**Inspection and Test Plan – Subsurface Drainage**

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| **Project no.** | | **CC0374** | **Project name** | Pakenham Roads Upgrade | | **Date** |  | | **Approved by** | Damian Hagebols/ Edward Ginger |
| **ITP no.** | 1630-P200-SYM-QAC-ITP-0013 | | **Revision date** | 20/06/2023 | **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** | Procedure for method of compaction and placement of no fines concrete filter material. | VR702.09 | **The method of compaction shall be in accordance with the Contractor’s quality procedures and shall be submitted for review by the Superintendent.** | Prior to start of works | H | SE |  | **R** |  | As per approved Construction Document |
| **2.0 Materials** | | | | | | | | | | |
| **2.1** | Supply of Pipes & Geocomposite Drains. | VR702.04  PS3030.05  IFC Drawings | All subsurface drainage pipes supplied shall be Category 1 (Class 1000)  Perforation size must be a maximum width of 1.5 mm and a minimum length of 150 mm per m2  Plastic pipes and geocomposite drains shall be handled appropriately to reduce sunlight exposure during delivery, storage, and installation. | Each Lot | R  I | SE |  |  |  | Manufactures Compliance Certificates (AS2439). **Yes □ No □** |
| **2.2** | Supply of Pits & Flushout Risers | SD1631  SD1611  PS3030.5  IFC Drawings | Flushout risers for geocomposite drains shall consist of a preformed riser fitting, or a pipe of diameter not less than 100 mm.  Flushout risers shall have surface fittings as shown on the drawings.  Pits shall be supplied in accordance to SD1611. | Each Lot | R | SE |  |  |  | Supplier Compliance Certificate  **Yes □ No □** |
| **2.3** | Granular Filter Material – Sand | VR702.05  VR702.13  Table 702.051  Table 702.131 | Granular filter material must meet the below requirements:   * Grading: As per Table 702.051, * pH: 6.0 – 10.0. * For glass fines: be thoroughly washed and retested prior to use, where the measured Total Dissolved Solids (TDS) of the granular filter material exceeds 1500 mg/L.   pH and total dissolved solids (glass fines only) must be tested at a rate of one test per 5000 tonnes of product. | Each Lot | R | SE |  | **R** |  | Material Compliance Data/ Delivery Docket  **Yes □ No □**  NATA Test Report: Grading  **Yes □ No □** |
| **2.4** | Granular Filter Material – Crushed Rock | VR702.05  VR702.13  Table 702.051  Table 702.131 | Granular filter material must meet the below requirements:   * Grading: As per Table 702.051, * Unsound Rock Content: < 5% by mass, * pH: 6.0 – 10.0.   Crushed Rock Components: The percentage by mass of unsound and marginal rock in that fraction of an aggregate retained on a 4.75 mm AS sieve shall not exceed the values specified in Table 702.052.  Granular filter material must be tested for grading, unsound rock content on each production day or at a rate of one test per 500 tonnes of material as per Table 702.131. | Each Lot | R | SE |  | **R** |  | Material Compliance Data/ Delivery Docket  **Yes □ No □**  NATA Test Report: Grading  **Yes □ No □** |
| **2.5** | Granular Filter Material – No Fines | VR702.05  VR702.13  Table 702.051  Table 702.131 | Granular filter material must meet the below requirements:   * Grading: As per Table 702.051, * Unsound Rock Content: < 5% by mass, * pH: 6.0 – 10.0.   No fines concrete shall consist of B4 filter as defined in Table 702.051 and mixed with 4.0% by mass of cement and 3.5% by mass of water in a mixing plant.  Granular filter material must be tested for grading, unsound rock content on each production day or at a rate of one test per 500 tonnes of material as per Table 702.131. | Each Lot | R | SE |  | **R** |  | Material Compliance Data/ Delivery Docket  **Yes □ No □**  NATA Test Report: Grading  **Yes □ No □** |
| **2.6** | Geotextile Filters | VR702.06  Table 702.061 | Geotextile filter shall consist of a fabric manufactured from synthetic fibres of a long-chain polymer such as polypropylene, polyethylene, polyester or similar material and shall be stabilised against deterioration due to ultraviolet light. The geotextile shall be free from defects or flaws which significantly affect its physical and/or filtering properties.  A geotextile filter may be non-woven or knitted fabric and shall comply with the requirements of Table 702.061 relevant to the geotextile filter type specified in clause 702.12. | Each Lot | R | SE |  |  |  | Manufactures Compliance Certificates  **Yes □ No □** |
| **3.0 Installation of Subsoil Drainage** | | | | | | | | | | |
| **3.1** | Excavation of Trench | VR702.08  VR702.09 | Where a geotextile is to be used as a first stage filter in contact with a trench wall, the trench wall shall be excavated to allow the geotextile to be in close contact with the wall when the granular filter material is placed against the geotextile  Trench base shall not be more than 50mm below the specified level of invert of the pipe.  The base of the trench shall be inspected to verify compliance with the requirements in this clause prior to placing bedding in completed excavations.  Subsurface drainage pipes or geocomposite drains shall be laid to the depths or levels shown on the drawings. The top of any subsurface drainage pipe shall be at least 200 mm below subgrade. | Each Lot | S | SE |  | **I** |  |  |
| **3.2** | Excavation of Trench in Expansive Material | PS3030.07 (b) | Subsurface drainages laid in expansive materials with swell ≥2.5% shall conform to the following requirements:   * Pipes shall not come into contact with material. * At least 100mm of capping materials provided below the floor of the subsurface drainage trench. | Each Lot | I | SE |  |  |  |  |
| **3.3** | Placement of Bedding | VR702.09 | A bedding of granular filter material of thickness between 25 mm and 50 mm shall be placed across the bottom of the trench. The bedding shall be tamped and screeded or graded to level. Bedding is not required for geocomposite drains. | Each Lot | H | SE |  |  |  |  |
