

**SPECIFICATION
AMENDMENTS
FOR
HIGHWAY AND BRIDGE
CONSTRUCTION**

**(Supplemental to the Standard Specifications for Highway
Construction Manual, Edition 11, 2003 and Standard
Specifications for Bridge Construction 2003)**

**Prepared by
Alberta Transportation
Edmonton, Alberta**

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PRIORITY LINE PAINTING FOR SITE OCCUPANCY

.1 SITE OCCUPANCY

In accordance with Section 1.2.21.7, Completion of Line Painting and for the purposes of calculating calendar days for site occupancy, this project will be considered a Priority Line Painting project.

NON-PRIORITY LINE PAINTING FOR SITE OCCUPANCY

.1 SITE OCCUPANCY

In accordance with Section 1.2.21.7, Completion of Line Painting and for the purposes of calculating calendar days for site occupancy, this project will be considered a Non-Priority Line Painting project.

CONSTRUCTION STAKING AND SURVEY BY CONTRACTOR

- .1 FOR ASPHALT CONCRETE PAVEMENT- EPS OR COMBINED GRANULAR BASE COURSE, ASPHALT CONCRETE PAVEMENT- EPS PROJECTS OR OTHER APPLICABLE PROJECTS WHERE MEASUREMENT OF EXCAVATION QUANTITIES AS DETAILED IN SPECIFICATION 2.3, GRADING IS NOT REQUIRED**

Insert the following at the beginning of Section 1.2.31, Stakes, Marks and Engineering Tests:

The Consultant will indicate the beginning and end of the project and sufficient reference points and other information for horizontal and vertical control, to be used by the Contractor for his detailed layout. This information will include, if available, radii and lengths of curves, design superelevations, pavement widths, and centreline deflection points. The Contractor shall protect and shall not remove or destroy, or permit to be removed or destroyed, the stakes or marks set as reference points by the Consultant.

Subsequent to the initial reference points staking performed by the Consultant, the Contractor shall perform all layout, survey and construction staking necessary to meet specified requirements for any type of construction.

The Contractor's detailed survey layout for base course construction shall include a complete base-line displaying project stationing at 20 m intervals suitable for referencing test locations and for purposes of measurement for payment. For Asphalt Concrete Pavement overlay projects, the base-line shall display project stationing at 30 m intervals.

Layout for interim lane markings, including those for intersection treatments, shall be performed by the Contractor at his own cost.

The cost of all survey and construction staking performed by the Contractor shall be incidental to the Work and will not be paid for separately.

CONSTRUCTION STAKING AND SURVEY BY CONSULTANT

.1 FOR PROJECTS WITH A MAJOR GRADING COMPONENT WHERE MEASUREMENT OF EXCAVATION QUANTITIES AS DETAILED IN SPECIFICATION 2.3, GRADING IS NECESSARY

Insert the following at the beginning of Section 1.2.31, Stakes, Marks and Engineering Tests:

Stakes or marks will be set by the Consultant to define the location, alignment, elevation, and grade required for the Work. The Contractor shall give the Consultant ample notice of the time and place where the stakes or marks will be needed. The Contractor shall protect, and shall not remove or destroy or permit to be removed or destroyed, the stakes or marks placed on or about the Work by the Consultant.

The Contractor shall satisfy himself before commencing the Work as to the correctness and meaning of all stakes and marks.

Initially, the Consultant will provide complete baseline survey stakes at 20 m intervals which show offsets and metric station numbers or kilometre chainages that correspond to the control section. Additional baselines may be warranted depending on the complexity and terrain of the project. At least one baseline will note elevations above or below the shoulder grade. Work stakes will indicate backslope and/or sideslope cut and fills left and right of centerline.

Culvert locations will be staked by the Consultant noting the location of culvert ends, invert elevations, sizes and lengths.

Bridge fills will be staked by the Consultant in accordance with the applicable standard drawing(s).

The Contractor shall perform any further required survey to complete and prepare the roadway for final grade stakes.

When the Contractor determines that the roadway is sufficiently completed and prepared for final grading, he shall request that the Consultant provide final grade stakes. The Consultant will provide a maximum of two sets of final grade stakes.

Notwithstanding these provisions, layout for interim lane markings, including those for intersection treatment, shall be performed by the Contractor at his own cost.

SIDE SLOPE IMPROVEMENT

The grading portion of this Contract includes reconstruction of the sideslopes in the areas as shown on the plans, drawings or as specified by the Consultant.

The Consultant may adjust ditch elevations and sideslope ratio to ensure positive drainage.

1. Materials

The Consultant will estimate the amount of embankment material required to perform the Work and will determine possible availability within the right-of-way. When possible sources of sideslope material are indicated in the special provisions, the material will be considered Department Supply. Otherwise, all required sideslope embankment material will be considered Contractor Supply. The amount of excavation or fill amount required will vary according to the typical cross sections shown on the mosaic.

Indication of the availability of material by the Department does not guarantee the quantity or suitability of the material and Bidders are advised that only material approved by the Consultant at the time of construction may be used. Department Supply material which is found unsuitable at the time of construction shall be replaced with approved material by the Contractor and this will not be considered as a basis for claim.

.1 Department Supply

Generally, Department Supply materials shall be obtained from reshaping ditches and backslopes or from designated borrow sources. Unless otherwise indicated in the special provisions, all suitable material from within the right-of-way shall be used prior to obtaining material from borrow sources.

.2 Contractor Supply

When the Contract does not specify that material is available from a Department Source, the Contractor shall supply all embankment material required for the sidesloping work from sources of his own choosing. Only material approved by the Consultant may be used.

.1 Construction

Prior to modifying the existing sideslopes, the Contractor shall denude the sideslopes of all vegetation and topsoil and windrow this material.

To ensure a proper bond between the existing and new material, the denuded sideslopes shall be scarified to a depth of 150 mm, or as approved by the Consultant. Embankment material as required, shall be added and compacted to the satisfaction of the Consultant. Typical compaction equipment (eg. packers) will not normally be required.

The Contractor shall perform the sidesloping work so that there is sufficient width available to construct base course and/or asphalt concrete pavement to the depths indicated on the plans and to maintain a consistent finished pavement width with uniform sideslope configuration for the full height of the highway grade, all as shown on the plans.

Existing guardrail shall be removed and then reinstalled after the completion of the work.

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Existing culverts shall be extended or shortened or grouted as noted on the plans or as determined by the Consultant.

The Contractor shall keep the roadway surface free of dirt and debris during sidesloping work. Equipment shall not be driven over culvert ends. Material placement and trimming shall be done by methods approved by the Consultant.

The Contractor shall remove and dispose of any rocks and debris within the sidesloping area larger than 100 mm in diameter. Any posts that are removed or damaged as a result of this work shall be replaced at the Contractor's expense.

Upon completion of the sidesloping work, the Contractor shall uniformly redistribute the windrowed vegetation and topsoil material on the finished sideslopes. All disturbed areas shall be seeded in accordance with Specification 2.20, Seeding.

.2 Measurement and Payment

Sideslope improvement work will be measured by the actual kilometres per side to the nearest 0.1 km as determined by the Consultant.

Payment for sideslope improvement will be made at the unit price bid per kilometre for "Sideslope Improvement" and will include denuding the sideslopes of vegetation and topsoil, supply of borrow material, excavating, loading, hauling, placing, finishing, redistribution of denuded topsoil, seeding and all equipment tools, labour and incidentals necessary to complete the work.

All other work including extending culverts and removing and reinstalling signs, guideposts and guardrail will be paid for at the applicable unit prices bid.

**AMENDMENT TO SPECIFICATIONS 2.3 GRADING, 3.1, SUBGRADE
PREPARATION AND ALL BASE COURSE SPECIFICATIONS
REGARDING TOLERANCE FOR SURFACE FINISH**

1. GENERAL

The finished surfaces constructed under this contract are subject to tolerances for elevation, slope and width. These tolerances shall apply to the following:

- (i) the finished subgrade surface;
- (ii) the finished surface of Granular Base Course, Cement Stabilized Base Course and Asphalt Stabilized Base Course; and
- (iii) embankment sideslope and ditches.

