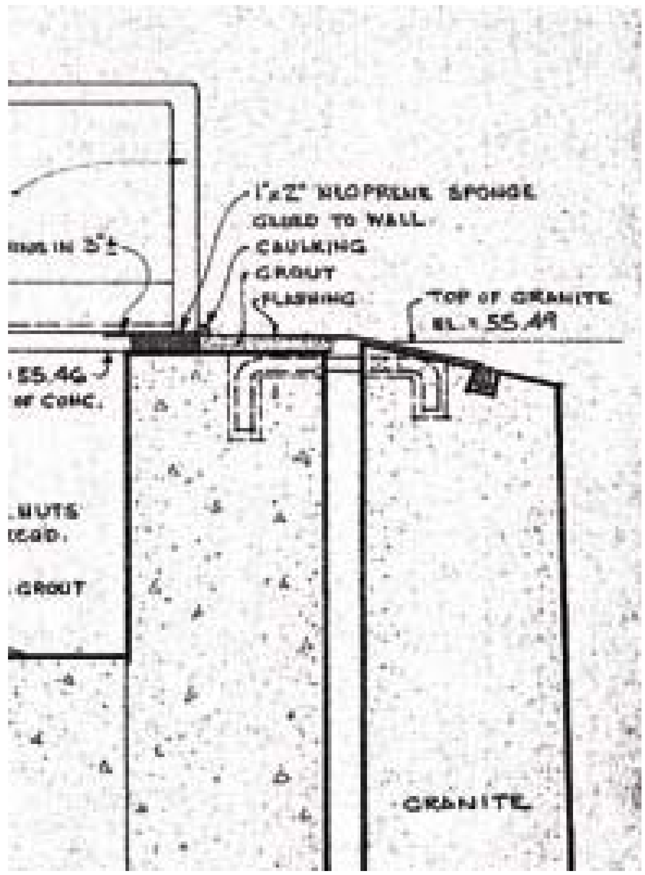
preparation. This condition resulted in multiple layers of poorly installed sealants, including tar-based and elastomeric sealants, thereby compromising both waterproofing systems.

Flashing

The lead-coated copper flashing consists of four pieces and appears to extend beneath the bronze base of the statue as is indicated in the original as-built drawings. The as-built drawings depict the flashing extending 3 inches under the base of the statue, but that could not be verified. The pieces of lead coated copper overlap at the corners and are in fair condition. The original drawings call for the flashing to fully engage the reglet, return on itself and be held in place with some manner of wedge. This is a common method of installation, however, removal of a portion of the deteriorated sealant at the reglet showed that the flashing extends only approximately ¼" into the stone reglet with no return or wedges. The minimal degree to which this flashing edge engages the reglet compromises the level of protection from moisture infiltration that was originally intended. The burden for moisture protection falls entirely on the sealant thereby leaving this seam especially vulnerable when the sealant fails. The oxidation and corrosion products present at the concealed surfaces of the flashing indicate that moisture has penetrated the sealant joints for an extended period of time.



Detail of the original as-built drawing showing the flashing condition at the top of the granite pedestal dado. Detail also shows the metal cramp used to anchor the granite to the concrete. See Appendix A for full set of as-built drawings.

VIBRATION MONITORING

The Juarez Monument is located at the intersection of Virginia Avenue NW and New Hampshire Avenue NW. The tunnel for Interstate 66/Potomac River Freeway runs underground relatively close to the monument. This proximity to heavy traffic has caused concern that vibrations may be causing, or at least contributing to the displacement of the stones at the monument pedestal and plaza. Because of this concern, vibration monitors were installed on the pedestal base on November 2, 2009 to monitor the severity and frequency of any vibration. The sensors remained in place for approximately 29 days and were then removed and the data reviewed.

The pair of vibration sensors installed at the monument's pedestal base. Sensors were linked to an on-site recording device.

The recorded data indicated that there is not a level of vibration occurring at the monument significant enough to cause movement of the stone. The vibration events that were recorded over the course of the month were characterized as short-duration and long-duration events with periods of vibration ranging from one minute to two days. Both types of vibration event occurred only during rainy periods and were likely weather-related. Regardless of the cause, the recorded vibration events were well within an acceptable range and posed no threat to the integrity of the monument. None of the recorded vibration events could be associated with tunnel traffic; they did not relate to periods of high traffic or occur on a regular basis as one would expect from daily traffic patterns. The entirety of the data was graphed and compiled in a report on the findings which is attached to this assessment in Appendix D.

REPAIR PLAN

The recommendations which follow have been organized by priority within each material division. Where practical, multiple options are provided. Typically, Option 1 proposes work items necessary to deal with conditions of immediate concern at the monument in the most targeted manner possible, incurring the minimum amount of cost and intervention. Options 2 and 3 include larger scopes of work and therefore higher cost. In some instances, these Options include work items that address less critical conditions. Options 2 and 3 are more comprehensive approaches to the critical conditions than is outlined in Option 1. Approximate life expectancies for treatments are given and assume that regular cyclical maintenance will be performed.

GRANITE

Option 1

G1.1 - Remove and reset the pedestal granite surbase only in a new mortar bed with new weeps at stone joints. Point all of the pedestal mortar joints with black mortar to match the color of the original. Add low-sloped concrete to the shelf of the concrete substructure to provide a sloped surface for drainage of any water that penetrates the stone cladding. This treatment will securely reset the stones in their original locations reduce moisture penetration and provide drainage for any water that may infiltrate behind the stones in the future. The additional sloped concrete will encourage moisture drainage toward the weeps and prevent ponding on the surface of the concrete. With proper maintenance this repair could last for many years.

Pros:
- Corrects the most severe stone displacement
- Lower cost than dismantling and resetting all of the pedestal granite
- Allows installation of weeps and sloped concrete at the horizontal concrete shelf to correct the water drainage problem

Cons:
- Requires shoring of the remaining granite during the project
- Does not allow for waterproofing of the concrete substructure
- Does not allow for assessment of the condition of the concrete at the outside or at the interior via the access hole shown on the as built drawings

G1.2 - Remove and reset the plaza pavers at the depressed area at the south corner of plaza on a new setting bed to match the existing. Resetting the pavers at the proper elevation and slope will remove the ponding that currently occurs and reduce the deterioration of mortar joints and movement of adjacent granite curbing. Resetting the pavers should have a life expectancy measured in decades.

Pros:

- Corrects the most severe paver settlement
- Lower cost compared to dismantling and resetting all of the plaza pavers
- Does not disturb cracked but stable pavers

Cons:

- Exposes the remaining pavers to damage during the restoration of the pedestal granite
- Does not allow for full assessment of the concrete slab
- Does not allow waterproofing of the concrete slab in other locations

G1.3 - Remove and reset all plaza curbing and vertical wall cladding in a new mortar bed. Install new weeps at top and bottom mortar joints of the perimeter plaza facing. Point all curbing and vertical wall stone with mortar to match the color of the original. The removal of the curbing and vertical wall cladding will allow replacement of the damaged mortar and resetting of the displaced stones to their original positions. The pointing will prevent moisture penetration at the curbing stone joints. The weeps at the top of the facing will allow for drainage of any water that penetrates below the plaza pavers and drains to the perimeter of the plaza. The weeps at the bottom of the vertical wall cladding will allow any water that penetrates behind the facing stones to exit.

Pros:

- Corrects the drainage problem and stone movement at the plaza perimeter

Cons:

- Requires regular maintenance of the weeps to insure continued drainage

G1.4 - Rake out the mortar joints and install sealant and backer rod at the pedestal perimeter, plaza pavers, curbing and steps. This method of repair is easily installed although its lifespan is not as long as other options. The expected lifespan of a sealant and backer rod system is approximately 5-10 years.

Pros:

- Easily installed
- More effective in horizontal joints than mortar alone

Cons:

- Vulnerable to ultraviolet exposure and therefore has a shorter life than other options

G1.5 - Clean soiling and biological growth from the statue, pedestal and plaza. Besides improving the appearance of the monument, removing biological growth and animal excrement will help slow the deterioration of the stone and mortar. Biological growth holds moisture at the stone and mortar surface which can contribute to its deterioration. Cleaning of the monument should be a component of a comprehensive maintenance program and repeated on a regular basis. Other aspects of the scope of work will help prevent some of these soiling and other conditions from quickly recurring.

Pros:

- Improves the appearance and helps slow the deterioration of the monument

Cons:

- Requires regular maintenance to maintain the appearance

Option 2

G2.1 - Dismantle and reset all granite cladding at statue pedestal fully bedded in new mortar and fully grouted at the vertical joints. Install new weeps at the base joints. Point the pedestal mortar joints with black mortar to match the original mortar color. Add low-sloped mortar wash to the horizontal ledges of the concrete substructure. Install waterproofing at the surface of the concrete substructure. Inspect existing anchor bolts for the bronze statue and replace if necessary. Clean out the drain in the statue base support slab, if blocked. Install new metal cramps and mortar bed at top of pedestal. This approach to restoration of the statue pedestal is more comprehensive and expensive than the minimal approach outlined in Option G1.1. This approach would improve drainage throughout the structure, correct all stone displacement, repair any unseen damage behind the stone, and provide an opportunity to assess the condition of the concrete and statue anchoring system. The lifespan of this repair would likely be decades if appropriate cyclical maintenance is performed.

Pros:

- Corrects all of the stone displacement
- Will allows full mortar bedding of the granite
- Does not require shoring

- Allows for the condition assessment of the concrete and anchor bolts both inside and out through the access hole indicated on the original as-built drawings
- Allows waterproofing of the concrete substructure

Cons:

- Higher cost compared to only resetting the pedestal surbase

G2.2 - Dismantle and reset all of the plaza pavers at correct slope on a new setting bed. Unlike Option G1.2 which addresses only the current low spot in the plaza pavers, this approach would address the entire plaza. The current low spot is likely caused by the failure of the setting bed. A complete resetting of the plaza would replace the entire setting bed. Point the paver joints to prevent moisture penetration and waterproof the concrete slab with a mopped-on bitumen layer that would protect the concrete from moisture that may infiltrate through to the slab's surface in the future. Any damage or defective slope at the concrete slab should be corrected to prevent water from ponding on the concrete beneath the pavers. Any penetrating water should flow toward the plaza perimeter where it can exit at the new weeps. This repair should likely last 10-20 years.

Pros:

- Corrects all of the paver settlement
- Allows for the assessment and repair of the concrete slab
- Allows for the waterproofing of the concrete slab
- Protects the pavers from damage during the restoration of the pedestal granite

Cons:

- Higher cost compared to only resetting the depressed area of the pavers
- Disturbs cracked pavers which will likely require repair before reinstallation

G2.3 - Repair cracked pavers before reinstallation. Repairing the small number of cracked plaza pavers will prevent these pavers from deteriorating further. Such repairs have a long life and barring unforeseen damage in the future, should last decades.

Pros:

- Improves the appearance of the pavers

Cons:

- Higher cost than reinstalling the pavers without repair

G2.4 - Remove and reset all plaza curbing and facing cladding in new mortar bed. Install new weeps at top and bottom mortar joints of the perimeter plaza facing. See discussion for Option G1.3.

G2.5 - Rake out the mortar joints and install sealant and backer rod at the pedestal perimeter and at the joints between the plaza curbing and pavers. Point the paver joints, steps and curbing with black mortar to match the color of the original mortar. Pointing the pavers with mortar is not quite as easily performed as installing a sealant and backer rod system, but arguably has a more aesthetically pleasing appearance. Mortar is less durable in horizontal applications such as the plaza pavers, curbing and steps when compared to a vertical installation as the extended periods of wetting accelerate deterioration.

Pros:

- Arguably more aesthetically pleasing

Cons:

- Marginally shorter life than other options
- Greater cost than sealant and backer rod

G2.6 - Investigate extent of root system of adjacent trees to determine the existence of any damage to the foundation or the likelihood of such damage in the future through targeted excavation at the plaza perimeter. If such damage is present or likely, relocate or replace trees at a greater distance from the monument. This would also mitigate the presence of biological growth and may limit the amount of animal deposits and vegetative detritus in the future. If the tree roots are not causing damage to the foundation the trees still need to be cut back to the maximum extent possible without compromising the health of the tree to address the issues of shading, biological growth and animal soiling.

Pros:

- Allows for inspection of the plaza foundation

Cons:

- Higher cost than not doing any excavation at all

G2.7 - Clean all soiling and biological growth from pedestal and plaza. See discussion for Option G1.5.

Option 3

G3.1 - Dismantle and reset all granite cladding at statue pedestal fully bedded in new mortar and fully grouted at the vertical joints. Install new weeps at the base joints. Point the pedestal mortar joints with black mortar to match the original mortar color. Add a low-sloped mortar wash to the horizontal ledges of the concrete substructure. Install waterproofing at the surface of the concrete substructure. Inspect the existing anchor bolts for the bronze statue and replace if necessary. Clean out the drain in the statue base support slab, if blocked. Install new metal cramps and mortar bed at top of pedestal. See discussion for Option G2.1.

G3.2 - Remove and reset all plaza pavers at correct slope in new setting bed. See discussion of Option G2.2.

G3.3 - Patch all cracks, chips and spalls at granite statue pedestal, pavers, curbing, facing and steps. Using appropriate masonry repair materials tinted to match the existing granite. Repairing this damage will improve the appearance of the monument and prevent further deterioration in these locations. Such repairs have a long life if performed correctly and barring unforeseen damage in the future, should last decades.

Pros:

- Improves the appearance of the granite
- Protects the stone from further deterioration in locations of existing damage

Cons:

- Higher cost than not repairing the granite

G3.4 - Dismantle and reset all plaza curbing and vertical wall cladding in new mortar bed with new pointing. Install weeps at mortar joints at top and bottom of facing stones. See discussion of Option G2.4.

G3.5 - Rake out the mortar joints and install sealant and backer rod at the pedestal perimeter and at the joints between the plaza curbing and pavers. Point the paver joints, steps and curbing with a dual system of black mortar over sealant and backer rod. In the place of the methods discussed in Options G1.4 and G2.5, a dual system provides the appearance of mortar pointing with the additional protection of a sealant and backer rod as supplemental protection against water penetration. This additional protection would be necessary at horizontal locations where mortar is more vulnerable. Should the mortar in these locations begin to deteriorate, the sealant will provide additional protection against moisture infiltration. Conversely, the presence of the mortar will protect the sealant from exposure to the elements thereby extending its functional life.

Pros:

- More aesthetically pleasing

- Provides better moisture protection than other options
- Extends the life of the sealant

Cons:

- Greater cost than other options

G3.6 - Investigate the extent of the root system of the adjacent trees to determine the existence of any damage to the monument's foundation or the likelihood of such damage in the future through targeted excavation at the plaza perimeter. See discussion for Option G2.6.

G3.7 - Clean all soiling and biological growth from pedestal and plaza. See discussion for Option G1.5.

BRONZE

Option 1

B1.1 - Repair large cracks at statue surfaces, including at the statue base and underneath the left arm. Large holes in the bronze, such as that under the left arm, will need to be patched with a piece of bronze brazed into place. The repair metal should match the existing bronze alloy to the greatest extent possible and then be patinated to match the adjacent bronze. Less severe cracks should be brazed closed. In locations where the brazing repairs damage the existing patina, the bronze should be locally patinated to match the surrounding bronze. These repairs, if done properly, should last many years and likely decades.

Pros:

- Prevents further damage to the bronze from water infiltration
- Improves the appearance of the bronze
- Lower cost than more comprehensive repairs

Cons:

- Greater cost than no repairs at all
- Additional effort is required to blend repairs with existing bronze

B1.2 - Fill holes at major pitting. Major pitting is characterized as pitting large enough to collect and retain water. These pits should be filled with bronze putty, an epoxy resin carrying fine bronze particles and pigmented to match the surrounding bronze, and finished to follow the contours of the adjacent material. The life of a bronze putty repair should be decades with cyclical maintenance of the bronze with a wax coating.

Pros:

- Prevents further damage to the bronze from water collecting in the pits
- Improves the appearance of the bronze
- Lower cost than more comprehensive repairs

Cons:

- Greater cost than no repairs at all
- Additional effort is required to blend repairs in with existing bronze

B1.3 - Drill out remnants of the ferrous pins and patch holes. The concentrations of ferrous material at the original casting pin locations should be drilled out to prevent additional corrosion and deterioration of the metal. The resulting holes should be repaired with plugs of bronze threaded rod closely matching the existing alloys. The repairs should then be spot patinated to match the adjacent material. These repairs will permanently stop any further corrosion and the repairs should last decades with cyclical maintenance of the bronze.

Pros:

- Prevents further damage to the bronze from corrosion and water infiltration
- Improves the appearance of the bronze

Cons:

- Greater cost than no repairs at all
- Additional effort is required to blend the repairs in with existing bronze

B1.4 - Clean the statue and lettering of soiling and refinish with wax. Wax at the statue and lettering should be pigmented to match the original statue finish. After cleaning the statue of soiling and other accretions, finishing the bronze will protect it from future oxidation. The expected life of a wax application in this environment is likely to be 1-2 years. Cleaning and reapplication of the protective wax coating should be included in a comprehensive cyclical maintenance plan.

Pros:

- Improves the appearance of the bronze
- Inhibits further corrosion

Cons:

- Requires regular maintenance to maintain

B1.5 - Repair loose lettering. Reinstall missing lettering. Where letters are loose, the letter should be removed and the pins repaired or reset in adhesive as required. The missing letter 'A' in the possession of the Park Service should be reinstalled with new anchors. Care should be taken in reinstalling the letters to insure that they are straight and in alignment with adjacent lettering. The new anchors and adhesive at the reinstalled letters should last decades.

Pros:
- Prevents further damage to already loose letters
- Improves the appearance of the monument
- Lower cost than removing and reinstalling all of the letters
- Lower cost than replacing letters if they detach and are lost in the future

Cons:
- Greater cost than no repairs at all
- Does not address letters that may become loose or damaged in the future

Option 2

B2.1 - Repair all damage at the statue surface. This approach would include repairing all deterioration at the surface of the statue including cracks and pits of all sizes. The cracks should be repaired through either brazing or filling with bronze putty depending on the crack width. The pits should be repaired with bronze putty. All repairs should be performed with materials to match existing bronze and blended in and finished to match adjacent material. Expected life of the repairs should be measured in decades if the wax coating is properly maintained. See discussion of Options B1.1, B1.2 and B1.3.

Pros:
- Prevents further damage to bronze from water infiltration at cracks and water collecting in the pits
- Prevents tight cracks and smaller pits from deteriorating further
- Improves the appearance of the bronze

Cons:
- Greater cost than less comprehensive repairs
- Additional effort required to blend repairs in with existing bronze

B2.2 - Drill out remnants of ferrous pins and patch the holes. See discussion of Option B1.3.

B2.3 - Clean the statue and lettering of corrosion products and soiling, repatinate and finish with wax. See discussion of Option B1.4.

