

SPECIAL PROVISIONS MODIFYING

SECTIONS:

303 BASE COURSE

403 OPEN GRADED FRICTION COURSE (NON-QLA)

412 HOT IN-PLACE RECYCLING OF ASPHALT PAVEMENT

413 SINGLE-MACHINE HOT IN-PLACE SURFACE REPAVING

415 PAVEMENT SURFACE RESTORATION

416 MINOR PAVING

417 MISCELLANEOUS PAVING

451 PORTLAND CEMENT CONCRETE PAVEMENT

517 PRECAST CONCRETE STRUCTURES

518 PRE-STRESSED CONCRETE MEMBERS

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

303.5.1 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

403.5.2 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

412.5.1 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

413.5.1 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

415.5.2 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

416.5.1 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

417.5.1 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

451.5.2 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

517.5.1 Work Included in Payment

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

518.5.1 Work Included in Payment

Add the following:

The development of the Contractor Quality Control Plan shall be included in the payment and is considered incidental to the completion of this Bid Item. All references to 901.2 "Contractor Quality Control" is for reference only and no separate measurement will be made.

SPECIAL PROVISIONS MODIFYING

SECTIONS:

203 EXCAVATION, BORROW, AND EMBANKMENT

405 DETOUR PAVEMENTS

408 PRIME COAT

605 DRAINS

608 SIDEWALKS, DRIVE PADS AND CONCRETE MEDIAN PAVEMENT

609 CURB AND GUTTER

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete reference to **304 Base Course** and replace with **303 Base Course** for the following subsections:

203.3.3 Rock Cuts

405.3.1 General

408.3.3 Preparation of Surface

605.2.3 Granular Materials

608.2.3 Bed Course Material

609.2.3 Bed Course Material

609.3.1 Foundation

SPECIAL PROVISIONS MODIFYING SECTION 201 CLEARING AND GRUBBING

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 201: CLEARING AND GRUBBING** in its entirety and replace with the following:

201.1 DESCRIPTION

This Work consists of clearing, grubbing, scalping, removing, and disposing of vegetation and debris. This Work includes protecting vegetation designated to remain and removal or control of all State-listed noxious weed species identified in the Contract. Scalping includes the removal of material such as brush, roots, sod, stumps, and the residue of agricultural crops.

201.2 MATERIALS

201.3 CONSTRUCTION REQUIREMENTS

201.3.1 General

The Department will establish Right of Way lines, construction limits, and designate trees, shrubs, plants, and other items to remain. The Contractor shall comply with Section 620, "Selective/Non-Selective Herbicide Application" for herbicide application.

The Contractor shall remove and dispose of all refuse and non-organic material from within the Project limits. Surface debris, trees, stumps, roots, organic matter, and other obstructions that can be chipped or broken down to an appropriate size and readily blended into the topsoil during final stabilization may remain within the Project limits. When approved by the Project Manager, the Contractor may leave undisturbed stumps and other solid objects within the Roadway Prism that do not extend more than six (6) inches above existing ground and will be at least four (4) ft below the finished Subgrade elevation. The Contractor shall backfill and compact material placed in stump holes and other holes in accordance with Section 203.3.5, "Embankments."

The Contractor shall prune low-hanging branches from trees or shrubs designated to remain and prune overhanging tree branches to provide a clearance 20 ft above the Roadway surface. Pruning of trees and shrubs shall be performed in accordance with American National Standards Institute (ANSI) A300 Standard Part 1 Pruning.

The Contractor shall confine operations including dragging, piling, and burning of debris to Department approved areas.

The Contractor shall remove or control all State-listed Class A noxious weed species within the Right of

Way Project limits as identified in the Contract in a manner that prevents their re-growth and spread. Herbicide use shall comply with all applicable Federal, State, County and Municipal regulations and ordinances." The Contractor shall comply with Section 620, "Selective/Non-Selective Herbicide Application" of the current New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction for herbicide application.

The current New Mexico Noxious Weed List is available at:
<http://plants.usda.gov/java/noxious?rptType=State&statefips=35> .

201.3.2 Salvageable Timber

The Contractor shall fell and cut timber (to the specified length) in accordance with the Contract. The Contractor shall stack cut logs as directed by the Project Manager.

201.3.3 Scalping

The Contractor shall scalp before excavation or placement of Embankment and remove organic material under pipe Culvert bedding, regardless of Embankment height.

201.3.4 Removal and Disposal of Material

The Contractor shall remove from the Right of Way, Materials that cannot be safely and properly disposed (burned or chipped) of within the Project, and dispose at locations outside the Project.

The Contractor shall obtain written permission from the owners of property used for debris material disposal.

The Contractor shall burn Materials:

1. In accordance with applicable laws and regulations;
2. Under the constant care of competent watchmen; and
3. Without damage to items designated to remain on the Right of Way, surrounding property, or vegetative cover.

The Roadway and adjacent areas shall have a neat and finished appearance after any removal and disposal of material. The Contractor shall not accumulate flammable Materials on or adjacent to the Right of Way.

201.4 METHOD OF MEASUREMENT

Clearing and grubbing will be measured as a Lump sum unit.

201.5 BASIS OF PAYMENT

Pay Item

Clearing and Grubbing

Pay Unit

Lump Sum

201.5.1 Work Included in Payment

The Department will consider the following Work as included in the payment for Clearing and Grubbing and no separate payment will be made:

1. Obtaining disposal locations and in making the disposal;
2. When clearing and grubbing is not established as a pay item;
3. Herbicide applied for noxious weed control; and
4. Delivery to storage site if required of salvageable timber.

Selective / Non-Selective Herbicide Application will be paid only if the Plans list this item in the Estimated Quantities table.

**SPECIAL PROVISIONS
MODIFYING
SECTION 203: EXCAVATION, BORROW, AND EMBANKMENT**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 203: EXCAVATION, BORROW, AND EMBANKMENT** in its entirety and replace with the following:

203.1 DESCRIPTION

This Work consists of performing excavation in soil and rock Material, providing borrow Material, constructing Embankment, hauling, disposing, placing, and compacting Materials.

203.2 MATERIALS

The Department will provide geotechnical investigation and pavement investigation results (when available) in the Contract documents. The Contractor shall use the results for information only.

203.2.1 Material Classifications

203.2.1.1 Rock Excavation

Rock excavation is material that meets one (1) of the following field test criteria:

1. **Ripping Test.** Material that cannot be broken down with two passes parallel to construction centerline with a single tooth ripper mounted on a crawler-type tractor in low gear with a minimum net flywheel power rating of 312 hp;
2. **Seismic Test.** Material that has a seismic velocity greater than 6,000 ft/s. The Contractor shall submit the qualifications of the individual performing and interpreting the seismic testing to Project Manager for approval a minimum of 14 Days prior to testing. Perform the Ripping Test to resolve differences in material classification if seismic velocities fall below 6,000 ft/s;
3. **Handling Test.** Boulders or detached stones having a volume greater than one (1) yd³ that cannot be readily broken down with excavation Equipment.

203.2.1.2 Unclassified Excavation

Unclassified excavation shall consist of the excavation of all Materials other than rock excavation obtained within the right of way. Suitable Material obtained from unclassified excavation shall be used for areas that require Embankment.

203.2.1.3 Borrow

Borrow shall consist of Contractor provided suitable Embankment Materials obtained from an approved source outside the Right of Way, unless otherwise specified in the Contract. The Contractor shall only

utilize borrow when the following conditions are met, unless approved otherwise by the Project Manager.

1. All unclassified excavation material has be utilized in the contractor's current phase of construction;
2. The contractor has requested to begin Borrow operations and the Project Manager has concurred; and
3. Embankment areas that require borrow have been bladed and cross sectioned by the Contractor and provided to the Project Manager.

Borrow Material placed within two (2) Ft, vertically and laterally, of final Subgrade elevations shall meet the design R-Value as shown in the Contract. Prior to borrow operations the Contractor shall perform R-value testing in accordance with AASHTO T-190 at the best fit exudation pressure of 300 psi at each borrow source. This information shall be submitted to the Project Manager with the request to begin borrow operations. During borrow placement, if the Project Manager observes changes in soil properties, including gradation, plasticity limits, and/or additional soil characteristics, then, at the Project Manager's request, additional AASHTO T-190 tests may be required, at the Contractors expense.

When work conforming to Section 306 "Portland Cement or Lime Treated Subgrade" is specified in the Contract, the Contractor shall perform sulfate testing in accordance with AASHTO T290 at each borrow source. Sulfate content shall be determined and reported as parts per million (ppm). Soils with sulfate contents equal to or greater than 2,000 ppm shall not be used as borrow.

203.2.1.4 Unstable Subgrade Stabilization

See Section 203A, "Unstable Subgrade Stabilization", when specified in the Contract.

203.2.1.5 Unsuitable Embankment Material

Unsuitable Material includes organic Materials, frozen lumps, ice, and soils such as peat, shale, gypsum or other Materials that may degrade with time, or are contaminated. Suitable Material that is unstable may be reworked to create a stable platform as directed by the Project Manager.

Material below embankment and areas identified by the Project Manager and determined to be unsuitable shall be excavated and disposed of in accordance with Section 107, "Legal Relations, Environmental Requirements, and Responsibility to the Public" unless otherwise specified in the Contract.

When unsuitable Material is removed and disposed of, the resulting void shall be filled with Material suitable for its planned use as directed by the Project Manager. Such suitable Material shall be placed and compacted in accordance with this specification.

203.3 CONSTRUCTION REQUIREMENTS

203.3.1 General

The Contractor shall finish excavation and Embankment for the Roadway, intersections, and entrances to reasonably smooth and uniform surfaces. The Contractor shall not remove Materials from the Project limits without the approval of the Project Manager.

The Contractor shall ensure Borrow Material placed within the top two (2) Ft of the finished Subgrade

meets the minimum design R-value.

The Contractor shall preserve the Materials below and beyond the lines and grades while conducting excavation operations. Before beginning excavation, grading, and Embankment operations, the Contractor shall perform the necessary clearing and grubbing in accordance with Section 201, "Clearing and Grubbing." The Contractor shall notify the Project Manager before opening excavation or borrow areas. The Contractor shall take cross section elevations of the ground surface before opening excavation or borrow areas.

The Contractor shall terminate operations in the immediate area of environmental or Cultural Resources not listed in the Contract, until the Department reviews and completes appropriate mitigation actions in accordance with Section 107.12, "Environmental, Hazardous Materials and Cultural Resource Discoveries."

203.3.2 Excavation

Within cut sections, the Contractor shall remove excavated Material from the limits of the cut section to the Subgrade elevation for the width of the Roadbed. The Contractor shall finish Roadbed cut sections to a smooth and uniform surface. The Contractor shall remove unsuitable Material below finished Subgrade in accordance with 203.2.1.5, "Unsuitable Material." The Contractor shall take cross-sectional measurements after the removal of unsuitable Material.

203.3.3 Rock Cuts

The Contractor shall perform proper drilling and blasting operations in accordance with the specified practices. When required, the Contractor shall perform controlled blasting of rock excavation to produce a clean face on the excavated cut. The Contractor shall ensure subsequent blasting and excavation operations do not affect previously excavated faces. The Contractor shall not excavate more than six (6) inches below the specified Subgrade elevation for Roadbed cuts in rock, unless directed otherwise. The Contractor shall not leave undrained pockets on the Roadbed surface. The Contractor shall place and compact Base Course on the rock cut foundation in accordance with Section 303, "Base Course."

203.3.3.1 Blasting Requirements

The Contractor shall use controlled blasting to establish a specified backslope with minimal blast damage, and production blasting to facilitate excavation. Before the start of blasting, the Contractor shall notify adjacent property owners, occupants and utility owners.

203.3.3.1.1 Definitions

Blasting Operations. Activities related to blasting including, but not limited to the following:

1. Collaring and drilling blast holes;
2. Preparing, fixing, loading, and firing explosive charges;
3. Assessing the blast after detonation; and
4. Handling misfires.

Buffer Row. The first row of production blast holes immediately adjacent and drilled in a plane

parallel to the controlled blast line. The explosive load in the buffer row should be reduced from standard production loads to minimize damage to the backslope of the final excavation.

Controlled Blasting. The controlled use of explosives and blasting accessories in carefully spaced and aligned blast holes to provide a free surface or shear plane in the rock along the specified backslope, and to limit fly rock, permanent ground displacement, air concussion, and overbreak. Controlled blasting methods include pre-splitting and cushion blasting.

Cushion Blasting (Trim Blasting). The simultaneous detonation of one (1) line of blast holes along a specified excavation backslope after the main excavation is complete. This method is performed to trim the excavation to the final backslope.

Final Line (Controlled Blast Line). Refers to the row of controlled blast holes drilled in the plane of a specified excavation backslope. The controlled blast holes drilled in this plane constitute the basis for payment under the Controlled Blasting pay item. The Department considers the blast holes drilled in front of the final line blast holes to be production blast holes, which are Incidental to the Rock Excavation pay item.

Pre-Splitting. The simultaneous detonation of one (1) line of blast holes drilled along a specified excavation backslope before production blast holes are fired.

Production Blasting. Fragmentation blasting in the main excavation area.

203.3.3.1.2 Submittals

203.3.3.1.2.1 Blaster in Charge

The Contractor shall not begin drilling or blasting Work until the Project Manager approves of the Blaster in Charge. The Contractor shall submit the name and qualifications of the proposed Blaster in Charge to the Project Manager for approval at least 30 Days before the delivery of explosive Material to the Project. The Contractor shall provide the following information:

1. Proof of a license by the applicable State and/or local regulatory agencies to possess, transport, and use explosives; and
2. A list of, and references, for at least three (3) blasting Projects, of similar complexity, successfully completed within the previous five (5) years.

The Blaster in Charge must be on site during blasting operations.

203.3.3.1.2.2 Blasting Plans

The Contractor shall submit a General Blasting Plan to the Project Manager for each cut that requires blasting, at least two (2) weeks before the start of drilling and blasting operations on a specified cut. The Contractor shall provide the following information in the General Blasting Plan:

1. Description of the proposed blasting operation;
2. Preliminary design criteria for production and controlled blasting, including blast hole depths and patterns; and

3. Details regarding the proposed explosives and blasting accessories;

The Contractor shall submit a Detailed Blasting Plan at least 48 H before an individual blast. The Contractor shall provide the following information in the Detailed Blasting Plan:

1. Station limits of the proposed location of the blast, including the bench elevation, if applicable;
2. Date and time the blasting will occur;
3. Required removal of overburden, if applicable;
4. Plan and cross section diagrams of proposed drill pattern for controlled and production blast holes, including buffer rows, free face, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height, and subdrill depth. Draw these Plans and cross sections to scale;
5. Loading diagram showing the type and amount of explosives, primers, and initiators; and the location, depth, and type of stemming;
6. Initiation sequence of controlled and production blast holes, including delay times and the delay system; and
7. Manufacturer's data sheets for the explosives, primers, and initiators to be used.

The Contractor shall submit the blasting Plans to the Project Manager for review and acceptance. The Project Manager will review and provide comments to the Contractor. The Contractor shall submit revisions to the blasting Plans for final review and acceptance. The Contractor shall not proceed with drilling and blasting operations related to a General Blasting Plan or loading of blast holes associated with a Detailed Blasting Plan without written notice.

The Contractor shall cease blasting operations and submit revised blasting Plans if the Department determines that the blasting operations under the employed methods are causing property damage in and beyond the Right of Way.

203.3.3.1.2.3 Blasting Records

The Contractor shall prepare and submit to the Department a Blasting Record for each blast, on the Day of the blast. The Contractor shall provide the following information in a Blasting Record:

1. Actual dimensions of the shot, including blast hole diameters and depths, burden, spacing, subdrilling depths, stemming, powder loads, powder factors, and timing;
2. A drawing or sketch showing the direction of the face and the physical shot layout;
3. The location of the blast in relation to Project stationing and elevation;
4. The date and time of loading and detonation;
5. The name and signature of the person responsible for loading and firing;
6. Comments by Blaster in Charge regarding misfires, fly rock occurrences, unusual results or effects; and damage to existing facilities, adjacent property, or completed Work;
7. Vibration and blast monitoring results; and
8. Any complaints received due to the blasting.

203.3.3.1.3 Explosives

The Contractor shall transport, store, handle, and use explosives in accordance with applicable federal, State, and local laws and regulations. The Contractor shall purchase explosives and accessory devices from industry recognized Suppliers and manufactures. The Contractor shall use explosives and accessory devices in accordance with manufacturer instructions. The Contractor shall not use expired products.

The CFR specifies responsibility for the following federal agencies regarding the administration of regulations involving explosive Materials:

1. Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF). Storage and accountability of record keeping and security in accordance with 27 CFR part 555;
2. OSHA. Transportation, worker safety, and health in accordance with title 29 CFR; storage and safe blasting practices in handling and use in accordance with 29 CFR part 1926.900 et seq; and
3. Federal Department of Transportation (USDOT). Transportation and public safety, 49 CFR.

The fire marshal, sheriff, or other local officials, may have additional regulations for explosive Materials.

203.3.3.1.4 Safety

The Contractor shall follow safe practices, including the following:

1. Federal, State, and local regulations pertaining to the transportation, storage, and use of explosives must be strictly followed;
2. When required, the Blaster in Charge must obtain a blasting permit from the local regulatory agency before blasting;
3. Only persons authorized and qualified based on training and experience will handle and use explosives;
4. No person will smoke; carry matches or other flame producing devices; or carry firearms or loaded cartridges while in or near a motor vehicle that is transporting explosives;
5. Keep track of explosives at all times. Explosives must be stored and locked in an approved magazine facility in accordance with the applicable provisions of the Department, ATF, and OSHA until used in blasting;
6. Post appropriate signs in the required areas and vehicles in accordance with federal regulations;
7. Safely station the necessary guards or flag persons on Highways during blasting to control Highway traffic; and
8. Before starting Work in the cut, observe the entire blast area for at least five (5) minutes after each blast. Remove potentially dangerous rocks or other Material located beyond the excavation limits. Cease blasting operations if the required slopes are not stable, or if the safety and convenience of the public are being jeopardized.

203.3.3.1.5 Vibration Risk Survey

For each cut that requires blasting, the Contractor shall perform a vibration risk survey of nearby buildings, Structures, utilities, water supplies, or environmentally sensitive areas that may be at risk of blasting or construction damage. The Contractor shall perform the vibration risk survey in accordance with Section 617, "Vibration Monitoring and Video Taping." The Contractor shall obtain written approval for the vibration risk survey from the Project Manager before drilling blast holes.

203.3.3.1.6 Blasting Test Sections

The Contractor shall demonstrate the adequacy of proposed Blasting Plan with a blasting test section(s) for Material of different geologic characteristics. For Projects involving multiple cuts in similar geologic Materials, the Project Manager may reduce the requirement for a blasting test section in each cut. Blasting test sections include drilling, blasting, and excavating cut sections approximately 100 Ft long to determine the optimal combination of method, blast hole spacing, and charge. When field conditions warrant, the Project Manager may direct the Contractor to use test section lengths less than 100 Ft long.

Blasting test section requirements include the following:

1. The Contractor shall perform the blasting test section in accordance with Section 203.3.3.1, "Blasting Requirements." The Contractor shall prepare and submit a Detailed Blasting Plan for the test section to the Project Manager at least 48 H before the planned time of the blast. The Contractor shall not start blasting the test section until the Project Manager accepts the Detailed Blasting Plan;
2. Unless the Contractor's Detailed Blasting Plan indicates otherwise, the Contractor shall begin the tests with the controlled blast holes spaced at 30 inches; and
3. After blasting, the Contractor shall remove a sufficient amount of material from the test section to determine if the blast hole diameter, blast hole spacing, and amount of explosives are adequate to provide the required backslope. The Contractor shall not continue drilling of the test section area until the test section is excavated and the Department evaluates the results.

If, at any time during the progress of the main blasting operation, the methods of drilling and blasting do not produce the desired results, the Contractor shall revise and retest the blasting techniques until a technique produces the required results. The Department will consider the results to be unsatisfactory if:

1. There is an excessive amount of breakage beyond the indicated lines and grade;
2. There is excessive flyrock;
3. The final backslope within the specified tolerances is not uniform or overhangs are created;
4. Ground vibration and air blast levels exceed limits as stated in Section 617, "Vibration Monitoring and Video Taping;"
5. There are violations of other requirements of the Specifications;
6. The slopes are unstable;
7. The safety of the public is jeopardized; and
8. Property or natural features are endangered.

203.3.3.1.7 Blasting Execution

203.3.3.1.7.1 Notification and Schedule

The following requirements will apply to the notification and scheduling of blasting procedures:

1. The Contractor shall coordinate blasting operations with the Project Manager and notify the Project Manager a minimum of 1.5 H before the blast. The Contractor shall provide a one (1) hour timeframe for the blast. For example, if the Contractor notifies the Project Manager by 9:00 a.m. the blast may occur between 10:30 a.m. and 11:30 a.m.;
2. The Contractor shall provide notice to the required federal, State, and local agencies before each blast, as required by the blasting permits;
3. The Contractor shall notify occupants of buildings and owners of Structures and utilities of the blast time and location at least 48 H before the start of drilling or blasting; and
4. The Contractor shall detonate blasts at the planned time, unless approved otherwise by the Project Manager.

203.3.3.1.7.2 General Requirements

The Contractor shall cover the blast area with blasting mats, soil, or another equally serviceable material, before firing blasts in areas where flying rock may result in personal injury or damage to property or the Work.

203.3.3.1.7.3 Controlled Blasting Requirements

The Contractor shall perform controlled blasting in accordance with the Detailed Blasting Plans that produced acceptable results in blasting test sections. The Contractor shall perform control blasting using either pre-splitting or cushion blasting in accordance with the following requirements:

1. If the overburden does not support the drill holes, completely remove the overburden soil and loose rock along the top of the cut to expose the rock surface before drilling the controlled blast holes;
2. Mechanically monitor the blast hole angles;
3. Drill and space blast holes with a nominal diameter from two (2) inch to three (3) inch, in accordance with the blasting test sections or the results achieved in similar geologic Materials. Do not exceed three (3) Ft;
4. Use proper Equipment and technique to ensure that no blast holes deviate from the plane of the backslope shown in the Plans by more than eight (8) inches, parallel or normal to the slope. The Department will not pay for blast holes exceeding these limits unless the Project Manager approves the obtained slopes;
5. Drill the controlled blast holes at the required slope inclination, to the full depth of the cut, or to a pre-determined stage elevation. The maximum drill depth is 30 Ft. Use shallower holes if the directional control is inadequate. If more than five percent (5%) of the controlled blast holes are misaligned in any one (1) lift, reduce the height of the lifts until the eight (8) inch tolerance is met. The length of controlled blast holes may be incrementally increased once satisfactory directional control and blast results are demonstrated;
6. Drill unloaded and un-stemmed guide holes to the same diameter, in the same plane, and to the same tolerance as the controlled blast holes;

7. The Department will allow a maximum offset of 24 inches from the bottom of each lift to allow for drill Equipment clearances, when the cut requires more than one (1) lift. Begin drilling the control blast hole at a point that allows the necessary offsets, and adjust at the start of lower lifts as necessary to compensate for drift in the upper lifts;
8. Do not use horizontal blast holes for controlled blasting;
9. Use explosive charges, detonating cord, and other items necessary for the blasting operation in accordance with the manufacturer's recommendations and instructions;
10. Before placing charges, ensure the hole is free of obstructions. Use casing if necessary to prevent the walls of the hole from collapsing;
11. Use only standard explosives manufactured especially for the type of controlled blasting (cushion or pre-splitting). Do not load ammonium nitrate and fuel oil in the controlled blast holes. Use explosives and blasting accessories appropriate for the conditions of the blast hole (including water in the holes) and necessary to achieve satisfactory results;
12. Assemble and affix continuous column cartridge-type explosives to the detonating cord in accordance with the explosive manufacturer's instructions;
13. The bottom charge in a blast hole may be larger than the charges above, but not large enough to cause overbreak. Place the top charge far enough below the collar and sufficiently reduced in size to avoid overbreaking or heaving; and
14. Use a dry, angular, and granular Material that passes a 3/8 inch sieve to stem the controlled blast holes, from the top charge to the hole collar.

203.3.3.1.7.4 Pre-Split Blasting

The Contractor shall perform pre-split blasting in accordance with Section 203.3.3.1.7.3, "Controlled Blasting Requirements," and the following requirements:

1. Detonate the pre-split blast holes before drilling for production blasting; or fire the pre-split blast holes at least 75 Ms before the production holes if detonated in the same blast;
2. Fire pre-split blast holes simultaneously, unless ground vibrations, noise, or air blast are excessive. Fire pre-split holes in delayed sections and reduce the charge weight per delay to mitigate excessive effects;
3. The line of pre-split blast holes will extend beyond the limits of the production blast holes to be detonated. The minimum length of this extension will be 30 Ft or to the end of the cut, but will not be greater than one-half of the distance of the expected blast advance; and
4. Do not perform pre-split blasting if the distance between the controlled blast line and free face is less than 20 Ft or less than three (3) times the blast hole depth, whichever is greater.

203.3.3.1.7.5 Cushion Blasting

The Contractor shall perform cushion blasting in accordance with item No. 3 of Section 203.3.3.1.7.3, "Controlled Blasting Requirements," and the following requirements:

1. Perform cushion blasting as part of the final shot after other blasting is finished;
2. If the final shot includes production blast holes, detonate the cushion blast no more than 75 Ms or less than 25 Ms after the production blast; and
3. Fire cushion blast holes simultaneously, unless ground vibrations, noise, or air blast are excessive.

Fire cushion blast holes in delayed sections and reduce the charge weight per delay to mitigate excessive effects.

203.3.3.1.7.6 Production Blasting

The Contractor shall perform production blasting in accordance with the Blasting Plan that produced acceptable results in blasting test sections and the following requirements:

1. Minimize blast damage to the final excavation backslope;
2. Drill buffer rows of production blast holes on a plane approximately parallel to the controlled blast line;
3. Place the buffer row of production blast holes no closer than 6 Ft to the controlled blast line unless the Contractor can prove the final excavation backslope will not be damaged by the production blast;
4. Where necessary to minimize damage to the excavation backslope, load blast holes in the buffer row lighter than other production holes;
5. Ensure the bottoms of production blast holes are not lower than the bottom of controlled blast holes, except in the lowest lift;
6. Ensure the diameter of production blast holes does not exceed six (6) inches, unless approved by the Project Manager;
7. Before placing charges, ensure the hole is free of obstructions. Use casing, if necessary, to prevent the walls of the hole from collapsing;
8. Use a dry, angular, and granular Material that passes a 3/8 inch sieve to stem the holes, from the top charge to the hole collar;
9. Detonate production blast holes in a controlled delay sequence toward a free face;
10. Do not use horizontal holes for production blasting, except for Equipment access; and
11. Use explosives and blasting accessories appropriate for wet or dry blast hole conditions as necessary to achieve satisfactory results.

203.3.3.1.7.7 Scaling and Stabilization of Slopes Established by Controlled Blasting

The Contractor shall perform scaling and stabilization of slopes established by controlled blasting in accordance with the following requirements:

1. Observe the entire blast area following a blast before starting Work in the cut. If any rocks are loose, hanging, or potentially dangerous within a blast area, the Contractor shall remove them. Scale slopes by hand using a standard steel mine scaling rod. Use other methods to supplement or in lieu of hand scaling, such as, machine scaling, hydraulic splitters, or light blasting, if approved by the Project Manager;
2. Slopes shall be scaled and stabilized before further construction activities take place. Scale slopes throughout the span of the Contract and as often as necessary to keep the slopes free of hazardous loose rock or overhangs; and
3. Cease blasting operations if the following conditions exist:
 - 3.1. There is an excessive amount of breakage beyond the specified lines and grade;
 - 3.2. There is excessive flyrock;
 - 3.3. The final backslope within the specified tolerances is not uniform;

- 3.4. Ground vibration and air blast levels exceed limits specified in Section 617, "Vibration Monitoring and Video Taping;"
- 3.5. There are violations of other requirements of the Specifications;
- 3.6. The slopes are unstable;
- 3.7. The safety of the public is jeopardized; and
- 3.8. Property or natural features are endangered.

203.3.4 Borrow

The Contractor shall be responsible for obtaining the borrow source, unless otherwise specified in the Contract. The Contractor shall exhaust all available suitable Material from unclassified excavation operations prior to utilizing a borrow source. The Contractor shall notify the Project Manager, in writing, when there is no longer unclassified excavation Material for Embankment and request that borrow operations commence. Borrow placed prior to this notification shall not be paid. If the Contractor places more than the specified amount of borrow and causes a waste of unclassified excavation, the Department will deduct the wasted amount from the borrow volume, as measured in the borrow area. After unclassified excavation is complete, the Contractor shall blade the areas that require borrow to allow accurate payment measurements by cross sectioning by the Contractor. The Contractor shall maintain and restore Right of Way fencing removed for borrow operations to its original condition or better to prevent livestock from entering Right of Way at all times during the project.

203.3.5 Embankments

The Contractor shall not place Embankment Material on frozen earth, or incorporate frozen soils in Embankments. The Contractor shall suspend Embankment construction if Embankment Materials become frozen. The Contractor shall not resume until the Materials are thawed and suitable for compaction. Before beginning Embankment construction, the Contractor shall perform scalping in accordance with Section 201, "Clearing and Grubbing." The Contractor shall bench new Embankments into the following:

1. Natural slopes including rock;
2. Existing Embankments; or
3. Phased Embankment construction.

The Contractor shall ensure benches are wide enough to allow operation and placement of compacting Equipment. The Contractor shall recompact new Embankment Material and Material that is cut out at no additional cost to the Department. The Contractor shall not place rock, broken concrete, or other solid Materials in Embankment areas where driven pilings, drilled shafts, utility lines, or other Structures are specified in the Plans.

203.3.5.1 Roadbed Embankments

The Contractor shall break up the original ground surface to at least six (6) inches by plowing, scarifying, or stepping up. The Contractor shall compact this area in accordance with Section 203.3.6, "Moisture and Density Control." The Contractor shall place Material for Roadbed Embankment in uniform lifts not exceeding eight (8) inches thick and compact in accordance with Section 203.3.6, "Moisture and Density Control."

The Department will allow rocks no larger than three (3) Ft (in any dimension) as long as the Contractor distributes and fills the interstices to form a dense mass. If the interstices between the rock fragments cannot be completely filled and compacted, the Contractor shall use bridging geotextile, approved by the Project Manager, over the top of the rock fragments to prevent the overlying Embankment Material from filling the interstices. The Contractor shall not use rock fragments that may degrade with time or may be water sensitive (such as shale or gypsum) as rock fill in Roadbed Embankments.

The Contractor may place larger rocks greater than three (3) Ft in any dimension in the toe of the slope in accordance with the following requirements:

1. No rock is larger than one-half the Embankment height or ten (10) Ft;
2. No rock is placed in fill height less than eight (8) Ft, measured at the edge of the Roadway Shoulder; and
3. Place rocks inside a line six (6) inches from the slope stake, space a minimum of three (3) Ft from edge to edge, and cover with approved Embankment Material.

The Contractor shall construct rock Embankments to a maximum of six (6) inches below Subgrade elevation. The Contractor shall consolidate rock fills by using the appropriate Equipment and methods approved by the Project Manager.

203.3.5.2 Non-Roadbed Embankment

The Contractor shall break up the original ground surface to at least six (6) inches by plowing, scarifying, or stepping up. The Contractor shall compact this area in accordance with Section 203.3.6, "Moisture and Density Control." The Contractor shall place Material for Non-Roadbed Embankment in uniform lifts not exceeding eight (8) inches thick and compact in accordance with Section 203.3.6, "Moisture and Density Control."

If the Embankment Material consists of rock, place the rock in layers of sufficient depth to contain the largest rock in the Material, and carefully distribute and fill the interstices to form a dense mass.

203.3.6 Moisture and Density Control

Maximum dry density of all soil types encountered or used will be determined in accordance with AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified) and AASHTO T 224.

The Contractor shall construct Roadbed, Roadbed Embankment, non-roadbed Embankment, and Roadway Median excavation or Embankment, with moisture and density control. The Contractor shall compact each layer of Embankment to at least 95% of maximum density as specified above. The Contractor shall ensure that the in-place moisture content of the soil shall not be less than five percent (5%) below optimum moisture content or greater than two percent (2%) above optimum moisture content, at the time of compaction. For soils with a plasticity index of 15 or greater, the Contractor shall ensure the moisture content of the soil at the time of compaction is between optimum moisture to optimum moisture plus four percent (4%). If the moisture content at the time of compaction is not within the specified range, the Contractor shall moisten or dry the Material, then thoroughly mix the Material to the full lift depth before re-compacting. No additional payment shall be made for the reworking of materials that do not fall within the ranges specified above.

Roadbed Embankments that contain mostly rock or coarse-grained Material (65% or greater retained on the No. 4 sieve) do not require moisture and density control, except the top six (6) inches of the Embankment; construct in accordance with Section 207.3, "Construction Requirements." Non-roadbed Embankments of rock Material will not require moisture and density control unless otherwise specified in the Contract.

The Department will perform field densities in accordance with AASHTO T 310 or other Department approved methods. Densities shall be measured at each lift before the next subsequent lift is placed in accordance with Minimum Testing Requirements.

203.4 METHOD OF MEASUREMENT

203.4.1 Rock Excavation

The Department will measure Rock Excavation based on the estimated percentages if shown in the Contract, unless otherwise requested by the Contractor and approved by the Department.

If the Contractor requests, the Department will measure Rock Excavation in its original position for Material classified as Rock Excavation in accordance with Section 203.2.1.1, "Rock Excavation." Before excavation, the Contractor and Project Manager must agree on the limits of Material classified as rock excavation. The Contractor shall calculate volumes in accordance with Section 203.4.3, "Unclassified Excavation and Borrow." The Contractor shall include in measurements the overbreakage in rock excavation a maximum of ten (10) inches beyond the backslope specified in the Plans or as directed by the Project Manager. The Department will use the blaster's drill-hole log cards to determine the quantities of rock excavation covered by soil or overburden. The Contractor shall provide these log cards as part of the surveying records.

The Department will pay for stabilization necessitated by existing geological conditions and for Base Course and geotextile if necessary as required to backfill rock Subgrade conditions.

203.4.2 Controlled Blasting

The Department will measure Controlled Blasting by the blast holes drilled along the final line, whether loaded or not; and will measure the lengths from the top of the rock surface to the elevation of the Roadway ditch or to a bench elevation set by the Project Manager. The Department based the quantities for Controlled Blasting shown in the Plans on assumed blast hole spacing; the actual quantities depend on field conditions and the results from test sections.

203.4.3 Unclassified Excavation and Borrow

For each phase of the Project, identified in the Contract or approved by the Department, the Contractor shall measure the original ground surface of any areas that are designated as unclassified excavation (cut sections) and/or Embankment (fill sections using available unclassified excavation Material), or Borrow (fill sections when all unclassified excavation Material has been exhausted). Prior to any Work continuing in completed excavation areas, the Contractor shall measure the newly excavated ground surface "final surface". For embankment and borrow areas the contractor shall measure the final surface once these operations are completed and accepted by the Project Manager. Prior to commencing Borrow operations the Contractor must ensure that all requirements of 203.2.1.3, "Borrow" have been met. Earthwork

quantities will be calculated as the neat volume from the original ground surface (less the existing roadway surfacing) between the limits shown on the plans, and/or authorized changes by the Project Manager, and the new ground surface. The Department will not apply any shrinkage or swell factor due to payment being made on the final cross sectioned volume.

For the measurements described above the Contractor shall survey and submit the original ground surface and final surface data at completion of each phase of construction using an electronic XML-compatible format approved by the Project Manager. The Contractor shall use a New Mexico licensed Engineer or New Mexico licensed surveyor to stamp and certify cross-sections at 50 Ft. intervals, unless otherwise specified in the Contract or approved by the Project Manager prior to commencement of earthwork operations. The Contractor shall submit certified volume summary reports to the Project Manager based on this electronic data for each phase of construction including a report that summarizes the basis for the final volumes.

203.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Rock Excavation</i>	Cubic Yard
<i>Unclassified Excavation</i>	Cubic Yard
<i>Borrow</i>	Cubic Yard
<i>Unsuitable Material Excavation</i>	Cubic Yard
<i>Controlled Blasting</i>	Linear Foot

203.5.1 Double Handling

The Department will pay for excavated Materials that require more than one (1) handling as identified within the Contract before final placement, including fertile topsoil required to be stockpiled and reserved for later use in the Work:

1. At the Bid Item Unit Price for unclassified excavation, for each handling approved by the Project Manager; or
2. As another item of Work for the second handling if specified in the Contract.

However, if the Contractor handles excavated and borrow Materials more than once, at the Contractor's request or at the convenience of the Contractor, there will be no additional cost to the Department. If the Contractor chooses to stockpile excess unclassified excavation Material to be used as borrow in a later phase, the Department will not pay for this Material as double handling. Double handling shall not be paid for Material that is excavated and placed in the same phase of the Project.

203.5.2 Work Included in Payment

The Department will consider the item(s) listed in this section as included in the pay items(s) listed 203.5, "Basis of Payment" and will not measure or pay for them separately:

1. Controlled blasting drill holes through overburden;
2. Production blasting;

3. Scaling within the limits of a final backslope established by controlled blasting;
4. Damage resulting from blasting;
5. Mobilization of any Equipment and testing of rock in accordance with Section 203.2.1.1, "Rock Excavation;"
6. Time Delays to perform testing of rock in accordance with Section 203.2.1.1, "Rock Excavation;"
7. Material required to fill the voids and irregularities in Embankment areas below the tolerance limit from the specified elevation;
8. Bridging geotextiles required to prevent overlying Embankment Material from migrating into the interstices between rock fragments;
9. Fence removal and replacement;
10. AASHTO T-190 Resistance R-Value and Expansion Pressure of Compacted Soils, including sampling, laboratory testing and reporting;
11. AASHTO T-290 Water-Soluble Sulfate Ion Content in Soil, including sampling, laboratory testing, and reporting;
12. Survey, calculations, and engineering;
13. Hauling and/or disposal related to Rock Excavation, Unclassified Excavation, Borrow, and Unsuitable Material Excavation; and
14. Suitable backfill Material for Unsuitable Material Excavation.

The Contractor shall dispose of Material in accordance with Section 107, "Legal Relations, Environmental Requirements, and Responsibility to the Public" unless otherwise specified in the Contract. The Contractor shall not dispose of Material within the project limits without written approval from the Project Manager.

**SPECIAL PROVISIONS
MODIFYING
SECTION 206: EXCAVATION AND BACKFILL FOR CULVERTS AND MINOR
STRUCTURES**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 206: EXCAVATION AND BACKFILL FOR CULVERTS AND MINOR STRUCTURES** in its entirety and replace with the following:

206.1 DESCRIPTION

This Work consists of excavating, placing and compacting select backfill, bedding, and flowable fill materials, and disposing of material related to construction of Minor Structures. Excavation includes dewatering, pumping, bailing, draining, sheeting, bracing, and Incidentals required for proper execution of the Work.

Ditches required at Culvert inlets and outlets, and other locations indicated in the Plans are included under the item for Unclassified Excavation.

