Response to Comments on Audit Report on Measures for Mitigating Hazard to Life (Issue 2)

1. Comments from Environemtnal Protection Department dated 6 October 2023 via Fax

No.	Comments	Response
1.	General – Please state explicitly (e.g. S.1.2, cover letter, etc.) if the scope of the Project covers Stage 1 of the Tsueng Kwan O Desalination Plant (DP1) only.	The relevant text has been amended accordingly.
2.	Report Cover – Please clarify whether the Report is intended for Stage 2 of the Tseung Kwan O Desalination Plant.	The report is intended for the first stage of the desalination plant. Report cover has been amended accordingly.
3.	Table 2-1 and 2-2 – (a) "Audit Results" – According to Condition 2.20 of the EP, the audit report should certify the implementation of design requirements / measures recommended in the Detailed Design Plan (DDP). However, it is noted from the audit results that the implementation status of some measures are stated as "will be installed"/ "will be provided" / "being installed"/ "construction in progress" / etc., which suggests that the requirements / measures are yet to be implemented. Please review and clarify.	The audit results have been updated to clarify that the measures have been implemented.
	(b) "Audit Results" (last column) – It appears that some of the audit results does not confirm the implementation of the requirements / measures as required by Condition 2.20 of the EP, but indicates that there is no change to the recommendation presented in DDP and provide supplementary information only. Please provide the audit results with explicit confirmation of the implementation of requirements / measures if applicable.	The audit results have been updated to clarify that the measures have been implemented.
4.	Table 2-2 – (a) Item 1.3 (last column) – It is noted from the audit result that the provided on-site chlorine generation (OSCG) building volume is 5450.38 m3, which exceeds the design requirements stated in the 2017 ERR (i.e. 4000 m3) and the recommendation in the 2021 DDP (i.e. 3800 m3). In view that the OSCG building volume of 4000 m3 was a design assumption for computation of the chlorine release rate in the 2017 ERR as stated in the 4th column, please clarify whether such increase of OSCG building volume was reviewed / approved in any of the EIAO documents of the Project (e.g. those listed in Condition 1.7 of the EP). If not, another ERR should be submitted	Please be clarified that the volume of 4,000 m^3 is not a design requirement. It is not an upper limit nor a lower limit but is a design assumption used in the 2017 ERR. Text has been added in Table 2.2 (Item 1.3) to adequately address the environmental implications of such change and explain to the public that the change will not cause any adverse hazard to life impact. Implications of the changes have also been reviewed in S13.2.11 of a separate ERR (Issue 1) for "*Agreement No. CE 92/2022 (WS) Second Stage of Desalination Plant at Tseung Kwan O - Investigation, Design and Construction*" (2023 ERR) submitted to EPD. Based on the technical comments

No.	Comments	Response
	separately to review the implication of the revised design (e.g. whether the chlorine release rate would be changed due to the increase in volume of the OSCG building) before implementation.	received from the EPD on 18 Oct, 1 Nov and 8 Nov 2023, EPD has no comment on S13.2.11 of the 2023 ERR , which states that such change of building volume would not cause additional adverse hazard to life impact.
	(b) Item 4.1 (last column) – Please confirm whether hoses and couplers for transfer of the concerned chemicals are different in size as required.	Confirmation has been added in the revised report.
	(c) Item 4.2 (4th column) – It seems that the design value in the approved DDP is "about 300m". Please review.	Amended accordingly.
	(d) Item 5.7 (4th column) – It seems illogical that recommendations in 2021 DDP was based on the explosive delivery route provided by CEDD in 2023. Please review.	The typo "in 2023" has been deleted.
5.	S.3.1.1.1 – We have reservation to the conclusion at this stage as some of the design requirements / measures are not "being implemented" yet.	Updated information has been provided in the revised report for your review.

ISSUE 3

AUDIT REPORT ON MEASURES FOR MITIGATING HAZARD TO LIFE

First Stage of Desalination Plant at Tseung Kwan O

BINNIES PROJECT NO. 4110400/40.0000.11A

Report Authorized For Issue By:	For and on Behalf of Binnies Hong Kong Limited

PREPARED FOR

Water Supplies Department

DOCUMENT CONTROL AMENDMENT RECORD	Contract No. 13/WSD/17 First Stage of Desalination Plant at Tseung Kwan O	No: 4110400/40.0000.11A Prepared By: Binnies
Audit Report on Measures for Mitigating Hazard to Life	Client: Water Supplies Department	Initials: AC Date: 29 April 2024

Pages	Date	Issue No.	Description	Initials
All	August 2023	1	Issue 1	AC
All	September 2023	2	Issue 2	AC
All	April 2024	3	Issue 3	AC

First Stage of Desalination Plant at Tseng Kwan O

Environmental Certification Sheet for
Further Environmental Permit (FEP) No. FEP-01/503/2015/B and
Environmental Permit (EP) No. EP-503/2015/B

Name of this Document:	Audit Report on Measures for Mitigating Hazard to Life
Prepared by:	Binnies Hong Kong Limited
Date of Report:	29 April 2024

Reference FEP and EP Condition: Condition 2.20

No later than 3 months before the commencement of operation of the Project, 4 hard copies and 1 electronic copy of an audit report shall be submitted to the Director for record to certifying the implementation of design requirements / measures recommended in the Detailed Design Plan approved under Condition 2.12 of this Permit. Before submission to the Director, the audit report shall be certified by the ET Leader and verified by the IEC as conforming to the recommendations contained in the Detailed Design Plan approved under Condition 2.12.

Environmental Team (ET) Certification:

I hereby certify the above reference document in accordance with Condition 2.20 of FEP No. FEP-01/503/2015/B and EP No. EP-503/2015/B.

Jacky LEUNG
ET Leader
Acuity Sustainability Consulting Limited

Refer to the separate certification letter
Signature

Date: 30 April 2024

Independent Environmental Checker (IEC) Verification:

I hereby verify the above reference document in accordance with Condition 2.20 of FEP No. FEP-01/503/2015/B and EP No. EP-503/2015/B.

Serena SHEK
IEC
Lam Environmental Services Limited

Refer to the separate verification letter
Signature

Date: 30 April 2024

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List of Appendices

1 Introduction

1.1 Background

1.1.1 The desalination plant at Tseung Kwan O (TKO) Area 137 (**the Project**) involves 2 stages. Stage 1 of the Project (DP1) involves a water production capacity of 135,000 cubic meters (m^3) per day. Stage 2 of the Project (DP2) involves an additional water production capacity of 135,000 m^3 per day. The overall capacity of the Project would be 270,000 m^3 per day at the ultimate stage.

1.1.2 An Environmental Impact Assessment (EIA) study for the Project was completed in accordance with the EIA Ordinance (EIAO) during the Feasibility Study (FS) stage of the Project. The EIA Report for the Project (Register No.: AEIAR-192/2015) was approved on 4 November 2015 under the EIAO (**the 2015 EIA**). The Environmental Permit (EP) (No: EP-503/2015), covering the construction and operation of Project, was granted on 4 December 2015.

1.1.3 Following the approval of the 2015 EIA, the Project design was further reviewed, and several design changes were identified. An environmental review was then carried out to address the environmental impacts arising from the design changes and to support the necessary Variation of Environmental Permit (VEP) application for the Project. The findings of the environmental review are presented in the report "*Agreement No. CE 8/2015 (WS) First Stage of Desalination Plant at Tseung Kwan O – Investigation, Design, Construction. Environmental Review Report - Variations for Design Changes (Issue 2)*" issued on 3 November 2017" (**the 2017 ERR**). Amendment of the EP was applied under the EIAO on 5 January 2018. The amended EP (No: EP-503/2015/A) was subsequently granted on 26 January 2018.

1.1.4 On 29 November 2019, the Contractor of DP1 submitted the application for Further Environmental Permit (FEP) to the Environmental Protection Department (EPD) under Section 12 of the EIAO. The FEP (No. FEP-01/503/2015/A) was granted to the Contractor on 20 December 2019.

1.1.5 Further amendment of the EP and FEP was applied on 12 March 2024. The latest amended EP (No. EP-503/2015/B) and FEP (No. FEP-01/503/2015/B) were granted on 3 April 2024.

1.1.6 In accordance with Condition 2.12 of the latest EP and FEP, a Detailed Design Plan (DDP) for Storage of Chlorine and Carbon Dioxide was prepared for the Project and submitted to EPD on 17 March 2020. With incorporation of all comments received from the EPD, the DDP was approved by EPD on 17 August 2021. The 2021 DDP provides the design details of DP1 and assumes that the design of DP2 would remain the same as the reference design adopted in the 2017 ERR. The 2021 DDP also compares the design details of the Project against the design requirements / measures specified in Table 1 of the EP / FEP and in the 2017 ERR.

1.2 Scope and Purpose of this Audit Report

1.2.1 This Audit Report is prepared for the first stage of the Tseung Kwan O Desalination Plant (DP1) in accordance with Condition 2.20 of the FEP and EP for certifying the implementation of design requirements / measures recommended in the 2021 DDP approved under Condition 2.12 of the FEP and EP, and for submission to the EPD for record. This Audit Report has been certified by the Environmental Team Leader and verified by the Independent Environmental Checker (IEC) as conforming to the recommendations contained in the 2021 DDP approved under Condition 2.12 of the FEP and EP.

1.3 Report Structure

1.3.1 The Report Structure is as follows:

Section 1	Introduction
Section 2	Audit Results
Section 3	Conclusion

2 Audit Results

2.1.1 DP1 is under construction stage and is scheduled for completion and commissioning by late December 2023. DP2 is currently under the investigation and design stage. DP2 is scheduled for construction in 2024 and commissioning in 2027. The audit results for certifying the implementation of design requirements / measures in DP1 as recommended in the 2021 DDP are presented in **Table 2-1** and **Table 2-2**.

Table 2-1 Audit Results for Implementation of Design Requirements / Measures for Chlorine and Carbon Dioxide Storage Recommended in the FEP and 2021 DDP

No.	Types of Storage	Design Requirements/Measures in FEP	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
1.	**Chlorine Store**			
1.1	Chlorine storage quantity in the chlorine store	No more than 37 tonnes in 1-tonne drums	The Project will adopt the On-site Chlorine Generation (OSCG) system for use in disinfecting the process water. The use of OSCG system avoids the importation of liquid chlorine and the need for stocking/ on-site storage of chlorine (i.e., Potential Hazardous Installation) whereby intrinsically eliminating the hazard due to transport (on-site and off-site), use, and storage of liquid chlorine, and thus reducing the risk to human life and the development constraints in the vicinity.	OSCG has been implemented in DP1 in accordance with the recommendation of the DDP to replace the importation, storage and use of liquid chlorine. The OSCG main skids (2 trains) are currently positioned in the OSCG building for DP1. Drawing and photo records are provided in **Appendix A-1** and **Appendix A-2**.
1.2	Volume of chlorine store	Larger than 4200 m^3		
1.3	Design and layout of chlorine store	The chlorine store shall be designed in a way such that the average number of drums ruptured in the worst-case scenario during earthquake should be no more than 6.		
1.4	Separation distance between, the chlorine store and explosive trucks / TKO Area 137 Pier	The setback distance between the chlorine building and explosive trucks / TKO Area 137 Pier shall provide sufficient clearance **(see remarks below) so that the overpressure resulting from explosion of explosive trucks or the explosives offloading operation that reaches the chlorine building is less than 2 psi.		
1.5	Separation distance between the chlorine store and any one of the site boundaries (except for the site boundary adjacent to the Clear Water Bay Country Park)	More than 100m		
2	**Carbon Dioxide Store**			
2.1	Maximum number of carbon dioxide storage tank	16 units	5 units in DP1	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Only 5 units are installed in DP1. Layout drawing and photo records are provided in **Appendix B-1** and **Appendix B-2.**
2.2	Type of storage tank	Vacuum insulated, double containment	Vacuum insulated, double containment	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Storage tanks are vacuum insulated with double containment. Specifications of CO_2 tanks installed in DP1 are given in **Appendix B-3**.
2.3	Storage tank capacity	No more than 100 tonnes per tank	Capacity 100 tonnes per tank	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Capacity of each tank is 100 tonnes as indicated in **Appendix B-1**.
2.4	Pressure relief system of carbon dioxide storage tank	Pressure protection for the inner vessel shall be provided by 2 sets (1 duty and 1 stand-by) of pressure protection devices. Each set of pressure protection device will be composed of 2 independent pressure relief valves. The pressure relief valves system will be designed to avoid the common mode failure such that the risk of common mode failure is negligible.	Two sets of pressure protection devices will be provided at inner vessel. Each will compose of two independent pressure relief valves and will be designed to avoid common mode failure.	The CO_2 tanks have been implemented following the recommendations in 2021 DDP and in accordance with the Detailed Process and Instrumentation Diagrams (P&IDs) of Remineralization CO_2 storage tanks and related systems and details of the pressure relief system as presented in the 2021 DDP. Relevant information from the 2021 DDP is reproduced in **Appendix B-4** and **Appendix B-6** for record. Photo record of pressure relief valve is included in **Appendix B-7**.
		The pressure protection device on the outer vessel shall be a plate relief device. The plate relief device will be a standard installation in accordance with industrial standards (EN 13458 Part 2 Annex 1).	Pressure relief valves will be provided on the outer vessel, which will be plate relief valves and will be of EN 13458 Part 2 standard compliant.	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Details and photo record of the pressure relief system implemented for the CO_2 storage tanks in DP1 are given in **Appendix B-6** and **Appendix B-7**.
2.5	Pressure relief system of carbon dioxide road tanker	Pressure protection for the inner vessel shall be provided by 2 sets (1 duty and 1 stand-by) of pressure protection devices. Each set of pressure protection device shall be composed of 2 independent pressure relief valves. The pressure relief valves system shall be designed to avoid the common mode failure such that the risk of common mode failure is negligible.	Two sets of pressure protection devices will be provided on the inner vessel. Each will compose of two independent pressure relief valves and will be designed to avoid common mode failure.	Pressure protection devices have been implemented for the CO_2 tanker following the recommendations in 2021 DDP and in accordance with the P&ID of CO_2 Road Tanker and details of the pressure relief system as presented in the 2021 DDP. The relevant information from the 2021 DDP is reproduced in **Appendix B-5** and **Appendix B-6** for ease of reference.
2.6	Separation distance between the carbon dioxide storage area and explosive trucks / TKO Area 137 Pier	The setback distance between the carbon dioxide storage area and explosive trucks / TKO Area 137 Pier shall provide sufficient clearance so that the overpressure resulting from explosion of explosive trucks or the explosives offloading operation that reaches the carbon dioxide storage area is less than 2 psi.	The maximum offloading capacity to the explosive offloading pier at TKO Area 137 is 5,000 kg TNT equivalent explosives. The maximum capacity per explosive truck from the explosive offloading pier at TKO Area 137 is 1,750 kg TNT equivalent explosives. According to 2017 ERR and based on the formula given in the Queensland Explosives Information Bulletin 50 Version 4 (current) Section 12 (the Bulletin 50) and referring	The as-built location of the CO_2 storage area in DP1 (as indicated in **Appendix C**) follows the recommendations in the 2021 DDP, and hence also met the relevant separation requirement of the EP and FEP.

No.	Types of Storage	Design Requirements/Measures in FEP	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
			to Kingery-Bulmash Blast Parameter Calculator on the website of International Ammunition Technical Guidelines, United Nation, the 2-psi overpressure zone for 5,000 kg and 1,750 kg TNT equivalent explosives is within 178 m and 125m from the explosion source respectively. The liquid carbon dioxide (CO_2) storage area in DP1 is over 300m from the explosive offloading pier, which is greater than the maximum hazard distance or the 2psi overpressure zone of 178m from the explosive source. The CO_2 storage area in DP1 would have sufficient clearance from the explosive offloading pier. The CO_2 storage area in DP1 would not be impacted by the explosive explosion at the pier. Based on the explosive delivery route provided by CEDD at the time of preparing the 2021 DDP, the CO_2 storage area in DP1 is located outside the 2psi overpressure zone of the explosion of the explosive delivery truck. The CO_2 storage area in DP1 would not be impacted by the road transport of explosives.	
2.7	Separation distance between the carbon dioxide storage area and any one of the site boundaries (except for the site boundary adjacent to the Clear Water Bay Country Park)	More than 100m	The CO_2 storage in DP1 is situated at more than 100 m away from both northern and western boundaries of the desalination plant.	The as-built CO_2 storage area in DP1 follows the recommendations of 2021 DDP. It is situated at more than 100 m away from both northern and western boundaries of the desalination plant as shown in **Appendix C**.
2.8	Other safety features of carbon dioxide storage tanks and the facilities	Trycock for overfilling alarm and warning shall be provided on carbon dioxide storage tanks.	Trycock valves will be provided for overfilling alarm and warning on CO2 storage tanks.	Trycock valves have been provided on the CO_2 storage tanks. Details and photo records of the trycock valves are given in **Appendix B-8** and **Appendix B-9**.
		High level alarm shall be provided to operating staff at control room for liquid level monitoring and warning.	High level alarm will be provided and connected to main control room.	High level alarm has been provided and connected to the control room. High level alarm is indicated in the P&ID in **Appendix B-4**.
		Fencing shall be provided surrounding the carbon dioxide facilities.	Security fence will be provided around CO_2 storage area.	Security fence has been installed around the CO_2 Storage area as shown in **Appendix B-10**.

Table 2-2 Audit Results for Implementation of Design Requirements / Measures for Chlorine and Carbon Dioxide Storage Recommended in the 2017 ERR and 2021 DDP

No.	Parameters	Design Requirements / Measures in 2017 ERR	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
1	**On-site Chlorine Generation**			
1.1	Chlorine generation rate	The ultimate chlorine generation rate (including both Stage 1 and Stage 2 works) is 2250 kg per day. Two OSCG systems, each with capacity of 1125 kg per day, will be installed in 2 stages in 2 separate buildings.	No changes to these assumptions are proposed.	The current OSCG design ultimate production for DP1 is 426 kg/d (213 kg/d per train x 2 trains) for DP1. Supporting information including data sheet extracted from the material submission is given in **Appendix A-3**. The reduced production rate would not induce additional hazard to life impact.
1.2	Ventilation rate	6 air change per hour (ACPH)	No change to the ventilation rate is proposed.	Forced ventilation of minimum 6 ACPH is provided for 7 nos. of rooms within the OSCG building for DP1 as follows.

<table>
<tr><th>No.</th><th>Parameters</th><th>Design Requirements / Measures in 2017 ERR</th><th>Recommendations in 2021 DDP</th><th>Audit Results - Actual Provisions for DP1 and Records</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><th rowspan="2">Room Name</th><th rowspan="2">Provision</th><th colspan="3">Ventilation</th></tr>
<tr><th>ACH</th><th>Max. Room Design Temperature, °C</th><th>Relative Humidity, %</th></tr>
<tr><td>Scrubber Room</td><td>MV</td><td>6</td><td>40</td><td>Uncontrolled</td></tr>
<tr><td>Big Bag Salt Store Room</td><td>MV</td><td>6</td><td>-</td><td>Less than 50%</td></tr>
<tr><td>Electrolyser Skid Stream Room</td><td>MV</td><td>6</td><td>40</td><td>Uncontrolled</td></tr>
<tr><td>Equalisation Tank and Neutralisation Tank Room</td><td>MV</td><td>6</td><td>40</td><td>Uncontrolled</td></tr>
<tr><td>Filtered Brine Tank Room</td><td>MV</td><td>6</td><td>-</td><td>Uncontrolled</td></tr>
<tr><td>Chlorinators Room</td><td>MV</td><td>6</td><td>40</td><td>Uncontrolled</td></tr>
<tr><td>DG Store 4 Class 8 (Sodium Hypochlorite Store)</td><td>MV</td><td>6</td><td>-</td><td>Uncontrolled</td></tr>
</table>
Air Conditioning is provided for Electrical room of OSCG building.

Natural ventilation is provided for the Sodium Bisulphite room, Hydrochloric Acid room and Sodium Hydroxide room of OSCG building.

Supporting documents including data sheet and drawing are provided in Appendix A4 and Appendix A5.
</td></tr>
<tr><td>1.3</td><td>Volume of each OSCG building</td><td>4000 m^3</td><td>Proposed Design Value: 3800 m^3
Hazard Implications: In the 2017 ERR, the 10-minute average chlorine release rates to atmosphere (due to accidental indoor chlorine release) were computed by the PHAST model with reference to the building volume of 4000 m^3 and the 6 ACPH ventilation rate. In view that the ventilation rate and chlorine generation rate in each OSCG building and the associated indoor chlorine release rate at source as assumed in the 2017 ERR would remain unchanged, the chlorine release rates to atmosphere would not be significantly affected by the slight reduction of the building volume. In addition, the chlorine risks as predicted in the 2017 ERR are well within the acceptable levels with great safety margins from the assessment criteria. The slight reduction of the building volume would not cause any significant implication on the overall conclusion of the 2017 ERR on the chlorine hazards.</td><td>As-built Building Volume:
Electrolyser skid stream room = 4323.10 m^3
Entire OSCG Building = 5450.38 m^3
Supporting information is given in Appendix A-6.
Hazard Implications: The OSCG skids are stored in the electrolyser skid stream room. Its ventilation rate would remain to be 6 ACPH) and the daily chlorine production rate and the associated indoor chlorine release rate at source would be reduced by more than 50% from 1,125 kg per day as assumed in the 2017 ERR to 426 kg per day. The chlorine release rates to atmosphere would not be increased due to the increase in the skid room volume. In addition, the predicted chlorine risks in the 2017 ERR are well within the acceptable levels with great margins from the assessment criteria. The change of the building volume would not cause any adverse implication on the chlorine risk presented in the 2017 ERR and would not lead to any unacceptable chlorine hazard.</td></tr>
<tr><td>2</td><td colspan="4">Chlorine Gas</td></tr>
<tr><td>2.1</td><td>Discharge of chlorine gas to the atmosphere</td><td>No vent pipe will be provided for direct discharge to the atmosphere</td><td>No change to this design requirement is proposed.</td><td>This design requirement has been properly implemented. There is no vent pipe for direct discharge of chlorine gas to atmosphere.
There are three types of vents discharging to atmosphere in the OSCG building, which are hydrogen vent, tank air vent and treated air vent from scrubber as shown in Appendix A-7.</td></tr>
<tr><td>2.2</td><td>Safety measures</td><td>- Chlorine detectors
- Chlorine scrubber system
- Activation of recycle damper when chlorine scrubber is in operation</td><td>All these safety measures will be adopted in the proposed design.</td><td>Safety measures have been implemented following the recommendations of 2021 DDP. Please refer to supporting information and EPD's "no objection" reply to the proposed scrubber in Appendix A-8 to Appendix A-11.</td></tr>
<tr><td>2.3</td><td>Separation distance between the centre of OSCG building and the nearest site boundary</td><td>Greater than 30 m</td><td>- Over 100 m for OSCG in DP1
- > 30 m for OSCG in DP2</td><td>The OSCG building in DP1 has been implemented following the recommendations of 2021 DDP. Please refer to the supporting document including the BIM screen shot in Appendix A-12 and photo record in Appendix C.</td></tr>
</table>

No.	Parameters	Design Requirements / Measures in 2017 ERR	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
2.4	Separation distance between the exhaust point / louvers of OSCG buildings and the nearest site boundary	Greater than 30 m	- Over 100 m for OSCG in DP1 - > 30 m for OSCG in DP2	The OSCG building and the associated exhaust point / louvers in DP1 have been implemented following the recommendations of 2021 DDP. Please refer to the supporting document including the BIM screen shot in **Appendix A-12** and photo record in **Appendix C.**
3	**Hydrogen Release**			
3.1	Discharge of hydrogen gas to the atmosphere	Individual vent pipe will be provided for each generator	No change to this design requirement is proposed.	Individual hydrogen vent has been provided for each generator as indicated in **Appendix A-7**.
3.2	Concentration of hydrogen gas for discharge to the atmosphere	1% of Lower Flammability Limit (LFL) for hydrogen	No change to this design requirement is proposed.	Dilution blower has been provided to dilute the hydrogen with air to less than 1% by volume, below LFL. Alarm has been installed and will be raised when the in-duct hydrogen monitoring sensor detect the hydrogen concentration higher than 1%. Emergency shutdown (ESD) has been implemented. The ESD panel will be activated and shut off OSCG skids 1 & 2. Please refer to the supporting drawings and document in **Appendix A-8, Appendix A-13** and **Appendix A-14**.
3.3	Hydrogen explosion due to failure of OSCG units	The hazard distance of hydrogen explosion from the OSCG skid was estimated to be 11m for overpressure of 2 psi. Under the reference design, sufficient separation was provided between the chemical tanks and OSCG units to avoid simultaneous failure of tanks containing incompatible chemicals.	Sufficient separation will be provided between the chemical tanks and OSCG units in DP1 to avoid simultaneous failure of tanks containing incompatible chemicals,	The chemical tanks and OSCG units have been installed in the OSCG building of DP1 in accordance with the recommendation in 2021 DDP. BIM model separation distance as supporting information is shown in **Appendix A-15**. OSCG facilities have been installed in accordance with the BIM model.
4	**Sodium Bisulphite ($NaHSO_3$) Assessment**			
4.1	Safety measures to avoid right product delivered into the wrong tank.	Hoses and couplers for transferring of $NaHSO_3$, hydrochloric acid (HCl), ferric chloride ($FeCl_3$), sulphuric acid (H_2SO_4) and citric acid ($C_6H_8O_7$) are different in size to avoid connecting road tankers of incompatible chemicals to corresponding storage tanks.	No change to the safety measure is proposed.	According to Contractor's current design, there is no citric acid ($C_6H_8O_7$) storage in DP1. Hoses and couplers for transferring of $NaHSO_3$, HCl, $FeCl_3$ and H_2SO_4 are in different sizes and have been implemented following the recommendations in the 2017 ERR and 2021 DDP (see **Appendix A-42**).
		Warning signs will be displayed at the inlet of each storage tank to show chemical name and to warn the potential hazards of mixing incompatible chemicals	No change to the safety measure is proposed.	Warning signs have been installed in accordance with the recommendations in 2017 ERR and 2021 DDP (see **Appendix A-43**).
		$NaHSO_3$, sodium hypochlorite (NaOCl), HCl, $FeCl_3$, H_2SO_4 and $C_6H_8O_7$ will be delivered by road tankers.	No change to the safety measure is proposed.	The safety measure has been implemented in accordance with the recommendations of 2021 DDP. Please refer to the supporting information in **Appendix A-16** to **Appendix A-22** showing the provision of filling points for road tankers at Chemical Building and OSCG Building. As advised by the potential chemical supplier(s), the following chemicals will be delivered by road tanker • $NaHSO_3$ (OSCG Building) (Note: Powder form of sodium metabisulphite will be used for preparing $NaHSO_3$ in Chemical Building) • NaOCl (both Chemical Building and OSCG Building) (photo for Chemical Building is attached in **Appendix A-22**) • HCl (OSCG Building) • $FeCl_3$ (Chemical Building) (photo attached in **Appendix A-22**) • H2SO4 (Chemical Building)
		HCl, $FeCl_3$, H_2SO_4 and $C_6H_8O_7$ at chemical building will be stored in double containment tanks.	No change to the safety measure is proposed.	Double containment has been provided for the chemicals in accordance with the recommendations in the 2017 ERR and 2021 DDP. FSD approved DG drawings showing the bund arrangement are provided in

