**Inspection and test plan – Piling**

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| **Project no.** | CC0375 | | | **Project name** | Hunter Power Project | | | | | | | | | |
| **Symal ITP no.** | | CC0375-ITP-014 | | **Revision no.** | 4 | | **Revision date** | 02/02/2023 | | **Plant and equipment used** | | |  | | |
| **UGL ITP no.** | | 3200-0663-HPP-QA-ITP-014 | | | | | | | **SHL ITP no.** | | HPP-UGL-QUA-GN-GEN-ITP-0014 | | | |
| **Lot no.** | | |  | | | **Location (chainages, detailed description or marked up plan)** | | | | | |  | |

Attach Dockets, Certificates and QA Documents to ITP

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| Contact Details | | Summary of Requirements | | | Principle Codes / Standards | | Records | |
| **Customer:**  **Construction Manager:**  **Project Engineer:**  **Quality Representative:**  Subcontractors  **Piling:**  **Concrete pumping:**  **Geotechnical:**  Surveillance / Inspection Key  **HOLD POINT (H):** Nominated point beyond which work shall not proceed without verified acceptance by nominee.  **WITNESS POINT (W):** Points at which the nominee shall be notified and invited to witness an activity, but further work may proceed without the presence of the nominee.  **REVIEW (R): Verify** by examination of documentary evidence that inspection / tests have been satisfactorily conducted.  **SURVEILLANCE (S): Continuing** evaluation of the status of methods, analysis of records and monitoring of activities on a random basis to ensure quality requirements will be met.  **VISUAL (V): 100**% Visual Inspection of work / item to ensure compliance with code / specification.  **DIMENSIONAL (D): Measurement** of critical dimensions to ensure work / item is within tolerance. | | **Process Qualifications**  **Traceability:**  Material:  Alloy Verification  Heat Treatment:  Pressure Testing  Consumable:  NDT:  Welder ID:  WPS:  Electrical:  Instruments  **Heat Treatment:**  **Dimensional Control:**  **Testing (NDT):**  **Acceptance Specification:**  **Pressure Testing:**  **Elect. / Instrumentation:**  Notes: | | | * AS2159-2009 Piled Footing Design & Installation * AS1379-2007 Specification and Supply of Concrete   **Client Specifications**   * HPP-AEC-CIV-ST-GEN-SPT-0003\_0 PILING * HPP-AEC-GEO-GN-GEN-SPT-0001   **Engineering Procedures / WI**   * Wagstaff WP-MS-09.3.07 * WP-MS-09.3.30 Low Strain Dynamic Testing | | **(MDR Insert as marked )**   * Inspect Release Certs. * Deviations/Concessions * Material Certificates * Conformance Certificate * Welding Records * Welder Qual. Register * NDT Reports * Report on Repairs * Heat Treatment Records * Dimensional Records * Non-Conformance Rpts * Pressure Test Records * Drawings & Data Sheets * Misc Verification Records * Electrical Test Sheets | |
| Prepared by: | Steven Lee | | Date : 02/02/23 | Approved By: Mitchell Hogg | | Date : 02/02/23 | |  |