All surfaces shall be built true to grade, cross-section and alignment with consistent, uniformly contoured surfaces. Furthermore, the finished roadway grade, alignment and widths shall tie neatly into fixed control points such as bridge abutments, railway crossings, grade intersections, etc. to the satisfaction of the Consultant.

2. TOLERANCES FOR ALL TYPES OF GRADING AND BASE COURSE WORK

The Contractor shall produce all finished surfaces to achieve or exceed the grade, slope and width tolerance limits as follows:

.1 SURFACE TOLERANCE AT BASE LINE STATIONS

The deviation of the finished surface from the corresponding design elevation will be determined by the Consultant at each station. The maximum allowable deviation from the design elevation at any point will be ± 30 mm for subgrade surfaces and ± 20 mm for base course surfaces.

Furthermore, the maximum difference in deviation between consecutive stations at the same offset, shall not be more than 30 mm for subgrade surfaces and 20 mm for any type of base course surface.

.2 SLOPE TOLERANCE LIMITS

The Consultant will determine the roadway slope using the elevations at centerline and edge of shoulder at any location on the finished surface that he determines necessary. These measured slopes shall be considered Slope Reference Lines.

For projects consisting of combined Grading/Granular Base Course Work or Base Course Work only, the Slope Reference Line at any location on a finished surface shall not deviate from the design slope by more than 0.25%.

For projects consisting of Grading Work only, the Slope Reference Line at any location on a finished surface shall not deviate from the design slope by more than 0.5%.

Furthermore, for all types of Work, no point on the surface shall deviate in elevation by more than 15 mm from the Slope Reference Line as determined.

.3 SURFACE WIDTH TOLERANCE LIMITS

The finished surface, as measured from shoulder edge to shoulder edge, shall not be wider by more than 0.1 m or narrower by more than 0.05 m from the design width as determined by the Consultant.

.4 ROAD SIDE SLOPE TOLERANCE LIMITS

At any location, no part of any finished side slope shall deviate from the design side slope by more than ± 0.2 m/m.

.5 ROAD DITCH WIDTH TOLERANCE LIMITS

At any location, the ditch width shall not deviate by more than 0.2 m from the design or as approved by the Consultant.

The tolerance limits for Road Side Slope and Road Ditch Width only apply when the Contract calls for Grading Work.

3. MEASUREMENT

The Consultant will take as many measurements as he thinks necessary to establish compliance with this specification and may vary the general interval, particularly where the finished surface is evidently not plane between stations or across the travel lanes. The Department will make no charge for initial measurements. Where compliance with surface tolerance requirements is not initially achieved, reworking will be required. After the surfaces are reworked, the Consultant will determine if remeasuring to confirm compliance is required. If the Consultant performs remeasure and the surfaces are not in compliance, the Contractor will be charged an amount of \$500.00 per occurrence and further reworking shall be required. An "occurrence" will be considered a day or portion of a day in which remeasuring to verify compliance is performed. If the Consultant performs remeasure and the reworked surfaces are in compliance, no charge will be made for the remeasure.

For Granular Base Course projects, no payment will be made for any granular material placed outside the specified tolerance limits for Surface Width and Road Side Slope, with the exception that for Grade Widening projects where there is a need to initially construct the granular base course to a width that will accommodate construction equipment, the Consultant and Contractor shall agree on the allowable tolerances for construction and payment purposes.

In any cases where granular base course material is placed outside the specified or allowable tolerances, as the case may be, such quantity will be determined by the Consultant.

SUPPLY OF PLASTIC GUARDRAIL POSTS - CONTRACTOR'S OPTION

The Contractor has the option of supplying plastic guardrail posts in place of wooden posts except for the following locations:

- At any installation on Highway 2 between Edmonton and Calgary,
- On strong post system installations at bridge abutments or
- At any other installation specifically prohibited by the Consultant

.1 In Specification 5.25, Add a new Sub-section as follows:

5.25.3.4 Plastic Guardrail Posts

Plastic Guardrail Posts shall be supplied in accordance with the Alberta Transportation Recognized Products List as shown on the Department's web pages and the following:

Plastic posts shall be stamped at the top of the post on a surface not used for rail attachment with:

- the identifying product number or code, and
- the year of manufacture.

These markings shall be legible throughout the normal service life of the post. The Contractor shall supply the Consultant with certification from the supplier that the plastic posts conform with the specifications.

.2 In Specification 2.19, Guardrail and Guide Posts, add the following new section:

2.19.4.6 Supplying and Installing Plastic Guardrail Posts

If the Contractor elects to install plastic posts instead of wooden posts, the Department will make a premium payment of \$ 2.50 for each plastic guardrail post supplied and installed. This premium will be paid in addition to the unit price bid for the applicable supply and install guardrail bid item.

CHANGES TO DESIGNED GRANULAR BASE COURSE GRADATION

This Contract specifies the use of Designation 2 Class 25 material for Granular Base Course. The Contractor has the option of supplying Designation 2 Class 20 material providing it meets the requirements of the Specifications.

If the Contractor chooses to supply Designation 2 Class 20 in place of Designation 2 Class 25 material for granular base course material, payment will be made at the unit price bid for Designation 2 Class 25.

The Contractor shall advise the Consultant which material (2-20 or 2-25) he will be producing prior to commencing his crushing operations. If the Contractor decides to change materials at any time during his crushing operations, he shall immediately advise the Consultant and stockpile the new material separately from any previously crushed material. In cases where the Contractor elects to use more than one material he shall, prior to hauling, keep the Consultant informed which material is being hauled on a daily basis. No intermixing of materials will be allowed at any time.

HOT IN-PLACE RECYCLED ASPHALT CONCRETE PAVEMENT - EPS

.1 GENERAL

This specification is to be used only for pavement to be processed using the Hot In-Place Recycling (HIR) technology and serves as a supplement to Specification 3.50, Asphalt Concrete Pavement - End Product Specification (EPS). Specification changes have been made recognizing the unique characteristics of mixes processed using this technology. In case of conflict between this special provision and Specification 3.50, this special provision shall govern. References to Asphalt Concrete Pavement in Specification 3.50, except where noted in this special provision, shall also apply to Hot In-Place Recycling.

.2 HOT IN-PLACE RECYCLING (HIR)

Hot In-Place Recycling shall consist of heating the existing asphalt concrete pavement; milling the heated pavement; mixing the milled material; adding as directed, admix, or rejuvenating agent and spreading and compacting the resultant mixture, all in one continuous operation, to the depths, lines, grades and dimensions shown on the plans or as designated by the Consultant.

.3 CHANGES TO SPECIFICATION 3.50

.1 In Section 3.50.1.2 Definitions make the following changes:

.1 Remove definition 3.50.1.2.1 Acceptance Limits (i) Density and Actual Asphalt Content and replace with:

(i) Density, Marshall Air Voids and Recovered Asphalt Penetration

Acceptance Limit for Density, Marshall Air Voids and Recovered Asphalt Penetration is the limiting value of the Sample Mean beyond which a Lot is accepted at full, increased or reduced payment as shown in Tables 6, 7 and 8.

.2 In Section 3.50.1.2.1 Acceptance Limits remove (iii) Gradation.

.3 Replace Section 3.50.1.2.5 Lot with the following:

A Lot is a portion of the Work being considered for acceptance and is generally considered to represent 3 lane-kilometres of production, but can vary in length, according to project specific requirements, within the limits of 1 lane.km to 4 lane-kilometres. The actual Lot size is to be chosen by the Consultant.

A change in any one of the following may require a new Lot designation:

- (a) Mix design
- (b) Pavement Density Requirement

.4 In Section 3.50.1.2.6 Rejection Limit remove (i) Density and Asphalt Content and replace with:

(i) Density, Marshall Air Voids and Asphalt Penetration - Rejection Limit for density, Marshall air voids and asphalt penetration is the limiting value of the Sample Mean beyond which a Lot is rejected and not paid for as shown in Tables 6, 7 and 8.

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.5 In Section 3.50.1.2.6 Rejection Limit remove (iii) Gradation.

.6 Add the following to Section 3.50.1.2 Definitions:

3.50.1.2.14 Admix

Aggregate, with sufficient asphalt cement added to produce a uniform completely coated mixture that is added during the recycling process to improve the engineering characteristics of the HIR mix.