B2.4 - Remove, repair and reinstall all letters. This approach addresses any letters that, though they appear sound now, may become loose or damaged in the near future. By repairing and reinstalling all of the letters, this approach takes advantage of economies of scale and prevents the possibility that any letters may become completely detached in the future.

Pros:

- Prevents further damage to already loose or damaged letters
- Improves the appearance of the monument
- Likely a lower cost than replacing individual letters if they detach and are lost in the future

Cons:

- Much greater cost than addressing only the currently loose or damaged letters

WEATHERPROOFING

Option 1

W1.1 - Replace existing lead-coated copper flashing with new lead-coated copper flashing. Extend the flashing to fully engage the stone reglet and install a lead wedges to secure the flashing in place. Install elastomeric sealant at the reglet, statue base and flashing overlaps. Install a lead joint cover over the sealant at the stone reglet. This approach essentially replaces the flashing that is currently in place, but corrects the termination detail at the reglet by extending the flashing fully into the reglet. Installation of the lead joint cover at the perimeter sealant will extend the life of the sealant by protecting it from exposure and UV degradation. If the flashing is properly installed and the sealant is maintained, the flashing itself should last decades.

Pros:

- Corrects the poor moisture protection at the stone reglet
- Replaces the previous failed sealant campaigns with new sealant appropriate to the application
- Less expensive due to not needing to remove the statue
- Longer life than sheet membrane alone

Cons:

- Provides less moisture protection than a sheet membrane and metal flashing system
- Can weaken the sealant more quickly due to greater expansion and contraction of the metal when compared to the sheet membrane

Option 2

W2.1 - Replace existing lead-coated copper flashing with new waterproof sheet membrane. Extend the membrane to fully engage the stone reglet. Extend the membrane under the statue base and over the interior concrete structure. Install sealant at the stone reglet and statue base. It may be difficult to properly extend the membrane beneath the statue base while it is in place. It is likely that removing the statue entirely will be necessary. If the membrane is properly installed and the sealant is replaced when necessary, the membrane itself should last 20 years.

Pros:

- Corrects the poor moisture protection at the stone reglet
- Replaces the previous failed sealant campaigns with new sealant appropriate to the application
- Removing the statue provides an opportunity to easily assess the condition of the statues anchoring system
- Low degree of expansion and contraction increases the life of the adjacent sealant

Cons:

- Much more expensive than replacing the metal flashing in kind due to the necessity of removing the statue
- Provides less moisture protection than a combined sheet membrane and metal flashing system
- Shorter life in comparison to metal flashing

Option 3

W3.1 - Replace the existing lead-coated copper flashing with a new combination system of metal flashing over sheet membrane. Extend the system to fully engage at the stone reglet and to extend beneath the statue base and over the interior concrete structure. Install a lead joint cover at the stone reglet. This approach provides two layers of moisture protection. It also extends the life of the sheet membrane as the metal flashing protects it from ultraviolet exposure. This approach would require the statue to be temporarily removed while the flashing system was installed and as with all three options discussed, proper maintenance and timely replacement of failing sealant will be essential to the ongoing performance of the system. With regular maintenance, this system should last decades.

Pros:

- Corrects the poor moisture protection at the stone reglet

- Replaces the previous failed sealants with new sealant appropriate to the application
- Removing the statue provides the opportunity to assess the condition of the statue anchoring system and the concrete slab
- Provides the greatest amount of moisture protection
- Longest life of all the options

Cons:

- Most expensive option due to the additional material, installation costs and the necessity of removing the statue
- Could weaken the sealant more quickly due to greater expansion and contraction of the metal when compared to the sheet membrane alone

SITE

Due to the location of the monument on a traffic circle and the configuration of the surrounding landscape, the impact of the any work on these areas should be considered. In addition to the excavation for work at the plaza vertical wall granite cladding and the possible removal or relocation of the adjacent trees, areas of the site will need to be designated for vehicle and equipment parking, contractor staging, and material storage. The monument and plaza restoration will likely result in damage to the surrounding site, including the grass, trees, shrubs and planting beds. The construction scope of work should include scope and funds for the restoration of the landscape after job completion.

CONSIDERED TREATMENT OPTIONS

In addition to the treatment options listed above, other treatments, systems, and materials were considered for the project and determined not to be acceptable for various reasons. The shortcomings included difficulty or expense of installation, inappropriate materials or methods, and simple impracticality. Below are some of the approaches considered that are not recommended.

X.1 Wall Construction Options

In the existing cavity wall, the stone was set on shims without a full bed of mortar and without the vertical joints between the stone being filled solid with mortar. Face pointing was done to minimal depth after the stone was installed. When the face pointing failed, there was a direct path for moisture into the wall system, which in turn, resulted in the displacement of the stone. The top of the wall flashing, while of good quality material, was dependant largely on the elastomeric sealant to prevent water penetration.

In considering the best means of preventing similar damage to the pedestal in the future, three options were considered for reconstruction of the stone: 1) reinstalling the stone as a traditional, solid bearing wall with no cavity, 2) reinstalling as a typical cavity wall with added anchoring of the stone, and flashing and weeps, and 3) reinstalling as a cavity wall similar to the existing. In considering the three options the assumption was made that mortar joints and flashing will fail in the future and that moisture will eventually enter the wall.

Construction of the wall as a traditional solid bearing wall would provide a full bed of mortar at all horizontal joints, fill all vertical joints solid and eliminate the cavity by grouting solid with mortar. Filling the joints solid and eliminating the cavity would provide greater protection from water entering through the mortar joints and would eliminated the path for moisture migration behind the stone when the flashing a the top of the pedestal failed in the future. However, when moisture does enter the wall through failed joints or flashing, there would be no path for exit and thus the potential for freeze-thaw pressure on the stone. With a solid wall, there is a higher possibility for cracking of the stone.

Reinstallation as a typical cavity wall would add through wall flashing at any water collection points, like the offset ledges in the concrete and install weeps at each flashing course. To prevent future displacement of the stone when flashing or mortar joints fail and water collects behind the stone, the stone would be anchored to the concrete as is typical for stone cavity wall construction. Adding flashing and weeps would change the outward appearance of the wall, and adding anchors could result to greater damage to the stone when water enters the wall in the future. The stone in the current wall construction, while displaced, has no cracking or spalling. If the original wall had been constructed with typical stone anchoring, there would likely now be substantial damage as the result of corrosion of the anchors.

A modified version of the existing wall construction would keep the cavity wall construction, but not introduce through wall flashing or additional anchoring for the stone. A double system of waterproofing membrane and metal flashing would be installed at the top of the stone to keep water out for as long as possible. The concrete ledges, where water now appears to collect, would be sloped slightly to promote drainage, and weeps would be installed at the base of the wall to provide a path for moisture to exit. Further moisture infiltration protection would be provided by setting the stone in a full bed of mortar for the entire depth of the stone and filling the vertical joints solid with mortar for the full depth of the stone. After setting the stone, the face joints would be pointed solid with mortar to match the color of the original mortar. There would then be 3-5” of mortar between the exterior and the cavity. This option seems to provide the best long term protection for the monument.

X.2 Plaza Pavers

An area of the project in which an alternative approach was considered and rejected was the removal and reinstallation of the plaza pavers. Resetting the plaza pavers on a new pedestal system instead of replacing the bedding material was considered as this would encourage drainage and prevent future low spots and curbing stone movement. However, it was ultimately determined that this was an unnecessarily expensive and overly aggressive approach to a relatively minor problem at the monument. It was decided that simply replacing the setting bed, waterproofing the concrete slab and installing the necessary weeps at the perimeter would provide sufficient drainage and moisture protection to discourage future settlement of the setting bed and stone movement.

PREFERRED TREATMENTS

Based on a number of factors including urgency, cost and priority as related by the National Park Service, the following were chosen as the preferred treatment approaches for correction of the deterioration of the monument.

GRANITE

G3.1 - Remove and reset all granite cladding at statue pedestal in a full mortar bed and with the vertical joints fully grouted. Install new weeps at the base joints. Point the pedestal joints with black mortar colored to match the original but with a modified mix design. Add a low-sloped mortar wash to the horizontal ledges of the concrete substructure and install waterproofing at the surface of the concrete substructure. Inspect the existing anchor bolts for the bronze statue and replace if necessary. Clean out the drain in the statue base support slab, if blocked. Install new metal cramps and mortar bed at top of pedestal.

G3.2 - Remove and reset all plaza pavers at the correct slope on a new setting bed.

G3.3 - Remove and reset all plaza curbing and vertical wall cladding in new mortar bed. Install new weeps at top and bottom mortar joints of the perimeter plaza facing.

G3.4 - Patch all cracks, chips and spalls at granite statue pedestal, pavers, curbing, facing and steps.

G3.5 - Rake out the mortar joints and install sealant and backer rod at the pedestal perimeter and at the joints between the plaza curbing and pavers. Point the paver joints, steps and curbing with a dual system of black mortar over sealant and backer rod.

G3.6 - Investigate the extent of the root system of the adjacent trees to determine the existence of any damage to the monument's foundation or the likelihood of such damage in the future through targeted excavation at the plaza perimeter.

G3.7 - Clean soiling and biological growth from the statue pedestal and plaza.

BRONZE

B1.1 - Repair cracks at statue surfaces, including at statue base and underneath the left arm.

B1.2 - Fill major pitting at statue surface.

B1.3 - Drill out remnants of ferrous pins and patch holes.

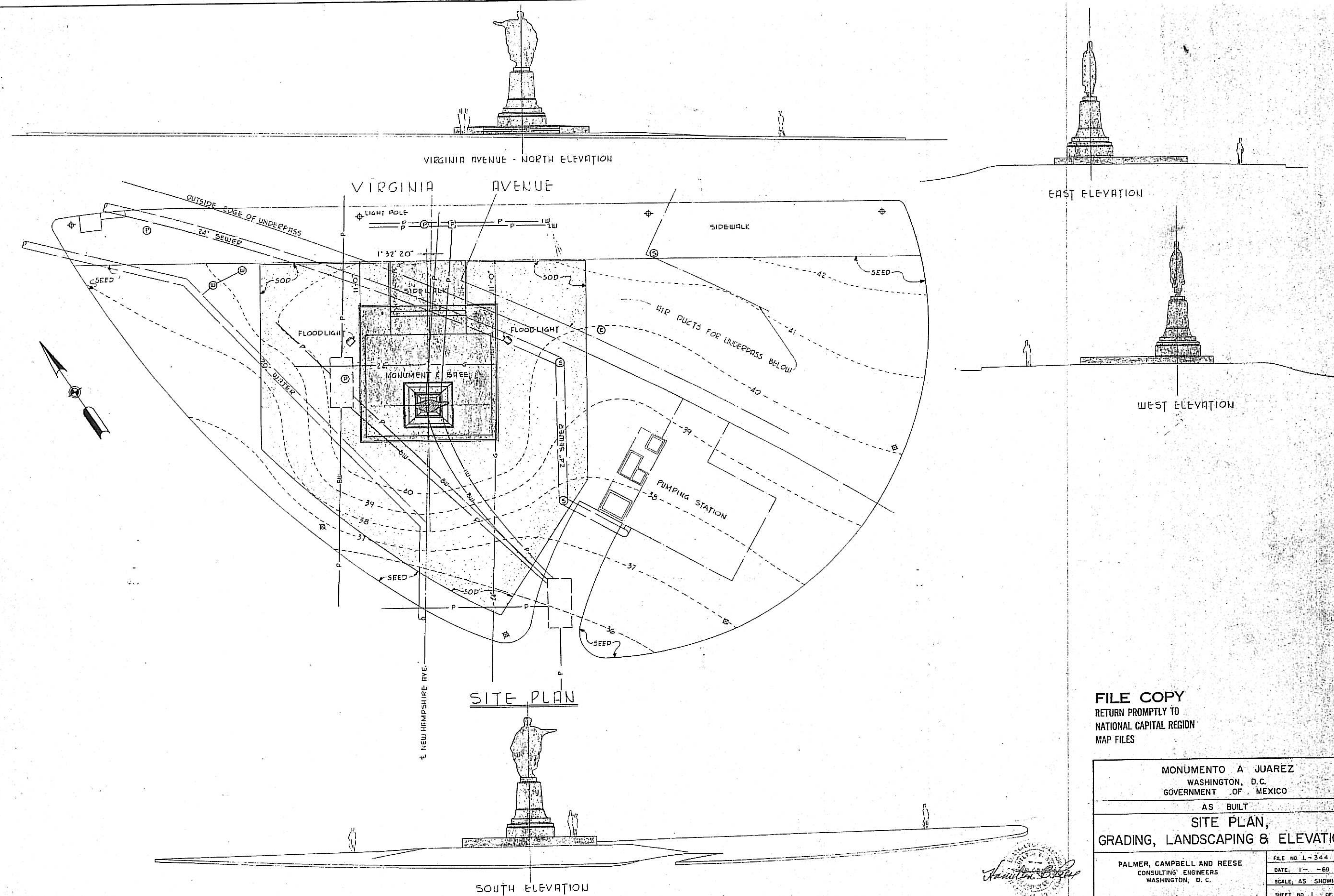
B1.4 - Clean the statue and lettering of soil, oxidation and old finishes. Repatinate at repairs and dissimilar alloy areas to provide an even statuary brown color. Protect with hot wax application.

B1.5 - Repair loose lettering. Reinstall missing lettering.

WEATHERPROOFING

W3.1 - Replace the existing lead-coated copper flashing with a new combination system of metal flashing over sheet membrane.

APPENDIX A – HISTORIC DRAWINGS



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SITE PLAN, GRADING, LANDSCAPING & ELEVATIONS	
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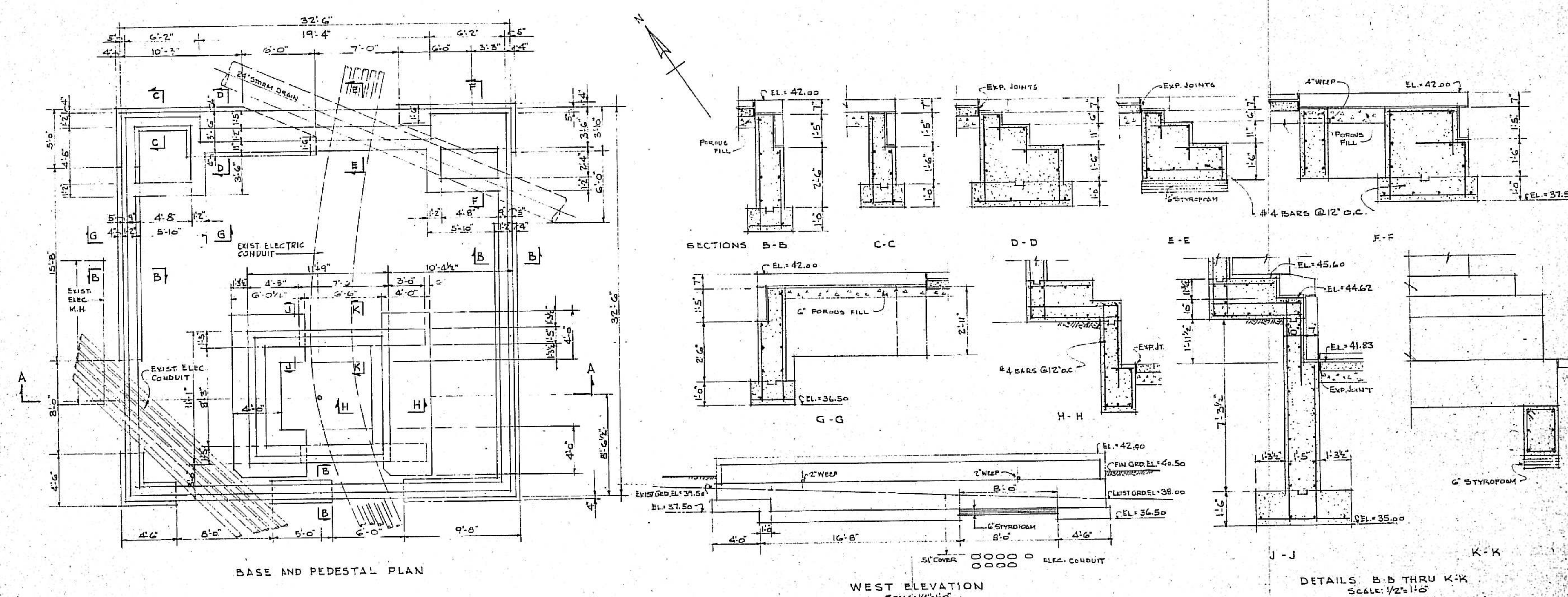
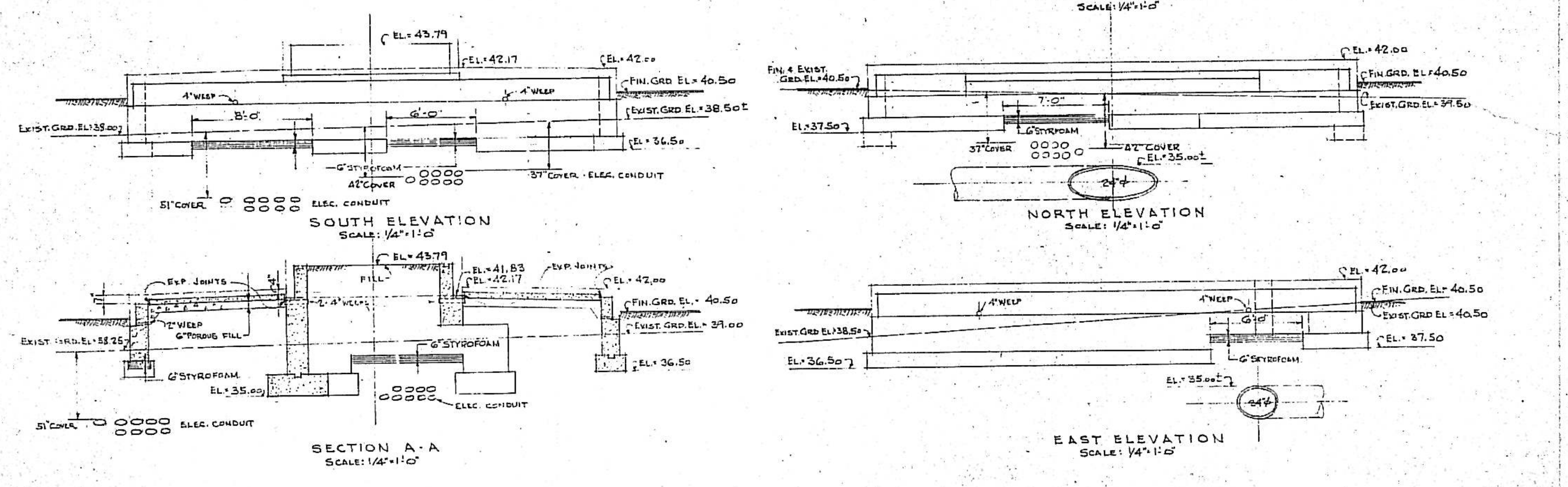




NOTES:
PEDESTAL FOOTING BEARING APPROX. 1500#/□FT.
ALL PERIMETER WALLS AND SUPPORTING PEDESTAL WALLS SHALL BE REINFORCED WITH #4-BARS ON 12" CENTERS OR AS SHOWN. BARS SHALL HAVE MINIMUM COVER OF 1½" IN WALLS AND 2½" IN FOOTINGS.
HORIZONTAL CORNERS SHALL HAVE #4 BARS AROUND CORNERS AT 12" O.C. OUTSIDE FACE.
SLABS SHALL BE REINFORCED WITH 6x6-8/8 WELDED WIRE MESH.

