Maryland
Department of
Transportation

INSPECTOR'S JOB GUIDE FOR CONSTRUCTION

2016

STATE HIGHWAY ADMINISTRATION
OFFICE OF CONSTRUCTION

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INTRODUCTION:

This 2016 edition of the Job Guide is a revision of the 2002 edition to reflect the 2008 Standard Specifications for Construction and Materials (SSCM) as well as changes in policy and procedures. The Job Guide has been prepared as a review of key construction activities for standardization of inspection procedures.

Purpose: To provide a quick reference guide to Inspectors on their duties and responsibilities. This guide is intended to cover the very basic duties of inspection. In depth knowledge of key activities requires reference to Contract Documents, Construction Manual, Construction Directives, and guidance by the Construction Project Engineer (CPE).

The Construction Project Engineer (CPE) directs all inspector assignments.

Key:

2008 Standard Specifications for Construction and Materials	**SSCM**
Area Material Engineer	**AME**
Construction Directives	**CD**
Construction Memorandums	**CM**
Construction Project Engineer	**CPE**
Erosion and Sediment Control	**E&SC**
Erosion and Sediment Control Manager	**ESCM**
General Provisions	**GP**
Disadvantage/Minority Business Enterprise	**D/MBE**
Inspector's Daily Report	**IDR**
Invitation for Bids	**IFB**
Item Number	**IN**
Lead Design Engineer	**LDE**
Landscape Operations Division	**LOD**
Maintenance of Traffic	**MOT**
Materials Management System	**MMS**
Nutrient Management Plan	**NMP**
Office of Materials and Technology	**OMT**
Office of Traffic and Safety	**OOTS**
Sequence of Construction	**SoC**
Special Provisions	**SP**
Special Provision Inserts	**SPI**
Terms and Conditions	**TC**
Traffic Control Plan	**TCP**
Traffic Manager	**TM**

GENERAL INSTRUCTIONS

AUTHORITY AND DUTIES OF INSPECTORS. Inspectors are authorized to inspect all work performed and all materials used to ensure the work done is completed in conformance with the Contract Documents. The verb "shall" applies to all actions by the Contractor in the Contract Documents; the verb "will" refers to those actions performed by the SHA. This means that the Contractor shall do the work as specified in the Contract Documents and the SHA will inspect the work for compliance with the Contract Documents.

The Inspector must become thoroughly familiar with the Contract Documents that apply to the work being inspected. The Inspector should always plan ahead by being familiar with the construction schedule. The Inspector should anticipate and resolve problems to maintain work progress. The Inspector's job is to enforce the Contract Documents by being “firm” and “fair”.

PARTNERING. The Administration invites the Contractor to participate in a voluntary partnership for effective and efficient Contract performance, completion within the Contract bid price, on schedule, and in conformance with the Contract Documents. The Inspector should partner on all work that is inspected to meet the objectives.

CONSTRUCTION INSPECTION TEAM. The CPE and the Inspectors should always function as a well-organized team. Teamwork will enhance the quality of the work.

SAFETY. Safety is a definite team effort and, as such, the team members should look out for each other. The majority of Highway Construction is now done while traffic is being maintained and everyone must be safety minded. Always be alert and observant and report unsafe conditions.

When performing duties under traffic, review the Traffic Control Plan (TCP) and ensure all work is done in conformance with the TCP. Wear proper attire, hardhat, hard-soled shoes, safety vest and other protective equipment required for the work being performed.

PROJECT DOCUMENTATION

DEFINITION. The preparation and assembly of permanent written records detailing the history of a construction project and providing evidence of compliance or non-compliance of all parties with the Contract Documents.

THE 5 C’S OF DOCUMENTATION. Original documentation to be effective and used as evidence must be: Clear, Concise, Comprehensive, Complete and Correct.

INSPECTOR’S DAILY REPORT (IDR). The IDR is the chronological history of the daily events that take place during construction and is therefore the single most important original document on the construction site.

Reference the **Construction Directives** (CD) 07220.100.16 **IDR**, CD 07220.100.19 **Schedule of Participation**

Reference the **Construction Memorandum (CM)** 07210.100.14 **IDR Step by Step Instructions**

The Inspector must document the work the Contractor performs on the project daily on an IDR. Workers and Equipment, Materials Received or Used and the Work the Contractor performs. Also note the first and last day when the work occurred.

The Contract **Schedule of Prices** or commonly called the Contract Items of Work is the list of Bid Items found in the back of the **Invitation for Bids (IFB)** that quantifies the work the Contractor performs under a particular **Item Number (IN).** IN’s are broken down into sections of 1000, 2000, … up to 8000. Generally these sections correspond with SSCM sections 100, 200, … 800.

The SSCM is the specification listing the requirements for the work, materials to be used and the method of how the contractor is to be paid for the work.

