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| **CLIENT:** | | Watercare Services Limited | | **INSPECTION AND TEST PLAN FOR:** | | | | **ITP No:** | **GAJV-ITP-00329\_3.0** |
| **CONTRACT No. #** | | 6661 | | **JOB/ITP TITLE:** | **CONFLUENCE CHAMBER PRECAST ELEMENTS** |
| **CONTRACT:** | | Central Interceptor | | **WORK DESCRIPTION: Confluence Chamber precast elements – Baffle wall, roof beam & roof slabs CONTRACTOR NAME: GAJV**  **SUBCONTRACTOR/S NAME: Seipp Construction** | | | | **PACKAGE No:** | **MPS-CON-DTMAN-20-0005.03** |
| **WORKPLACE NAME / ADDRESS:** | | Mangere Pump Station | | **CHAINAGE (if any):** | **N/A** |
| **DATE:** | | **22/05/2024** | | **WORK AREA:** | **Confluence Chamber** |
| **ENGINEERS NAME:** | | Kevin Rajan | | **RELATD CEP No:** | **GAJV-CEP-00363** |
|  | |  | | **SWMS No (if any):** | **TBC** |
| **The purpose of this Inspection and Test Plan is for identifying and tracking stages of completion and product traceability during all phases of construction. ISSUED FOR CONSTRUCTION**  **Packages:** - Discrete components or work areas.  **Inspection and Test Plan:** A sequential work method statement capturing quality related requirements that provide evidence of conformance to specifications.  **Inspection Check Sheet:** A document detailing specific criteria to be checked and recorded, often developed to meet testing requirements of standards and / or technical specifications.  **Punch List / Defects List:** A list of minor rectification type tasks which need to complete to satisfy the term of the contract.  **Surveillance:** Ongoing monitoring  **Hold Point:** A notice of the event must be provided and shall not proceed with the work without the client or its representative being present unless authority to proceed has been provided by the client in writing. Signature required  **Witness Poin**t: A notice of the event must be provided. If the client representative is not present at the designated time and place, work may proceed. | | | | | | | | | |
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| **LEGEND:** | W = WITNESS POINT | | H = HOLD POINT | | S= SURVEILLANCE | GAJV = GHELLA ABERGELDIE JOINT VENTURE | S/C = SUBCONTRACTOR | | WSL = ENGINEER REPRESENTATIVE |

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| **ACTIVITY No. #** | **DESCRIPTION** | **RESPONSIBILITY** | **REQUIREMENTS / REFERENCE** | **CONFORMANCE CRITERIA** | **METHOD** | **FREQUENCY/PROCESS HELD** | **HOLD/WITNESS REQUIREMENTS** | | **RECORDS OR CHECKLISTS** |
| **TYPE** | **ATTENDANCE**  **REQUIRED** |
| **1.0 Preliminaries** | | | | | | | | | |
| 1.1 | Check - Drawings are IFC and current | GAJV | Ensure latest IFC drawings are used and  available onsite | * Sighting of drawings | Retain Drawings | Before project execution | **H** | GAJV | DWG register with the drawing revision. |
| 1.2 | Check – Shop Drawings | SEIPP | Ensure latest IFC drawings and are  approved by GAJV | * Sighting of drawings | Retain Drawings | Before project execution | **H** | GAJV | DWG register with the drawing revision. |
| **2.0 Materials** | | | | | | | | | |
| 2.1 | Concrete | SEIPP | 2012034 & 2012036  DWG Series  MS-18P | * Approved mix used – Allied/Holcim Mix 451PFA40CI | Review | Each Mix | **H** | GAJV | Material certificate |
| 2.2 | Reinforcing Steel | SEIPP | DWG 2012036 Series  NZS 4671/ 3109  GC-C4P – 4.1 and 4.1.1.10 | * Grade 500E * Produced using micro-alloy process | Review | Each batch | **W** | GAJV | Material certificate |
| 2.3 | Bearing Strip | SEIPP | 20120036.863 DWG | * FOSROC Cellfix or approved alternative | Review | Each delivery | **W** | GAJV | Delivery dockets |
