

# Construction Critical Inspection

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## **INTRODUCTION**

It is expected that WisDOT construction projects are staffed in the most cost-effective and efficient manner. Reduced costs and efficiencies may be realized by using less-experienced inspectors for appropriate tasks, or combining several tasks to be administered by an individual inspector. The objective of this manual is to provide guidance and strengthen the application of critical inspection throughout the life of a construction project. This guidance is intended to prevent high risk consequences while providing the minimal amount of inspection to ensure a safe and successful project. The project manager is allowed the flexibility of using this guidance in its entirety, or portions of it, depending on the project conditions.

The main purpose for inspection is to validate that the contractor is performing the work as required in the contract. If an inspector witnesses a contractor performing work that does not meet the requirements, the contractor should be notified immediately so that the situation can be remedied. If the contractor's work operations appear to be unsafe, or if they are performing non-conforming work that is a safety concern, the inspector should notify the contractor immediately. If the contractor does not rectify the situation, it should be escalated through the WisDOT project management team and to the WisDOT region management, if necessary.

Adequate quality assurance can be obtained on most contract items by inspection at predetermined stages of completion of the various work activities. Generally, the stages are identified as the point at which contractors can proceed no further without eliminating the opportunity for the inspector to verify that the construction is in conformance with the contract, plans, standards and specifications, or to document a quantity for payment (the inspector should measure, verify and document quantities of work completed; updates of quantities should realistically reflect the work done by the contractor).

There are many construction activities that are not considered to be critical inspection items. These include activities such as removals of existing structures and roadways. Although not considered as critical activities, there are certain aspects that are to be intermittently reviewed and monitored as those removal activities occur. Environmental commitments including archaeology, bridge netting, erosion/sediment control, and debris in water are examples of things that require monitoring during both critical and non-critical work operations.

The recommendations for Construction Critical Inspection are minimal inspection requirements and based on preventing high risk consequences of failure. The Inspection Level, Priority, Inspector Experience, Inspection Objective and Activities before/during work are listed for each construction operation and are reflective of a typical size or complexity of construction project.

Construction operations, where cost is high and consequence of failure is significant, are prioritized as high and/or require Continuous Inspection at each operation. In this type of inspection, an inspector is assigned only to the operation in question for the duration of that operation.

Other construction operations which require inspection at appropriate points during the operation, but do not require continual inspection, require Intermittent Inspection; this may be Daily or Weekly as needed. An example of this type of operation would be excavation, where inspection would be required before and after excavation and before subbase, base course operations have taken place. Intermittent checks of the contractor's operation would be necessary between

the start of the operation and the beginning of the next major operation.

Some work items may be inspected after the construction is completed without significant risk to the department. These types of activities are termed End Product Inspections.

At the project level, the inspector must blend and shift emphasis of quality assurance based on the resources available as well as the demonstrated abilities or lack thereof by the contractor to perform in specific areas according to the contract, plans, standards and specifications.

This document is intended to provide the methodology to ensure that critical phases and work operations receive sufficient inspection to ensure conformance to plans, contract, standards, and specifications.

## **INSPECTION DEFINITIONS**

**Continuous Inspection** = requires inspection during the entire operation

**Intermittent Inspection** = requires inspection at critical times in the operation

**End Product Inspection** = requires inspection only after completion of the operation and during the construction operation when time permits

**Priority** = Level of associated risk resulting from insufficient inspection.

## **RESPONSIBILITY AND COMMITMENT OF WisDOT AND CONTRACTOR**

In order for the inspection levels set forth in this manual to be effective, proper inspection will require certain commitments by both WisDOT personnel and the contractor.

WisDOT personnel must be knowledgeable in the appropriate materials certification, and provide or obtain timely decisions regarding the work, so that the contractor will not incur a delay. Inspectors must clearly communicate expectations to the contractor concerning inspection of the contractor's activities. Inspectors must maintain a cooperative attitude toward the contractor's prosecution of the work, but be assertive in their efforts and insist on conformance with the contract, plans, standards and specifications.

Inspectors must ensure conformity with project specifications and contractual requirements, and document acceptance of materials. The inspector will use the guidelines in the Timely Decision Making (TDM) Manual during the project to insure timely and accurate responses to contractor requests.

The contractor also has an important role in the successful application of proper inspection. The contractor must accept the responsibility to construct the project in accordance with the contract, plans, standards, and specifications without regard to the level of inspection. The contractor must place competent management, engineering, and technical personnel on the project to ensure an effective pursuit of work.

The contractor's project representative must keep the project engineer informed of schedule changes that may affect the necessary inspection required. The contractor will use the guidelines in the TDM Manual during the project to insure timely and accurate requests and responses to the project inspectors.

## **STAFFING**

Staffing projections require a project-by-project evaluation using the inspection level outlined in this document. This will allow WisDOT personnel to be flexible in establishing inspection priorities based upon job conditions as well as individual contractor work performance. Proper WisDOT project management will ensure an optimum inspection level throughout the life of the project, and monitoring by the Region Construction Management team will provide the correct distribution of inspection resources on a Region-wide basis.

## **INSPECTION GUIDELINES**

The following tables are organized so that inspectors can assess the level of inspection required followed by the objective of inspection for the type of work specified. The column noting inspector activity presents the major activities required of an inspection for this item of work.