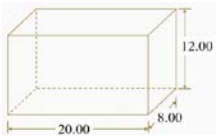
The IDR must document the work under the appropriate IN. The IN should be listed along with the IN Description and include the Station Number Location and the Distance from the Station. (Example: Station 102+50, 50ft RT BL. BL stands for the Base Line that is on the plans that all the work is referenced from).

IDR Entry Example:

Item 2002– Class I Excavation. The contractor excavated soil material from MD 187 station 102+50 to 104+75 RT BL 25ft to 75ft and hauled it to the fill area along Ramp A station 207+00 to 211+00 RT and LT BL 15ft. Work Incomplete.
No Pay

IN can have a quantity that will require a sketch. You must show a sketch, the formula you are using and the calculations of the quantity of work.

An Example of a Cubic Yard IN Sketch and Calculations
Sketches are required for all area and volume payments and when linear feet payments are not clearly defined under the IDR Description of the Work.



Calculations = Cubic Yard (Pay Quantity)
Formula = L' x W' x H' / 27 CF/CY = CY
20.00 x 8.00 x 12.00 / 27 CF/CY = CY
1920.00 CF / 27 CF/CY = 71.11 CY
Pay 71.11CY
Checked by: Signature / Date

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Checked by: Signature / Date

Covering **Disadvantage/Minority Business Enterprise (D/MBE)** Contractors on the IDR. There are 4 things that must be put on the IDR.

1) Name of the Foreman
2) If Equipment is rented (R) or Owned (O).
3) Materials Used or Received.
4) Write MBE # under the Item of work.

The D/MBE # is assigned in the Field and will be found on the D/MBE Posting Chart that is posted on the SHA Field Office wall. (CD 07220.100.19)

CONTRACT DOCUMENTS

Review Contract Documents: The Governing Order of Contract Documents in order highest to lowest shall be Special Provisions, Plans, Special Provision Insert, and Standard Specifications. SSCM TC 3.01

The Contract Documents consist of the following elements:

Agreement. A written agreement between the owner (SHA) and Contractor setting forth the work to be performed, the time for completion, and the contract payment.
Conditions of the Contract. Consists of the general conditions, supplementary conditions, and other conditions.
Drawings. The graphic presentation of the work to be done.

Standard Specifications. The most current book of specifications intended for general application and repetitive use.
Standards. The official Book of Standards for Highway and Incidental Structures.

The Agreement and Conditions of the Contract are found in the Invitation for Bid (IFB) on the specific Contract. The IFB is just for that Contract and contains all special conditions, Special Provisions, and the latest changes to the Standard Specifications.
The Drawings are the Plans for the specific Contract.
The Standard Specifications and Book of Standards are documents for general application and repetitive use.

BEFORE BEGINNING INSPECTION DUTIES

1. Review Contract Plans, IFB, Contract Documents, **Materials Management System (MMS)**, Construction Manual, and Construction Directives that apply to your assigned duties.
2. Discuss your responsibility and authority with the CPE.
3. Review format and required contents of the IDR's.
4. Review materials control: sampling, testing and forms.
5. If you are not sure of your duties, go over them again with the CPE.

Inspector's Responsibility: Identify to the Contractor any non-compliance in the work. SSCM GP 5.03

IFB: Contains the Contract and Quantities of Work the Contractors must bid on and be the lowest bidder to receive the work. The IFB details the contract requirements for Minority Business Goals, Wage Classifications and Rates, Certified Payroll requirements, Non Discriminations requirements, Permits Required, Bid Items and Quantities.

The IFB contains **Special Provisions (SP)** that are unique requirements for the Contract and **Special Provision Inserts (SPI)** which are changes to the Standards in the SSCM. SSCM TC 1.03

Plans: Official Drawings that show the location, character, dimensions and details of the work to be done. SSCM TC 1.03

SSCM: Standard Specifications intended for general application and repetitive use. SSCM TC 1.03

Review the Construction Manual to Determine

Inspection Requirements:
The manual describes inspection duties before-during-after the work. The inspector should list their inspection in the Project Record Book. Inspections of Survey, Sub Base, Sub Grade, Structures etc.

Review the Material Source of Supply:

The SHA requires the Contractor to use only materials that meet SHA contract requirements. The Contractor is required to identify to the SHA Office of Materials and Technologies **Area Material Engineer (AME)** the material manufacture and the source where the material was purchased. The Contractor enters this information into the MMS.

The AME will approve or deny the material submittal. Also, the AME will note what **Acceptance Procedure(s) the Inspector must perform** to accept that material on the jobsite. This acceptance procedure could include onsite testing, receipt of material certification, onsite inspection and evaluation report, certified tickets produced from and scaled weight of material delivered, and many other requirements that will be defined in the MMS Source of Supply and in the SSCM. The Inspector shall know what material is to be received or used on the contract before the work occurs. Check with you CPE if you have any questions.

