



**Questions & Answers Document No. 1**  
**Next Generation Fare Gates Project**

**Request for Expressions of Interest**



**November 6, 2020**

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## **1. QUESTIONS AND ANSWERS**

### **1.1. Background**

**Q1. BART has noted a series of changes and improvements made to the AFC system, starting in 2003 and ending in 2019. Please describe changes and/or improvements made to the pneumatic system powering faregates that may have been done during that period, including work done in faregates as well as related to air compressor and compressed air distribution systems.**

A1. In 2003, the current generation of Cubic Transportation System (CTS) fare collection equipment was installed systemwide replacing the previous generation. In 2019, BART surveyed the industry on conceptual designs for new fare gates, which was used to develop the Request for Expressions of Interest (RFEI). During that time, BART has modified the pneumatic system by "cinching" the pneumatic barriers. The modification increased the static pressure to gates in the fully closed and locked position, making it more difficult for anyone to push through the gate.

**Q2. BART reported that it implemented upgrades to fare gates in 2012 and 2019. Were upgrades to the pneumatic systems used to power fare gate barriers in that scope of work? If yes, what were the upgrades and can BART please provide the tech specs for the upgrades?**

A2. Please see Answer No. 1.

**Q3. Post the 2019 round of upgrades to the AFC system, and as a result of piloting its own fare gate design, has BART identified additional necessary upgrades to the pneumatic system, and any other fare system support hardware and software, and any other infrastructure specific to the fare gates and/or the fare payment system?**

A3. BART has yet to identify any additional necessary upgrades to the pneumatic system as a result of the recent pilot of its pneumatic swing barrier design.

### **1.2. Purpose**

**Q4. Can BART please elaborate on its criteria for defining what it considers to be "off-the-shelf" products?**

A4. "Off-the-shelf" products are readily available and can be deployed with minimal customization and integration effort for the BART environment.

**Q5. How is off-the-shelf being defined in this RFEI??**

A5. Please see Answer No. 4.

**Q6. Depending on how off-the-shelf is defined, is the incumbent CTS, known for customizing its fare gates including at BART, able to provide off-the-shelf fare gates?**

A6. BART is not in a position to respond to questions regarding the product offerings of CTS or other vendors.

### 1.3. Process

**Q7. Is Pacific Standard Time intended instead of PDT?**

A7. All response times in the RFEI are intended for Pacific Time – Pacific Standard Time (PST) and Pacific Daylight Time (PDT) when daylight saving time is being observed.

**Q8. Will BART make available the list of all questions and who posed them?**

A8. BART will distribute this Questions and Answers document to all parties who requested the RFEI. In addition, Section 2 of this document lists all RFEI requesters but the document does not attribute questions to a particular firm.

**Q9. Does BART intend to make public the names of requestors of the RFEI?**

A9. Yes, Section 2 of this document lists all requesters.

**Q10. BART may hold one-on-one meetings with one or more of the respondents. For the sake of clarity, in the event that more than one respondent is invited to the discussions, would respondents meet with BART individually or in a joint session?**

A10. BART may hold one-on-one discussions with individual respondents at its discretion. Although BART anticipates holding those sessions with individual respondents, BART reserves the right to change the format.

**Q11. Is BART's current plan for these sessions to hold them via video conference? If yes, could BART please identify the video conferencing service that it plans to use and other details of the format that BART will use (i.e., time allotted, presentation format, discussion format, etc.)?**

A11. If one-on-one discussions are held with respondents, BART anticipates holding those sessions virtually. The session details and format have not yet been determined.

### 1.4. Non-Disclosure Agreement

**Q12. Subsequent to issuing the RFEI, BART then deferred allowing interested parties to obtain supplementary technical information under a series of NDAs. Does BART intend to revive this option, or include it unconditionally in the context of issuance of an RFP?**

A12. BART cannot comment at this time on the availability of the supplemental technical information identified under Section 4 of the RFEI in a potential future request for proposal (RFP). At this time, the supplement information identified in Section 4 would require an executed non-disclosure agreement (NDA) to be released.

**Q13. Would BART consider offering proponents the opportunity to request additional information from BART not already envisioned in BART's original NDA offering?**

A13. This question period represented an opportunity for respondents to request additional information. If you have further requests for information not included in your current set of questions, please provide them as soon as possible for BART consideration.

## 1.5. Form of Response and Requested Items

**Q14. Please clarify what is an acceptable format for submitting pre-printed materials, drawings, diagrams, and other supporting materials.**

A14. All submissions should be in an electronic/digital format and submitted by e-mail to [FareGatesRFEI@bart.gov](mailto:FareGatesRFEI@bart.gov). Additional pre-printed materials, drawings, diagrams, and other supporting materials should be in "PDF" format. These files should not be scanned copies, but electronically generated PDF files with quality resolution. Respondents may submit supporting materials as separate e-mail attachments and labeled with the relevant question number.

### 1.5.1. 5.A Firm Information and Payment Technology Experience

No questions were submitted on this section.

### 1.5.2. 5.B Design

**Q15. Page 5, part 5/B – Do you strictly prefer pneumatic solution or are you open to discuss another solution(s)?**

A15. BART is open to other design options.

**Q16. While BART expresses the preference for "pneumatic fare gates", will BART consider electrically operated fare gates?**

A16. BART is open to other design options, including electronically operated fare gates, particularly if the product has a proven record of equal or better performance, service and reliability compared to pneumatically actuated fare gates.

**Q17. Please provide details of the maintenance history of BART's current faregates for at least one calendar year.**

A17. This information is not necessary to respond to the RFEI. Proposers may provide details of the maintenance history of their products to demonstrate performance and reliability in response to question 5.B.

**Q18. Does BART have a Maintenance Management System in place? If yes, can BART please share details about the system and any plans to modify its capabilities?**

A18. BART currently uses Maximo, which tracks the history of maintenance services performed as well as recommended servicing actions at the component level based on pre-established cycle counts. There are currently no plans to modify its capabilities.

### 1.5.3. 5.C Fare Gates Dimensions

**Q19. Please provide representative samples of as built architectural/engineering drawings for installations of faregates.**

A19. Exhibit 1 includes relevant BART Facilities Standards (BFS) automatic fare collection equipment drawings for the - J005, J006, J007, J010, J011, and J012.

**Q20. Do all current faregate installations meet the standards provided in Table 5-1 of the RFEI?**

A20. Yes, with some nominal variations.

**Q21. Has BART determined a required dimension between the two swing barriers when in a closed position?**

A21. BART currently does not have a requirement for the dimension between the two swing barriers when in a closed position. Firms may provide dimensions of the proposed product and how it fits into the existing space as part of the RFEI response.

**Q22. Can BART please provide details about any infrastructure work that been done since the as built drawings were issued?**

A22. Infrastructure work in the passenger stations has not been done since the initial installation of the fare gates.

**Q23. Does BART plan to modify or upgrade any power, telecommunications, and other physical infrastructure prior to or concurrently with execution of the fare gate project SOW?**

A23. Information related to all possible relevant modifications and upgrades related to the fare gates scope of work will be provided as part of a future procurement. This information is not necessary to respond to the RFEI at this time.

**Q24. Please summarize the Scope of Work for any alterations to the physical infrastructure in BART stations that BART deems necessary in order to move forward with the faregate project?**

A24. At this time, the scope of work has not been finalized and BART does not anticipate alterations to the physical infrastructure for installation of new fare gates.

**Q25. Can BART please provide further details on known or potential variations in physical placement of faregates and supporting power, electrical, telecommunications, and other infrastructure?**

A25. BART will provide more details about the existing infrastructure as part of a future procurement.

**Q26. Please provide engineering drawings showing dimensions for legacy system and pilot fare gates.**

A26. Please see Exhibit 1, drawing J006 for legacy fare gate dimensions. The retrofitted pilot fare gate's console dimensions are the same other than the height of the bi-parting swing barriers.

**Q27. If the footprint of a proposed new fare gate is less than that of the legacy fare gate, previously hidden floor areas may need remedial repairs. Does BART have information about the condition of these floor areas? Is BART anticipating that this work will be necessary?**

A27. If the proposed fare gate does not match BART's existing fare gates dimensions, firms should describe the approach for fitting its gates into the existing space and state any assumptions about the condition of the floor area as part of the description.



**Q28. Can BART please provide a detailed engineering drawing or template for the location of conduit and other physical infrastructure used to connect the fare gate to legacy power and telecommunications systems? Are the template and the types of physical connections standard and uniform throughout BART?**

A28. This is beyond the scope of the RFEI.

#### **1.5.4. 5.D Integration**

**Q29. Does BART anticipate requiring upgrades and/or modifications to its central system and communications capabilities in order to comply with PCI as part of its eventual SOW for the fare gate project?**

A29. BART is currently compliant with PCI data security standards. The Supplier would need to ensure continued compliance as stated in requirements in the preliminary scope of work. BART reserves the right to add or modify requirements in any future RFP.

**Q30. Can BART please describe the status and level of its current compliance with PCI?**

A30. BART is compliant with PCI level 2 for ticket vending machines and e-commerce back office systems.

**Q31. BART appears to intend to move ahead with accepting a broader range of fare payment media and technologies for fare payment. Can BART please provide additional information about its plan and timelines, as well as specifics about its technology preferences?**

A31. BART is working with Metropolitan Transportation Commission (MTC) on the Clipper 2.0 implementation including network upgrades and installation of CTS Tri-Reader 4. Mobile payment is being implemented for the BART fare gates through the Clipper 2.0 transition. Open payment is being considered and the timeline is still to be determined.

**Q32. What are BART's expectations regarding the payment processing capabilities of the reader/validator that proponents would be expected to provide? What does BART plan to adopt as a new fare media as well as fare type? (ISO 14443 A, B, mifare, QR code, and this is not direct related with faregates but, mobile ticketing and openpayment system).**

A32. BART is planning and coordinating reader/validator capability with MTC, including support for ISO 14443 A/B and NXP MiFare Clipper cards, as well as mobile ticketing/virtualized Clipper cards as part of the Clipper 2.0 transition. Open payment is being considered and the timeline is still to be determined.

**Q33. Is BART's plan to fully integrate with Clipper in every aspect of Clipper's features and services?**

A33. BART anticipates fully integrating with the regional Clipper fare payment system.



**Q34. In Section D.ii, please clarify the reference to "vendor." If this is referring to BART's legacy system provider, could BART please describe plans and timelines that BART has for development and implementation of the architecture to capture information from the Clipper back office?**

A34. In 5.D.ii, "vendor" refers to CTS under contract with MTC for Clipper 2.0. The system architecture is still in development.

**Q35. Does BART envision a collaborative effort among BART, its legacy system provider, and its chosen fare gate supplier for development and implementation of the new Clipper interface architecture? If yes, does BART have the administrative structure for this collaboration in place, and would BART please provide details of its planned management/oversight structure?**

A35. This has not yet been determined.

**Q36. Please provide additional information on the types of real-time/near real-time data and data size, frequency of data capture (daily, weekly, monthly, yearly), and data transfer rates among the data currently generated and transmitted by Legacy Gates.**

A36. This information is not necessary to respond to the RFEI. BART will consider including such information as part of a future RFP.

#### **1.5.5. 5.E Alternative Implementation Approaches**

**Q37. In Section 5.E, p. 8 of RFEI, BART discusses integration with its DAS and EME systems without mention of the SCADA system. Later, in the Preliminary SOW, Section h., Requirement 68, p. 19, BART states that faregates must connect to SCADA using DeviceNet. Please clarify the distinction made between "integration" with DAS and EME and "connection" to SCADA.**

A37. Integrations with DAS and EME are required to transmit, receive, and processed specific data and messages properly. The typical connection to SCADA uses dry contact to IO blocks in the fare gate to trigger specific actions or to report specific statuses to the SCADA PLC.

**Q38. BART preferred project delivery approach has the fare gate solution provider working closely with BART in-house talent resources. Has BART developed a project management structure and procedures that would guide execution of the BART's preferred approach? Can BART provide details of its plans in this regard? Does BART intend to allow vendors who eventually bid on the fare gate project to share in project management process development?**

A38. This has not yet been determined.

**Q39. It is unclear which approach BART is taking in Appendix A. It is stated in Appendix A, "For the new fare gate implementation, BART prefers to purchase fare gates that require minimal customization. BART prefers to minimize changes to its existing physical and systems infrastructure." This suggests Approach 3 in that the fare validation hardware would have already been implemented, tested and would represent 0% change from the current fare validation system. It is stated in 5.E that Appendix A reflects approach 1. Please clarify.**

A39. BART's implementation preference is to purchase fare gates that require minimal customization and changes to its existing physical and systems infrastructure, with BART taking responsibility for all civil work and installation and the Supplier for integration. Approach 3 addresses the Supplier role regarding fare media validators and not other aspects of implementation. BART is open to exploring alternative approaches other than those specifically outlined in the RFEI. Also, see Answer No 40 for additional information about the difference between Approaches 1 and 3.

**Q40. Please describe in greater detail the role BART assigns to the supplier of fare gate during each of the three implementation approaches in Section E, p. 8.**

A40.