| 2.4 | Gatic frames & Grates – Roof slabs only | GAJV | 20120036 DWG Series | * Gatic covers delivered as per the drawings | Review | Each delivery | **W** | GAJV | Delivery dockets |
| 2.5 | PE Liner & Weld Rod | SEIPP | CG-27P Table 5.1 | * Technical data sheets * Manufacturers Certificates of compliance | Review | Prior to commencement of  work | **W** | GAJV | Material Cert |
| 2.6 | PEF Rod & Sealant | SEIPP | GAJV-DCRQST-000344 | * Closed cell Polyethene foam backing strip –   FOSROC expandafoam or approved similar.   * Fosroc Nitoseal SC600 or approved equivalent | Review | Each delivery | **W** | GAJV | Delivery dockets |

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| **TYPE** | **ATTENDANCE**  **REQUIRED** |
| 2.7 | Non-shrink grout | SEIPP | 2012036.863 | * High strength non-shrink grout | Review | Prior to commencement of  work | **MAR** | WSL/GAJV | Material Approval Request |
| 2.8 | Epoxy (for dowel bar post install) | SEIPP | 2012036.863 | * Hilti HIT-RE-500 or approved similar | Review | Each delivery | **W** | GAJV | Delivery dockets |
| 2.9 | Galvanised dowel bars | SEIPP | 2012036.863 | * 600mm long hot dip galvanised bars | Review | Each delivery | **W** | GAJV | Material certificate |
| **3.0 Concrete Element Construction** | | | | | | | | | |
| 3.1 | Reinforcement Placement | SEIPP | CG-C4P – 4.1.2.12P  CG-C4P – 4.1.1  2012036 DWG Series Approved shop drawings | * Ensure that the placed reinforcement complies in all respects with the Design Drawings and Specification * Minimum cover over reinforcement shall be as noted on the Design Drawings * Lap lengths/cover shall generally be as detailed on the Design Drawings or 2012053   series | Visual inspection | After steel placement | **H** | GAJV/WSL | Pre-pour checksheet Precast HQ QA Pack |
| 3.2 | Formwork/moulds | SEIPP | CG-C4P – 4.1.2.12P MS-41P – 12.1P  CG-C4P – 4.5P  NZS3109  Approved shop drawings | * Dimensional tolerances as per NZS 3109 Table 5.1 * Formwork to be treated with release agent where in direct contact with concrete * Exposed concrete edges to have minimum 10mm chamfer unless otherwise shown on the drawings * Formwork must provide cast surface in line with concrete finish requirements (U2 for floor   & roof slabs) | Visual Inspections | Prior to concrete pour | **H** | GAJV | Pre-pour checksheet Precast HQ QA Pack |
| 3.3 | Penetrations and Cast-in Items (including PE liner) | SEIPP | CG-C4P – 4.1.7P  Approved shop drawings CG-C27P 6.2P | * Penetrations shall be as per the design drawings * Installation of CPL to form a smooth continuous surface free of sags, wrinkles   bubbles and bulges. | Visual Inspections | Prior to concrete pour | **H** | GAJV/WSL | Pre-pour checksheet Precast HQ QA Pack |
| 3.4 | Concrete Testing   * Consistency * 28-day compressive strength * Shrinkage * Permeability * Water absorption * Sulphite content * Alkali content * Chloride content * Temperature rise | SEIPP | MS-41P - 5P MS-41P - 12P  MS-41P – table 6.1P  **Consistency:** NZS 3109  and NZS 3112  **28-day compressive strength:** NZS 3109  Section 9 and NZS 3112  **Shrinkage:** AS 1012.13  **Permeability:** DIN 1048  **Water absorption:** AS 4058  Appendix F  **Sulphite content:** AS 1012.14  **Alkali content: Chloride content:** AS 1012.14  **Temperature rise**: Not  applicable as pours are less than 0.9m thick (as per MPS Temperature Control  Plan) | * **Consistency:** For water retaining structures, slump tolerances shall be half those given in Table   9.1 of NZS 3109   * **28-day compressive strength:** 45 MPa * **Shrinkage:** 430mS at 21 