Tips on Working with the Contractor

A major inspector responsibility is to point out nonconformance in the Contractor's Work. A tactful approach is always best with a reasonable Contractor. It is better to have a discussion of the work requirements and procedures prior to doing any work. This insures you and the Contractor know what the expectation is and there is a less likely chance that something will not be done correctly.

Contractors First Day on Site (or beginning a new operation). When you arrive on site, immediately ask who is in charge and introduce yourself. Ask if it is a good time to have a conversation (that person may have important responsibilities in setting up the work. Ask what work they are going to perform).

Discuss any **safety** issues or requirements (if you see a safety issue, address it). **Discuss** the **material** requirements and acceptance procedure. **Discuss** the contract requirements in the **IFB, Plans** and **SSCM**. Notify the Contractor what inspection procedures you need to perform and ask when it is convenient for the Contractor to allow you to perform those inspections. If any deficiencies are discovered, notify the contractor in a professional manner and follow up to insure corrections are made.

If the contractor knowingly fails to correct the work, notify him again, do not pay for the work and if you cannot resolve the issue, then escalate the issue to the CPE for a resolution.

CATEGORY 100 PRELIMINARY

Job Guide - Traffic Control

1. Review the IFB for special restrictions for the Contract.
2. Review and discuss the approved Traffic Control Plan (TCP) with the CPE and the Contractor's Traffic Manager (TM).
3. Once the TCP is in effect, the Inspector and TM must review the plan to ensure traffic is moving efficiently and safely. The TM may make minor adjustments as field conditions warrant.
4. Monitor Maintenance of Traffic (MOT) throughout the entire life of the Contract and have any necessary correction made immediately.
5. Continue to review the TCP with the CPE and TM on a regular basis.
6. Refer to Section 104 of the Specifications and Section 100 of the Construction Manual as needed.
7. Complete the IDR and all other required documentation.

CATEGORY 200 GRADING

1. Review the IFB for Special Provisions.
2. Review: Sequence of Construction (SoC), Grading Plan and Erosion and Sediment Control (E&SC) Plan.
3. Installation of berm ditches in cuts and side ditches in fills must be completed in grading areas before starting placement of embankment. As grading operations proceed, all erosion and sediment control devices must be installed as required and maintained throughout the entire life of the Contract.
4. Monitor salvaging of topsoil and subsoil to ensure proper drainage and erosion control. Measure and record topsoil, subsoil, and root mat removed under fill sections prior to placement of embankment.
5. When unstable or unsuitable material is encountered, check with the CPE to establish the procedures for correction. Geosynthetic stabilized subgrade using graded aggregate base is the most effective and efficient correction method.
6. Embankment to be placed, spread and compacted full width in layers normally not exceeding eight inches. In deep fills with unstable ground that will not support the weight of the equipment, the first layer of embankment may be constructed by depositing material in a layer no thicker than that necessary to support the equipment.
7. Review the specifications for treatment of rock embankment.
8. Check for compaction and stability by visual observation of embankment and subgrade under earth moving equipment. The subgrade shall be proof rolled as specified in the Contract Documents. Perform moisture and compaction tests as required. Any indication of rutting, pumping, or other embankment instability must be reported to the CPE immediately so corrective action can be initiated.
9. Ensure hauling and leveling equipment is working over the width of embankment.
10. Water and special compacting equipment may be required. In residential areas, special attention must be given to Dust Control. Dust Control is also critical working adjacent to Traffic.
11. Throughout grading operations, consideration must be given to continued drainage and erosion and sediment control measures.
12. Culverts to be "bridged" with sufficient embankment to prevent damage from hauling equipment.
13. Prior to permitting hauling over structures, check with the CPE.
14. Complete an IDR and all relative documents.

CATEGORY 300 DRAINAGE

Job Guide - Pipe Culverts

1. Review the IFB for Special Provisions.
2. Verify location, size, type, and length of pipe.
3. Check pipe for quality control stamps.
4. Obtain certification for each shipment of pipe.
5. Review control stakes and adjacent terrain for proper drainage. Check laser setup, if used. Do not change alignment or grade without design approval.
6. Check for potential conflicts with existing and proposed underground utilities.
7. Check trench for proper width and sheeting needs. Check depth of preliminary fill to determine minimum fill required before allowing trench excavation. Require sheeting, shoring, sloping to angle of repose for the type of soil or other protective measures to comply with safety standards for depth of trench.
8. Check stability of bedding, unsuitable material should be removed and replaced as directed by the CPE.
9. Check bedding for proper grade and compaction. Culverts 48 in. or more shall be bedded in an approved foundation by means of a template.
10. Ensure tongue end of concrete pipe is in direction of flow of pipe and lap in metal pipe is positioned so that flow is overlap.
11. Check invert elevation and alignment as pipe is installed.
12. Verify that concrete pipe joints are snug and sealed with rubber type gaskets for circular pipe and resilient material for elliptical pipe.
13. Verify that backfill material meets specifications; sample and test as required.
14. Require that backfill is placed in 6 in. layers and each lift is thoroughly compacted before placing the next lift. Complete compaction tests in three-foot increments as required and have Contractor take corrective action for failing tests.
15. Determine pay length while installing the pipe and provide the final measurement for each location for the sketchbook.
16. Complete an IDR and all other required documents.

