# MEASUREMENT AND PAYMENT

DIPL Roadworks Master – July 2023

The following Measurement and Payment clauses refer to the specification sections of the same name, however, the clause numbers do not match the section numbers of the same title.

The selection of specific items or materials for the works being carried out are those items listed in the Schedule of Rates in the Response Schedules for the particular Contract and any items specified elsewhere in this RFT.

[Delete the matching Measurement and Payment clause where the particular specification section has been deleted in the project specification.]

## Miscellaneous Provisions

### Environmental Management Generally

Not measured separately

Include the cost of environmental management in the rates for the applicable items.

### Environmental Management Plan

Measured as an item.

### Cleaning of Vehicles and Plant

Measured as an item (irrespective of the number cleaned).

Vehicles and plant items are priced separately.

### Establishment

The sum for establishment not to exceed 30 per cent of the Tender Sum.

Mobilisation: Measured as an item. Not to exceed 10 per cent of the Tender Sum.

Payment when the Contractor established on site.

Demobilisation: Measured as an item.

Payment when demobilisation complete.

Ongoing costs: Measured as an item.

Payment progressively during the contract in proportion to the value of complying work.

### Project Notice Boards

Measured by number by type erected.

### As Constructed Information

Provide as constructed information as detailed in MISCELLANEOUS PROVISIONS.

Include the cost for as constructed information in the costs for the related elements of the works.

Provide as constructed information related to variations in the scope of the works. Include the cost of the as-varied scope constructed information in the negotiated costs for the variations to the works.

### Level Checking

Measured in kilometres for the layer under consideration.

### Control Station Check Survey

Measured as an item.

### Cycle and pedestrian shared paths

Not measured separately.

Include in MISCELLANEOUS CONCRETE.

## Provision For Traffic

### Traffic Management Plan

Include in Provision for Traffic. Include Traffic Guidance Schemes (TGSs) including, but not limited to, plans, drawings, sketches, and/or diagrams.

### Provision for Traffic

Measured as an item.

Includes TMP and TGSs and all activities required to implement them.

Includes detours, temporary connections access to adjacent properties, traffic guidance, traffic control devices, temporary bridging, warning devices, maintenance and restoration.

Includes variable message boards irrespective of number.

Payment will be made progressively in proportion to the value of work carried out.

### Gravelling of Detours

Measured in square metres for the specified gravel thickness and width.

Make allowance for supply, delivery, and compaction of material, and maintenance, and rehabilitation, of detours.

### Sealing of Detours

Measured in square metres for the specified width.

Make allowance for the removal and disposal of seal and restoration work.

### Temporary Traffic Management (TTM) – Independent Third Party Audits

The Principal will pay for all auditing directly to the Panel Period Audit Consultant selected to perform the audits required under this contract which are nominated as the Principal’s responsibility.

If a re-auditing is required due to non-conformances, the costs of the re-audits will be negative variations to the contract.

If auditing has been ordered and the site is not ready for auditing at the time specified by the Contractor, the Contractor will bear the cost of the time and travel incurred by the Panel Period Audit Consultant and the Superintendent.

All post rectification re-auditing will be at no cost to the Principal.

The Contractor must make good all non-conformances at no cost to the Principal.

### Contractor WZTM Road Compliance Audit

The payment for all Contractor WZTM Road Compliance Audits is the Contractor’s responsibility.

## Clearing Grubbing and rehabilitation

Measured as an item.

Includes removing vegetation stripping and stockpiling, top soil respreading, removal of un-recoverable fencing, drainage structures, old road surfaces and other obstacles.

Make allowance for stripping, stockpiling and respreading of the top layer.

Make allowance for replacement of stripped layer.

### Treatment of Existing Sealed Surface

Not measured separately.

### Scarifying of Existing Roads

Measured in linear metres.

### Mulching

Measured as an item.

Make allowance for mulching demolished vegetation, burying stumps, roots and grasses, stockpiling mulched material, spreading mulch and removing excess mulched material.

## Earthworks

Measurements are based on natural surface levels prior to stripping.

### Earthworks in Cut

Measured in in-situ cubic metres.

Volume includes Table Drains.

Allow for trimming and compaction of exposed surfaces.

### Rock in Subgrade

Measured in in-situ cubic metres.

Payment only for works directed by the Superintendent.

Payment for excavation will be at a rate to be agreed. Payment for filling is at the rate for Select Fill (compacted volume).

### Unsuitable Material Below Subgrade Surface Other Than Rock

Measured in in-situ cubic metres.

Payment only for works directed by the Superintendent.

Payment for excavation is at the rate for Earthworks in Cut. Payment for filling is at the rate for Earthworks in Fill (compacted volume).

### Earthworks in Fill

Measured in compacted cubic metres.

Make allowance for volumes affected by Clearing and Grubbing.

Make allowance for preparation prior to filling and benching.

Allow for trimming.

### Unsuitable Material Beneath Fill

Measured in in-situ cubic metres.

Payment only for works directed by the Superintendent.

Payment for excavation is at the rate for Earthworks in Cut. Payment for filling is at the rate for Earthworks in Fill (compacted volume).

### Select Fill

Measured in compacted cubic metres.

Payment at a rate to be agreed.

[Delete if item in Schedule of Rates]

### Sand Clay Fill

Measured in compacted cubic metres.

### Subgrade Layer (150mm)

Measured in square metres.

### Stream Diversions

Measured in in-situ cubic metres for cut and compacted cubic metres for fill.

Temporary work is not measured.

### Levees

Measured in compacted cubic metres.

Temporary work is not measured.

### Table Drain Offlets

Measured by number.

### Table Drain Blocks

Measured by number.

### Catch Drains

Measured in linear metres.

### Widening of Existing Formation

Measured in linear metres.

### Trim and Compact Unpaved Areas

Measured in square metres.