| **3.4** | Construction – Pipe and Geocomposite Installation | VR702.09  702.03 | The grade of pipes or geocomposite drains shall be not flatter than 1 in 250.  Pipes shall be placed centrally in the trench on the prepared bedding. Slotted pipes shall be laid with the openings in the lower half of the pipe.  The minimum width of geotextile used for wrapping shall be 450 mm.  Lap joints in geotextile used as first stage filters shall consist of an overlap of not less than 900 mm longitudinally and 150 mm transversely. Lap joints in geotextile used as second stage filters shall consist of an overlap of not less than 300 mm. | Each Lot | S | SE |  |  |  |  |
| **3.5** | Construction – Access points and Inspection Openings | VR702.10  IFC Drawing | Subsurface drains shall have access points at the start and finish of each run. Subsurface drain end shall be located minimum 100 mm above the invert of the stormwater drainage pit outlet unless noted otherwise on drawings. Inspection openings shall be provided between 100 m and 150 m intervals unless noted otherwise on drawings. | Each Lot | R  I | SE |  |  |  |  |
| **3.6** | Construction – S1 Pit, Batter Outlet & Flush Out Riser Installation | VR702.10  SD1611  IFC Drawings  PS3030.05 | Flushout risers for drainage pipes shall have the same diameter as the pipe.  Flushout risers for geocomposite drains shall consist of a preformed riser fitting, or a pipe of diameter not less than 100 mm.  Flushout risers shall be installed in accordance to SD1631.  Pits shall be installed in accordance to SD1611.  Pits deeper than 1m shall be fitted with step irons.  Batter outlets into a swale must maintain min. 200mm clearance to the invert of the swale. | Each Lot | R  I | SE |  |  |  |  |
| **3.7** | Inspection of Drainage Lines & Pits | PS3030.07 (iv) | **The superintendent must inspect subsoil drainage trenches, subsoil drainage lines, and associated pits, endwalls and risers, prior to the commencement of backfilling** | Each Lot | H | SE |  | **H** |  |  |
| **3.8** | Construction – Granular Filter Backfill | VR702.09(g)  Approved procedure in Construction Document - Drainage | Material shall be placed moist and compacted in layers not exceeding 300 mm. Material shall be compacted with minimal disturbance to pipes, geocomposite drains, geotextiles and trench walls.  **The method of compaction shall be in accordance with the Contractor's quality procedures and shall be submitted for review by the Superintendent.** | Each Lot | H | SE |  | **H** |  |  |
| **3.9** | Construction – Granular Filter Backfill (No Fines) | VR702.09(g)  Approved procedure in Construction Document – Drainage | All subsurface drainage beneath trafficable areas shall have no fines concrete filter medium. No-fines concrete placed and compacted within 1 hour of mixing.  **Contractor shall submit quality procedures for review by the Superintendent which detail the method of placing the no-fines concrete to prevent segregation and the formation of a slurry layer at the surface of the concrete which may prevent the passage of water into the filter material.** | Each Lot | H | SE |  | **H** |  |  |
| **4.0 Work Lot Close Out** | | | | | | | | | | |
| **4.1** | Flushing of Subsoil Lines Flushed after  Completion of Flushers, Outlets | VR Clause 702.09 (h) | Subsoil Lines Flushed to ensure Drainage Lines are free from obstruction.  Location, Date & Time for subsoil line recorded on lot map.  **The flushing test shall be witnessed by a representative nominated by the Superintendent.** | Each Lot | R | SE |  | **W** |  |  |
| **4.2** | Inspection of Subsurface Drainage Lines | DoT Clause 702.09(i) | **All subsurface drainage lines constructed shall be inspected, after completion of the flushing test as stated in clause 702.09(h) and prior to placement of asphalt, by an independent testing organisation using closed circuit television (CCTV) to verify that the flow of water is not obstructed by waste construction material left inside and to check for visible signs of defects.**  The report shall be provided to the Superintendent, with a copy of the CCTV record including any video recordings and a summary of the location of any waste construction materials, obstructions and defects detected by the survey.  Any sections of damaged or deformed subsurface drainage pipe shall be removed and replaced. A further CCTV survey shall be undertaken to verify that the damaged or deformed subsurface drainage pipes have been replaced and are defects free.  Placement of Asphalt shall not proceed until the CCTV inspection and flushing test has been completed, damaged or deformed subsurface drainage pipe has been removed and replaced and the waste and defects free condition of subsurface drainage line has been verified by the superintendent. | Each Lot | H | SE |  | **H** |  |  |
| **4.3** | As built | DoT Clause 702.03 | Subsurface drains to be constructed true to line, level and depth, as shown on the drawings.  The invert of the subsurface drainage to be < 25 mm from the specified level and not more than 50 mm from the specified line.  Grade < 10mm in any 3m length or lead to ponding of  water within the drainage pipe.  Changes to design shall be recorded. | Each Lot | H | SE |  |  |  |  |
| **4.4** | Product Non-Conformance | CQMP | All Product Non-Conformance(s) recorded and closed (if applicable) | Each Lot | R | SE |  |  |  | NCR No:\_\_\_\_\_\_\_\_\_\_\_  **Yes □ No □** |

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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 Point, **I –** Inspection Point

A picture containing text, diagram, technical drawing, plan

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Description automatically generated with low confidence