SECTION 711 - WIRE ROPE SAFETY BARRIER (WRSB)

~~##This section cross-references Sections 703, 708 and 812.~~
~~Section 703 should be included in the specification when this section is used.~~
~~If any of the above sections are relevant, they should be included in the specification.~~
~~If any of the above sections are not included in the specification, all references to those sections should be struck out, ensuring that the remaining text is still coherent:~~

711.01 GENERAL

This section covers the requirements for the supply and/or installation of wire rope safety barrier (WRSB) systems and associated works.

711.02 STANDARDS

(a) Australian Standards

Australian Standards are referenced in an abbreviated form (e.g. AS 1012).

AS 1012	Methods of testing concrete
AS 1214	Hot dip galvanized coatings on threaded fasteners
AS 1379	Specification and supply of concrete
AS 1397	Continuous hot-dip metallic coated steel sheet and strip-coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 1163	Cold formed structural steel hollow sections
AS/NZS 3000	Wiring rules
AS/NZS 3750	Paints for steel structures
AS/NZS 3845	Road safety barrier systems
AS/NZS 4680	Hot dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4792	Hot dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process

(b) Other Documents

Proprietary	Manufacturer's specification and drawings for the proprietary WRSB system and associated national or international standards.
NCHRP 350	National Cooperative Highway Research Program Report 350
AASHTO	Manual for Assessing Safety Hardware (MASH-1) 2009
Austroads	Guide to Traffic Management
VicRoads	Safe System Design Notes
VicRoads	Traffic Engineering Manual
VicRoads	Road Design Notes
VicRoads	Road Design Note RDN 06-02 - The use of wire rope safety barriers (WRSB)
VicRoads	Road Design Note RDN 06-04 - Accepted safety barrier products
VicRoads	Standard Drawings

Section 175 details the reference to these documents.

711.03 WRSB SYSTEM

The WRSB shall be a four wire rope proprietary system, which satisfies the requirements of the current version of VicRoads Road Design Note RDN 06–02, including:

(a) Conformance with the Recommended Procedures for the Safety Performance Evaluation of Highway Features, National Cooperative Highway Research Program (NCHRP) Report 350 -with the matrix of test conditions, as follows:

(i) minimum Test Level 4 for the length of need and transition as shown in Table 3.1; and

(ii) minimum Test Level 3 for all terminals as shown in Table 3.2.

(b) Conformance with the requirements of AS/NZS 3845.

(c) Details of the particular WRSB systems (longitudinal barrier and terminals) have been submitted to VicRoads and accepted for use in accordance with the current version of VicRoads Road Design Note 06-04.

711.04 MATERIALS

(a) WRSB Materials

Materials for the WRSB shall be manufactured in accordance with the specification for the proprietary WRSB system and satisfy the requirements of the system for a minimum design life of 20 years. The proprietary WRSB systems shall have the same composition, mechanical properties and geometry as those used in the verification and acceptance tests in its country of origin. Posts may also be manufactured from steel complying with AS/NZS 1163 or AS 1397.

Steel posts shall be either:

- Hot dipped galvanised in accordance with AS/NZS 4680; or
- Pre-galvanised in accordance with Z600 coating type to AS 1397 (total minimum coating mass on both surfaces of 600 g/m^2); or
- Pre-galvanised in accordance with ZM275 coating type to AS 1397 (total minimum coating mass on both surfaces of 275 g/m^2)

The weld seam made during forming of pre-galvanised steel post sections shall be repaired in accordance with AS/NZS 4792, Section 3 by applying a coating using a metal spraying system employing a suitable zinc or zinc-alloy wire/powder.

(b) Protective Treatment

Hot dipped galvanised posts or pre-galvanised posts shall be powder coated with a thermosetting polyester powder coating (Dulux Anotec Heritage Green or approved equivalent), while specified posts shall be white. The powder coating shall provide a grainy, low gloss appearance. Table 711.041 provides details of the location of different post types.