Excludes trimming and compacting areas exposed in cut.

Excludes trimming and compacting in fill.

### Surface Formation

Measured in linear metres.

Allow for imported material.

### Batter Protection by Grassing

Measured in square metres.

### Bridge Foundation Excavation

Measured in in-situ cubic metres.

The quantity measured shall be determined by multiplying the dimensioned area of the structure footing by the distance from natural surface to foundation level.

Make allowance for coffer‑dams, shoring and sheeting, pumping.

Make allowance for excavation beyond measured limits for formwork, shoring and sheeting, pumping, etc.

### Bridge Foundation Blinding

Measured in square metres.

### Bridge Foundation Backfilling

Measured in compacted cubic metres.

Make allowance for backfill beyond measured limits.

### Fill Adjacent to Bridge Structures

Measured in compacted cubic metres.

## Conformance Testing

### Conformance Testing

The Superintendent will pay for all conformance testing directly to the Panel Period Contractor selected to perform the conformance tests required under this contract and nominated as the Superintendent’s responsibility.

If the tests fail the cost of the failed tests will be a negative variation to the contract.

When testing has been ordered and the site is not ready for testing at the time specified by the Contractor, the Contractor will bear the cost of time and travel incurred by the Panel Period Contractor and the Superintendent, where applicable.

Where bituminous products are Non-Conforming: refer to the Superintendent for requirements if samples are non-conforming.

### Process Testing

The Contractor is responsible for the ordering up and payment for all process tests carried out.

This is not measured separately.

Include the cost of process testing under the relevant items in the Schedule of Rates.

## Pavements and Shoulders

### Construction of Pavement Layers

Measured in square metres for each specified layer, thickness, and material.

Make allowance for pavement or shoulder materials outside the carriageway width not included in measurement.

### Reconstruction and Rehabilitation of Existing Pavements

[Sometimes appropriate to make a provisional item for adding base in accordance with Superintendent's instructions to allow smoothing of existing road surface]

Refer to **Strengthening by Granular Overlay** sub-clauses**.**

Measured in linear metres, includes both sides for widening.

Measured in square metres for overlay and reworking.

Make allowance for variation in pavement thickness and deformation of existing pavement.

### Supply to Stockpile

Measured in cubic metres in the stockpile.

### Pavement Acceptance

Measured as an item for activities undertaken to achieve pavement and shoulder acceptance.

## Stabilisation and Modification

### Supply of Materials to be Stabilised

Measured in square metres, compacted, for each specified thickness, for each layer type (sub-base, base, shoulders).

### Supply and Spread Binder

[Use for in situ methods]

Measured in tonnes for cement and lime. Measured in litres for bitumen.

Determined by multiplying the application rate by the area to be treated.

Make allowance for tolerances.

### Granular Modification

Measured in compacted cubic metres.

[Payment for supply of materials to be stabilised is included in the STABILISATION AND MODIFICATION Section and must not be included in the PAVEMENTS AND SHOULDERS Section. Ensure quantities in the Schedule of Rates are determined accordingly]

### Mixing, Trimming and Curing

Measured in square metres for each specified thickness.

### Plant‑Mix

Measured in cubic metres.

Determined by multiplying the specified area by the specified compacted depth.

Make allowance for all materials to be stabilised.

Make allowance for curing.

## Spray Sealing

Bitumen prices are subject to Rise and Fall. Refer clause titled **Price Adjustment for Bitumen** in the SPRAY SEALING section.

Allow for different spray rates for different traffic lanes and/or paths of travel in the same sections of the roadway.

### Calculation Accuracy

All calculations regarding payment to be to an accuracy of the nearest whole number.

### Under Path Growth Inhibitor

For pedestrian, cycle, and shared paths.

Measured in square metres of treated surface below path.

### Preparation of Pavement

Measured in square metres of the prepared area.

### Prime, Primer Seals, Seals, Pre-coats, and Enrichment Coats

[Delete those processes not required]

Measured in litres at 15°C. Adjust volumes using the ***Table - Volume Correction - Bitumen (including PMB and cutback bitumen)***and/or the ***Table - Volume Correction – Bitumen emulsion***. in **Calculation of Equivalent Volumes for Spray Rates** clause in SPRAY SEALING.

Payment calculated for each spray run. Quantity sprayed is determined by dipping the sprayer tank for each spray run.

Allow for the temperature of the mixture in determining the actual application rate.

The designated volume is determined from the area sprayed and the rate of application indicated in the procedure for such area at 15°C. Multipliers for reducing the volume of hot bitumen to the equivalent volume at 15°C are contained in the ***Table - Volume Correction - Bitumen (including PMB and cutback bitumen)***and/or the ***Table - Volume Correction – Bitumen emulsion***.in **Calculation of Equivalent Volumes for Spray Rates** clause in SPRAY SEALING***.***

For primers, enrichment coats, primer seals, seals, polymer modified binder seals or emulsion seals the rate of application refers to the whole of the mixture.

Allow for adhesion agent in the rate for polymer modified binder.

Tapers are exempt from adjustment tables.

**Adjustment To Payment For The Sprayed Volume When The Spray Application Rates Equal Or Exceed 1.0 L/m2:**

1. Application 90% to 95% of the designated volume:

Payment for the sprayed volume less one‑half the difference between the sprayed volume and 95% of the designated volume.

(Example: Application = 92% of designated volume.

Pay for (92% - 0.5 x (95% - 92%)) = 90.5% of designated volume.)

1. Application 95% to 105% of the designated volume:

Payment for the sprayed volume.

1. Application 105% to 115% of the designated volume:

Payment for 105% of the designated volume.

The Contractor must rectify bleeding or flushing seals during the defined defects period where binder application rates were applied at > than 105% of the designated volume.

1. Application less than 90% or more than 115% of the designated volume will be rejected. Rectify by methods approved by the Superintendent, at the Contractor’s expense.

