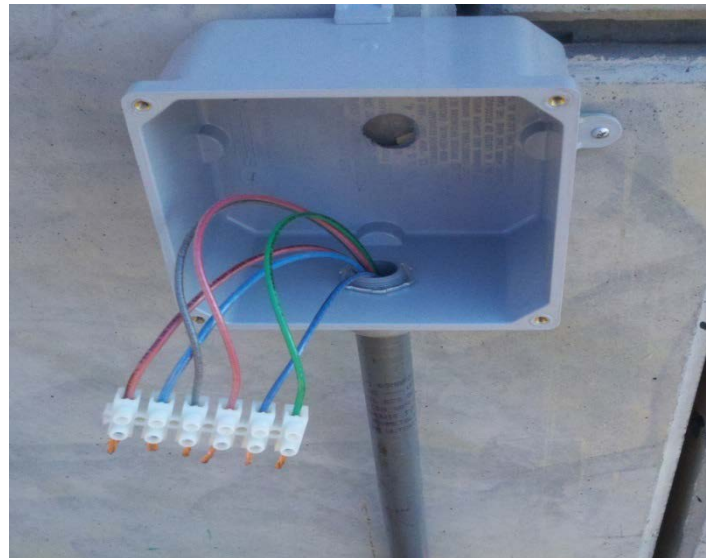


# *Materials & Tests Unit*

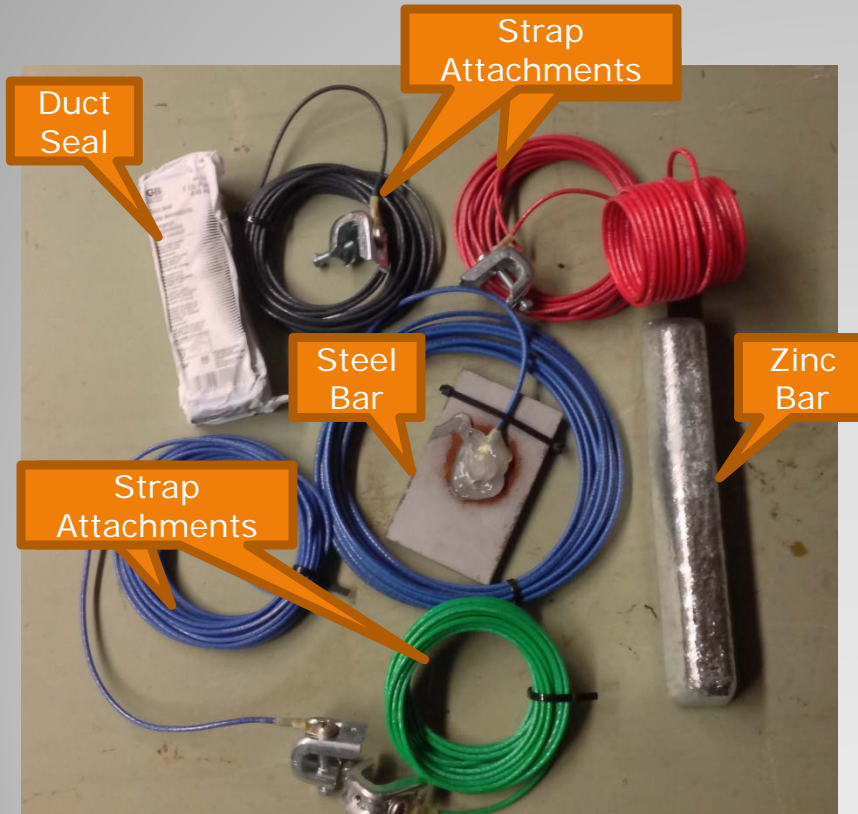
## **MSE Wall Corrosion Monitoring Kit Installation Guide**



Revision #3,  
26 February 2018

- The Materials and Tests Unit Chemical lab annually monitors and maintains corrosion data on 100 plus MSE walls throughout the state.
- These installations provides crucial data and research on the effects of backfill material and corrosion reaction to the supporting straps.
- This guide will cover installation of the corrosion monitoring kit for both the Reinforced Earth Type, SINE Wall type and the Vista wall type MSE wall.

# Corrosion Monitoring Kit Contents



- Steel Reference Bar
  - Blue, 10 Gauge Strand Wire with approximately 15 feet of wire.
- Zinc Reference Bar
  - Red, 10 Gauge Solid Wire with approximately 15 feet of wire.
- 4 each strap attachments
  - Black, Red, Blue Green 12 Gauge Wires with approximately 15 feet of wire.
- 1 Block of Duct Seal
- 1 each installation instructions

# Installation Considerations

- In most cases, one corrosion monitoring kit per bridge structure; unless the Engineer and or Geo-Technical Unit requests an additional monitoring kit to be installed.
- For projects that utilizes the same quarry for 78 or 57 stone one corrosion monitoring kit will be installed per project.
- If one or more additional quarries are utilized to obtain backfill material an additional monitoring kit will be placed per structure.