206.2 MATERIALS

206.2.1 Select Backfill

The Contractor shall furnish a suitable, well-graded, compactible material free of Recycled Asphalt Pavement (RAP), organic matter, clay balls, lumps, rock fragments that may degrade with time such as shale or gypsum and other deleterious materials. Select backfill material shall conform to the following and be placed in accordance with the Contract:

- a) For structures and pipes other than plastic pipe:
 - 1) Maximum particle size: two (2) inch
 - 2) Soil classification, AASHTO M 145 A-1 or A-2-4
- b) For plastic pipe:
 - 1) Maximum particle size: 1½ inch
 - 2) Soil classification, AASHTO M 145 A-1 or A-2-4

All Backfill Material shall meet the electrochemical criteria where specified in the Contract.

206.2.2 Flowable Fill

The Contractor may substitute flowable fill for select backfill in accordance with Section 516, "Flowable Fill," at no additional cost to the Department. The Contractor shall secure Culverts and minor Structures to prevent flotation.

206.2.3 Bedding

The Contractor shall furnish a suitable, well-graded, non-plastic, free draining material, free of Recycled Asphalt Pavement (RAP), organic matter, clay balls, lumps, rock fragments that may degrade with time such as shale or gypsum and other deleterious materials. Bedding material shall conform to the following and be placed in accordance with the Contract:

- (a) Maximum particle size: ½ inch or half the corrugation depth, whichever is smaller
- (b) Material passing No. 200 (75-µm) sieve: ten percent (10.0%) max AASHTO T 27 and AASHTO T 11

All Bedding Material shall meet the electrochemical requirements where specified in the Contract.

206.2.4 Unsuitable Material

Unsuitable Material includes organic materials, frozen lumps, ice; soils such as peat, shale, gypsum or other Materials that may degrade with time, or are contaminated soil. Suitable Material that is unstable may be reworked to create a stable platform as directed by the Project Manager.

Material below minor Structures and areas identified by the Project Manager, determined to be unsuitable shall be excavated and disposed of in accordance with Section 107, "Legal Relations, Environmental Requirements, and Responsibility to the Public" unless otherwise specified in the Contract.

When unsuitable Material is removed and disposed of, the resulting void shall be filled with Material suitable for its planned use as directed by the Project Manager. Such suitable Material shall be placed and compacted in accordance with this specification.

206.3 CONSTRUCTION REQUIREMENTS

206.3.1 General

The Contractor shall remove unsuitable foundation material below the specified bottom-of-structure elevation and replace with approved Material, as directed by the Project Manager. The Contractor shall use backfill Material to backfill Culverts in accordance with Section 206.2.1, "Select Backfill," or Section 206.2.2, "Flowable Fill," unless otherwise shown on the Plans. The Contractor shall ensure the moisture content of the soil; at the time of compaction is not less than five percent (5%) below optimum moisture content or greater than optimum moisture content. The Contractor shall compact the top six (6) inches of existing ground to at least 95% of maximum density in accordance with AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified). The Contractor shall maintain the density, approved surface elevation, and shape of the foundation immediately before placing Structures and forms.

The Contractor shall distribute backfill Material in uniform layers, each no more than eight (8) inches thick (loose measurement) and compact to 95 percent (95%) maximum density. At the time of compaction, the Contractor shall ensure that the in-place moisture content of the soil is not less than three percent (3%) below optimum moisture content or greater than three percent (3%) above optimum moisture content in accordance with AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified) and AASHTO T 224. Test for field density and moisture content using nuclear methods in accordance with AASHTO T 310.

Application of load including backfill against new masonry or concrete Structures shall be in accordance with Section 511.3.5.6, "Sequence of Placement and Application of Load." The Contractor shall maintain Structure alignment and integrity during backfill compaction. The Contractor shall not place backfill on frozen earth or with frozen Materials. The Contractor shall suspend operations until Material is thawed and meets requirements of this specification. The Contractor shall remove sheeting and bracing before placing backfill.

206.3.2 Pipe Culverts, Storm Drains, and Structural Plate Pipe

For preparation and installation of pipe culverts, storm drains, and structural plate pipes with bottoms the Contractor shall remove rock and other unyielding foundation material a minimum of four (4) inches (maximum 12 inches) below the bottom of the Structure. The Contractor shall backfill this added depth with an approved Material as identified in the Contract. The Contractor shall excavate trenches as described in the Contract to allow for pipe joining and compaction of the bedding and backfill Material under and around the pipe in accordance with Section 206.3.1, "Construction Requirements, General." The Contractor shall ensure that the trench width for pipes and Culverts conforms to the trench widths requirements in Section 570.3.2, "Excavation and Backfill." The Contractor shall uniformly compact the trench for its full length and width. If specified in the Contract, the Contractor shall provide the longitudinal camber of the specified magnitude for cross drains.

206.3.3 Box Culverts and Other Drainage Structures

For preparation and installation of box culverts and other drainage structures the Contractor shall excavate material to the elevations established by the Contract. The Contractor shall not remove material, except unsuitable material, below the final grade, if placing footings on excavated surfaces other than rock. The Contractor shall remove rock and other unyielding foundation material a maximum 12 inches below the bottom of the Structure. The Contractor shall clean rock seams and cavities, and fill with concrete or grout. If the Contractor's excavation extends beyond the neat lines shown in the Contract, the Contractor shall use concrete (of the same class as the footing) to backfill these areas, at no additional cost to the Department.

The Contractor shall notify the Project Manager after each footing excavation. The Contractor shall not place footings until the excavation depth and foundation materials are approved by the Project Manager. The Contractor shall maintain the moisture and density and the approved surface elevation and shape of the foundation before installing reinforcing steel.

206.4 METHOD OF MEASUREMENT

The Project Manager will measure the void created by the removal of Unsuitable Material Excavation below the bottom-of-structure elevation.

206.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Unsuitable Material Excavation</i>	Cubic Yard

The Department will pay for rock excavation in accordance with Section 203, "Excavation, Borrow, and Embankment."

206.5.1 Work Included in Payment

Excavation, disposal of unsuitable material, bedding, backfill and select backfill Materials, placement and compaction of bedding and select backfill Materials for Culverts, storm drains, other drainage Structures, box Culverts, and minor Structures shall be included in the Contract unit price per linear foot of Structure identified in the Contract.

Excavation shall include all dewatering, pumping, bailing, draining, sheeting, bracing, and Incidentals required for proper execution of the Work. Select backfill shall include the use of Section 516, "Flowable Fill." Backfilling with concrete of the same class as the footings where the Contractor excavates below the established final elevation for bottom of footings or beyond the neat lines of the footings in rock or other hard foundation material shall be included in the Contract unit price per linear foot of Culvert. Unrippable rock or unyielding material will be defined and paid for as covered in Section 203, "Excavation, Borrow, and Embankment."

**SPECIAL PROVISIONS
MODIFYING
SECTION: 207 SUBGRADE PREPARATION**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 207: SUBGRADE PREPARATION** in its entirety and replace with the following:

207.1 DESCRIPTION

This Work consists of compacting and finishing the Subgrade.

207.2 MATERIALS—Reserved

207.3 CONSTRUCTION REQUIREMENTS

Maximum dry density of all soil types encountered or used will be determined in accordance with AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified) and AASHTO T 224.

The Contractor shall ensure the top two (2) ft of borrow Materials in the finished Subgrade is comprised of material with the design R-value.

The Contractor shall compact the top six (6) inches of the Roadbed to 95% of maximum density.

The Contractor shall ensure the soil moisture content (at the time of compaction) is from optimum to optimum minus five percent (5%). For soils with a PI of 15 or greater, the Contractor shall ensure the moisture content of the soil at the time of compaction is from optimum moisture to optimum moisture plus four percent (4%).

Field density tests shall be performed in accordance with the "Minimum Testing Requirements", in accordance with AASHTO T 310, or by other Department approved methods.

207.3.1 Tolerances

The Contractor shall ensure the top surface of the finished subgrade along centerline shall not vary by more than 0.1 foot above or below established grade and 0.05 foot above or below the typical cross-section measured on the finished surface at right angles to the centerline. All deviations from these tolerances shall be corrected.

207.4 METHOD OF MEASUREMENT

The Department will measure Subgrade preparation using the dimensions shown in the Contract and/or approved modifications.

207.5 BASIS OF PAYMENT

Pay Item

Subgrade Preparation

Pay Unit

Square Yard

207.5.1 Work Included in Payment

No payment will be made for rehandling or reworking material to meet moisture and density requirements.

Proof rolling for Unstable Subgrade Stabilization shall be considered Incidental to the Contract and will not be measured or paid for separately.

**SPECIAL PROVISIONS
MODIFYING
SECTION 209 BLADING AND RESHAPING**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 209: BLADING AND RESHAPING** in its entirety and replace with the following:

209.1 DESCRIPTION

This Work consists of constructing or restoring and shaping Roadbeds and Base Course to the typical section or as specified in the Contract.

209.2 MATERIALS—Reserved

209.3 CONSTRUCTION REQUIREMENTS

The Contractor shall shape the surface of the Roadbed or Base Course Materials to the typical section or as specified in the Contract with approved existing Materials. Any unapproved existing Roadbed or Base Course materials shall be replaced in accordance with the requirements of Section 203, "Excavation, Borrow, and Embankment" and Section 303, "Base Course", as directed by the Project Manager.

209.3.1 Compaction

The Contractor shall perform the following to the top six (6) inches of the Roadbed or Base Course, after restoring the grade and typical section:

1. Scarify;
2. Water; and,
3. Compact to 95% of maximum density per AASHTO T180 Method A or D (TTCP Modified). Ensure the moisture content of the Roadbed and Base Course Materials meet the requirements of Section 203, "Excavation, Borrow and Embankment;" and Section 303, "Base Course".

209.3.2 Tolerances

The Contractor shall ensure the top surface of the finished Roadbed or Base Course Materials along centerline shall not vary by more than 0.1 foot above or below established grade and 0.05 foot above or below the typical cross-section measured on the finished surface at right angles to the centerline. All deviations from these tolerances shall be corrected.

209.4 METHOD OF MEASUREMENT

The Department will measure blading and reshaping along the Roadbed centerline or the typical section.

209.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Blading and Reshaping</i>	Mile

209.5.1 Work Included in Payment

The Department will consider as included in the payment for the pay item(s) listed in this section and will not measure or pay separately for the following Work:

1. Restoring Grade and typical section;
2. Material placement and compaction;
3. Reworking or rehandeling of Materials to meet compaction requirements; and
4. Finishing Roadbed or Base Course to uniform grade and typical section.

SPECIAL PROVISIONS MODIFYING

SECTION 210: EXCAVATION AND BACKFILL FOR MAJOR STRUCTURES

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 210: EXCAVATION AND BACKFILL FOR MAJOR STRUCTURES** in its entirety and replace with the following:

210.1 DESCRIPTION

This Work consists of excavating, disposing of Material, supplying and placing backfill Material related to the construction of Major Structures identified in the Contract. Excavation and backfill for major Structures includes dewatering, temporary shoring and bracing and other Incidentals required for proper execution of the Work.

210.2 MATERIALS

210.2.1 Select Backfill

The Contractor shall use Base Course per Section 303 "Base Course", A-1 or A-2-4 Material as determined by AASHTO M145 composed of stone, crushed stone, crushed or screened gravel, caliche, sand, or a combination thereof. The Contractor shall use Material that is free of Deleterious Materials, peat, gypsum, shale or other Materials that may degrade with time. Material shall not contain lumps or stones with an average dimension greater than two (2) inches.

The Contractor shall not use Recycled Asphalt Pavement (RAP) as select backfill Materials. The Contractor shall not use Base Course containing RAP for use as select backfill Materials.

210.2.2 Approach Slab

The Contractor shall use AASHTO Soil Classifications A-1-a Material with a maximum coarse fraction size of 1.5 inches or Base Course per Section 303, "Base Course" under the approach slab. The Contractor shall extend the Material to a minimum of ten (10) feet beyond the end of the approach, unless otherwise specified in the Contract, for the full width of the abutment and to the depth indicated in the Contract. Recycled Asphalt Material (RAP) shall not be used within this prism.

210.2.3 Unsuitable Material

Unsuitable Material includes organic Materials, frozen lumps, ice, and soil/rock such as peat, shale, gypsum or other Materials that may degrade with time, or are contaminated. Suitable Material that is unstable may be reworked to create a stable platform as directed by the Project Manager.

Material identified by the Project Manager and determined to be unsuitable shall be excavated and disposed of in accordance with Section 107, "Legal Relations, Environmental Requirements, and Responsibility to the Public" unless otherwise specified in the Contract.

When unsuitable Material is removed and disposed of, the resulting void shall be filled with Material suitable for its planned use as directed by the Project Manager. Such suitable Material shall be placed and compacted in accordance with Section 210.3.2, "Compaction."

210.3 CONSTRUCTION REQUIREMENTS

210.3.1 General

The Contractor shall excavate material to the elevations established in the Contract. The Contractor shall not remove material, except unsuitable material, below the final grade, if placing footings on excavated surfaces other than rock. The Contractor shall remove rock and other unyielding foundation material a maximum of 12 inches below the bottom of the Structure. The Contractor shall clean rock seams and cavities, and fill with concrete or grout. This additional concrete or grout is Extra Work. The Contractor shall notify the Project Manager after each footing excavation. The Contractor shall not place footings until the Project Manager approves the excavation depth and the foundation material.

The Contractor shall dewater wet pits for inspection and for construction of footings. When necessary, the Contractor shall install well-braced cofferdams, built as watertight as practical. The Contractor shall not use timber or bracing inside cofferdams that cannot be removed without damage to the concrete. The Contractor shall make temporary Structures large enough to provide ample room for pile driving, drilled shaft construction, form construction, inspection, and sump pumps. The Contractor shall straighten or move cofferdams that threaten to damage the Structure. The Contractor shall submit to the Project Manager Working Drawings showing proposed methods of constructing cofferdams, cribs, shoring, or similar temporary Structures sealed by a New Mexico licensed Engineer. The submittal of Working Drawings does not relieve the Contractor of any responsibility.

The Contractor shall backfill excavated areas not occupied by piles, shafts, abutments, or other permanent Structures to the adjoining finished surface elevation. The Contractor shall not use rock in backfill that is within two (2) ft of the Structure. The Contractor shall place backfill Material in approximately level layers for the length and width of the backfilled area. When necessary to prevent wedge action, the Contractor shall bench the slopes bounding the area being backfilled in accordance with Section 203.3.5.1, "Roadbed Embankments." The Contractor shall dispose of unsuitable excavated material outside of the Roadway Prism as directed by the Project Manager. Before placing backfill Material against new masonry or concrete Structures, the Contractor shall wait until the concrete has developed its specified design strength as determined in Section 510.3.5.1, "Concrete Strength" or until the concrete reaches 80% of the specified compressive strength but no less than 2,500 psi, as determined by the Maturity Method, in accordance with Section 510.3.5.2, "In-place Concrete Strength Measurements." The Contractor shall prevent unbalanced loading while placing backfill Material.

210.3.2 Compaction

The Contractor shall make layers of uncompacted backfill no more than eight (8) inches thick. Before placing the next layer, the Contractor shall compact to 95% of the maximum density near optimum moisture content for AASHTO Soil Classifications A-1-a Material and Roadway Embankment as determined by AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified). The Contractor shall use nuclear methods to determine field densities in accordance with AASHTO T 310.

Prior to concrete placement the foundation soils shall be compacted to at least 95% of maximum density as determined by AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified).

210.4 METHOD OF MEASUREMENT

210.4.1 Major Structure Excavation

For each phase of the Project, identified in the Contract or approved by the Department, the Contractor shall measure the original ground surface of any areas that are designated as Structure Excavation. Prior to any Work continuing in completed excavation areas, the Contractor shall measure the newly excavated ground surface "final surface." Major structure excavation quantities shall be measured and calculated as the neat volume below the original ground surface between the limits shown in the Contract, and/or approved changes by the Project Manager, and the final excavated ground surface.

For the measurements described above the Contractor shall survey and submit the original ground surface and final excavated ground surface data at completion of each phase of construction or completed major structure using an electronic XML- compatible format approved by the Project Manager with a volume summary report summarizing the basis for the final volumes. If no cross section intervals are shown in the plans the Contractor shall purpose cross-section intervals, to the Project Manager, that adequately quantify the volumes. The approved intervals shall be used for the entire project unless otherwise specified in the Contract and/or approved by the Project Manager prior to commencement of earthwork operations. The Contractor shall use a New Mexico licensed Engineer or New Mexico licensed surveyor to stamp and certify the surveyed cross-sections and the volume summary report.

Do not include the following volumes in structure excavation:

1. Material excavated outside vertical planes located 18 inches outside and parallel to the limits of the footings or foundations;
2. Excavation required because of slides, cave-ins, silting or filling due to lack of support of sides, the action of the elements or carelessness of the Contractor;
3. Any material included within the staked limits of the surfacing and unclassified excavation for which measurement is covered under other sections;
4. Water or other liquid material;
5. Material excavated before measurements of the original ground or embankment placement;
6. Material rehandled, except when the contract specifically requires excavation after embankment placement; and
7. Rock encountered during structural excavation will be paid per Section 203.4.1, "Rock Excavation."

210.4.2 Major Structure Backfill

For each phase of the Project, identified in the Contract or approved by the Department, the Contractor shall measure major structure backfill by the cubic yard compacted in place in accordance with the limits shown in the Contract. The Contractor shall calculate major structure backfill as the neat volume above the existing or excavated ground surface between the limits shown on the plans, and/or authorized changes by the Project Manager, and the final compacted ground surface. The Department will not apply any shrinkage or swell factors due to payment being made on the final cross sectioned volume.

For the measurements described above the Contractor shall survey and submit the existing or excavated ground surface and final compacted ground surface data at completion of each phase of construction or completed major structure using an electronic XML-compatible format approved by the Project Manager with a volume summary report summarizing the basis for the final volumes. If no cross section intervals are shown in the plans the Contractor shall propose cross-section intervals, to the Project Manager, that adequately quantify the volumes. The approved intervals shall be used for the entire project unless otherwise specified in the Contract and/or approved by the Project Manager prior to commencement of earthwork operations. The Contractor shall use a New Mexico licensed Engineer or New Mexico licensed surveyor to stamp and certify the surveyed cross-sections and the volume summary report.

No measurement for payment will be made of backfill required because of slides, cave-ins, silting or filling due to lack of support of sides, over excavation or any other the action of the elements or carelessness of the Contractor.

210.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Major Structure Excavation</i>	Cubic Yard
<i>Major Structure Backfill</i>	Cubic Yard
<i>Unsuitable Material Excavation</i>	Cubic Yard

210.5.1 Work Included in Payment

Payment will be full compensation for the Work and Materials prescribed in this Section.

Excavation and Backfill for Major Structures includes the following:

1. Material compaction to 95% of maximum density as determined by AASHTO T 180 (Modified Proctor), Method A or D (TTCP Modified);
2. All temporary shoring and bracing;
3. Dewatering;
4. Suitable backfill Material for Unsuitable Material Excavation;
5. Hauling and disposal of Material related to Structure Excavation and Unsuitable Material Excavation; and
6. Survey, calculations, and engineering.

The Contractor shall dispose of Material in accordance with Section 107, "Legal Relations, Environmental Requirements, and Responsibility to the Public" unless otherwise specified in the Contract. The Contractor shall not dispose of Material within the project limits without written approval from the Project Manager.

**SPECIAL PROVISIONS
MODIFYING
SECTION 213 OBLITERATING OLD ROAD**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 213: OBLITERATING OLD ROAD** in its entirety and replace with the following:

213.1 DESCRIPTION

This Work consists of obliterating old Road.

213.2 MATERIALS—Reserved

213.3 CONSTRUCTION REQUIREMENTS

After the old Road is no longer needed for traffic, the Contractor shall remove and stockpile existing surfacing Materials to Subgrade in an environmentally acceptable manner.

The Contractor shall fill ditches, rough grade the Road (to blend with the surrounding terrain) and form natural rounded slopes (approved by the Project Manager). Next, the Contractor shall scarify or plow (to thoroughly mix the remaining surfacing material with earth), harrow, and smooth the Roadbed.

213.4 METHOD OF MEASUREMENT

The Contractor shall measure obliterating old road along the centerline of the old Road.

213.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Obliterating Old Road</i>	Mile

213.5.1 Work Included in Payment

The Department will consider as included in the payment for the pay item(s) listed in this section and will not measure or pay separately for the following Work:

1. Removing and stockpiling existing surfacing Materials; and
2. Grading, scarifying, and plowing.

SPECIAL PROVISIONS MODIFYING

SECTION 401: PAVEMENT SMOOTHNESS MEASUREMENT

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Table 401.5.1.2:2 of subsection **401.5.1.2 Pay Adjustment for PCC Pavement** and substitute the following:

Table 401.5.1.2:2
MRI Based Profile Pay Adjustment Schedule
for Category II PCCP Projects

Pay Adjustment (\$ per square Yard)			
MRI (Mean Roughness Index) inch/0.1mi			Category II
<65.0			0.00
65.0	to	66.0	-0.12
66.1	to	67.0	-0.24
67.1	to	68.0	-0.36
68.1	to	69.0	-0.48
69.1	to	70.0	-0.60
70.1	to	71.0	-0.72
71.1	to	72.0	-0.84
72.1	to	73.0	-0.96
73.1	to	74.0	-1.08
74.1	to	75.0	-1.20
75.1	to	76.0	-1.32
76.1	to	77.0	-1.44
77.1	to	78.0	-1.56
78.1	to	79.0	-1.68
79.1	to	80.0	-1.80
>80.0			Corrective Work Required

Delete the fourth paragraph of Subsection **401.3.1.4 Profile Measurement Operations** in its entirety and replace with the following:

Measure the longitudinal smoothness of the final surface of HMA, WMA, OGFC, PCCP, and CRCP using a Department certified profile measurement device. Operate the profile measurement device in accordance with AASHTO R 57 "Operating Inertial Profiling Systems" and manufacturer's recommendations and procedures established by TTCP. The profile measurement device shall be equipped with dual-sensors, bar lasers up to four (4.0) inches long, that measures the profile traces for each wheel path. Locate outside trace three (3) feet from and parallel to the approximate location of the pavement edge line. Ensure the center line distance between sensors is 70.0 inches \pm (1.0) inch. At transverse joints, commence profile traces at the joint location. Operate the device on the driving surface of the Roadway at the manufacturer's recommended speed without interfering with traffic or its own operation.

**SPECIAL PROVISIONS
MODIFYING
SECTION 402: ASPHALT MATERIALS, HYDRATED LIME, AND ANHYDRITE BASED
MATERIAL**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

402.2 MATERIALS

Include the following subsection:

402.2.7.6 Emulsified Petroleum Resin Prime (EPR-1)

Provide EPR-1 designated emulsified petroleum resin prime in accordance with Table 402.2.7.6:1, "Emulsified Petroleum Resin Prime."

**Table 402.2.7.6:1
Emulsified Petroleum Resin Prime**

Test	EPR-1
Particle Charge Test	Positive
Residue from Evaporation Test, % ^a	60+
Sieve Test, Retained on 0.850mm Sieve, % ^b	0.1-
Viscosity, Saybolt Furol at 77 °F, Seconds	14-60

^aASTM D-244 Evaporation Test for percent of residue is modified by heating 50 gram sample to 300°F until foaming ceases, then cool immediately and calculate results

^bTest procedure with ASTM except that distilled water shall be used in place of 2%w sodium oleate solution

SPECIAL PROVISIONS
MODIFYING
SECTION 403: OPEN GRADED FRICTION COURSE (NON-QLA)

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **403.2.5 Mix Design** and replace with the following:

403.2.5 Mix Design

A Department approved Private Testing Lab will develop the OGFC mix design in accordance with ASTM D 7064, "Standard Practice for Open Graded Friction Course (OGFC) Mix Design", as modified by the New Mexico Department of Transportation State Asphalt Engineer. The mix design shall be signed by a professional Engineer licensed by the NM Board of Registration for Professional Engineers and Land Surveyors. The JMF gradation will be within the master range for the specified type of OGFC. The mix design will establish a single percentage of aggregate passing each required sieve size and a single percentage of asphalt Material to be added to the aggregate. The mix design will specify whether to add hydrated lime or anhydrite based material and how much to use. The Mix Design shall identify the minimum and maximum mixing and placement temperatures of the mix. Add a minimum of one percent (1%) hydrated lime or anhydrite based material, include it in the gradation for establishing the mix design.

Delete Subsection **403.3.6.1.1 Suspension of Operations** and replace with the following:

403.3.6.1.1 Suspension of Operations

If one (1) or more properties listed in Subsection 403.3.6.2, Department Quality Assurance, fail to meet the specification requirements for a period of one (1) Day or a maximum production of 1000 tons; the production will be halted by the Project Manager. Use the gradation information to determine causes or factors that may be a contribution to the problem and prepare a plan to solve the problem. Approval of the plan must be obtained from the Project Manager before resumption of paving operations. Upon approval of the proposed plan, the Contractor may resume operations to determine if the actions taken have corrected the problem. Limit production to 1000 tons that will be tested in 500 ton increments. If that testing indicates that the problem has been corrected, the Contractor may resume full operations. If the problem has not been corrected, further trial runs and testing as described herein will be required. Take corrective action to remedy any property of the mix that is out of specification. Contractors who elect to produce Material that is not within the specification limits do so at their own risk. Price reductions due to out of specification Material being placed will be deducted from the unit price of the item in accordance with the Department's current Acceptance and Price Reduction Procedures. All Material that is rejected shall be removed and replaced with specification Material at the Contractor's expense. Material that is improperly

graded or segregated or fails to meet the requirements herein provided shall be corrected or removed and disposed of immediately as directed by the Project Manager at the Contractor's expense.

**SPECIAL PROVISIONS
MODIFYING
SECTION 405: DETOUR PAVEMENTS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Amend Subsection **405.3 CONSTRUCTION REQUIREMENTS** to include the following:

405.3.1 General

Construct the Detour pavement in accordance with the following applicable Specifications:

6. Section 423 Hot-Mix Asphalt – Superpave (QLA & NON-QLA);"
7. Section 424 Warm Mix Asphalt."

**SPECIAL PROVISIONS
MODIFYING
SECTION 408: PRIME COAT**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

408.2 MATERIALS

Revise the following subsection:

408.2 Materials

Provide one (1) of the following types of prime coat asphalt Material:

1. Asphalt emulsified prime (AE-P);
2. Penetrating emulsified prime (PE-P);
3. Emulsified Petroleum Resin Prime (EPR-1);
4. MC-70; or
5. Other Material approved by the Project Manager.

Provide prime coat asphalt Material in accordance with Section 402, "Asphalt Materials, Hydrated Lime, and Anhydrite Based Material."

**SPECIAL PROVISIONS
MODIFYING
SECTION 423: HOT MIX ASPHALT – SUPERPAVE (QLA AND NON-QLA)**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Insert the following paragraph as third paragraph in Subsection **423.2.7 Reclaimed Asphalt Pavement**:

423.2.7 Reclaimed Asphalt Pavement

If Plus Grades of PG asphalt binder is specified on the project, for quantities greater than 15% RAP, the Contractor shall extract, recover, and combine the RAP's asphalt binder with a virgin asphalt binder per AASHTO M 323, Appendix A. The Contractor shall ensure the resultant binder meets the entire AASHTO M 320 required Project PG asphalt binder properties indicated on the approved mix design including the additional Plus Grade requirements for Elastic Recovery and Solubility.

Delete Subsection **423.3.4.2 Haul Equipment** in its entirety and replace with the following:

423.3.4.2 Haul Equipment

Haul asphalt mixtures with trucks that are tarped and have tight, clean, smooth metal beds and a thin coat (a minimal amount) of Department approved release agent in accordance with Section 423.3.4.2.1.

Include the following subsection:

423.3.4.2.1 Asphalt Release Agents (ARA)

Use Asphalt Release Agents (ARA) for prevention of asphalt mixtures adhering to haul trucks and any other type of equipment that is used for asphalt paving operations. ARA shall meet the requirement of Table 423.3.4.2.1:1 and shall be on the NMDOT's Approved Products List. All testing will be in accordance with the NTPEP Evaluation of Asphalt Release Agents AASHTO ARA 14-01.

Table 423.3.4.2:1
Asphalt Release Agent Properties

Test	Result
7-Day Asphalt Stripping Test	
Diluted	No Stripping
Full Strength	No Stripping
Mixture Slide Test (Truck beds)	10 g retained, maximum
Asphalt Performance Test	Does not fail after 3 pours

Delete Subsection **423.3.5.7 Test Strip & Shakedown Period** in its entirety and replace with the following:

423.3.5.7 Test Strip & Shakedown Period

Construct a test strip for each HMA mix design to be incorporated in the project prior to placing the material on mainline. The test strip will consist of a maximum of 1,000 tons, the minimum test strip size will be 500 tons or as approved by the Project Manager. Construct the test strip on shoulders, low volume segments of the pavement, or area approved by the Project Manager.

Obtain a minimum of three (3) Contractor and three (3) agency samples to evaluate the JMF, process control, and placement operations. If necessary, based on the results obtained from the test strip, develop a revised JMF, modify placement operations, and/or implement adjustments to process control procedures. Production and placement operations performed prior to approval of a revised JMF are at the Contractor's risk.

The test strip will be evaluated for acceptance according to Table 423.3.5.7:1 "Test Strip Acceptance Limits". If accepted, the test strip will be paid at the unit price for HMA Complete or HMA per Section 423.5 "Payment". If rejected, said material shall be handled in accordance with Section 423.3.6.1.3 Adherence to Specifications and Rejection of Non-specification Material. Remove rejected test strip material placed within the Roadway Prism at no cost to the Department. If the Contractor disagrees with removing and replacing unacceptable material placed in test strips outside the Roadway Prism, the Assistant District Engineer for Construction, based on engineering judgment, will decide if the material can remain in place with a maximum pay factor of 50%, or shall be removed and replaced at no cost to the Department.

If the test strip is rejected, construct a subsequent test strip. Do not proceed to full production until an accepted test strip is produced. After the test strip is accepted, continue to evaluate the mix properties and the JMF during the placement of the first two (2) sublots in the first lot. Changes may be made to the JMF or the mix proportions and/or properties with the concurrence of the State Materials Bureau, Project Manager, and Assistant District Engineer for Construction. For changes made prior to the completion of the first two (2) sublots, the adjustments will be applied to the entire lot for purposes of payment.

The Project Manager may waive test strip requirements for the Project, if requested by the Contractor based on prior experience with the JMF.

For QLA Projects, the Shakedown Period is defined as the first two (2) sublots produced in the first lot.

For Non-QLA Projects, the Shakedown Period is defined as the test strip. As the test strip is placed, evaluate the mix properties and the JMF. Changes may be made to the JMF or the mix proportions and/or properties with the concurrence of the State Materials Bureau, Project Manager, and the Assistant District Engineer for Construction.

Table 423.3.5.7:1
Test Strip Acceptance Testing Limits ^{a,c}

Characteristic	Allowable Tolerances from TV
Air Voids, %	± 2.0
Pavement Density % ^c	90% to 97%
Hydrated Lime or Anhydrite Based Material %	±0.2%
Voids in the Mineral Aggregate (VMA), % ^a	± 2.0
Asphalt Content % ^{a,b}	± 0.50

^a Asphalt Content will be determined using AASHTO T308 as modified by TTCP.

^b HMA will not be rejected based on Asphalt Content Determined by AASHTO T 308

^c Acceptance will be based on the average test values.

Include the following to Subsection **423.3.7 Dispute Resolution**:

423.3.7 Dispute Resolution

Include the following to the list of possible Laboratory selections:

The State Asphalt Engineer will select a Laboratory, without disclosing the name of the lab to Department Project personnel or Contractor personnel from the following, not in priority order:

3. State Materials Bureau Laboratory

**SPECIAL PROVISIONS
MODIFYING
SECTION 424: WARM MIX ASPHALT**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete the first sentence of Subsection **424.2.3 Asphalt Binder** in its entirety and replace with the following:

After the Warm Mix Additive is introduced, the PG grade of the binder shall comply with the PG grade as specified in the Contract.

Delete Subsection **424.2.3.1 Warm Mix Additive or Technology** in its entirety and replace with the following:

424.2.3.1 Warm Mix Additive or Technology

Only Warm Mix Additives or Technologies approved by the Product Evaluation Program and listed on the NMDOT Approved Products List can be used on Department Projects.

To be placed on the Approved Products List, the WMA additive Supplier shall verify that the binder with the additive meets the PG grade of the specified binder. The potential additive Supplier shall demonstrate this to the Department by evaluating the Asphalt Binder containing the WMA additive at the expected additive dosage rates for compliance with the specified PG grade in accordance with AASHTO M320, Table 1 and Section 402.2.5, "Performance Graded Asphalt Binder (PGAB)."

The type and dosage rate of Warm Mix Additives shall comply with the recommendations of the Warm Mix Additive Supplier. Warm Mix Additive dosage rates shall not deviate from those recommended by the Warm Mix Additive Supplier. If a terminal blend Warm Mix Additive is used, the dosage rate shall be shown on the Materials Certificate of Compliance.

For foamed asphalt systems, only foam systems that are approved by the State Asphalt Engineer shall be used.

Insert the following paragraph as third paragraph in Subsection **424.2.7 Reclaimed Asphalt Pavement**:

424.2.7 Reclaimed Asphalt Pavement

If Plus Grades of PG asphalt binder is specified on the project, for quantities greater than 15% RAP, the Contractor shall extract, recover, and combine the RAP's asphalt binder with a virgin asphalt binder per AASHTO M 323, Appendix A. The Contractor shall ensure the resultant binder meets the entire AASHTO M

320 required Project PG asphalt binder properties indicated on the approved mix design including the additional Plus Grade requirements for Elastic Recovery and Solubility.

Delete Subsection **424.3.2 Mix Temperature Requirements** in its entirety and replace with the following:

424.3.2 Mix Temperature Requirements

For Non-foamed asphalt mixtures, the Contractor shall not allow the temperature of the WMA discharged from the mixer into the transport vehicle to be greater than 275 degrees F or less than 215 degrees F unless written recommendations by the asphalt cement Supplier, the Warm Mix Additive Supplier and the Mix Design Laboratory are provided to the Project Manager.

For Foamed asphalt mixtures utilizing RAP, the temperature may be increased up to 10 degrees above 275 degrees F when discharged from the mixer into the transport vehicle, as allowed in the approved mix design. The mix shall not be less than 215 degrees F unless written recommendations by the asphalt cement Supplier, the Warm Mix Additive Supplier and the Mix Design Laboratory are provided to the Project Manager.

WMA delivered to the Project with mix temperatures outside the acceptable range shall, at the sole discretion of the Project Manager, be removed and replaced at no cost to the Department.

Delete Subsection **424.3.4.2 Haul Equipment** in its entirety and replace with the following:

424.3.4.2 Haul Equipment

Haul asphalt mixtures with trucks that are tarped and have tight, clean, smooth metal beds and a thin coat (a minimal amount) of Department approved release agent in accordance with Section 424.3.4.2.1.

Include the following subsection:

424.3.4.2.1 Asphalt Release Agents (ARA)

Use Asphalt Release Agents (ARA) for prevention of asphalt mixtures adhering to haul trucks and any other type of equipment that is used for asphalt paving operations. ARA shall meet the requirement of Table 424.3.4.2.1:1 and shall be on the NMDOT's Approved Products List. All testing will be in accordance with the NTPEP Evaluation of Asphalt Release Agents AASHTO ARA 14-01.

Table 424.3.4.2.1:1
Asphalt Release Agent Properties

Test	Result
7-Day Asphalt Stripping Test	
Diluted	No Stripping
Full Strength	No Stripping
Mixture Slide Test (Truck beds)	10 g retained, maximum
Asphalt Performance Test	Does not fail after 3 pours

Delete Subsection **424.3.5.7 Test Strip & Shakedown Period** in its entirety and replace with the following:

424.3.5.7 Test Strip & Shakedown Period

Construct a test strip for each WMA mix design to be incorporated in the project prior to placing the material on the mainline. The test strip will consist of a maximum of 1,000 tons, the minimum test strip size will be 500 tons or as approved by the Project Manager. Construct the test strip on shoulders, low volume segments of the pavement, or area approved by the Project Manager.

Obtain a minimum of three (3) Contractor and three (3) agency samples to evaluate the JMF, process control, and placement operations. If necessary, based on the results obtained from the test strip, develop a revised JMF, modify placement operations, and/or implement adjustments to process control procedures. Production and placement operations performed prior to approval of a revised JMF are at the Contractor's risk.

The test strip will be evaluated for acceptance according to Table 424.3.5.7:1 "Test Strip Acceptance Limits". If accepted, the test strip will be paid at the unit price for WMA Complete or WMA per Section 424.5 "Payment." If rejected, said material shall be handled in accordance with Section 424.3.6.1.3 Adherence to Specifications and Rejection of Non-specification Material. Remove rejected test strip material placed within the Roadway Prism at no cost to the Department. If the Contractor disagrees with removing and replacing unacceptable material placed in test strips outside the Roadway Prism, the Assistant District Engineer for Construction, based on engineering judgment, will decide if the material can remain in place with a maximum pay factor of 50%, or shall be removed and replaced at no cost to the Department.

If the test strip is rejected, construct a subsequent test strip. Do not proceed to full production until an accepted test strip is produced. After the test strip is accepted, continue to evaluate the mix properties and the JMF during the placement of the first two (2) sublots in the first lot. Changes may be made to the JMF or the mix proportions and/or properties with the concurrence of the State Materials Bureau, Project Manager and Assistant District Engineer for Construction. For changes made prior to the completion of the first two (2) sublots, the adjustments will be applied to the entire lot for purposes of payment.

The Project Manager may waive test strip requirements for the Project, if requested by the Contractor based on prior experience with the JMF.

For QLA Projects, the Shakedown Period is defined as the first two (2) sublots produced in the first lot.

For Non-QLA Projects, the Shakedown Period is defined as the test strip. As the test strip is placed, evaluate the mix properties and the JMF. Changes may be made to the JMF or the mix proportions and/or properties with the concurrence of the State Materials Bureau, Project Manager and the Assistant District Engineer for Construction.

Table 424.3.5.7:1
Test Strip Acceptance Testing Limits ^{a,c}

Characteristic	Allowable Tolerances from TV
Air Voids, %	± 2.0
Pavement Density % ^c	90% to 97%
Hydrated Lime or Anhydrite Based Material %	±0.2%
Voids in the Mineral Aggregate (VMA), % ^a	± 2.0
Asphalt Content % ^{a,b}	± 0.50

^a Asphalt Content will be determined using AASHTO T308 as modified by TTCP.

^b HMA will not be rejected based on Asphalt Content Determined by AASHTO T 308

^c Acceptance will be based on the average test values.

Include the following to Subsection **424.3.7 Dispute Resolution**:

424.3.7 Dispute Resolution

Include the following to the list of possible Laboratory selections:

The State Asphalt Engineer will select a Laboratory, without disclosing the name of the lab to Department Project personnel or Contractor personnel from the following, not in priority order:

3. State Materials Bureau Laboratory

SPECIAL PROVISIONS
MODIFYING
SECTION 450: PORTLAND CEMENT CONCRETE PAVEMENT (PCCP) (QLA)

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

450.3.1 Proportioning

Use a Class F-LS concrete mix that has been reviewed and approved in accordance with Section 509 by the State Concrete Engineer. If the concrete is not slip-formed, an approved Class AA-HPD concrete mix shall be used instead of Class F.