No.	Parameters	Design Requirements / Measures in 2017 ERR	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
				Appendix A-23 to **Appendix A-32**. Chemical storage tanks of HCl, $FeCl_3$ and H_2SO_4 are located within bund with capacity equal to 100% of all tanks in a compartment which is capable to contain any spillages within the bund. The bund works are regarded as double containment for HCl, $FeCl_3$ and H_2SO_4 at Chemical Building and OSCG Building. Photo records are given in **Appendix A-33**.
		HCl, $FeCl_3$, H_2SO_4 and $C_6H_8O_7$ flowing outside of the chemical building will be collected by roadside drains	Floor surface gradient will be used for directing any spillage of HCl, $FeCl_3$, H_2SO_4 and $C_6H_8O_7$ towards the sump within the storage compartment and contained inside the chemical building for further clean-up and proper disposal. Design of the floor gradient shall take account of the viscosity of the chemicals.	Floor surface gradient has been provided for HCl, $FeCl_3$, $H2^SO_4$, $NaHSO_3$, NaOCl rooms, within the bund in accordance with the recommendations of 2021 DDP. Please refer to the architectural drawings as supporting information in **Appendix A-34** and **Appendix A-35** and photo record of sump pits in **Appendix A-36**.
		Perimeter drain will be installed surrounding $NaHSO_3$, HCl and NaOCl storage compartments at OSCG buildings.	Floor surface gradient will be used for directing any spillage of $NaHSO_3$, HCl and NaOCl towards the sump within the storage compartments and contained inside the OSCG buildings for further clean-up and proper disposal. The floor gradient design of the buildings shall take account of the viscosity of the chemicals.	
		Bunds will be provided for all storage compartments	No change to this design measure is proposed.	Bunds have been provided for the chemical storage compartments. Supporting information is provided in **Appendix A-23** to **Appendix A-33**.
		Double containment will be provided for HCl pipelines in OSCG buildings.	No change to this design measure is proposed.	This design measure has been implemented accordingly. Double containment has been provided for HCl pipeline to contain the spillages outside HCl store room. Inside HCl store room, the HCl acid storage tanks and pipeline are located within the bund with capacity equal to 100% of all tanks in a compartment. The bund is regarded as double containment and will contain the spillages inside HCl store room. Supporting information is provided in **Appendix A-37** to **Appendix A-40**.
		Alignment of HCl pipeline is away from pipelines for other incompatible chemicals in OSCG building.	No change to this safety measure is proposed.	This design measure has been implemented accordingly. As-built alignment of HCl pipeline is away from pipelines for other incompatible chemicals in OSCG building as shown in **Appendix A-38**.
		Floor surface gradient will be used for directing spillage of incompatible chemicals to different locations such that HCl will be collected to a separate drain system.	No change to this safety measure is proposed in the latest design.	This design measure has been implemented accordingly. Floor surface gradient has been provided and will be used for directing spillage of incompatible chemicals to different locations such that HCl will be collected to a separate drain system. Please refer to the architectural drawings as supporting information in **Appendix A-35**.
		Only one storage tank will be connected to delivery pipeline at any one time to minimize the amount of spillage.	No change to this design measure is proposed.	This design measure has been implemented accordingly. Separate control valves (open/close) are provided at each tank outlet. The control logic of the valves has been developed in a way such that only one storage tank will be connected to delivery pipeline at any one time to minimize the amount of spillage. Please refer to the supporting information in **Appendix A-16** to **Appendix A-22**
		Pipe pressure will be continuously monitored. Pumps will be immediately shut down if irregular pressure drops occur.	No change to these design measures is proposed.	This design measure has been implemented accordingly. Pressure monitoring system has been installed at the discharge of the sodium bisulphite dosing pumps. The pumps will be tripped to stop running by the control system when irregular pressure drops are detected at pump discharge. Please refer to the process and instrumentation diagram in **Appendix A-41**.
		Vibration sensing system will be installed alone pipelines. Pumps will be immediately shut down if excessive vibration is detected to minimize the amount of leakage through damaged pipelines.	No change to these design measures is proposed.	This design measure has been implemented accordingly. Vibration sensing system has been installed at the dosing line of the sodium bisulphite dosing pumps. The pumps will be tripped to stop running by the control system when irregular vibration are detected at dosing line. Please refer to the process and instrumentation diagram in **Appendix A-41**.
4.2	Separation distance between OSCG buildings and chemical building.	380m	**Design Value:** about300 m **Hazard Implications**: The separation distance of 380 m in the 2017 ERR is mainly to show that it is one of the safety measures for eliminating the operation error namely "right product delivered into the wrong tank". There is no significant risk implication due to the change in the separation distance from 380 m to 280 m.	Actual Value: 340 m (which met the requirement of 2021 DDP) Please refer to BIM screen shot in **Appendix A-12** and photo record in **Appendix C**.

No.	Parameters	Design Requirements / Measures in 2017 ERR	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
5	**Liquid Carbon Dioxide (CO_2)**			
5.1	Number of CO_2 storage tank	16 units	5 tanks in DP1	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Only 5 units are installed in DP1. Layout drawing and photo records are provided in **Appendix B-1** and **Appendix B-2.**
5.2	Type of storage tank	Vacuum insulated	Vacuum insulated	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Storage tanks installed in DP2 are vacuum insulated with double containment. Specifications of CO2 tanks installed in DP1 are given in **Appendix B-3**.
5.3	Storage tank capacity	100 tonnes per tank	100 tonnes per tank	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Capacity of each tank is 100 tonnes as indicated in **Appendix B-1**.
5.4	Type of vaporizer	Ambient	Ambient	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. The type of vaporizer is ambient. Inspection report is provided in **Appendix B-11**.
5.5	Transport mode	By road tanker	By road tanker	The transport mode by road tanker has been implemented. Plan view of road tanker filling point is shown in the CO2 system layout in **Appendix B-1**. CO_2 road tanker license is attached in **Appendix B-12**.
5.6	Safety measures	CO_2 storage in double containment	CO_2 storage in double containment	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP. Storage tanks are vacuum insulated with double containment. Specifications of CO_2 tanks installed in DP1 are given in **Appendix B-3**.
		2. set of pressure relief valves (PRVs) on inner containment. The 2 sets of PRVs are connected by a switchover valve. Each set consists of 2 PRVs.	No changes to the design measures are proposed.	The CO_2 storage tanks have been implemented following the recommendations in 2021 DDP and in accordance with the Detailed P&IDs of Remineralization CO_2 storage tanks and related systems and details of the pressure relief system as presented in the 2021 DDP. Relevant information from the 2021 DDP is reproduced in **Appendix B-4** and **Appendix B-6** for record. Photo record of pressure relief valve is included in **Appendix B-7**.
		Plate pressure relief device on outer containment (considered on storage tanks only).	No changes to the design measures are proposed.	Plate pressure relief devices have been provided on outer containment in accordance with the recommendations in 2021 DDP. Details and photo record of the pressure relief system are given in **Appendix B-6** and **Appendix B-7**.
		Trycock for overfilling alarm and warning	No changes to the design measures are proposed.	Trycock for overfilling alarm and warning has been implemented in accordance with the recommendation in 2021 DDP. Details and photo records of the trycock valves are given in **Appendix B-8** and **Appendix B-9**.
		High level alarm to operating staff at control room for liquid level monitoring and warning	No changes to the design measures are proposed.	High level alarm has been provided in accordance with the recommendation in 2021 DDP. High level alarm is indicated in the P&ID in **Appendix B-4**.
5.7	Separation distance between CO_2 storage area and the explosive truck during off-site transport	Set back the CO_2 storage with sufficient clearance so that the overpressure resulting from explosion of explosive vehicle during off-site transport that reaches the storage is less than 2 psi.	Based on the explosive delivery route provided by CEDD, the setback distance of the CO_2 storage area in DP1 is located outside the 2psi overpressure zone from the explosive delivery truck. The CO_2 storage area in DP1 would not be impacted by the road transport of explosives.	The as-built location of the CO_2 storage area in DP1 (as indicated in **Appendix C**) follows the design assumption in 2021 DDP, and hence also met the relevant separation requirement of the 2017 ERR.
5.8	Separation distance between CO_2 storage area and the explosive offloading pier	Set back the CO_2 storage with sufficient clearance so that the overpressure resulting from explosion of explosives at the offloading pier that reaches the storage is less than 2 psi.	The liquid CO_2 storage areas in DP1 is over 300m from the explosive offloading pier, which is greater than the maximum hazard distance or the 2psi overpressure zone from the explosive source. The CO_2 storage area in DP1 would have sufficient clearance from the explosive offloading pier.	
5.9	Separation distance between CO_2 storage area and site boundary	Approximately 100 m	The CO_2 storage in DP1 is situated at more than 100 m away from both northern and western boundaries of the desalination plant.	The as-built CO_2 storage area in DP1 follows the recommendations of 2021 DDP. It is situated at more than 100 m away from both northern and western boundaries of the desalination plant as shown in **Appendix C**.

No.	Parameters	Design Requirements / Measures in 2017 ERR	Recommendations in 2021 DDP	Audit Results - Actual Provisions for DP1 and Records
5.10	Separation distance between CO_2 storage area and toe of natural slope behind	Approximately 30m	Approximately 30m for CO_2 storage in DP1	The as-built CO_2 storage area in DP1 follows the recommendations in 2021 DDP. It is situated at more than 30 m away from the slope toe in indicated in **Appendix B-13** and **Appendix C**.
5.11	Safety measure to protect the CO_2 storage area from soil debris.	A 1.5m high baffle barrier will be constructed at the roadside of the internal access road.	No change to the safety measure is proposed.	A 1.5 m high barrier has been provided as indicated in the photo record in **Appendix B-14**.

3 Conclusion

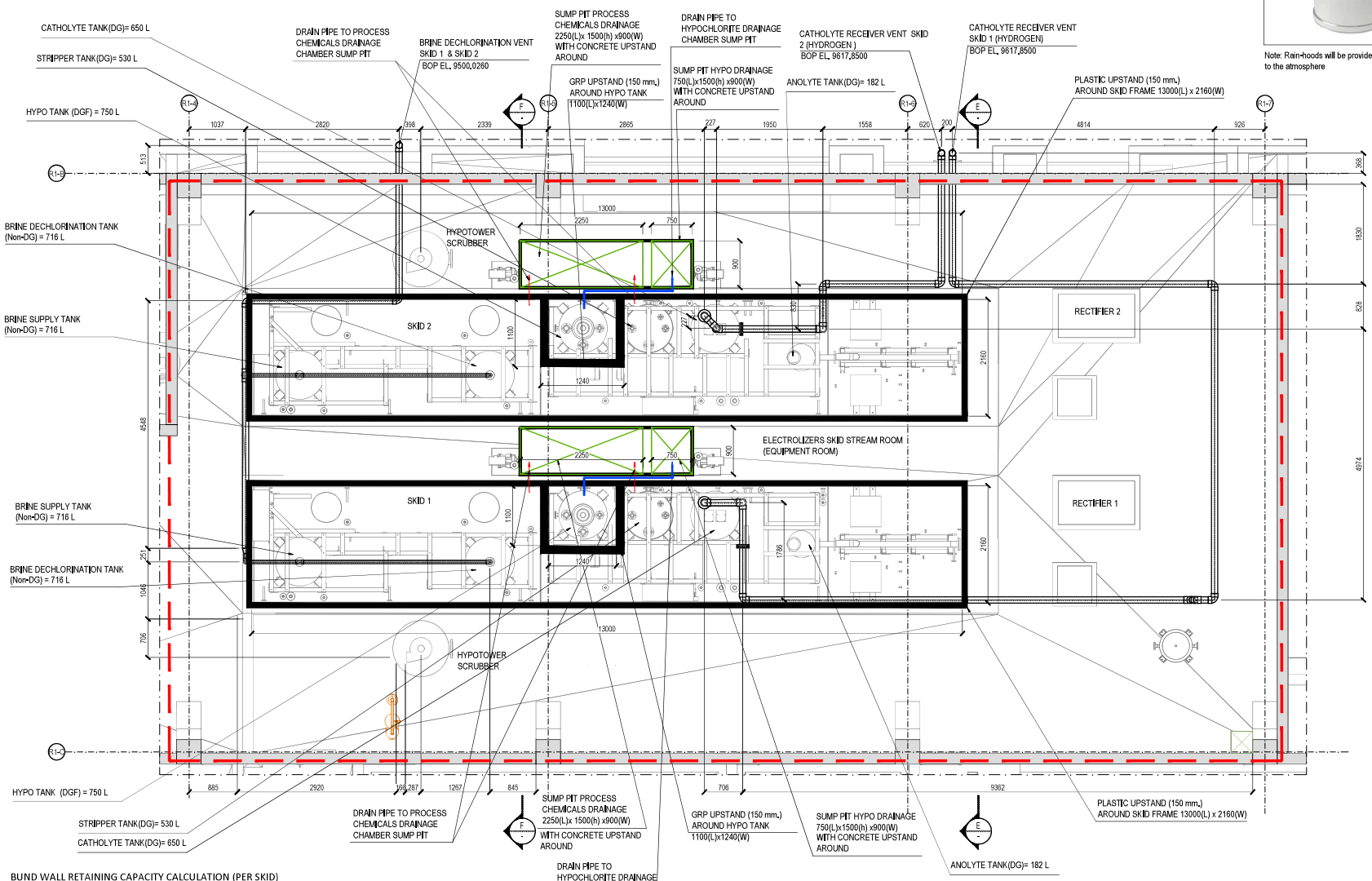
3.1.1 An audit has been carried out in accordance with Condition 2.20 of FEP No. FEP-01/503/2015/A and EP No. EP-01/503/2015/A for certifying the implementation of design requirements / measures recommended in the 2021 DDP approved under Condition 2.12 of the FEP and EP. The audit results showed that the design requirements and measures for mitigating hazard to life as recommended in the 2021 DDP have been implemented at DP1. With the provision of these design requirements and measures, operation of the DP1 would not induce additional hazard to life impact as compared to the predictions in the 2017 ERR and 2021 DDP.

End of Text

Appendix A
Design Requirements and Measures for OSCG, Chemical Handling and Storage

Appendix A-1 Layout of OSCG Skids

Note: Rain-hoods will be provided for the vents to the atmosphere



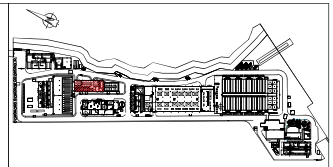
PLAN VIEW Elev. +12.780

Scale 1:40

BUND WALL RETAINING CAPACITY CALCULATION (PER SKID)

Total volume of bund wall area of the OSCG skid 13x2.16x0.150	4.212m3	(A)
Volume of process chemicals drainage chamber´s Sump Pit 2.25x0.9x1.5	3.037m3	(B)
Volume of hypochlorite drainage chamber´s Sump Pit 0.75x0.9x1.5	1.012m3	(C)
Hypo tank capacity	750 L	(D)
OSCG On-Skid Tanks capacity		
Brine supply tank	716 L	(E)
Brine dechlorination tank	716 L	(F)
Anolyte tank	182 L	(G)
Catholyte tank	650 L	(H)
Stripper tank	530 L	(I)
TOTAL	2794 L	(J)=E+F+G+H+I

(C)>(D) Retaining capacity of sump pit is adequate for holding volume of Hypo.
(B)>(J) Retaining capacity of sump pit is adequate for holding volume of chemicals other than Hypo.
(A)>(D)&(J) Retaining capacity of bund wall is adequate for holding volume of all chemicals.



KEY PLAN | DWG AREA

NOTES

Note 1: Sump Pit With Level Switch, Alarm to DCS for High Level. Refer Detail in Page 9.

Note 2: Each Chemical have a Bund Pit and Drain Pit. The Drain System for each Chemical Room is separated. There isn´t any mix of Chemicals. From each Chemical Storage Tank the chemical is pumping to the process separately.

Note 3: All the dimensions are in mm.

LEGEND

- TRUCK LOAD PIT (SPILLAGE PIT)
- DRAIN/SUMPIT (INTERNAL)
- SAFETY SHOWER AND EYEWASH
- CABINET
- CABINET WITH EMERGENCY STOP BUTTON
- EMERGENCY STOP BUTTON FOR THE EQUIPMENT MOTOR
- HAZARDOUS AREA

REFERENCE DRAWINGS

Rev	Description	By	Date
F1	FSD SUBMISSION	XMR	13/07/23

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: WSP In Association with APU

Project title

CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title

ON SITE CHLORINE GAS PLANT BUILDING FIRE SERVICES DEPARTMENT LAYOUT SKIDS AREA. SCRUBBER VENTS PLAN VIEW

Drawing no.	Rev.
TKOD1-DWG-R001-AFS0001 PART 05 of 10	F1

Drawn	Date	Checked	Approved
ALR	28-03-2022	JA	JB

Scale: -

Status: PRELIMINARY DESIGN

HK01C2-240-R001-A001 0.8
DATE: 04/sep/2023 11:59:55
FILENAME : G:\01_DESIGN\ACON\HK01C2 TSEUNG KWAN O\30 HK01C2\ORTH-DS\DWGS\R001 OSCG\FSD DOCUMENTS\HK01-DWG-R001-AFS0001 05-10.DWG

Appendix A-2 Photo Records of OSCG Skids in DP1

Appendix A-3 OSCG Design Data Sheet

First Stage of Tseung Kwan O Desalination Plant

AJC Joint Venture

Rev: 6
Date: 14/01/2022
Created By: E.P.

ETS CHLORINATION SIZE JUSTIFICATION

DESIGN SCENARIOS

OSCG PRODUCTION SKID

Case	Stage 1 25% Guaranteed 25%	Stage 1 100% Guaranteed 100%	Stage 1 Annual 106%	
Duty Units	1	1	1	
Stand-By Units	1	1	1	
Skid Maximum Production	213	213	213	kg/d
Minimum Turndown Ratio	16%	20%	20%	
	Note: Below 20% turndown, energy consumption on OSCG will be higher the guarantee performance			
Flow	35.674	135.000	142.694	m3/d
Cl2 Dose Minimum	1,0	1,00	1,00	ppm
NaOCl Back Up (as Cl2)	0	0	0	
Cl2 Production	35,67	135,00	142,69	kg/d
NaOCl Back Up (as Cl2)	0,00	0,00	0,00	kg/d
Frequency	Continuous	Continuous	Continuous	
Total Postreatement	35,67	135,00	142,69	kg/d
Intake Flow	84.795	339.178	354.952	m3/d
Cl2 Dose	0	0	0	ppm
Cl2 Production	0,00	0,00	0,00	kg/shock
Frequency	14	14	14	days
Total Intake	0,00	0,00	0,00	kg/d
Total	35,67	135,00	142,69	kg/d
Turndown	16,7%	63,4%	67,0%	
Cl2 Dose Status	OK	OK	OK	0.5<Dose<1.5
TD Status	OK	OK	OK	16%<TD<100%

OSCG NaOCl TANKS

Average Dose	1	1	1	ppm
Storage time	20,00	20,00	20,00	days
NaOCl Concentration	6,00%	6,00%	6,00%	
NaOCl Density	1100	1100	1100	kg/m3
Volume Storage	10,81	40,91	43,24	m3
Tanks at OSCG Building	3	3	3	
Tank Capacity	17	17	17	m3
Storage Days at OSCG B	94,36	24,93	23,59	days
Total Storage Capacity	94,36	24,93	23,59	days
Storage Capacity Status	OK	OK	OK	Storage>20 days

Appendix A-4 Data Sheet of OSCG Ventilation Fans (Sheet 1 of 3)

Room Name	Floor Level	Room Dimension			System	Environmental Design Condition		Equipment Load	Lighting Load	Occupants			Outdoor Air			
		Floor Area	Height	Volume		Design Temperature	Humidity			Default Occupant Density	No. of Occupants	Metabolic Heat	People Outdoor Air Rate	Area Outdoor Air Rate	Combined Outdoor Air rate	Outdoor Air Rate
		m^2	m	m^3	AC/MV/NV	°C	%	kW	W/m^2	m^2/pr	pr	W/pr	L/s/pr	$L/s/m^2$	L/s/pr	L/s
Scrubber	GF	15.2	6.6	100	MV	40	Uncontrolled	0	10	-	2	450	-	-		
Electrical Room	GF	74.8	6.6	494	AC	28	Uncontrolled	-	-	-	-	-	-	-		
Big Bag Salt Storage	GF	128.5	6.6	848	MV	-	50	-	-	-	-	-	-	-		
Chlorinators Room	GF	11.4	6.6	75	MV	40	Uncontrolled	0.85	10	-	2	450	-	-		
Electrolyser and Rectifier Room	GF	247.3	6.6	1632	MV	40	Uncontrolled	0.7	10	-	2	450	-	-		
Sodium Hypochlorite Tank Store (Cat No.4)	GF	57.5	6.6	380	MV	-	-	-	-	-	-	-		-		
Filtered Brine Tank Room	GF	38.1	6.6	251	MV	-	-	-	-	-	-	-		-		
Equali Tank and Neutra Tank Room	GF	35.0	5.3	186	MV	40	Uncontrolled	0.5	10	-	2	450	-	-		

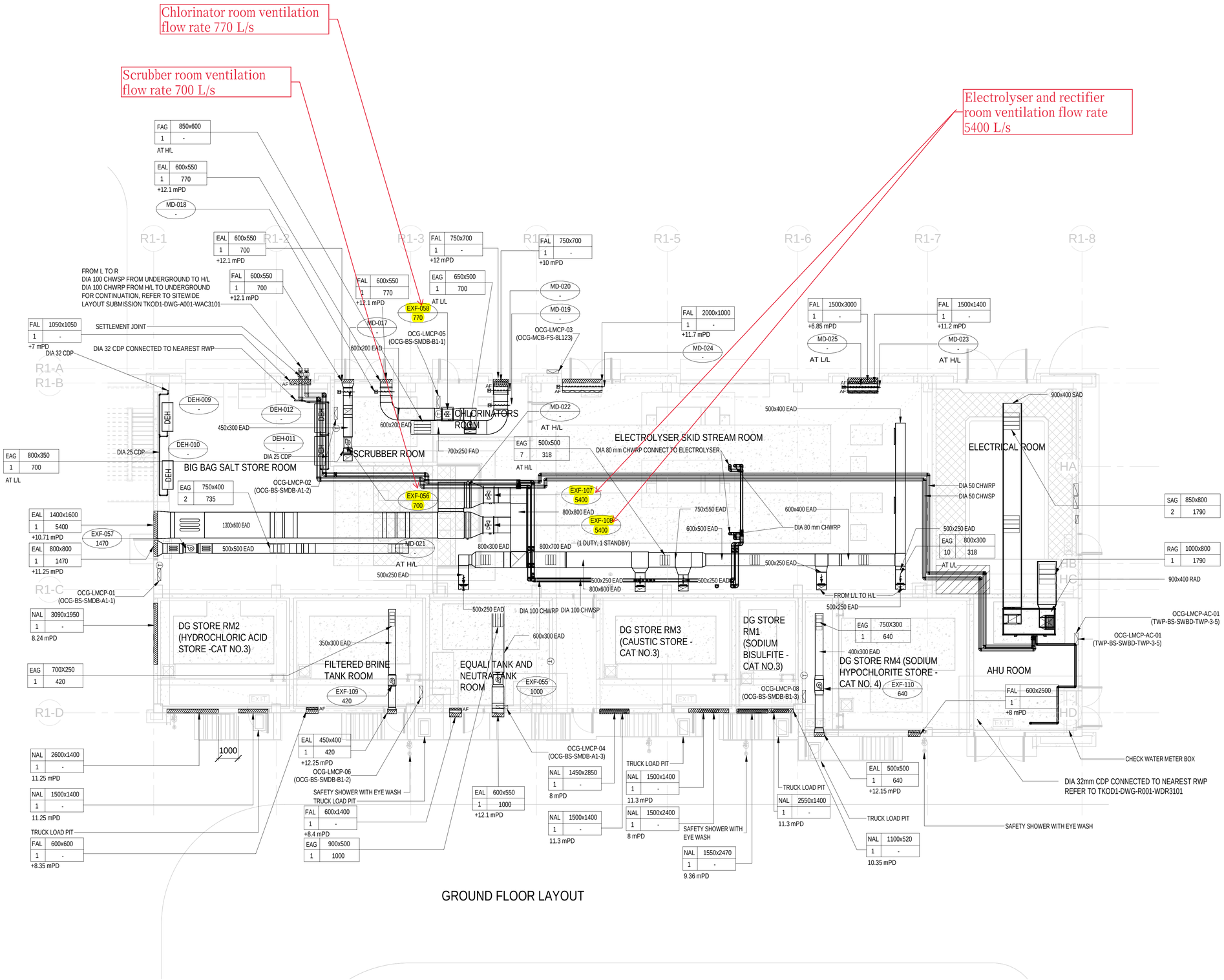
Appendix A-4 Data Sheet of OSCG Ventilation Fans (Sheet 2 of 3)