NOTE: The inspection during work activity column is not meant to present all of the activities that an inspector should perform during the specific operation; it presents the minimum requirements of the major activities. Further guidance and inspection checklists are available in the Construction and Materials Manual (CMM).



## TRAFFIC CONTROL

**Specification Reference:** 643  
**Inspection Level:** Continuous, Intermittent (Daily)  
**Priority:** Medium  
**Inspector Experience:** 1-3 years of Traffic Control inspection  
**Inspection Objective:** Work zone impacts assessment

Before Work Begins	Inspection During Work Activity
<p>Ensure a copy of Transportation Management Plan (TMP) is available in the field office.</p> <p>Review and be familiar with the TMP requirements.</p> <p>Verify Lane Closure System (LCS) requirement for the project.</p> <p>Ensure the contractor has staked each sign location and that sign location meets field conditions.</p>	<p>Monitor and manage work zone impacts on traffic during the initial set-up. (Continuous)</p> <p>Monitor and manage work zone impacts on traffic during stage changes. (Daily-as needed)</p> <p>Monitor and manage work zone impacts on pedestrians during construction. (Daily-as needed)</p> <p>Monitor and manage work zone impacts on traffic safety and mobility during construction. (Daily-as needed)</p> <p>Perform and document day time and nighttime inspection to verify proper illumination. (Daily-as needed)</p> <p>Verify the retroreflective sheeting on drums, barricades, and other devices are clean. (Daily-as needed)</p> <p>Ensure the contractor repairs scratches, rips, and tears in the sheeting. (Daily-as needed)</p> <p>Ensure contractor replaces devices that have large areas of abrasion, missing reflective sheeting, asphalt splatter, concrete slurry, or other residue. (Daily-as needed)</p> <p>Ensure contractor removes devices from the project when they are no longer needed. (Continuous)</p> <p>Measure and document traffic control item quantities. (Daily-as needed)</p>

## EROSION CONTROL

**Specification Reference:** 107  
**Inspection Level:** Intermittent (Daily/Weekly)  
**Priority:** Medium  
**Inspector Experience:** 2-5 years of Erosion Control inspection  
**Inspection Objective:** Ensure environmental controls are in place prior to land-disturbing activity.

Before Work Begins	Inspection During Work Activity
<p>Ensure Erosion Control Implementation Plan (ECIP) is approved.</p> <p>Review the approved ECIP prior to erosion control measures layout and installation.</p> <p>Confirm stockpile locations with the contractor.</p> <p>Ensure erosion controls are in place prior to land-disturbing activity.</p> <p>Verify all erosion control measures are on Erosion Control Product Acceptability List (PAL).</p>	<p>Inspect and document erosion control at the beginning of each construction stage and throughout construction. (Daily/Weekly-as needed)</p> <p>Check erosion control measures <u>prior to a major rainfall</u> event. (Daily/Weekly-as needed)</p> <p>Inspect and document erosion control after <u>each rainfall event greater than ½"</u>. (Daily/Weekly-as needed)</p> <p>Notify Project Engineer and DNR of <u>any discharge into waterway</u>. (Daily/Weekly-as needed)</p> <p>Issue the Erosion Control Order Form for <u>corrective action</u>. (Daily/Weekly-as needed)</p> <p>Measure and document erosion control items quantities. (Daily/Weekly-as needed)</p>

## CONSTRUCTION STAKING

**Specification Reference:** 650  
**Inspection Level:** Intermittent (Daily/Weekly)  
**Priority:** Medium  
**Inspector Experience:** 2 - 5 years of Surveying  
**Inspection Objective:** Ensure performance of construction staking by the contractor.

Before Work Begins	Inspection During Work Activity
<p>Verify the survey packet contains survey information, Design Data Files, and documents to be used by the contractor.</p> <p>Verify plan control is in place and usable.</p> <p>Verify the accuracy of existing benchmarks (bench loop) and their location.</p> <p>Furnish data for the horizontal and vertical control points.</p> <p>Verify establishment of additional benchmarks and control points as necessary to support methods of operations.</p> <p>Verify protection of known property and survey markers and land monuments.</p>	<p>Ensure performance of construction staking by the contractor. (Daily-as needed)</p> <p>Verify protection of known property and survey markers and land monuments.</p> <p>Randomly verify survey computations. (Daily-random)</p> <p>Randomly verify the accuracy of contractor's staking; early in the project, daily verification is expected; once confident with the ability of the crew, less frequent verification. (Weekly-random; prior to start of the item of work)</p> <p>Ensure to obtain copies of survey books, daily notes, and completed contractor survey packet. (End of each stage)</p> <p>Measure and document construction staking item quantities. (Weekly-as Needed)</p>

## CLEARING & GRUBBING

**Specification Reference:** 201  
**Inspection Level:** Intermittent (Daily)  
**Priority:** Medium - Low  
**Inspector Experience:** 1 - 5 years of Site Preparation  
**Inspection Objective:** Measure environmental controls and prepare documentation.