# Installation Considerations

- For projects that utilize screened backfill one corrosion monitoring kit will be placed on either side of the bridge structure.
- For the use of screened backfill there are additional sampling and testing requirements.
- [https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Procedures.pdf](https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically%20Stabilized%20Earth%20Wall%20Fine%20Aggregate%20Sampling%20and%20Testing%20Procedures.pdf)

# Installation Considerations

Once the Contractor installs the kit and drills **ONE** 7/8" hole in the wall panel for all 6 wires; contact the M&T Corrosion Engineer at 919-329-4090 for installing the wall box.



**DO NOT DRILL MORE THAN  
ONE 7/8" HOLE!**





# Installation Considerations



- The kit should not be installed on straps or cages that will be in contact with the steel piles.
- This will interfere with the annual readings.

# Installation Considerations



- The kit should be installed at least 6 feet from the inside panel.
- The reference bar and lead wires are supplied with 10-15 feet of additional wire.



# Installation Consideration



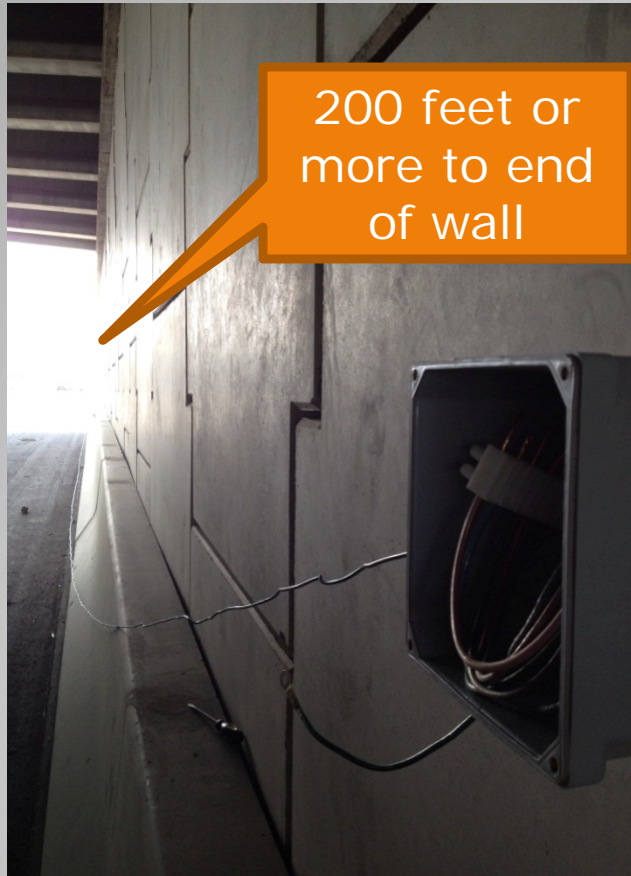
- Ideal locations for long walls are no more than 75 feet to the end of the wall.

# Installation Consideration



- An alternative location is along the wing wall side of the MSE wall.

# Installation Consideration



- Not an ideal location for a corrosion monitor kit.
- When taking annual readings the technician will be exposed to traffic volume while unrolling a spool of wire to obtain a soil ground for testing.

# Installation Considerations



- Before installing take into consideration the final grade and any jersey barriers that may be installed.
- The kit should be installed at the lowest or near lowest area.
- The single hole for the wires coming from the wall should be 4-5 feet above final grade.



# Installation Considerations



- Try to avoid extremely low or high placements of the corrosion monitoring kits.
- These can be corrected, however additional labor, money and equipment are needed to adequately install monitoring box.

# RECO & SINE Wall Installation





# RECO Wall Installation



- Utilizes straps that are bolted to panels and are backfilled with various stone sizes and or screened backfill.

# SINE Wall Installation



- Utilizes “sine wave” style straps that are bolted to panels and are backfilled with various stone sizes and or screened backfill.



# RECO & SINE Wall Installation



- For the use of screened backfill there are additional sampling and testing requirements.
- [https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Procedures.pdf](https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically%20Stabilized%20Earth%20Wall%20Fine%20Aggregate%20Sampling%20and%20Testing%20Procedures.pdf)

# RECO Wall Installation



- Prior to installing the corrosion monitoring kit the Project Inspector will need to provide:
  - Type and size of backfill
  - Length & thickness of straps in which the corrosion monitoring kit is attached.
- This information is crucial to calculating the corrosion formula will need to be given to the M&T representative when performing the box installation.