MONUMENTO A JUAREZ
WASHINGTON, D.C.
GOVERNMENT OF MEXICO

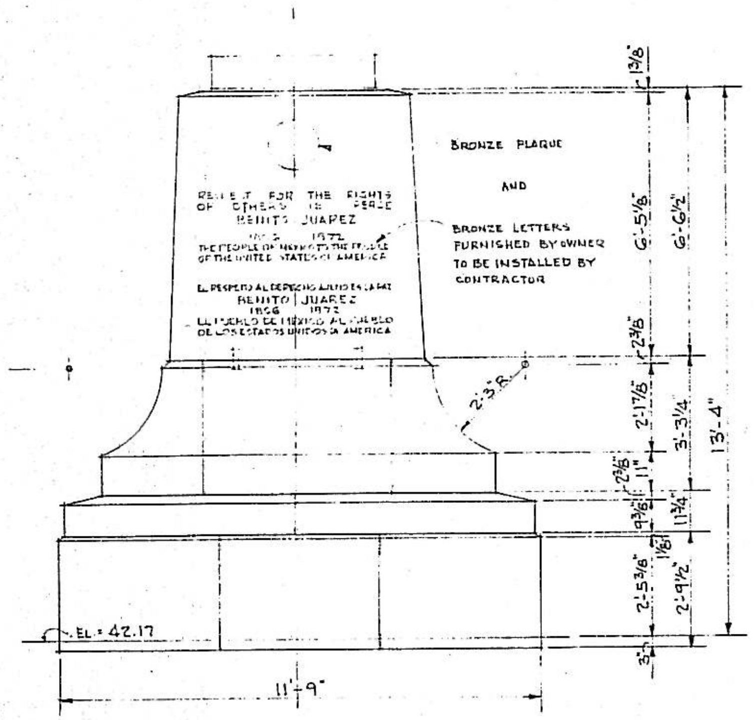
AS BUILT

FOUNDATION DETAILS

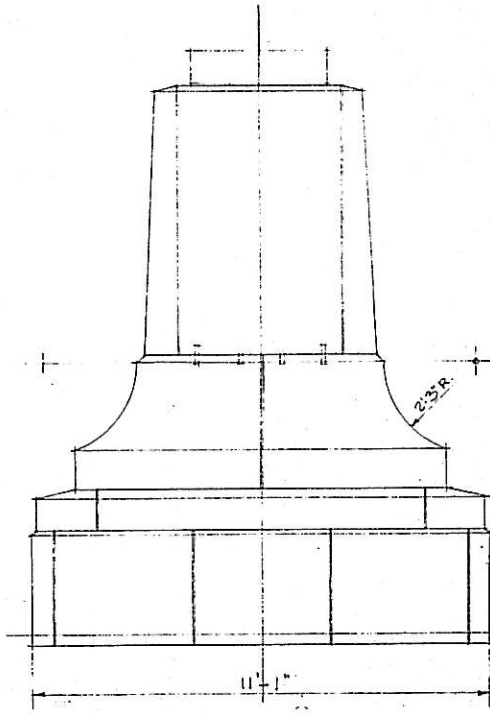
Hamilton B. Reese

PALMER, CAMPBELL AND REESE
CONSULTING ENGINEERS
WASHINGTON, D. C.

FILE NO. L-344
DATE: – 7
SCALE: AS SHOWN
SHEET NO. 2 OF 7



FRONT AND REAR ELEVATION
SCALE: 1/2"=1'-0"



SIDE ELEVATION
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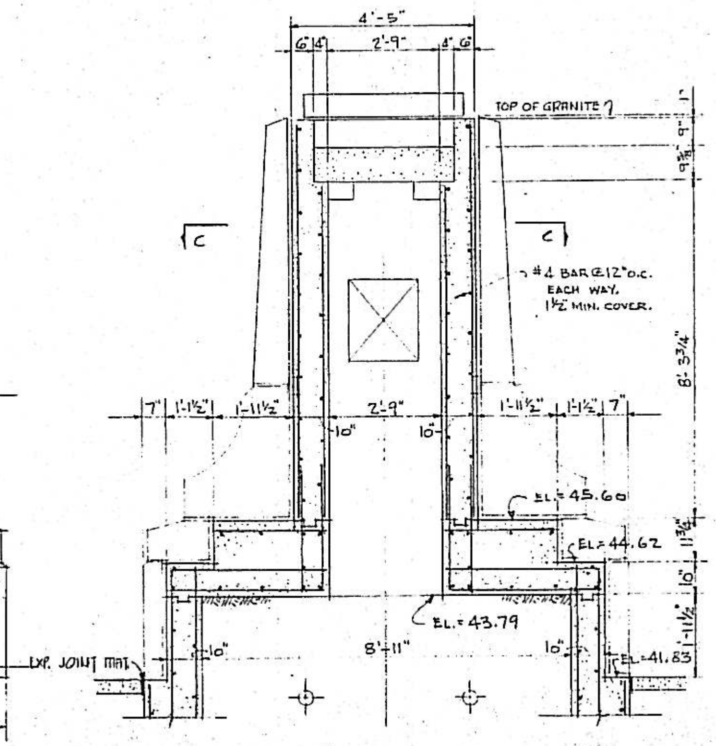
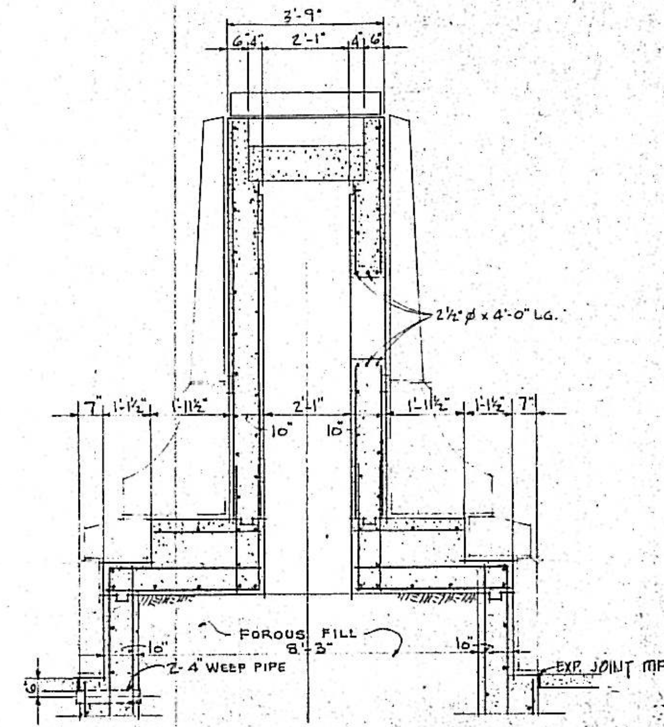
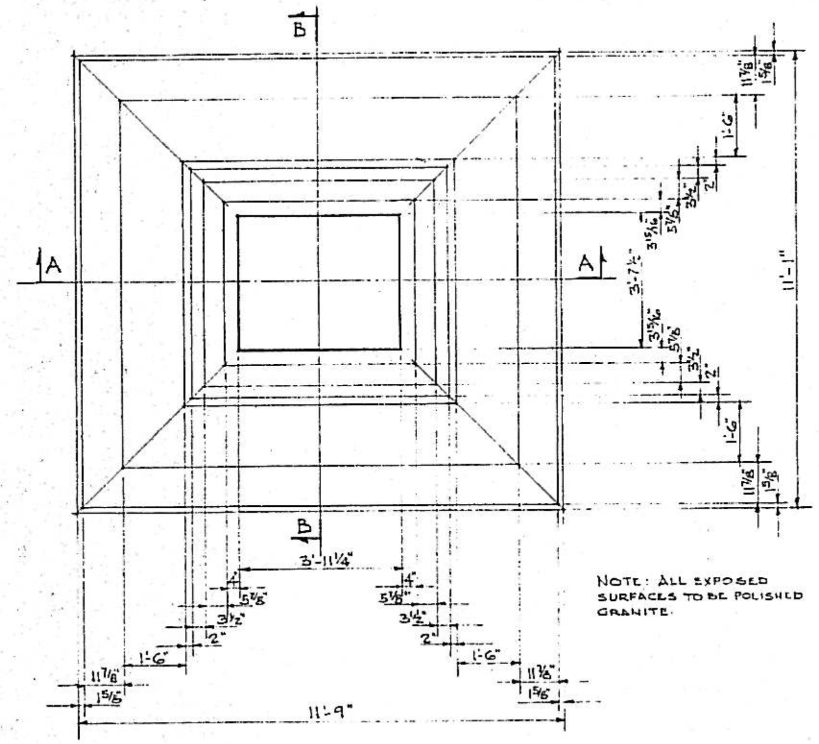


SECTION A-A
SCALE: 1/2"=1'-0"



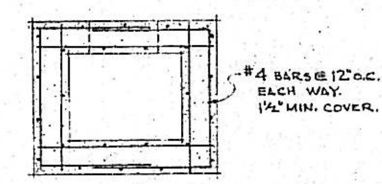
SECTION B-B
SCALE: 1/2"=1'-0"

NOTE:
FOR ADDITIONAL DETAILS AT TOP OF PEDESTAL SEE SECTIONS L-L & M-M, SHEET 4 OF 7.



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

NOTE: ALL EXPOSED SURFACES TO BE POLISHED GRANITE.



SECTIONAL PLAN C-C
SCALE: 1/2"=1'-0"

MONUMENTO A JUAREZ
WASHINGTON, D.C.
GOVERNMENT OF MEXICO

AS BUILT

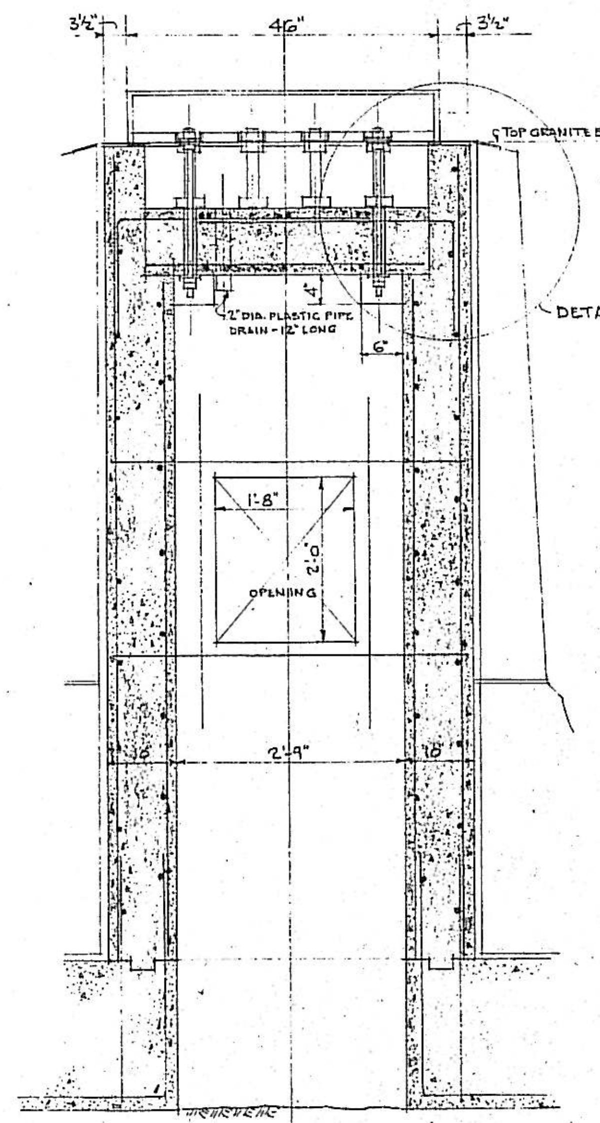
PEDESTAL DETAILS

Hamilton B. Reese

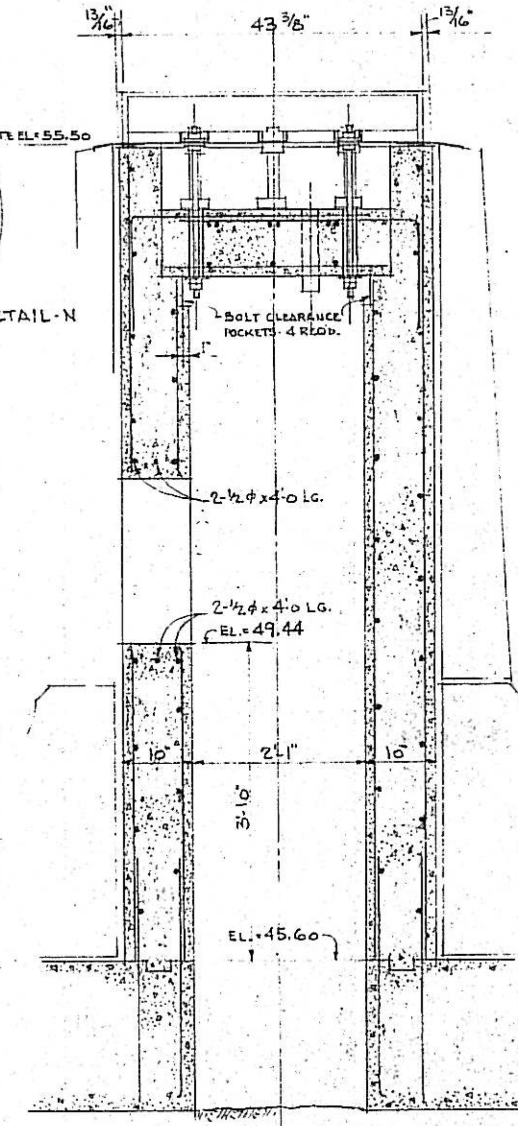
PALMER, CAMPBELL AND REESE
CONSULTING ENGINEERS
WASHINGTON, D.C.

FILE NO. L-344
DATE: — —
SCALE: AS SHOWN
SHEET NO. 3 OF 7

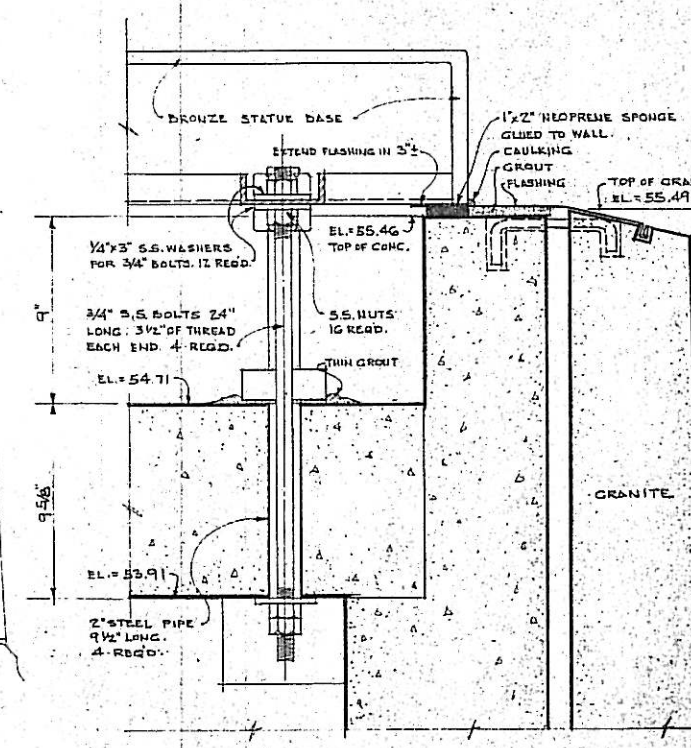
File No. N.C.R. 67/134-19-3
875-83409



SECTION L-L
Scale: 1"=1'-0"

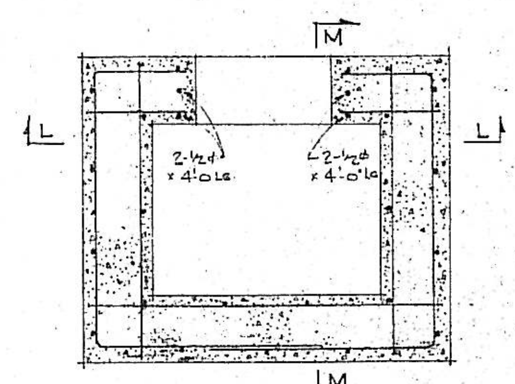


SECTION M-M
Scale: 1"=1'-0"



DETAIL "N"
Scale: 3"=1'-0"

REVISED TOP OF PEDESTAL AND STATUE ANCHORAGE DETAILS



PLAN AT OPENING
Scale: 1"=1'-0"