Table 711.041

Colour	Location
Galvanized	##:
Green (low gloss)	##:
White (low gloss)	##:

(i) **Green Posts** shall be powder coated with a thermosetting polyester powder coating (Dulux Anotec Heritage Green or approved equivalent)

(ii) **White Posts** shall be white and the powder coating shall provide a grainy, low gloss appearance.

All galvanised coatings shall be smooth, adherent and free from stains, gross surface imperfections, markings, brand names and/or inclusions.

Hot-dipped galvanised coating on bolts, nuts and washers shall comply with AS 1214.

Where the galvanising has been damaged, the coating shall be repaired by re-galvanising or by painting with a minimum of two coats of a zinc-rich inorganic paint in accordance with AS/NZS 3750.9 and one coat of aluminium paint.

(c) Concrete

(i) Portland Cement-based Concrete

Portland cement–based concrete shall be N20, N25 or N32 standard strength grade, as specified for the application and complying with the requirements of AS 1379 and as stated in Table 711.042.

(ii) Geopolymer Binder-based Concrete

Geopolymer binder-based concrete shall comply with the requirements of Section 703 and manufactured to comply with the minimum 28 day compressive strength requirements for each strength grade ranging from 20 MPa to 32 MPa as stated in Table 711.042.

The use of chemical admixtures shall comply with the requirements of Section 703.

Table 711.042

Portland Cement Concrete Strength Grade	Geopolymer Binder Concrete Strength Grade	Minimum Compressive Strength at 28 days (MPa)
N20	20	20
N25	25	25
N32	32	32

711.05 CERTIFICATES OF COMPLIANCE OF MATERIALS, COMPONENTS AND PROCESSES

The Contractor shall submit for review by ~~the Superintendent~~ Council not less than 14 days prior to the proposed use of materials and components, a signed statement including relevant test reports demonstrating the compliance of the materials and components with the specification for the proprietary WRSB system and this specification.

HP The installation of the WRSB shall not proceed until the signed statement and certificates of compliance have been accepted by ~~the Superintendent~~ Council.

The Contractor's statement shall also be supported with certificates of compliance certifying that the zinc coating mass of galvanised steel components, the powder coating and welding procedures for relevant components of the proprietary WRSB systems are in accordance with the manufacturer's specification and the associated national or international standards and the specification.

The Contractor's statement and supporting documentation shall identify all relevant national or international standards with which the various materials, components or fabrication and welding processes must comply.

711.06 MATERIAL HANDLING AND STORAGE

All materials and components shall be handled and stored such that damage that may affect performance is avoided, particularly to threaded components. Care shall be taken to avoid damage to galvanised and powder coating systems. Any damage that occurs shall be made good in accordance with the national or international standard with which the various materials or components must comply, the specification, and to the satisfaction of ~~the Superintendent~~ Council. Wire ropes shall be supplied on reels and shall not be twisted or kinked.

The Contractor shall provide, for each of the materials and components, a copy of the manufacturer's information as specified below:

(a) Manufacturer's name

(b) Product reference

(c) Certificate of date of manufacture.

All posts shall be permanently and clearly marked with the manufacturer's identification mark, which shall be clearly visible at the completion of the installation.

711.07 INSTALLATION OF WRSB

(a) General

The Contractor shall install the WRSB in accordance with the drawings and the manufacturer's requirements.

(b) Post Foundations and Anchor Blocks

(i) Where no geotechnical investigation is undertaken the proprietary WRSB supplier's nominated default anchor and post footing shall be used in accordance with the manufacturer's product manual and VicRoads Road Design Note RDN 06-04.

(ii) A geotechnical investigation shall be undertaken to determine the soil properties and to ensure the accuracy of the installation and performance of the barrier where:

(1) The Contractor proposes to use an approved alternative anchor or post foundation as identified within the manufacturer's product manual and VicRoads Road Design Note RDN 06-04.