Mix and place all concrete in accordance with Section 510.3 except for the following subsections: 510.3.5.5 "Price Adjustments", 510.3.5.5.1 "Cylinder Based Price Adjustments", and 510.3.5.5.2 "Price Adjustment based on In-Place Strength Tests".

Use a concrete mix that has been approved for use in the Freeze-Thaw zone, as defined in Section 509.2.8.2, "Freeze-Thaw Risk Zones" in which the Project is located.

Keep a copy of the approved mix design available on the jobsite when using the concrete mix.

450.3.4 Joints

Delete the first paragraph, and replace with the following:

Submit the proposed joint layout plan in .pdf format to the Project Manager, State Pavement Engineer and the State Materials Bureau for review and approval at least four (4) weeks before starting concrete slab construction. The proposed joint layout plan shall have the lane markings, and manholes and utilities where applicable, clearly depicted. Attempts shall be made in the submitted jointing plan for mainline paving not to place longitudinal joints in the wheel path. After receiving the recommendations and/or responses from the State Pavement Engineer and from the State Materials Bureau, the Project Manager will either approve or reject the submittal within 10 Working Days from the date of submittal.

Delete the second paragraph, and replace with the following:

Construct joints at the locations, intervals, and dimensions shown in the approved joint layout plan, and seal them in accordance with Section 452, "Sealing and Resealing Concrete Pavement Joints." Ensure no re-entrant corners. For typical slabs the longitudinal joint spacing shall not exceed 12 feet and the transverse joint spacing shall not exceed 15 feet. The maximum slab length-to-width ratio shall not be greater than 1.25:1 for the primary traveled lanes and longitudinal joints shall be placed within the lane stripe or as approved by the Project Manager and NMDOT Pavement Engineer. For joints in shoulders and non-mainline paving, length to width ratios exceeding 1.25:1 may be required to maintain the continuity of

the joints. Longitudinal tied joints shall be placed between bike lanes and primary traveled lanes. Skewed joints are not allowed. Avoid tapered joints if possible. If a tapered joint is formed, place a control joint at:

Delete fifth paragraph that states "Begin sawcutting of the joints as soon as possible"

Add to seventh paragraph, at the beginning:

Time to cut longitudinal and transverse joints is to be determined by the contractor. Approval of jointing plan by NMDOT does not absolve the contractor from responsibility of PCCP panels containing uncontrolled cracks. The Project shall not be granted Substantial Completion until all panels containing cracks have been removed and replaced.

450.3.4.1 Longitudinal Joints

Delete the second paragraph, and replace with the following:

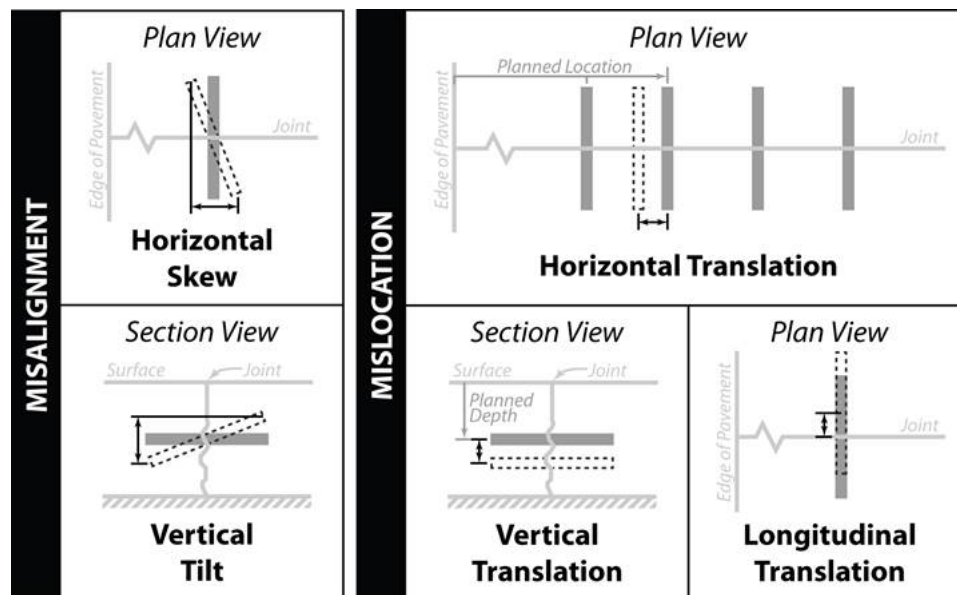
The combined width of all concrete slabs tied together in any one placement shall not be more than 40 feet.

450.3.4.2 Transverse Joints

Delete the last sentence of the second paragraph, and replace with the following;

Dowel placement tolerances are:

- Horizontal Skew = 3/8 inch
- Vertical Tilt = 3/8 inch
- Horizontal translation = two (2) inches
- Vertical Translation = one (1) inch
- Longitudinal Translation / Side Shift = one (1) inch



- Horizontal Skew – The deviation of the dowel bar from true parallel alignment from the edge of the pavement, measured over the entire length of the dowel bar.
- Vertical Tilt – The deviation of the dowel bar from true parallel alignment from the surface of the pavement, measured over the entire length of the dowel bar.
- Alignment – The degree to which a dowel bar aligns true (e.g., parallel) to the horizontal and vertical planes of the pavement.
- Misalignment – Any deviation in either the horizontal or vertical plane from a true alignment condition (e.g., horizontal skew or vertical tilt).

450.3.4.4 Final Location of Dowels and Tie Bars

Delete the first paragraph, and replace with the following;

Within 72 hours of concrete placement confirm that the final location of the transverse dowel bars and the longitudinal tie bars comply with the specified location and placement tolerances for every transverse joint and longitudinal joint in the first 120 linear feet of paving, or as otherwise specified. Ground Penetrating Radar equipped with dual side-by-side antennas or approved equal approved by the Project Manager and

State Concrete Engineer can be used for all embedded steel reinforcement. Magnetic Tomography (i.e.: MIT Scan 2) may be utilized. Regardless of the equipment used, the results from the nondestructive testing shall be confirmed by drilling or coring for at least three (3) dowel bars within the first 120 linear feet of paving.

450.3.5.3 Surfacing Smoothness Requirements

Delete the second paragraph and 1. in its entirety;

Test the longitudinal smoothness of the PCCP finished surface in each through traffic lane and passing lane with an approved Profile, in accordance with Section 401, "Pavement Smoothness Measurement."

450.3.5.4 Straightedge Measurements

Measure the surface of PCCP not subject to Profiler measurements using an approved 10-foot straightedge at both right angles and parallel to the centerline. Correct surface deviations in accordance with Section 401.

450.3.8 Protections from and Opening to Traffic

Delete the second paragraph, and replace with the following:

Contractor is required to use Maturity Method, in accordance with Section 510.3.5.2 "In-Place Concrete Strength Measurements" and Section 450.3.3.2 "Placing, Spreading, and Consolidating Concrete" to determine time to allow traffic to operate on concrete pavement.

450.5 BASIS OF PAYMENT

Include the following paragraph to **BASIS OF PAYMENT**.

Work Included in Payment

The Department considers dowels, tie bars, joint Materials, and required coring, including filling the core holes with concrete, Incidental to the Work in accordance with Section 452, "Sealing and Resealing Concrete Pavement Joints."

April 16, 2014

**SPECIAL PROVISIONS
MODIFYING**

SECTION 451: PORTLAND CEMENT CONCRETE PAVEMENT (PCCP) (Non-QLA)

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete subsection **451.3.9.1 Contractor Quality Control**, and replace with the following;

451.3.9.1 Contractor Quality Control

See Section 450.3.10.1, "Contractor Quality Control"

SPECIAL PROVISIONS
MODIFYING
SECTION 452: SEALING AND RESEALING CONCRETE PAVEMENT JOINTS

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete subsection **452.2.1 Sealant**, and replace with the following:

452.2.1 Sealant

Joint sealant Material will either be a Type NS or SL single component silicone formulation meeting the requirements of ASTM D 5893 or a single component low modulus polyurethane formulation meeting the requirements of ASTM C 920 and Table 452.2.2:1, "Polyurethane Sealant Physical Requirements."

Provide a qualified manufacturer's representative on the Project for at least the first Day of sealant application. Prepare and seal the joints in accordance with proper procedures approved by the manufacturer's representative.

Obtain the manufacturer's written verification of primer, backer, and sealant compatibility.

**SPECIAL PROVISIONS
MODIFYING
SECTION 455: DIAMOND GRINDING AND DIAMOND GROOVING OF PORTLAND
CEMENT CONCRETE PAVEMENT (PCCP)**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Replace the following sub-section with:

455.3.4 Final Surface Finish

Produce a pavement surface in accordance with Section 450.3.5.3, "Surfacing Smoothness Requirements."

Ensure the texture has parallel longitudinal corrugations that present a narrow ridge corduroy-type appearance. Make the peaks and grooves approximately 0.08 inch apart in elevation. Make the grooves from 0.08 inch to 0.16 inch wide, and the peaks from 0.08 inch to 0.12 inch wide. Determine the appropriate number of grooves per yard to produce the specified surface requirements.

SPECIAL PROVISIONS MODIFYING SECTION 504: LOAD TESTING OF BEARING PILES

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete SECTION 504: LOAD TESTING OF BEARING PILES in its entirety and substitute the following:

504.1 DESCRIPTION

This Work consists of static axial compressive load tests (pile load test), static axial tensile load tests (pile pullout tests), and high strain dynamic measurements (dynamic measurements) of piles for the purpose of determining ultimate bearing capacity and pile pullout capacity.

For driven piles, dynamic measurements determine driving stresses, pile integrity, and hammer efficiency. For cast-in-place concrete piles (drilled shafts), dynamic measurements verify pile integrity.

504.1.1 Contractor's Responsibilities

504.1.1.1 Dynamic Measurements

Provide labor, Equipment, and Materials necessary to drill the dynamic test piles holes and for mounting transducers. Provide the analysis Equipment power supply.

Where dynamic measurements are to be made on cast-in-place piles, provide a gravity drop hammer and pile cushioning. Excavate around the pile, cut the permanent casing, drill holes in the test pile(s) and provide impacts on cast-in-place dynamic test piles as required.

If a Pile Dynamic Test Consultant Testing is required, as designated on the plans, the consultant's qualifications and equipment must meet the requirements of this Section and Section 504.3 "Equipment." Pile Dynamic Consultant Equipment must meet the requirements of Section 504.3.1.5 "Pile Driving Analyzer." Perform field Pile Dynamic Testing with an experienced technician or engineer having at least two (2) years of experience with Pile Dynamic Testing methods. Use a licensed Professional Engineer having at least three (3) years of experience in Pile Dynamic Testing performed to interpret the recorded measurements and generate reports.

At the option of the State Geotechnical Engineer, Department personnel may perform the Pile Dynamic Testing.

504.1.1.2 Pile Load and Pile Pullout Tests

Provide everything necessary to perform pile load or pile pullout tests. Record load measurement and pile movement readings, and produce a report(s) showing the load displacement curve(s).

504.1.2 Department's Responsibilities

504.1.2.1 Dynamic Measurements

If Pile Dynamic Testing performed by the Department is required, as designated on the plans, the Department will provide the Equipment to perform dynamic measurements and the Department will provide personnel to take the dynamic measurements.

504.1.2.2 Pile Load and Pile Pullout Tests

The Contract will specify the anchor pile requirements. The Department will provide personnel to observe and monitor the Contractor's test apparatus, test methods, and data collection.

504.1.3 Pile Testing Mobilization

Mobilize testing Equipment as needed and as designated by the Contract or authorized by the State Geotechnical Engineer. Mobilize testing Equipment only after receipt of written authorization.

504.2 SUBMITTALS

504.2.1 Load Test Frame

Submit the proposed load test frame and anchorage method, details, and design computations 30 Days before the start of pile load tests and pile pullout tests. Use a professional Engineer licensed in New Mexico to prepare and seal the proposed loading apparatus detail Plans.

504.2.2 Certificates of Calibration

Submit a calibration certificate and a calibration chart relating pressure to load for the load pressure gauge(s) from a certified Laboratory before use. Calibrate each jack and its gauge as a unit. Submit a calibration certificate for load cell(s). Calibrate gauges and cells within six (6) months before use.

504.2.3 Pile and Equipment Data Form

Submit a *Pile and Driving Equipment Data Form* as required in Section 501.2.3.1, "Pile Driving Equipment Submittals," when proposing a gravity drop hammer for dynamic measurements of cast-in-place piles.

504.3 EQUIPMENT

504.3.1 Equipment for Dynamic Testing

504.3.1.1 Power Supply

Provide dynamic test Equipment electric power that supplies 10 A, 115 V, 55 Hz to 60 Hz, A.C. only. If a field generator is used as the power source, provide functioning voltage and frequency level monitoring

meters.

504.3.1.2 Gauge Mounting Equipment

Provide a power drill, bits, taps, and expandable masonry anchor studs to drill holes in the dynamic test piles for bolting transducers to the piles. Provide a six (6) lb rubber mallet hammer when dynamic testing is specified on precast concrete piles.

504.3.1.3 Personnel Lift

To assist with the installation of instruments, provide a hydraulic, telescoping arm personnel lift. Provide a personnel lift with adequate length to reach the top of the pile while the pile is located in the leads.

The contractor may use an alternative to a personnel lift in accordance with Section 504.3.4.1.2 "Preparation for Testing."

504.3.1.4 Gravity Drop Hammer

Provide a gravity drop hammer and pile cushion when cast-in-place piles dynamic testing is specified. Provide the minimum hammer ram weight and free fall height and cushion thickness specified in the Contract. Equip gravity hammers with guides to ensure concentric drive head impact.

If approved by the State Geotechnical Engineer, the Contractor may use a diesel hammer with the minimum required ram weight and impact energy. Cut-off the fuel flow.

504.3.1.5 Pile Driving Analyzer

Perform the Pile Dynamic Testing using a Pile Driving Analyzer® (PDA) system (Model 8G or PAX) or equivalent. The Dynamic Testing Consultant shall furnish all equipment necessary for the Pile Dynamic Testing such as sensors, cables or wireless transmitters, etc.,. The equipment shall conform to the requirements of ASTM D-4945.

504.3.2 Equipment for Pile Load Test

Provide testing Equipment and measuring systems in accordance with ASTM D 1143, except as modified within these Specifications.

504.3.2.1 Load System

Provide a load system capable of applying 250% of the required ultimate pile capacity. Provide a load test frame design compatible with the anchor pile requirements in accordance with Section 504.3.4.2.1, "Test Pile and Anchor Pile Requirements."

Construct the apparatus so that it is possible to place load increments gradually without causing test pile or load test frame vibration.

504.3.2.2 Load Application System

Use hydraulic jacks to apply the load. When using multiple jacks, fit each jack with a pressure gauge in addition to the master hydraulic pressure gauge. Use jacks from the same manufacturer with the same rated capacity. Connect jacks to a common manifold with pressure supplied by one (1) hydraulic pump.

504.3.2.3 Load Measuring System

Provide a dual load measuring system (gauge and load cell) to verify the test pile load. Calibrate the load cell and mount it between the load frame and the pile head to confirm the load recorded from the pressure gauge.

504.3.2.4 Settlement Measuring System

Use a dual settlement measuring system. Provide two (2) dial gauges bearing on the reference beams at opposite sides of the pile, below the test plate. Support the reference beams outside of pile-soil movement influences. Provide two (2) linear variable differentiating transformers, with remote digital read-outs bearing on reference beams on opposite sides of the pile.

504.3.3 Equipment for Pile Pullout Test

Use testing Equipment and measuring systems in accordance with Section 504.3.2, "Equipment for Pile Load Test," except as modified within these Specifications.

504.3.3.1 Load System

Provide a load system capable of applying 200% of the required ultimate pile pullout capacity.

504.3.3.2 Reaction System

It is permissible to use suitable cribbing or other bearing plates for reaction points instead of anchor piles. Use cribbing or bearing plates of sufficient size and stiffness to limit undesirable reaction frame movement.

504.3.4 Testing Requirements

504.3.4.1 Preconstruction Wave Equation Analysis

The State Geotechnical Engineer or Dynamic Testing Consultant shall use the submitted information required in Section 501.2.3.1 "Pile Driving Submittals" to perform wave equation analyses and shall prepare a summary report of the wave equation results. The wave equation analysis (using GRLWEAP™ software by Pile Dynamics, Inc. or equivalent) shall be used to assess the ability of the proposed driving system to install the pile to the required capacity and desired penetration depth within the allowable driving stresses.

Approval of the proposed driving system by the Engineer shall be based upon the wave equation analyses indicating that the proposed driving system meeting the requirements of Section 501.3.1.4 "Approval of Driving System."

A Preliminary Wave Equation Analysis Acceptance Chart shall be developed and submitted to the Project Manager a minimum of seven (7) days before commencing pile driving. Submit the Preliminary Wave Equation Analysis Acceptance Chart meeting the template requirements as provided by the NMDOT Geotechnical Section.

504.3.4.2 Dynamic Pile Testing Requirements

Perform dynamic testing during the pile driving as described in the Contract as "Dynamic Test Piles." The State Geotechnical Engineer may decide to designate additional piles shown in the Contract as dynamic test piles.

504.3.4.2.1 Driven Pile Preconstruction Meeting

Attend and respond to comments provided by NMDOT at the required Driven Pile Preconstruction Meeting held after all submittals have been approved. The Driven Pile Preconstruction Meeting will take place no less than one (1) week before the start of pile driving.

504.3.4.2.2 Notification to Proceed

Notify the Project Manager at least 21 Days before commencing dynamic test pile testing. Confirm the testing schedule with the Project Manager 3 Days before the testing date. Notify the Project Manager promptly of any changes in the schedule. Test dynamic test piles before any other piles are driven or installed, unless the Project Manager approves otherwise.

504.3.4.2.3 Preparation for Testing

Prepare dynamic test piles as follows:

1. **Drilling for Mounting Transducers.** Drill holes for mounting the transducers. Bolt the instruments near the head of the pile at the location and using a bolt pattern designated by the State Geotechnical Engineer.

Drilling requirements for each test pile include the following:

- 1.1. Steel pipe piles: Seven (7) holes drilled with a 7/32 inch diameter bit, tapped to accommodate ¼ in bolts;
- 1.2. Steel HP piles: Five (5) holes drilled with a 5/16 inch diameter bit through the web;
- 1.3. Precast concrete or cast-in-place concrete piles: Seven (7) ¼ inch x 1 ½ inch holes with ¼ inch expandable anchor studs set in the holes to accommodate ¼ inch bolts;

2. **Wave Speed Measurements.** When precast concrete piles are specified as dynamic test piles, place the pile horizontally on wooden sleepers so that it is not in contact with the ground or with other piling. The State Geotechnical Engineer will take wave speed measurements for the Pile Driving Analyzer (PDA) by hitting the pile with a six (6) lb rubber mallet hammer. The Department will not require wave speed measurements for steel piles;
1. **Transducer Installation.** Install the instruments while the pile is in the leads using a man-lift raised to the top of the pile. As an alternative to the man-lift requirement, the State Geotechnical Engineer may install the instruments after the pile is driven to a tip elevation of ten (10) ft above the Plan tip elevation.

504.3.4.2.4 Procedure for Testing Driven Piles

The following are the procedures for testing driven piles for either Department or Consultant Pile Dynamic Testing:

1. Drive the test pile in accordance with Section 501.3.5, "Pile Driving Operations," while monitoring the dynamic measurements;
2. Monitor the test pile stresses that result from the driving to ensure that the compressive or tensile stresses do not exceed the allowable driving stresses as defined in Table 501.3.1.4:1, "Wave Equation Analysis Allowable Driving Stress." If the monitored pile stresses exceed these criteria, stop driving. Perform necessary modifications to the driving operation to ensure that pile damage does not occur;
3. Monitor the test pile stresses on individual gauges to determine if non-axial driving is indicated. If the pile bends beyond acceptable allowances, stop driving and realign the driving system;
4. If the Contract specifies an estimated penetration elevation, drive the first dynamic test pile until the required ultimate capacity or the estimated penetration elevation is achieved;

If the Contract specifies a minimum penetration elevation, drive the first dynamic test pile to that elevation;

If the test pile does not achieve the required ultimate capacity at the estimated or minimum penetration elevation, splice the test pile with additional length of pile. Remove and relocate the instruments to the spliced section. Proceed with driving until the ultimate driving capacity is achieved;

5. Forty-eight hours after the initial drive, restrike each test pile previously driven with the dynamic measuring Equipment installed. The State Geotechnical Engineer may allow shorter wait periods depending on soil and test conditions. Alternatively, the Contract may require longer wait periods, multiple restrike intervals, or both on a given test pile. Use a "warm" hammer that has previously driven at least one (1) pile other than the test pile(s), to restrike the test pile(s). The maximum total number of hammer blows for the restrike is 40.

504.3.4.2.5 Procedure for Testing Cast-in-Place Piles

The following are the procedures for testing cast-in-place piles:

1. When the Contractor casts the dynamic test pile(s), the Inspector will make three (3) test cylinders of concrete or grout for each test pile in accordance with AASHTO T 23M. Provide concrete that will achieve a compressive strength at seven (7) Days of 3,000 psi;
2. After seven (7) Days, weigh the three (3) concrete test cylinders and report the average unit weight to the State Geotechnical Engineer.

Test one (1) concrete cylinder at seven (7) Days. If the compressive strength is at least 3,000 psi, test the other two (2) cylinders. Report the average of the three (3) breaks to the State Geotechnical Engineer.

Perform the dynamic test on the test pile the same Day that the cylinders are broken;

3. If the first test cylinder breaks at less than 3,000 psi, report the result to the State Geotechnical Engineer. The State Geotechnical Engineer may decide either to have the last two (2) cylinders tested the same Day or to wait up to a maximum of 14 additional Days before breaking the last two (2) cylinders. The Day the last two (2) cylinders are tested, re-weigh the cylinders and determine the average unit weight of the concrete.

Perform the dynamic test on the test pile the same Day the last two (2) cylinders are broken; There will be no added compensation to the Contractor and no time extension to the Contract if Delays occur because the concrete does not achieve the required strength at seven (7) Days.

4. Use the average compressive strength and the average unit weight of the concrete to estimate the modulus of elasticity and the wave speed of the concrete for input into the PDA;
5. Perform excavation around the test pile as needed to mount the gauges. Typically, the required depth of excavation will be twice the diameter of the pile;
6. Attach the instruments to the pile head and impact the pile with the ram at the free fall height directed by the State Geotechnical Engineer. Each test pile will not require more than 40 blows. Monitor the pile stresses that result from the ram impact to ensure that the compressive or tensile stresses do not exceed the allowable pile driving stresses defined in Table 501.3.1.4:1, "Wave Equation Analysis Allowable Driving Stress." If the monitored pile stresses exceed these criteria, the Department will direct the Contractor to reduce the ram free fall height or add pile cushioning.

504.3.4.2.6 Case Pile Wave Analysis

NMDOT Geotechnical Section personnel or approved Pile Dynamic Testing Consultant will perform the Case Pile Wave Analysis as designated on the plans or determined by the NMDOT State Geotechnical Engineer.

Signal matching analysis (by CAPWAP® software, available from Pile Dynamics, Inc. or equivalent) of the dynamic pile testing data shall be performed on data obtained from the end of initial driving and the beginning of restrike of specified Pile Dynamic Test piles. CAPWAP analysis should be performed by an

engineer who meets the minimum requirements outlined in Section 504.1.1.1 "Dynamic Measurements", and is capable of returning analysis within one (1) working day from time of transmission. The State Geotechnical Engineer or Dynamic Testing Consultant may request additional analyses at selected pile penetration depths.

504.3.4.3 Pile Load and Pile Pullout Testing Requirements

504.3.4.3.1 Test Pile and Anchor Pile Requirements

1. Driven Piles. Apply the load to a production pile driven in the final Plan location, unless otherwise specified in the Contract, and apply the test frame against anchor (tension) piles;

Use production piles driven in final Plan locations for the anchor piles unless the layout of the test frame reaction points is fixed and inconsistent with the production pile layout or unless an alternative pile type is required to develop adequate pullout resistance. The Project Manager will decide if anchor piles that are not final production piles may be cut-off below final grade or pulled after the testing is completed;

2. Cast-in-Place Piles. Apply the load to a production pile located in the final Plan location, unless otherwise shown in the Contract. Use either driven piles or cast-in-place piles as anchor piles. Do not use anchor piles as final production piles. Provide cast-in-place anchor piles with reinforcement capable of carrying the pile tension force.

504.3.4.3.2 Commencement of Load Test

Unless otherwise specified in the Contract, wait a minimum of 24 h between driving or installing anchor piles or the test pile and commencing with the pile load or pile pullout test.

When testing pipe piles filled with concrete or cast-in-place concrete piles, begin load tests after the concrete has attained a compressive strength of 2,500 psi.

504.3.4.3.3 Load Testing Procedures

Conduct pile load tests and pile pullout tests in accordance with the following requirements:

1. Perform the *Quick Load Test Method for Individual Piles* in accordance with ASTM D 1143, but take the load test to the first of either failure of the test pile or capacity of the load system;
2. Test pile failure is defined as total vertical pile movement equal to the greater of either five percent (5%) of the pile diameter or two (2) inches;
3. If failure occurs, remove the test load in four (4) approximately equal amounts with a five minute interval between removals;
4. For pile load tests where piles are 24 inch or less in diameter or width, the ultimate capacity is the load that produces a settlement of the pile head in accordance with the following equation:

$$S_f = S + (0.15 + 0.008D) \quad (1)$$

Where,

- S_f is the settlement at the ultimate pile capacity in inches
- D is the pile diameter or width in inches
- S is the elastic deformation of pile length in inches

Use the following equation for piles with diameters or widths greater than 24 inches:

$$S_f = S + \frac{D}{30} \quad (2)$$

Where,

- S_f is the settlement at the ultimate pile capacity in inches
- D is the pile diameter or width in inches
- S is the elastic deformation of pile length in inches

5. For pile pullout tests, the State Geotechnical Engineer will determine when the ultimate pile capacity is attained.

504.3.4.4 Completion of Dynamic Testing of Driven Piles

After completing the dynamic test pile(s) at a Substructure element, prepare the pile(s) for any specified pile load or pile pullout test(s).

If no load testing is required as determined in Section 501.3.6, "Pile Acceptance", the Final Wave Equation Analysis Acceptance Charts, based on results of the Pile Dynamic Testing, should be submitted to the Project Manager within thirty six (36) hours after completion of PDA testing and CAPWAP analyses at the applicable bridge or structure element.

The Dynamic Testing Consultant shall prepare a written report of the of the Pile Dynamic Testing results within seven (7) days of completion of all dynamic test piles specified. This report shall include the results of static load test(s) (if performed) and shall contain a discussion of the pile capacity obtained from the dynamic and static testing. The report shall also discuss hammer and driving system performance, driving stress levels, and pile integrity.

Drive production piles no deeper than the estimated or minimum penetration elevation before receiving the field Acceptance criteria. Record the average hammer stroke and pile set after driving of each pile to determine pile Acceptance once the driving criteria is established. After receiving the field Acceptance criteria, drive piles until attaining the required ultimate capacity.

504.3.4.5 Completion of Dynamic Testing of Cast-in-Place Piles

Base the required production pile tip elevation on the dynamic testing and load testing results if specified. The State Geotechnical Engineer will require up to 36 h after completion of the last test pile to provide the pile tip elevation.

Unless the State Geotechnical Engineer directs otherwise, place no other piles until receiving the production pile tip elevation.

504.3.4.6 Completion of Load Testing

After completing the specified load test(s) to the Project Manager's satisfaction, dismantle the test apparatus and Equipment and remove from the site. Use the load test results to determine the ultimate pile capacity Acceptance criteria of driven piles as established under Section 501.3.6, "Pile Acceptance," and to confirm ultimate pile capacities determined by dynamic pile tests.

Pulled anchor piles of the same type as the production piles may be reused as production piles if not rejected by the Project Manager due to damage as covered in Section 501.3.6.3, "Damaged Pile Limitations."

For cast-in-place piles, use the load test results to determine the pile penetration requirements, if no subsequent dynamic testing is specified.

The State Geotechnical Engineer will require up to 36 h after completion of the last test pile to provide the pile tip elevation.

Re-drive production piles used as anchor piles in accordance with Section 501.3.6, "Pile Acceptance."

504.4 METHOD OF MEASUREMENT—Reserved

504.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Pile Testing Mobilization</i>	Lump Sum
<i>Pile Load Test</i>	Each
<i>Pile Pullout Test</i>	Each
<i>Pile Dynamic Test</i>	Each
<i>Pile Dynamic Test Consultant Testing</i>	Each
<i>Case Pile Wave Analysis Test</i>	Each
<i>Case Pile Wave Analysis Test Consultant Testing</i>	Each

504.4.1 Work Included in Payment

The following Work will be considered as included in the payment for the mail item(s) and will not be measured or paid for separately: Non-production anchor and test piles which will not remain in use as part of the permanent structure.

**SPECIAL PROVISIONS
MODIFYING
SECTION 509: PORTLAND CEMENT CONCRETE MIX DESIGNS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Add performance requirement No. 12 to Section **509.2.8.4.2 Concrete Mix Design Designing & Proportion** as follows:

12. For Class F-LS concrete mixtures and for HPD concrete mixtures, use coarse aggregates to produce CRCP concrete with a Coefficient of Thermal Expansion (CTE) not more than a value of 5.5 microstrain/°F as tested in accordance with AASHTO T336.

**SPECIAL PROVISIONS
MODIFYING
SECTION 510: PORTLAND CEMENT CONCRETE**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **510.3.4.3.2 Continuous Concrete Placements** in its entirety and replace with the following:

510.3.4.3.2 Continuous Concrete Placements

It is common practice to place and test concrete at the same time, therefor:

As concrete is being placed and tested, concrete tests which are outside the allowable concrete test ranges may be encountered and are to be immediately reported to the Project Manager. Concrete that has already been placed shall be removed if the slump is more than one (1) inch over the specified limits or air is more than ½% below the minimum air specified. The Project Manager then can determine to place or halt the placement of the remaining concrete. The Project Manager can determine if the placed concrete needs to be removed or if it can remain. In the event that two (2) consecutive trucks or any two (2) out of six (6) trucks are outside the allowable testing ranges, concrete shall not be placed in the structure until the concrete testing is performed prior to the placement operation and the allowable concrete test ranges are shown to be in the allowable range. If concrete from five (5) consecutive trucks are delivered within allowable concrete testing parameters, then the placement and testing of concrete can once again be performed concurrently.

Payment of concrete that deviated from required parameters will receive a 50% pay reduction in addition to the outcome of the final pay factors for the concrete.

**SPECIAL PROVISIONS
MODIFYING
SECTION 511: CONCRETE STRUCTURES**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Replace Section 511 **CONCRETE STRUCTURES** in its entirety:

511.1 DESCRIPTION

This Work consists of constructing concrete box Culverts, headwalls, retaining walls, abutments, bents, piers, slabs, girders, and Incidental Structures requiring the use of concrete, except pre-stressed members.

511.2 MATERIALS

511.2.1 Portland Cement Concrete

The Contractor shall use concrete mixes that have been designed in accordance with Section 509, "Portland Cement Concrete Mix Designs" and approved for use on NMDOT Projects by the State Materials Bureau for the freeze/thaw risk zone in which the Project is located. A higher risk zone concrete may be substituted.

511.2.2 Steel Reinforcing

The contractor shall provide steel reinforcement in accordance with Section 540. "Steel Reinforcement."

511.2.3 Bonding Agent

The Contractor shall use latex bonding agent that meets the requirements of ASTM C1059, Type II. The Contractor shall not use a bonding agent that is water soluble or is delivered in a water-based solution.

511.2.4 Form Release Agent

The Contractor may use form release agents at their discretion. Compatibility must be confirmed in a letter from the Manufacturer of subsequent surface treatments including but not limited to penetrating water repellent treatment, stains, and/or paints. If compatibility cannot be confirmed, form release residue shall be removed per the surface preparation recommendations of the manufacturer of the subsequent product.

When integrally colored concrete is used, the Contractor shall use form release agents that are

non-staining and minimize surface imperfections of concrete.

511.2.5 Liquid Applied Evaporation Reducers

Unless otherwise specified in the Contract Documents, the Contractor may utilize liquid-applied evaporation reducers to reduce the effects of excessive rate of evaporation at the surface of plastic concrete. Evaporation reducers shall be commercially available water-based compounds that are specifically designed to form a thin monomolecular film to reduce rapid moisture loss from the concrete surface prior to curing. The product shall be certified to have no adverse effects on the cement hydration process or the concrete and that it reduces surface moisture evaporation from the concrete when performing concrete operations in direct sun, wind, high temperatures, and/or low relative humidity.

511.2.6 Curing Materials

511.2.6.1 Liquid Membrane Forming Compounds

The Contractor shall use Type 1-D or Type 2 liquid membrane-forming concrete curing compounds that comply with ASTM C 309.

When integrally colored concrete is used, the Contractor shall use only curing compounds specifically recommended for use with colored concrete.

511.2.6.2 Linseed Oil Emulsion

The Contractor shall not use linseed oil emulsion-curing agent.

511.2.6.3 Sheet Materials for Curing Concrete

The Contractor shall use concrete curing sheet Materials in accordance with AASHTO M 171. The Department will only allow the white reflective type.

511.2.7 Joint Materials

The Contractor shall provide joint filler material in accordance with AASHTO M33 or AASHTO M153 Type I or IV (no cork).

The Contractor shall provide liquid-applied joint sealant in accordance with Section 452, "Sealing and Resealing Concrete Pavement Joints" at non-Bridge joint locations.

511.2.8 Extruded Polystyrene

The Contractor shall provide extruded polystyrene that complies with ASTM C578 Types X or XII (15 psi), Type IV (25 psi), or Type VII (60 psi). If strength is not shown in contract documents, use Type IV (25 psi).

511.2.9 Tear-Web Waterstop

Waterstop at the joint between abutment cap and abutment diaphragm shall be tear-web waterstop. The Contractor shall provide a product that meets the requirements of Table 511.2.8:1.

TABLE 511.2.9:1

Typical Properties	ASTM Method	Minimum Value
Water Absorption	D-570	0.10%
Tear Resistance, lb/in	D-624	225
Specific Gravity, (+/- 0.05)	D-792	1.38
Hardness, Shore A (+/-5, 10 sec. delay)	D-2240	80
Tensile, psi	D-638, Type IV	2000
Elongation %	D-638, Type IV	350
Low Temperature Brittleness @ -35° F	D-746	No Failure
Stiffness in Flexure, psi	D-747	600
Accelerated Extraction, USACE CRD-C572		
Tensile, psi	D-638, Type IV	1600
Elongation, %	D-638, Type IV	300
Effect of Alkali, USACE CRD-C572		
Weight Change, %	-----	+0.25%, - 0.10%
Change in Hardness, Shore A	D-2240	+/-5 points

511.2.10 Membrane Waterproofing

When specified in the Contract Documents, the Contractor shall install waterproof membrane materials. For this application, the Contractor shall provide flexible, self-adhering sheet membrane waterproofing

material that is a minimum 60 mil thickness. Compatible surface primers and flashings shall be used as recommended by the manufacturer's application instruction. The material shall meet the requirements of Table 511.2.10:1.

TABLE 511.2.10:1

Typical Properties	ASTM Method	Value
water vapor permeance	ASTM E96	0.05 perms max
elongation	ASTM D412	300% min
tensile strength	ASTM D412	300 psi min
peel strength	ASTM D903	8 lbs/in min
puncture resistance	ASTM E154	45 lbf min

511.2.11 Fluid-Applied Waterproofing

When specified in the Contract Documents, the Contractor shall install cold, fluid-applied waterproof membrane materials on concrete walls prior to backfill. For this application, the Contractor shall provide seamless rubberized asphalt membrane at a minimum thickness of 60 mils. Compatible surface primers, and joint, crack, and corner treatments shall be used as recommended by the manufacturer's application instruction. The material shall meet the requirements of Table 511.2.11:2.

TABLE 511.2.11:2

Typical Properties	ASTM Method	Value
solids by weight	ASTM D1644	60% min
elongation	ASTM D412	300% min
water vapor permeance	ASTM E96	0.1 perms max
hardness	ASTM C661	60 max

When waterproofing is required by the Contract but a type is not specified, membrane waterproofing shall be used.

511.3 CONSTRUCTION REQUIREMENTS

511.3.1 Concrete Placement

Concrete shall be placed and tested for compliance with the Project Specifications in accordance with Section 510.

511.3.2 Falsework and Falsework Foundation

The Contractor shall construct Structure in accordance with Section 511, "Concrete Structures," and Section 512, "Superstructure Concrete", as applicable.

The Contractor shall design, construct, and maintain falsework and falsework foundation to provide the required strength and rigidity, and to support loads without settlement. The Contractor shall have a professional Engineer licensed in the State of New Mexico design the falsework and its foundation. The design of the falsework and foundation will be required if one (1) or more of the following conditions apply:

1. If the height of the Structure is greater than ten (10) ft, (excluding concrete Culverts with bottom slabs);
2. Where the supported span is greater than 15 ft;
3. Where traffic, other than workmen involved in constructing the Structure, will travel under the falsework.

The Contractor shall place the falsework on an adequate foundation. The maximum foundation bearing pressure is 2,000 pounds per square foot unless a Geotechnical investigation indicates a higher value can be used. The Contractor shall provide methods for measuring settlement or movement of falsework and forms under load. If falsework shows settlement greater than 3/8 inch at the vertical supports, the Contractor shall stop the Work and correct the settlement or movement.

If pilings are used for falsework, the Contractor shall pull or cut off falsework pilings. The Contractor shall ensure the cut-off elevations are one (1) ft below the low water level, natural ground, or bottom of proposed channel.

If required, the Contractor shall submit Plans for falsework to the State Bridge Engineer for approval. The Contractor shall submit proposed changes to existing Structures required for maintenance of traffic to the Project Manager for approval. 30 Days shall be allowed for the initial review. 15 additional Days shall be allowed for each resubmittal.

511.3.3 Form Construction

The Contractor shall make forms mortar tight and sufficiently rigid to prevent deformation due to the pressure of the concrete and other loads incidental to the construction operations, including vibration. The Contractor shall construct and maintain forms to prevent the joints from opening. The Contractor shall construct and maintain forms used on surfaces in public view such that the finished concrete surface will be smooth and of uniform color and texture.

The Contractor shall remove loose dirt, laitance and miscellaneous debris from the bottom of the forms before placing concrete.

The Contractor shall fillet forms and chamfer them 3/4 inch, unless required otherwise in the Contract,

and give them a bevel or draft for easy removal of projections such as girders and copings.

511.3.3.1 Form Lumber

The Contractor shall use lumber that is planed on at least one (1) side and the two (2) edges for exposed concrete surfaces. The Contractor shall place the planed face so that it will be the formed surface for the concrete being placed.