FILE COPY
RETURN PROMPTLY TO
NATIONAL CAPITAL REGION
MAP FILES

MONUMENTO A JUAREZ
WASHINGTON, D.C.
GOVERNMENT OF MEXICO

AS BUILT

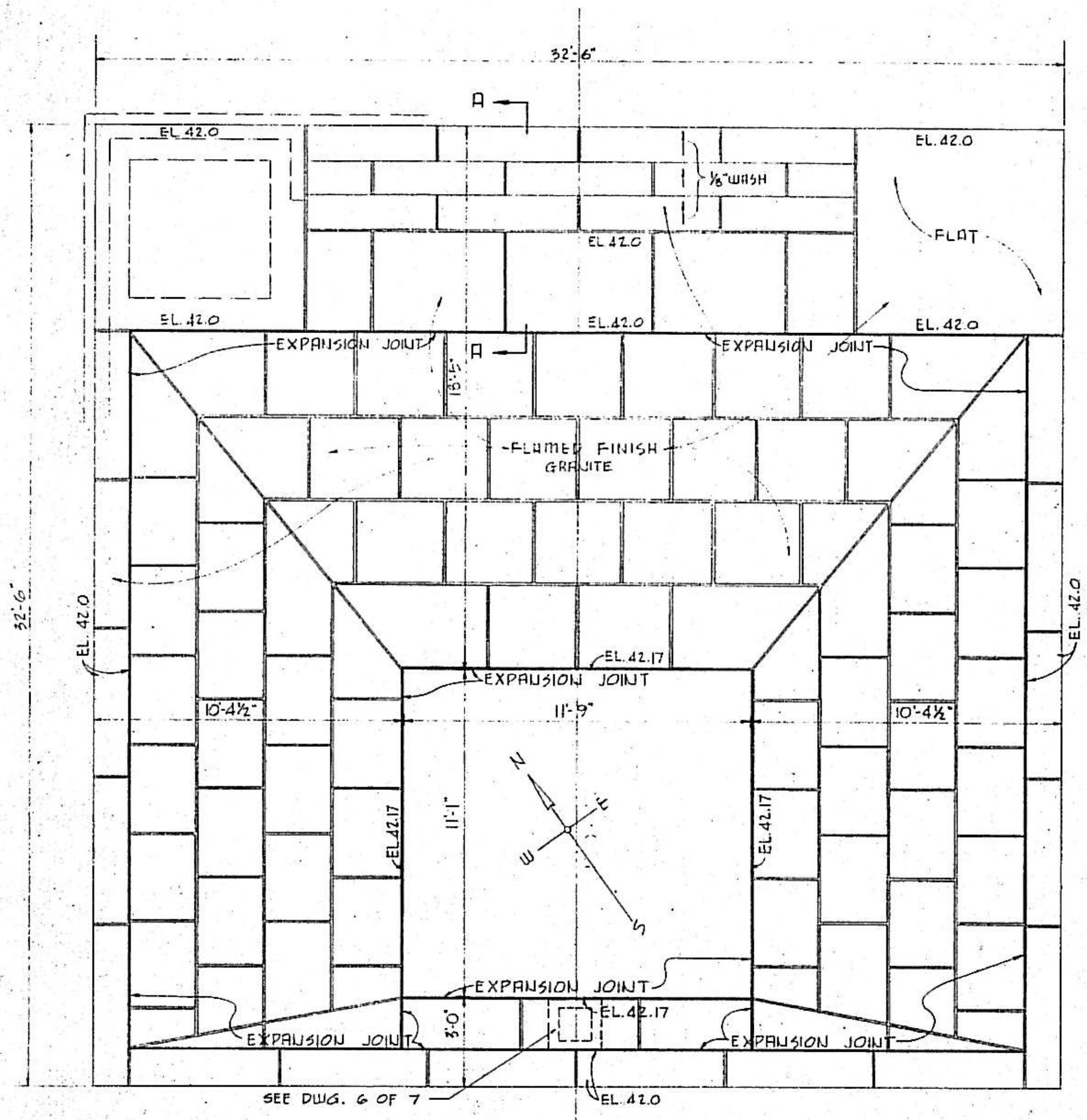
PEDESTAL DETAILS

Hamilton B. Reese

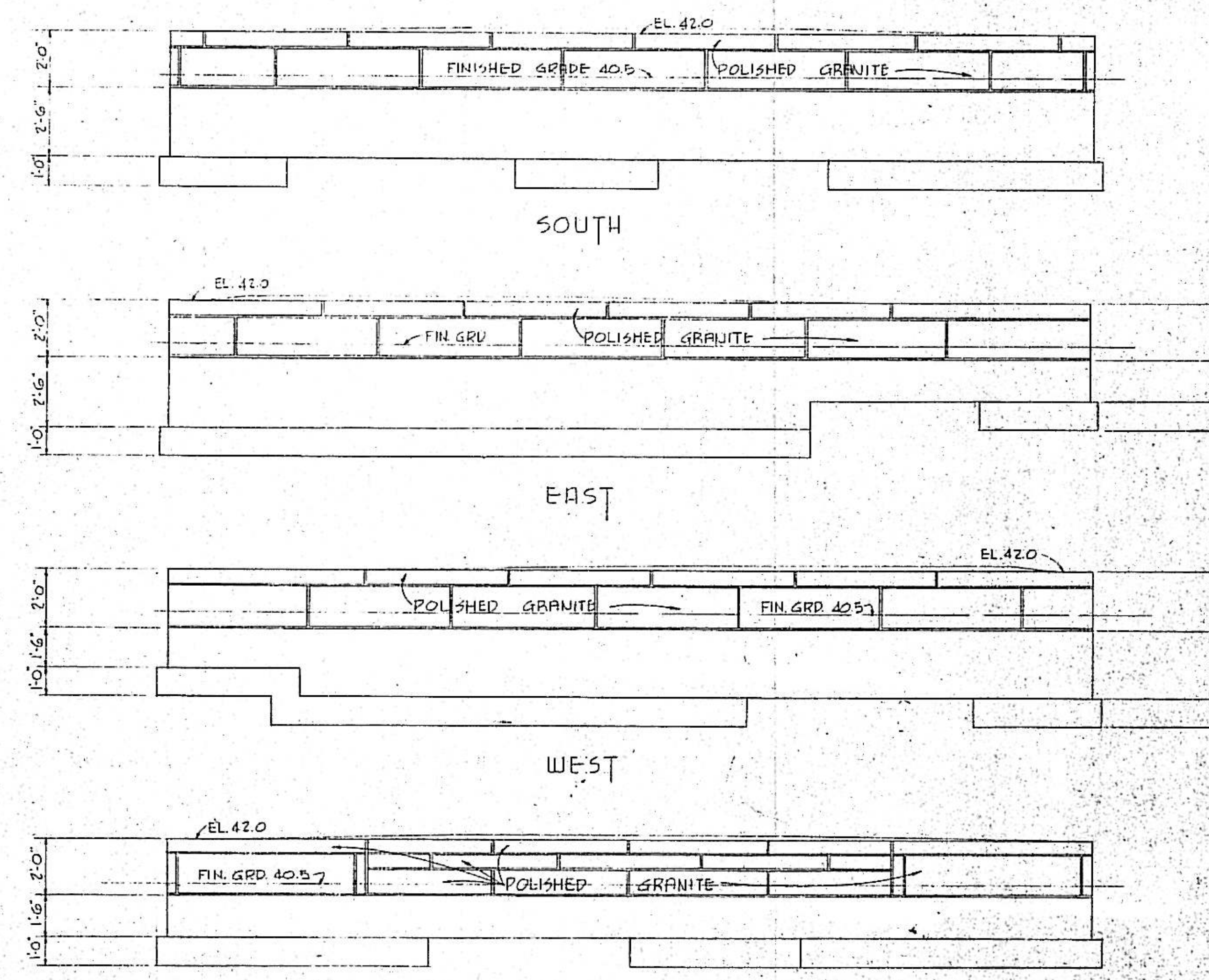
PALMER, CAMPBELL AND REESE
CONSULTING ENGINEERS
WASHINGTON, D. C.

FILE NO. L-344
DATE:
SCALE: AS SHOWN
SHEET NO. 4 OF 7

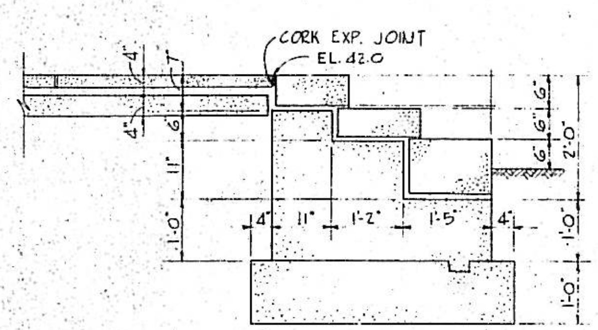
File No. N.C.R. 69.134-12-4
875
83409



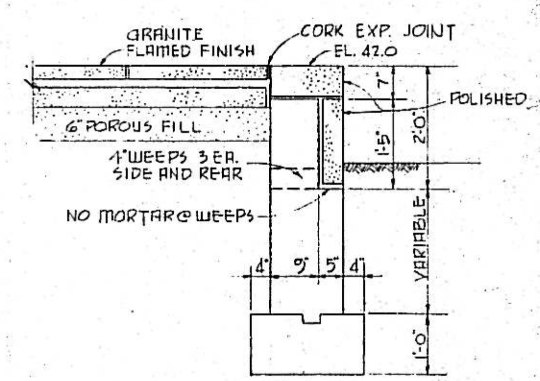
PLAN
SCALE: 1/8"=1'-0"



ELEVATIONS
SCALE 3/8"=1'-0"



SECTION A-A
SCALE 3/4"=1'-0"



TYPICAL WALL SECTION
SCALE 3/4"=1'-0"

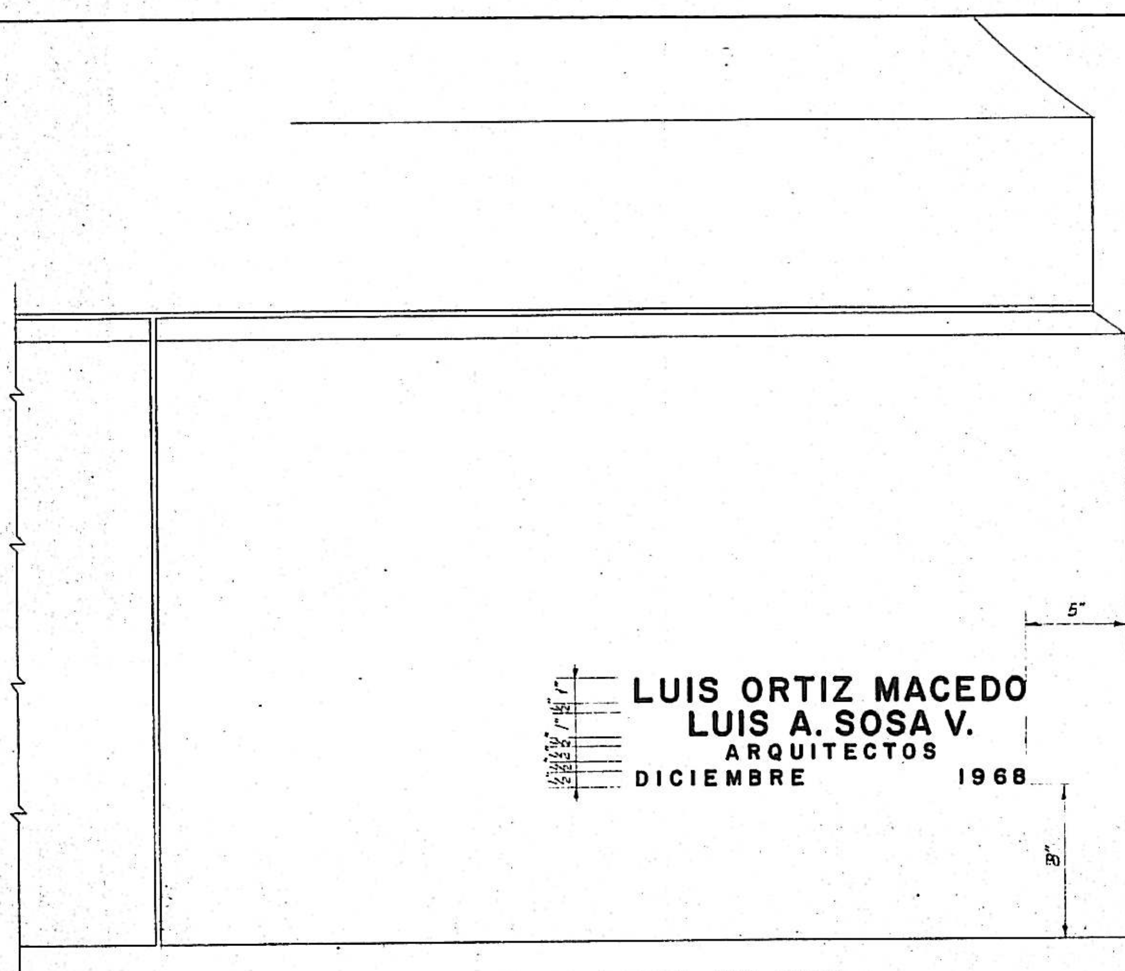
NOTE: GRANITE
ALL HORIZONTAL SURFACES TO BE FLAMED
FINISH, ALL VERTICAL SURFACES TO BE POLISHED.

FILE COPY
RETURN PROMPTLY TO
NATIONAL CAPITAL REGION
MAP FILES

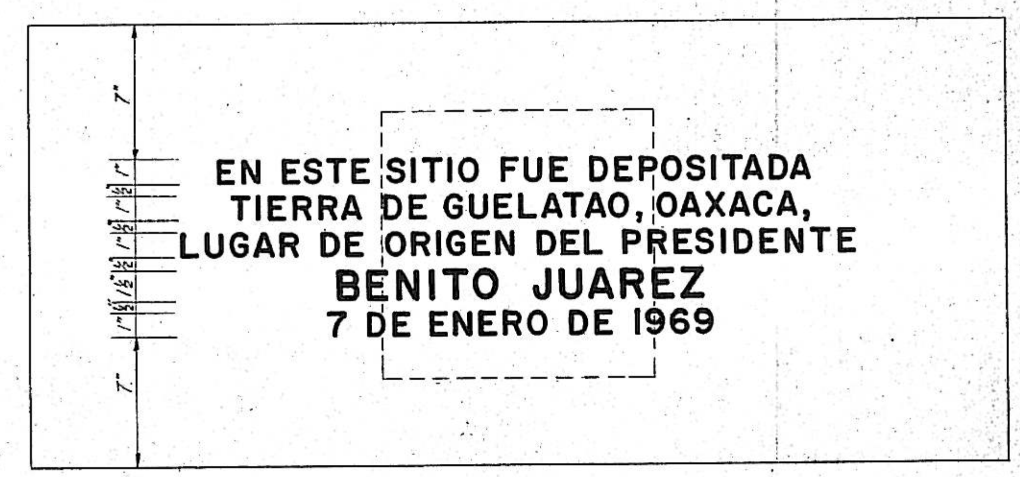
Hamilton B. Reese

MONUMENTO A JUAREZ WASHINGTON, D.C. GOVERNMENT OF MEXICO	
AS BUILT	
GRANITE DETAILS	
PALMER, CAMPBELL AND REESE CONSULTING ENGINEERS WASHINGTON, D. C.	FILE NO. L-344 DATE: - - SCALE: AS SHOWN SHEET NO. 5 OF 7

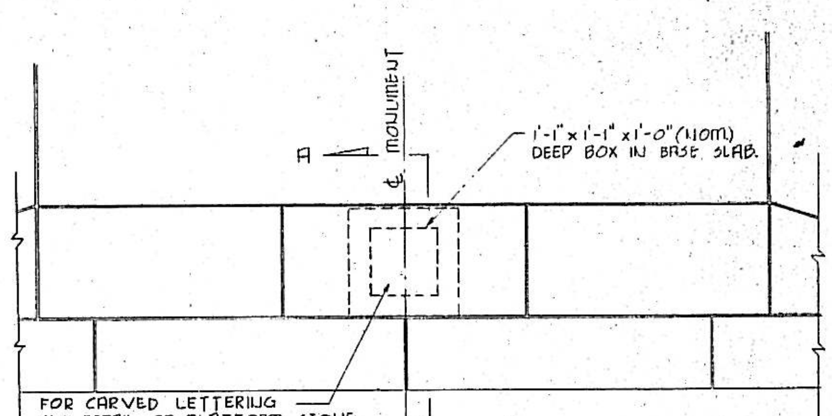
File No. N.C.R. 69.734-12-5
875
83409 C



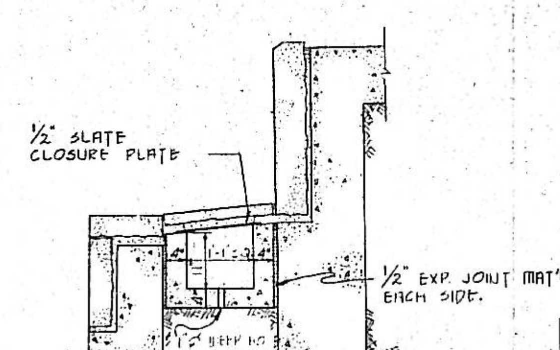
CARVED LETTERING IN PEDESTAL BASE STONE AT REAR OF MONUMENT
1/4" = 1'



CARVED LETTERING IN PLATFORM STONE AT REAR OF BASE
1/4" = 1'



PARTIAL PLAN
3/4" = 1'



SECTION A-A
3/4" = 1'

FILE COPY
RETURN PROMPTLY TO
NATIONAL CAPITAL REGION
MAP FILES

MONUMENTO A JUAREZ
WASHINGTON, D.C.
GOVERNMENT OF MEXICO

AS BUILT

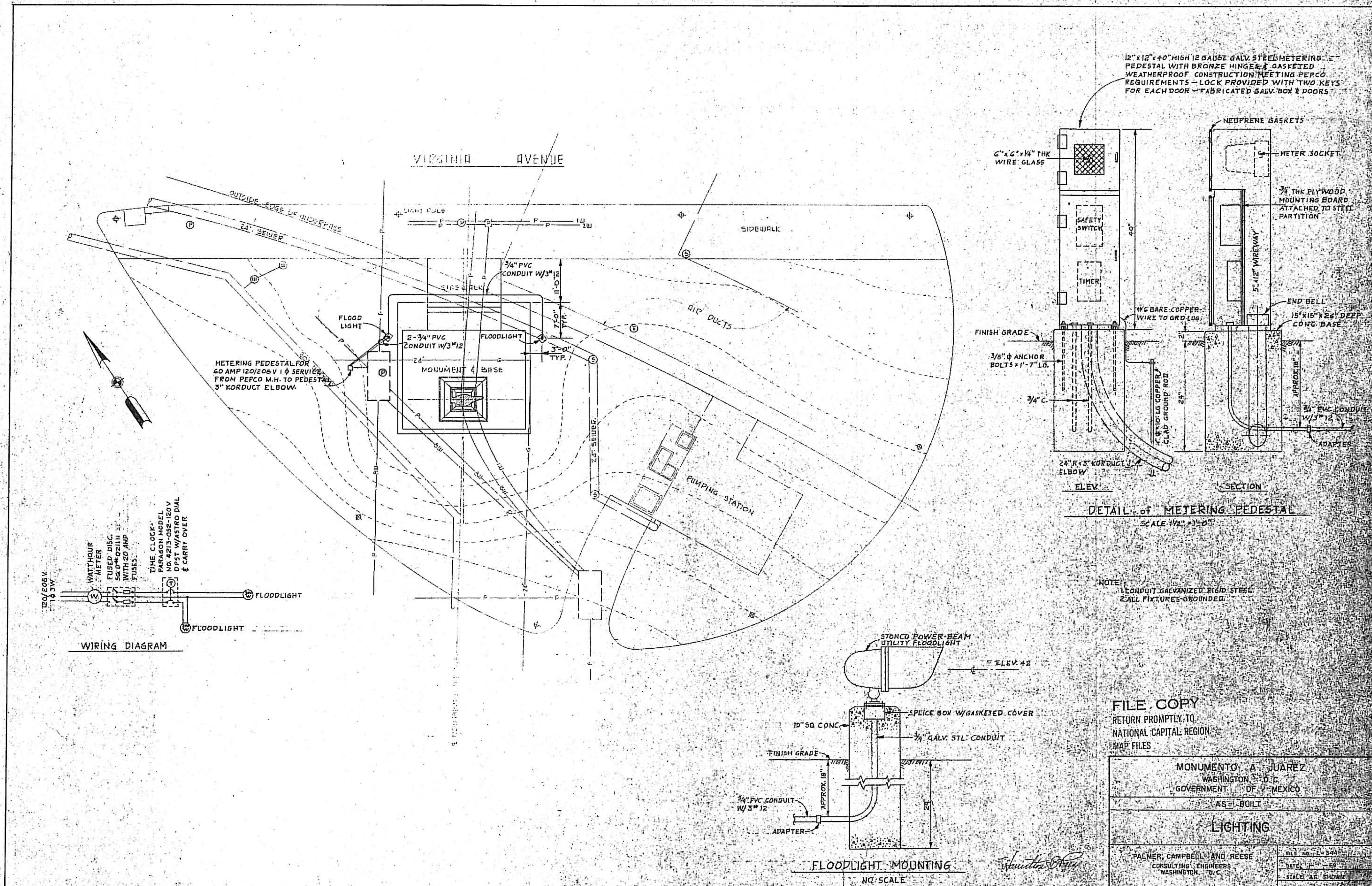
LOCATIONS & DETAILS
CARVED LETTERING

PALMER, CAMPBELL AND REESE
CONSULTING ENGINEERS
WASHINGTON, D. C.