**Adjustment To Payment For The Sprayed Volume When Spray Application Rates Below 1.0L/m2:**

1. Application plus 0.1L/m2 and minus 0.1L/m2 of the designated spray rate:

Payment for the sprayed volume.

1. Application rates varying more than 0.1L/m2 of the designated spray rate will result in work being rejected. Rectification will be at the Contractor’s expense by respraying or by other methods approved by the Superintendent.

Payment will be made for the designated volume upon satisfactory rectification of the rejected area at no extra expense to the Principal.

Adjustment to payment for seal coat items (binder, additive, precoat, aggregate) is in accordance with the ***Table - Payment Adjustments***.

### Table - Payment Adjustments

|  |  |
| --- | --- |
| **Table - Payment Adjustments** | |
| **Viscosity (at 60**°**C Pa.s) of AS 2008 Class 320 Bitumen Component of The Binder** | **Reduction in Payment for Seal Coat Items** |
| Under 260 | 10% reduction for each 10 Pa.s (or part thereof) below 260. |
| 260 – 380 | Nil. |
| Over 380 | 10% reduction for each 10 Pa.s (or part thereof) over 380. |
|  | |
| **Where Samples Not Collected** | 10% reduction to rate per litre |
|  | |
| **Polymer Modified Binders** | **Reduction in Payment for Seal Coat Items** |
| Torsional Recovery 1 – 3% less than specified | 2% reduction to rate per litre |
| Torsional Recovery 4 – 6% less than specified | 10% reduction to rate per litre |
| Torsional Recovery over 6% less than specified | 20% reduction to rate per litre |
| Softening Point 0 – 2 deg. C less than specified | 5% Reduction to rate per litre |
| Softening Point 2.1 – 5 deg. C less than specified | 15% Reduction to rate per litre |
| Softening Point 5.1 – 10 deg. C less than specified | 20% Reduction to rate per litre |
| Softening Point 10.1 or more deg. C less than specified | \*Rejected (see note below) |
| Note: \* Rejected - Reseal with materials and methods approved by the Superintendent. Costs incurred from reseal work will be at the Contractor’s expense.  Note: Adjustments are only applied to materials represented by the test sample. | |

### Payment Adjustment Applied to Sub-Contractors

Where:

* a payment adjustment is applied against the Contractor under the Contract; and
* the Contractor then applies that adjustment to the sub-contractor that carried out the Works the subject of the payment adjustment,

the Contractor will provide the sub-contractor with a copy of the document/s from the Principal that evidence the payment adjustment applied to the Contractor.

### Additives

Not measured separately.

Polymer additives in polymer modified binders not measured separately.

Make allowance in the rates for seal coats.

### Precoat Applied to Aggregate

Measured in litres.

Make allowance for adhesion agent.

### Stockpile Sites

Make allowance for stockpile sites in the relevant rates for sealing aggregate.

Allow for clearing and preparation of stockpile sites in other rates.

### Sealing Aggregate

Supply and delivery.

Measured in square metres.

### Application of Aggregate

Measured in square metres of finished aggregate work for each size of aggregate.

### Application of Geofabric

Measured in square metres of fabric, installed, with tack coat.

### Waste Material

Sweeping up and removal of excess aggregate not measured separately. Allow for in other rates.

## Dense Graded Asphalt

### New Pavements

Measured in square metres for each specified thickness.

Payments will be determined as per ***Rate of Payment Adjustments*** sub-clause and tables.

### Under Path Growth Inhibitor

For pedestrian, cycle, and shared paths.

Measured in square metres of treated surface below path.

### Correction Course Layer

Measured in tonnes placed as evidenced by weighbridge dockets.

Correction courses are exempt from adjustments for voids.

### Resurfacing Work

Measured in tonnes placed as evidenced by weigh bridge dockets.

Payments will be determined as per ***Rate of Payment Adjustments*** sub-clause and tables.

### Rate of Payment Adjustments

Rates will be adjusted as follows:

|  |  |
| --- | --- |
| **Table - Rate of Payment Adjustments** | |
| **Reduction Level** | **Payment Reduction** |
| Level 1 | 5% |
| Level 2 | 10% |
| Level 3 | 20% |
| Note: Adjustments are for materials specified at 30mm and greater thickness. | |

|  |  |
| --- | --- |
| **Table - Payment Adjustments - Bitumen Conformance - Class 320 Bitumen** | |
| **Viscosity (At 60oC Pa.s) of AS 2008 Class 320 Bitumen Component Of The Binder** | **Payment Reduction** |
| Under 260 (Pa.s) | 5% reduction for each 10 Pa.s (or part thereof) less than 260 |
| 260 – 380 (Pa.s) | Nil. |
| Over 380 (Pa.s) | 5% reduction for each 10 Pa.s (or part thereof) over 380. |

| **Table - Payment Adjustments - Bitumen Conformance - Polymer Modified Binder A15E** | |
| --- | --- |
| **Polymer Modified Binders A15E** | **Payment Reduction\* to m2 rate ($) of lot** |
| Consistency (60oC Pas) 4500 - 4999 | 5% |
| Consistency (60oC Pas) 4000 - 4449 | 10% |
| Consistency (60oC Pas) 4000 - 3000 | 20% |
| Consistency (60oC Pas) less than - 3000 | Remove and Replace |
| Torsional Recovery (25oC,30s,%)1% – 5% less than specified | 5% |
| Torsional Recovery (25oC,30s,%) 6% – 10% less than specified | 10% |
| Torsional Recovery (25oC,30s,%) over 10% less than specified | 20% |
| Softening Point 0 – 5 oC less than specified | 5% |
| Softening Point 5.1 – 10 oC less than specified | 10% |
| Softening Point 10.1 – 15 oC less than specified | 20% |
| Softening Point more than 15.1 – 20.0 oC less than specified | 30% |
| Softening Point more than 20.1 oC less than specified | Remove and Replace |
| \* Payment reduction shall only apply to the test property providing highest level of non-conformance | |