Job Guide - Structural Plate Pipe and Structural Plate Pipe Arch Culverts

The guidelines are basically the same as Pipe Culverts with exception that the Structural Plate Pipe is shop manufactured with specific procedure for fabrication and erection as specified in Section 304 of the specifications.

Job Guide - Erosion and Sediment Control

1. Review IFB for Special Provisions.
2. Review Sequence of Construction and E&SC Plan.
3. Meet with the approved Erosion and Sediment Control Manager (ESCM) and review the schedule for implementation.
4. Initial controls, such as perimeter controls, must be installed prior to the grubbing operation.
5. Verify that controls are implemented in conformance with the E & S Plan and monitor maintenance throughout the life of the contract.
6. Obtain the daily report from the ESCM.
7. Witness after-storm inspections conducted by the ESCM, obtain reports and follow up on any corrective action required.
8. Complete an IDR and all other related documentation.

Job Guide - Miscellaneous Structures

1. Review IFB for Special Provisions.
2. Become familiar with the Standard Details for the structure(s) being built.

3. Obtain the certification from the manufacturer for each shipment of Precast Drainage Structures.
4. Check location, alignment, and grade for structures.
5. Ensure that required drainage conditions are met.
6. Measure for payment as specified in the Contract Documents and provide daily and final measurement.
7. Complete an IDR and all other related documentation.

CATEGORY 400 STRUCTURES

Job Guide - General

1. Review IFB for Special Provisions.
2. Review field controls for horizontal and vertical alignment.
3. Review utility installations and railroad company requirements.
4. Check foundation for correct elevation, suitable bearing value, layout and excavation requirements.
5. When subfoundation investigation is included in the Contract Documents (2001 Spec) review Construction Directive 07220.400.08 for procedures.

Job Guide - Piling

1. Check and document type, length, size, heat numbers, condition, and certifications.
2. Check pile layout.
3. Review subsurface exploration log with CPE and anticipate driving characteristics.
4. Contact CID for pile hammer approval. Prior approval is required before work commences.
5. Review driving operation for proper hammer, pile cap, cushion block, hammer operations, pile splices, and bearing values.
6. Obtain minimum penetration and do not overdrive. Contact Design Engineer if penetration varies significantly from plan.
7. After driving, check placement and final alignment and inspect for damage from driving.
8. Record item numbers, locations, pile number, penetration data, driven length, cut off length, and final measurement.
9. Complete an IDR and all other related documentation.

Job Guide - Forms and Falsework

1. Ensure the approved working drawings are available before work commences.
2. Inspect placement of forms/falsework for conformance with the approved working drawings and Contract Documents.
3. Ensure that any changes in forms/falsework are approved by the Design Engineer prior to allowing the changes to be made.

Job Guide - Reinforcement

1. The installation of all reinforcement shall conform to the Contract Drawings. Reinforcement steel drawings shall be used as a fabrication guide and do not supersede the Contract Drawings unless so approved by the Design Engineer.
2. Ensure that approved drawings are available before commencing work.
3. Require proper job site storage.
4. Check condition, size, steel grade, length, spacing, form clearance, support, ties, mat tie down, lap, and embedment.
5. Check anchor bolt and conduit placement.
6. Welding and heating of reinforcement is prohibited unless authorized by the Lead Design Engineer (LDE).
7. Complete an IDR and all other related documentation.

Job Guide - Concrete Placement: General

1. Attend Pre-Placement Conference.
2. Check forms for conformance to line and grade specified on the Contract Drawings and ensure that forms are clean and free of debris.
3. Check rate of pour shown on form drawings and ensure that the rate is not exceeded.
4. Check mix design, air content, temperature, and slump of concrete prior to placement.
5. Check form alignment and location of reinforcement during placement. Any variations must be corrected.
6. Be aware of time concrete was mixed and allowable time of discharge.
7. Ensure that concrete is placed as close as possible to its final location and properly vibrated. Excessive vibration should be avoided.
8. Ensure that the concrete is finished in conformance with the Contract Documents. Pay special attention to bearing seat areas.
9. Ensure that specified curing and cold weather protection is enforced.
10. Prior to backfilling, check specification requirements.
11. Complete an IDR and all other related documents.