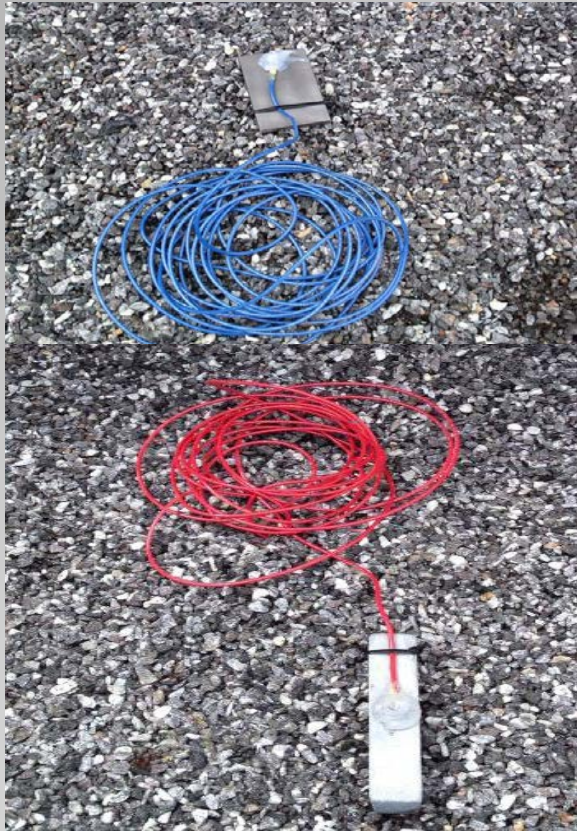


# SINE Wall Installation



- Prior to installing the corrosion monitoring kit the Project Inspector will need to provide:
  - Type and size of backfill
  - Length & thickness of straps in which the corrosion monitoring kit is attached.
- This information is crucial to calculating the corrosion formula will need to be given to the M&T representative when performing the box installation.

# RECO & SINE Wall Installation



- The zinc and steel should be approximately 3-6 feet apart, 6 feet from the inside face of the wall and not touching the straps or other steel components.
- Both reference bars lay directly on the aggregate or screened backfill.



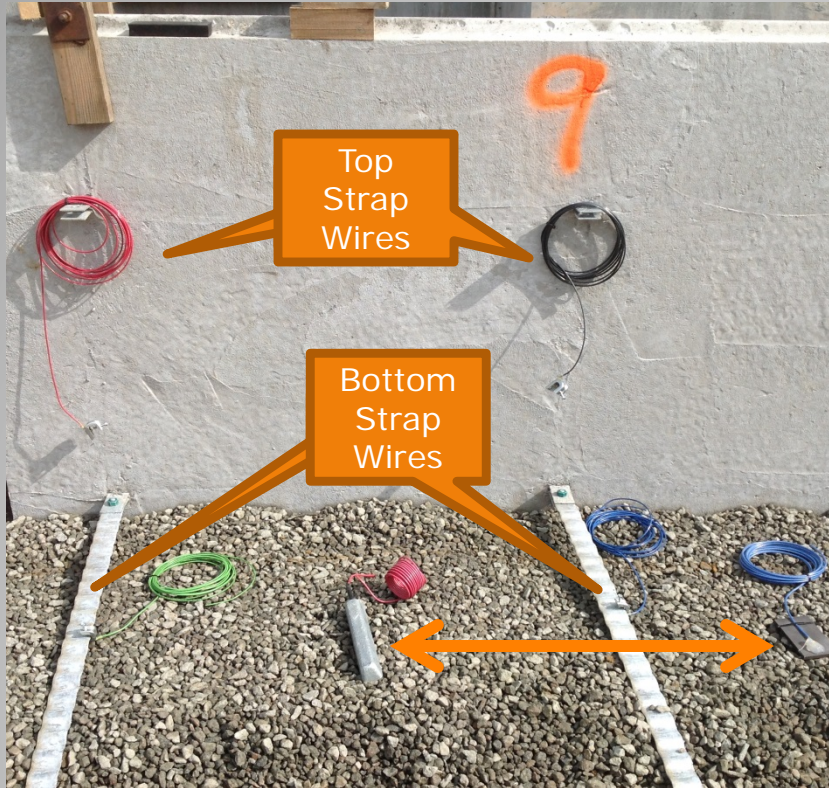
# RECO & SINE Wall Installation



C-clamp  
covered in  
duct seal

- The wire connector is slid on the strap and tightened down.
- Once tightened the C-clamp is completely covered in duct seal.
- Consolidate wires with electrical tape before feeding through panel hole.
- Any wire with damaged insulation shall have five wraps of electrical tape on and around damaged area.