### Surface Roughness

Adjustments related to Surface Roughness (per lot)

|  |  |
| --- | --- |
| **Table - Payment Adjustments - Related to IRI over specified IRI (per lot)** | |
| **Increase in specified maximum IRI**  **(per lot)** | **%Adjustment to the m2 rate of lot** |
| 0.01 – 0.10 | 2% |
| 0.11 – 0.20 | 4% |
| 0.21 – 0.30 | 6% |
| 0.31 – 0.40 | 8% |
| 0.41 – 0.50 | 10% |
| 0.51 – 0.60 | 12% |
| 0.61 – 0.70 | 14% |
| 0.71 – 0.80 | 16% |
| >0.80 | Remove and Replace / Rectify |
| **Note:** Lots may be subdivided where individual IRI exceeds 2.5. | |

### Progress Claims

Contractor may claim up to three-quarters of the contract rate when works are physically completed on site with balance of payment following conformance test results.

### Payment Adjustment Applied to Sub-Contractors

Where:

* a payment adjustment is applied against the Contractor under the Contract; and
* the Contractor then applies that adjustment to the sub-contractor that carried out the Works the subject of the payment adjustment,

the Contractor will provide the sub-contractor with a copy of the document/s from the Principal as evidence that the payment adjustment applied to the Contractor.

## Slurry Surfacing

Payment will be made at the tendered rates for the actual quantity of accepted slurry surfacing mix spread.

Measurement;

* Slurry surfacing laid per m2 at an average 9 mm thickness, including surface preparation and supply and laying of slurry surfacing mix.
* Slurry correction volume per m3.

## Miscellaneous Concrete

Make allowance for excavation, bedding and backfilling in the following items.

[Add extra clauses as required]

### Footpaths

Includes cycle and pedestrian shared paths. (Refer to MISCELLANEOUS PROVISIONS)

Measured in linear metres for each type.

Make allowance for reinforcement.

Make allowance for Under Path Growth Inhibitor.

### Vehicle Crossings and Access Strips

Measured as an item for each type.

[Edit this sentence if there is only one type]

Make allowance for reinforcement.

### Kerbs and Gutters

Measured in linear metres for each type (any drainage structures/crossings excluded from measured lengths.)

### Inverts

Measured in linear metres.

### Wheelchair Crossings

Measured by number.

### Traffic Island and Median Infill

Measured in square metres.

## Drainage Works

### Excavation in Trenching

Measured in in-situ cubic metres for the specified range of depths to invert.

The length of the trench shall be measured between the outside face of headwalls or between the centre of pits.

The width of the trench shall be the outside width of the culvert plus margins on each side as shown on drawing CS-3101.

The depth of the trench is the average of the depths to invert measured at the structure at each end of the section.

The depth to invert is the lesser of the depth below natural surface and the depth below finished surface level. In the case of kerbside structures, the finished surface level is measured at the top of kerb.

Make allowance for shoring, bedding, inlet structures, outlet structures, irregularities in the natural surface, and for the depth of RC floor slabs for precast box culverts, where applicable.

### Supply, Load, Transport, Bed, Lay and Backfill Culverts

Measured in linear metres along the invert of the culvert as the distance between the outside face of headwalls for the type and size scheduled.

Multiple barrel culverts are measured as the single distance between the outside face of headwalls.

Make allowance for RC floor slabs for precast box culverts.

Make allowance for bedding and haunching for Reinforced Concrete Pipes in accordance with Civil Standard Drawing CS3101.

Excavation is measured separately.

### Concrete Headwalls, Headwalls with Wing Walls and Aprons, Pits and Other Structures

Measured by number.

Headwalls with wing walls and aprons are measured separately from headwalls without wing walls.

Other structures include, but are not limited to:

* Gully / Side Entry / Letter Box inlet pits,
* Alterations to existing structures and/or devices,
* Connections to existing structures and/or devices,
* Inspection pits,
* Junction pits,

### Collar Joints, Bandage Joints, Anchor Blocks and End Caps

Measured by number.

Make allowance for splay ends.

### Inlet and Outlet Channels

Measured in in-situ cubic metres.

Not measured separately for culvert waterways less than 2 square metres in cross‑sectional area and channels less than 50 metres long.

### Open Unlined Drains

Measured in in situ cubic metres.

### Subsoil Drains

Measured in linear metres.

Make allowance for blocks, headwalls, filter material, geotextiles, and connection to existing drainage system.

### Drainage Blanket

Measured in square metres.

Make allowance for filter material, geotextile fabric, drainage pipe and headwalls.

### Demolish and Remove Existing Drainage Structures

Measured as an item.

Make allowance for backfilling.

## Protection Works

### Geotextile Fabric

Measured in square metres of completed area.

Make allowance for supply and placement.

Make allowance for laps and folds.

### Stone Pitching

Measured in square metres of the face area.

### Grouted Stone Pitching

Measured in square metres of the face area.

Make allowance for weep holes.

### Dumped Rock Protection

Measured in cubic metres.

### Rubble

Measured in cubic metres.

### Gabions

Measured in cubic metres.

Includes the excavation, steel wire mesh box and the stone filling.

### Reno Mattresses

Measured in square metres.

Includes the excavation, steel wire mesh box and the stone filling.

### Revetment Mattresses

Measured in square metres.

### Embankment Protection - Concrete

Measured in square metres of the face area.

Make allowance for weep holes.

Make allowance for toes (nib walls) and reinforcement.

### Margins

Measured in linear metres.

Make allowance for reinforcement.

## Road Furniture And Traffic Control Devices

### Tactile Ground Surface Indicators

Measured in square metres installed.

