, pursuant to Title 35, Chapter 2, Article 9 of the Arizona Revised Statutes. Provided that these statutory requirements are applicable, Contractor by entering this Contract now certifies that it is not currently engaged in, and agrees for the duration of the Contract to not engage in, a boycott of goods or services from Israel.

#### 4.15. No Forced Labor of Ethnic Uyghurs

If this Contract requires Contractor (a company engaging in for-profit activity and having ten or more full-time employees) to acquire or dispose of services, supplies, information technology, goods, or construction, then pursuant to Title 35, Chapter 2, Article 10 of the Arizona Revised Statutes Contractor must certify and agree that it and any contractors, subcontractors, or suppliers it utilizes do not and will not use the forced labor of ethnic Uyghurs in the People's Republic of China or any goods or services produced by such forced labor. Provided these statutory requirements are applicable, Contractor, by entering this Contract, now certifies it is not currently engaged in, and agrees for the duration of the Contract to not engage in, (a) the use of forced labor of ethnic Uyghurs in the People's Republic of China; (b) the use of any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China; or (c) the use of any contractors, subcontractors, or suppliers that use the forced labor or any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China.

#### 4.16. Advertising

Except as required by law, Contractor shall not publish, release, disclose or announce to any member of the public, press, official body, or any other third party any information or documents concerning this Agreement or any part thereof without the prior written consent of the City. The name of any City site on which services are performed by the Contractor pursuant to this Agreement shall not be used in any advertising or other promotional context by Contractor without the prior written consent of the City.

#### **4.17. Strict Performance**

Failure of either party to insist upon the strict performance of any item or condition of the contract or to exercise or delay the exercise of any right or remedy provided in the contract, or by law, or the acceptance of materials or services, obligations imposed by this contract, or by law, will not be deemed a waiver of any right of either party to insist upon the strict performance of the contract.

#### **4.18. Authorized Changes**

The City reserves the right at any time to make changes in any one or more of the following: (a) specifications; (b) methods of shipment or packing; (c) place of delivery; (d) time of delivery; and/or (e) quantities. If the change causes an increase or decrease in the cost of or the time required for performance, an equitable adjustment may be made in the price or delivery schedule, or both. Any claim for adjustment will be deemed waived unless asserted in writing within sixty days from the receipt of the change. Price increases or extensions of delivery time will not be binding on the City unless evidenced in writing and approved by the Chief Procurement Officer prior to the institution of the change.

## **5. Special Terms and Conditions**

### **5.1. Term of Contract**

The term of this Contract will commence on or about July 1, 2025 and will continue for a period of five (5) years thereafter.

### **5.2. Free on Board (FOB)**

Prices quoted shall be FOB destination and delivered, as required, to the following point(s): City of Phoenix Street Transportation, Signal Shop, 2141 E Jefferson Street, Phoenix, AZ, 85034.

### **5.3. Price**

All prices submitted shall be firm and fixed for the initial two-years of the contract. Thereafter, price increases will be considered annually provided the adjustments are submitted in writing with 60 days' notice to the Procurement Officer. Price increase requests shall be accompanied with written documentation to support the increase, such as a letter from the manufacturer, published price index, applicable change in law, etc. Price decrease requests do not require supporting documentation and are allowed at any time during the contract term.

The City will be the sole judge in determining the allowable increase amount. Price increases agreed to by any staff other than the Chief Procurement Officer are invalid. The Contractor acknowledges and agrees to repay all monies paid because of a requested price increase unless the increase was specifically approved, in writing, by the Chief Procurement Officer.

### **5.4. Method of Ordering**

Contractor shall deliver items and/or services only upon receipt of a written purchase order. All Contractor invoices and packing/delivery tickets must include the City of Phoenix purchase order number.

### **5.5. Method of Invoicing**

Invoice must be emailed in .pdf format to [invoices@phoenix.gov](mailto:invoices@phoenix.gov) and must include the following:

- City purchase order number or shopping cart number
- Items listed individually by the written description and part number
- Unit price, extended and totaled
- Quantity ordered, back ordered, and shipped
- Applicable tax
- Invoice number and date
- Delivery address
- Payment terms
- FOB terms

- Remit to address

## 5.6. Method of Payment

Payment to be made from Contractor's invoice and a copy of the signed delivery/service ticket submitted to cover items received and accepted during the billing period.

## 5.7. Partial Payments

Partial payments are not authorized on individual purchase orders. Payment will be made upon final delivery and acceptance of all goods and services on the purchase order.

## 5.8. Supplier Profile Changes

It is the responsibility of the Contractor to promptly update their profile in procurePHX at <https://www.phoenix.gov/procure>. If Contractor's legal identify has changed, the Procurement Officer must be notified immediately. Failure to do so may result in non-payment of invoices and contract termination.

## 5.9. Estimated Quantities or Dollar Amounts

Quantities and dollar amounts listed are the City's best estimate and do not obligate the City to order or accept more than City's actual requirements during the period of this agreement, as determined by actual needs and availability or appropriated funds. It is expressly understood and agreed that the resulting contract is to supply the City with its complete actual requirement for the contract period.

## 5.10. Post Award Conference

A post-award conference will be held prior to commencement of any work on the project. The purpose of this conference is to discuss critical elements of the work schedule and operational problems and procedures.

## 5.11. Performance Interference

Contractor shall notify the City's authorized Department representative immediately of any occurrence and/or condition that interferes with the full performance of the contract and confirm it in writing within 24 hours.

## 5.12. Cooperative Agreement

In addition to the City and with approval of the Contractor, this contract may be extended for use by other municipalities and government agencies in the State of Arizona.

## 5.13. Delivery

All deliveries shall be made between the hours of 8:00 a.m. and 2:00 p.m., local time, Monday through Friday, excluding City holidays. City holiday calendar: <https://www.phoenix.gov/calendar/holidays>

## 5.14. Evaluation Literature

Offers submitted for products considered by the Contractor to be equal or better than the products specified herein must be submitted with technical literature and/or product brochures for the City's

use to evaluate the offered products. Complete specifications, literature, illustrations, blueprints, photos etc. describing the offered product shall be included with the Offer. Contractor shall indicate any variation between the product offered and the literature submitted.

### 5.15. Industry Standards

It is intended that the manufacturer in the selection of components will use material and design practices that are the best available in the industry for the type of operating conditions to which the item will be subjected. Component parts shall be selected to give maximum performance, service life and safety and not merely meet the minimum requirements of this specification. All parts, equipment and accessories shall conform in strength, quality of material and workmanship to recognized industry standards.

The term "heavy duty" if used in these specifications shall mean that the item to which the term is applied shall exceed the usual quantity, quality, or capacity supplied with standard production items and it shall be able to withstand unusual straining, exposure, temperature, wear and use.

The City reserves the right to waive minor variations if, in the opinion of the City's authorized Department representative, the basic unit meets the general intent of these specifications.

The product offered shall not include a major component that is of a prototype nature or has not been in production for a sufficient length of time to demonstrate reliability.

If the specifications stated herein for component items do not comply with legal requirements, the Contractor shall so notify the City prior to the offer opening due date.

### 5.16. Inspection and Acceptance

Each product delivered shall be subject to complete inspection by the City prior to acceptance. Inspection criteria shall include, but not be limited to, conformity to the specifications, mechanical integrity, quality, workmanship and materials. Ten business days will be allowed for this process. If delivered items are unacceptable and returned to the Contractor prior to acceptance, an additional five business days will be allowed for inspection when subsequent delivery occurs. It shall be the Contractor's responsibility to pick up unacceptable products, correct the deficiencies, and return the product following the corrections.

### 5.17. Inventory Levels

Contractor's inventory levels of the items may be a factor in the City's award decision. Contractor will be required to maintain sufficient local inventory to provide daily support of the City's requirement. Failure to supply sufficient support may result in cancellation of the contract.

### 5.18. New Equipment

All items offered shall be new equipment supplied from the manufacturer. Offers for remanufactured/refurbished equipment will be considered as non-responsive and rejected.

### 5.19. Product Discontinuance

The City may award contracts for products and/or models of equipment because of this solicitation. If a product or model is discontinued by the manufacturer, the City, in its sole discretion, may allow the Contractor to provide a substitute for the discontinued item. Contractor shall request permission to substitute a new product or model and will provide the following:

- A formal announcement from the manufacturer that the product or model has been discontinued.
- Documentation from the manufacturer that names the replacement product or model.
- Documentation that provides clear and convincing evidence that the replacement meets or exceeds all specifications required by the original solicitation.
- Documentation that provides clear and convincing evidence that the replacement will be compatible with all functions or uses of the discontinued product or model.
- Documentation from the manufacturer confirming that the price for the replacement item will be the same as the discontinued item.
- The Chief Procurement Officer will be the sole judge in determining the allowable substitute, new product or model change for discontinued item.

## 5.20. Repair and Replacement Parts Guarantee

Following the expiration of any express or implied warranty applicable to those goods, furnished to the City under this contract, Contractor agrees to supply the City (as well as its agents, representatives, Contractors, and hires) with in-stock repair and replacement parts carrying a full manufacturer's warranty at a cost that shall not exceed the cost it would charge if it were contracted to service or install those repair and replacement parts.

## 5.21. Replacement Parts Availability

A response to this solicitation shall constitute a guarantee by the Contractor that a stock of replacement parts for the specified equipment is locally available. Captive parts must be available within 48 hours following the placement of an order. Contractor shall provide parts delivery, to include deliveries on Saturday. If special handling and/or freight are required, the Contractor will assume all charges.

## 5.22. Substitution of Specified Items

Whenever in the specifications any item or process is requested or identified by manufacturer name, proprietary name, or patent such specifications shall be used to facilitate descriptions of the item or process and shall be followed by the words "or equal". The Contractor may offer any item or process that is equal in every respect. However, if the item or process delivered is not, in the opinion of the City of Phoenix, equal in every respect to the specifications, then the Contractor must furnish the item or material that is equal, in the opinion of the City.



## **6. Defense and Indemnification**

### **6.1. Standard General Defense and Indemnification**

Contractor (“Indemnitor”) must defend, indemnify, and hold harmless the City of Phoenix and its officers, officials (elected or appointed), agents, and employees (“Indemnitee”) from and against any and all claims, actions, liabilities, damages, losses or expenses (including but not limited to court costs, attorney fees, expert fees, and costs of claim processing, investigation and litigation) of any nature or kind whatsoever (“Losses”) caused, or alleged to be caused, in whole or in part, by the wrongful, negligent or willful acts, or errors or omissions of Indemnitor or any of its owners, officers, directors, members, managers, agents, employees or subcontractors (“Indemnitor’s Agents”) arising out of or in connection with this Contract. This defense and indemnity obligation includes holding Indemnitee harmless for any Losses arising out of or recovered under any state’s Workers’ Compensation Law or arising out of the failure of Indemnitor or Indemnitor’s Agents to conform to any federal, state or local law, statute, ordinance, rule, regulation or court decree. Indemnitor’s duty to defend Indemnitee accrues immediately at the time a claim is threatened or a claim is made against Indemnitee, whichever is first. Indemnitor’s duty to defend exists regardless of whether Indemnitor is ultimately found liable. Indemnitor must indemnify Indemnitee from and against any and all Losses, except where it is proven that those Losses are solely a result of Indemnitee’s own negligent or willful acts or omissions. Indemnitor will be responsible for primary loss investigation, defense and judgment costs where this indemnification applies. In consideration of the award of this Contract, Indemnitor waives all rights of subrogation against Indemnitee for losses arising from the work performed by Indemnitor or Indemnitor’s Agents for the City of Phoenix. The obligations of Indemnitor under this provision survive the termination or expiration of this Contract.

## **7. Insurance Requirements**

### **7.1. Vendor's Insurance**

Vendor must procure insurance against claims that may arise from or relate to performance of the work hereunder by Vendor and its agents, representatives, employees and sub-Vendors. Vendor must maintain that insurance until all their obligations have been discharged, including any warranty periods under this Contract.

The City in no way warrants that the limits stated in this section are sufficient to protect the Vendor from liabilities that might arise out of the performance of the work under this Contract by the Vendor, its agents, representatives, employees or subcontractors and Vendor may purchase additional insurance as they determine necessary.

### **7.2. Scope and Limits of Insurance**

Vendor must provide coverage with limits of liability not less than those stated below. An excess liability policy or umbrella liability policy may be used to meet the liability limits provided that (1) the coverage is written on a "following form" basis, and (2) all terms under each line of coverage below are met.

### **7.3. Commercial General Liability – Occurrence Form**

General Aggregate \$2,000,000  
Products – Completed Operations Aggregate \$1,000,000  
Personal and Advertising Injury \$1,000,000  
Each Occurrence \$1,000,000

The Vendor's insurance coverage must be primary and non-contributory with respect to any insurance or self-insurance carried by the City.

### **7.4. Notice of Cancellation**

For each insurance policy required by the insurance provisions of this Contract, the Vendor must provide to the City, within 5 business days of receipt, a notice if a policy is suspended, voided or cancelled for any reason. Such notice must be mailed, emailed, or hand delivered City of Phoenix Finance Department, Procurement Division, 251 W Washington Street, Phoenix, AZ 85003 OR [procurement@phoenix.gov](mailto:procurement@phoenix.gov).

### **7.5. Acceptability of Insurers**

Insurance is to be placed with insurers duly licensed or authorized to do business in the state of Arizona and with an "A.M. Best" rating of not less than B+ VI. The City in no way warrants that the required minimum insurer rating is sufficient to protect the Vendor from potential insurer insolvency.

### **7.6. Verification of Coverage**

Vendor must furnish the City with certificates of insurance (ACORD form or equivalent approved by the City) as required by this Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.

All certificates and any required endorsements are to be received and approved by the City before work commences. Each insurance policy required by this Contract must be in effect at or prior to commencement of work under this Contract and remain in effect for the duration of the project. Failure to maintain the insurance policies as required by this Contract or to provide evidence of renewal is a material breach of contract.

All certificates required by this Contract must be sent directly to City of Phoenix Finance Department, Procurement Division, 251 W Washington Street, Phoenix, AZ 85003 OR [procurement@phoenix.gov](mailto:procurement@phoenix.gov). The City project/contract number and project description must be noted on the certificate of insurance. The City reserves the right to review complete copies of all insurance policies required by this Contract at any time. **DO NOT SEND CERTIFICATES OF INSURANCE TO THE CITY'S RISK MANAGEMENT DIVISION.**

### 7.7. Approval

Any modification or variation from the insurance coverages and conditions in this Contract must be documented by an executed contract amendment.

## 8. Submittals

### 8.1. Copies

Please submit one electronic copy of the Submittal Section and all other required documentation. Please do not lock the electronic copy with password protection so that the City may incorporate the successful Offer into the awarded contract.

**Please submit only the Submittal Section, do not submit a copy of the entire solicitation document.** This Offer will remain in effect for a period of 180 calendar days from the opening date, and is irrevocable unless it is in the City's best interest to release offer(s).

### 8.2. Solicitation Response Check List

Use this check list as a tool to review your submission to ensure that all required documents and forms are included.

The written offer should be:

- Typewritten for ease of evaluation
  - Signed by an authorized representative of the Offeror
  - Submitted with contact information for the individual(s) authorized to negotiate with the City
- A. Submittal Forms - All submittal forms are completed and signed.
- B. Addenda - Signed copies of all published addenda.
- C. Price Proposal - All price proposal are completed.

Offers must be in possession of the Department on or prior to the exact time and date indicated in the Schedule of Events. Late offers will not be considered. Electronic submission is preferred. Due to file size limitations for electronic transmission, offers sent by email may need to be sent in parts with multiple emails. It is the responsibility of the Offeror to ensure that the offer is received timely and that there are no technical reasons for delay. Please refer to the Instructions Section for complete information regarding the submission of offers.

### 8.3. Additional Quantities

The City anticipates considerable activity under the resultant contract(s). However, no guarantee can be made as to actual traffic signal heads and LED indications that will be purchased under this contract. The City reserves the right to add, change or delete quantities or items as circumstances may require.



GENERAL NOTES:

- 1 The contractor shall notify the City Of Phoenix Traffic Signal Shop ((602) 262-6733) a minimum of fourteen (14) calendar days prior to beginning any traffic signal work. Submittals of all equipment shall be furnished to the Signal Shop and approved prior to the ordering of any traffic signal equipment. The Contractor shall verify that they have the most current set of drawings prior to start and ordering of any equipment.
- 2 The Contractor shall layout all ADA ramps, junction boxes and foundation locations for approval by the traffic signal representative prior to any excavation.
- 3 The Contractor shall provide and install all traffic signal items as shown on the approved traffic signal plans.
- 4 Foundation elevations must be within 1/4" of finished sidewalk grade.
- 5 A minimum of four (4) feet of clearance is required between all traffic signal poles and the back edge of sidewalk pedestrian ramps.

F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL
9	ARIZ.			

DR: \_\_\_\_\_ DES: \_\_\_\_\_ CK: \_\_\_\_\_ DATE: \_\_\_\_\_

## TRAFFIC SIGNAL STANDARD DETAILS INDEX

### POLES

SHEET NO.	DESCRIPTION	APPROVED
TS1 - 1	General Structural Notes	04-06-2020
TS1 - 2	P45, DP45, P70, DP70, # LP Poles and Mast Arm Members and Lengths	04-06-2020
TS1 - 3	Mast Arm Maximum Loading Without Damper # Pole Maximum Loading	04-06-2020
TS1 - 4	Mast Arm Maximum Loading With Damper	04-06-2020
TS1 - 5	P45, DP45, P70, DP70, # LP Poles and Mast Arm Details 1 of 2	04-06-2020
TS1 - 6	P45, DP45, P70, DP70, # LP Poles and Mast Arm Details 2 of 2	04-06-2020
TS1 - 7	GP Pole with Lumaire Arm	04-06-2020
TS1 - 8	AP Signal Pole # BP Push-Button Pole	04-06-2020

### JUNCTION BOXES AND FOUNDATIONS

SHEET NO.	DESCRIPTION	APPROVED
TS2 - 1	Junction Boxes, Foundations for Controller and Power Service Pedestal	04-06-2020
TS2 - 2	Pole Foundations	04-06-2020

### SIGNAL EQUIPMENT DETAILS

SHEET NO.	DESCRIPTION	APPROVED
TS3 - 1	Mounting Details - Side Mount Signal Equipment	08-01-2014
TS3 - 2	Traffic Signal Head Graphic Detail	04-01-2019
TS3 - 3	HAWK Pedestrian Crossing Beacon - Dual Mast Arm	04-01-2019
TS3 - 4	HAWK Pedestrian Crossing Beacon - Single Mast Arm	04-01-2019

### WIRING

SHEET NO.	DESCRIPTION	APPROVED
TS4 - 1	Wire Code Tables	04-01-2019
TS4 - 2	Pull Box/Pole Hand Hole Wiring	04-01-2019
TS4 - 3	Color Coding/Banding Scheme, Loop Numbering	08-01-2016

### DETECTION

SHEET NO.	DESCRIPTION	APPROVED
TS5 - 1	Detection Loops	05-08-2017

### PUSH BUTTON DETAIL


SHEET NO.	DESCRIPTION	APPROVED
TS6 - 1	Clear Space	04-06-2020

### SPECIAL USE POLES

SHEET NO.	DESCRIPTION	APPROVED
S1	Verizon SR Comm Signal Pole - Pole Details	10-31-2014
S2	Verizon SR Comm Signal Pole - Foundation Details	10-31-2014
S1	Verizon SM Comm Signal Pole - Pole Details	10-31-2014
S2	Verizon SM Comm Signal Pole - Pole Details	10-31-2014
S1	Verizon LM Comm Signal Pole - Pole & Foundation Details	10-31-2014

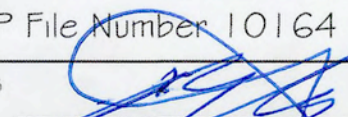
\*PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.\*

CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAIL INDEX  
 CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

INDEX SHEET

10164.dwg Modified: 04/06/2020 3:56pm

TPP File Number 10164 DATE 4-6-2020  
TRAFFIC SERVICES ENGINEER 

PROJECT #:  
DR: \_\_\_\_\_ DES: \_\_\_\_\_ CK: \_\_\_\_\_ SHEET NO: \_\_\_\_\_ TOTAL SHEETS: \_\_\_\_\_  
DATE: \_\_\_\_\_ DATE: \_\_\_\_\_ DATE: \_\_\_\_\_  
SCALE: \_\_\_\_\_ QS: #:

DETAIL INDEX:

PROJECT #:



**General Structural Notes**

1. General Structural Notes on TS 1-1 apply to City of Phoenix Street Transportation Department Traffic Signal Standard Drawings TS 1-2 through TS 1-8 and TS 2-2.
2. All materials and construction shall conform to the requirements of the City of Phoenix Street Transportation Department Traffic Signal Standard Specifications, current edition.
3. Supports and foundations are designed in accordance with "AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 1st Edition, 2015 with revisions through 2019.
4. Design Criteria:
  - Wind Speed: 120mph
  - Mean Recurrence Interval: 1,700yr (ADT > 10,000)
  - Fatigue Category: I no damper  
II with damper
5. All welding shall conform to the requirements of the American Welding Society D1.1, latest edition.
6. Pole, arm, risers and appurtenances shall be finished according to City of Phoenix Street Transportation Department Traffic Signal Standard Specifications, latest edition.
7. Poles and arms shall be permanently labeled with manufacturer's name, date manufactured, and equipment type. Pole ID shall be marked on tag and tag affixed to bottom of pole.
8. All bolt heads shall include washers against adjacent plate (except anchor plate).
9. All wire entrance and exit holes shall be free of all burrs and sharp edges.
10. Pole shafts arms shall be fabricated from not more than two pieces of sheet steel. When two pieces are used, the longitudinal welded seams shall be directly opposite each other. Seam welds in pole shall be placed to form continuous straight seams from base to top of pole. Seam welds in cantilever arm sections shall be located in the lower quadrant of the arm (compression side under dead load). Seam welds for pole and arm section shall have 60 percent minimum penetration or fusion except as follows:
  - 10.1. Longitudinal seam welds within six (6) inches of circumferential tube-to-tube-splice full penetration groove welds, tube-to-plate full penetration groove welds or luminaire, traffic signal, and sign supports shall be full penetration groove welds, and
  - 10.2. Longitudinal seam welds on the female section of telescopic (i.e. slip-type) field splices of lighting (pole-type) luminaire, traffic signal and sign-supports shall be full penetration groove welds for a length equal to the minimum splice length plus six (6) inches.
11. Orient pole bottom handhole 90-degrees from the arm(s), away from traffic.
12. Do not scale from drawings.
13. Materials:
  - A. Tubes:
    - a. Mast Arm, Pole, Insert, Riser, & Extension: ASTM A500 Gr C (46 ksi) HSS
    - b. BP Pole: ASTM A500 Gr B or C (42ksi min) HSS
    - c. AP Pole: ASTM A500 Gr B, C or D (36ksi min) HSS
    - d. LP & GP Pole, Sleeve, Tenon & Luminaire Arm: ASTM A53 Gr B or C (35 ksi min)
  - B. Steel Plates:
    - a. Reducer: ASTM A572 Gr 50
    - b. All other plates: ASTM A36
  - C. Bolts, Nuts & Washers
    - a. Bolts 1/2" to 1 1/2": ASTM F3125, Grade A325, Type 1 (92 ksi yield)
    - b. Bolts 1 3/8" to 3": ASTM A449 Type 3 (58 ksi yield)
    - c. Nuts: ASTM A563 DH3 Heavy Hex
    - d. Washers: ASTM F436 Type 1
  - D. Handhole Frame: ASTM A36 Gr 36, or A572 Gr 42
  - E. Handhole Cover: ASTM A1011 Gr 30
  - F. Stainless Steel Screws: AISI Type 316
  - G. Welding Electrodes: E-70XX low hydrogen rods

**14. Weld Inspection**

All welds shall be visually inspected (VT).

Full-penetration welds shall be inspected by magnetic particle testing (MT) or ultrasonic testing (UT), based on the thinnest mating material:  
 Thickness < 0.25 in. MT inspection  
 Thickness ≥ 0.25 in. UT inspection

Full-penetration laminated tube-to-transverse-plate welds shall be inspected by MT, after the welding of each individual ply.


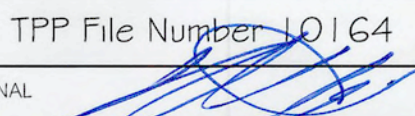
As an alternative, Contractor may inspect full penetration groove welds by radiographic testing (RT).

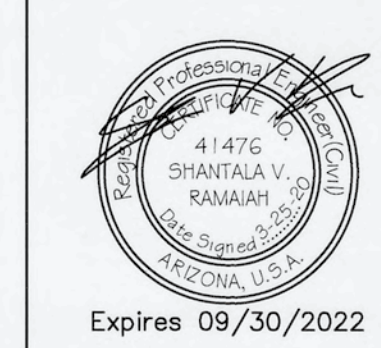
Full-penetration groove welds shall be inspected over their full length,.

TRAFFIC SIGNAL DETAILS:

PROJECT #:

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

 101 N. 196 AVENUE, #2000, PHOENIX, AZ 85008 480.255.1800   480.255.1802 WWW.JACOBS.COM	CITY OF PHOENIX, ARIZONA STREET TRANSPORTATION DEPARTMENT TRAFFIC SIGNAL STANDARD DETAILS		TRAFFIC SIGNAL DETAILS CITY OF PHOENIX, ARIZONA STREET TRANSPORTATION DEPARTMENT			
	General Structural Notes		PROJECT #: DR: SVR    DES: ANA    GK: WR    SHEET NO:    TOTAL SHEETS DATE: 3/11/2020    DATE: 3/11/2020    DATE: 3/11/2020 SCALE:    QS: #: TPP File Number: 10164    TS 1-1 TRAFFIC SIGNAL ENGINEER:  2/16/20			

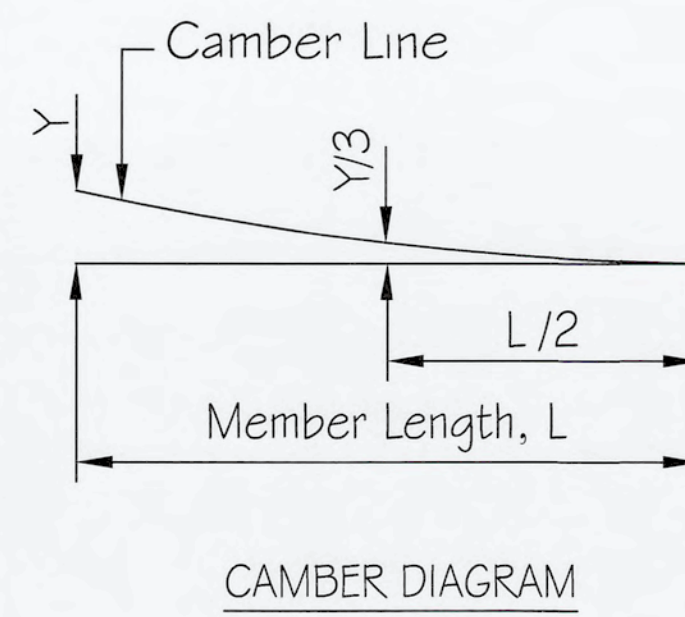




**Camber**

Camber as shown is required to be built into the mast arms and extension members. Members shall be erected so that camber is provided above the horizontal line. Camber calculated provides for deflection due to dead load of tubular structure plus dead loads due to sign panels and attachments. Additional camber values along the arm may be interpolated.

CAMBER	
ID	Y
M55 Arm	1 1/2"
M40 Arm	4 1/2"
M30 Arm	1 3/4"
M15 Arm	1/2"
15'-0" Extension	1"
10'-0" Extension	1/2"
5'-0" Extension	1/4"
1'-0" Extension	0"



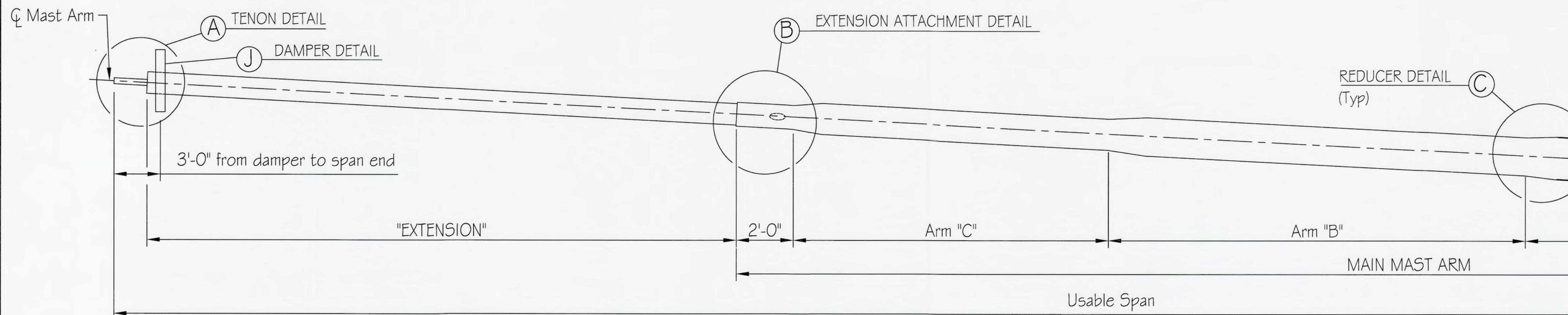
MEMBER	WEIGHT (lb)
P70 # DP70 Pole	1871
P45 # DP45 Pole	1253
LP Pole	661
20'-0" Riser	227
15'-0" Riser	170
10'-0" Riser	114
5'-0" Riser	57
1'-0" Riser	11

MEMBER	WEIGHT (lb)
M55P70	2966
M40P70	1703
M30P45 # M30P70	845
M15P45 # M15P70	337
15'-0" Extension	236
10'-0" Extension	157
5'-0" Extension	79
1'-0" Extension	16

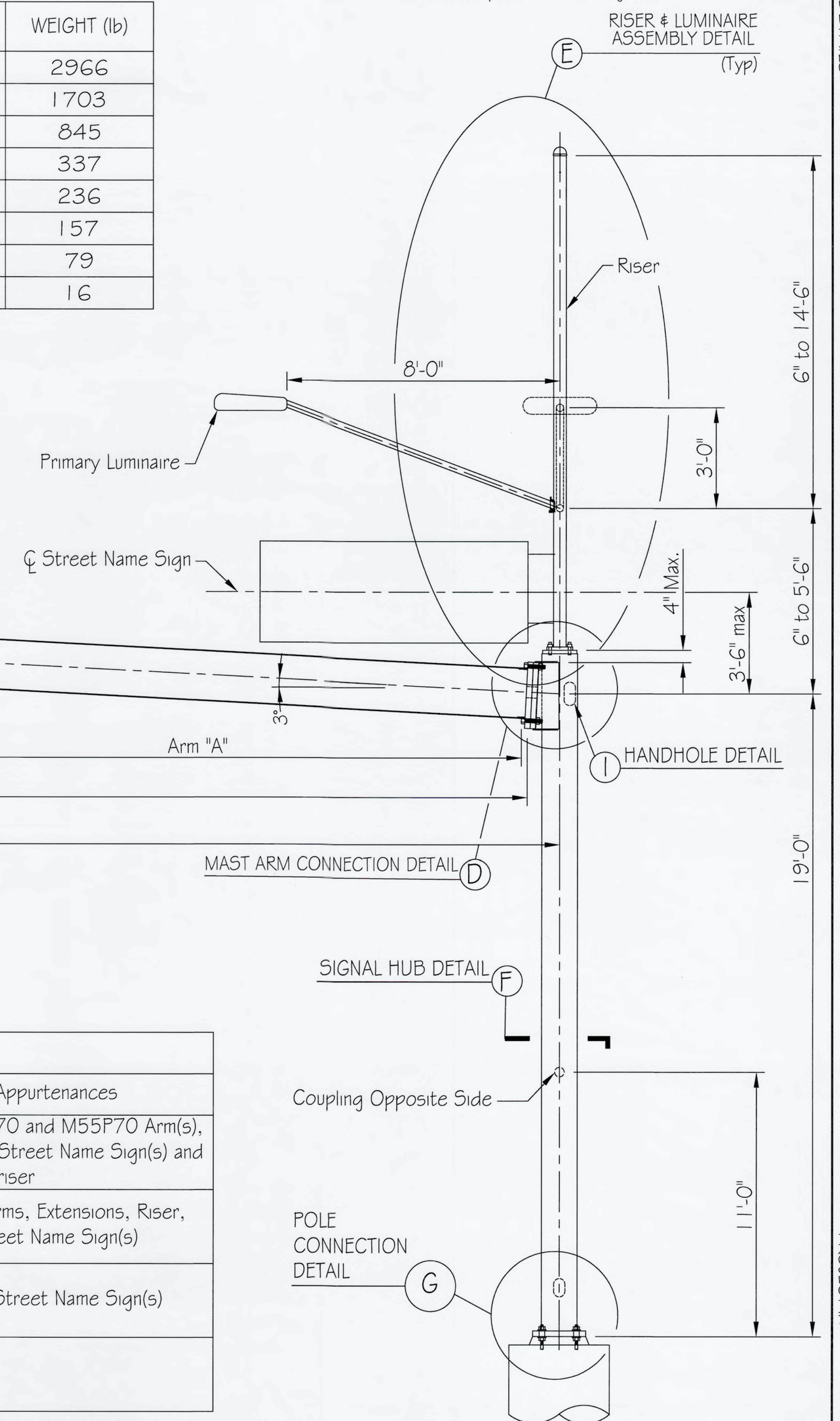
**MEMBER WEIGHTS**

**NOTES:**

1. See plans for Riser lengths.



**TRAFFIC SIGNAL SUPPORT ASSEMBLY**  
(Single Arm Shown, Double Arm Similar.)



EXTENSION	
ID	Member
E15	8 5/8" O.D. x 0.188 x 15'-0"
E10	8 5/8" O.D. x 0.188 x 10'-0"
E5	8 5/8" O.D. x 0.188 x 5'-0"
E1	8 5/8" O.D. x 0.188 x 1'-0"

MAIN MAST ARM						
ID	Usable Spans*	Arm "C"	Arm "B"	Arm "A"	Attach.	Length
M55P70	53'-8" to 70'-0"	12 3/4"Ø x 0.25 x 18'-4"	14"Ø x 0.25 x 15'-0"	16"Ø x 0.625 x 17'-0"	2'-0"	52'-6"
M40P70	38'-8" to 55'-0"	12 3/4"Ø x 0.25 x 9'-4"	14"Ø x 0.25 x 11'-0"	16"Ø x 0.375 x 15'-0"	2'-0"	37'-6"
M30P45 # M30P70	28'-8" to 45'-0"	-	12 3/4"Ø x 0.25 x 13'-0"	16"Ø x 0.25 x 12'-6"	2'-0"	27'-8"
M15P45 # M15P70	13'-8" to 30'-0"	-	-	12 3/4"Ø x 0.25 x 10'-6"	2'-0"	12'-8"

POLE		
ID	Member	Allowable Arms # Appurtenances
P70 (Single Arm)	18"Ø x 0.50	M15P70, M30P70, M40P70 and M55P70 Arm(s), Extensions, Luminaire(s) and Street Name Sign(s) and one (1) riser
DP70 (Double Arm)		
P45 (Single Arm)		
DP45 (Double Arm)	16"Ø x 0.375	M15P45 and M30P45 Arms, Extensions, Riser, Luminaire(s) and Street Name Sign(s)
LP**	8 5/8"Ø x 0.375	Riser, Luminaire(s) and Street Name Sign(s)
Riser	4 1/2"Ø x 0.25	-

\* Usable span = Pole centerline to "C" Plate + Mast Arms "A"+"B"+"C" + 2'-0" + Extension + Tenon

\*\* LP pole similar to Traffic Signal Support Assembly shown, but with no mast arm

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-26, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

**Jacobs**

CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

**TRAFFIC SIGNAL DETAILS**

CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



Expires 09/30/2022

P45, DP45, P70, DP70,  
& LP Poles and Mast Arm  
Members and Lengths

TPP File Number: 10164

TRAFFIC SIGNAL ENGINEER

TS 1 - 2

4/6/20

PROJECT #:	DES: SVR	DES: ANA	CK: WR	SHEET NO:	TOTAL SHEETS:
DATE: 3/1/2020	DATE: 3/1/2020	DATE: 3/1/2020	DATE: 3/1/2020	NO:	
SCALE:	Q5. #:				

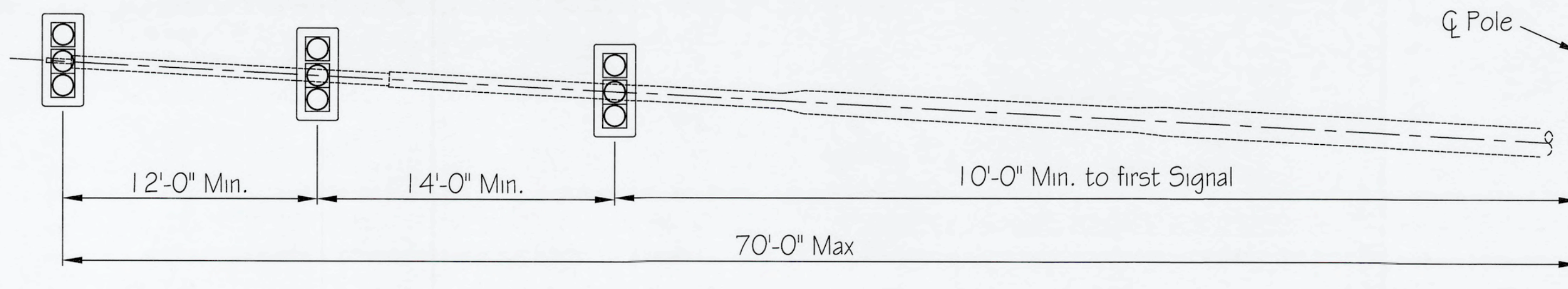
TRAFFIC SIGNAL DETAILS:

PROJECT #:

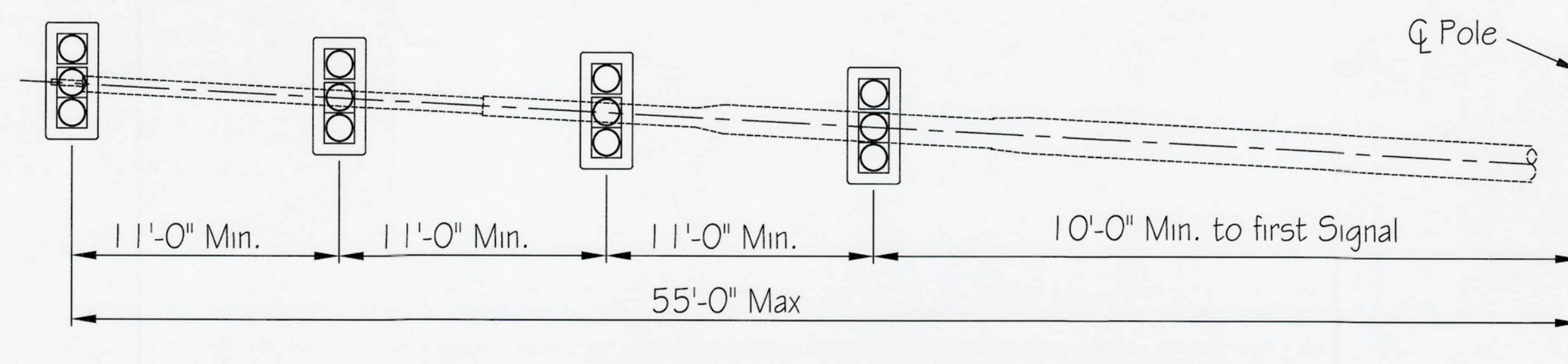


NOTES

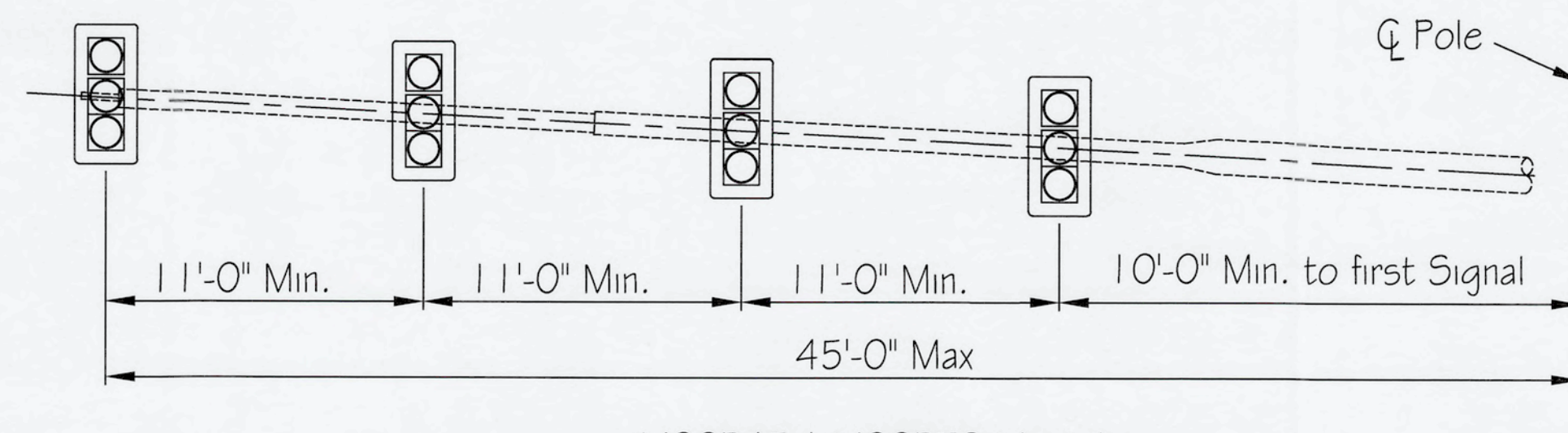
1. Maximum loading conditions are shown. Appurtenances can be removed from loading conditions shown, but not added.
2. Appurtenances without spacing noted may be placed at any point between adjacent signals as shown.



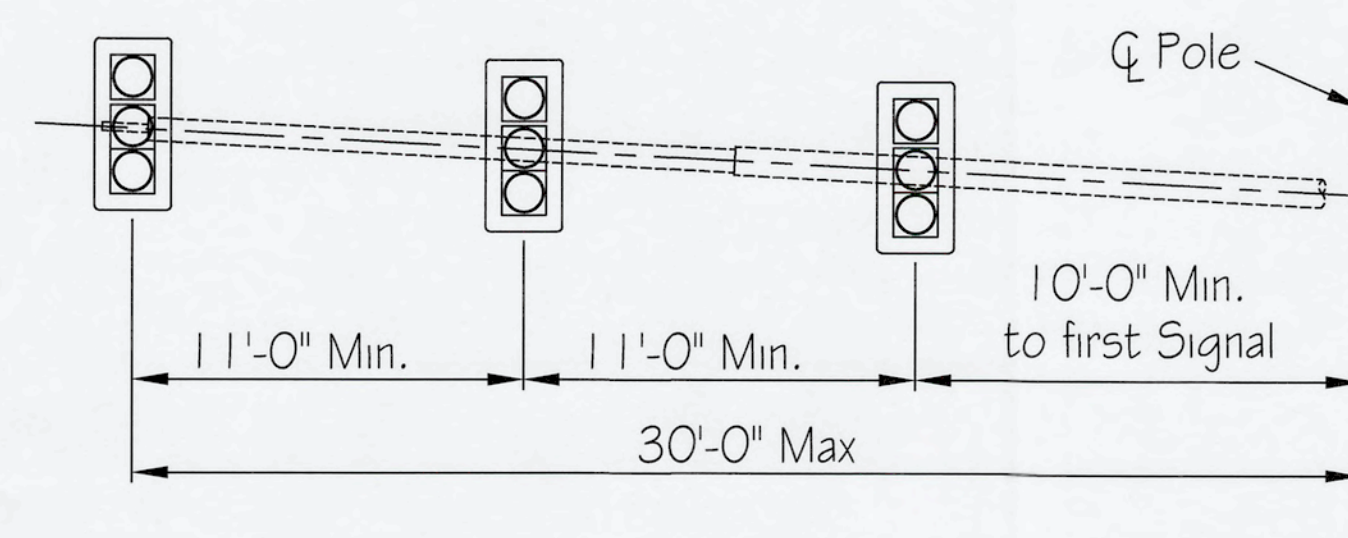
M55P70 Mast Arm



M40P70 Mast Arm



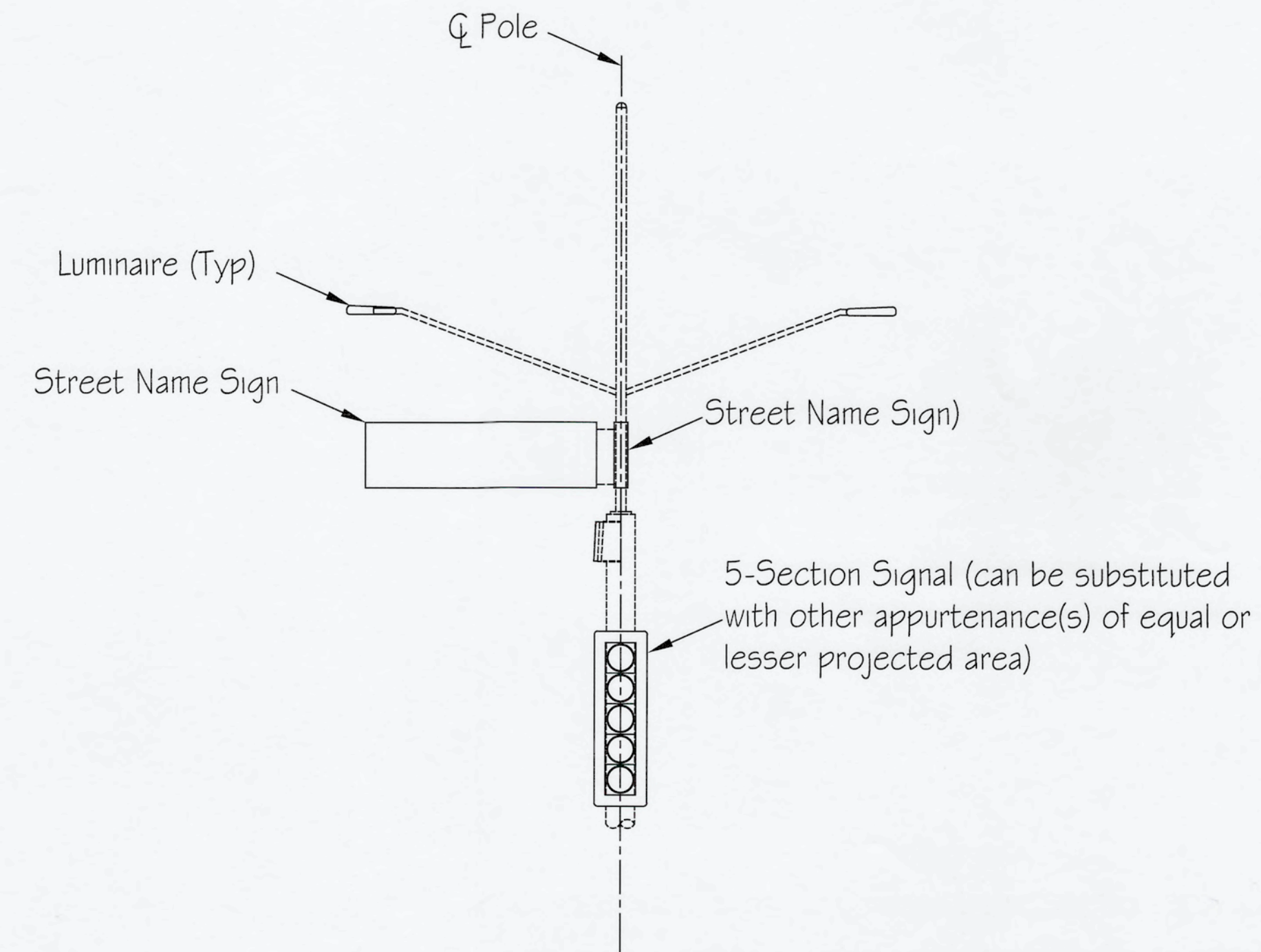
M30P45 & M30P70 Mast Arms



M15P45 & M15P70 Mast Arms

ALLOWABLE MAST ARM LOADING CONFIGURATIONS WITHOUT DAMPER

(See Note 1)



MAXIMUM POLE LOADING CONDITION

(WITH OR WITHOUT DAMPER)

(See Note 1)

APPURTENANCES				
Symbol	ID	Projected Area	Plan Area	Weight
	3-Section Signal	8.5 ft <sup>2</sup>	0.5 ft <sup>2</sup>	39 lb
	5-Section Signal	12.6 ft <sup>2</sup>	0.5 ft <sup>2</sup>	50 lb
	Street Name Sign	20.7 ft <sup>2</sup>	2.9 ft <sup>2</sup>	135 lb
	Sign Panel	7.5 ft <sup>2</sup>	n/a	15 lb
	Luminaire	0.5 ft <sup>2</sup>	2.0 ft <sup>2</sup>	14 lb

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CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



Mast Arm Maximum Loading  
Without Damper &  
Pole Maximum Loading

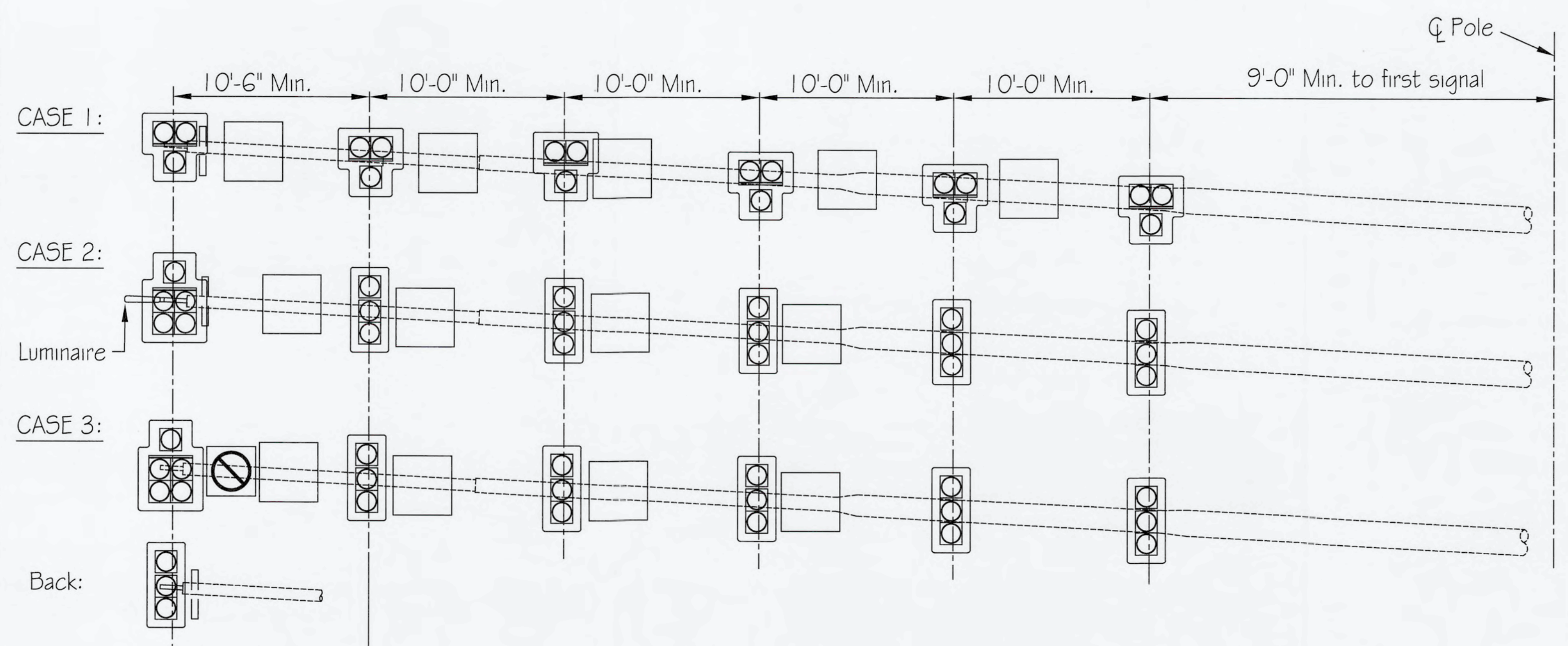
TPP File Number 10164 TS 1-3  
DATE: 3/1/2020 DATE: 3/1/2020  
ENGINEER: [Signature] 4/6/20

PROJECT #:	DR: SVR	DES: ANA	CK: WR	SHEET NO:	TOTAL SHEETS:
SCALE:	Q5. #:				



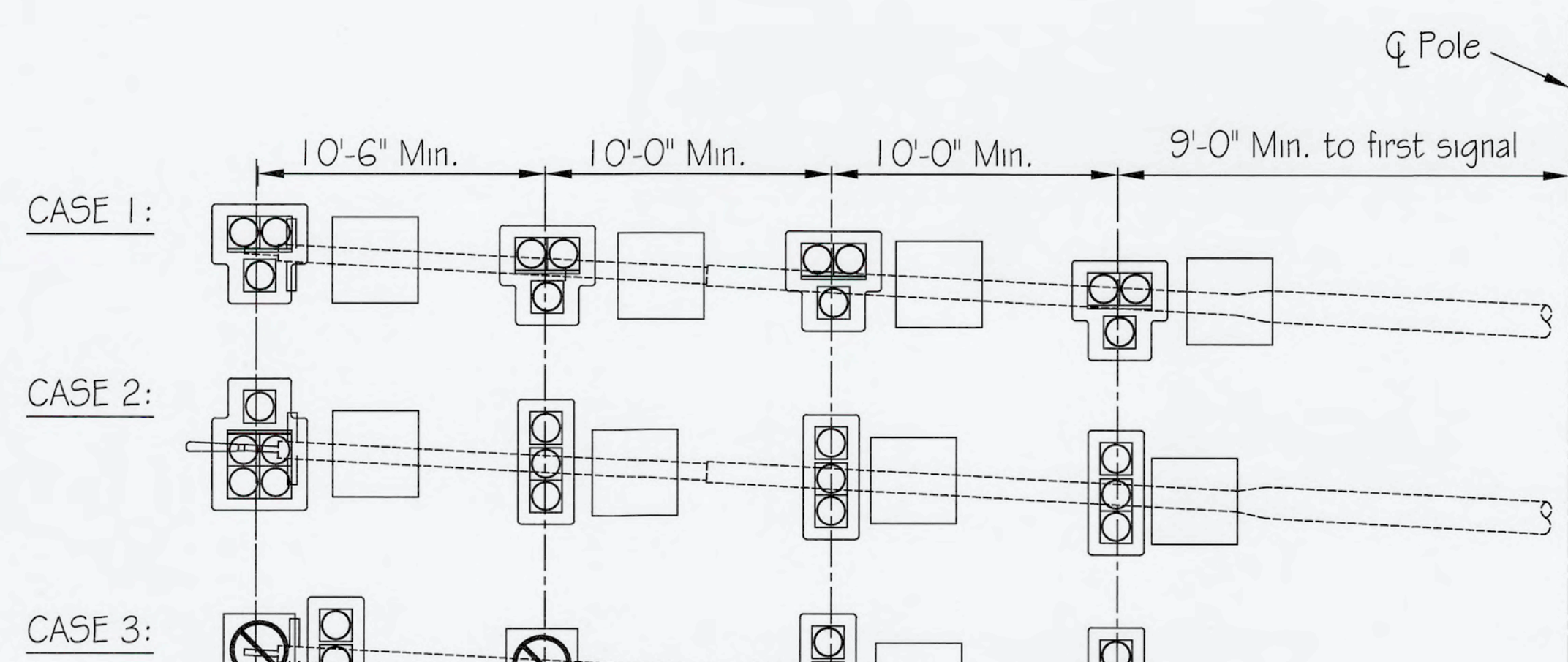
NOTES

1. Maximum loading conditions are shown. Appurtenances can be removed from loading conditions shown, but not added.
2. Appurtenances without spacing noted may be placed at any point between adjacent signals as shown.