Before Work Begins	Inspection During Work Activity
<p>The contractor must obtain burning permits required under local and state fire protection regulations and provide copies to the engineer before burning.</p> <p>Ensure erosion controls are in place prior to land-disturbing activity.</p> <p>Measure any additional area requiring clearing &amp; grubbing and prepare documentation.</p> <p>Ensure clearing and grubbing operation is confined to proposed construction limits and the excavation is planned to be performed.</p>	<p>Ensure environmental clearances are in place prior to land-disturbing activity. (Daily-as needed)</p> <p>Verify burning impacts to traffic and adjacent properties. (Daily-as needed)</p> <p>Ensure marked areas to be cleared/grubbed. (Daily-as needed)</p>

## EXCAVATION & EMBANKMENT

(For EBS, see EBS section below)

**Specification Reference:** 205, 207

**Inspection Level:** Intermittent (Daily)

**Priority:** Medium

**Inspector Experience:** 2 - 5 years of Earthwork inspection

**Inspection Objective:** Verify contractor's effort in obtaining desired density and moisture content as defined in the specifications.

Before Work Begins	Inspection During Work Activity
<p>Confer with contractor about area to be graded using contractor's sequence of operations, discuss environmental concerns, stripping and disposition of topsoil, limiting of disturbed areas, and balance points which are outlined in the plans and specifications.</p> <p>Ensure proper environmental controls are in place. (refer to erosion control)</p> <p>Ensure ECIP is approved and borrow and waste sites are cleared for environmental impact.</p> <p>Ensure area to be excavated as per plans, limit disturbed areas to minimize erosion and siltation.</p> <p>Before placement of borrow, ensure material has been tested and approved.</p>	<p>Ensure slopes intercept ditch line or shoulder line at correct locations. (Daily-random)</p> <p>Maintain proper drainage to minimize saturation of grade. (Daily)</p> <p>Perform tests to determine earth or rock fill embankment in order to ensure placement of material in lift depths defined in the specifications. Verify depth of fill embankment layers. (Daily)</p> <p>Perform and document density and moisture tests on embankments. (Daily, if QMP subgrade)</p> <p>Perform and document checks of line and grade, slope ratio, and slope texture. (Daily-random)</p> <p>Proof roll grade before acceptance. (Daily-random)</p>

## EXCAVATION BELOW SUBGRADE (EBS), ROCK EXCAVATION, MARSH EXCAVATION

**Specification Reference:** 205, 207  
**Inspection Level:** [Continuous; Intermittent \(Daily\)](#)  
**Priority:** High  
**Inspector Experience:** 2 - 5 years of Earthwork inspection  
**Inspection Objective:** Detection of soft, yielding areas that may cause pavement failure

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
<p>Confer with the Region Soils Engineer prior to undercutting.</p> <p>If a geotextile fabric is used, ensure the fabric has been approved for the application.</p>	<p>Define and document undercut excavation area and reason for removal. (<a href="#">Continuous-during operation</a>)</p> <p>BEFORE starting backfill operations:                      Sketch and compute undercut quantities by cross-sectioning or direct measure of undercut area. (<a href="#">Continuous-during operation</a>)</p> <p>Perform and document density tests on backfill material. (<a href="#">Continuous-QMP only</a>)</p> <p>Verify unsuitable material is disposed of in an approved method and area. (<a href="#">Daily-as needed</a>)</p> <p>Ensure establishment of firm foundation prior to backfilling. (<a href="#">Continuous-during operation</a>)</p>

**SELECT MATERIAL, SUBBASE, BASE AGGREGATE, DENSE & OPEN-GRADED BASE**

**Specification Reference:** 301, 305, 310  
**Inspection Level:** Intermittent (Daily); Continuous  
**Priority:** High  
**Inspector Experience:** 2 - 5 years of Aggregate Placement inspection and grade preparation  
**Inspection Objective:** Ensure grade and typical section of material below the course to be placed is within specified tolerances and density has been obtained.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
<p>Before placing subsequent layers of material:</p> <p>Ensure the materials source has current and wear soundness testing.</p> <p>Check QC/QV testing requirements.</p> <p>Perform and record density tests (proof rolling).</p>	<p>Ensure grade and typical section of material below the course to be placed is within specified tolerances and proper compaction has been obtained. (Daily-as needed)</p> <p>Ensure placement of material or scarification is performed to the specified depths. (Continuous-during operation)</p> <p>Ensure grade, density, confinement of material to proper limits, and that no contamination or segregation takes place. (Continuous-during operation)</p> <p>Collect and process tickets for each load of material. Verify yield. (Continuous-during operation)</p> <p>Verify lift thickness, moisture content, watering operations, and compaction. (Continuous-during operation)</p> <p>Inspect for cracking or rutting after compaction. (Continuous-during operation)</p> <p>Ensure that sampling &amp; testing is performed and tracked appropriately. (Continuous)</p>

## BASE PATCHING

**Specification Reference:** 390

**Inspection Level:** [Continuous, Intermittent \(Daily\)](#)

**Priority:** Medium - High

**Inspector Experience:** 2 - 5 years of Concrete Paving inspection

**Inspection Objective:** Ensure all failed pavement has been defined and sub-grade is structurally sound and all delaminated concrete is removed.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
<p>Locate and mark all areas of repair.</p> <p>Ensure paving equipment will place pavement on line and grade specified in plans while maintaining proper reinforcing steel location.</p>	<p>Ensure the contractor has a safe traffic control operation that will be followed; especially related to the operation of trucks through the work zone. <a href="#">(Daily)</a></p> <p>Ensure subgrade is structurally sound and all delaminated concrete is removed. <a href="#">(Continuous)</a></p> <p>Check and document size, location, and grade of reinforcing steel and dowel assemblies. <a href="#">(Daily)</a></p> <p>Check and document type of mix, truck delivery operation, and placing, consolidation, texturing, curing and protecting operations. <a href="#">(Continuous)</a></p> <p>Sample and test as required. <a href="#">(Continuous)</a></p> <p>Ensure saw cutting performed as soon as concrete has hardened sufficiently to prevent spalling or tearing. <a href="#">(Daily-as needed)</a></p> <p>Verify that proper curing time or strength requirement has been met prior to opening to traffic. <a href="#">(Daily)</a></p>



## CONCRETE PAVEMENT

**Specification Reference:** 415

**Inspection Level:** [Continuous](#), 1 inspector minimum

**Priority:** High

**Inspector Experience:** 3 - 5 years of Concrete Paving inspection

**Inspection Objective:** Ensure that a quality, durable, and smooth riding concrete pavement is achieved according to the contract requirements.

