**Inspection and Test Plan – Conduit and Pit Installation**

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| **Project no.** | | CC-0374 | **Project name** | Pakenham Roads Upgrade | | **Date** |  | | **Approved by** | Edward Ginger |
| **ITP no.** | 1630-P200-SYM-QAC-ITP-0021 | | **Revision date** | 18/07/2023 | **Plant and equipment used** | | |  | | |
| **Lot no.** |  | | **Location (chainages, detailed description or marked up plan)** | | | | |  | | |

Attach Dockets, Certificates and QA Documents to ITP

|  |  |  |  |  | **Verification of acceptance by** | | | | | **Remarks/record (eg. Test frequency reports, certificates, checklist etc)** |
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|  |  |  |  |  | **Symal** | | | **Superintendent** | |
| **Item no.** | **Activity** | **Ref docs** | **Acceptance criteria** | **Freq** | **Key** | **Resp** | **Initial/ date** | **Key** | **Sign/ date** |
| **1.0 Pre-start activities** | | | | | | | | | | |
| **1.1** | Boring under Carriageways | VR Clause 733.05 | Boring by water jet not permitted.  Detailed proposals for boring under carriageways shall be submitted to the superintendent for review two weeks prior to the programmed commencement of work.  **Approval to proceed?**  **Yes □ No □ N/A □** | Prior to start of works | H | SE/SS |  | **H** |  |  |
| **2.0 Conduit Materials** | | | | | | | | | | |
| **2.1** | Material Conformance – Conduits and bends | VR Clause 733.02  Table 733.041 | Conduits are correct type, class & diameter and comply with AS1477, AS2053, AS4130 (as relevant), unless noted otherwise.  Electrical – Heavy Duty Grade, Rigid orange UPVC conduit to AS/NZS 2053.2.  Communications – Heavy Duty Grade, Rigid White UPVC communication conduit to AS/NZS 2053.2.  **Have all the above materials been approved?**  **Yes □ No □** | Each Lot  &  Each possession | R | SE/SS |  |  |  | Supplier Compliance Certificate  **Yes □ No □** |
| **3.0 Conduit Cover** | | | | | | | | | | |
| **3.1** | Excavation and Cover Requirements | VR Clause 733.05  Table 733.051 | Cover requirements for both electrical and communications conduits shall be:   * Pavement surface to top of conduit minimum 1200 mm. * Invert of open drain to top of conduit minimum 750 mm. * Unpaved areas to top of conduit minimum 600 mm.   Or else as specified on design drawings.  **Has all the above been completed and approved?**  **Yes □ No □** | Each Lot  &  Each possession | S | SE/SS |  |  |  |  |
| **4.0 Installation of Conduits** | | | | | | | | | | |
| **4.1** | General | VR Clause 733.06  Table 733.061  AS/NZS 3000  AS/ACIF S009 | All conduits shall be installed as shown on the VicRoads Standard Drawings and Contract specific drawings, or as otherwise specified.  All conduits for electrical and communications cabling shall be installed to conform to the relevant requirements of controlling legislation, regulations, industry codes and standards, including:   * AS/NZS 3000 Electrical installations (Australian/New Zealand Wiring Rules) * AS/ACIF S009 Installation requirements for customer cabling (Wiring Rules), and any other relevant requirements of the Australian Communications and Media Authority (ACMA) for connections to telecommunication carriers’ network.   Installation of conduits shall be carried out in accordance with the following:  □ HD UPVC Plain to be Thrust bore or Open Trench.  □ HDPE continuous (must have ID not less than that of 100 mm HD UPVC for electrical and 90 mm HD UPVC for communications) to be Directional Bore. | Each Lot | I | SE/SS |  |  |  |  |
| **4.2** | Bedding Material/Placement | VR Clause 733.08 | * Bedding material does comply with the requirements of Table 733.081. * Minimum 80 mm bedding below conduits on earth foundation. * Minimum 200 mm bedding below conduits on rock foundation. * Bedding placed to full width of trench, and between conduits as shown on trench details on latest revision IFC drawings. * Shaped sufficiently to maintain the conduit in line as the sections are placed.   **Has all the above been completed?**  **Yes □ No □** | Each Lot | I | SE/SS |  |  |  | Material Compliance for Bedding/  NATA Test Report  **Yes □ No □** |
| **4.3** | Bedding Material/Placement | VR Clause 733.08 | Once the bedding material has been laid and the conduits put in place, works shall not proceed prior to inspection by Superintendent.  **Approval to proceed?**  **Yes □ No □** | Each Lot | H I | SE/SS |  | **H** |  |  |
| **4.4** | Bedding Material/Placement | VR Clause 733.08 | When conduit sections are in position, additional layers of bedding material shall be placed and compacted to a height 150 mm above the bedding previously placed.   * Bedding material must not be the same material excavated for the trench, it shall be clearly identifiable as introduced material.   **Has all the above been completed?**  **Yes □ No □** | Each Lot | I | SE/SS |  |  |  |  |