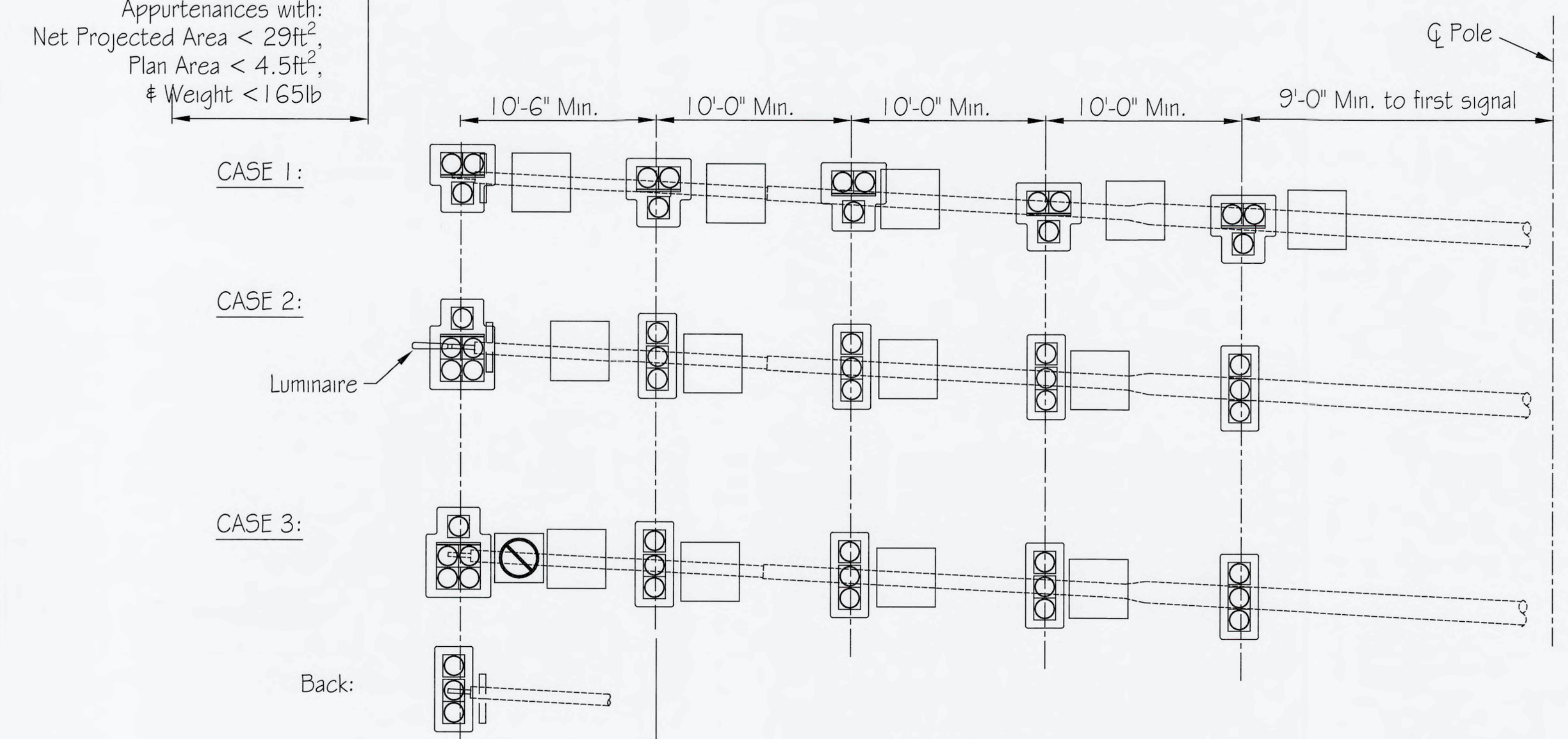
Provide any configuration of Appurtenances with:  
 Net Projected Area < 29ft<sup>2</sup>,  
 Plan Area < 4.5ft<sup>2</sup>,  
 # Weight < 165lb

M55P70 Mast Arm



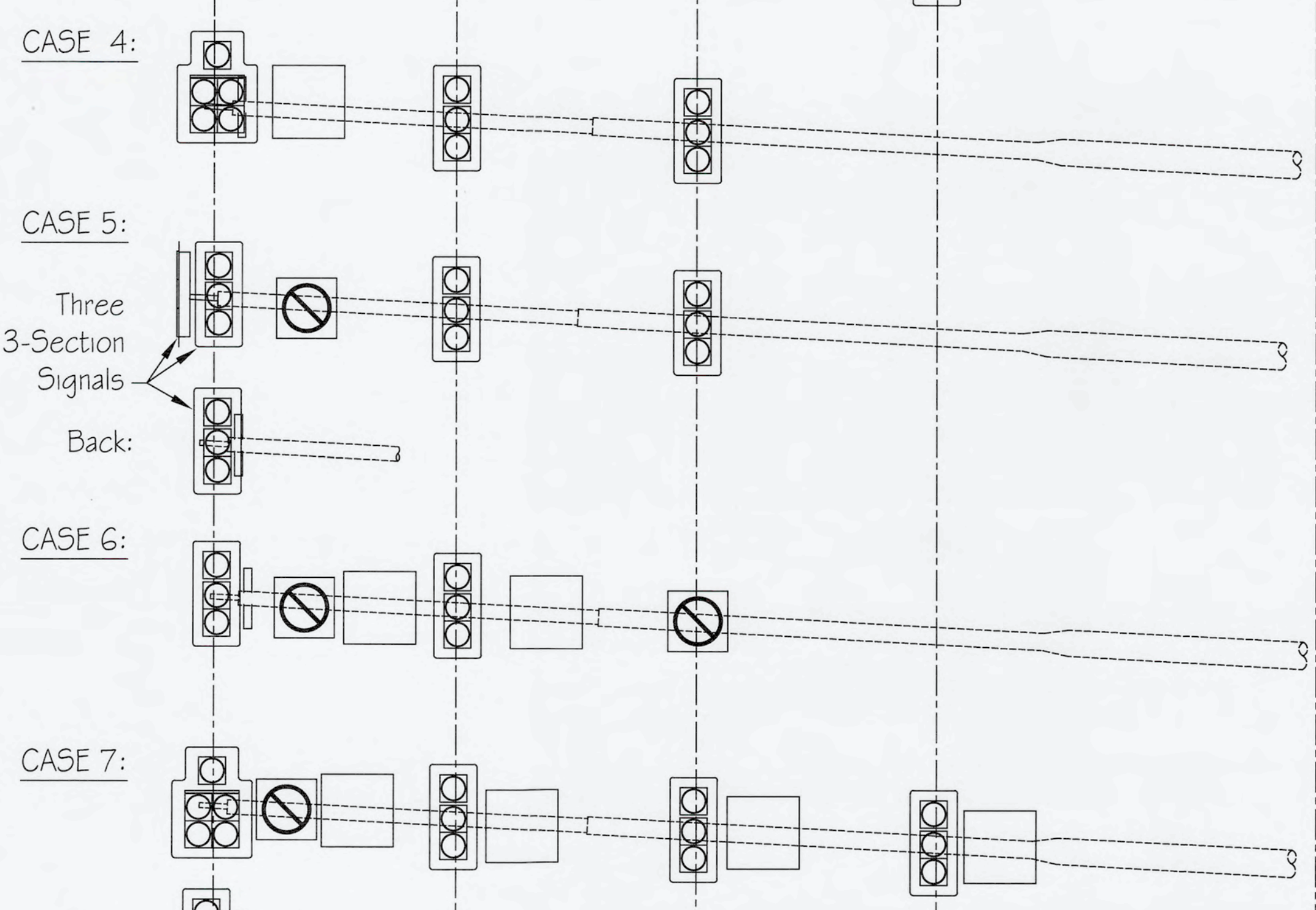
Provide any configuration of Appurtenances with:  
 Net Projected Area < 29ft<sup>2</sup>,  
 Plan Area < 4.5ft<sup>2</sup>,  
 # Weight < 165lb

M30P45, M30P70, M40P70, # M55P70 Mast Arms



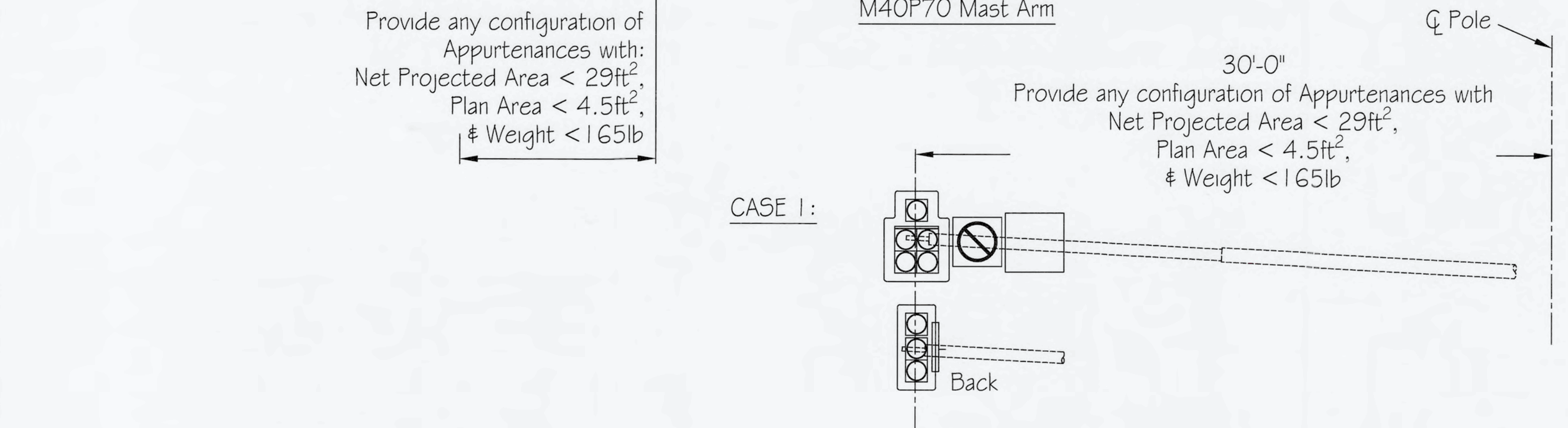
Provide any configuration of Appurtenances with:  
 Net Projected Area < 29ft<sup>2</sup>,  
 Plan Area < 4.5ft<sup>2</sup>,  
 # Weight < 165lb

M40P70 Mast Arm



Provide any configuration of Appurtenances with:  
 Net Projected Area < 29ft<sup>2</sup>,  
 Plan Area < 4.5ft<sup>2</sup>,  
 # Weight < 165lb

M30P45, M30P70, M40P70, # M55P70 Mast Arms



Provide any configuration of Appurtenances with:  
 Net Projected Area < 29ft<sup>2</sup>,  
 Plan Area < 4.5ft<sup>2</sup>,  
 # Weight < 165lb

MI 5P45 # MI 5P70 Mast Arms

APPURTENANCES				
Symbol	ID	Projected Area	Plan Area	Weight
	3-Section Signal	8.5 ft <sup>2</sup>	0.5 ft <sup>2</sup>	39 lb
	4-Section Signal	10.5 ft <sup>2</sup>	0.5 ft <sup>2</sup>	48 lb
	5-Section Signal	12.6 ft <sup>2</sup>	0.5 ft <sup>2</sup>	50 lb
	Doghouse	13.7 ft <sup>2</sup>	1.1 ft <sup>2</sup>	63 lb
	HAWK	10.0 ft <sup>2</sup>	1.1 ft <sup>2</sup>	46 lb
	Blankout	7.3 ft <sup>2</sup>	2.9 ft <sup>2</sup>	48 lb
	Damper	n/a	n/a	50 lb
	Sign Panel	7.5 ft <sup>2</sup>	n/a	15 lb
	Luminaire	0.5 ft <sup>2</sup>	2.0 ft <sup>2</sup>	14 lb

ALLOWABLE MAST ARM LOADING CONFIGURATIONS WITH DAMPER



CITY OF PHOENIX, ARIZONA  
 STREET TRANSPORTATION DEPARTMENT  
 TRAFFIC SIGNAL STANDARD DETAILS



Mast Arm  
 Maximum Loading With Damper  
 TPP File Number: 10164  
 TS 1-4  
 DATE: 3/1/2020  
 SCALE: 4/16/20

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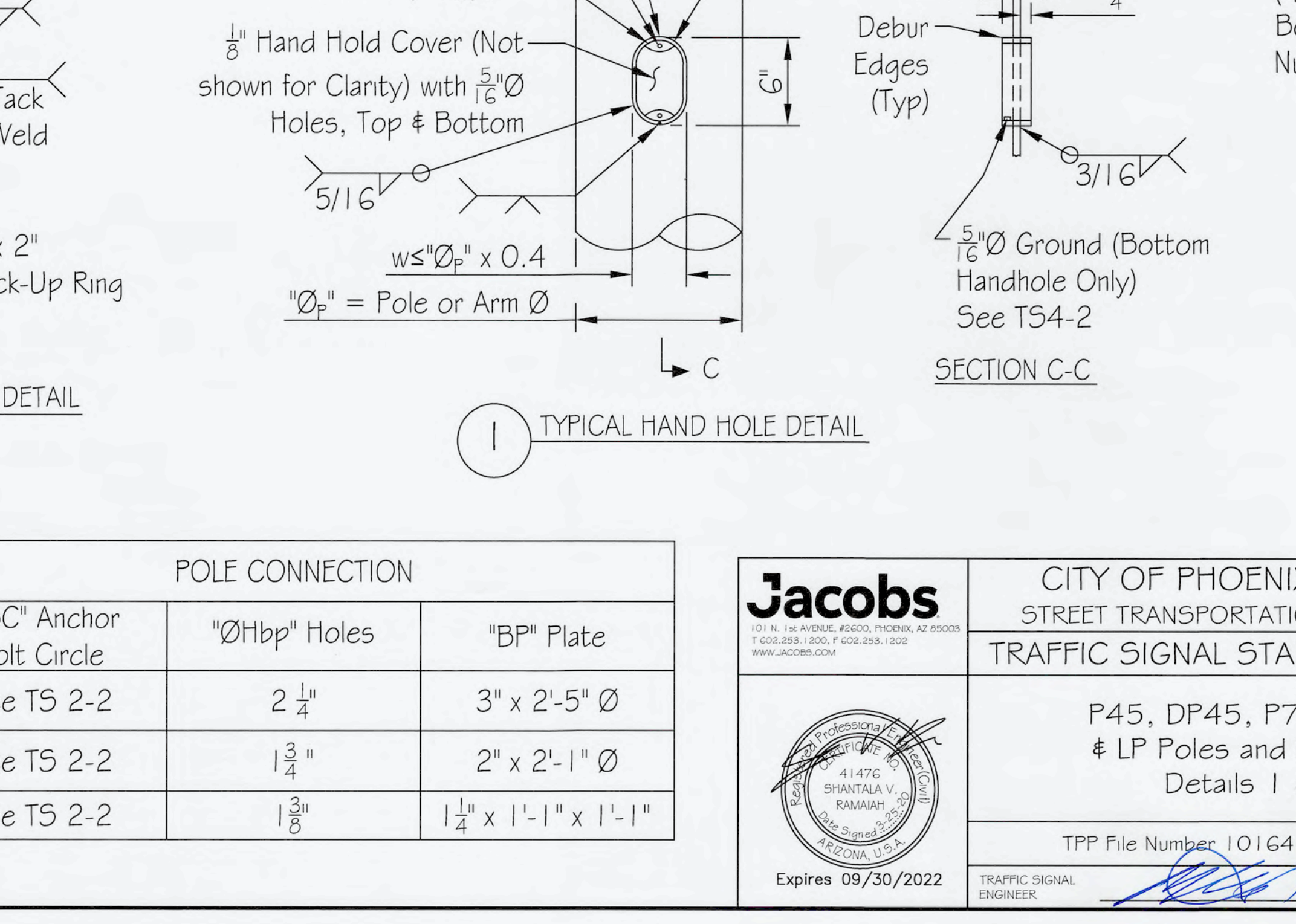
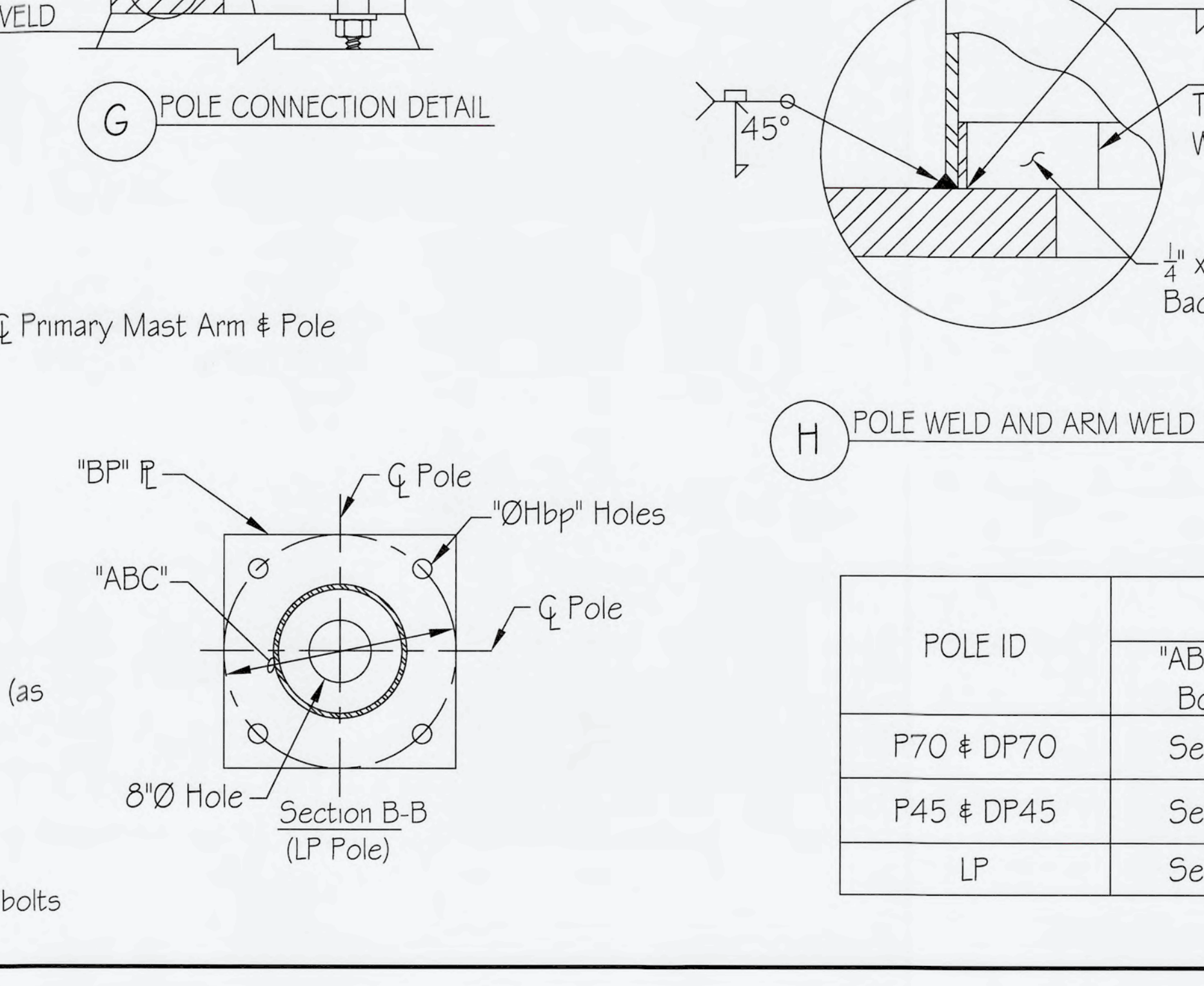
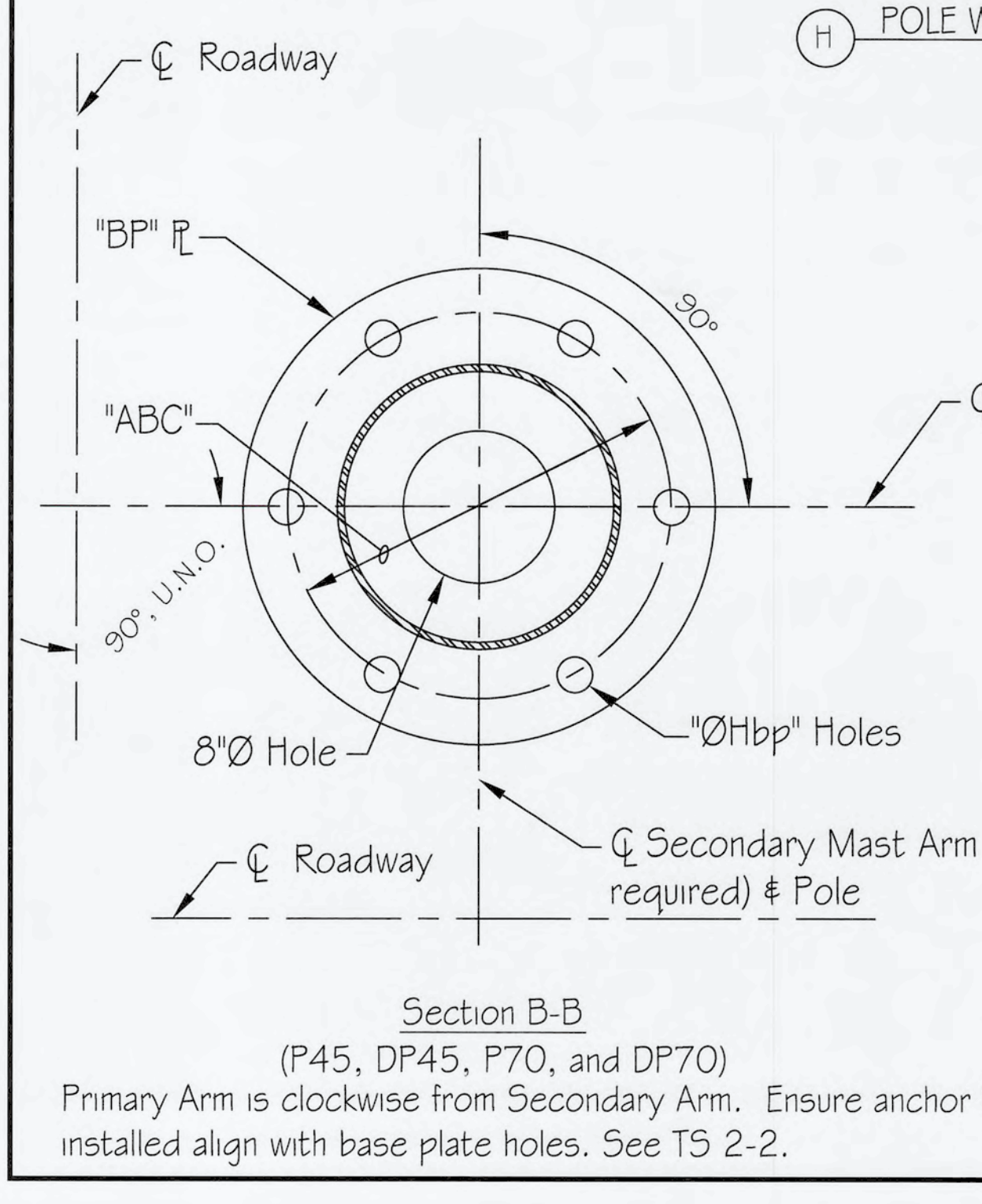
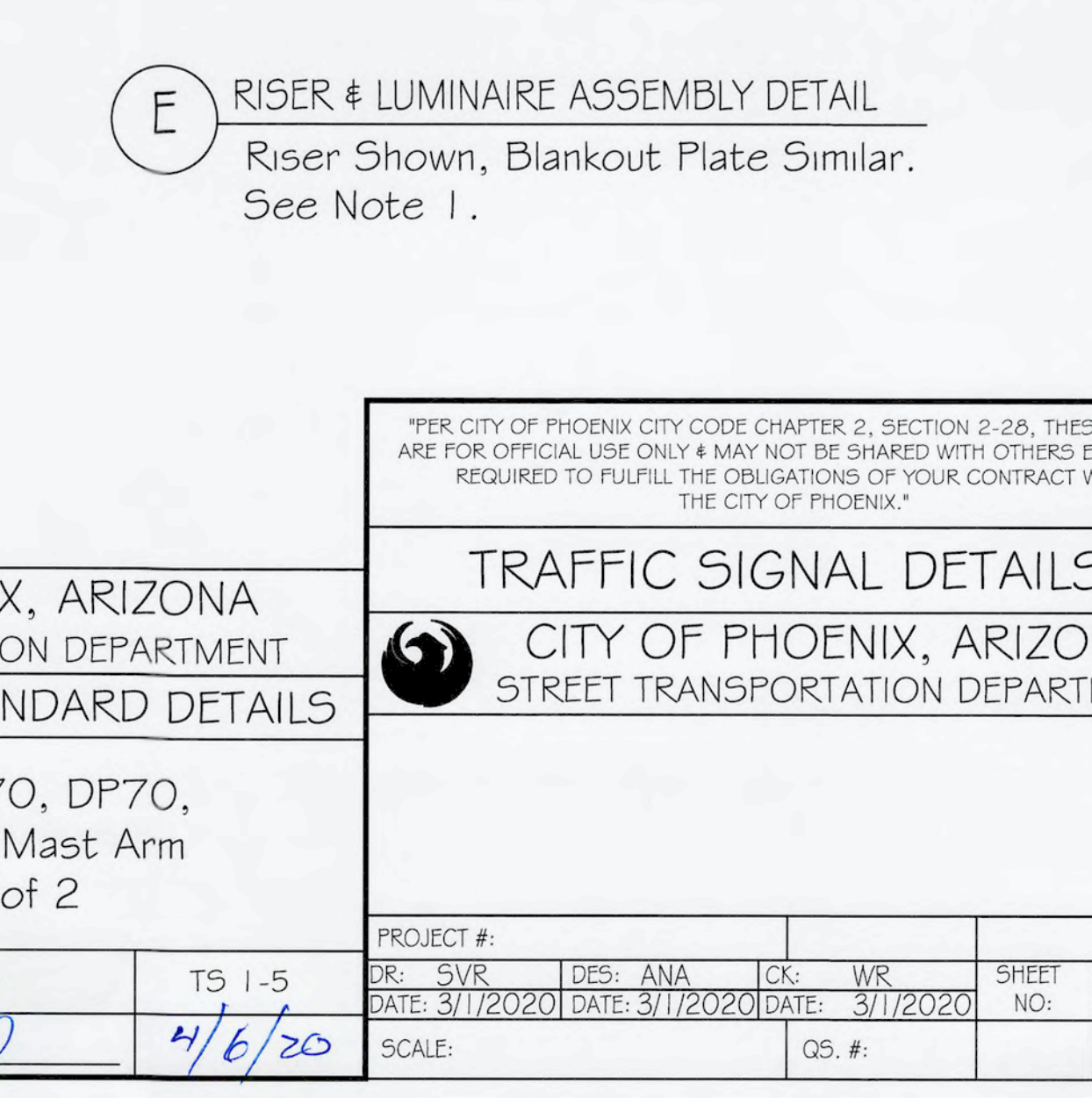
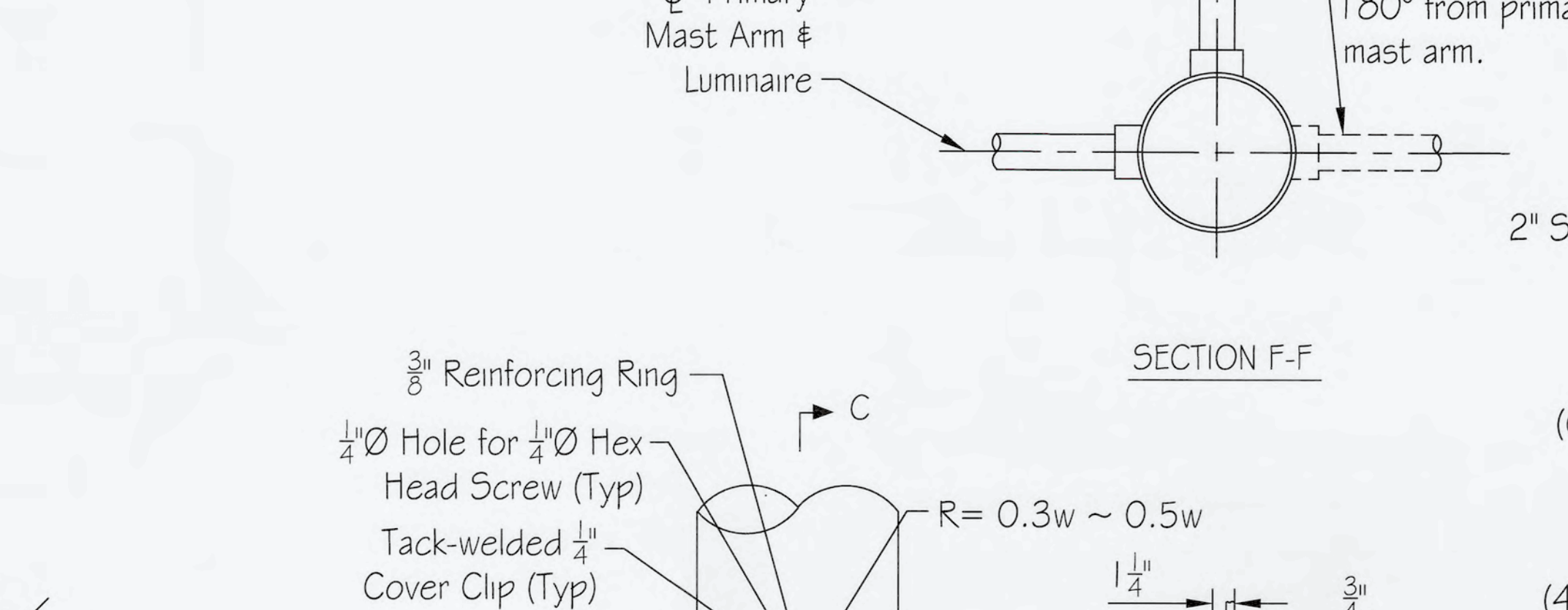
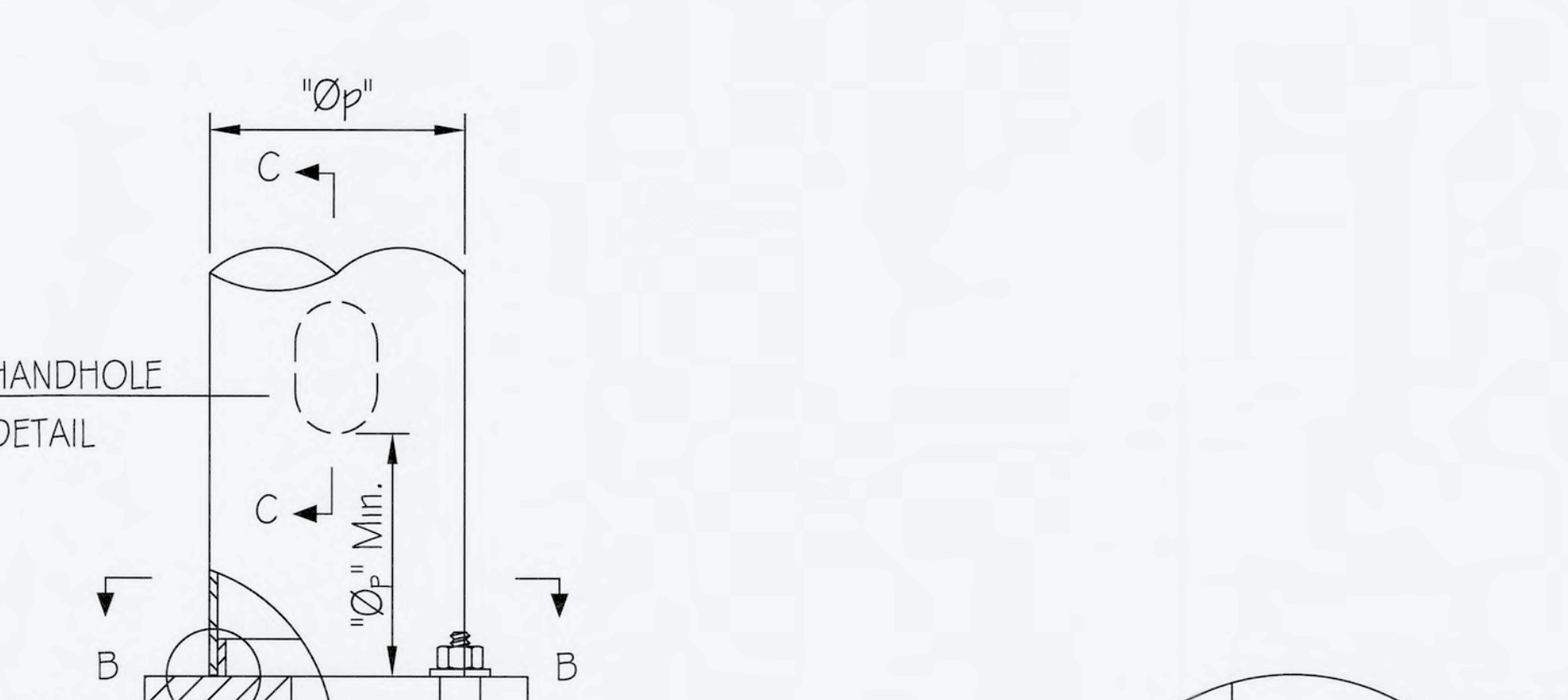
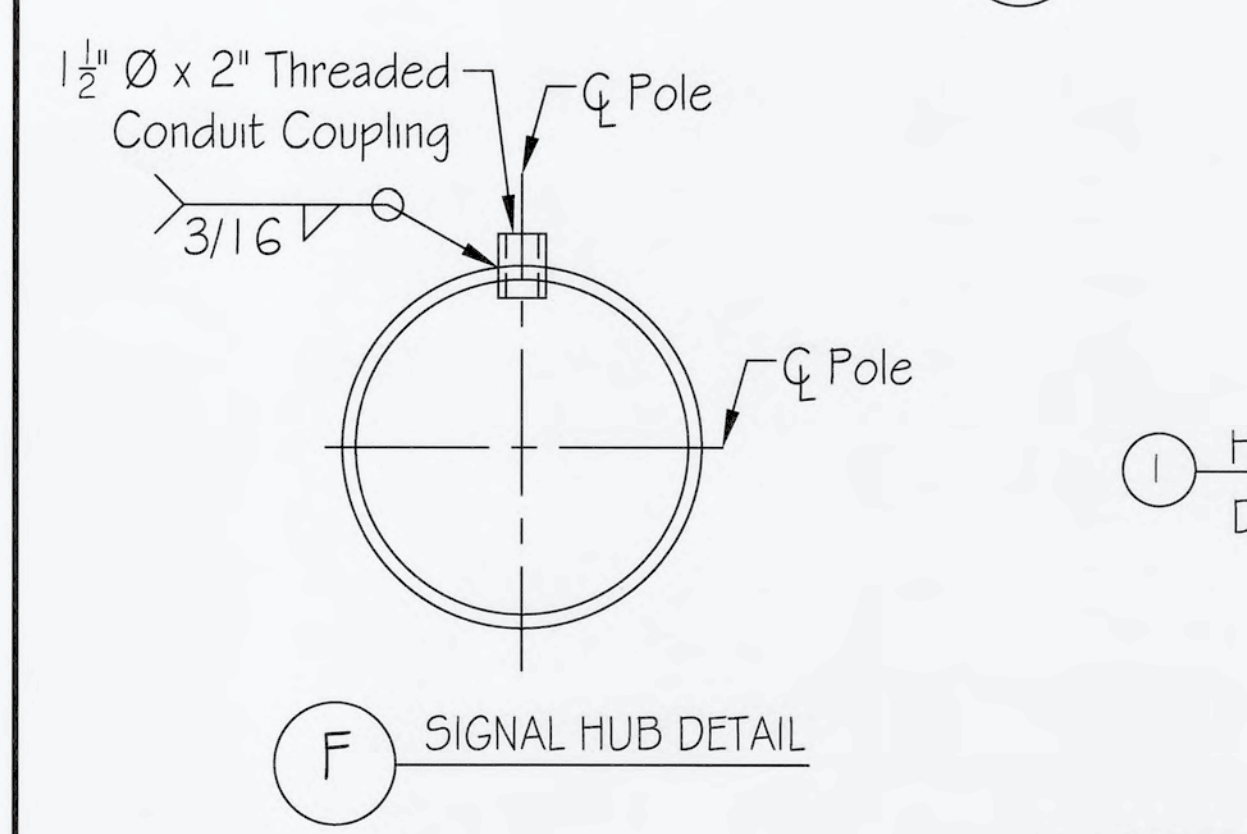
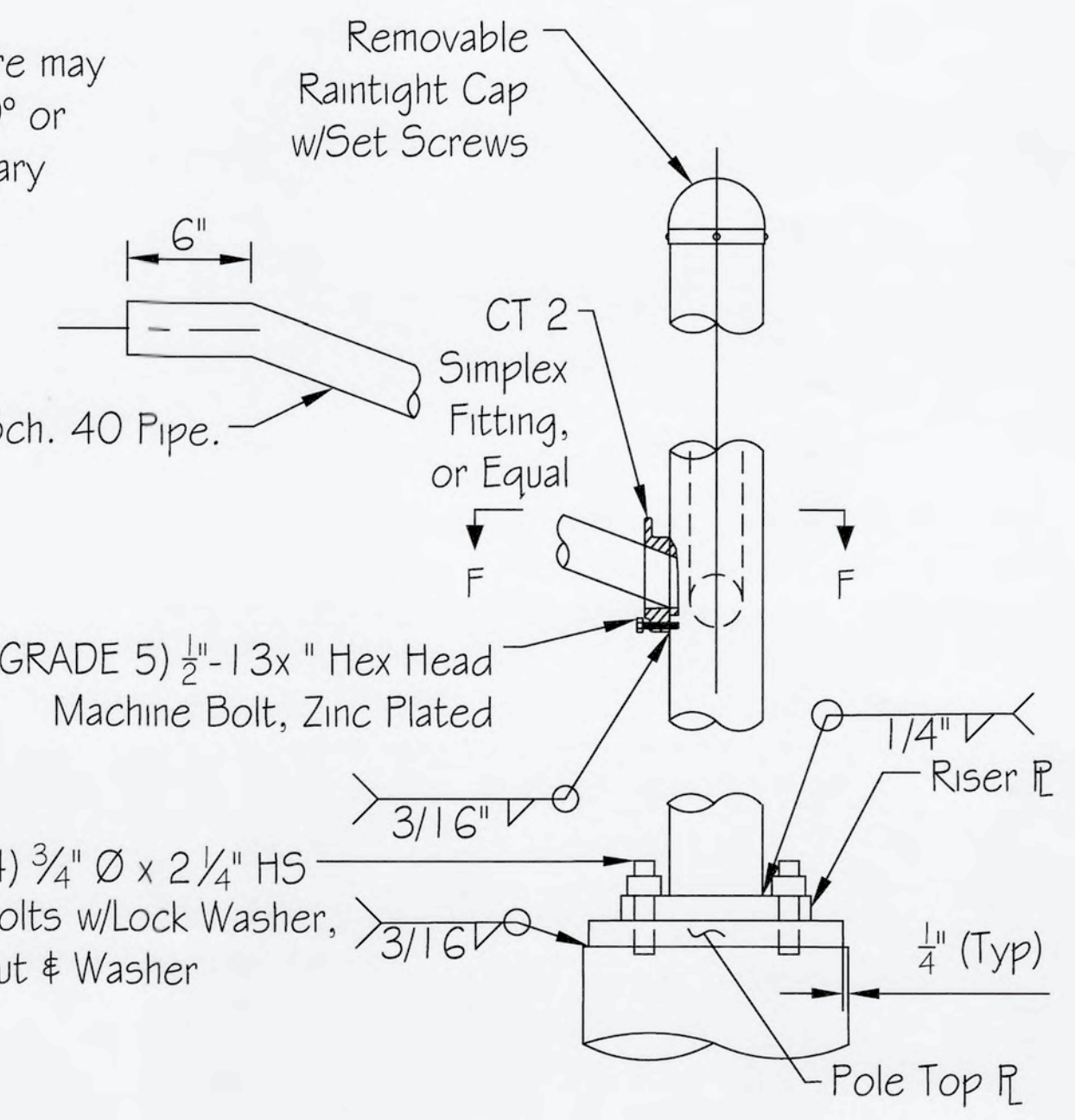
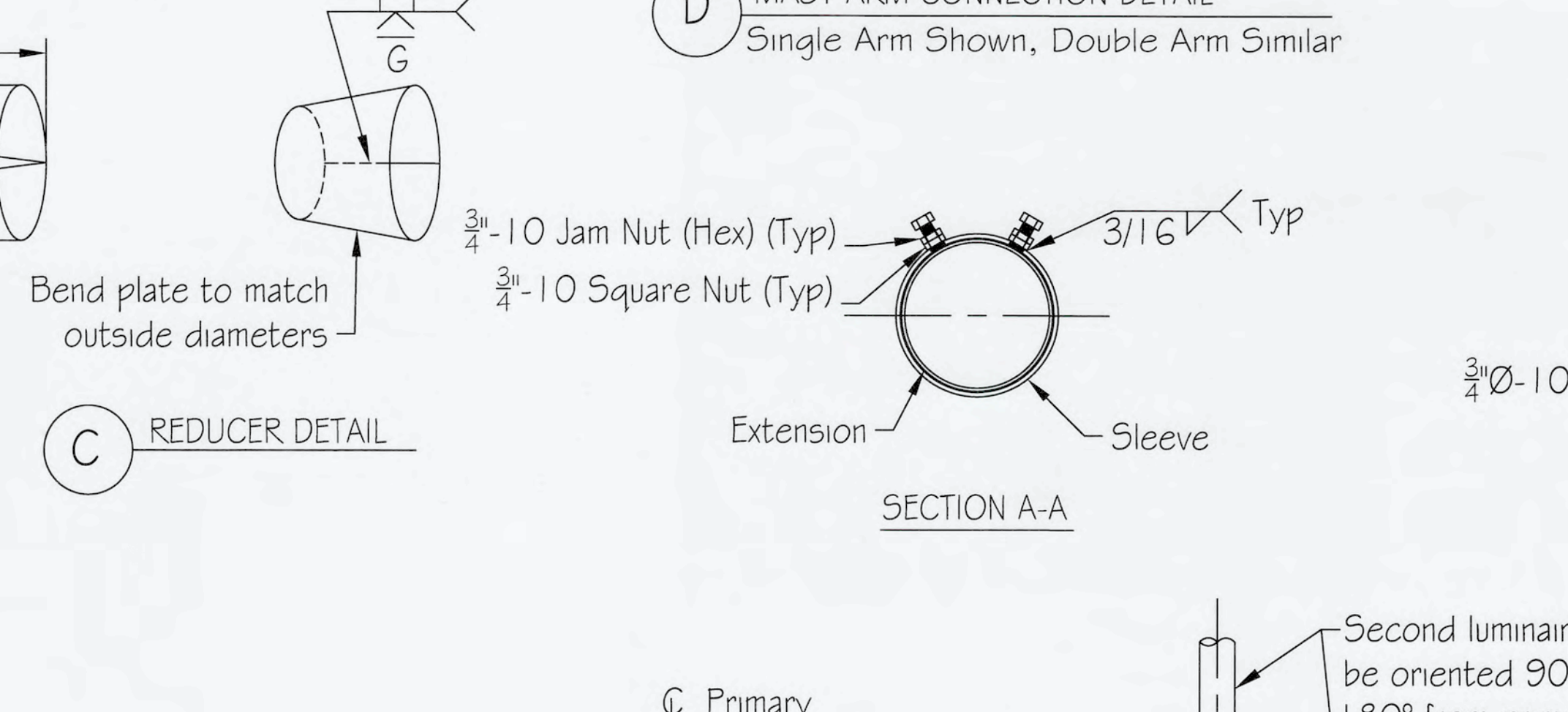
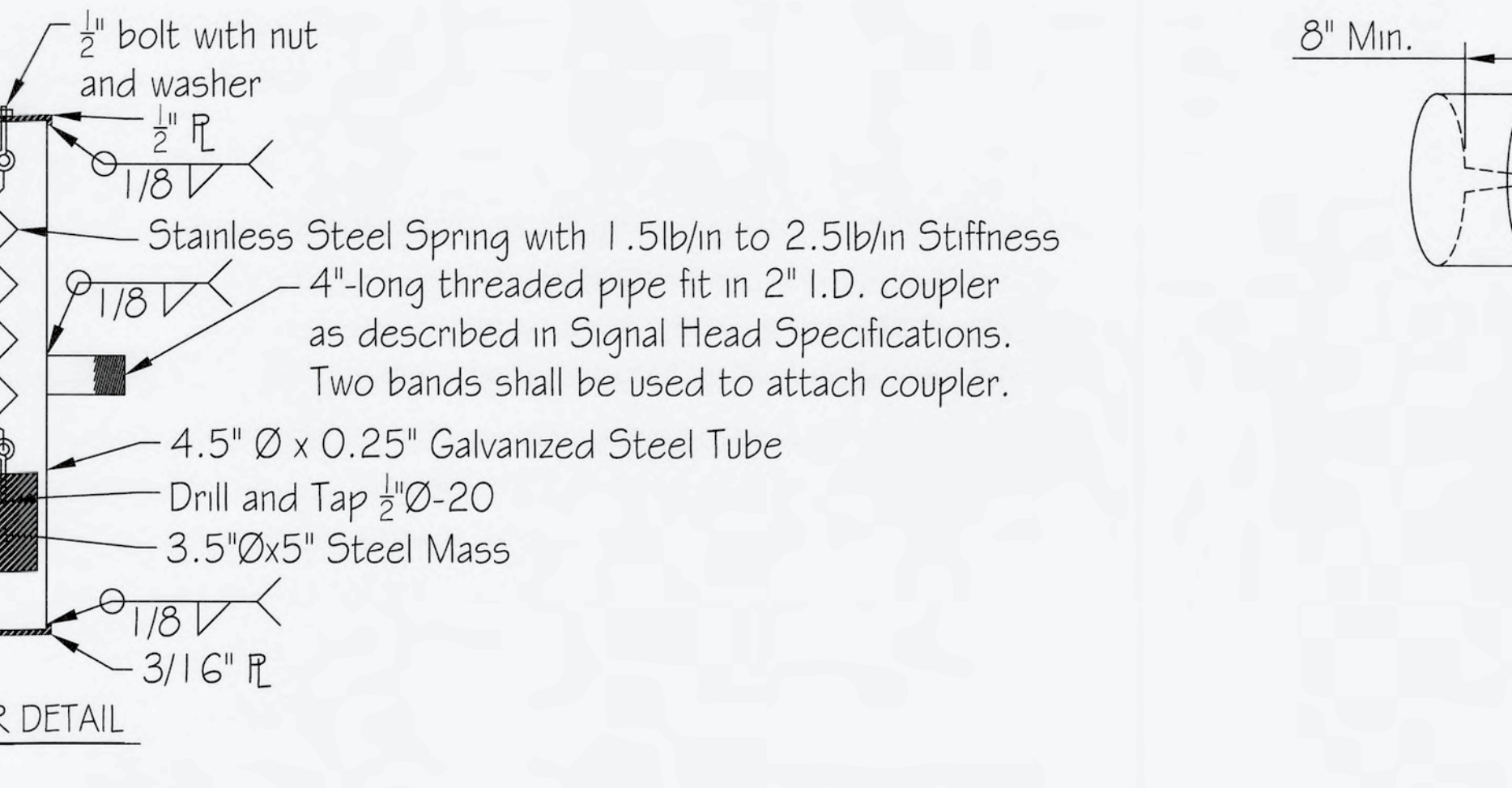
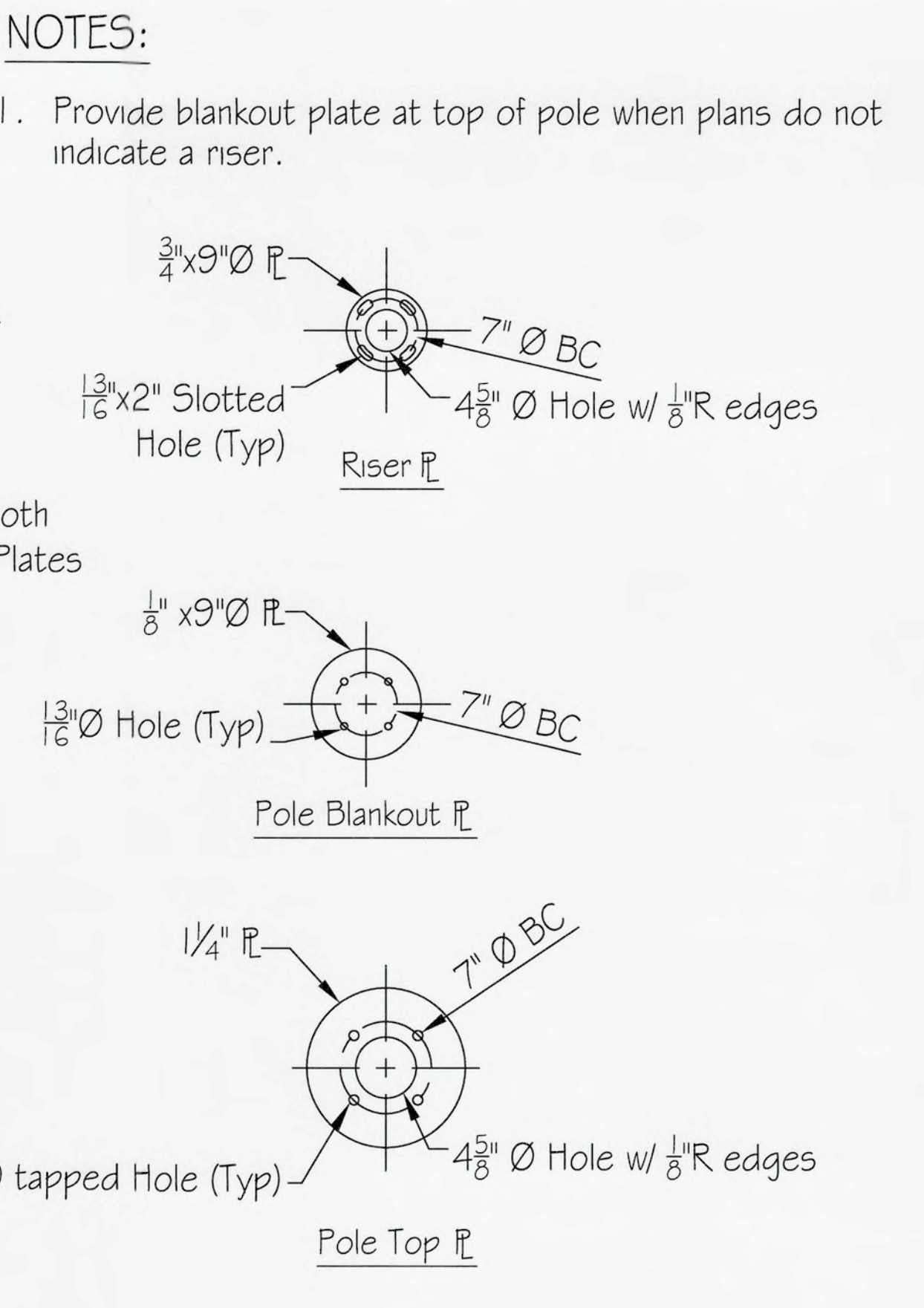
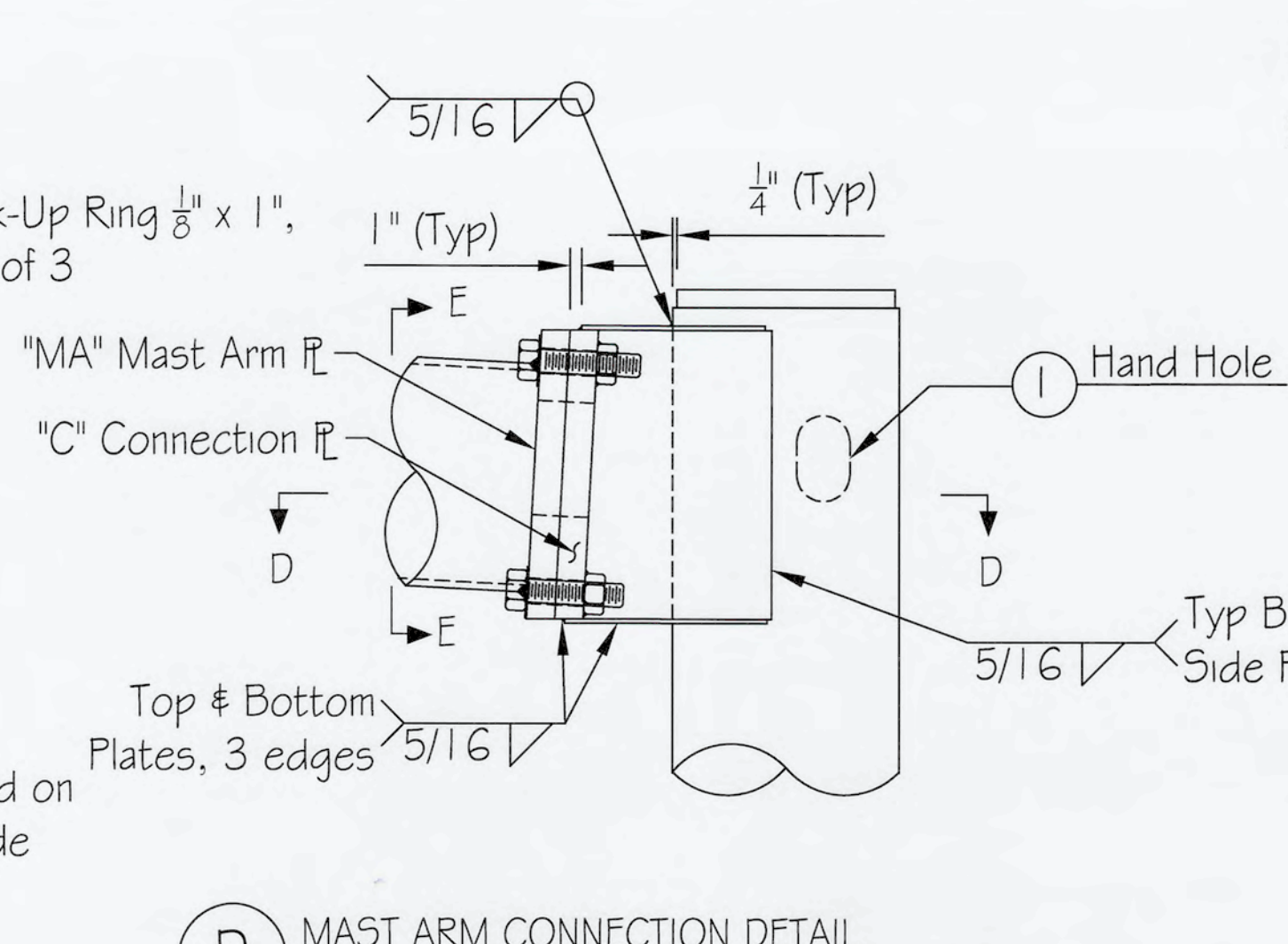
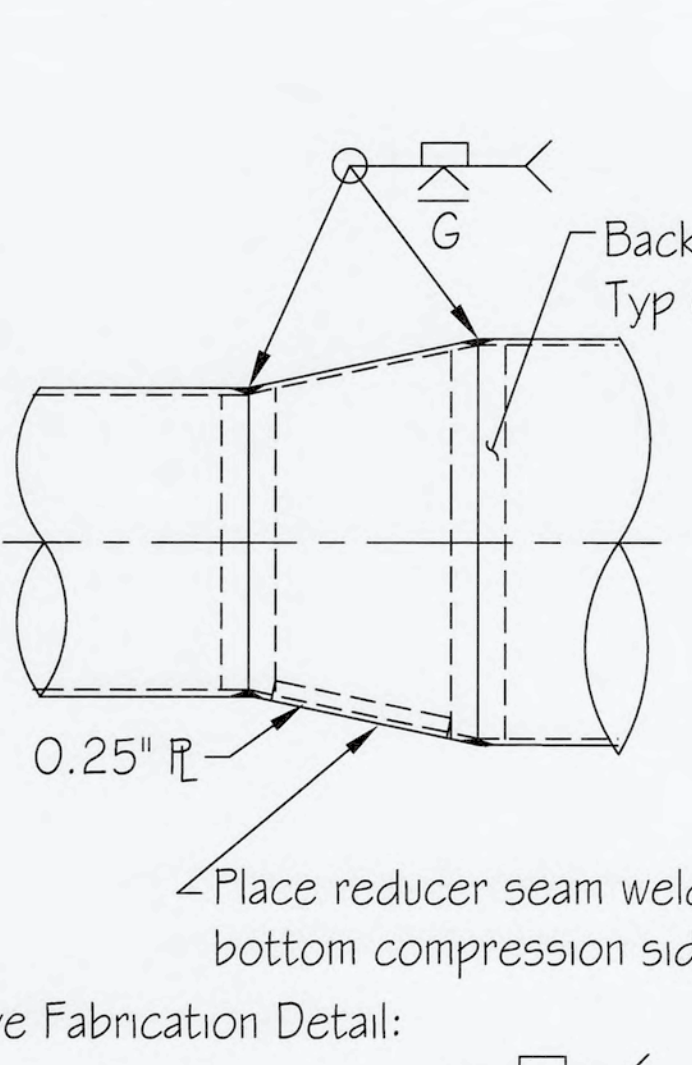
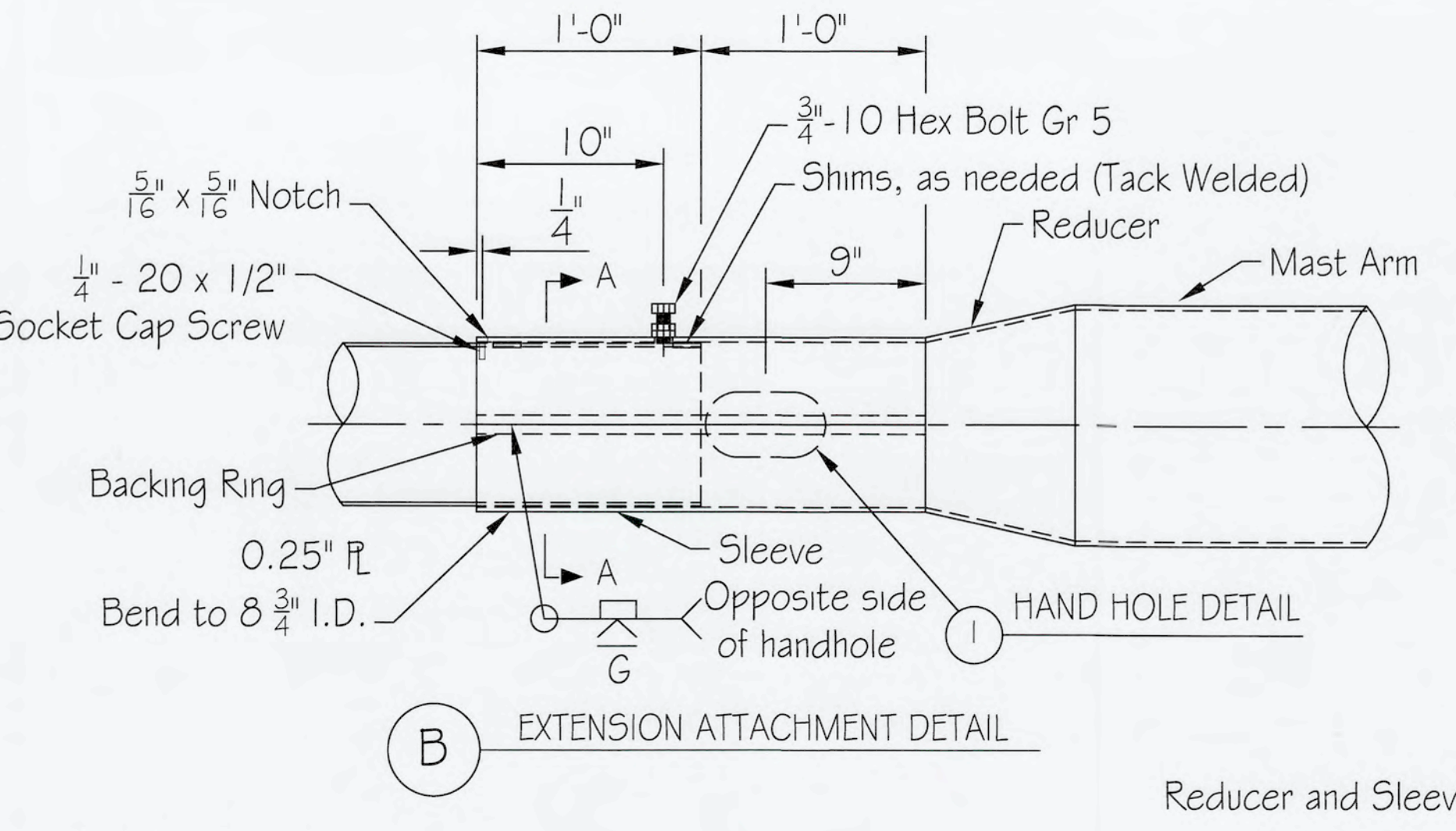
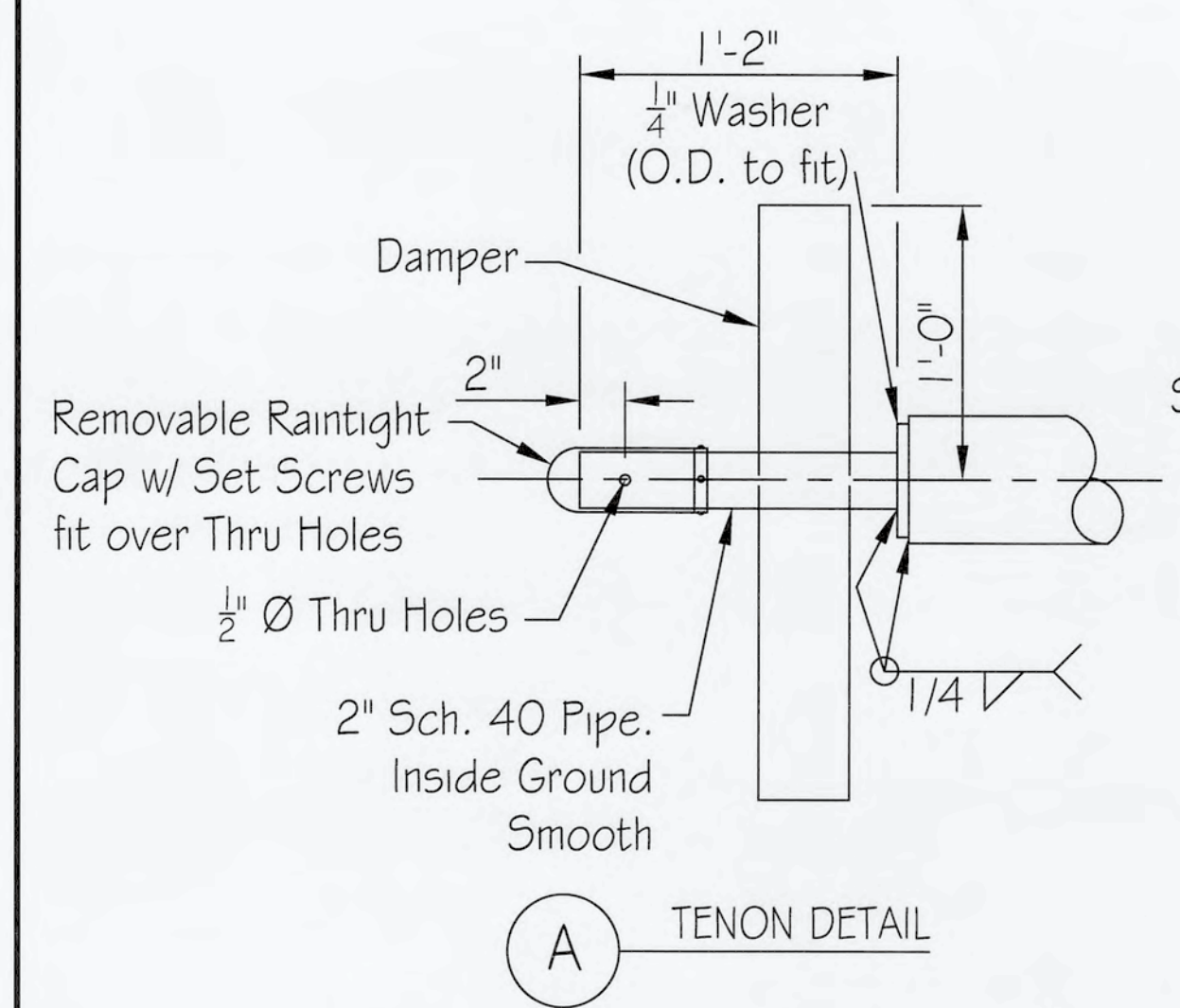
TRAFFIC SIGNAL DETAILS  
 CITY OF PHOENIX, ARIZONA  
 STREET TRANSPORTATION DEPARTMENT