3.50.1.2.15 Segment

For the purposes of acceptance sampling and testing for Pavement Density, a Lot is divided into 5 or more segments of approximately equal area.

.2 Remove the contents of Section 3.50.2.1 Asphalt and replace with:

The Contractor shall supply asphalt material for pre-coating of the admix in accordance with Specification 5.7, Supply of Asphalt.

.3 Remove the first sentence of Section 3.50.2.2 Aggregate and replace with:

The Contractor shall supply aggregate in accordance with Specification 3.2 Aggregate Production and Stockpiling according to the Admix Aggregate Requirements outlined in Table 2 HIR Mix Types and Characteristics

.4 Add the following Section to 3.50.2 MATERIALS

3.50.2.5 **Rejuvenating Agent**

An asphalt rejuvenating agent or asphalt shall be provided and added by the Contractor, when required, to result in the recycled asphalt cement meeting the specified penetration criteria.

Only asphalt rejuvenating agents listed within the Department's Recognized Products List shall be used by the Contractor.

Any asphalt rejuvenating agent used by the Contractor shall meet the applicable manufacturer's specifications.

Supplements, Amendments, Modifications and Provisions

.5 In Section 3.50.3 ASPHALT MIX DESIGN AND JOB MIX FORMULA

.1 Replace Table 3.50.3.2 with Table 1

Table 1 HIR Mix Types and Characteristics

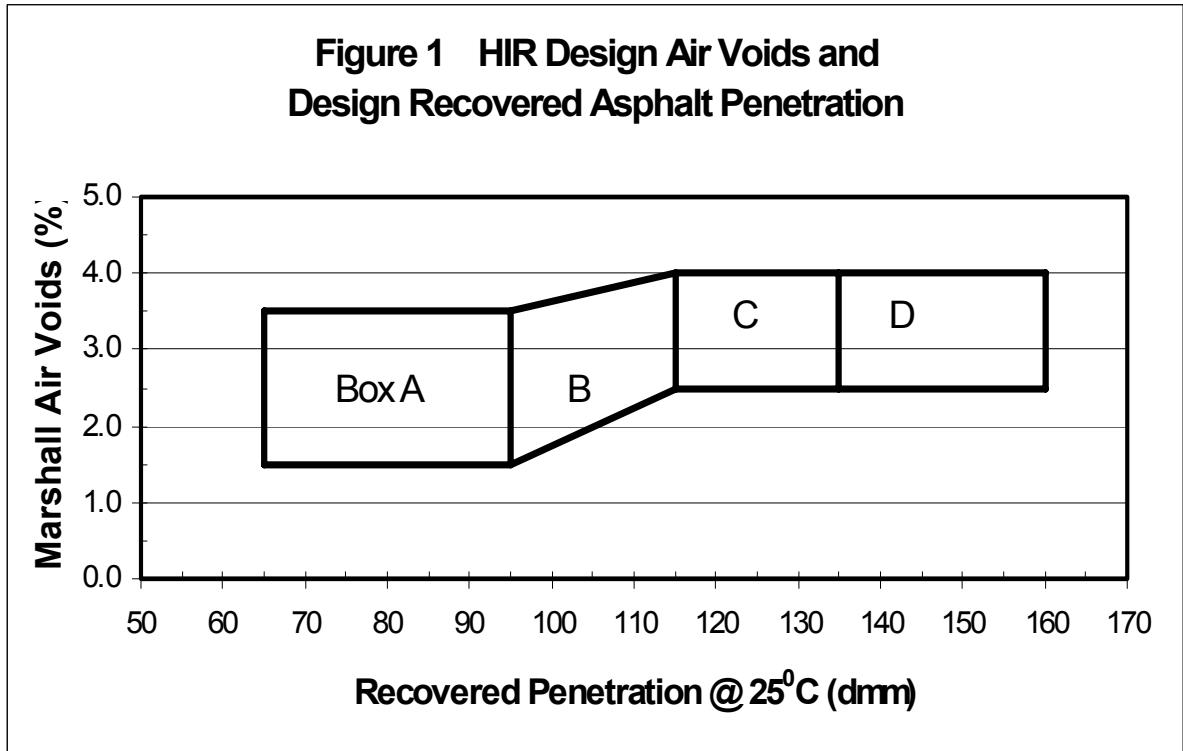
Mix Type (Note 4)	Recovered Asphalt Penetration (dmm) (Note 1)	Admix Aggregate Requirements		Air Voids (%) (Note 3) refer to Figure 1 for Box Boundaries	Marshall Stability	
		Plasticity Index (PI)	Maximum Passing 80 μm Sieve (%) (Note 2)		Minimum (N)	Minimum % Retained
HR1	65 to 135	NP	10	A, B & C	8 000	70
HR1C	95 to 135	NP	10	B & C	8 000	70
HR2	65 to 160	NP	10	A, B, C & D	6 000	70
HR2C	115 to 160	NP	10	C & D	6 000	70

Note 1 Recovered Asphalt Penetration requirements are for the combined asphalt including any rejuvenating agent or virgin asphalt.

Note 2 If the admix is a manufactured fines aggregate the maximum limit for percent passing the 80 μm sieve shall be 13%.

Note 3 Air voids shall be determined on the basis of maximum specific gravities at each asphalt content. Marshall briquettes shall be formed using 75 blows per face at a compaction temperature of 130°C.

Note 4 HIR Mix Type shall be as listed in the special provisions.



.6 In Section 3.50.3.3 Verification of Mix Design make the following changes:

.1 Remove items (i), (ii), (iii), (iv), (v) and (vi) and replace with the following:

- (i) The aggregate type and amount of any admix added by weight of total mix.
- (ii) The aggregate gradation of any admix used and the other aggregate characteristics for admix as specified in Table 2 HIR Mix Types and Characteristics.
- (iii) The type of asphalt cement grade and percent asphalt content added to the admix.
- (iv) Other aggregate characteristics of the admixture as specified in Table 1 HIR Mix Types and Characteristics.
- (v) Test data of the existing pavement used in the preparation of the mix design, including sampling locations, aggregate gradations, asphalt contents and penetrations @25°C (100 g, 5 s) of the existing asphalt cement.
- (vi) Identification of type and quantities of any asphalt rejuvenating agent required.
- (vii) All Marshall mix design characteristics as specified in Table 1 HIR Mix Types and Characteristics including the aggregate gradation of the recycled mix including admix where applicable.

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.2 Add the following to the end of the fourth paragraph:

For HIR mix the Consultant may, at any time, require the Contractor to provide representative samples of each of the aggregate components or existing pavement material for verification purposes. A sufficient quantity of each component shall be provided to result in a 10 kg sample of recycled material and no individual component shall be less than 5 kg.

.3 Add the following paragraph:

The addition rate of admix and rejuvenating agent for the approved mix design will then be the Job Mix Formula for the production of HIR mix.

.7 Remove the first three paragraphs of Section 3.50.3.4 Variation from Approved Job Mix Formula and add the following:

After the Consultant has accepted the HIR mix design, the combined aggregate gradation in the accepted design shall become the Design Combined Aggregate Gradation. The difference between the Lot Average Gradation and the Design Combined Aggregate Gradation shall not exceed the amounts shown in Table 2. Deviations outside the permissible limits shown in Table 2 will be evaluated by the Consultant to determine if a new mix design is required.

Table 2 HIR GRADATION VARIATION

SIEVE DESIGNATION	MAXIMUM PERMISSIBLE VARIATION PERCENT BY WEIGHT PASSING
5000	±6
1250	±5
630	±4
315	±3.5
160	±3.0
80	±2.5

.8 In Table 3.50.4.2 Test Methods make the following changes:

.1 Add "ASTM D3203" under test method for Test Description No. 9. Voids Calculation, Asphalt Concrete Specimens.

.2 Add the following:

18	Asphalt Recovery from Solution by the Abson Method	ASTM D1856
19	Standard Penetration Test for Asphalt	ASTM D5
20	Theoretical Maximum Specific Gravity, Asphalt Mix	ASTM D2041

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.9 Add the following to Section 3.50.4.3 Quality Control Testing

The quality control testing requirements for HIR shall be as outlined in Table 3 QUALITY CONTROL TESTING REQUIREMENTS - HOT IN-PLACE RECYCLING.