Room Name	Floor Level			ACH Method				Heat Gain Method			Heat Gain Method					
		Outdoor Air in ACH	% of Extract Air	Exhaust Air by heat load	Exhaust Air by Area	ACH	Exhaust Air	Solar Heat Gain			Solar Heat Gain				Plant Heat Gain	
								Solar Intensity		Material	Transmission factor	Area		Solar Heat Load	Lighting Load	Electrical Load
								Vertical	Horizonatal			Vertical	Horizonatal			
		ACH	%	/	L/s/m2		L/s	kW/m^2	kW/m^2			m^2	m^2	kW	kW	kW
Scrubber	GF	-	100	-	-	6	167	0.71	1.03	250mm concrete	0.08	31	15	3.03	0.15	0.0
Electrical Room	GF	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Big Bag Salt Storage	GF	-	100	-	-	6	1464	-	-	-	-	-	-	-	-	-
Chlorinators Room	GF	-	-	-	-	6	125	0.71	1.03	250mm concrete	0.08	30.5	11	2.67	0.11	0.9
Electrolyser and Rectifier Room	GF	-	100	-	-	6	2753	0.71	1.03	250mm concrete	0.08	130	247	27.76	2.47	0.7
Sodium Hypochlorite Tank Store (Cat No.4)	GF	-	100	-	-	6	633	-	-	-	-	-	-	-	-	-
Filtered Brine Tank Room	GF	-	100	-	-	6	419	-	-	-	-	-	-	-	-	-
Equali Tank and Neutra Tank Room	GF	-	100	-	-	6	309	0.71	1.03	250mm concrete	0.08	22	35	4.13	0.35	0.5

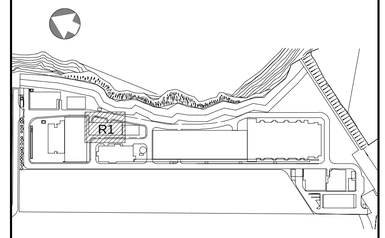
Appendix A-4 Data Sheet of OSCG Ventilation Fans (Sheet 3 of 3)

Room Name	Floor Level	Heat Gain Method				ACH Method	Exhaust Air Flow Rate Required (Compared ACH & Heat Gain Method)	Total Exhaust Air Flow Rate Provided
		Metabolic Heat Gain People Load (0.45kW per person)	Total Heat Gain	Temperature Rise	Exhaust Air	Exhaust Air		
		kW	kW	°C	L/s	L/s	L/s	L/s
Scrubber	GF	0.9	4.09	5	692	167	692	700
Electrical Room	GF	-	-	-	-	-	-	-
Big Bag Salt Storage	GF	-	-	-	-	1464	1464	1470
Chlorinators Room	GF	0.9	4.54	5	769	125	769	770
Electrolyser and Rectifier Room	GF	0.9	31.84	5	5396	2753	5396	5400
Sodium Hypochlorite Tank Store (Cat No.4)	GF	-	-	-	-	633	633	640
Filtered Brine Tank Room	GF	-	-	-	-	419	419	420
Equali Tank and Neutra Tank Room	GF	0.9	5.88	5	997	309	997	1000

Appendix A-5 OSCG Building Ventilation Rates



GROUND FLOOR LAYOUT



Rev	Description	By	Date
B1	DETAILED DESIGN APPROVAL	WYF	23 DEC 2022
B0	DETAILED DESIGN APPROVAL	WYF	07 MAY 2021
A0	APPROVAL IN PRINCIPLE	WYF	31 JUL 2020

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC AKC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title

CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title

MVAC -
ON-SITE CHLORINE GENERATION SYSTEM BUILDING - LAYOUT - GROUND FLOOR

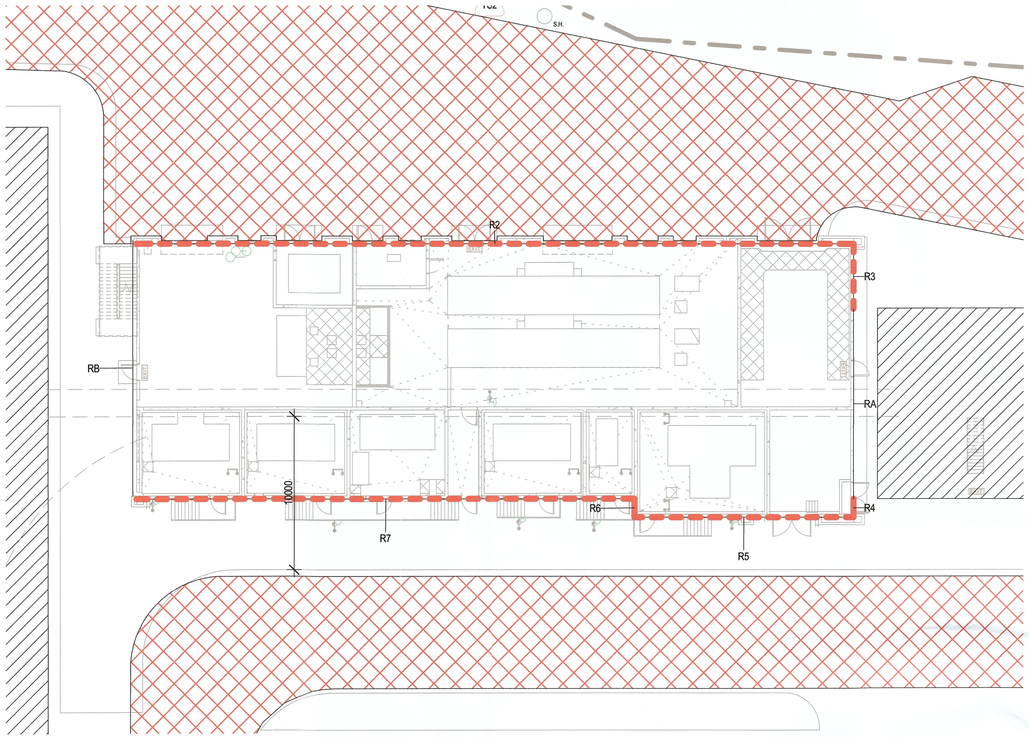
Drawing no.	Rev.
TKOD1-DWG-R001-WAC3101	B1

Drawn	Date	Checked	Approved
WYF	31 JULY 2020	AKC	SY

Scale: 1 : 100

Status: FSD SUBMISSION

Appendix A-6 OSCG Building Volume



1 GBP-EVA DIAGRAM
1 : 200

NOTES OF EVA:

1. THE DESIGN OF THE FORMATION EVA SHALL BE CAPABLE OF RESISTING THE WEIGHT OF THE FIRE APPLIANCE 30,000kg.
2. ANY OVERHEAD STRUCTURE OVER ABOVE EVA, A CLEAR HEADROOM SHOULD BE MAINTAINED WITH A MIN. 4.5 METERS THROUGHOUT THE EVA ROUTING.
3. NO PART OF THE GRADIENT THROUGHOUT THIS ACCESS ROAD IF STEEPER THAN 1 IN 10
4. NO PART OF THE WIDTH THROUGHOUT THIS EVA IS LESS THAN 7.3 METERS WIDE OR OTHERWISE SPECIFIED.
5. THE EVA SHALL BE HARD PAVED.
6. AN EVA LAYOUT SIGN SHALL BE ERECTED AT THE ENTRANCE OF THE SITE.
7. EVA EMERGENCY ROUTE SIGNS SHALL BE POSITIONED AT AN INTERVAL OF NOT LESS THAN 100M ALONG THE EVA.
8. NO PARKING SIGNS SHALL BE ERECTED ALONG THE EVA AT 50M INTERVALS EXCEPT WHERE DISGNATED CARPARKS ARE MARKED.

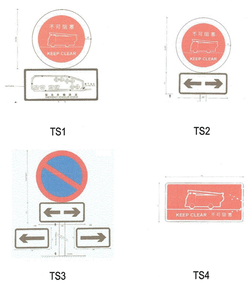
LEGEND:

EVA

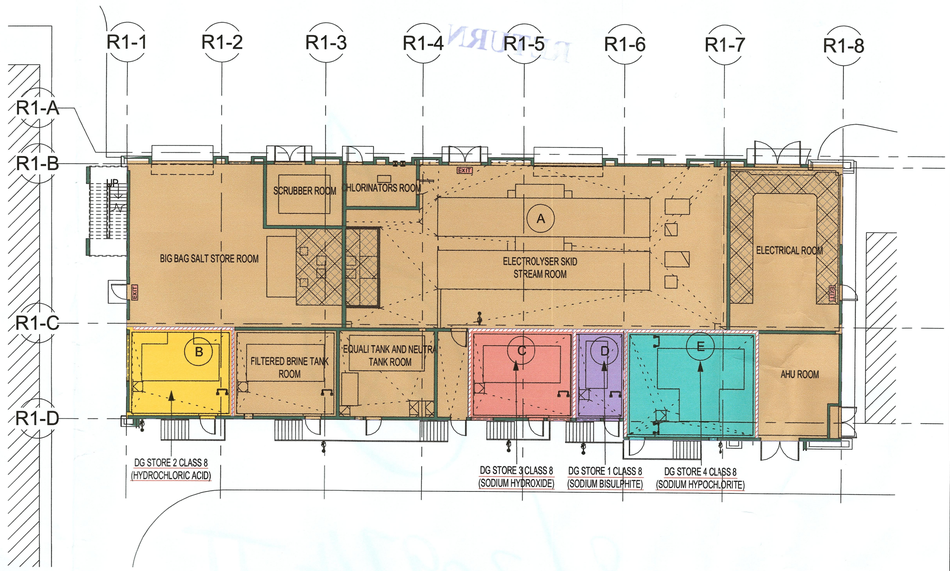
SITE BOUNDARY

S.H. STREET HYDRANT

BUILDING FACADE SERVED BY EVA



TS1 TS2 TS3 TS4



2 COMPARTMENT DIAGRAM
1 : 200

TOTAL LENGTH OF ALL PERIMETER WALL (OSCG)

SEGMENT MARK	LENGTH OF PERIMETER WALL
R2	46.912 m
R3	4.206 m
R4	1.200 m
R5	14.329 m
R6	1.195 m
R7	32.583 m
RA	12.439 m
RB	16.650 m
Grand total	129.514 m

LENGTH OF FACADE TO BE SERVED BY EVA (OSCG)

SEGMENT MARK	LENGTH OF PERIMETER WALL
R2	46.912 m
R3	4.206 m
R4	1.200 m
R5	14.329 m
R6	1.195 m
R7	32.583 m
Grand total	100.425 m

FIRE RESISTANCE REQUIREMENT FOR ELEMENTS OF CONSTRUCTION

COMPARTMENT				FRR Required	MINIMUM DIMENSION OF ELEMENT OF CONSTRUCTION					
					R.C. COLUMN		R.C. BEAM		R.C. SLAB	
Number	AREA	HEIGHT	VOLUME		COVER TO STEEL	MIN. DIM.	COVER TO STEEL	WIDTH	COVER TO STEEL	THICKNESS
A	640.460 m²	6750	4323.10 m³	-/60/60	30	200	25	200	20	100
B	41.824 m²	6750	282.31 m³	-/120/120	50	200	35	300	35	125
C	41.223 m²	6750	278.25 m³	-/120/120	50	200	35	300	35	125
D	20.763 m²	6750	140.15 m³	-/120/120	50	200	35	300	35	125
E	63.195 m²	6750	426.57 m³	-/120/120	50	200	35	300	35	125

5450.38 m³

CALCULATION FOR LENGTH OF EVA

TOTAL LENGTH OF ALL PERMETER WALL OF THE BUILDING
=129.514m

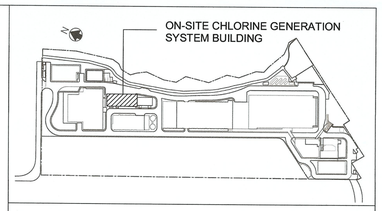
LENGTH OF FACADES FOR BUILDING TO BE SERVED BY EVA
= 100.425m

PERCENTAGE OF PERIMETER WALLS FOR BUILDING FACING EVA
R2 & R3:
51.118/129.514 X 100% = 39.461% > 25%

R4, R5, R6, R7:
49.307/129.514 X 100% = 38.071% >25%

PROVISION OF EXIT DOORS & EXIT ROUTES FROM STOREY

LEVEL	NAME	Area	USE CLASSIFICATION	OCCUPANCY FACTOR	OCCUPANT CAPACITY	MIN. NOS. OF EXIT DOOR & EXIT ROUTE	MINIMUM TOTAL WIDTH (IN MM)				MINIMUM WIDTH (IN MM) OF EACH			
							EXIT DOORS		EXIT ROUTES		EXIT DOOR		EXIT ROUTE	
						PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED
GROUND FLOOR	BIG BAG SALT STORE ROOM	125.672 m²	PLANT ROOMS (>100M2)	30	5	2		900		1050	750	900	1050	1050
GROUND FLOOR	DG STORE 1 CLASS 8 (SODIUM BISULPHITE)	17.602 m²	STORAGE , MANUFACTURING OF HAZARDOUS / DANGEROUS GOODS PREMISES	30	1	1		900		1050	750	900	1050	1050
GROUND FLOOR	DG STORE 2 CLASS 8 (HYDROCHLORIC ACID)	37.183 m²	STORAGE , MANUFACTURING OF HAZARDOUS / DANGEROUS GOODS PREMISES	30	2	1		900		1050	750	900	1050	1050
GROUND FLOOR	DG STORE 3 CLASS 8 (SODIUM HYDROXIDE)	37.190 m²	STORAGE , MANUFACTURING OF HAZARDOUS / DANGEROUS GOODS PREMISES	30	2	1		900		1050	750	900	1050	1050
GROUND FLOOR	DG STORE 4 CLASS 8 (SODIUM HYPOCHLORITE)	57.436 m²	STORAGE , MANUFACTURING OF HAZARDOUS / DANGEROUS GOODS PREMISES	30	2	1		900		1050	750	900	1050	1050
GROUND FLOOR	ELECTROLYSER SKID STREAM ROOM	250.516 m²	PLANT ROOMS (>100M2)	30	9	2		3400		1050	750	900	1050	1050



FRR WALL REQUIRED -/120/120 BETWEEN COMPARTMENTS

FIRE SERVICES REQUIREMENTS INCORPORATED
Date 28 SEP 2022
(CHAN Tak-pang)
Senior Station Officer

Rev.	Description	By	Date
F1	FSD SUBMISSION	HH	27 JUL 2022
F0	FSD SUBMISSION	DT	21 APR 2021

FOR AND ON BEHALF OF
ARCHITECTURAL PROJECT UNIT LIMITED

CHAN WING YAN
AUTHORIZED PERSON

Employer
水務署 Water Supplies Department

Supervising Officer designate
BLACK & VEATCH

Design Checker
ARCADIS Design & Consultancy for natural and built assets

Contractor
acciona JEC AGUEC
AJC JOINT VENTURE

Designer
wsp
In Association with APU

Project title
CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

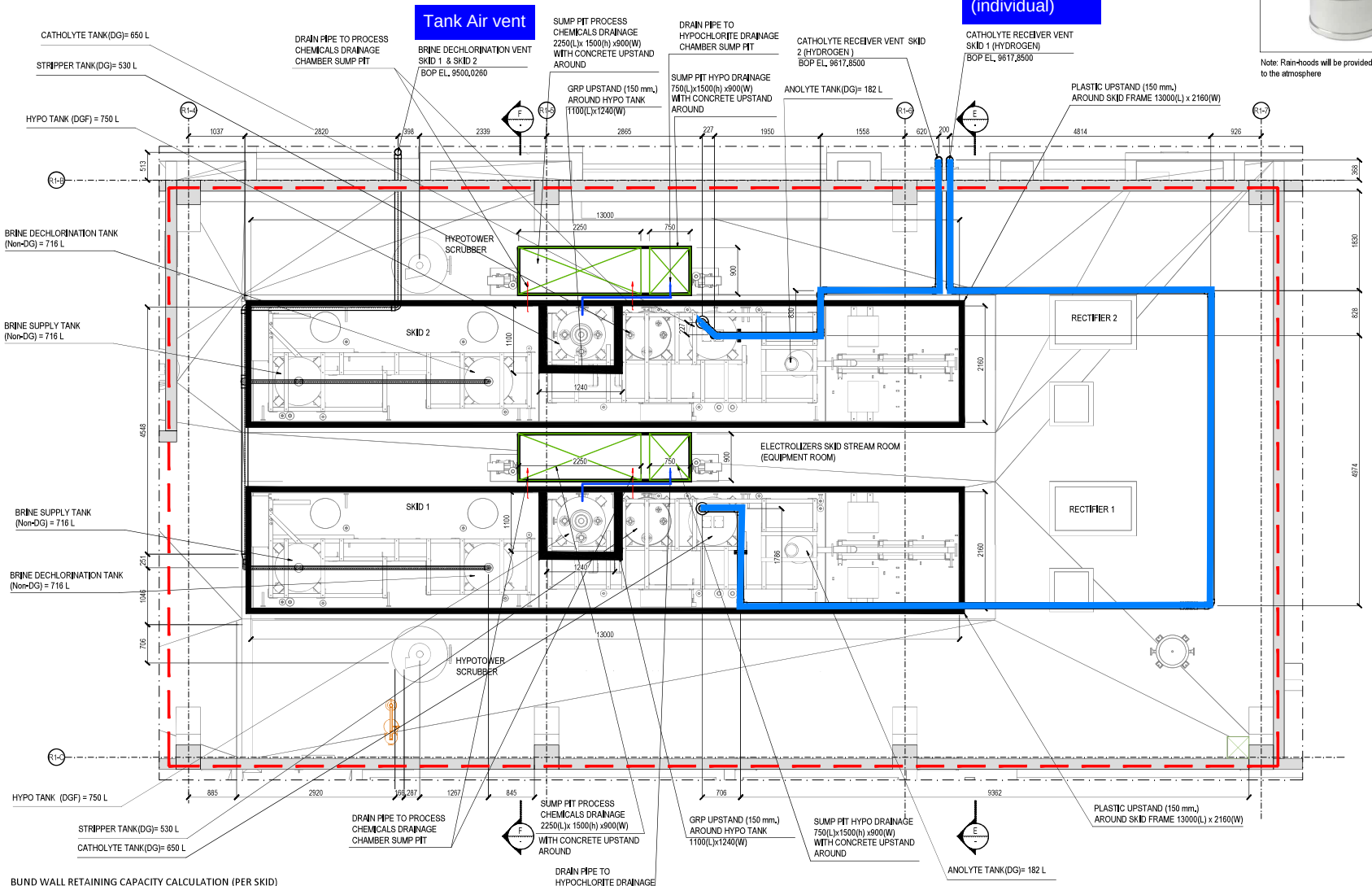
Drawing title
ON-SITE CHLORINE GENERATION
SYSTEM BUILDING
GENERAL BUILDING PLAN
CALCULATION AND DIAGRAM

Drawing no.	Rev.
TKOD1-DWG-R001-PAR8001	F1

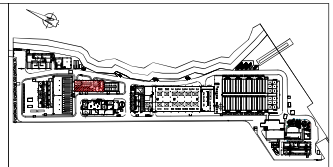
Drawn	Date	Checked	Approved
SL	27 JUL 2022	HH	BC

Scale: As indicated
Status: DDA SUBMISSION

Appendix A-7 Vent Pipes of OSCG Building (Sheet 1 of 3)



Note: Rain-hoods will be provided for the vents to the atmosphere



KEY PLAN | DWG AREA

NOTES

Note 1: Sump Pit With Level Switch, Alarm to DCS for High Level. Refer Detail in Page 9.

Note 2: Each Chemical have a Bund Pit and Drain Pit. The Drain System for each Chemical Room is separated. There isn't any mix of Chemicals. From each Chemical Storage Tank the chemical is pumping to the process separately.

Note 3: All the dimensions are in mm.

LEGEND

- TRUCK LOAD PIT (SPILLAGE PIT)
- DRAIN/SUMPIT (INTERNAL)
- SAFETY SHOWER AND EYEWASH
- CABINET
- CABINET WITH EMERGENCY STOP BUTTON
- EMERGENCY STOP BUTTON FOR THE EQUIPMENT MOTOR
- HAZARDOUS AREA

REFERENCE DRAWINGS

BUND WALL RETAINING CAPACITY CALCULATION (PER SKID)

Total volume of bound wall area of the OSCG skid	13x2.16x0.150	4.212m3	(A)
Volume of process chemicals drainage chamber´s Sump Pit	2.25x0.9x1.5	3.037m3	(B)
Volume of hypochlorite drainage chamber´s Sump Pit	0.75x0.9x1.5	1.012m3	(C)
Hypo tank capacity		750 L	(D)
OSCG On-Skid Tanks capacity			
Brine supply tank		716 L	(E)
Brine dechlorination tank		716 L	(F)
Anolyte tank		182 L	(G)
Catholyte tank		650 L	(H)
Stripper tank		530 L	(I)
TOTAL		2794 L	(J)=E+F+G+H+I

(C)>(D) Retaining capacity of sump pit is adequate for holding volume of Hypo.
(B)>(J) Retaining capacity of sump pit is adequate for holding volume of chemicals other than Hypo.
(A)>(D)&(J) Retaining capacity of bund wall is adequate for holding volume of all chemicals.

PLAN VIEW Elev. +12.780
Scale 1:40

Rev	Description	By	Date
F1	FSD SUBMISSION	XMR	13/07/23

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSOEC AJC JOINT VENTURE

Designer: WSP In Association with APU

Project title
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title
ON SITE CHLORINE GAS PLANT BUILDING FIRE SERVICES DEPARTMENT LAYOUT SKIDS AREA. SCRUBBER VENTS PLAN VIEW

Drawing no.	Rev.
TKOD1-DWG-R001-AFS0001 PART 05 of 10	F1

Drawn	Date	Checked	Approved
ALR	28-03-2022	JA	JB

Scale: -
Status: PRELIMINARY DESIGN

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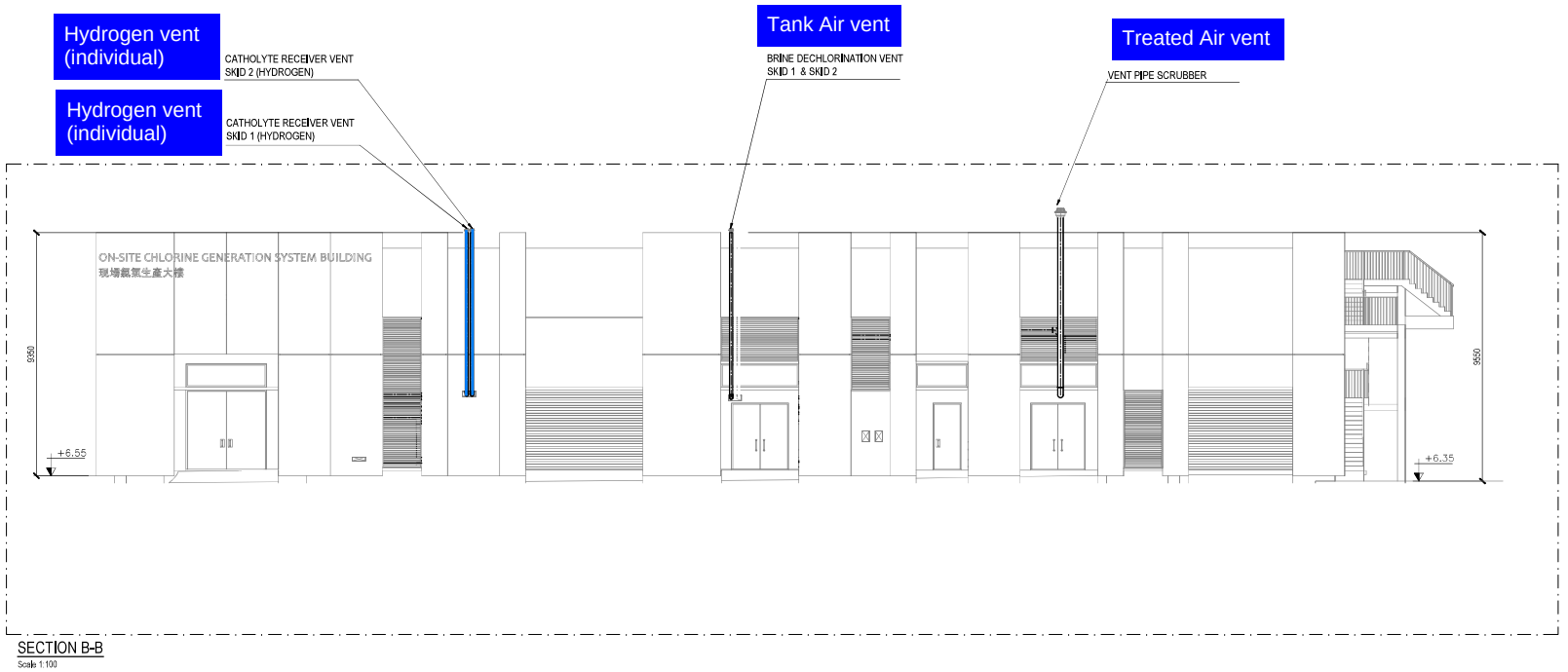
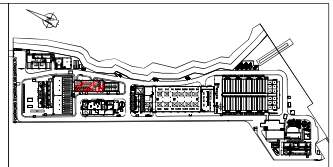
Appendix A-7 Vent Pipes of OSCG Building (Sheet 2 of 3)

Note: Rain-hoods will be provided for the vents to the atmosphere



SECTION B-B
Scale 1:100



KEY PLAN | DWG AREA

Rev	Description	By	Date
F1	FSD SUBMISSION	XMR	13/07/23

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title:
ON SITE CHLORINE GAS PLANT BUILDING
FIRE SERVICES DEPARTMENT LAYOUT
SECTION BB