|  |  |  |  |  | **Verification or test by** | | | |  | | **Remarks / record (eg. test frequency, reports, certificates, checklist etc)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Symal** | | **UGL** | | **SHL** | |
| **Item no.** | **Activity** | **Ref docs** | **Acceptance criteria** | **Acceptance** | **Key** | **Sign date** | **Key** | **Sign date** | **Key** | **Sign date** |  |
| **1.0 Preliminaries** | | | | | | | | | | | |
| **1.1** | Documentation | Issued drawings / Site copy drawings | Check that you have the latest site and engineering drawings BEFORE starting each task/set of tasks. | Yes  No  N/A | S |  | S |  |  |  |  |
| **1.2** | Determine lot size |  | Lots to be broken up accordingly and outlined on a lot map | Yes  No  N/A | S |  | S |  |  |  | Lot map |
| **1.3** | Geotechnical Engineer | Spec. 0003 Piling [Cl 2.7.1] | Proposed Geotechnical Engineer holds correct qualifications and Experience.  5+ Years Geotechnical Experience including CFA Pile installation | Yes  No  N/A | S |  | S |  |  |  |  |
| **2.0 Materials & Equipment** | | | | | | | | | | | |
| **2.1** | Boring machine | Spec. 0003 Piling  [Cl 3.3.2] | Details of the boring machine and any other tools that may be required shall be provided for approval by the Superintendent  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  |  |  | Plant documents |
| **2.2** | Approval of Concrete Mix Design | Spec. 0003 Piling  [Cl 3.1.2] | Concrete Mix Code: **S40/10/220** – Special Mix  Strength: 40MPa  Agg Size: not greater than 18mm  Slump: not greater than 220mm  Required to achieve 25MPa @ 7 Days  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  |  |  | Mix design |
| **2.3** | Pile Cage & Spacers | Drawings | Certificate of Compliance for Pile Cage  Cage Manufactured as per approved IFC Drawings and welding to approved weld procedure LOR-CJAUTO-12/20-250/500-1  Site splice weld as required IAW approved weld procedure WPS-CSS-014  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  |  |  | Material certificates and COC ☐ Site Daily Weld Repot |
| **3.0 Piling** | | | | | | | | | | | |
| **3.1** | Survey Setout | Spec. 0003 Piling [3.10]  Drawings | A registered surveyor shall be used to accurately located all pile locations as shown on the drawings and specifications. | Yes  No  N/A | S |  | S |  |  |  | ☐ Survey Repot |
| **3.2** | Concrete lines primed and in good order | Wagstaff WP-MS-09.3.07 [ Cl 6.2.1] | Inspect concrete liners have no damage and are primed correctly. | Yes  No  N/A | S |  | S |  |  |  |  |
| **3.3** | Excavation of bore hole | Spec. 0003 Piling [Cl 3.3]  Drawings | Verify: (via Pile Rig)   * **Inclination.** +/- 4% * **Diameter**: 900mm * **Depth**:   Refer to drawings for min. depth into socket material   * The tolerances on the level of the bottom of the piles shall be +0, -100mm from the RL nominated on the drawings or as directed by the Superintendent * Length of pile/pile liner shall not be less than total length shown on drawings | Yes  No  N/A | S |  | S |  | W |  | Pile Log Sheets |
| **3.4** | Excavation conformance | Drawings | Check dimensions and cover are within tolerance refer to below conformance check section for details. Correct toe level as per plan. Material encountered consistent with design. Softened soil shall be removed from the bottom of the drill holes. | Yes  No  N/A | S |  | S |  |  |  | Pile Log Sheets |
| **3.5** | Examination of borehole | Spec. 0003 Piling [Cl 3.4] | Boreholes excavations shall be inspected as the work proceeds. When the founding level as shown on the drawings or as otherwise directed has been reached, each hole will be subject to a visual examination (or other methods of examination) by a Geotechnical Engineer appointed by the superintendent.  The Geotechnical Engineer will advise whether a satisfactory founding level exist or whether further excavation is required.  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  |  |  | Geotechnical Engineer Sign Off Sheets  Pile Log Sheets |