Job Guide - Structural Steel Beams and Girders

1. Attend the Pre-Erection Conference.
2. Make visual checks for in-transit damage, alignment tolerances, defects, and dimensional requirements.
3. If not set in place on arrival, require proper job site storage.
4. Review Plans and Erection Drawings.
5. Inspect bearing devices and seats to ensure 100% bearing for masonry plates.
6. Check in-place alignment, camber, and anchor bolts.
7. Review field welding and high strength bolting to ensure that no erection bolts are confused with high strength bolts.
8. Check torque values with an Office of Materials and Technology (OMT) calibrated torque wrench and record results. Ensure corrective action is taken as necessary.
9. Complete an IDR and all related documentation.

Job Guide - Bridge Deck Slabs

1. Attend Pre-Deck Placement Conference.
2. Inspect all forming, falsework, paving equipment for condition and adjustment.
3. Perform “dry run” inspection of the finishing machine with the Contractor. Check reinforcement embedment, deck thickness, and typical section. Ensure that the Contractor makes any and all corrections immediately.
4. Make final check of forms for cleanliness and remove any construction debris.
5. Perform relevant items under “Job Guide - Concrete Placement – General”.
6. Ensure the concrete is placed in a continuous operation and vibrated sufficiently for uniform consolidation. Vibrate concrete under roadway dams until it appears through all vent holes. Remember that excessive vibration may reduce entrained air content.
7. Make required slump, air, and concrete test cylinders.
8. During placement, continually check reinforcement embedment and deck thickness. Also, observe deflection or movement of finishing rails and forms. Alert Contractor if any problems develop.
9. Observe rollers on finishing machine to ensure that it is not striking off excessive amount of concrete.
10. Check straight-edging.
11. Check longitudinal grade of deck at face of reinforcement for parapet wall to ensure a uniform grade for the wall and drainage to the scuppers.
12. Ensure that misting equipment is available. Misting is required whenever the concrete is left uncovered for more than 30 minutes.
13. Ensure that the deck slab is kept continuously and uniformly saturated throughout the entire curing period.
14. Inspect slab grooving for proper depth and spacing.
15. Record such things as pour location, volume, air, slump, problems encountered with corrective action taken, in the Project Record Book.
16. Complete an IDR and all relative documentation.

CATEGORY 500 PAVING

Job Guide - Aggregate Base Courses

1. See that the Contractor submits the proposed plants, equipment, and materials sources to OMT at least 30 days prior to the start of work.
2. Prior to placing the base course, ensure that the subgrade is true to correct cross-section, alignment, and compaction meets requirements.
3. See that shoulders or berms at least 2 ft. wide are built up on each side of the base to the top elevation of each uncompacted layer unless the base is placed against existing pavement or concrete curbs and/or gutters.
4. Check depth and yield to ensure required coverage.
5. Ensure compaction of each lift to the required density and cross-section before placing the next lift.
6. Perform depth checks to ensure the proper depth is being placed.
7. Collect, check, and sign delivery tickets for each load as it arrives.
8. Complete an IDR and all other related documents.

Job Guide - Asphalt Paving

1. Attend Pre-Paving Conference to discuss Quality Control Plan and the entire paving process with the Contractor, SHA, and producers. Mix design(s) should be approved prior to this conference.
2. Prior to placement of pavement material, the Inspector will ensure that the foundation is constructed to the grade and cross-section specified in the Contract Documents.
3. Existing Asphalt and concrete bases to be clean and free of loose patches. Excessive joint and crack material to be removed.
4. Be aware of acceptable temperature range. Frequently check and record ambient air temperature and surface temperature. Alert Contractor of any problems for corrective action.
5. Inspect the paver prior to commencing work. Alert the Contractor to any corrections, if necessary, and approve the paver.
6. Collect, check for proper mix, and sign each load ticket.
7. Delivery of the mixture and placement to be continuous.
8. Paver to maintain correct line, grade, and cross slope and automatic controls adjusted so as to minimize screed " bounce" or "drift".
9. Rolling to be as continuous as practical and at proper speed with drive wheel nearest paver.
10. Frequently check mat thickness, width, and yield.
11. Maximum yield not to exceed the tolerance of the preceding course.
12. Check the surface of the mat as necessary with the straightedge furnished by the Contractor.
13. Check all transverse and longitudinal joints.
14. Mat should have a uniform appearance and be free of longitudinal seams.
15. Construction joints to be finished flush with adjacent surface.
16. When paving is placed on highways carrying traffic, construct a temporary tie-in a minimum of 4 ft. in length for each 1 in. of pavement depth before traffic is allowed to cross the transverse joint.
17. Review Pavement Surface Profile Special Provision requirements with the Contractor and proceed as specified.
18. Provide a daily yield for each mix placed for each day to the CPE for entry on the daily log.
19. Complete an IDR and all related documentation.

Job Guide - Concrete Pavement

1. Attend pre-paving conference.
2. Ensure that the Contractor’s proposed paving plan is submitted and approved prior to the start of work.
3. Ensure that the concrete plant is certified and approved by OMT.
4. Become familiar with paving sequence and review field controls for line and grade.
5. Verify stringline is set sufficiently in advance to avoid delays.