PROJECT #:	DR: SVR	DES: ANA	CK: WR	SHEET NO:	TOTAL SHEETS:
DATE: 3/1/2020	DATE: 3/1/2020	DATE: 3/1/2020	DATE: 3/1/2020	NO:	
SCALE:	Q5 #:				

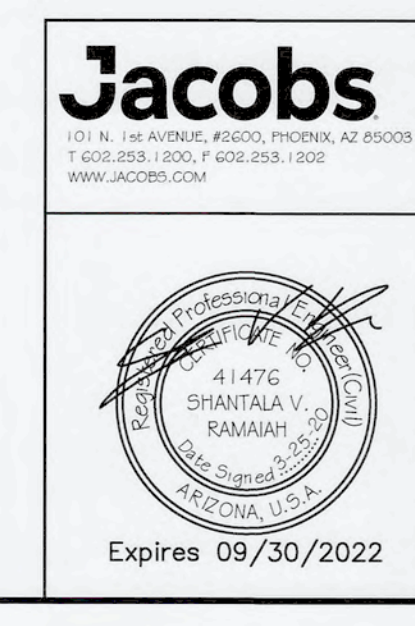


NOTES:

1. Provide blankout plate at top of pole when plans do not indicate a riser.



POLE ID	POLE CONNECTION		
	"ABC" Anchor Bolt Circle	"ØHbp" Holes	"BP" Plate
P70 & DP70	See TS 2-2	2 1/4"	3' x 2'-5" Ø
P45 & DP45	See TS 2-2	1 3/4"	2' x 2'-1" Ø
LP	See TS 2-2	1 3/8"	1 1/4' x 1'-1" x 1'-1"



CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

P45, DP45, P70, DP70,  
& LP Poles and Mast Arm  
Details 1 of 2

TPP File Number 10164  
TS 1-5  
DATE: 3/17/2020 DATE: 3/17/2020  
4/6/20

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TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

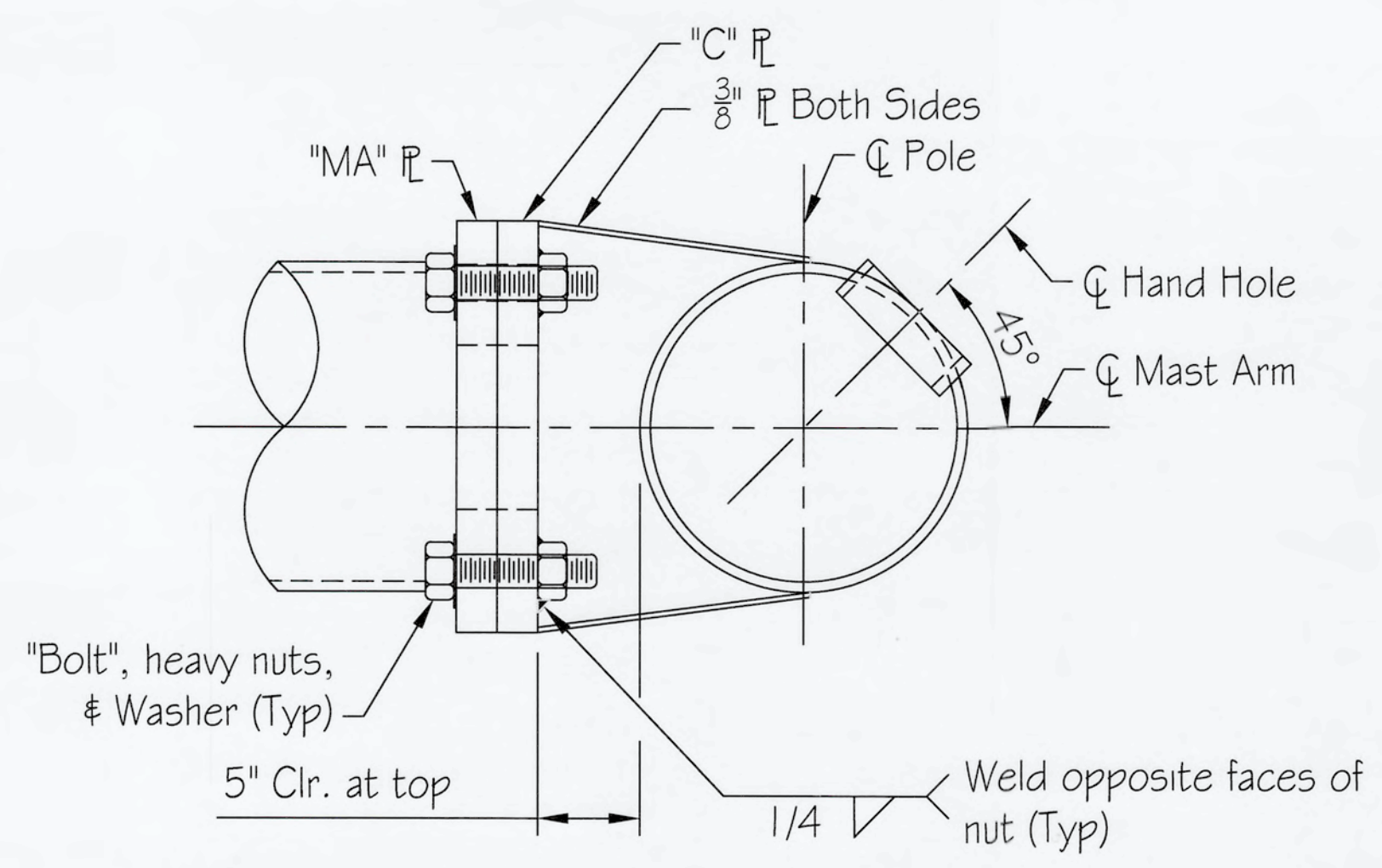
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	DATE: 3/17/2020	DATE: 3/17/2020	DATE: 3/17/2020	4/6/20	
SCALE:	Q5. #:				

Section B-B (P45, DP45, P70, and DP70)  
Primary Arm is clockwise from Secondary Arm. Ensure anchor bolts installed align with base plate holes. See TS 2-2.

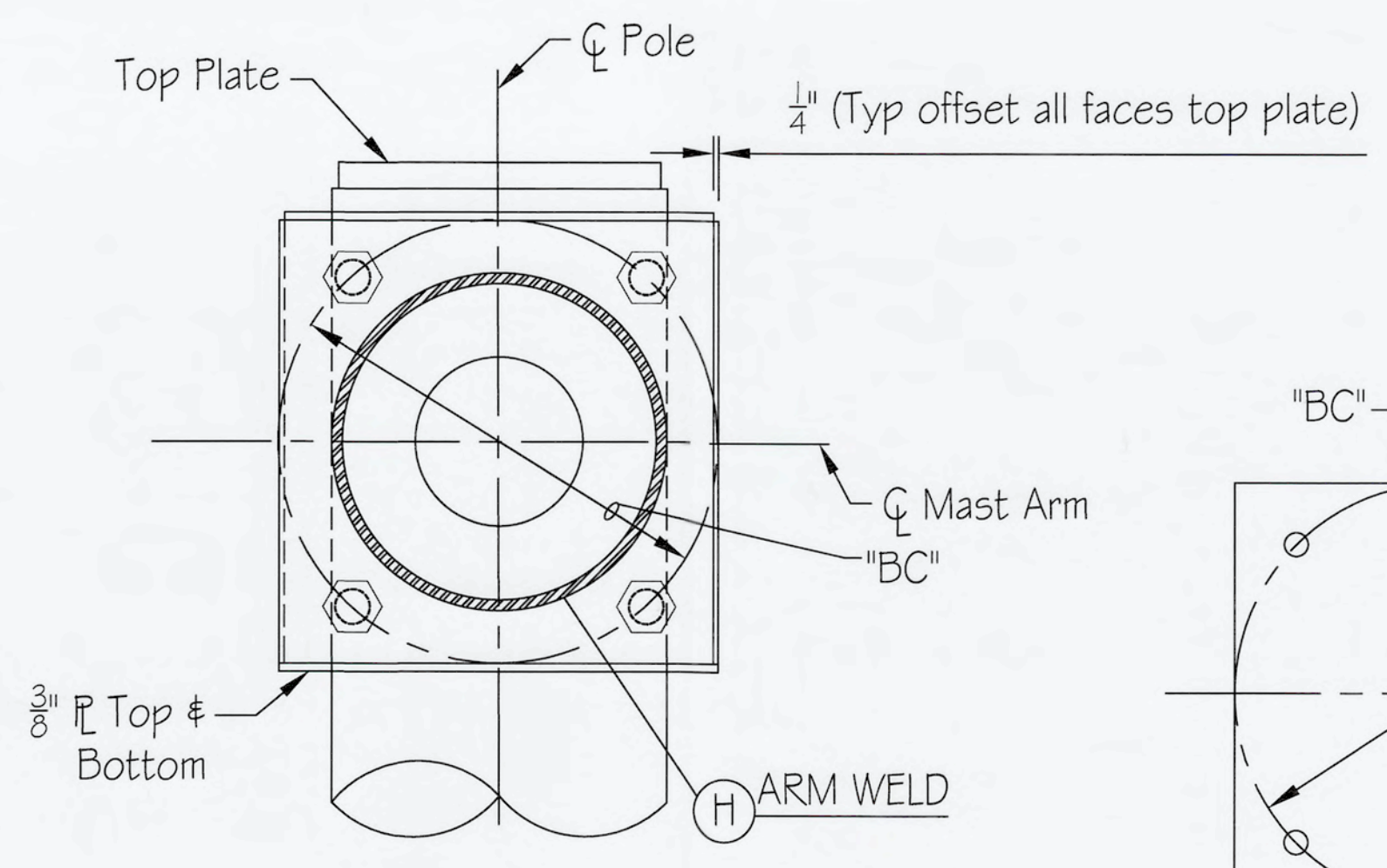


NOTES:

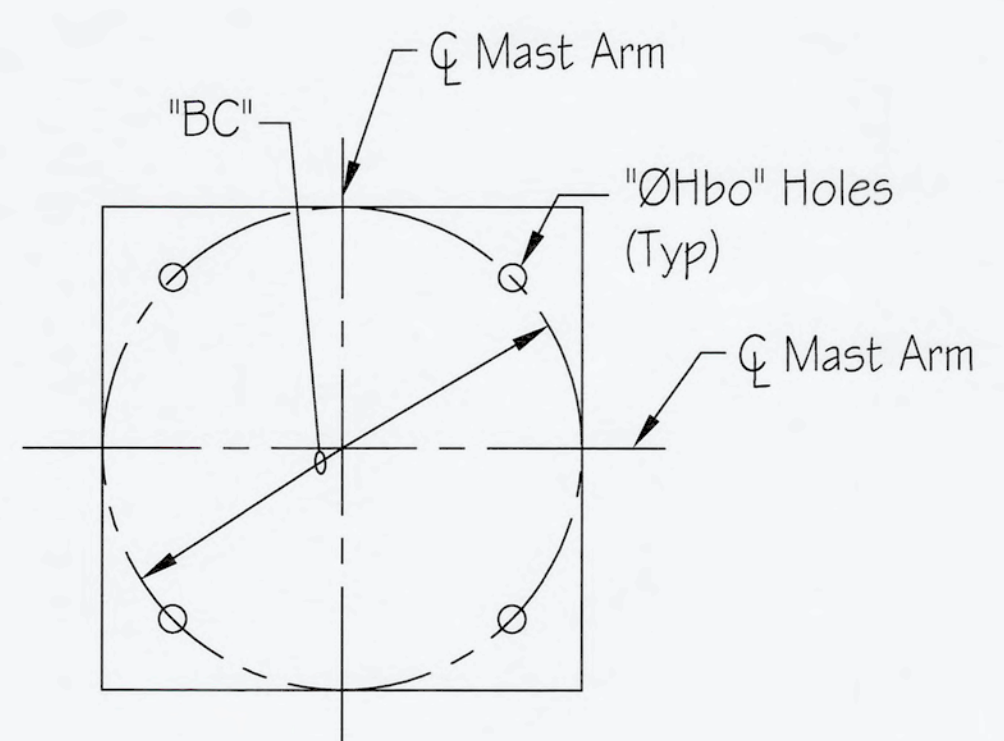
1. If blankout plate is used, bolt length shall be 3".



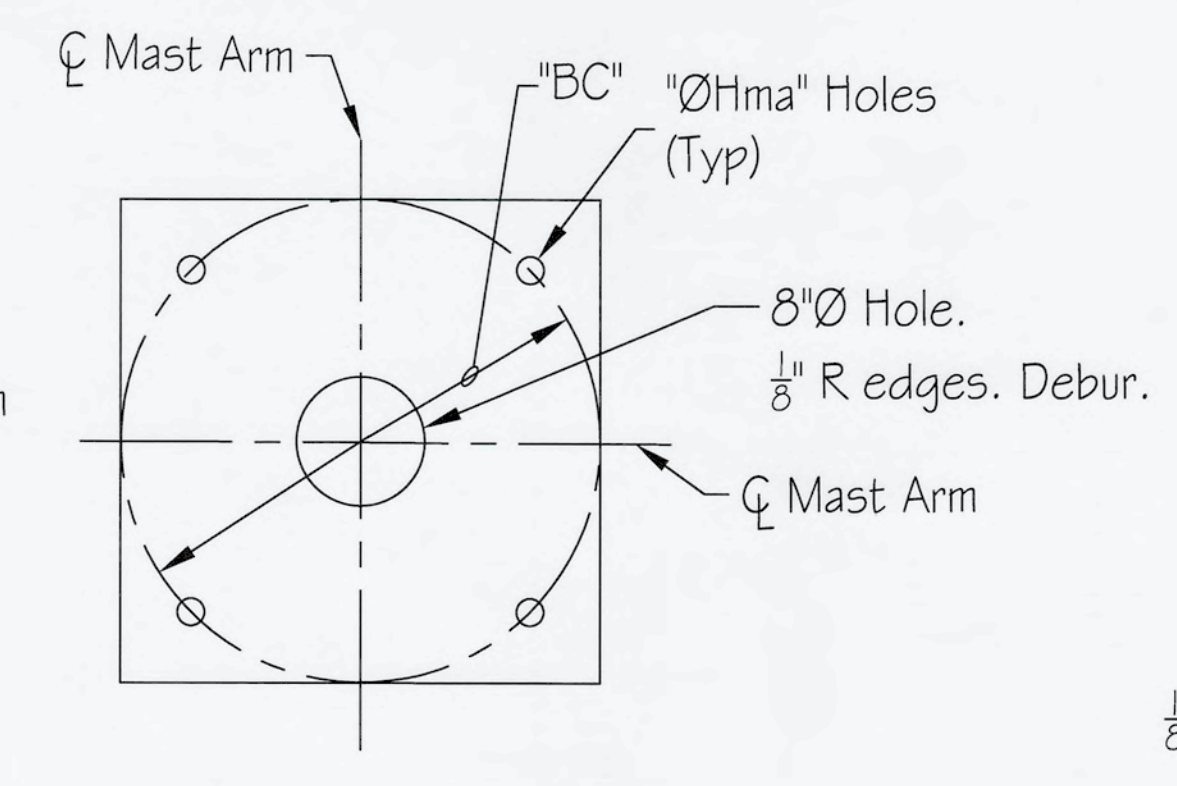
SECTION D-D for Single Arm Pole



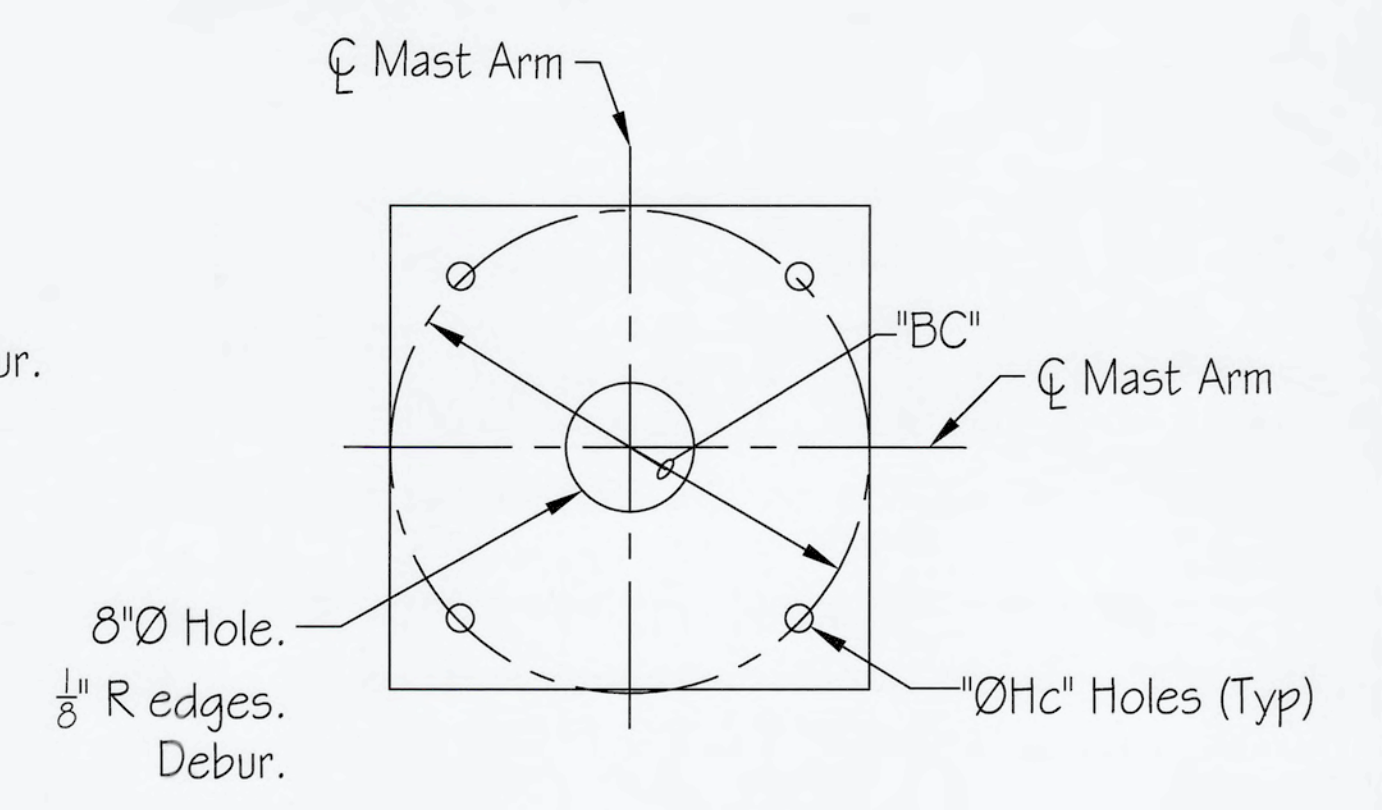
VIEW E-E for Single Arm Pole



Blank-Out "BO" Plate  
See Note 1.

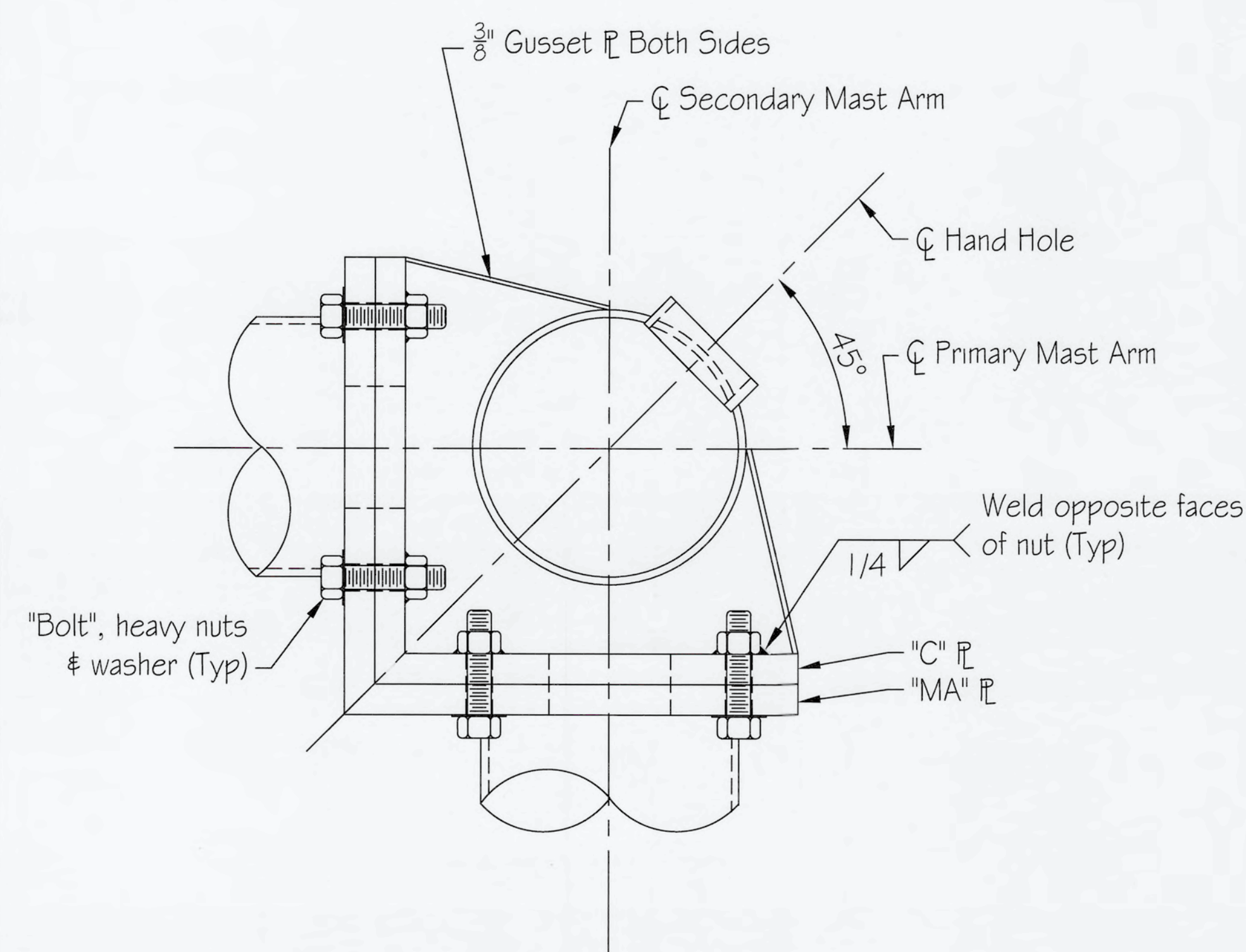


Mast Arm "MA" Plate

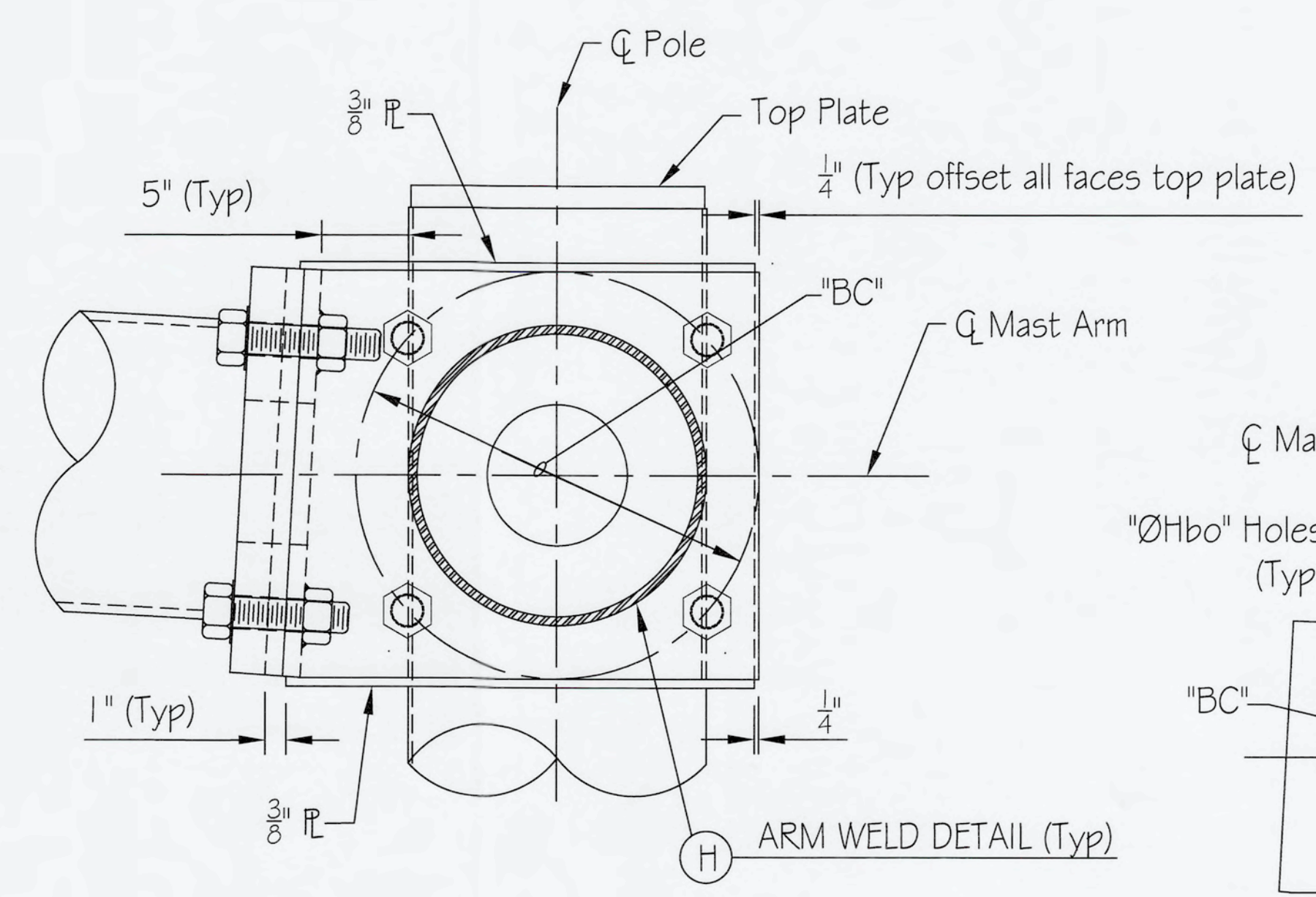


Connection "C" Plate

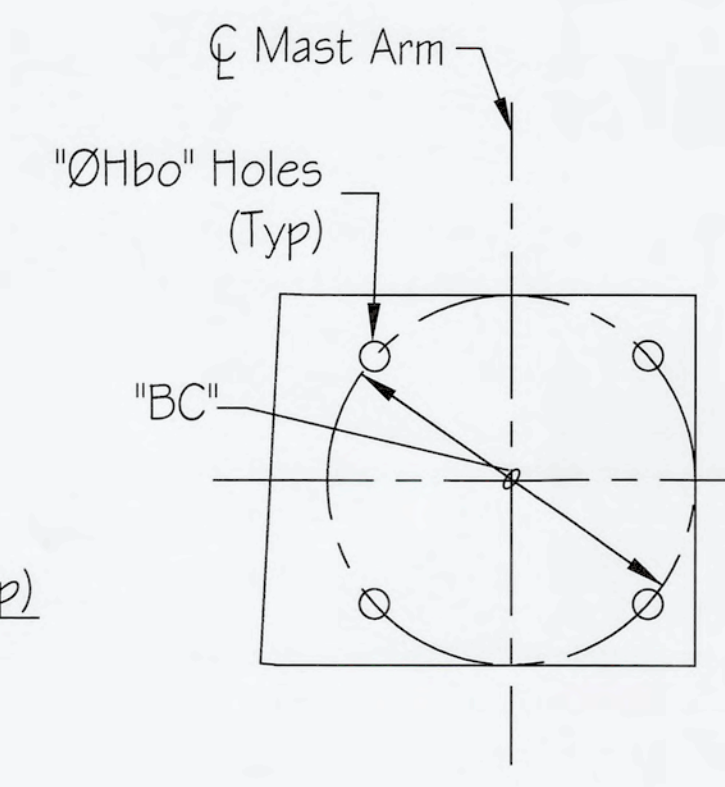
SINGLE MAST-ARM POLE



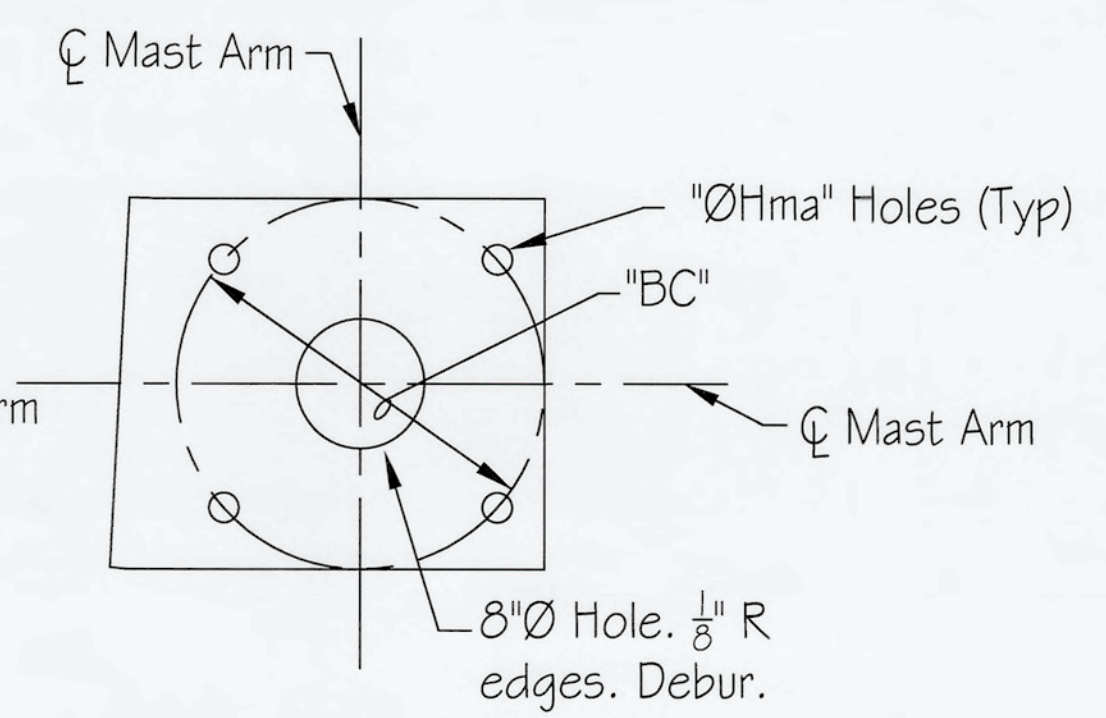
SECTION D-D for Double Arm Pole



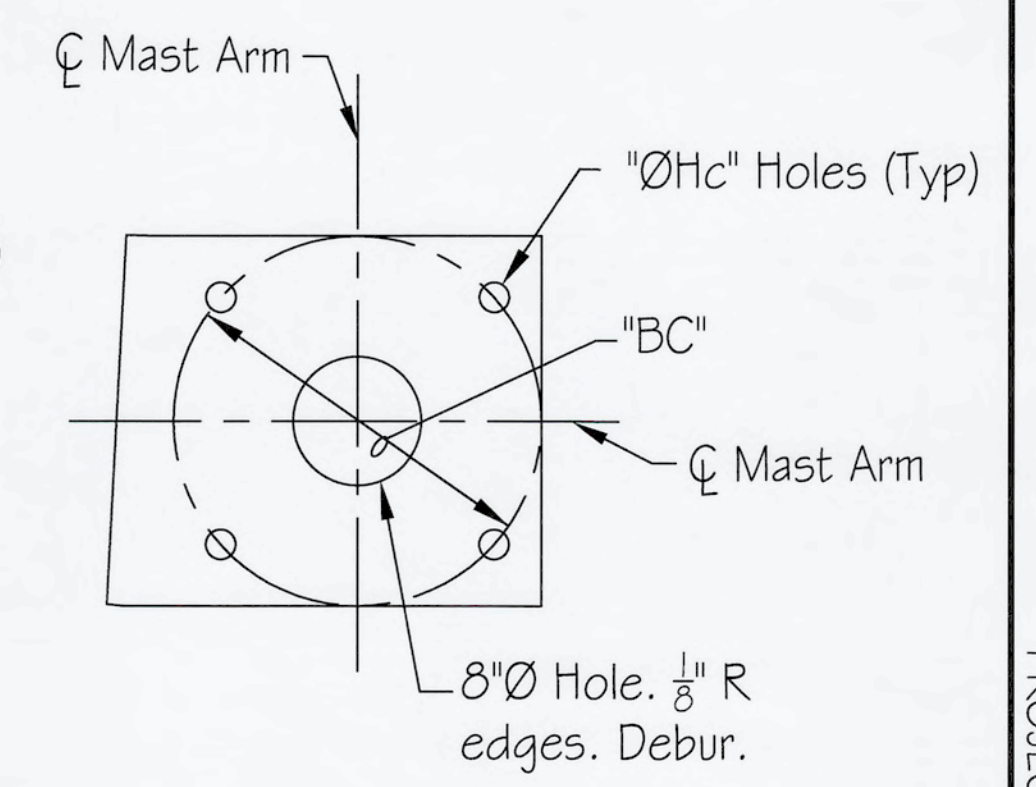
VIEW E-E for Double Arm Pole



Blank-Out "BO" Plate



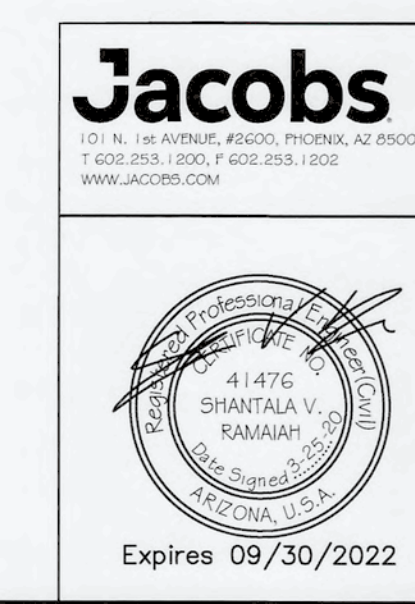
Mast Arm "MA" Plate



Connection "C" Plate

DOUBLE MAST-ARM POLE

MAST ARM CONNECTION										
MAST ARM ID	Compatible Poles	"Bolt"	Pretension	"BC" Bolt Circle	"C" Plate thickness	"MA" Plate thickness	"BO" Plate thickness	"ØHc" Holes	"ØHma" Holes	"ØHbo" Holes
M15P70, M30P70, M40P70 & M55P70	P70 & DP70	2Ø x 8" (See Note 1)	198 kip	22"	2"	2"	1/8"	2 1/8"	2 5/16"	2 1/8"
M15P45 & M30P45	P45 & DP45	1 1/2" Ø x 8" (See Note 1)	148 kip	21"	2"	2"	1/8"	1 5/8"	1 9/16"	1 5/8"



CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

P45, DP45, P70, DP70,  
& LP Poles and Mast Arm  
Details 2 of 2

TPP File Number 10164  
DATE: 3/1/2020

TS 1-6  
DATE: 3/1/2020

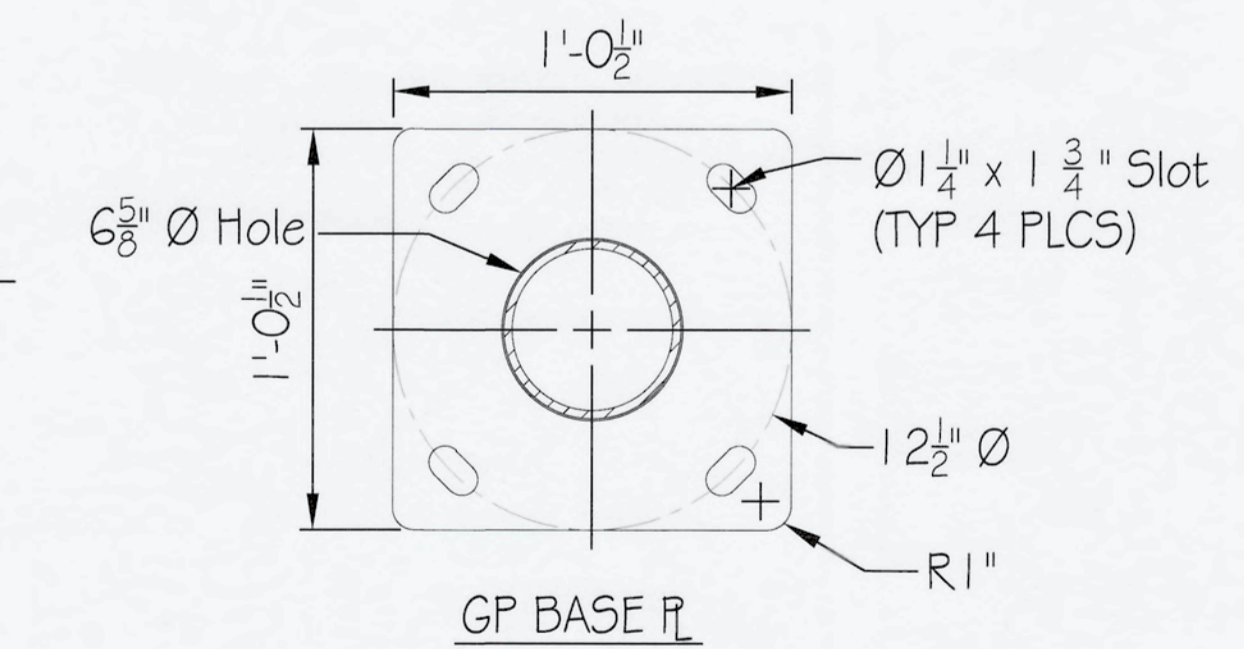
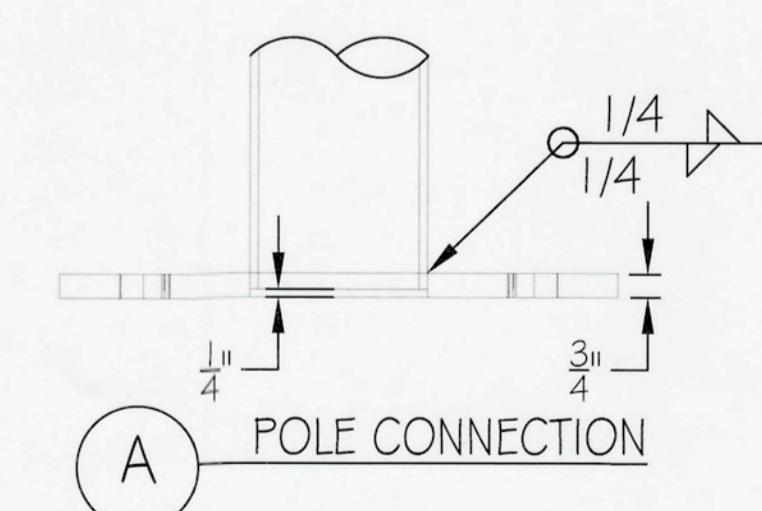
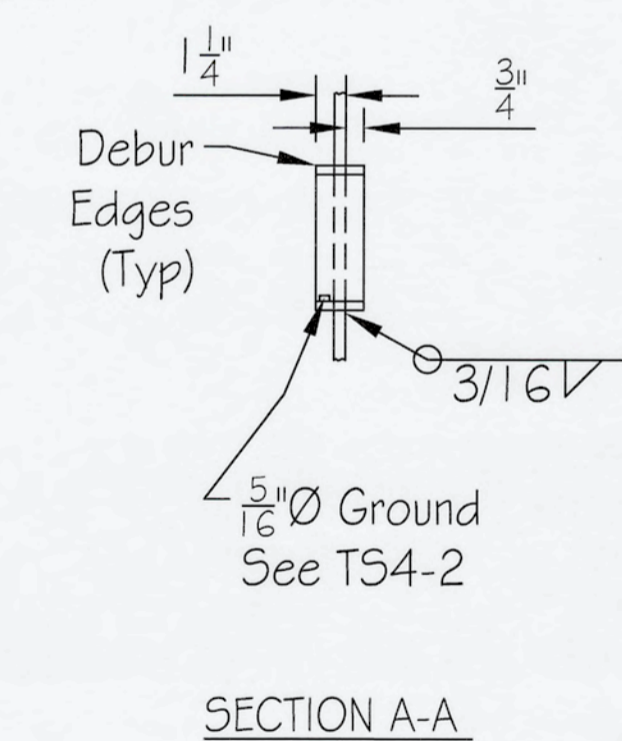
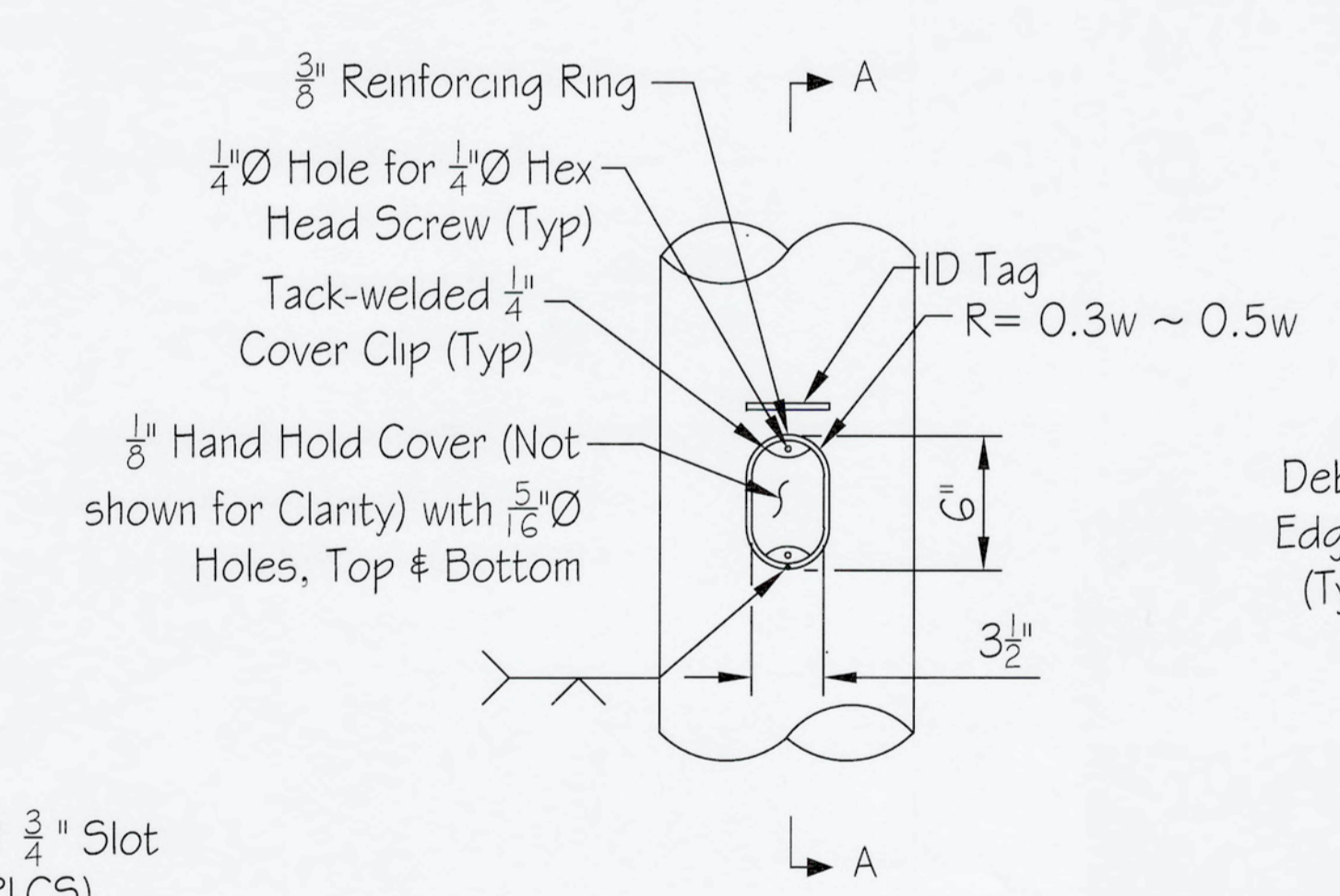
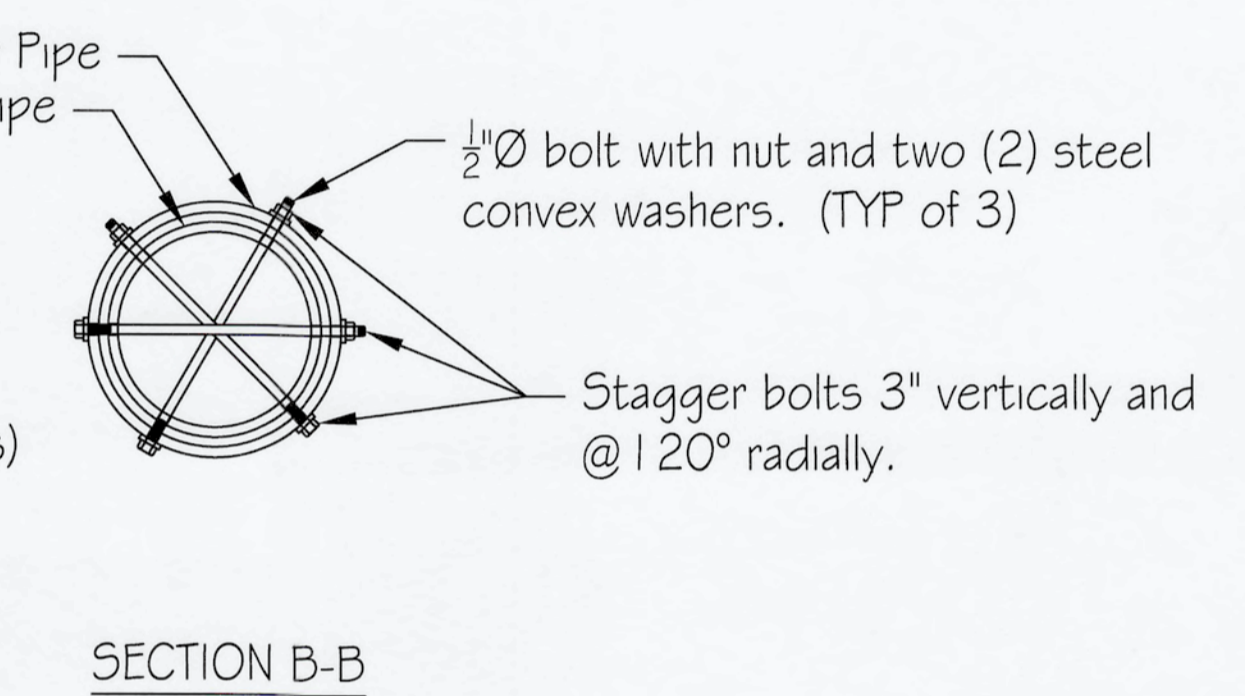
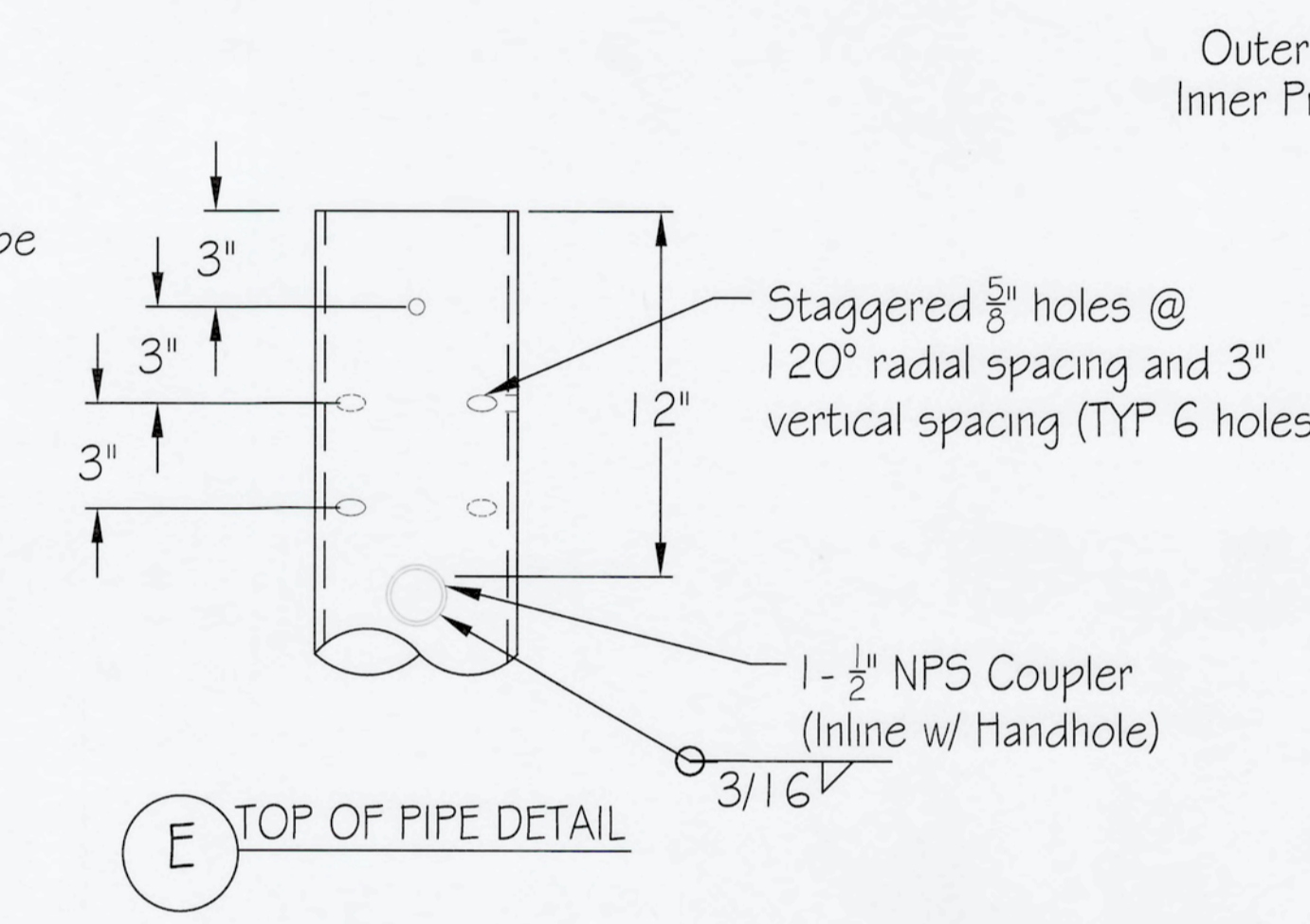
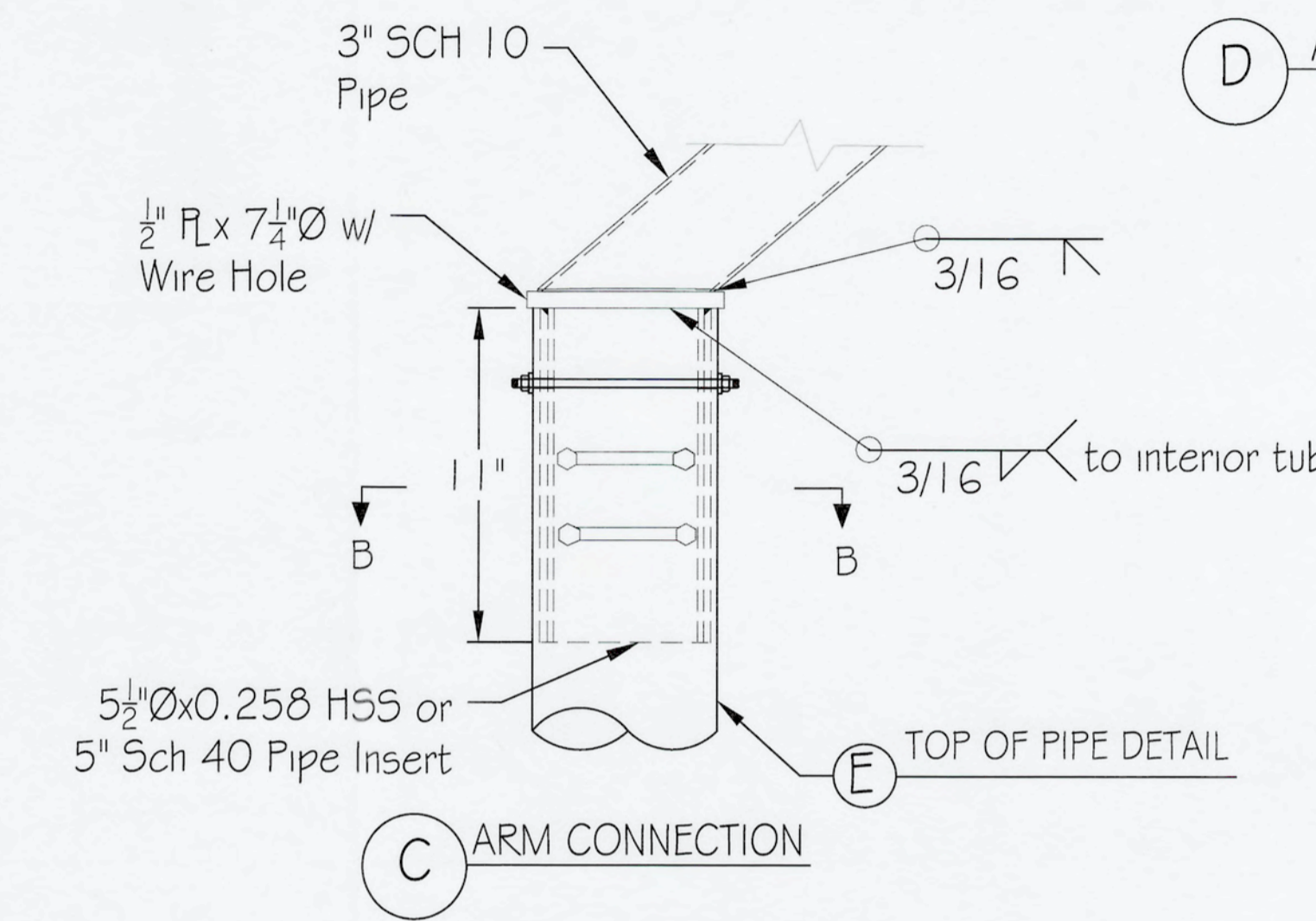
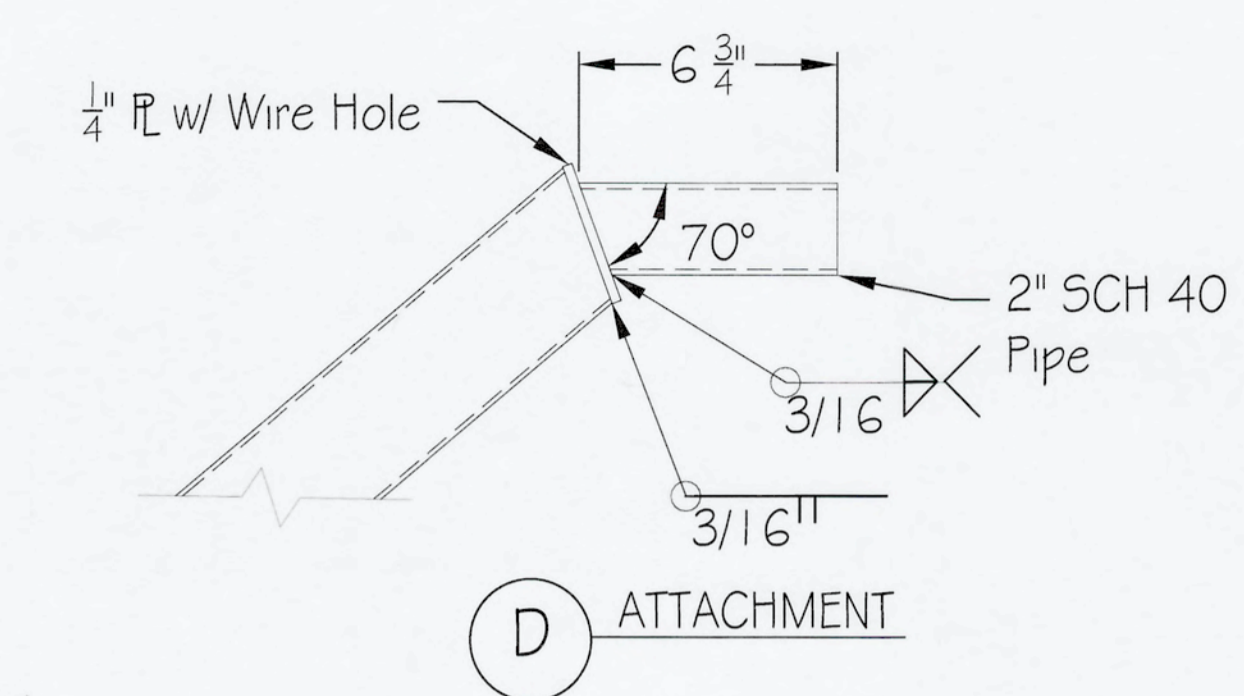
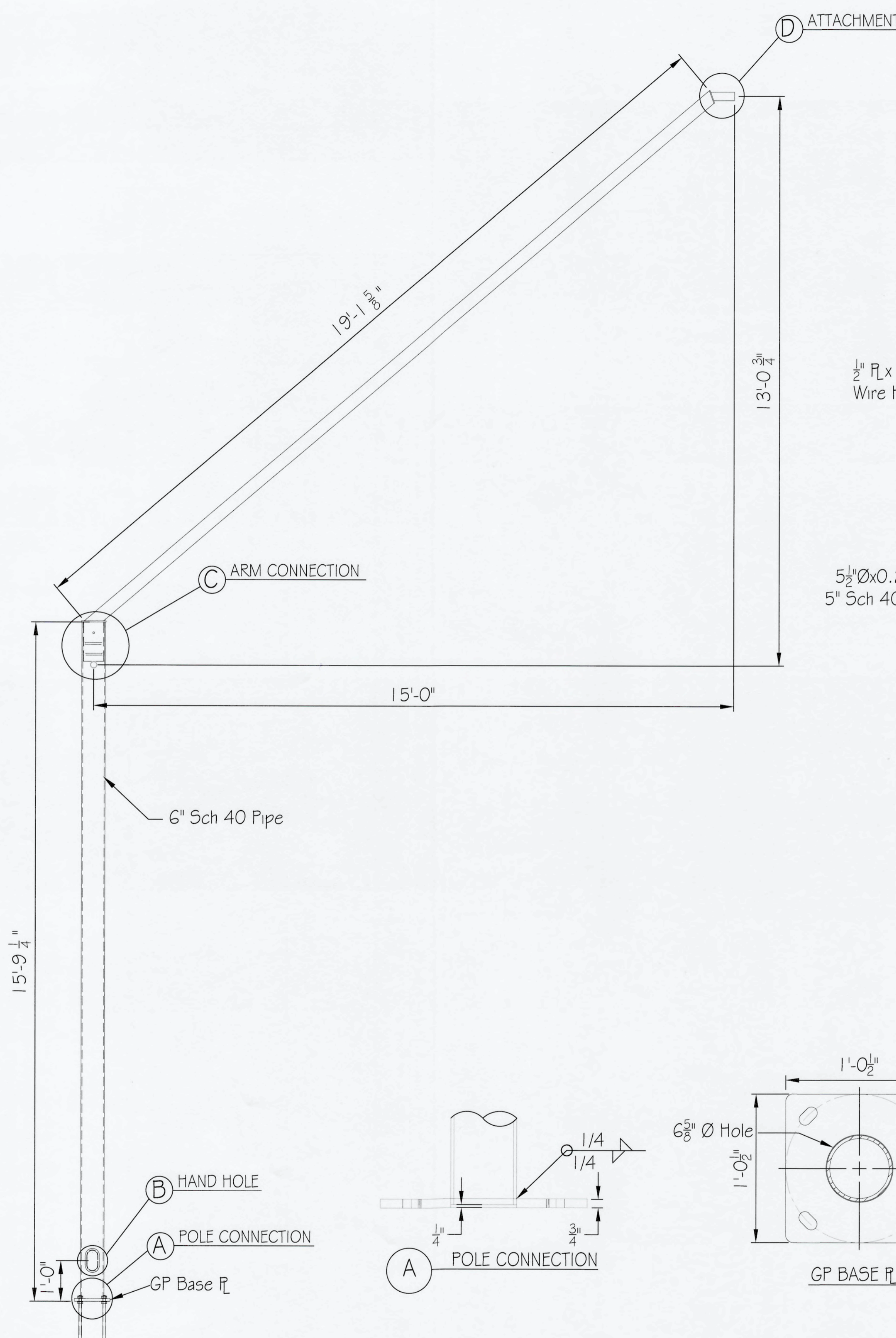
SCALE: 1/2" = 1'-0"

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

PROJECT #:  
DR: SVR DES: ANA CK: WR SHEET NO: TOTAL SHEETS  
DATE: 3/1/2020 DATE: 3/1/2020  
SCALE: Q5. #:





MEMBER	WEIGHT (lb)
GP Pole	300
Luminaire Arm	71

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TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

**Jacobs**  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

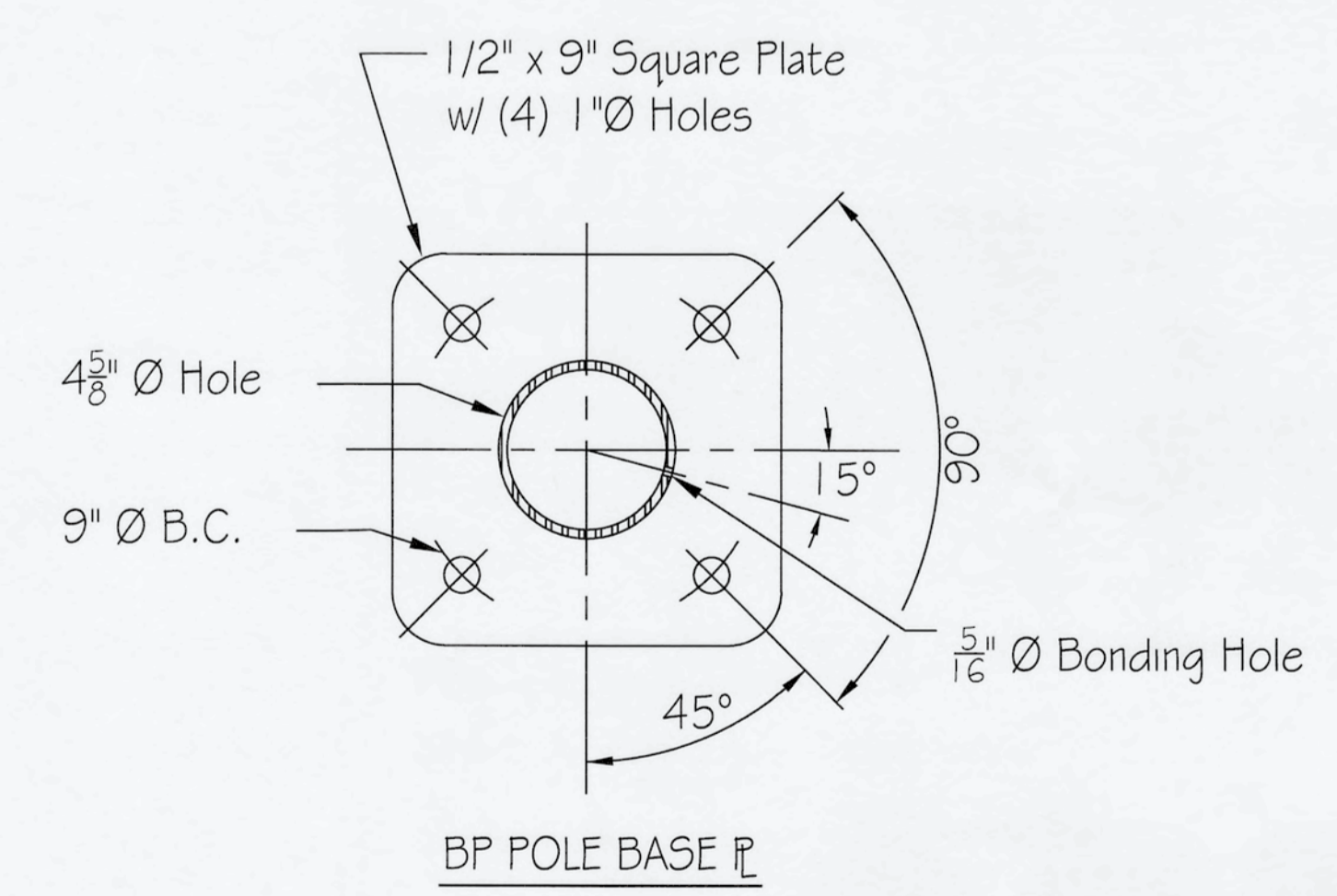
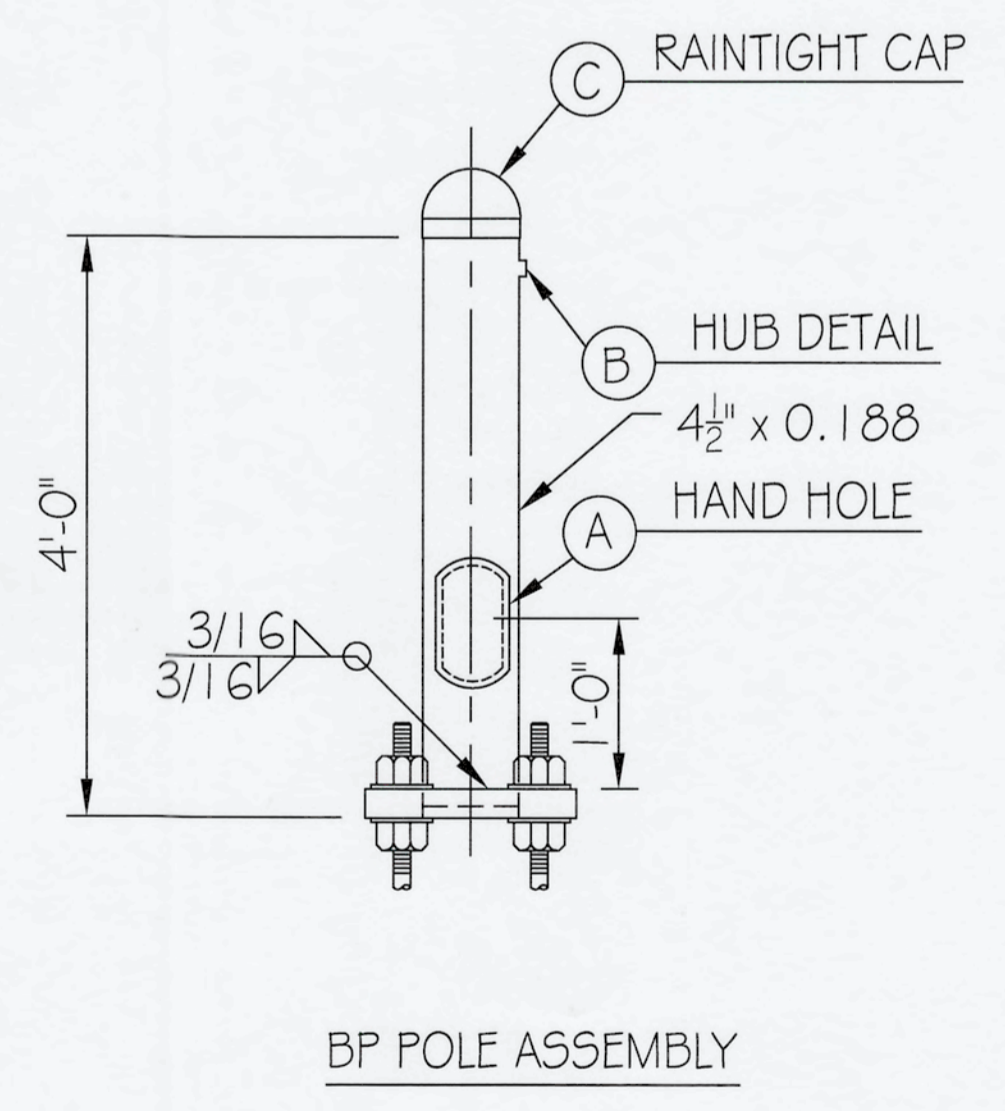
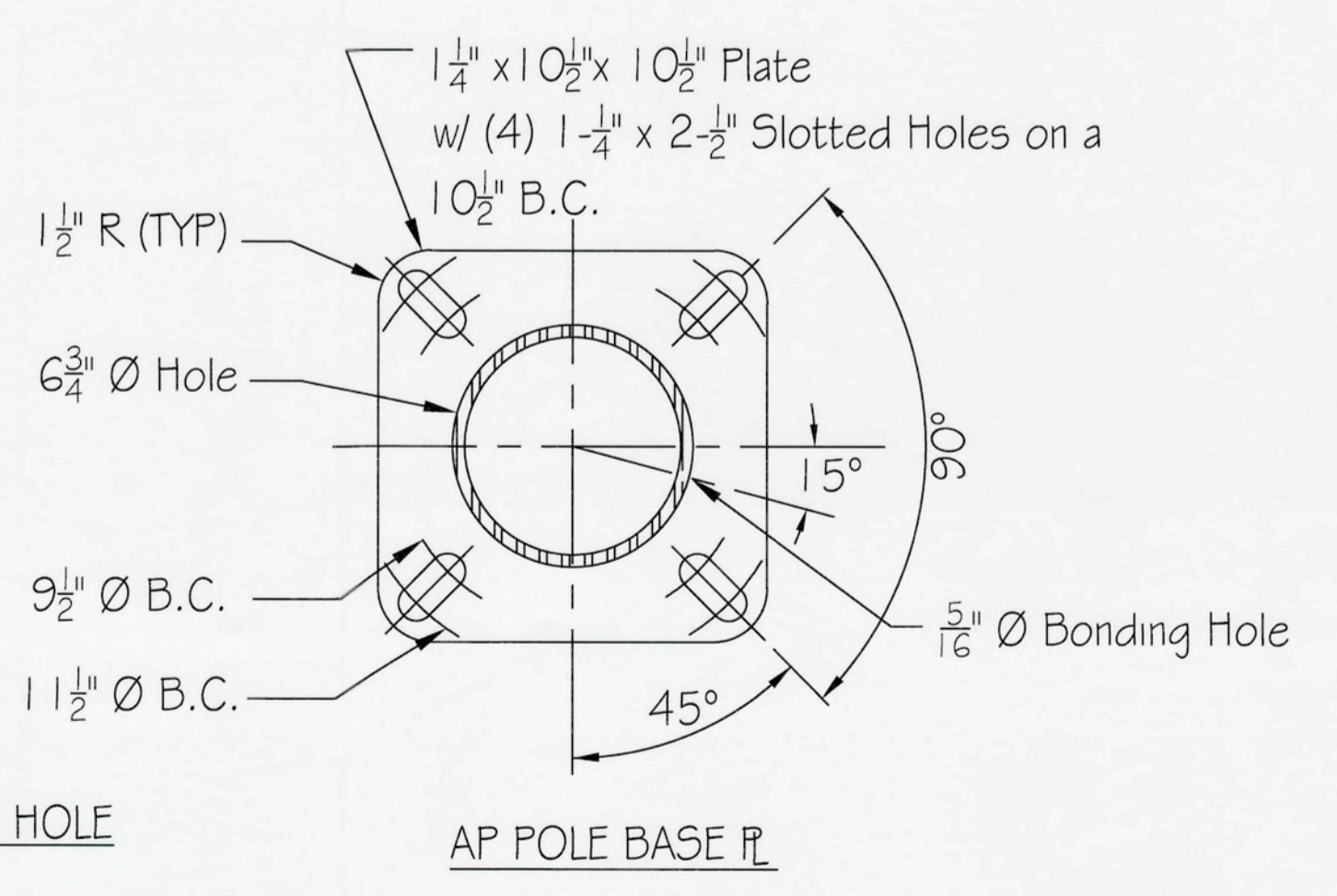
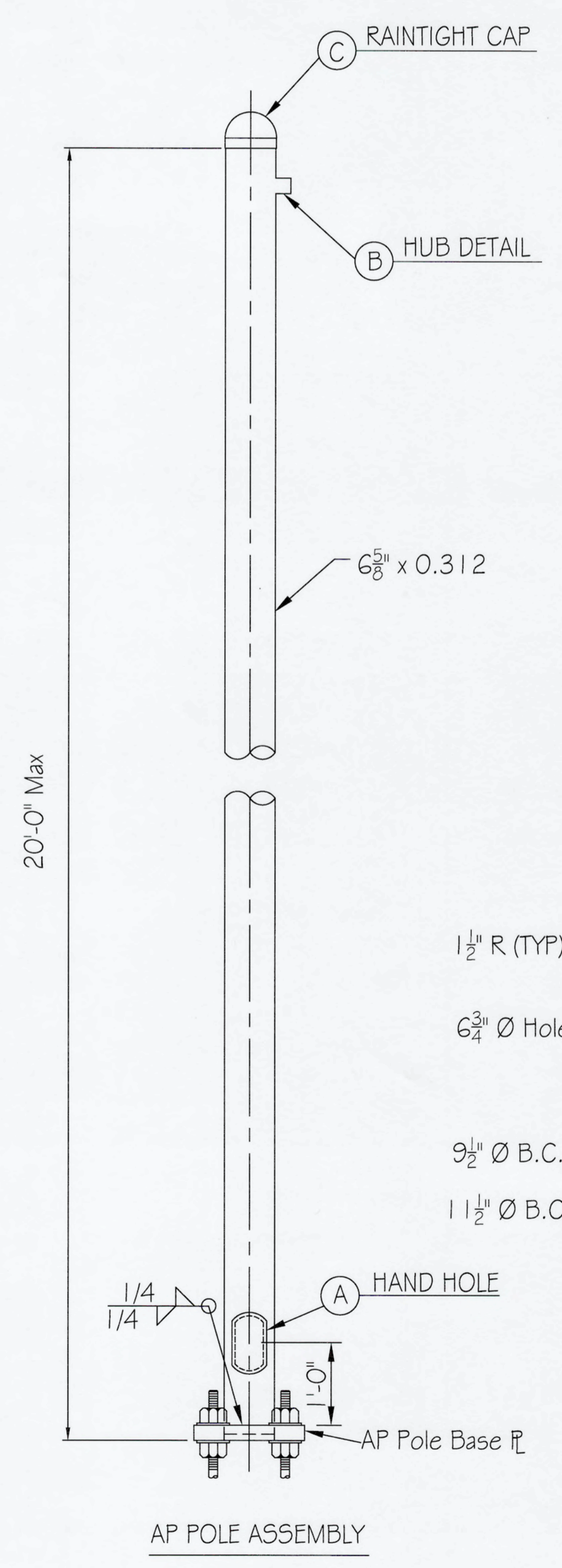
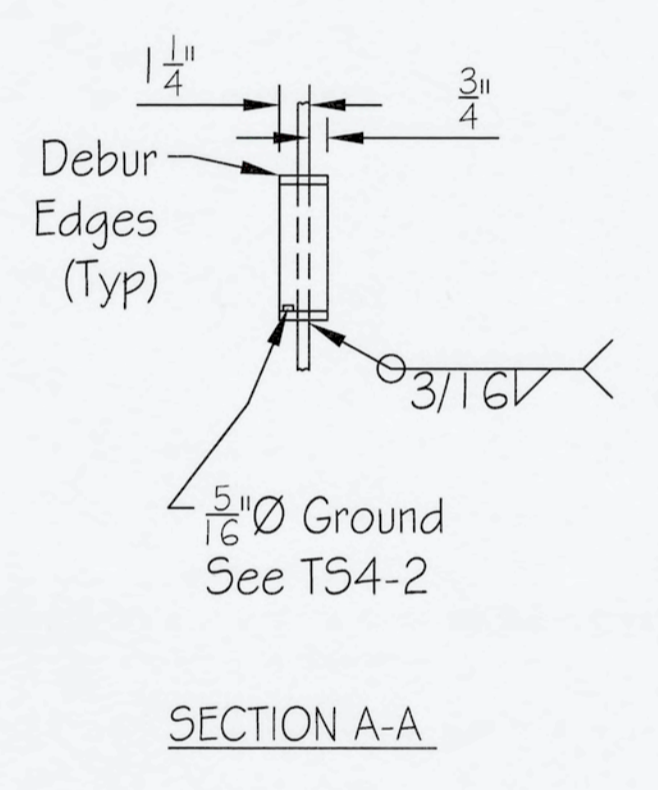
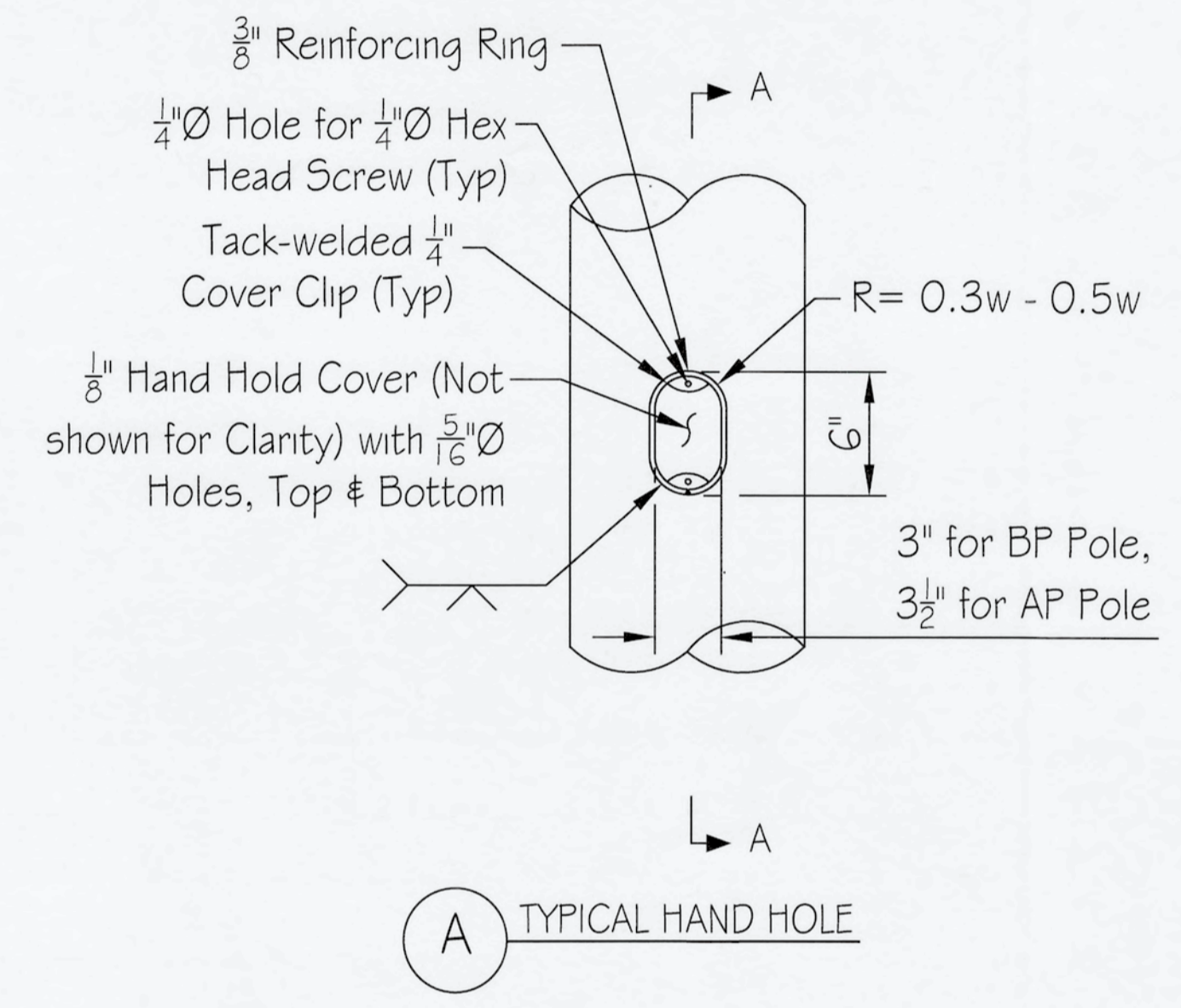
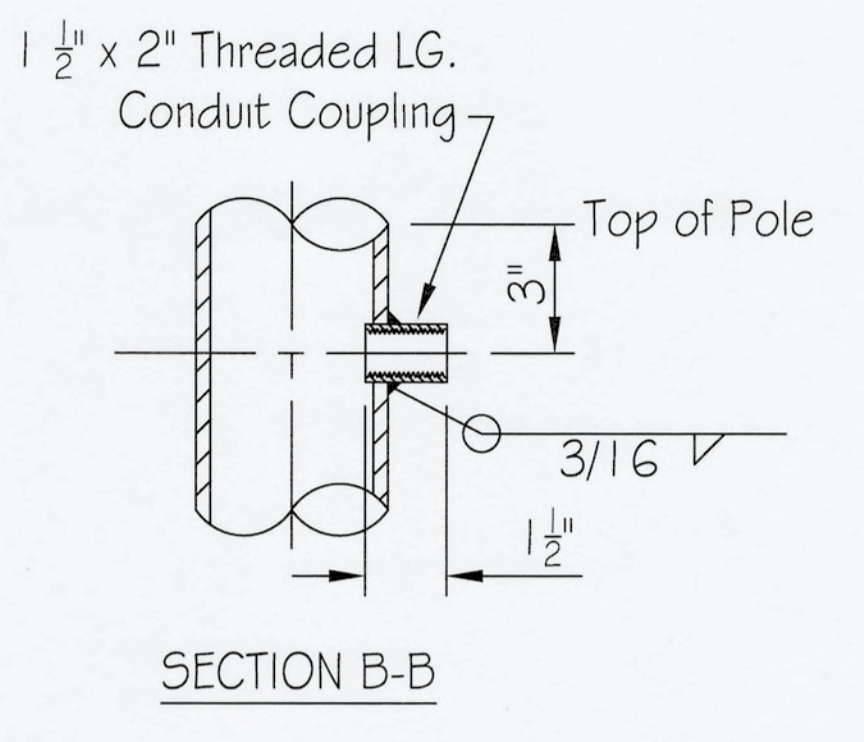
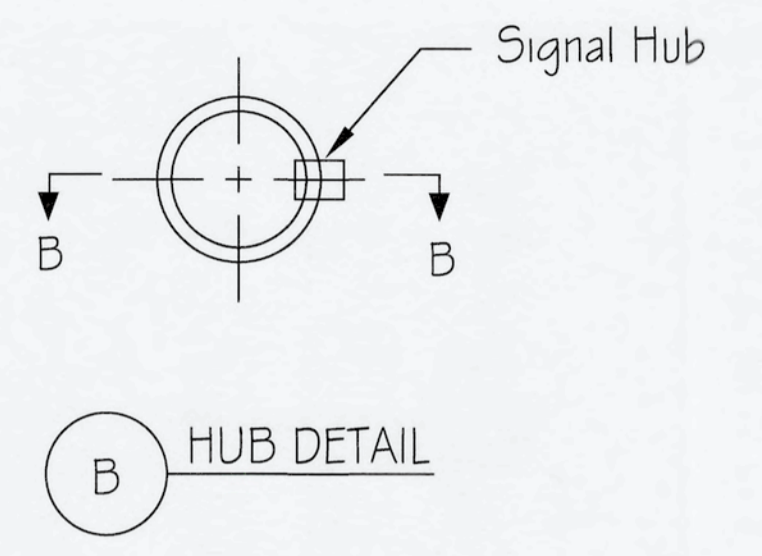
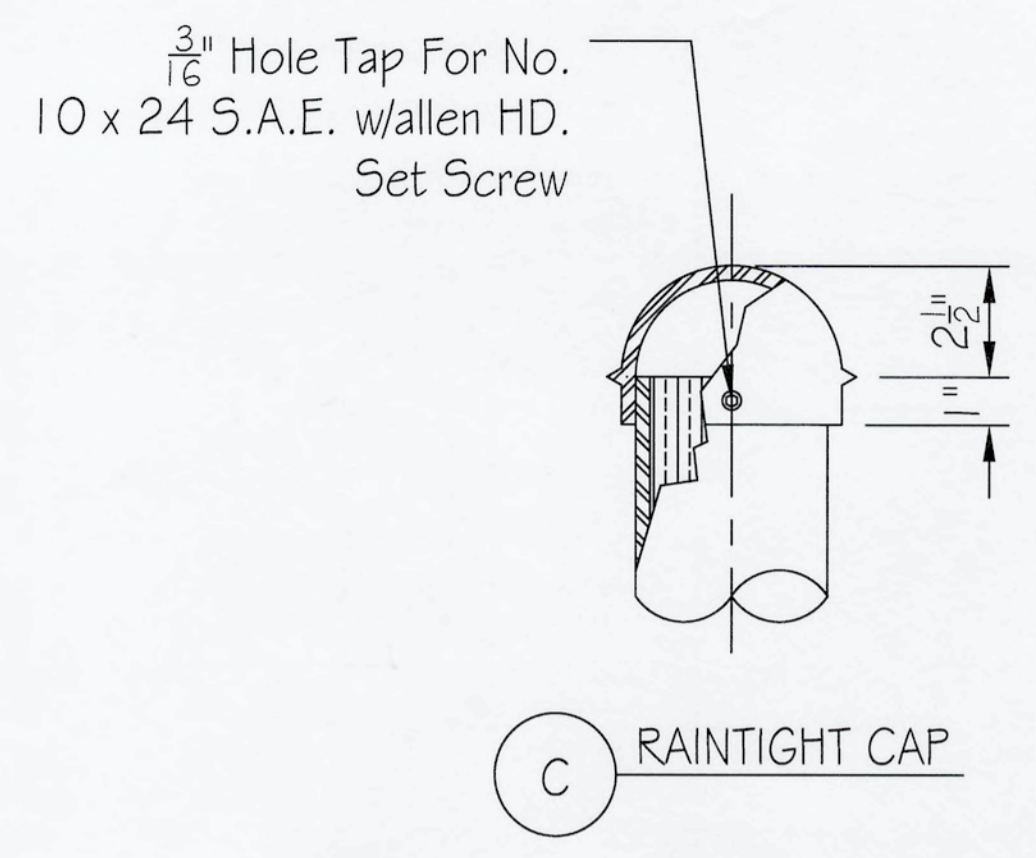
GP Pole with Lumaire Arm

TPP File Number: 10164  
TS 1-7  
DATE: 3/1/2020  
SCALE: 4/16/20

PROJECT #:	DR: SVR	DES: ANA	CK: WR	SHEET NO:	TOTAL SHEETS:
	DATE: 3/1/2020	DATE: 3/1/2020	DATE: 3/1/2020		
	ENGINEER:		SCALE:	QS. #:	



- NOTES:
1. See Signal Plans for pole height.
  2. See TS 3-3 for allowable signal configurations.



MEMBER	WEIGHT (lb)
15' AP Pole	316
20' AP Pole	421
BP Pole	35

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TRAFFIC SIGNAL DETAILS

CITY OF PHOENIX, ARIZONA STREET TRANSPORTATION DEPARTMENT

**Jacobs**

101 N. 1st Avenue, Suite 400, Phoenix, AZ 85001  
 480.225.1200, F 480.225.1202  
 www.jacobs.com

CITY OF PHOENIX, ARIZONA  
 STREET TRANSPORTATION DEPARTMENT  
 TRAFFIC SIGNAL STANDARD DETAILS

AP Signal Pole & BP Push-Button Pole

TPP File Number: 10164 TS 1-8

DATE: 3/11/2020 DATE: 3/11/2020 DATE: 3/11/2020

TRAFFIC SERVICES ENGINEER: [Signature] 4/6/20

Expires 09/30/2022

PROJECT #:	DR: SVR	DES: ANA	CK: WR	SHEET NO:	TOTAL SHEETS:
SCALE:			Q5. #:		



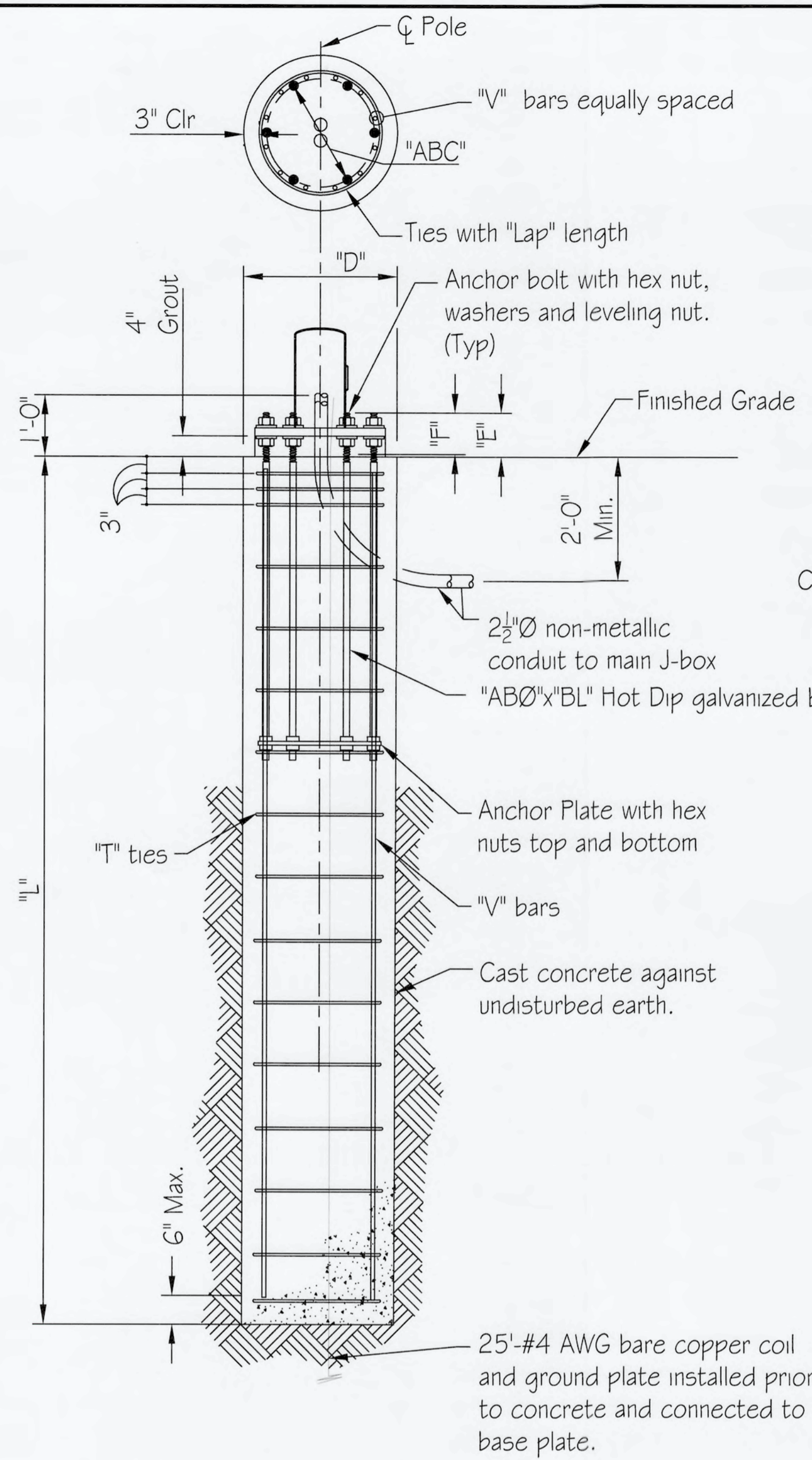




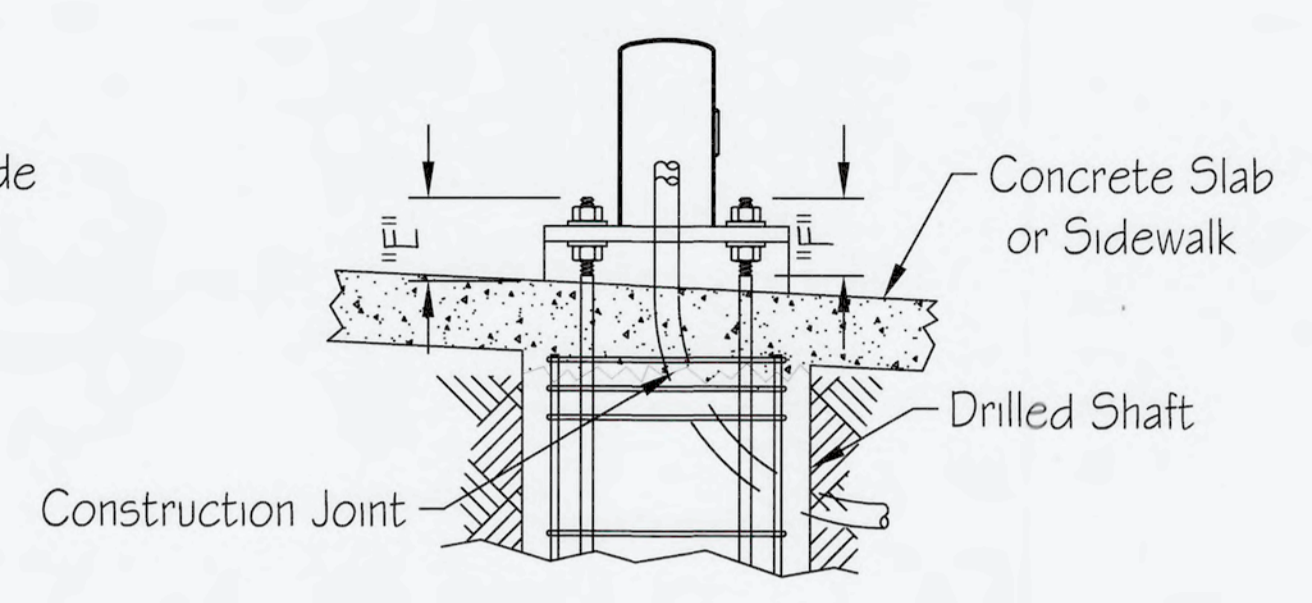
**FOUNDATION NOTES:**

- Anchor Bolts, Nuts & Washers
  - Anchor Bolts: ASTM F1554, Grade as noted
  - Nuts: ASTM A563 Grade DH3 Hex
  - Plate Washer: ASTM A36
  - Grout: Non-shrink Cementitious, 28-day  $f_c=5,000$  psi
- Concrete shall be MAG class A with  $f_c=3,000$ psi.
- All reinforcing shall conform to ASTM A615, Gr 60.
- A 25' coil of #4 AWG bare copper conductor shall be installed 6" below bottom of foundation and covered with 6" of soil before concrete is poured. Conductor shall extend 1'-0" above the top of foundation.
- Foundation embedment is based on assumed soil properties below. If encountered material varies from value below, the Engineer shall be notified and the shaft depth adjusted appropriately:
 

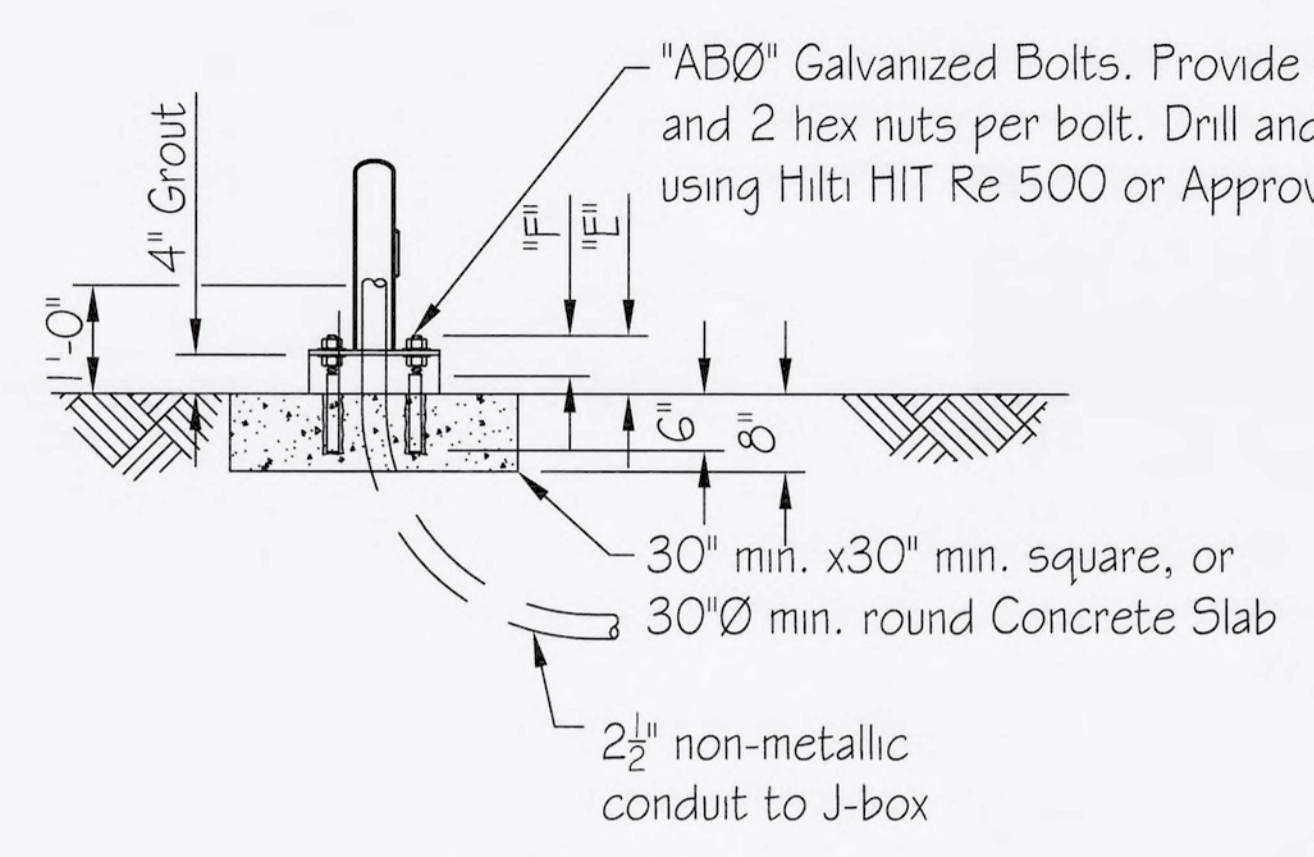
Soil shear strength:	0.5 ksf
Soil Friction Angle:	25°
Soil unit weight:	110 pcf
- Galvanize top 18" of bolts satisfying ASTM A153.
- Anchor bolts shall be equally spaced around bolt circle. Bolt circle shall be oriented so primary mast arm is perpendicular to roadway as shown on this sheet.
- Projection "E" shall be within  $\frac{1}{2}$ " of table dimension.



