**Inspection and Test Plan – Precast Stormwater Drainage Pits**

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| **Project no.** | | **CC-0374** | **Project name** | Pakenham Roads Upgrade | | **Date** |  | | **Approved by** | Damian Hagebols |
| **ITP no.** | 1630-P200-SYM-QAC-ITP-0015 | | **Revision date** | 15/06/2023 | **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** | Design | 705.08(a) | Design has been provided, including Proof Engineering (by prequalified VicRoads engineer) to confirm that all requirements of AS5100 and additional loading requirements have been met. | Each Lot | R | SE |  |  |  | * Design * Proof Engineer Certificate |
| **1.2** | Concrete Mix Design | 705.04(b) | The concrete mix design used by the pre-cast supplier is approved and current in accordance with the requirements of VR610. | Each Lot | R | SE |  |  |  | * Concrete mix design |
| **1.3** | Concrete Supply | 705.04(a) | Concrete has been provided in accordance with VR610 and VR705. The minimum grade of concrete is VR450/50. | Each Lot | R | SE |  |  |  | * Compliance Certificates or Dockets by Supplier |
| **1.4** | Fibres | 705.04(f)  705.08(d) | Fibres comply with the requirements of ASTM C1116 and have been supported with documentary evidence confirming their long term resistance to deterioration when in contact with the moisture and alkalis present in cementitious paste or the substances present in chemical admixtures.  Fibres have been tested to the requirements of ASTM C1609 (flexural toughness) and ASTM C1399 (average residual strength of fibre reinforced concrete) and comply with the requirements of AS 5100.  Evidence has been provided by the supplier than the minimum fibre content has been achieved.  The worksheet and/or report for determination of fibre content shall be submitted to review by the Superintendent. | Each Lot | R | SE |  | **R** |  | * Compliance Certificates and/or Test Reports * Worksheet for determination of fibre content |
| **1.5** | Wall thickness | BTN033 | For concrete drainage pits up to 2 m deep, the minimum wall and base thickness must be 100 mm. For concrete drainage  pits more than 2 m deep, the minimum wall and base thickness must be 150 mm or thicker if required.  Where the depth of the concrete drainage pit exceeds 2 m there may be a need to adopt two different wall thicknesses in  the construction of the complete pit. The wall thickness at the bottom will need to be a minimum of 150 mm thick whilst the  wall thickness of the riser must be a minimum of 100 mm thick.  The depth of drainage pit must be measured from the bottom of the pit towards the surface. The bottom 2 m must have 150  mm minimum wall thickness.  Where the depth of the drainage pit is over 2 m in height then it is acceptable to construct the complete pit as one section  with 150 mm wall thickness.  Where the depth of the drainage pit is greater than 4 m, the wall thickness and reinforcement requirements must be  structurally designed and Proof Engineered, but not less what has been specified under Section 5 for unhaunched concrete  drainage pits up to 4 m in depth. | Each Lot | R | SE |  |  |  |  |
| **1.6** | Supply Precast Covers, Grates, Lids | 705.04(c) | Pit covers and grates have been designed in accordance with AS 3996 and table 7 from BTN 033. | Each Lot | R | SE |  |  |  |  |
| **1.7** | Step Irons (pits greater than 1.0m) | 705.04(d) | Ensure step irons are manufactured from steel AS/NZS 3679.1 grade 250. Step irons are hot dip galvanised as per AS/NZS 4680 or 13 mm steel bar covered with polypropylene shall be approved by design. | Each Lot | R | SE |  |  |  | Compliance Certificates  Superintendent Approval (for polypropylene step irons) |
| **1.8** | Weep Holes | 705.09(c) | Weepholes of 50 mm diameter shall be provided in all precast pits and shall be placed between the midpoint and top of the stormwater drain in those walls which have openings for drains. | Each Lot | R | SE |  |  |  |  |
| **1.9** | Segments | 705.09(b) | If a precast drainage pit is cast in segments, each section of the drainage pit shall be rebated to ensure correct alignment and to prevent horizontal movement. A minimum rebate of 15 mm shall be used. | Each Lot | R | SE |  |  |  |  |
| **1.10** | Repair to Defective Pits (if applicable) | VR Clause 689  687 | Any Pits damaged due to handling onsite post acceptance at delivery of non-defective product are to be repaired as per the approved Cracks and/or Patch repair procedure. A Non-conformance to be raised for the defects identified and issued to the State and IR for information and refer it to the Designer for assessment.  Prior to any patch repair of concrete, Symal shall assess the damaged pit to determine the influence of spalled, deteriorated, damaged or honeycombed concrete on load bearing capacity, serviceability and durability, and submit the assessment to the Superintendent for review.  The Designer and the Engineering team to agree upon an appropriate repair treatment(s) and materials, consistent with the requirements of VR Spec. Section 687 and 689.  Complete ITP for either crack repair or patch repair.  Measure, document and photograph the dimensions and condition of the defects.  **Has all of the above been completed and approved?**  **Yes □ No □ N/A □** | Prior to start of works.  Each Lot | H  W | SE |  | **H** |  |  |
| **2.0 Excavation** | | | | | | | | | | |
| **2.1** | Conformity with Drawings |  | Prior to commencement of excavation for the pits the Contractor shall confirm the position of all pits with the Superintendent.    The location of each pit may be altered to suit site constraints ±1m with both the approval of Survey and the superintendent.  **Approval to proceed?**  **Yes     □       No** □  **N/A** □ | Prior to start of works | H | SE |  | **H** |  |  |