(2) Where site constraints restrict the use of the default or an approved alternative anchor or post foundation. In which case the Contractor shall provide the geotechnical information to the proprietary WRSB supplier and obtain a written statement from the supplier that the anchor block size and post foundation size are appropriate for the existing natural or constructed ground conditions and the installation meets the operational requirements.

The geotechnical investigation shall ensure that the completed in situ concrete post foundation system meets the requirements of the proprietary WRSB system and will not crack, lift or displace during impact by a vehicle equivalent to the design vehicle during the design life of the barrier.

The Contractor shall confirm with the supplier the geotechnical information required, but shall include as a minimum:

- soil bearing pressure
- soil type
- average allowable soil stress.

The Contractor shall include sufficient time for the geotechnical investigation in its program.

HP **Anchor blocks and post foundations shall not be constructed until the design and manufacturer's acceptance has been reviewed by ~~the Superintendent~~ Council.**

(iii) General Construction and Concrete Requirements

HP **Anchor blocks and post foundation shall not be cast until inspected by ~~the Superintendent~~ Council.**

Anchor block foundation and post foundation holes shall be free of loose material, debris and water prior to the placement of concrete.

Further to any installation guidelines for construction of anchor blocks for a proprietary WRSB system, the Contractor shall form anchor block holes by excavating the hole to the correct dimension, shape, level and alignment specified by the proprietary system.

Over-excavation of the anchor block excavation shall not be reformed with form work or soil, but shall be cleaned out and filled with concrete forming the concrete anchor block.

In situ concrete post foundations shall be constructed using N25 strength grade concrete or 20 MPa geopolymer binder-based concrete conforming to the requirements of Clause 711.04(c).

Notwithstanding the specific proprietary WRSB system requirements, the anchor blocks shall be constructed using N32 strength grade concrete or 32 MPa geopolymer binder-based concrete conforming to the requirements of Clause 711.04(c).

All anchor frames, posts, sockets and reinforcing rings shall be positioned to the line and levels as specified in the drawings and shall be secured against displacement during placing of the concrete.

No construction joints shall be provided within the anchor block.

The finished surface of all anchor blocks and footings shall be shaped such that water cannot pool on the surface.

(c) Wire Rope and Posts

The Contractor shall install the wire rope and posts to the line, level and height as shown on the drawings, the specification, manufacturer's specification and to the tolerances specified in Clause 711.08.

Posts shall be spaced in accordance with the manufacturer's specification unless otherwise required by the design requirements of VicRoads Road Design Note RDN 06-02. Posts shall be installed with their correct profile in the direction of travel.

Intermediate anchors shall be spaced in accordance with the lesser of the manufacturer's specification or Section 4.3.7 of VicRoads Road Design Note RDN 06-02, and installed as per the manufacturer's specification and drawings.

The vertical alignment of the wire ropes shall be smooth and uniform, without sudden changes in gradient and generally consistent with the vertical alignment of the edge of the traffic lanes. The length of the post socket or overall length of the post may be adjusted in accordance with the tolerances specified by the manufacturer to achieve the specified vertical alignment. **Any such adjustment shall be as per the manufacturer's specification and obtained written statement of advice, which shall be submitted by the Contractor to ~~for review by the Superintendent~~ Council.**

HP **The WRSB shall not be installed until the set out alignment of the posts has been reviewed and accepted by ~~the Superintendent~~ Council.**

The Contractor shall allow ~~the Superintendent~~ Council a minimum of one working day to inspect the pegged alignment and a further minimum period of five working days to provide its acceptance including details of any required changes in alignment, length or number of installations or terminals.

In the event that the horizontal and/or vertical geometry of the alignment do not satisfy the manufacturer's requirements or the specification, the Contractor shall immediately notify ~~the Superintendent~~ Council advising details of the deficient areas along with the proposed dispositions. Any adjustments accepted by ~~the Superintendent~~ Council shall then be made to the alignment or the level of the median or outer verge to ensure that the installation complies with the requirements of the proprietary WRSB system and the specification.