Table 3 Quality Control Testing Requirements
Hot In-place Recycling

TEST	STANDARD	MINIMUM FREQUENCY
AGGREGATE PRODUCTION		See Specification 3.2
EQUIPMENT CALIBRATION	Determined by Contractor	Once per project or as required
SAMPLES		
1. Admix	ATT-38	(1)
2. HIR mix	ATT-38	One per lane·km
3. QA Cores for Pavement Density - Stratified Random Test Sites Chosen by the Consultant	ATT-56, ATT-5	Five per Lot
EQUIPMENT INSPECTION	Determined by Contractor (2)	Four per day
TESTING WITH NO SPECIFIED MINIMUM FREQUENCIES		
1 Asphalt Content of Admix and HIR mix	AASHTO T-164, T287 or ATT-12 or ATT-74	(1)
2 Moisture Content of Admix and HIR mix	ATT-15	(1)
3. Field Formed Marshall Briquettes	ATT-13	(1)
4. Abson Extraction of HIR mix	ASTM D1856	(1)
5. Standard Penetration of Recovered Asphalt	ASTM D5	(1)
TESTING WITH SPECIFIED MINIMUM FREQUENCIES		
1 Aggregate Extraction or Ignition Sieve Analysis of HIR mix.	ATT-26	One per HIR mix sample
OTHER RELATED TESTS		
1. Density Immersion Method, Saturated Surface Dry	ATT-7	(1)
2. Temperatures	ATT-30	(1)
3 Extraction Sieve Analysis of Admix	ATT-26	(1)
4. Void Calculations, Cores or Formed Specimens	ASTM 3203 (3)	(1)
5. Coring or Nuclear Density	ATT-5 or ATT-11 (3)	(1)
6 Percent Compaction, Asphalt Concrete Pavement	ATT-67 or ATT-11	(1)
7 Random Test Site Locations	ATT-56	As applicable

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TEST	STANDARD	MINIMUM FREQUENCY
8. Correction Factors, Nuclear Moisture-Density Measurement	ATT-48	(1)
9. Thickness Measurement of Un-compacted Mat	ASTM D2041	Minimum of one per hour of production
10 Theoretical Maximum Specific Gravity of Bituminous Mixes		(1)
Notes: (1) Minimum Frequency not specified. (2) To include checks on the addition rate of any asphalt rejuvenating agent and/or admix used. (3) Percent compaction and core air voids based upon the Lot Mean Maximum Specific Gravity (Gmm). Air voids on Marshall formed specimens to be based upon corresponding individual Gmm tests.		

.10 Make the following changes to Section 3.50.4.4 Acceptance Sampling and Testing

.1 Replace the third paragraph of Section 3.50.4.4.1 with the following:

The Contractor shall provide to the Consultant all quality assurance density cores within 24 hours of receiving the stratified random sample locations. Prior to obtaining the cores, the Consultant may provide the Contractor with new or different random sample locations. The Consultant may have the Contractor obtain quality assurance cores at any time throughout the project for any Lot. All cores provided to the Consultant shall be in their original condition. Core preparation or sawing shall be done by the Consultant.

All costs associated with pavement coring for quality control and quality assurance testing shall be the responsibility of the Contractor.

.2 Add the following to Section 3.50.4.4.1 General

If the testing equipment malfunction, improper testing procedures or calculations were on the part of the Consultant, the Contractor shall be reimbursed \$50 per location for obtaining cores.

.3 In Section 3.50.4.4.2.1 Pavement Sampling for Density, Asphalt Content and Gradation change the title to Pavement Sampling for Density.

.4 Delete the contents of 3.50.4.4.2.3 Asphalt Mix Sampling and replace with the following:

Sampling of the recycled asphalt mixture for the formation of Marshall briquettes, mix extraction, determination of the maximum specific gravity, air voids determination and penetration testing of the recovered asphalt will be done by the Consultant behind the paver as outlined in ATT-37 with the following changes:

For each mix sampling instance, an additional two split samples, of 5 000 g each, will be collected. One of the two split samples will be identified for recovered asphalt penetration testing while the remaining sample will be identified for possible appeal testing of the Lot maximum specific gravity that is used for the determination of the Lot average Marshall Air Voids.

Supplements, Amendments, Modifications and Provisions

.5 Add the following as Section 3.50.4.4.2.5 Recovered Asphalt Penetration

From the group of split samples identified for penetration testing for each lot, one of the 5 000 g samples will be selected for penetration testing of the recovered asphalt. The remaining split samples identified for penetration testing, are to be saved for possible follow-up testing as outlined in the new Section 3.50.4.8.8, Recovered Asphalt Penetration as shown in this specification amendment.

The Consultant may not test every Lot for Recovered Asphalt Penetration if he is satisfied that the requirements for Recovered Asphalt Penetration is being achieved.

.11 Delete all of Section 3.50.4.6 Aggregate Gradation Requirements.

.12 In Section 3.50.4.8 Appeal of Acceptance Test Results and Appeal Testing delete all reference to Asphalt Content and Gradation.

.13 Rename Section 3.50.4.8.4 to be "Payment of Appeal Testing Costs for Smoothness and Marshall Air Voids" and add the following:

Theoretical maximum specific gravity tests for determination of Lot Average Marshall Air Voids: \$100 per test.

.14 Add the following as Section 3.50.4.8.7 Marshall Air Voids

The Contractor may appeal the theoretical maximum specific gravity test results, used to determine the Marshall air voids, of any rejected or penalized lot only once. The appeal shall be for all the theoretical maximum specific gravity tests within the Lot, and there will be no appeal allowed for single tests within a Lot.

No appeal will be allowed for Marshall bulk specific gravity test results.

The following procedure will apply for an appeal:

- (i) The Contractor shall serve notice of the appeal to the Consultant, in writing, within 48 hours of receipt of the QA test results.
- (ii) The appeal testing will consist of retesting for theoretical maximum specific gravity the split mix samples obtained for the appealed lot.
- (iii) The number of split samples shall correspond to the original number of quality assurance mix samples taken in the Lot.
- (iv) The high and low test results from the old Lot will be rejected and all the remaining test results will be added to the results of the new tests. A new mean for the test results will be determined and used for calculating the new average Marshall air voids to be used for acceptance and unit price adjustment.

The new mean, thus determined, in all cases, will be binding on the Contractor and the Department.

.15 Add the following as Section 3.50.4.8.8, Recovered Asphalt Penetration

If the original test result for the penetration of the abson recovered asphalt falls within the range for rejection or penalty, the Consultant will arrange to have the remaining penetration split samples from that Lot tested. The number of split samples shall correspond to the original number of quality assurance mix samples taken in the Lot, less one for the original penetration test.

A new mean including the original test result and subsequent test results will be used for calculating the new average penetration of recovered asphalt for acceptance and unit price adjustment.

The new mean, thus determined, in all cases, will be binding on the Contractor and the Department.

.16 Add the following to Section 3.50.5 CONSTRUCTION

3.50.5.10 Hot In-Place Recycling

Equipment used for hot in-place recycling shall be specifically designed to heat and mill the existing pavement to a minimum depth of 50 mm, thoroughly mix the recycled material and uniformity spread the recycled material. Milling heads are to be used for removing the existing pavement material as opposed to the sole use of scarifier tines which shall not be allowed.

The recycling equipment shall be designed to heat the recycled material to within specified limits without scorching or localized over-heating of any of the recycled material.

The hot in-place recycling equipment shall be equipped with a mixing system capable of continued and consistent mixing. The mixing system must have sufficient capacity to thoroughly mix the recycled material including any admixture and/or rejuvenating agent into a homogeneous mass.

The hot in-place recycling equipment shall be equipped with a vibratory heated screed and strike-off device capable of distributing and placing the recycled mix to the depths and dimensions shown on the typical plans and sections. The temperature of recycled material behind the paver screed shall be greater than 110°C. At no time shall the recycled material be heated over an average material temperature of 150°C in order to avoid excessive oxidation and hardening of the recycled asphalt cement.

The recycler unit shall be equipped to enable admix to be metered into the material being processed at a controlled and uniform rate and in such a manner to ensure that all materials are uniformly mixed with the recycled material. All HIR material, with or without admix, shall be uniformly mixed and coated.