Before Work Begins	Inspection During Work Activity
<p>Ensure the contractor has a safe traffic control operation that will be followed; pay particular attention to safe operation of trucks through the work zone.</p> <p>Confirm and document that traffic control measures are providing a safe work zone to the traveling public throughout the duration of the paving operation.</p> <p>Check and document grade, density, and surface of underlying material.</p> <p>Ensure paving equipment in proper operating order and will place pavement on line and grade specified in plans while maintaining proper reinforcing steel location.</p>	<p>Check and document type of mix, truck delivery operation, and placing, consolidation, texturing, curing and protecting operations. (<a href="#">Continuous</a>)</p> <p>Verify the delivery time of each load meets specifications. (<a href="#">Continuous</a>)</p> <p>Cast strength specimens and perform required slump, temperature, and air content tests. (<a href="#">Daily-as needed</a>)</p> <p>Reject concrete mix that does not meet the materials specifications. (<a href="#">Continuous</a>)</p> <p>Ensure the specified surface finish is applied. (<a href="#">Continuous</a>)</p> <p>Ensure concrete pavement thickness is per contract requirements. (<a href="#">Continuous</a>)</p> <p>Ensure the proper curing method is applied in accordance with the contract. (<a href="#">Continuous</a>)</p> <p>Ensure saw cutting performed as soon as concrete has hardened sufficiently to prevent spalling or tearing. (<a href="#">Daily-end of paving operation</a>)</p> <p>Inspect for random cracking per the contract requirements. (<a href="#">Daily-as needed</a>)</p> <p>Verify opening strength and ensure concrete pavement is ready to open to traffic. (<a href="#">Daily-as needed</a>)</p>

## TACK COAT

<b>Specification Reference:</b>	455
<b>Inspection Level:</b>	Intermittent (Daily)
<b>Priority:</b>	Medium
<b>Inspector Experience:</b>	2 - 5 years of Asphalt Paving inspection
<b>Inspection Objective:</b>	Ensure tack coat conforms to plans, standards, specifications and contract requirements.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
Ensure the surfaces to which the tack coat is to be applied must be clean.	Ensure the surfaces to which the tack coat is to be applied must be clean and no standing water. (Continuous-during operation)  Ensure Tack Coat application is limited each day to the area the contractor expects to pave during that day. (Daily)  Sample for testing as required. (Daily)

## ASPHALTIC PAVEMENT & ASPHALT SURFACE

**Specification Reference:** 450, 455, 460, 465

**Inspection Level:** [Continuous](#), 1 inspector minimum

**Priority:** High

**Inspector Experience:** 3 - 5 years of Asphalt Paving inspection

**Inspection Objective:** Ensure cross-section of roadway constructed to specified elevations and template, uniform coverage and smooth surface.

Before Work Begins	Inspection During Work Activity
<p>Ensure cross-section of roadway constructed to specified elevations and template prior to application.</p> <p>Ensure the contractor has a safe traffic control operation that will be followed; pay particular attention to safe operation of trucks through the work zone. Also discuss weather and plans for inclement forecast, and cold weather plan, if applicable.</p> <p>Check and document grade, density, and surface of underlying material.</p> <p>Document contractor's equipment.</p> <p>Check and document type of mix, truck delivery operation, mix temperature, and laydown operation.</p>	<p>Coordinate with the Region QC and QV density tester, verifying random testing locations. <a href="#">(Continuous)</a></p> <p>Review all surfaces, especially milled areas, for cleanliness prior to placement. <a href="#">(Continuous)</a></p> <p>Collect ticket for each load of material. Verify quantity with the contractor daily. Compute and track the yield based on weight tickets. <a href="#">(Continuous)</a></p> <p>Check and document surface and edges of each layer by straight edging and have contractor make necessary corrections. Ensure paver is using appropriate grade controls, and that lines are straight and match the plan. <a href="#">(Continuous)</a></p> <p>Confirm rolling procedures based on startup or density control strip are being maintained. Check temperature of mat to confirm that density is being obtained before mat cools. <a href="#">(Continuous)</a></p> <p>Check for proper thickness and construction joint operations. <a href="#">(Continuous)</a></p>