Make allowance for all required preparatory work for installation, and for all fixings, fasteners, adhesives, and other necessary items.

### Fencing

[Show type or types of fencing in schedule]

Measured in linear metres by type.

Make allowance for gates which are not measured separately.

Make allowance for clearing of fence lines which is not measured separately.

Bollards measured by number. Make allowance for installation including footings.

Vehicle movement barriers measured by number for each type (stock length, half stock length, “banana bars” restriction/terminal devices).

### Cyclist Holding Rails

Measured by number.

Make allowance for installation including footings.

### Recycled Plastic Bollards

Measured by number.

Make allowance for installation including footings.

### Culvert Crossing Guardrails

Measured by number by type.

Make allowance for installation including footings.

### Guide Posts

Measured by number.

Make allowance for delineators.

### Road Signs, Supply and Install

Measured by number of each sign type or classification.

[Ensure each sign is scheduled separately]

Make allowance for anti-spear fixings where these are required.

### Reinstate/Relocate Existing Road Signs

Measured by number.

### Flood Gauge Posts

Measured by number.

Make allowance for gauge.

### Cattle Grids

Measured by number per type. (10 m or 12.4 m and with or without concrete approach)

Make allowance for gate in adjacent fence.

[Ensure that the grid size is shown on the drawings]

### Road Safety Barriers - Steel Rail

Measured from centre to centre of end posts in linear metres, for type as specified

Make allowance for posts, footings, spacers, fasteners, delineators and all necessary fittings.

### Road Safety Barriers - Steel Rail Terminals

Measured by number for type installed.

### Road Safety Barriers - Wire Rope

Measured from centre to centre of end posts in linear metres, for type as specified

Make allowance for posts, footings, tensioning devices and equipment, spacers, fasteners, delineators and all necessary fittings.

### Road Safety Barriers - Wire Rope Terminals

Measured by number for type installed.

Make allowance for footings.

## Boat Ramps and Barge Landings

### Dredging strategy

Measured as an item.

Provide details of any Dredging Strategies for all dredging works required during the execution of the works.

### Survey

Measured as an item.

Provide copies of survey reports prepared for the works.

Does not include survey reports commissioned by the Principal or the Superintendent.

### Survey of Intertidal Zone (Clearance Surveys)

Measured as an item.

Allow for surveys to be carried out after each Construction Stage. If the survey shows that the excavation for access to the channel does not meet the requirements, the contractor will be required to resurvey at their own cost to prove compliance.

### Geotechnical investigation

Measured as an item.

Provide copies of geotechnical investigation reports prepared for the works.

Does not include geotechnical investigation reports commissioned by the Principal or the Superintendent.

### Acid sulfate soil investigation

Measured as an item.

Provide copies of acid sulfate soil investigation reports prepared for the works.

Does not include acid sulfate soil investigation reports commissioned by the Principal or the Superintendent.

### Contaminated land investigation

Measured as an item.

Does not include contaminated land investigation reports addressing the listed contaminants or other identified contaminants commissioned by the Principal or the Superintendent.

### Geotextile and geogrid placement – Layout, lapping, and braiding plan(s)

The geogrid layout, lapping, and braiding plan. Measured as an item.

The geotextile layout, and lapping plan. Measured as an item.

Before placement of the geotextile, and geogrid submit plans to the Superintendent.

### Precast panel lifting and placement procedure

Not measured separately. Include in other items.

### Allowance for Construction staging and barge / vessel access during construction

Measured as an item.

### Allowance for Temporary works

Measured as an item for each stage of works.

### Design Review 30%

Measured as an item.

### Design Review 60%

Measured as an item.

### Design Review 90%

Measured as an item.

### Design 100%

Measured as an item.

### Crushed Rock Fill

Measured in in-situ cubic metres for each specified layer.

### Geogrid and Geotextile Fabric

Measured in square metres of completed area for each type contained within the plan shape of the concrete footing, and/or the final founding surface.

Allow for supply, delivery, and installation/placement.

Make allowance for laps and folds.

### Concrete

Measured in cubic metres.

Calculated as the solid volume having the dimensions shown on the drawings

Applicable to all cast in-situ concrete other than protection works for shoulders and batters.

Make allowance for:

* reinforcing steel
* fillets, chamfers, cored holes, and blockouts,
* all ducts, scuppers, steel fitments, water stops and any other embedded items shown on the drawings.
* surface finishes,
* epoxy resins and mortars,
* stainless steel components,
* concrete additives and curing compounds,
* overbreak in concrete cast against ground,
* excess concrete required in tremie operations,
* construction joints,
* all labour, materials, falsework, formwork, equipment,
* all other incidental costs not covered by a separate item,
* placement, finishing, and curing,
* removal and repair of rejected surface finishes,
* removal and replacement of rejected members and concrete,

### Reinforcing steel

Not measured separately. Include in other items.

Make allowance for:

* rolling margins and approximate methods used by suppliers when preparing schedules and invoices,
* reinforcing mesh or fabric laps, and the wastage remaining from cut sheets,
* reinforcement not shown on the drawings.
* non‑structural bars, ties, and fitments required to facilitate the construction,
* supply, handling and placing,
* corrosion protection to reinforcement materials,
* stainless steel components
* Calcium nitrate corrosion inhibitor added to the concrete mix, and
* labour, materials, tools, equipment.

### Expansion Joints

Measured by number

### Waterproof membrane

Measured in square metres of completed area

### Supply and Installation of Precast Concrete Panels

Measured by number of units.