- In Approach 1, BART would be responsible for all field work including site preparation, infrastructure, field installation, etc. The Supplier would provide fare gate equipment, including software, and work with BART and Clipper contractor for any integration work required.
- Approach 2 is the same as Approach 1 with the exception that the fare gate Supplier would perform the field installation supervised by BART staff.
- Approach 3 is the same as Approaches 1 and 2 with the exception that BART would provide the fare media validators for the Supplier to integrate into the fare gate.
- BART is open to exploring alternative approaches and roles other than those specifically outlined in the RFEI.

**Q41. In Section E, Approach 1, please provide specifics about the scope of civil work that BART would be responsible for as it relates to fare gates, station physical infrastructure, and fare system support infrastructure such as telecommunications, power (both electric and pneumatic), SCADA, and other areas that might be involved in the fare gate replacement project. On the basis of descriptive language in Approach 2, it appears that the reference to "civil work" in Approach 1 would include the development and design of fare gates. Is this what BART intends to do?**

A41. In both Approach 1 and Approach 2, BART would be responsible for all site preparation work required such as electrical, pneumatic, communications infrastructure. In Approach 1, BART would perform field installation. In Approach 2, the fare gate Supplier would perform the field installation.

**Q42. In section E, Approach 3, please describe the scope of civil work, if any, that BART would be responsible for.**

A42. Approach 3 assumes that BART would be responsible for all site preparation work required such as electrical, pneumatic, communications infrastructure, along with field installation. Variations on each of the listed approaches will be considered.

**Q43. In the event BART selects Approach 1 or Approach 2 for implementation, will all business rules and business rule logic now included within the existing fare gates be provided in an English language format so that the supplier does not have to reinvent all of the existing logic?**

A43. For both approaches, the Supplier will be expected to work with BART and the Clipper contractor to integrate the fare gate with the required systems. BART and the Clipper contractor will determine what business rules and logic are relevant to provide depending on the selected solution as part of the future procurement. BART documentation is currently in English language format.

**Q44. In Section E, Approach 2, please clarify whether the Supplier would be responsible to provide new fare media validators/readers. If yes, can BART please describe the functionality that would be required for those readers in terms of fare media types accepted and payment technology options accepted?**

A44. Approach 2 assumes the Supplier will provide the fare media validator/reader. Specific validator requirements will be an integration effort with Clipper contractor. At a minimum, the validator needs to provide direct ethernet connection (through the BART network) to the Clipper back office, to be able to process ISO 14443 A/B compliant cards and MiFare DESFire EV1 cards, to be EMV certified to accept open payment cards in the future, and to support NFC for mobile / virtual fare media. These are preliminary requirements and are subject to change.

**Q45. In the event BART selects Approach 3, what are the software and hardware specifications of the Cubic Tri-Reader's communications?**

A45. BART has not determined an approach to implementation and is seeking input from Suppliers through this RFEI. If Suppliers believe this information is necessary for a proposal for this alternative, please provide details as part of the response to question 5.E.

**Q46. In the event BART selects Approach 3, what is the processing time in milliseconds when a fare card is presented to the Tri-Reader and a fare gate command is given to the new fare gate processor?**

A46. BART has not determined an approach to implementation and is seeking input from Suppliers through this RFEI. If Suppliers believe this information is necessary for a proposal for this alternative, please provide details as part of the response to question 5.E.

#### **1.5.6. 5.F Reducing Fare Evasion**

**Q47. Can BART please provide observations, details, and analysis of fare evasion techniques, and as well as a profile of "hot spots" and circumstances other than the design of fare gates that may facilitate or contribute to fare evasion issue?**

A47. BART is interested in solutions that address the following, but not limited to: forcing barriers open, hopping over the top of the fare gate, sliding under the barrier, and piggybacking/tailgating behind someone else before the barrier closes. Suppliers do not need to address circumstances other than the design of fare gates that may facilitate or contribute to fare evasion as part of this RFEI.

**Q48. Many transit agencies have plans to address fare evasion in a systemic approach, combining improvements in physical infrastructure with other steps. Can BART please elaborate on its overall strategy to address fare evasion, any additional programs and techniques that it may employ, and timelines and approaches to implementation as they relate to BART's proposed phasing-in of new fare gate deployment?**

A48. BART has on ongoing station hardening effort systemwide, including raising the height of fare barriers between free and paid areas, alarming service gates, and utilizing proof-of-payment fare inspection. Fare gate replacement is part of this effort.

#### **1.5.7. 5.G Schedule**

**Q49. What are the factors driving the definition, scope, and timing of BART's phased approach to project implementation? Are there specific resource considerations or other factors, such as other concurrent capital projects, funding issues, etc. internal to BART that impact phasing?**

A49. Funding for the project will likely be available over a period of time. The scope of the project and technical implementation requirements may be mostly independent of funding, but equipment production and field deployment may be subject to funding availability depending on the approach BART selects.

**Q50. Does BART expect all phases to be conducted to completion once the initial phase is begun, or is there a likelihood that there will be pauses between phases?**

A50. This will be determined as part of the future RFP. If pauses between phases pose additional costs or risks to your firm's proposed solution, please provide such information as part of the response to question 5.G.

**Q51. Is prior securing of full funding for all phases of the faregate project a pre-requisite for issuance of an RFP?**

A51. Not at this time.

**Q52. Would BART consider a project proposal with a sequence and timeline that would accelerate implementation as a way of avoiding lost opportunity costs, such as a continued period of significant revenue losses due to fare evasion?**

A52. Yes, BART will consider proposals that would help minimize lost opportunity costs and accelerate deployment.

#### **1.5.8. 5.H Warranties and Maintenance**

**Q53. Could BART please provide details of the current support infrastructure provided to maintenance staff in performing fare gate maintenance?**

A53. BART has a custom back office system to perform usage-based maintenance. Through the back office system and data from DAS, BART is able to offer real-time status reporting on component failures. BART uses Maximo for all maintenance activities across all disciplines. These two systems work in parallel to provide status information and maintenance tracking for maintenance staff.

**Q54. In Section H.i, can BART please describe the circumstances motivating, and potential types and purposes of, software and hardware modifications that BART envisions?**

A54. Past modifications include changes to fare media business rules and support for high-coercivity fare media. Other possible changes may impact user interfaces such as screen messages, timing, receipt format, audible tones for the visually impaired, or others depending on the Supplier's solution.

**Q55. Could BART please provide a profile of the number, availability, experience levels, and training of in-house maintenance talent resources?**

A55. This information is not necessary to respond to the RFEI.

#### **1.5.9. 5.I Performance Standards**

**Q56. Modern technology can provide a uniquely data-rich environment as the basis for monitoring and analyzing equipment performance. Have any of the system upgrades mentioned in the RFEI in Section 1 addressed central system and communications infrastructure that would be required in order to take full advantage of state-of-the-art equipment monitoring and reporting capabilities? Could BART please share details of the capabilities of its current central system and communications infrastructures?**

A56. The BART back office system is the Data Acquisition System (DAS) which receives real-time transaction, equipment status and events (business rule validation, equipment status changes, etc.) and stores the information in a database. Other customized web-based reporting tools have been developed and built around the data collected in DAS. All fare collection in the BART passenger stations are connected to the DAS system via wide area network.

**Q57. Does BART have plans to implement further central system and communications infrastructure improvements in connection with deployment of new fare gates?**

A57. BART plans to improve the fiber network connectivity to segregate the fare collection network from the rest of the BART operational network in order to support Clipper 2.0. No other central system and communication infrastructure improvements are planned at this time.



**Q58. Has BART developed performance goals for fare gates and other specific components of its fare payment system? If so, can BART please share those goals?**

A58. BART expects the new fare gates to meet or exceed the 99+ percent availability achieved with the existing fare gates.

#### **1.5.10. 5.J Contract Terms and Conditions**

**Q59. Can BART please elaborate on the procurement method BART will use for the fare gate project, and what framework and options are available to collaborate prior to the formal RFP and submission of formal bids?**

A59. The procurement method has not yet been determined.

### **1.6. Additional RFEI Terms**

No questions were submitted on this section.

### **1.7. Appendix A**

#### **1.7.1. Introduction/Preamble**

**Q60. Would BART consider including language in the SOW that would allow for proponents to propose alternative solutions and technical standards that could potentially benefit the outcome of the fare gate initiative, but may not be specifically referenced in the SOW?**

A60. Yes, the scope of work (SOW) in the RFEI is preliminary. Firms may provide feedback on the SOW as part of responses to the questions in Section 5.

**Q61. Page 12, part APPENDIX A. – Do you suppose the current SCADA system will be kept or shall it be part of the offer? If the current system is to remain, please provide us with the interface.**

A61. At this time, BART intends to keep SCADA. BART will consider providing the interface as part of a future RFP.

#### **1.7.2. A. General Standards**

**Q62. Page 13, part 6 – Could you define composition of Eolian particles (sand, rock, salt etc.)? Or can you please share some adequate test procedure based on standard what is necessary to fulfil?**

A62. For additional information on requirement #6, please see [BART Standard Specifications/Facilities Standards 34 50 10 - Fare Collection System Section 2.02.G.](#)

**Q63. At page13, Req. 8 Q: May you list the safety codes, regulations and standards you refer, please?**

A63. Requirement #8 is a preliminary requirement for the purposes of soliciting input through the RFEI. The full list of applicable safety codes, regulations, and standards will be made available as part of a future RFP.

### 1.7.3. B. Physical Requirements

**Q64. Is there a specific stainless steel gauge required?**

A64. For requirement #9, there is no specific gauge required. Firms may provide this information for its proposed product or provide BART feedback on this requirement as part of the response to the RFEI.

**Q65. For the sake of clarity, could BART please comment on whether, and what physical elements of BART's pilot swing barrier design conform to the dimensions in b.10 of the draft SOW?**

A65. BART's pilot swing barrier design conforms to the specifications in requirement #10.

**Q66. In order to broaden the scope of design options, would BART consider exempting the mounting mechanism for the swing barriers from the maximum height of 43.3"?**

A66. Requirement #10 is in reference to the height of the console and not the barrier height. BART will consider barrier heights greater than 43.3" and up to 6 feet from the floor.

**Q67. Please elaborate on the methodology and rationale behind providing a range for the fare gate console dimensions provided in the draft SOW Physical Requirements, Section b.10.**

A67. The range of dimensions in requirement #10 is to allow Suppliers to propose fare gates that could fit into the existing footprint. This requirement could change in the final SOW in any future RFP.

**Q68. Please clarify whether BART's aisle assumes that the minimum aisle dimension of 20.75" must be preserved when the swing barrier arms are fully opened.**

A68. No, per preliminary requirement #11, the width of the aisle for patrons to pass through can be between 20.75" and 29.5".

**Q69. Please confirm that the dimension of 5' refers to the barrier panel only, and that the actual height of the barrier panel from the station floor would be more than 5' depending upon the height above the ground at which it is mounted.**

A69. Correct. Requirement #13 refers to the barrier panel height and the height of the mounted barrier may be taller than 5 feet.

**Q70. Page 14, part 14 – Does the open/close within 0,75 seconds procedure include validation? The card validation needs some time and it depends on transferred and stored data. Could you give us card structure?**

A70. In requirement #14, the 0.75 seconds does not include validation, but does include all activities between a successful validation and ready for next transaction, including barrier opening, patron passage, and barrier closing. It is expected that the validation process will take between 500 ms and 800 ms.



**Q71. Page 14, part 16 – it depends on local behavior of passengers. Can be 1.5m sufficient in your experience?**

A71. Requirement #16 refers to the opening between the floor and the bottom of the barrier to prevent crawling under the barrier. 1.5m (about 5 feet) may be sufficient depending on the mounting position. Per requirement #13, BART would consider barriers with the height of no more than 5 feet thus the top of the barrier from the floor when installed could be up to 6 feet.

**Q72. What is the difference between a "standard" and "non-standard" fare gate?**

A72. A "non-standard" fare gate has a wider aisle for wheelchair accessible use. Please see requirement #19 for "non-standard" aisle dimensions.

**Q73. Does BART have specific requirements that address the needs of the visually and hearing impaired community?**

A73. Yes, please see requirements #33 and #34 for some specific requirements. In addition, BART requires that fare gates meet regulations, guidelines, and requirements noted in requirement #2. These are preliminary requirements and additional requirements related to the needs of patrons with visual, hearing, or other impairments may apply as part of any future RFP.

**Q74. Can BART please verify the accuracy of the ADA dimensions in Item 19?**

A74. Per U.S. Department of Transportation, Federal Transit Administration Circular C 4710.1, Americans with Disabilities Act (ADA) Guidance, all doors must be greater or equal to 32". Requirement #19 meets this standard.

**Q75. Page 15, part 22 – Could you provide us more explanation regarding "An authorized user shall be able to configure the maximum number of payments that the fare gate may bank"?**

A75. BART would like to explore and retain the flexibility to change banking limits, as defined as the ability of the fare gates to process two or more successful fare payments without closing and reopening the fare barriers. This preliminary requirement refers to the ability of an authorized user, designated by BART, to configure a maximum number of payments that may be "banked" for patrons to pass through the fare gate without closing.

**Q76. Does the configuration for banking mode need to be configurable for each element of a gate array, or only for the whole array?**

A76. (Requirement #22) Banking mode should be configurable for each fare gate independently to provide flexibility.