(d) Location of Posts Adjacent to Batter Hinge Points

WRSB posts constructed with the manufacturer's default post footing design shall be located at the greater of a minimum 1 m offset from the batter hinge point and the manufacturer's specification, subject to dynamic deflection requirements being met. The batter hinge point is defined as per VicRoads Standard Drawing SD 4551.

Where the minimum offset to the batter hinge point is to be reduced, the depth of footing is to be adjusted as per the manufacturer's specification and the Contractor shall obtain a written statement of advice from the manufacturer based on geotechnical testing. This shall be submitted by the Contractor to ~~for review by the Superintendent~~ Council. Side Load Testing as per Clause 711.07(f) shall also be undertaken at 45 degrees to the WRSB in ALL directions at locations nominated by ~~the Superintendent~~ Council.

(e) Tensioning of the Wire Rope

Each wire rope shall be tensioned in accordance with the relationship between rope tension and ambient temperature, applicable to the proprietary WRSB system as per the manufacturer's specification. The tension shall be measured using a tension meter supported with a current calibration certificate. Prior to commissioning the WRSB system, the tension in each wire rope shall be checked, and re-tensioned if required, to ensure compliance with the ambient temperature/rope tension relationship.

The Contractor shall prepare and submit a tensioning report to ~~for review by the~~ ~~Superintendent~~ Council within seven days of the tensioning works being carried out.

(f) Loading Test of Post Foundations

Side load testing of posts shall be undertaken at locations nominated by the Superintendent Council prior to the installation of the wire rope to provide evidence that the foundations satisfy the specification requirements and will not crack, lift or displace during impact by a vehicle equivalent to the design vehicle during the design life of the barrier.

~~The Superintendent~~Council may request side load testing be undertaken at the discretion of ~~the~~ ~~Superintendent~~ Council:

- where non-standard post foundations are to be used, i.e. not the manufacturer's nominated default foundation
- in the event that the soil type cannot be verified
- ground conditions are such that the required depth of footing cannot be installed
- in certain geological conditions, i.e. a rock cut section where the post foundation may be reduced in length, or where soft clay or medium to loose sand profiles have been identified and the standard foundation dimensions may be insufficient
- where posts are required to be located at the minimum offset to batter hinge points [refer Clause 711.07(d)].

Side load testing of posts shall be carried out by applying a force of 10 kN (approximately 1 tonne) to the post 600 mm above ground level at an angle of 45 degrees to the WRSB. The top of the footing shall not move more than 3 mm. If the footing withstands the force with a movement of less than 3 mm at ground level then the footing shall be considered acceptable.

The test shall be carried out by placing a post into the completed concrete footing and using a lever hoist or equivalent and calibrated load cell anchored to a truck.

At the completion of the load testing, the Contractor shall remove the test posts and rectify any disturbed or damaged post foundations.

The result of all tests shall be recorded digitally (photograph) and logged against location. For any footings failing the test the Contractor shall seek advice from ~~the Superintendent~~ Council based on relevant advice from the manufacturer, take remedial measures and re-test the rectified post plus one other similar post at no cost to Council ~~the Principal~~.

(g) WRSB over Box Culverts and Concrete Pipes

Where WRSB has been designed to straddle a box culvert or a concrete pipe crossing, as shown on the drawings or as stated in this specification, the post spacing shall be located centrally about the box culvert or concrete pipe. Adjacent post spacing at box culverts or concrete pipe crossings may be locally reduced to meet this requirement.

711.08 CONSTRUCTION TOLERANCES

Tolerances for construction of the WRSB system shall be in accordance with the lesser of the manufacturer's specification or as follows:

(a) vertical tolerance on the height of the WRSB shall be ± 20 mm from the design line

(b) longitudinal line tolerance for the WRSB system shall be ± 20 mm in plan view

(c) tolerance on post spacing shall be ± 25 mm.