Make allowance for:

* manufacture,
* fillets, chamfers, cored holes, anti slip grooves and blockouts,
* all ducts, lifting anchors, scuppers, steel fitments, water stops and any other embedded items shown on the drawings,
* surface finishes,
* epoxy resins and mortars,
* concrete additives and curing compounds,
* all labour, materials, falsework, formwork, equipment,
* all other incidental costs not covered by a separate item,
* reinforcement steel,
* post‑tensioning anchorages, ducts, grout vents and other related fittings,
* investigation of lack of correlation between jacking force and tendon extension,
* post‑tensioning,
* pressure testing and grouting,
* prestressing,
* placement, finishing, and curing,
* load testing of rejected members,
* removal and repair of rejected surface finishes,
* removal and replacement of rejected members and concrete, and
* handling and storage.

Payment for precast members will be made when the units are approved, on site, in position.

### Delivery of Precast Concrete Panels

Measured by number of units.

Payment for precast members will be made when the units are on site and undamaged or repaired as approved by the Superintendent.

Any damage to precast panels are the responsibility of the contractor to rectify prior to payment.

### Installation of Precast Concrete Panels

Measured by number of units.

Payment for precast members will be made when the units are installed in place as per the project drawings and undamaged or repaired as approved by the Superintendent.

### Stainless steel links including bolting and grouting

Measured by number

Include all works required as per the project drawings including link bars, bolts, tape, grouting.

### Raised Retroreflective Pavement Markers

Measured by number of each type specified.

Allow for supply, delivery, and installation. Includes preparation of pavement. Includes replacement of defective devices, and replacement of incorrectly installed devices.

### Flexible concrete mattress including pins

Measured in square metres of completed area

Include all supply and installation.

Include all requirements as per the project drawings and manufacturers recommendations

### Concrete edge treatment

Measured in linear metres for each type.

Make allowance for excavation, bedding and backfilling

### Concrete footings for bollards

Measured by number.

Make allowance for excavation, bedding and backfilling

### Supply and install new bollards

Measured by number.

Maker allowance for

* supply, fabrication, delivery, and installation,
* bolts, nuts, washers, fastenings and all incidentals necessary for the work,
* shop and field splicings,
* provision of test certificates and Certificates of Compliance,
* all labour, materials tools, equipment,
* jigs, cleaning, protective coatings, and,
* inspection by the Superintendent.

Payment (if specified) will not be made until the items are approved, in place.

### Coffer dams, timbering, shoring, sheeting, formwork, falsework, scaffolding

Not measured separately. Include in other items.

### Excavation and stockpiling of sediments for access channel to basin at toe of ramp (tidal zone)

Measured in in-situ cubic metres.

* Payment will be made from survey prior to commencement of excavation and survey after excavation to -2.25m RL with 1:6 batters.
* No payment for over excavation.
* No payment for additional excavation required due to collapse of sediments into the excavation due to tidal influences or other factors.

### Disposal of clean fill to landfill (including approvals)

Measured in in-situ cubic metres.

Include all costs of loading, transport, unloading, approvals, and disposal fees

### Additional cost if disposal to Darwin required – Provisional Sum

Measured in in-situ cubic metres.

Provisional Sum Item only

Payment only for works approved by the Superintendent.

Allow for all loading, transport, unloading, approvals, and fees associated with the transportation and disposal to landfill in Darwin.

### Excavation For Foundations and Footings

Measured as the cubic metre volume contained within the plan shape of the concrete footing, the final founding surface, and the lower of either the finished surface or the surface level at the time of excavation.

Make allowance for:

* the concrete working platform,
* fencing,
* overbreak and over‑excavation and their backfilling with concrete,
* the various materials likely to be encountered,
* removal and replacement of unsuitable materials, and
* backfilling with approved material.

Where excavation is not a specific Schedule item, make allowance for it within the rates of other appropriate items in the Schedule.

### Demolition and disposal of existing boat ramp, and/or barge landing, and/or protection works

Measured as an item.

Include demolition of existing boat ramp and/or barge landing, associated concrete, existing protection works, other obstacles, and other items specified, or shown on drawings, as items to be demolished.

Allow for stripping and crushing concrete if disposing at landfill.

All approvals and fees associated with disposal are the responsibility of the contractor.

Allow for loading, transport, and unloading.

### Demolition and disposal of other existing structures

Measured as an item for each structure.

Include all costs to remove the structures and services to, or associated with the structures, or those within the site of the works and specified and/or as shown on the drawings to be demolished. Allow for loading, transport, unloading, and disposal of the demolished structures, services, and materials. Allow for all costs and fees.

Make allowance for backfilling.

Payment will be made on demolition and removal.

### Earthworks in Cut

Measured in in-situ cubic metres.

Include protection of existing structures and services which are to be retained.

The excavation for the anchor beam is measured as the cubic metre volume contained within the plan shape of the concrete footing, the final founding surface, and the lower of either the finished surface or the surface level at the time of excavation.

Make allowance for:

* fencing,
* overbreak and over‑excavation and their backfilling with concrete,
* the various materials likely to be encountered,
* backfilling with approved material.

### Fill for foundations

Measured as the cubic metre volume contained within the plan shape of the concrete footing, the final founding surface, and the lower of either the finished surface or the surface level at the time of excavation. Make allowance for .02 thick waterproof polythene membranes

### Core Fill

Measured as the cubic metre volume contained within the plan shape of the concrete footing, the final founding surface, and the lower of either the finished surface or the surface level at the time of excavation.

Make allowance for .02 thick waterproof polythene membranes.

### Unsuitable Material

Measured in in-situ cubic metres.

Unsuitable material below the design excavated surface to be removed before constructing foundations and replaced with crushed rock core fill.

Obtain directions from the Superintendent before works commence.

### Treatment of Acid Sulphate Soils

Plan - Measured as an item.

Treatment – Measured in in-situ cubic metres.

If acid sulfate soils are confirmed, the contractor must develop an Acid Sulfate Soils Management Plan and submit to the Superintendent for review. Treat the acid sulfate soils as per the plan. The plan is to be developed, implemented, and monitored by a suitably qualified independent organization.