The recycler unit shall be equipped to enable a rejuvenating agent to be uniformly added to the heated and milled mixture. Such equipment shall provide for the following:

- (i) Positive feed and shut-off, interlocked to the movement and processing rate of the recycler.
- (ii) Control of the quantity to ± 0.05 l/m² from the approved target application rate.
- (iii) Measurement of the total volume used by means of a calibrated metering device capable of recording accumulated litres to an accuracy of $\pm 2\%$.

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- (iv) Heating and maintaining the temperature to within $\pm 5^{\circ}\text{C}$ of the temperature recommended by the manufacturer of the rejuvenating agent used.

HIR equipment shall be operated in accordance with the manufacturer's recommendations and shall be calibrated prior to commencing production. The Contractor shall provide the Consultant with calibration data indicating that the hot in-place recycling equipment has been calibrated to produce a uniform mixture in accordance with the Job Mix Formula.

The HIR production has the potential to produce unlawful air emissions unless carried out carefully using the appropriate equipment. In this regard, the Contractor's attention is directed specifically to Section 1.2.51 of the specifications. The Contractor shall have no claim to any exemption from the requirements of Alberta Environment, or to any payment for extra costs resulting from the need to comply with their requirements, by virtue of this Contract or for any other reason.

- .17 Add the following to Section 3.50.5.2.1 General

Pavement surfaces to be recycled shall be cleaned of all dirt, dust, and other objectionable matter. The existing asphalt surface shall be heated a minimum of 0.10 m wider on each side than the width being processed. The processing width shall be as shown on the plans or as determined by the Consultant.

For hot in-place processed material, the requirements for prime coat or tack coat do not apply.

- .18 Add the following to Section 3.50.5.2.3 Transverse Pavement Joints:

At locations where hot in-place recycling is used the preceding joint requirements do not apply, however the Contractor shall ensure that the transition between the treated and untreated surfaces is smooth with no irregularities.

- .19 Make the following changes to Section 3.50.6.2.1 Acceptance at Full or Increased Payment:

- .1 delete sections (ii) and (v)

- .2 add the following

- (vi) the average Marshall Air Voids of the mix is within the applicable limits specified in Table 1 HIR Mix Type and Characteristics.

- (vii) the average penetration of the recovered asphalt is within the limits shown within Table 6 indicating no price adjustment for the applicable HIR mix type.

- .20 In the first paragraph of Section 3.50.6.3 End Product Rejection replace the words "actual asphalt content or aggregate gradation" with "Marshall air voids or penetration of recovered asphalt".

- .21 In Section 3.50.7 Measurement and Payment, replace Section 3.50.7.1 with the following:

3.50.7.1 HIR Pavement

Accepted HIR Pavement will be measured in square metres as determined by the actual treatment width and length measured according to the established baseline survey and will be paid for at the unit price bid per square metre for "HIR Pavement - EPS" subject to the unit price adjustments and assessments hereinafter specified. This payment will be full compensation for all labour, equipment, tools and incidentals necessary to complete the work in accordance with the Special Provisions in the Contract and shall include heating, milling, mixing, laying and compacting the recycled asphalt mixture; supplying and adding admix; aggregate supply and processing; supplying and adding rejuvenating agent or virgin asphalt; interim lane markings; quality control testing including sampling of quality assurance cores and traffic accommodation.

.22 In Section 3.50.7.1.1 Pay For Acceptable Work make the following changes:

.1 Delete the first six paragraphs and replace with the following:

The following end product properties of "HIR Pavement - EPS" will be measured for acceptance in accordance with Section 3.50.4.4 Acceptance Sampling and Testing.

- (i) Pavement Density
- (ii) Marshall Air Voids
- (ii) Penetration of Recovered Asphalt
- (iv) Smoothness (top lift only)
- (v) Segregation (top lift only)

For the Pavement Density, Marshall Air Voids and Penetration of Recovered Asphalt to be acceptable, they must be within the limits shown in Tables 4, 5 and 6.

For each Lot, the unit price adjustments for Pavement Density, Marshall Air Voids and Penetration of Recovered Asphalt will be the amounts shown in Tables 4, 5 and 6.

The unit price applicable to each Lot quantity of "HIR Pavement, - EPS" will be calculated as follows:

$$\boxed{\text{Lot Unit Price per Square Metre}} = \boxed{\text{Contract Unit Price per Square Metre}} + \boxed{\text{the sum of the unit price adjustment for PAd + PAr + PAv}}$$

where:

- PAd = Unit Price Adjustment for Pavement Density (bonus or penalty)
- PAr = Unit Price Adjustment for Penetration of Recovered Asphalt (penalty only)
- PAv = Unit Price Adjustment for Marshall Air Voids (penalty only)

If the mean Pavement Density or the mean Marshall Air Voids or the mean Penetration of Recovered Asphalt is outside the acceptance limit, the Lot is rejected, and no payment will be made for the quantity of HIR in that Lot, until the defect has been remedied.

.2 In the second last paragraph of 3.50.7.1.1 Pay For Acceptable Work delete the term "PAa and PAg" and replace with the terms "PAr and PAv".

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.23 In section (ii) of 3.50.7.1.3 Payment For Work That had Been Rejected, But Was Made Acceptable delete the words "Asphalt Content and Gradation" and replace with "Marshall Air Voids and Penetration of Recovered Asphalt".

Table 4 Unit Price Adjustment for Density - Hot In-Place Recycled Asphalt Concrete Pavement		
% Lot Mean Maximum Specific Gravity	HIR UNIT PRICE ADJUSTMENT	
	HIR (\$/m2)	
Lot Average	DESIGN LIFT THICKNESS	
	40 mm	50 mm
≥ 95.5	0.048	0.06
95.4	0.043	0.054
95.3	0.039	0.048
95.2	0.034	0.042
95.1	0.029	0.036
95.0	0.024	0.03
94.9	0.019	0.024
94.8	0.015	0.018
94.7	0.009	0.012
94.6	0.005	0.006
94.5	0	0
94.4	-0.009	-0.012
94.3	-0.019	-0.024
94.2	-0.029	-0.036
94.1	-0.039	-0.048
94.0	-0.048	-0.06
93.9	-0.057	-0.072
93.8	-0.066	-0.084
93.7	-0.077	-0.096
93.6	-0.086	-0.108
93.5	-0.096	-0.12
93.4	-0.106	-0.132
93.3	-0.115	-0.144
93.2	-0.125	-0.156
93.1	-0.134	-0.168
93.0	-0.144	-0.180
92.9	-0.154	-0.192
92.8	-0.163	-0.204
92.7	-0.173	-0.216
92.6	-0.182	-0.228
92.5	-0.191	-0.240
92.4	-0.211	-0.264
92.3	-0.229	-0.288
92.2	-0.250	-0.312
92.1	-0.268	-0.336
92.0	-0.288	-0.360
91.9	-0.307	-0.384
91.8	-0.327	-0.408

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Table 4 Unit Price Adjustment for Density - Hot In-Place Recycled Asphalt Concrete Pavement		
% Lot Mean Maximum Specific Gravity	HIR UNIT PRICE ADJUSTMENT	
	HIR (\$/m2)	
Lot Average	DESIGN LIFT THICKNESS	
	40 mm	50 mm
91.7	-0.345	-0.432
91.6	-0.365	-0.456
91.5	-0.384	-0.480

For lower lifts when the Lot average density is less than 90.0% and greater than 86.9%, payment will be 50% of the unit bid price.

For top lifts where the Lot average density is less than 90.0% and greater than 87.9%, payment will be 50% of the unit bid price.

For top lifts where the Lot average density is less than 88.0% and on lower lifts where the density is less than 87.0%, the Contractor shall remove and replace the mix, or on approval of the Consultant, reprocess using HIR equipment.