WRSB height shall be measured from the road pavement when it is located within 1.5 m of the edge of pavement. For distances beyond 1.5 m, the WRSB height shall be measured from the ground surface at its location.

711.09 COMPLIANCE AUDITING OF BARRIER SYSTEM INSTALLATION

~~HP~~ **Further to Clause 711.07 Installation of WRSB, and prior to the issue of the Statement of Compliance ~~Certificate of Practical Completion~~, the Contractor shall arrange for a safety barrier compliance audit on all WRSB installations constructed. ~~under the Contract~~.** The audit shall be undertaken and a report prepared by the Australian Licensed Supplier of the safety barrier system. A Certificate of Compliance (CoC) signed by the Contractor's Representative and the Licensed Supplier shall be provided certifying that the product systems (including terminals) have been installed in accordance with the manufacturer's Installation Manual and this specification. A CoC shall be provided for each length of WRSB installed including terminals.

In addition the Contractor shall complete and submit to ~~the Superintendent~~ Council a signed copy of the manufacturer's Installation Checklist / Inspection and Test Plan as per the manufacturer's Product and Installation Manual.

711.10 DELINEATORS

The Contractor shall supply and fasten delineators to the WRSB system, comprising post caps fitted with 50 x 100 mm Class 1A retro-reflective material, as defined in AS/NZS 1906.2, or placed on the front top of the post above the wire ropes. Delineators shall be installed at approximately 12.5 to 15 m spacing. Delineators shall not be placed on flared sections.

The Contractor shall arrange delineators so that vehicles approaching from either direction at night will only see:

- red delineators on the left side of one-way and two-way roadways
- white delineators on the right side of two-way roadways
- yellow delineators on the right side of one-way roadways.

Delineators shall not be installed on WRSB posts when the WRSB offset is greater than 4 m from the traffic lane. White guide posts with delineators shall be installed in accordance with the VicRoads Traffic Engineering Manual Volume 2.

Where guard fence delineators are required to be installed as part of the Works, they shall be installed in accordance with the VicRoads Traffic Engineering Manual Volume 2.

711.11 STRAY CURRENT EFFECTS ON WRSB

All wires within a WRSB system shall be tested for induced currents and voltages relative to all other adjacent wires and the ground using calibrated equipment in accordance with AS/NZS 3000 Wiring Rules by a qualified electrical contractor. Tests shall be undertaken at each location where two sections of WRSB overlap at anchorage points. Where an induced current or voltage is recorded, or high voltage powerlines are within 50 m of the barrier, the WRSB system shall be earthed to remove current or voltage running through the wires.

All wires in the WRSB and overlapping sections of WRSB shall be connected to earth using a flexible system, detailed in a submission for acceptance by ~~the Superintendent~~ Council. The earthing shall occur at the location of overlapping WRSB and at a maximum of 500 m intervals along the length of each affected section of WRSB.

Prior to putting the WRSB system into service the earthing shall be checked to ensure that any further stray current effects have been eliminated.

711.12 INTERACTION OF WRSB WITH EXISTING ASSETS

The Contractor shall install the WRSB to provide for its dynamic deflection that does not interfere with any existing roadside furniture.

The Contractor shall remove any guard fence located between existing assets, such as gantry legs, variable speed signs and bridge piers, and the WRSB as shown on the drawings. The Contractor shall allow for the interaction between the WRSB and all roadside furniture, including slip base light poles, by providing for the maximum barrier deflection as per VicRoads Road Design Note RDN 06-02, or providing reduced post spacing therefore reducing the WRSB dynamic deflection as per VicRoads Road Design Note RDN 06-04 and the manufacturer's specification.

The Contractor shall integrate the WRSB with any existing lengths of safety barriers protecting ends of bridge parapets as shown on the drawings and in accordance with Clause 711.13.

The Contractor shall not connect new WRSB to existing WRSB unless it is the same system comprising the same components.