**Q77. Do the ADA gates need to support banking mode?**

A77. (Requirement #22) Yes, all fare gates, including ADA accessible fare gates, shall support banking mode.

**Q78. Does the requirement to close the gate automatically after a configurable interval of time — even if the requisite quantity of patrons has not yet passed through the gate — apply to the non-banked mode of operation as well?**

A78. (Requirement #24) Yes, this requirement applies to non-banked mode of operations.

**Q79. Does the time before closing need to be individually configurable by mode of operation?**

A79. (Requirement #24) Yes, time intervals before closing shall be configurable for each fare gate for both banked and non-banked modes.

**Q80. (Requirement #25) This requirement seems dependent, in part, on the speed of the fare media validation (e.g. if Approach 3 is adopted, this is not in control of the fare gate supplier) and the speed of the people traversing the fare gate. Is there a way to express this requirement without those dependencies?**

A80. These are preliminary requirements. Firms may provide feedback on this requirement as it relates to questions in Section 5, particularly the approaches to implementation.

#### **1.7.4. C. Reader and Patron Feedback Display**

**Q81. Is it correct to assume that if BART elects to supply the fare gate vendor for this procurement with Cubic Tri-Reader 4 equipment, that equipment will have firmware or software installed that will process Clipper, Open Payment cards, employee cards and BART-only smart cards?**

A81. Regarding requirements under part C in Appendix A (requirements 26-36), BART has not selected an approach. Firms may provide feedback on the additional information that would be needed to integrate the Tri-Reader 4 with their respective fare gates in the response to the RFEI.

**Q82. If the Approach 3 is chosen as the path to be used by BART will the reader requirements described in Section C be satisfied completely by the Cubic Tri-Reader 4?**

A82. At a minimum any fare reader/validator, including the Tri-Reader 4, should demonstrate the ability to meet requirements 26 through 36. These are preliminary requirements and subject to change in any future RFP.

**Q83. If the requirements in Section C are not satisfied by the Cubic Tri-Reader 4, what additional features must be added to Cubic Tri-Reader 4 functionality?**

A83. At a minimum any fare reader/validator, including the Tri-Reader 4, should demonstrate the ability to meet requirements 26 through 36. At this time, BART has not determined any additional features that need to be added.

**Q84. At page 15 point c, may you clarify if you intend in the future to use also QR e-ticket (on smartphone)?**

A84. BART is open to payment technologies other than those identified in the section, including QR. Firms may provide information about their experience with such

technologies as part of the response to Section 5.A as well as alternative implementation approaches in Section 5.E.

**Q85. (Requirement #28) Will the Fare Gate Supplier be responsible for implementing any processing logic of the BOSC and, if so, when will this logic description be provided to the supplier?**

A85. This information will be determined as part of the future RFP.

**Q86. (Requirement #28) Will the processing logic of the BOSC be wholly contained within the smart card reader?**

A86. This information will be determined as part of the future RFP.

**Q87. (Requirement #29) Will the Fare Gate Supplier under the proposed contract be responsible for the implementation of the processing logic within the fare gate for any NFC app?**

A87. NFC requirements have not been defined at this time and could be determined as part of the future RFP.

**Q88. (Requirement #30) Does the "fare gate ... get the necessary information" in real time for each entry or does the fare gate use previously obtained information stored locally in the gate for each entry?**

A88. This preliminary requirement assumes that account information will be obtained in real-time.

**Q89. (Requirement #30) Where is the data described or provided in this document that is used to perform the functions described herein?**

A89. The data described in requirement #30 are not included in the RFEI.

**Q90. (Requirement #31) Does the "fare gate ... get the necessary information" in real time for each exit or does the fare gate use previously obtained information stored locally in the gate for each exit?**

A90. This preliminary requirement assumes that account information will be obtained in real-time.

**Q91. (Requirement #31) Where is the data described or provided in this document that is used to perform the functions described herein?**

A91. The data described in requirement #31 are not as part of the RFEI.

**Q92. (Requirement #32) Will the patron display be integral with the Cubic TriReader?**

A92. If BART requires use of the Tri-Reader 4, BART anticipates that the patron display will utilize its validation results, but will not be integrated with the reader itself.

**Q93. Page 16, part 35 – Does the vandal resistant include anti-graffiti (easy to clean graffiti from surface in case of occurrence) too?**

A93. Vandal resistance under requirement #35 may include prevention of or easy clean-up of graffiti on the equipment.

#### **1.7.5. D. Fare Gate Arrays**

No questions were submitted on this section.

#### **1.7.6. E. Fare Evasion Prevention**

**Q94. Page 17, part 43 – Is there requested taking images of fare gate users? If yes, could be used face recognition?**

A94. Surveillance ordinance adopted by the BART Board of Directors prevents the use of facial recognition, but video images may be used to detect presence of a person or object if it does not allow the specific person to be identified from the images. Please see [BART's Surveillance Technology Ordinance \(2018\)](#) for additional information.

#### **1.7.7. F. Safety Requirements**

No questions were submitted on this section.

#### **1.7.8. G. Security Requirements**

**Q95. (Requirement #60) What specific cards are included within the terms "fare card"?**

A95. Fare cards will include at minimum Clipper cards supported by Clipper 2.0 and other fare media (physical or virtual) supported by the Clipper program. Open payment bank-issued cards will be supported as an option to the Clipper program.

**Q96. (Requirement #60) Will the term "tickets" include magnetic stripe tickets and/or QR-Code tickets?**

A96. Preliminary requirement #60 applies to any and all fare media used as part of this project. At this time, BART does not anticipate supporting magnetic stripe tickets as part of the Next Generation Fare Gates project.

**Q97. (Requirement #60) If magnetic stripe tickets are to be processed, will a ticket swipe type reader be an acceptable reader?**

A97. At this time, BART does not anticipate supporting magnetic stripe tickets as part of the Next Generation Fare Gates project.

**Q98. Page 18, part 62 – Virus protection we implement to server and each devices are in closed network under server. Is it acceptable?**

A98. Yes, at this time, the intent of requirement #62 is to have the equipment in a closed network, with local antivirus, anti-malware, file integrity monitoring capability updated via a centralized server.

#### **1.7.9. H. Infrastructure Connectivity**

**Q99. Page 18, part h, - Unfortunately, we didn't find example layout of station. Could you share it with us or guide us where this is stated in the documentation?**

A99. Exhibit 2 can be found on page 94 of the RFEI.

**Q100. Page 18, part 64 - How and when do you present the connection to BART infrastructure?**

A100. Please see Exhibit 2, which is the Lake Merritt station floor plan. It was provided as an example of the layout of a typical BART station infrastructure, so firms could better understand the existing footprint, cabling, conduits, and other connections.

**Q101. (Requirement #65) How many active fiber optic connections must be connected to the new fare gate processor?**

A101. At this time, it is anticipated that the fare gate controller will require one (1) network connection. Each fare validator in the fare gate will be separately connected to the operational network. This is subject to change in any future RFP.

**Q102. Page 18, part 66 – is the 277Vac Phase-to-phase voltage or Phase-to-ground?**

A102. The input voltage to the current equipment is 277Vac single-phase power source. BART is considering the use of standard 120Vac input for future equipment.

**Q103. (Requirement #67) Can BART provide the features that pneumatic-actuated fare gates possess that are superior to electrically operated fare gates?**

A103. Historically, pneumatic gates have been more reliable and had lower maintenance costs and effort compared to electric actuation.

**Q104. (Requirement #67) Can BART provide the operating characteristics of pneumatic fare gates such as actuating speed and actuating force?**

A104. Per requirement #25, BART's preliminary requirement for any proposed fare gate would enable passenger throughput of at least 30 persons per minute. The actuating force shall support the passenger throughput, reduce fare evasion and prevent injury or damage if the fare barrier makes contact with individuals or their belongings.

**Q105. (Requirement #67) What is the adjustable range of initial closing force and final closing force of the pneumatic fare gates?**

A105. BART does not have an adjustable range requirement. Please see A104 related to minimum requirements for passenger throughput.

**Q106. (Requirement #67) BART reported that it conducted analysis and tests of its pilot pneumatic design. Can BART please share the results of its pilot analysis and testing as it pertains to performance of the pneumatic power system?**

A106. BART recently retrofitted an accessible fare gate (AFG) with a swing barrier design. Operating environment and safety tests were conducted prior to implementation in public space. The pilot AFG at the Richmond Station has performed well with less forced opening incidents and minimum wear and tear.

**Q107. (Requirement #67) Will the final Scope of Work for the BART faregate replacement project include replacement, upgrades, and/or modifications of the current pneumatic power infrastructure?**

A107. The procurement for the Next Generation of Fare Gates Projects has not been finalized including the scope of work.

**Q108. (Requirement #67) Are the capabilities of the pneumatic system as presently equipped and configured such that it can support meeting all of BART's technical requirements in its Preliminary SOW?**

A108. Yes.

**Q109. (Requirement #67) Please provide technical spec sheets and operating/maintenance manuals for the current pneumatic power system for fare gates.**

A109. This information is not necessary to respond to the RFEI. BART will consider including such information as part of a future RFP.

**Q110. (Requirement #67) In the event of BART experiencing a failure in the legacy pneumatic power, what provisions does BART have in the legacy fare gate design to enable barriers to open in the event of an emergency, or simply in the event that an authorized operator needs to open them?**

A110. The pneumatic fare gates are designed to be fail-safe, spring-loaded so that they open in the event of loss of pneumatic air pressure.

**Q111. (Requirement #67) In conducting its pilot, did BART determine that a pressure setting of 10lbs. per barrier leaf was satisfactory in deterring riders from forcing barriers open?**

A111. This information is not necessary to respond to the RFEI. BART will consider including such information as part of a future RFP.

**Q112. (Requirement #67) Please clarify expectations about system performance in the event that electric power is lost to the air compressor shown in Exhibit B.**

A112. It is expected that the fare gates would automatically open upon station power loss or other emergency situations. The fare gates are considered part of the station emergency egress pathway.

**Q113. (Requirement #67) What system is used to monitor the performance of the pneumatic power system used for fare gates? Does BART have specific performance measures for this system?**

A113. The performance of the pneumatic power system is not specifically monitored. Its performance is associated with the ability of the fare gate barrier to open properly. The overall performance of the fare gate barriers is monitored by BART's Data Acquisition System (DAS).

**Q114. (Requirement #67) Please provide details regarding the pneumatic power system, specifically: 1) the type, number, and location of pneumatic lines that feed fare gates and fare gate arrays; 2) technical specifications of compressors and any back-up systems; and 3) details of any expected monitoring and troubleshooting capabilities of pneumatic systems expected in the SOW.**

A114. This information is not necessary to respond to the RFEI. BART will consider including such information as part of a future RFP.

**Q115. (Requirement #68) Please provide additional details about BART's SCADA and DeviceNet systems.**



A115. Per the RFEI, BART will consider solutions other than using DeviceNet. At a minimum, to meet SCADA connection requirement #68, the Supplier would provide a multi-protocol capable expandable remote IO module.

**Q116. (Requirement #68) Is Device Net accessible on the fiber optic network connections?**

A116 DeviceNet is currently deployed for SCADA functionality and is independent from the fiber optic network.

**1.7.10. I. Data Communications Interface**

No questions were submitted on this section.

**1.7.11. J. Other Requirements**

No questions were submitted on this section.

**1.7.12. Implementation A. Design**

**Q117. (Requirement #100) Is the BART general installation plan to take delivery of the fare gates from the successful supplier at street delivery point? Will BART then be responsible to move the gates into the final position ready for supplier installation within the stations?**

A117. The installation plan has not yet been determined. Firms may provide input on the installation plan as part of the response to Section 5.E on the alternative approaches to implementation.

**1.7.13. Implementation B. Testing**

No questions were submitted on this section.

**1.7.14. Implementation C. Manuals and Training**

No questions were submitted on this section.

**1.7.15. Implementation D. Delivery and Installation**

No questions were submitted on this section.

**1.7.16. Implementation E. On-going Maintenance and Support**

No questions were submitted on this section.

**1.8. Appendices B-F**

No questions were submitted on Appendices B through F.

**1.9. Exhibit 1**

No questions were submitted on Exhibit 1.



## **1.10. Exhibit 2**

**Q118. Note is taken of the fact that not all fare gates in RFEI Exhibit 2, p. 94 appear to have a port or connection to the pneumatic system. Please explain the configuration and rationale of the design and layout of pneumatic ports relative to the fare gate arrays shown in Exhibit 2.**

A118. This exhibit was provided as an example of the layout of a typical BART station infrastructure, so firms could better understand the existing footprint, cabling, conduits, and other connections. The explanation of the design and layout are not required to respond to the RFEI.

## **1.11. Exhibit 3**

No questions were submitted on Exhibit 3.