Drawing no.	Rev.
TKOD1-DWG-R001-AFS0001 PART 07 of 10	F1

Drawn	Date	Checked	Approved
ALR	28-03-2022	JA	JB

Scale: -
Status: PRELIMINARY DESIGN

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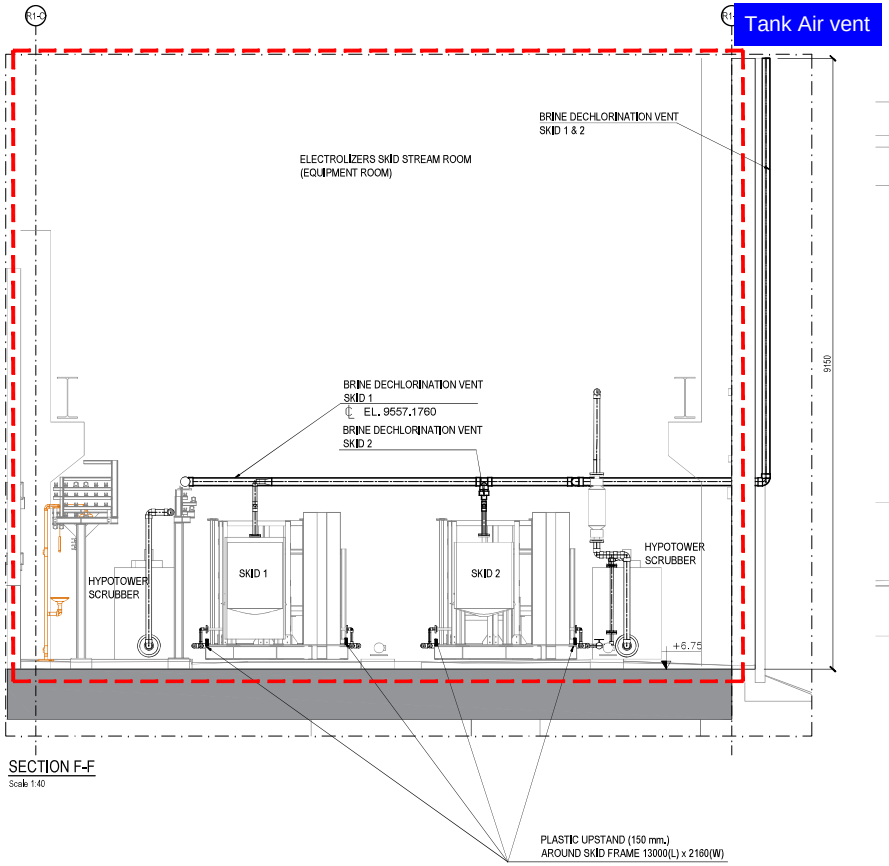
DATE: 04/sep/2023 12:21:00
FILENAME : G:\01_DESIGN_ACON\HK01C2_TSEUNG KWAN O_30\HK01C2\ORTHOS\DWGS\R001 OSCGBP\FSD DUCUMENTS\HK001-DWG-R001-AFS0001 07-10.DWG

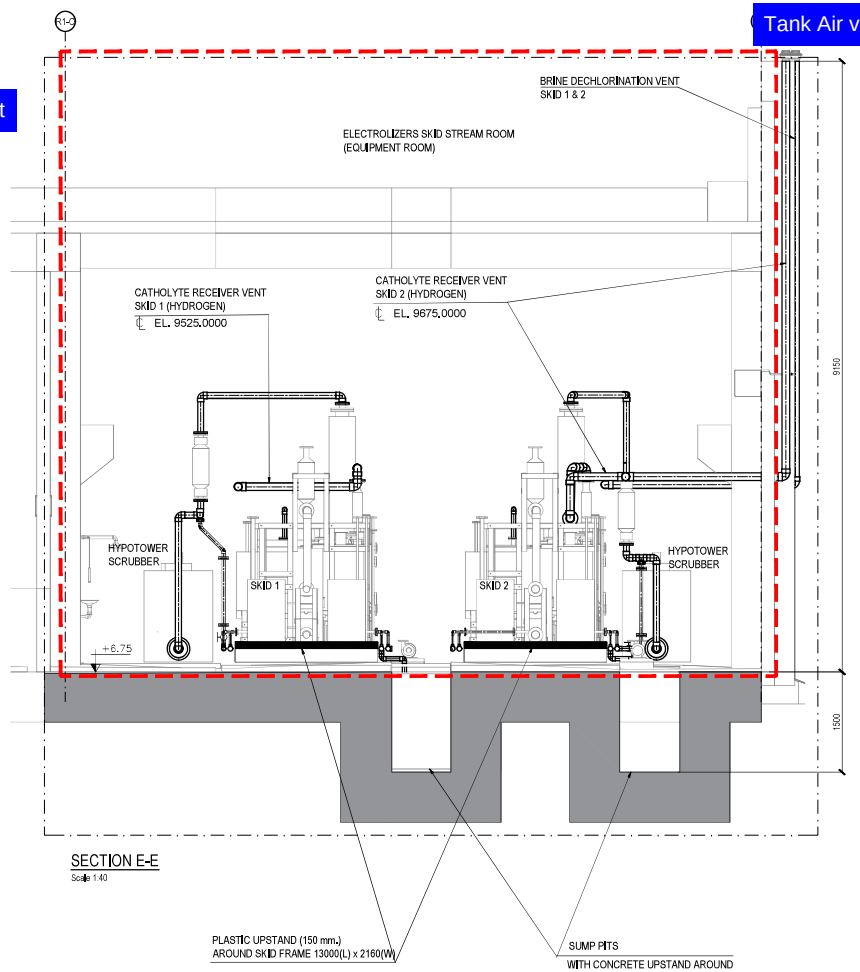
Appendix A-7 Vent Pipes of OSCG Building (Sheet 3 of 3)

Rainhood for air vent

Note: Rain-hoods will be provided for the vents to the atmosphere



SECTION F-F
Scale 1:40



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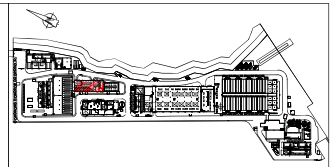


KEY PLAN | DWG AREA

NOTES

Note 1: Sump Pit With Level Switch, Alarm to DCS for High Level. Refer Detail in Page 9.

Note 2: Each Chemical have a Bund Pit and Drain Pit. The Drain System for each Chemical Room is separated. There isn't any mix of Chemicals. From each Chemical Storage Tank the chemical is pumping to the process separately.

Note 3: All the dimensions are in mm.

LEGEND

- TRUCK LOAD PIT (SPILLAGE PIT)
- DRAIN/SUMPIT (INTERNAL)
- SAFETY SHOWER AND EYEWASH
- CABINET
- CABINET WITH EMERGENCY STOP BUTTON
- EMERGENCY STOP BUTTON FOR THE EQUIPMENT MOTOR
- HAZARDOUS AREA

REFERENCE DRAWINGS

Rev	Description	By	Date
F1	FSD SUBMISSION	XMR	19/7/23

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
ON SITE CHLORINE GAS PLANT BUILDING FIRE SERVICES DEPARTMENT LAYOUT SKIDS AREA. SCRUBBER VENTS SECTIONS EE, FF

Drawing no.	Rev.
TKOD1-DWG-R001-AFS0001 PART 06 of 10	F1

Drawn	Date	Checked	Approved
ALR	28-03-2022	JA	JB

Scale: -
Status: PRELIMINARY DESIGN

Appendix A-8 Ventilation System and Scrubber Operation Philosophy (Sheet 1 of 2)

Contract No. 13/WSD/17
Design, Build and Operate
First Stage of Tseung Kwan O Desalination Plant

acciona JEC CSCEC AJC JOINT VENTURE

OSCG PLANT

VENTILATION SYSTEM AND SCRUBBER OPERATION PHILOSOPHY

1. VENTILATION SYSTEM

The ventilation system at the "Electrolyzers Skid Stream Room" and "Chlorinators Room" comprises of:

a. High level air intake wall louvers, equipped with motorized dampers
b. Ventilation fans, are provided with extraction air ducts for low level extraction
c. High level air extraction wall louvers, equipped with motorized dampers, for air exhaust via the ventilation fans.

2. DRY CHLORINE SCRUBBER SYSTEM

One dry type chlorine scrubber is provided at the "Scrubber Room". Low level extraction air ducts are provided around the skid areas to ensure effective extraction of chlorine to the scrubber for adsorption via the scrubber fans.

3. AMBIENT CHLORINE GAS DETECTORS

Seven (7) nos. ambient chlorine gas detectors will be located at low levels inside the "Electrolyzers Skid Stream Room" to detect the ambient chlorine level.

One (1) no. ambient chlorine gas detector will be located at low levels inside the "Chlorinator Room" to detect the ambient chlorine level.

Please refer to drawing TKOD1-DWG-R001-WFS1011 showing the locations of above detectors.

All the chlorine detectors are default at 1 ppm for low leakage alarm and 3 ppm for high leakage alarm. Manual Call Point will be treated as high leakage alarm at the detection area. Please see below Part 5 for the alarm and control logic of chlorine gas detection. Visual and audio alarms in Electroyzers Skid Stream Room" and "Chlorinator Rooms shall be activated. The siren and amber light at the gas detection local panel shall be maintained.

4. SCRUBBER CONTROL

On detection of chlorine leak within "Electrolyzers Skid Stream Room" or "Chlorinator Room" at and above 3 ppm, or initiated by a manual activation call point, the OSCG plant will shut down and the plant room normal ventilation system will stop with all motorized wall louvres and dampers closed.

The scrubbers will start to extract the air inside the above two rooms via the low level ducts to the dry chlorine scrubber. The dry chlorine scrubber is designed with 99.5% removal efficiency of media absorption. The scrubbed air will be allowed to discharge back to the above rooms. Three detectors to give triple validation are located at the scrubber discharge to monitor the chlorine level of scrubbed air.

The stopped of the scrubber will only be initiated manually by the operator.

5. CHLORINE LEAKAGE ALARM AT ELECTROLYZERS SKID STREAM ROOM, SCRUBBER ROOM AND CHLORINATOR ROOM

Low Leakage alarm – Chlorine gas detection at 1 ppm or above (low leakage alarm):
(1) The Gas Detection Control Panel triggers and latches the siren and amber light at the gas detection local panel;
(2) The Gas Detection Control Panel activates the Emergency Shutdown Device (ESD);
(3) The ESD sends the low chlorine gas leakage alarm signal through the distributed control system;

High Leakage alarm – Chlorine gas detection at 3 ppm or above (high leakage alarm):
(1) The Gas Detection Control Panel triggers and latches the siren and amber light at the gas detection local panel;
(2) The Gas Detection Control Panel sends an alarm signal through OSCG sub-main AFA system to main AFA panel in guard house A;
(3) The Gas Detection Control Panel activates the ESD
(4) The ESD activates the scrubber system (scrubber control panel) (please see above Part 4 for the scrubber control for detail);
(5) The ESD shuts down OSCG 1 and OSCG 2 (motor control panel);
(6) The ESD shuts down the ventilation fans of chlorine gas detector areas (ventilation fan control panels in "Chlorinator Room" and "Electrolyzers Skid Stream Room")
(7) The ESD shuts down the motorised dampers of chlorine gas detector areas (damper control panel);
(8) The ESD sends the high chlorine gas leakage alarm signal through the distributed control system.

6. HYDROGEN GAS DETECTION ABOVE 1% SETPOINT VALUE (HYDROGEN LEAKAGE ALARM)
(1) The Gas Detection Control Panel triggers and latches the siren and amber light at the gas detection local panel;
(2) The Gas Detection Control Panel sends an alarm signal through OSCG sub-main AFA system to main AFA panel in guard house A.
(3) The Gas Detection Control Panel activates the ESD
(4) ESD sends signals to Hydrogen Exhaust Fan Control Panel to activate the hydrogen extraction ventilation fans;
(5) ESD shuts down OSCG 1 and OSCG 2 plants through the motor control panel;
(6) The ESD sends the hydrogen gas leakage alarm signal through the distributed control system

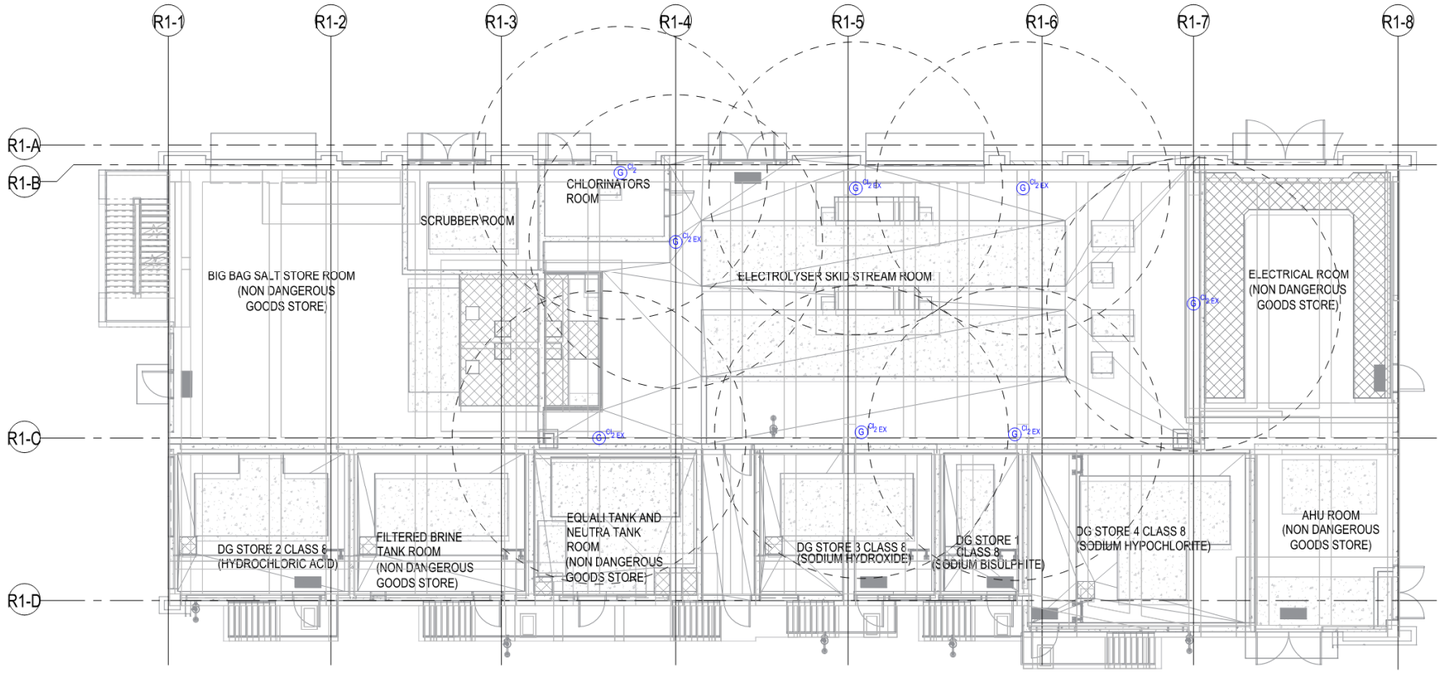
Appendix A-9 Chorine Detector Coverage

NOTES:

1. PRESET VALUES OF CHLORINE DETECTION LEVELS ARE 3PPM AND 1PPM FOR 'HIGH CHLORINE LEAK' AND 'LOW CHLORINE LEAK' RESPECTIVELY. UPON RECEIVING A LOW CHLORINE LEAKAGE ALARM FROM A GAS DETECTOR, THE SIREN AND AMBER LIGHT AT THE GAS DETECTION LOCAL PANEL SHALL BE TRIGGERED AND LATCHED. VISUAL & AUDIO ALARMS IN HAZARDOUS AREA SHALL BE ACTIVATED.
2. UPON RECEIVING A HIGH CHLORINE LEAKAGE ALARM, THE SIREN AND AMBER LIGHT AT THE GAS DETECTION LOCAL PANEL SHALL BE MAINTAINED . VISUAL & AUDIO ALARMS IN HAZARDOUS AREA SHALL BE MAINTAINED.THE VENTILATION FANS SERVING THAT AREA WILL BE SHUT DOWN AND THE DAMPERS AT THE VENTILATION DUCT AND INTAKE LOUVRE WILL BE CLOSED. THE CHLORINE SCRUBBER SYSTEM WILL BE OPERATED, AND THE SIREN AND AMBER LIGHT AT THE GAS DETECTION LOCAL PANEL SHALL BE TRIGGERED AND LATCHED.
3. UPON DETECTION OF HYDROGEN GAS LEAKAGE ABOVE 1% BY VOLUME, HYDROGEN EXTRACTION VENTILATION FANS SHALL START AUTOMATICALLY AND THE OSCG PLANTS SHALL BE AUTOMATICALLY SHUT DOWN ACCORDING TO THE PRE-SET HYDROGEN CONCENTRATIONS. THE SIREN AND AMBER LIGHT AT THE GAS DETECTION LOCAL PANEL SHALL BE TRIGGERED AND LATCHED.VISUAL & AUDIO ALARMS IN HAZARDOUS AREA SHALL BE ACTIVATED.
4. ALL GAS DETECTORS SHALL BE INTRINSICALLY SAFE DETECTORS. ALL HEAT DETECTORS IN SCRUBBER ROOM, CHLORINATORS ROOM AND ELECTROLYSER SKID STREAM ROOM SHALL BE EXPLOSION PROOF.
5. THE MOTORS OF THE VENTILATION FANS IN ELECTROLYSER SKID STREAM ROOM IN SHALL BE NON-SPARKING TYPE.
6. DOUBLE BEND LOUVER WILL BE USED.
7. DOUBLE CONTAINMENT WILL BE USED FOR HYDROCHLORIC ACID PIPES.
8. DETAILS OF THE DG STORE ROOMS 1 TO 4 ARE SHOWN IN SEPARATE SUBMISSION FOR APPLICATION FOR LICENSE FOR STORAGE OF DANGEROUS GOODS.
9. THE MECHANICAL VENTILATION SYSTEMS SHOULD COMPLY WITH THE REQUIREMENTS OF FSD CIRCULAR LETTER NO. 4/96 PART XI AND THE BUILDING (VENTILATING SYSTEMS) REGULATIONS CAP. 123J, WHICHEVER APPLICABLE.
10. LOUVERS SHOWN IN THIS SUBMISSION ARE FOR NATURAL / MECHANICAL VENTILATION ONLY. EXCESSIVE ARCHITECTURAL FEATURE LOUVERS WILL BE BLANKED OFF.
11. FOR DETAILS OF THE EQUIPMENT INSIDE THE ELECTROLYSER SKID STREAM ROOM, SCRUBBER ROOM AND CHLORINATORS ROOM, REFER TO TKOD1-DWG-R001-AFS0001 AND AFS0002.

LEGEND

- G Cl_2 EX — CHLORINE GAS DETECTOR (EXPLOSION PROOF)
- G Cl_2 — CHLORINE GAS DETECTOR
- DETECTOR COVERAGE



Rev	Description	By	Date
F0	FSD SUBMISSION	KWK	03 APR 2023

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC GDC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:

CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title:

FIRE SERVICES -
ON-SITE CHLORINE GENERATION
SYSTEM BUILDING
CHLORINE DETECTOR COVERAGE
GROUND FLOOR

Drawing no.	Rev.
TKOD1-DWG-R001-WFS3211	F0

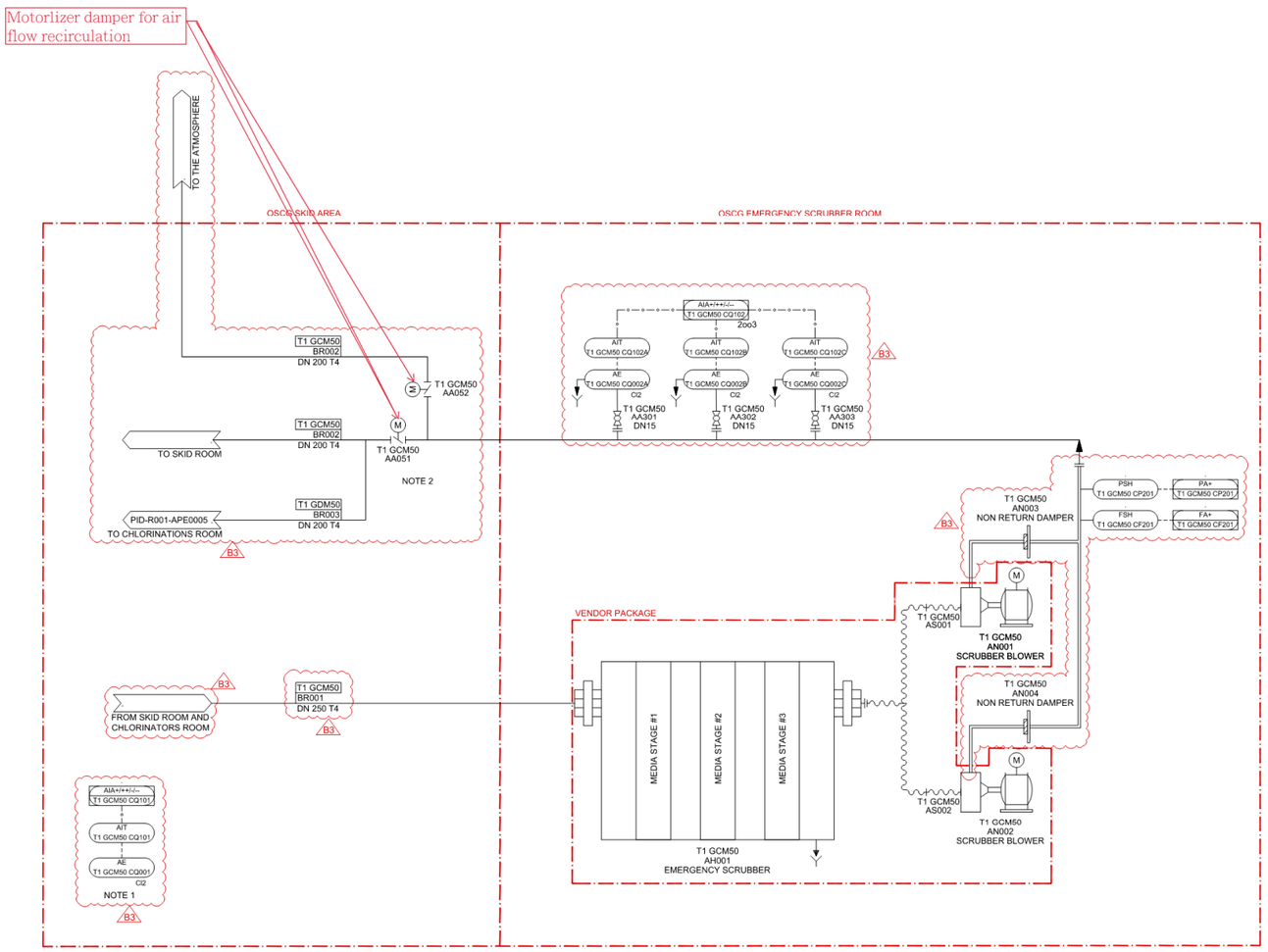
Drawn	Date	Checked	Approved
KWK	24 MAR 2022	IML	SY

Scale	Status
1 : 100	FSD SUBMISSION

Appendix A-10 Process & Instrumentation Diagrams (P&IDs) of Scrubber

			T1GCM50AH001		T1GCM50AN001/002		T1GCM50AN003//004		
			EMERGENCY SCRUBBER		SCRUBBER BLOWER		NON RETURN DAMPER		
			Type: Dry		Flow: 1189 m3/h (700ft3/min)		Material: Aisi 316		
			Flow: 1189 m3/h (700ft3/min)		Pressure: 2164.9 Pa (8.7 inch w.g)		.		
			Material: GRP		Material: GRP B3		.		
			.UNITS:1		UNITS:1 DUTY, 1 STANDBY		.UNITS:1 DUTY, 1 STANDBY		

B3



NOTES:
- REFER TO TKOD1-CAL-R001-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING-CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- CHEMICAL DIAPHRAGM SEALS WILL BE INCLUDED IN THE PRESSURE INSTRUMENTATION IF THE MATERIALS ARE NOT COMPATIBLE WITH THE CHEMICAL.
- EQUIPMENT POWER VALUES ARE INDICATIVE AND WILL BE CONFIRMED ONCE THE FINAL VENDOR IS SELECTED.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006

- NOTE 1: SEVEN AMBIENT CHLORINE DETECTORS WILL BE INSTALLED.
- NOTE 2: DAMPENER ACTUATORS WILL BE INTERLOCKED. ONE DAMPENER WILL ONLY OPEN IF THE OTHER IS CLOSED.

B3

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B3	DDA SUBMISSION	B.A.	03/23
B2	DDA SUBMISSION	B.A.	11/22
B1	DDA SUBMISSION	M.P.	06/21
B0	DDA SUBMISSION	M.P.	05/21

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp

Project title: CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title: PROCESS AND INSTRUMENTATION DIAGRAM EMERGENCY CHLORINE SCRUBBER

Drawing no.	Rev.
TKOD1-PID-R001-APE0050	B3

Drawn	Date	Checked	Approved
B.A.	MAR 23	J.A.	J.B.