511.3.3.2 Metal Ties

The Contractor shall construct metal ties and anchorages within the forms to permit the removal of a portion of the tie connections without damaging the concrete, and provide at least 1/2 inch depth of cover from the concrete surface.

511.3.3.3 Surface Treatment of Forms

The Contractor shall ensure that forms have been properly wetted before placing concrete.

The Contractor shall use form release agents at their discretion before placing reinforcing steel. The Contractor shall not use form release agents that adhere to or discolor the concrete.

511.3.3.4 Metal Forms

The Contractor shall provide metal forms thick enough to prevent bending and maintain their shape. The Contractor shall use countersunk bolts and rivet heads. The Contractor shall use clamps, pins, and other connecting devices designed to hold forms rigidly together and for removal without damaging the concrete. The Contractor shall use metal forms that have a smooth surface and line up properly.

The Contractor may use metal forms that remain part of the Structure in accordance with the Contract or as approved by the State Bridge Engineer. The Contractor shall use permanent steel Bridge deck forms in accordance with Section 512.3.4.1, "Permanent Steel Deck Forms."

511.3.3.5 Reuse of Forms

The Contractor shall continuously maintain the shape, strength, rigidity, water tightness, and surface smoothness of reused forms. The Contractor shall resize warped or bulged lumber before reusing it.

511.3.4 Temperature and Weather Limitations

The Contractor shall keep the concrete mixture temperature between 50 °F to 90 °F at the time of placement.

511.3.4.1 Cold Weather Concrete

The Contractor shall place cold weather concrete in accordance with ACI 306, *Cold Weather Concreting*.

If air temperatures are likely to fall below 40 °F during the placement or curing periods, the Contractor shall submit a cold weather concreting and curing plan to the Project Manager for approval by the State Concrete Engineer before concrete placement. The Contractor shall allow 14 Days for review. The Contractor shall ensure that the plan details the methods and Equipment to maintain the required concrete temperatures over the entire concrete pour area.

Information submitted will include, but not be limited to:

- Whether or not outside heating sources will be used (and how the exhaust will be vented away from the fresh concrete);
- Whether or not the rate of surface evaporation is expected to exceed the limitations detailed in 511.3.4.3, "Rate of Evaporation Limitations" and measures to be taken
- What the target mix temperature will be;
- How the concrete will be protected from the ambient conditions;
- Curing methods to be used during and following the protection period;
- How soon after the placement the protection from the ambient conditions will be implemented;
- Who will be responsible for insuring that the proper protection from the environment is properly implemented;
- How the actual temperature of the concrete will be monitored;
 - How often will this be checked;
 - Who will do the checking;
- What actions will be taken if the temperatures fall below the target points;
- Who will be responsible for taking the necessary actions;
- Who the contact will be if Department Personnel need to transmit notices or information about the cold weather conditions.

Review and acceptance of the Cold Weather Concreting and Curing Plan shall not relieve the Contractor from its obligation to perform the Work and provide Materials in strict conformance with the Contract.

The Contractor shall not place concrete directly onto any surface that is less than 40 °F unless otherwise approved by the Project Manager. The Contractor shall not place concrete on frozen ground.

If placing concrete at or below air temperatures of 35 °F, the Contractor shall provide suitable enclosures and heating devices. The Contractor shall vent exhaust from combustion type heating devices outside the placing area so that the exhaust fumes cannot come in contact with the freshly placed concrete.

The Contractor shall ensure the concrete surface temperatures never fall below 45 °F during placement and the first three (3) Days after placing. The Contractor shall not let the surface temperature fall below 40 °F during the next four (4) Days after the initial 3 Day curing period, or until the in-place strength determined by the *Maturity Method*, in accordance with Section 510.3.5.2, "In-Place Concrete Strength Measurements" indicates that 75% of the design strength is achieved.

The Contractor shall monitor the minimum concrete temperatures at various locations including edges and corners of slabs or other Structures, and check immediately before placing insulating material over the concrete.

If heating the aggregates or water, the Contractor shall use heating methods and Equipment that can heat the Material uniformly. The Contractor shall not heat the Materials to more than 110 °F. During the heating or mixing process, the Contractor shall not add cement to water and aggregate combinations that are hotter than 90 °F.

511.3.4.2 Hot Weather Concrete

The Contractor shall place hot weather concrete in accordance with ACI 305, *Hot Weather Concreting*.

Hot weather is any combination of the following conditions that tends to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration or otherwise causing detrimental results: high ambient temperature; high concrete temperature; low relative humidity; wind speed; solar radiation.

The Contractor shall estimate the rate of evaporation at the surface of the concrete per 511.3.4.3, "Rate of Evaporation Limitations". If the rate of evaporation is anticipated to be greater than 0.2 lb per sqft per hour, the Contractor shall submit a hot weather concreting and curing plan to the Project Manager for approval by the State Concrete Engineer before concrete placement. The Contractor shall allow 14 Days for review.

The Contractor's Hot Weather Concreting and Curing Plan shall include measures that shall be taken by the Contractor at their expense and maintained to the satisfaction of the Project Manager to reduce the rate of evaporation during initial cure to within the specified rate. The methods can include but not be limited to following:

1. Erect windbreaks to reduce the wind velocity over the concrete surface;
2. Place concrete during nighttime or early morning hours;
3. Use cool aggregate and mixing water to lower the fresh concrete temperature;
4. Increase the relative humidity at the site with a fog spray; and/or
5. Apply a liquid-applied evaporation reducer

Review and acceptance of the Hot Weather Concreting and Curing Plan shall not relieve the Contractor from its obligation to perform the Work and provide Materials in strict conformance with the Contract.

511.3.4.3 Rate of Evaporation Limitations

The "Rate of Evaporation Limitations" are detailed in ACI 305 – Hot Weather Concrete. These procedures lessen the potential of plastic-shrinkage cracking in concrete. The "Rate of Evaporation Limitations" apply to Bridge decks, approach slabs, CBC (top and bottom slabs), slipped formed concrete Structures, all PCCP, structural shotcrete, and concrete slope paving. ACI 308 – Guide to Curing Concrete emphasizes that the rate of evaporation limitations can be exceeded in both cold and hot weather and must be addressed in both conditions.

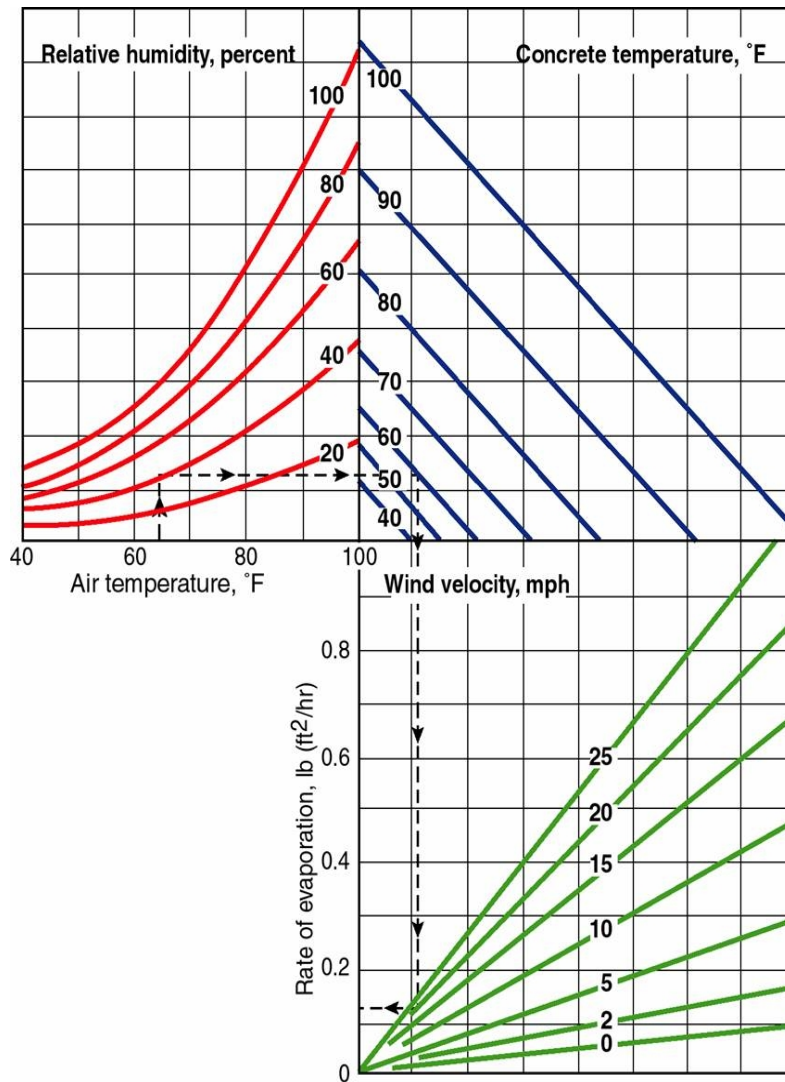
The Contractor shall determine the anticipated rate of evaporation of surface moisture from the concrete by utilizing Figure 511.3.4.3:1 – "Surface Evaporation from Concrete". The Contractor shall not place concrete if the anticipated rate of evaporation exceeds 0.20 lb per square foot per hour at the site

over any ten (10) minute period, unless measures are taken to prevent excessive moisture loss from the surface of the concrete during initial curing. See 511.3.4.2 for acceptable measures. These measures must be detailed in the Cold Weather Concrete Plan per 511.3.4.1 or the Hot Weather Concrete Plan per 511.3.4.2.

During the concrete placement, the wind speed, relative humidity and ambient air temperature shall be collected via a computerized weather station that shall be provided and retained by the Contractor. The weather stations shall be an automated system that does not require any human support or effort after its initial set-up. The Contractor shall record readings at minimum five (5) minute intervals until the final curing system has been physically applied. Copies of these readings shall be submitted to the Project Manager within 24 hours of the placement. Measurements to determine the Surface Evaporation from the Concrete shall be taken at a height of approximately five (5) feet above the deck for relative humidity and ambient air temperature, and at a height of 20 inches for wind speed.

For concrete placements that are smaller than 10 cubic yards, a handheld anemometer may be used in lieu of a weather station. The handheld anemometer shall be capable of measuring wind speed, humidity and air temperature; and shall be supplied and retained by the Contractor.

Figure 511.3.4.3:1
Surface Evaporation from Concrete (reference ACI 305)



To use this chart:

1. Enter with air temperature, move up to relative humidity
2. Move right to concrete temperature
3. Move down to wind velocity
4. Move left; Read approximate rate of evaporation

511.3.4.3.1 Wind Break

If a wind break is used, the wind break shall be a minimum height of eight (8) ft- 0 inches and constructed in a perimeter enclosing the Bridge deck, approach slabs, sleeper footings and/or transition slabs (if applicable). All areas of the freshly placed concrete must be protected by the wind break. The nature and type of windbreak to be used shall be approved by the Project Manager prior to placement of any Superstructure concrete.

511.3.4.3.2 Fogging System

If a fogging system is used, a water fog shall be continuously applied over the surface of the freshly placed concrete in such a manner that the entire surface is kept at a relative humidity of 90% or greater and the surface of concrete is kept at an evaporation potential of 0.15 pound/square foot/hour or less, as determined from Figure 511.3.4.3.1. The evaporation potential shall be determined prior to fogging and outside the wind protection, and continuously monitored with evaporation potential measurements taken and recorded at least once every five (5) min throughout the entire placement, and continuing until the concrete curing system has been completely installed. If a wind break and/or fogging are being used, the Contractor shall obtain these readings from the protected area at a height of approximately five (5) feet above the protected concrete.

The area to be fogged shall be the entire area of the freshly placed concrete, which has not had the final finish applied. This fog shall be delivered through a network of nozzles, which are properly spaced to provide a uniform fog at the surface of the concrete. The nozzles used shall be of the type, which atomizes the water so that there are no visually discernible droplets of water. The area of coverage from each nozzle shall overlap all adjacent nozzle coverage by at least one (1) ft. It shall be demonstrated prior to the placement of the concrete that the intended system is capable of delivering the required fogging environment for at least twice the anticipated required time. The Contractor shall not finish or otherwise mix any of the fogging water into the fresh concrete.

The intended system must be properly field tested, and approved by the State Materials Bureau before being used on any Superstructure concrete. Fogging shall continue until the surface is treated with an approved curing method.

511.3.4.3.3 Liquid Applied Evaporation Reducers

If a liquid-applied evaporation reducer is used, it shall be selected from the Departments Approved Products list and must be applied in strict accordance with manufacturer's application instructions.

Liquid applied evaporation reducers are not curing compounds and are not finishing aids. Liquid applied evaporation reducers are to be used to reduce surface evaporation during the initial cure of concrete. Initial cure of concrete typically occurs up to and including bull-floating. Multiple applications of liquid applied evaporation reducer may be required, reference manufacturer's application instructions.

Upon commencing surface finishing (beyond bull-floating), further application of liquid evaporation reducers shall not be allowed (liquid evaporation reducers cannot be used as finishing-aids). Cure concrete after surface finishing in accordance with 511.3.9 – Curing.

511.3.5 Concrete Placement

Concrete shall be placed and tested for compliance with the Project Specifications in accordance with Section 510, "Portland Cement Concrete".

The Contractor shall not place concrete until the Project Manager approves the reinforcing steel and forms. The Contractor shall ensure that forms are clean and free of rust, grease, and other Deleterious Material immediately before placing the concrete. The Contractor shall remove wooden form spacers immediately before placing concrete in that area.

The Contractor shall vibrate the concrete during placement to force the coarse aggregate from external surfaces and to bring mortar against the forms to produce a smooth finish significantly free of water, air pockets, and honeycombs.

The Contractor shall place concrete in girders, walls, and other similar Structures in horizontal layers. The Contractor shall ensure that the concrete is not too thick for the vibrator to consolidate and merge it with the previous layer. The Contractor shall not pour concrete layers deeper than two (2) ft.

The Contractor shall not place concrete faster than the rate used for the design of the forms. The Contractor shall adjust the rate for the temperature of the concrete being placed.

511.3.5.1 Chutes and Troughs

The Contractor shall avoid segregation of the Materials and the displacement of the reinforcement when placing the concrete. The Contractor shall use metal or metal-lined open troughs and chutes; do not use aluminum. All tools used for the moving and/or spreading of the concrete shall be square pointed tools. The Contractor shall not use round nose shovels and spreading tools.

Where the Contract requires steep slopes, the Contractor shall equip the chutes with baffle boards or use short lengths that reverse the direction of movement.

The Contractor shall keep chutes, troughs, and pipes clean and free of hardened concrete by thoroughly flushing with water after each pour. The Contractor shall discharge the water used for flushing away from the placed concrete.

The Contractor shall not allow concrete to free fall for more than five (5) ft, unless confined by closed chutes or pipes. With the exception of CBC walls, for walls equal to or less than ten (10) inch thick, concrete may have a free fall of less than nine (9) ft.

The Contractor shall fill each part of the form by placing the concrete as close to the final position as possible. The Contractor shall vibrate the concrete during placement to force the coarse aggregate back from the forms and around the reinforcement without displacing the bars. After the concrete's initial set, the Contractor shall not jar the forms or place strain on the ends of projecting reinforcement.

511.3.5.2 Concrete Pumping

If placing concrete by pumping, the Contractor shall install pumping Equipment so that vibrations

resulting from the operation do not damage the concrete being placed. The Contractor shall obtain Project Manager approval before using concrete pumping Equipment.

Before placing the concrete, the Contractor shall clean the Equipment thoroughly. The Contractor shall operate the Equipment so that it pumps a continuous flow of concrete without air pockets and without an appreciable loss of slump or entrained air.

The Contractor shall control the loss of entrained air by one (1) or more of the following methods:

1. Tie the end of the pump hose so that the discharge end is pointing upward, forming a "J" at the end of the hose;
2. Install a series of four (4) consecutive elbows to form a 360° loop;
3. Reduce the diameter of the end of the pump line; or
4. Limit the enclosed angle of the boom arms to an angle of 135° or more.

The Contractor shall make sure that the discharge of the concrete from the pump is as close as possible to the bottom of the structure being placed, but in no case shall it be allowed to drop a distance greater than four (4) feet with the exception of CBC walls where the walls equal to or less than ten (10) inch thick, concrete may have a free fall of less than nine (9) ft.

The Contractor shall not use aluminum pipe. The Contractor shall not add water to the concrete during pumping. If water is added at the pump hopper to clear a clogged pump, the Contractor shall dispose of the concrete in the hopper and the line.

511.3.5.3 Conveyers and Belts

The Contractor may use conveyor belts to transport the concrete from the point of delivery to the point of placement. If using multiple belts, the Contractor shall ensure that the drop from one (1) belt to the next is no greater than 18 inches. At the end of the last belt, the Contractor shall not allow the concrete to free-fall more than four (4) ft. The Contractor shall ensure that the concrete coming off the end of any belt is not being segregated. If segregation occurs, the Contractor shall slow down the speed of the belt until segregation no longer occurs.

511.3.5.4 Placing Concrete Under Water

If placing concrete under water, the Contractor shall submit a mix design and procedure plan to the Project Manager. The Project Manager may require up to 30 Days to approve them. The Contractor shall allow time in the schedule to accommodate this approval process.

511.3.5.5 Vibrating/Consolidation

Unless otherwise directed by the Project Manager, and excluding drilled shafts, the Contractor shall consolidate concrete with suitable mechanical vibrators operating within the concrete. During concrete placement, the Contractor shall keep enough personnel, vibrators, and other tools available to assure adequate consolidation. If necessary, the Contractor shall supplement vibrating with hand spading with suitable tools to assure proper consolidation. If using vibrators, the Contractor shall use procedures in accordance with ACI 309 – Consolidation of Concrete.

The Contractor shall not use a "jitterbug" or any other flat tool that could cause concrete segregation.

The Contractor shall use approved vibrators that can transmit vibration at frequencies up to 10,000 vpm. The Contractor shall provide vibrators that have each been certified within the last 90 Days to provide 8,000 to 10,000 vpm.

The Contractor shall operate vibrators to consolidate the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The Contractor shall not use vibrators to make concrete flow or run. The Contractor shall vibrate long enough to accomplish consolidation, but do not vibrate so long to cause segregation or air bubbles. The Contractor shall insert the vibrators vertically into the concrete, and immediately withdraw upward along the same line with the opposite motion. The Contractor shall not drag the vibrator horizontally across the placing area.

When operating vibrators, the Contractor shall avoid contact with reinforcing bars, particularly epoxy coated reinforcing bars or bars that extend into concrete that has taken an initial set. If vibrating concrete in areas reinforced with epoxy-coated bars, the Contractor shall cover the vibrators with nonmetallic sleeves to prevent damage to the epoxy coating.

511.3.5.6 Sequence of Placement and Application of Load

The Contractor shall not place superimposed loads on or against load carrying members, floor slabs, or retaining walls until the concrete reaches 75% of specified design compressive strength but no less than 2,500 psi, as determined by the *Maturity Method*, in accordance with Section 510.3.5.2, "In-Place Concrete Strength Measurements." Concrete Box Culverts and CBC wingwalls shall not be backfilled until specified design compressive strength has been achieved.

The Contractor shall submit a concrete placement schedule to the Project Manager upon request. The Contractor shall plan and schedule concrete placement to prevent damage to previously placed concrete or to the curing or protection systems of previously placed concrete.

The following applies to concrete placement scheduling:

1. The Contractor may erect reinforcement and formwork for walls, columns, and pier caps 24 h after placement of footings or floor slab concrete;
2. Unless otherwise provided, the Contractor may place concrete columns, walls, and pier caps, 48 h after placement of footing or floor slab concrete;
3. Do not set beams or girders, or place Superstructure concrete until Substructure forms have been stripped sufficiently to determine the quality of the concrete;
4. Do not place the load of the Superstructure on the Substructure until the Substructure concrete has been in place for at least 14 Days or until in-place strength measured by the *Maturity Method* indicates that the concrete has attained 75% of the design strength;
5. Ensure that the concrete has achieved sufficient strength as determined by the *Maturity Method* in accordance with the form design before placing concrete for integral horizontal members, such as pier caps or top slabs;
6. Place the vertical members at least seven (7) Days before mounting friction collars or falsework

brackets that will support the weight of horizontal members. Ensure that the vertical members have attained the specified strength before applying loads, unless the Department approves otherwise;

7. Limit monolithic casting of walls and deck slabs of concrete box Culverts to Culverts that are six (6) ft high or less. Construct box Culvert walls higher than six (6) ft in accordance with this subsection;
8. If the concrete is not gaining strength as expected, the Assistant District Engineer of Construction may extend the waiting periods. Conduct construction operations in a manner that does not damage the previously placed concrete.

511.3.5.7 Supplementary Lighting

The Contractor shall not mix, place, or finish concrete when the natural light is insufficient without using an adequate artificial lighting system, approved by the Project Manager. The Contractor shall test the lighting system at least one (1) Day before placing the concrete to assure that the system will provide sufficient light, without shadows or dark areas for placing, testing and finishing concrete. The Contractor shall ensure that the lights do not create a hazard for traffic on adjacent Roadways or Detours.

511.3.6 Removal of Forms

The Contractor shall not remove the forms until the concrete is strong enough to avoid damage by removing the forms.

If in-place strength tests in accordance with Section 510.3.5.2, "In-Place Concrete Strength Measurements," are not used to control field operations, remove forms in accordance with Table 511.3.6:1, "Timetable for Removal of Forms," not counting those Days when the temperature is below 40 °F.

Table 511.3.6:1**Timetable for Removal of Forms**

Structural component	Minimum time for removal
Bottom of beams	14 Days
Bridge decks ^a	seven (7) Days
Floor slabs	seven (7) Days
CBC Floors	seven (7) Days
CBC Top Slab	seven (7) Days
Walls	24 h
Columns	48 h
Sides of beams	24 h
All other parts	24 h
^a Additional requirements of Section 512, "Superstructure Concrete," shall apply.	

If one (1) of the test methods in Section 510.3.5.2, "In-Place Concrete Strength Measurements," is used to control the field operations, the Contractor may remove forms from the bottom of beams and floor slabs when the concrete reaches 75% of the design compressive strength.

511.3.7 Joints

The Contractor shall make construction joints in concrete Structures in accordance with the Plans, unless otherwise directed or approved by the Project Manager.

If the concrete placement is interrupted and additional construction joints are required, the Contractor shall place the additional joints in planes perpendicular to the principal lines of stress, and at points of minimum shear, as approved by the Project Manager.

511.3.7.1 Keyed Joints

The Contractor shall mechanically bond construction joints with keys formed by beveled strips embedded in the surface of the concrete. The Contractor shall make the keys from 1 3/8 inch to 1 1/2 inch deep. The Contractor shall place the keys centrally within the thickness of the joint. The Contractor shall ensure that the keys have a width that is one-third of the depth of the smallest dimension of the joint. The keys do not need to exceed the clear distance between reinforcing mats, or be greater than eight (8) inches. The Contractor shall provide raised keys in accordance with the Plans.

511.3.7.2 Bonding New Concrete to Existing

If bonding new and existing concrete, the Contractor shall retighten the forms before depositing new concrete on or against the hardened concrete. The Contractor shall roughen the surface of the hardened concrete without loosening the aggregate or damaging the concrete on the surface. The Contractor shall thoroughly clean the surface of foreign matter and laitance.

The Contractor shall utilize a bonding method at the interface between the hardened and fresh

concrete by covering the cleaned and saturated surfaces with a coating of enriched mortar (reference Section 533 for enriched mortar specifications), or a latex bonding agent from the Approved Product List. The Contractor shall place the new concrete before the enriched mortar reaches an initial set. If using a latex bonding agent, the Contractor shall follow the manufacturer's application instructions. The Contractor shall place the concrete continuously from joint to joint, and finish the face edges of exposed joints in accordance with the Plans.

511.3.7.3 Water Stops and Flashings

The Contractor shall provide and place water stops, and flashings per the Contract documents. The Contractor shall splice or solder water stops and flashings to form continuous watertight joints.

Swellable hydrophilic waterstop shall be installed with 2" minimum concrete cover. Materials shall be installed per manufacturer's installation instructions.

511.3.7.4 Joint Sealing Materials

The Contractor shall install joint sealers in accordance with the manufacturer's recommendations, including surface preparation and the use of primers and backer-rod as required.

511.3.8 Miscellaneous Construction

511.3.8.1 Setting of Bearings

The Contractor shall ensure the surfaces on which metal masonry plates and elastomeric bearing pads will rest are flat and on level planes. If using elastomeric bearing pads, the Contractor shall finish the Bridge seats slightly high and grind to the correct elevation.

If it is necessary to adjust the elevation of a bearing upward, the Contractor shall make the adjustment by placing full size shim plates. If it is necessary to adjust the elevation of a bearing downward, the Contractor shall make the adjustment by diamond grinding to a level plane-bearing surface. The Contractor shall not use grout to level or adjust elevation.

If placing a bearing surface below the level of adjacent concrete, the Contractor shall ensure water drains away from the masonry plate or elastomeric bearing pad.

The Contractor shall finish sections of Bridge seats on abutments or piers on both sides of bearing assemblies to drain, with a slope of from 1/16 inch to 1/8 inch per foot. The Contractor shall correct depressions that retain water.

511.3.7.2 Waterproofing

If required in the Contract, the Contractor shall protect the backsides of abutment backwalls and wingwalls by waterproofing. The Contract shall define the vertical and horizontal limits of the waterproofing. The material shall be installed in conformance with the manufacturer's application instructions.

511.3.8 Finishing

The Contractor shall perform finishing after removing forms in accordance with the Contract.

511.3.8.1 Exposed Surfaces

The Department considers "exposed surfaces" as surfaces that are not buried in the ground or permanently covered by the fill, or against which the fill is not permanently placed. However, the Department does not consider the inside surfaces of concrete box drainage Culverts and concrete box girders, and the bottom side of concrete Bridge decks as "exposed surfaces."

511.3.8.2 Class 1, Ordinary Surface Finish

The Contractor shall apply a Class 1 finish to exposed surfaces as a final finish or before a Class 2, Rubbed Surface Finish, or a Class 4, Special Surface Finish.

A Class 1 finish includes the removal of rods, bolts, or other form ties to at least 1/2 inch deep from the face of the concrete. The Contractor shall fill tie holes and honeycombs with mortar composed of one (1) part cement and two (2) parts sand; use the same brand and type of cement as used in the concrete.

The Contractor shall remove objectionable fins, bulges, and projections by rubbing with carborundum bricks or by other methods approved by the Project Manager. If necessary, the Contractor shall clean the entire surface. The Contractor shall keep such surfaces in an acceptable condition until final Acceptance of the Work.

The Contractor shall apply a Class 1 finish to surfaces buried in the ground or permanently against the fill, except that form ties may be cut off even with the concrete surface, and fins, minor bulges, projections, stains, and discolorations do not need to be removed.

Unless specified otherwise in the Contract, the Contractor shall apply a Class 1 finish to the front faces of backwalls of abutments, the top surfaces of Bridge seats on piers and abutments, and concrete curtain walls between pier pilings.

The Contractor shall apply a Class 1 finish to the inside surfaces of concrete box drainage Culverts, except as noted in Section 511.3.8.3, "Class 2, Rubbed Surface Finish."

511.3.8.3 Class 2, Rubbed Surface Finish

The Contractor shall apply a Class 2 finish to concrete surfaces generally exposed to public view.

The Contract may specify a Class 4, Special Surface Finish with selected colors, for various components or parts of components. If the Contract specifies a Class 4, Special Surface Finish, the Contractor shall apply a Class 2 finish first, unless otherwise approved by the Project Manager.

A Class 2 finish consists of a Class 1 finish, then thoroughly wetting the surface and applying a mortar.

The Contractor shall apply a thin mortar, composed of one (1) part cement and four (4) parts sand, and rub it into holes and pockets; use the same brand and type of cement as used in the concrete. The

Contractor shall use sand passing a No. 16 sieve. The Contractor shall allow the mortar to remain until it has set sufficiently to prevent removal by subsequent rubbing operations. The Contractor shall rub the surface with a No. 25 to No. 30 carborundum brick, then, rub with burlap to remove excess mortar. If the completed rubbed surface does not look uniform, the Contractor shall make a final finish by wet rubbing with a No. 30 carborundum brick.

The Contractor shall apply Class 2 finish to the following:

1. Outside vertical surfaces of Bridge decks;
2. Outside surfaces of exterior girders, curb and rail posts seen in elevation view;
3. Curb tops, post tops, inside faces of curbs, and faces of hand rails;
4. Exposed surfaces of pier columns and caps;
5. Abutment wingwalls and Bridge seats one (1) ft below final grade;
6. Bridge rehabilitation Projects with existing slope paving;
7. Top surface of slope paving (tops of Bridge seats require only a Class 1 finish);
8. Exposed surfaces of barrier railings on Bridges or concrete box Culverts;
9. Exposed surfaces of miscellaneous concrete Structures extending above Shoulder line grade and inside walls of concrete underpass Structures.
10. Concrete box Culverts used for drainage, on the soffit and streamside faces of headwalls and wingwalls, and for six (6) inches down the back side of wingwalls; and
11. The interiors of sidewalls to one (1) ft back from the face of the Culvert at the tops of the sidewalls, and extending on a 45° line downward and inward.

511.3.8.4 Class 3, Float Finish

The Contractor shall apply a Class 3 finish to upper surfaces not formed, such as tops of walls, headwall, tops of slabs and bottom slabs of box Culverts, copings and Bridge seats, except tops of Bridge decks, Sidewalks, or curbs.

A Class 3 finish consists of placing an excess amount of concrete in the forms and striking off this excess concrete with a template, forcing the coarse aggregate below the surface. After striking off the concrete, the Contractor shall thoroughly work the surface with a wooden, cork, or canvas float without adding water or cement. Before the final finish has set, the Contractor shall use a fine brush to remove surface film and to produce a fine grain, smooth, sanded texture.

511.3.8.5 Class 4, Special Surface Finish

When specified in the Contract documents, the Contractor shall apply a Class 4, Special Surface Finish. The Class 4, Special Surface Finish shall be applied in accordance with Specification Section 548 - Concrete Coatings.

The Contractor shall apply the Class 4 finish over the Class 2 finish, unless directed otherwise by the Project Manager.

The Contractor shall apply the Class 4 finish consistent with the location requirements of 511.3.8.3 Class 2,

Rubbed Surface Finish. If repairing existing Structures, apply a Class 4 finish to the entire surface of the repaired components.

511.3.9 Curing

The Contractor shall cure all concrete in accordance with ACI 308 – Guide to Curing Concrete. All concrete shall receive a minimum of seven (7) Days of curing treatment. The Contractor shall use curing methods in accordance with Table 511.3.10:1, "Curing of Concrete Structures," unless the Contract specifies otherwise.

If the Department allows the Contractor to choose the curing method, the Contractor shall obtain the approval of the Project Manager before beginning curing operations.

**Table 511.3.10:1
Curing of Concrete Structures**

Method designation	Curing method description
Method 1	Water curing
Method 2	Curing compound
Method 3	Form curing
Method 4	Combination of Method 1 and Method 2
Structure description	Curing methods
<u>Top surfaces of:</u>	
Bridge decks ^a	4
Approach slabs	4
Concrete curbs, gutters and Sidewalks	1 or 2
Pier caps, abutment Bridge seats	1 or 2
Wingwalls and parapet walls	1 or 2

All vertical concrete surfaces that begin in contact with form materials, including but not limited to:	
Barrier walls, barrier railing, wingwalls, parapet walls, abutments, box culverts, decks, slabs, curbs, gutters, sidewalks, construction joints	3
Elevated horizontal surfaces on the underside of structural elements that begin in contact with temporary form materials including but not limited to:	3
Slip Formed Concrete elements including but not limited to:	2
concrete wall barriers, curb, gutter	
All other concrete ^b	1, 2, or 3
^a See Section 512.3.10.1, "Curing," for additional curing requirements for Bridge decks.	
^b Unless the Contract specifies otherwise.	

511.3.9.1 Method 1, Water Curing

The Contractor shall keep the concrete thoroughly and continuously wet and covered for at least seven (7) Days. The Contractor shall place and anchor covers, mats, and sheeting to ensure continuous contact with the concrete surfaces.

The Contractor shall cover concrete slabs as soon as possible with a double layer of clean, wet burlap or cotton mats, or other moisture retaining Material approved by the Project Manager. The Contractor shall ensure that the moisture retaining Materials lay flat with no wrinkles and that adjacent strips of moisture retaining materials overlap at least 12 inches. After installation, the Contractor shall soak the moisture retaining material and add moisture as required to ensure that it is not allowed to become dry for the duration of the specified curing period. The Project Manager will determine the suitability of the moisture retaining material for reuse, based on the cleanliness and absorptive ability of the Materials.

In addition to the moisture absorptive material, the Contractor shall install plastic sheeting over the moisture absorptive material. If the slabs are on grade, the Contractor shall extend the cover materials at least twice the slab's thickness beyond the edges of the slab, and make sure that the entire exposed surface of the concrete is protected. If the slab is a Bridge deck, the Contractor shall place the cover materials to fully protect exposed edges and unformed surfaces of the concrete.

The Contractor may temporarily remove the cover from surfaces that require a rubbed finish for finishing, but shall restore the cover as soon as possible.

511.3.9.2 Method 2, Curing Compound

Application of curing compound shall be in accordance with manufacturer's application recommendations.

For slabs, Bridge decks and other flatwork, the Contractor shall apply the curing compound to the fresh concrete as soon after finishing as allowed by the manufacturer.

The Contractor shall thoroughly mix the membrane forming curing compound per the manufacturer's recommendations.

The Contractor shall not apply the curing compound in rainy conditions. The Contractor shall adhere to the thermal limitations as specified by the manufacturer – typically, the product when stored should not be allowed to freeze and should not be applied when the air or concrete temperature is less than 40 degrees Fahrenheit.

The Contractor shall apply the curing compound under pressure with an atomizing-type spray nozzle. The Contractor shall uniformly cover the entire surface area at the rate recommended by the manufacturer or at a rate of at least one (1) gal per 175 ft² whichever rate is greater. The Contractor shall use spray Equipment with enough pressure to force the curing compound to leave the nozzle as a fine mist. If the nozzle becomes plugged, the Contractor shall immediately clear the nozzle before continuing the application. The Contractor shall not continue to spray curing compound through a nozzle that has become plugged or obstructed.

The Contractor shall apply the curing compound by first spraying back and forth in one (1) direction until a uniform covering has been achieved. Then, the Contractor shall spray back and forth in a direction perpendicular to the first application until a second, uniform covering has been achieved. The Contractor shall ensure that the entire curing surface has been uniformly covered with two (2) coatings of curing compound. The Contractor shall not apply the curing compound to exposed reinforcing steel.

The Contractor shall protect all surfaces covered with curing compound for seven (7) Days after application. The Contractor shall provide walkways and mats for workmen, Material, and Equipment.

The Contractor shall not use a curing compound that exhibits separation, segregation, or skimming.

The Contractor shall not apply curing compound to surfaces that will receive a Class 2 or Class 4 finish, unless the Contractor thoroughly cleans the surfaces per the recommendations of the manufacturer of the Class 2 or Class 4 finish product.

511.3.9.3 Method 3, Form Curing

The Contractor shall leave forms in place in accordance with 511.3.6. The Contractor shall keep wood forms moist during the curing period and replenish the system with water to maintain a continuously moist condition. The Contractor shall cure exposed surfaces with Methods 1 or 2.

Form removal shall be in accordance with 511.3.6 "Removal of Forms". Should forms be removed prior to the specified seven (7) day curing period, the Contractor shall immediately resume curing by Method 2.

For Structures with formed surfaces that require the application of a finish per 511.3.8 "Finishing" such as barrier walls, barrier railings on Bridges, wingwalls, or parapets on Bridges or box Culverts, the Contractor shall remove the forms in accordance with 511.3.6 "Form Removal", finish the concrete in accordance with 511.3.8 "Finishing", and resume curing with Method 2 for the duration of the curing period. The Contractor shall not pause curing for more than two (2) hours.

511.3.9.4 Method 4, Combination of Curing Compound and Water Curing

The Contractor shall apply Method 2 curing compound as soon after finishing as is allowed by the manufacturer.

When the concrete is hard enough that placement loads and burlap or cotton mats can be applied without marring the concrete surface or deformation of structural elements, the Contractor shall apply Method 1 curing directly over the curing compound coated surface.

511.3.9.5 Equipment and Personnel Readiness

The Contractor shall show the Project Manager that curing Material and Equipment (including backup sprayers and mixers) are in working order, at least one (1) Day before concrete placement.

511.3.9.6 Temperature Requirements for Storage and Application

The Contractor shall store curing compounds in protected areas away from weather and extreme temperatures and per the manufacturer's recommendations. The Contractor shall dispose of compounds that have been frozen in storage. The Contractor shall apply curing compounds when the temperature of the compound is between 50 °F and 95 °F.

511.3.10 Penetrating Water Repellent Treatment Solution

The Contractor shall saturate the exposed surfaces of the following concrete Structures with a penetrating water repellent treatment in accordance with Section 532, "Penetrating Water Repellent Treatment;"

1. Bridge wingwalls;
2. Front and side faces of abutment Bridge seats;
3. Front faces of abutments, backwalls and diaphragms;
4. Top surfaces of Bridge seats on piers and abutments;
5. Pier columns, stem walls and vertical surfaces of pier caps;
6. Top and vertical side surfaces of Bridge decks, except in the areas where using epoxy Bridge deck overlays;
7. Top surfaces of concrete approach slabs;
8. Concrete barrier railings;
9. Concrete wall barriers; and
10. Sidewalks, curbs and gutters on Structures.

The Contractor shall extend treatment to at least one (1) ft below the final groundline.

The Contractor shall not treat the underside of pier caps, or side and end surfaces of concrete approach slabs.

511.4 METHOD OF MEASUREMENT

The Department will measure all pay items using the dimensions shown in the Contract or approved modifications.

511.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Structural Concrete, Class _____</i>	Cubic Yard
<i>Structural Concrete, Class _____, _____ inch</i>	Square Yard
<i>Substructure Concrete, Class _____</i>	Cubic Yard

511.5.1 Work Included in Payment

The following Work and items will be considered as included in the payment for the main item(s) and will not be measured or paid for separately:

1. Waterstops and flashings;
2. Waterproofing;
3. Premolded and preformed joint fillers;
4. Concrete required to fill overbreakage in excavation when footings or walls are cast against vertical or horizontal faces of excavation;
5. Installation of drains and weep holes;
6. Extruded polystyrene;
7. Means and methods associated with placement of concrete in hot and cold weather conditions, including but not limited to wind break, fogging systems, and temporary heat.

**SPECIAL PROVISIONS
MODIFYING
SECTION 512: SUPERSTRUCTURE CONCRETE**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

512.3 CONSTRUCTION REQUIREMENTS

Delete Subsection 512.3.7.3 Rate of Evaporation Limitations and substitute with the following:

Comply with Section 511.3.4.5 Rate of Evaporation Limitations.

512.3.10 Final Operations

Delete Subsection 512.3.10.1 Curing and substitute with the following:

Unless otherwise specified in the Contract, cure Bridge decks and approach slabs in accordance with Section 511.3.10, "Curing." Ensure forms supporting Bridge decks remain in place for at least seven (7) Days.