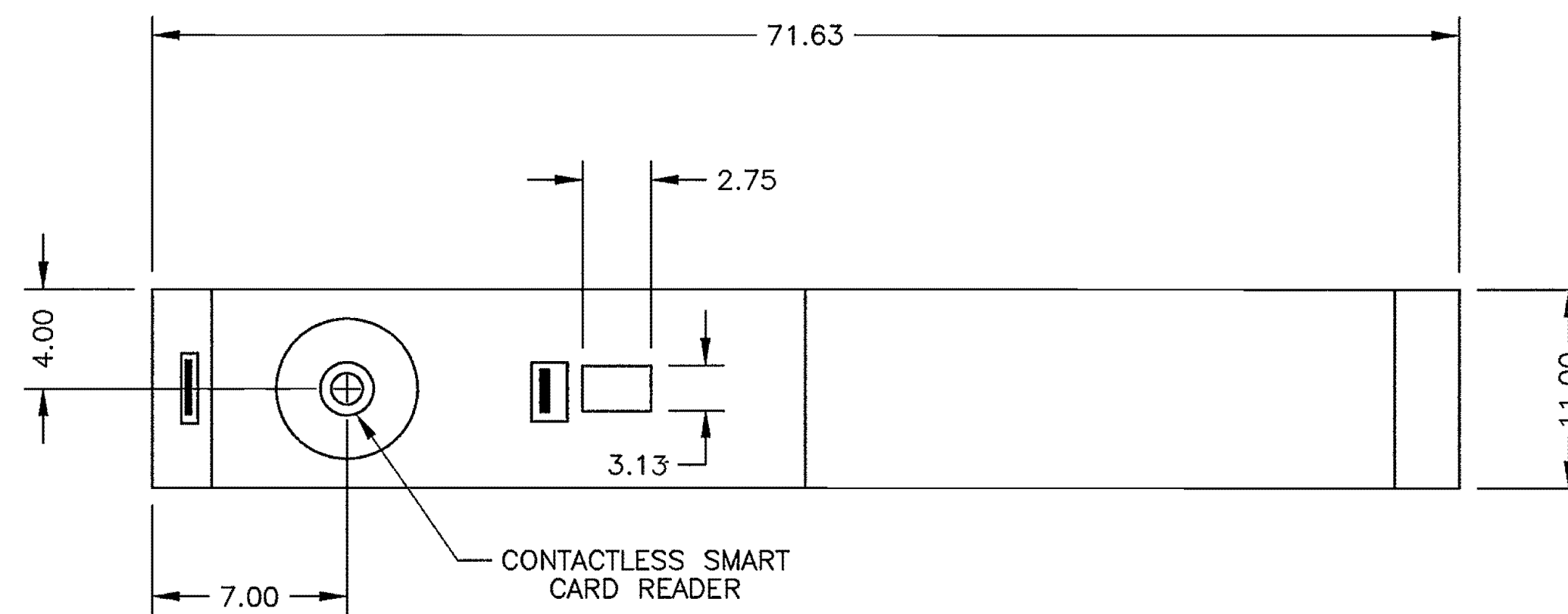
## 2. LIST OF INTERESTED SUPPLIERS

	Name of Firm	Representative	Title	E-mail
1	Acumen Building Enterprise	Alexa Welch	BD Coordinator	<a href="mailto:alexandra.welch@acumentransit.com">alexandra.welch@acumentransit.com</a>
2	Conduent	Bill Brunet	Director, Public Sector, Transportation	<a href="mailto:Bill.Brunet@conduent.com">Bill.Brunet@conduent.com</a>
3	Cubic Transportation Systems, Inc.	Keith Foxe	Business Development Director	<a href="mailto:Keith.fox@cubic.com">Keith.fox@cubic.com</a>
4	EASIER (dba for Automatic Systems, SA)	Herve Muller	President North America	<a href="mailto:hmuller@go-easier.com">hmuller@go-easier.com</a>
5	Gunnebo	Doug Lenzo	Regional Sales Manager - Western United States	<a href="mailto:doug.lenzo@gunnebo.com">doug.lenzo@gunnebo.com</a>
6	Mikroelektronika	Lubos Srnsky	Sales Manager	<a href="mailto:l.srnsky@mikroelektronika.cz">l.srnsky@mikroelektronika.cz</a>
7	Optex America	Douglas Easter	Regional Sales Manager, Northwestern US and Western Canada	<a href="mailto:deaster@optexamerica.com">deaster@optexamerica.com</a>
8	Rebel Group	Jochem Baud	Consultant Transit Payment Systems	<a href="mailto:Jochem.Baud@Rebelgroup.com">Jochem.Baud@Rebelgroup.com</a>
9	Scheidt-Bachmann	Richard Simpson	Director Business Development	<a href="mailto:Simpson.Richard@scheidt-bachmann-usa.com">Simpson.Richard@scheidt-bachmann-usa.com</a>
10	Solari Corp.	Germana Petris	Secretary, Sales Dept	<a href="mailto:info@solaricorp.com">info@solaricorp.com</a>
11	STraffic America, LLC	Paul Korczak	Senior Consultant	<a href="mailto:korczakpaul@gmail.com">korczakpaul@gmail.com</a>
12	Thales	Nicolas Moppert	International Sales & Business Manager - IT & Public Transport	<a href="mailto:Nicolas.Moppert@thalesgroup.com">Nicolas.Moppert@thalesgroup.com</a>
13	Virginkar & Associates, Inc.	Danielle Holguin	Coordinator	<a href="mailto:holguin.danielle@va-inc.com">holguin.danielle@va-inc.com</a>



## **EXHIBIT 1. SELECT FARE GATE EQUIPMENT DRAWINGS**

FRONT ELEVATION

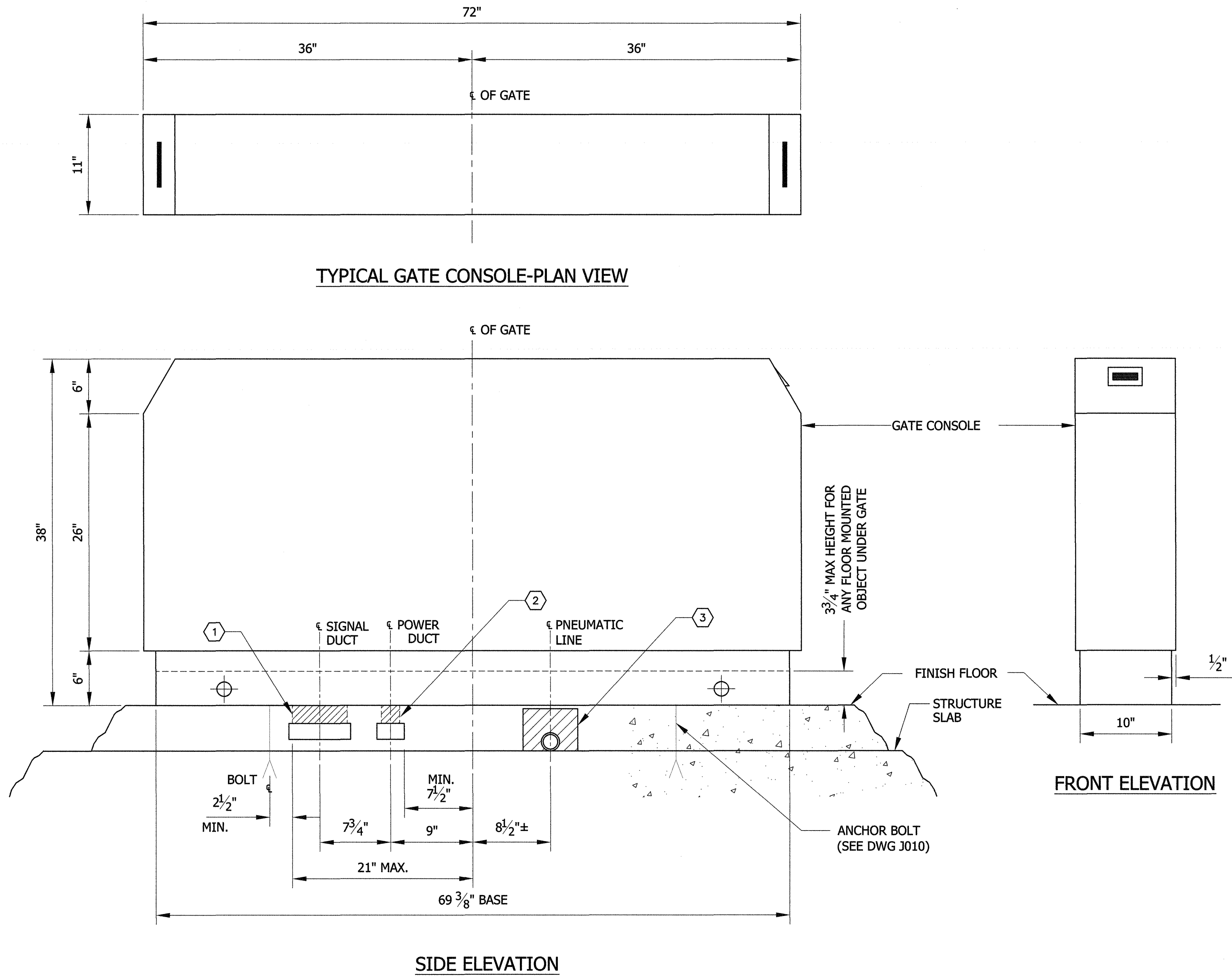


TYPICAL EXIT CONSOLE  
(SEE NOTE 2)



- [illegible]

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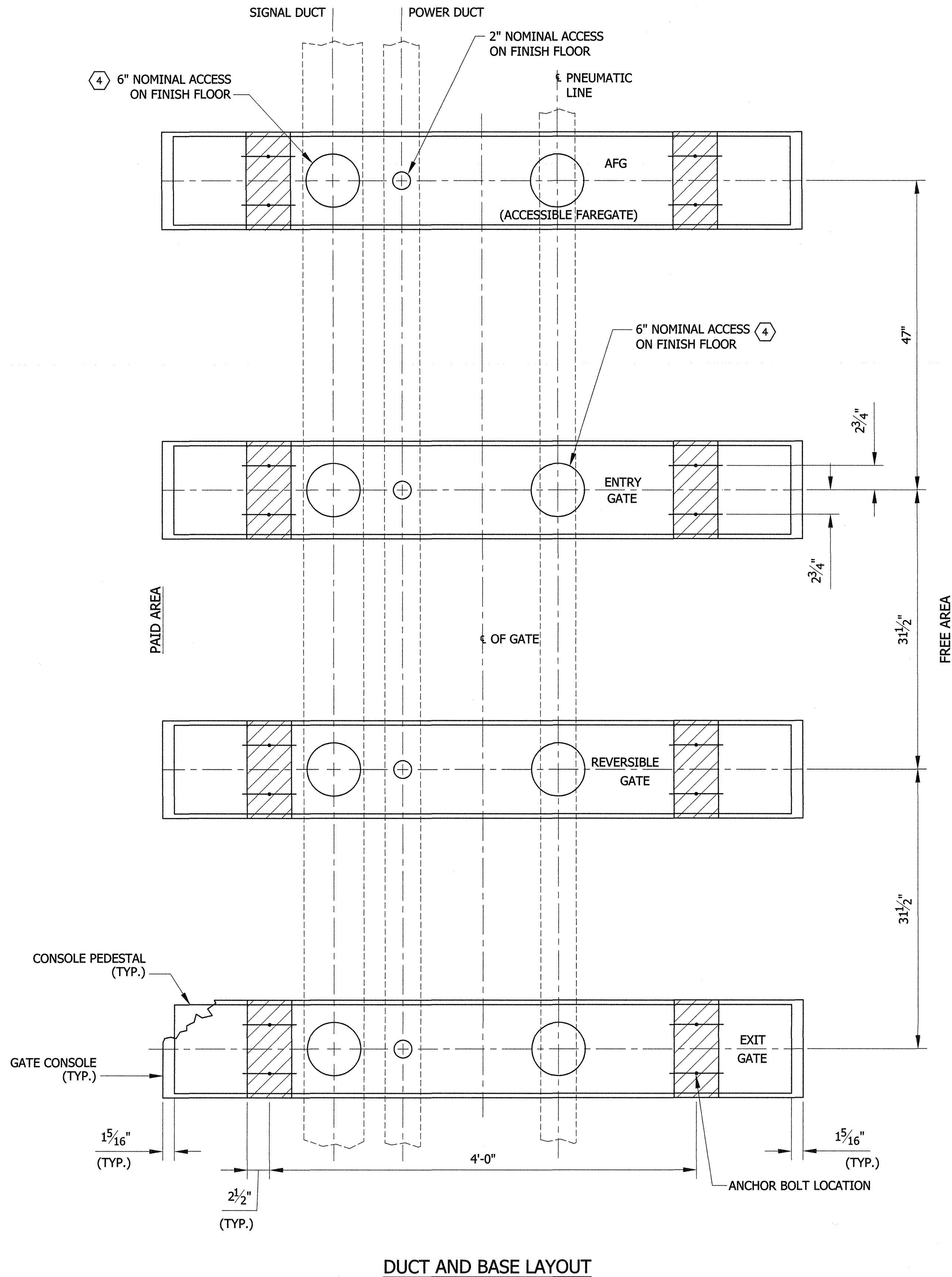


GENERAL SHEET NOTES:

1. THE HOME RUN FIBER CABLE USED TO SERVICE THE COMMUNICATION REQUIREMENTS OF THE FAREGATES WILL ENTER THE GATE ARRAY THROUGH THE CONTROL DUCT OPENING OF EACH GATE CONSOLE OF THE ARRAY. THE FIBER CABLE WILL BE TERMINATED AT AN APPROVED FIBER DISTRIBUTION/PANEL.
2. THIS DRAWING DEFINES THE REQUIREMENTS FOR ARRANGEMENT AND ORIENTATION OF FRONT PANEL DEVICES AND EQUIPMENT OVERALL DIMENSIONS.
3. GATE BASE PLATES ARE TO BE ALIGNED LEVEL ACROSS WIDTH WITH OTHER GATE AISLES AND LEVEL LENGTH WISE WITH THE GATE.
4. THE POWER RECEPTACLE SHALL BE MOUNTED AS IN DRAWING J011.