Hamilton B. Reese

FILE NO. L-344
DATE: 1 - -69
SCALE: AS SHOWN
SHEET NO. 6 OF 7

File No. N.C.R. 69.134-12-6
875÷83409 C



FILE COPY
RETURN PROMPTLY TO
NATIONAL CAPITAL REGION
MAP FILES

MONUMENTO A JUAREZ
WASHINGTON, D.C.
GOVERNMENT OF MEXICO

AS BUILT

LIGHTING

PALMER, CAMPBELL AND REESE
CONSULTING ENGINEERS
WASHINGTON, D.C.

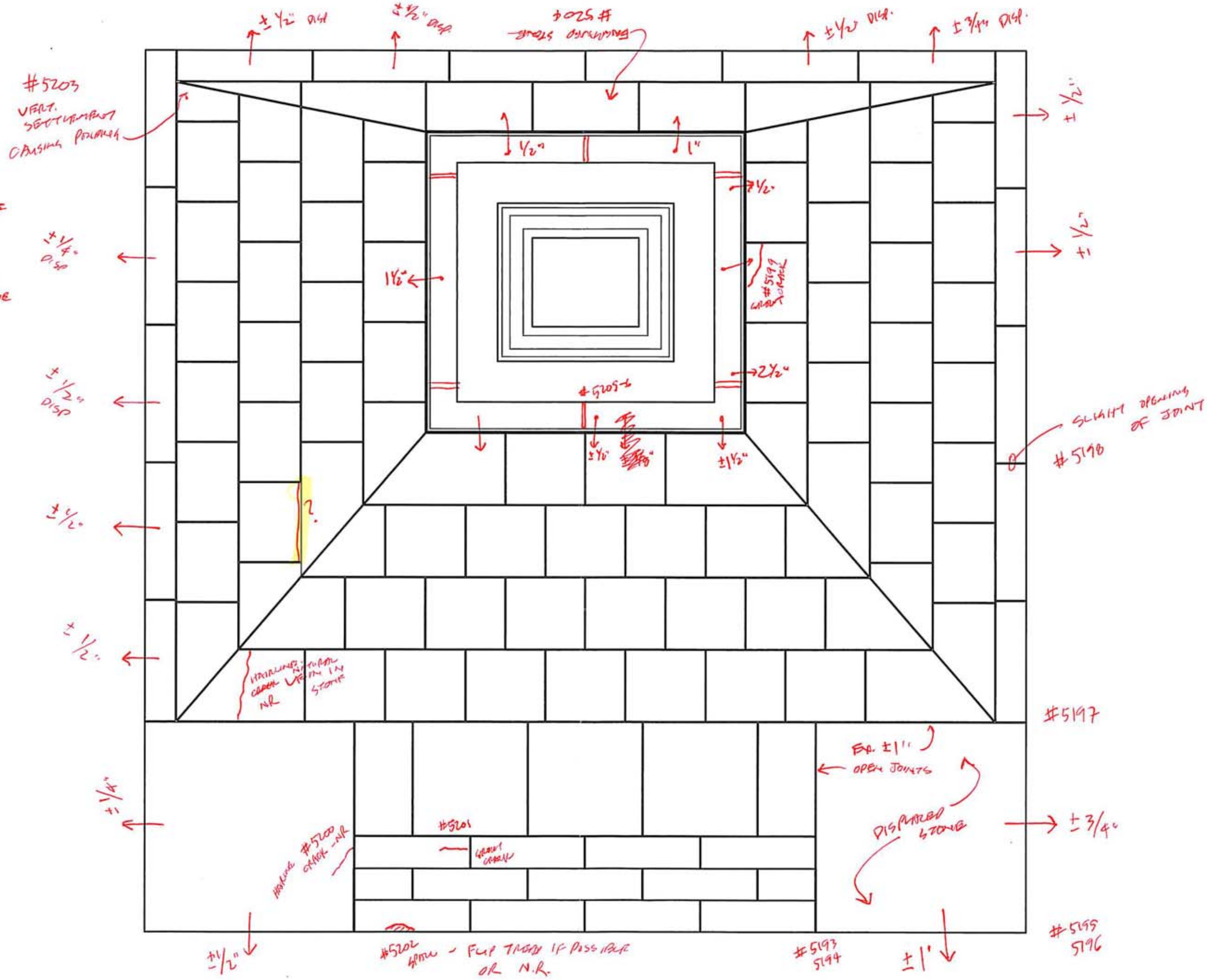
SCALE AS SHOWN

File No. N.C.R. 69/37

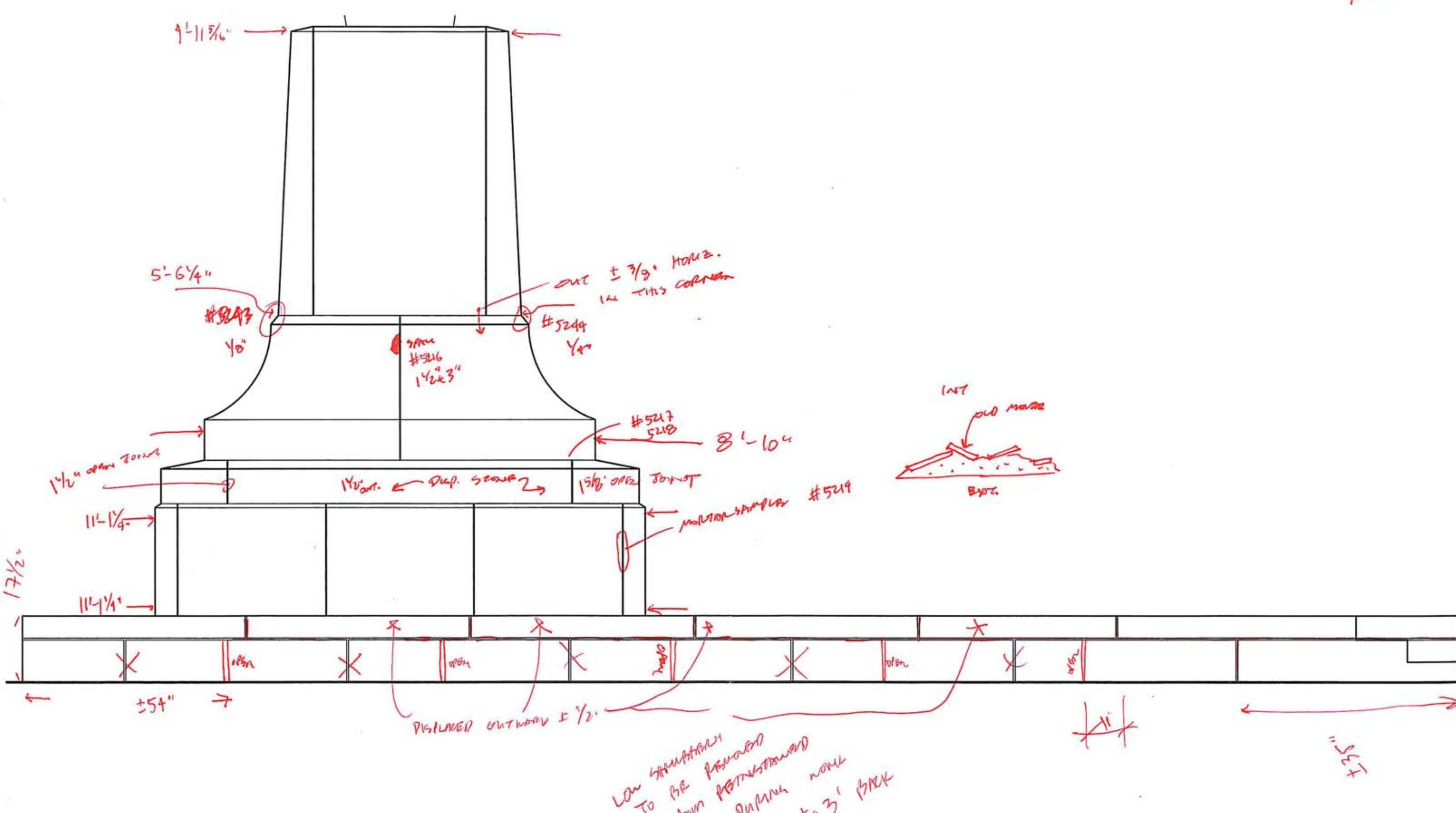
APPENDIX B - EXTERIOR SURVEY FIELD NOTES

11/2/09
MJH

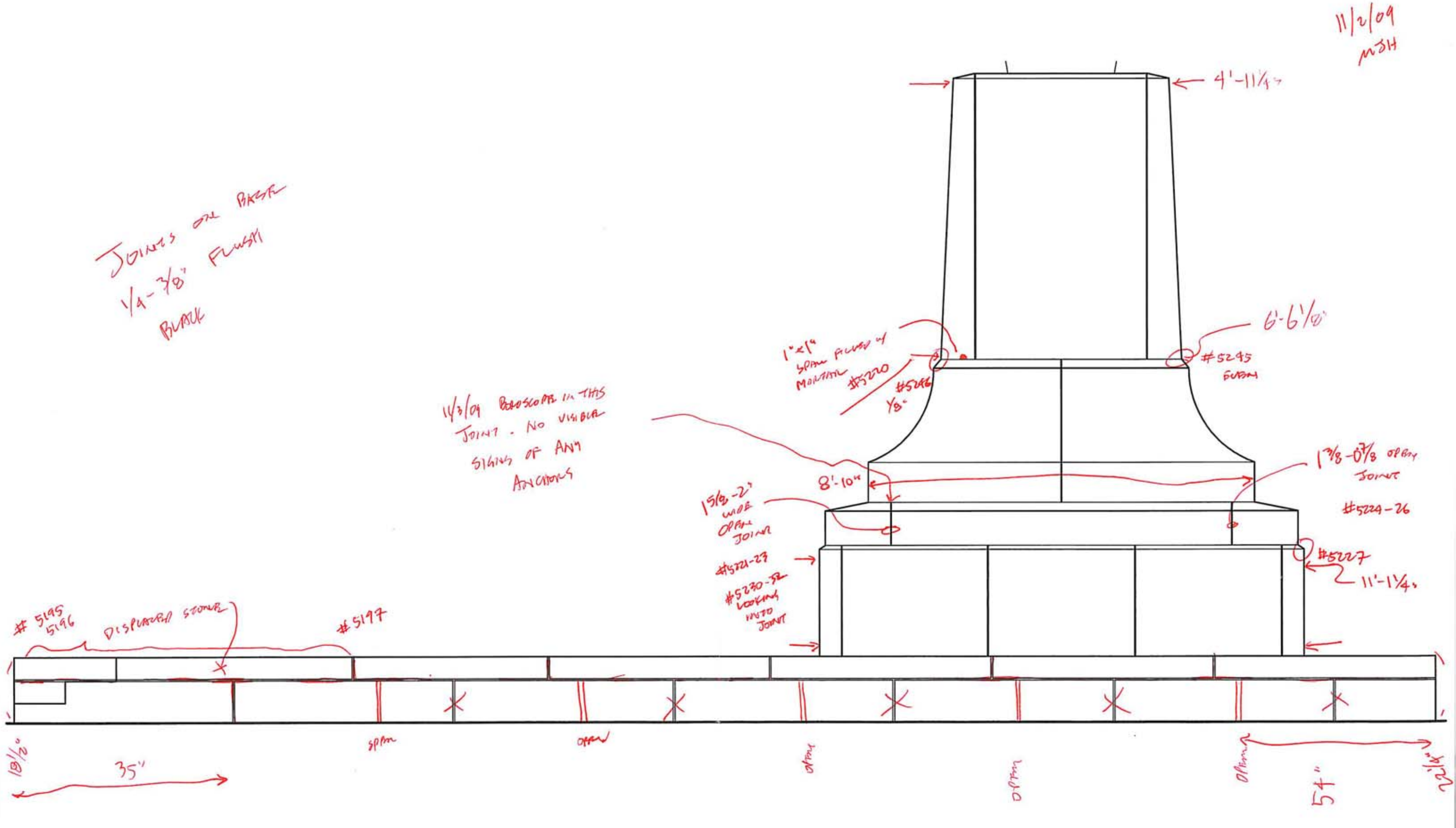
- ALL JOINTS NEED REPOINTED.
- SOME JOINTS HAVE MORTAR, SOME HAVE SEALANT, SOME ARE OPEN.
- GRAY SEALANT ON BACKER ROD AROUND PERIMETER OF STATUE BASE.



11/2/09
MJH

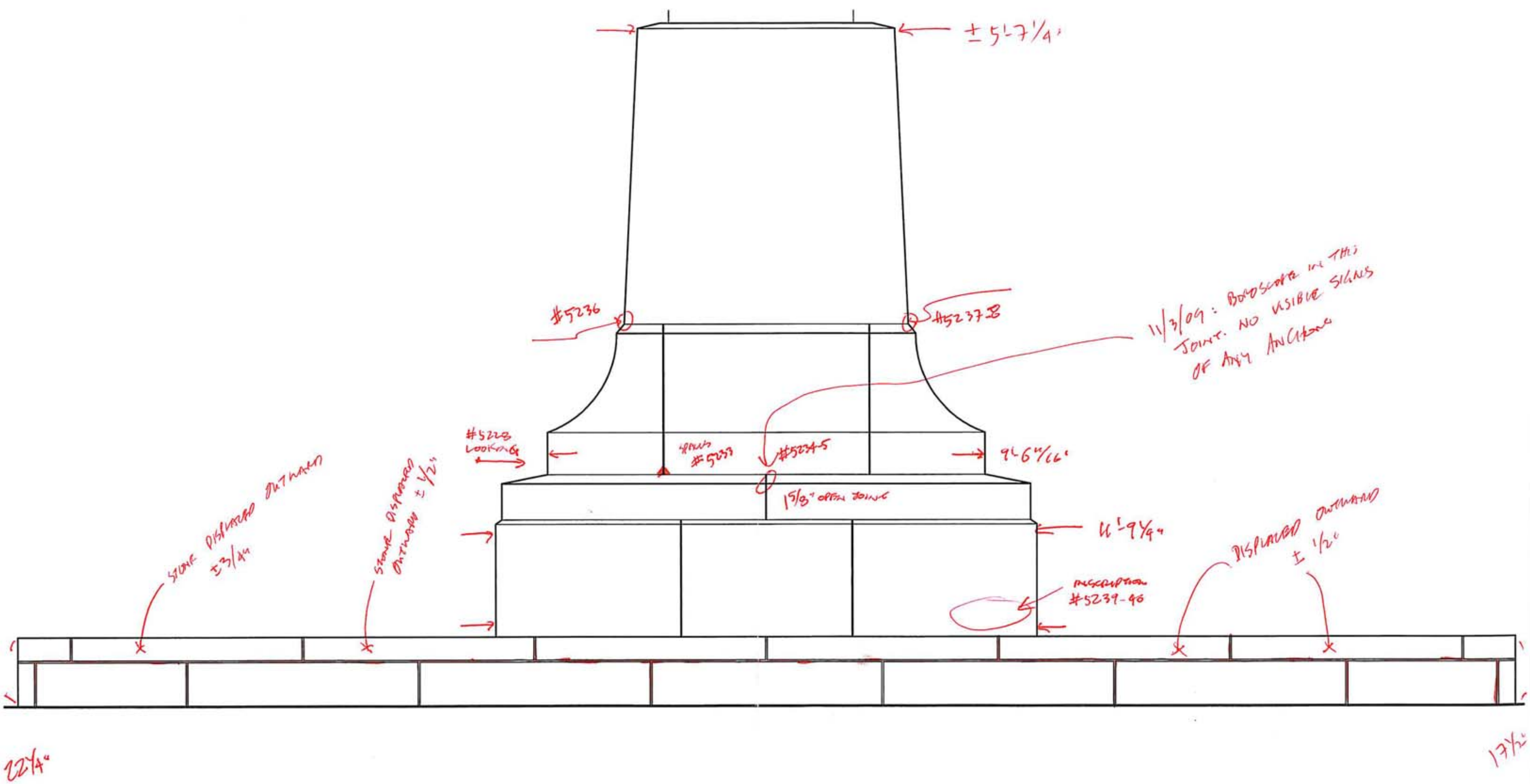


9'-11 5/16"
5'-6 1/4"
1/8"
OUT ± 3/8" HORIZ. IN THIS CORNER
#5244
#5216
1 1/2" x 3"
#5217
5218
8'-10"
1 1/2" OPEN JOINT
1 1/2" OUT.
DISP. STONE
1 5/8" OPEN JOINT
11'-1 1/8"
MORTAR SAMPLE #5219
17 1/2"
11'-1 1/4"
OPEN
±54"
DISPLACED OUTWARD ± 1/2"
LOW SANDSTONE TO BE REMOVED AND REINSTALLED DURING WORK ± 3' BACK
INT.
OLD MORTAR
EXT.
±35"



11/2/09
MSH
4'-11¼"
JOINTS ON BASE
¼-⅜" FLUSH
BLACK
6'-6⅛"
1"x1" SPAN FILLED W/ MORTAR
#5220
#5246
⅛"
#5245
SUGAR
11/3/09 BOROSCOPE IN THIS JOINT . NO VISIBLE SIGNS OF ANY ANCHORS
8'-10"
1⅜-0⅞ OPEN JOINT
#5224-26
15/8-2" WIDE OPEN JOINT
#5221-23
#5230-32 LOOKING INTO JOINT
#5227
11'-1¼"
5195
5196
DISPLACED STONE
#5197
SPAN
OPEN
OPEN
OPEN
OPEN
10½"
35"
54"
22¼"

11/2/09
MJH



±5'-7 1/4"
#5236
#5237 B
11/3/09: BOROSCOPE IN THE JOINT. NO VISIBLE SIGNS OF ANY ANCHORS
#5228 LOOKING
SPALL #5233
#5234-5
9'-6 11/16"
15/8" OPEN JOINT
11'-9 1/4"
STONE DISPLACED OUTWARD ±3/4"
STONE DISPLACED OUTWARD ±1/2"
DISPLACED OUTWARD ± 1/2"
INSCRIPTION #5239-40
22 1/4"
17 1/2"