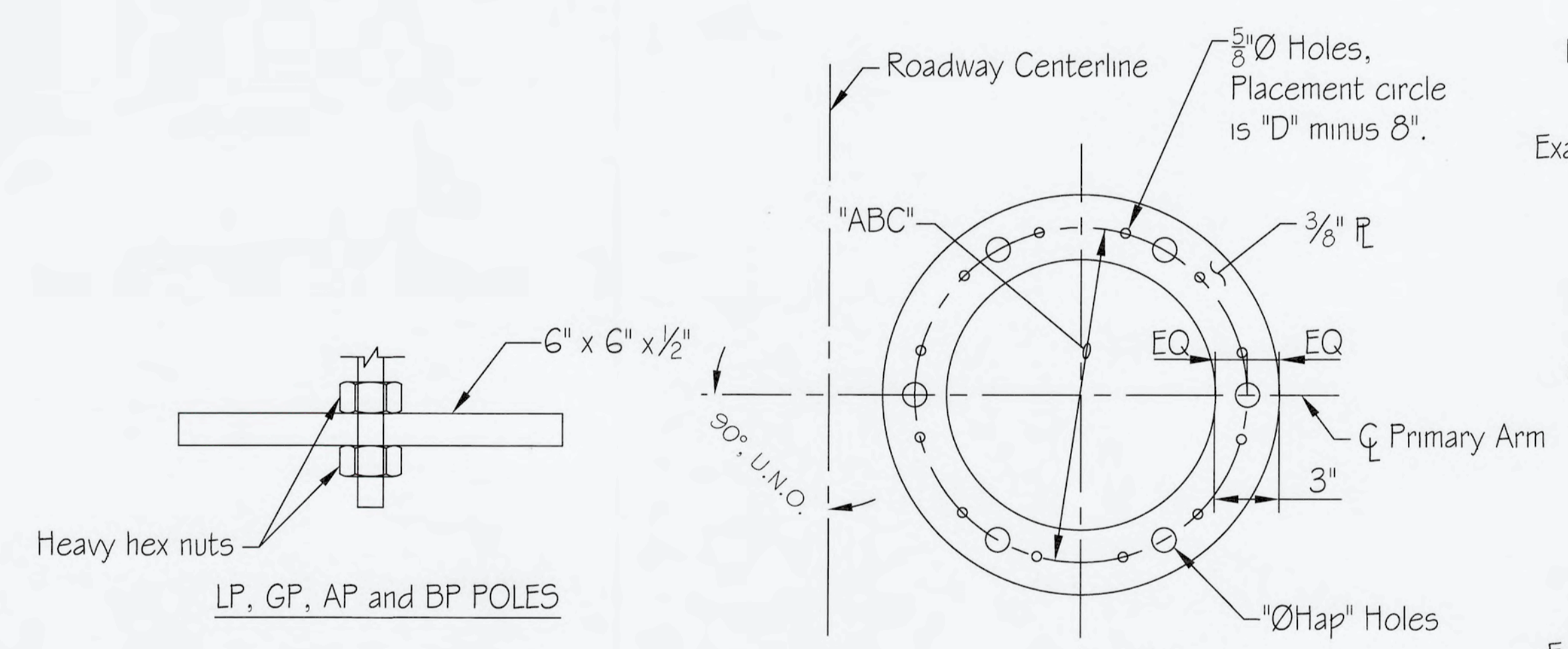
TYPICAL DRILLED SHAFT FOUNDATION



MODIFICATIONS FOR SHAFT FOUNDATION IN SLAB

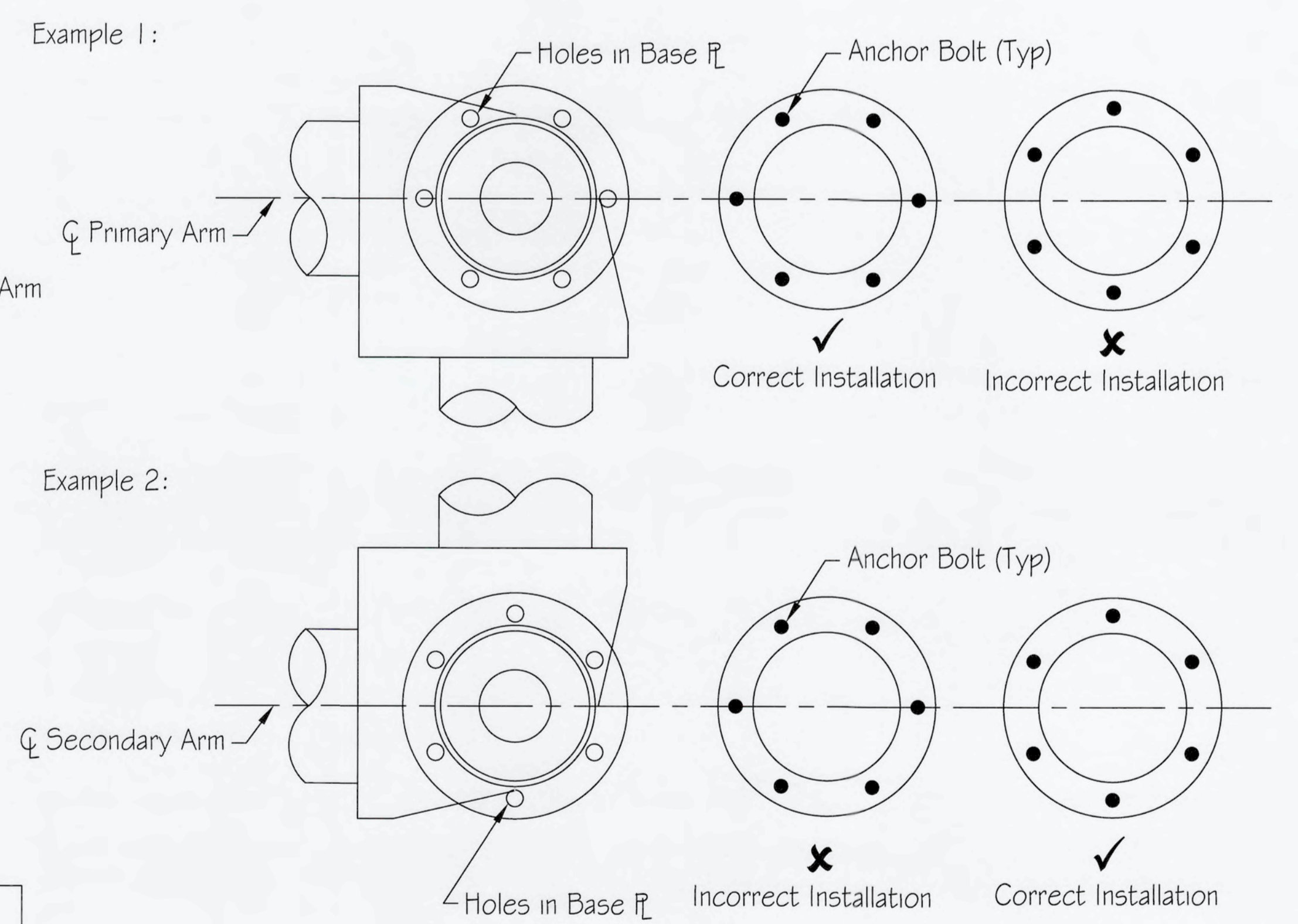


BP POLE IN SIDEWALK



ANCHOR PLATE DETAIL

Install anchor bolts to yield mast arm alignment shown in plans:

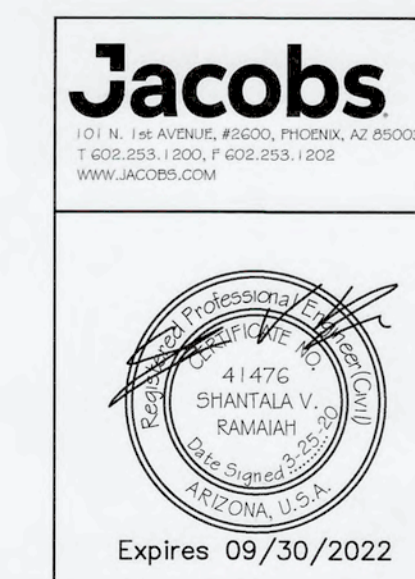


ANCHOR BOLT ORIENTATION

POLE ID	FOUNDATION						ANCHOR BOLTS								
	"D"	"L" (Depth)	"V" Bars	Conduit Quantity	"T" Ties	Tie "Lap"	Grade (ksi)	"AB"	No. Bolts	"BL" (Length)	"E" Proj. (See Note 9)	"F" Threaded	"ABC" Bolt Circle	"Hap" Holes	
P70, DP70	36"	16'-0"	14 #8	2	#5@6"	2'-2"	105	2"	6	66"	10"	9"	24"	2 1/8"	
P45, DP45	30"	13'-0"	10 #8	2	#5@6"	2'-2"	105	1 1/2"	6	66"	9"	7"	21"	1 5/8"	
LP	30"	10'-0"	10 #8	2	#4@12"	1'-9"	55	1 1/8"	4	66"	7"	6"	13"	1 1/4"	
GP	24"	7'-0"	6 #8	1	#4@12"	1'-9"	36	1"	4	36"	7"	5"	12 1/2"	1 1/8"	
AP	24"	7'-0"	6 #8	1	#4@12"	1'-9"	36	1"	4	36"	7"	5"	10 1/2"	1 1/8"	
BP	24"	4'-0"	6 #8	1	#4@12"	1'-9"	36	3/4"	4	30"	6"	4"	9"	7/8"	

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-25, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

**TRAFFIC SIGNAL DETAILS**  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

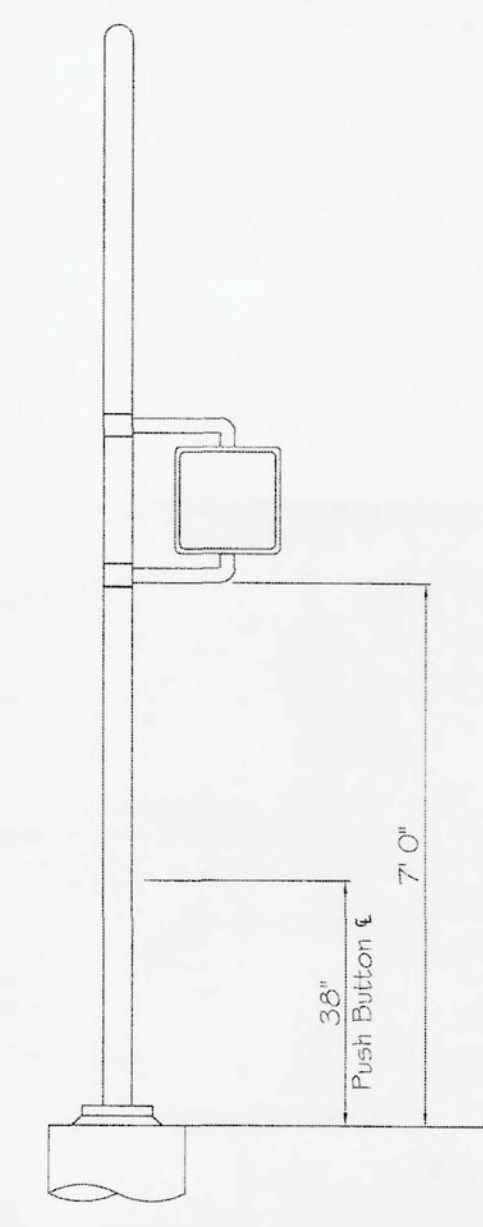
Pole Foundations

TPP File Number: 10164 TS 2-2  
DATE: 3/1/2020 DATE: 3/1/2020  
TRAFFIC SIGNAL ENGINEER: [Signature] 4/6/20

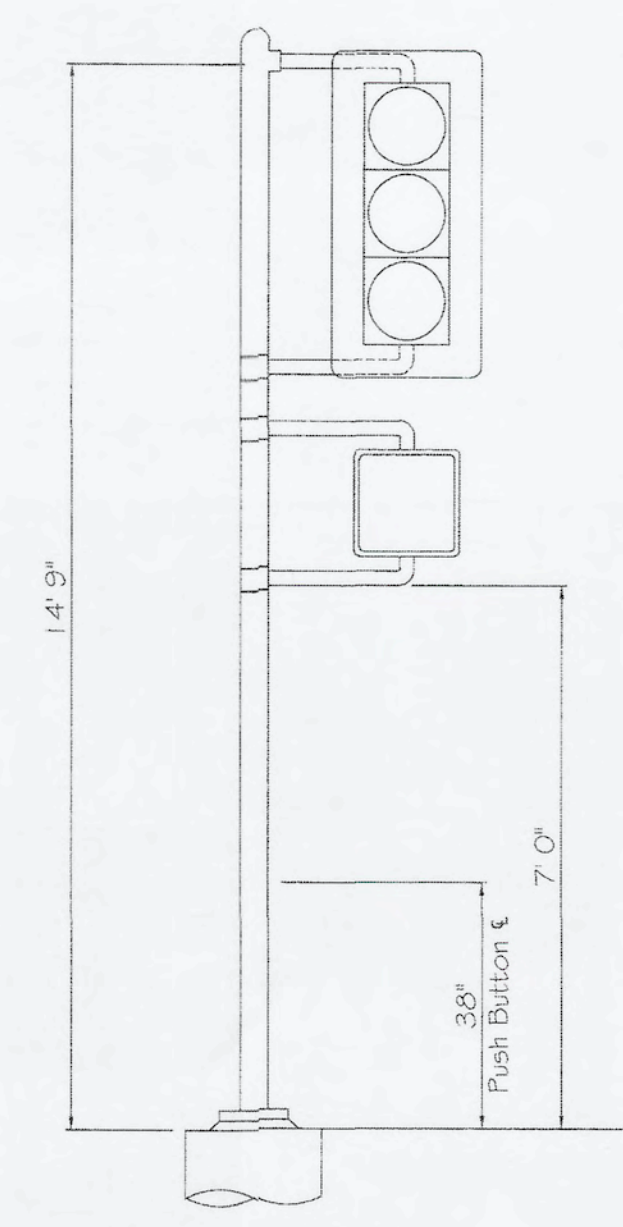
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SCALE:	DATE: 3/1/2020	DATE: 3/1/2020	DATE: 3/1/2020	NO:	
Q5. #:					



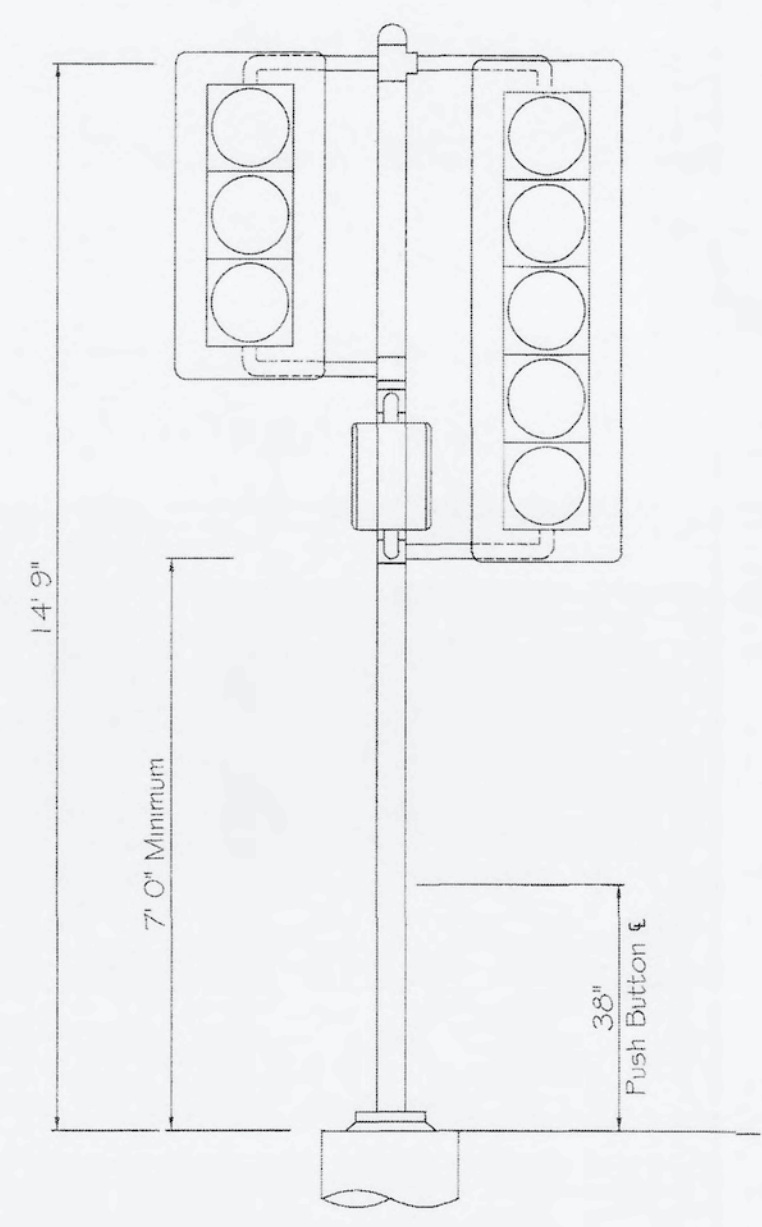
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL
9	ARIZ.			
DR:	DES:	CK:	DATE:	



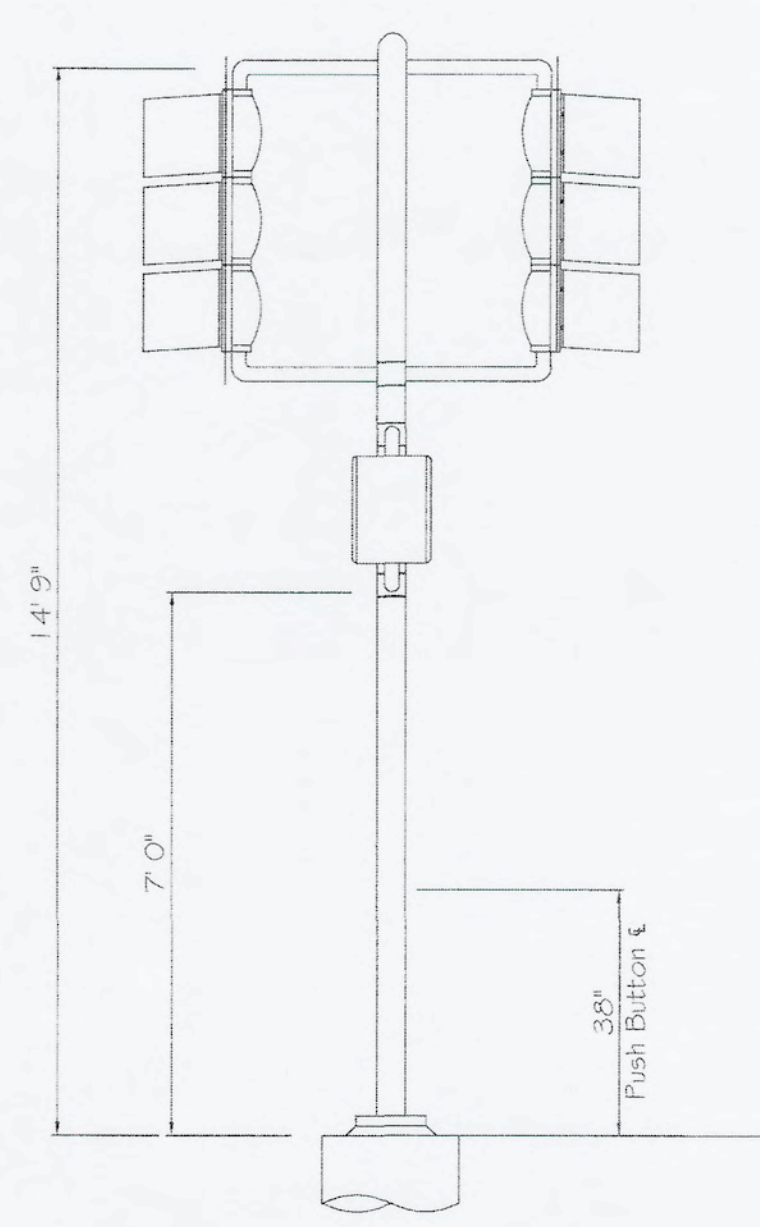
TYPE A POLE  
PED SIGNAL



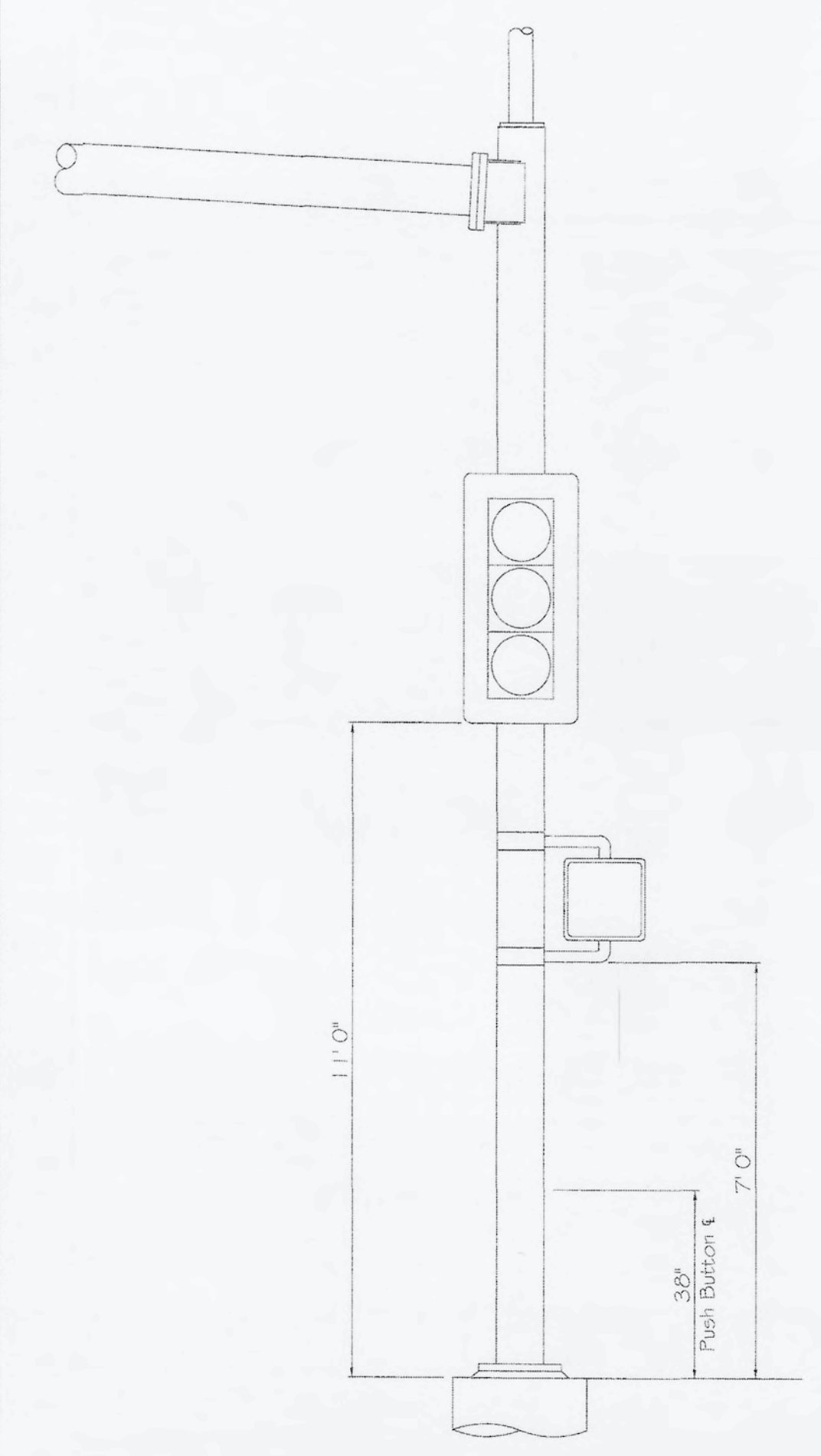
TYPE A POLE  
12" VEHICLE SIGNAL AND PED SIGNAL



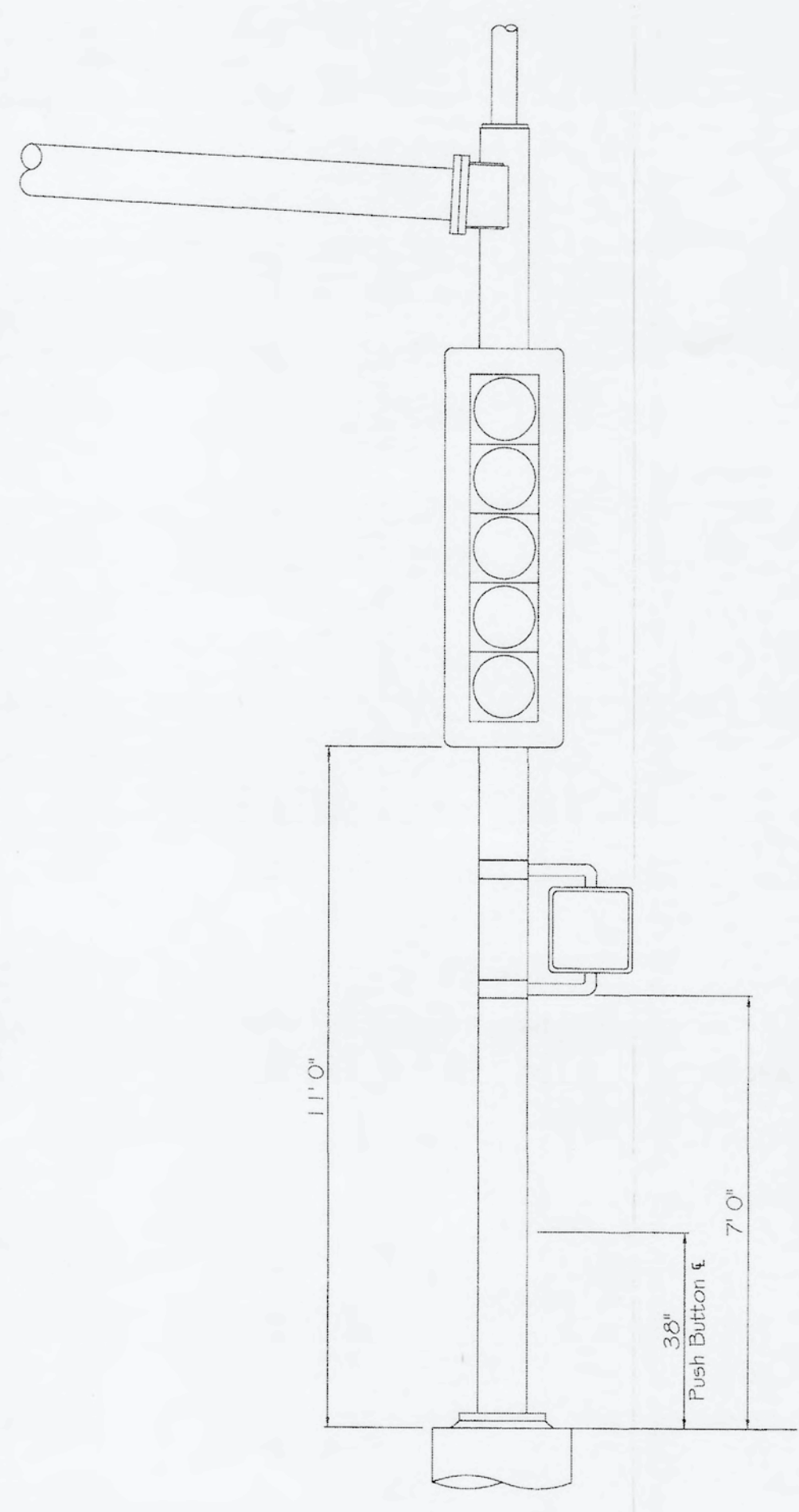
TYPE A POLE  
12" 5 SECTION VEHICLE SIGNAL  
AND PED SIGNAL



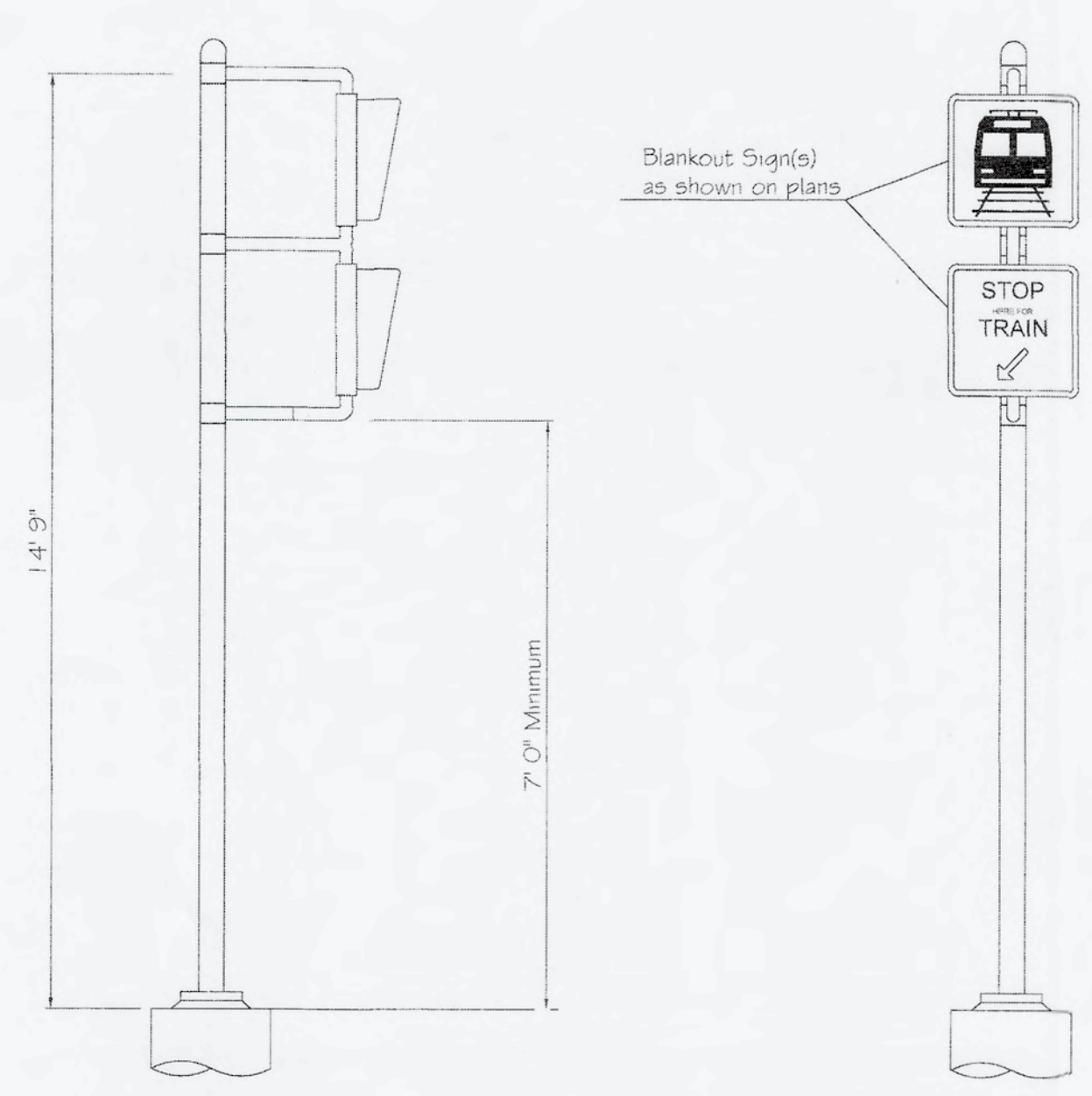
TYPE A POLE  
12" BACK TO BACK VEHICLE SIGNAL  
AND PED SIGNAL



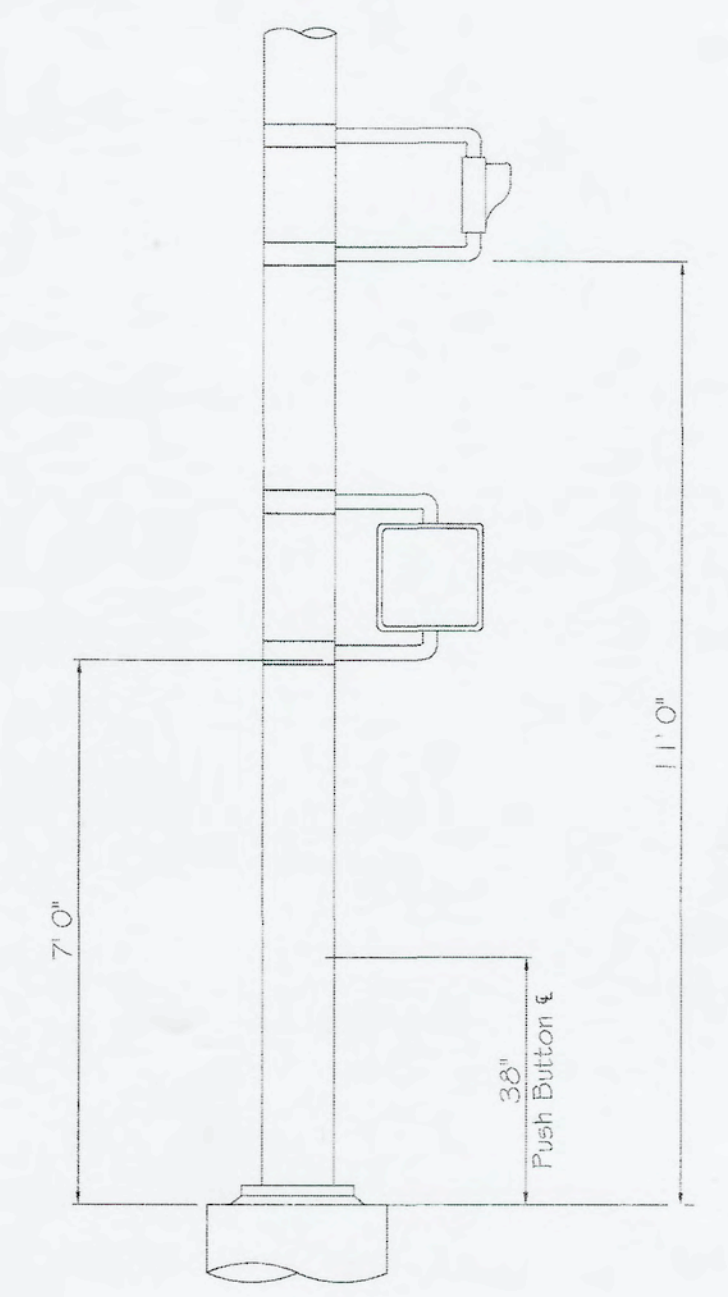
TYPE SM OR SR POLE  
12" VEHICLE SIGNAL HEAD  
AND PED SIGNAL



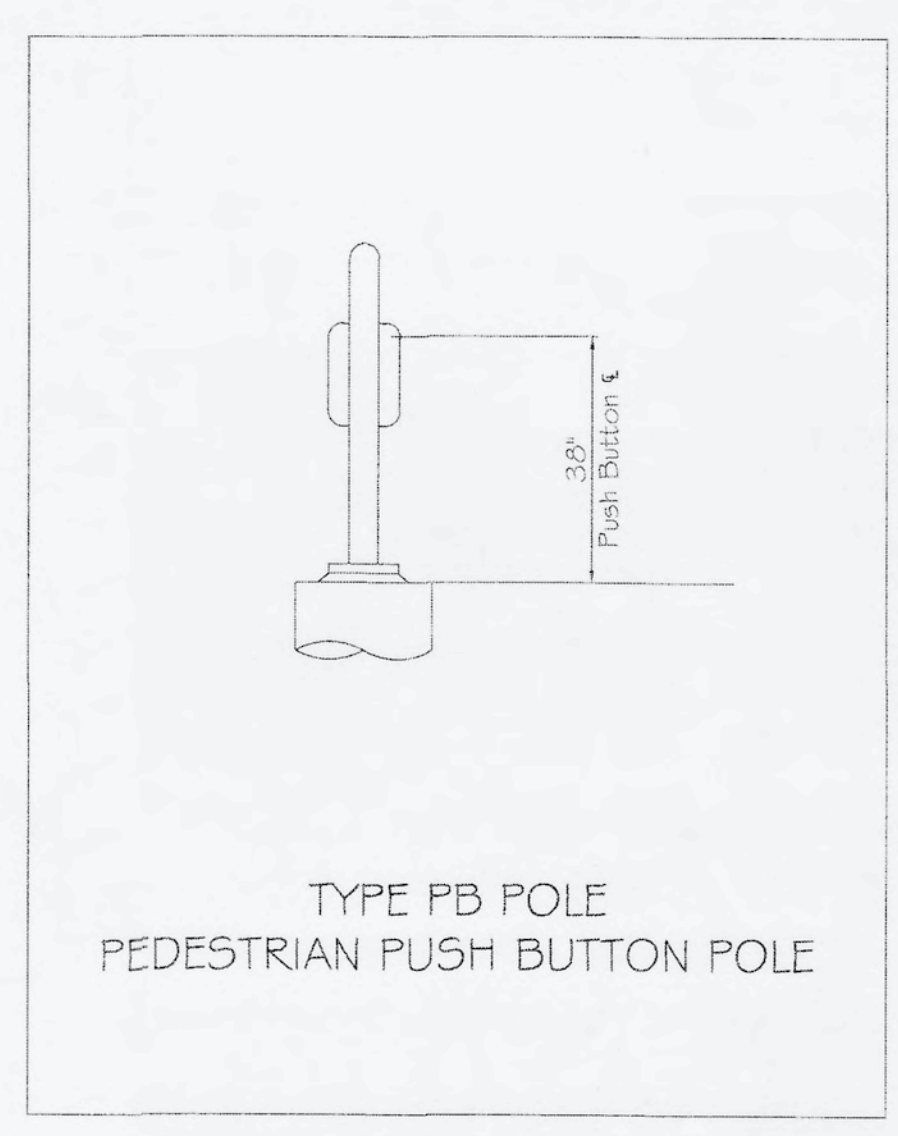
TYPE SM OR SR POLE  
12" 5 SECTION VEHICLE SIGNAL HEAD  
AND PED SIGNAL



TYPE A POLE  
WITH BLANKOUT SIGNS



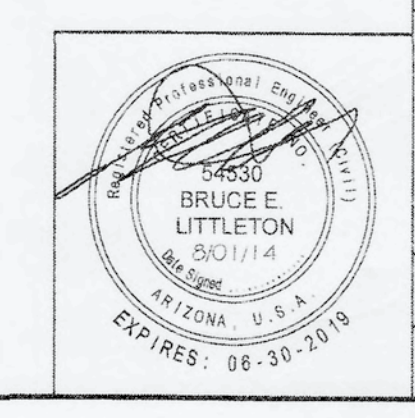
OCS POLE WITH  
LRT SIGNAL, PEDESTRIAN SIGNAL  
PUSHBUTTON AND SIGNS



TYPE PB POLE  
PEDESTRIAN PUSH BUTTON POLE

NOTES

- 1 Height measurement for Pedestrian Pushbutton is from finished grade to center of pushbutton, regardless of pushbutton style.
- 2 Height measurement for other Traffic Signal Devices are minimums. Up to a plus 6" will be acceptable.



CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

MOUNTING DETAILS  
SIDE MOUNT SIGNAL EQUIPMENT

TPP File Number 10164 TS 3-1  
DATE: 8-1-2014  
TRAFFIC SERVICES DEPUTY DIRECTOR: *Thomas J. [Signature]*

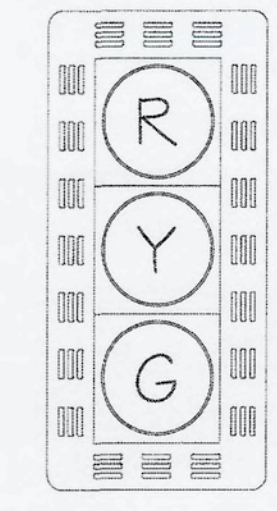
"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-2B, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

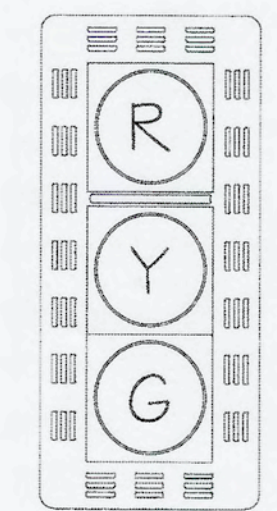
PROJECT #:	DR:	DES:	CK:	SHEET NO:	TOTAL SHEETS:
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	SCALE:	QS #:			



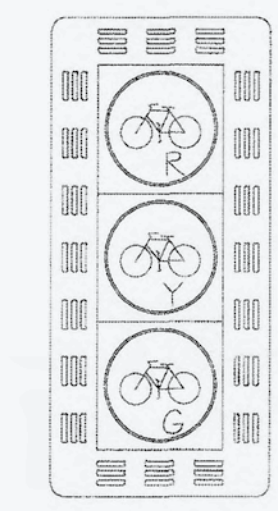
F.H.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL
9	ARIZ.			
DR: _____ DES: _____ CK: _____ DATE: _____				



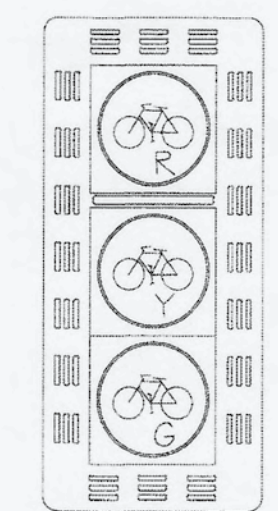
Type "F"  
3 Section 12" Vehicle Signal Head  
Mounted on Signal Pole



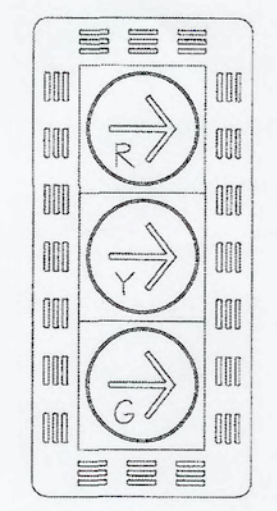
Type "F1" with Plumbizer  
3 Section 12" Vehicle Signal Head  
Mounted on Signal Mast Arm



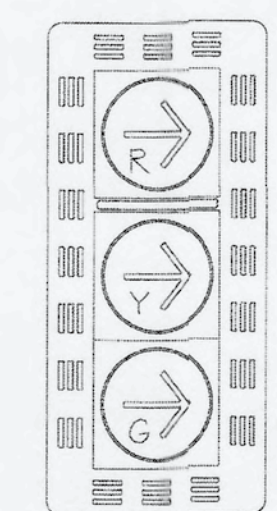
Type "B"  
3 Section 12" Bike Signal Head  
Mounted on Signal Pole



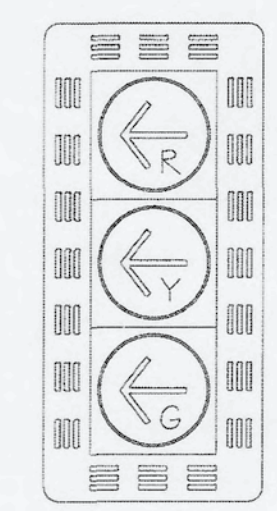
Type "B1" with Plumbizer  
3 Section 12" Bike Signal Head  
Mounted on Signal Mast Arm



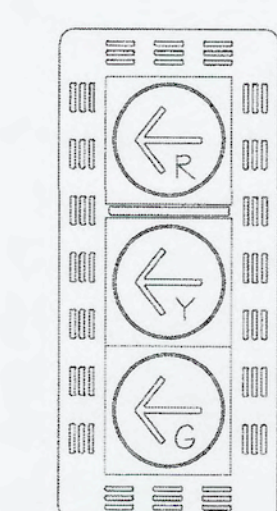
Type "R" (Right Turns)  
3 Section 12" Vehicle Signal Head  
with Arrows  
Mounted on Signal Pole



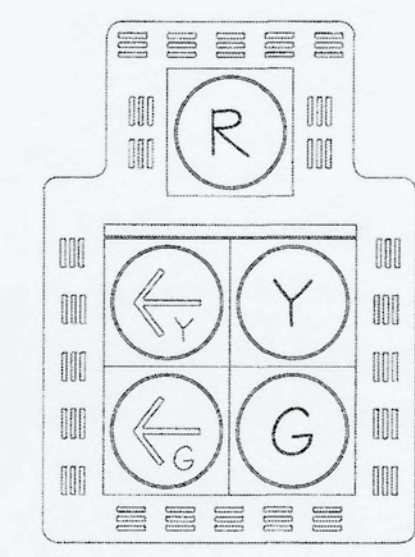
Type "R1" (Right Turns) with Plumbizer  
3 Section 12" Vehicle Signal Head  
with Arrows  
Mounted on Signal Mast Arm



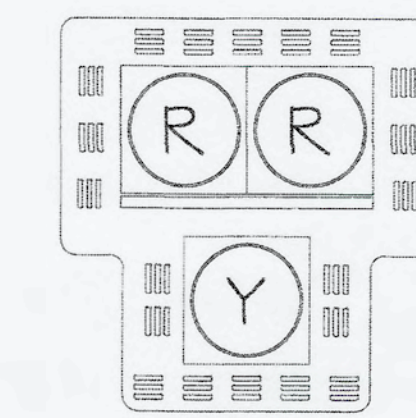
Type "R"  
3 Section 12" Vehicle Signal Head  
with Arrows  
Mounted on Signal Pole



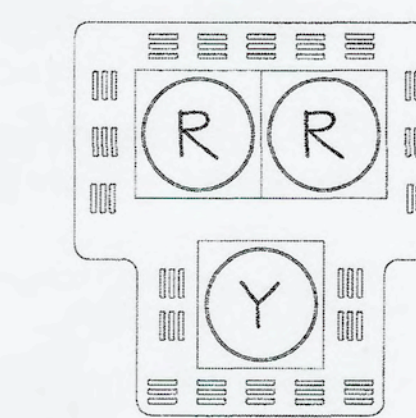
Type "R1" with Plumbizer  
3 Section 12" Vehicle Signal Head  
with Arrows  
Mounted on Signal Mast Arm



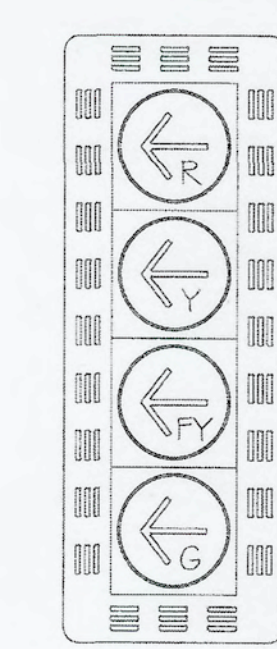
Type "Q2" with Plumbizer  
5 Section 12" Signal Head  
Mounted on Signal Mast arm



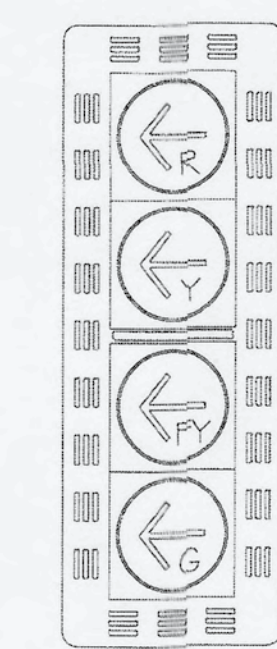
Type "T1" with Plumbizer  
3 Section 12" HAWK Signal Head  
Mounted on Signal Mast arm



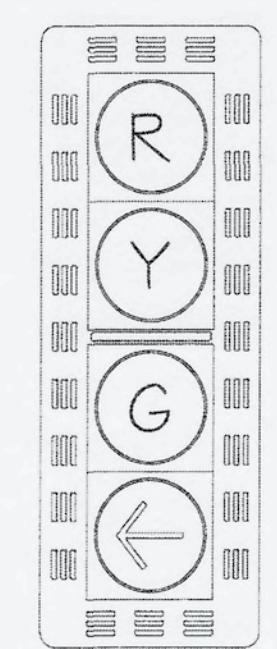
Type "T"  
3 Section 12" HAWK Signal Head  
Mounted on Signal Pole



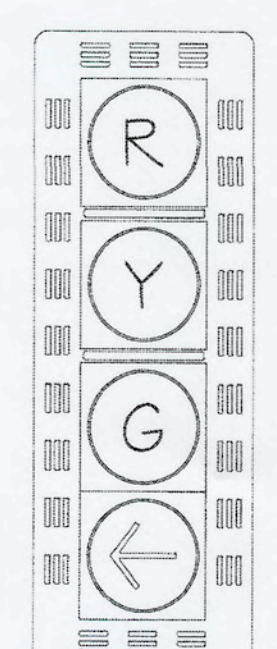
Type "FA"  
4 Section 12" Signal Head  
Mounted on Signal Pole  
FLASHING YELLOW



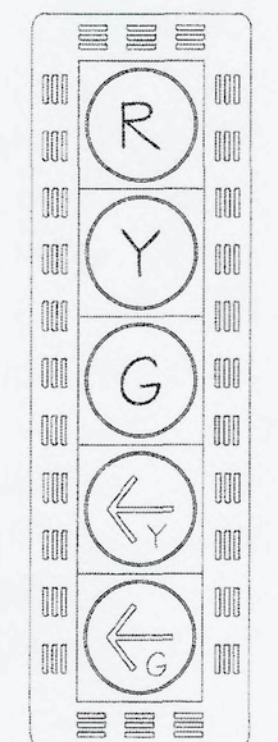
Type "FA1" with Plumbizer  
4 Section 12" Signal Head  
Mounted on Signal Mast Arm  
FLASHING YELLOW



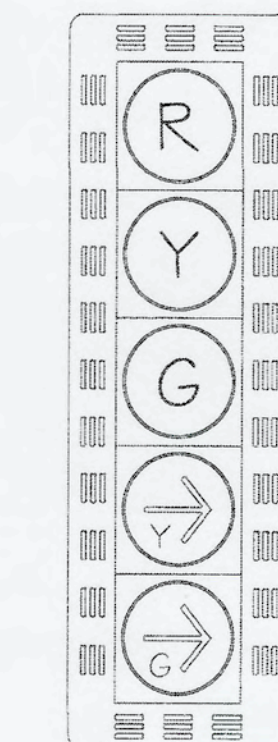
Type "G"  
4 Section 12" Signal Head  
Mounted on Signal Pole



Type "G1" with Plumbizer  
4 Section 12" Signal Head  
Mounted on Signal Mast Arm



Type "Q"  
5 Section 12" Vehicle Signal Head  
Mounted on Signal Pole

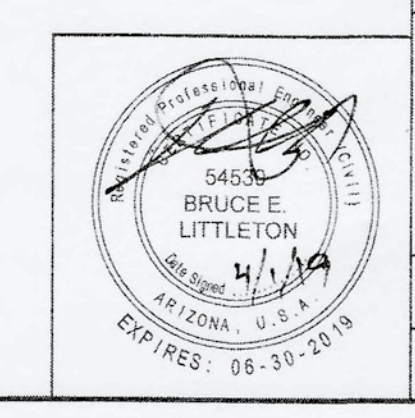


Type "Q" (Right Turns)  
5 Section 12" Vehicle Signal Head  
Mounted on Signal Pole

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CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



TRAFFIC SIGNAL HEAD  
GRAPHIC DETAIL

TPP File Number 10164  
TS 3-2  
DATE: 4-1-2019  
SCALE: \_\_\_\_\_

PROJECT #:		SHEET NO:	TOTAL SHEETS:
DR:	DES:	CK:	
DATE:	DATE:	DATE:	
SCALE:	QS. #:		



- GENERAL NOTES**
- All IMSA Cable shall be pulled continuous (no splicing) from the Terminal Compartment in each Signal Head or Push Button Station to the Hand Hole at the base of Pole.
  - Cable shall be utilized as follows:
    - 3 Conductor - All ADA Push Button Stations, Luminaires, Illuminated Street Signs, Detection Cameras
    - 5 Conductor - All 3 Section, 4 Section Signal Heads, HAWK Signal Heads, Pedestrian Heads, Audible pushbutton Stations
    - 7 Conductor - All outside Mast Arm and Type Q Signal Heads
  - Orange (North or East) or blue (South or West) Tape shall be applied six (6) inches above PVC bell end on IMSA Cable Jacket in Junction Box.
  - All Cable shall be tagged in the Hand Hole with orange (North or East) or blue (South or West) tape as follows:

MAST ARM VEHICLE INDICATIONS		
HEAD	CONDUCTORS	TAPES
On Pole	5	1
First on Mast Arm	3	2
Next Outside	5	3
Next Outside	5	4
End of Mast Arm	7	5*

\* Band Number corresponds to Head Number

- IMSA Cables for Pedestrian Heads shall be identified in Hand Hole using Brown tape in addition to color of phase.
- IMSA Cable for Luminaires shall be run continuous to Junction Box and identified with one (1) band of purple tape.
- IMSA Cable for Illuminated Street Signs shall be run continuous to Junction Box and identified with two (2) bands of purple tape.
- IMSA Power Cable for wireless Radio shall be pulled continuous from radio to dedicated circuit in Power Service Pedestal when available. Connect to luminaire circuit in junction box at base of pole when PSP is not available. Identified cable in junction boxes with three (3) bands of purple tape.
- CAT 5e Cable shall be pulled continuous from Wireless Radio to inside the Controller Cabinet.
- CCTV Cable and Video Detection Cable shall be pulled continuous from the device to inside the Controller Cabinet.
- All IMSA Cable to be #16 AWG Stranded unless otherwise noted on approved signal plans. When terminating in Signal Heads use suitable manufactured crimp on connector of appropriate size.