| **3.6** | Concrete supply | Spec. 0003 Piling [3.9] | Verify:  Concrete mix   * 40 MPa 10mm 220mm TREMMIE [N545526] * 65 MPa 10mm 220mm TREMMIE [N876626]   A concrete delivery docket to be supplied with each batch delivered. | Yes  No  N/A | S |  | W |  |  |  | Material dockets Concrete Pour Records |
| **3.7** | Concrete Sampling | Spec. 0003 Piling [3.9]  Spec 0002 Concrete Supply, Construction and Grouting [10.2.3] | The nominal rate of sampling shall be taken after the concrete has been discharged at site prior to handling:   1. Compressive strength (1 x 7 day and 2 x 28 day cylinders): One set per pour or as otherwise directed by Superintendent; 2. Slump: One per batch of concrete   Acceptance Testing shall be done at a NATA registered laboratory | Yes  No  N/A | S |  | W |  |  |  |  |
| **3.8** | Concrete Placement | Spec. 0003 Piling [3.9] | All concrete shall be placed continuously and in the dry so as to ensure the exclusion of all harmful materials and provide a well-formed dense unit of full cross-section without voids or segregation.  All concrete shall be placed by approved methods to limit free fall of concrete to a maximum of 3.0m  Top of 3m of concrete shall be well compacted with a high-capacity vibrator with a min. diameter of 50mm  **Notice: 1 working day prior to placing concrete for test pile**  **WITNESS POINT** | Yes  No  N/A | S |  | W |  | W |  | Concrete Pour Records |
| **3.9** | Concrete testing | Drawings | Concrete test reports achieve design requirements | Yes  No  N/A | S |  | S |  | R |  | Test reports |
| **3.10** | Placement of reinforcement cage. | Spec. 0003 Piling [Cl. 3.2.2, 3.8]  Drawings | Ensure that cage is clean and straight. Plunge the cage centrally to pile hole and ensure spacers are attached at correct locations.  Reinforcement cages and embedment to conform with drawings and specification.  **Notice: 1 working day prior to installation of each pile**  **WITNESS POINT** | Yes  No  N/A | S |  | W |  | W |  | Pile Log Sheets |
| **3.11** | Concrete RL and depth | Drawings | Bored piers depth, size, position and concrete RL as per the Piling Pile Log Sheet and Drawings. | Yes  No  N/A | S |  | S |  | R |  | Pile Log Sheets |
| **4.0 Integrity Testing - Dynamic** | | | | | | | | | | | |
| **4.1** | Pile Testing | AS 2159:2009  Spec. 0003 Piling  [Cl 3.13 (5)]  WP-MS-09.3.30 Low Strain Dynamic Testing | * Minimum 5% sample size * Pile Integrity testing (PIT) as per Wagstaff Procedure WP-MS-09.3.30 Low Strain Dynamic Testing.   **Notice – 3 working days to commence testing**  **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  | R |  | Integrity Test Reports |
| **5.0 Conformance check** | | | | | | | | | | | |
| **5.1** | Survey | Spec. 0003 Piling [3.10] | All piles shall be constructed within the tolerance specified below:   * The centreline at the top of the piles shall be within 50mm of the specified position * The inclination of the pile shaft shall be within ± 4% of the nominated inclination * The tolerance on the level of the top of the piles shall be ± 10mm * The tolerances on the level of the bottom of the piles shall be +0, -100mm from the RL nominated on the drawings or as directed by the Superintendent * Piles shall be constructed to the minimum diameters specified on the drawings * Length of pile/pile liner shall not be less than total length shown on drawings * Maximum bow of pile shall be 0.1% of length * The projection of the pile cage bars above the cut-off shall be ± 25mm from the nominated level | Yes  No  N/A | **H** |  | **H** |  | **H** |  | As-Built Surveys |
| **5.2** | Acceptance and closure of non-conforming items | Spec. 0161 Quality [CL 3.8] | NCRs to be opened for non-conforming items and closed prior to closing construction lot. **HOLD POINT** | Yes  No  N/A | **H** |  | **H** |  | **H** |  |  |