The Contractor shall remove and dispose of existing guide posts that conflict with a new WRSB, including any in front of a new WRSB located within a 4 m offset from the traffic lane and any behind a new WRSB greater than 4 m offset from the traffic lane, as well as bollards or other roadside furniture affected by the Works or where shown on the drawings or instructed by ~~the Superintendent~~ Council.

711.13 MODIFICATION TO THE WRSB AT THE INTERFACE WITH GUARD FENCE

The Contractor shall be responsible for any alteration and/or relocation of any existing guard fence, including the removal and disposal of existing redundant guard fence, dismantling and reinstating existing guard fence (including terminals) and extension of existing guard fence (including the provision of a concrete maintenance strip) where required and as shown on the drawings.

The Contractor shall terminate the WRSB at the interface with the guard fence ensuring sufficient overlapping of systems as detailed on the drawings.

Any variations to the interface of the WRSB with the guard fence shall be reviewed for acceptance by ~~the Superintendent~~ Council prior to installation of the WRSB.

Any modifications to the guard fence shall be in accordance with Section 708 and the relevant VicRoads Standard Drawings.

The Contractor shall be responsible for the supply of all materials and labour necessary to undertake the modification works as specified above and as shown on the drawings.

711.14 ASSOCIATED PAVEMENT (SHOULDER) WIDENING

The Contractor shall widen the existing shoulder on the median or outer verge applications adjacent to locations where WRSB is to be installed, in accordance with VicRoads Supplement to AGRD Part 6 Section V6.7.12, or as shown on the typical cross section, drawings or specification.

The Contractor shall provide additional pavement between the edge of existing pavement and the WRSB. The Contractor shall adopt the nominated pavement design. Where a nominated pavement design has not been specified the Contractor shall construct the widening with a pavement that matches the existing.

The edge of shoulder shall be saw-cut to provide a neat straight edge against which the additional pavement can be placed.

711.15 MAINTENANCE STRIP FOR WRSB

The Contractor shall provide maintenance strips beneath the WRSB and terminals as indicated on the drawings and/or as nominated in Table 711.151.

*** **Table 711.151 Maintenance Strip Locations**

Location	Start CH	Finish CH	Direction	Strip Type
## The following item is an example only - change text to suit your specification. DELETE THIS ROW BEFORE PRINTING:				
Road Name	00	125	North Bound	Concrete

The Contractor shall provide a concrete maintenance strip beneath the WRSB and terminals in unpaved areas of median or outer verge applications as shown on the drawings or as specified. Where ~~concrete~~ paving adjoins the sealed carriageway, the paving shall match the level of the adjacent shoulder.

(a) Concrete Maintenance Strips

The concrete maintenance strip shall be placed parallel to the barrier, such that it extends a minimum of 300 mm clear of both sides of the WRSB post or as otherwise specified. It shall be constructed with minimum 2% crossfall or with the same slope as abutting pavement and shall be constructed flush with the adjacent ground level so the finished level does not impede road runoff.

The concrete maintenance strip shall be placed between and around the post foundations to not affect the performance of the WRSB.

The concrete maintenance strip shall consist of minimum 75 mm depth of N20 strength grade concrete or 20 MPa geopolymer binder-based concrete conforming to the requirements of Clause 711.04(b), on minimum 75 mm of compacted Class 3 crushed rock. Where the soil is solid well compacted in situ material as agreed by ~~the Superintendent~~ Council, the crushed rock can be omitted and a minimum 100 mm depth of N20 strength grade concrete placed for the maintenance strip.

Where the maintenance strip is adjacent to kerb or pavement, separation from the kerb or pavement by the use of a cork expansion joint (or approved alternative) shall be used.

Where the maintenance strip is concrete, weakened plane joints ~~Dummy joints~~ at least 20 mm deep and 5 mm wide shall be formed at 2 m intervals across the full width of the concrete maintenance strip. Expansion joints shall be placed at intervals not exceeding 12 m.

The Contractor shall topsoil and grass all disturbed areas as necessary to ensure that the concrete maintenance strip is flush with the adjacent ground surface level.