Table 5 Unit Price Adjustment for Marshall Air Voids - HIR		
Amount That Lot Average Air Voids (%) is	HIR Unit Price Adjustment HIR (\$/m ²)	
	Treatment Depth	
Below Lower Design Limit	40 mm	50 mm
0.1	-0.04	-0.05
0.2	-0.08	-0.10
0.3	-0.12	-0.15
0.4	-0.16	-0.20
0.5	-0.20	-0.25
0.6	-0.24	-0.30
0.7	-0.32	-0.40
0.8	-0.40	-0.50
0.9	-0.48	-0.60
1.0	-0.56	-0.70
Above Upper Design Limit	40 mm	50 mm
0.1	-0.04	-0.05
0.2	-0.08	-0.10
0.3	-0.12	-0.15
0.4	-0.16	-0.20
0.5	-0.20	-0.25
0.6	-0.32	-0.40
0.7	-0.44	-0.55
0.8	-0.56	-0.70
0.9	-0.68	-0.85
1.0	-0.80	-1.00

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Note 1 Lower and upper Air void design limits are determined from Figure 1 HIR Design Air Voids and Recovered Asphalt Penetration Limits according to the Design Recovered Asphalt Penetration.

For lower lifts when the Lot average Marshall air voids is greater than 1% above the upper design limit, payment will be at 50% of the unit bid price.

For top lifts when the Lot average Marshall air voids is greater than 1% above the upper design limit, the Contractor shall either overlay or remove and replace the previously placed mix or, on the approval of the Consultant, reprocess using HIR equipment.

For lower lifts where the Lot average Marshall air voids is greater than 1.0% below the lower design limit, payment will be at 50% of the unit bid price.

For top lift where the Lot average Marshall air voids is greater than 1.0% below the lower design limit, the Contractor shall remove and replace the mix or, on the approval of the Consultant, reprocess using HIR equipment.

Table 6 Unit Price Adjustment for Recovered Asphalt Penetration Hot In-Place Recycled Pavement			
Amount That Lot Average Recovered Penetration is (dmm @ 25 C°)		HIR Unit Price Adjustment HIR (\$/m2)	
Below Lower Design Limit Shown in Table 1	Above Upper Design Limit Shown in Table 1	Treatment Depth	
		40 mm	50 mm
≤ 10	0	0.00	0.00
11	1 - 2	-0.06	-0.08
12	3 - 4	-0.08	-0.10
13	5 - 6	-0.10	-0.12
14	7 - 8	-0.11	-0.14
15	9 - 10	-0.13	-0.16
16	11 - 12	-0.17	-0.21
17	13 - 14	-0.21	-0.26
18	15 - 16	-0.25	-0.31
19	17 - 18	-0.29	-0.36
20	19 - 20	-0.33	-0.41
21	21 - 22	-0.38	-0.48
22	23 - 24	-0.44	-0.55
23	25 - 26	-0.50	-0.62
24	27 - 28	-0.55	-0.69
25	29 - 30	-0.61	-0.76

For any lifts when the Lot average recovered asphalt penetration is greater than 30 dmm above the upper specification limit, the Contractor shall remove and replace the previously placed mix.

For any lifts where the Lot average recovered asphalt penetration is greater than 25 dmm below the lower specification limit, payment will be at 50% of the unit bid price.

ACCEPTANCE TESTING FOR CONTRACTS WITH SMALL QUANTITIES (LESS THAN 1000 TONNES) OF ASPHALT CONCRETE PAVEMENT (ACP)

1. AMENDMENTS TO SPECIFICATION 3.50, ASPHALT CONCRETE PAVMENT - EPS:

.1 IN SECTION 3.50.1.2.5 LOT, ITEMS (I) AND (II) ARE DELETED AND REPLACED WITH THE FOLLOWING; AND ITEM (III) IS RENUMBERED TO ITEM (II):

(i) The entire quantity of ACP will normally be considered as one Lot, notwithstanding the conditions outlined in item (ii).

.2 TABLE 3.50.4.3 QUALITY CONTROL TESTING REQUIREMENTS - MANAGED QA TESTING PROJECTS, IS REPLACED WITH THE FOLLOWING TABLE:

QUALITY CONTROL TESTING REQUIREMENTS - SMALL QUANTITY ACP CONTRACTS

TEST	STANDARD	MINIMUM FREQUENCY
AGGREGATE PRODUCTION		See Specification 3.2
ASPHALT MIX PLANT		
1. Calibration	ATT-17	Once per project or as required
2. Inspection	ATT-16	(1)
SAMPLES		
1 Asphalt Cement	ATT-42	See Specification 5.7
2 Tack, Prime and Fog Materials	ATT-42	See Specification 5.7
3 Cold Feed Aggregate	ATT-38	(1)
4 Mix	ATT-37	(1)
5 QA Cores for Pavement Density, Asphalt Content and Gradation obtained by the Contractor at Stratified Random Test Sites chosen by the Consultant	ATT-56 ATT-5	Five core locations per Lot.
TESTS		
1 Mix Asphalt Content	AASHTO T-164, T287 or ATT-12 or ATT-74	(1)
2 Correction Factors	ATT-12, Part III or ATT-74, Part II	As Required
3. Mix Moisture Content	ATT-15	(1)
4. Aggregate Sieve Analysis	ATT-26	(1)
5. Field Formed Marshall Briquettes	ATT-13	(1)
6. Density Immersion Method, Saturated Surface Dry	ATT-7	(1)
7. Void Calculations, Cores or Formed Specimens	ATT-36	(1)
8. Temperatures	ATT-30	(1)
9. Percent Compaction, Cores or Nuclear Density	ATT-67, ATT-5 or ATT-11	(1)
10 Random Test Site Locations	ATT-56	(1)
11 Correction Factors, Nuclear Moisture-Density Measurement	ATT-48	(1)

Notes: (1) Minimum Frequency not Specified.

.3 THE FOLLOWING IS ADDED TO SECTION 3.50.4.4.2.1, PAVEMENT SAMPLING FOR DENSITY, ASPHALT CONTENT AND GRADATION:

Samples for asphalt content and gradation may be obtained by the consultant using the Sampling Mix Behind Paver method described in ATT-37. If the number of mix samples is less than five and the test results on the loose mix samples indicates that the mix is in penalty or rejection for asphalt content or in rejection for gradation, then additional cores samples shall be taken by the Contractor at locations as determined by the Consultant in order to perform the minimum five tests per Lot.

Testing for pavement density may be waived at the discretion of the Consultant. Pavement sampling for density will consist of 5 cores taken by the Contractor at locations as determined by the Consultant. If field formed Marshall density values are not available for compaction comparison the Consultant will determine the average Maximum Specific Gravity (Test Method ASTM D2041) on the 5 core samples to use for compaction comparison. Price adjustments and acceptance criteria will then be based upon Table 3.53A Unit Price Adjustments for Density.

.4 ALL REFERENCES TO TABLE 3.50A SHALL MEAN TABLE 3.53A.

.5 THE FOLLOWING IS ADDED TO SECTION 3.50.4.4.2.2, PAVEMENT SAMPLING FOR SMOOTHNESS:

QA smoothness testing may be waived at the discretion of the Consultant. Acceptance and rejection criteria for smoothness, including lump sum subplot assessments, will not apply if the Consultant elects not to undertake smoothness testing. If the Consultant does undertake QA smoothness testing then all acceptance and rejection criteria will apply, including lump sum subplot assessments and penalties for bump or dip defects over 8 mm.

.6 IN SECTION 3.50.4.4.2.3 ASPHALT MIX SAMPLING, THE WORD "WILL" IS CHANGED TO "MAY".

.7 THE FOLLOWING CHANGES ARE MADE TO SECTION 3.50.4.7.3.2, INSPECTIONS BY THE CONSULTANT:

- .1 The third sentence of the second paragraph of item (i) Inspections During Construction, is replaced with the following:

During the inspection(s) of the top lift, the Consultant will identify and record any areas of slight, moderate and severe segregation and any areas of centre-of-paver streak.

- .2 Item (ii) 'Inspection Following Construction' is deleted.

.8 IN SECTION 3.50.6.2.1 END PRODUCT ACCEPTANCE, THE TERM "LOT MEAN MARSHALL DENSITY" IS REPLACED WITH THE FOLLOWING:

"Lot Mean Marshall density or the Lot Mean Maximum Specific Gravity".