6. Verify that the Contractor is prepared for inclement weather.
7. Verify that utility and conduits are complete. Pre-locate utility and storm drain fixtures to be incorporated in the pavement.
8. Check the final subgrade for conformance to the specified tolerance.
9. Check dowel baskets for proper placement and alignment. Ensure dowel baskets are securely anchored and assembly ties are removed.
10. Ensure that the subgrade is dampened ahead of concrete placement.
11. Verify proper reinforcement size, grade, spacing, ties, and depth.
12. Monitor paving operation for continuous, uninterrupted placement and consolidation, including proper operation of vibrators.
13. Monitor pavement width, thickness, crown, superelevation, edge slump, joint match and yield.
14. Perform air and slump tests, and make test cylinders as required.
15. Collect, check, and sign delivery tickets. Be aware of time allowed for placing concrete.
16. Check placement of keyway to assure location at proper elevation.
17. Check to see that joint locations are marked at the same location as the dowel baskets.
18. Check for proper finishing and check surface with 10 ft. straightedge.
19. Ensure texturing is properly performed at the appropriate time and meets contract dimensions.
20. Check application rate of curing compound for uniformity, yield, and timely placement.
21. Maintain compliance with cold weather protection requirements.
22. Observe proper timing of sawing and appearance, depth, and width of joints.
23. Ensure proper joint cleaning and sealing.
24. Review the Pavement Profile Special Provision and follow up with the Contractor.
25. Complete an IDR and all related documentation such as, but not limited to the following: concrete temperatures, air content, slump readings, cylinder data, stations paved, width, depth, yield, weather, air temperature, and problems or unique circumstances encountered.
26. Document any and all work that was found not to be in compliance with the Contract Documents and the corrective action taken, including the final results after the corrective action was completed.

Job Guide - Permanent Pavement Markings

1. Review the Special Provision in the Contract Documents for the type of markings specified for the Project.
2. Attend the Pre-Paving and Pavement Marking Conference. Ensure that the Contractor has submitted a proposed Quality Control Plan for approval prior to the conference.
3. Ensure that work does not commence until the Quality Control Plan is approved.
4. See that the Contractor has Certified Technicians in conformance with the Contract Documents.
5. See that the pavement surface is dry and free of oil, dirt, grease and other contaminants.
6. See that existing pavement markings that conflict with the proposed markings are completely removed.
7. See that the schedule of operations has been submitted and approved before marking work is begun.
8. See that the markings are placed in conformance with the width, alignment, and retroreflectance requirements of the Contract Documents.
9. Perform regular inspections during the observation period.
10. Complete an IDR and all other related documentation.

CATEGORY 600 SHOULDERS

Job Guide - Concrete Curb, Combination Curb and Gutter, Monolithic Median, & Concrete Traffic Barrier

1. Review the applicable Contract Documents for the type of work performed.
2. Check the Contractor's equipment and forms to ensure that plan dimensions are met. Special attention should be given to slip-form equipment to produce a finished product meeting plan dimensions.
3. Check all string lines used to control the vertical and horizontal alignment of forms or slip-form machines. Special attention should be given to string line and supporting devices for slip-form machines to ensure that control sensors ride smoothly on these devices.
4. Refer to the appropriate Standard Detail in the Book of Standards for dimensions and details.
5. Inspect the foundation for correct grade, compaction, and moisture. Special attention must be given to the foundation that supports the slip-form machine to ensure its stability.
6. Review requirements for reinforcement, tie bars, dowels, and joints.
7. Confirm sidewalk ramps and driveway locations.
8. Ensure that all drainage conditions are met.
9. Check allowable tolerances and review finishing procedures.
10. Check placement and consolidation of concrete.
11. Check finishing.
12. Perform air tests, slump tests, and make the required number of concrete cylinders.
13. Check application rate of curing material and timely placement.
14. When required, ensure proper cold weather protection is provided.
15. Complete an IDR and all related documentation.

Job Guide - Metal Traffic Barrier

1. See that the District Area Engineer and CPE review the locations prior to starting any work.
2. Review the Book of Standards for construction details.
3. See that the District Engineer approves any additional request for barrier.
4. See that End Treatments are located as accurately as possible.
5. See that provisions are made to protect the coating on the tops of posts that are driven.
6. See that posts are driven at correct alignment and specified depth.
7. Check all posts during driving to ensure they are plumb, at the correct height and true to the line established.
8. See that the area is redressed as necessary.
9. Complete an IDR and all related documentation.