## BOX CULVERTS

**Specification Reference:** 504

**Inspection Level:** [Intermittent \(Daily\) & Continuous](#)

**Priority:** High

**Inspector Experience:** 2 - 5 years of Concrete Structure inspection

**Inspection Objective:** Ensure the structure conforms to plans, standards, specifications and contract requirements.

Before Work Begins	Inspection During Work Activity
For pre-cast structures, verify that shop drawings have been submitted.	Measure and record quantitative data and sketch and compute minor structural excavation, if applicable. <a href="#">(Continuous)</a>
Verify and document that width, length and height meet field and slope conditions.	Check foundation, bedding material, and grades for conformance with specifications and properly sampled. If foundation is questionable, contact Region Soils Engineer. <a href="#">(Daily-as needed)</a>
Ensure alignment and location staked by contractor will maintain proper drainage.	Inspect and document all pile driving operations. Verify that proper splicing methods are being used. <a href="#">(Continuous)</a>
Ensure uniform foundation, and grade will allow desired bedding thickness.	Perform required concrete mix testing and reject concrete that does not meet the materials specifications. <a href="#">(Continuous)</a>
Ensure placement of forms and reinforcing steel are in accordance with the plans and specifications.	Verify that the delivery time of each concrete load meets the specifications. <a href="#">(Continuous)</a> Ensure the proper curing method is applied in accordance with the contract. <a href="#">(Daily-as needed)</a> Ensure uniform backfill compaction. <a href="#">(Continuous)</a>

## RETAINING WALLS

**Specification Reference:** 504  
**Inspection Level:** Intermittent (Daily)  
**Priority:** High  
**Inspector Experience:** 2 - 5 years of Retaining Wall inspection  
**Inspection Objective:** Ensure uniform foundation and that the grade will allow desired bedding thickness.

Before Work Begins	Inspection During Work Activity
<p>For proprietary designs, verify that shop drawings have been submitted.</p> <p>Ensure uniform foundation, and grade will allow desired bedding thickness.</p>	<p>Check foundation, bedding material, and grades for conformance with specifications and properly sampled. If foundation is questionable, contact Region Soils Engineer. (Daily-as needed)</p> <p>Ensure wall segments, location and alignment are per contract. (Daily)</p> <p>Ensure wall segments are properly installed and connected. (Daily)</p> <p>Ensure uniform backfill compaction. (Continuous)</p>

## INCIDENTAL CONCRETE ITEMS

**Specification Reference:** 601, 602, 603, 604  
**Inspection Level:** [Continuous, Intermittent \(Daily\)](#)  
**Priority:** Medium - High  
**Inspector Experience:** 1 - 5 years of Ancillary Concrete inspection  
**Inspection Objective:** Ensure alignment and grade according to plans and specifications.

Before Work Begins	Inspection During Work Activity
<p>Verify and document that width, length and height meet field and slope conditions.</p> <p>Ensure alignment and grade according to plans and specifications.</p> <p>Check foundation, bedding material, and grades for conformance with specifications. If foundation is questionable, contact Region Soils Engineer.</p>	<p>Check and document line, grade, elevation, dimensions, condition of forms, bracing, ties and location of reinforcing. <a href="#">(Daily)</a></p> <p>Ensure placement of forms and reinforcing steel are in accordance with the plans and specifications. <a href="#">(Daily)</a></p> <p>Ensure discharging, conveying, spreading, consolidating, screeding, finishing, texturing, curing, and protecting operations are performed according to the contract requirements. <a href="#">(Continuous)</a></p> <p>Verify the delivery time of each concrete load meets the specifications. <a href="#">(Continuous )</a></p> <p>Cast strength specimens and perform required slump, temperature, and air content tests. <a href="#">(Daily-as needed)</a></p> <p>Reject concrete mix that does not meet the specifications. <a href="#">(Continuous-during operation)</a></p> <p>Verify that concrete strength has been obtained. <a href="#">(Daily)</a></p> <p>Ensure uniform backfill compaction. <a href="#">(Continuous-for items cast below grade, Daily-for surface items)</a></p>

## RIPRAP

**Specification Reference:** 606

**Inspection Level:** Intermittent (Daily)

**Priority:** Medium - Low

**Inspector Experience:** 1 - 3 years of Site Preparation inspection

**Inspection Objective:** Ensure placement and depth of bedding material (fabric) as outlined in specifications.

Before Work Begins	Inspection During Work Activity
<p>Ensure base material prepared according to plans and specifications.</p> <p>Ensure proper use and anchorage of geotextile fabric, if used.</p> <p>Ensure proper class of riprap is utilized for the application.</p> <p>Ensure proper riprap placing techniques are being followed.</p>	<p>Ensure placement and depth of bedding material as outlined in specifications. (Daily-when complete)</p> <p>Ensure fabric is stored and installed properly (Daily)</p> <p>Verify the contractor overlaps the fabric in joints per specification. (Daily)</p> <p>After placing the fabric on the earth grade, the contractor shall not allow traffic or construction equipment to travel on the fabric. (Daily)</p> <p>Verify that finished riprap does not have pockets of small stones and clusters of large stones. (Daily)</p> <p>Ensure to obtain copies of daily notes, and all test results. (Daily)</p> <p>Ensure payment for quantity placed. (Daily-when complete)</p>

## STORM SEWER, PIPE CULVERT, AND SANITARY SEWER

**Specification Reference:** 520, 607, 611  
**Inspection Level:** [Continuous](#)  
**Priority:** High  
**Inspector Experience:** 1 - 5 years of Pipe Installation inspection  
**Inspection Objective:** Ensure uniform foundation, line, grade, size, type, and installation of culvert.