11/2/09
MJH

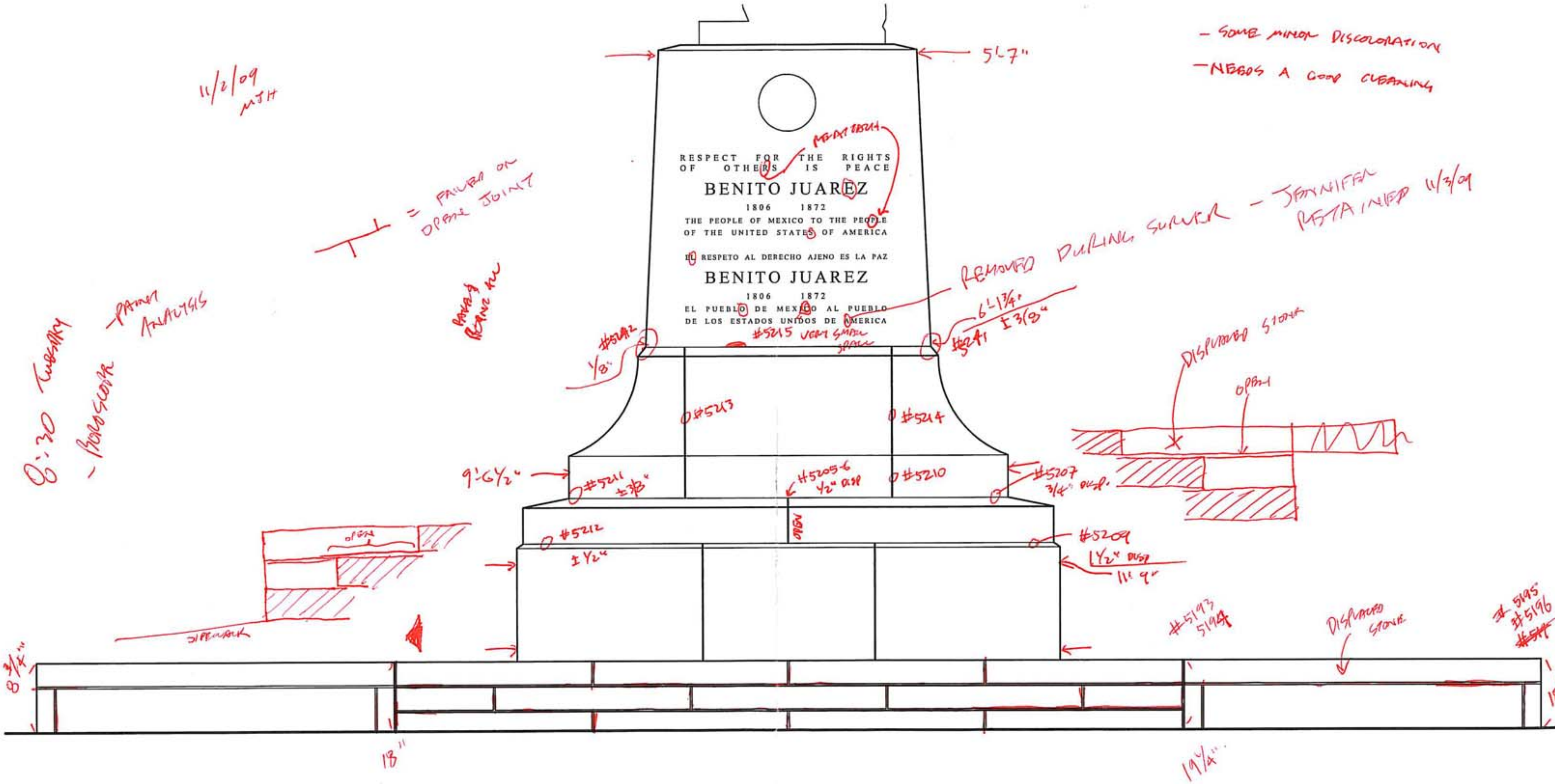
- Some minor discoloration
- Needs a good cleaning

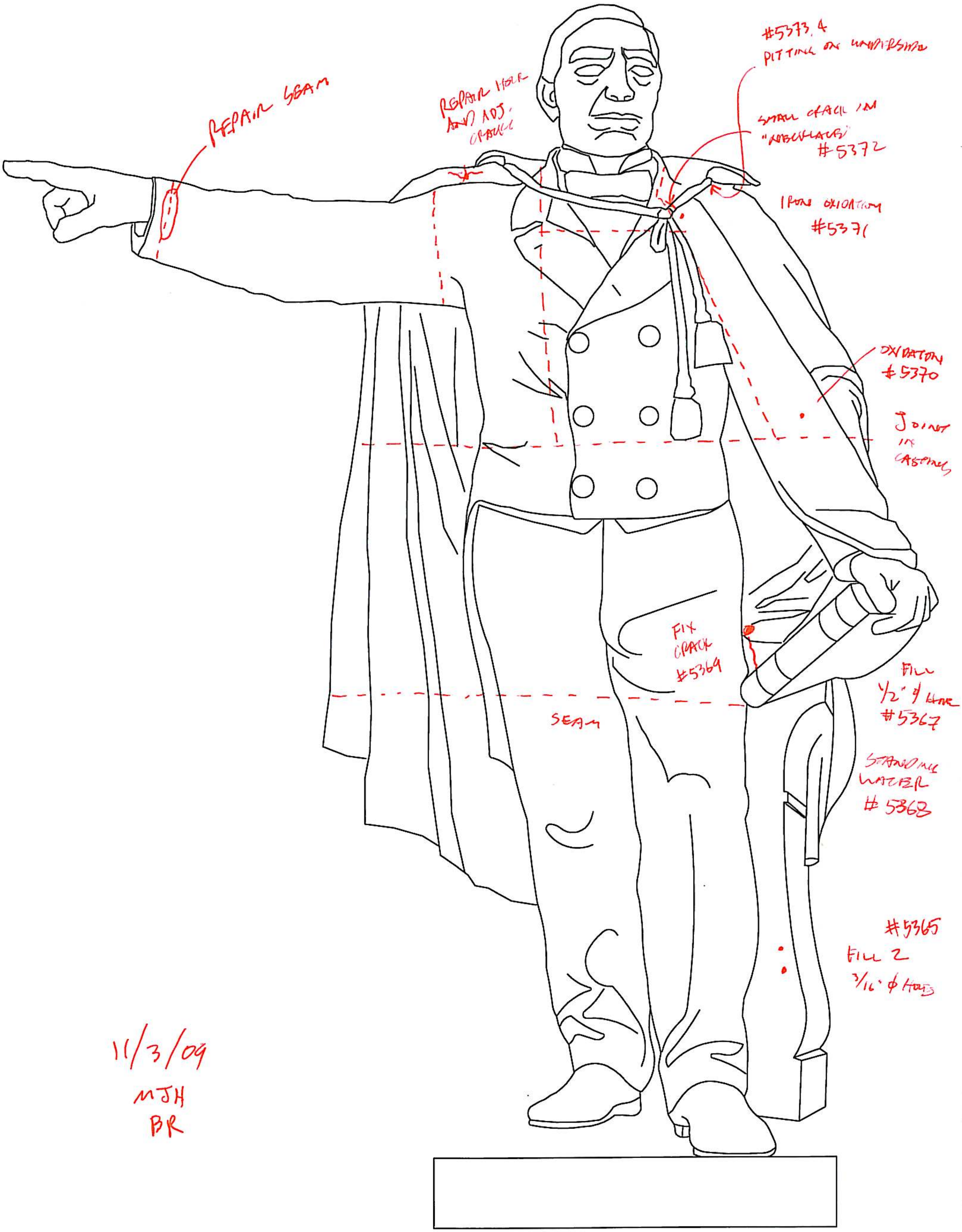
11/2/09
MJH

⊥ = Failure on open joint

8:30 Tuesday
- Boroscope - Paint analysis

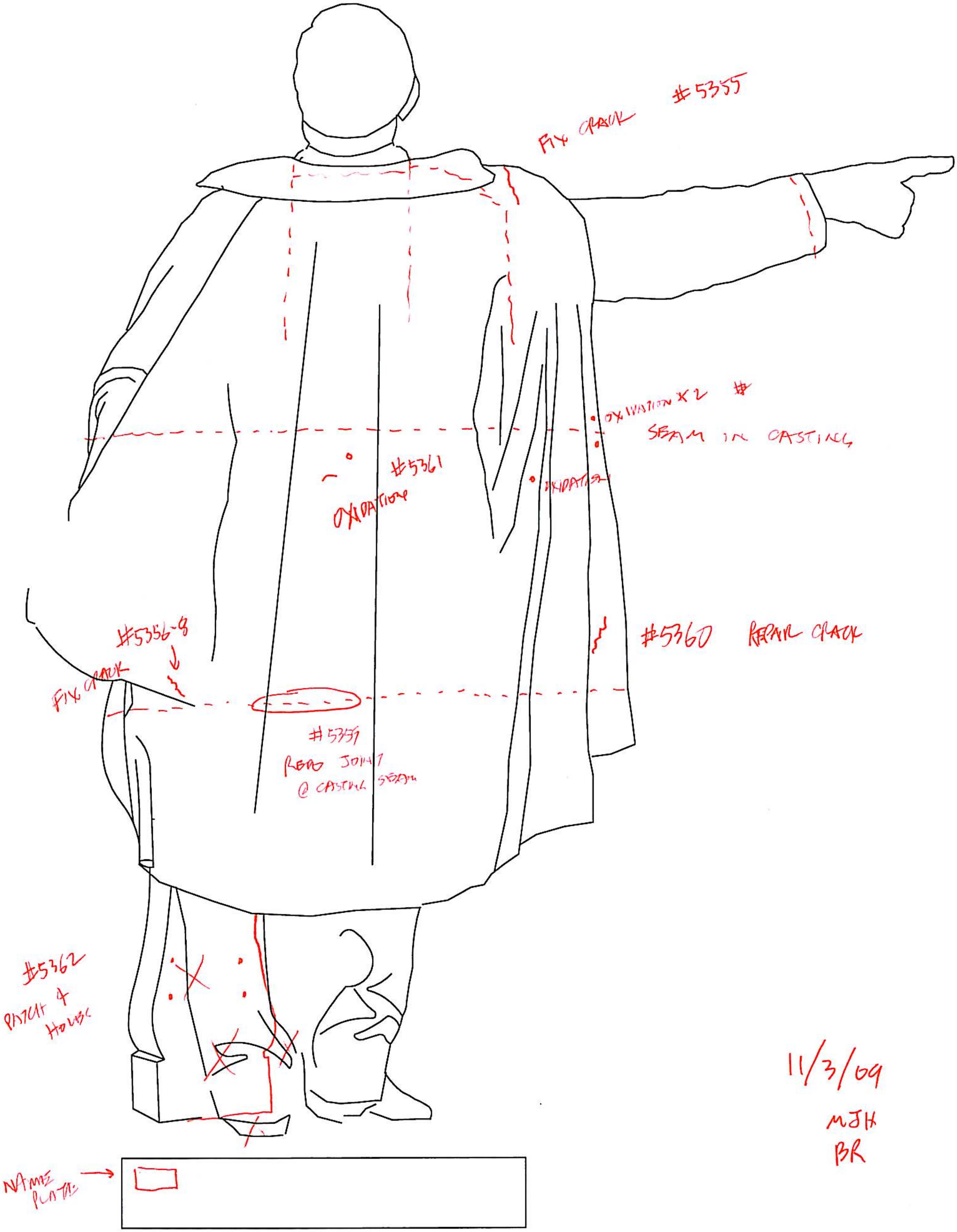
Removed during survey - Jennifer retained 11/3/09





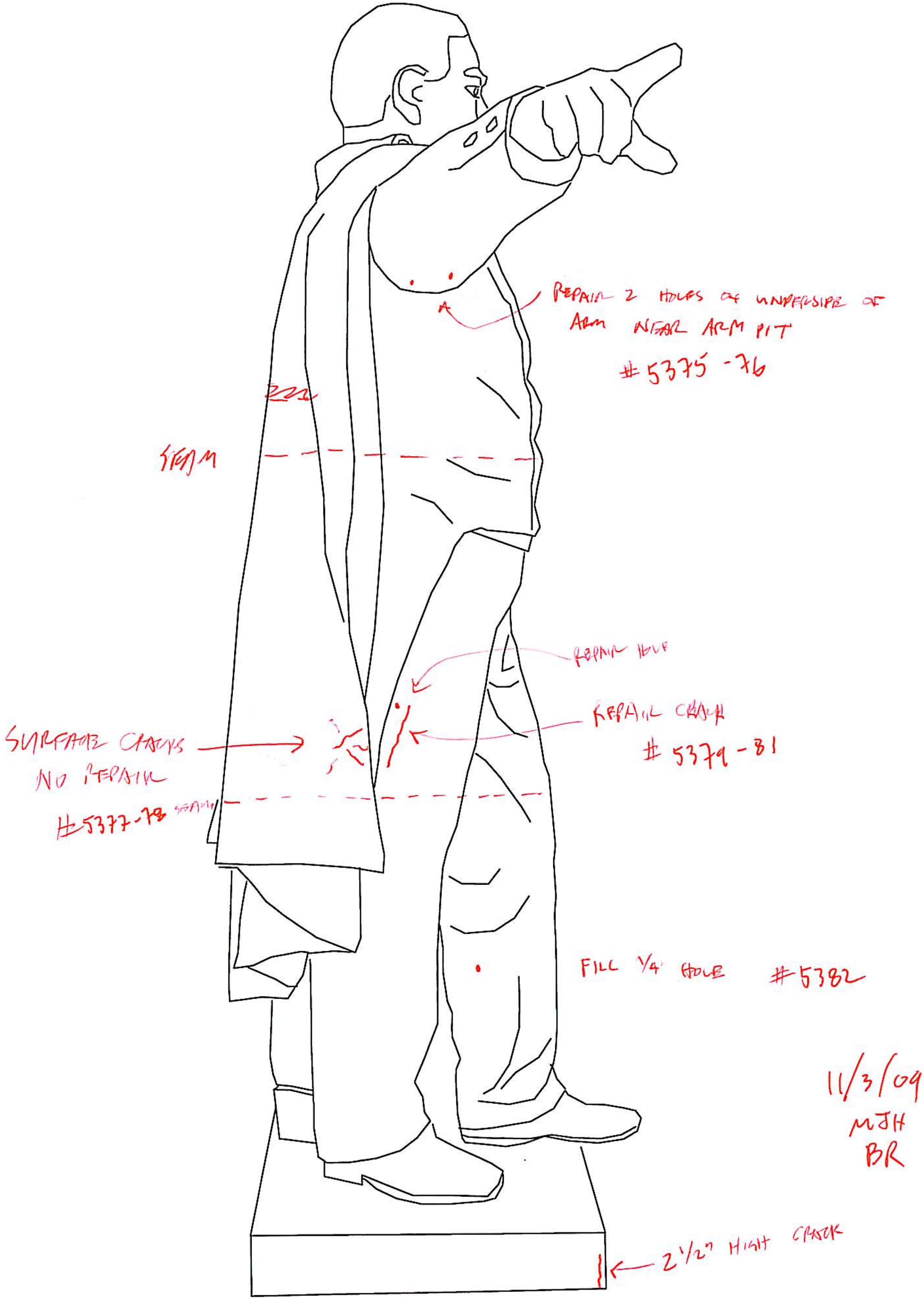
REPAIR SEAM
REPAIR HOLE AND ADJ. CRACK
#5373, 4
PITTING ON UNDERSIDE
SMALL CRACK IN "NOBCHLACE"
#5372
IRON OXIDATION
#5371
OXIDATION
#5370
JOINT IN CASTING
FIX CRACK
#5369
SEAM
FILL 1/2" ϕ HOLE
#5367
STANDING WATER
#5368
#5365
FILL 2 3/16" ϕ HOLES

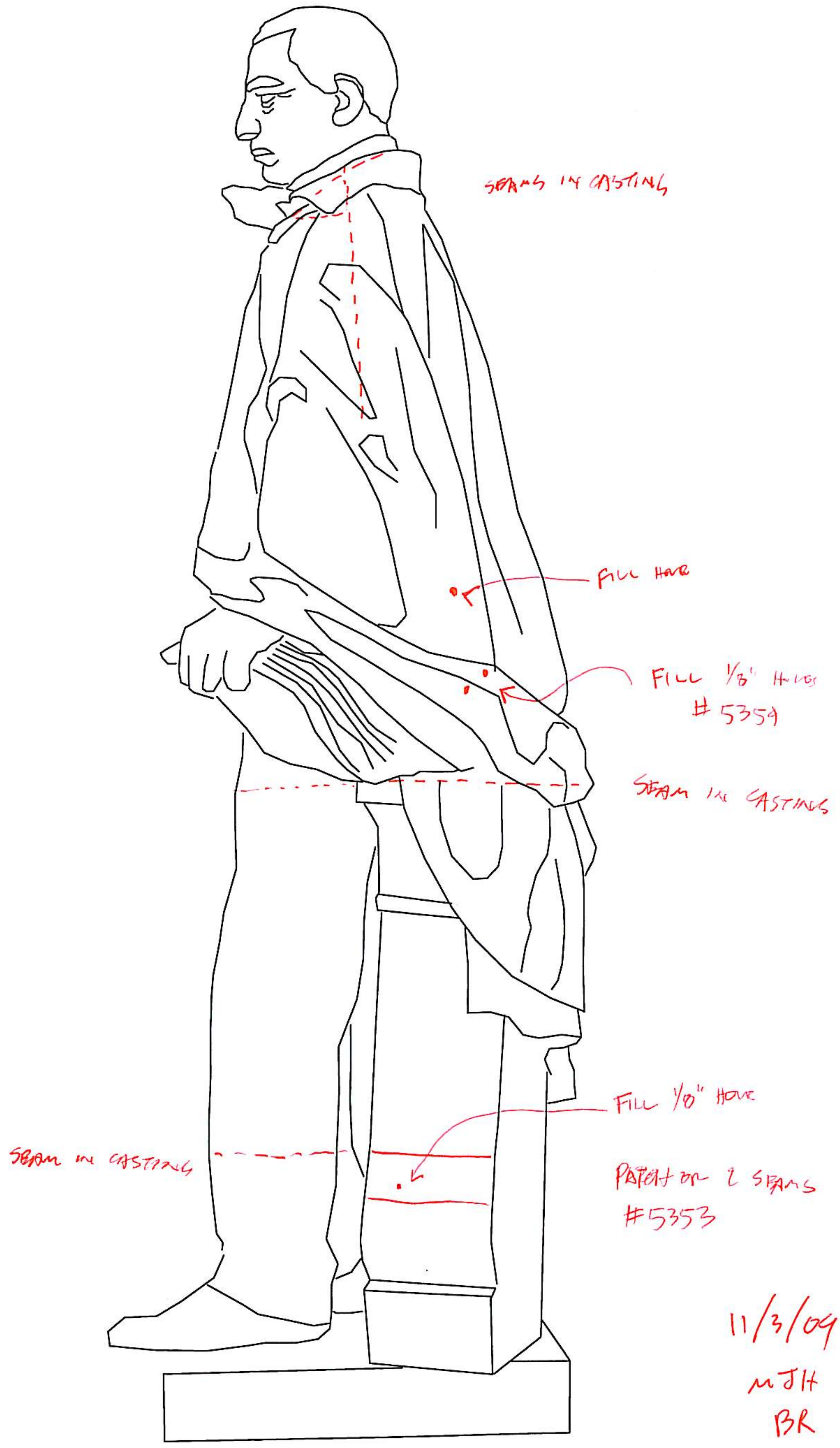
11/3/09
MJH
BR


FIX CRACK #5355
OXIDATION X 2 #
SEAM IN CASTING
#5361
OXIDATION
OXIDATION
#5360 REPAIR CRACK
#5356-8
FIX CRACK
#5359
REPAIR JOINT
@ CASTING SEAM
#5362
PATCH 4
HOLES
NAME PLATE