### Temporary bunding to acid Sulphate soil areas

Not measured separately. Include in other items.

### Access Channel Final Profiles

Not measured separately. Include in other items.

### Excavation and Re-Profiling of Difficult Material

Measured in in-situ cubic metres.

Should re-profiling of material which is difficult to excavate (too cohesive, cemented etc.) be encountered, the Contractor to employ a different technique of removing the material which is to be approved by the Superintendent.

### Crushed Rock - 75 mm - Under Slabs

Measured in in-situ compacted cubic metres.

Allow for supply, delivery, placement, and compaction.

### Gravel Blinding - 10 mm

Measured in in-situ compacted cubic metres.

Allow for supply, delivery, placement, and compaction

### Shoulders and Shoulder Batters – Cast Insitu Concrete

Measured in square metres of the face area.

Make allowance for weep holes.

Make allowance for toes (nib walls) and reinforcement.

### Shoulders and Shoulder Batters – Fully Grouted Stone Pitched

Measured in square metres of the face area.

Make allowance for weep holes.

Allow for supply, delivery, installation, and replacement of non-conforming materials.

### Shoulders and Shoulder Batters - Stone Pitched

Measured in square metres of the face area.

Allow for supply, delivery, installation, and replacement of non-conforming materials.

### Rock Armour

Measured in cubic metres.

Allow for supply, delivery, installation, and replacement of non-conforming materials.

### Marine Works - Gangway

Measured by number.

### Marine Works - Pontoon Units

Measured as an item

### Marine Works – Electrical Works

Measured as an item

### Ramp Signage

Measured by number of each sign type or classification.

Allow for supply, delivery, and installation, including footings, and fixtures and fittings.

### Navigational Aids

Applies to Navigational Aids listed below.

Allow for supply, delivery, and installation.

Includes replacement of defective devices, and replacement and/or reinstallation of incorrectly installed devices.

Includes moorings and connection between moorings and devices, including all accessories, fixings, and hardware. Includes installed piles and fixings for pile mounted devices.

Installed devices to be fully operational and working correctly.

Land based devices include footing, mounting member (post, pile) and fixings.

### Navigational Aids - Navigational Buoys

Measured by number of each type specified.

### Navigational Aids - Solar Marine Lantern

Measured by number of each type specified.

### Navigational Aids - Solar Marine Lantern Power Supply

Measured by number of each type specified.

### Navigational Aids - Sector Lantern

Measured by number of each type specified.

### Navigational Aids - Sectored Port Entry Light

Measured by number of each type specified.

### Navigational Aids - Leading Light

Measured by number of each type specified.

### Piles, dolphins and the like

Measured by number for each type.

Does not include those for navigational aid devices shown above.

### Completion - Operation and Maintenance Manuals

Not measured separately. Include in other items.

### Completion - As-Constructed Drawings

Not measured separately. Include in other items.

### Completion - Documentation Detailing Navigational Aid Installation

Not measured separately. Include in other items.

### Completion - Warranties

Not measured separately. Include in other items.

## Pavement Marking

### Establishment

Mobilisation - not measured separately

Demobilisation - not measured separately

Include the cost in the rates for the applicable items

### Pavement Marking

Refer to the T***able – Application Rates – All Longitudinal and Transverse Pavement Markings*** in the **Pavement Marking Conformance Tolerances** clause in PAVEMENT MARKING.

Lengths of line being painted are based on the total length for the work item. For example, 2,500m of broken line will paid as a single rate item within the ordered lengths ‘Broken Line’.

**Glass Beads**

Make allowance for the supply and application of specified glass beads with all markings.

Payment for Type B-HR beads for initial new works application shall be made at the tendered Schedule of Rates for all pavement marking.

Payment for Type B-HR beads for subsequent remark and all remarking works shall be made at the tendered Schedule of Rates for all rural pavement marking.

Payment for Type D-HR beads for subsequent remark and all remarking works shall be made at the tendered Schedule of Rates for all urban pavement markings.

**Line markings**

The following are measured in linear metres for type of painted line, inclusive of unpainted gaps:

* + - * + Continuity line - (single broken).
        + Continuity line special (single broken).
        + Unbroken lane line - (single continuous).
        + Broken lane line or separation line - (single).
        + Barrier lines both directions - (double continuous longitudinal lines).
        + Barrier lines one direction - (double longitudinal lines broken on one side, continuous on the other).
        + Edge line - (single continuous).
        + Single Yellow Line - (yellow single continuous).
        + Outline (around medians)
        + Stop Lines (single continuous)
        + Hold Lines (single continuous)
        + Turn Lines (single broken)
        + Special Purpose Broken Lane Line (Alberta Line)
        + Signalized Pedestrian Crossings (single broken)
        + Car / Bus / Truck Parking Bays

The following are measured by number:

* + - * + Arrow Heads (single, double, triple, merge)
        + Numbers and Letters
        + Disabled Symbols

Chevrons and Speed Humps are measured by square meter (within the boundary/outline/perimeter of the areas in which the chevrons and/or speed humps are located, includes painted and unpainted sections).

Removal of existing pavement markings and disposal of the waste is measured as an item.

Provision of audio tactile line marking is measured in lineal metres including unpainted gaps.

Other lines are measured in lineal metres.

Other large areas are measured in square metres of painted areas only.