| **4.5** | Conduits for Traffic Signals/ITS/Public Lighting | VR Clause 733.06 | 1. All conduits shall terminate in a pit in accordance with VicRoads Standard Drawing TC‑1207, TC-1230 and TC-2200 – TC223. 2. Only one size conduit shall be used for a complete run between pits; unequal size conduits shall not be joined in the ground. 3. All conduits shall be temporarily sealed prior to cabling to avoid blockage. 4. Changes in conduit direction or depth shall be made by natural set or in the case of bottom entry, by means of a swept bend; elbows or tees shall not be used. 5. All conduit joints shall be correctly prepared and sealed with approved solvent cement. 6. Conduits for detector cables shall be installed as shown in VicRoads Standard Drawings TC‑1207 and TC‑1320; and   A 50 mm electrical (orange) conduit shall be used to convey the detector feeder cable from the detector pit to the cable pit, as shown in VicRoads Standard Drawing TC‑1207.  **Has all the above been completed correctly and to a high standard?**  **Yes □ No □** | Each Lot | S  I | SE/SS |  |  |  | Installation Records from Subcontractor  **Yes □ No □** |
| **4.6** | Draw Cords | VR Clause 733.07 | Draw Cords to be 3 mm diameter and with a minimum breaking strain of 1.6 kN.  **Where the conduit terminates in a pit**  Have no less than 500 mm of the draw cord tied to a marker peg 25 mm x 25 mm, no less than 300 mm long, left coiled in the pit for future use.  **Where conduits do not terminate into a pit.**  Be tied to a marker peg 100 mm x 100 mm, not less than 400 mm long, driven firmly into the ground with the top 50 mm projecting above finished surface and painted yellow.  **Has all the above been completed correctly and to VicRoads standard?**  **Yes □ No □ N/A □** | Each Lot | I | SE/SS |  |  |  | Installation Records from Subcontractor  **Yes □ No □**  Material Conformance Certificate  **Yes □ No □** |
| **5.0 Backfill** | | | | | | | | | | |
| **5.1** | Bore access excavation | VR Clause 733.05 | Before backfilling the bore access excavation, the pressure grouting shall be inspected by the superintendent or representative.  **Has all the above been completed?**  **Yes □ No □** | Each Lot | H | SE/SS |  | **H** |  |  |
| **5.2** | Material Properties | VR Clause  Table 733.081 | Backfill material properties to be as per Table 733.081. | Each Lot | R | SE/SS |  |  |  | NATA Test Report (if applicable)  **Yes □ No □** |
| **5.3** | Filling | VR Clause 733.08 | Unless otherwise specified or shown on the drawings, selected and common backfill shall be placed and compacted as follows under, around, and above the conduit after the sections are bedded:   * Place and compact selected backfill 400 mm above bedding (in non-trafficable areas) remaining fill to be common backfill. * Place and compact selected backfill to subgrade level (in area’s to be paved) | Each Lot | R | SE/SS |  |  |  |  |
| **5.4** | Compaction - Areas not to be paved and below pavement | VR Clause 733.08 | All pavement material shall have during compaction, uniform moisture content within the range 85% to 115% of the optimum moisture content as determined in the Modified Compaction test.  Compacted to refusal using handheld mechanical equipment.  **Has all the above been completed?**  **Yes □ No □** | Each Lot | R | SE/SS |  |  |  |  |
| **5.5** | Compaction – Area’s pavement layer | VR Clause 733.08 | Where specified, pavement material shall be assessed for compaction in lots as defined in Section 173. The number of tests per lot shall be three. All pavement material shall have during compaction, uniform moisture content within the range 85% to 115% of the optimum moisture content as determined in the Modified Compaction test. All pavement layers shall be placed and compacted in layers to a density ratio of not less than 98%. The calculation of density ratio shall be based on Modified compactive effort.  Compacted to refusal using handheld mechanical equipment. | Each Lot | R | SE/SS |  |  |  | NATA Test Report (if applicable)  **Yes □ No □** |
| **5.6** | Warning Tape | AS/NZS2648.1 | Where marker tapes overlap electrical tape to overlay communications tape:   * Marker tape 100 mm wide complying with AS/NZS2648.1 coloured orange with black lettering “DANGER BURIED ELECTRIC CABLE BELOW” inscribed at regular intervals installed 300 mm above the conduits in all trenches where electrical conduits are provided. * Marker tape 100 mm wide with two stainless steel tracer wires coloured white with black lettering “DANGER BURIED COMMUNICATION CABLE BELOW” inscribed at regular intervals installed 300 mm above the conduits. In all trenches where communication conduits are provided at least two meters of each tracer wire shall be anchored to and neatly coiled in each communication pit. * Where both electrical and communication conduits are provided in a trench two marker tapes shall be provided one for electrical and the other for communication conduits.   **Has all of the above been completed?**  **Yes □ No □** | Each Lot | S | SE/SS |  |  |  |  |