HAWK SIGNAL HEAD		
5 CONDUCTOR CABLE		
NO.	COLOR	FUNCTION
1	Black	Left Red Signal
2	White	
3	Red	Right Red Signal
4	Green	
5	Orange	Yellow

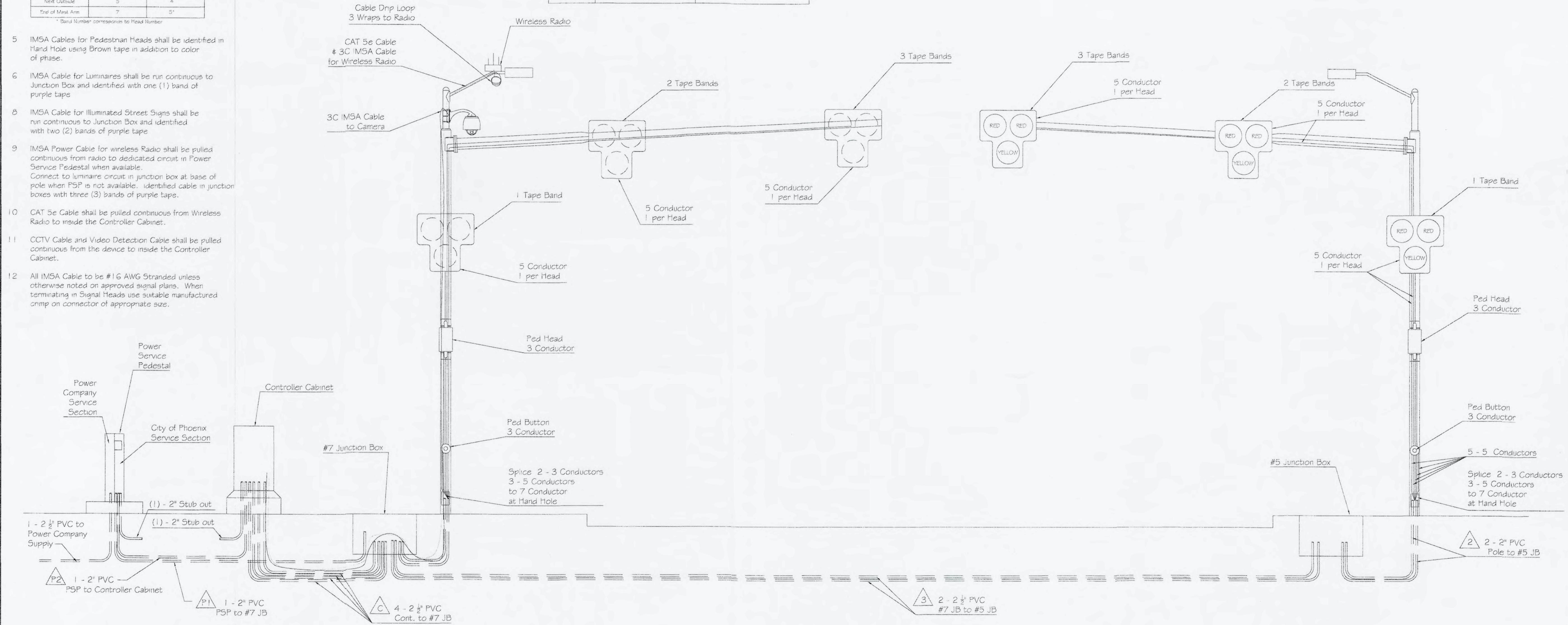
COMMUNICATION RADIO			
3 CONDUCTOR CABLE			
NO.	BASIC COLOR	FUNCTION	
1	Black	Load	
2	White	Neutral	
3	Green	Ground	

LUMINAIRE (FROM LUMINAIRE)			
3 CONDUCTOR CABLE			
NO.	BASIC COLOR	FUNCTION	
1	Black	Load	
2	White	Neutral	
3	Green	Ground	

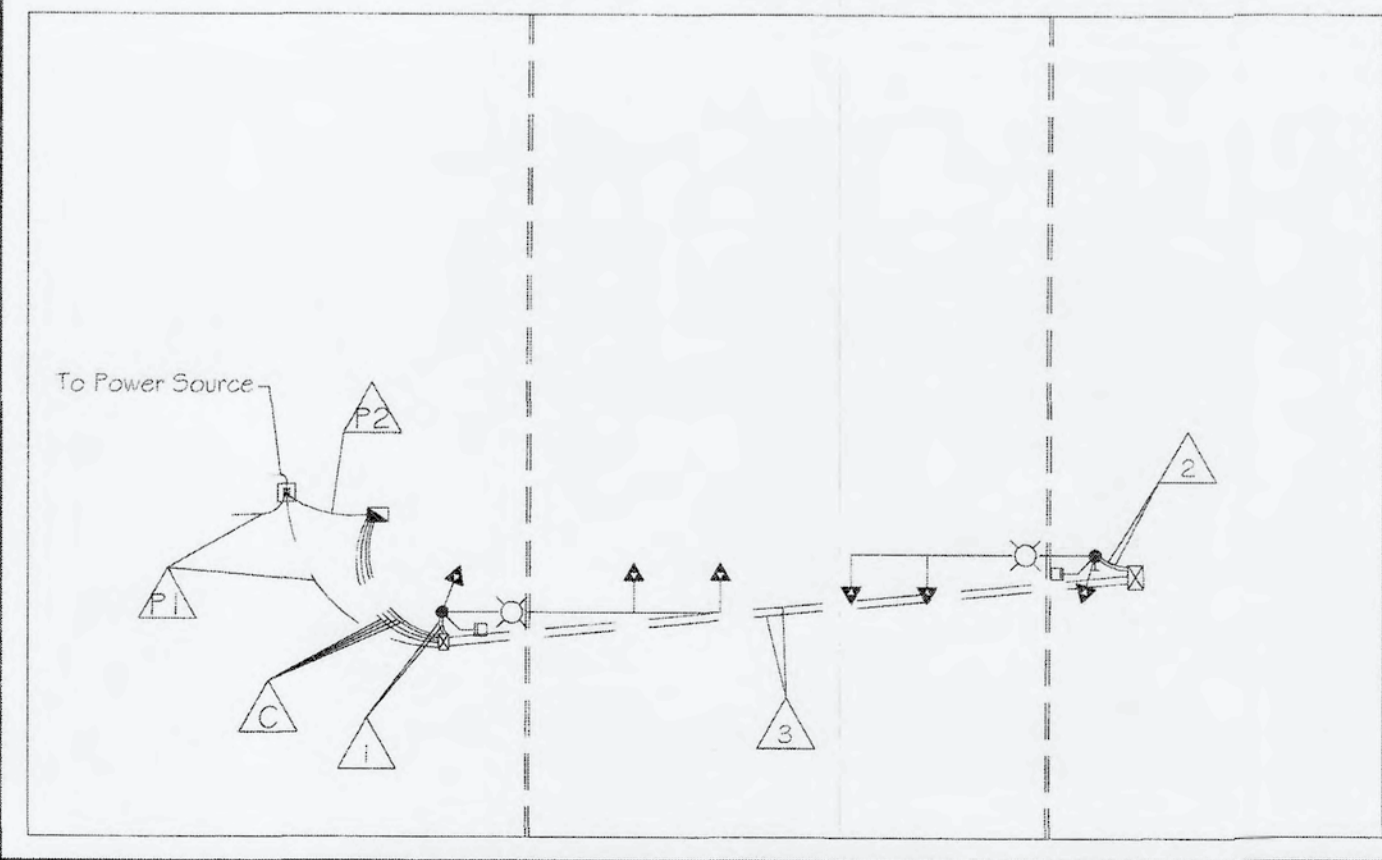
7 CONDUCTOR HAWK ONLY	
INSULATION COLOR	SIGNAL INTERVAL
Black	Left Red Signal
Red	Right Red Signal
Orange	Yellow
Blue	Don't Walk
Green	Walk
White/Black	Push Button
White	Push Button Common

ADA PUSH BUTTON		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	PUSH BUTTON STATION
1	Black	Push Button
2	White	Push Button Common
3	Green	Spare

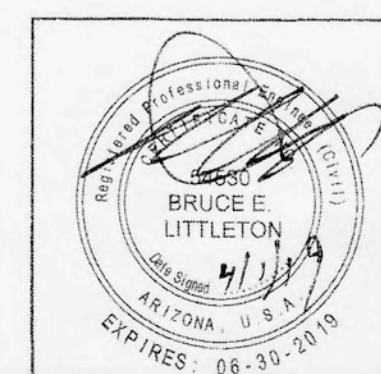
PEDESTRIAN HEAD			
5 CONDUCTOR CABLE			
NO.	BASIC COLOR	SIGNAL INTERVAL	
1	Black	Don't Walk	
2	White	Pedestrian Common	
3	Red	Spare	
4	Green	Walk	
5	Orange	Spare	



High Intensity Activated CrossWalk (HAWK) Schematic - Dual Mast Arm



<p><b>Controller to #7 Junction Box</b></p> <table border="1"> <tr> <th>CONDUIT 1</th> <th>CONDUIT 2</th> <th>CONDUIT 3</th> <th>CONDUIT 4</th> <th>CONDUIT 5 to PSP</th> <th>CONDUIT 6 Stub-Out</th> </tr> <tr> <td>#10 Bare Copper #10 AWG White 7C IMSA Cable</td> <td>#10 Bare Copper 179 Cable</td> <td>#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green</td> <td>Detachable Mole Tape</td> <td>#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green</td> <td>Detachable Mole Tape</td> </tr> </table>	CONDUIT 1	CONDUIT 2	CONDUIT 3	CONDUIT 4	CONDUIT 5 to PSP	CONDUIT 6 Stub-Out	#10 Bare Copper #10 AWG White 7C IMSA Cable	#10 Bare Copper 179 Cable	#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green	Detachable Mole Tape	#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green	Detachable Mole Tape	<p><b>Power Service Pedestal to #7 Junction Box</b></p> <table border="1"> <tr> <th>CONDUIT 1</th> <th>CONDUIT 2</th> </tr> <tr> <td>#10 Bare Copper 5C IMSA Cable 3C Radio 3C Luminaire</td> <td>Stub-Out</td> </tr> </table>	CONDUIT 1	CONDUIT 2	#10 Bare Copper 5C IMSA Cable 3C Radio 3C Luminaire	Stub-Out	<p><b>Power Service Pedestal to Controller</b></p> <table border="1"> <tr> <th>CONDUIT 3</th> </tr> <tr> <td>#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green 5C IMSA Cable</td> </tr> </table>	CONDUIT 3	#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green 5C IMSA Cable
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CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TYPICAL HAWK  
PEDESTRIAN CROSSING BEACON  
DUAL MAST ARM

TPP File Number 10164  
TS 3-3  
4-1-2019

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

PROJECT #:	DR:	DES:	CK:	SHEET NO:	TOTAL SHEETS:
	DATE:	DATE:	DATE:		
SCALE:	CS. #:				



- GENERAL NOTES**
- All IMSA Cable shall be pulled continuous (no splicing) from the Terminal Compartment in each Signal Head or Push Button Station to the Hand Hole at the base of Pole
  - Cable shall be utilized as follows:  
 3 Conductor - All ADA Push Button Stations  
 Luminaires, Illuminated Street Signs, Detection Cameras  
 5 Conductor - All 3 Section, 4 Section Signal Heads, HAWK Signal Heads, Pedestrian Heads, Audible pushbutton Stations  
 7 Conductor - All outside Mast Arm and Type Q Signal Heads
  - Orange (North or East) or blue (South or West) Tape shall be applied six (6) inches above PVC bell end on IMSA Cable Jacket in Junction Box
  - All Cable shall be tagged in the Hand Hole with orange (North or East) or blue (South or West) tape as follows:

MAST ARM VEHICLE INDICATIONS		
HEAD	CONDUCTORS	TAPES
On Pole	5	1
First on Mast Arm	5	2
Next Outside	5	3
Next Outside	5	4
End of Mast Arm	7	5*

\* Band Number corresponds to Head Number

- IMSA Cables for Pedestrian Heads shall be identified in Hand Hole using Brown tape in addition to color of phase.
- IMSA Cable for Luminaires shall be run continuous to Junction Box and identified with one (1) band of purple tape
- IMSA Cable for Illuminated Street Signs shall be run continuous to Junction Box and identified with two (2) bands of purple tape
- IMSA Power Cable for wireless Radio shall be pulled continuous from radio to dedicated circuit in Power Service Pedestal when available. Connect to luminaire circuit in junction box at base of pole when PSP is not available. Identified cable in junction boxes with three (3) bands of purple tape.
- CAT 5e Cable shall be pulled continuous from Wireless Radio to inside the Controller Cabinet.
- CCTV Cable and Video Detection Cable shall be pulled continuous from the device to inside the Controller Cabinet.
- All IMSA Cable to be #16 AWG Stranded unless otherwise noted on approved signal plans. When terminating in Signal Heads use suitable manufactured crimp on connector of appropriate size.
- See sheet TS3-5 for variations of pole configuration based on project.

HAWK SIGNAL HEAD		
5 CONDUCTOR CABLE		
NO.	COLOR	FUNCTION
1	Black	Left Red Signal
2	White	
3	Red	Right Red Signal
4	Green	
5	Orange	Yellow

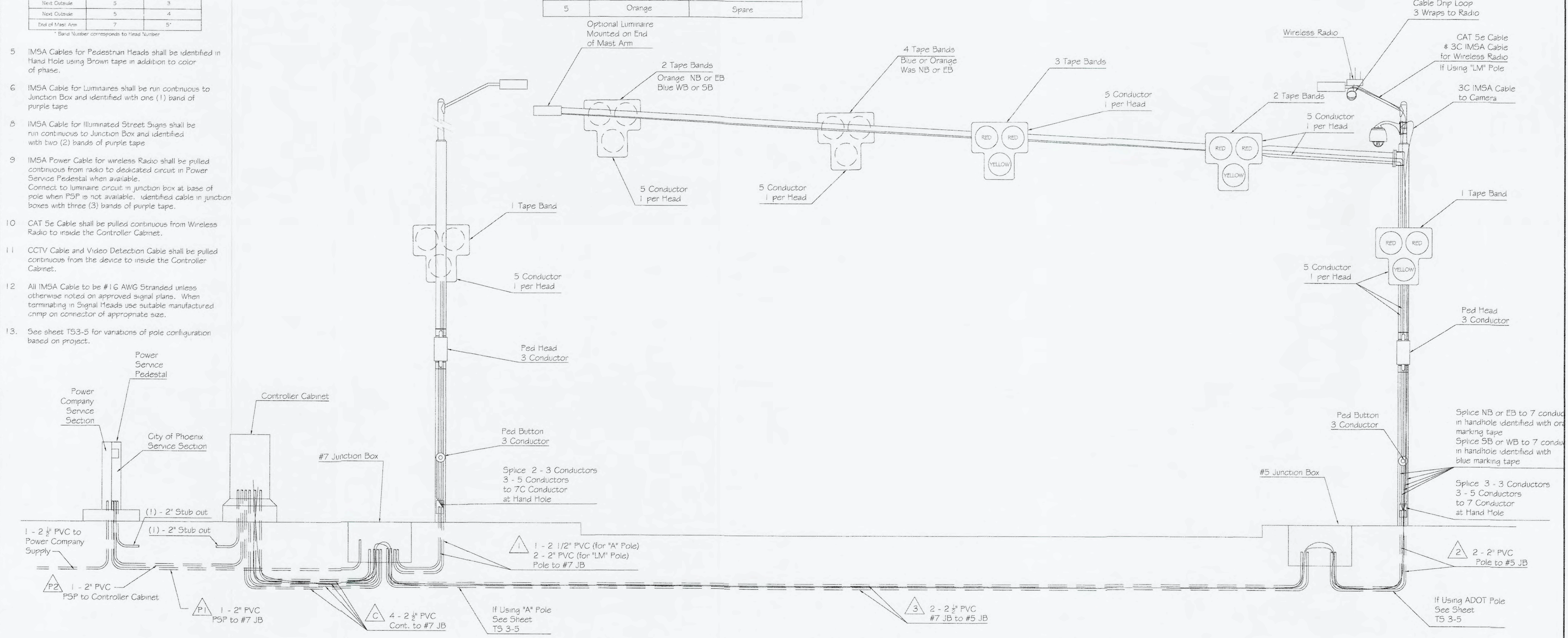
COMMUNICATION RADIO		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	FUNCTION
1	Black	Load
2	White	Neutral
3	Green	Ground

LUMINAIRE (FROM LUMINAIRE)		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	FUNCTION
1	Black	Load
2	White	Neutral
3	Green	Ground

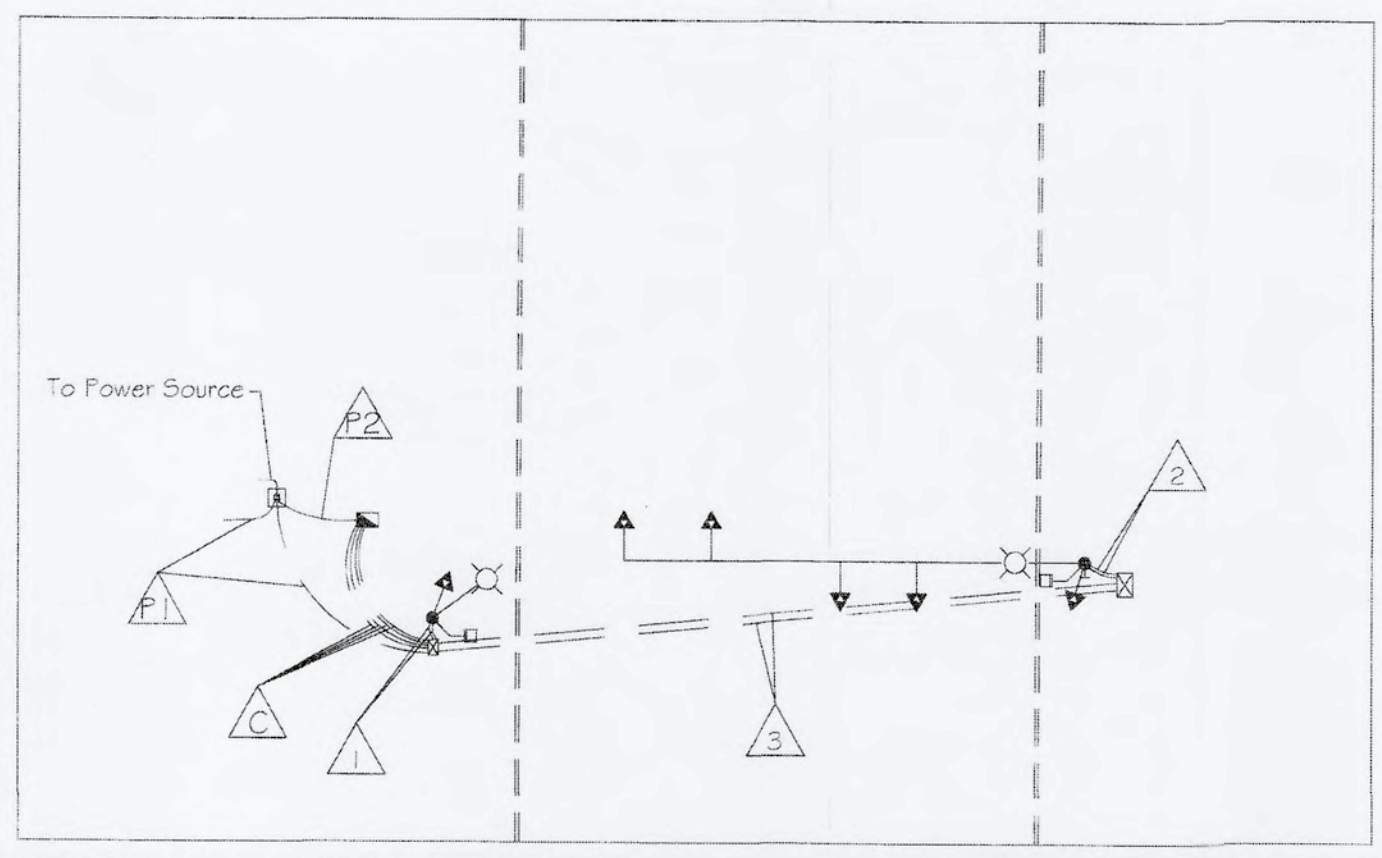
7 CONDUCTOR HAWK ONLY	
INSULATION COLOR	SIGNAL INTERVAL
Black	Left Red Signal
Red	Right Red Signal
Orange	Yellow
Blue	Don't Walk
Green	Walk
White/Black	Push Button
White	Push Button Common

ADA PUSH BUTTON		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	PUSH BUTTON STATION
1	Black	Push Button
2	White	Push Button Common
3	Green	Spare

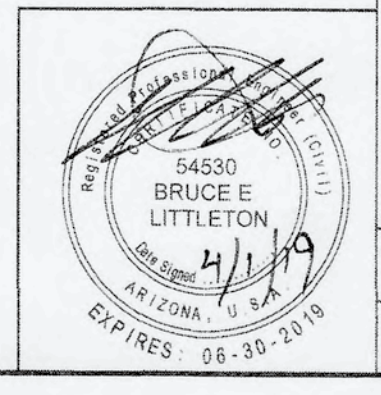
PEDESTRIAN HEAD		
5 CONDUCTOR CABLE		
NO.	BASIC COLOR	SIGNAL INTERVAL
1	Black	Don't Walk
2	White	Pedestrian Common
3	Red	Spare
4	Green	Walk
5	Orange	Spare



High Intensity Activated CrossWalk (HAWK) Schematic - Single Mast Arm



<p><b>C</b> Controller to #7 Junction Box</p> <table border="1"> <tr> <th>CONDUIT 1</th> <th>CONDUIT 2</th> <th>CONDUIT 3</th> <th>CONDUIT 4</th> <th>CONDUIT 5 to PSP</th> <th>CONDUIT 6 Stub Out</th> </tr> <tr> <td>#10 Bare Copper #10 AWG White 7C IMSA Cable</td> <td>#10 Bare Copper ITS Cable</td> <td>#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green</td> <td>Detectable Mute Tape</td> <td>#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green</td> <td>Detectable Mute Tape</td> </tr> </table>	CONDUIT 1	CONDUIT 2	CONDUIT 3	CONDUIT 4	CONDUIT 5 to PSP	CONDUIT 6 Stub Out	#10 Bare Copper #10 AWG White 7C IMSA Cable	#10 Bare Copper ITS Cable	#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green	Detectable Mute Tape	#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green	Detectable Mute Tape	<p><b>F1</b> Power Service Pedestal to #7 Junction Box</p> <table border="1"> <tr> <th>CONDUIT 1</th> <th>CONDUIT 2</th> </tr> <tr> <td>#10 Bare Copper 5C IMSA Cable 3C Radio 3C Luminaire</td> <td>Stub Out</td> </tr> </table>	CONDUIT 1	CONDUIT 2	#10 Bare Copper 5C IMSA Cable 3C Radio 3C Luminaire	Stub Out	<p><b>F2</b> Power Service Pedestal to Controller</p> <table border="1"> <tr> <th>CONDUIT 3</th> </tr> <tr> <td>#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green 5C IMSA Cable</td> </tr> </table>	CONDUIT 3	#10 Bare Copper #10 AWG Black #10 AWG White #10 AWG Green 5C IMSA Cable
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CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TYPICAL HAWK  
PEDESTRIAN CROSSING BEACON  
SINGLE MAST ARM

TPP File Number 10164  
DATE: 4-1-2019  
TRAFFIC SERVICES DEPUTY DIRECTOR

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TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT

PROJECT #:	DR:	DES:	CK:	SHEET NO:	TOTAL SHEETS:
	DATE:	DATE:	DATE:	4-1-2019	
SCALE:	OS #:				



TRAFFIC SIGNAL COLOR CODE TABLE					
SIGNAL INDICATION	PHASE / DIRECTION	INSIDE/OUTSIDE BUNDLE COLOR	42 CONDUCTOR CABLE	25 CONDUCTOR CABLE	20 CONDUCTOR CABLE
		OUTSIDE BUNDLE ORANGE			
Red Yellow Green	Eastbound	Outside Outside Outside	Red Orange Green	Red Orange Green	Red Orange Green
Red Yellow Green	Northbound	Outside Outside Outside	Red/Black Orange/Black Green/Black	Red/Black Orange/Black Green/Black	Red/Black Orange/Black Green/Black
L/T Red Arrow L/T Yellow Arrow L/T Green Arrow	Eastbound to Northbound	Outside Outside Outside	Red/White Orange/Red Green/White	Red/White Orange/Red Green/White	Red/White Orange/Red Green/White
L/T Red Arrow L/T Yellow Arrow L/T Green Arrow	Northbound to Westbound	Outside Outside Outside	Red/Green Orange/Green Blue/Red	Red/Green Orange/Green Blue/Red	Red/Green Orange/Red Blue/Red
Walk Don't Walk	East/West North Leg	Outside Outside	Blue Black	Blue Black	Blue Black
Walk Don't Walk	North/South East Leg	Outside Outside	Blue/White Black/White	Blue/White Black/White	Blue/White Black/White
Ped Push Button	East/West North Leg	Outside	White/Black	White/Black	White/Black
Ped Push Button	North/South East Leg	Outside	White/Red	White/Red	White/Red
Ped Common	All	Outside	White	White	White
Spare	North to West Flashing Yellow Arrow	Outside	Blue/Black	Blue/Black	Blue/Black
Spare	East to North Flashing Yellow Arrow	Outside	Black/Red	Black/Red	
Spare				Yellow/Red	
Spare				Yellow/Blue	
Spare				Brown	
Spare				Brown/White	
		INSIDE BUNDLE BLUE			
Red Yellow Green	Westbound	Inside Inside Inside	Red Orange Green	Red Orange Green	Red Orange Green
Red Yellow Green	Southbound	Inside Inside Inside	Red/Black Orange/Black Green/Black	Red/Black Orange/Black Green/Black	Red/Black Orange/Black Green/Black
L/T Red Arrow L/T Yellow Arrow L/T Green Arrow	Westbound to Southbound	Inside Inside Inside	Red/White Orange/Red Green/White	Red/White Orange/Red Green/White	Red/White Orange/Red Green/White
L/T Red Arrow L/T Yellow Arrow L/T Green Arrow	Southbound to Eastbound	Inside Inside Inside	Red/Green Orange/Green Blue/Red	Red/Green Orange/Green Blue/Red	Red/Green Orange/Red Blue/Red
Walk Don't Walk	East/West South Leg	Inside Inside	Blue Black	Blue Black	Blue Black
Walk Don't Walk	North/South West Leg	Inside Inside	Blue/White Black/White	Blue/White Black/White	Blue/White Black/White
Ped Push Button	East/West South Leg	Inside	White/Black	White/Black	White/Black
Ped Push Button	North/South West Leg	Inside	White/Red	White/Red	White/Red
Ped Common	All	Inside	White	White	White
Spare	South to East Flashing Yellow Arrow	Inside	Blue/Black	Blue/Black	Blue/Black
Spare	West to South Flashing Yellow Arrow	Inside	Black/Red	Black/Red	
Spare				Yellow/Red	
Spare				Yellow/Blue	
Spare				Brown	
Spare				Brown/White	

TYPE F SIGNAL HEADS INSIDE & SIDE MOUNT		
5 CONDUCTOR CABLE		
NO.	BASIC COLOR	SIGNAL INTERVAL
1	Black	Spare
2	White	Vehicle Common
3	Red	Red
4	Green	Green
5	Orange	Yellow

OUTSIDE MAST ARM AND TYPE Q HEADS		
7 CONDUCTOR CABLE		
NO.	BASIC COLOR	SIGNAL INTERVAL
1	Black	Yellow Arrow
2	White	Vehicle Common
3	Red	Red
4	Green	Green
5	Orange	Yellow
6	Blue	Green Arrow
7	White/Black	Spare

4 SECTION FLASHING YELLOW ARROW MAST ARM AND SIDE MOUNT		
7 CONDUCTOR CABLE		
NO.	BASIC COLOR	SIGNAL INTERVAL
1	Black	Flashing Yellow Arrow
2	White	Vehicle Common
3	Red	Red Arrow
4	Green	Green Arrow
5	Orange	Yellow Arrow
6	Blue	Spare
7	White/Black	Spare

LRT 2 Indication Signal		
7 CONDUCTOR CABLE		
NO.	BASIC COLOR	INDICATION
1	Black	Diagonal
2	White	Neutral
3	Red	Horizontal Bar W/B
4	Green	Vertical Bar E/B
5	Orange	Horizontal Bar E/B
6	Blue	Vertical Bar W/B
7	White/Black	Spare

LRT 3 Indication Signal		
7 CONDUCTOR CABLE		
NO.	BASIC COLOR	INDICATION
1	Black	Diagonal
2	White	Neutral
3	Red	Horizontal Bar
4	Green	Vertical Bar
5	Orange	Spare
6	Blue	Spare
7	White/Black	Spare

LRT Signal 5 Conductor Head to Hand Hole		
5 CONDUCTOR CABLE		
NO.	BASIC COLOR	INDICATION
1	Black	Diagonal
2	White	Neutral
3	Red	Horizontal Bar
4	Green	Vertical Bar
5	Orange	Spare

**NOTES**  
5 conductor cable from all LRV head to hand hole  
2-7 conductor to all 3 headed LRV signal poles

120V ILLUMINATED STREET SIGN AND LUMINAIRE		
5 CONDUCTOR CABLE		
NO.	COLOR	FUNCTION
1	Black	Sign
2	White	Neutral (Shared)
3	Red	Luminaire
4	Green	Ground
5	Orange	Spare

240V ILLUMINATED STREET SIGN AND LUMINAIRE		
5 CONDUCTOR CABLE		
NO.	COLOR	FUNCTION
1	Black	Sign
2	White	Sign
3	Red	Luminaire
4	Green	Ground
5	Orange	Luminaire

LUMINAIRE (FROM LUMINAIRE)		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	FUNCTION
1	Black	Load
2	White	Neutral
3	Green	Ground

ILLUMINATED STREET SIGN (FROM SIGN)		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	FUNCTION
1	Black	Load
2	White	Neutral
3	Green	Ground

ADA PUSH BUTTON		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	PUSH BUTTON STATION
1	Black	Push Button
2	White	Push Button Common
3	Green	Spare

PEDESTRIAN HEAD		
5 CONDUCTOR CABLE		
NO.	BASIC COLOR	SIGNAL INTERVAL
1	Black	Don't Walk
2	White	Pedestrian Common
3	Red	Spare
4	Green	Walk
5	Orange	Spare

COMMUNICATION RADIO		
3 CONDUCTOR CABLE		
NO.	BASIC COLOR	FUNCTION
1	Black	Load
2	White	Neutral
3	Green	Ground

BLANK OUT SIGN		
5 CONDUCTOR CABLE		
NO.	COLOR	FUNCTION
1	Black	BO Sign
2	White	Neutral
3	Red	BO Sign *
4	Orange	Spare
5	Green	Spare

\* Where second function is required

OUTSIDE BUNDLE MARKED WITH ORANGE TAPE

INSIDE BUNDLE MARKED WITH BLUE TAPE

F.P.W.A. REGION	STATE	PROJ. NO.	NO.	TOTAL
9	ARIZ.			

DR: \_\_\_\_\_ DES: \_\_\_\_\_ CK: \_\_\_\_\_ DATE: \_\_\_\_\_

- GENERAL NOTES**
- All IMSA Cable shall be pulled continuous (no splicing) from the Terminal Compartment in each Signal Head or Push Button Station to the Hand Hole at the base of Pole
  - Cable shall be utilized as follows:  
3 Conductor - All ADA Push Button Stations  
Luminaires, Illuminated Street Signs, Detection Cameras  
5 Conductor - All 3 Section, 4 Section Signal Heads, HAWK Signal Heads, Pedestrian Heads, Audible pushbutton Stations  
7 Conductor - All outside Mast Arm and Type Q Signal Heads
  - Orange (North or East) or blue (South or West) Tape shall be applied six (6) inches above PVC bell end on IMSA Cable Jacket in Junction Box
  - All Cable shall be tagged in the Hand Hole with orange (North or East) or blue (South or West) tape as follows:

MAST ARM VEHICLE INDICATIONS		
HEAD	CONDUCTORS	TAPE(S)
On Pole	5	1
First on Mast Arm	5	2
Next Outside	5	3
Next Outside	5	4
End of Mast Arm	7	5*

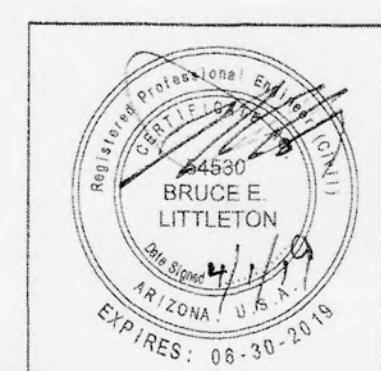
\* Band Number corresponds to Head Number

- IMSA Cables for Pedestrian Heads shall be identified in Hand Hole using Brown tape in addition to color of phase.
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- CAT 5e Cable shall be pulled continuous from Wireless Radio to inside the Controller Cabinet.
- CCTV Cable and Video Detection Cable shall be pulled continuous from the device to inside the Controller Cabinet.
- All IMSA Cable to be #16 AWG Stranded unless otherwise noted on approved signal plans. When terminating in Signal Heads use suitable manufactured crimp on connector of appropriate size.

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CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



WIRE CODE TABLES

TPP File Number: 10164

TS 4-1

DATE: 4-1-2019

SCALE: \_\_\_\_\_

PROJECT #:	DR:	DES:	CK:	SHEET NO.:	TOTAL SHEETS:
	DATE:	DATE:	DATE:		
	SCALE:	Q5. #:			

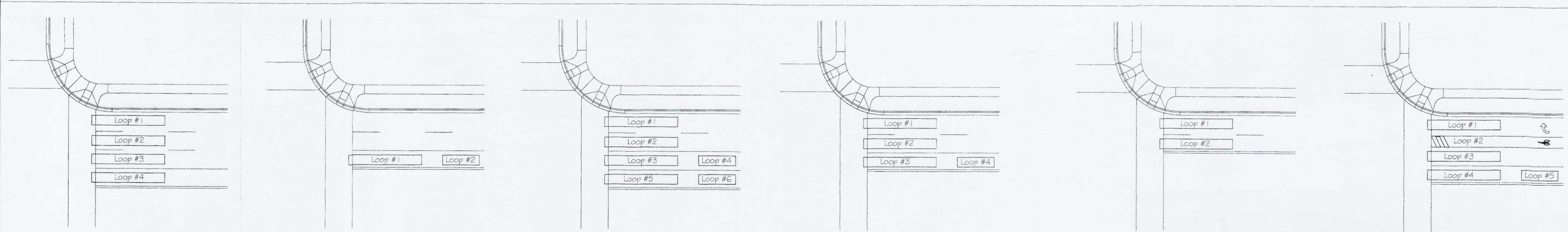
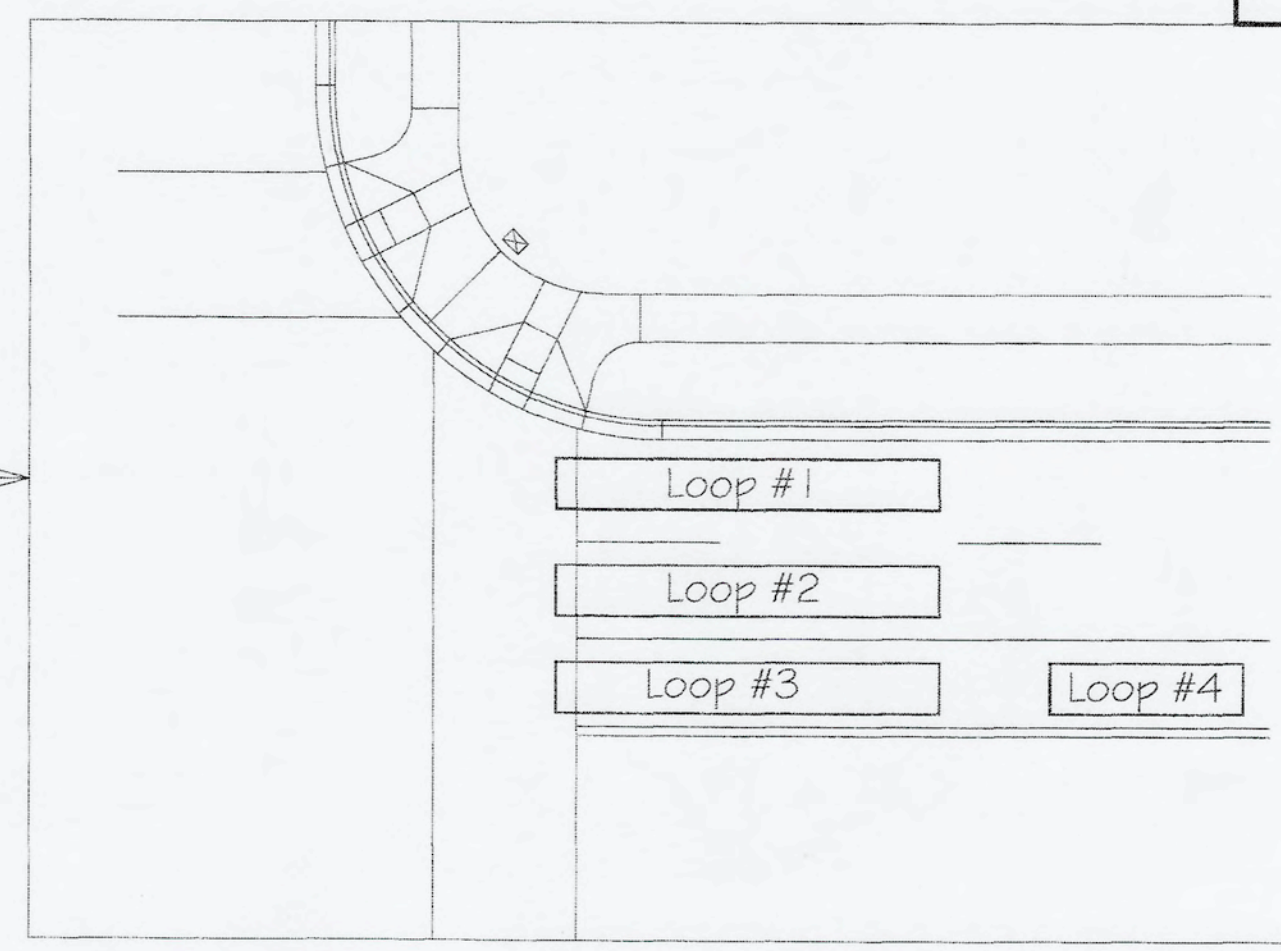
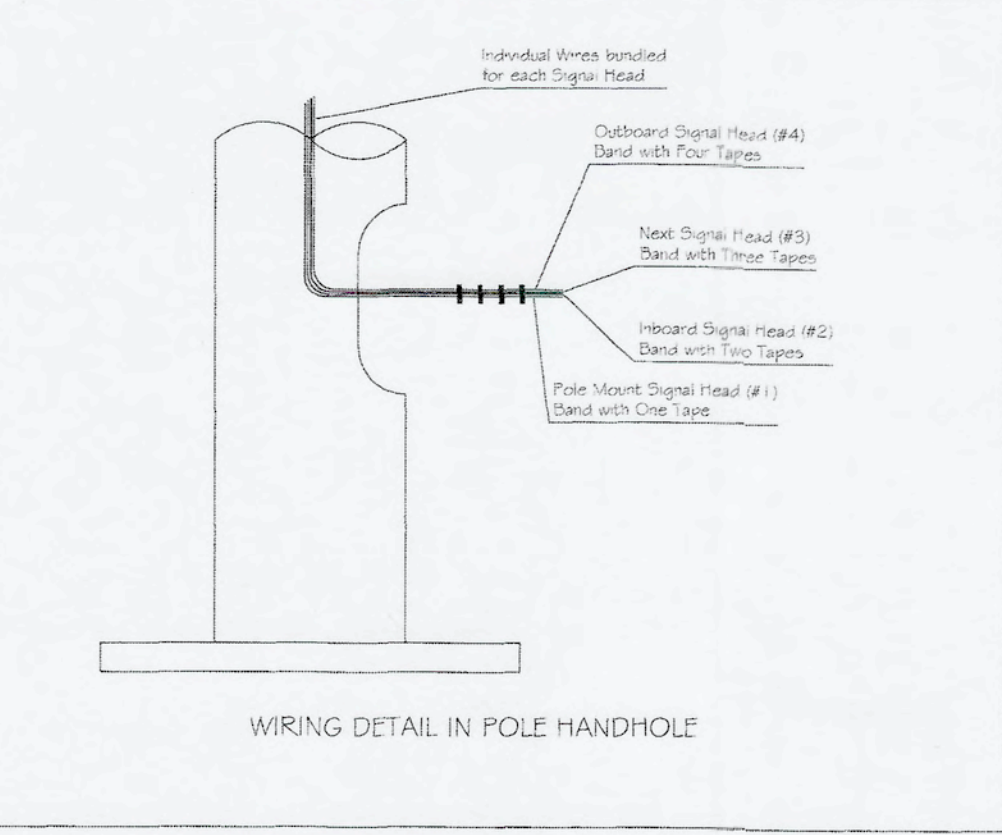
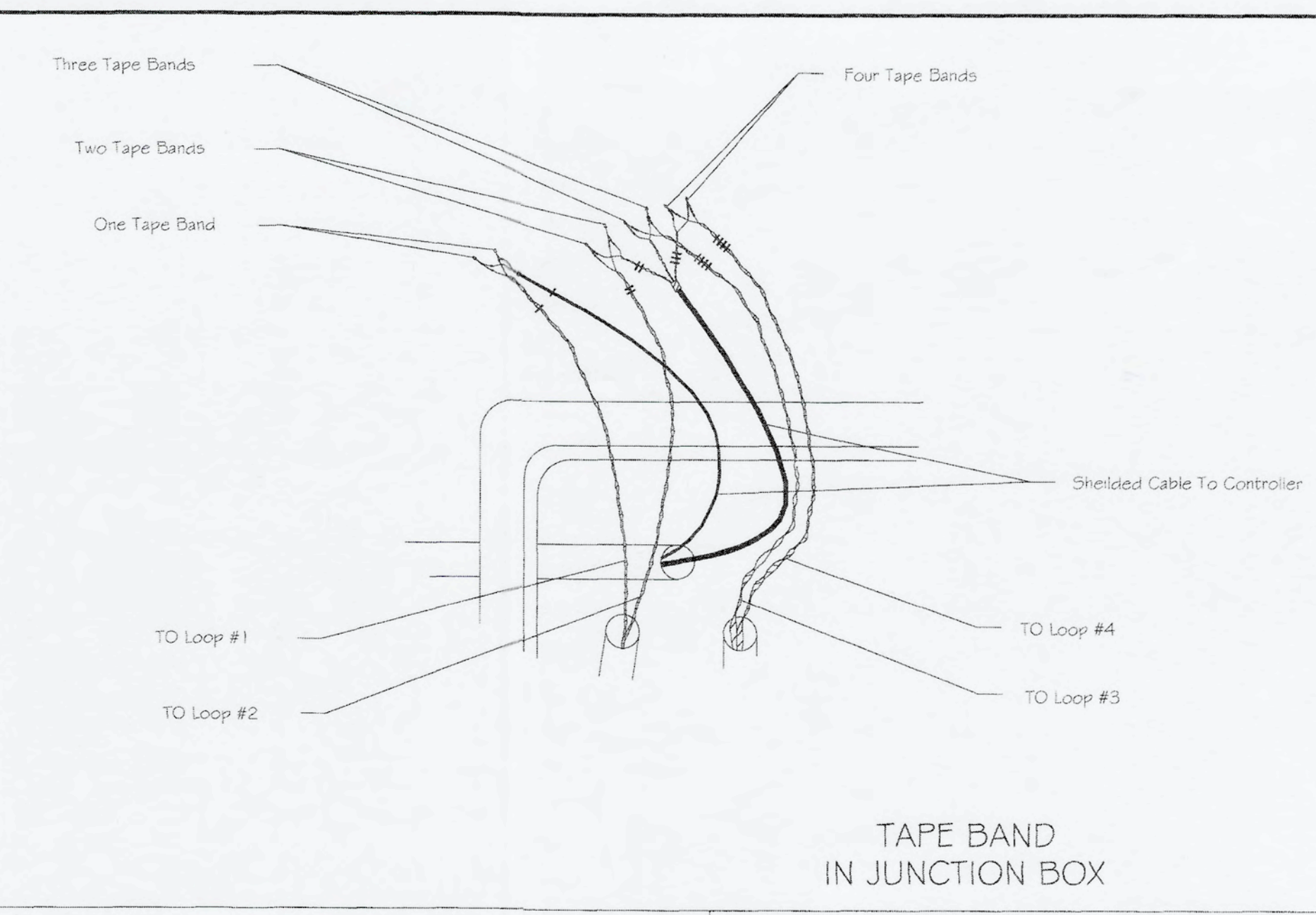
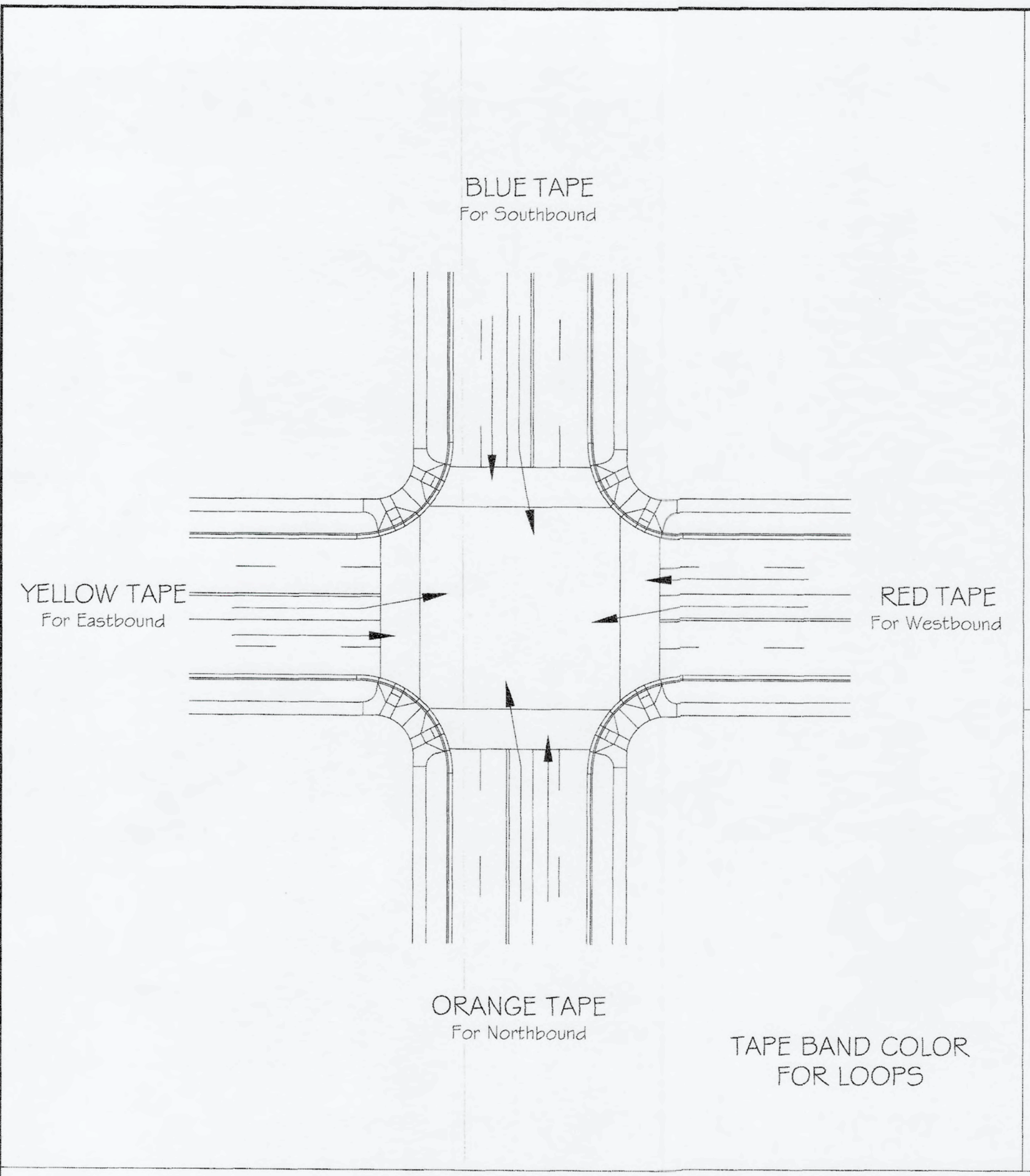






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DR: DES: CK: DATE:



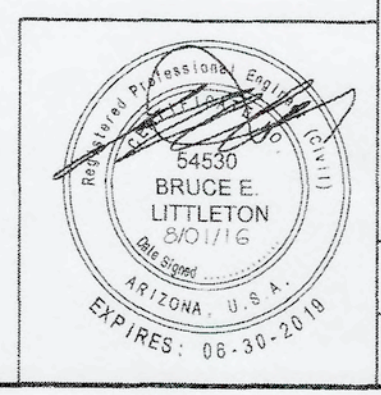
LOOP NUMBERING SCHEME

- 1 - Loop numbering begins with the right most internal loop numbered #1
- 2 - Loops are numbered sequentially in the lane, then to the adjacent lane
- 3 - Numbering starts over with each approach
- 4 - See approved plans for loop locations

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-26, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



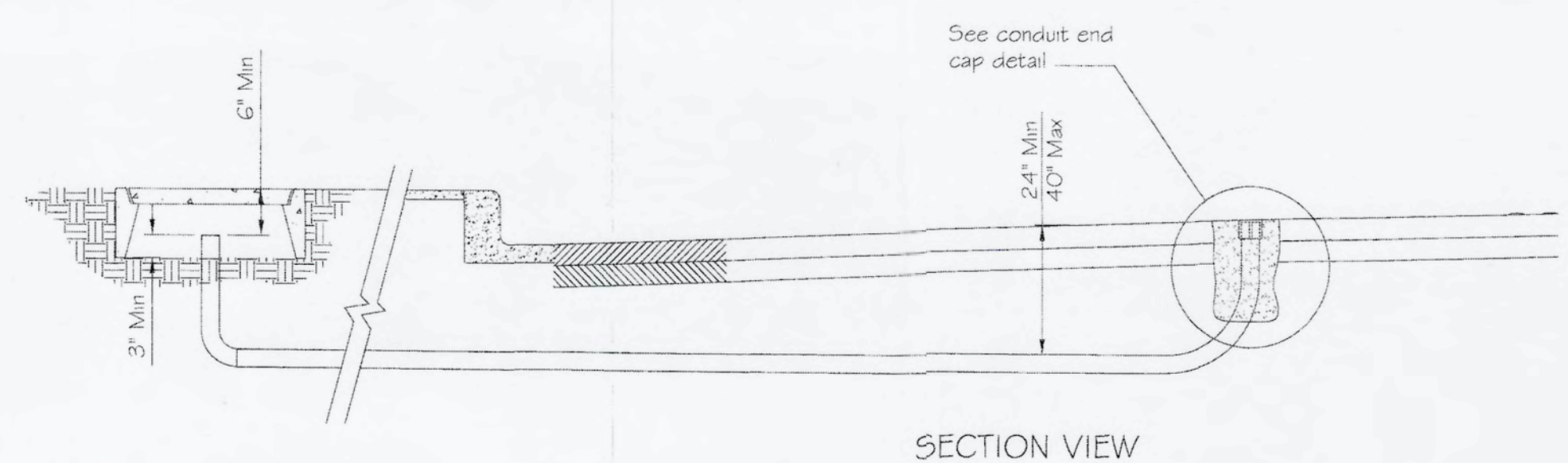
COLOR CODING/BANDING SCHEME  
LOOP NUMBERING

TPP File Number: 10164  
TS 4-3  
8-1-2016

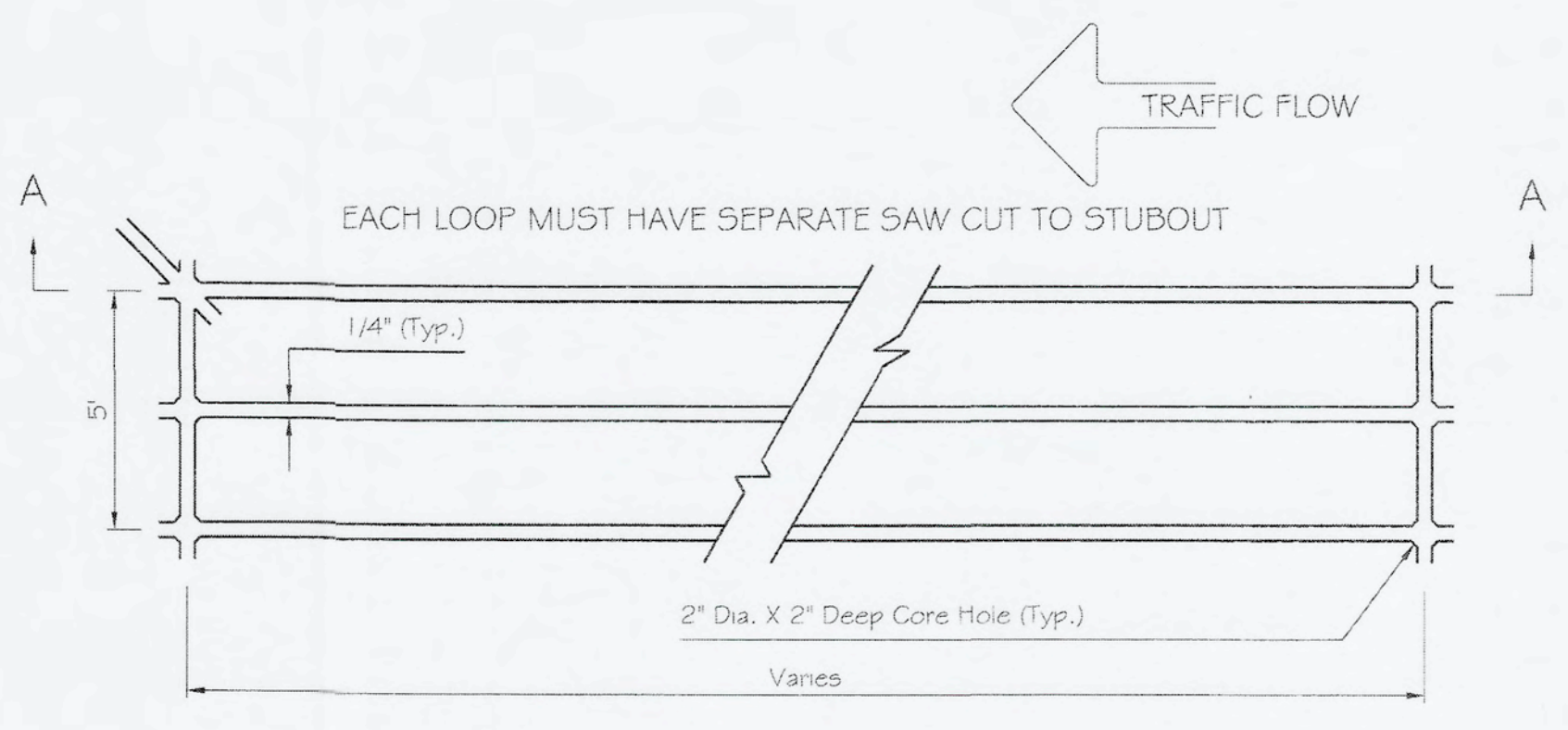
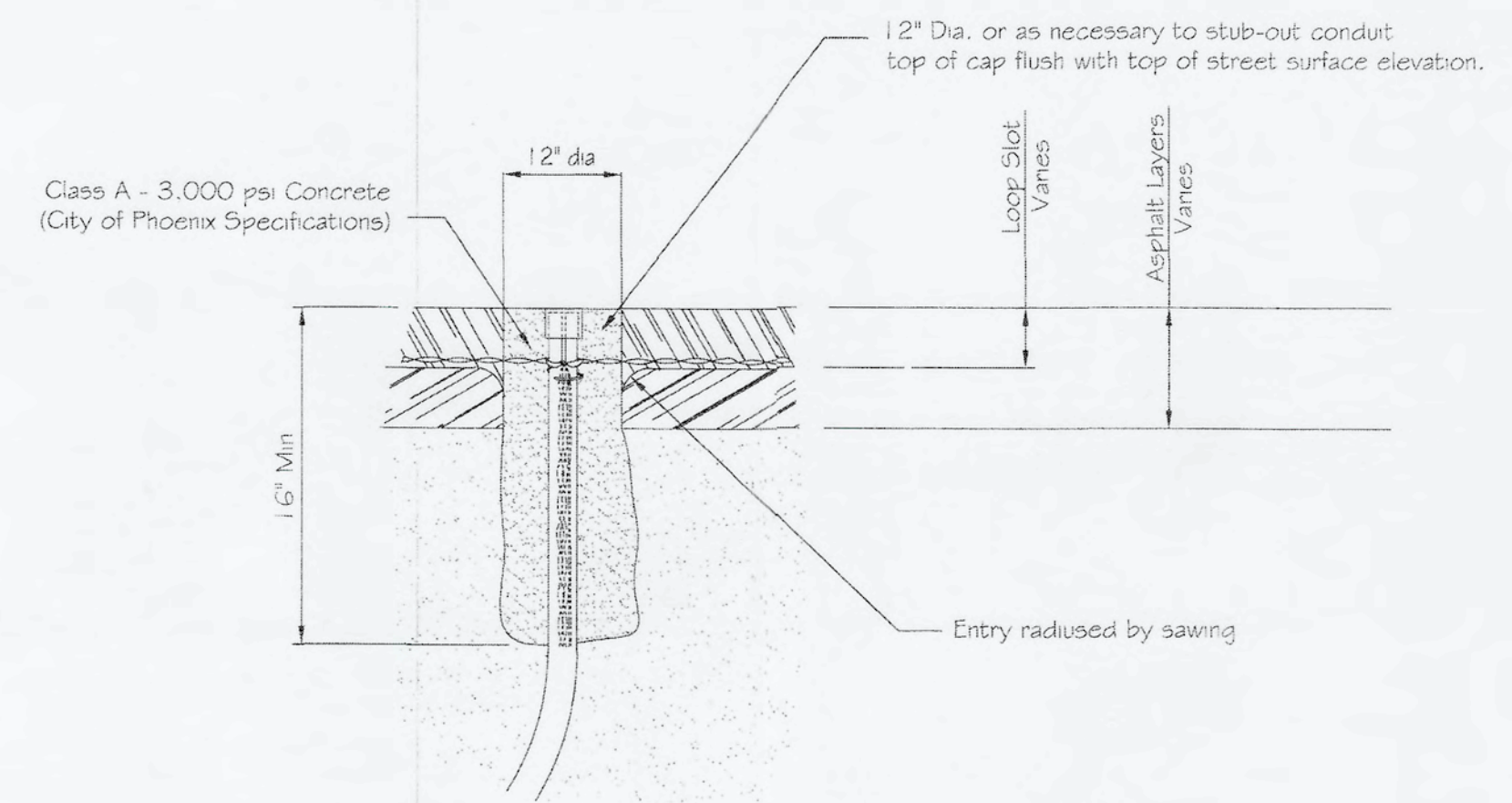
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SCALE:	SCALE:			QS: #:	