CATEGORY 700 LANDSCAPING

Nutrient Management Plan (NMP)

1. SHA is required to comply with the Water Quality Improvement Act of 1998. The Act requires the development of an NMP for establishing the limestone and fertilizer requirements for both salvaged and furnished topsoil used to establish turf on the Project.
2. These Plans are developed by the Landscape Operations Division (LOD) in the form of a Special Provision for salvaged topsoil and forwarded to the Design Division responsible for the Project. The Special Provisions will indicate the current pH and phosphorus level in the salvaged topsoil and the application rates for both the limestone and fertilizer required to establish new turf. Non-topsoil areas will be fertilized in conformance with Section 705 of the Specifications.
3. When the topsoil is furnished, the samples taken will be tested for pH and phosphorus and an NMP will be provided for the furnished topsoil.
4. There are also cases where the NMP for both salvaged and furnished topsoil is developed by samples taken on the Project and the requirements will be included in the Special Provision for the Project. This is usually done on Projects that have a small quantity of salvaged topsoil.

Job Guide - NMP

1. Review the Special Provision for the NMP in the IFB for the Project.
2. See that required samples are taken. Contact LOD for guidance in obtaining representative sample(s).
3. See that no turf establishment requiring either furnished or salvaged topsoil is started until the NMP is provided by LOD.
4. Verify that the Contractor complies with the application rates specified in the NMP.
5. See that the NMP report is completed each day that work is performed.
6. See that the NMP report is forwarded to LOD at the completion of the Project.
7. Complete an IDR and all other related documents.

Job Guide - Seeding, Finishing, Etc.

1. Ensure topsoil is placed on cut and fill slopes to the depth and locations designated on the plans.
2. See that topsoil is free from clumps, rocks, roots, etc. and properly prepared for seeding.
3. Ensure fertilizer and limestone application rates conform to the NMP.
4. Ensure the seed mixes conform to the Contract Documents.
5. Ensure the seed mix is placed uniformly and yield meets requirements.
6. Count and record empty fertilizer and seed bags as used.
7. Collect certified seed tickets.
8. Remove and file at least one fertilizer analysis cut from each type of fertilizer for each day.
9. Ensure that mulch and binder conform to the Contract Documents.
10. Ensure that all sod is certified.
11. Ensure that all sod is rolled or lightly tamped, stapled/pegged, and watered as required.
12. Check soil stabilization matting for conformance with specification and placement as required with staples in full contact, upgrade edges buried, and disturbed areas restored.
13. Ensure final finishing accomplishes removal of all liter and debris, repair of damaged areas, and cleaning of drainage structures.
14. File certified seed and sod tickets and fertilizer analysis in project file.
15. Measure all work for payment.
16. Complete an IDR and all related documentation.

Job Guide - Planting

1. Review the IFB for Special Provisions for Planting items.
2. Review and approve or adjust the Contractor’s layout and staking.
3. Inspect plant stock upon delivery and obtain shipping lists and certifications with each shipment.
4. Ensure that plant pits are excavated to correct depth and minimum diameter specified.

5. Ensure that plants are acceptably planted, watered, and mulched.
6. See that required permits from the Maryland Department of Natural Resources are on file.
7. See that the Contractor submits a request in writing for acceptance of the construction phase.
8. See that the Contractor maintains the plants for the period as specified in the Contract Documents.
9. Measure all work for payment.
10. File plant shipping list and certifications.
11. Complete an IDR and all required documents.
12.

CATEGORY 800 TRAFFIC / UTILITIES

Job Guide - Signals and Lighting

1. The Office of Traffic and Safety (OOTS) has various unique requirements and therefore the Inspector must consult Category 800 of the Project IFB to review all the relevant Special Provisions for the Project.
2. See that all catalog cuts are approved by OOTS.
3. See that Contractor notifies Miss Utility to locate existing Utilities.
4. Review stakeout for conflicts.
5. See that all footings are at the correct location, excavated to the specified dimensions, and reinforcement, bolt circles, and finish grade are checked and approved prior to placing concrete.
6. Check to ensure all posts are set plumb.
7. Verify that sign locations and legends comply with Contract Documents.
8. Maintain existing equipment at all times until new equipment is tested and put in service.
9. Ensure that each conduit run is cleaned and checked by a pull through mandrel.
10. Check that cable in conduit is installed in a manner to prevent stretching of the conductor.
11. See that 6 ft. of slack cable, coiled and tied, is provided in all manholes, handholes and cabinets.
12. See that general electrical work is tested and completed in conformance with the Contract Documents.
13. See that the Contractor furnishes As-Built Plans as specified in the Contract Documents.
14. Complete an IDR and all related documentation.

Job Guide - Utilities

Review the IFB for Special Provisions regarding specific Utilities in the Contract. The specifications for this work will be found in the IFB as there are no Utility Specifications in the Standard Specifications.

Special Provisions for Utilities are: SP Section 875 Utility Statement; SP Section 876 Water and Sanitary Sewer; SP 877 Telephone and Fiber Optical; SP Section 878 Electric; SP Section 879 Gas; SP Section 880 Cable TV; and SP Section 881 Railroad. The applicable SP(s) will be found in the IFB.