Scale: % Status: WORKING

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Appendix A-11 "No Objection" Reply from EPD on the Submission of Dry Type Scrubber for the OSCG (Sheet 1 of 4)

Binnies-April Wong<CA> 190495/(13/WSD/17)/M45/100/M201348

收件者: Binnies-Phoebe Ho<CO>
副本: Binnies-Fannie Fong<ACO>; Binnies-Vivi Chan<ACO>; Binnies-Eli Hui<ACO>
主旨: RE: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

From: Binnies-Anthony Mok<SRE.M&E> <sre4@bv13wsd17.com.hk>
Sent: Monday, June 12, 2023 5:56 PM
To: WSD-LAW Wai Ho, Milton<Sr Engr/CM2> <wh_law@wsd.gov.hk>; WSD-LAI Hon Lam, Jack<Engr/CM5> <jack_hl_lai@wsd.gov.hk>; Binnies-Phoebe Ho<CO> <co@bv13wsd17.com.hk>
Cc: BinniesHK-Christina KO<Senior Project Manager> <kosc@binnies.com>; Binnies-Roger Wu<CRE> <cre@bv13wsd17.com.hk>; JEC-Stephen Yeung<Project Manager> <stephen.cw.yeung@jec.com>; ACC-Sergio Pinelo Otero<Project Manager> <spinuelo@acciona.com>; Binnies-Aldous Lee<RE.Mech.> <re11@bv13wsd17.com.hk>; Binnies-Patrick MAK<RE.Mech.> <re10@bv13wsd17.com.hk>
Subject: FW: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

Dear all,

RE: AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

For you information and record, attached is the email from EPD stating no comment on the Submission of Dry Type Chlorine Scrubber for the OSCG Plant. This email **serves as formal reply of no objection to the proposed installation**. Meanwhile the only outstanding issue is the submission for manufacturing license for OSCG system, which will be re-submission this week.

Dear Phoebe,

Please record this email under EDMS file M45/100.

Best regards,
Anthony MOK
Tel: 9155-8863

From: kyng@epd.gov.hk <kyng@epd.gov.hk>
Sent: Monday, June 12, 2023 5:09 PM
To: 甘忠校 <chunghau_kam@cohl.com>
Cc: Billy Chan <billy.chan@jec.com>; Bidaurrazaga Marijuan, Jose Andres <joseandres.bidaurrazaga.marijuan@acciona.com>; CSHK-Chung Kam Fai, Jason<施工經理> <kamfai_chung@cohl.com>; Binnies-Aldous Lee<RE.Mech.> <re11@bv13wsd17.com.hk>; ACC-Sergio Pinelo Otero<Project Manager> <spinuelo@acciona.com>; Binnies-Anthony Mok<SRE.M&E> <sre4@bv13wsd17.com.hk>; JEC-Stephen Yeung<Project Manager> <stephen.cw.yeung@jec.com>; CSHK-Laurence Wong<Project Manager> <wingkeung_wong@cohl.com>
Subject: RE: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

1

Appendix A-11 "No Objection" Reply from EPD on the Submission of Dry Type Scrubber for the OSCG (Sheet 2 of 4)

Dear Brian,

My email reply to you dated 10:28 today serves as a formal reply of no objection to the proposed installation. Thank you!

Regards,
Jacky Ng
E(ASM)82
Tel: 2835 2142

From: 甘忠校 <chunghau_kam@cohl.com>
To: "kyng@epd.gov.hk" <kyng@epd.gov.hk>
Cc: Billy Chan <billy.chan@jec.com>, "Bidaurrazaga Marijuan, Jose Andres" <joseandres.bidaurrazaga.marijuan@acciona.com>, 鍾錦輝 <kamfai_chung@cohl.com>, "BV-Aldous Lee<RE.Mech.>" <re11@bv13wsd17.com.hk>, "ACC-Sergio Pinelo Otero<Project Manager>" <spinuelo@acciona.com>, "Binnies-Anthony Mok<SRE.M&E>" <sre4@bv13wsd17.com.hk>, "JEC-Stephen Yeung<Project Manager>" <stephen.cw.yeung@jec.com>, "Wong, Wing Keung (CN - Hong Kong)" <wingkeung_wong@cohl.com>
Date: 12/06/2023 16:59
Subject: RE: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

Dear Jacky,

Thanks for your time and vetting. To address our Employer's and the Supervising Officer's concern, we would like to check if the below message would serve as a formal reply of no objection to our proposed scrubber installation.

Best Regards,
Brian Kam

Env Monitoring Mgr
Mobile (852-9456 9541)
Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant
AJC Joint Venture

From: kyng@epd.gov.hk <kyng@epd.gov.hk>
Sent: Monday, June 12, 2023 10:28 AM
To: 甘忠校 <chunghau_kam@cohl.com>
Cc: Billy Chan <billy.chan@jec.com>; Bidaurrazaga Marijuan, Jose Andres <joseandres.bidaurrazaga.marijuan@acciona.com>; 鍾錦輝 <kamfai_chung@cohl.com>; BV-Aldous Lee<RE.Mech.> <re11@bv13wsd17.com.hk>; ACC-Sergio Pinelo Otero<Project Manager> <spinuelo@acciona.com>; Binnies-Anthony Mok<SRE.M&E> <sre4@bv13wsd17.com.hk>; JEC-Stephen Yeung<Project Manager> <stephen.cw.yeung@jec.com>; Wong, Wing Keung (CN - Hong Kong) <wingkeung_wong@cohl.com>
Subject: RE: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

Dear Brian,

I refer to your preceding emails for the subject matter. Based on the information provided, the proposed dry type chlorine scrubber for the OSCG Plant has chlorine removal efficiency of

Appendix A-11 "No Objection" Reply from EPD on the Submission of Dry Type Scrubber for the OSCG (Sheet 3 of 4)

higher than 99.99% and availability of higher than 99%. Therefore, please be advised that we have no comment on the proposed installation from non-fuel gas dangerous goods risk perspective.

Regards,
Jacky Ng, E[ASM]82

From: 甘忠校 <chunghau_kam@cohl.com>
To: "kyng@epd.gov.hk" <kyng@epd.gov.hk>, Billy Chan <billy.chan@iec.com>
Cc: "JEC-Stephen Yeung<Project Manager>" <stephen.cw.yeung@iec.com>, "ACC-Sergio Pinelo Otero<Project Manager>" <spinuelo@acciona.com> "Bidaurrazaga Marijuan, Jose Andres" <joseandres.bidaurrazaga.marijuan@acciona.com>, "Binnies-Anthony Mok<SRE.M&E>" <sre4@bv13wsd17.com.hk>, "BV-Aldous Lee<RE.Mech.>" <re11@bv13wsd17.com.hk>, "Wong, Wing Keung (CN - Hong Kong)" <wingkeung_wong@cohl.com>, 鍾錦輝 <kamfai_chung@cohl.com>
Date: 12/06/2023 09:17
Subject: RE: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

Dear Jacky,

May I coordinate our response (w/ reference to the page of submission document) to your queries as below.

1. Confirmation of removal efficiency of the scrubber system be >99%

Its minimum removal efficiency of Purafil system is 99.5% as shown in the product catalogue (page 8 -16 o the submission document). Further, the calculation of absorber performance and removal efficiency has been provided in page 125 to 127 (Section E) of the submission document.

Application Guidelines

Temperature	-40°F to 125°F (-40°C to 51°C)
Humidity	10 - 95% RH
Air Speed	60 - 500 fpm (0.30 - 2.54 m/s)
Performance	99.5% (min)initial removal efficiency in Purafil systems

2. Availability of the scrubber system >99% ?

The availability is about 99.18% where its calculation has been provided in page 124 (Section D) of the submission document.

3. One scrubber or more installed ?

One scrubber and two blowers installed. The information has been provided in page 6 (Section A data sheet) and page 141 (para 2 of Section F) of the submission document.

Please let us know should you have any further query. Thanks for your attention and assistance.

Regards,
Brian

From: 甘忠校
Sent: Friday, June 9, 2023 11:23 AM
To: 'kyng@epd.gov.hk' <kyng@epd.gov.hk>; 'Billy Chan' <billy.chan@iec.com>
Cc: 'JEC-Stephen Yeung<Project Manager>' <stephen.cw.yeung@iec.com>; 'ACC-Sergio Pinelo Otero<Project Manager>' <spinuelo@acciona.com>; 'Binnies-Anthony Mok<SRE.M&E>' <sre4@bv13wsd17.com.hk>; 'BV-Aldous Lee<RE.Mech.>' <re11@bv13wsd17.com.hk>; Wong, Wing Keung (CN - Hong Kong) <wingkeung_wong@cohl.com>; 鍾錦輝

Appendix A-11 "No Objection" Reply from EPD on the Submission of Dry Type Scrubber for the OSCG (Sheet 4 of 4)

<kamfai_chung@cohl.com>
Subject: FW: 13/WSD/17 - AJC/EPD/230012 Submission of Dry Type Chlorine Scrubber for the On-Site Chlorine Generation Plant (OSCG)

Dear Jacky,

Thanks for your call this morning. Attached please find the softcopy as requested. For your other enquires below, may I direct to our respective team member to respond/ reply.

1. Confirmation of removal efficiency of the scrubber system be >99%
2. Availability of the scrubber system >99% ?
3. One scrubber or more installed ?

By copy to Billy, would you help respond the above by citing the respective section in the submission document, please.

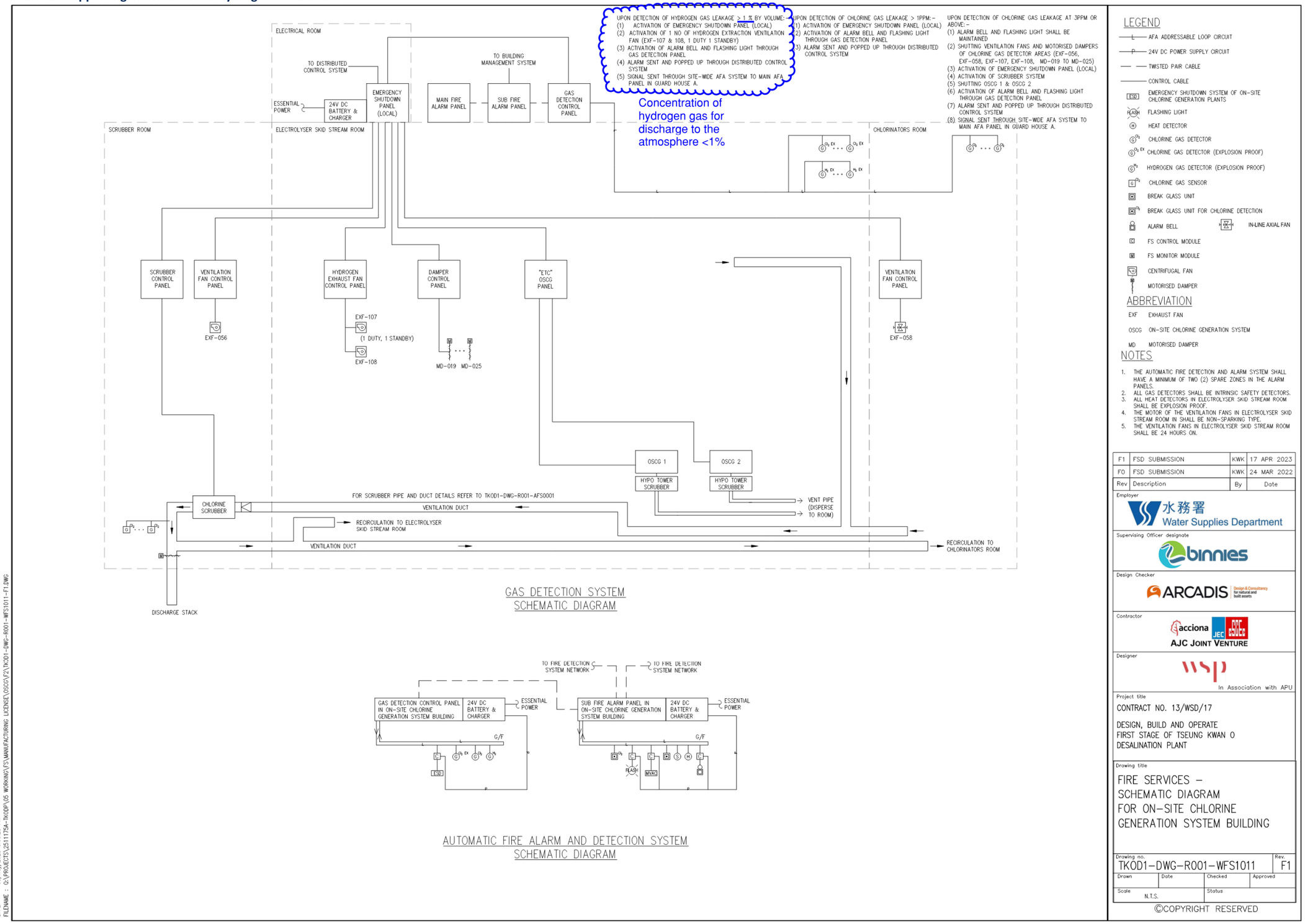
Best Regards,
Brian Kam

Env Monitoring Mgr
Mobile (852-9456 9541)
Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant
AJC Joint Venture

4

Appendix A-12 BIM Screen Shot of OSCG and Chemical Building

Appendix A-13 Supporting Information on Hydrogen Gas Dilution



GAS DETECTION SYSTEM
SCHEMATIC DIAGRAM

AUTOMATIC FIRE ALARM AND DETECTION SYSTEM
SCHEMATIC DIAGRAM

LEGEND

- L — AFA ADDRESSABLE LOOP CIRCUIT
- P — 24V DC POWER SUPPLY CIRCUIT
- TWISTED PAIR CABLE
- CONTROL CABLE
- ESD — EMERGENCY SHUTDOWN SYSTEM OF ON-SITE CHLORINE GENERATION PLANTS
- FLASH — FLASHING LIGHT
- H — HEAT DETECTOR
- Cl_2 — CHLORINE GAS DETECTOR
- Cl_2 EX — CHLORINE GAS DETECTOR (EXPLOSION PROOF)
- H_2 EX — HYDROGEN GAS DETECTOR (EXPLOSION PROOF)
- Cl_2 — CHLORINE GAS SENSOR
- BREAK GLASS UNIT
- BREAK GLASS UNIT FOR CHLORINE DETECTION
- ALARM BELL — IN-LINE AXIAL FAN
- FS CONTROL MODULE
- FS MONITOR MODULE
- CENTRIFUGAL FAN
- MOTORISED DAMPER

ABBREVIATION

EXF	EXHAUST FAN
OSCG	ON-SITE CHLORINE GENERATION SYSTEM
MD	MOTORISED DAMPER

NOTES

1. THE AUTOMATIC FIRE DETECTION AND ALARM SYSTEM SHALL HAVE A MINIMUM OF TWO (2) SPARE ZONES IN THE ALARM PANELS.
2. ALL GAS DETECTORS SHALL BE INTRINSIC SAFETY DETECTORS.
3. ALL HEAT DETECTORS IN ELECTROLYSER SKID STREAM ROOM SHALL BE EXPLOSION PROOF.
4. THE MOTOR OF THE VENTILATION FANS IN ELECTROLYSER SKID STREAM ROOM IN SHALL BE NON-SPARKING TYPE.
5. THE VENTILATION FANS IN ELECTROLYSER SKID STREAM ROOM SHALL BE 24 HOURS ON.

F1	FSD SUBMISSION	KWK	17 APR 2023
F0	FSD SUBMISSION	KWK	24 MAR 2022
Rev	Description	By	Date

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CRBC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
FIRE SERVICES – SCHEMATIC DIAGRAM FOR ON-SITE CHLORINE GENERATION SYSTEM BUILDING

Drawing no.	Rev.
TKOD1-DWG-R001-WFS1011	F1

Drawn	Date	Checked	Approved

Scale: N.T.S. Status:

DATE: 08/May/2023 5:03:28 PM
FILENAME : C:\PROJECTS\2511175A-TKODP\05 WORKING\FS\MANUFACTURING LICENSE\OSCG\F2\TKOD1-DWG-R001-WFS1011-F1.DWG

Stage 1 – Brine Displacement
Stage 2 – Backwash
Stage 3 – Acid Addition
Stage 4 – Acid Rinse
Stage 5 – Caustic Addition
Stage 6 – Caustic Rinse
Stage 7 – Water Displacement

1.3. Electrolyzers Unit

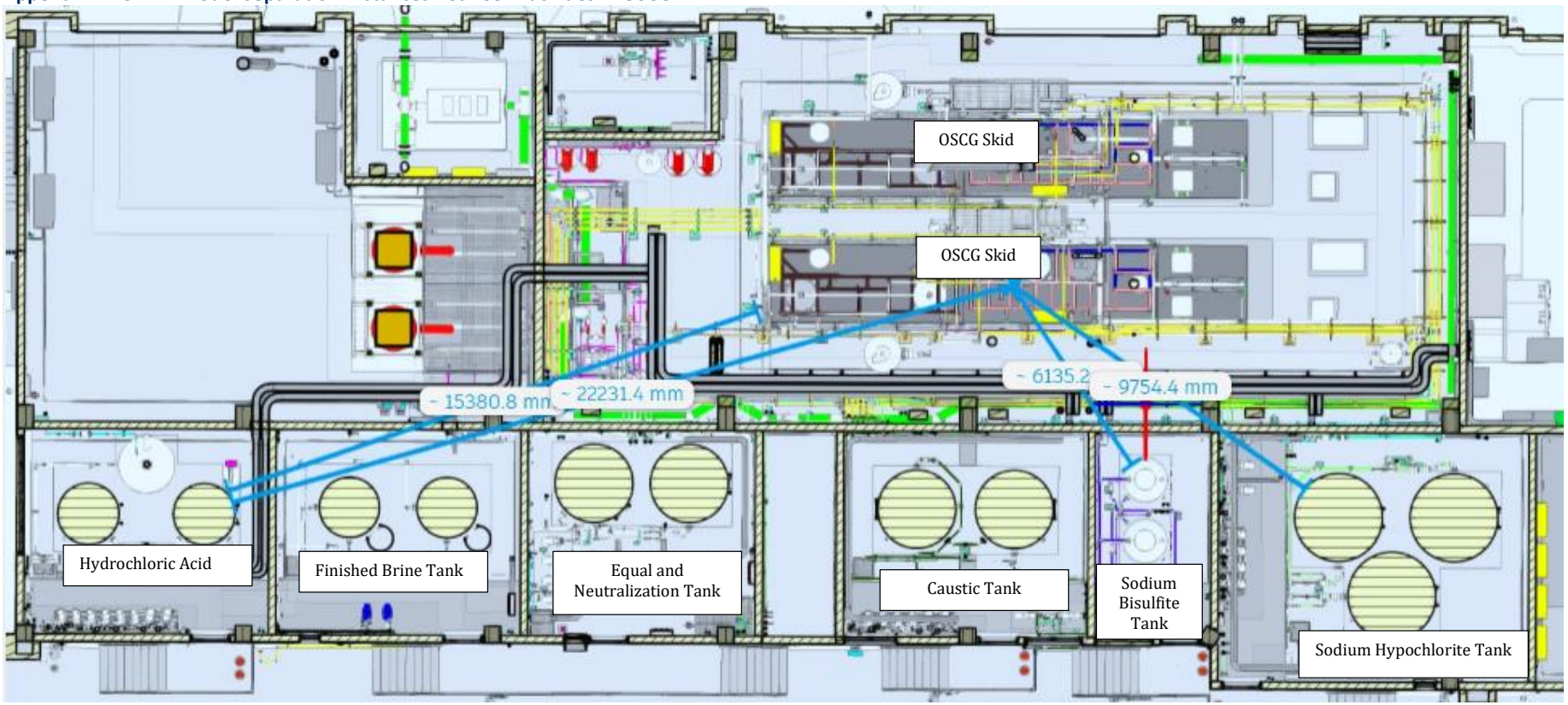
The demineralized, saturated brine is added to the Inlet Header where it circulates to the bottom of electrolyzers, passes through the electrolyzer, and returns to the Anolyte tank. Chlorine gas is generated in the electrolyzers on the anode side (anolyte side) of the Klorigen™ membrane cell. The anolyte pump keeps the brine recirculating through the heat exchanger, the electrolyzers, and the Anolyte Tank.
A combination of chlorine gas and anolyte brine exits the electrolyzers and moves into the Anolyte Tank. By design, the tank is only half-filled with chlorinated, depleted brine while the headspace above the liquid is filled with chlorine gas. Chlorine gas is removed by vacuum and sent directly to a gas dosing system. Caustic (NaOH) liquid and hydrogen gas are generated in the electrolyzers on the cathode side (caustic side) of the Klorigen™ membrane cell. The Caustic transfer pump keeps the caustic recirculating through the electrolyzers and the Caustic Receiver Tank. Air is blown into the Caustic Receiver to dilute the hydrogen to 1% by volume, below its Lower Explosive Limits (LEL). The hydrogen diluted with air is then safely vented to the atmosphere.

1.4. Stripper Unit

After the finished brine has been depleted on the anolyte side, it must be dechlorinated and sent back to the brine pit for re-saturation. The volume of depleted brine used is equal to the finished feed brine volume minus the evaporated water. It is displaced and/or transferred from the Anolyte tank to the Stripper Unit. The pH of the chlorinated, depleted brine is adjusted between 1 and 2 by adding hydrochloric acid to the stripper tank. This releases the saturated chlorine which is then forced into the Hypo Conversion Unit by a regenerative air blower. Once in the Hypo Conversion Unit, the chlorine gas reacts with sodium hydroxide to produce more sodium hypochlorite solution. A portion of the depleted brine exiting the system recirculates to the Stripper Unit to maintain equilibrium in the stripper module.

1.5. Brine Dechlorination Unit

Appendix A-15 BIM Model Separation Distances Between Facilities in OSCG

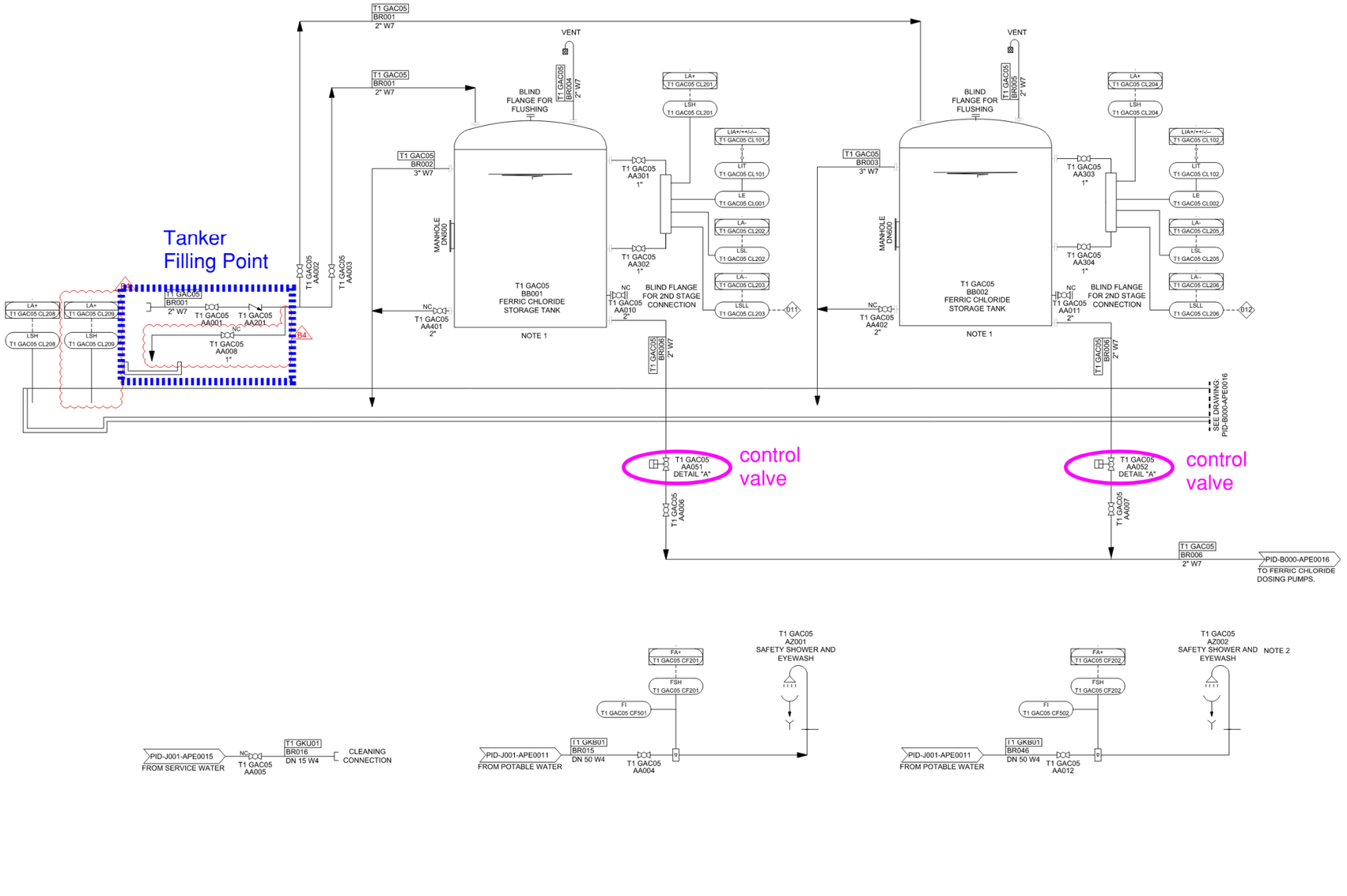


Appendix A-16 P&ID Showing Tanker Filling Point and Control Valve for Ferric Chloride Storage in Chemical Building

T1GAC05BB001//002

FERRIC CHLORIDE STORAGE TANK

USEFUL VOLUME: 40.5 m3.
MATERIAL: GRP
.
.UNITS:2



NOTES:

- REFER TO TKOD1-CAL-R000-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING-CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- COMMERCIAL PROUDUCT CONCENTRATION: 40% FERRIC CHLORIDE.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
- DRAINAGES IN THE STORAGE TANK AREA WILL BE ROUTED TO THE TANK BUND PIT.

1. FOR FURTHER INFORMATION ON VENDOR DESIGN, REFER TO TKOD1-MPS-R000-AME0003_GRP TANKS SUBMITTAL
2. SAFETY SHOWER LOCATED AT THE CENTRAL HALLWAY

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B4	DDA SUBMISSION	B.A.	06/22
B3	DDA SUBMISSION	A.P.	03/22
B2	DDA SUBMISSION	A.P.	06/21
B1	DDA SUBMISSION	B.A.	02/21
B0	DDA SUBMISSION	C.C.	11/20
01	FOR REVIEW	A.L.R.	06/20
00	FOR REVIEW	C.C.	03/20

Employer: 水務署 Water Supplies Department
Supervising Officer designate: BLACK & VEATCH
Design Checker: ARCADIS
Contractor: acciona JEC AJC JOINT VENTURE
Designer: wsp

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
PROCESS AND INSTRUMENTATION DIAGRAM PRETREATMENT. FERRIC CHLORIDE STORAGE TANKS.