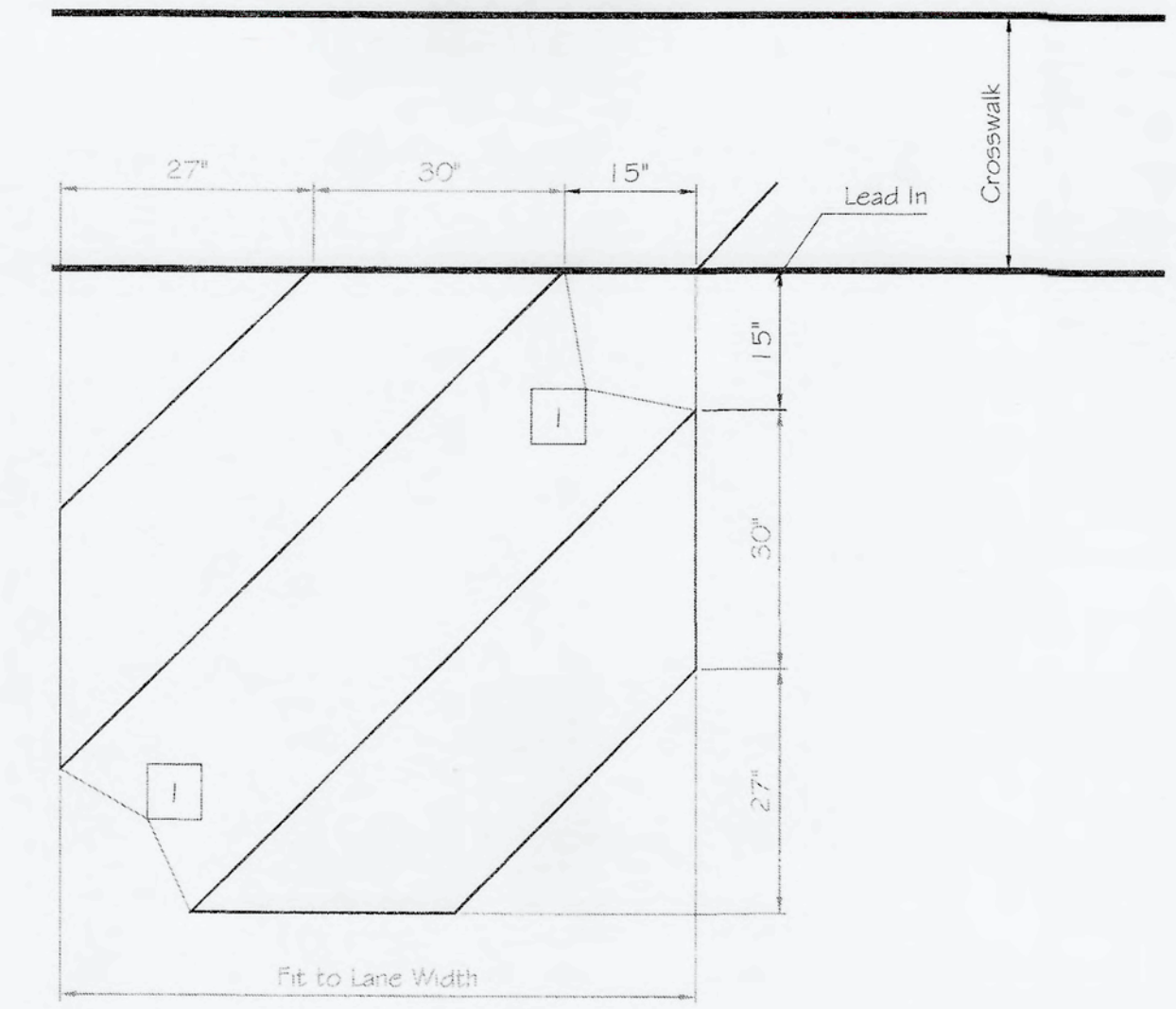
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9	ARIZ.			
DR:	DES:	CK:	DATE:	



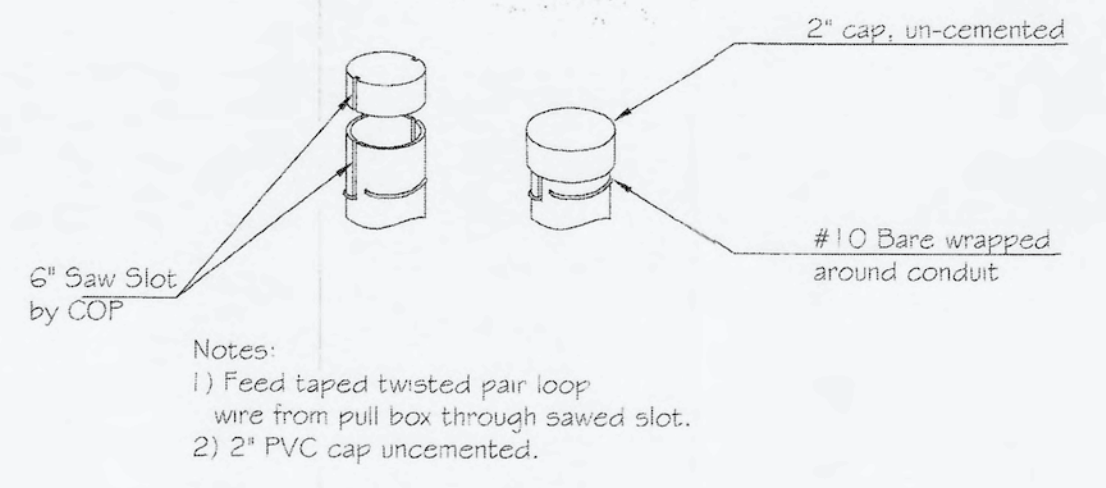
SECTION VIEW  
LOOP TO JUNCTION BOX DETAIL



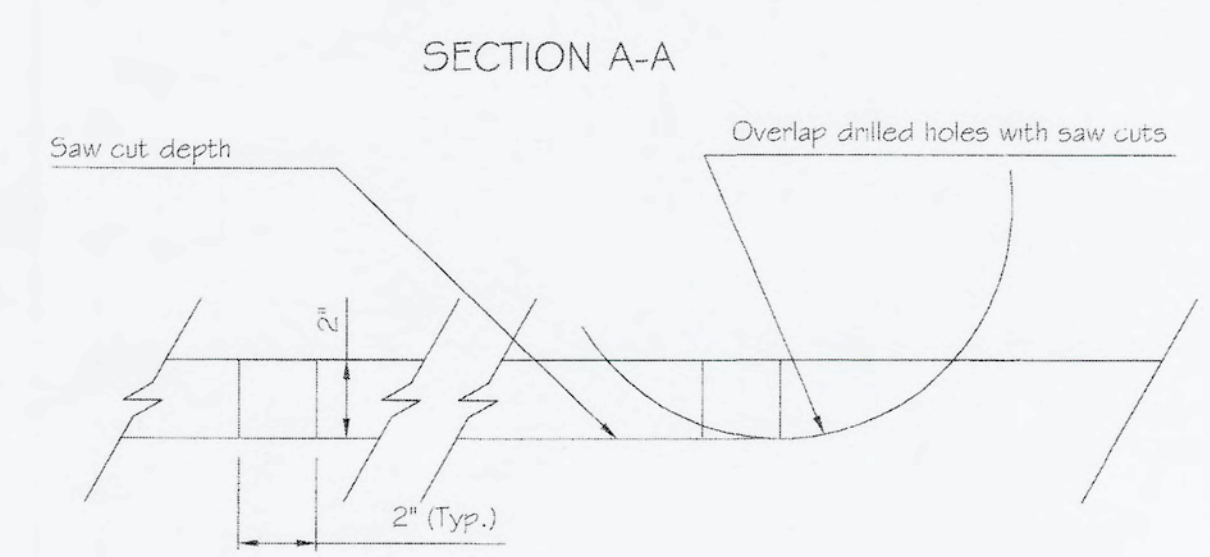
QUADRUPOLE DETECTOR LOOP SAW CUT DETAIL



BICYCLE DETECTOR LOOP SAW CUT DETAIL

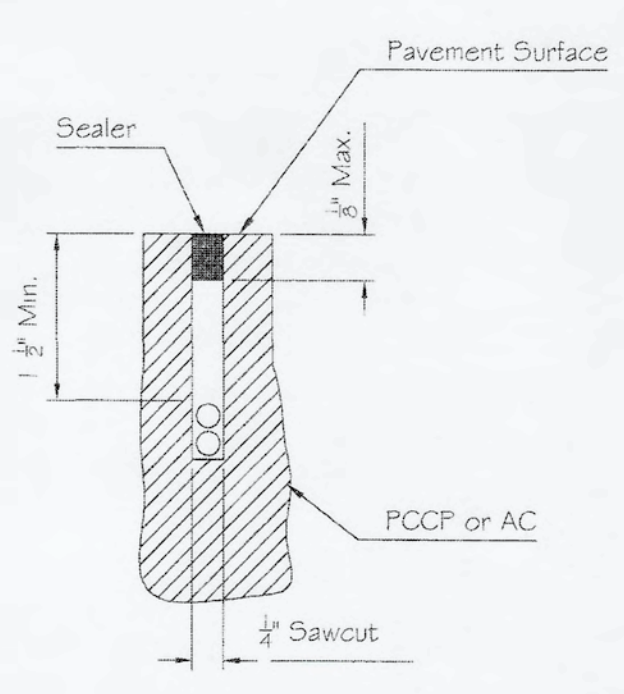


CONDUIT END CAP DETAIL

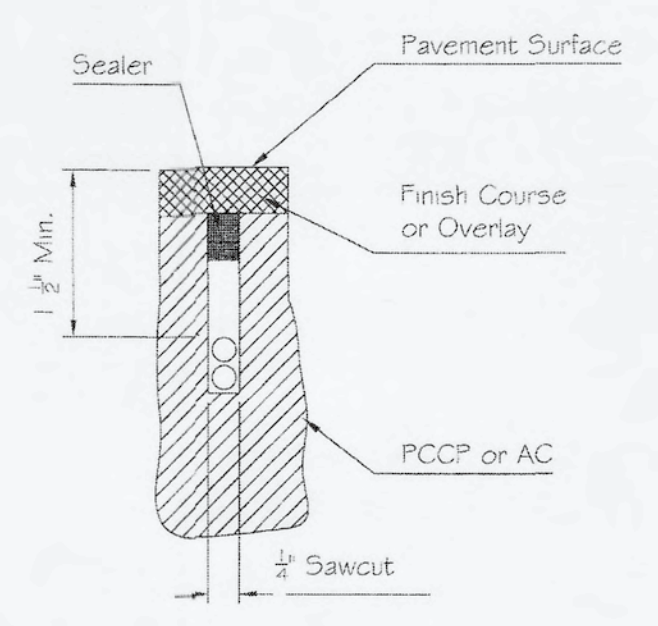


SECTION A-A

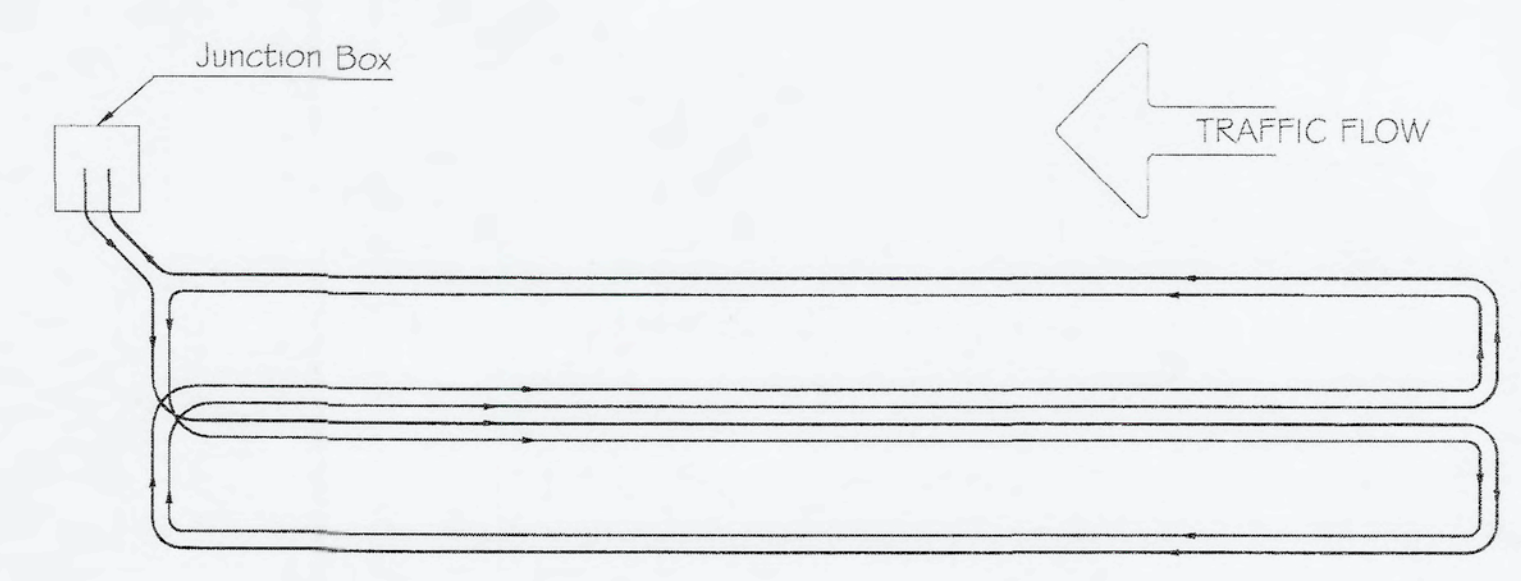
- 1 Round corners of acute angle sawcuts to prevent damage to conductors
- 2 5 Turns



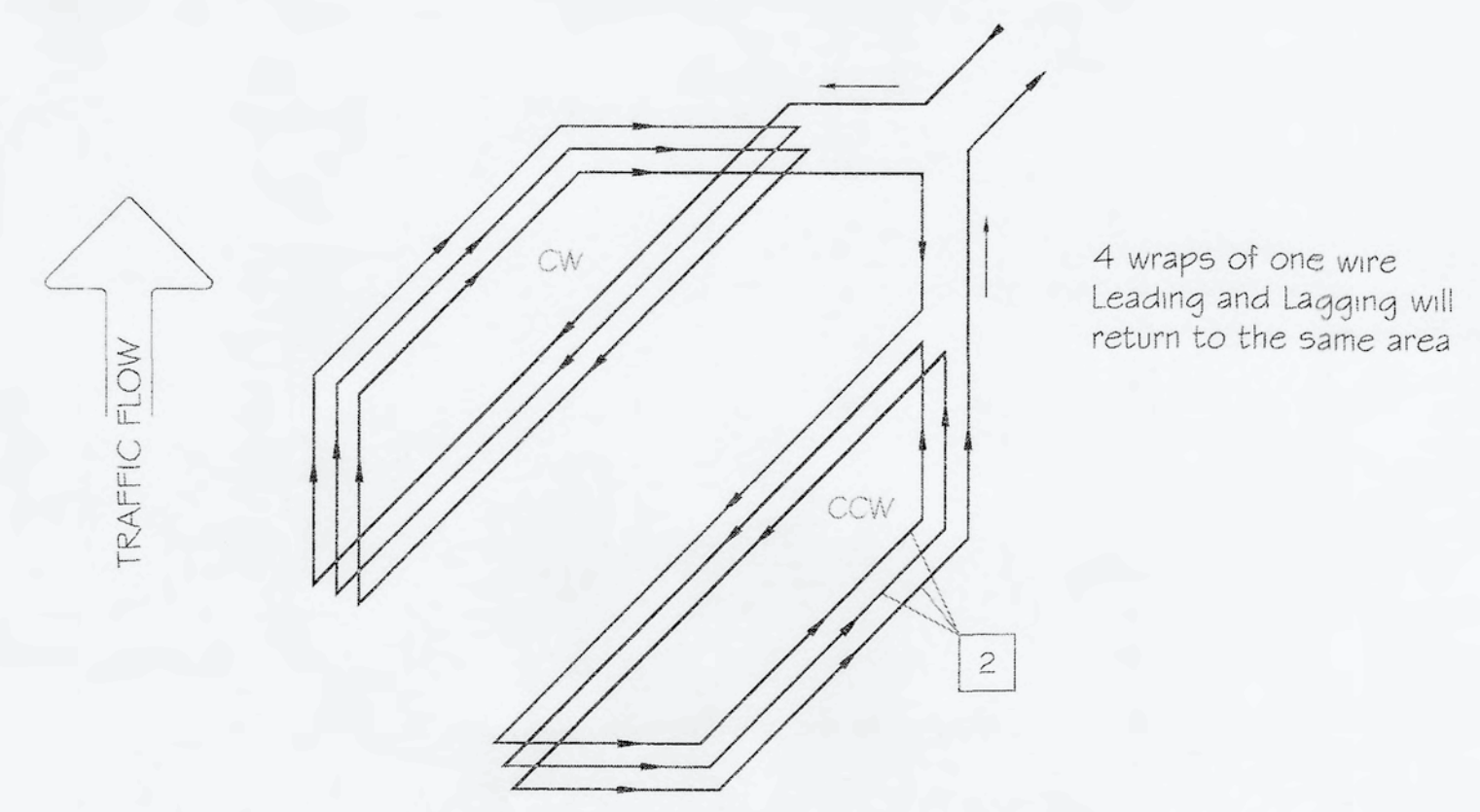
DETAIL 1



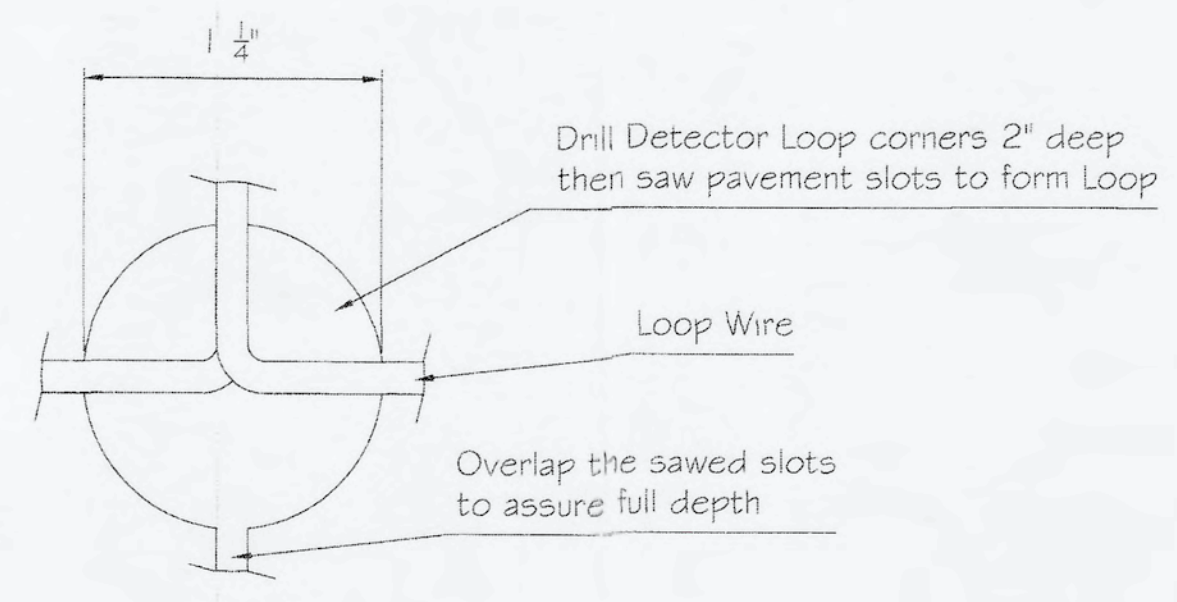
DETAIL 2



QUADRUPOLE DETECTOR LOOP CONDUCTOR PLACEMENT



BICYCLE DETECTOR LOOP CONDUCTOR PLACEMENT

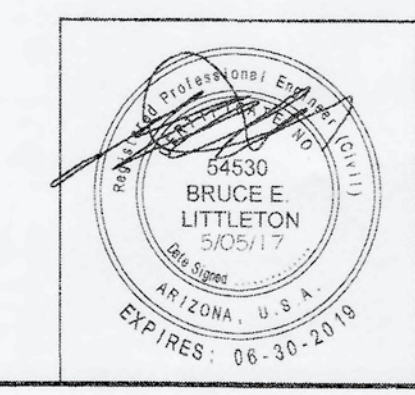


DRILLING DETAIL

\*PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-26, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX.\*

CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



DETECTION LOOPS

TPP File Number: 0164  
DATE: 5-08-2017  
TRAFFIC SERVICES DEPUTY DIRECTOR

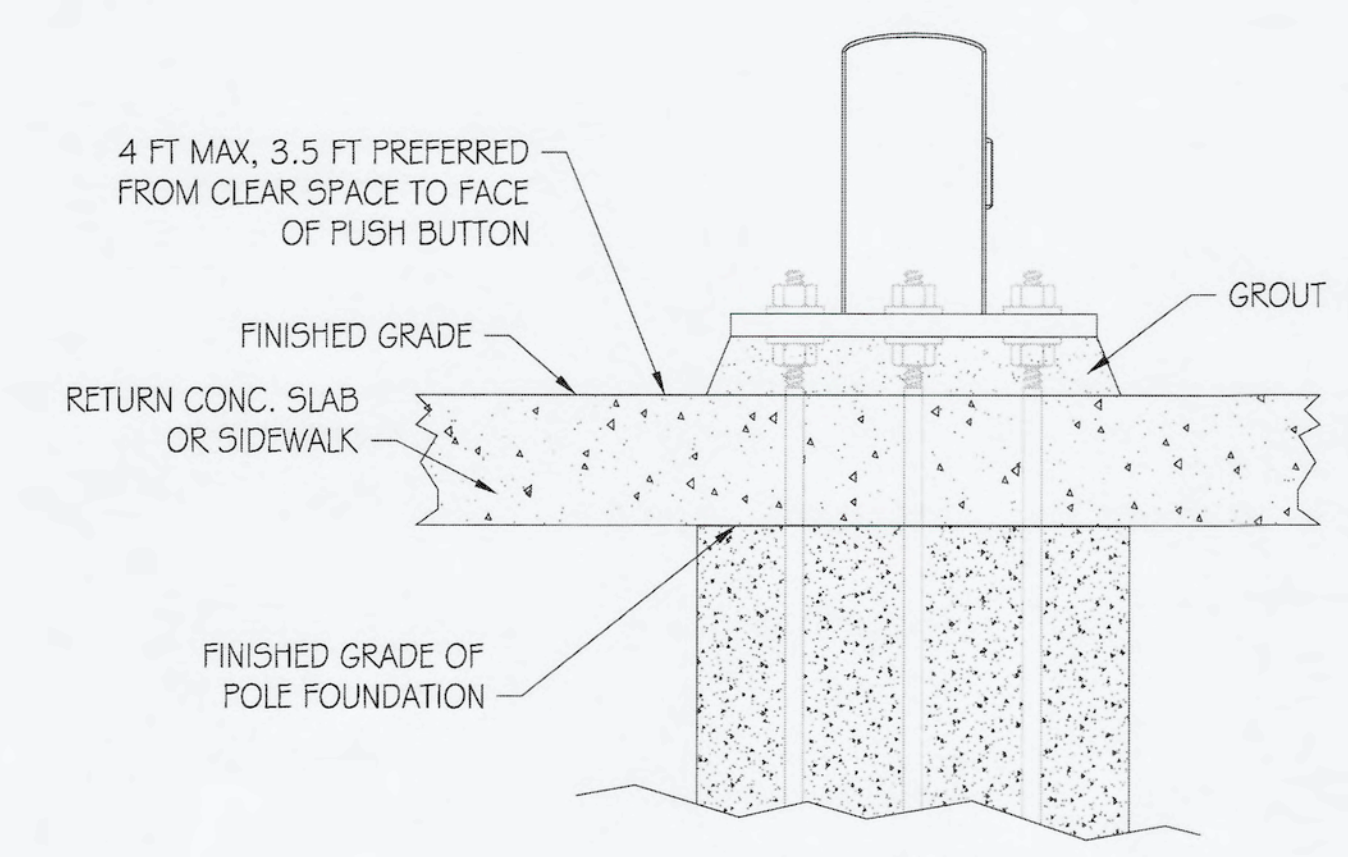
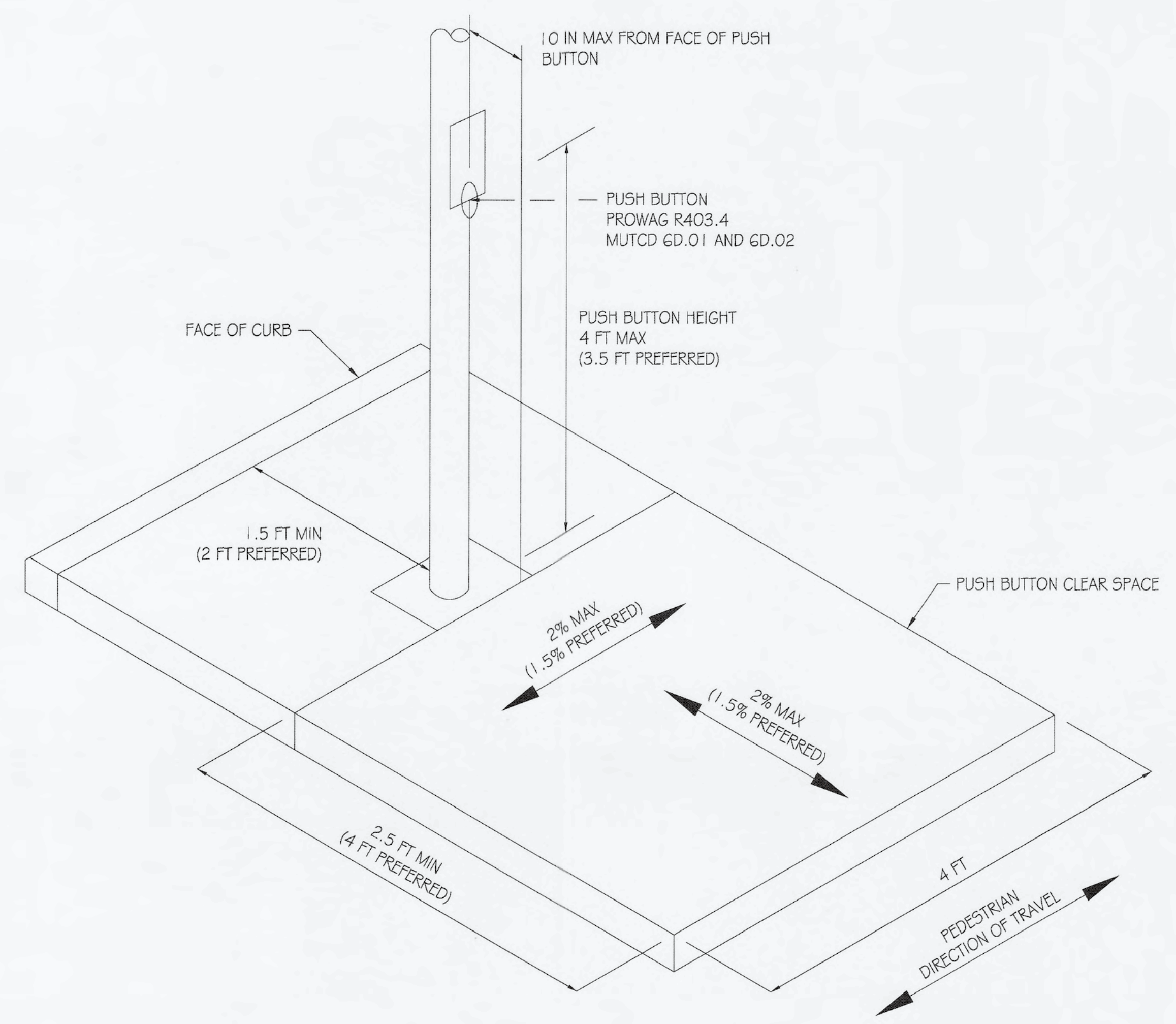
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SCALE:	DATE:	DATE:	DATE:	NO:	SHEETS:



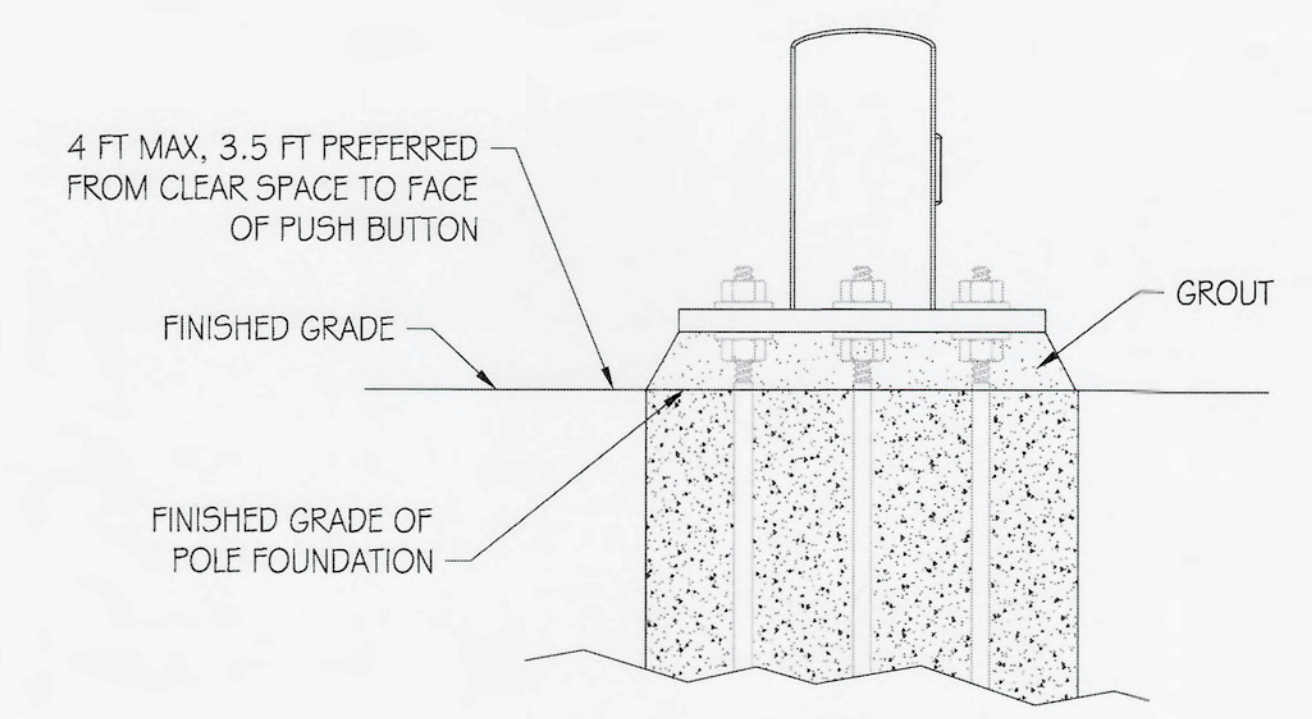
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9	ARIZ.			
DR:		DES:	CK:	DATE:

**CLEAR SPACE NOTES:**

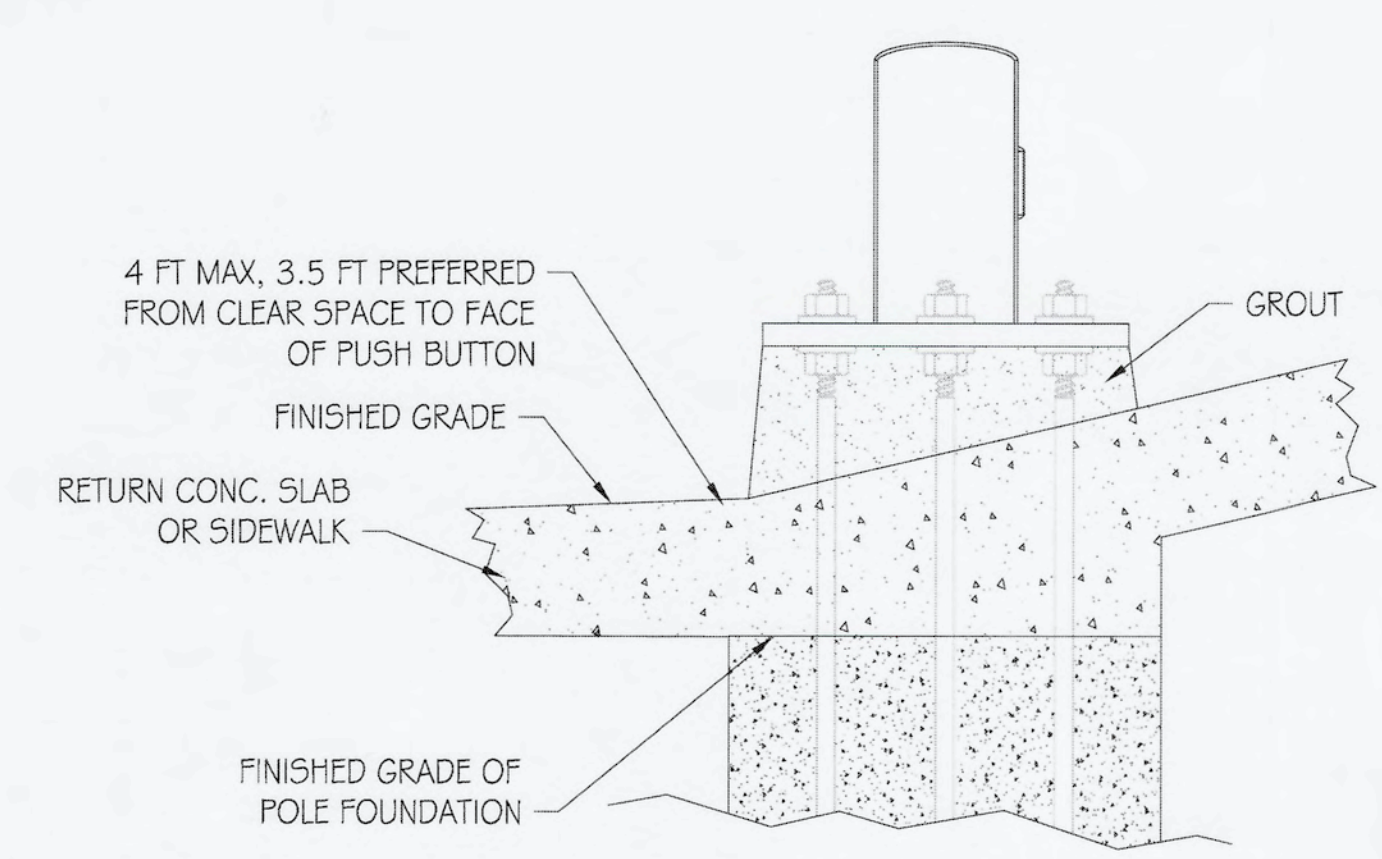
- PUSH BUTTON SHALL HAVE A 2.5 FT MIN (4 FT PREFERRED) X 4 FT CLEAR SPACE CENTERED AT PUSH BUTTON.
- CONCRETE CURB AND GUTTER AT CURB RETURNS WITH CURB RAMPS SHALL BE M.A.G. CLASS A. CONCRETE SIDEWALKS AND CURB RAMPS AT CURB RETURNS SHALL BE M.A.G. CLASS A.
- PUSH BUTTON FACE SHALL BE ALIGNED WITH PEDESTRIAN DIRECTION OF TRAVEL.
- MAINTAIN THE PLANE OF THE LANDING ONE FOOT (FT.) BEYOND THE TOP OF LANDING.
- ADDITIONAL SIDEWALK PER NOTES 2 & 5 WHEN SIGNAL POLES WITH PUSH BUTTONS ARE LOCATED IN THESE MINIMUM 1.5 FT OF SIDEWALK MUST BE PROVIDED BETWEEN FACE OF CURB AND EDGE OF PUSH BUTTON POLE (2 FT PREFERRED).
- PUSH BUTTON SHOULD BE 1.5 FT TO 6 FT FROM EDGE OF CURB. IF PUSH BUTTON CANNOT BE LOCATED WITHIN 6 FT FROM EDGE OF CURB, IT SHOULD NOT BE FURTHER THAN 10 FT FROM EDGE OF CURB.
- PUSH BUTTON CLEAR SPACE AREA TO BE CONCRETE SIDEWALK.
- BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE OF 4 FT MINIMUM BY 4 FT MINIMUM SHALL BE PROVIDED WITH THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE.
- A 4 FT PEDESTRIAN ACCESS ROUTE IS REQUIRED FROM THE ACCEPTABLE AREA FOR PUSH BUTTON LOCATION TO THE EDGE OF CURB RAMP.
- TWO POLES WITH PEDESTRIAN PUSH BUTTONS ON THE SAME CORNER, MUST HAVE A MINIMUM OF 10 FEET SEPARATION.



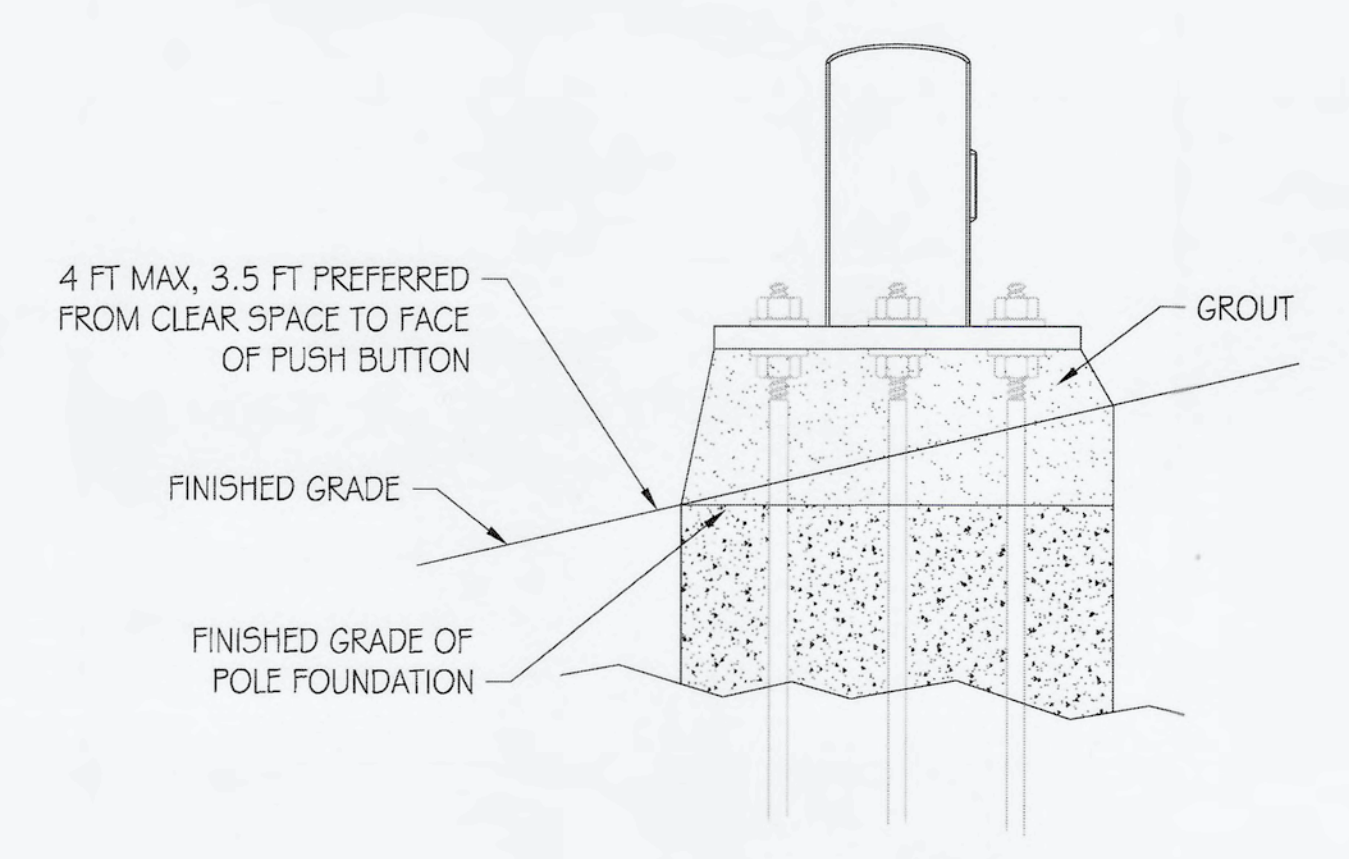
TYPICAL POLE LOCATED WITHIN LEVEL SIDEWALK SLAB



TYPICAL POLE LOCATED WITHIN LEVEL FINISHED GRADE



TYPICAL POLE LOCATED WITHIN ANGLED SIDEWALK SLAB



TYPICAL POLE LOCATED WITHIN ANGLED FINISHED GRADE

"PER CITY OF PHOENIX CITY CODE CHAPTER 2, SECTION 2-28, THESE PLANS ARE FOR OFFICIAL USE ONLY & MAY NOT BE SHARED WITH OTHERS EXCEPT AS REQUIRED TO FULFILL THE OBLIGATIONS OF YOUR CONTRACT WITH THE CITY OF PHOENIX."

CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT  
TRAFFIC SIGNAL STANDARD DETAILS