.9 IN SECTION 3.50.7.1.2 SEGREGATION PAYMENT ADJUSTMENTS, THE FOLLOWING TEXT IS DELETED FROM THE FIRST SENTENCE OF THE SECOND PARAGRAPH:

"either during construction or during the inspection conducted 2 weeks after the completion of paving work,"

SUPPLY OF AGGREGATE - CONTRACTOR'S SUPPLY WITH OPTION

The Contractor shall supply the aggregate for this Contract. The Contractor has the option of supplying aggregate from the source controlled by the Department identified in the special provisions or from other sources of his own choice. No other source controlled by the Department may be used for the gravel component of the aggregate. However, sources controlled by the Department may be used for the blend sand component of the aggregate subject to the approval of the Department.

**SUPPLY OF AGGREGATE - CONTRACTOR'S SUPPLY WITH
NO OPTION**

The Contractor shall supply the aggregate for this Contract from sources of his own choice with the exception that the gravel component of the aggregate may not be obtained from a source controlled by the Department. However, sources controlled by the Department may be used for the blend sand component of the aggregate subject to the approval of the Department.

APPROVED LINE AND MESSAGE PAINTING PRODUCTS LIST

For further information on products, Contractors may contact:

Highway Traffic Paint

General Paint Ltd.
950 Raymur Avenue
Vancouver, B.C.
V6A 3L5
Attn: Ray Flores
Telephone:(604)253-3131

IBIS Products Limited
21 Munham Gate
Scarborough, ONT.
M1P 2B3
Attn: Stephen C. Noxon
Telephone: (416) 757-3241

Hannigan Investments
5817 - 54 Avenue
Beaumont, AB
T4X 1B6
Attn: Sean Hannigan
Telephone: (780) 929-5465

Northern Paint Canada Inc.
394 Gertrude Avenue
Winnipeg, MN
R3L 0M6
Attn: Terry Yee
Telephone: (204) 958-5400

Glass Beads

Canasphere Industries
(Alberta) Limited
3344-58 Avenue S.E.
Calgary, AB T2C 0B3
Attn: Bob Knott
Telephone: (403) 279-2296
FAX: (403) 279-1820

The Contractor shall choose the paint and glass beads to be supplied from the list of products shown in the following tables.

GLASS BEADS

SUPPLIER NAME	SPECIFICATION COMPLIANCE
Canasphere Industries Alberta Limited	AT GB-00

PAINT (WHITE)

TEST METHODS		TOLERANCE	SUPPLIER NAME						
			GENERAL PAINT FORMULATION 78-221	HANNIGAN FORMULATION A-1	IBIS PRODUCTS FORMULATION T40-4926	IBIS PRODUCTS FORMULATION T40-4960	IBIS PRODUCTS FORMULATION T44-4954 (WB)	NORTHERN FORMULATION 62308 ¹	NORTHERN FORMULATION 62312(WB) ¹
Hiding Power	CGSB 1-GP-71(14.7)	±10 %	5.0	8.5	4.6	4.3	4.1	5.0	4.0
Specific Gravity	ASTM D 1475	±0.025	1.502	1.434	1.471	1.500	1.638	1.404	1.552
Skimming	CGSB 1-GP-71(10.1)	NON	NON	NON	NON	NON	NON	NON	NON
Accelerated Storage Stability	ASTM D1309	±1	8	9	9	8	2	9	5
BYK Gardner Color Guide Model #6805	ASTM E313	±5 %	85.0	82.0	77.6	80.2	89.0	82.2	84.9
Bleeding	ASTM D868, D969	±10%	7.70	2.70	9.27	7.20	1.71	9.70	6.60
Abrasion Resistance	ASTM D968	±1	7	7	7	7	10	7	8
Flexibility	ASTM D522	90 - 120 %	9.8	18.5	7.5	8.0	16.2	13.6	30.1
Drying Time(minutes)	ASTM D1640	±20 %	21.0	12.0	14.0	7.0	15.0	10.3	>30.1
Viscosity	ASTM D711	±2 min.	7.0	8.5	7.0	7.5	7.5	8.5	8.0
Non-Volatile Content	ASTM D562	±20 %	*	*	*	*	*	*	*
Pigment Content	CGSB 1-GP-71(17.1)	±5	74	72	74	80	83	74	82
Non-Volatile Vehicle	CGSB 1-GP-71(21.1)	±2 % (absolute)	74.5	70.6	72.7	73.6	78.1	70.7	72.3
Particle Coarseness	ASTM D185	±2 % (absolute)	62.1	57.7	57.5	57.6	62.2	52.2	55.4
Fineness of Grind	ASTM D1210	±2 % (absolute)	12.4	12.9	15.2	16.0	15.9	18.5	16.9
Water Resistance	ASTM D870	±0.3 % (absolute)	0.01	0.08	0.04	0.73	0.03	0.14	0.10
Water Content	CGSB 1-GP-71(24.1)	±1	7.0	6.0	7.25	6.50	6.25	5.60	6.50
Gloss	ASTM D523	±1	9	9	10	8	10	9	9
Colour (Yellow)	CGSB 1-GP-12C	±0.2 % (absolute)	0.16	0.15	0.2	0.22	20.4	0.05	26.60
Six Month Settlement	ASTM D869	±3	4.0	5.0	5.0	5.0	5.5	6.0	4.0
Flash Point	CGSB 1-GP-71(3.1)	Match	-	-	-	-	-	-	-
		5 min	9	9	9	8	7	9	7
			-4	3	-8	-9	Non-Combustible	-6	Non-Combustible

* Dry to Traffic requirements are relative to the pre-qualified tender sample at the time of testing

(WB) Waterborne

Additional effort may be required to control tracking

PAINT (YELLOW)

TEST METHODS	TOLERANCE	SUPPLIER NAME							NORTHERN FORMULATION 62313(WB) ¹
		GENERAL PAINT FORMULATION 78-222	GENERAL PAINT FORMULATION 78-223	HANNIGAN FORMULATION A-2	IBIS PRODUCTS FORMULATION T40-4919	IBIS PRODUCTS FORMULATION T44-4953 (WB) (T44-4951 (WB)) ²	NORTHERN FORMULATION 62309 ¹		
Hiding Power	±10 %	5.6	4.3	6.5	4.3	4.4 (4.5)	5.0	4.2	
Specific Gravity	±0.025	1.489	1.486	1.463	1.496	1.657 (1.598)	1.423	1.586	
Skimming	NON	NON	NON	NON	NON	NON	NON	NON	
Accelerated Storage Stability	±1	8	8	7	7	2 (0)	9	7	
BYK Gardner Color Guide Model #6805	±5 %	48.2	49.6	51.9	47.2	53.7 (50.5)	46.7	46.8	
Bleeding	±10%	83.34	88.76	90.32	91.40	92.29 (87.49)	92.87	90.95	
Abrasion Resistance	±1	8	9	8	8	10 (10)	10	10	
Flexibility	90 - 120 %	9.9	6.9	7.6	7.9	15.3 (12.2)	13.2	29.4	
Drying Time(minutes)	±20 %	15.6	21.8	25.6	18	17.0 (17.0)	9.9	>30.0	
Viscosity	±2 min.	7.5	6.5	7.5	7.0	7.0 (7.0)	9.5	8.0	
Non-Volatile Content	±20 %	*	*	*	*	*	*	*	
Pigment Content	±5	80	76	81	74	80 (79)	75	77	
Non-Volatile Vehicle	±2 % (absolute)	73.7	74.5	71.5	73.5	77.4 (77.2)	72.3	74.4	
Particle Coarseness	±2 % (absolute)	60.4	60.9	58.2	58.3	61.1 (58.0)	54.6	55.3	
Fineness of Grind	±2 % (absolute)	13.3	13.6	13.3	15.2	16.3 (19.2)	17.7	19.1	
Water Resistance	±0.3 % (absolute)	0.06	0.08	0.01	0.05	0.02 (0.02)	0.17	0.03	
Water Content	±1	7.00	7.00	6.75	6.75	6.50 (6.75)	5.50	6.00	
Gloss	±1	9	9	9	10	10 (10)	9	8	
Colour (Yellow)	±0.2 % (absolute)	0.25	0.22	0.15	0.12	19.10 (21.40)	0.15	24.60	
Six Month Settlement	±3	4.0	4.0	4.0	4.0	4.0 (4.0)	6.0	3.5	
Flash Point	Match	Much Lighter	Slightly Lighter	Much Lighter	Much Lighter	Much Lighter (Slightly Lighter)	Lighter	Slightly Lighter	
	5 min	9	9	8	9	7 (7)	9	8	
	±6	-6	-4	3	-8	Non-Combustible (Non-Combustible)	2	Non-Combustible	

* Dry to Traffic requirements are relative to the pre-qualified tender sample at the time of testing

(WB) Waterborne

¹ Additional effort may be required to control tracking.