Drawing no.	Rev.
TKOD1-PID-B000-APE0015	B4

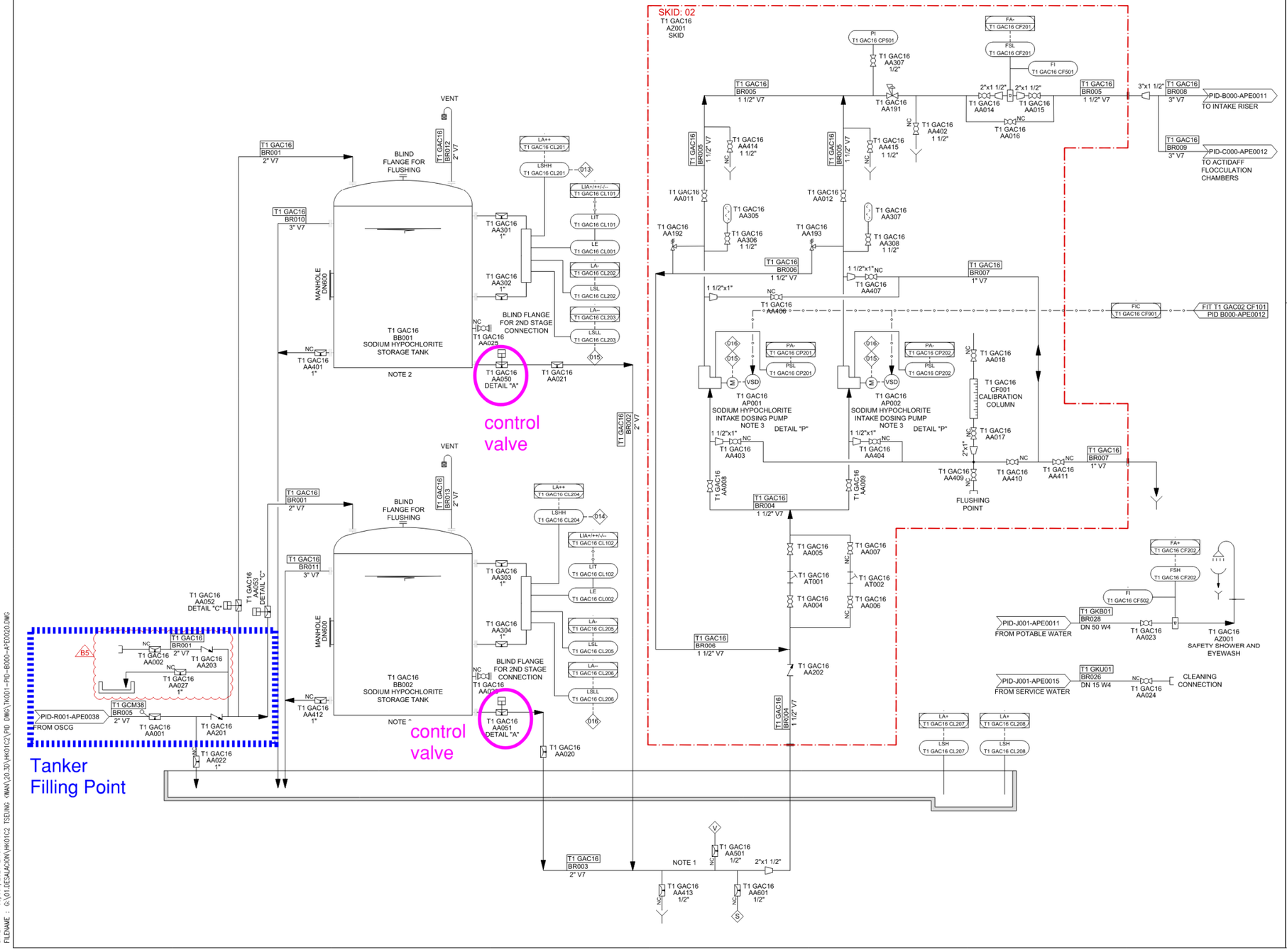
Drawn	Date	Checked	Approved
B.A.	JUN 22	J.A.	J.B.

Scale: % Status: WORKING

FILENAME : G:\01.DESALACION\HK01C2 TSEUNG KWAN\20.3D\HK01C2\PID DWG\TKOD1-PID-B000-APE0015.DWG

Appendix A-17 P&ID Showing Tanker Filling Point and Control Valve for Sodium Hypochlorite Storage in Chemical Building

	T1GAC16BB001//002				T1GAC16AP001//003				
	SODIUM HYPOCHLORITE STORAGE TANK				SODIUM HYPOCHLORITE INTAKE DOSING PUMP				
	USEFUL VOLUME: 8.5 m3.				FLOW: 3,410.47 l/h.				
	MATERIAL: GRP				PRESSURE: 3 bar				
	.				POWER: 4 kW				
	.UNITS:2				.UNITS: 1 DUTY , 1 STANDBY				



NOTES:

- REFER TO TKOD1-CAL-R000-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING - CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- CHEMICAL DIAPHRAGM SEALS WILL BE INCLUDED IN THE PRESSURE INSTRUMENTATION IF THE MATERIALS ARE NOT COMPATIBLE WITH THE CHEMICAL.
- DOSING PUMPS PROVIDED WITH INLET AND OUTLET INTEGRATED CHECK VALVES.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
- DRAINAGES IN THE STORAGE TANK AREA WILL BE ROUTED TO THE TANK BUND PIT. REFER TO NOTE 4 FOR SAFE DISPOSAL METHOD.

1. DRAINAGE AND VENT TO BE SAFELY ROUTED TO AREA PIT.
2. FOR FURTHER INFORMATION ON VENDOR DESIGN, REFER TO TKOD1-MPS-R000-AME0003_GRP TANKS SUBMITTAL.
3. FOR FURTHER INFORMATION ON VENDOR DESIGN, REFER TO TKOD1-MPS-R000-AME0002_CHEMICAL DOSING SKIDS SUBMITTAL
4. COMMERCIAL PROUDUCT CONCENTRATION: 6% TO 12.5% AS FREE CHLORINE.

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B5	DDA SUBMISSION	B.A.	01/23
B4	DDA SUBMISSION	B.A.	06/22
B3	DDA SUBMISSION	A.P.	11/21
B2	DDA SUBMISSION	A.P.	07/21
B1	DDA SUBMISSION	B.A.	02/21
B0	DDA SUBMISSION	C.C.	11/20
01	FOR REVIEW	C.C.	06/20
00	FOR REVIEW	C.C.	03/20

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS

Contractor: acciona JEC CRCG AJC JOINT VENTURE

Designer: wsp

Project title: CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title: PROCESS AND INSTRUMENTATION DIAGRAM PRETREATMENT. SODIUM HYPOCHLORITE DOSING

Drawing no.: TKOD1-PID-B000-APE0020 Rev. B5

Drawn	Date	Checked	Approved
B.A.	JAN 23	J.A.	J.B.

Scale: % Status: WORKING

HK01C2-02-16-R916-0001-RevB5
DATE: 08/JAN/2021 2:45:47 PM
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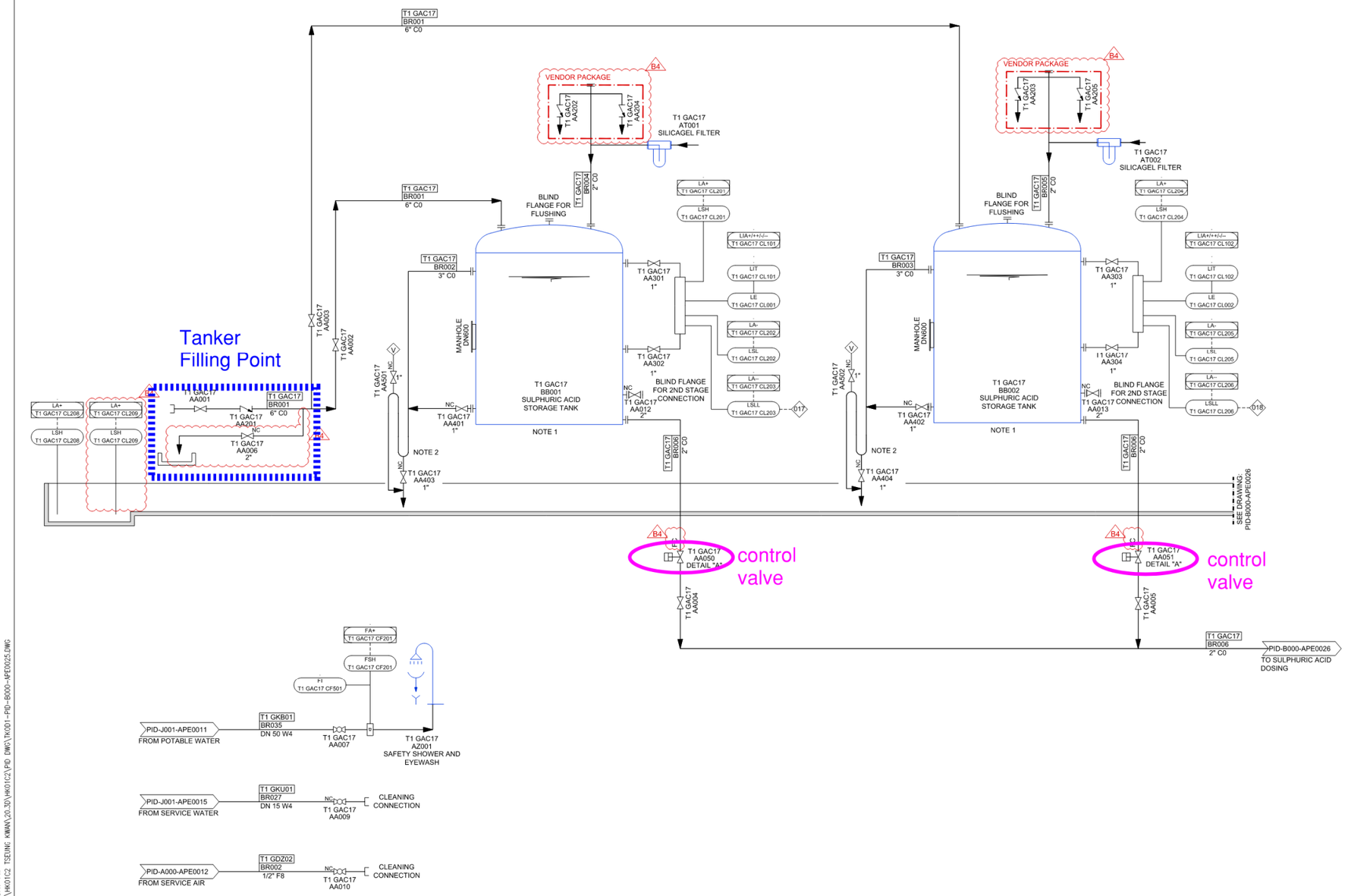
Appendix A-18 P&ID Showing Tanker Filling Point and Control Valve for Sulphuric Acid Storage in Chemical Building

				T1GAC17BB001//002					
				SULPHURIC ACID STORAGE TANK					
				USEFUL VOLUME: 62.8 m3.					
				MATERIAL: CARBON STEEL					
				-					
				.UNITS:2					



NOTES:

- REFER TO TKOD1-CAL-R000-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING-CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
- COMMERCIAL PROUDUCT CONCENTRATION: 98% SULPHURIC ACID.
- DRAINAGES IN THE STORAGE TANK AREA WILL BE ROUTED TO THE TANK BUND PIT.

1. FOR FURTHER INFORMATION ON VENDOR DESIGN, REFER TO TKOD1-MPS-R000-AME0004_STEEL TANK SUBMITTAL.
2. GLYCERINE WILL BE USED TO AVOID CONTACT WITH AIR.

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B4	DDA SUBMISSION	B.A.	07/22
B3	DDA SUBMISSION	A.P.	03/22
B2	DDA SUBMISSION	B.A.	06/21
B1	DDA SUBMISSION	B.A.	02/21
B0	DDA SUBMISSION	C.C.	11/20
01	FOR REVIEW	A.L.R.	06/20
00	FOR REVIEW	C.C.	03/20

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CRCEC AJC JOINT VENTURE

Designer: wsp

Project title:
CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
PROCESS AND INSTRUMENTATION DIAGRAM PRETREATMENT.
SULPHURIC ACID STORAGE TANKS

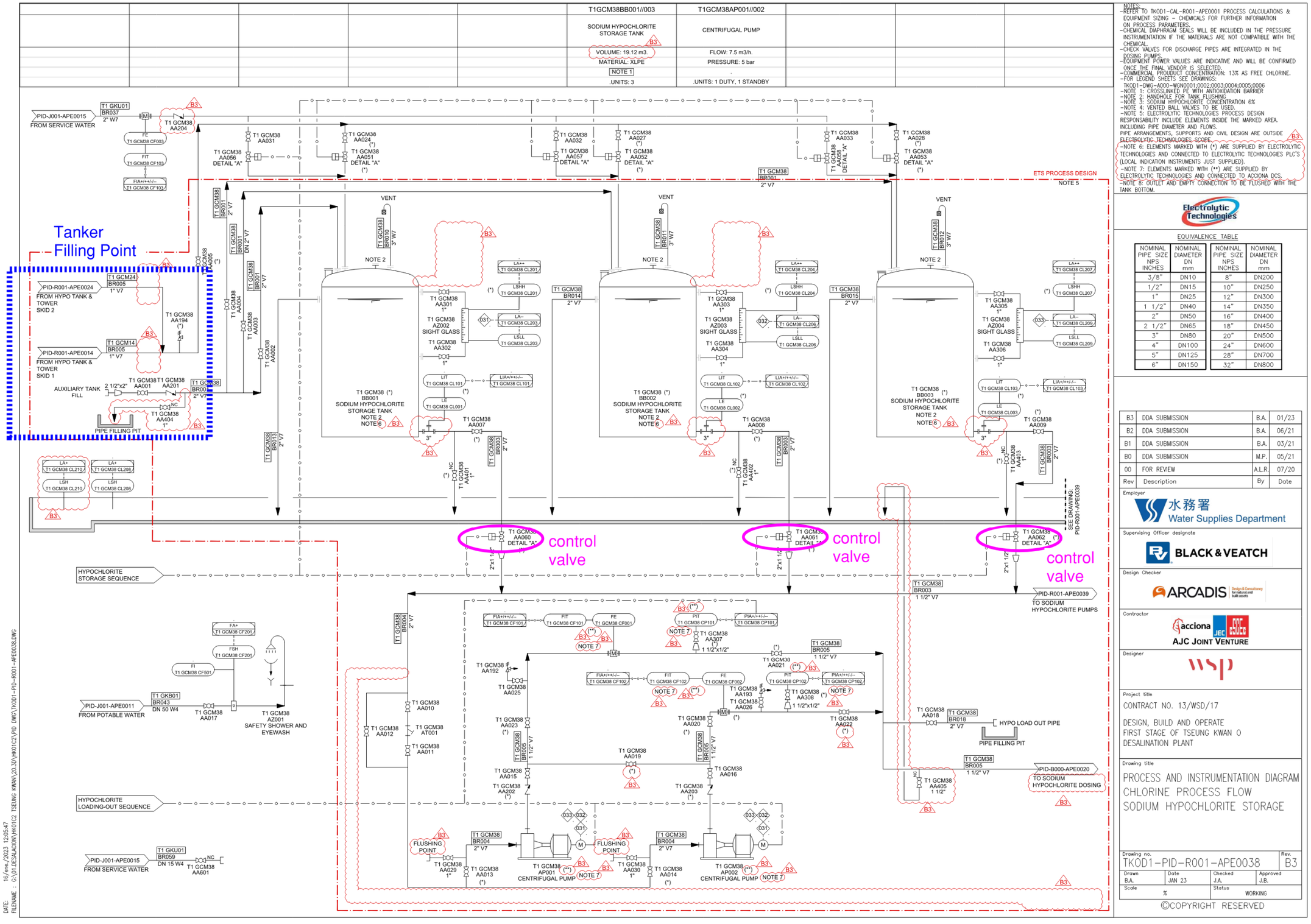
Drawing no.	Rev.
TKOD1-PID-B000-APE0025	B4

Drawn	Date	Checked	Approved
B.A.	JUL 22	J.A.	J.B.

Scale: % Status: WORKING

HK01C2-02-16-R968-0001-RevB4.3
DATE: 08/Jun/2021 2:45:47 PM
FILENAME : G:\01.DESAL\DON\HK01C2 TSEUNG KWAN\20.3D\HK01C2\PID DWG\TK001-PID-B000-APE0025.DWG

Appendix A-19 P&ID Showing Tanker Filling Point and Control Valve for Sodium Hypochlorite Storage in OSCG Building



NOTES:
- REFER TO TKOD1-CAL-R001-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING – CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- CHEMICAL DIAPHRAGM SEALS WILL BE INCLUDED IN THE PRESSURE INSTRUMENTATION IF THE MATERIALS ARE NOT COMPATIBLE WITH THE CHEMICAL.
- CHECK VALVES FOR DISCHARGE PIPES ARE INTEGRATED IN THE DOSING PUMPS.
- EQUIPMENT POWER VALUES ARE INDICATIVE AND WILL BE CONFIRMED ONCE THE FINAL VENDOR IS SELECTED.
- COMMERCIAL PRODUCT CONCENTRATION: 13% AS FREE CHLORINE.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
- NOTE 1: CROSSLINKED PE WITH ANTIOXIDATION BARRIER
- NOTE 2: HANDHOLE FOR TANK FLUSHING
- NOTE 3: SODIUM HYPOCHLORITE CONCENTRATION 6%
- NOTE 4: VENTED BALL VALVES TO BE USED.
- NOTE 5: ELECTROLYTIC TECHNOLOGIES PROCESS DESIGN RESPONSABILITY INCLUDE ELEMENTS INSIDE THE MARKED AREA. INCLUDING PIPE DIAMETER AND FLOWS. PIPE ARRANGEMENTS, SUPPORTS AND CIVIL DESIGN ARE OUTSIDE ELECTROLYTIC TECHNOLOGIES SCOPE. B3
- NOTE 6: ELEMENTS MARKED WITH (*) ARE SUPPLIED BY ELECTROLYTIC TECHNOLOGIES AND CONNECTED TO ELECTROLYTIC TECHNOLOGIES PLC'S (LOCAL INDICATION INSTRUMENTS JUST SUPPLIED).
- NOTE 7: ELEMENTS MARKED WITH (**) ARE SUPPLIED BY ELECTROLYTIC TECHNOLOGIES AND CONNECTED TO ACCIONA DCS.
- NOTE 8: OUTLET AND EMPTY CONNECTION TO BE FLUSHED WITH THE TANK BOTTOM.

Electrolytic Technologies

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B3	DDA SUBMISSION	B.A.	01/23
B2	DDA SUBMISSION	B.A.	06/21
B1	DDA SUBMISSION	B.A.	03/21
B0	DDA SUBMISSION	M.P.	05/21
00	FOR REVIEW	A.L.R.	07/20

Employer: 水務署 Water Supplies Department
Supervising Officer designate: BLACK & VEATCH
Design Checker: ARCADIS
Contractor: acciona JEC AJC JOINT VENTURE
Designer: wsp

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
PROCESS AND INSTRUMENTATION DIAGRAM
CHLORINE PROCESS FLOW
SODIUM HYPOCHLORITE STORAGE

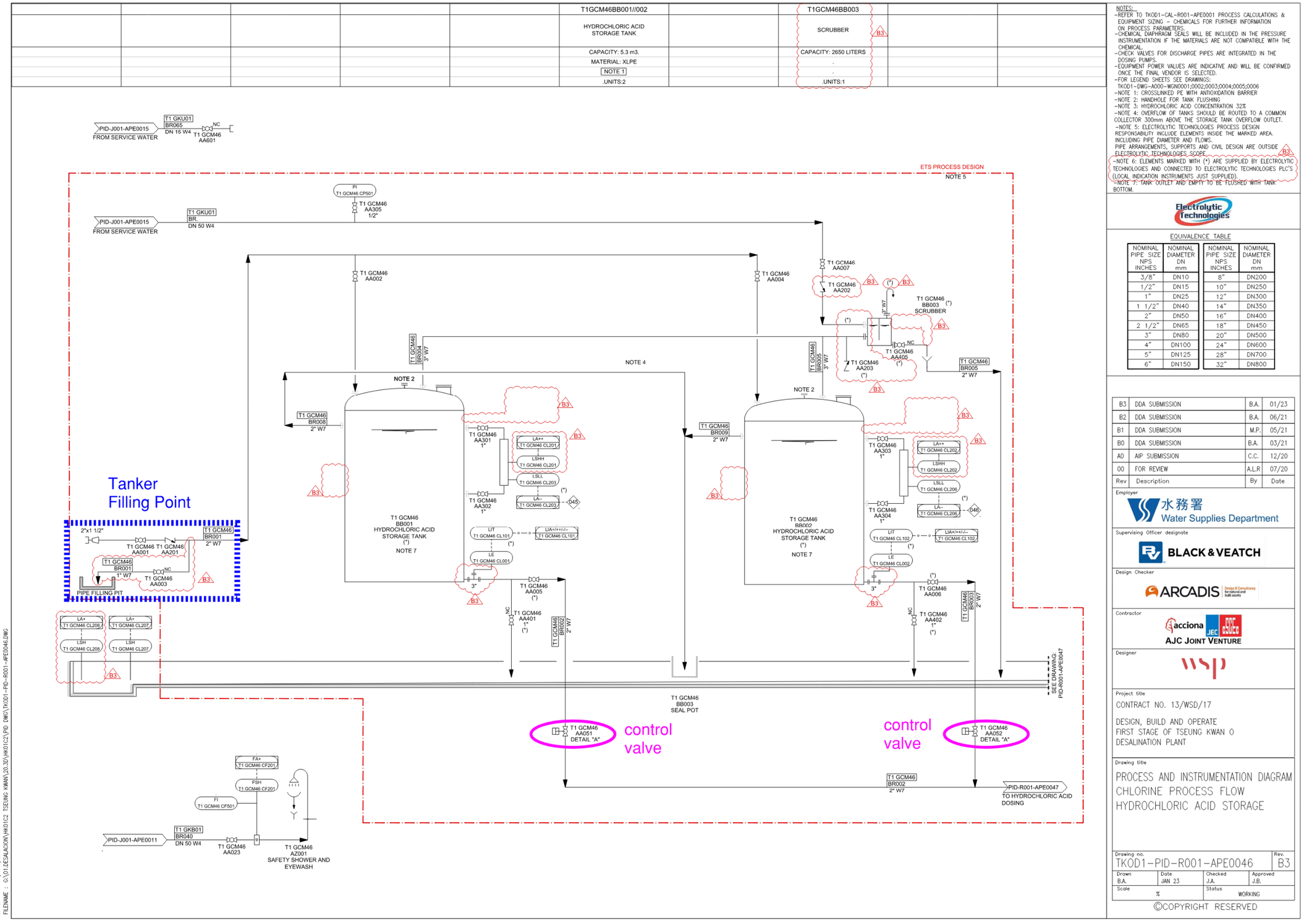
Drawing no.	Rev.
TKOD1-PID-R001-APE0038	B3

Drawn	Date	Checked	Approved
B.A.	JAN 23	J.A.	J.B.