SPECIAL PROVISIONS MODIFYING SECTION 519: SHOTCRETE

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Include Subsection 519.2.1.1 and 519.2.1.2 to include the following:

519.2.1.1 Fine Aggregate Quality Requirements

Provide fine aggregate with the following properties:

1. A soundness Loss of 12 or less when tested in accordance with AASHTO T 104 using magnesium sulfate solution and a test duration of five (5) cycles; and
2. A sand equivalent of at least 75 when tested in accordance with AASHTO T 176.

519.2.1.2 Fine Aggregate Gradation Requirements

Fine aggregates shall comply with Table 519.2.1.2:1 for either Grading No.1 or Grading No. 2

Table 519.2.1.2:1 Fine Aggregate Gradation

Sieve size, U.S. standard square mesh	Percent by weight passing individual sieves	
	Grading No. 1	Grading No. 2
3/4 in. (19 mm)	—	—
1/2 in. (12 mm)	—	100
3/8 in. (10 mm)	100	90 to 100
No. 4 (4.75 mm)	95 to 100	70 to 85
No. 8 (2.4 mm)	80 to 98	50 to 70
No. 16 (1.2 mm)	50 to 85	35 to 55
No. 30 (600 μ m)	25 to 60	20 to 35
No. 50 (300 μ m)	10 to 30	8 to 20
No. 100 (150 μ m)	2 to 10	2 to 10

**SPECIAL PROVISIONS
MODIFYING
SECTION 532: PENETRATING WATER REPELLENT TREATMENT**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

532.4 METHOD OF MEASUREMENT

Delete Subsection **532.4 METHOD OF MEASUREMENT** and substitute with the following:

Penetrating Water Repellent Treatment of existing concrete surface areas will be paid for at the contract unit price per square yard.

532.5 BASIS OF PAYMENT

Pay Item	Pay Unit
Penetrating Water Repellent Treatment	Square Yard

Include the following Subsection:

532.51 Work Included in Payment

Penetrating Water Repellent Treatment applied to surfaces of new concrete structures will be considered as included in the payment for the main items and will not be paid for separately.

SPECIAL PROVISIONS
MODIFYING
SECTION 536: POLYMER CONCRETE BRIDGE DECK OVERLAY

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Replace the following Subsection **536.3.6 Usage Limitations** in its entirety.

The manufacturer's application requirements shall govern. If the manufacturer does not provide guidance on the following items, the following shall apply:

1. PCC shall not be less than 28 Days of age at the time of overlay.
2. The concrete shall be dry at the time of overlay application. The criteria for "dry" shall be established by ASTM D 4263: for every 500 square feet, an 18 inch x 18 inch plastic sheet shall be taped to the deck with 2" duct tape. The test area shall be protected from direct sunlight, direct heat, and damage to the plastic. After 16 hours, the concrete shall be considered dry when no moisture appears on the bottom of the plastic.
3. The air and deck temperature shall be a minimum of 40 °F at the time of overlay application, and for eight (8) hours after overlay application. Do not use artificial methods to raise the deck temperature.
4. Do not apply the epoxy or epoxy urethane if the gel time is less than ten (10) minutes.

For new Bridge decks with unventilated stay-in-place forms, in addition to the manufacturer's application requirements, the Contractor shall not install the overlay on PCC that is less than 56 Days of age.

Delete Subsection **536.3.11 Warranty** in its entirety.

November 17, 2016

**SPECIAL PROVISIONS
MODIFYING
SECTION 537: POLYESTER CONCRETE BRIDGE DECK OVERLAY**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **537.3.11 Warranty** in its entirety.

SPECIAL PROVISIONS MODIFYING SECTION 544 – PROTECTIVE COATING OF NEW STRUCTURAL STEEL

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Replace **Section 544 Protective Coating of New Structural Steel** in its entirety with the following:

544.1 DESCRIPTION

This Work consists of applying liquid coating materials to steel surfaces.

Refer to Section 541 "Steel Structures" for galvanized (hot-dipped)" applications. Refer to Section 545 "Protective Coating of Miscellaneous Structural Steel" for two coat and powder coating applications. Note that bridge railings are included in 545. Refer to Section 546 "Recoating Structures" for repairs to new coatings. The Contractor shall adhere to all requirements in Section 547 "Safety and Environmental Requirements for Painting Operations" of this specification.

544.1.1 Terminology and Standards

The Contractor shall use terminology in accordance with the following standards:

Society for Protective Coatings (SSPC) Painting Manual Volume 2
Surface Preparation Standards, Guides, and Specifications, Section 2 of the SSPC Painting Manual
Volume 2 (SSPC-SP) American Architectural Manufacturer's Association (AAMA)
American Association of State Highway and Transportation Officials (AASHTO)
American Society for Testing and Materials (ASTM)
American Institute of Steel Construction (AISC)

544.2 MATERIALS

544.2.1 Coating System

The Contractor shall select a complete coating system comprised of products meeting all performance requirements as listed in Table 544.2.1:1 below. Testing shall be in accordance with AASHTO R-31. All products in each system shall be from the same manufacturer. All products shall be represented on the latest version of the manufacturer's product data sheet as being suitable for use on bridges and capable of being applied at the specified dry film thickness requirements in Table 544.3.4.4:1

Inorganic Zinc-Rich Primer – Shall achieve minimum SSPC Paint 20 Level 2 requirements for amount of zinc dust in the dry film of equal to or greater than 77% by weight.

Epoxy Intermediate Coat – Shall be a two-component epoxy, polyamide or polyamidoamine, including Phenalkamine coatings with minimum solids by volume of 65%.

Polyurethane Topcoat – Shall be a two-component aliphatic polyurethane coating with minimum solids by volume of 65%.

Table 544.2.1:1
Acceptable Product Requirements

TEST	REF. NO.	PRODUCT(S)	ACCEPTANCE CRITERIA	COMMENTS
Slip Coefficient	ASTM A 325, Appendix A.	IOZ	Class B, Min. 0.5	
Salt Fog Resistance	ASTM B 117	P/I/T (IOZ)	(A) No Delamination Allowed (B) Rust – Max creep 4mm, Avg. creep 2mm @5000 Hrs. (C) Blister – Conversion #8 @ 4000 Hrs.	
Cyclic Weathering Resistance	ASTM D 5894	P/I/T (IOZ)	(A) No Delamination Allowed (B) Rust – Max creep 4mm, Avg. creep 2mm @5040 Hrs. (C) Blister – Conversion #9 @ 4032 Hrs.	
Adhesion Pull-Off Strength	ASTM D 4541	IOZ Alone P/I/T (IOZ)	2.4 MPa (600 psi) 2.4 MPa (600 psi)	
Freeze-Thaw Stability Pull-Off Strength	ASTM D 4541	P/I/T (IOZ)	2.4 MPa (350 psi) 4.1 MPa (600 psi) 2.4 MPa (350 psi) 4.1 MPa (600 psi)	Requires same average as adhesion pull-off strength results, with no tests measuring less than 60% of those results
Field History	NA	P/I/T (IOZ)	Five (5) Bridges with Minimum two (2) year successful field history	

P = Primer; I = Intermediate coat; T = Topcoat; IOZ = Inorganic Zinc Rich Primer

For structural components that require a galvanized (hot-dipped) coating, reference 541.2.6 "Structural Steel Coatings".

Primer information for the use of organic zinc for touch-up and repair is included in Section 546: Recoating Structures

If the Contract does not specify a color, the Contractor shall use the color Federal Standard 16307, RAL 7004, Pantone 423, or approved equal.

544.2.2 Submittals

The Contractor shall provide a submittal for the proposed coating option and manufacturer to the Project Manager at least 30 Days before coating operations. If the color varies from the specified color, the Contractor shall submit color samples on boards at least eight (8) inches by ten (10) inches for review and approval.

The Department may take random coating Materials samples during the Work for testing.

When the contract requires painting more than 1,500 sq ft of steel surface, the Contractor shall submit a coating plan 30 Days prior to start of coating operations. Sample coating plans are available on the NMDOT website.

544.2.2.1 Certification

After the Department approves the coating Material, the Contractor shall submit:

1. Notarized manufacturer's Certificates of Compliance stating that the Materials are the same as those described in the manufacturer's product data sheets.
2. Certified test reports from an independent laboratory performed in accordance with AASHTO R-31, showing acceptable performance results as listed on the chart in Section 544.2.1. The Contractor shall submit two (2) copies of each to the Department.

544.2.2.2 Product Data Sheets

The Contractor shall provide manufacturer's product data sheets and SDS with each Submittal that shows the following:

1. Mixing and thinning directions;
2. Recommended spray nozzles and pressures;
3. Minimum/maximum drying time, including re-coat times, for shop or field applied coats; and
4. Manufacturer recommended application procedures, including temperature requirements.

544.2.2.3 Contractor Qualifications

When the contract requires painting more than 1,500 sq. ft of steel surface, the Contractor shall demonstrate qualification by one of the following two methods:

Method 1

Obtain SSPC QP 1 certification for field painting or either SSPC-QP 3 certification or the AISC Sophisticated Paint Endorsement (SPE) for shop painting. The Contractor shall perform and

document QA/QC inspections daily. QA/QC inspection documents shall be electronically submitted to the Project Manager on a weekly basis.

Method 2

Provide a coating plan and provide for NACE certified inspection (Level 2 minimum). The inspection services shall include but not be limited to:

1. Surface preparation and cleanliness inspection verifying profile and appropriate surface preparation.
2. Confirm and document products match approved submittals and certification letters. Document the batch numbers of all coatings.
3. Inspection of primer coat to include dry film thickness readings. Review contractors QA/QC reports for environmental conditions and document.
4. Observe application of stripe coat on the intermediate coat and document environmental readings during the start and stop of application. Review contractors QA/QC reports.
5. Inspect intermediate coat to include dry film thickness readings. Review Contractor's QA/QC reports.
6. Observe start and stop of finish coat application and document environmental conditions.
7. Inspect members after transportation, prior to subsequent coating and / or final acceptance.
8. Final inspection to include visual inspection for runs, sags, and foreign material in coating. Also perform final dry film thickness inspection.
9. Electronically submit interim reports after each inspection to the Project Manager within 3 working days.
10. Electronically submit comprehensive final report including photos to the Project Manager within 14 Days of completion of inspection. Final report shall include QA/QC daily inspections performed by the Contractor.
11. Add field connection points

Any deficiencies shall be corrected and re-inspected by the NACE inspector prior to proceeding.

Samples of a coating plan and QA/QC inspection documents are available on the NMDOT website.

Provisions for demonstration of qualifications are incidental to the performance of the coating; no additional payment shall be made. NMDOT shall be granted open access to the coating operation to perform inspections and to review documentation of Contractor inspections.

544.3 CONSTRUCTION REQUIREMENTS

The Contractor shall apply coatings in conformance with SSPC – PA 1 “Shop, Field and Maintenance Painting of Steel” and with SSPC – PA Guide 13 “Guide Specification for Application of Coating Systems with Zinc-Rich Primers to Steel Bridges” (aka AASHTO/NSBA Steel Bridge Collaboration S 8.1)

544.3.1 Surface Preparation for Priming

The Contractor shall remove oil, grease, and other contaminants with methods specified in SSPC-SP 1

Solvent Cleaning, or other Department-approved methods.

The Contractor shall blast-clean the carbon steel surfaces, in preparation for coating, in accordance with SSPC-SP 10 Near White Metal Blast Cleaning.

Prior to commencing full surface preparation activities, the Contractor shall prepare an acceptance standard on a flat portion of the surface to be cleaned, located by the Project Manager. The Project Manager shall make the final determination as to whether prepared surfaces meet the specification. The surfaces shall be evaluated using the SSPC-Vis 1, Visual Standard for Dry Abrasive Blast Cleaning. The Contractor shall provide the SSPC-Vis 1 manual for the Project Manager for inspection and acceptance. The Vis 1 Guide shall become the property of the Department.

The Contractor shall select the type of abrasive. All abrasives brought to the site shall be stored in a clean and dry environment. Abrasives shall not be recycled or re-used without NMDOT approval. The Contractor shall ensure that the abrasives produce a uniform profile from one (1) mil to three (3) mils with an angular pattern as measured in accordance with SSPC-PA 17 / ASTM D 4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel. If surface profile requirements of the coating manufacturer differ from those specified herein, the Contractor shall comply with the coating manufacturer's requirements. Actual replica test tapes used shall be maintained with the permanent project inspection records. The profile shall be measured a minimum of three (3) times for every 500 feet of surface area, or as directed by the Project Manager.

The Contractor shall prepare all corners, pockets, re-entrant angles, splice plates and bolted or riveted connection plates. The Contractor shall remove fins, tears, slivers, and burred or sharp edges found during the blast cleaning operation. The Contractor shall grind and re-blast the area in accordance with SSPC-SP 10 Near White Metal Blast Cleaning.

Immediately prior to coating application, the Contractor shall ensure that the surface complies with the degree of cleaning specified in SSPC-SP 10, including but not limited to ensuring the absence of dust, loose residue, oil, grease, rust or other contaminants.

544.3.2 Coating Preparation

544.3.2.1 Mixing Coatings

The Contractor shall mix coatings using a power mixer. The Contractor shall not use paint shakers. The Contractor shall mix the coatings, as much as possible, in the original containers. Only complete kits shall be mixed and used.

The Contractor shall strain coatings through a 30 – 60 mesh screen, or per coating the manufacturer's recommendations. Zinc pigmented primers shall have no clumps of zinc remaining in the coating after mixing and during application.

The Contractor shall agitate mixed primers continuously from straining through application.

544.3.2.2 Thinning Coatings

The Contractor shall not thin the coatings without the approval of the Project Manager. If it is necessary to thin the coatings, the Contractor shall thin the Material in accordance with the manufacturer's recommendations.

544.3.3 Temperature and Weather Limitations

The application of a coating system shall occur only when the air and substrate temperature is within the range indicated by the manufacturer's written instructions for both application and curing and can be expected to remain in that range.

The following conditions shall be considered but shall not supersede the manufacturer's written instructions. The Contractor shall apply the coating when the air and surface temperatures are above 40 °F and at least 5 °F above the dew point. The Contractor shall apply the coatings when the relative humidity is 85% or lower. Coatings shall not be applied in rain, wind, snow, fog or mist. Coatings shall not be applied on frosted or ice-coated surfaces. The Contractor shall apply inorganic zinc primers when the relative humidity is 50% or higher. Manufacturer may require water misting of inorganic zinc primers for proper curing.

544.3.4 Coating Applications

The Contractor shall not apply coatings until the Project Manager approves the surface preparation. Prior to application of subsequent coats the Project Manager shall verify that surfaces are free of dust and any deleterious contaminants. The Project Manager may waive this approval.

When the contract requires painting more than 1,500 square feet of steel surface, the Contractor shall have a coating manufacturer representative present to provide technical assistance at the start of each coating operation.

The Contractor shall apply subsequent coats within the recoat window specified by the manufacturer. If the recoat time period is exceeded, the undercoat surface shall be specially treated as recommended by the manufacturer before subsequent coats are applied. Such treatments include but are not limited to mild abrasion, solvent treatment, or use of a fog coat.

544.3.4.2 Coating Options

The Contractor shall use one (1) of the following coating options:

1. Apply the primer, intermediate, and protective topcoat in the shop; or
2. Apply the prime coat in the shop and the intermediate and protective topcoat in the field; or
3. Apply the primer and intermediate coat in the shop and the protective topcoat in the field.

544.3.4.3 Spray Equipment

The Contractor shall apply coatings with spray nozzles at pressures recommended by the coating system manufacturer.

The Contractor shall use conventional or airless spray systems to apply the coatings, following manufacturer application instructions.

544.3.4.4 Film Thickness Requirements

The Contractor shall provide coating thicknesses in accordance with Table 544.3.4.4:1, "Required Film Thicknesses." The Department will reject the coating if the DFT (dry film thickness) gauge shows less than the specified minimum thickness for any coating.

Table 544.3.4.4:1 Required Film Thicknesses	
Coating	Dry film thickness range (mils)
Primer	2.0 – 4.0
Intermediate	4.0 – 6.0
Polyurethane Protective Topcoat	3.0 – 5.0

The Contractor shall determine the dry film thickness using magnetic film thickness gauges, SSPC PA 2 Procedure for Determining Conformance to Dry Coating Thickness Requirements. The Contractor shall calibrate the gauges on blasted steel with plastic shims approximately the same thickness as the minimum dry film thickness. All dry film thickness requirements are to be measures above the peaks of the blast profile.

544.3.4.5 Primer Application

The Contractor shall prime coat all Structural Steel surfaces, except as noted in Section 544.3.4.6, "Bolted and Welded Connections."

The Contractor shall not apply primers over blasted steel that has begun to rust or bloom. The Contractor shall apply primer in a smooth, wet, continuous film.

A stripe coat of primer material shall be applied to all edges, corners, seams, crevices, interior angles, junctions of joining members, rivets, bolt heads, nuts and threads, welds and similar irregularities. The stripe coats shall be of sufficient thickness to completely hide the surface being covered and shall be followed, as soon as practicable, by a full application of the appropriate coating to its specified thickness.

The Contractor shall apply all coatings according to the latest manufacturer's written instructions. The Contractor shall repair deficiently primed areas in accordance with the manufacturer's recommendations and as directed by the Project Manager. The Contractor shall remove dry overspray with light sanding.

The Contractor shall give steel Bridge sole plates one (1) coat of zinc rich primer. The Contractor shall mask-off strips where sole plates will be welded to beam flanges and surfaces that will be in contact with elastomeric bearing pads. After welding, the Contractor shall apply a primer touch-up to the welded areas.

544.3.4.6 Bolted and Welded Connections

The Contractor shall blast clean faying (contact) surfaces in accordance with SSPC-SP 10 Near White Metal Blast Cleaning, and leave uncoated for bolting and/or field welding.

The Contractor shall make uncoated areas slightly larger than the contact areas to ensure that the bolted connections clamp down only on the blast-cleaned Material and not on painted surfaces.

The Contractor shall mask off faying areas to protect them from rust during hauling and storage. The Contractor shall apply a rust prohibitor to the faying surfaces or coat the faying areas with a Class B primer (slip coefficient equal to or greater than 0.50), as listed in Table 544.2.1:1. The Department will approve the rust prohibitor or Class B primer. Before bolting, the Contractor shall remove the rust prohibitor. The Contractor shall not remove Class B primers before bolting, unless required.

Immediately before bolting and/or field welding, the Contractor shall ensure the exposed connection areas are in accordance with SSPC-SP 10 Near White Metal Blast Cleaning. The Contractor shall apply the complete coating system to these surfaces after erection. The Contractor shall mask-off connection areas to leave neat lines between the connection area coating and previously coated areas.

The Contractor shall apply the topcoats on bolted field connections after placing the deck.

544.3.4.7 Intermediate Coat Application

After cleaning and before applying the intermediate coating system, the Contractor shall mask opposite sides of the diaphragms and stiffeners over areas that the direct tension indicators will bear on. The Contractor shall not coat these areas until after erection and bolt tightening.

Before applying the intermediate coat, the Contractor shall tie coat the galvanized components using manufacturer's recommended tie coat Material. The Contractor shall apply the tie coat with a brush.

The Project Manager will inspect the primed surfaces before the Contractor applies the intermediate coat.

The Contractor shall not apply the intermediate coat to the following Structural Steel surfaces:

1. Faying surfaces of bolted connections (Section 544.3.4.6, "Bolted and Welded Connections");
2. The top flange top surfaces of beams, girders or diaphragms to be embedded in concrete;
3. Bearing surfaces resting on concrete Substructures or are subject to sliding and rotational movement; and
4. Bearing surfaces in contact with elastomeric bearing pads.

A stripe coat of intermediate material shall be applied to all edges, corners, seams, crevices, interior angles, junctions of joining members, rivets, bolt heads, nuts and threads, welds and similar irregularities. The stripe coats shall be of sufficient thickness to completely hide the surface being covered and shall be followed, as soon as practicable, by a full application of the appropriate coating to its specified thickness.

544.3.4.8 Urethane Protective Topcoat Application

The Contractor shall apply the polyurethane protective topcoat only on cured intermediate coat.

544.3.5 Handling Steel

The Contractor shall protect uncoated faying surfaces to minimize corrosion during shipping and storage.

The Contractor shall store Structural Steel on pallets so it does not rest on dirt. The Contractor shall store beams and girders in an upright (as erected) position.

The Contractor shall use softeners to insulate steel from chains. The Contractor shall pad hooks and slings for hoisting steel. The Contractor shall space parts during shipment so that no rubbing occurs.

The Contractor shall use rubber rollers, soft support pads, or other protective devices on Equipment support members or fasteners resting on or attached to newly coated surfaces.

544.3.6 Protection of the Work and the Public

During the coating operations, the Contractor shall protect structures from blast cleaning operations, paint splatter, splashes and smirches with protective covering or other methods approved by the Project Manager.

When the protective devices or procedures are ineffective, the Project Manager may suspend the Work until corrections take place.

The Contractor shall remove blasting and coating debris from all on-site work before reopening the area to traffic.

544.3.6 Field Repair of Liquid Coatings

Field repair of liquid coatings shall be performed in accordance with Section 546 "Recoating Structures" and the manufacturer's recommendations. Field repair shall be accomplished with the same coating system used for the original application with the exception that organic zinc rich primer may always be used.

The Contractor shall field repair coated areas that are rusted or damaged. The Contractor shall prepare the surface in accordance with 546.3.1 "Surface Preparation of Existing Bridges and Structures" or with methods approved by the Project Manager.

The Contractor shall prime large areas using spray Equipment, brush, or roller. The Contractor shall prime small areas with a brush. The Contractor shall spray or brush the topcoat. Two (2) or more coats may be necessary to build up the required film thickness. The Contractor shall apply topcoat only to areas where the topcoat is damaged. Requirements of Section 546.3, "Construction Requirements" apply to field repairs.

544.3.7 Inspection

The Contractor will be responsible for performing and documenting Quality Control (QC) inspections of all shop / field surface preparation and coating activities. When the contract requires painting more than 1,500 square feet of steel surface, the Contractor shall reference Section 544.2.2.3 Contractor Qualifications. When the contract required painting less than 1,500 square feet of steel surface, the Contractor shall document all QC inspection activities, measurements and observations on the Daily Inspection report. These reports shall be submitted to the Project Manager at a minimum on a weekly basis and shall account for all work performed.

The Contractor shall notify the Project Manager at least ten (10) Days before surface preparation and/or coating to allow adequate time to plan inspection activities.

After completing erection, the Project Manager will inspect the surfaces to be embedded in concrete. The Contractor shall repair damaged or rusted surfaces before placing decks. After placing the deck and at an agreed upon time, the Project Manager will inspect the entire steel Structure for coating system damage. The Project Manager will mark damaged areas for repair and will re-inspect after repairs are complete.

544.3.7 Final Operations

544.3.7.1 Final Cleaning

The Contractor shall clean the steel Structure, bearings, and Bridge seat tops after completing coating activities.

544.3.7.2 Stenciling

At the completion of coating operations, the Contractor shall stencil in four (4) inch high black letters on the inside of the fascia girders at two (2) locations designated by the Project Manager:

1. The completion month and year;
2. The term "Section 544;" and
3. The coating manufacturer.

The Contractor shall make the markings with the same material used for the urethane protective coats.

Example: "6/93-Section 544, Excel Coatings"

544.4 METHOD OF MEASUREMENT—Reserved

544.5 BASIS OF PAYMENT

The Department will pay for the coating system as Incidental to Structural Steel, in accordance with Section 541, "Steel Structures."

**SPECIAL PROVISIONS
MODIFYING
SECTION 545 – PROTECTIVE COATING OF MISCELLANEOUS STRUCTURAL STEEL**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Replace **SECTION 545 PROTECTIVE COATING OF MISCELLANEOUS STRUCTURAL STEEL** in its entirety with the following:

545.1 DESCRIPTION

This Work consists of coating new steel elements including:

1. bridge railing
2. pedestrian railing
3. drop inlet grates and frames,
4. cattle guards grates,
5. field coating of new steel piling
6. CWB access panels
7. gates
8. headgates & flapgates
9. I-beam posts
10. safety grates
11. sole plates and bearing devices
12. misc. steel elements

545.1.1 Terminology and Standards

The Contractor shall use terminology in accordance with the following standards:

Society for Protective Coatings (SSPC) Painting Manual Volume 2
Surface Preparation Standards, Guides, and Specifications, Section 2 of the SSPC Painting Manual
Volume 2 (SSPC-SP)
American Architectural Manufacturer's Association (AAMA)
American Association of State Highway and Transportation Official (AASHTO)
American Society for Testing and Materials (ASTM)
American Institute of Steel Construction (AISC)
National Association of Corrosion Engineers (NACE)

545.2 MATERIALS

The Contractor shall apply the coating system specified within the Contract Documents. If the Contract Documents do not specify a specific coating system, the Contractor may select the coating system from Table 545.2:1.

Table 545.2:1
Coating System Selection Matrix

Specification Section	Coating System								Color Comments
	galvanize	3-Coat poly	2-Coat epoxy s	2-Coat epoxy f	2-Coat acrylic	Powder Coat	3-Coat poly	2-Coat acrylic	if not galvanized, color (unless otherwise noted in drawings)
	541	544	545	545	545	545	546	546	
	541.2.6.1	544.2.1	545.2.1	545.2.2	545.2.3	545.2.4	546.2.1	546.2.2	
Element									
new structural steel	X	X					R		light gray*
metal Bridge railing	X					X		R	light gray*
metal Pedestrian railing	X					X		R	light gray*
drop inlet grates & frames	X		X	X				R	light gray*
cattle guard grates			X	X				R	safety yellow
CWB Access Panels	X		X	X	X	X		R	light gray*
Gates	X		X	X	X	X		R	interstate green
Headgates & Flapgates **			X	X	X				light gray**
I-Beam Posts	X		X	X	X	X		R	interstate green
new steel pilings							X R		light gray*
sole plates & bearing devices			X					R	light gray*
safety grates	X		X	X		X		R	light gray*
Misc. steel	X		X	X	X	X		R	light gray*
Coating Component									
galvanizing	C								
inorganic zinc primer		C	C		C				
organic zinc primer				C	C		C	C	
epoxy intermediate		C					C	***	
polyurethane topcoat		C					C		
epoxy topcoat			C	C					
acrylic topcoat					C			C	
powder coating						C			

"X" denotes a coating system that is acceptable for each element. Specific coating systems noted in the Contract Documents supersede the information provided in this table.

"R" denotes the coating system that is allowable for recoating unless otherwise specified in the Contract Documents. Reference 546 "Recoating Structures" for additional information. All recoating is allowable as field applied.

"C" denotes the coating system component, reference specification section for details.

* If the Contract does not specify a color, the Contractor shall use the color Federal Standard 16307, RAL 7004, Pantone 423, or approved equal.

** If purchased as an assembly, any corrosion inhibiting coating that is provided by the manufacturer is acceptable.

*** Intermediate or tie-coat to be provided if recommended by the manufacturer.

545.2.1 Coating System No. 1: Shop Applied 2-Coat with Epoxy Topcoat

The Contractor shall select a complete coating system comprised of products meeting all performance requirements as listed in Table 545.2.1:1 below. Testing shall be in accordance with AASHTO R-31. All products in each system shall be from the same manufacturer. All products shall be represented on the latest version of the manufacturer's product data sheet as being suitable for use on bridges and capable of being applied at the specified dry film thickness requirements in Table 545.3.6:1.

Inorganic Zinc-Rich Primer – Shall achieve minimum SSPC Paint 20 Level 2 requirements for amount of zinc dust in the dry film of equal to or greater than 77% by weight.

Epoxy Topcoat Coat – Shall be a two-component epoxy polyamide or polyamidoamine coating, including Phenalkamine coatings with minimum solids by volume of 65%.

**Table 545.2.1:1
Acceptable Product Requirements**

TEST	REF. NO.	PRODUCT(S)	ACCEPTANCE CRITERIA	COMMENTS
Slip Coefficient	ASTM A 325, Appendix A.	IOZ	Class B, Min. 0.5	
Salt Fog Resistance	ASTM B 117	P/T (IOZ)	(A) No Delamination Allowed (B) Rust – Max creep 4mm, Avg. creep 2mm @5000 Hrs. (C) Blister – Conversion #8 @ 4000 Hrs.	
Cyclic Weathering Resistance	ASTM D 5894	P/T (IOZ)	(A) No Delamination Allowed (B) Rust – Max creep 4mm, Avg. creep 2mm @5040 Hrs. (C) Blister – Conversion #9 @ 4032 Hrs.	
Adhesion Pull-Off Strength	ASTM D 4541	IOZ Alone	2.4 MPa (350 psi)	
		P/T (IOZ)	2.4 MPa (350 psi)	
Freeze-Thaw Stability Pull-Off Strength	ASTM D 4541	P/T (IOZ)	2.4 MPa (350 psi)	
			4.1 MPa (600 psi)	
			2.4 MPa (350 psi)	
			4.1 MPa (600 psi)	
Field History	NA	P/T (IOZ)	Five (5) Bridges with Minimum two (2) year successful field history	

P = Primer; T = Topcoat, IOZ = Inorganic Zinc Rich Primer

Primer information for the use of organic zinc for touch-up and repair is included in Section 546: Recoating Structures.

545.2.2 Coating System No. 2: Field Applied 2 Coat with Epoxy Topcoat

The Contractor shall select products meeting all performance requirements as listed in Table 546.2.1:1 below. Testing shall be in accordance with AASHTO R-31. All products used in a system shall be from the same manufacturer. All products shall be represented on the latest version of the manufacturer's product data sheet as being suitable for use on bridges and capable of being applied at the specified dry film thickness requirements in Table 546.3.5:1.

Epoxy Organic Zinc-Rich Primer (used to prime exposed bare steel areas only, spot prime) shall achieve minimum SSPC Paint 20 Level 2 requirements for amount of zinc dust in the dry film of equal to or greater than 77% by weight.

Epoxy Top Coat over existing finishes (applied over zinc primer and other sound existing coatings deemed suitable for over coating by the coating manufacturer's representative) shall be a two-component, surface tolerant epoxy coating with minimum solids by volume of 65%.

**Table 545.2.2:1
Acceptable Product Requirements**

TEST	REF. NO.	PRODUCT(S)	ACCEPTANCE CRITERIA	COMMENTS
Salt Fog Resistance	ASTM B 117	P/T (OZ)	(A) No Delamination Allowed (B) Rust – Max creep 8mm, Avg. creep 4mm @5000 Hrs. (C) Blister – Conversion #7 @ 4000 Hrs.	
Cyclic Weathering Resistance	ASTM D 5894	P/T (OZ)	(A) No Delamination Allowed (B) Rust – Max creep 8mm, Avg. creep 4mm @5040 Hrs. (C) Blister – Conversion #8 @ 4032 Hrs.	
Adhesion Pull-Off Strength	ASTM D 4541	OZ Alone P/T (OZ)	 4.1 MPa (600 psi) 4.1 MPa (600 psi)	
Freeze-Thaw Stability Pull-Off Strength	ASTM D 4541	P/T (OZ)	2.4 MPa (350 psi) 4.1 MPa (600 psi) 2.4 MPa (350 psi) 4.1 MPa (600 psi)	Requires same average as adhesion pull-off strength results, with no tests measuring less than 60% of those results
Field History	NA	P/T (OZ)	Five (5) Bridges with Minimum two (2) year successful field history	

545.2.3 Coating System No. 3: Shop or Field Applied 2 - Coat with Acrylic Topcoat

The Contractor shall select products meeting all performance requirements as listed in Table 545.2.1:1 above for Inorganic Zinc Rich Primer or Table 545.2.2:1 for Organic Zinc Rich Primer and 545.2.3:1 for Acrylic Top Coat below as applicable. It is acceptable to use either inorganic or organic zinc rich primer for 545.2.3 Coating System 3. All products used in a system shall be from the same manufacturer. All products shall be represented on the latest version of the manufacturer's product data sheet as being suitable for use on bridges and capable of being applied at the specified dry film thickness requirements in Table 546.3.5:1.

Epoxy Organic Zinc-Rich Primer (used to prime exposed bare steel areas) shall achieve minimum SSPC Paint 20 Level 2 requirements for amount of zinc dust in the dry film of equal to or greater than 77% by weight (Table 545.2.1:1), or;

Inorganic Zinc-Rich Primer (used to prime exposed bare steel areas) shall achieve minimum SSPC Paint 20 Level 2 requirements for amount of zinc dust in the dry film of equal to or greater than 77% by weight (Table 545.2.2:1), and;

Acrylic Topcoat (applied as overcoat over sound existing coatings deemed suitable for over coating by the coating manufacturer's representative or for repair to the finish of certain items per Section 545 Miscellaneous Steel) shall be a high performance DTM acrylic coating with minimum solids by volume of 38%. Suitable for application over zinc rich primers (Table 545.2.3:1).

Table 545.2.3:1
Acceptable Product Requirements

TEST	REF. NO.	PRODUCT(S)	ACCEPTANCE CRITERIA	COMMENTS
Adhesion Pull-Off Strength	ASTM D 4541	HPA	> 500 lbs.	One coat applied over blasted steel
Flexibility	ASTM D 522	HPA	Pass: No cracking / flaking	1/8 " conical mandrel One coat applied over blasted steel
Hardness (Pencil)	ASTM D 3363	HPA	Final Cure: "F"	One coat applied over blasted steel
Impact	ASTM D 2794	HPA	> 140 in. lbs.	One coat applied over blasted steel

HPA = High Performance Acrylic

545.2.4 Coating System No. 4 – Powder Coating

The Contractor shall obtain primer and topcoat from one (1) manufacturer. The Contractor shall select a coating system that meets the requirements of AAMA 2604.

545.2.5 Galvanizing or Zinc Coating

Reference Section 541.2.6.1.

545.2.6 Submittals

The Contractor shall provide a submittal for the proposed coating option and manufacturer to the Project Manager at least 30 Days before coating operations. If the color varies from the specified color, the Contractor may submit color samples on boards at least eight (8) inches by ten (10) inches for review and approval.

The Department may take random coating Materials samples during the Work for testing.

When the contract requires painting more than 1,500 square feet of steel surface, the Contractor shall submit a coating plan 30 Days prior to start of coating operations. Sample coating plans are available on the NMDOT website. The Project Manager shall have the option to waive the coating plan requirement.

545.2.6.1 Certification

Prior to coating application, the Contractor shall submit:

1. Notarized manufacturer's Certificates of Compliance stating that the Materials are the same as those described in the manufacturer's product data sheets.
2. Certified test reports from an independent laboratory performed in accordance with AASHTO R-31, showing acceptable performance results as listed on the chart in Section 545.

545.2.6.2 Product Data Sheets

The Contractor shall provide manufacturer's product data sheets and SDS with each Submittal that shows the following:

1. Mixing and thinning directions;
2. Recommended spray nozzles and pressures;
3. Minimum/maximum drying time, including re-coat times, for shop or field applied coats; and
4. Manufacturer recommended application procedures, including surface preparation and temperature requirements.

545.2.7 Contractor Qualifications

When the contract requires painting more than 1,500 sq ft of steel surface, the Contractor shall demonstrate qualification by one of the following two methods:

Method 1

Obtain SSPC QP 1 certification for field painting or either SSPC-QP 3 certification or the AISC Sophisticated Paint Endorsement (SPE) for shop painting. The Contractor shall perform and document QA/QC inspections daily. QA/QC inspection documents shall be electronically submitted to the Project Manager on a weekly basis.

Method 2

Provide a coating plan and provide for NACE certified inspection (Level 2 minimum). The inspection services shall include but not be limited to:

1. Surface preparation and cleanliness inspection verifying profile and appropriate surface preparation.
2. Confirm products match approved submittals and certification letters. Document the batch numbers of all coatings.
3. Inspection of primer coat to include dry film thickness readings. Review contractors QA/QC reports for environmental conditions and document.
4. Observe application of stripe coat on the intermediate coat and document environmental readings during the start up of application. Review contractors QA/QC reports.
5. Inspect intermediate coat to include dry film thickness readings. Review Contractor's QA/QC reports.
6. Observe start up of finish coat application and document environmental conditions.
7. Final inspection to include visual inspection for runs, sags, and foreign material in coating. Also perform final dry film thickness inspection.
8. Inspect members after transportation, prior to subsequent coating and / or final acceptance.
9. Electronically submit interim reports after each inspection to the Project Manager within 3 working days.
10. Electronically submit comprehensive final report including photos to the Project Manager within 14 days of completion of inspection. Final report shall include QA/QC daily inspections performed by the Contractor.

Any deficiencies shall be corrected and reinspected by the NACE inspector prior to proceeding.

Samples of a coating plan and QA/QC inspection documents are available on the NMDOT website.

Provisions for demonstration of qualifications are incidental to the performance of the coating, no additional payment shall be made. NMDOT shall be granted open access to the coating operation to perform inspections and to review documentation of Contractor inspections.

The Project Manager shall have the option to waive the Contractor Qualification requirement for Miscellaneous Structural Steel scope.

545.3 CONSTRUCTION REQUIREMENTS

545.3.1 Liquid Coating Systems No. 1, No. 2, and No. 3

The Contractor shall apply coatings in conformance with SSPC – PA 1 “Shop, Field and Maintenance Painting of Steel” and with SSPC – PA Guide 13 “Guide Specification for Application of Coating Systems with Zinc-Rich Primers to Steel Bridges” (aka AASHTO/NSBA Steel Bridge Collaboration S 8.1) and the manufacturer’s application instructions.

545.3.1.1 Surface Preparation

The Contractor shall remove contaminants in accordance with SSPC-SP 1, or other methods approved by the Project Manager.

Surface preparation for all steel elements include in Section 545 shall be in accordance with SSPC-SP10 / NACE 2 Near White Blast Cleaning: When viewed without magnification shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter of at least 95% of each unit area. Staining shall be limited to no more than 5 percent of each unit area, and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings. Unit area shall be approximately 3 in. x 3 in. (9 sq. in.).

Prepared surfaces shall be evaluated using the SSPC-VIS 3 Guide and Reference Photographs. The Contractor shall provide a current copy of the SSPC-VIS 3 Guide and Standard to the Project Manager. It shall become the property of the Department.

The Contractor shall maintain the steel dust free and prime within eight (8) hours after blast cleaning. The Contractor shall re-clean rusted or contaminated surfaces at no additional cost to the Department. The Contractor shall mask areas that require field welding before coating.

The Contractor shall clean again before applying each subsequent coat.

545.3.1.2 Coating

545.3.1.2.1 Mixing the Coating

The Contractor shall mix the coating with a power mixer to a smooth and lump-free consistency, in accordance with the coating manufacturer’s Specifications.

The Contractor shall mix the coating as much as possible in the original containers and continue mixing until the metallic powder or pigment is in suspension. The Contractor shall keep mixed primers continuously agitated before and during application.

545.3.1.2.2 Thinning the Coating

The Contractor shall not thin the coatings without the approval of the Project Manager. If it is necessary to thin the coatings, the Contractor shall thin the Material in accordance with the manufacturer’s recommendations.

545.3.1.2.3 Temperature and Weather Limitations

The Contractor shall only apply the coatings when the ambient air temperature and surface

temperature of the steel are both above 50 °F and at least five (5) °F above the dew point.