² Waterborne Lead Free

ADJUSTMENT OF COMPLETION DATE AND LIQUIDATED DAMAGES FOR BRIDGE STRUCTURE WORK

The following changes are applicable to the bridge structure portion of the work only:

.1 SECTION 1.2.19, ADJUSTMENT OF COMPLETION DATE:

- .1 In the first paragraph of Clause 1.2.19(c)(vi), the words "roadway surface" are changed to "Bridge Structure".
- .2 The second sentence of the second paragraph of Clause 1.2.19(vi) is deleted.
- .3 The last two paragraphs of Section 1.2.19 starting with "If an adjustment to the..." are deleted.

.2 SECTION 1.2.20, FAILURE TO COMPLETE ON TIME:

- .1 In clause 1.2.20(i)(a) - "\$1,350.00" is replaced with "\$800.00".
- .2 Item (b) of subsection 1.2.20(i) is deleted.

DURATION OF WORK AND SITE OCCUPANCY FOR BRIDGE STRUCTURE CONSTRUCTION

.1 THE FOLLOWING SHALL APPLY TO THE BRIDGE STRUCTURE PORTION OF THE WORK ONLY:

.1 Replace the Contents of Section 1.2.21 with the Following:

1.2.21.1 General

When the Contract contains a bid item for "Site Occupancy - Bridge Structures", bidders shall indicate the number of Calendar Days required to complete the Bridge Structure Work under the "estimated quantity" column of the unit price schedule and extend that number of days times the unit price per day as shown, to get the total bid for "Site Occupancy - Bridge Structures".

1.2.21.2 Calculation of Calendar Days

Calendar Days will be calculated as whole days. The assessment of Calendar Days for "Site Occupancy - Bridge Structures" will commence on the day of the first disturbance of the right-of-way for the bridge portion of the Work. Thereafter, every day will be counted as a Calendar Day with the exception of when:

- The Contractor is prohibited from working due to restrictions imposed by local bylaws after the contract has been awarded or as a result of directives from the Consultant or the Department.
- The Contractor is unable to work on the project, or works less than half of a normal working day for reasons of inclement weather or conditions resulting from inclement weather. A normal working day shall comprise the average duration worked by the Contractor on the proceeding 5 uninterrupted working days.
- The Contractor pre-schedules interruptions to continuous prosecution of the Work as a result of the desire to schedule certain phases of the Work at different times.
- The Contractor schedules employee time off subject to the conditions specified herein.
- The Contractor is working solely on preparing and installing temporary environmental measures as detailed in the department manual entitled "Environmental Construction Operations (ECO) Plan Framework.

1.2.21.3 Employee Time Off

The Contractor will be granted a maximum of eight non-charged days per thirty day period for the purpose of allowing employee time off, providing:

- The Consultant is given at least seven days notice.
- There is no construction ongoing which requires the presence of the Consultant.
- No more than five consecutive days are taken at one time.

The thirty day period will start at the commencement of work as defined above and any of the time-off days not taken in a specified thirty day period will not be permitted to be used in subsequent periods. When the estimated number of Calendar Days required to complete the project is less

than thirty, the number of allowable days off for this purpose will be prorated.

.4 Conclusion of Site Occupancy

Assessment of Calendar Days will cease entirely only once the entire Work has been completed and in the opinion of the Consultant, the project is ready for the construction completion inspection as detailed in Section 1.2.53, Construction Completion and Acceptance. Calendar Days will not be assessed during the completion of any deficiencies identified in the construction completion inspection.

.5 Statements, Extensions and General

The Consultant will, on a weekly basis, prepare a statement for the Contractor showing the number of Calendar Days worked on the contract during that week. In the event that the Contractor disagrees with the number of Calendar Days shown on the statement, he shall within one week of the date of such statement, notify the Consultant in writing of reasons for the disagreement, otherwise the number of Calendar Days shown on the statement shall be considered final.

An increase in the number of Calendar Days to complete the Work will be considered for an increase in quantities, late delivery of Department supplied materials, design changes to the project, or any other reason which in the opinion of the Consultant is outside the control of the Contractor, or could not have been reasonably foreseen by the Contractor.

If the Contractor believes there is an entitlement to an extension of the number of Calendar Days required to complete the Work, he shall, prior to the completion of the Work, submit a written request to the Consultant setting out the reasons for the request, justifying the number of additional days required.

This provision for Duration of Work in no way negates or mitigates the conditions of Sections 1.2.19, Adjustment of Contract Completion Date, 1.2.20, Failure to Complete on Time or Section 1.2.14, Commencement and Scheduling of Work.

.6 Payment

Payment for "Site Occupancy - Bridge Structures" will be made as follows:

If the Contractor completes the bridge structure work in the exact number of calendar days entered in the "Site Occupancy - Bridge Structures" bid item, no payment will be made.

If the Contractor completes the bridge structure work in fewer Calendar Days than the number entered in the "Site Occupancy" bid item, a payment equal to the unit price per day as shown, multiplied by the difference between the estimated and actual number of Calendar Days will be made.

If the Contractor completes the bridge structure work in more than the number of Calendar Days entered in the "Site Occupancy - Bridges Structures" bid item, an assessment equal to the unit price per day as shown, multiplied by the difference between the estimated and actual number of Calendar Days will be made and charged to the Contractor. This assessment will be deducted from any monies due the Contractor.

LANE CLOSURE FOR BRIDGE STRUCTURES

.1 GENERAL

In addition to the requirements of Section 1.2.21, Duration of Work and Site Occupancy, this contract contains a bid item for "Lane Closure - Bridge Structures".

Bidders shall indicate the number of Calendar Days during which travel lane widths will be restricted or lanes will be closed, under the "estimated quantity" column of the unit price schedule and extend that number of days times the unit price per day as shown, to get the total bid for "Lane Closure - Bridge Structures".

.1 Calculation of Calendar Days

Calendar Days will be calculated as whole days. The assessment of Calendar Days will commence on the first day that the clear roadway is restricted in width and/or a travel lane is closed. Thereafter, every day will be counted as a Calendar Day with the exception of when:

- the Contractor is prohibited from working due to restrictions imposed by local bylaws after the Contract has been awarded or as a result of directives from the Consultant or the Department.

.2 Conclusion of Lane Closure

Assessment of Calendar Days will cease entirely once the roadway is open to unimpeded flow of traffic with all the following conditions:

- continuous smooth, paved intact travel surface
- curb to curb unobstructed clear roadway width
- traffic control removed and traffic fully restored

.3 Extensions

An increase in the number of Calendar Days for Lane Closure - Bridge Structures will be considered for an increase in quantities, late delivery of Department supplied materials, design changes to the project, or any other reason which in the opinion of the Department is outside the control of the Contractor, or could not have been reasonably foreseen by the Contractor.

If the Contractor believes there is an entitlement to an extension of the number of Calendar Days for Lane Closure - Bridge Structures, he shall, prior to the completion of the Work, submit a written request to the Consultant setting out the reasons for the request, justifying the number of additional days required.

.4 Payment

Payment for Lane Closure - Bridge Structures will be made as follows:

If the Contractor restricts the roadway width or closes a travel lane for the exact number of Calendar Days bid for "Lane Closure - Bridge Structures", no payment will be made.

If the Contractor restricts the roadway width or closes a travel lane for fewer Calendar Days than the number bid for "Lane Closure - Bridge Structures", a payment equal to the unit price per day as shown, multiplied by the difference between the estimated and actual number of Calendar Days

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will be made.

If the Contractor restricts the roadway width or closes a travel lane for more than the number of Calendar Days entered in the "Lane Closure - Bridge Structures" bid item, an assessment equal to the unit price per day as shown, multiplied by the difference between the estimated and actual number of Calendar Days will be made. This assessment will be deducted from any monies due the Contractor.