11/3/09

MJH
BR

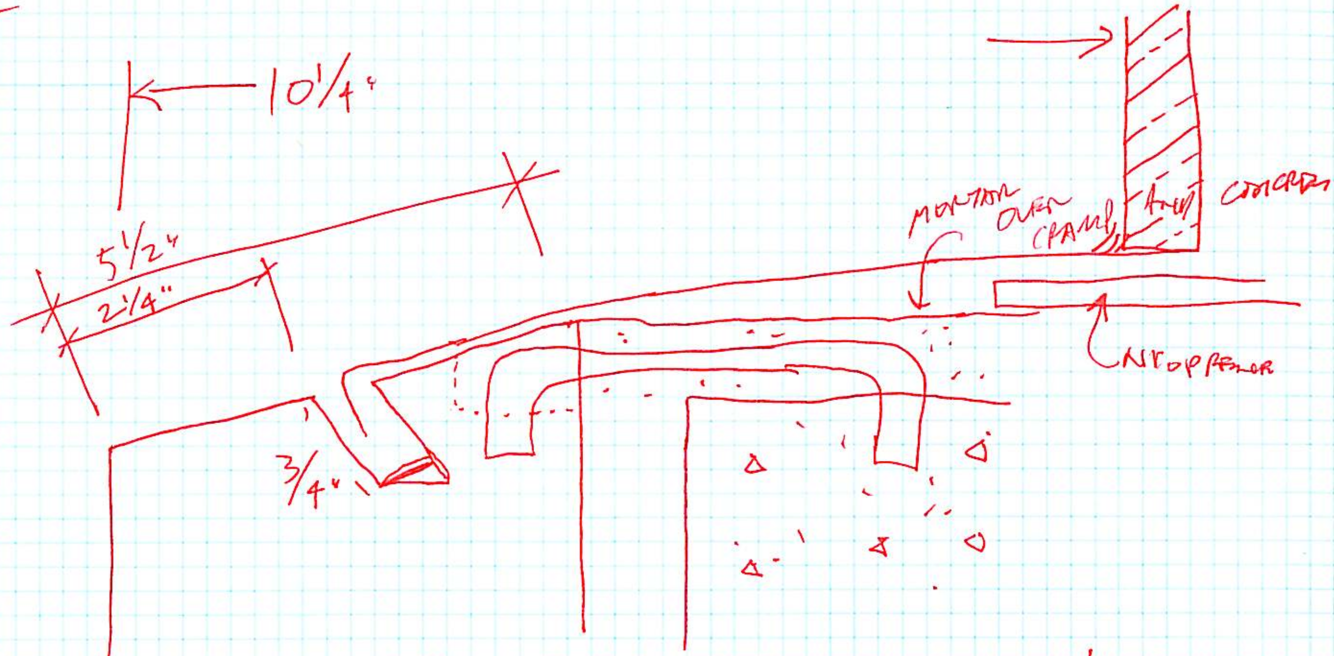

REPAIR 2 HOLES ON UNDERSIDE OF ARM NEAR ARM PIT
#5375-76
SEAM
REPAIR HOLE
REPAIR CRACK
#5379-81
SURFACE CRACKS NO REPAIR
#5377-78 SEAM
FILL 1/4" HOLE #5382
11/3/09
MJH
BR
2 1/2" HIGH CRACK


SEAMS IN CASTING
FILL HOLE
FILL 1/8" HOLES
#5359
SEAM IN CASTING
FILL 1/8" HOLE
SEAM IN CASTING
PATCH OR 2 SEAMS
#5353

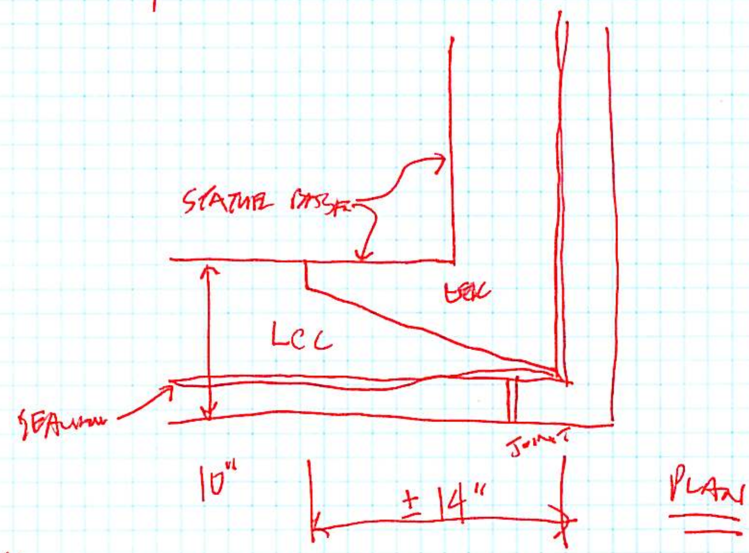
11/3/09
MJH
BR

11/3/09

MJH
BR



KXR.COM BOROSCOPE



11/3/09 ± 10:15 AM

WORKING WITH BOROSCOPE REBAR

LOWER VIBRATION MONITOR

MAY HAVE SOME ANOMOLIES IN VIBRATION DATA

→ HIGH TOWER TENT
SOUTH DISH RT
FELIX TILTING

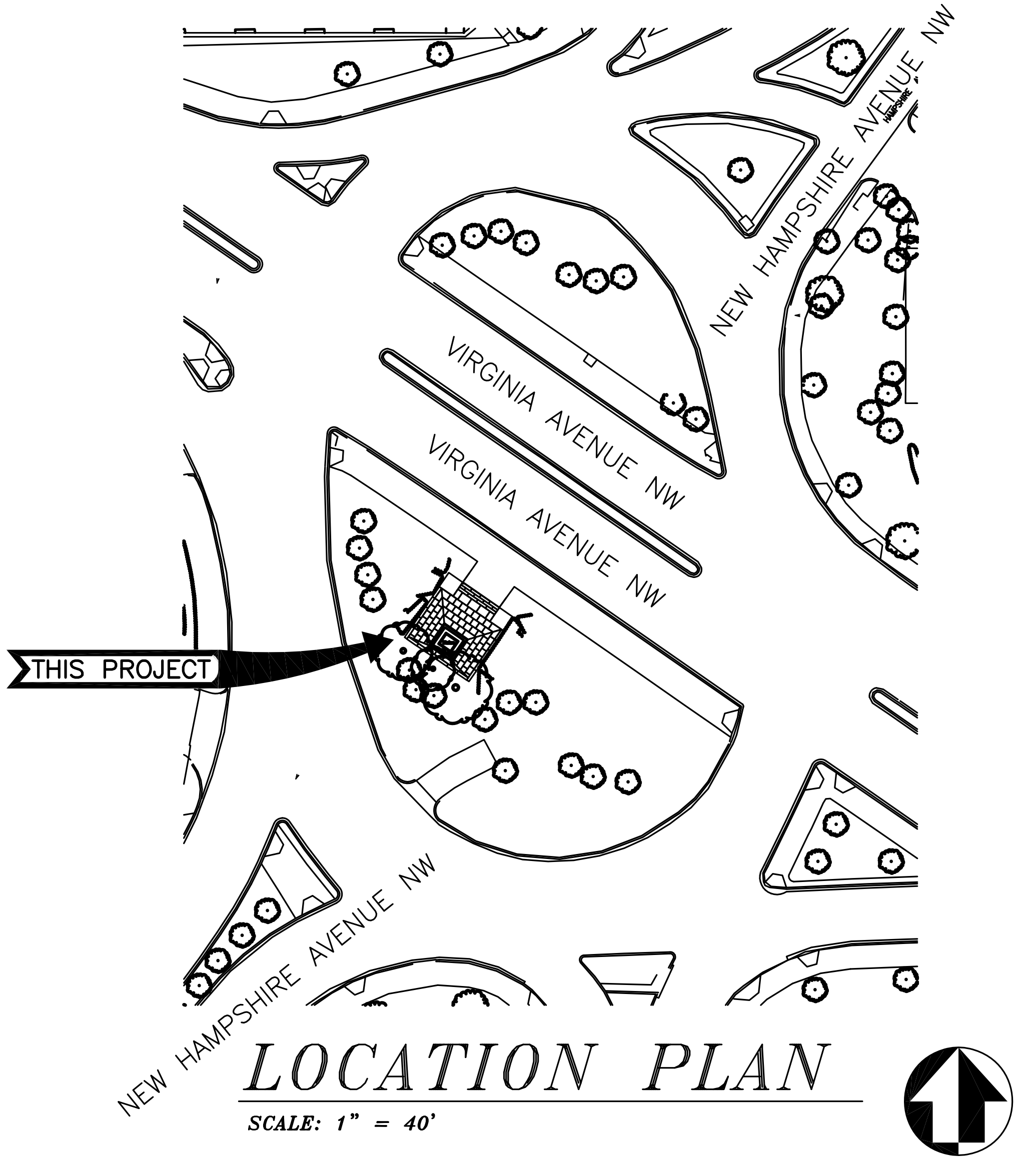
Appendix C – Existing Condition Drawings and Repair Plan Drawings

UNITED STATES DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE

INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA

NATIONAL MALL AND MEMORIAL PARKS (NAMA)
WASHINGTON, DC

NPS PMIS NO. 43681



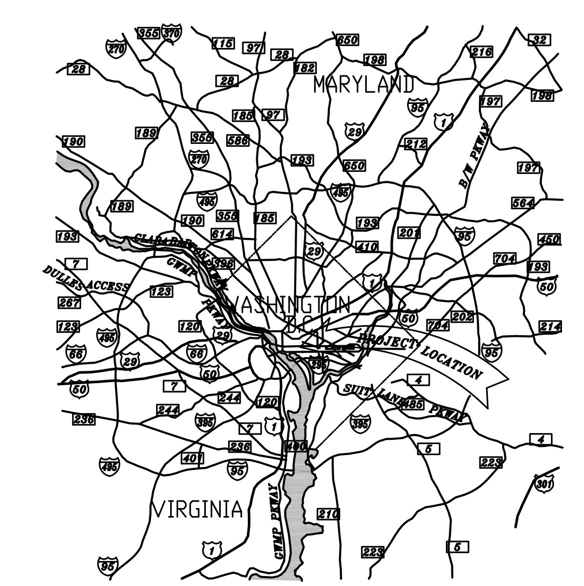
LOCATION PLAN
SCALE: 1" = 40'

INDEX OF DRAWINGS

INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA

VICINITY MAP

4 0 4 8
SCALE OF MILES



WASHINGTON D.C. AND VICINITY

RECOMMENDED DATE

CHIEF, BRANCH DESIGN AND CONSTRUCTION

SUPERINTENDENT, PARK

APPROVED

REGIONAL DIRECTOR, NATIONAL CAPITAL REGION

A/E FIRM
ARCHITECT:
OEHRLEIN & ASSOCIATES ARCHITECTS
1350 CONNECTICUT AVE. NW
SUITE 412
WASHINGTON, DC 20036
202-785-7336
202-785-7334 (FAX)

Mark	Sheet	REVISION	Date	Initial

COVER SHEET
TITLE OF DRAWING

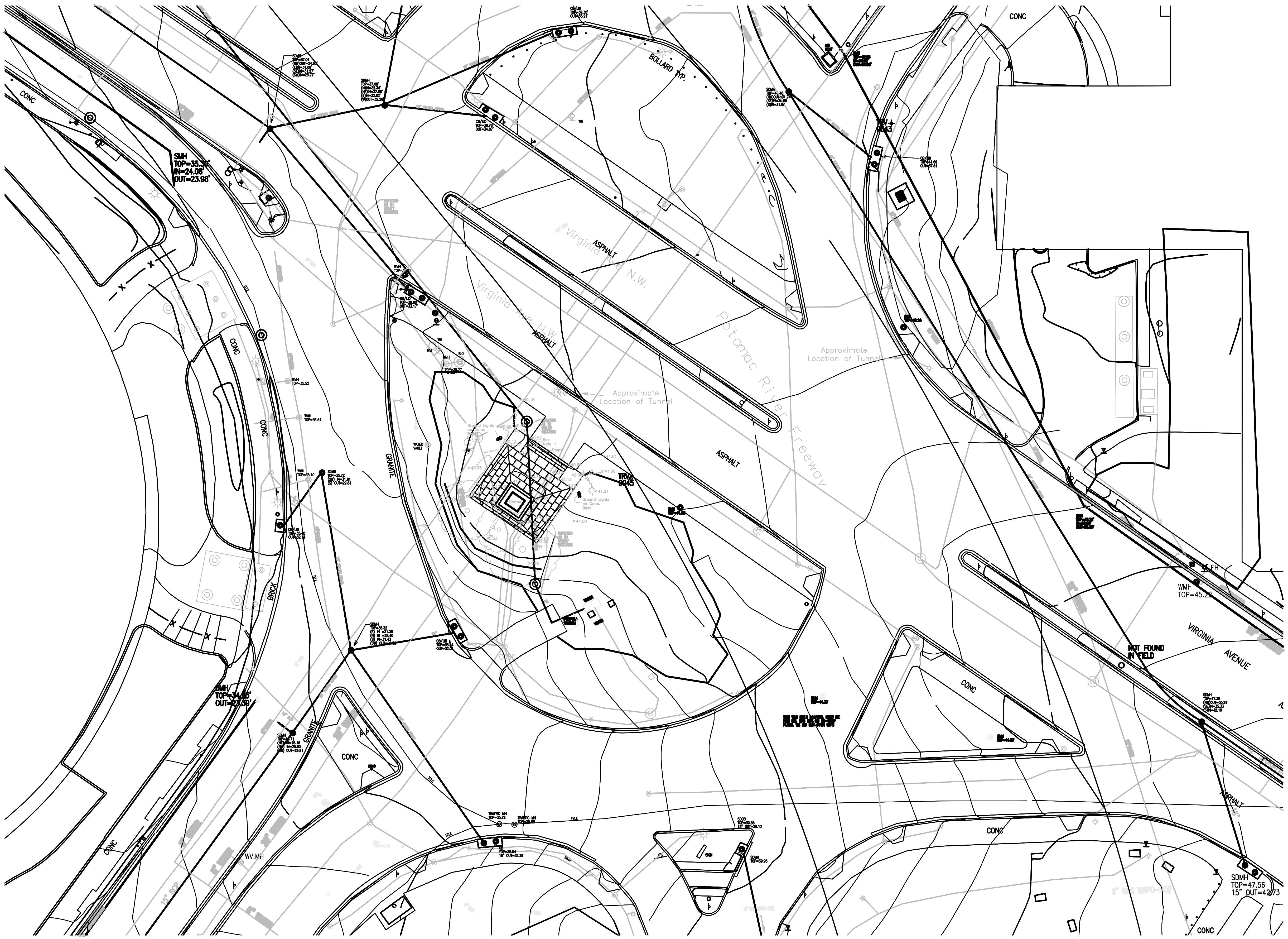
CS-1
SUB SHEET NUMBER

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE – NATIONAL CAPITAL REGION
BRANCH OF DESIGN AND CONSTRUCTION

TITLE OF PROJECT: INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA

LOCATION WITHIN PARK: RESERVATION 134
NAME OF PARK: NAT'L MALL & MEM. PARKS

DESIGNED: MJH/BDR
DRAWN: MJH/BDR
CHECKED: MJH/BDR
DWG. NO. 875 / 83420
DATE 01/25/10
SHEET 1 OF 8



General Notes:

1. The data on this survey is the results of a field survey by this firm, last date of field survey 10-05-09.
2. Elevations shown are referenced to DCDPW datum BM 9-53 & 9-51. 3)
3. Visible above ground utilities have been shown. Subsurface utilities, where shown, follow ASCE 38-02 quality levels A-D. Lines are labeled as follows: A: Visually verified via test holes; B: Designated and surveyed; C: Record information correlated with surveyed surface features; D: Record information only. Where subsurface utilities have been apparently designated by others on site, those locations will be shown as quality level C. Utilities may exist that are not shown. Unless otherwise labeled as above, this survey represents quality level C.
4. D.C. Benchmark 9-23 was checked Nov. 2005 and Oct. 2009. No movement was observed.
5. Background is derived from the Federal Hwy Utility Drawings drawing provided by the National Park Service named Juarez Base 3d. dated 10-19-09.