TRAFFIC SIGNAL DETAILS  
CITY OF PHOENIX, ARIZONA  
STREET TRANSPORTATION DEPARTMENT



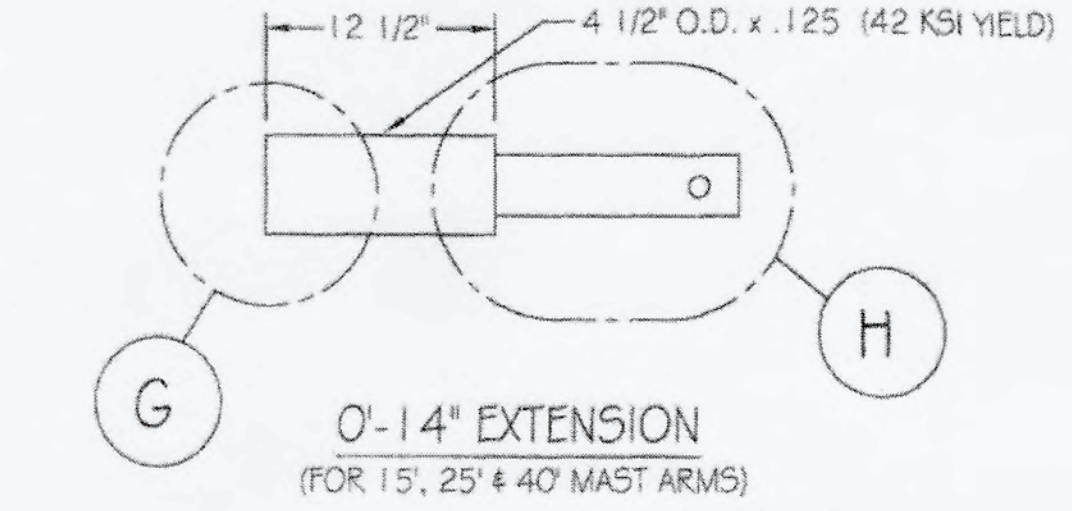
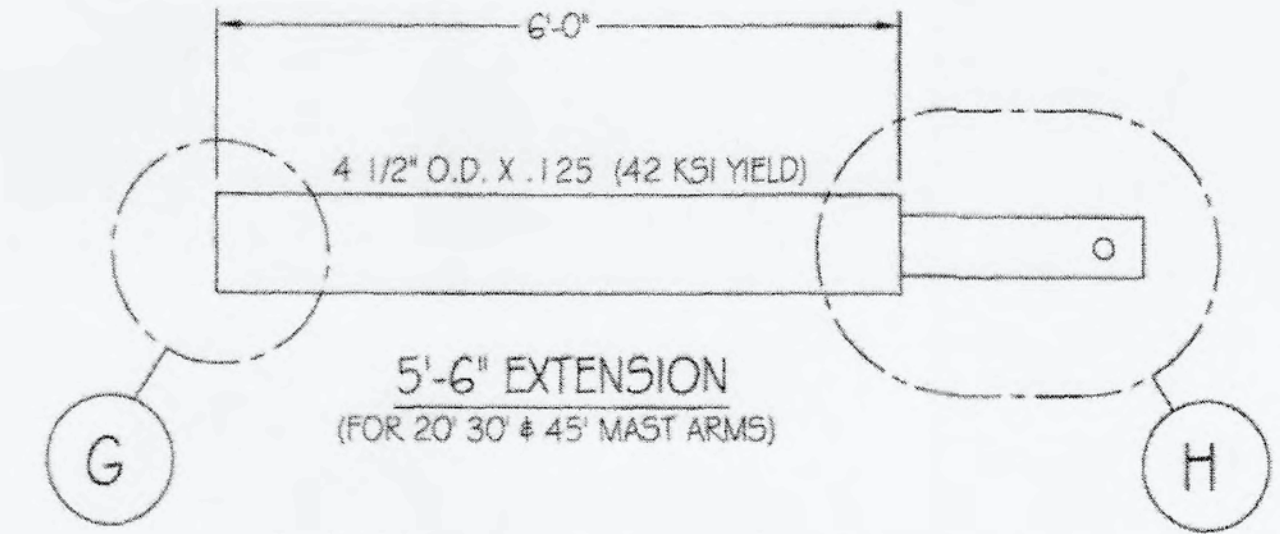
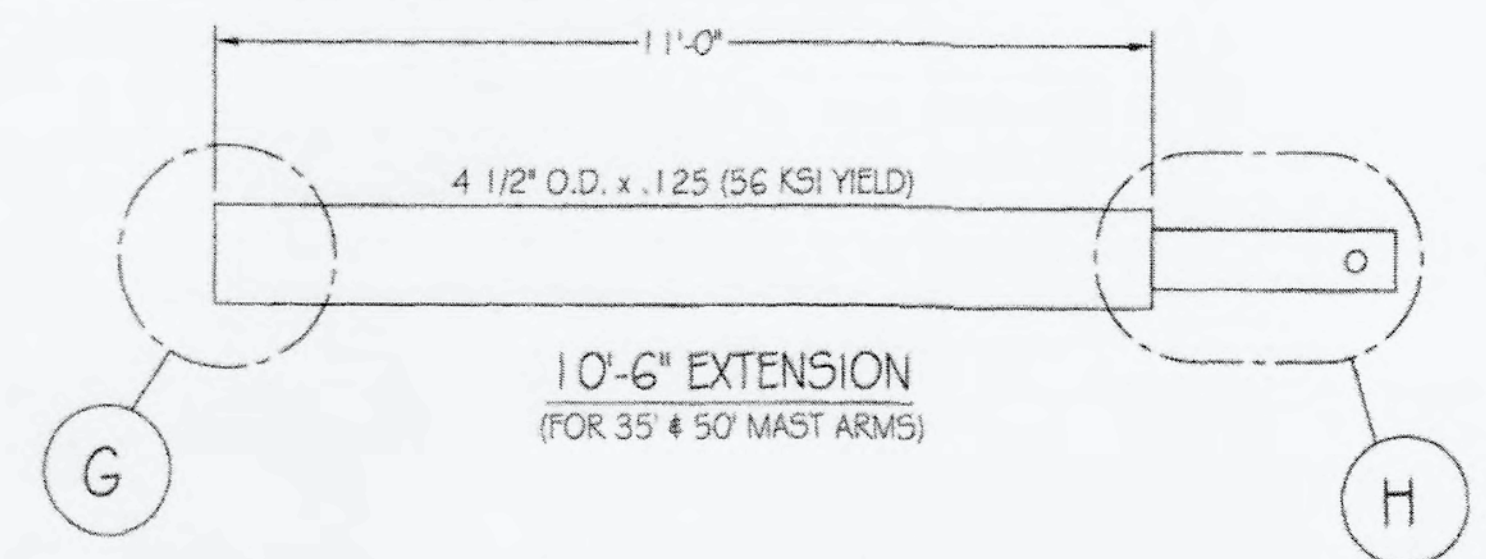
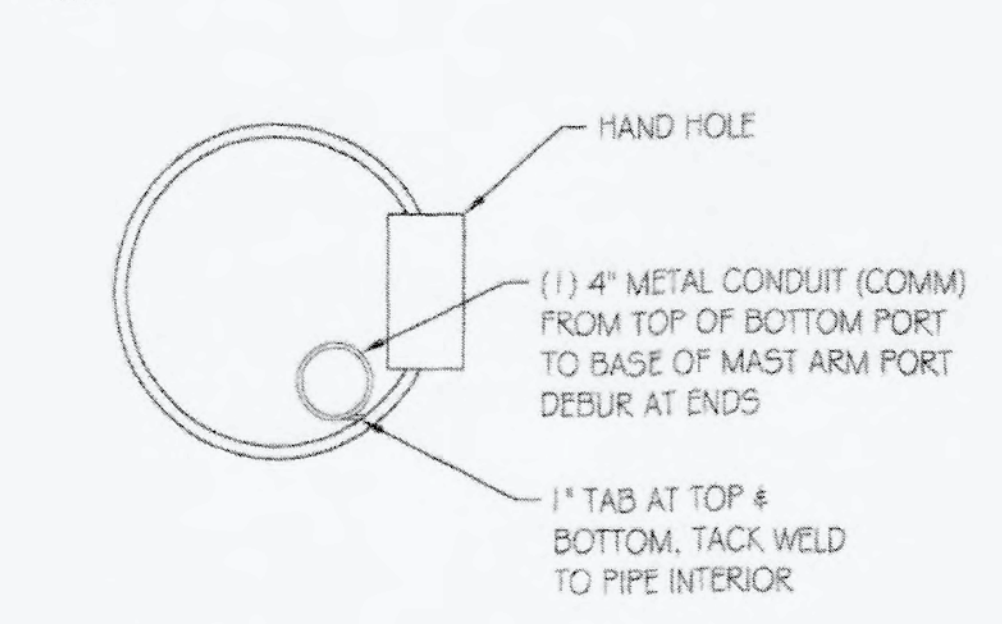
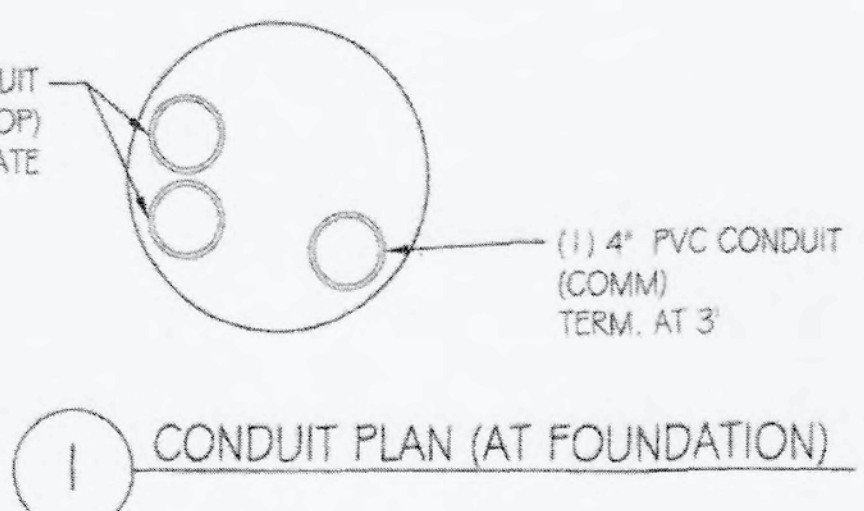
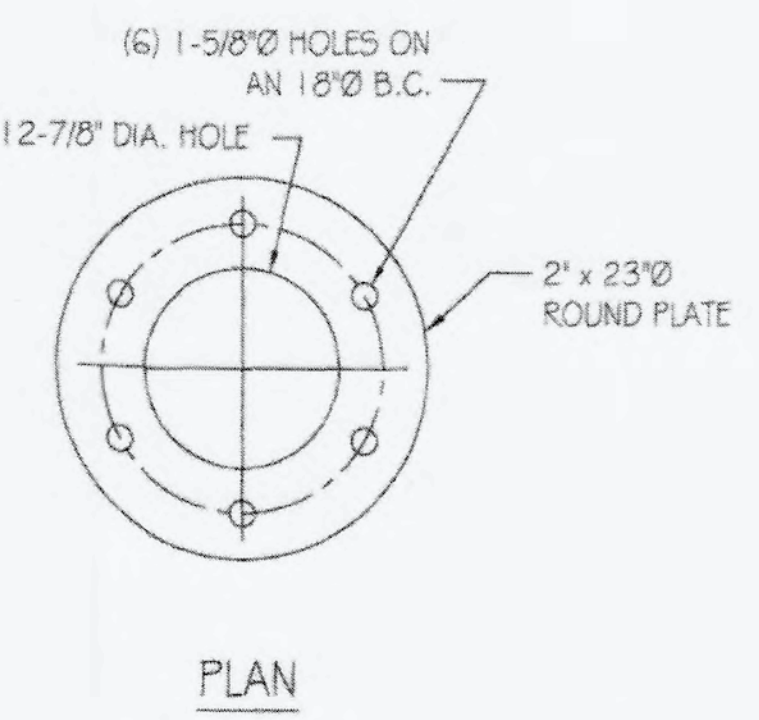
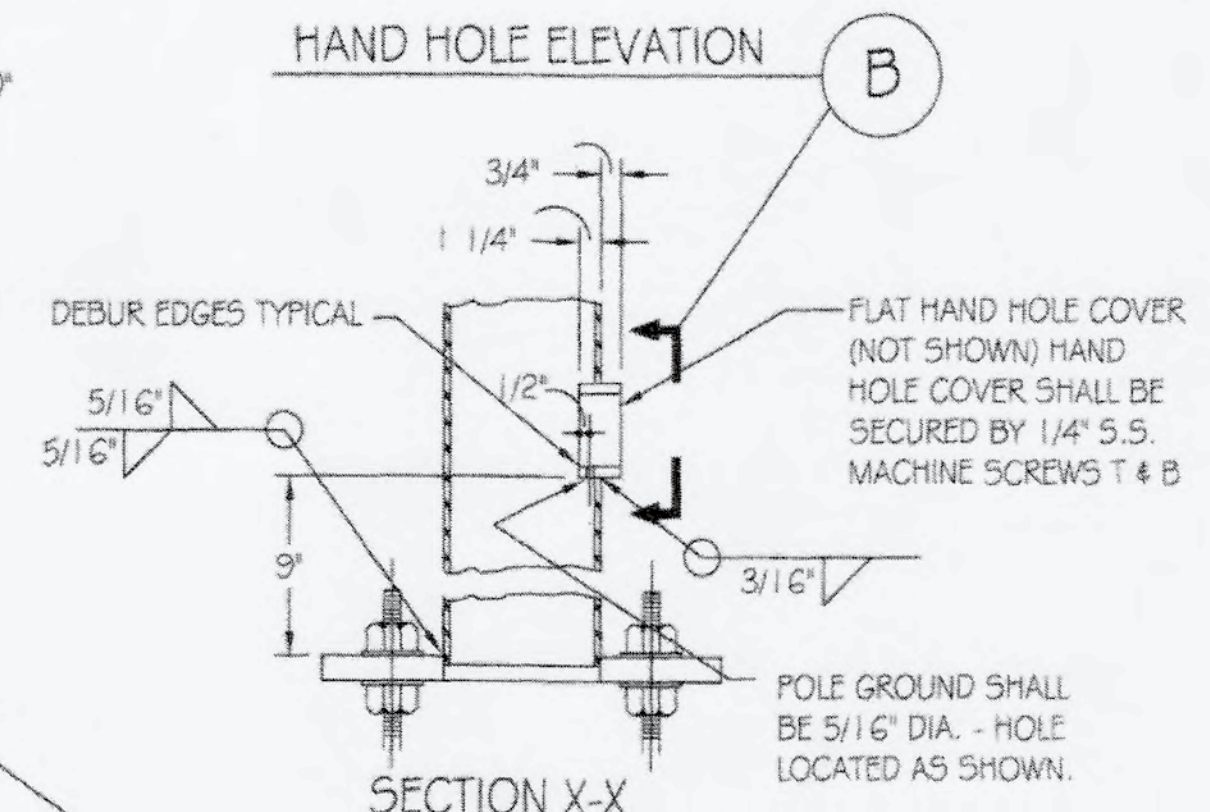
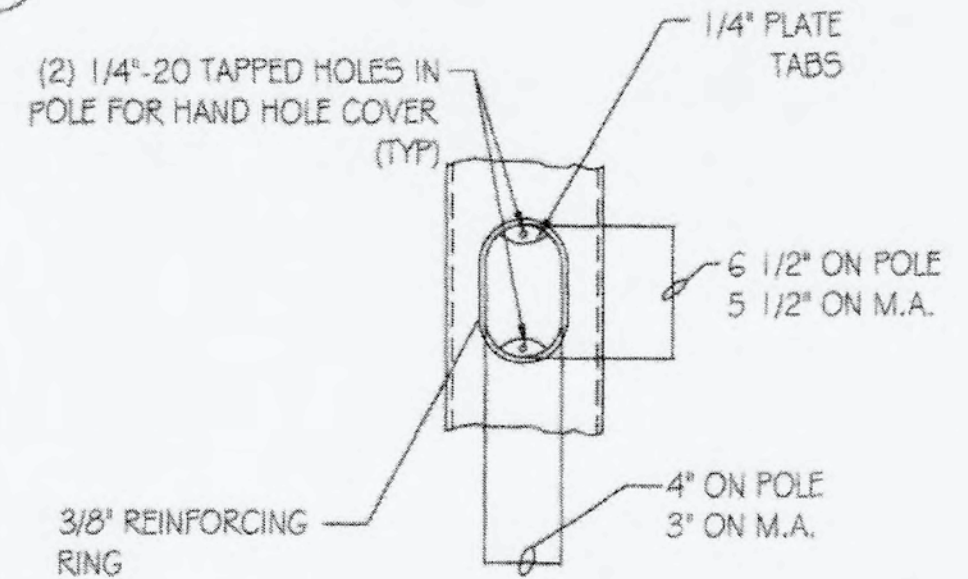
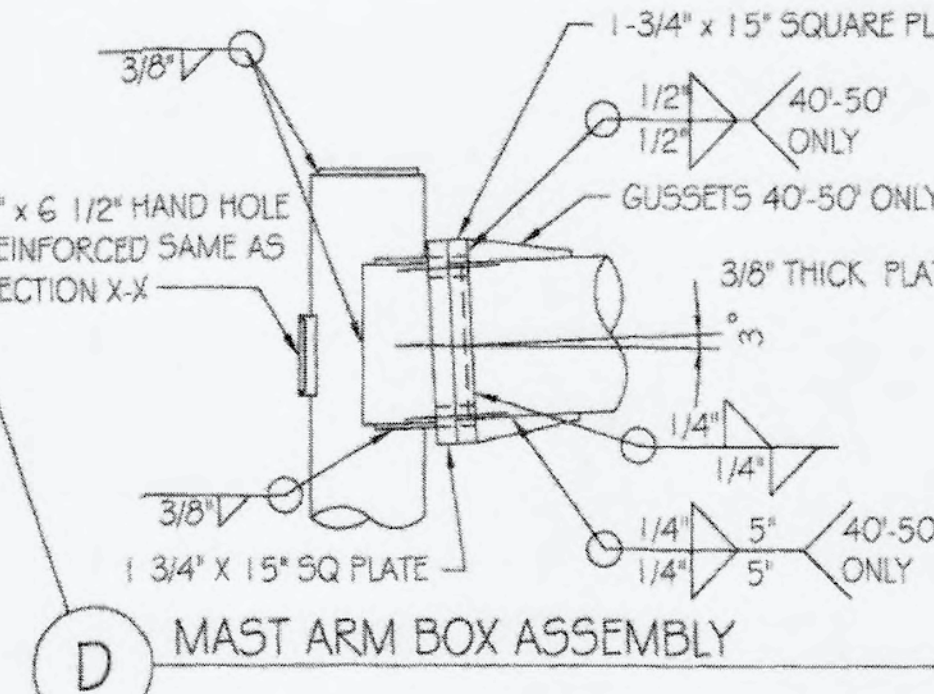
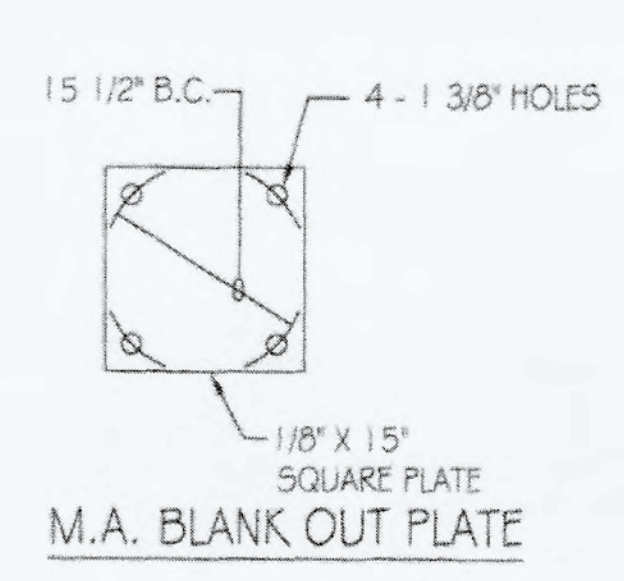
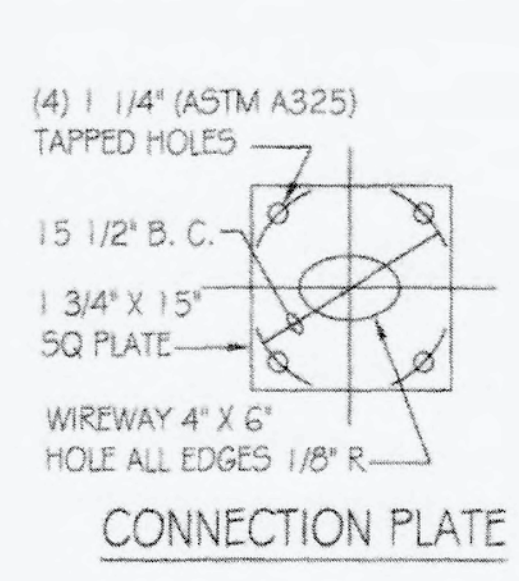
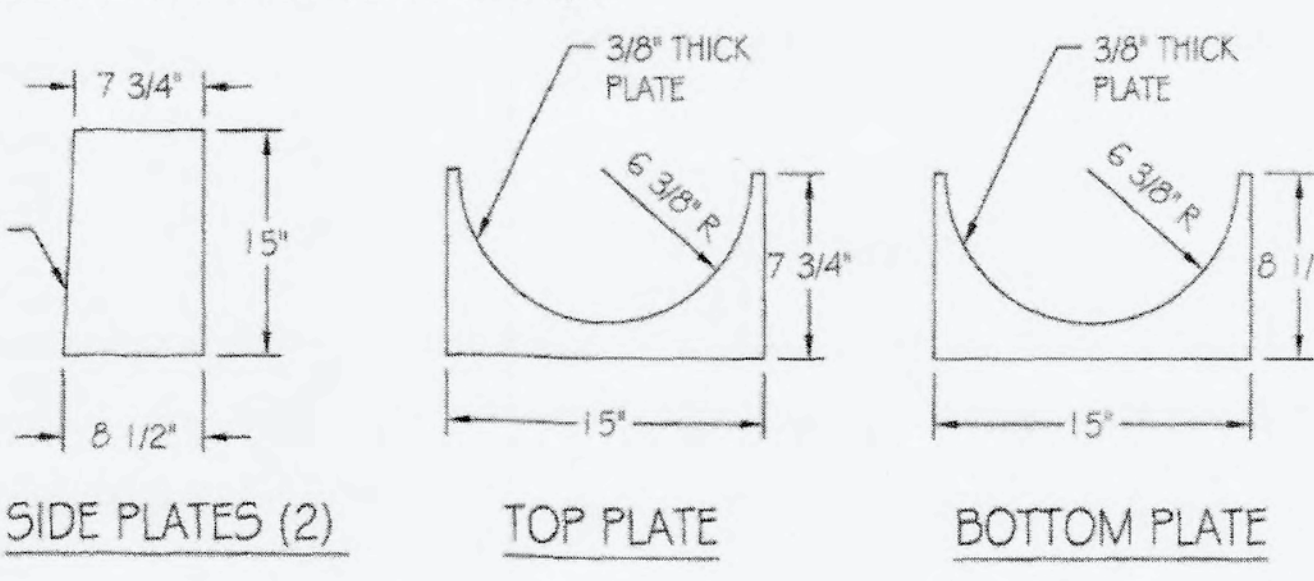
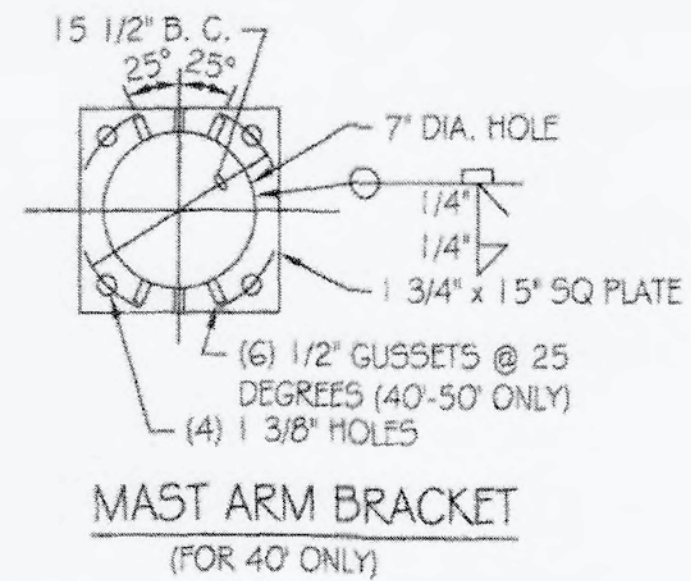
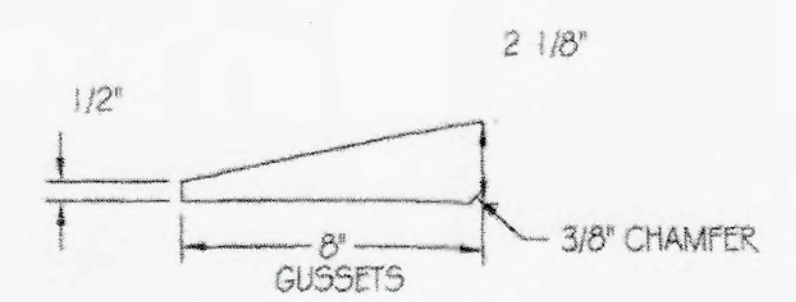
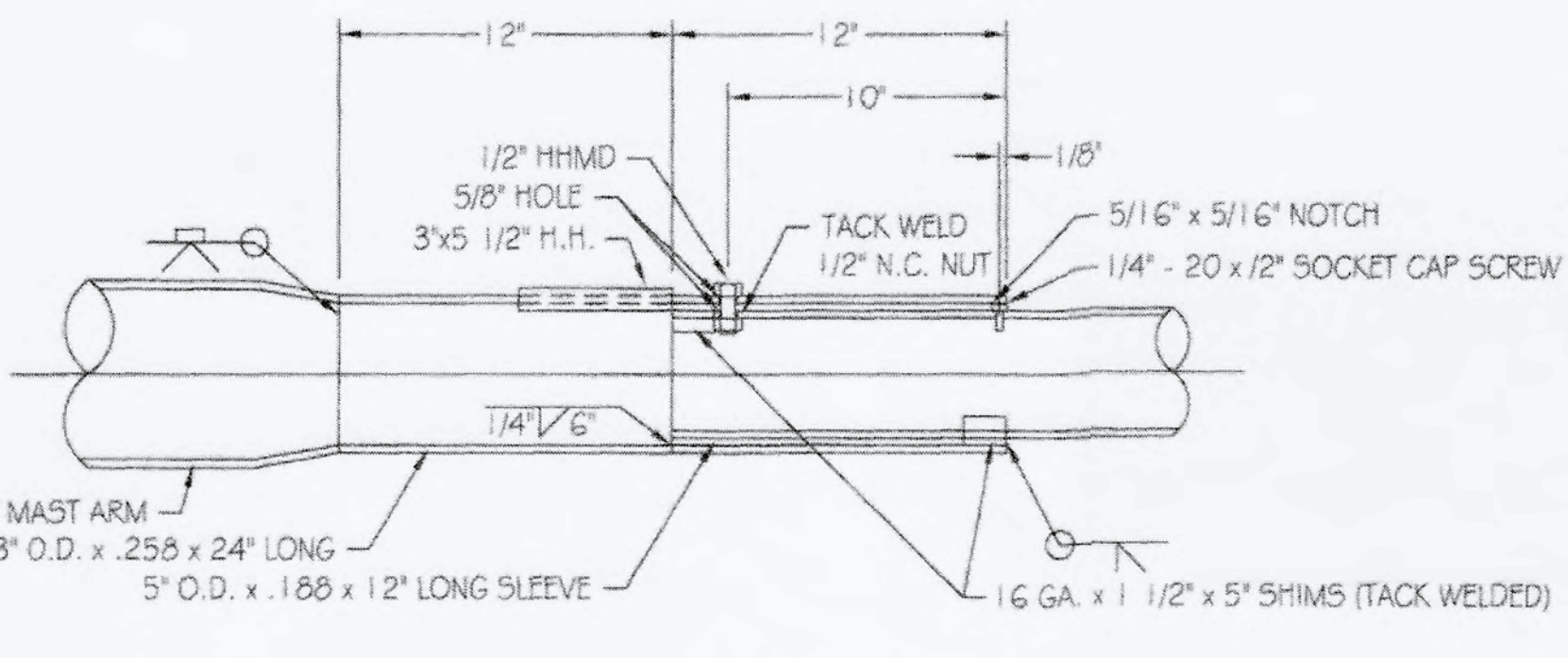
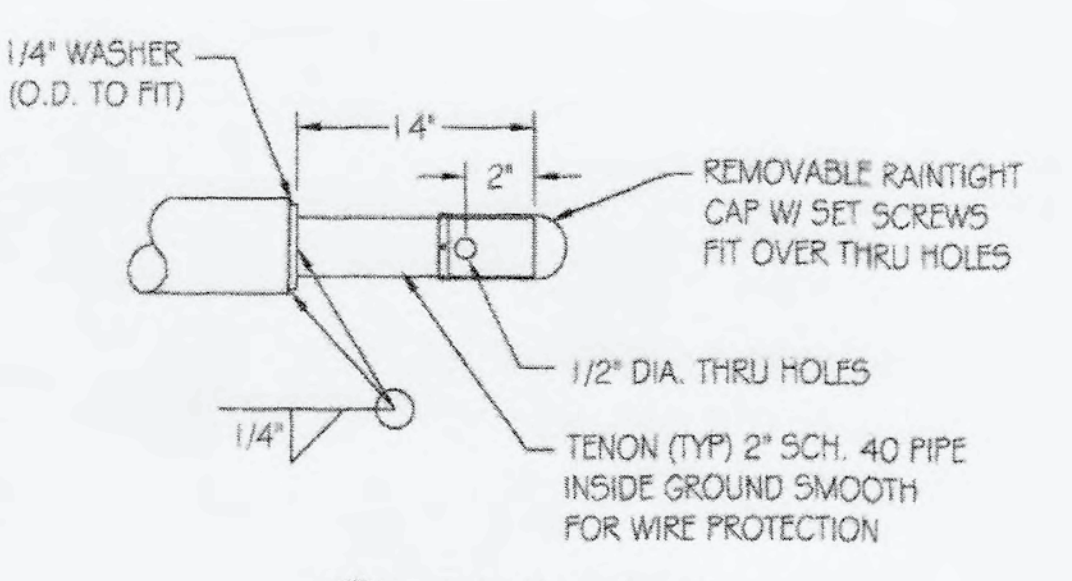
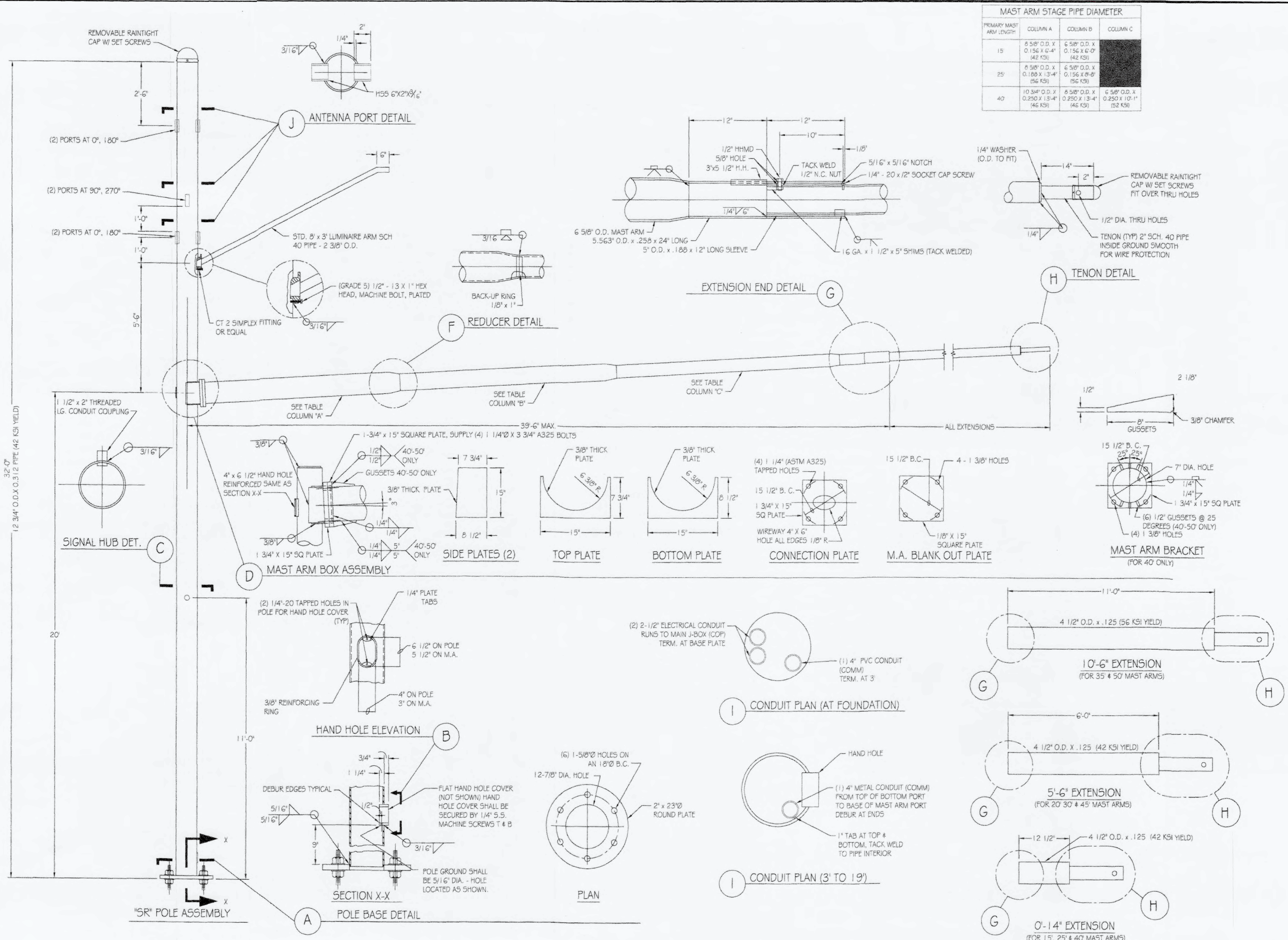
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TS 6-1  
4-6-2020

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DR:	DES:	CK:	SHEET NO:	TOTAL SHEETS
DATE:	DATE:	DATE:		
SCALE:		QS. #:		



**CITY OF PHOENIX  
'SR' COMM SIGNAL POLE  
POLE DETAILS**

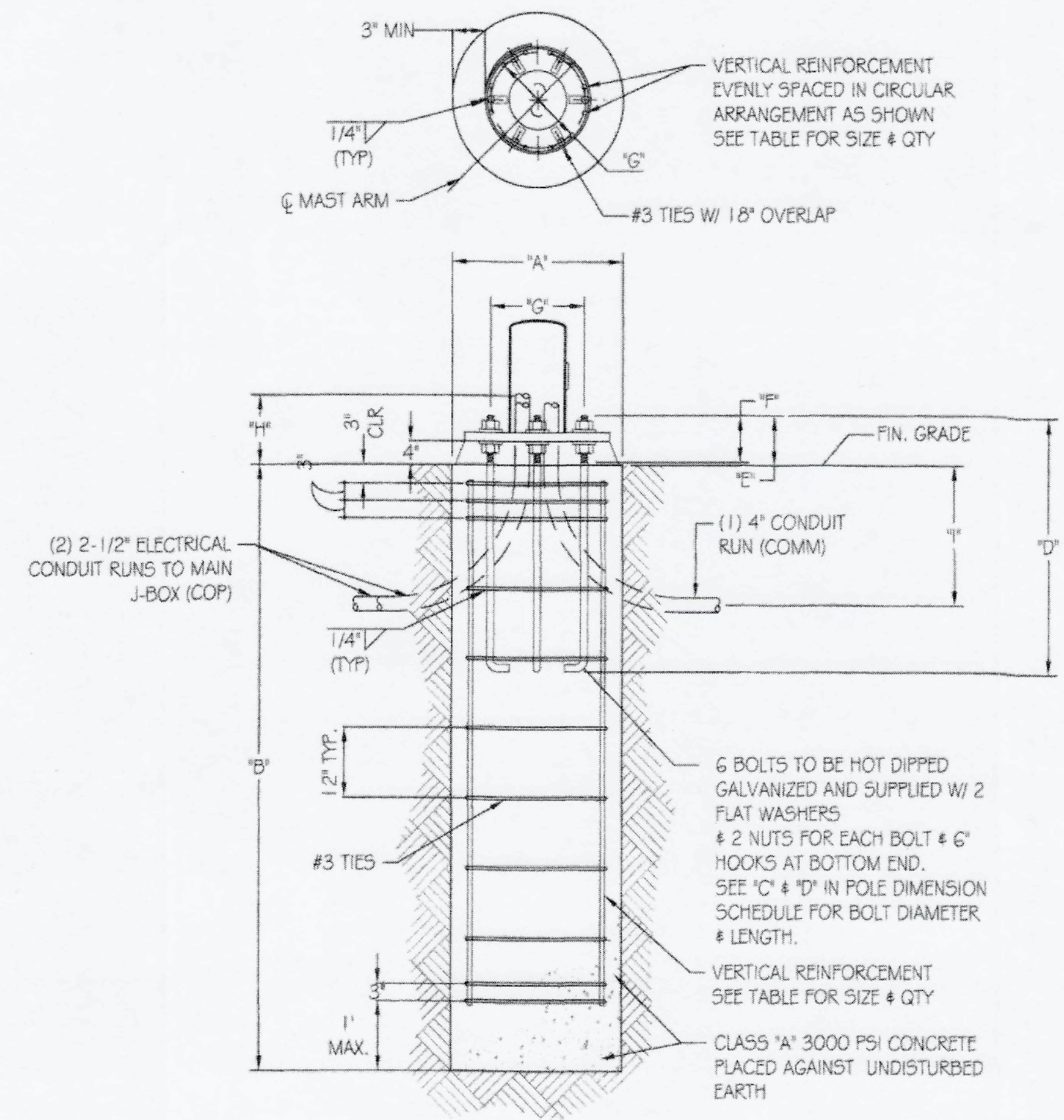
MAST ARM STAGE PIPE DIAMETER			
PRIMARY MAST ARM LENGTH	COLUMN A	COLUMN B	COLUMN C
15'	6 5/8" O.D. X 0.156 X 6'-4" (42 KSI)	6 5/8" O.D. X 0.156 X 6'-0" (42 KSI)	
25'	6 5/8" O.D. X 0.188 X 13'-4" (56 KSI)	6 5/8" O.D. X 0.156 X 8'-0" (56 KSI)	
40'	10 3/4" O.D. X 0.250 X 13'-4" (46 KSI)	6 5/8" O.D. X 0.250 X 13'-4" (46 KSI)	6 5/8" O.D. X 0.250 X 10'-1" (52 KSI)



PROGRESS LOG	
0	8/9/14 ISSUED TO CLIENT
SHEET NUMBER	PROGRESS
S1	0
DRAWING DATE August 09, 2014	



CITY OF PHOENIX  
 'SR' COMM SIGNAL POLE  
 FOUNDATION DETAILS



FOUNDATION, ANCHOR BOLT & REBAR CAGE DETAIL

POLE FOUNDATION DIMENSION SCHEDULE															
FOUNDATION POLE TYPE	POLE DETAIL (ft.)		FOUNDATION DETAIL (in.)		VERT. REINFORCEMENT		BOLT DETAIL (in.)					* CONDUIT DETAIL			
	POLE HEIGHT	MAST ARM LENGTH	'A' WIDTH	'B' DEPTH	REBAR QUANTITY	REBAR SIZE	ASTM MATERIAL GRADE	'C' DIAMETER	'D' LENGTH OVERALL	'E' PROJECTION	'F' THREAD	'G' BOLT CIRCLE	'H' CLEAR	'I' MIN. DEPTH	CONDUIT QUANTITY
'SR' COMM POLE	32	15-50	36	138	12	#6	F1554-55	1-3/4	66	8 1/2	10	18	12	24	2 C.O.P. 1 COMM
			30	168	10	#6									

\* CONDUIT SHALL ENTER 24" MINIMUM DEPTH, VERTICALLY, THROUGH THE BOTTOM OF THE FOUNDATION



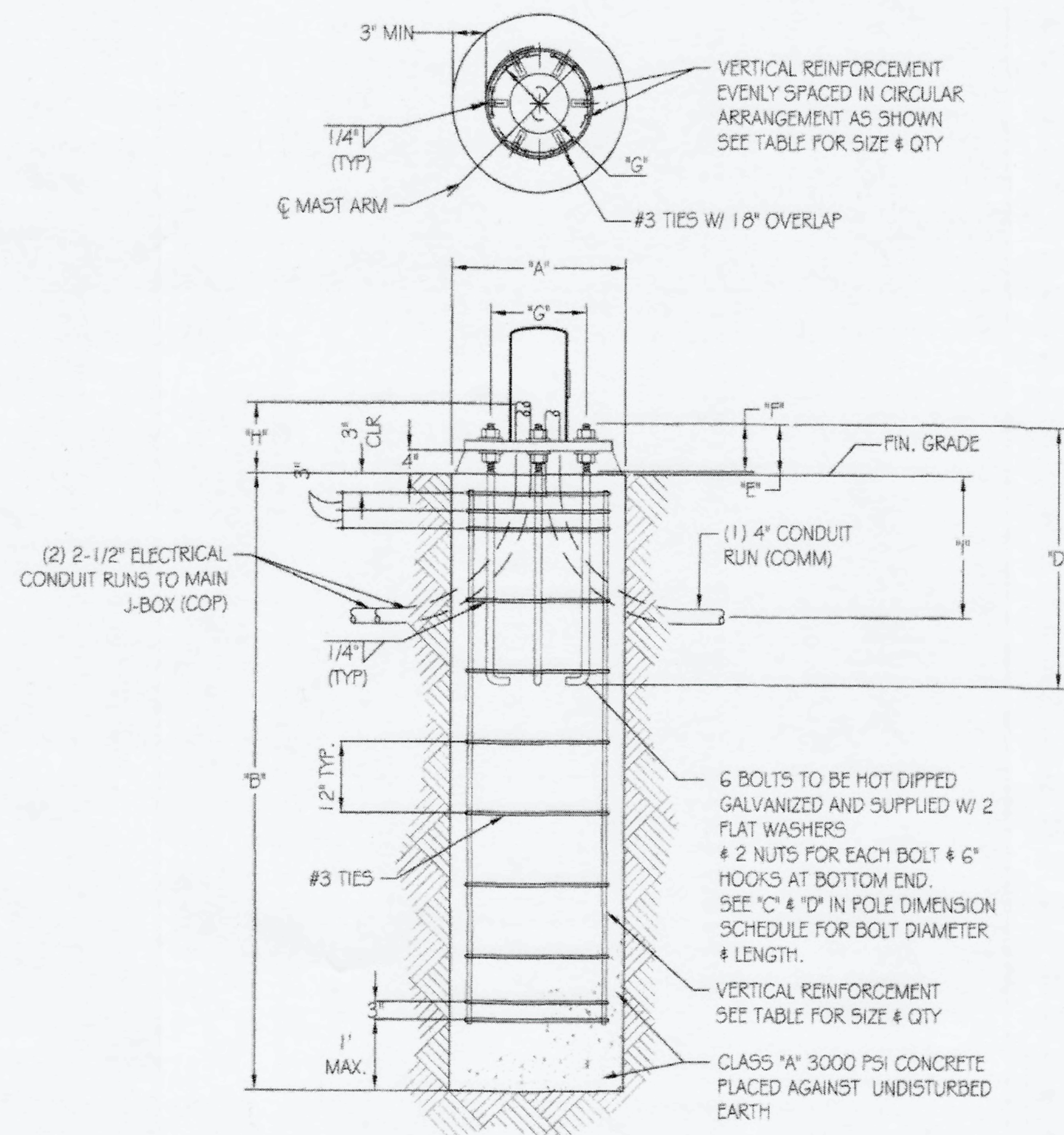
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DRAWING DATE	
August 09, 2014	







CITY OF PHOENIX  
 'SM' COMM SIGNAL POLE  
 FOUNDATION DETAILS



FOUNDATION, ANCHOR BOLT & REBAR CAGE DETAIL

FOUNDATION POLE TYPE	POLE DETAIL (ft.)		FOUNDATION DETAIL (in.)		VERT. REINFORCEMENT		BOLT DETAIL (in.)						* CONDUIT DETAIL		
	POLE HEIGHT	MAST ARM LENGTH	'A' WIDTH	'B' DEPTH	REBAR QUANTITY	REBAR SIZE	ASTM MATERIAL GRADE	'C' DIAMETER	'D' LENGTH OVERALL	'E' PROJECTION	'F' THREAD	'G' BOLT CIRCLE	'H' CLEAR	'I' MIN. DEPTH	CONDUIT QUANTITY
COMM POLE	32	15-35	36 30	120 132	12 10	#6 #6	F1554-55	1 1/2	54	8 1/2	8	16 1/2	12	24	2 C.O.P. 1 COMM

\* CONDUIT SHALL ENTER 24" MINIMUM DEPTH, VERTICALLY, THROUGH THE BOTTOM OF THE FOUNDATION



PROGRESS LOG

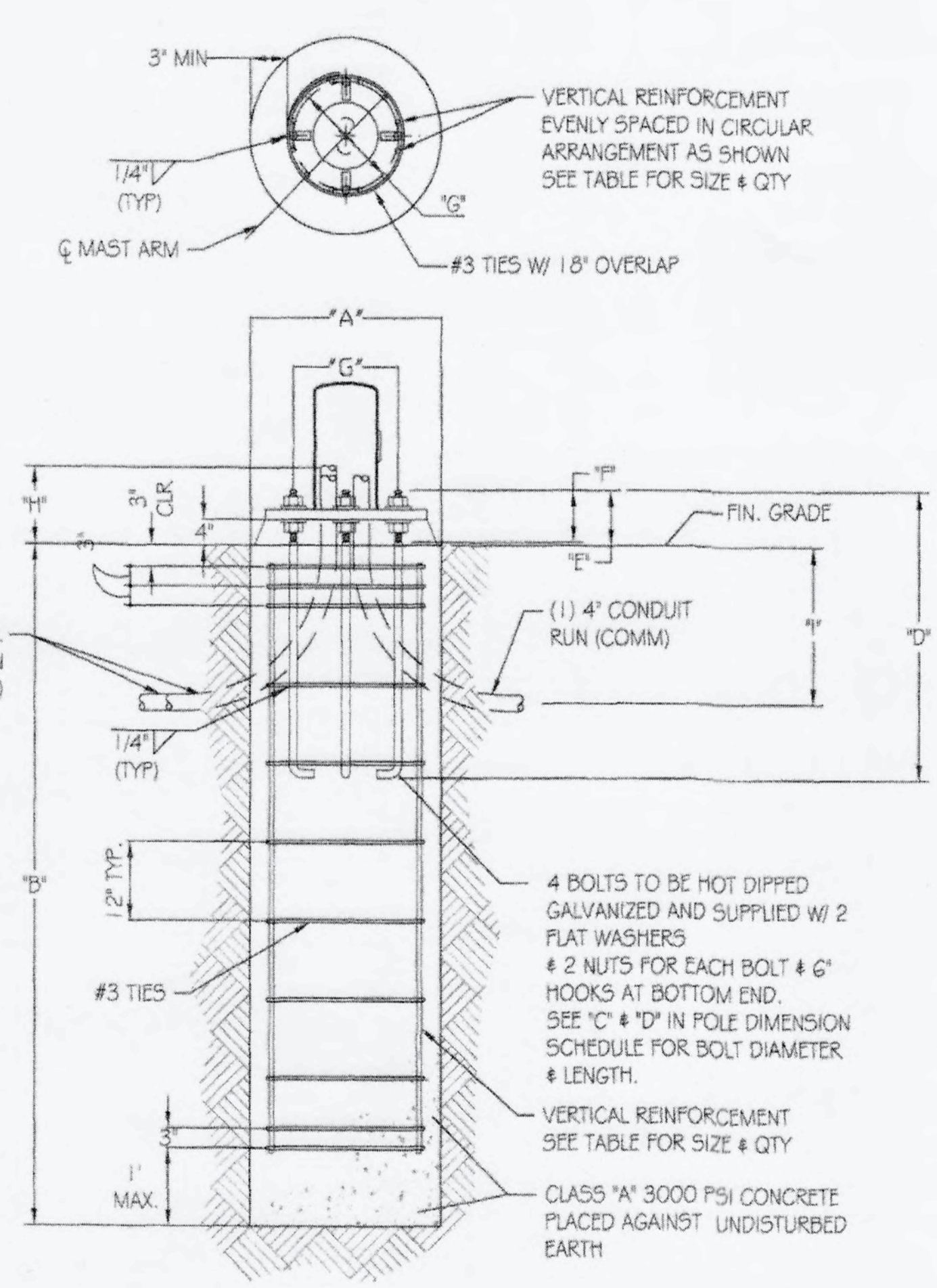
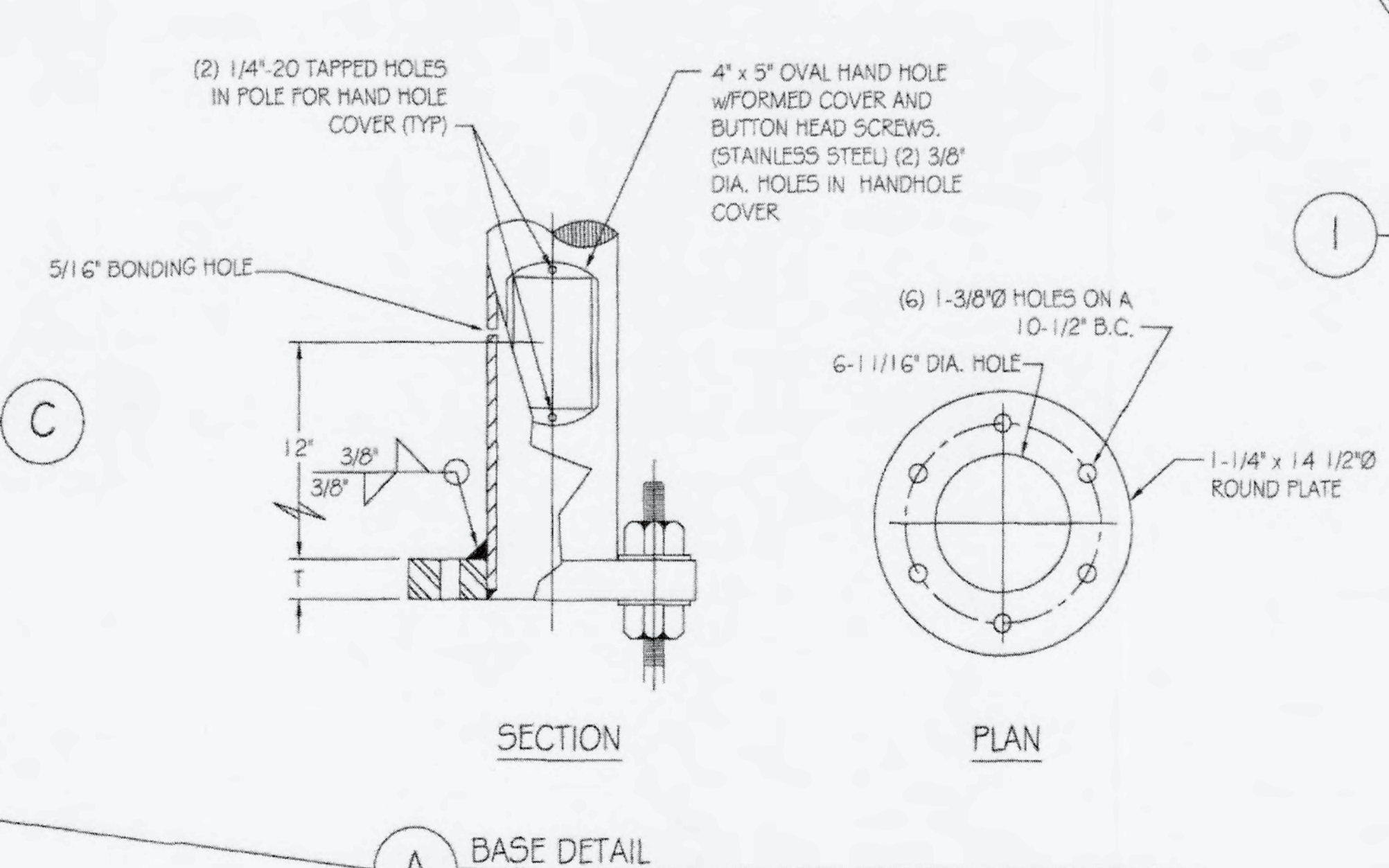
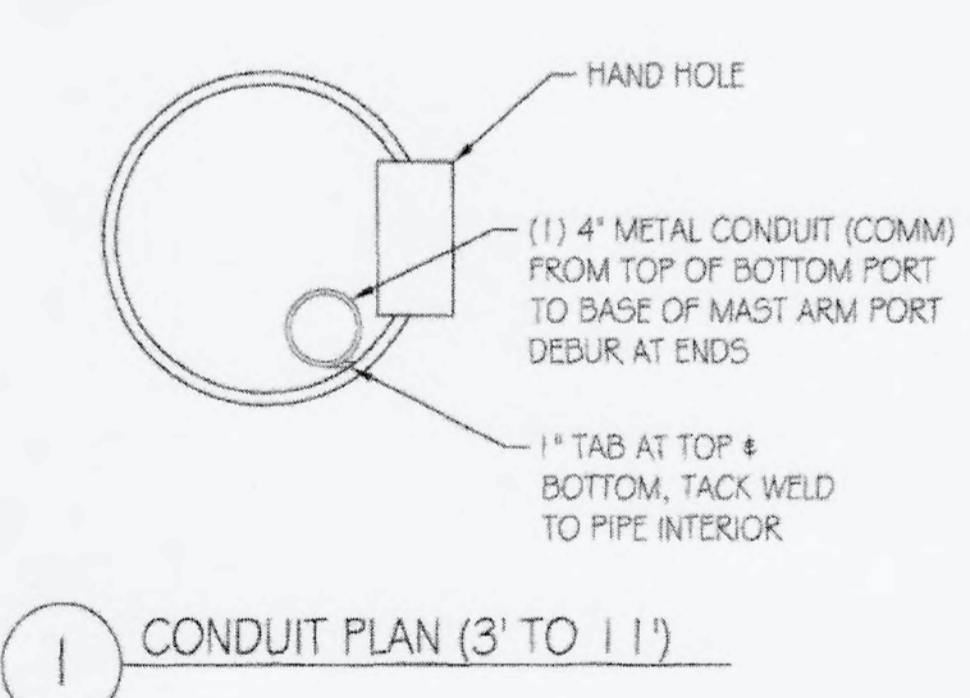
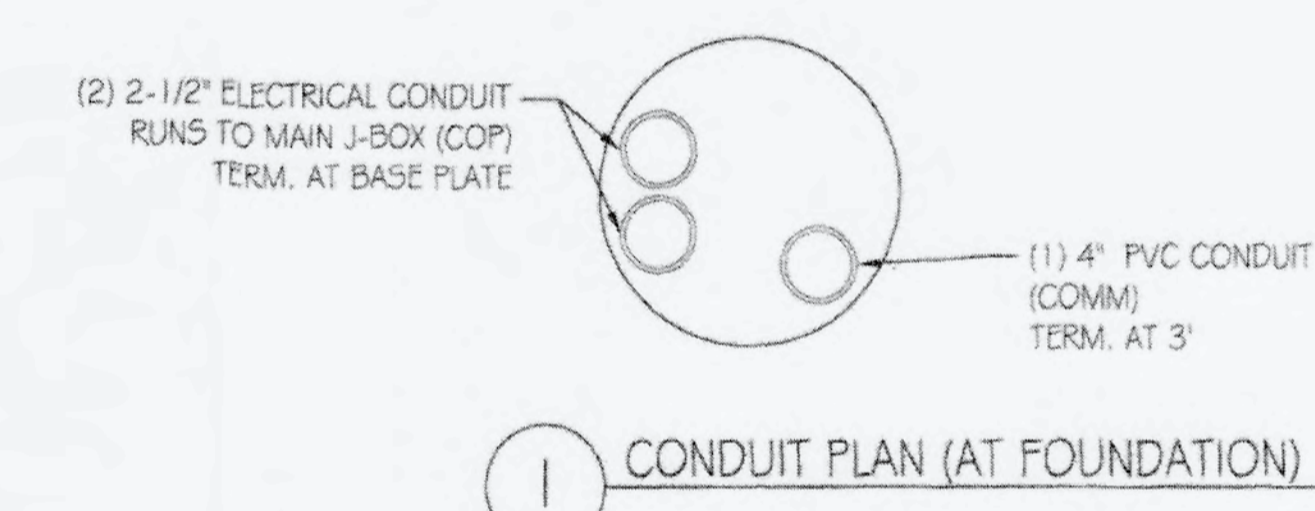
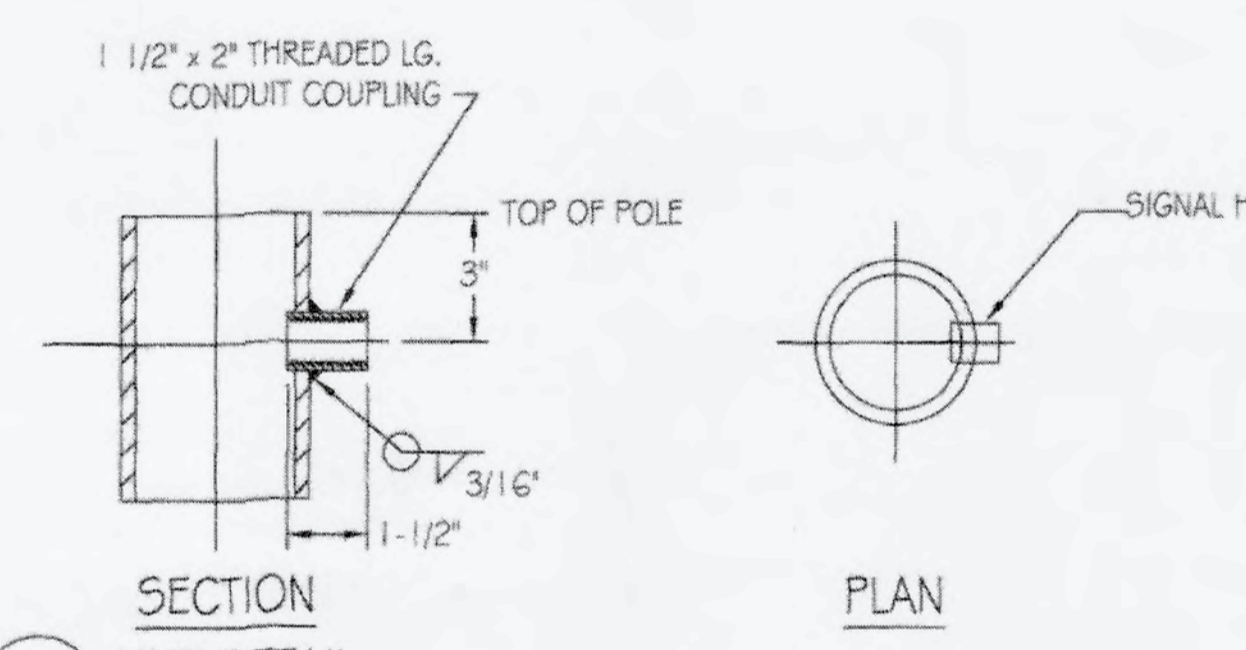
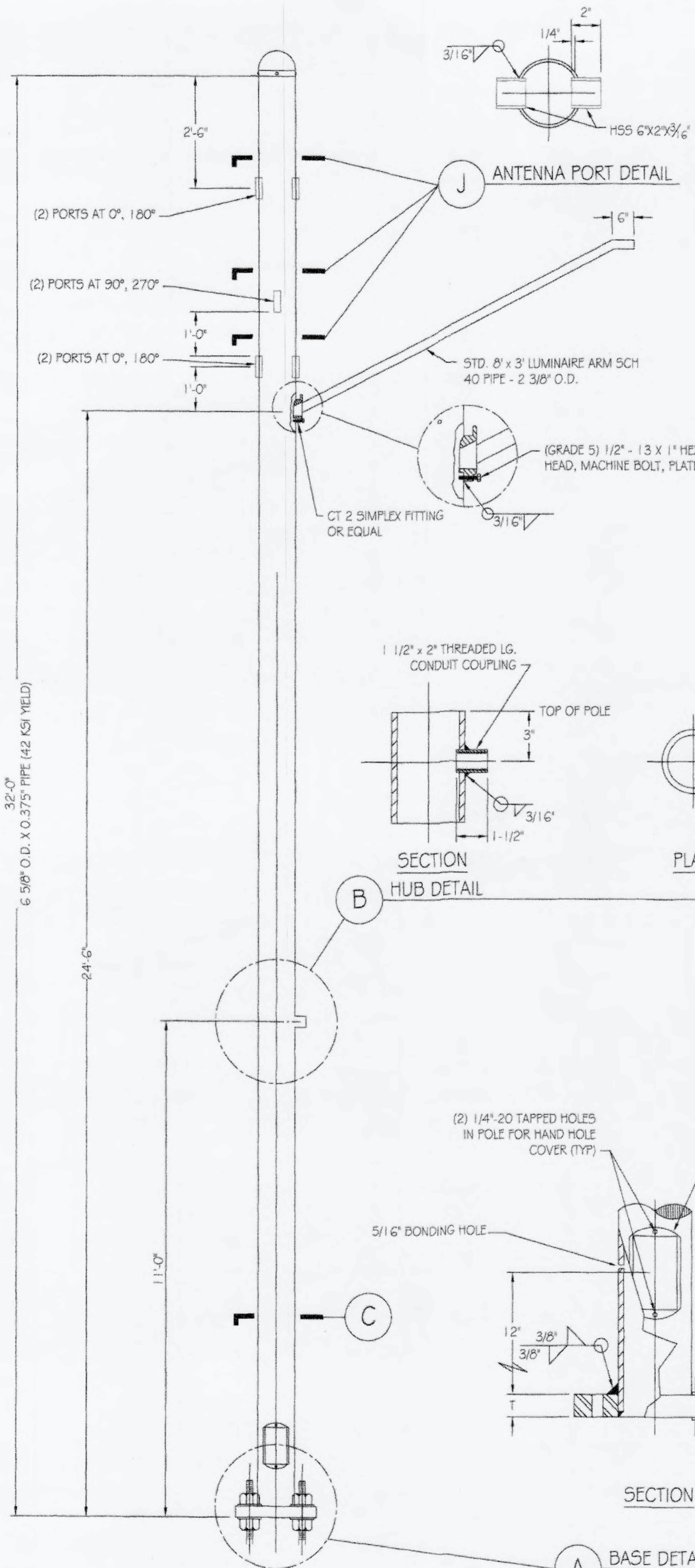
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SHEET NUMBER      PROGRESS

S2      0

DRAWING DATE  
 August 09, 2014





FOUNDATION POLE TYPE	POLE DETAIL (ft.)		FOUNDATION DETAIL (m.)		VERT. REINFORCEMENT		BOLT DETAIL (m.)					* CONDUIT DETAIL			
	POLE HEIGHT	MAST ARM LENGTH	'A' WIDTH	'B' DEPTH	REBAR QUANTITY	REBAR SIZE	ASTM MATERIAL GRADE	'C' DIAMETER	'D' LENGTH OVERALL	'E' PROJECTION	'F' THREAD	'G' BOLT CIRCLE	'H' CLEAR	'I' MIN. DEPTH	CONDUIT QUANTITY
TYPE 'LM'	32	N/A	36	96	12	#6	F1554-55	1-1/4	44	7	6	10 1/2	12	24	2 COP 1 COMM

\* CONDUIT SHALL ENTER 24" MINIMUM DEPTH, VERTICALLY, THROUGH THE BOTTOM OF THE FOUNDATION

**verizon wireless**  
126 W. GEMINI DR.  
TEMPE, AZ 85283

**ISE Incorporated**  
Structural Engineers  
P.O. BOX 50039  
Phoenix, Arizona 85076  
PHONE: 480-481-8614  
www.ise-inc.biz

ISE JOB #: 8344

CITY OF PHOENIX  
'LM' COMM SIGNAL POLE  
POLE & FOUNDATION DETAILS



PROGRESS LOG	
0 8/6/14	ISSUED TO CLIENT
SHEET NUMBER	PROGRESS
<b>S1</b>	<b>0</b>
DRAWING DATE August 09, 2014	





EXHIBIT B - Doghouse Component Wiring Diagram

CITY OF PHOENIX

Exhibit B