The following are measured as nominated for Aerodrome Marking:

1. Runway centreline measured in linear metres inclusive of unpainted gaps (white 0.300m wide) (MoS 8.3.3)
2. Runway designation markings. measured by number of digits (white 9.0 m length) (MoS 8.3.4)
3. Runway end markings measured in linear metres of painted line (white 1.2 m wide) (MoS 8.3.5)
4. Runway Threshold Markings measured by number (white 30 m x 1.5 m wide) (MoS8.3.8)
5. Taxi Guideline Markings. measured in linear metres of painted line (yellow 0.150m wide) (MoS 8.4.2)
6. Runway holding positions Pattern “A” measured in linear metres include all painted lines required to meet detail in MoS 8.4.3 (yellow 0.150m wide).
7. Taxiway edge markings and Apron markings (measured in linear metres of double painted line (yellow 0.150m wide spaced 0.150m apart) (MoS 8.4.5 and 8.5.3)
8. Lead Out Line measured in linear metres of painted line (yellow 0.150m wide) (MoS 8.5.22)
9. Alignment Line measured by number for a 17.0 m length of painted line (yellow 0.150m wide) (MoS 8.15.18)
10. Parking Clearance Line measured in linear metres of painted line to detail in MoS 8.4.5 (yellow and red lines)

### Raised Reflective Pavement Markers.

Supply and install, and/or removal and disposal. Includes preparation of pavement.

Measured by number of each type as nominated in the schedule of rates.

### Compliance with the requirements for Project Control and Procedures, Calls and Payments

Not measured separately.

Include all costs associated with the Project Control, and Procedures Calls and Payments clauses, in the rates for the applicable items.

### Distance Measuring Equipment and Communication Equipment

Not measured separately.

Include the cost of Distance measuring Equipment and Communication Equipment in the rates for applicable items

### Payment Generally.

Payment for Scheduled Work shall be made at the tendered Schedule of Rates.

Payment for Priority Work shall be made at the tendered Schedule of Rates and an additional payment for Priority attendance.

Payment for Urgent Works shall be made at the tendered Schedule of Rates, and an additional payment for urgent attendance.

## Landscape

### Site Preparation

Measured as an item.

Make allowance for any filling and levelling required.

### Topsoil

Measured in square metres.

Make allowance for any supply required, and spreading.

### Trees, Shrubs and Ground Covers

Measured by number of each type of genus and species.

Make allowance for supply of plants, mulch, fertilisers, excavation of planting holes, and planting.

### Irrigation

Measured as an item.

Make allowance for any design requirements, cost of approvals and connection to the water supply, cost of testing, and provision of as constructed drawings.

### Grassing

Measured in square metres.

Make allowance for reseeding.

### Watering

Measured as an item.

Note that cost of water will be borne by the Superintendent.

## Ducting And Conduits

### Electrical Ducting

Measured in linear metres.

Make allowance for excavation and backfilling trenches, marker tapes, draw wires and kerb markers.

### Water Ducting

Measured in linear metres.

Make allowance for excavation and backfilling trenches, marker tapes, draw wires and kerb markers.

### Conduit Markers

Measured by number.

## Traffic Control Signals and Intelligent Transport Systems

### Supply and Install Pedestals and Footings

Measured by number.

### Supply and Install High Mast Pedestals and Footings

Measured by number.

### Supply and Install Non‑standard Pedestals and Footings

Measured by number.

### Supply and Install Vehicle and Pedestrian Signal Lanterns

Measured by number.

Make allowance for terminal assembly, target boards, cowls and louvres, and all ancillary items.

### Install and Commission Controller

Measured as an item.

Make allowance for all ancillary items such as surge reduction filter and earth stake.

### Supply, Install and Test Multicore Connecting Cable

Measured in linear metres.

### Supply, Install and Test Detector Feeder Cables

Measured in linear metres.

### Supply and Install Detector Loops

Measured by number.

### Provision of Power Connection

Measured as an item.

### Supply and Install Conduits

Measured in linear metres.

Make allowance for draw wires, end caps, and ancillary items.

### Supply and Install Conduit Junction Pits

Measured by number.

### Supply and Install Detector Pits

Measured by number.

### Supply and Install Pedestrian Push Button and Audio‑tactile Assemblies

Measured by number.

### Supply and Install Communications Isolation Pillar

Measured as an item.

### Documents and Plans

Measured as an item.

### Provision Of Communication Line

Measured as an item.

## Traffic Counting Stations

### Install Cabinet

Measured as an item.

Make allowance for supply and installation of terminal blocks and switchboard.

Make allowance for drawing of labelled loop layout and terminal blocks.

### Construction of Pole Foundation

Measured as an item.

Make allowance for excavation, reinforcement and rag bolts.

### Supply and Install Vehicle Loop Detectors

Measured by number.

Make allowance for cutting, install cable, junction boxes and detector feeder cables.

### Install Piezo Axle Sensors

Measured by number.

Make allowance for supply and installation of feeder cables.

### Install Pole Assembly

Measured as an item.

Make allowance for installation of solar power supply.

### Supply and Install Conduits

Measured by length in lineal metres.

Make allowance for excavation, ducting, reinstatement and connections.

## Street Lighting

### Supply and Install Light Columns

Measured by number.

Make allowance for supply and installation of street lighting columns including the following:

* Determining the locations of other services, above, on, and below ground;
* trenching and supply and installation of cables including marker tape and backfilling;
* supply and installation of footings and hold down bolts;
* supply and installation of distribution pillars and control equipment;
* luminaires and lamps;
* connections; and
* testing and commissioning.

### Supply and Install Conduits

Measured in metres.

Make allowance for draw wires, end caps and ancillary items.

Cable installation is paid for in the “Install Light Columns” item.

### Removal of Existing Street Lighting

Measured by number.

Make allowance for removal of existing footings and the delivery of the salvaged materials to the specified location.

### Provision of Temporary Lighting

Measured as an item.

Make allowance for temporary lighting and additional work required by Power and Water Corporation.

### Connection of Power

Measured as an item.

Make allowance for fees and charges and additional work required by Power and Water Corporation.

## Directional Boring

### Directional Boring With Pipe Casing

Measured in linear metres.

Includes supply of pipe casing and filling of cavities.

### Directional Boring Without Pipe Casing

Measured in linear metres.

Includes filling of cavities.

## Protective Coatings

Measured as an item for each coating system required.