SHEET KEYNOTES:

1. SIGNAL DUCT SHALL BE 1-1/4" X 6-3/4" WITH A COMPLETE ACCESS ACTIVATION. CUT BOOT TO 2" HIGH.
2. POWER DUCT SHALL BE 1-1/4" X 3-1/8" WITH A 2" AFTERSET INSERT.
3. COPPER AIR PIPE SHALL BE COVERED BY PVC CONDUIT ALL THE WAY TO AIR COMPRESSOR. ALSO SEE DRAWING J007.
4. PLATES COVERING SIGNAL AND PNEUMATIC ACCESS SHALL BE FLUSH WITH FINISH FLOOR. TO EXTEND ASSEMBLY HEIGHT UP TP 3" USE EXTENSION RING. TO EXTEND MORE THAN 3" ADD A PVC PIPE (SEE DRAWING J007).



REV.	DATE	BY	CHKD.	APP.	DESCRIPTION
06	05/15/19	BM	VN	VN	REVISED PER BECO BFS00571
05	10/17	MD	VN	TY	REVISED PER BECO BFS00426
04	10/16	FC	VN	VN	REVISED PER BECO BFS00426
03	10/12	FC	BY	TH	DRAWN PER BECO BFS00132

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DESIGNED: BATC	DATE: 09/08
DRAWN: L. CHU	09/08
CHECKED: B. YEE	09/08
APPROVED: S. VAN DUSSEN	09/08

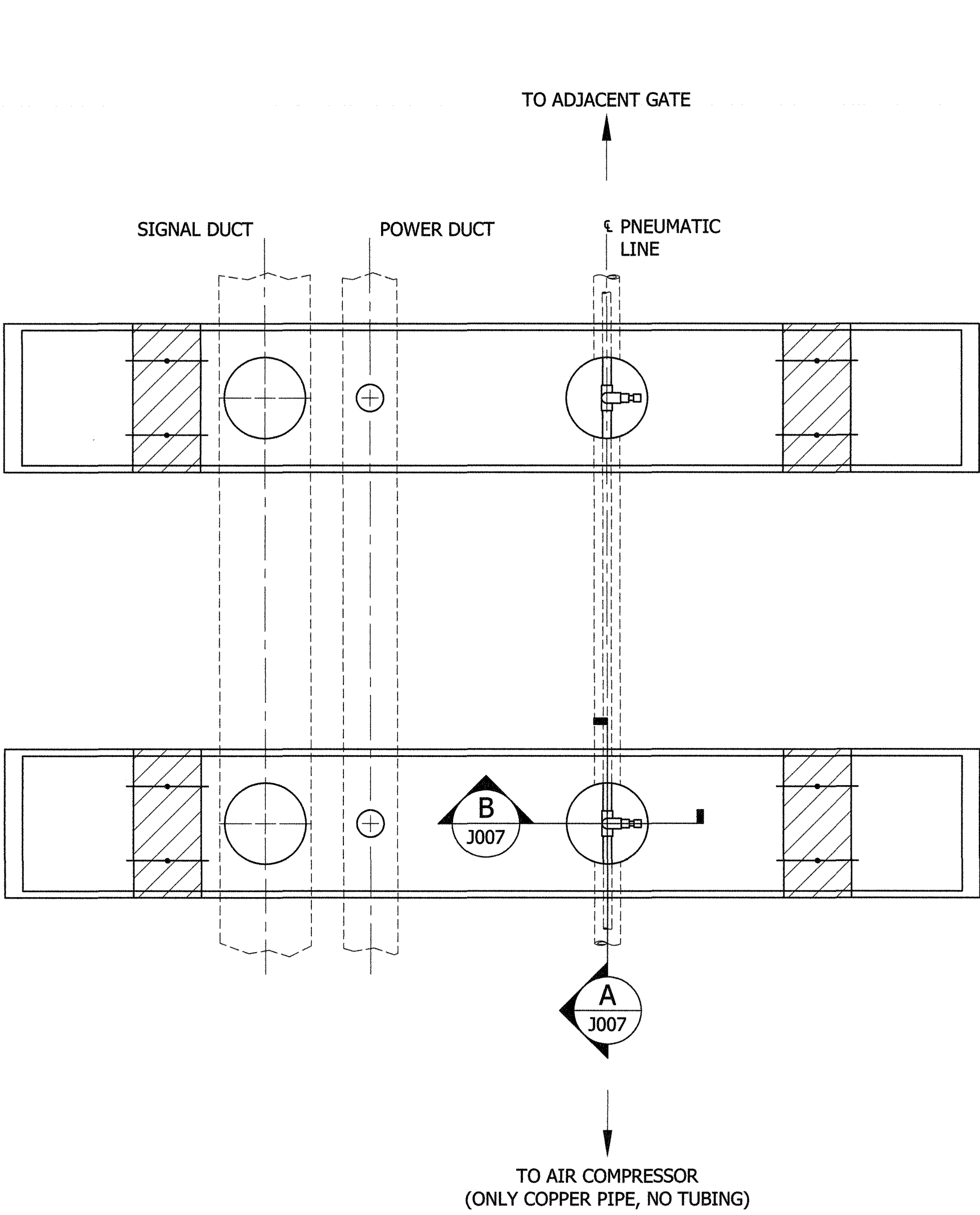
**BART FACILITIES STANDARDS  
AUTOMATIC FARE COLLECTION  
EQUIPMENT**  
FARE GATES  
BASE DETAILS

REF. NO.	
SIZE: SCALE	
CONTRACT NO.	REV. 06
SHEET NO. J006	PAGE NO.

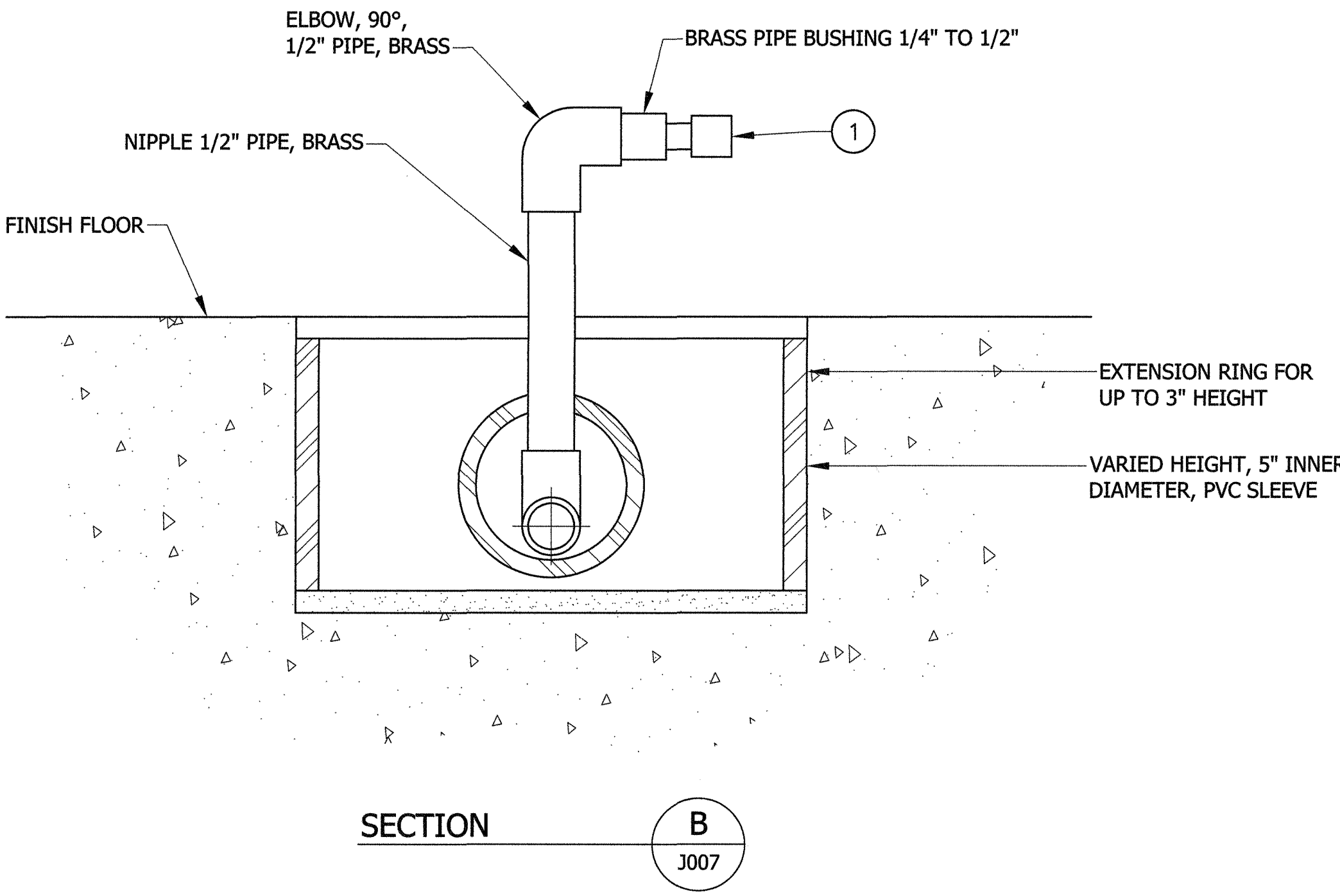
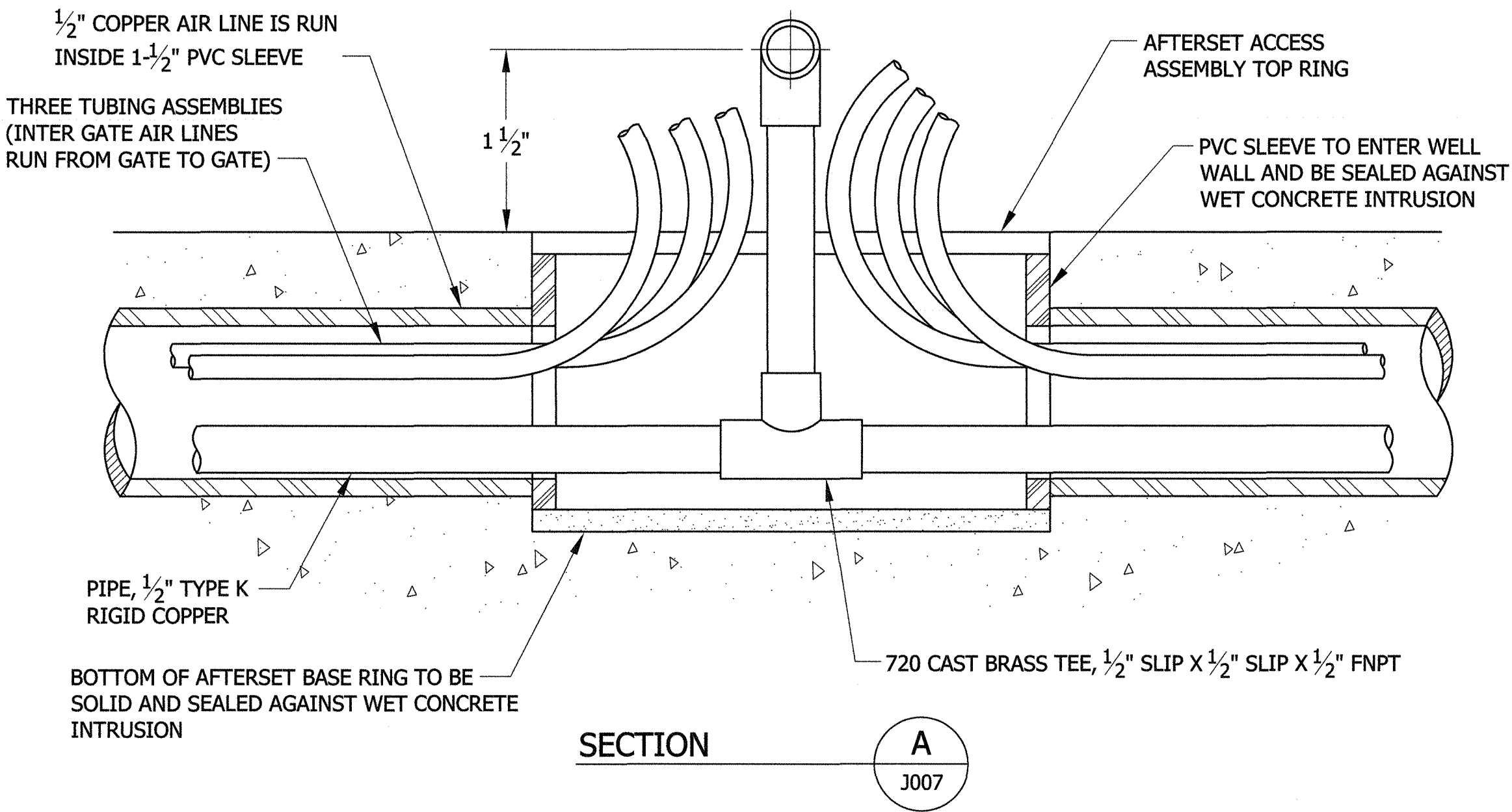
ITEM NO.	PART NO.	QTY	DESCRIPTION
1		1	INDUSTRIAL, QUICK CONNECT 1/8" COUPLER BODY, PUSH-TO-CONNECT TYPE, BRASS, NITRILE SEAL, MNPT, 1/4" PIPE, 300 PSI