Before Work Begins	Inspection During Work Activity
Before contractor begins excavation verify pipe layout. Verify that Diggers Hotline has been contacted.	Ensure uniform foundation and proper line and grade. ( <a href="#">Continuous</a> ) Verify pipe layout and placement of pipe bedding material and pipe. ( <a href="#">Continuous</a> )
Ensure uniform foundation and proper line and grade.	Ensure placement and depth of bedding material as outlined in specification. ( <a href="#">Continuous</a> ) Ensure pipe is of the correct type and size for the application. ( <a href="#">Continuous</a> )
Verify pipe layout and placement of pipe bedding material and pipe.	Ensure pipe joints installed according to contract. ( <a href="#">Continuous</a> )
Ensure pipe is of the correct type and size for the application.	Ensure pipe joints and fittings are sealed to the degree needed for the type and purpose of the pipe. ( <a href="#">Continuous</a> )
Verify the lengths of pipe required.	Ensure proper compacted cover has been achieved. ( <a href="#">Continuous</a> )
Ensure the pipe manufacturer is on the approved list.	Verify backfill operations, suitability of materials, layer depths, density, and moisture as defined in the specifications. ( <a href="#">Continuous</a> )
Before installing pipe verify type, size, condition and evidence of inspection.	



## UNDERDRAIN

<b>Specification Reference:</b>	612
<b>Inspection Level:</b>	Intermittent (Daily)
<b>Priority:</b>	Medium
<b>Inspector Experience:</b>	1 - 5 years of Pipe Installation inspection
<b>Inspection Objective:</b>	Ensure underdrain conforms to plans, standards, specifications, and contract.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
<p>Before installing pipe verify type, size, and evidence of inspection.</p> <p>Ensure underdrain conforms to plans, standards, specifications, and contract.</p>	<p>Check and document that underdrain is the proper type and that installation and alignment is per plans and specifications. (Daily)</p> <p>Notify the Region Materials Engineer, after installation, for video camera inspection of underdrains and pavement edge drains. (Daily-optional)</p> <p>Record location and quantity. (Daily)</p>

## GUARDRAIL

<b>Specification Reference:</b>	614
<b>Inspection Level:</b>	Intermittent (Daily)
<b>Priority:</b>	Medium
<b>Inspector Experience:</b>	1 - 5 years of Guardrail Installation inspection
<b>Inspection Objective:</b>	Ensure guardrail conforms to plans, standards, specifications and contract requirements.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
<p>Ensure guardrail conforms to plans, standards, specifications and contract requirements.</p> <p>Review post layout and location of each terminal.</p> <p>Verify that guardrail materials are on approved product list.</p>	<p>Verify alignment, site grading, height, proper laps, post spacing, post embedment, bolting, and galvanization for each location. Record location and quantity. (Daily)</p> <p>Ensure beams, posts, and other hardware are not damaged. (Daily)</p> <p>Observe placement and look for possible damage. (Daily)</p>

## FENCING

**Specification Reference:** 616  
**Inspection Level:** Intermittent (Daily)  
**Priority:** Medium - Low  
**Inspector Experience:** 1 - 5 years of Fencing Installation inspection  
**Inspection Objective:** Ensure fencing conforms to plans, standards, specifications, and contract requirements.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
Before installing fencing verify location, type, size, and evidence of inspection.	Verify alignment, gauge, type of wire, spacing of posts, depth of set, tightness and stability of posts, tightness of fabric, grounding and bracing at each location. (Daily)  Sample for testing as required. (Daily)  Record location and quantity. Verify sawn treated wood post received application of end treatment. (Daily)

## PAVEMENT MARKING

**Specification Reference:** 646  
**Inspection Level:** Intermittent (Daily)  
**Priority:** Medium  
**Inspector Experience:** 1 - 5 years of Pavement Marking inspection  
**Inspection Objective:** Ensure markings and markers conform to the contract requirements.

Before Work Begins	Inspection During Work Activity
<p>Verify that pavement surface has been prepared to receive markings and markers.</p> <p>Verify layout and check installation of markings, messages, and markers.</p>	<p>Verify that pavement surface has been prepared to receive markings and markers. (Daily)</p> <p>Verify layout and check installation of markings, messages, and markers. (Daily)</p> <p>At the start of each day and every three hours thereafter: Observe the contractor performing application thickness and bead rate testing, and document. (Daily)</p> <p>After each day's operation: Review and record daily log for temporary and permanent markings and markers. (Daily)</p>

## TOPSOIL & SEEDING

**Specification Reference:** 625, 630

**Inspection Level:** [Intermittent \(Daily\)](#)

**Priority:** Medium - Low

**Inspector Experience:** 1 - 5 years of Landscaping and Site Preparation

**Inspection Objective:** Ensure uniform roughened surface to accept and retain topsoil until vegetative cover is established. Ensure uniform application of seeding as specified in the plans and specifications.