The Contractor shall not apply the coatings when there is condensation or frost on the metal surfaces.

The Contractor shall not apply the coatings when the relative humidity is higher than 85 percent.

545.3.1.2.4 Coating Applications

The Contractor shall not apply coating until the Department approves the surface preparation. The Department may waive this inspection.

A stripe coat of primer and intermediate material shall be applied to all edges, corners, seams, crevices, interior angles, junctions of joining members, rivets, bolt heads, nuts and threads, welds and similar irregularities. The stripe coats shall be of sufficient thickness to completely hide the surface being covered and shall be followed, as soon as practicable, by a full application of the appropriate coating to its specified thickness.

The Contractor shall repair coated areas where the primer or topcoat runs, sags or cracks.

The Contractor shall not apply any coating until the previous coat has fully cured or per the manufacturer's application requirements.

The Contractor shall allow the manufacturer's minimum recommended cure time to lapse between coats. If more than 30 Days elapse between the primer application and the topcoat application, the Contractor shall contact the coating system manufacturer for surface preparation recommendations before applying subsequent coats.

The Department may accept minor cosmetic defects in ground level miscellaneous Structural Steel components not in public view, if the defects will not affect durability.

545.3.1.2.5 Required Coating of Components

The Contractor shall apply the primer and topcoat to steel surfaces, except those that will contact elastomeric bearing pads or are subject to sliding and rotational movements.

The Contractor shall coat new steel piling from the bottoms of the pier caps to two (2) ft. below the finished grade or streambed elevations.

545.3.1.2.6 Coating of Sole Plates for Concrete Bridges

The Contractor shall deliver sole plates to the Project with one (1) coat of primer applied to all surfaces except masked-off strips, where the sole plates will be welded to the shoe plates, and surfaces that will contact elastomeric bearing pads.

Before installation, the Contractor shall clean surfaces that will contact pads in accordance with SSPC-SP 6. The Contractor shall clean off all rust on sole plates prior to installing and welding.

After installing the pads and welding the sole plates to the shoe plates, the Contractor shall touch up the primer and apply topcoat to exposed surfaces.

545.3.1.2.7 Spray Equipment

The Contractor shall apply the coatings with spray nozzles at the manufacturer recommended pressures.

545.3.1.2.8 Film Thickness Requirements

The Contractor shall apply coatings in accordance with Table 545.3.1.2.8:1, "Required Film Thicknesses."

Table 545.3.1.2.8:1 Required Film Thicknesses	
Coating	Dry film thickness range (mils)
Primer (IOZ) OR Primer (OZ)	2 - 4 3 - 5
Topcoat (epoxy) OR Topcoat (acrylic)	4 - 6 2 - 4

545.3.1.2.9 Field Repair of Liquid Coatings

Field repair of liquid coatings shall be performed in accordance with Section 546 "Recoating Structures" and the manufacturer's recommendations. Field repair shall be accomplished with the same coating system used for the original application with the exception that organic zinc rich primer may always be used.

The Contractor shall field repair coated areas that are rusted or damaged. The Contractor shall prepare the surface in accordance with 546.3.1 "Surface Preparation of Existing Bridges and Structures" or with methods approved by the Project Manager.

The Contractor shall prime large areas using spray Equipment, brush, or roller. The Contractor shall prime small areas with a brush. The Contractor shall spray or brush the topcoat. Two (2) or more coats may be necessary to build up the required film thickness. The Contractor shall apply topcoat only to areas where the topcoat is damaged. Requirements of Section 546.3, "Construction Requirements" apply to field repairs.

545.3.2 Powder Coating System No. 3

545.3.2.1 Surface Preparation

The Contractor shall remove contaminants in accordance with SSPC-SP 1, or other methods approved by the Project Manager. The Contractor shall blast clean in accordance with SSPC-SP10 Near-

White Metal Blast Cleaning. Additionally, for powder-coated surfaces, an iron or zinc phosphate wash shall be included to provide long-term corrosion protection.

545.3.2.2 Primer Application

The Contractor shall use a primer that is a zinc rich epoxy powder coating designed for use over ferrous metal substrates. The Contractor shall apply the zinc rich epoxy powder coat primer to a minimum of two (2) mils dry film thickness, above the peaks of any blast profile.

545.3.2.3 Topcoat Application

The Contractor shall use a topcoat that is a super durable polyester powder coating designed to provide for maximum UV exposure protection. The Contractor shall apply the polyester topcoat to a minimum of three (3) mils dry film thickness before the primer has cured or as recommended by the manufacturer.

Table 545.3.2.3:1
Required Film Thicknesses

Coating	Dry film thickness range (mils)
Zinc-rich epoxy primer	Min. 2 mils
Polyester topcoat	Min. 3 mils

The Contractor shall use a magnetic film thickness gage or an electronic film thickness detector to determine dry film thickness per SSPC – PA 2 "Procedure for Determining Conformance to Dry Coating Thickness Requirements".

545.3.2.4 Fixturing

The Contractor shall suspend the components by suitable metal hooks or fixtures to provide a sufficient electrical grounding path. The Contractor shall affix the components with a minimum of direct contact area with the fixture device.

545.3.2.5 Curing

The Contractor shall place the powder-coated components in a suitable oven and cure per the manufacturer's recommended cure cycle. The Contractor shall remove the components from the oven and allow cooling. The Contractor shall visually inspect the components to ensure a smooth continuous uniform finish, free from runs, sags, pinholes or other defects.

545.3.2.6 Touch-up Painting / Field Repair of Powder Coatings

Field repair of powder coatings shall be performed in accordance with Section 546 "Recoating Structures" and the manufacturer's recommendations. The Contractor shall use Coating System No. 1 from Section 546.2.1, using the epoxy organic zinc-rich primer only where bare metal is exposed.

The Contractor shall field repair coated areas that are rusted or damaged.

545.4.8 Handling Steel

The Contractor shall handle or load newly coated Structural Steel only when the coating has fully cured.

The Contractor shall store coated components on pallets or in other approved ways so that the steel does not rest on soil.

The Contractor shall protect steel coatings from binding chains with approved softeners. The Contractor shall hoist with padded hooks and slings. The Contractor shall space parts during shipment to ensure that no rubbing occurs.

545.4.9 Provisions for Inspection

The Contractor will be responsible for performing and documenting Quality Control (QC) inspections of all shop / field surface preparation and coating activities. When the contract requires painting more than 1,500 sq. ft. of steel surface, the Contractor shall reference Section 544.2.2.3 Contractor Qualifications. When the contract required painting less than 1,500 sq. ft. of steel surface, the Contractor shall document all QC inspection activities, measurements and observations on the Daily Inspection report. These reports shall be submitted to the Project Manager at a minimum on a weekly basis and shall account for all work performed.

The Contractor shall notify the Project Manager at least ten (10) Days before surface preparation and/or coating to allow adequate time to plan inspection activities.

After completing erection, the Project Manager will inspect the surfaces to be embedded in concrete. The Contractor shall repair damaged or rusted surfaces before placing decks. After placing the deck and at an agreed upon time, the Project Manager will inspect the entire steel Structure for coating system damage. The Project Manager will mark damaged areas for repair and will re-inspect after repairs are complete.

545.4.10 Protection of the Work and Public

During the coating operations, the Contractor shall protect the work and the public from blast cleaning operations, paint splatter, splashes and smirches with protective covering or other methods approved by the Project Manager.

When the protective devices or procedures are ineffective, the Project Manager may suspend the Work until corrections take place.

545.4.11 METHOD OF MEASUREMENT—Reserved

545.4.12 BASIS OF PAYMENT

The Department will pay for the coating system as Incidental to Structural Steel, in accordance with Section 541, "Steel Structures."

SPECIAL PROVISIONS MODIFYING SECTION 546: RECOATING STRUCTURES

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Replace **Section 546 – Recoating Structures** in its entirety with the following:

SECTION 546: RECOATING STRUCTURES

546.1 DESCRIPTION

This Work consists of surface preparation and recoating existing Structural Steel. Touch-up paint of surfaces coated per Sections 544, 545 and 546 is included.

The Contractor shall adhere to Section 547: Safety and Environmental Requirements for Painting Operations.

546.2 MATERIALS

Projects that require SSPC – SP 6 shall engage 546.2.1 Coating System 1, unless otherwise specified in the contract documents.

Projects that require SSPC – SP 3, SSPC – SP 11, and/or SSPC 16 shall engage 546.2.2 Coating System 2, unless otherwise specified in the contract documents.

Reference 545.2:1 for additional information regarding coating systems that are allowable for specific elements.

If the Contract does not specify a color, the Contractor shall use the color Federal Standard 16307, RAL 7004, Pantone 423, or approved equal. If another color is specified in the Contract, the Contractor shall select an approved system that is available in the specified color.

All products shall be on the Approved Products List.

546.2.1 Coating System No. 1 – Polyurethane Topcoat

The Contractor shall select products meeting all performance requirements as listed in Table 546.2.1:1 below. Testing shall be in accordance with AASHTO R-31. All products used in a system shall be from the same manufacturer. All products shall be represented on the latest version of the manufacturer's product data sheet as being suitable for use on bridges and capable of being applied at the specified dry film thickness requirements in Table 546.3.5:1.

Epoxy Organic Zinc-Rich Primer shall achieve minimum SSPC Paint 20 Level 2 requirements for

amount of zinc dust in the dry film of equal to or greater than 77% by weight. Epoxy Organic Zinc-Rich Primer shall not be required when surface preparation of SSPC – SP 3 and / or SSPC – SP 11 are employed.

Epoxy Intermediate Coat or Tie-Coat over existing finishes shall be a two-component epoxy, polyamide or polyanidoamine, including phenikamine coating with minimum solids by volume of 65%. Epoxy Intermediate Coat or Tie-Coat shall be required unless specifically excluded by the manufacturer in the compatibility confirmation letter that shall be submitted per 546.2.3.

Polyurethane Topcoat shall be a two-component aliphatic polyurethane coating with minimum solids by volume of 65%.

Table 546.2.1:1
Acceptable Product Requirements

TEST	REF. NO.	PRODUCT(S)	ACCEPTANCE CRITERIA	COMMENTS
Salt Fog Resistance	ASTM B 117	P/I/T (OZ)	(A) No Delamination Allowed (B) Rust – Max creep 8mm, Avg. creep 4mm @5000 Hrs. (C) Blister – Conversion #7 @ 4000 Hrs.	
Cyclic Weathering Resistance	ASTM D 5894	P/I/T (OZ)	(A) No Delamination Allowed (B) Rust – Max creep 8mm, Avg. creep 4mm @5040 Hrs. (C) Blister – Conversion #8 @ 4032 Hrs.	
Adhesion Pull-Off Strength	ASTM D 4541	OZ Alone P/I/T (OZ)	4.1 MPa (600 psi) 4.1 MPa (600 psi)	
Freeze-Thaw Stability Pull-Off Strength	ASTM D 4541	P/I/T (OZ)	2.4 MPa (350 psi) 4.1 MPa (600 psi) 2.4 MPa (350 psi) 4.1 MPa (600 psi)	Requires same average as adhesion pull-off strength results, with no tests measuring less than 60% of those results
Field History	NA	P/I/T (OZ)	Five (5) Bridges with Minimum two (2) year successful field history	

P = Primer; I = Intermediate coat; T = Topcoat; OZ = Epoxy Organic Zinc Rich Primer

546.2.2 Coating System No. 2 – Acrylic Topcoat

The Contractor shall select products meeting all performance requirements as listed in Table 546.2.1:1 above and 546.2.2:1 below as applicable. All products used in a system shall be from the same manufacturer. All products shall be represented on the latest version of the manufacturer's product data sheet as being suitable for use on bridges and capable of being applied at the specified dry film thickness requirements in Table 546.3.5:1.

Epoxy Organic Zinc-Rich Primer shall achieve minimum SSPC Paint 20 Level 2 requirements for amount of zinc dust in the dry film of equal to or greater than 77% by weight (Table 546.2.1:1). Epoxy Organic Zinc-Rich Primer shall not be required when surface preparation of SSPC – SP 3 and / or SSPC – SP 11 are employed.

Epoxy Intermediate Coat or Tie-Coat over existing finishes shall be a two-component epoxy, polyamide or polyanidoamine, including phenikamine coating with minimum solids by volume of 65% (Table 546.2.1:1). Epoxy Tie-Coat shall be required unless specifically excluded by the manufacturer in the compatibility confirmation letter that shall be submitted per 546.2.3.

Acrylic Topcoat shall be a high performance DTM acrylic coating with minimum solids by volume of 38% (Table 546.2.2:1).

**Table 546.2.2:1
Acceptable Product Requirements**

TEST	REF. NO.	PRODUCT(S)	ACCEPTANCE CRITERIA	COMMENTS
Adhesion Pull-Off Strength	ASTM D 4541	HPA	> 500 lbs.	One coat applied over blasted steel
Flexibility	ASTM D 522	HPA	Pass: No cracking / flaking	1/8 " conical mandrel One coat applied over blasted steel
Hardness (Pencil)	ASTM D 3363	HPA	Final Cure: "F"	One coat applied over blasted steel
Impact	ASTM D 2794	HPA	> 140 in. lbs.	One coat applied over blasted steel

HPA = High Performance Acrylic

The Contractor may substitute Polyurethane topcoat for Acrylic topcoat at their discretion pending full system submittal and approval.

546.2.3 Submittals

In addition to the submittals require per Section 106 Control of Materials, the Contractor shall provide the following submittals to the Project Manager at least 30 Days before coating operations:

1. Product data and SDS for each product in the system
2. Surface preparation requirements
3. Application instructions
 - a. Mixing and thinning directions
 - b. Recommended spray nozzles and pressures
 - c. Minimum / maximum drying times, including re-coat times for shop or field coatings
 - d. Temperature requirements
4. Letter from the manufacturer detailing the coating system components and the compatibility of those components to adjacent materials including but not limited to:
 - a. every product in the system (primer, intermediate, topcoat, etc)
 - b. any preapplied or preexisting products (such as existing coatings)
 - c. any post applied products (such as anti-graffiti coating)
 - d. any modifications to the surface preparation or application instructions related to the total system performance.
5. If the color varies from the specified color, the Contractor shall submit color samples on boards at least eight (8) inches by ten (10) inches for review and approval.
6. Documentation related to Contractor Qualifications per 546.2.3.1

Prior to coating application, the Contractor shall submit a notarized manufacturer's Certificates of Compliance stating that the Materials are the same as those described in the manufacturer's product data sheets.

546.2.3.1 Contractor Qualifications

When the contract requires painting more than 500 square feet of steel surface, the Contractor shall demonstrate qualification by one of the following two methods:

Method 1

Obtain SSPC QP 1 certification for field painting or either SSPC-QP 3 certification or the AISC Sophisticated Paint Endorsement (SPE) for shop painting. The Contractor shall perform and document QA/QC inspections daily. QA/QC inspection documents shall be electronically submitted to the Project Manager on a weekly basis.

Method 2

Provide a coating plan and provide for NACE certified inspection (Level 2 minimum). The inspection services shall include but not be limited to:

1. Surface preparation and cleanliness inspection verifying profile and appropriate surface preparation.
2. Confirm products match approved submittals and certification letters. Document batch numbers of all coatings.
3. Inspection of primer coat to include dry film thickness readings. Review contractors QA/QC reports for environmental conditions and document.
4. Observe application of stripe coat on the intermediate coat and document environmental readings during the start-up of application. Review contractors QA/QC reports.
5. Inspect intermediate coat to include dry film thickness readings. Review Contractor's QA/QC reports.
6. Observe start-up of finish coat application and document environmental conditions.

7. Final inspection to include visual inspection for runs, sags, and foreign material in coating. Also perform final dry film thickness inspection.
8. Inspect members after transportation, prior to subsequent coating and / or final acceptance.
9. Electronically submit interim reports after each inspection to the Project Manager within 3 working days.
10. Electronically submit comprehensive final report including photos to the Project Manager within 14 Days of completion of inspection. Final report shall include QA/QC daily inspections performed by the Contractor.

Any deficiencies shall be corrected and re-inspected by the NACE inspector prior to proceeding.

Provisions for demonstration of qualifications are incidental to the performance of the coating, no additional payment shall be made. NMDOT shall be granted open access to the coating operation to perform inspections and to review documentation of Contractor inspections. The Project Manager shall have the option to waive the Contractor Qualification requirement.

546.3 CONSTRUCTION REQUIREMENTS

The Contractor shall apply coatings in conformance with SSPC – PA 1 “Shop, Field and Maintenance Painting of Steel” and with SSPC – PA Guide 13 “Guide Specification for Application of Coating Systems with Zinc-Rich Primers to Steel Bridges” (aka AASHTO/NSBA Steel Bridge Collaboration S 8.1), SSPC-TU 3 “Technical Update No. 3 Overcoating”, and the manufacturer’s application instructions.

546.3.1 Surface Preparation of Existing Bridges and Structures

The Contractor shall perform surface preparation in accordance with the most stringent of the following:

1. At locations where loosely adherent coatings or corrosion are NOT present: SSPC – SP 1, and
2. At locations where loosely adherent coatings are present: SSPC – SP 3, and
3. At locations where corrosion is present: SSPC – SP 11 or
4. Specific contract document requirements or
5. Specific guidance by the Project Manager or
6. Manufacturer recommendations (per the application instructions as amended by the manufacturer’s letter submitted per 546.2.3 #4d if applicable)

546.3.1.1 Surface Preparation Description and Evaluation

Various SSPC surface preparation standards are cited in this section. For reference, a brief summary of each is listed below. The Contractor is responsible to perform to the current versions of all requirements of the full and complete standards available directly from SSPC, The Society for Protective Coatings.

SSPC-SP1 Solvent Cleaning

Removes all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces with solvent, vapor, cleaning compound, alkali, emulsifying

agent, or steam. SSPC-SP 1 is a prerequisite to all hand tool, power tool and abrasive cleaning standards. SSPC-SP1 shall be incidental.

SSPC-SP3 Power Tool Cleaning

Removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by power wire brushing, power sanding, power grinding, power tool chipping, and power tool descaling. Tightly adherent, intact materials may remain.

SSPC-SP6 Commercial Blast Cleaning

When viewed without magnification shall be free of all visible oil, grease, dirt, dust, loose mill scale, rust, and coating, but will permit staining from rust, mill scale, or previously applied coatings. The surface will not necessarily be uniform in color.

SSPC-SP7 / NACE 4 Brush-Off Blast Cleaning

When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating. Tightly adherent mill scale, rust, and coating may remain on the surface. Mill scale, rust, and coating are considered tightly adherent if they cannot be removed by lifting with a dull putty knife.

SSPC-SP10 / NACE 2 Near-White Blast Cleaning

When viewed without magnification shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter of at least 95% of each unit area. Staining shall be limited to no more than 5 percent of each unit area, and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings. Unit area shall be approximately 3 in. x 3 in. (9 sq. in.). SSPC-SP10 shall only be engaged when required by the manufacturer. It shall be paid under the bid item for SSPC-SP6.

SSPC-SP11 Power Tool Cleaning to Bare Metal

When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. The surface profile shall not be less than 1 mil (25 microns).

SSPC-SP16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals. When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, metal oxides (corrosion products), and other foreign matter. Intact, tightly adherent coating is permitted to remain. A coating is considered tightly adherent if it cannot be removed by lifting with a dull putty knife. The surface shall have a minimum profile of 0.75 mil (19 microns).

Prepared surfaces shall be evaluated using the SSPC standards. The following references will be provided to the Project Manager by the Contractor for inspection and acceptance of prepared surfaces:

- If SP 10, SP 6, SP 14 or SP 7 are engaged: SSPC-VIS 1 Guide and Standard (includes reference photographs)

- If SP 2, SP 3, SP 11 are engaged: SSPC-VIS 3 Guide and Standard (includes reference photographs)
- If SP 12 is engaged: SSPC-VIS 4 Guide and Standard (includes reference photographs)

SSPC VIS Guide and Standard shall become the property of the Department. Provide current version.

546.3.1.2 SSPC-SP 1 - Solvent and Pre-Cleaning

The Contractor shall clean exposed areas in accordance with SSPC-SP 1 Solvent Cleaning.

The Project Manager may approve cleaning with high pressure water and an approved, mild detergent to supplement solvent cleaning, where more effective or suitable. This method of pre-cleaning is required on all surfaces that have been exposed to chloride contamination from the use of road salts for snow and ice control.

546.3.1.3 SSPC-SP 3 Power-Tool Cleaning

The Contractor shall remove poorly adhering coatings and prepare the surface with power-tools in accordance with SSPC-SP 3, Power Tool Cleaning. At the Contractor's discretion, SSPC-SP 7 or SSPC _ SP 12 WJ 3 may be employed in lieu of SSPC-SP 3.

546.3.1.4 SSPC-SP 6 – Commercial Blast Cleaning

The requirement for commercial blast cleaning shall be established by the more stringent of contract documents or the manufacturer's recommendations.

546.3.1.5 SSPC-SP 7 – Brush-Off Wet Blast Cleaning

The requirement for brush-off wet blast cleaning shall be established by the more stringent of contract documents or the manufacturer's recommendations. Acceptability of wet cleaning shall be determined by the Project Manager as confirmed against project environmental constraints.

546.3.1.6 SSPC-SP 10 – Near-White Blast Cleaning

The requirement for near-white blast cleaning shall be established by the manufacturer's recommendations. SSPC-SP 10 shall be paid under the same bid item as SSPC-SP 6.

546.3.1.7 SSPC-SP 11 – Power-Tool Cleaning to Bare Metal

The Contractor shall clean areas that show moderate to severe corrosion in accordance with SSPC-SP 11, *Power-Tool Cleaning to Bare Metal*. Areas too large to be prepared using power tools may be cleaned per SSPC SP-6 Commercial Blast Cleaning at the Contractor's discretion.

The Project Manager will mark additional areas for cleaning in accordance with SSPC-SP 11. The Contractor shall clean at least two (2) inches beyond the damaged areas in all directions. The Contractor shall feather the exposed edges of the cleaned areas in accordance with SSPC-SP 11. The Contractor

shall not leave ragged edges of intact paint. During and after power-tool cleaning, the Contractor shall maintain the degree of cleaning specified in accordance with SSPC-SP 11.

The Department will accept these surfaces by visually comparing them to a prepared standard on the Project. The Contractor shall prepare a Project standard by power-tool cleaning an area designated for recoating. Before cleaning, the Contractor shall ensure that the prepared standard is in accordance with SSPC-Vis 3, *Visual Standard for Power and Hand-Tool Cleaned Steel*, Pictorial Standard E SP 11, F SP 11, and G SP 11, and obtain Department approval. The Contractor shall prepare at least one (1) standard for each Structure. More than one (1) standard may be necessary if the cleaned steel differs significantly from the photographic standards. For recoating Bridges, the Contractor shall make the standard at least one (1) ft. × one (1) ft. For recoating Bridge railing or minor Structures, the standard may be smaller. The Contractor shall protect the Project standard from corrosion and contamination by applying a clear polyurethane coat. Upon completing the cleaning Work, the Contractor shall re-clean and coat the standard. If the standard becomes deteriorated or ineffective, the Contractor shall re-establish it at no additional cost to the Department.

The SSPC VIS 1 “Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning” shall be used in this same manner to prepare a standard for surfaces that are blast cleaned per SSPC SP-7 and SP-10.

SSPC _ SP 12 WJ 3 may be employed in lieu of SSPC-SP 3. At the Contractor's discretion, SSPC-SP 7 or

546.3.1.8 SSPC-SP 12 WJ-3 – Thorough Waterjetting

The requirement for thorough waterjetting shall be established by the more stringent of contract documents or the manufacturer's recommendations. Acceptability of waterjet cleaning shall be determined by the Project Manager as confirmed against project environmental constraints.

546.3.1.9 SSPC SP-16 – Galvanized Surfaces

Previously galvanized surfaces shall be prepared by the Contractor in accordance with SSPC-SP16 – Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel. Brush-off blast cleaning includes SSPC-SP1 solvent cleaning or other method approved by the project manager to remove oil, grease, or other contaminants. The SSPC-SP1 is followed by a dry abrasive blasting using compressed air, blast nozzles, and abrasives. To avoid formation of zinc oxides that will result in potential coating failure, blast cleaning must occur when the surface temperature is a minimum of 5 degrees above the dew point and the surface cannot be permitted to get damp after cleaning. The Contractor shall apply coating as soon as possible after surface cleaning.

The Contractor shall apply intermediate and top coat products in accordance with manufacturer's application instructions and this specification.

546.3.1.10 Preparing Glossy Surfaces

All previously coated glossy surfaces shall be lightly abraded / deglossed prior to re-coating.

546.3.1.11 Testing for Chloride Contamination

Prepared surfaces with exposed metal will be tested by the Contractor for chloride contamination. All test areas will be recorded for retesting purposes. A minimum of five (5) tests per 1,000 s.f. or fraction thereof shall be conducted prior to surface preparation. If results greater than 7micrograms per cubic centimeter are detected, the surface shall be re-cleaned as specified and re-tested at the same frequency. If acceptable results are achieved, surface preparation may begin.

546.3.1.9 Abrasives Used in Blast Cleaning Operations

When blast cleaning options are employed in lieu of SSPC SP – 3 and SP – 11 standards (ie SP-7 and SP-6), the Contractor shall select the type of abrasive. All abrasives brought to the site shall be stored in a clean and dry environment. Abrasives shall not be recycled or re-used without NMDOT approval.

546.3.1.10 Limited Access Areas

A best effort with the specified methods of cleaning shall be performed in limited access areas. These methods may need to be supplemented with other equipment such as angle nozzles, to properly clean the limited access areas. The acceptability of the best effort cleaning in these areas is at the sole discretion of the Project Manager.

When replacing a concrete Bridge deck, the Contractor shall not clean or coat the top surfaces of top flanges of beams and girders and shear connectors.

546.3.1.11 Chemical Paint Removal

Chemical removal products and methods may be approved by the Department.

546.3.2 Coating

546.3.2.1 Mixing the Coatings

The Contractor shall mix the coatings with a power mixer in accordance with the coating manufacturer's directions until the Material is smooth and lump-free. The Contractor shall not use paint shakers.

The Contractor shall mix the Material as far as possible in its original container and continue mixing until the metallic powder or pigment is in suspension.

The Contractor shall thoroughly disperse the coating solids that may have settled to the bottom of the container. The Contractor shall strain coatings through a 30 – 60 mesh screen, or per coating manufacturer's recommendations.

The Contractor shall continuously agitate mixed coatings until application.

546.3.2.2 Thinning the Coating

The Contractor shall not thin the coatings without the approval of the Project Manager. If it is necessary to thin the coatings, the Contractor shall thin the Material in accordance with the manufacturer's

recommendations.

546.3.2.3 Coating Application

The Contractor shall apply the coating system with a brush, roller, or by spraying (preferred). The Contractor shall use nozzles and pressures in accordance with the manufacturer's recommendations.

A stripe coat shall be applied to all edges, corners, seams, crevices, interior angles, junctions of joining members, rivets, bolt heads, nuts and threads, welds and similar irregularities. The stripe coats shall be of sufficient thickness to completely hide the surface being covered and shall be followed, as soon as practicable, by a full application of the appropriate coating to its specified thickness.

546.3.2.4 Temperature and Weather Limitations

546.3.2.4.1 Temperature

The Contractor shall apply the coating when the air and surface temperatures are above 50 °F and at least five (5) °F above the dew point.

The Contractor shall not apply coatings on metal surfaces with condensation or frost.

546.3.2.4.2 Humidity

The Contractor shall not apply the coatings when the relative humidity is above 85 %.

546.3.3 Priming

The Contractor shall prime coat all steel surfaces prepared in accordance with SSPC SP-11. The Contractor shall apply primer the same day as cleaning, unless otherwise authorized by the Project Manager. The Contractor shall re-clean surfaces that develop rust or are contaminated with deleterious material before coating, at no additional cost to the Department.

546.3.4 Intermediate and Topcoat

The Contractor shall ensure the primer is cured and dry before applying subsequent coats.

The Contractor shall not allow the manufacturer's recommended maximum time to lapse between coats.

546.3.5 Thickness of Coatings

The Department will reject the coating if the DFT (dry film thickness) gauge shows less than the specified minimum thickness for any coating. The Contractor shall provide coating thicknesses in accordance with Table 546.3.5:1, "Required Film Thicknesses."

Table 546.3.5:1
Required Film Thicknesses

Coating	Dry film thickness range (mils)
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Coating System No. 1 - Polyurethane Topcoat Overcoat / Repair System (As required For Surfaces Coated Per Section 544 New Structural Steel and Certain Items Per Section 545 Miscellaneous Steel)

Primer (epoxy organic zinc)	3.0 – 5.0 mils
Intermediate (epoxy)	5.0 – 8.0 mils
Topcoat (polyurethane)	3.0 – 5.0 mils

Coating System No. 2 - Acrylic Topcoat Overcoat / Repair System (As Required for Designated Items Per Section 545 Miscellaneous Steel)

Primer (epoxy organic zinc)	3.0 – 5.0 mils
Topcoat (acrylic)	2.0 – 4.0 mils

The Contractor shall determine the dry film thickness using magnetic film thickness gauges, per latest version of SSPC PA-2 Procedure for Determining Conformance to Dry Coating Thickness Requirements. The Contractor shall calibrate the gauges on blasted steel with plastic shims approximately the same thickness as the minimum dry film thickness. All dry film thickness requirements are to be measures above the peaks of the blast profile.

546.3.6 Field Repair of Liquid Coatings

Field repair shall be accomplished with the same coating system used for the original application with the exception that organic zinc rich primer may always be used.

The Contractor shall field repair coated areas that are rusted or damaged. The Contractor shall prepare the surface in accordance with 546.3.1 "Surface Preparation of Existing Bridges and Structures" or with methods approved by the Project Manager.

The Contractor shall prime large areas using spray Equipment, brush, or roller. The Contractor shall prime small areas with a brush. The Contractor shall spray or brush the topcoat. Two (2) or more coats may be necessary to build up the required film thickness. The Contractor shall apply topcoat only to areas where the topcoat is damaged.

546.3.7 Protection of the Work and Public

During the coating operations, the Contractor shall protect the work and the public from blast cleaning operations, paint splatter, splashes and smirches with protective covering or other methods approved by the Project Manager.

When the protective devices or procedures are ineffective, the Project Manager may suspend the Work until corrections take place.

The Contractor shall remove blasting and coating debris from all on-site work before reopening the area to traffic.

546.3.8 Inspection

The Contractor will be responsible for performing and documenting Quality Control (QC) inspections of all shop / field surface preparation and coating activities. When the contract requires painting more than 500 square feet of steel surface, the Contractor shall reference Section 544.2.2.3 Contractor Qualifications. When the contract required painting less than 500 square feet of steel surface, the Contractor shall document all QC inspection activities, measurements and observations on the Daily Inspection report. These reports shall be submitted to the Project Manager at a minimum on a weekly basis and shall account for all work performed.

The Contractor shall notify the Project Manager at least ten (10) Days before surface preparation and/or coating to allow adequate time to plan inspection activities.

After completing erection, the Project Manager will inspect the surfaces to be embedded in concrete. The Contractor shall repair damaged or rusted surfaces before placing decks. After placing the deck and at an agreed upon time, the Project Manager will inspect the entire steel Structure for coating system damage. The Project Manager will mark damaged areas for repair and will re-inspect after repairs are complete.

546.4 METHOD OF MEASUREMENT

The Project Manager will measure cleaned areas in accordance with SSPC-SP 11 and SSPC-SP 3 before the application of the prime coat.

546.5 BASIS OF PAYMENT

Pay Item	Pay Unit
Recoating Structures	Lump Sum
SP 6 Commercial Blast Cleaning	Lump Sum
SP 3 Power Tool Cleaning	Square Foot
SP 11 Power Tool Cleaning	Square Foot
SP 16 Brush-Off Blast Cleaning of Galvanized Steel	Lump Sum

546.5.1 Work Included in Payment

The following items will be considered as included in the payment for Recoating Structures and will not be measured and paid for separately:

1. Cleaning all exposed areas of existing steel members in accordance with SSPC-SP 1;
2. When SSPC-SP 6 is performed at the Contractor's discretion in lieu of SSPC-SP 11, SSPC-SP 11 shall be used as the pay item;

3. When SSPC-SP 7 is performed at the Contractor's discretion in lieu of SSPC-SP 3, SSPC-SP 3 shall be used as the pay item;
4. SSPC-SP 11 power-tool cleaning and priming of those areas designated in the Contract to be so included in the Lump sum price.
5. SSPC-SP 3 power-tool cleaning and priming of those areas designated in the Contract to be so included in the Lump sum price;
6. When the manufacturer requires surface preparation other than SSPC-SP 6, 3, 11, or 16 and the surface preparation is not called out to be incidental to other bid items, the surface preparation shall be paid through an existing pay item that is closest in effort to that required. The Project Manager shall determine which pay item shall be used.
7. Furnishing and applying the appropriate coating system to all exposed steel surfaces of the structure;
8. Any field touch-up required to correct shipping or installation damage.
9. Final cleanup of the structure and the immediate area; and
10. Re-caulking the perimeters of all railing post base plates per Section 543.

SPECIAL PROVISIONS MODIFYING SECTION 548 COATING OF CONCRETE

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

548.1 DESCRIPTION

This Work consists of applying Class 4, Special Surface Finish to concrete. Reference 511.3.8 "Finishing" for additional required surface treatment. This section includes specifications for colored concrete stain/sealer, thin film liquid applied coatings (referred to as paint), and textured coating.

For Penetrating Water Repellent Treatment, see Section 532. For Permanent Anti-Graffiti Protective Coating, see Section 531.

548.2 MATERIALS

The following coating systems are included in this specification:

1. Coating System 548-1: colored concrete stain/sealer
2. Coating System 548-2: paint
3. Coating System 548-3: textured coating

When the Contract Documents require a Class 4 Special Surface Finish, the Contractor shall provide Coating System 1: colored concrete stain/sealer, unless another method is specifically required in the Contract Documents.

For new construction with no drainage systems, Coating Systems 1, 2, and 3 require the application of waterproofing materials on the backside of below grade walls such as retaining walls and planter boxes. Waterproofing shall be per Section 511.

Unless noted in the Contract Documents, the color shall be selected by the Project Manager from the Federal Standard 595C color chart for Coating Systems 1, 2, and 3.

The Contractor shall select a coating system from the Department's Approved Products List for Coating Concrete.

548.2.1 Coating System 548-1: Colored Concrete Stain/Sealer

The Contractor shall provide an acrylic polymer penetrating concrete stain. Compositions including acrylic, silicone, silane and / or siloxane are acceptable. Solid, opaque, and semi-transparent products are acceptable. The stain shall contain a minimum of 40.3% solids by mass and meet the requirements described in Table 548.2.1:1

Table 548.2.1:1

Test Description	Test	Criteria
Water Vapor Transmission	ASTM D1653	0.4-0.8 grains/ sq.ft. / hr.
Adhesion to Concrete	ASTM D7234	500 psi
Wind Driven Rain Resistance	ASTM D6904 or TT-C-555B 48 hr duration	no visible leaks, no weight gain
Accelerated Weathering	ASTM D4587 - 11 cycle, 1,000 hour duration	pass

The Contractor shall apply two (2) coats. The manufacturer shall determine the composition of the two coats: ie one coat of stain and one coat of sealer, or two coats of stain. Both coats shall be provided by the same manufacturer.

548.2.2 Coating System 548-2: Paint

The Contractor shall provide paint products from the Master Painters Institute's Approved Product List – MPI #108. The product shall possess the following properties:

1. Does not show excessive settling in a freshly opened full container
2. Easily re-disperses with a paddle to a smooth, homogeneous state free of curdling, livering, caking, color separation, lumps and skins
3. Brushes on easily
4. Shows no running or sagging tendencies when applied to smooth vertical surfaces
5. Dries to a uniform finish.

The final condition of the concrete must have penetrating water repellent properties consistent with ASTM D6532, water absorption shall perform a minimum of 80% better than untreated material. A combination of products may be required to meet this requirement (paint, sealer, penetrating water repellent, etc.). For coating system 548-2, the Contractor shall provide a letter from the manufacturer recommending the order of application of products that will meet their product requirements and water repellent capability. This letter shall confirm the compatibility of all products in the system.

548.2.3 Coating System 548-3: Textured Coating

The Contractor shall provide a textured coating product from the Master Painters Institute's Approved Product List MPI #42.

A light sand texture shall be provided unless otherwise specified in the Contract Documents (note: textured coatings can be specified as smooth).

The final condition of the concrete must have penetrating water repellent properties consistent with ASTM D6532, water absorption shall perform a minimum of 80% better than untreated material. A combination of products may be required to meet this requirement (textured coating, sealer, penetrating water repellent, etc.). For coating system 548-3, the Contractor shall provide a letter from the manufacturer recommending the order of application of products that will meet their product requirements and water repellent capability. This letter shall confirm the compatibility of all products in the system.

548.2.4 Submittals

The Contractor shall submit manufacturer's product data sheets, application instructions, paint certifications and an application plan 30 Days prior to application of coatings.

The Contractor shall provide a coating Application Plan according to the manufacturer's written recommendations. The Plan shall include:

1. Proposed surface preparation
2. Mixing and thinning directions
3. Rate of application
4. Recommended spray nozzles and pressures
5. Number of necessary coats
6. Allowable ambient air temperature range
7. Allowable ambient surface temperature range
8. Application equipment qualification of workers
9. Safety and damage protection plan

If the color varies from the specified color, the Contractor shall submit color samples on boards at least eight (8) inches by ten (10) inches for review and approval.

548.3 CONSTRUCTION REQUIREMENTS

548.3.1 General

Prior to application of a Class 4 Special Surface Finish (reference 511.3.9.5), the Contractor shall ensure that the surface meets the requirements of a Class 2, Rubbed Surface Finish (reference 511.3.9.3).

The Class 2 Rubbed Surface Finish, including any patch material, must be allowed 28 days to cure prior to the application of coating systems unless otherwise recommended by the manufacturer and approved by the Department.

548.3.2 Surface Preparation

The Contractor shall prepare the surface in conformance with the manufacturer's recommendations and shall, at a minimum, include power spraying with a minimum 4000 PSI sprayer with a zero degree rotary nozzle at a 6" stand-off distance. The Contractor may also find it necessary to employ detergents or abrasives. Unless otherwise directed by the manufacturer, the prepared surface shall be in conformance with SSPC-SP 13 / NACE No. 6 'Surface Preparation of Concrete.' The concrete surface

must be free of contaminants, curing compounds, form release agents, efflorescence, and existing incompatible coatings, laitance, loosely adhered concrete, and dust and shall provide a sound, uniform substrate.

Alkalinity testing by the Contractor and associated follow-up action shall be required if recommended by the manufacturer.

548.3.3 Temperature and Weather Limitations

The Contractor shall apply coatings on concrete surfaces that have cured for a minimum of 28 Days and only when the atmospheric temperature is in the range from 50 degrees F to 100 degrees F, and when the relative humidity is at or below 85 percent. Coatings shall only be applied to a surface which is at least 5 degrees F above the dew point. The surface temperature should remain above the minimum temperature specified above until the coating is thoroughly dry. Coatings shall not be applied when weather conditions exist which might damage the work such as windborne dust. With the approval of the Project Manager, temperature and weather limitations may be adjusted to those conditions recommended by the Manufacturer.