GENERAL SHEET NOTES:

1. PROVIDE AIR PIPING AND SLEEVE TO ALL CONSOLES.
2. PLUG TEE WHERE AIR IS NOT REQUIRED.



GATE ARRAY - PLAN VIEW  
SCALE: 1/8"=1'-0"



REV.	DATE	BY	CKD.	APP.	DESCRIPTION
02	05/15/19	BM	VN	VN	REVISED PER BECO BFS00571
01	10/17	MD	VN	JY	REVISED PER BECO BFS00426
00	10/12	FC	BY	RR	DRAWN PER BECO BFS00132

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DESIGNED:	DATE:
DRAWN: M. DELOSO	10/12
CHECKED: B. YEE	10/12
APPROVED: R. REAVIS	10/12

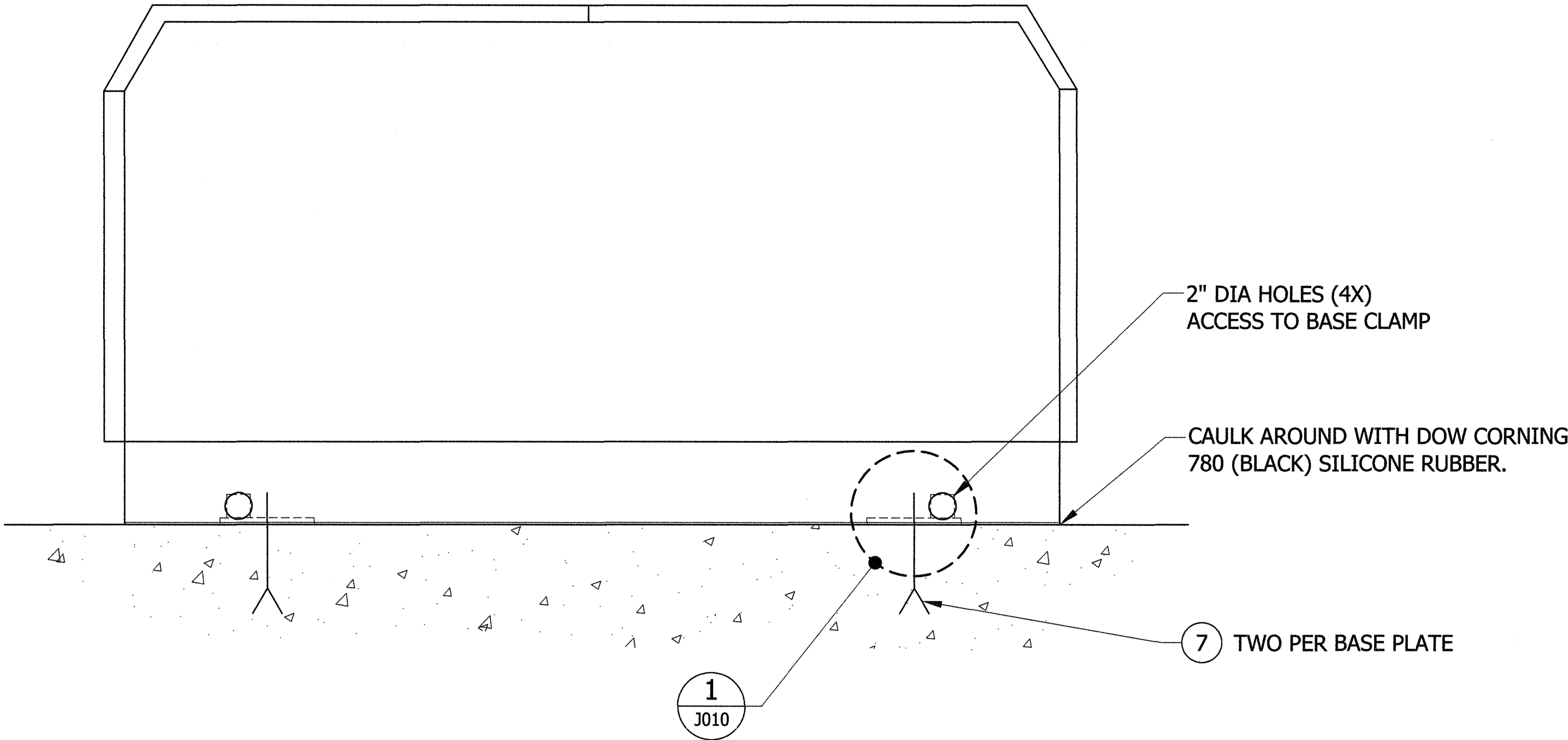
BART FACILITIES STANDARDS  
AUTOMATIC FARE COLLECTION  
EQUIPMENT  
FARE GATE PNEUMATIC LINES

REF. NO.	REV.
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SHEET NO. J007	

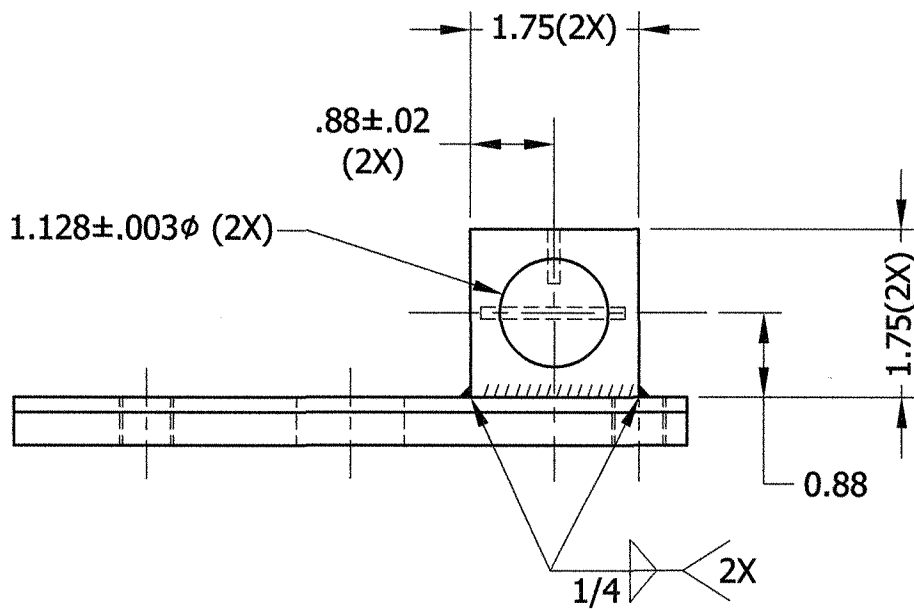
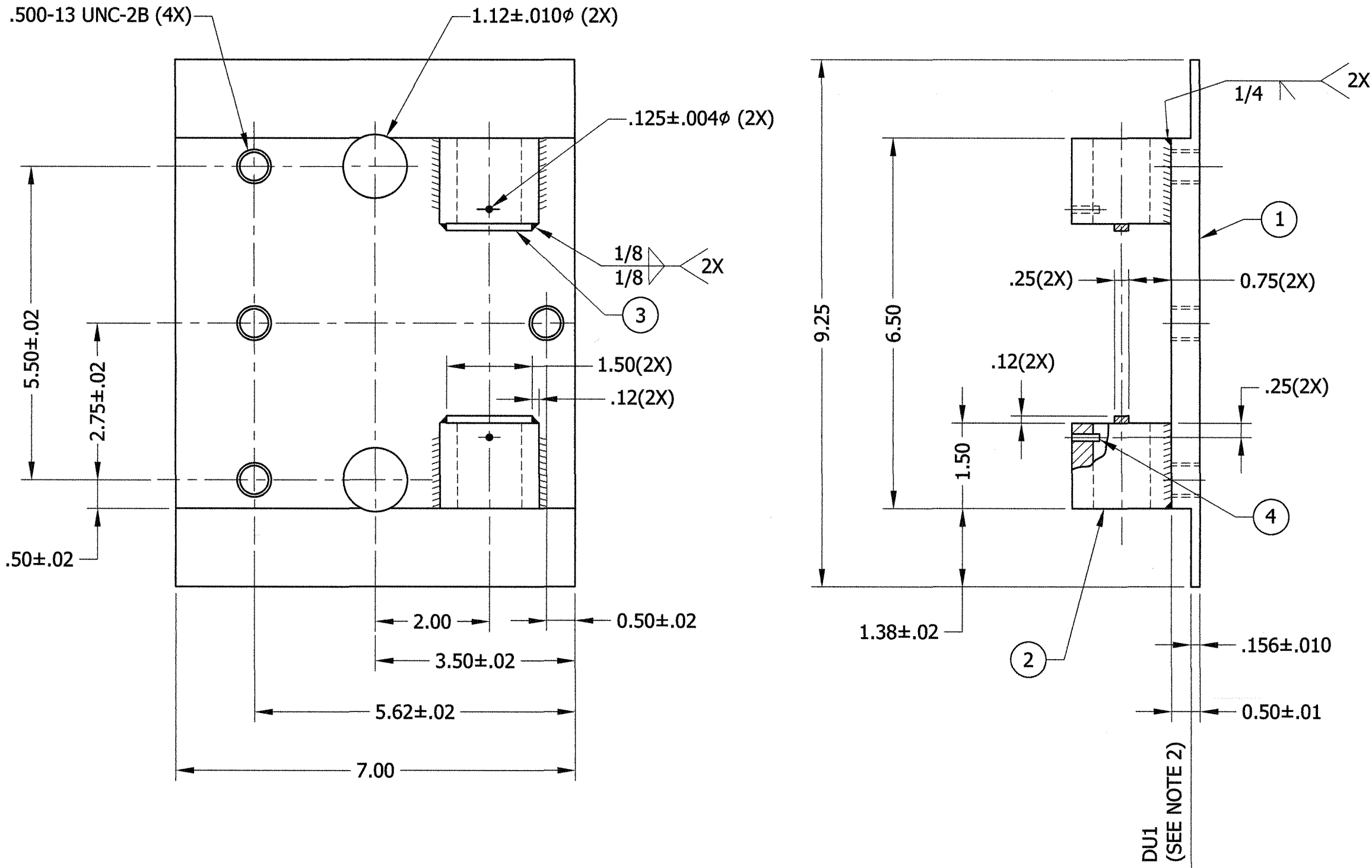


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ITEM NO.	QTY. PER GATE	DESCRIPTION	REF. LENGTH	MATERIAL	NOTES
1	2	PLATE - 7.00 X .50	9.25	06-220	
2	4	RETAINER - 1.75 X 1.50	1.75	06-220	
3	4	STOP - .25 X .12	1.50	06-060	
4	4	ROLL PIN - .125 DIA. X .375 LG. (CADMIUM PLATE OR ZINC 93)			STEEL
5	4	NYLON PLASTIC LOCKING PLUG FOR PANELS FOR 2" ID			
6	4	316 STAINLESS STEEL SQUARE-HEAD CUP-POINT SET SCREW, SUPER-CORROSION-RESISTANT, 1/2"-13 THREAD, 1-1/2" LONG			
7	4	CRES BOLTS 5/8-11 UNC x 6" OR LONGER			