# RECO & SINE Wall Installation

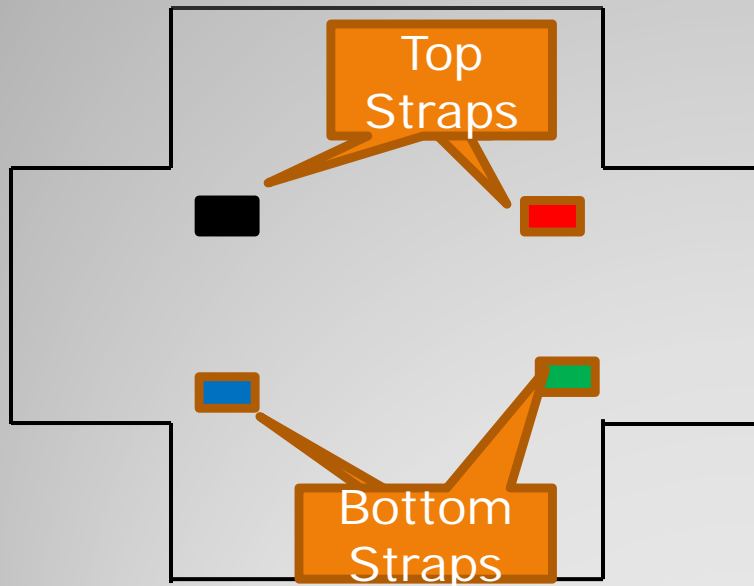


**Reference Bars are not in contact with wire panels & approx. 3 feet apart**

- Each C- clamp designated for top and bottom strap can attach to each strap as shown in this diagram.
- Black
  - Top Strap
- Red
  - Top Strap
- Blue
  - Bottom Strap
- Green
  - Bottom Strap

# RECO & SINE Wall Installation

## Wiring Diagram



- Each C-clamp attaches to a separate strap as shown in this diagram.
- Black
  - Top Strap
- Red
  - Top Strap
- Blue
  - Bottom Strap
- Green
  - Bottom Strap



# RECO & SINE Wall Installation



- Any damage to the galvanizing shall be repaired with two coats of an organic zinc rich paint on the approved list.
- Both the Contractor and Project Inspector shall assure that the zinc dust is agitated prior to application. No partial kits are permitted.
- The Materials and Tests Unit maintains a list of approved paint suppliers:
- <https://connect.ncdot.gov/resources/Materials/MaterialsResources/Approved%20Paint%20Suppliers.pdf>



# VISTA Wall Installation



# VISTA Wall Installation



- Utilizes welded wire grids that attach to the panels with a pin and are backfilled with various stone sizes and or screened backfill.
- For the use of screened backfill there are additional sampling and testing requirements.
- <https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Procedures.pdf>



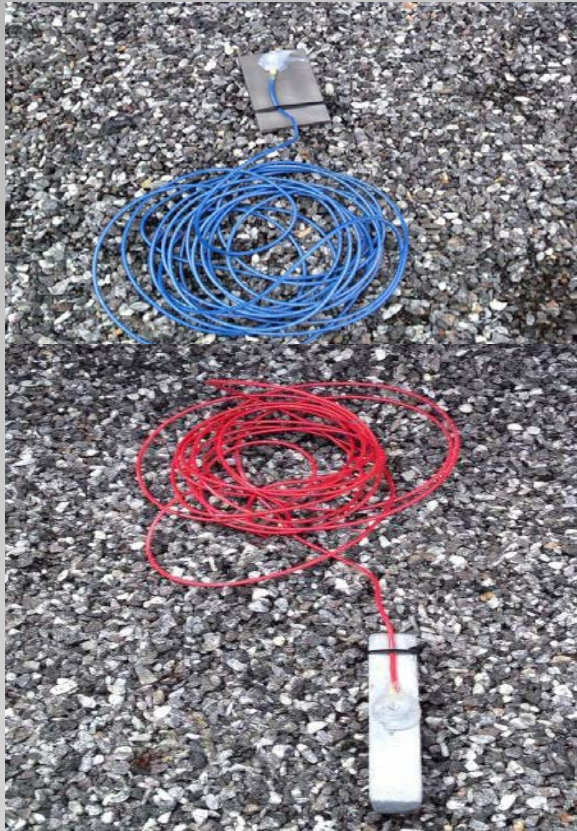
# VISTA Wall Installation



- Prior to installing the corrosion monitoring kit the Project Inspector will need to provide:
  - Type and size of backfill
  - Length, width & thickness of wire cage in which the corrosion monitoring kit is attached.
- This information is crucial to calculating the corrosion formula will need to be given to the M&T representative when performing the box installation.