Scale: %
Status: WORKING

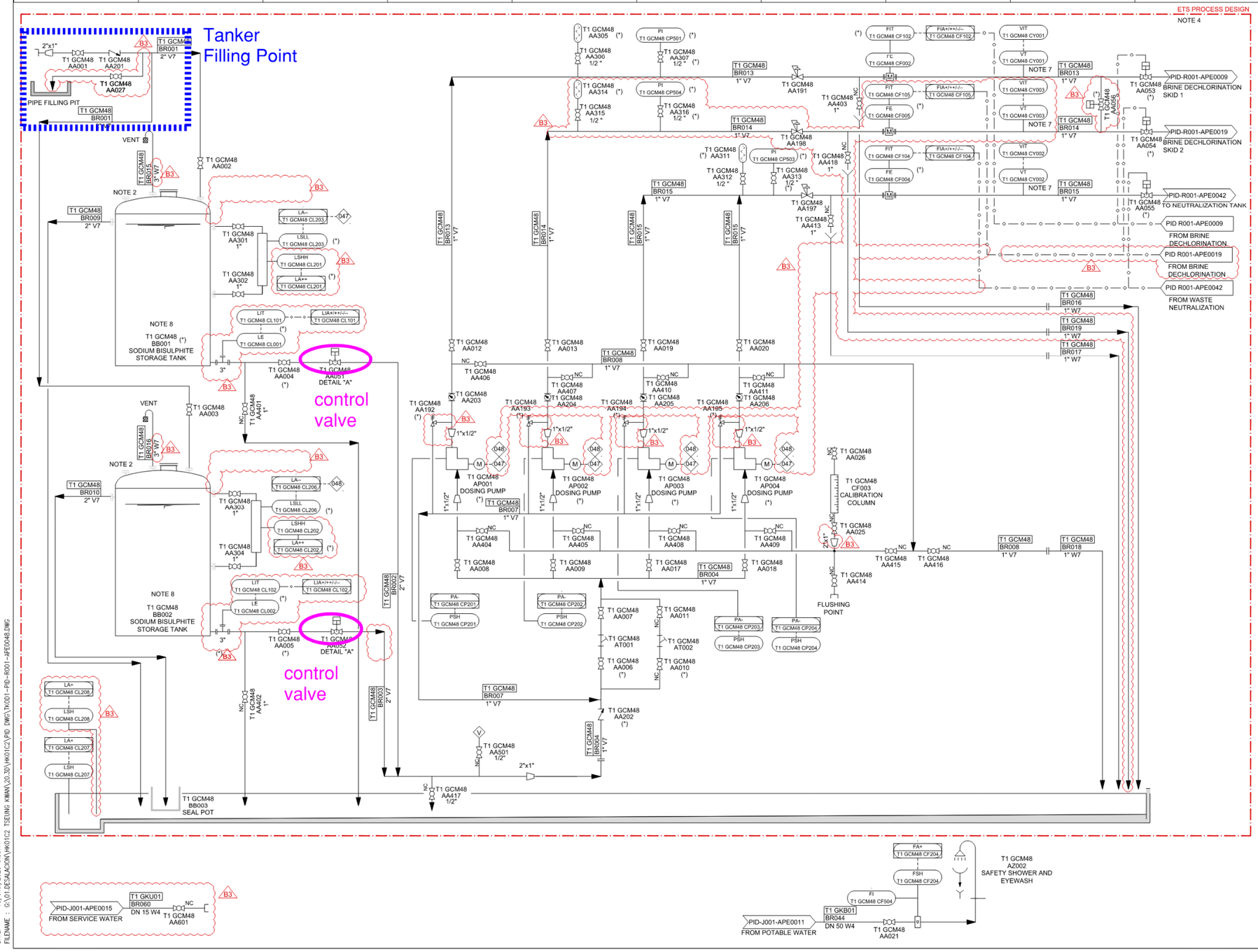
HK01C2-02-16-K913-0029-RevB3.8
DATE: 16/ene./2023 12:05:47
FILENAME : G:\01.DESALACION\HK01C2 TSEUNG KWAN\20.3D\HK01C2\PID DWG\TKOD1-PID-R001-APE0038.DWG

Appendix A-20 P&ID Showing Tanker Filling Point and Control Valve for Hydrochloric Acid Storage in OSCG Building



Appendix A-21 P&ID Showing Tanker Filling Point and Control Valve for Sodium Bisulphite Storage in OSCG Building

	T1GCM48BB001.				T1GCM48AP001//002		T1GCM48AP003//004		
	SODIUM BISULPHITE STORAGE TANK				DOSING PUMP		DOSING PUMP		
	CAPACITY: 1.8 m3.				FLOW: 90 l/h.		FLOW: 90 l/h.		
	MATERIAL: XLPE				PRESSURE: 6 bar		PRESSURE: 6 bar		
	NOTE 1				.		.		
	.UNITS:2				.UNITS:1 DUTY , 1 STANDBY		.UNITS:1 DUTY , 1 STANDBY		



NOTES:
- REFER TO TKOD1-CAL-R001-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING-CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- PRODUCT PREPARATION CONCENTRATION: 22.5% SODIUM BISULPHITE.
- CHEMICAL DIAPHRAGM SEALS WILL BE INCLUDED IN THE PRESSURE INSTRUMENTATION IF THE MATERIALS ARE NOT COMPATIBLE WITH THE CHEMICAL.
- CHECK VALVES FOR DISCHARGE PIPES ARE INTEGRATED IN THE DOSING PUMPS.
- EQUIPMENT POWER VALUES ARE INDICATIVE AND WILL BE CONFIRMED ONCE THE FINAL VENDOR IS SELECTED.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
- NOTE 1: CROSSLINKED PE WITH ANTIOXIDATION BARRIER
- NOTE 2: HANDHOLE FOR TANK FLUSHING
- NOTE 3: SODIUM BISULPHITE CONCENTRATION 40%
- NOTE 4: ELECTROLYTIC TECHNOLOGIES PROCESS DESIGN RESPONSABILITY INCLUDE ELEMENTS INSIDE THE MARKED AREA. INCLUDING PIPE DIAMETER AND FLOWS.
- PIPE ARRANGEMENTS, SUPPORTS AND CIVIL DESIGN ARE OUTSIDE ELECTROLYTIC TECHNOLOGIES SCOPE.
- NOTE 5: ELEMENTS MARKED WITH (*) ARE SUPPLIED BY ELECTROLYTIC TECHNOLOGIES AND CONNECTED TO ELECTROLYTIC TECHNOLOGIES PLC'S (LOCAL INDICATION INSTRUMENTS JUST SUPPLIED).
- NOTE 6: PRESSURE SAFETY VALVE CANNOT BE INSTALLED IN TUBING.
- NOTE 7: VIBRATION SENSOR FOR PIPES.
- NOTE 8: TANK OUTLET AND EMPTY TO BE FLUSHED WITH TANK BOTTOM.

Electrolytic Technologies

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B3	DDA SUBMISSION	B.A.	01/23
B2	DDA SUBMISSION	B.A.	06/21
B1	DDA SUBMISSION	M.P.	05/21
B0	DDA SUBMISSION	B.A.	03/21
A0	AIP SUBMISSION	B.A.	12/20
00	FOR REVIEW	A.L.R	07/20

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
PROCESS AND INSTRUMENTATION DIAGRAM
CHLORINE PROCESS FLOW
SODIUM BISULPHITE DOSING

Drawing no.			Rev.
TKOD1-PID-R001-APE0048			B3
Drawn: B.A.	Date: JAN 23	Checked: J.A.	Approved: J.B.
Scale: %		Status: WORKING	

HK01C2-02-16-K913-0035-Rev03.12
DATE: 18/ene./2023 3:53:11
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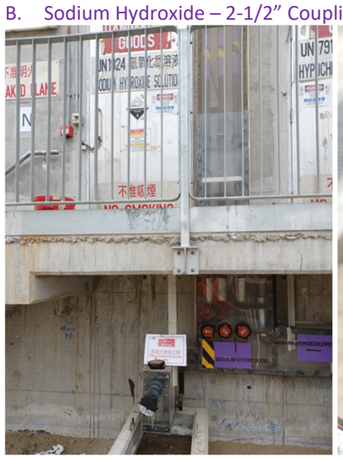
Appendix A-22 Photo Records of Chemical Tank Outlet Control Valve and Filling Point (Page 1 of 4)

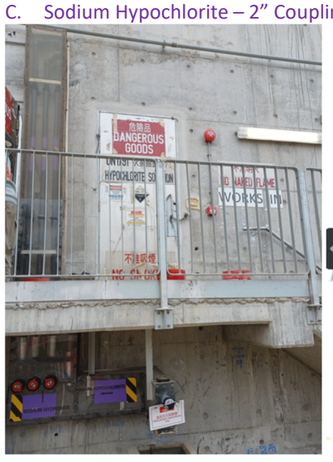
Chemical Building

A. Ferric Chloride – 3” Coupling Camlock for chemical filling

B. Sodium Hydroxide – 2-1/2” Coupling Camlock for chemical filling



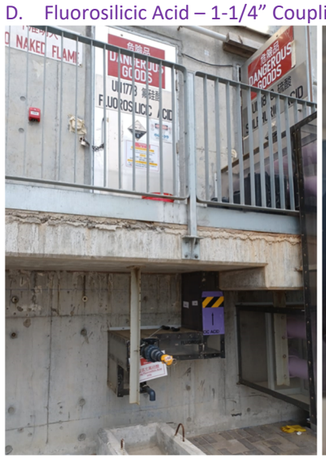
C. Sodium Hypochlorite – 2” Coupling Camlock for chemical filling



BINNIES

Appendix A-22 Photo Records of Chemical Tank Outlet Control Valve and Filling Point (Page 2 of 4)

D. Fluorosilicic Acid – 1-1/4" Coupling Camlock for chemical filling



E. Sulphuric Acid – 1-1/2" Coupling Camlock for chemical filling

Appendix A-22 Photo Records of Chemical Tank Outlet Control Valve and Filling Point (Page 3 of 4)

OSCG Building

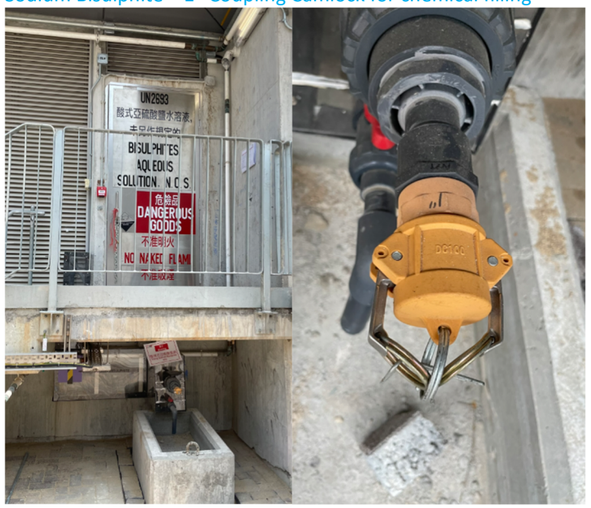
F. Hydrochloric Acid – 3/4” Coupling Camlock for chemical filling

G. Sodium Hydroxide – 2 1/2” Coupling Camlock for chemical filling

BINNIES

Appendix A-22 Photo Records of Chemical Tank Outlet Control Valve and Filling Point (Page 4 of 4)

H. Sodium Bisulphite – 1” Coupling Camlock for chemical filling



I. Sodium Hypochlorite – 2” Coupling Camlock for chemical filling

Appendix A-23 Bund Arrangement for Ferric Chloride Storage in Chemical Building

NOTES ON SIGNAGES

THE FOLLOWING SIGNS, NOTICES ETC. SHALL BE DISPLAYED AT THE DOOR OF EACH DANGEROUS GOODS STORE WITH DETAILS AS FOLLOWS:-

DISPLAY OF PICTORIAL PLATES COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE PICTORIAL PLATE SHALL BE SQUARE-SHAPED, WITH THE MINIMUM LENGTH OF EACH SIDE MEASURING 150MM;
2. THE PICTORIAL PLATE SHALL BE DISPLAYED ON A BACKGROUND OF CONTRASTING COLOUR, OR IF A BACKGROUND OF CONTRASTING COLOUR CANNOT BE PROVIDED, HAVE A DOTTED OR SOLID OUTER BOUNDARY LINE; AND
3. THE PICTORIAL PLATE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH CLASS 8 DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

危險品
DANGEROUS GOODS

DISPLAY OF A DANGEROUS GOODS NOTICE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE HEIGHT AND WIDTH OF THE NOTICE SHALL NOT BE LESS THAN 300MM AND 400MM RESPECIVELY;
2. THE NOTICE SHALL BE MADE OF WHITE OR SILVER CHARACTERS ON A RED BACKGROUND; AND
3. THE NOTICE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

不准吸煙
NO SMOKING

不准明火
NO NAKED FLAME

DISPLAY OF NOTICES 'NO SMOKING', 'NO NAKED FLAME' AND NOTICE FOR CHEMICAL STORED INSIDE THE DANGEROUS GOODS STORE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE NOTICES SHALL HAVE CHARACTER SIZES NOT LESS THAN 120MM IN HEIGHT;
2. THE NOTICES SHALL BE ADHERED TO THE SAMPLES AT THE LEFT FOR CLASS 8 DANGEROUS GOODS STORES IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLES.

UN2582
氯化鐵溶液 FERRIC CHLORIDE SOLUTION

LEGEND

- (H) HEAT DETECTOR (UNDER SLAB/CEILING)
- W WEATHERPROOF BREAK GLASS UNIT
- W WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORES
- EXIT EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- H.R. HOSE REEL CABINET
- Y X 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW:
  "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW:
  "E" - SWITCH FOR EMERGENCY LIGHTING
- Y X SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUB SCRIPTION "X" AS FOLLOW:
  "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW:
  "E" EMERGENCY POWER SUPPLY
- WEATHER PROOF LOUVRE
- A C / B D SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- L9W TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- DENOTES WALL-MOUNTED LUMINAIRE(AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

STORE	NO.1
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 x 42.79 m^3 (85,580 LITRES) FERRIC CHLORIDE
DIMENSIONS (m)	11.10 (L) x 6.90(W) x 8.075 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	(11.10 + 6.90) x 2 x 8.075 + 11.10 x 6.90 = 367.29(m^2)
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	4.6 x 3.2 + 2.0 x 3.2 =21.12(m^2)
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	21.12 x 0.5 = 10.56(m^3)
LOUVRE AREA: TOTAL AREA	2.88%
ROOM VOLUME (m^3)	11.10 x 6.90 x 8.075 = 618.46
VENTILATION RATE (ACH)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	N/A
USEFUL CAPACITY OF EACH TANK(m^3)	42.79
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	87,070

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.
2. HIGH AND LOW VENTILATORS FOR NATURAL VENTILATION COVERED INTERNALLY WITH METAL WIRE GAUZE OF NOMINAL APERTURE SIZE NOT GREATER THAN 12MM AND EXTERNALLY WITH NON-CORRODIBLE METAL GRATINGS SHALL BE PROVIDED FOR THE STORE.

ABBREVIATION

H.R.	HOSE REEL
NAL	NATURAL VENTILATION LOUVRE
ST	STAIR

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= LENGTH x WIDTH x HEIGHT WITH PROTECTIVE COATING
= 11.10 x 6.90 x 1.30 = 99.57 M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.60 x 0.60 x 0.50 = 0.13 M3

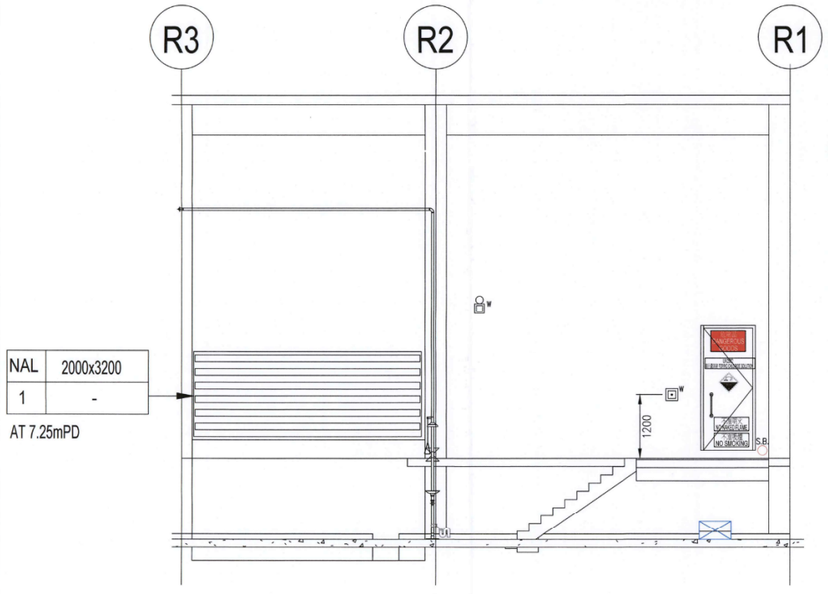
PLATFORM VOLUME (C)
= LENGTH x WIDTH x HEIGHT + BEAM WIDTH x BEAM LENGTH x BEAM HEIGHT
= 7.04 x 1.80 x 0.15 + 0.3 x (6.74+1.40) x 0.45 = 3.00 M3

PLINTH VOLUME (D)
= LENGTH x WIDTH x HEIGHT
= 8.60 x 3.90 x 0.20 = 6.71 M3

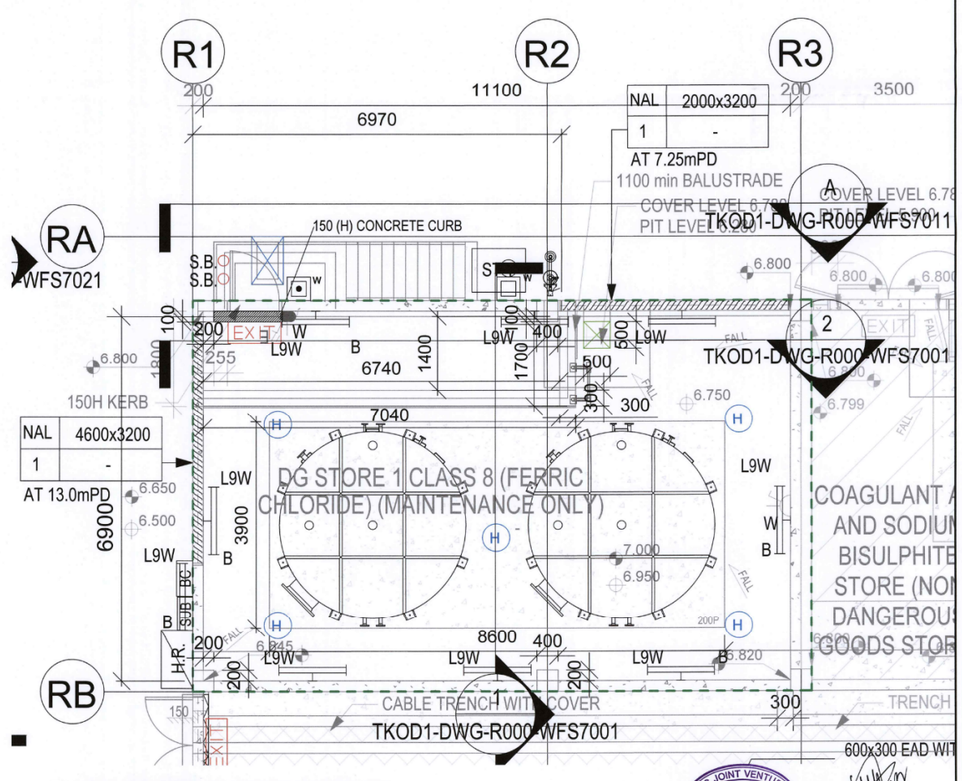
COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= (0.40 x 0.20 + 0.20 x 0.20 + 0.20 x 0.10 + 0.40 x 0.10 + 0.30 x 0.30) x 1.30
= 0.27 x 1.30 = 0.35 M3

VOLUME OCCUPIED BY EQUIPMENT (F) (3% OF TOTAL QUANTITY OF CHEMICAL)
= 0.03 x 85.58 = 2.57 M3

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F)
= 99.57 + 0.13 - 3.00 - 6.71 - 0.35 - 2.57 = 87.07 M3 > 42.79 x 2 = 85.58 M3



A DG STORE 1 ELEVATION 1
1 : 50



- DG STORE 1 BLOW-UP PLAN
  1 : 50

Rev	Description	By	Date
Z0	DG - INSPECTION (AS-FITTED)	ZC	05 MAY 2023
F2	FSD SUBMISSION	KWK	20 NOV 2022
F1	FSD SUBMISSION	KWK	19 AUG 2022
F0	FSD SUBMISSION	KWK	22 JUL 2022

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CRCG AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
D.G. SUBMISSION
CHEMICAL BUILDING
ELEVATION 1 -
GROUND FLOOR -
DG STORE 1

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
18 JUN 2023
(CHEUNG Ngo-wai)
for Director of Fire Services

Drawing no.: TKOD1-DWG-R000-WFS7011 Rev.: Z0

Drawn	Date	Checked	Approved
ZC	05 MAY 2023	HS	BC

Scale: AS SHOWN Status: DG - INSPECTION (AS-FITTED)

AJC JOINT VENTURE AJC合營 FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT 13/WSD/17

Appendix A-24 Bund Arrangement for Sulphuric Acid Storage in Chemical Building

NOTES ON SIGNAGES

THE FOLLOWING SIGNS, NOTICES ETC. SHALL BE DISPLAYED AT THE DOOR OF EACH DANGEROUS GOODS STORE WITH DETAILS AS FOLLOWS:-

DISPLAY OF PICTORIAL PLATES COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE PICTORIAL PLATE SHALL BE SQUARE-SHAPED, WITH THE MINIMUM LENGTH OF EACH SIDE MEASURING 150MM;
2. THE PICTORIAL PLATE SHALL BE DISPLAYED ON A BACKGROUND OF CONTRASTING COLOUR, OR IF A BACKGROUND OF CONTRASTING COLOUR CANNOT BE PROVIDED, HAVE A DOTTED OR SOLID OUTER BOUNDARY LINE; AND
3. THE PICTORIAL PLATE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH CLASS 8 DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

危險品
DANGEROUS GOODS

DISPLAY OF A DANGEROUS GOODS NOTICE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE HEIGHT AND WIDTH OF THE NOTICE SHALL NOT BE LESS THAN 300MM AND 400MM RESPECIVELY;
2. THE NOTICE SHALL BE MADE OF WHITE OR SILVER CHARACTERS ON A RED BACKGROUND; AND
3. THE NOTICE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

不准吸煙
NO SMOKING

不准明火
NO NAKED FLAME

DISPLAY OF NOTICES 'NO SMOKING', 'NO NAKED FLAME' AND NOTICE FOR CHEMICAL STORED INSIDE THE DANGEROUS GOODS STORE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE NOTICES SHALL HAVE CHARACTER SIZES NOT LESS THAN 120MM IN HEIGHT;
2. THE NOTICES SHALL BE ADHERED TO THE SAMPLES AT THE LEFT FOR CLASS 8 DANGEROUS GOODS STORES IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLES.

UN1830
硫酸 SULPHURIC ACID

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- W — WEATHERPROOF BREAK GLASS UNIT
- W — WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORES
- EXIT — EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- HR — HOSE REEL CABINET
- Y X — 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW:
  "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW:
  "E" - SWITCH FOR EMERGENCY LIGHTING
- Y X — SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUB SCRIPTION "X" AS FOLLOW:
  "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW:
  "E" EMERGENCY POWER SUPPLY
- WEATHER PROOF LOUVRE
- A C / B D — SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- L9W — TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- DENOTES WALL-MOUNTED LUMINAIRE(AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B — DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

STORE	NO.2
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 x 62.83 m^3(125,660 LITRES) SULPHURIC ACID
DIMENSIONS (m)	11.90 (L) x 6.90 (W) x 8.075 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	(11.90 + 6.90) x 2 x 8.075 +11.90 x 6.90 = 385.73(m^2)
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	1.90 x 2.45+ 0.80 x 2.45 + 4.30 x 3.05 =19.73(m^2)
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	19.73 x 0.5 = 9.87(m^2)
LOUVRE AREA: TOTAL AREA	2.56%
ROOM VOLUME (m^3)	11.90 x 6.90 x 8.075 = 663.04
VENTILATION RATE (ACH)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	N/A
USEFUL CAPACITY OF EACH TANK(m^3)	62.83
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	127,550

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.
2. HIGH AND LOW VENTILATORS FOR NATURAL VENTILATION COVERED INTERNALLY WITH METAL WIRE GAUZE OF NOMINAL APERTURE SIZE NOT GREATER THAN 12MM AND EXTERNALLY WITH NON-CORRODIBLE METAL GRATINGS SHALL BE PROVIDED FOR THE STORE.