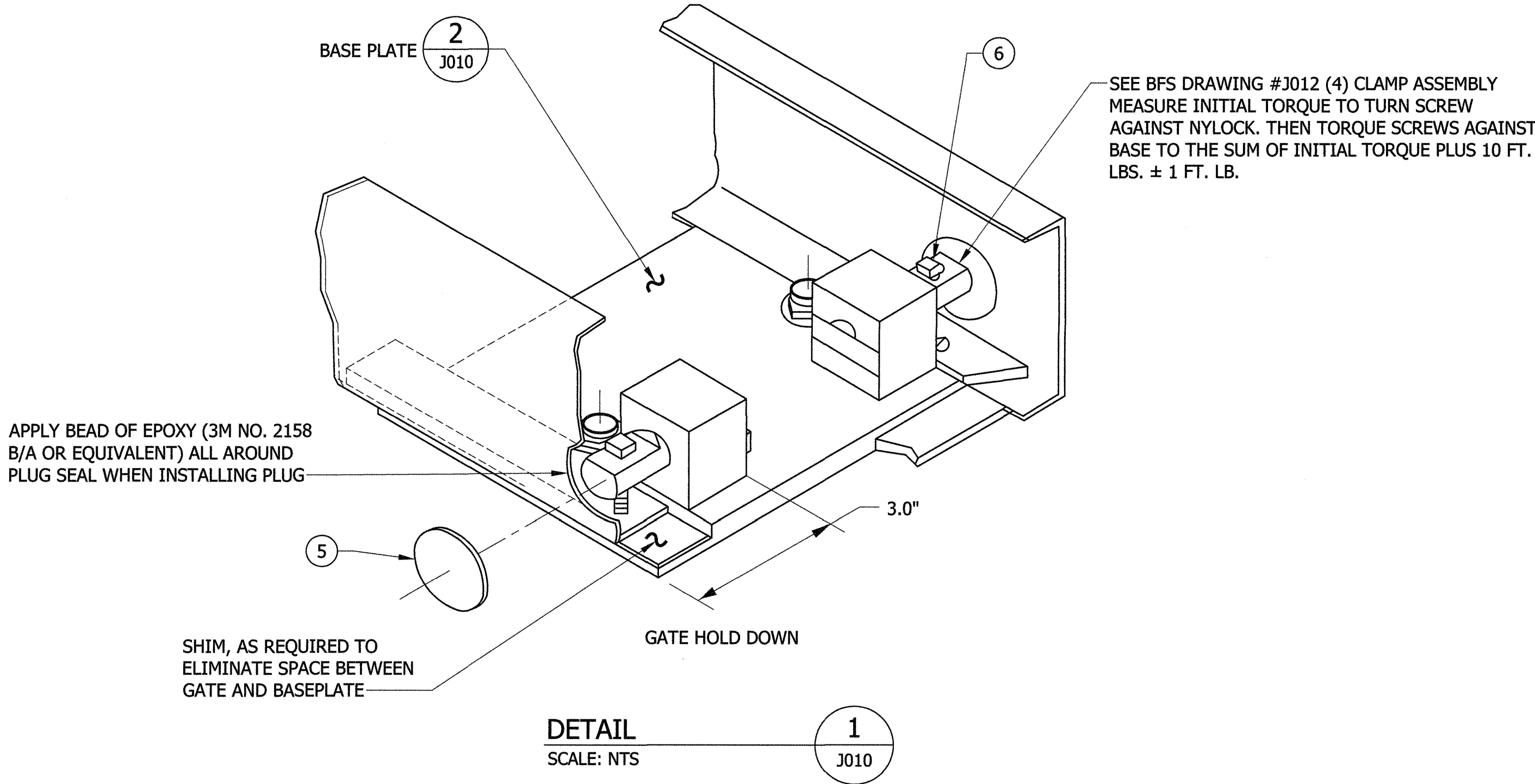


GATE - SIDE VIEW



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

- NOTES:
- UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN INCHES.
  - PLANE DU1 SHALL BE FLAT WITHIN 0.030 AFTER WELDING & FINAL MACHINING.
  - FINISH: ZINC 93.0003 MIN. THICKNESS FOR WELDMENT.
  - ANCHOR THE TVM CABINET TO THE ELEVATION ADAPTER IN ACCORDANCE WITH SEISMIC PROTECTION, SHOCK AND VIBRATION REQUIREMENTS.. BOLTS SHALL PENETRATE AT LEAST 2" INTO STRUCTURAL SLAB.



REV.	DATE	BY	CHKD.	APP.	DESCRIPTION
02	6/19	BM	VN	VN	REVISED PER BECO BFS00571
01	10/17	MD	VN	JY	REVISED PER BECO BFS00426
00	09/08	LC	BY	JG	DRAWN PER BECO EM001537

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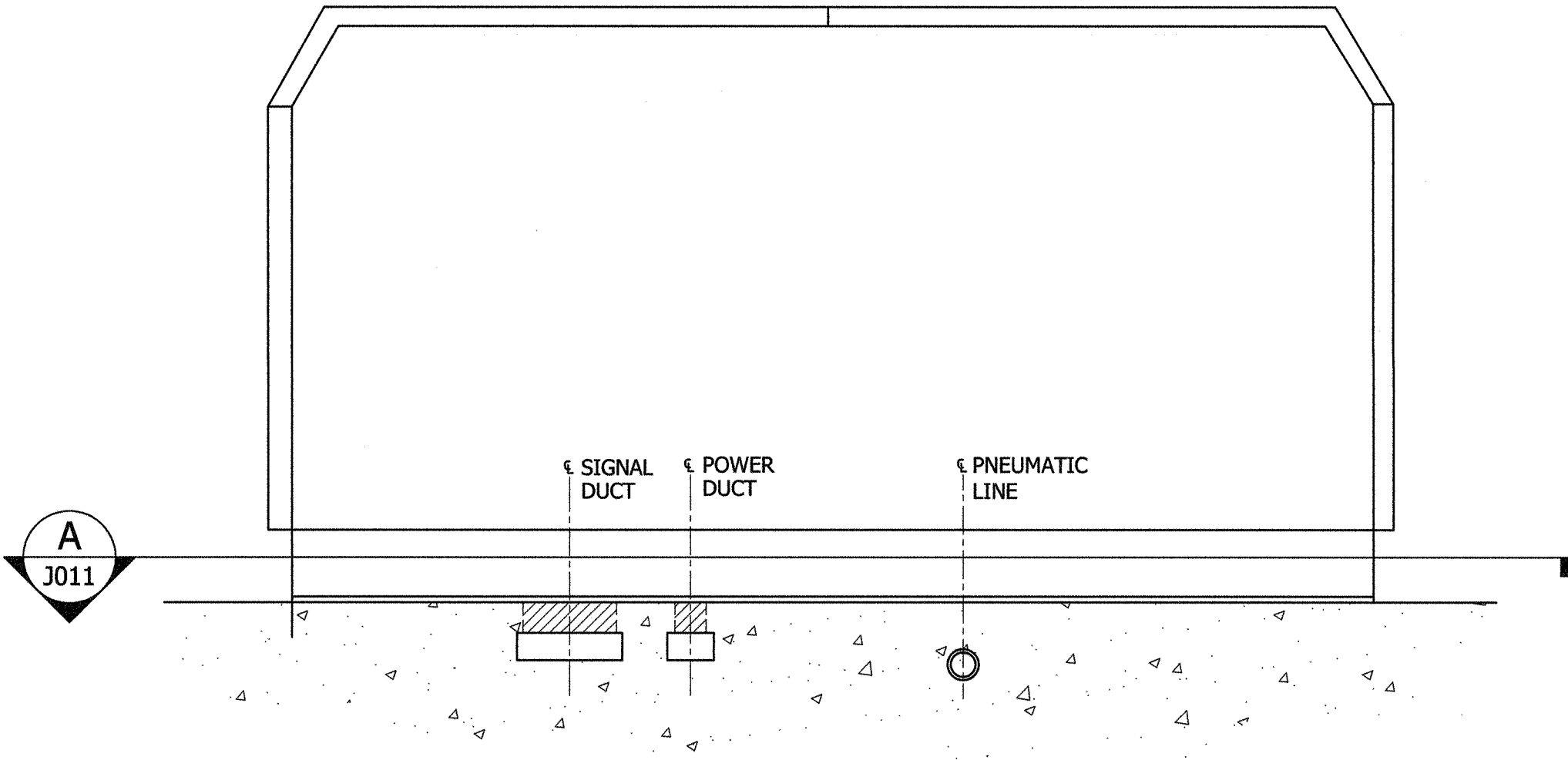
DESIGNED:	DATE:
DRAWN:	09/08
CHECKED:	09/08
APPROVED:	09/08
J. GARCIA	09/08

BART FACILITIES STANDARDS  
AUTOMATIC FARE COLLECTION  
EQUIPMENT  
FARE GATE - BASE PLATE

REF. NO.	SIZE:	SCALE
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CONTRACT NO.	REV.	02
SHEET NO.	PAGE NO.	J010

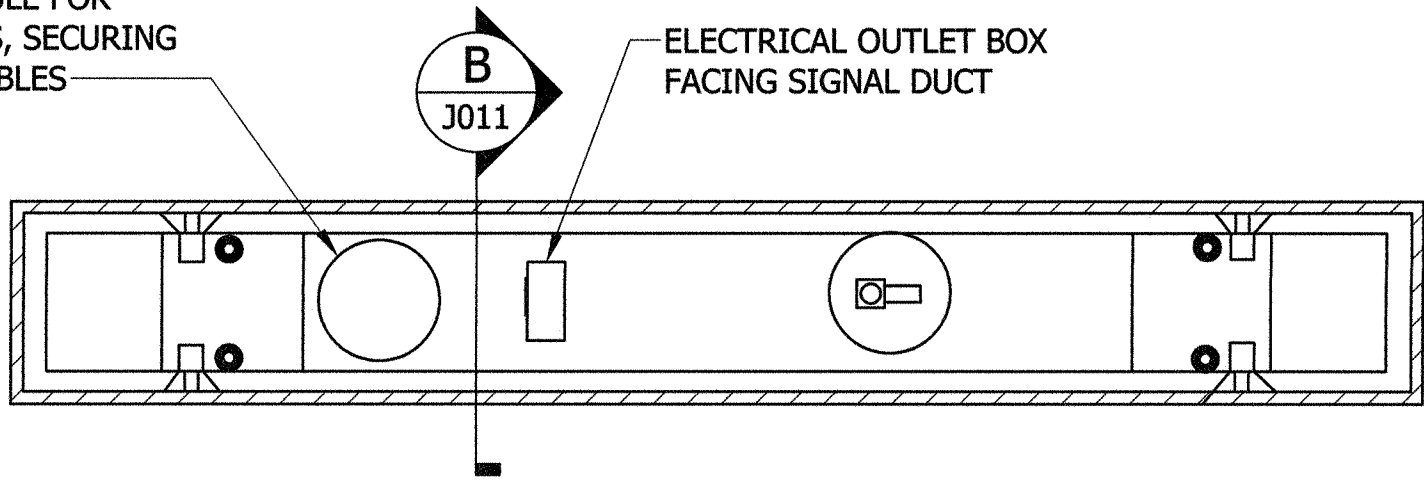


ITEM NO.	PART NO.	QTY	DESCRIPTION
1		1	WEATHERPROOF DIE CAST ALUMINUM 1-GANG SILVER UNIVERSAL BOX WITH MOUNTING LUGS, TWO CLOSURE PLUGS AND GROUND SCREW. VOLUME-17.0; HUB SIZE-3/4 INCH, 5 HOLES.
2		1	TWIST LOCK RECEPTACLE, SINGLE, FLUSH, 2 POLE 3 WIRE, 20 AMP 277 VAC, NEMA L7 - 20R
3		1	RECEPTACLE PLATE, SATIN STAINLESS STEEL 302, 1 OUTLET HOLE 1.60 ID
4		1	3/4" NIPPLES, STAINLESS STEEL (SS)
5		1	2" TO 3/4" ADAPTER, A DESIGNATED MATCHING PRODUCT (DMP)
6		1	2" THREADED COUPLING, SS
7		1	2" PIPE NIPPLES THREADED ON BOTH ENDS, SS
8		1	2" AFTERSET INSERT, A DMP



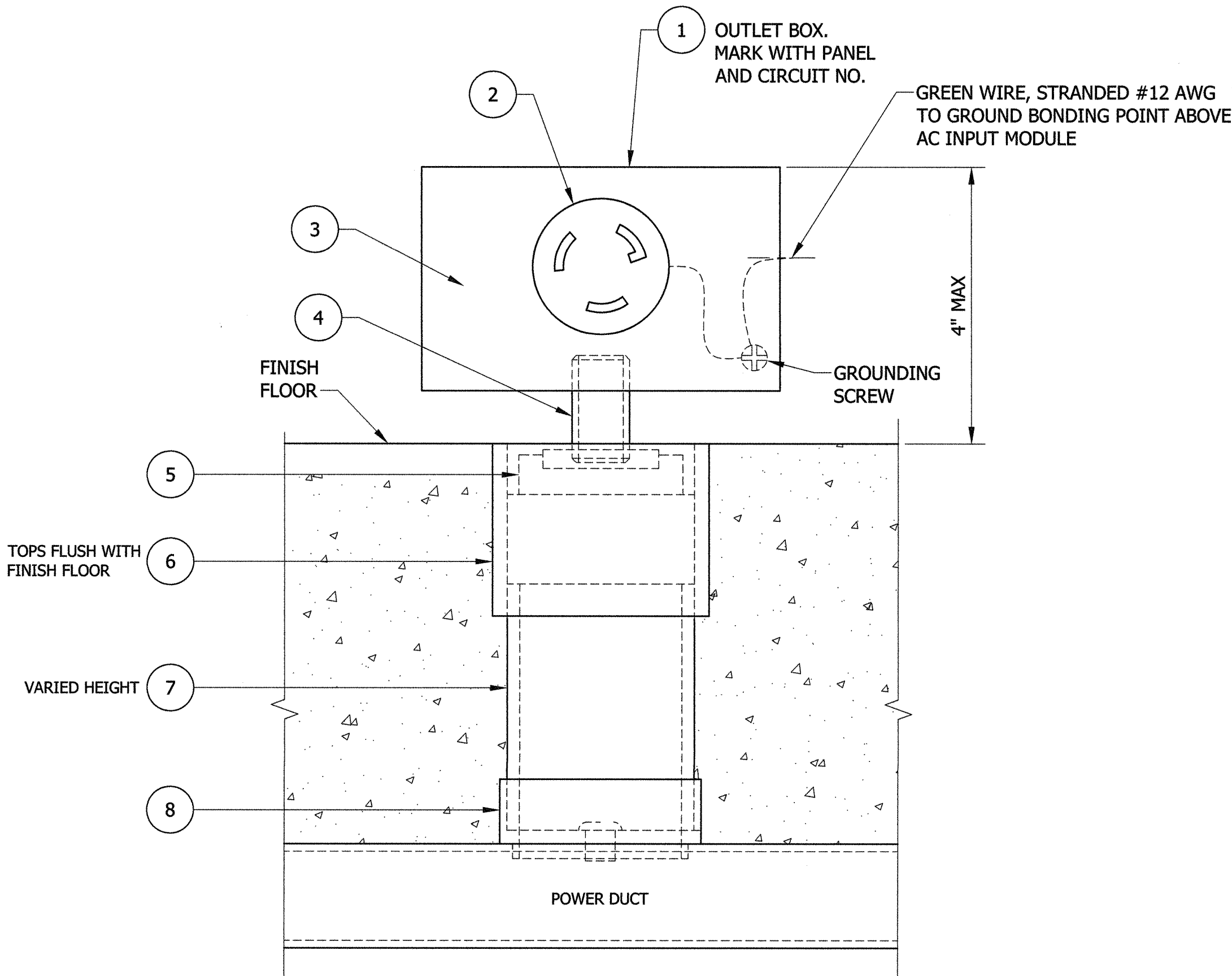
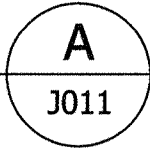
GATE - SIDE VIEW