Before Work Begins	Inspection During Work Activity
<p>Ensure grade is within the contract tolerance prior to spreading topsoil.</p>	<p>Verify the topsoil is a minimum depth of 4 inches in rural areas and a minimum depth of 6 inches in urban areas. <a href="#">(Daily)</a></p> <p>Check that topsoil is free of lumps, clods, rocks, and debris. <a href="#">(Daily)</a></p> <p>Topsoil sample may be needed to determine the PH factor. <a href="#">(Daily)</a></p> <p>Where using either sod or seed mixture 40 ensure that, for the upper 2 inches, 100 percent of the material passes a one-inch sieve and at least 90 percent passes the No. 10 sieve. <a href="#">(Daily)</a></p> <p>Verify roughened surface to receive topsoil or seed. <a href="#">(Daily)</a></p> <p>Verify seed mixture is in accordance with the contract requirements. <a href="#">(Daily)</a></p> <p>Check and document seeding application rate. <a href="#">(Daily)</a></p>

## PLANTING

<b>Specification Reference:</b>	632
<b>Inspection Level:</b>	Intermittent (Daily)
<b>Priority:</b>	Medium - Low
<b>Inspector Experience:</b>	1 - 3 years of Landscaping and Site Preparation
<b>Inspection Objective:</b>	Ensure that each location is in accordance with the plans and does not conflict with underground obstructions or traffic signs.

<b>Before Work Begins</b>	<b>Inspection During Work Activity</b>
<p>Inspect layout of plant locations and beds before digging pits and cultivating.</p> <p>Inspect pits and beds for compliance with specifications before installation of plants.</p> <p>If necessary, obtain approval of region environmental personnel of all plants.</p>	<p>Ensure that pits and beds have been prepared in accordance with the plans and specifications. (Daily)</p> <p>Ensure that plants are living and have been installed according to the plans and specifications. (Daily)</p> <p>Ensure that plants, pits, and beds are maintained to achieve healthy growth until the end of the establishment period. (Daily)</p>

## CONCRETE BASES

**Specification Reference:** 654

**Inspection Level:** Intermittent (Daily)

**Priority:** High

**Inspector Experience:** 2 - 5 years of Concrete Base and Bolting inspection

**Inspection Objective:** Ensure that each location is in accordance with the plans and does not conflict with underground obstructions or traffic signs.

Before Work Begins	Inspection During Work Activity
<p>Verify locations of bases.</p> <p>Verify that Diggers Hotline has been contacted prior to excavation.</p>	<p>Verify bases are excavated by the use of a circular auger. (Daily)</p> <p>Verify placement of forms and reinforcement steel. (Daily)</p> <p>Verify the contractor is protecting anchor bolt threads above the top of the foundation level from concrete splash. (Daily)</p> <p>Ensure concrete placement is per the specifications and required testing is performed. (Daily-as needed)</p> <p>Verify the anchor bolts are not misaligned greater than 1:40 from vertical. (Daily)</p> <p>Verify top layer of the base is trowel finished and level. (Daily)</p> <p>Ensure exposed portions of concrete footing are cured in accordance with the contract. (Daily)</p> <p>Before placing a load on the base, verify that proper curing time or strength requirement has been met. (Daily)</p>

## TEMPORARY STRUCTURES

**Specification Reference:** 526

**Inspection Level:** Intermittent (Daily)

**Priority:** Medium - High

**Inspector Experience:** 2 - 5 years of Structure inspection

**Inspection Objective:** Ensure the temporary structure is conforming to the National Bridge Inspection Standard (NBIS) before opening to traffic

Before Work Begins	Inspection During Work Activity
Ensure that plans and/or shop drawings have been submitted.	Ensure to obtain copies of Bridge Inspection Report, daily notes, and other completed contractor reports. (Daily)
Ensure the contractor obtains all necessary permits as specified in 107.3.	Check foundation, bedding material, and grades for conformance with specifications. If foundation is questionable, contact Region Soils Engineer. (Daily)
Ensure that the temporary structure does not constrict stream flow during use.	Inspect and document any pile driving operations. (Daily)
Verify the basic design criteria providing for a 5 year frequency storm with 6 inches of backwater.	Verify that proper splicing methods are being used. (Daily)
Verify the minimum roadway width.	Check and document proper fit of bearing assemblies, clearances, and vertical installation of structural steel and concrete beams. (Daily)
	Verify that contractor performs field rotational test on bolts. Ensure that proper nut, washer, and bolt combination is used, and that bolts have required torque. (Daily)



## BRIDGES

**Specification Reference:** 502, 503, 505, 512, 550  
**Inspection Level:** Intermittent (Daily), Continuous  
**Priority:** High  
**Inspector Experience:** 2 - 5 years of Structure inspection  
**Inspection Objective:** Ensure the structure is conforming to the contract.

Before Work Begins	Inspection During Work Activity
<p>Ensure the contractor obtains all necessary permits as specified in 107.3.</p>	<p>If existing girders are to remain in place, verify that no damage is occurring to the girders during deck removal operations. (Daily)</p> <p>Measure and record quantitative data and sketch and compute minor structural excavation, if applicable. (Daily)</p> <p>Check foundation, bedding material, and grades for conformance with specifications. If foundation is questionable, contact Region Soils Engineer. (Daily)</p> <p>Inspect and document any pile driving operations. Verify that proper splicing methods are being used. (Continuous)</p> <p>Check and document line, grade, elevation, dimensions, condition of forms, bracing, ties, bolsters, and location of steel bar reinforcement. (Daily)</p> <p>Check and document beam seat bearing areas for line and grade. Check and document proper fit of bearing assemblies, clearances, and vertical installation of structural steel and concrete beams. (Daily)</p> <p>Verify that contractor performs field rotational test and that proper nut, washer, and bolt combination is used, and that bolts have required torque. (Daily)</p> <p>Prior to placing deck concrete, verify the steel reinforcement clearances and deck thickness with a finishing machine dry-run. (Intermittent-as needed)</p> <p>Determine and record if weather conditions are conducive for concrete placement. (Daily)</p>

## BRIDGES (Continued)

**Specification Reference:** 502, 503, 505, 512, 550  
**Inspection Level:** Intermittent (Daily), Continuous  
**Priority:** High  
**Inspector Experience:** 2 - 5 years of Structure inspection  
**Inspection Objective:** Ensure the structure is conforming to the contract.