All bedding material used for cast in place concrete construction works shall be Class 3 Crushed Rock in accordance with Section 812.

711.16 CONCRETE

Unless otherwise specified, and any applicable requirements for proprietary barrier systems, the supply and placement of concrete shall comply with the requirements of Section 703

711.17 EXISTING SIGNS AND MARKINGS

All existing signs that are temporarily removed or relocated during the execution of the works shall be reinstated to their original location as soon as practical to ensure that adequate information is provided to road users. In all cases the Contractor shall provide continuity of regulatory and warning signs.

The Contractor shall reinstate all signs to a standard not less than the pre-existing condition and to the satisfaction of ~~the Superintendent~~ Council.

The Contractor shall reinstate any existing painted edge lines and reinstate or replace any missing Raised Reflective Pavement Markers (RRPMs) along the length of the Works, including RRPMs damaged by the installation process for the WRSB.

~~**711.18 SUPPLY OF ADDITIONAL MATERIALS**~~

~~The Contractor shall supply additional posts and associated fittings as specified. These posts and fittings shall be delivered to a storage area nominated by the Superintendent and shall include all appropriate components as required by the proprietary WRSB system to repair damage which occurs beyond the expiration of the Defects Liability Period.~~

~~The Contractor shall provide details of the posts and associated fittings as required by the proprietary WRSB system. The Contractor shall make due allowance for the supply and delivery of all required components to be paid under the relevant Provisional Quantity items.~~

711.19 ACCIDENT DAMAGE TO WRSB

In the event of any damage to the WRSB caused by errant vehicles prior to the Date of Statement of Compliance ~~Practical Completion and during the Defects Liability Period~~, the Contractor shall make the area immediately safe for traffic and shall be responsible for repairs, including all associated traffic management measures. Repairs shall be undertaken within five working days of an impact or of a request by ~~the Superintendent~~ Council.

The Contractor shall be responsible for the supply of all WRSB materials including any concrete necessary to undertake the repair works. ~~to be paid under the relevant Provisional Quantity items.~~

During the construction ~~Contract~~ period, the Contractor shall record the number of vehicle impacts where damage has occurred to the WRSB so that ~~VicRoads~~ Council can maintain a maintenance history of the WRSB installations.

711.20 MEDIAN CROSSINGS

Where a median crossing is removed, the Contractor shall reinstate the median with a treatment consistent with the surrounding area. Any redundant median crossing signs within the Limit of the Works shall be removed and delivered to a storage area nominated by ~~the Superintendent~~ Council.

Median crossings within the Limit of the Works shall be retained by the Contractor.

Where detailed on the drawings, new median crossing points shall be constructed in accordance with the pavement details specified, to provide for adequate access for emergency vehicles and shall be integrated with the WRSB installation.

711.21 EXISTING VEGETATION

The Contractor shall ensure that the existing vegetation within the Limit of Works is not affected by the Works. Areas where no works are required shall not be disturbed. Any damage to existing vegetation shall be rectified immediately to the satisfaction of ~~the Superintendent~~ Council.

711.22 GRASSING OF DISTURBED AREAS

(a) General

All disturbed areas shall be topsoiled and grassed in accordance with Section 740.

~~All areas are to be cultivated to a minimum 50 mm depth, and moistened prior to the application of grass seed and fertiliser.~~

~~Grass seed shall be applied at a rate of not less than 200 kg/Ha. Fertilizer shall be applied in accordance with the manufacturer's recommendations.~~

~~HP **A joint inspection of all grassed areas shall be carried out between the Contractor and Superintendent three months after sowing has taken place.**~~

~~Areas with less than 90% cover shall be re-sown by the Contractor.~~

~~Any remedial works required are to be performed within two weeks of the date of inspection.~~

~~(b) Maintenance of Grassed Areas~~

~~The Contractor shall be responsible for the maintenance of grassed areas, including mowing, for the duration of the Defects Liability Period for the Whole of the Works.~~