SEE STATION CABLE SCHEDULE FOR ROUTING OF SIGNAL CABLES, SECURING AND SEALING OF SIGNAL CABLES



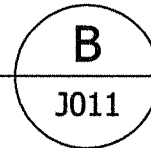
GATE BASE

SECTION



SECTION

SCALE: NTS



REV.	DATE	BY	CKD.	APP.	DESCRIPTION
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01	10/17	MD	VN	JY	REVISED PER BECO BFS00426
00	09/08	LC	BY	JG	DRAWN PER BECO EM001537

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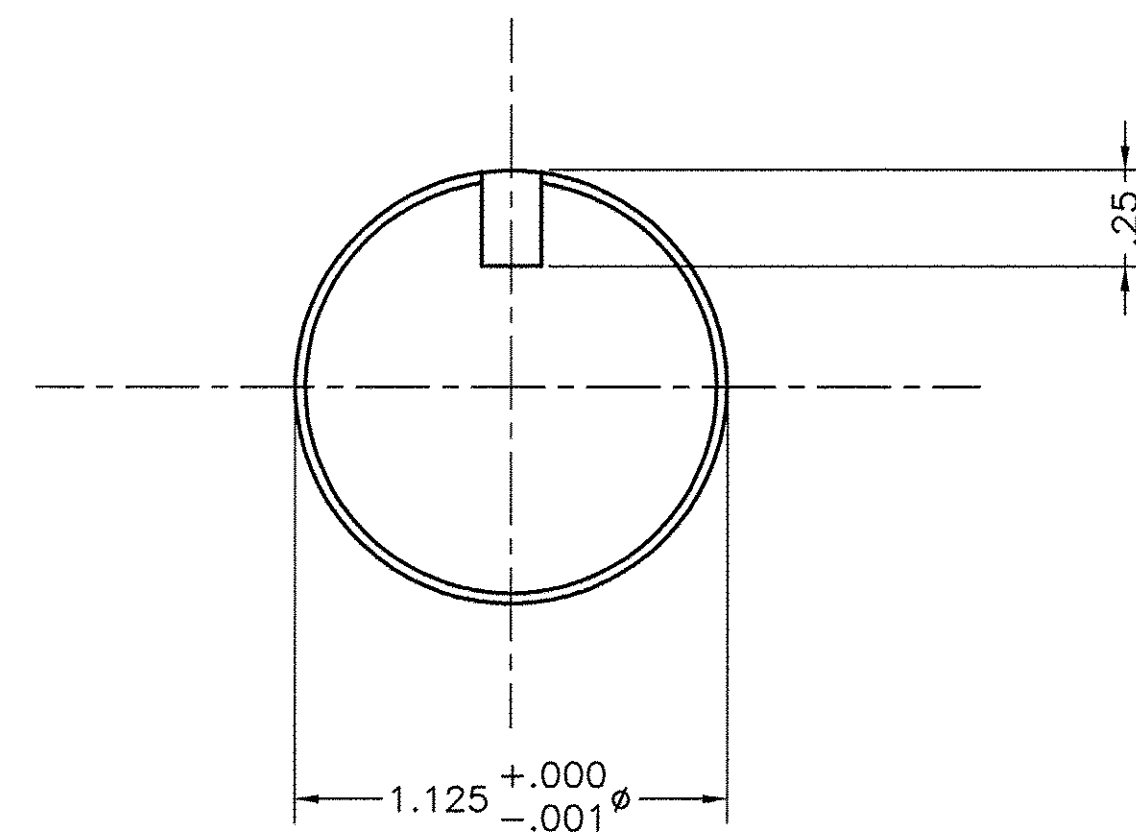
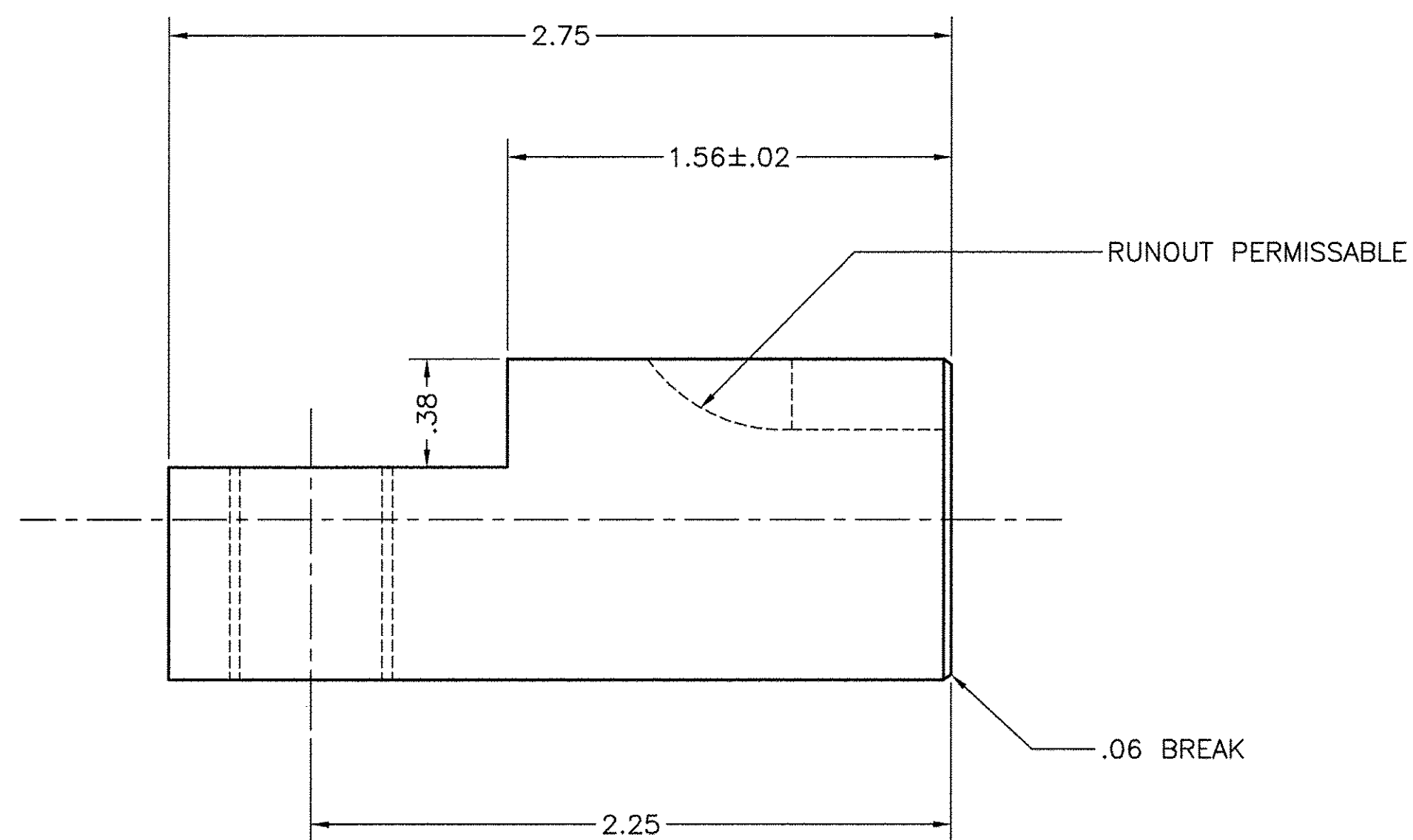
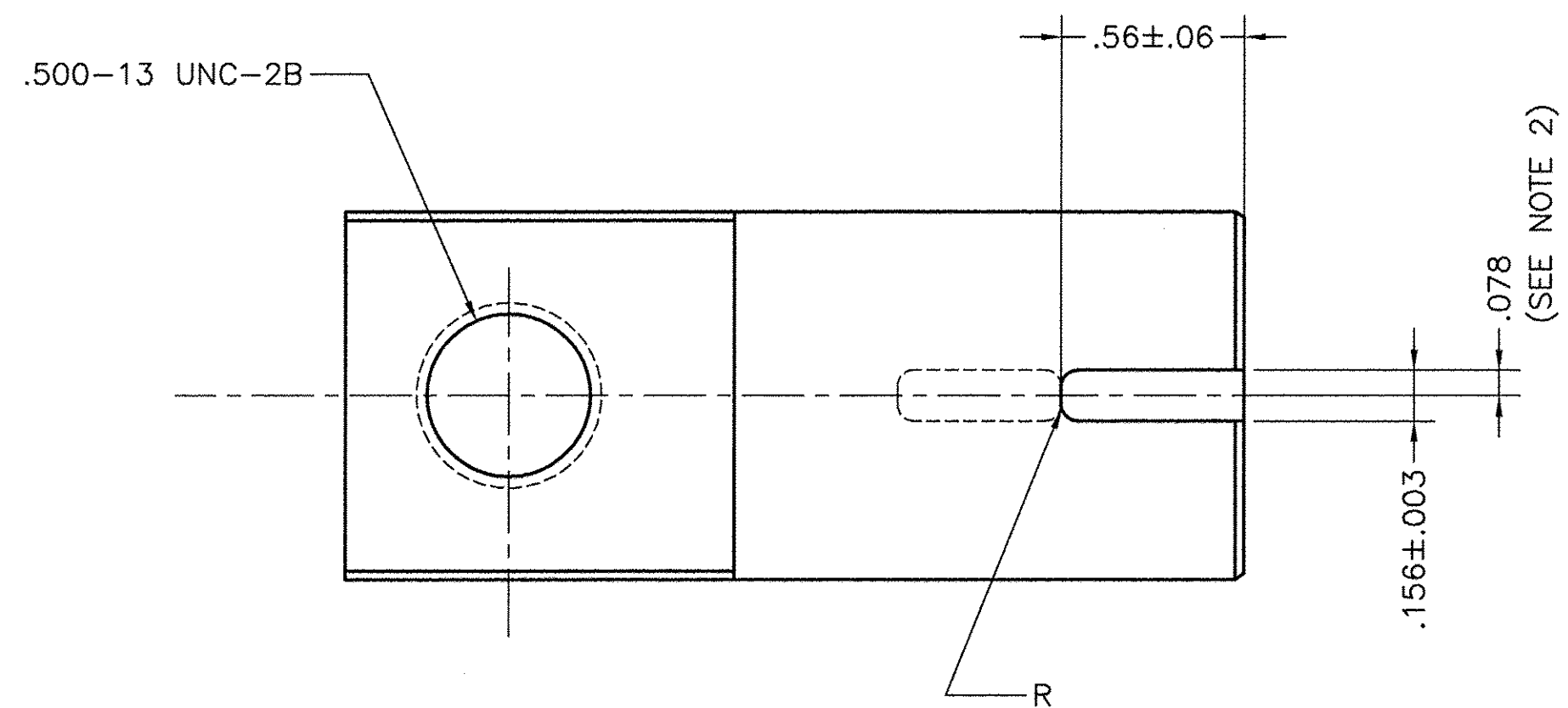


DESIGNED:	DATE:
DRAWN:	09/08
CHECKED:	09/08
APPROVED:	09/08
L. CHU	
B. YEE	
J. GARCIA	

BART FACILITIES STANDARDS  
AUTOMATIC FARE COLLECTION  
EQUIPMENT  
FARE GATE - ELECTRICAL

REF. NO.	SIZE:	SCALE
	D	
CONTRACT NO.	REV.	02
SHEET NO.	PAGE NO.	J011

1. FINISH: ZINC 93.0003 MIN. THICKNESS.
2. .156 KEY WAY TO BE ON SAME  $\phi$  AS .500-13  
THREAD WITHIN .015.



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