| **6.0 Installation of Pits, Lids and Cables** | | | | | | | | | | |
| **6.1** | Location of Pits | VR Clause  733.09 | Pits shall be located in accessible locations for maintenance activities.  Pits to have a maximum spacing between cable pits of 100m. | Each Pit | R | SE/SS |  |  |  |  |
| **6.2** | Cable Pits & Pit Lids | VR Clause 733.09  TC2200 TC2201  TC2202  TC2203 | **Before the pit lid surround or pre-formed collar is cemented into position an inspection by VicRoads Superintendent or representative must be carried out.**   * Install cable pits in accordance with the design drawings and VicRoads Standard Drawings TC-1210, TC-1220 and TC-1230, TC2200-TC2232. * Top of pit lid matches the surrounding finished surface level fits neatly without movement. * Pits watertight and suitably drained. * All conduit connections to cable pits shall be neatly made and the ends of the conduits trimmed off and fitted with a conduit bush. The area between the conduit bush and pit wall shall be stopped with a suitable sealant that bonds to the pit wall and the conduit. * Heavy Duty Pit lids provided for pits in the road pavement.   Entry conduits to be installed at:  80mm +/- 20mm into pit (VicRoads)  **Has all of the above been completed correctly and to a high standard?**  **Yes □ No □ N/A □** | Each Pit  &  Each possession | S | SE/SS |  | **H** |  |  |
| **6.3** | Detector Pits for Traffic Signals | VR Clause 733.10 | Install detector pits in accordance with the design drawings and VicRoads Standard Drawings TC-1310 and TC-1320.  Fix pit cover securely using the fixing device supplied.  **Has all the above been completed correctly and to a high standard?**  **Yes □ No □ N/A □** | Each Lot | S | SE/SS |  |  |  |  |
| **7.0 Foundation** | | | | | | | | | | |
| **7.1** | Location of Foundation |  | Foundations shall be located in accordance with the drawings and approved at the pre-installation meeting. | Each Lot | R | SE/SS |  |  |  |  |
| **7.2** | Foundation Type | VR730  Table 730.111 | Foundations and footings shall be as specified in the VicRoads Standard Drawings for the specific item of equipment they are to support, as listed in Table 730.111  **Where alternative foundations are proposed, they shall be approved by the Superintendent prior to the Contractor installing the foundations.** | Each Lot | H | SE/SS |  | **H** |  |  |
| **7.3** | Inspection of Foundation | VR730.11 | All foundation works shall be inspected by the Superintendent prior to the Contractor covering the works. | Each Lot | H | SE/SS |  | **H** |  |  |
| **7.4** | Concrete | VR610  Table 610.161 | Concrete is to be vibrated, and not dropped from a height greater than 2m.  Concrete is to be tested as per VR610 and should be a minimum concrete grade of VR330/32. | Each Lot | R | SE/SS |  |  |  |  |
| **8.0 Completion** | | | | | | | | | | |
| **8.1** | As-built Information | VR Clause 733.12 | Identification and recording as follows:   * All conduit locations not identified by pits immediately installed at the ends shall be marked with pegs 75 x 38 mm stakes projecting 0.4 m above the ground, with the top 150 mm painted yellow, or as otherwise agreed by the Superintendent. * Conduits under road pavement shall be marked with stakes clear of the road pavement. * Conduits not under road pavement shall be marked with stakes at the ends, at changes of direction, and at intervals of not more than 30 m.   The actual installed location and depth of conduits on the as-built drawings.  **Has all the above been completed correctly and to a high standard?**  **Yes □ No □ N/A □** | Each Lot | R | SE/SS |  |  |  | Survey Conformance Report  **Yes □ No □** |
| **9.0 Work Lot Close Out** | | | | | | | | | | |
| **9.1** | Test Reports | VIC Roads Specifications | All Test reports received and reviewed.  **Has all the above been proven to meet and/or exceed minimum tested requirements?**  **Yes □ No □** | Each Lot | R  I | SE/SS |  |  |  | NATA Endorsed Test Reports  **Yes □ No □** |
| **9.2** | Product Non-Conformance | CQMP | All Product Non-Conformance(s) recorded and closed (if applicable)  **Has all the above been proven to meet and/or exceed minimum tested requirements?**  **Yes □ No □** | Each Lot | R | SE/SS |  |  |  | NCR reports  **Yes □ No □** |

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| **Works complete (signer SE/SS)** | |  | | | **Date works complete** | |  | | | |
| **Lot conforms (signer PE)** |  | | **Date lot closed** |  | | **NCR/s no. raised** | |  | **Date NCR closed for this lot** |  |

**Responsibility (Resp.) Key**: **PM**-Project Manager, **PE**-Project Engineer, **SE**- Site Engineer, **CS**-Civil Superintendent, **SS**-Site Supervisor, S**V**-Surveyor, **CR**-Client Representative,

**SI –** Superintendent

**Inspection Key: W –** Witness, **H –** Hold Point, **S –** Surveillance, **I –** Inspection, **R –** Review Point