# VISTA Wall Installation



- The zinc and steel should be approximately 3-6 feet apart, 6 feet from the inside face of the wall and not touching the straps or other steel components.
- Both reference bar lay directly on the aggregate or screened backfill.

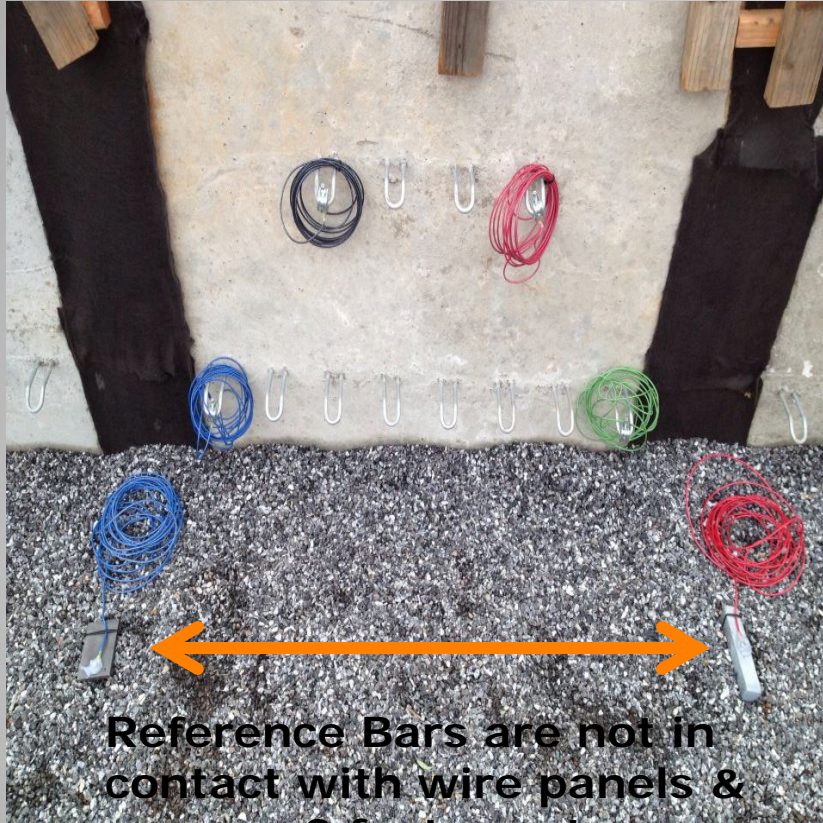
# VISTA Wall Installation



C-clamp  
covered in  
duct seal

- The wire connector is slid on the strap and tightened down.
- Once tightened the C-clamp is completely covered in duct seal.
- Consolidate wires with electrical tape before feeding through panel hole.
- Any wire with damaged insulation shall have five wraps of electrical tape on and around damaged area.

# VISTA Wall Installation



- Each C- clamp designated for top and bottom strap can attach to the same grid as shown in this diagram.
- Black
  - Top Strap
- Red
  - Top Strap
- Blue
  - Bottom Strap
- Green
  - Bottom Strap





# VISTA Wall Installation



- Any damage to the galvanizing shall be repaired with two coats of an organic zinc rich paint on the approved list.
- Both the Contractor and Project Inspector shall assure that the zinc dust is agitated prior to application. No partial kits are permitted.
- The Materials and Tests Unit maintains a list of approved paint suppliers:
- <https://connect.ncdot.gov/resources/Materials/MaterialsResources/Approved%20Paint%20Suppliers.pdf>

- State Field Operations Manager
  - Todd Whittington, PE
  - (919) 329-4220
  - [twhittington@ncdot.gov](mailto:twhittington@ncdot.gov)
- Metals Engineer
  - Randy Porter
  - (919) 329-4202
  - [srporter@ncdot.gov](mailto:srporter@ncdot.gov)
- Manufactured Products Engineer
  - Cabell Garbee, II, PE
  - (919) 329-4224
  - [cgarbee@ncdot.gov](mailto:cgarbee@ncdot.gov)
- Coatings and Corrosion Engineer
  - Aaron Dacey
  - (919) 329-4102 Office
  - [ahdacey@ncdot.gov](mailto:ahdacey@ncdot.gov)

## M&T Contact Information For MSE Wall Installation