| **2.2** | Excavation for Pits | VR Clause 705.05 | Excavate to required depth which shall also include excavation necessary to prepare the pit foundation & provide the full specified depth of pit bedding. Maintain excavation width clearance. Excavation for pits shall not be less than 400 mm from external wall to side of excavation.  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | S | SE |  |  |  |  |
| **3.0 Bedding** | | | | | | | | | | |
| **3.1** | Bedding | VR Clause 705.05  Table 701.091 & 701.092 | Bedding placed and compacted to a thickness not less than 80 mm on clay foundation or 150 mm on rock foundation.  Bedding needs to conform to Table 701.091 & Table 701.092.  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | S | SE |  |  |  | Bedding and Backfill Material Conformance  **Yes □ No □ N/A □** |
| **4.0 Installation of Pits** | | | | | | | | | | |
| **4.1** | Installation of Pits | VR Clause 705.07  705.08  705.09  705.11 | Precast pits shall be installed at the locations and to the dimensions shown on the drawings.  Subsurface Drainage Connections – Holes for subsurface drainage shall be 150 mm diameter (cored not broken), unless specified on the drawings.  Segments – If a precast pit is cast in segments, each section of the pit shall be rebated to ensure correct alignment and to prevent horizontal movement. A minimum rebate of 15 mm shall be used.  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | I | SE |  |  |  | Test results for fibres and fibre content (if applicable) (Compliance Certificate provided by Supplier)  **Yes □ No □ N/A □** |
| **4.2** | Pits with Risers | BTN033 | Where a drainage pit is manufactured in multiple sections with different wall thicknesses, the internal wall face must be  vertically aligned, and the step in the wall thickness is to be located on the outside face of the pit. Joints must be sealed  with cement mortar to provide watertight joints. No bonded anchors to be used for the construction of the drainage pits. | Each Lot | R | SE |  |  |  |  |
| **4.3** | Step Iron Fitting | VR Clause 705.12 | Pits greater than 1.0 meter shall be fitted with step irons. Step irons shall not obstruct openings or be fitted to a wall which has openings.  Step Irons shall be installed in accordance with the manufacturer’s instructions and shall be an approved proprietary type.  **Has all of the above been completed correctly and to a high standard?**  **Yes □ No □ N/A □** | Each Lot | S | SE |  |  |  | Material Conformance Certificates  **Yes □ No □ N/A □** |
| **4.4** | Shaping the floor | VR Clause 705.13 | Drainage pit floors shall be smoothly shaped from the inlets to the outlet for a height of one third of the diameter of the outlet pipe with cementitious mortar, to provide a profile that will ensure smooth flow conditions between inlet and outlet pipes and prevent any snagging of debris. The cementitious mortar shall comply with the requirements of clause 610.33  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | S | SE |  |  |  |  |
| **4.5** | Jointing | VR Clause 705.14  705.16  610.33 | The joints between drainage pits, access chambers and pipes shall be made watertight using a cementitious mortar in accordance with the requirements of Clause 610.32.  Mortared joints and recesses shall be cured for a period of not less than 48 hours with no backfilling until the curing period is finished.  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | W | SE |  |  |  |  |
| **5.0 Backfilling** | | | | | | | | | | |
| **5.1** | Survey Location Confirmation. |  | The location of each drainage pit shall be verified by a survey certificate prior to backfilling the drainage pit.  Offset of entry pits required to match lines of kerbs or barriers ±20 mm.  Plan location of pits other than offsets to kerb lines or barriers ±100 mm. | Each Lot | R | SE  SV |  |  |  | Survey Conformance Report  **Yes □ No □** |
| **5.2** | Backfill Material | PS3030.07 (a) | Backfill material shall conform to the requirements for type A material.  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | R | SE |  |  |  | NATA Test Report: Grading/PI  **Yes □ No □** |
| **5.3** | Backfill Pits | VR Clause 705.18  PS3030.07 (b. iv) | Backfilling around drainage pits shall be placed in layers not exceeding 300 mm loose thickness and compacted to refusal using handheld mechanical equipment.  Superintendent must inspect before backfilling as indicated in PS3030.07 (b. iv).  **Has all of the above been completed?**  **Yes □ No □ N/A □** | Each Lot | S | SE |  | **H** |  |  |
| **6.0 Completion** | | | | | | | | | | |
| **6.1** | As-built Survey | VR Clause 705.19  610.46 | Survey complies with specified requirements.  The level at every point of the pit covers perimeter shall be within 10 mm of the design level. The line of the cover shall be within 10mm of the design kerb line  Offset of entry pits required to match lines of kerbs or barriers ±20 mm.  Plan location of pits other than offsets to kerb lines or barriers ±100 mm.  The tolerance listed in Clause 610.46 are the allowable deviations of the finished product from the dimensions shown on the drawings. These tolerances will be a basis for acceptance of the work.  **Has all of the above been proven and meets requirements?**  **Yes □ No □** | Each Lot | R | SE |  |  |  | Survey Conformance Certificate  **Yes □ No** |
| **7.0 Work Lot Close Out** | | | | | | | | | | |
| **7.1** | Test Reports | DoT Specs | All Test reports received and Reviewed | Each Lot | R | SE |  |  |  | NATA Endorsed Test Reports  **Yes □ No □** |
| **7.2** | Product Non-Conformance | CQMP | All Product Non-Conformance(s) recorded and closed (if applicable) | Each Lot | R | SE |  |  |  | NCR reports  **Yes □ No**  **N/A □** |
| **7.3** | Quality Representative to check the above criteria and records to confirm | CQMP  Lot Records | All above criteria met, and records identified attached. | Each Lot | R | SE |  |  |  | Completed Checklist (if applicable) and reports and other compliance records attached. |

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| **Works complete (signer SE)** | |  | | | **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, **R –** Review, **I –** Inspection