Also, refer to CD 07220.800.01 for inspection and documentation criteria pertaining to Utility/Railroad forces and materials used on the project. The purpose is to verify locations, and time and material charges from the Utility/Railroad for work authorized and paid for by the Administration.

CATEGORY 900 MATERIALS

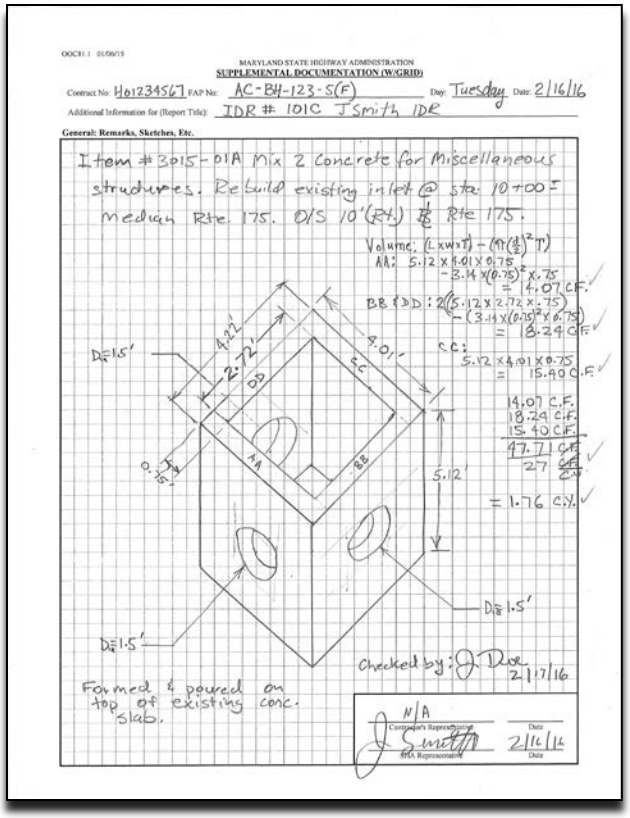
Job Guide - General

All materials included in Category 900 will be sampled, tested, and inspected to the limits specified. No deviations from these limits will be permitted except when, in the judgment the Engineer (Senior Management Level), the deviation will not be detrimental to the work. In these cases the appropriate specification for price adjustments for nonconformance applies.
Sampling shall conform to the Administration's Sample Testing and Frequency Guide.
Technicians performing Quality Assurance/Quality Control sampling and testing shall be qualified through the certification program provided by OMT. Technicians include SHA Construction and Consultant field personnel.

Job Guide - Inspection Staff

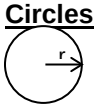
1. See that the Contractor submits in writing to the Area Materials Engineer the sources from which the Contractor intends to obtain all materials to be incorporated into the project.
2. See that all materials are tested and approved before the work commences unless otherwise provided for in the Contract Documents.
3. Perform all sampling and testing in conformance with sampling guide and testing procedures furnished by OMT.
4. Record daily inventory of materials received, used, and approval status on the IDR for all work done each day requiring materials. Obtain certifications that are required before the material is used. Otherwise, ensure that all material is approved to the extent required in the Contract Documents before the materials are incorporated into the work.
5. See that all Production Plants are approved and certified by OMT.
6. Attend the Portland Cement Concrete Pre-Placement Conference - Materials.
7. Ensure that the Contractor submits sources of supply for any new items of work added to the Contract.
8. Assist the CPE in resolving any material approvals for the items of work inspected as the work progresses.
9. Assist the CPE to ensure timely processing of Material Clearance for the project.

IDR SKETCH DETAIL EXAMPLE



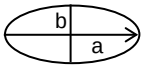
USEFUL FORMULAS

Circles



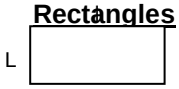
r (radius) = D (diameter) / 2
C (circumference) = $2\pi r$
A (area) = πr^2

Ellipses



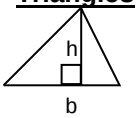
A (area) = π a b

Rectangles



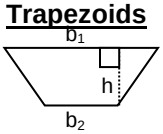
A (area) = L (length) x W

Triangles



A (area) = $\frac{b \text{ (base) } h \text{ (height)}}{2}$

Trapezoids



A (area) = $\frac{(b_1 + b_2)}{2}$ h (height)

Specific Gravity = $\frac{\text{Density of Substance}}{\text{62.4 lbs. / cu. ft.}}$

Density = $\frac{\text{Weight}}{\text{Volume}}$

Slope = $\frac{\text{Horizontal Distance}}{\text{Vertical Distance}}$

Percent of Grade = $\frac{\text{Vertical Distance}}{\text{Horizontal Distance}}$ x 100

$\frac{\textbf{Percent of Grade}}{\textbf{100}} = \frac{\text{Vertical Distance}}{\text{Horizontal Distance}}$