SYMBOL LEGEND	
ge	Granite
cn	Concrete
gs	Grass
⊙	Deciduous Tree
gd	Ground
☼	Ground Light

20 0 20 40
SCALE OF FEET

(A / C1.0) EXISTING CONDITIONS – PROJECT SITE

A/E FIRM	Mark	Sheet	REVISION	Date	Initial
ARCHITECT: OEHRLEIN & ASSOCIATES ARCHITECTS, 1350 CONNECTICUT AVE. NW, SUITE 412, WASHINGTON, DC 20036, 202-785-7336, 202-785-7334 (FAX)					

EXISTING CONDITIONS PROJECT SITE
TITLE OF DRAWING

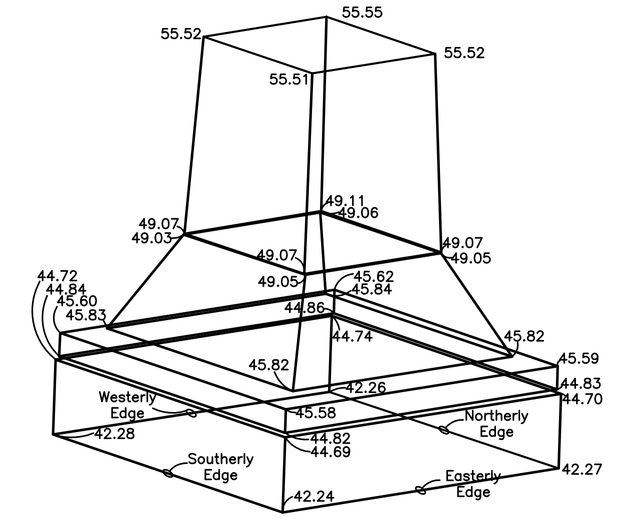
C1.0
SUB SHEET NUMBER

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE - NATIONAL CAPITAL REGION
BRANCH OF DESIGN AND CONSTRUCTION

INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA
TITLE OF PROJECT
NATIONAL MALL AND MEMORIAL PARKS
NAME OF PARK

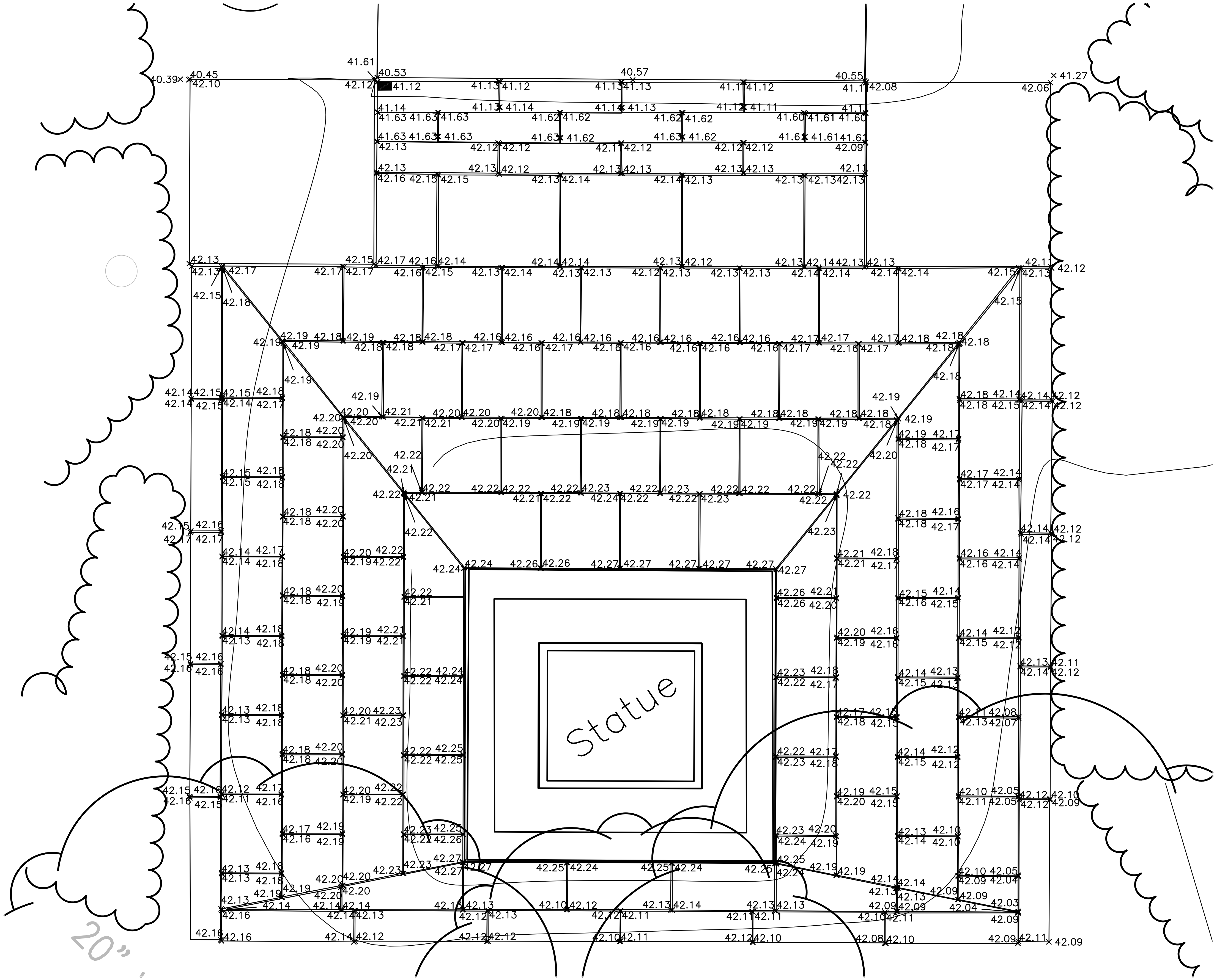
DESIGNED MJH/BDR
DRAWN MJH/BDR
CHECKED MJH/BDR
DWG. NO. 875 83420
DATE 01/25/10
SHEET 2 OF 8

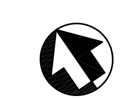
NOTE: ELEVATIONS TAKEN ON THE MONUMENT JOINTS.

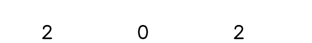


A C2.0 EXISTING CONDITIONS – PEDESTAL
NOT TO SCALE

SYMBOL LEGEND
Granite
Concrete
Grass
Deciduous Tree
Ground
Ground Light







A C2.0 EXISTING CONDITIONS – PLAZA

A/E FIRM
ARCHITECT:
OEHRLEIN & ASSOCIATES ARCHITECTS
1350 CONNECTICUT AVE. NW
SUITE 412
WASHINGTON, DC 20036
202-785-7336
202-785-7334 (FAX)

Mark	Sheet	REVISION	Date	Initial

EXISTING CONDITIONS
PLAZA & PEDESTAL
TITLE OF DRAWING

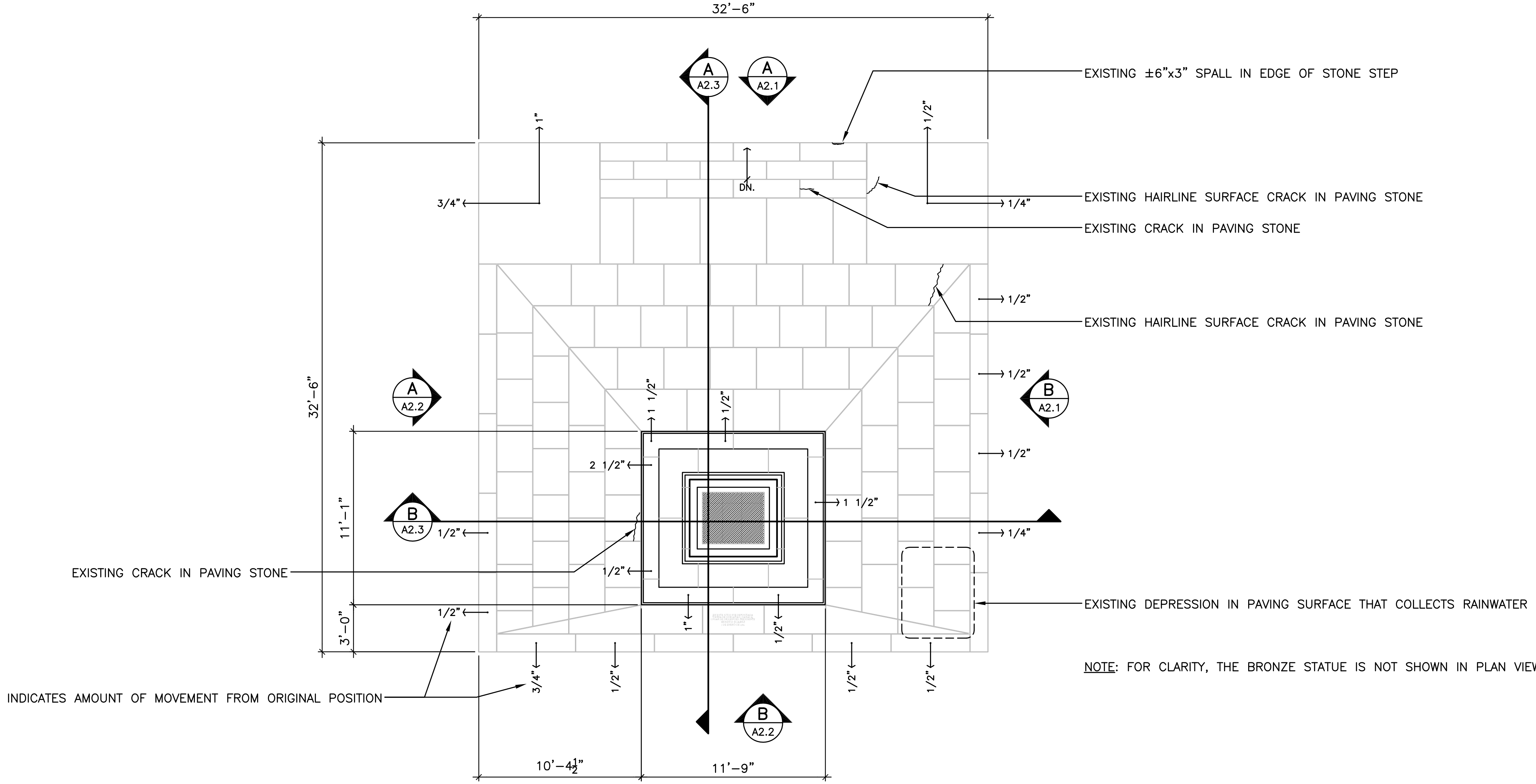
C2.0
SUB SHEET NUMBER

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE – NATIONAL CAPITAL REGION
BRANCH OF DESIGN AND CONSTRUCTION

INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA
TITLE OF PROJECT
NATIONAL MALL AND MEMORIAL PARKS
NAME OF PARK

MJH/BDR
MJH/BDR
MJH/BDR
875
83420
01/25/10
3 of 8

1/25/10 10:43 BROEDER R17 \\FS1\JUAREZ MONUMENT\875_83420 NAMA INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLE JUAREZ MONUMENT AND PLAZA\FINAL AE DELIVERABLES\01 DRAWINGS\CADD\CIVIL\C2.0 EXISTING MONUMENT.DWG XREFS: ..\XREF\XC-BASE.DWG; ..\XREF\XC-SURVEY.DWG;

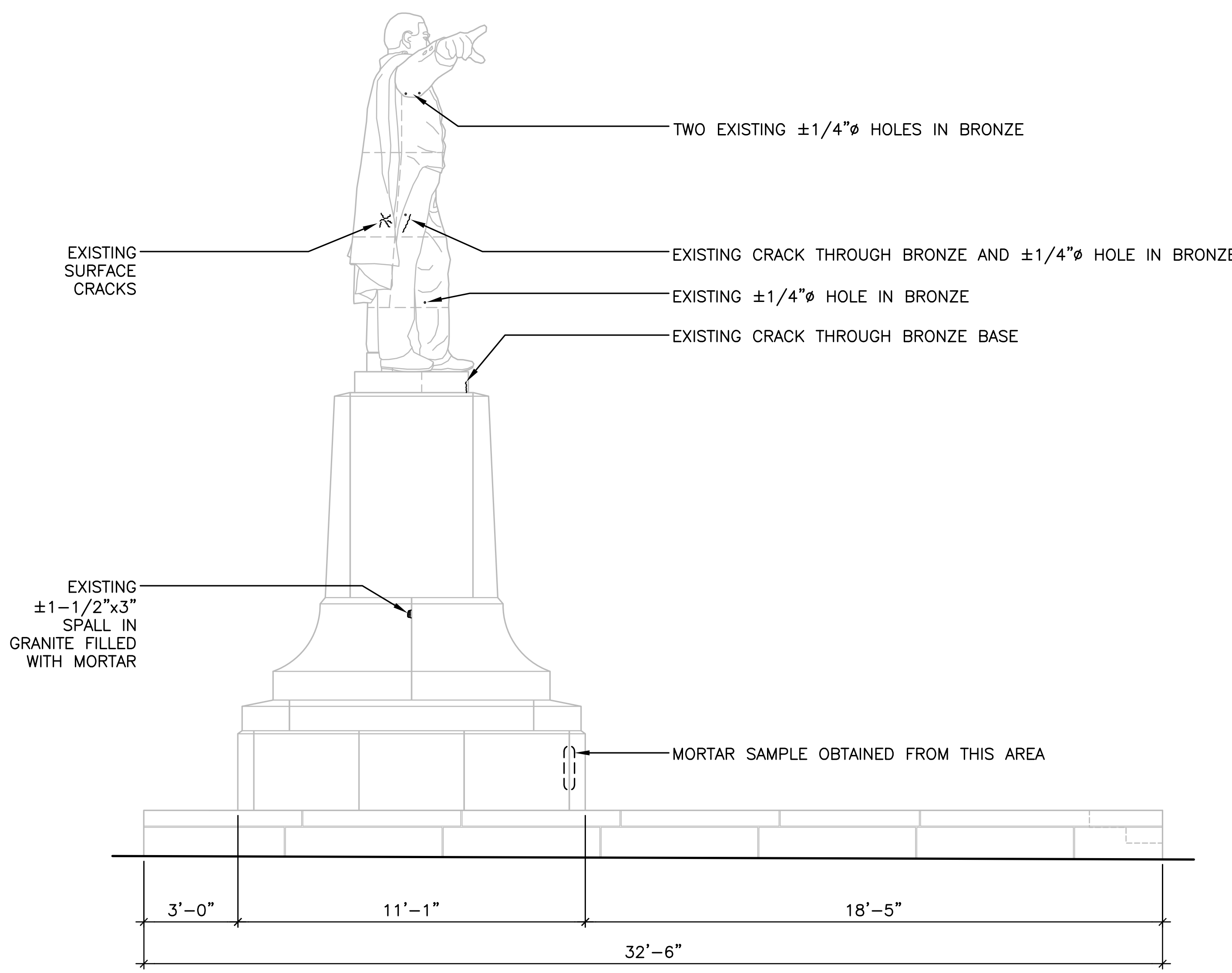


NOTE: FOR CLARITY, THE BRONZE STATUE IS NOT SHOWN IN PLAN VIEW

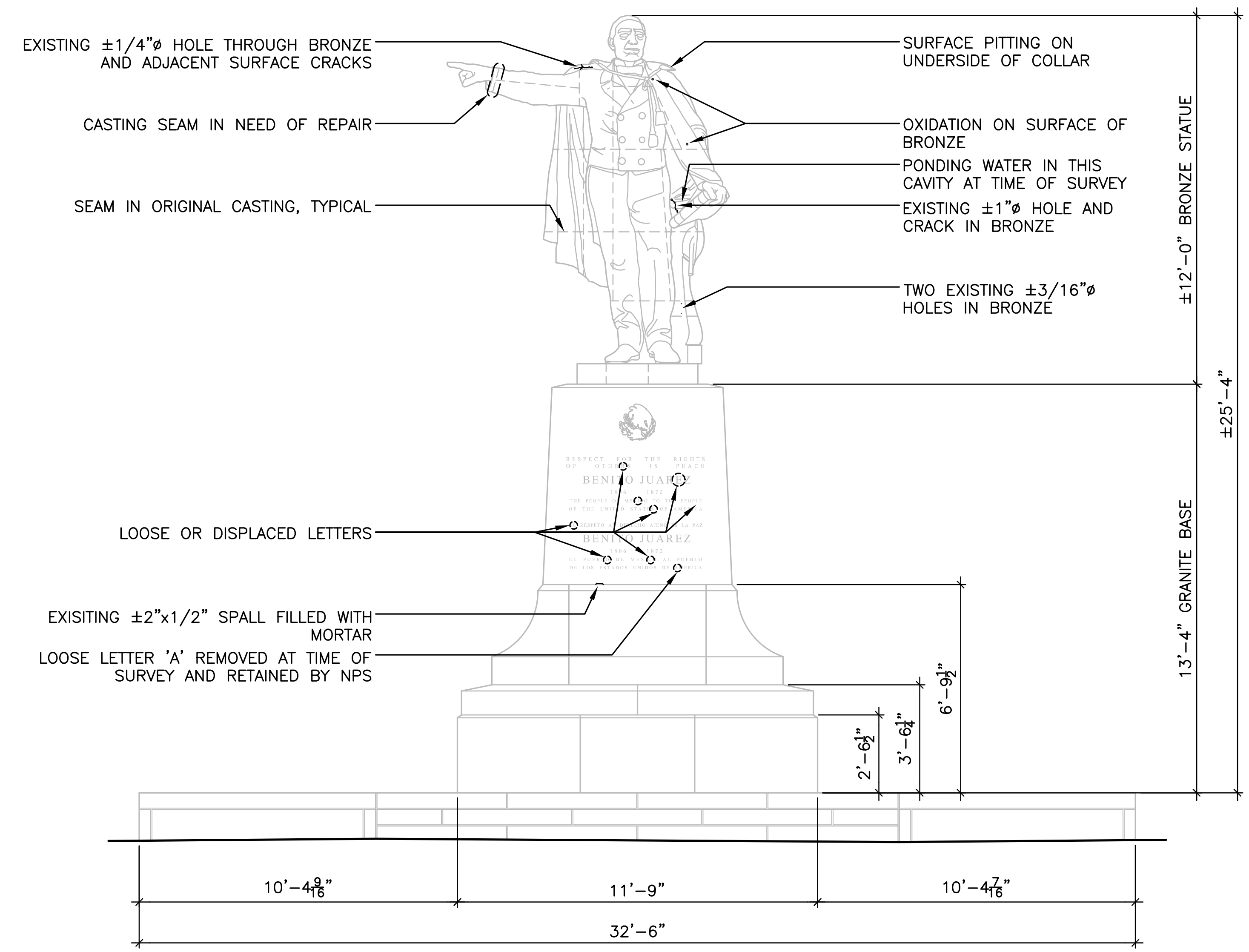
A A1.1 PLAZA PLAN

4 0 4 8
SCALE OF FEET

A/E FIRM ARCHITECT: OEHRLEIN & ASSOCIATES ARCHITECTS 1350 CONNECTICUT AVE. NW SUITE 412 WASHINGTON, DC 20036 202-785-7336 202-785-7334 (FAX)	Mark	Sheet	REVISION	Date	Initial	A1.1 SUB SHEET NUMBER	UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE - NATIONAL CAPITAL REGION BRANCH OF DESIGN AND CONSTRUCTION	MJH/BDR DESIGNED MJH/BDR DRAWN MJH/BDR CHECKED
			PLAZA PLAN TITLE OF DRAWING				INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA TITLE OF PROJECT NATIONAL MALL AND MEMORIAL PARKS NAME OF PARK	DWG. NO. 875 83420 DATE 01/25/10 SHEET 4 OF 8



A
A2.1
NORTH ELEVATION



B
A2.1
WEST ELEVATION

2 0 2 4 6
SCALE OF FEET

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NORTH & WEST ELEVATIONS
TITLE OF DRAWING

A2.1
SUB SHEET NUMBER

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE - NATIONAL CAPITAL REGION
BRANCH OF DESIGN AND CONSTRUCTION

INVESTIGATIVE CONDITION ASSESSMENT AND REPORT FOR BENITO PABLO JUAREZ MONUMENT AND PLAZA
TITLE OF PROJECT

NATIONAL MALL AND MEMORIAL PARKS
NAME OF PARK

MJH/BDR DESIGNED
MJH/BDR DRAWN
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DATE 01/25/10
SHEET 5 of 8