days, 600 mS at 56 * days with variance 10% precast & 15% for cast * in-situ * **Permeability:** <20mm * **Water absorption:** <6.5% * **• Sulphite content:** <4% by mass * **• Alkali content:** <2.5kg/m3 * **• Chloride content:** As per table 5-1 of MS-41P * **• Temperature rise:** The lesser of: Thermal Control Plan limits * <70°C maximum   + <40°C temperature rise from its fresh concrete casting temperature | IANZ Lab tests | **Consistency:** Slump test every batch  **28 days compressive**  **strength:** 3 Cylinders (1x7day, 2x28 day per shift or per 75m3 poured (NZS 3104), whichever is more frequent.  **Shrinkage:** Every 1,500m3 of concrete  **Permeability:** Every 1,500m3 of concrete **Water absorption:** Every 1,500m3 of concrete **Sulphite content:** Every 1,500m3 of concrete  **Shrinkage:** Every 1,500m3 of concrete  **Permeability:** Every 1,500m3 of concrete **Water absorption:** Every 1,500m3 of concrete  **Sulphite content:** Every | **W** | WSL/GAJV | Precast HQ QA Pack |

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| **TYPE** | **ATTENDANCE**  **REQUIRED** |
|  |  |  |  |  |  | 1,500m3 of concrete **Temperature rise:** Not applicable as pours are less than 0.9m thick (as  per MPS Temperature Control Plan) |  |  |  |
| 3.5 | Construction Joints (Baffle wall & Beam only) | SEIPP | CG-C4P - 4.1.2P | * Construction joints shall conform to NZS   3109, Clause 5.6.3, type B   * Joint position shall be as shown on the Design Drawings unless otherwise agreed with the engineer | Visual Inspection | Post Pour | **W** | GAJV | Post pour check sheet Precast HQ QA Pack |
| 3.6 | Concrete Curing | SEIPP | MS-41P - 11.1  CG-C4P – 4.1.12.6P  NZS 3109 Clause 7.8 | * All concrete shall be properly and   adequately cured.   * Concrete shall be maintained at a reasonable constant temperature with minimum moisture loss for the curing period * The curing period shall be 7 days | Visual Inspection | Post Pour | **W** | GAJV | Post pour check sheet Precast HQ QA Pack |
| 3.7 | Concrete Finishes | SEIPP | CG-C4P - 4.1.6P  CG-C4P – 4.1.2.12P | * Concrete finishes to be in line with the   design drawings and specification.   * Full post pour inspection review of the concrete finish to identify surface defects, concrete cover checks or any other defects identified or non-conformances. * Repair work shall be carried out using a method approved by the Engineer * Penetrations and cast-in items to be measured and location confirmed | Visual Inspection | Post Pour | **W** | GAJV | Post pour check sheet Precast HQ QA Pack |
| **4.0 Installation** | | | | | | | | | |
| 4.1 | Survey and Set out | GAJV | 2012034 & 2012036  DWG Series | * Set out to be as per drawings. | Visual Inspection | As required | **W** | GAJV | N/A |
| 4.2 | Precast inspection (delivery) | SEIPP | CG-C4P – 4.1.2.12P  Approved shop drawings | * Precast units shall be handled in such a manner that will not cause damage of any kind. | Visual Inspection | Each delivery | **W** | GAJV/WSL | Post pour check sheet |
| 4.3 | PE liner inspection | SEIPP | CG-C27P 4.5P CG-C27P 5.1P | * Tapping survey completed to identify   voids   * Surface inspection of The CPL. CPL shall be free from cracks, cleavages, or other defects. | Visual Inspection | Post Pour | **H** | GAJV/WSL | Post pour check sheet |
| 4.4 | PE extrusion weld certificates | SEIPP | CG-C27P | * Welders PE extrusion certs | Copy of Certificate | All welders | **W** | GAJV | Copy of certificate |
| 4.5 | PE extrusion weld testing | SEIPP | CG-C27P  ASTM D4437, ASTM D5641  DVS2227 | * All site welds shall be tested | High voltage spark test Visual inspection | All welds | **W** | WSL/GAJV | Visual Inspection |