Before Work Begins	Inspection During Work Activity
	<p>Check and document type of mix, truck delivery operation, and placing, consolidation, texturing, curing and protecting operations. (Continuous)</p> <p>For underwater concrete placement, ensure the operation follows the specification requirements. (Continuous)</p> <p>Verify that the delivery time of each concrete load meets specifications. Cast strength specimens and perform required slump, temperature, and air content tests; and reject concrete mix that does not meet the materials specifications. (Continuous)</p> <p>Ensure concrete deck thickness is per contract requirements. (Continuous)</p> <p>Ensure the specified surface finish is applied. (Continuous)</p> <p>Ensure the proper curing method is applied in accordance with the contract. For bridge deck concrete, verify timely application of fogging and wet cure methods. (Continuous)</p> <p>BEFORE beginning backfill operations:</p> <ul style="list-style-type: none"> <li>• Verify that required concrete strength has been obtained. (Daily)</li> <li>• Check and document suitability of backfill materials, depth of layers, density and moisture. (Daily)</li> <li>• Perform sampling and testing as required. (Daily)</li> </ul> <p>After completion of the structure, contact the Region bridge engineer for final inspection.</p>

## BRIDGE PAINTING

**Specification Reference:** 506  
**Inspection Level:** Intermittent (Daily)  
**Priority:** Medium  
**Inspector Experience:** 2 - 5 years of Structure Painting inspection  
**Inspection Objective:** Ensure proper bridge cleaning and painting.

Before Work Begins	Inspection During Work Activity
<p>Check and document materials requirements, sand blasting, collection of waste materials, painting.</p>	<p>Ensure proper enclosures. (Daily)</p> <p>Ensure paint removal &amp; hazmat waste handling meet the contract requirements. (Daily)</p> <p>Ensure proper cleaning and painting of misc. items: haunches, expansion devices, bearings, floor drains, railings, etc. Verify removal of rust, mill scale, dirt, oil, or grease and other foreign substances. (Daily)</p> <p>Notify Bureau of Structures of any steel or structural defects. (Daily)</p> <p>Verify and record field condition (temperature, humidity, wind, etc.). (Daily)</p> <p>Ensure paint type is in accordance with the contract. (Daily)</p> <p>Ensure paint thickness, etc. meets the contract requirements. (Daily)</p>

## TRAFFIC SIGNING

**Specification Reference:** 637

**Inspection Level:** Intermittent (Daily)

**Priority:** Medium

**Inspector Experience:** 2 - 5 years of Traffic Signing inspection

**Inspection Objective:** Ensure sign panels and support systems are manufactured and assembled in accordance with the plans, standards, specifications, and shop drawings.

Before Work Begins	Inspection During Work Activity
<p>Inspect condition of sign panels and supports and any allowable repairs that have been made.</p>	<p>Ensure contractor has staked each sign location and that the sign location meets field conditions and does not conflict with underground obstructions or other traffic signs. (Daily)</p> <p>Ensure footing or caisson conforms to the shop drawings or standard detail for each sign location. (Daily)</p> <p>Ensure placement of forms, reinforcing steel, conduits, and anchor bolts are in accordance with the plans, standards, and approved shop drawings. (Daily)</p> <p>Ensure concrete is placed according to plans and specifications. (Daily)</p> <p>Ensure uniform compaction as required by specifications. (Daily)</p> <p>Ensure conduit, wiring, electrical service, and illumination is in accordance with the plans, standards, specifications, and approved shop drawings. (Daily)</p> <p>For ground mounted breakaway signs, ensure the bolts have been torqued as specified in the plans. (Daily)</p> <p>Perform and document nighttime inspection to verify that sign has proper illumination. (Daily)</p>

## TRAFFIC SIGNALS and ELECTRICAL

**Specification Reference:** 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661

**Inspection Level:** Intermittent (Daily)

**Priority:** Medium

**Inspector Experience:** 2 - 5 years of Traffic Signals and Electrical inspection

**Inspection Objective:** Ensure all materials and electrical work are in accordance with the plans, standards, specifications, and approved shop drawings.

Before Work Begins	Inspection During Work Activity
<p>Ensure that submission of shop drawings has occurred and that necessary reviews have occurred by the Regional Traffic Engineer.</p> <p>Ensure contractor has staked each signal pole location and that the pole location meets field conditions and does not conflict with underground obstructions or other traffic signs.</p>	<p>Ensure the electrical workers meet the contract requirements for Journey worker electrician or apprenticeship. (Daily-as needed)</p> <p>Ensure footing or caisson conforms to the approved shop drawings or standard for each sign location. (Daily)</p> <p>Ensure placement of forms, reinforcing steel, conduits, and anchor bolts are in accordance with the plans, standards, and approved shop drawings. (Daily)</p> <p>Ensure concrete is placed according to plans and specifications. (Daily)</p> <p>Ensure uniform compaction as required by specifications. (Daily)</p> <p>Ensure conduit, wiring, electrical service, and illumination is in accordance with the plans, standards, specifications, and shop drawings. (Daily)</p>