548.3.4 Precoating Requirements

The Contractor shall allow the surface to visually dry completely before application of coatings.

All concrete surfaces shall be inspected by the Project Manager prior to application of coatings.

Do not apply penetrating water repellent treatment to the concrete surface before coating the concrete, unless otherwise recommended by the manufacturer.

548.3.5 Coating Application

Coating shall be applied in accordance with SSPC-PA 14.

No coating shall be applied until the preceding coat has dried/cured to the extent specified by the manufacturer.

All coatings shall be applied so that the cured film is continuous and pin-hole free.

548.3.5.1 Thinning the Coatings

The Contractor shall not thin the coating Material without Manufacturer and Department approval.

548.3.5.2 Application Equipment Requirements

Spray application equipment shall be employed to apply the coatings unless otherwise recommended by the manufacturer. The Contractor shall employ application equipment that meets the requirements of the manufacturer. Brushes and rollers may be used for touch-up paint and on areas less than 20 SQFT.

548.3.5.3 Dry Film Thickness

The Contractor shall apply the coatings at the dry film thickness recommended by the manufacturer. Dry film thickness shall be measured by the Contractor in accordance with ASTM D6132 using an ultrasonic film thickness gage that shall be provided and retained by the Contractor. Dry film thickness readings shall be taken and recorded every 1,000 SQFT or at a minimum of once per workshift.

548.3.6 Inspection and Reporting

The Contractor shall maintain daily field reports that include:

- weather and temperature data
- surface preparation observations including photographs
- product tracking information including lot and batch numbers of the products applied
- description of equipment used and names of applicators
- records of dry film thickness (reference 548.3.5.3)

The Contractor shall submit the inspection reports to the Project Manager on a weekly basis.

548.3.7 Project Test Area

For areas greater than 500 square feet, a project test area shall be prepared and tested by the Contractor. The test area can be either on the structure itself or on a sample that is representative of the substrate to be coated. The test panel shall be no smaller than three (3) sq. ft. in size. The test panel shall be of the same material and application process as the final product.

Following cure, adhesion testing shall be performed by the Contractor on the test panel in accordance with ASTM D7234. The location of the disbondment for each of the three pulls shall be within the concrete substrate (ie, cohesive failure of the concrete). Testing shall be observed by the Project Manager. Results of the test shall be submitted in writing to the Project Manager.

548.4 METHOD OF MEASUREMENT

Coating of the Concrete surfaces will be measured by the square foot.

548.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Coating of Concrete – Stain</i>	Square Foot
<i>Coating of Concrete – Paint</i>	Square Foot
<i>Coating of Concrete – Textured Coating</i>	Square Foot

548.5.1 Work Included in Payment

The Department will consider as included in the payment for the pay item(s) listed in this section and will not measure or pay separately for the following Work:

1. Preparation of the concrete surfaces to be painted;
2. Protection of pedestrian, vehicular or other traffic near or under the work from paint spatter and disfigurement; and
3. Inspection and testing as required by this Specification and the Contract Documents.

November 17, 2016

**SPECIAL PROVISIONS
MODIFYING
SECTION 564: PREFORMED CLOSED CELL FOAM BRIDGE JOINT SEALS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **564.3.8 Warranty** in its entirety.

SPECIAL PROVISIONS FOR SECTION 565 – PREFORMED SILICONE-COATED FOAM JOINT SYSTEM

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

565.1 DESCRIPTION

This Work consists of providing and installing preformed, pre-compressed, self-expanding foam with silicone precoated surface. The foam is bonded in place with a structural epoxy adhesive. The silicone precoated surface is sealed to the bridge with silicone sealant. This system is referred to herein as "joint system."

565.2 MATERIALS

565.2.1 Joint System

The Contractor shall provide 100% waterproof pre-compressed polymer impregnated open cell polyurethane foam topped with a silicone coating. Provide a joint system comprised of the following three (3) components:

1. Cellular polyurethane foam impregnated with 100% hydrophobic polymer, water based emulsion and factory coated with highway-grade, fuel resistant silicone.
2. Field-applied epoxy adhesive primer.
3. Field-injected silicone sealant.

The Contractor shall provide a total system from a single manufacturer.

565.2.1.1 Open Cell Polyurethane

Provide a foam seal with the following properties:

1. Provide a foam with a working range of 50% in tension and 50% in compression. Factory fabricate changes in plane and direction using factory fabricated watertight transition assemblies on inside and outside corners for 45 degrees and 90 degree bends.
2. Bleeding: none at 180 deg. F@ 50% compression for 3 hrs.
3. UV Resistance, no changes 2000 hrs., in accordance with ASTM G155.
4. Provide a polymer impregnation agent.

565.2.1.2 Epoxy Adhesive

Use 100% solids, two component moisture sensitive modified epoxy adhesive which meets ASTM C-881.

565.2.1.3 Silicone Sealant

Use a one part, cold applied chemically curing silicone joint sealant which meets ASTM D 5893. Silicone shall be fuel resistant.

565.3 CONSTRUCTION REQUIREMENTS

565.3.1 General

The Contractor shall be certified by the manufacturer for installation of the joint system. If the Contractor is not certified, the Contractor shall ensure that a technical representative from the manufacturer is present for the duration of the joint system installation.

565.3.2 Installation

The Contractor shall install the components of the joint system when the temperature is within the range specified by the manufacturer of each system component. The Contractor shall store materials in accordance with the manufacturer's requirements.

The Contractor shall install field-applied epoxy adhesive primer and field-injected silicone sealant as directed by the manufacturer. Prior to installation, measure the opening of the existing joint at different locations and compute the mean opening. Furnish the seal joint topped with fuel resistant silicone in a width greater than the mean measured joint extension which when compressed will form bellow(s) as recommended by the manufacturer. Furnish a foam seal having a depth appropriate for the joint width as recommended by the manufacturer.

The Contractor shall prepare surfaces to receive the sealant. For concrete surfaces, repair spalls, chips, irregular or unsound joint surfaces to provide smooth joint surfaces in a manner approved by the Project Manager. Blast clean steel surfaces in accordance with SSPC-SP 6, "Industrial Blast Cleaning." After preparing the surface, notify the Project Manager for inspection of the joint before installing the joint system. Ensure joint sides are dry of solvents or other cleaning agents prior to installation.

At deck edges, the joint material shall not extend horizontally beyond the deck, but shall turn down and seal the deck edge in the vertical plane. The joint material shall extend 1" below the bottom of the deck.

When factory fabricated universal 90's are required, the Contractor shall start installation with these members. Apply epoxy adhesive to the sides of the joint header as directed by the manufacturer. Unwrap joint system and place in joint opening as directed by the manufacturer. Provide a minimum recess of 1/2" for joint sizes 1/2" – 1-1/4" and a minimum recess of 3/4" for sizes 1-1/2" – 4". Prior to placing joint system in the joint opening, verify depth using a wooden block shaped in the form of a 'T.' Before the epoxy cures, install a bead of silicone sealant between the foam and the silicone topping.

565.3.3 Acceptance Test Procedures

The Contractor shall perform a watertight integrity test of the joint system if required by the Project Manager. The test shall be observed by the Project Manager. The test results shall be photographically recorded and transmitted to the Project Manager. Unless otherwise directed by the manufacturer, the water integrity test shall be as follows: Wait a minimum of 72 hours after the joint is placed. Flood the joint with water. Visually verify that there are not any leaks on the underside of the joint as observed by the Project Manager. Joints that leak will not be accepted. Repair leaky joints in accordance with the manufacturer's recommendations.

565.4 METHOD OF MEASUREMENT

The joint system will be measured by the linear foot from end to end along the joint centerline.

565.5 BASIS OF PAYMENT

Pay Item	Pay Unit
Preformed Silicone-Coated Foam Joint System	Linear Foot

565.5.1 Work Included in Payment

The Department will consider as included in the payment for the joint system and will not measure or pay separately for the following Work:

1. All material, labor and Certificate of Compliance;
2. All other costs associated with providing and installing of the joint system; and
3. Technical representative if required.

SPECIAL PROVISIONS FOR SECTION 602: SLOPE AND EROSION PROTECTION STRUCTURES

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

602.2.1 Classifications Delete Class D Classification from **Table 602.2.1:1** and substitute the following:

The Department will classify riprap and gabions in accordance with Table 602.2.1:1 "Riprap Classifications and Gabion Requirements" with the exception of Class D, Derrick Stone. Class D, Derrick Stone will follow the gradation requirements in Table 602.2.1:2 "Gradation Requirements for Class D, Derrick Stone" shown below.

Table 602.2.1:2
Gradation Requirements for Class D, Derrick Stone

CLASS, DESCRIPTION	PERCENT OF ROCK EQUAL OR SMALLER BY COUNT, D _x	RANGE OF INTERMEDIATE DIMENSION ¹ , (inches)	RANGE OF ROCK WEIGHT ² , (pounds)
D, Derrick Stone ³	100	30	5000
	70	24 – 18	1780 – 2500
	40	11 – 14	360 – 500
	20	6 – 8	70 - 100

¹ Intermediate dimension measured as the shortest straight-line distance from one side of the rock or rock particle to the other on the maximum projection plane (plane of rock or rock particle with the largest projected surface area).

² Weights based on a specific gravity of 2.65.

³ Include spalls and rock fragments to provide a stable dense mass.

July 17, 2017

SPECIAL PROVISIONS MODIFYING SECTION 606: METAL AND CONCRETE WALL BARRIER

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **Section 606: METAL AND CONCRETE WALL BARRIER** in its entirety and replace with the following:

606.1 DESCRIPTION

This Work consists of constructing guardrail, permanent concrete wall barrier (CWB), temporary concrete wall barrier (TCWB), end treatments, transitions, and protection systems.

606.2 MATERIALS

606.2.1 Guardrail

The types of guardrail are as follows:

- Single face W-beam guardrail;
- Double faced W-beam guardrail;
- Single face Thrie beam guardrail; and
- Double faced Thrie beam guardrail.

Each guardrail type shall have galvanized rail elements unless otherwise specified in the Contract. Use Materials for guardrail installations in accordance with the current edition of the AASHTO Task Force 13 *Guide to Standardized Highway Barrier Hardware*.

606.2.1.1 Rail Elements

606.2.1.1.1 Galvanized Guardrail

Provide guardrail elements with a corrugated beam in accordance with AASHTO M 180, Type 2, Class A.

Galvanize steel rail elements before or after fabrication in accordance with AASHTO M 180 if necessary.

Provide required hardware and fittings in accordance with AASHTO M 30 for the specified diameter and strength class.

606.2.1.1.2 Weathering Guardrail

Provide corrosion-resistant "weathering" guardrail Materials if specified in the Contract. Weathering guardrail Materials shall consist of A 606 Type 4 steel, be in accordance with AASHTO M 180, Class A, Type 4 standards, and shall ensure they have a corrosion resistance at least four times that of plain carbon steel.

606.2.1.1.3 Double Nested Guardrail

Provide a second rail element attached to each face as specified in the Contract. The second rail element shall have the same galvanization or "weathering" properties as that of the exterior rail element.

606.2.1.2 Fasteners

Unless otherwise specified, galvanize fasteners in accordance with AASHTO M 111 or ASTM A 153. Galvanize after fabrication.

Provide bolts in accordance with ASTM A 307 and nuts in accordance with ASTM A 563, Grade A or better.

Provide fasteners for weathering guardrail in accordance with AASHTO M 180 for Type 4 steel.

606.2.1.3 Posts

606.2.1.3.1 Reserved

606.2.1.3.2 Structural Shape Posts

Provide structural shape posts in accordance with ASTM A 36 and galvanize them in accordance with ASTM A 123. Do not perform punching, drilling, or cutting after galvanizing. Provide posts for guardrail in accordance with NCHRP Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features and the AASHTO Manual for Assessing Safety Hardware (MASH).

606.2.1.4 Offset Blocks

606.2.1.4.1 Wood Offset Blocks

Provide wood offset blocks as specified for the guardrail and end treatment type. Wood offset blocks shall be Southern Yellow Pine, Western Larch, Ponderosa Pine, Douglas Fir, or Lodgepole Pine and either rough sawn (unplaned) or S4S with nominal dimensions specified and with a stress grade of at least 1,200 psi.

The size tolerance of rough-sawn blocks in the direction of the bolt holes will be within $\pm 1/4$ in. of specified dimensions. Only use one combination of post and block for any one continuous length of barrier.

Provide wood preservatives and treatment in accordance with AASHTO M 133 and AWPA C14.

606.2.1.4.2 Plastic and Composite Offset Blocks

Provide plastic or composite offset blocks as specified for the guardrail and end treatment type and in accordance with the guardrail manufacture's recommendations.

Ensure Suppliers of plastic or composite blocks proposed for inclusion on the Department's Approved Products List submit certification to the Project Manager for approval by the State Traffic Engineer.

606.2.2 Reserved

606.2.3 Concrete Wall Barrier (CWB) and Temporary Concrete Wall Barrier (TCWB)

The types of CWB are as follows:

1. Slip-formed CWB;
2. Cast-in-place CWB; and
3. Precast CWB.

CWB shall be installed by slip-forming or cast-in-place. TCWB shall be precast.

Use Class A concrete in accordance with Section 509, "Portland Cement Concrete Mix Designs." Provide reinforcing steel in accordance with Section 540, "Steel Reinforcement." Provide preformed asphalt joint filler in accordance with AASHTO M 213. Provide penetrating water repellent in accordance with Section 532, "Penetrating Water Repellent Treatment."

A 3/8" diameter, ASTM A416 Grade 270, AASHTO M 203M, uncoated seven-wire steel strands may be substituted for the AASHTO M31, Grade 60 deformed bars provided that the steel strands are uncoated, clean and free from dirt, loose rust, oil, grease or other Deleterious Material, for Slip-formed CWB.

606.2.3.1 CWB Steel Access Panel

Provide and install CWB steel access panels in accordance with the Plans or as directed by the Project Manager.

Contour the steel access panel to the shape of and flush with the CWB. The Department will not allow the steel access panel to compromise the structural integrity and performance of the CWB assembly. Provide steel in accordance with AASHTO M 270, Grade 36. Coat the steel access panel in accordance with Section 545, "Protective Coating of Miscellaneous Structural Steel."

606.2.4 End Treatments

The types of end treatments are as follows:

- End Treatment – W-beam TL-3 end terminal (for all speeds);
- End Treatment – W-beam TL-2 end terminal (for speeds of 40 mph or less);
- End Treatment – W-beam end anchor;
- End Treatment – Thrie beam end anchor; and
- End Treatment – W-beam driveway end anchor (for curved guardrail for minor approaches and driveways).

Provide End Treatments on the Department's Approved Products List which are required to meet NCHRP Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH).

W-beam TL-3 End Terminals may be used for all posted speeds.

W-beam TL-2 End Terminals may be used for posted speeds of 40 mph or less.

W-beam End Anchors shall be used on the downstream end of W-beam guardrail runs when a crash-worthy TL-3 or TL-2 terminal is not required.

Thrie beam End Anchors shall be used on the downstream end of thrie beam guardrail runs when a crash-worthy TL-3 or TL-2 end terminal is not required.

Driveway End Anchors may be used on curved W-beam guardrail installations at minor roadway intersections such as driveways and low speed roadway approaches to the mainline.

606.2.5 Transitions

Transition types may include the following or others as specified in the Contract:

- Transition from W-Beam to thrie beam;
- Transition from guardrail to rigid barrier;
- Transition from existing guardrail to 31" guardrail.

606.2.6 Protection Systems

Protection Systems may include the following or others as specified in the Contract:

- Median Protection System;
- Drainage Structure Protection System.

Each system is comprised of W-beam, thrie beam, and expansion/reducer sections working in conjunction to provide increased protection for bridge piers, fixed objects and drainage structures. The minimum lengths required for each component of the system, as well as the required post spacing, shall be as indicated in the Contract.

606.2.7 Materials Certification

Provide MTRs and certificates of compliance in accordance with Section 106.4 "Certificates of Compliance" to the Project Manager, certifying that the Materials and fabrication are in accordance with these specifications. Fabrication shall be done by an identifiable source.

606.2.8 Member Identification and Marking

Ensure the manufacturer permanently stamps the specific type of guardrail end treatment at each location to correspond with those shown on the shop drawings provided to the Project Manager, so that each is readily identifiable in the field.

606.2.9 Reflective Barrier Delineators

Provide amber-colored reflective barrier delineators for median barriers and white reflectors for shoulder-side barriers in accordance with the Contract and **Section 703, "Traffic Markers."**

Place reflective barrier delineators back to back on median barriers.

606.3 CONSTRUCTION REQUIREMENTS

During construction, prevent exposed Steel or concrete barrier ends from creating a hazard to the traveling public.

606.3.1 Guardrail Installation

Installation of guardrail shall be done by personnel certified by the manufacturer. Provide certification to the Project Manager.

Position steel parts stored in transit, in open cars or trucks, or outside in yards or at job sites to allow free drainage and air circulation. Handle fabricated steel parts to avoid gouges, scratches, and dents.

Keep the steel clean of Deleterious Material. If the Contract specifies a weathering guardrail, the Department will not consider natural oxidation (mill scale) to be Deleterious Material and will not allow galvanizing, blast cleaning, or pickling of weathering guardrail to remove the mill scale.

Draw bolts tight (except adjustment bolts). Use bolts that are long enough to extend beyond the nuts.

606.3.1.1 Steel Posts

Set posts plumb, in hand-dug or mechanically made holes, or by driving. If upward vertical adjustment of posts is necessary, remove and reinstall the post.

606.3.1.1.1 Steel Posts in Asphalt

The Contractor shall construct a leave out for all W-beam locations in asphalt.

Perform post drilling or driving operations that does not cause bulging, distressing, or other disturbance of the asphalt surface.

If bulging or other distress of the asphalt surfacing occur when drilling or driving steel posts, remove and reinstall these posts using guide holes drilled through the asphalt surfacing. Make the guide holes with a minimum 8-inch diameter.

If after precutting or drilling the guide holes, bulging or other distress of the asphalt surfacing occurs or if posts cannot be driven to the specified depths, cease the driving, remove the posts, and extend the guide holes as necessary or as directed by the Project Manager.

Backfill and compact postholes with acceptable Material, such as Base Course or cold mix, placed in thin layers, to within three (3) inches of the surface grade. Place three (3) inches of Base Coarse in accordance with Section 303, manually tamp and neatly level to surface grade. Apply an emulsion to the leave out area within 24 hours of compaction as approved by the Project Manager.

Steel posts in asphalt thicker than 8 inches shall be constructed as steel posts in rock per section 606.3.1.1.3.

606.3.1.1.2 Steel Posts in Concrete

The Contractor shall construct a leave-out for all W-beam and thrie-beam locations in concrete.

Backfill and compact postholes with acceptable Material, such as Base Course or cold mix, placed in thin layers, to within three (3) inches of the surface grade. Place three (3) inches of Base Coarse in accordance with Section 303, manually tamp and neatly level to surface grade. Apply an emulsion to the leave out area within 24 hours of compaction as approved by the Project Manager.

606.3.1.1.3 Steel Posts in Rock

When W-beam posts are restrained by asphalt or concrete surfacing, a leaveout shall be constructed.

Perform post drilling operations that does not cause bulging, distressing, or other disturbance of the asphalt surface.

If bulging or other distress of the asphalt surfacing occur when driving steel posts, remove and reinstall these posts using guide holes drilled through the asphalt surfacing. Make the guide holes with a minimum 8 inch diameter.

If after precutting or drilling the guide holes, if bulging or other distress of the asphalt surfacing occurs or if posts cannot be driven to the specified depths, cease the driving, remove the posts, and extend the guide holes as necessary or as directed by the Project Manager.

Backfill and compact postholes with acceptable Material, such as Base Course or cold mix, placed in thin layers, to within three (3) inches of the surface grade. Place three (3) inches of Base Coarse in accordance with Section 303, manually tamp and neatly level to surface grade. Apply an emulsion to the leave out area within 24 hours of compaction as approved by the Project Manager.

606.3.1.2 Thrie Beams and W-Beams

Erect smooth and continuous rail elements. Overlap rails in the same direction as the traffic flow

of the nearest lane. The Department will only allow such drilling or cutting that is necessary for special connections and for sampling in the field.

Shop-fabricate curved rails having a radius of 150 ft. or less to the appropriate curvature specified in the Plans.

606.3.1.3 Repair of Damaged Coating

If the galvanizing of guardrail or appurtenances is damaged, repair the coating by galvanizing or by coating with two coats of zinc dust-zinc oxide paint in accordance with Federal Specification TT-P-641 or Military Specification ML-P-21035.

606.3.2 Reserved

606.3.3 Concrete Wall Barrier and Temporary Concrete Wall Barrier Installation

606.3.3.1 Concrete Wall Barrier and Temporary Concrete Wall Barrier Fabrication

Fabricate CWB in accordance with Section 510, "Portland Cement Concrete," and Section 511, "Concrete Structures."

Construct TCWB in accordance with the Plans.

Construct CWB in accordance with the Plans. Ensure that the top of the completed barrier does not deviate from the Plans more than ± 0.19 inches. Place reinforcement in accordance with Section 540. Give the CWB a Class 2, Rubbed Surface Finish, or Class 4, Special Surface Finish, in accordance with Section 511.3.8, "Finishing."

The reinforcement shall be placed as shown on the approved drawings. When substituting steel strands caution must be taken to prevent and avoid displacement from detailed orientation.

If the manufacturer requires sandblasting, do not displace mortar used in the surface finish from the bubble pockets, pits, depressions, and honeycombs.

Cure CWB in accordance with Section 511.3.9, "Curing".

Treat the entire exposed surfaces of CWB with penetrating water-repellent treatment in accordance with Section 532, "Penetrating Water Repellent Treatment."

When called for in the Contract, apply penetrating water repellent first, then the Special Surface Finish.

The Department will not require fly ash in the PCC used to fabricate TCWB.

606.3.3.2 Permanent Concrete Wall Barrier Joint Treatment

When sawing transverse weakened-plane joints, perform the sawing after the concrete has hardened enough to prevent raveling, crumbling, or shape deformation. Saw control joints at intervals designated in the Plans or as directed by the Project Manager. After completing the sawing operations, clean the sawed area of debris.

Make a construction joint after the day's permanent placement operations and at locations when concrete placement is interrupted for 30 minutes or more.

606.3.3.3 Permanent Concrete Wall Barrier Installation

Construct footings and foundations, and prepare the Subgrade to 95% of maximum density in accordance with AASHTO T 180 (Modified Proctor), Method D (TTCP Modified) as necessary, before placing the CWB.

Construct vertically offset (atypical) CWB as specified in the Plans.

606.3.3.3.1 Temporary Concrete Wall Barrier Requirements

The Contractor shall precast TCWB as specified in the Plans. The Contractor shall not intermix CWB of different designs, shapes, or lengths. The Contractor shall set TCWB in accordance with the Contract and the approved traffic control plan. Provide necessary loading, hauling, and unloading at designated sites.

The Contractor shall reset the TCWB during construction, as required by the Contract.

After completing the project, the Contractor shall remove, load, haul, unload, and stockpile the Department retained or Department provided CWB at the locations required in the Contract or as directed by the Project Manager.

606.3.3.3.2 Temporary Concrete Wall Barrier (Retained by the Contractor)

If the Contract specifies TCWB retained by the Contractor, the Contractor shall provide new or used TCWB. TCWB retained by the Contractor will remain the property of the Contractor upon completion of the project.

The Contractor shall provide connecting hardware for the TCWB assembly.

606.3.3.3.3 Temporary Concrete Wall Barrier (Retained by the Department)

If the Contract specifies TCWB retained by the Department, the Contractor shall provide new TCWB.

TCWB retained by the Department , including shop drawings and connecting hardware, as approved by the Project Manager, will become the property of the Department upon completion of the project.

The Contractor shall remove, dispose and replace Department retained TCWB that is not Accepted by the Project Manager.

606.3.3.3.4 Department-Furnished Temporary Concrete Wall Barrier

If the Contract specifies Department-furnished TCWB, the Contractor shall load, haul, and unload Department-furnished TCWB from origins to destinations.

Department-furnished TCWB will remain the property of the Department upon completion of the project.

If the Contract specifies Department-furnished TCWB, the Contractor shall provide connecting hardware for the TCWB assembly, if missing from the TCWB units.

606.3.4 End Terminal or End Anchorage Installation (End Treatment Systems)

Install end treatment systems in accordance with the manufacturer's recommendations and approved shop drawings. Installations shall be performed by certified personnel.

606.3.5 Transition Installation

Install transitions in accordance with project plans and approved shop drawings.

606.3.6 Protection System Installation

Install Protection Systems in accordance with the project plans and approved drawings.

Assembly and installation of each component of the Protection System shall be supervised at all times by the Contractor's representative certified by the manufacturer.

606.3.7 Embankment Grading Requirements

Compact Embankment Material to 95% of maximum density in accordance with AASHTO T 180 (Modified Proctor), Method D (TTCP Modified). Unless otherwise specified in the Contract, the ground surface between the edge of the shoulder and the hinge point of the slope behind the guardrail shall be graded at 10:1 (H:V) or flatter. Warp all grade transitions to create smooth surface contours.

606.3.8 Drainage Requirements

Provide guardrail drainage components as specified in the Contract.

When asphalt paving is specified in the project plans, a minimum thickness of 1 ½ inches of hot mix asphalt shall be placed and compacted beneath the guardrail area.

Asphalt curb or concrete curb may be used to direct surface runoff as specified in the project plans. Metal curbs are not allowed. For Transitions from guardrail to rigid barrier, do not extend the asphalt curb or concrete curb beyond the thrie beam to W-beam reducer element. If additional curb length is needed, then extend the curb through the entire Transition and add 12.5 ft. of nested W-beam adjacent to and upstream of the thrie beam to W-beam reducer element. All asphalt curb or concrete curb shall be placed below the guardrail offset block with the face of the curb aligned with the face of the guardrail.

606.3.9 Vegetation Management Requirements

Provide vegetation management as specified in the Contract. Vegetation management may consist of asphalt paving, concrete paving, or application of an approved herbicide.

606.4 METHOD OF MEASUREMENT

606.4.1 Guardrail Measurement

Guardrail will be measured and paid in linear feet of guardrail that has been satisfactorily completed and accepted, exclusive of that length of guardrail that is within the pay limits of end treatments and transitions, as specified. Measurement will be made along the centerline of the barrier.

Weathering Guardrail will be measured and paid in linear feet of guardrail that has been satisfactorily completed and accepted, exclusive of that length of guardrail that is within the pay limits of end treatments and transitions, as specified. Measurement will be made along the centerline of the barrier.

Curved Guardrail will be measured and paid as linear feet of standard Guardrail.

606.4.2 Reserved

606.4.3 Concrete Wall Barrier Measurement

CWB and TCWB will be measured along the centerline of the barrier. CWB flare within CWB Transition Section will be measured as CWB.

606.4.4 End Terminal or End Anchor (End Treatment System) Measurement

End Treatment Systems will be measured and paid in units of each completed and accepted, inclusive of integral transition sections connecting the End Treatment to the corresponding guardrail or concrete wall barrier. Each End Treatment is inclusive of all necessary posts, blocks, connections, anchorage, fasteners, grading, drainage elements, vegetation management components and leave-outs.

606.4.5 Transition Measurement

Transitions will be paid by each for transitions that have been satisfactorily completed and accepted. Measurement will be made along the transition centerline and exclusive of that length of barrier that is within the pay limits of end treatments or the corresponding guardrail or concrete wall barrier. Transitions that are integral to the end treatment system shall be considered to be part of the end treatment system and shall not be measured or paid separately. Each Transition is inclusive of all necessary anchorage fasteners, grading, drainage elements, and vegetation management components.

606.4.6 Protection System Measurement

Protection Systems will be measured and paid in units of linear feet of the protection system that has been satisfactorily completed and accepted. Measurement will be made along the protection system centerline and exclusive of that length of barrier that is within the pay limits of end treatments. Each Protection System is inclusive of all necessary anchorage, fasteners, grading, drainage elements, vegetation management components and leave-outs.

606.4.7 Removal and Reinstall Guardrail

Remove and Reinstall Guardrail will be measured and paid in linear feet of guardrail that has been satisfactorily removed, replaced, and accepted exclusive of end treatments and transitions. Measurement will be made along the railing face center to center of the outermost post in the length of guardrail being measured.

606.5 BASIS OF PAYMENT

Pay Item	Pay Unit
Guardrail	Linear Foot
Weathering Guardrail	Linear Foot
End Terminals	Each
End Anchors	Each
Transitions	Each
Protection Systems	Linear Foot
Remove and Reinstall Guardrail	Linear Foot
Concrete Wall Barrier	Linear Foot
TCWB Retained by the Contractor	Linear Foot
Resetting of TCWB	Linear Foot
TCWB Retained by the Department (___ ft)	Linear Foot
Resetting of TCWB (___ ft)	Linear Foot
Department-Furnished TCWB (___ ft)	Linear Foot
TCWB Retained by the Contractor (___ ft)	Linear Foot
Concrete Wall Barrier (Modified)	Linear Foot
Concrete Wall Barrier (Half Section)	Linear Foot

606.5.1 Work Included in Payment

The following work and items will be considered as included in the payment for the main item(s) and will not be measured or paid for separately:

- A. All loading, hauling, unloading, stockpiling, or disposal;
- B. Moving or removal of temporary barrier;
- C. Footings and foundations;
- D. Offset Blocks;
- E. Reflective sheeting and reflectors installed on guardrail, end treatments, and transitions;
- F. End treatment posts, sleeves, anchors, barrier rail and impact head;
- G. Backfilling and compacting of holes created by removal and installation of posts;
- H. Embankment material, placement, and grading;
- I. Placement and compaction of asphalt material;
- J. Construction of surfacing;
- K. Construction of post leaveouts;

- L. Construction of asphalt curbs;
- M. Patching material at posts;
- N. All connecting hardware;
- O. Reflective barrier delineators installed on CWB and TCWB;
- P. Curing of CWB and application of penetrating water-repellent treatment;
- Q. Connection pins for TCWB;
- R. Concrete wall barrier access panel;
- S. Reinforcing Steel;
- T. Transitions that are integral to end treatment systems; and
- U. Replacement of unacceptable Department retained TCWB due to Contractor mishandling.
- V. Guardrail post installation in rock.

July 6, 2015

**SPECIAL PROVISIONS
MODIFYING
SECTION 607: FENCE**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **607.2.2.2 Posts** and replace with the following:

Provide metal or wood corner, brace, intermediate brace gate, and line posts of the specified type, size, and length in accordance with the Contract.

Permanently cap all vertical metal pipes on fence and gate supports. Ensure that the top coating and color of the pipe is maintained.

SPECIAL PROVISIONS
MODIFYING
SECTION 608: SIDEWALKS, DRIVE PADS, AND CONCRETE MEDIAN PAVEMENT

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **608.3.8.4 Warranties** in its entirety.

Delete Subsection **608.5.1 Work Included in Payment** in its entirety and replace with the following:

The following Work and items will be considered Incidental to the main items:

1. Excavation, backfill, compaction, expansion joint, coloring, and other related items and appurtenances;
2. Bedding Material;
3. All labor, manufacturer field assistance, Materials, Equipment, submittals, repairs, and cleanup; and
4. Detectable warning surface.

**SPECIAL PROVISIONS
MODIFYING
SECTION 610: CATTLE GUARDS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

610.2.1 General

Permanently cap all vertical metal pipes.

Replace the following under **SECTION 610**:

610.2.2 Precast Concrete Cattle Guards

Use Class AA concrete in accordance with Section 510. "Portland Cement Concrete".

The Department will reject cattle guards with cracks, chips, spalls, or honeycombed or patched areas in excess of 30 in²; or those that fail to meet the minimum strength requirements.

Provide shop drawings in accordance with section 105.2 of the New Mexico State Department of Transportation Standard Specifications for Highway and Bridge Construction 2014 Edition, and in accordance with the current edition of the ACI Detailing Manual

Fabricate precast concrete cattle guard steel grids and other steel "appurtenances" in accordance with Section 541.

SPECIAL PROVISIONS MODIFYING SECTION 618: TRAFFIC CONTROL MANAGEMENT

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **618.2.2 Duties** in its entirety and replace with the following;

618.2.2 Duties

The TCS's only responsibility is traffic control management. The Department may allow exceptions to this rule if the Project is small and requires limited traffic control. The Project Manager and the District Traffic Engineer will determine approval of the exception at the preconstruction conference.

The TCS's primary duties include the following:

1. Providing management and supervision services at the Project site;
2. Preparing revisions requested by the Contractor to the traffic control plan in the Contract and submitting the new traffic control plan, in CAD format or hand drafted on a 12 inch × 18 inch piece of 20-pound paper using current drafting standards, to the Project Manager for approval by the District Traffic Engineer. Complex traffic control Plans require development by a registered professional Engineer prior to submittal to the Project Manager;
3. Coordinating the flagging and signing personnel training;
4. Supervising the flagging and signing personnel;
5. Coordinating traffic control operations for the duration of the Contract, including those of Subcontractors, utility companies, and Suppliers, to ensure that traffic control is in place and fully operational before the commencement of Work. When dealing with utility companies, the TCS shall coordinate concurrent utility traffic control with other construction traffic control to avoid conflicts;
6. Coordinating, in writing, Project activities with the appropriate individual traffic control, law enforcement, and fire control agencies;
7. Preparing and submitting statements concerning Road closures, Delays, and other Project activities to the news media, as necessary. Before submittal to the news media, the Contractor shall submit news releases to the Project Manager for review and approval;
8. Notifying the Project Manager of accidents related to the Project traffic control;
9. Recording time and date of accident notification in accordance with Section 618.2.2.1, "Traffic Control Diary;"
10. Attending the preconstruction conference;
11. Maintaining, cleaning, and replacing traffic control devices in use per the current traffic control plan during working and non-working hours.

12. Throughout the duration of construction the Contractor shall be responsible to keep the Project Manager and the District Public Relations Officer informed of any lane closures that will restrict the normal flow of traffic and any information regarding construction activities at least forty-eight (48) hours in advance.

**SPECIAL PROVISIONS
MODIFYING
SECTION 622: FIELD LABORATORIES AND FIELD OFFICES**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete 622.2.1.8 Field Laboratory Facsimile Machine Facilities in its entirety and replace with the following:

622.2.1.8 Field Laboratory Internet Access

Provide Internet access as approved by the Project Manager.

**SPECIAL PROVISIONS
MODIFYING
SECTION 631: RUMBLE STRIPS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete **631.5.1 Work Included in Payment** and include the following:

The following Work and items will be considered as included in the payment for the main items and will not be measured or paid for separately: Equipment and labor; repair of incorrectly placed rumble strips; continuous application of seal coat to completed rumble strips in accordance with Section 407; and repair of damaged pavement.

SPECIAL PROVISIONS

MODIFYING

SECTION 632: REVEGETATION

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Section 632 - **REVEGETATION** in its entirety and replace with the following:

632.1 DESCRIPTION

This revegetation Work consists of preparing the soil, seeding, mulching, crimping, and the application of tackifier to areas stripped of vegetation during construction operations and are required to be revegetated. For additional information refer to the US Clean Water Act as outlined in the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan (SWPPP). Construction staking and digital submittals are included in the scope of the revegetation Work.

632.2 MATERIALS

Provide submittals as per Table 632.3.4:1, "Operations Sequence for Classes of Seeding," for all Materials to the Project Manager at a minimum of ten (10) working days before revegetation Work commences. Submittals shall conform to the specifications and the revegetation Plan, and shall be on the Approved Products List. Rock Mulch material submittal shall be required and will not appear on the Approved Product List.

All bulk materials delivered to the project shall be accompanied by a certified weigh master ticket for materials utilized per project as per Section 109.1, "Measurement of Quantity." Split loads of fertilizer, seed, straw, tackifier, and bonded fiber matrix may be allowed with proper weigh master ticket and contractor affidavit. Split loads shall not be allowed for compost mulch and rock mulch.

All packaged Materials delivered to the Project shall be wrapped or otherwise securely protected from weather which might affect their integrity. Materials in weather-damaged packaging shall be rejected for use on the Project.

Certification for bulk Materials shall comply with Section 106.4, "Certificates of Compliance." Notify Project Inspectors when bulk Materials are delivered so loads may be inspected and verified.

The Contractor shall ensure that straw bales stored on the Project shall not exceed 20% moisture content.

632.2.1 Temporary Soil Stabilant/Tackifiers for Class A Seeding

Temporary soil stabilant and tackifier shall be considered the same and the terms used

interchangeably. When used as part of seeding operations it shall be applied at a rate of 200 pounds per acre.

Tackifiers shall be plant-derived and bio-degradable and be composed of either guar, psyllium (Plantago ovata), or starch.

Guar. Guar is a plant based product derived from the ground endosperm of the guar plant, treated with dispersant agents for easy mixing.

Psyllium. Psyllium is composed of the finely ground muciloid coating of Plantago ovata seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but re-wettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires twelve (12) to eighteen (18) hours drying time.

Starch. Starch is non-ionic, cold-water soluble (pre-gelatinized) granular cornstarch. The Material is mixed with water. Approximate drying time is nine (9) to twelve (12) hours.

632.2.2 Seed for Class A and C Seeding

The Project seed list shall conform to the NMDOT Revegetation Zone and Seed List Maps at the NMDOT website or at the following link: <http://arcg.is/1RHjFkJ>.

The list used shall be the year the Project was let. The Contract shall specify varieties of certified weed-free seed in accordance with New Mexico Seed Law (NMSA 1978, § 76-10-11 et seq.).

Provide certified seed of named varieties in accordance with the minimum standards of the appropriate seed certification agency.

Wild-sourced native seed may be used and need not be certified, however, must meet all the other requirements of Section 632.2.2.1, "Seed Labeling and Certification."

Seed submittal shall be a list from a certified seed producer showing the common name, botanical name, pure live seed, total poundage, and NMDOT Project control number, as per the revegetation/erosion control Plan.

All seed suppliers must be on the current Approved Products List and provide documentation that their certifying state agency belongs to the Association of Official Seed Certifying Agencies (AOSCA).

Seed mixtures shall be pre-mixed and bagged certifying the mixture quantity and percentage as noted in the contract.

All seed delivered to the Project shall be stored in a container protected from rodents and moisture and not subject to temperatures higher than 90°F.

632.2.2.1 Seed Labeling and Certification

Seal and label each bag in accordance with the Federal Seed Act (7 U.S.C. § 1551 et seq.) and NMDA

seed labeling requirements (NMSA 1978, § 76-10-13). Provide the following information on each bag tag for each species:

1. Variety (specify if certified);
2. Kind of seed;
3. Lot number;
4. Purity;
5. Germination;
6. Percentage crop seed, percentage inert, percentage noxious weeds, in accordance with New Mexico Seed Law (NMSA 1978, § 76-10-11. et seq)
7. Origin;
8. Test date; and
9. Weight (in pounds) of this species or percentage of total lot.

Provide seed analysis results that are not older than twelve (12) months prior to use.

Seed suppliers shall provide one-acre seed bags.