| 4.6 | Gatic Cover Installation (Post-installed) | SEIPP | Gatic installation guides | * Installation as per the Gatic installation guidelines | Visual Inspection | Each frame & cover | **W** | GAJV | Installation checklist |
| 4.7 | Precast installation | SEIPP | 2012034 & 2012036  DWG Series | * Bearing strip in position * Unit sitting level/plumb * Unit positioned in the correct location | Visual Inspection | After Installation | **W** | GAJV | Installation Checklist |
| 4.8 | Dowel bar installation (drill & epoxy fix) | SEIPP | As per  manufacturer’s installation instructions | * Hole cored to correct diameter and depth * Hole clean and free of loose debris * Epoxy placed in the hole and dowel bar installed to correct depth | Visual Inspection | Prior to placement of epoxy | **W** | WSL | Installation Checklist |
| **H** | GAJV |

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| **TYPE** | **ATTENDANCE REQUIRED** |
| 4.9 | Grouting of lifting points & dowel bar connections | SEIPP | 2012036.904 note  Manufacturer’s  installation  instructions | * Grout lifting eyes and dowels with non- shrink grout * Area to be free of dust | Visual Inspection | Each pour | **W** | GAJV | Installation Checklist |
| **5.0 Post Construction:** | | | | | | | | | |
| 5.1 | As built records | GAJV | Watercare Standard Specification 225.31 | * Tables 5.1 & 5.2 of NZS 3109 – (+-10mm) | Survey asbuilt | At completion | **H** | GAJV/WSL | As built records |

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| **ITEM** | **QA DOCUMENT CHECKLIST** | **TICK APPROPRIATE**  **BOX** | **COMMENTS** | **ITEM** | **QA DOCUMENT CHECKLIST** | **TICK APPROPRIATE**  **BOX** | **COMMENTS** |
| 1 | Completed Inspection and Test Plan | ☐ |  | 12 | Check sheets Completed and signed | ☐ |  |
| 2 | Material Delivery Dockets (if applicable) | ☐ |  | 13 | Independent Reviewer Report | ☐ |  |
| 3 | Incoming Material Inspection Checklist | ☐ |  | 14 | Operation and Maintenance Manuals (if applicable) | ☐ |  |
| 4 | All Aconex Mails Closed-Out - Related to Lots | ☐ |  | 15 | Warranties / Guarantees (if applicable) | ☐ |  |
| 5 | Conformance Certificates (if applicable) | ☐ |  | 16 | Producer Statements | ☐ |  |
| 6 | Test Reports | ☐ |  | 17 | Compliance Statement | ☐ |  |
| 7 | Engineers Red-Line mark ups | ☐ |  | 18 | Relevant RFIs - | ☐ |  |
| 8 | As Built Survey | ☐ |  | 19 | Instructions - | ☐ |  |
| 9 | Photos | ☐ |  | 20 | Factory Acceptance Test (if applicable) | ☐ |  |
| 10 | Geotechnical Site Inspection Report (if applicable) | ☐ |  | 21 | Other - | ☐ |  |
| 11 | QA Engineer Site Inspection Report | ☐ |  | 22 | Other - | ☐ |  |

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| **CONFORMANCE / VERIFICATION STATEMENT** | | | | | | |
| This closed lot conforms in all respects with the standards and requirements specified in the Contract Documents. The lot verification records are complete, and any non-conformances have been closed out in accordance with the Projects requirements. | | | | | | |
| **Construction Lot checked by the Senior Project Engineer responsible for the works** | **PRINT NAME** | Michael Pilkington | **SIGNATURE** |  | **DATE** | 16/05/2024 |
| **Construction Lot verified and closed by Quality Management Representative** | **PRINT NAME** | Click or tap here to enter text. | **SIGNATURE** |  | **DATE** | Click or tap to enter a date. |
| **Independent Verification Review (if required) by:** | **PRINT NAME** | Click or tap here to enter text. | **SIGNATURE** |  | **DATE** | Click or tap to enter a date. |