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| **Acceptance of works:** | | | | | | |
| Symal Infrastructure representative name | |  |  | Symal Infrastructure representative signature | |  |
| UGL representative name |  | |  | UGL representative signature |  | |
| SHL representative name |  | |  | SHL representative signature |  | |

**Inspection Checklist Report**

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| **Project no.** | CC0375 | **Project name** | Hunter Power Project | | **Date** |  | |
| **Symal ITP no.** | CC0375-ITP-14 | | | | | | |
| **UGL ITP no.** | 3200-0663-HPP-QA-ITP-014 | | **SHL ITP no.** | | HPP-UGL-QUA-GN-GEN-ITP-0014 | | |
| **Symal Lot no.** |  | | | | **Symal Sub Lot no.** | |  |
| **Location (chainages, detailed description or marked up plan)** | | | |  | | | |

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|  | | **Verify of acceptance by** | | | | | | | | | **Remarks / records** |
|  | | **Symal** | | | **UGL** | | | **SHL** | | |
| **ID No.** | **Activity to be verified** | **ITP Step No.** | **Items conforms?** | | | **NCR / Test Report No.** | | **Key** | | **Sign Date** | **Key** | | **Sign Date** | **Key** | | **Sign Date** |  | |
| Yes | No | NA |
| **Preliminaries** | | | | | | | | | | | | | | | | | | |
| 1. | Documentation | 1.1 |  |  |  |  | | S | |  | S | |  |  | |  |  | |
| 2. | Determine lot size | 1.2 |  |  |  |  | | S | |  | S | |  |  | |  | Lot map | |
| 3. | Geotechnical Engineer | 1.3 |  |  |  |  | | S | |  | S | |  |  | |  |  | |
| **Materials & Equipment** | | | | | | | | | | | | | | | | | | |
| 4. | Boring machine | 2.1 |  |  |  |  | | **H** | |  | **H** | |  |  | |  | Plant documents | |
| 5. | Approval of Concrete Mix Design | 2.2 |  |  |  |  | | **H** | |  | **H** | |  |  | |  | Mix design | |
| 6. | Pile Cage & Spacers | 2.3 |  |  |  |  | | **H** | |  | **H** | |  |  | |  | Material certificates and COC ☐ Site Daily Weld Repot | |
| **Piling** | | | | | | | | | | | | | | | | | | |
| 7. | Survey setout | 3.1 |  |  |  |  | | S | |  | S | |  |  | |  | Survey Report | |
| 8. | Concrete lines primed and in good order | 3.2 |  |  |  |  | | S | |  | S | |  |  | |  |  | |
| 9. | Excavation of bore hole | 3.3 |  |  |  |  | | S | |  | S | |  | W | |  | Pile Log Sheet | |
| 10. | Excavation conformance | 3.4 |  |  |  |  | | S | |  | S | |  |  | |  | Pile Log Sheet | |
| 11. | Examination of borehole  **HOLD POINT** | 3.5 |  |  |  |  | | **H** | |  | **H** | |  |  | |  | Pile Log Sheet  Geotechnical Engineer Sign Off Sheet | |
| 12. | Concrete supply | 3.6 |  |  |  |  | | S | |  | W | |  |  | |  | Material dockets Concrete Pour Record  Pile Log Sheet | |
| 13. | Concrete sampling | 3.7 |  |  |  |  | | S | |  | W | |  |  | |  |  | |
| 14. | Concrete placement  **WITNESS POINT** | 3.8 |  |  |  |  | | S | |  | W | |  | W | |  | Concrete Pour Record & Pile Log Sheet | |
| 15. | Concrete testing | 3.9 |  |  |  |  | | S | |  | S | |  | R | |  | Test report | |
| 16. | Placement of reinforcement cage  **WITNESS POINT** | 3.10 |  |  |  |  | | S | |  | W | |  | W | |  | Pile Log Sheet | |
| 17. | Concrete RL and depth | 3.11 |  |  |  |  | | S | |  | S | |  | R | |  | Pile Log Sheet | |
| **Pile Integrity Testing** | | | | | | | | | | | | | | | | | | |
| 18. | Pile Testing  **HOLD POINT** | 4.1 |  |  |  |  | | **H** | |  | **H** | |  | R | |  | Integrity Test Reports | |
| **Conformance Check** | | | | | | | | | | | | | | | | | | |
| 19. | Asbuilt survey | 5.1 |  |  |  |  | | S | |  | R | |  | R | |  | As-Built Survey Conformance | |
| 20. | Acceptance and closure of non-conforming items | 5.2 |  |  |  |  | | **H** | |  | **H** | |  | **H** | |  |  | |

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| I certify that this Lot conforms to the requirements of the design and specifications; that all associated NCRs have been closed out: and all survey, conformance testing and inspections have been undertaken in accordance with the specified requirements. | | | | |
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| **Symal Representative** |  | **Signature** |  | **Date** |
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|  |  |  |  |  |
| **UGL Representative** |  | **Signature** |  | **Date** |
|  | | | | |
|  |  |  |  |  |
| **SHL Representative** |  | **Signature** |  | **Date** |
| **Comments:** | | | | |
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