Provide to the Project Manager documentation of seed origin and pure live seed content from a certified testing Laboratory. Seed must arrive in the original sealed containers from the Certified Supplier and the Revegetation Contractor must provide all tags and certifications to the Project Manager. Certification must be provided that the seed has been stored in appropriate conditions in the twelve (12) months before arriving at the Project. Each seed bag shall have a unique identifying number and the certified seed Supplier shall maintain records of seed bag identification numbers for a period of three (3) years.

632.2.3 Fertilizer for Class A and C Seeding

Fertilizer shall be organic, slow release with an N-P-K (nitrogen, phosphorous, potassium) analysis of either 3-6-3 or 3-7-2 and blended with endo-mycorrhizza and humates. Application rate shall be 1,000 lbs. per acre. Humates must comprise a minimum of 12% by weight. Endo-mycorrhiza must be arbuscular with a minimum propagule of 1.33 propagules per gram. Provide fertilizer (specified type and formulation) and supplier's certification in accordance with the contract. Each bag or tote of fertilizer shall have a visible, sealed, and un-altered analysis tag from the manufacturer that must be approved by an authorized person prior to application of the material. The tag must include the manufacturer's information, the N-P-K analysis of the product, and the weight of the bag or tote. NMDOT reserves the right to inspect any bill of lading or packing slips from the supplier to verify quantity of material on site.

632.2.4 Hydro-Mulch - Bonded Fiber Matrix (BFM) for Class C Seeding

Hydro-mulch shall be Bonded Fiber Matrix (BFM). BFM is a hydraulically-applied blanket that controls soil erosion and accelerates seed germination. BFM is a three-dimensional composite of wood or paper fibers bonded by polymer tackifier that provides high performance erosion prevention on slopes. Dye and tackifier shall be included in the BFM formulation. BFM shall be applied at a rate of 3,500 lbs. per acre. As a hydraulic erosion control product (HECP) as defined by the Erosion Control Technology Council, the BFM

or its equivalent shall be Type 3 or higher in functional longevity as defined in Table 1 of the 2014 Standard Specifications for Hydraulic Erosion Control Products (HECPs) Part 2.01.

632.2.5 Rock Mulch for Class C Seeding

Rock mulch shall be 3/4 inch to one (1) inch diameter with a minimum of two Fractured Faces. Rock which is black in color will not be acceptable. Pumice rock is not acceptable.

632.2.6 Composted Mulch for Class A Seeding

Furnish and place composted mulch as shown on the revegetation plan and in accordance with the criteria as described below. Composted mulch provider must be registered with or permitted by the New Mexico Environment Department Solid Waste Bureau and must be in compliance with 20 NMAC 9.1.

Composted mulch is defined as the product of a controlled aerobic thermophilic biological decomposition process that meets the quality requirements in Table 632.2.6:1, "Material and Operations for Classes of Seeding." Raw Materials used in producing composted mulch may include green waste, animal manure, animal bedding, paper waste, food waste, biosolids or other non-toxic organic matter, but shall not include animal mortalities.

Concentrated compost mulch shall not be allowed as a substitute for composted mulch.

Table 632.2.6:1			
Requirements of Compost Mulch			
Material	Measure	Method	Criterion
All Composted Mulches	Moisture Content*	Evaporative Loss at 105°C (220°F)	Between 35% and 60%
	Particle Size	Sieve	40% minimum to 100% maximum of Material may pass 3/4" screen: 100% of pieces smaller than 4" in length and 2" in diameter.
	Electrical Conductivity*	1:5 slurry (mass basis)	<10 mmho/cm
	pH*	1:5 slurry (mass basis)	pH 5.0 - 8.0
	Organic Matter*	Loss on ignition at 550°C (1022°F)	25% - 100% of dry weight
	Maturity	Germination test in 50:50 (volume basis) mixture of 3/4 inch screened composted mulch and twice-rinsed nursery sand.	Minimum 50% germination to second set of leaves for marigold seeds.
	Stability		Maximum core temperature of 43°C (110°F) after 48 hours in 5 foot tall conical pile, with moisture adjusted to between 40% and 60%.
	Debris	By volume	Less than one percent (1%) inorganic debris, including but not limited to glass, plastic, stones, and metal.
Composted Mulches with Wastewater Biosolids	Trace Metals*	HNO ₃ digestion	Complies with Table 3 of 40 CFR 503.13.
	Fecal Coliforms*	MPN with A-1 broth	<1000 MPN/dry gram
* Tests marked with asterisks must be performed by a suitable analytical Laboratory; other tests may be performed by the composted mulch producer.			

632.2.6.1 Acceptance

Compost mulch suppliers on the Approved Products List are approved for project use. The NMDOT Landscape Architect shall review lab analysis and submittals from the compost producers every 180 days and confirm their listing on the Approved Products List.

Before delivering composted mulch, provider shall furnish documentation that includes the following:

1. The raw Materials, by percentage of volume, used in the production of the delivered composted mulch;
2. Daily temperature records for at least 20% of the piles or batches used to produce the delivered composted mulch, illustrating attainment of at least 130°F for at least seven (7) consecutive Days;
3. A Laboratory analysis for criteria shown in Table 632.2.6:1, "Material and Operations for Classes of Seeding," performed on composted mulch no more than 180 Days prior to composted mulch delivery; and
4. An affidavit, signed by a corporate officer, confirming that the composted mulch meets each requirement shown in Table 632.2.6:1, "Material and Operations for Classes of Seeding."

632.2.6.2 Straw Mulch for Class A Seeding

Do not use rotten or moldy straw. All straw mulch must be barley straw and is to be free of noxious weeds as certified by an industry-recognized forage certification authority. The date on the straw certification may not be older than one (1) year from the date of the straw inspection. Before Acceptance the Contractor shall provide to the Project Manager weight tickets signed by a certified weighmaster as per Section 109.1, "Measurement of Quantity," which confirms that the amount of bulk Materials delivered to the Project equals tonnage required for the Project per the determined acreage.

632.3 CONSTRUCTION REQUIREMENTS

632.3.1 Equipment

All Equipment shall be inspected and calibrated daily by the Contractor to confirm Equipment is in good working order prior to commencing work. An Inspector shall witness the inspection and calibration.

To avoid the spread of noxious weeds, all revegetation Equipment (including but not limited to trucks, trailers, tractors, hydro-seeders, drill seeders, straw blasters, and disks) shall be pressure-washed to remove all visible mud, soil, and debris prior to entering the Project limits within the state right of way. If Equipment leaves the Project for any reason it shall be re-inspected when returned to the job site.

Disking attachments shall have a minimum six (6) foot carriage with front and rear discs.

Crimping Equipment shall have a minimum eight (8) foot wide carriage.

Skid steer attachments may only be used on confined areas for seeding operations.

Skid steers shall not be used for spreading compost unless in a confined area.

632.3.1.1 Drill Seeder

Drill seeding Equipment shall be inspected so that drill seed drop tubes are not torn or clogged. All seed loaded into Equipment shall be verified by an Inspector to confirm correct application rates. An Inspector must verify that the auger in the seed bin is rotating and that seed is dropping through drop tubes.

The drill seeder must be calibrated daily to prevent loss of seed or to prevent over-seeding. Calibration is necessary to control rate and depth of seed distribution. Calibration procedure and demonstration shall be as per manufacturer's specifications.

Ensure that the Equipment has the following:

1. Double disc openers with 'A' frames
2. Depth bands;
3. Drop tubes;
4. Packer wheels or drag chains;
5. Rate control attachments;
6. Seed boxers with covers and agitators for trashy seed; and
7. Keyway holding auger to shaft

632.3.1.2 Hydro-Seeder

The hydro-seeder cannons, hoses and agitators shall be in good working condition. The hydro-seeder shall be capable of applying materials up to distances of 200'.

632.3.2 Materials and Sampling

Inspector must be present when Materials are to be loaded into Equipment or distributed on the areas to be seeded. Contractor shall provide all containers and bags to the Project Inspector for verification.

A one (1) quart sealed zip lock bag of seed Material labeled with the Material identification and the Project control number is to be provided to the NMDOT Landscape Architect for examination and testing. The Department may reject Materials not in accordance with the Contract.

632.3.3 Pre-Seeding Conference

A mandatory pre-seeding conference called by the Project Manager shall be held on the Project before revegetation Work begins. Attending will be the NMDOT Project Manager or representative, the NMDOT Landscape Architect or certified seeding Inspector, the General Contractor or representative, and the Revegetation Contractor.

The purpose of the meeting is to inspect the project, and off-site yards, pits, and borrow roads for confirmation of their revegetation requirements. The Project Manager shall have at the pre-seeding meeting

documentation of all pits, Contractor yards, etc. approved for use on the Project. Per 632.3.12, "Seeding Operations for Class A and Class C Seeding," test strip location shall be verified following the Pre-seeding Conference.

Submittals must be provided to the Project Manager and Landscape Architect ten (10) Days prior to the proposed start of revegetation Work. Any revegetation Work done prior to this inspection shall be rejected.

All areas to be revegetated shall be measured and confirmed for each class of seeding in accordance with Section 801, "Construction Staking By The Contractor." The Project Manager and the Contractor shall field verify and agree on the acreage for each Class before any Materials are ordered or delivered to the Project

The Prime Contractor shall provide minutes of this meeting for review and approval by the Project Manager and Landscape Architect or representative.

There will be no change in Materials or the scope of revegetation Work after the Contractor begins seeding operations.

For revegetation Work areas to be considered ready for revegetation they shall be accessible, free of Equipment, and no further construction processes occurring which would interfere with seeding operations. No further revegetation Work or Equipment access shall occur on areas which have been revegetated. Areas designated as Class C treatment shall be track-walked with tracks parallel to the toe of slope to compact and score the slopes prior to revegetation.

Slopes which have eroded or otherwise degraded may need to be re-graded before revegetation.

The Prime Contractor shall maintain a minimum twelve (12) foot wide Equipment access to all revegetated areas for use by revegetation Subcontractor until revegetation Work is complete.

632.3.3.1 Weather Limitations

Revegetation Work shall not be performed when the ground is frozen or when temperatures are below 32°F. No revegetation work shall be performed when wind speed exceeds fifteen (15) miles per hour as measured with a wind meter by the Inspector.

632.3.4 Seeding Classes

Provide the various classes and the Material and operations for each class in accordance with Table 632.3.4:1, "Operations Sequence for Classes of Seeding."

Table 632.3.4:1		
Operations Sequence for Classes of Seeding		
Operation	Seeding Class	
	A	C
Disk seed bed to four (4) inches	X	---
Apply fertilizer by broadcast, then disk to four (4) inches	X	---
Apply one (1) inch compost mulch, disk to four (4) inches	X	---
Drill seed	X	---
Straw crimp; apply tackifier, dye	X	---
Scarify soil surface vertically to slope	---	X
Hydro apply seed, fertilizer, dye, tackifier	---	X
Scarify seeded areas horizontally to slope	---	X
Hydro-mulch; apply tackifier, dye	---	X
Rock Mulch	---	X
Note: No seeding shall be applied on frozen ground		
Key:	X = required	
	--- = not required	
The Department defines the seeding classes as follows:		
1	Class A = seeding with a drill seeder (slopes up to 3:1 or flatter)	
2	Class C = seeding with hydro-seeder (slopes steeper than 3:1 to a maximum of 2:1)	

632.3.5 Modified Class A Seeding for Narrow Areas or Areas Inaccessible to Drill Seeding Equipment

Any areas less than 3:1 in slope requiring revegetation which are less than eight (8) ft. wide or are inaccessible to drill seeding Equipment shall use the following procedure and payment is to be made at the Class A rate.

Disk soil to a four (4) inch depth with one (1) inch of incorporated compost mulch and fertilize as per Class A treatment. A skid steer with attachments may be used.

A hydro-seeder shall then be used to apply the seed, dye, tackifier, and hydro mulch in two (2) steps as described below.

Step 1. Apply seed, dye, and tackifier to the newly disked soil.

Step 2. Apply an approved bonded fiber mulch with tackifier applied in two (2) coats from opposing directions at rate of 2,500 lbs. per acre.

Seed in these areas shall be applied at twice the specified rates and no extra payment shall be made therefore.

632.3.6 Revegetation of Areas Outside the Project Limits

Revegetation of all disturbed off-site locations will be in accordance with Sec. 104.7, "Final Cleanup," and the appropriate class of seeding will be used for the terrain. Section 632, "Revegetation," procedures will be followed for all public lands and private lands that are required to be revegetated unless other seed lists and procedures are required in a resource agency permit.

The Contractor must provide as part of submittals a letter of intent from landowners for off-site locations to be used as per Section 104.7, "Final Cleanup." The letter of intent must acknowledge the landowner's right to have revegetation performed as per our specifications and if that revegetation right is waived the owner acknowledges that neither the Contractor nor NMDOT shall be responsible for any claims, including but not limited to fugitive dust, noxious weeds, and siltation of waterways, related to the owner's decision to forgo revegetation. When revegetation Work is being performed on private land, a right of access permit for inspection of the revegetation Work for that private land must be provided by the Contractor to Project Management and shall be considered incidental to the Work.

The Contractor shall provide documentation of the treatment used and notify Project Management when the revegetation Work is being performed so Inspectors may be present.

Table 632.3.6:1
Schedule of Materials for Class A Seeding

CLASS A REVEGETATION MATERIALS PER ACRE				
<u>TACKIFIER</u>	<u>COMPOST MULCH</u>	<u>SEED</u>	<u>STRAW</u>	<u>FERTILIZER</u>
200 lbs.	134 cubic yards	Per revegetation zone list	2 tons	1000 lbs.

Table 632.3.6:2
Schedule of Materials for Class C Seeding

CLASS C REVEGETATION MATERIALS PER ACRE			
<u>HYDRO MULCH WITH TACKIFIER</u>	<u>SEED</u>	<u>ROCK MULCH</u>	<u>FERTILIZER</u>
3,500 lbs.	Per revegetation zone list X2	200 cubic yards	1,000 lbs.

632.3.7 Materials Certifications

Provide all certifications for required Material to the Project Manager before the Project begins.

632.3.8 Seedbed Preparation for Class A Seeding

Till the seedbed with a disk, harrow, or chiseling tools to at least four (4) inches deep. Uproot competitive vegetation during seedbed preparation, and uniformly work the soil to a surface free of clods, large stones, or other Deleterious Material that would interfere with seeding Equipment. Ensure Inspector approves area that was disked before compost is added to the soil.

Add fertilizer by broadcast and disc, harrow, or chisel to a depth of four (4) inches.

Add one (1) inch of compost mulch as specified by disc, harrow, or chisel to a depth of four (4) inches.

The same day as and preceding tilling compost mulch into the seedbed water shall be added to the compost mulch at a rate of 2,500 gallons per each 134 cubic yards. This is to aid in the incorporation of the mulch into the seedbed. All compost mulch must be incorporated into the seedbed.

Till across the slope, along the contour. Do not till the seedbed if the moisture content of the soil is outside the limits recommended by the seed Supplier for planting, or the ground is in a non-tillable condition.

Do not prepare more seedbed area on which the entire seeding operation can be applied before the surface crusts or loses seed and fertilizer to erosion. If erosion or crusting occurs, perform seedbed preparation again.

After seed bed preparation and before drill seeding commences all rocks larger than four (4) inches in diameter shall be removed from the seed bed and no payment shall be made therefore.

Any Class A area considered too rocky for drill seeding use shall have four (4) inches of bedding or clean fill placed so that Class A operations can occur as in Table 632.3.4:1, "Operations Sequence for Classes of Seeding."

632.3.9 Scarification for Class C Seeding

Class C slopes shall be scarified, competitive vegetation uprooted, and roughed up by chain harrow or raking in a vertical slope direction immediately before hydro-seeding and again horizontally across the slope following hydro-seeding so that seed has good adherence to the surface and soil cover.

Following scarification of the slopes all rocks larger than four (4) inches in diameter shall be removed from the hydro-seed bed and no payment shall be made therefore.

632.3.10 Fertilizer for Class A and Class C Seeding

Fertilizer bags shall be examined before use to confirm correct analysis and content. Notify Project Inspector when bags are to be loaded into machines and all bags shall be collected and counted confirming correct amounts used.

Apply the fertilizer uniformly to the prepared seedbed. Class A shall be broadcast and Class C shall be hydro-applied. Mix fertilizer in the hydro-seeder for a minimum of five (5) minutes before applying.

632.3.11 Compost Mulch for Class A Seeding

The Contractor shall wet down compost mulch so that wind loss is kept to a minimum. Stockpiles shall be less than six (6) ft. tall and oriented perpendicularly to the prevailing winds to prevent wind loss.

The certified Inspector shall verify the moisture after unloading 1/3 of the load. The Contractor shall provide a organic matter moisture measuring probe capable of measuring up to 65% moisture content. The device shall be the property of the Contractor and no extra payment therefore shall be made.

Regardless of the compost mulch moisture content, Project Management may require further wetting of

compost mulch at delivery to prevent loss through wind. No extra payment shall be made therefore.

The certified Inspector shall verify the load is full before unloading by climbing up on the trailer to confirm the Material is up to the front of the trailer. Indications of a short load are gaps at the front of the truck, overloading at the back of the truck, and slip staining of the Material from the original loading line.

632.3.12 Seeding Operations for Class A and Class C Seeding

Uniformly apply the seed mix at a rate in accordance with the Contract. Do not drive vehicles or other Equipment on seeded areas. The Contractor is responsible for protecting revegetation Work until Acceptance.

A test strip of each class of seeding shall be provided by Contractor before commencing general seeding. Each test strip shall measure no less than 1,000 square feet in a configuration which works for the Equipment and the site, shall be at a location of the Contractor's choosing within the Project, and shall be done as per specifications with a certified Inspector and the Landscape Architect or representative present. The test strip is to verify equipment functionality, proper adjustment and application rate.

Upon Acceptance of the test plot the Contractor may proceed with seeding operations. If the test strip is not accepted, establish a new 1,000 square foot test strip location and re-verify. The Contractor shall not proceed to full seeding operation until an acceptable test strip has been produced. Payment will only be made for accepted test strips and shall be made under appropriate class of seeding.

The Contractor shall coordinate with Project Management prior to starting seeding operations to ensure that an Inspector is present at all times. No revegetation Work shall be performed without the presence of a certified Inspector.

Once seed is installed on a given Project area all operations to complete that class of seeding for that area must be completed the same Day.

If rainfall or some other factor prevents the Contractor from seeding to the specified depth on prepared surfaces, the Contractor shall prepare the seedbed and apply seed again, at no additional cost to the Department.

Class C areas are to be seeded at twice the standard rate and no extra payment is to be made therefore.

Do not perform seeding operations when wind velocity exceeds fifteen (15) mph.

632.3.13 Drill Seeding for Class A Seeding

Plant seed 1/2 inch deep unless otherwise specified in the Contract. Ensure that the distance between the drilled furrows is no more than eight (8) inches. If the furrow openers on the drill exceed eight (8) inches, re-drill the area.

632.3.14 Hydro-Seeding for Class C Seeding

Seed shall be applied in a slurry with fertilizer, dye, and tackifier. All Materials loaded into Equipment

shall be verified by NMDOT Project Inspectors to confirm correct application rates. Mix all materials for a minimum of five (5) minutes before application.

632.3.15 Hydro-Mulching for Class C Seeding

Hydro-mulching shall be applied in two sweeps from opposing directions to ensure coverage is complete. Dye and tackifier shall be included in slurry so that Project Inspectors can confirm coverage. Mulch must be applied the same Day as the seed to protect seed. All Materials loaded into Equipment shall be verified by NMDOT Project Inspectors to confirm correct application rates. Mix all Materials for a minimum of five (5) minutes before application.

Contractor shall provide Project Management a laminated color reference card from the BFM manufacturer showing a close-up reference photograph of their product installed at the rate of 3,500 lbs. per acre.

632.3.16 Straw Mulching for Class A Seeding

Anchor straw mulch using a crimper with flat serrated discs at least one (1) inch thick with dull edges, spaced no more than nine (9) inches apart. Ensure that the disc diameter is large enough to prevent the frame of the Equipment from dragging in mulch.

Ensure that straw mulch crimping is at least two (2) inches deep and do not cover it with excessive amounts of soil. Perform mulch anchoring across the slope where practical, with no more than two (2) passes of the anchoring Equipment. Straw shall be evenly distributed over entire bedding area with no bare areas showing or areas with straw deeper than four (4) inches in depth before crimping.

Ensure that the rate of application of straw mulch is at least two (2) tons of air-dry straw per acre. The Inspector shall verify the total tons per acre of straw required per acre.

Ensure that straw mulch has at least 50% of fibers exceeding ten (10) inches long on the ground after application.

Spread straw mulch following drill seeding with a mechanical mulch spreader or by hand. If spreading by hand, tear apart the bales of mulch and fluff it before spreading.

Anchor straw following crimping with an approved tackifier with green dye at a rate of 200 lbs. per acre. The tackifier shall be Incidental to the seeding.

When crimping the straw is impractical due to rocky areas it may be spread and not crimped. Tackifier will be applied as per specification. This method shall be approved by the Project Manager for rocky areas only.

When the revegetation Work is being done the Contractor shall verify straw bale moisture content with a straw bale moisture meter with an eight (8) inch minimum length probe for the duration of the Project. An Inspector must be present and record this test. The moisture meter shall remain the property of the Contractor following Project completion and the testing shall be considered Incidental to the Project. Each bale must be tested to confirm that the bale interior moisture content is no greater than 20%. Any bales

with moisture above this level shall be rejected and removed from the Project. Higher levels of moisture may indicate the presence of mold and the risk of spontaneous combustion.

632.3.17 Rock Mulch

The finished rock mulch surface must be smooth and uniform maintaining the original flow lines, slope gradients, and contours of the job. Rock mulch must be applied in a fashion not to tear up or damage the hydro-mulch when being placed. Methods and means of rock mulch installation are not specified and may vary as per access. Damaged hydro-mulch shall be replaced and no extra payment made therefore.

632.3.18 Class C Slopes with over 50' of Slope Length

Class C slopes in excess of 50' of slope length (measured along the slope face from toe to crest) shall have the following treatment.

Class G rip-rap shall be used for the lower portion of the slope from the toe upwards to the point where there will not be more than 50' of slope length covered with 3/4 inch to one (1) inch rock mulch described in 632.2.5, "Rock Mulch for Class C Seeding," and Table 632.3.4:1, "Operations Sequence for Classes of Seeding." The rip rap shall be placed over the hydro-seeded and mulched surface in a way that does not damage the applied mulch treatment, shall be installed from the toe of the slope upwards and shall be one layer of Class G rip-rap in thickness.

632.4 METHOD OF MEASUREMENT

The Contractor shall digitally provide for approval a to-scale printable revegetation plan as part of the submittals before the mandatory pre-seeding meeting. The plan shall identify each area by the class of seeding as per Table 632.3.4:1, "Operations Sequence for Classes of Seeding." Quantities shall match those produced by construction staking and shall include all off-site areas.

An accompanying table to the plan shall be submitted showing the amount of each Material apportioned for each area on the Project and the acreage of that sub-area. Included in the plan shall be all off-Project areas requiring revegetation as enumerated in Section 632.5, "Basis of Payment."

632.5 BASIS OF PAYMENT

Pay Item	Pay Unit
<i>Class A Seeding</i>	Acre
<i>Class C Seeding</i>	Acre

632.5.1 Revegetation Work Included in Payment

The following revegetation Work items shall be considered as included in payment for the main items and shall not be measured or paid for separately:

- A. Tackifier for straw mulch;
- B. All compost mulch, fertilizer Materials, and water added at tilling;

- C. Rock for rock mulch;
- D. Seeding of the areas occupied by the Contractor for campsites, office, plant sites, Equipment parking, service areas, areas stripped of native vegetation through unnecessary or improper construction practices by the Contractor, and any fertilizing;
- E. Moisture probe for straw bales and compost mulch;
- F. Weed removal and disposal prior to seed operations;
- G. Revegetation plan;
- H. Right of access permit to be provided by Contractor for inspection of off-site locations located on private property;
- I. Multiple mobilizations to meet NPDES requirements; and
- J. Construction staking

**SPECIAL PROVISIONS
MODIFYING
SECTION 664: LANDSCAPE PLANTING**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **664.3.2 Care and Replacement** in its entirety and replace with the following:

If the Contractor installs a drip irrigation system, the Contractor shall hand water the plants until the drip irrigation system is in place and operational.

Delete Subsection **664.5.1 Work Included in Payment** in its entirety and replace with the following:

The following Work and items will be considered as included in the payment for the main items and will not be measured or paid for separately:

1. Furnishing, transporting, and planting of plants; and
2. Excavation, furnishing prepared backfill mixture, wrapping, staking, watering, care, and maintenance; of plants.

**SPECIAL PROVISIONS
FOR
SECTION 702-C: TRAFFIC CONTROL DEVICES FOR CONSTRUCTION and
TRAFFIC CONTROL DEVICES FOR PEDESTRIANS AND BICYCLISTS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

1.0 DESCRIPTION.

1.0.1 This work shall consist of implementing the necessary traffic control during construction in conformance with the contract and the Manual of Uniform Traffic Control Devices. The Contractor shall submit all proposed traffic control changes to the contract traffic control plan detailed in the construction plans to the Project Manager, for review and approval by the District Traffic Engineer/or Local Government Agency Engineer or designee, prior to beginning construction operations.

1.0.2 The Contractor shall furnish all materials, tools, labor, equipment and all other appurtenances necessary to complete the work. The materials shall include, all interim and temporary signing, construction signing, steel posts, base posts, portable sign supports, barricades, drums, sequential arrow displays, and flaggers as necessary to complete the traffic control detailed in the construction plans or modifications to the plan details as approved by the District Traffic Engineer including all setups and resetting of devices.

1.0.3 Submittals. The Contractor shall submit a summary of all necessary traffic control devices for this project in the format shown as TABLE 1 and/or TABLE 2 to the Project Manager at least two (2) weeks prior to the pre-construction conference. A minimum of five (5) copies shall be provided to the Project Manager. The summary shall be complete with appropriate supporting sections referenced, device descriptions, units of measure, quantities required, unit costs, and total costs for each type of device. The itemized costs for each device shall include all associated work and materials defined in the appropriate supporting section of the standard specifications, including all revisions. The Contractor will not be allowed to initiate any work on the project until TABLE 1 and/or TABLE 2 has been provided to the Project Manager.

TABLE 1

SUPPORTING SECTION	DEVICE DESCRIPTION	UNIT OF MEASURE	QTY.	UNIT COST	TOTAL COST
SECTION 702 - CONSTRUCTION TRAFFIC CONTROL DEVICES					
SS 702	CONSTRUCTION SIGNING	SQ. FT.			
SS 702	STEEL POSTS AND BASE POSTS FOR CONSTRUCTION SIGNING	LN. FT.			
SS 702	PORTABLE SIGN SUPPORT	EACH			
SS 702	BARRICADE, TYPE I	EACH			
SS 702	BARRICADE, TYPE II	EACH			
SS 702	BARRICADE, TYPE III-6 ft.	EACH			
SS 702	BARRICADE, TYPE III-8 ft.	EACH			
SS 702	VERTICAL PANEL, TYPE SINGLE	EACH			
SS 702	VERTICAL PANEL, TYPE BACK TO BACK	EACH			
SS 702	CONSTRUCTION TRAFFIC MARKER	EACH			
SS 702	CHANNELIZATION DEVICES TYPE DRUM	EACH			
SS 702	TRAFFIC CONES	EACH			
SS 702	SEQUENTIAL ARROW DISPLAY	EACH			
SS 702	TEMPORARY PORTABLE RUMBLE STRIPS	LN. FT.			
TOTAL FOR ITEM # 702810 TRAFFIC CONTROL DEVICES FOR CONSTRUCTION (LUMP SUM)				\$	

TABLE 2

SUPPORTING SECTION	DEVICE DESCRIPTION	UNIT OF MEASURE	QTY.	UNIT COST	TOTAL COST
SECTION 702 - CONSTRUCTION TRAFFIC CONTROL DEVICES					
SS 702	CONSTRUCTION SIGNING	SQ. FT.			
SS 702	PORTABLE SIGN SUPPORT	EACH			
SS 702	VERTICAL PANEL, TYPE SINGLE	EACH			
SS 702	TEMPORARY PEDESTRIAN CHANNELIZATION DEVICES	LN. FT.			
SS 702	TEMPORARY DETECTABLE WARNING SURFACE	EACH			
SS 702	TEMPORARY ADA RAMP	EACH			
SS 702	TEMPORARY ADA PLATFORM	EACH			
SS 702	TEMPORARY PEDESTRIAN BARRICADE	EACH			
TOTAL FOR ITEM # 702811 TRAFFIC CONTROL DEVICES FOR PEDESTRIANS AND BICYCLISTS (LUMP SUM)				\$	

2.0 MATERIALS.

2.0.1 All materials shall conform to the applicable requirements of SECTION 701 - TRAFFIC SIGNS AND SIGN STRUCTURES and SECTION 702 - CONSTRUCTION TRAFFIC CONTROL DEVICES.

3.0 CONSTRUCTION REQUIREMENTS.

3.0.1 All construction shall be effected by the Contractor in accordance with the applicable plan details and specifications shown in the contract or modifications to the plan details as approved by the District Traffic Engineer.

3.0.2 All materials and devices shall be maintained and replaced if necessary for the duration of the project in conformance with these specifications.

3.0.3 Traffic control shall be maintained in conformance with all specifications of SECTION 618 - TRAFFIC CONTROL MANAGEMENT, for the duration of the project.

4.0 METHOD OF MEASUREMENT.

4.0.1 When specifically designated for measurement and payment in the contract, Traffic Control Devices for Construction and Traffic Control Devices for Pedestrian and Bicyclist will be measured as a lump sum unit.

5.0 BASIS OF PAYMENT.

5.0.1 The accepted work for Traffic Control Devices for Construction and Traffic Control Devices for Pedestrian and Bicyclist will be paid for at the contract unit price lump sum. Payment shall be full compensation for furnishing all materials, tools, labor, equipment, hauling, and any other appurtenances necessary to satisfactorily complete and maintain adequate and safe traffic control until completion of the project.

This shall include all interim and temporary signing, construction signing, steel posts, base posts, portable sign supports, barricades, drums, sequential arrow displays, traffic cones and flaggers as necessary to complete the traffic control detailed in the construction plans or modifications to the plan details as approved by the District Traffic Engineer. Setting and resetting of devices shall also be included in payment of this item.

5.0.3 Traffic Control Devices for Construction and Traffic Control Devices for Pedestrian and Bicyclist shall not be considered as eligible for a cost savings suggestion.

Payment will be made under:

PAY ITEM	PAY UNIT
Traffic Control Devices for Construction	Lump Sum
Traffic Control Devices for Pedestrian and Bicyclist	Lump Sum

SPECIAL PROVISIONS MODIFYING SECTION 704: PAVEMENT MARKINGS

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Add the following to Subsection **704.2.2 Reflectorized Glass Beads**:

Glass beads are not required for black paint used for contrast pavement markings.

Delete the following sentence from Subsection **704.3.2 Equipment**:

The Department will allow placing temporary striping during construction with other Equipment designed for application of paint or beads.

Add the following sentence to the end of Subsection **704.3.4.4 Number of Striping Applications**:

Temporary reflectorized painted markings consist of a single (1) application of markings, unless otherwise specified in the Contract.

Add the following to the end of Subsection **704.3.4.5 Repair and Replacement of Unacceptable or Damaged Striping**:

Temporary reflectorized painted markings shall be replaced or repaired when damaged, or when retroreflectance falls below minimum levels as defined in Table 704.3.4.5:1, at no additional cost to the Department. If problem areas are found, at the Department's discretion, the Department will take measurements at a minimum of every $\frac{1}{4}$ (0.25) mile and an average will be calculated for every mile, as applicable. Measurements will be taken using 30-meter geometry in units of mcd/m²/lux. At the Department's discretion, the striping may be inspected at night to determine if the markings have sufficient retroreflectivity.

**Table 704.3.4.5:1
Temporary Reflectorized Painted Markings Minimum Retroreflectance**

Stripe Color	Minimum Retroreflectance (millicandelas)
White	187.5
Yellow	112.5

Delete Subsection **704.3.5.2 Paint Application Rate** and replace with the following:

For permanent markings, apply paint at a rate of 22 to 25 wet mils. (25.15 gal per mile of paint for a solid four (4) inch line and 6.31 gal per mile for a broken four (4) inch line).

For temporary markings, apply paint at a rate of 15 wet mils (16.5 gal per mile of four (4) inch solid and 4.13 gallons per mile for a broken four (4) inch line).

Apply other widths of striping at appropriate multiples of these minimum rates for solid and broken paint stripes.

Add the following to Subsection **704.3.5.5 Glass Reflectorizing Beads Application Rate:**

Glass beads are not required for black paint used for contrast pavement markings.

Add the following to Subsection **704.5.2 Work Included in Payment:**

F. Black out lines for contrast markings if specified in the Contract.

April 4, 2014

**SPECIAL PROVISIONS
MODIFYING
SECTION 705: GENERAL REQUIREMENTS FOR TRAFFIC SIGNAL AND LIGHTING
SYSTEMS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subsection **705.5 BASIS OF PAYMENT** and replace with the following;

705.5 BASIS OF PAYMENT

Signal/Lighting System Start-up Costs will be paid for the actual cost incurred, not to exceed the fixed amount entered by the Department into the Bid Schedule.

Provide the Project Manager with a detailed cost breakdown, including receipts and invoices of actual costs incurred.

For the purpose of bidding, the Department will enter into the Bid Schedule a fixed amount for Signal/Lighting System Start-up Costs.

Pay Item	Pay Unit
Signal/Lighting System Start-up Costs	Allowance

**SPECIAL PROVISIONS
MODIFYING
SECTION 802: POST CONSTRUCTION PLANS**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Delete Subection **802.3 BASIS OF PAYMENT** and replace with the following;

802.3 BASIS OF PAYMENT

Post Construction Plans will be paid for the actual cost incurred, not to exceed the fixed amount entered by the Department into the Bid Schedule.

Provide the Project Manager with a detailed cost breakdown, including receipts and invoices of actual costs incurred.

For the purpose of bidding, the Department will enter into the Bid Schedule a fixed amount for Post Construction Plans.

Pay Item	Pay Unit
Post Construction Plans	Lump Sum

**SPECIAL PROVISIONS
MODIFYING
SECTION 901: QUALITY CONTROL/QUALITY ASSURANCE (QC/QA)**

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

Add subsection **901.4.1 Aggregate Index** to follow **901.4 EVALUATION OF MATERIALS FOR ACCEPTANCE**.

901.4.1 Aggregate Index

901.4.1.1 Description

The AI combines test values from the Los Angeles Wear Test, Soundness Loss Test, and Absorption Test. The AI is a single value representing the overall quality of the source from which the aggregates are obtained. Do not use to evaluate individual aggregate stockpile quality.

901.4.1.2 Sampling and Testing Procedures

Determine Los Angeles Wear, Soundness Loss, and Absorption values for the AI equation using at least five (5) random test samples obtained from all stockpiles at the source in accordance with AASHTO T 2. Submit all of the five (5) samples to a Department approved private Laboratory for combination into a single sample. The Project Manager or the State Materials Bureau will have a list of approved private Laboratories. Extract a representative test sample from the single sample to determine the Los Angeles Wear and Absorption values. Prepare the sample used to determine the Absorption as follows:

Plus 3/4 in	1000 grams
3/4 in to 1/2 in	1000 grams
1/2 in to 3/8 in	1000 grams
3/8 in to #4	1000 grams

Separate the remaining amount of the single sample into five (5) test samples using the procedures in AASHTO T 248. Calculate a Soundness Loss value for each of these five (5) samples using Table 901.4.1.2:1, "Standard Gradation for Soundness Loss Testing."

Table 901.4.1.2:1
Standard Gradation for Soundness Loss Testing

Sieve size	% passing
1 1/4 in	100
1 in	100
3/4 in	79
1/2 in	53
3/8 in	34
No. 4	0

Average the five (5) soundness loss results to obtain the overall soundness loss value for the subject aggregate pit.

901.4.1.3 Testing of Aggregates

Perform the following tests using a Department-approved private Laboratory or the State Materials Bureau:

1. Los Angeles Wear (in accordance with AASHTO T 96, Method B);
2. Soundness Loss (in accordance with AASHTO T 104); and
3. Absorption (in accordance with AASHTO T 85 or NMDOT 001 (20066)).

Use the same private Laboratory for the entire project unless otherwise approved (in writing) by the Project Manager.

Obtain samples under the observation of the Project Manager or Department designee. Split samples into two (2) samples in accordance with AASHTO T 248, if requested by the Project Manager. The private Laboratory and the State Materials Bureau will each test one (1) sample. Send copies of test reports to the Project Manager.

901.4.1.4 Frequency of Testing

Submit samples at least once every year to maintain continuous approval of Commercial Material Sources.

901.4.1.5 Equation

Calculate the AI of a coarse aggregate to the nearest whole number in accordance with the following equation:

$$AI = \frac{1}{3} \sqrt{LA^{2.2} + SL^{3.0} + A^{4.0}} \quad (1)$$

Where:

- AI* is the aggregate index
- LA* is the Los Angeles Wear, the percent of aggregate wear at 500 revolutions if tested in accordance with AASHTO T 96
- SL* is the soundness loss of the sample if tested in accordance with AASHTO T 104 using magnesium sulfate with a test duration of 5 cycles and a standard gradation
- A* is the absorption, the amount of moisture retained if tested in accordance with AASHTO T 85

Example:

1. Determine the L.A. Wear as a whole number – for example, 25;
2. Determine the Soundness Loss as a whole number – for example, 15;
3. Determine the Absorption as a whole number – for example, 3;
4. Calculate the value of the L.A. Wear taken to the 2.2 power – that is, $25^{2.2} = 1189.8$;
5. Calculate the value of the Soundness Loss taken to the 3rd power – that is, $15^3 = 3375.0$;
6. Calculate the value of the Absorption taken to the 4th power – that is, $3^4 = 81.0$;
7. Add the value obtained from steps 4, 5, and 6 – that is, $1189.8 + 3375.0 + 81.0 = 4645.8$;
8. Determine the square root of Step 7 – that is, $\sqrt{4645.8} = 68.2$;
9. Divide the result from Step 8 by 3 – that is, $68.2 \div 3 = 22.7$; The A.I. for this sample is 23.

901.7 BASIS OF PAYMENT

Replace Table 901.7:5 with the following:

Table 901.7:5			
Minimum Process Control Guidelines for Portland Cement Concrete Pavement (QC)			
Item	Property	Testing frequency	Test method
Fresh Concrete for PCCP	Unit Weight	1 per 125 yd ³	AASHTO T 121
	Air Entrainment	1 per 125 yd ³	AASHTO T 121
	Slump	1 per 125 yd ³	AASHTO T 119
	Compressive Strength	1 per 125 yd ³	AASHTO T 22, 23, 231
PCCP in Place	Thickness ^a	2 per 2,500 yd ^{2 b}	—
^a Complete corrective Work specified in Section 450.3.5.2, "Surfacing Smoothness Requirements," before determining pavement thickness			
^b Determine thickness by actual survey conducted before and after the construction of the PCCP at fixed, randomly selected locations.			