ABBREVIATION

NAL	NATURAL VENTILATION LOUVRE
ST	STAIR

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= LENGTH x WIDTH x HEIGHT WITH PROTECTIVE COATING
= 11.90 x 6.90 x 1.75 = 143.69 M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x 0.50 = 0.13 M3

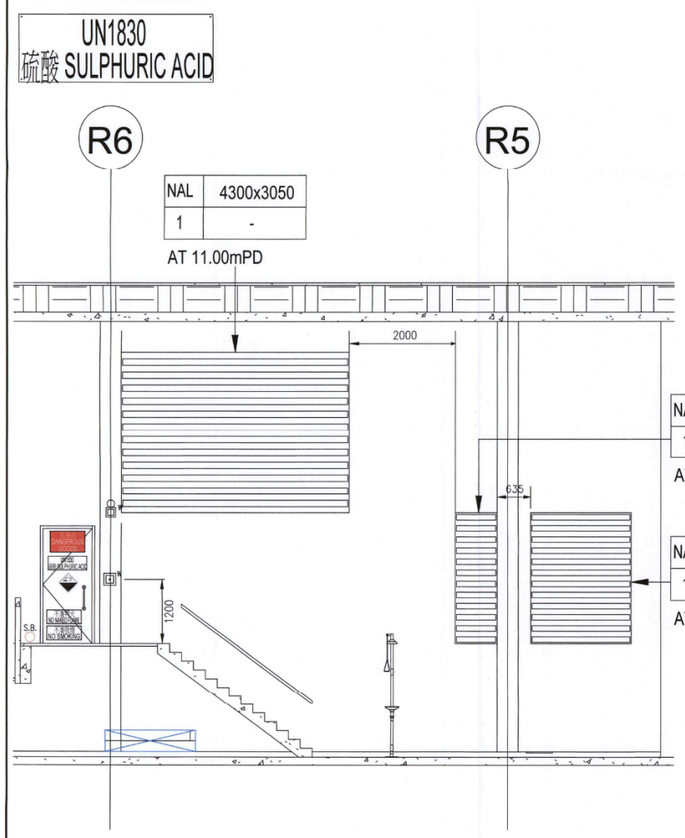
PLATFORM VOLUME (C)
= LENGTH x WIDTH x HEIGHT + BEAM WIDTH x BEAM LENGTH x BEAM HEIGHT
= 9.00 x 1.70 x 0.15 + 0.30 x 0.45 x (8.7 + 1.3) = 3.65 M3

PLINTH VOLUME (D)
= LENGTH x WIDTH x HEIGHT
= 9.40 x 4.40 x 0.20 = 8.27 M3

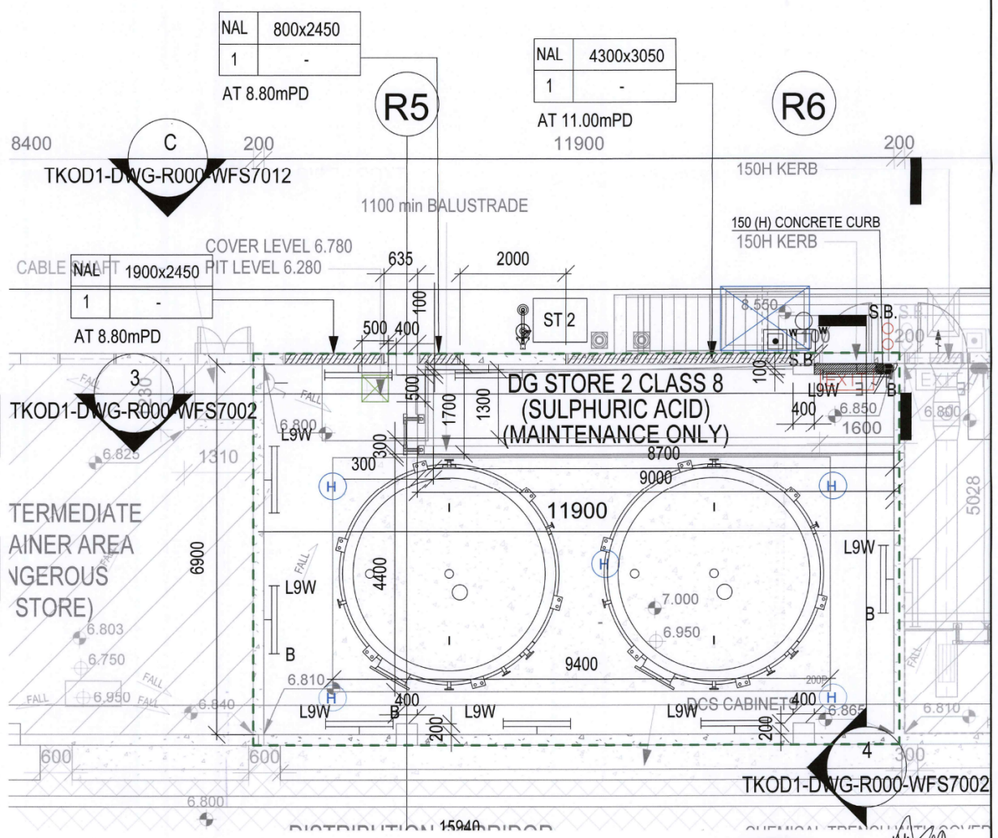
COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= (0.40 x 0.20) x 2 + (0.40 x 0.10) x 2 + 0.30 x 0.30
= 0.33 x 1.75= 0.58 M3

VOLUME OCCUPIED BY EQUIPMENT (F) (3% OF TOTAL QUANTITY OF CHEMICAL)
= 3.77 M3

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F)
= 143.69 + 0.13 -3.65 - 8.27 - 0.58 - 3.77 = 127.55 M3 > 62.83 x 2 = 125.66 M3



C DG STORE 2 ELEVATION
1 : 50



- DG STORE 2 BLOW-UP PLAN
  1 : 50

AJC JOINT VENTURE
AJC聯營
FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT
13/WSD/17

CHEUNG WING YAN
BARRISTER-AT-LAW
BARRISTER-AT-LAW

Rev	Description	By	Date
Z0	DG - INSPECTION (AS-FITTED)	ZC	05 MAY 2023
F2	FSD SUBMISSION	KWK	20 NOV 2022
F1	FSD SUBMISSION	KWK	19 AUG 2022
F0	FSD SUBMISSION	KWK	22 JUL 2022

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CSCEC AJC JOINT VENTURE
Designer: WSP In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
D.G. SUBMISSION
CHEMICAL BUILDING
ELEVATION - GROUND FLOOR - DG STORE 2

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
23 JUN 2023
(CHEUNG Kwok-wai)
for Director of Fire Services

Drawing no.: TKOD1-DWG-R000-WFS7012 Rev: Z0
Drawn: ZC | Date: 05 MAY 2023 | Checked: HS | Approved: BC
Scale: AS SHOWN | Status: DG - INSPECTION (AS-FITTED)

Appendix A-25 Bund Arrangement for Fluorosilicic Acide in Chemical Building

NOTES ON SIGNAGES

THE FOLLOWING SIGNS, NOTICES ETC. SHALL BE DISPLAYED AT THE DOOR OF EACH DANGEROUS GOODS STORE WITH DETAILS AS FOLLOWS:-

DISPLAY OF PICTORIAL PLATES COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE PICTORIAL PLATE SHALL BE SQUARE-SHAPED, WITH THE MINIMUM LENGTH OF EACH SIDE MEASURING 150MM;
2. THE PICTORIAL PLATE SHALL BE DISPLAYED ON A BACKGROUND OF CONTRASTING COLOUR, OR IF A BACKGROUND OF CONTRASTING COLOUR CANNOT BE PROVIDED, HAVE A DOTTED OR SOLID OUTER BOUNDARY LINE; AND
3. THE PICTORIAL PLATE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH CLASS 8 DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

危險品
DANGEROUS GOODS

DISPLAY OF A DANGEROUS GOODS NOTICE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE HEIGHT AND WIDTH OF THE NOTICE SHALL NOT BE LESS THAN 300MM AND 400MM RESPECIVELY;
2. THE NOTICE SHALL BE MADE OF WHITE OR SILVER CHARACTERS ON A RED BACKGROUND; AND
3. THE NOTICE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

不准吸煙
NO SMOKING

不准明火
NO NAKED FLAME

DISPLAY OF NOTICES 'NO SMOKING', 'NO NAKED FLAME' AND NOTICE FOR CHEMICAL STORED INSIDE THE DANGEROUS GOODS STORE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE NOTICES SHALL HAVE CHARACTER SIZES NOT LESS THAN 120MM IN HEIGHT;
2. THE NOTICES SHALL BE ADHERED TO THE SAMPLES AT THE LEFT FOR CLASS 8 DANGEROUS GOODS STORES IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLES.

UN1778
氟硅酸 FLUOROSILICIC ACID

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORES
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- HOSE REEL CABINET
- 10A 1-WAY LIGHTING SWITCH SUBSCRIPTION "Y" AS FOLLOW: "W" - WEATHER PROOF (IP66) SUBSCRIPTION "X" AS FOLLOW: "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING SUB SCRIPTION "X" AS FOLLOW: "W" - WEATHERPROOF SUBSCRIPTION "Y" AS FOLLOW: "E" EMERGENCY POWER SUPPLY
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AIR FILTER
- SCHEDULE OF AIR DIFFUSERS AND GRILLES A-TYPE B-QUANTITY C-WIDTH (mm) X HEIGHT (mm) NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE D-AIR FLOW RATE (l/s)
- A-TYPE OF EQUIPMENT B-AIR FLOW RATE (l/s) XXX-EQUIPMENT NUMBER
- AIR FLOW DIRECTION
- TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- DENOTES WALL-MOUNTED LUMINAIRE(AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

STORE	NO.3
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 x 14.1 m^3 (28,200 LITRES) FLUOROSILICIC ACID
DIMENSIONS (m)	6.90 (L) x 6.40(W) x 8.075 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	N/A
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	N/A
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	N/A
LOUVRE AREA: TOTAL AREA	N/A
ROOM VOLUME (m^3)	6.90 x 6.40 x 8.075 = 356.59
VENTILATION RATE (ACH)	6
MECHANICAL VENTILATION FLOW RATE (L/S)	594.32 < 610 (PROVIDED)
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	610 / (6.9 X 6.4) = 13.81 > 5 (FSD REQUIREMENT)
USEFUL CAPACITY OF EACH TANK(m^3)	14.10
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	32,040

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.

ABBREVIATION

C/W	COMPLETE WITH	H/L	HIGH LEVEL
EAD	EXHAUST AIR DUCT	H.R.	HOSE REEL
EAG	EXHAUST AIR GRILLE	L/L	LOW LEVEL
EXF	EXHAUST FAN	NAL	NATURAL VENTILATION LOUVRE
EAL	EXHAUST AIR LOUVRE		
FAL	FRESH AIR LOUVRE	ST	STAIR

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= LENGTH x WIDTH x HEIGHT WITH PROTECTIVE COATING
= 6.90 x 6.40 x 0.80 = 35.33 M3

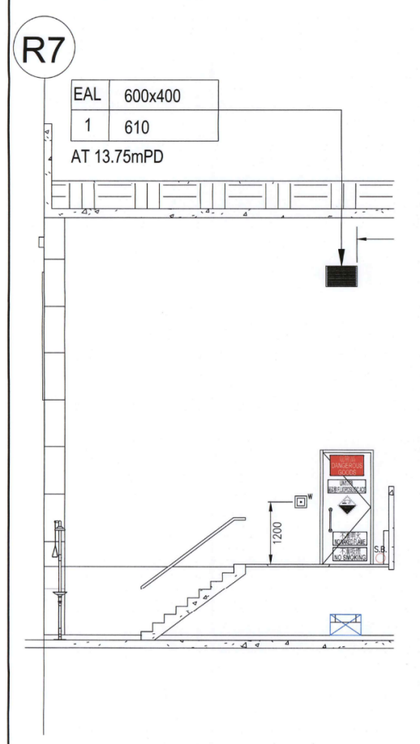
SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x 0.50 = 0.13 M3

PLINTH VOLUME (D)
= LENGTH x WIDTH x HEIGHT
= 5.10 x 2.40 x 0.20 = 2.45 M3

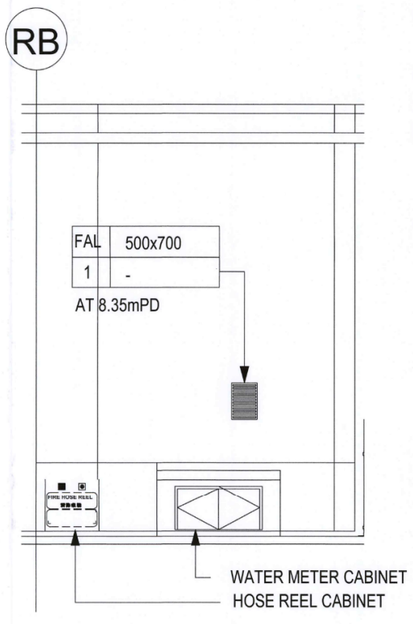
COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= (0.20 x 0.20 + 0.20 x 0.10 + 0.30 x 0.30) x 0.80
= 0.15 x 0.80 = 0.12 M3

VOLUME OCCUPIED BY EQUIPMENT (F) (3% OF TOTAL QUANTITY OF CHEMICAL)
= 0.03 X 28.20 = 0.85 M3

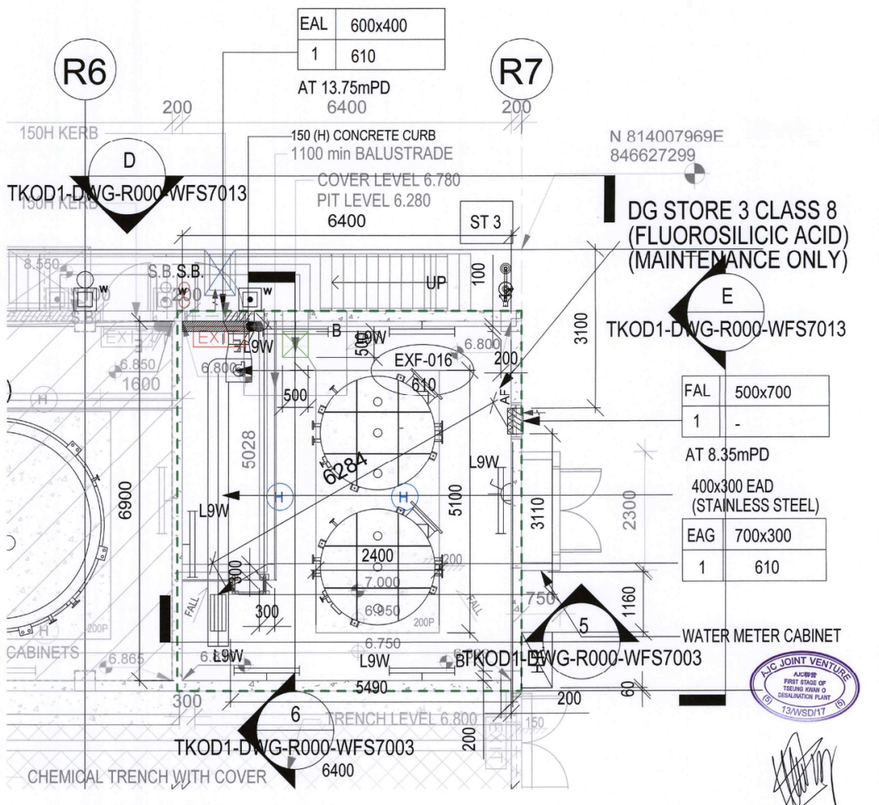
TOTAL RETAINING CAPACITY
= (A) + (B) - (D) - (E) - (F)
= 35.33 + 0.13 - 2.45 - 0.12 - 0.85 = 32.04 M3 > 14.10 x 2 = 28.20 M3



D DG STORE 3 ELEVATION 1
1 : 50



E DG STORE 3 ELEVATION 2
1 : 50



- DG STORE 3 BLOW UP PLAN
1 : 50

Rev	Description	By	Date
Z0	DG - INSPECTION (AS-FITTED)	ZC	05 MAY 2023
F2	FSD SUBMISSION	KWK	20 NOV 2022
F1	FSD SUBMISSION	KWK	19 AUG 2022
F0	FSD SUBMISSION	KWK	22 JUL 2022

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CSCEC AJC JOINT VENTURE
Designer: WSP In Association with APU

Project title: CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title: D.G. SUBMISSION CHEMICAL BUILDING ELEVATION - GROUND FLOOR - DG STORE 3

Approved. This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
29 JUN 2023 (CHEUNG Man-sing) for Director of Fire Services

Drawing no.: TKOD1-DWG-R000-WFS7013 Rev.: Z0

Drawn	Date	Checked	Approved
ZC	05 MAY 2023	HS	BC

Scale: AS SHOWN Status: DG - INSPECTION (AS-FITTED)

Appendix A-26 Bund Arrangement for Sodium Bisulphite Storage in Chemical Building

NOTES ON SIGNAGES

THE FOLLOWING SIGNS, NOTICES ETC. SHALL BE DISPLAYED AT THE DOOR OF EACH DANGEROUS GOODS STORE WITH DETAILS AS FOLLOWS:-

DISPLAY OF PICTORIAL PLATES COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE PICTORIAL PLATE SHALL BE SQUARE-SHAPED, WITH THE MINIMUM LENGTH OF EACH SIDE MEASURING 150MM;
2. THE PICTORIAL PLATE SHALL BE DISPLAYED ON A BACKGROUND OF CONTRASTING COLOUR, OR IF A BACKGROUND OF CONTRASTING COLOUR CANNOT BE PROVIDED, HAVE A DOTTED OR SOLID OUTER BOUNDARY LINE; AND
3. THE PICTORIAL PLATE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH CLASS 8 DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

危險品
DANGEROUS GOODS

DISPLAY OF A DANGEROUS GOODS NOTICE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE HEIGHT AND WIDTH OF THE NOTICE SHALL NOT BE LESS THAN 300MM AND 400MM RESPECIVELY;
2. THE NOTICE SHALL BE MADE OF WHITE OR SILVER CHARACTERS ON A RED BACKGROUND; AND
3. THE NOTICE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

不准吸煙
NO SMOKING

不准明火
NO NAKED FLAME

DISPLAY OF NOTICES 'NO SMOKING', 'NO NAKED FLAME' AND NOTICE FOR CHEMICAL STORED INSIDE THE DANGEROUS GOODS STORE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE NOTICES SHALL HAVE CHARACTER SIZES NOT LESS THAN 120MM IN HEIGHT;
2. THE NOTICES SHALL BE ADHERED TO THE SAMPLES AT THE LEFT FOR CLASS 8 DANGEROUS GOODS STORES IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLES.

UN2693
酸式亞硫酸鹽水溶液, 未另作規定的
BISULPHITES, AQUEOUS SOLUTION,N.O.S.

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORES
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- HOSE REEL CABINET
- 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW:
  "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW:
  "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUB SCRIPTION "X" AS FOLLOW:
  "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW:
  "E" EMERGENCY POWER SUPPLY
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AIR FILTER
- SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- A-TYPE OF EQUIPMENT
  B-AIR FLOW RATE (l/s)
  XXX-EQUIPMENT NUMBER
- AIR FLOW DIRECTION
- TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- DENOTES WALL-MOUNTED LUMINAIRE(AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

STORE	NO.4
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 X 4.2 m^3 (8,400 LITRES) SODIUM BISULPHITE
DIMENSIONS (m)	10.30 (L) x 7.74(W) x 8.075 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	N/A
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	N/A
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	N/A
LOUVRE AREA: TOTAL AREA	N/A
ROOM VOLUME (m^3)	10.30 x 7.74 x 8.075 = 643.76
VENTILATION RATE (ACH)	6
MECHANICAL VENTILATION FLOW RATE (L/S)	1073 < 1080 (PROVIDED)
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	1080 / (7.74 X 10.3) = 13.55 > 5 (FSD REQUIREMENT)
USEFUL CAPACITY OF EACH TANK(m^3)	4.20
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	10,128

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.

ABBREVIATION

C/W	COMPLETE WITH	FAL	FRESH AIR LOUVRE
EAD	EXHAUST AIR DUCT	H/L	HIGH LEVEL
EAG	EXHAUST AIR GRILLE	L/L	LOW LEVEL
EXF	EXHAUST FAN	NAL	NATURAL VENTILATION LOUVRE
EAL	EXHAUST AIR LOUVRE	ST	STAIR

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= LENGTH x WIDTH x HEIGHT WITH PROTECTIVE COATING
= 5.84 x 3.00 x 0.70 = 12.26 M3

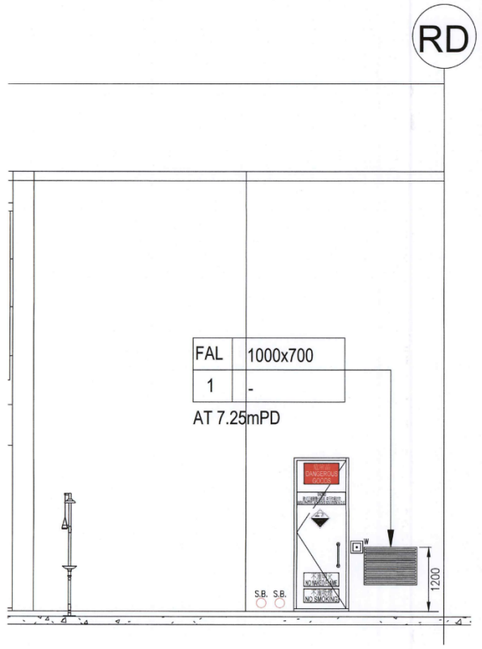
SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.70 x 0.70 x 0.850 = 0.42 M3

PLINTH VOLUME (C)
= LENGTH x WIDTH x HEIGHT
= 5.04 x 2.25 x 0.20 = 2.27 M3

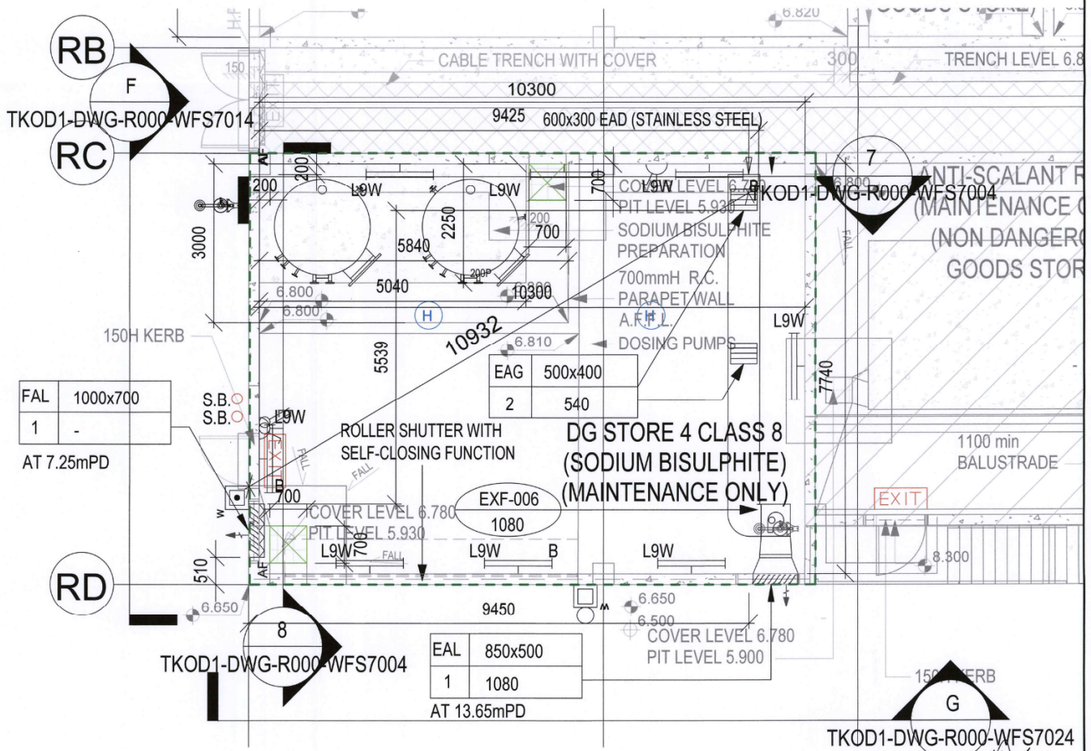
COLUMN VOLUME (D)
= COLUMN AREA x HEIGHT
= (0.20 x 0.20) x 0.70
= 0.04 x 0.70 = 0.03 M3

VOLUME OCCUPIED BY EQUIPMENT (E) (3% OF TOTAL QUANTITY OF CHEMICAL)
= 0.03 x 8.40 = 0.252 M3

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E)
= 12.26 + 0.42 - 2.27 - 0.03 - 0.252 = 10.128 M3 > 4.20 x 2 = 8.40 M3



F DG STORE 4 ELEVATION 1
1 : 50



\- DG STORE 4 BLOW UP PLAN
1 : 50

Rev	Description	By	Date
Z0	DG - INSPECTION (AS-FITTED)	ZC	05 MAY 2023
F2	FSD SUBMISSION	KWK	20 NOV 2022
F1	FSD SUBMISSION	KWK	19 AUG 2022
F0	FSD SUBMISSION	KWK	22 JUL 2022

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC AJC JOINT VENTURE
Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
D.G. SUBMISSION
CHEMICAL BUILDING
ELEVATION 1 - GROUND FLOOR - DG STORE 4

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
7 JUN 2023
(CHEUNG Ngan-ki)
for Director of Fire Services

Drawing no.: TKOD1-DWG-R000-WFS7014
Rev.: Z0

Drawn	Date	Checked	Approved
ZC	05 MAY 2023	HS	BC

Scale: AS SHOWN
Status: DG - INSPECTION (AS-FITTED)

Appendix A-27 Bund Arrangement for Sodium Hydroxide in Chemical Building

NOTES ON SIGNAGES

THE FOLLOWING SIGNS, NOTICES ETC. SHALL BE DISPLAYED AT THE DOOR OF EACH DANGEROUS GOODS STORE WITH DETAILS AS FOLLOWS:-

DISPLAY OF PICTORIAL PLATES COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE PICTORIAL PLATE SHALL BE SQUARE-SHAPED, WITH THE MINIMUM LENGTH OF EACH SIDE MEASURING 150MM;
2. THE PICTORIAL PLATE SHALL BE DISPLAYED ON A BACKGROUND OF CONTRASTING COLOUR, OR IF A BACKGROUND OF CONTRASTING COLOUR CANNOT BE PROVIDED, HAVE A DOTTED OR SOLID OUTER BOUNDARY LINE; AND
3. THE PICTORIAL PLATE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH CLASS 8 DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

危險品
DANGEROUS GOODS

DISPLAY OF A DANGEROUS GOODS NOTICE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE HEIGHT AND WIDTH OF THE NOTICE SHALL NOT BE LESS THAN 300MM AND 400MM RESPECIVELY;
2. THE NOTICE SHALL BE MADE OF WHITE OR SILVER CHARACTERS ON A RED BACKGROUND; AND
3. THE NOTICE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

不准吸煙
NO SMOKING

不准明火
NO NAKED FLAME

DISPLAY OF NOTICES 'NO SMOKING', 'NO NAKED FLAME' AND NOTICE FOR CHEMICAL STORED INSIDE THE DANGEROUS GOODS STORE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE NOTICES SHALL HAVE CHARACTER SIZES NOT LESS THAN 120MM IN HEIGHT;
2. THE NOTICES SHALL BE ADHERED TO THE SAMPLES AT THE LEFT FOR CLASS 8 DANGEROUS GOODS STORES IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLES.

UN1824
氫氧化鈉溶液
SODIUM HYDROXIDE SOLUTION

LEGEND

- H — HEAT DETECTOR (UNDER SLAB/CEILING)
- W — WEATHERPROOF BREAK GLASS UNIT
- W — WEATHERPROOF ALARM BELL
- S.B. — SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORES
- EXIT — EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- H-R — HOSE REEL CABINET
- Y X — 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW:
  "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW:
  "E" - SWITCH FOR EMERGENCY LIGHTING
- Y X — SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUB SCRIPTION "X" AS FOLLOW:
  "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW:
  "E" EMERGENCY POWER SUPPLY
- WEATHER PROOF LOUVRE
- A C / B D — SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- L9W — TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- L9W — DENOTES WALL-MOUNTED LUMINAIRE(AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B — DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

STORE	NO.5
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	3 X 46 m^3(138,000 LITRES) SODIUM HYDROXIDE
DIMENSIONS (m)	15.94 (L) x 6.64 (W) x 8.075 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	(15.94+6.64)x2x8.075+15.94x6.64 =470.51(m^2)
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	5.3x2.6+4.2x3.3=27.64(m^2)
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	27.64x0.5=13.82(m^2)
LOUVRE AREA: TOTAL AREA	2.94%
ROOM VOLUME (m^3)	15.94 x 6.64 x 8.075 = 854.67
VENTILATION RATE (ACH)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	N/A
USEFUL CAPACITY OF EACH TANK(m^3)	46.00
NUMBER OF TANK	3
RETAINING CAPACITY (LITRES)	146,770

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.
2. HIGH AND LOW VENTILATORS FOR NATURAL VENTILATION COVERED INTERNALLY WITH METAL WIRE GAUZE OF NOMINAL APERTURE SIZE NOT GREATER THAN 12MM AND EXTERNALLY WITH NON-CORRODIBLE METAL GRATINGS SHALL BE PROVIDED FOR THE STORE.

ABBREVIATION

NAL	NATURAL VENTILATION LOUVRE
ST	STAIR

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= LENGTH x WIDTH x HEIGHT WITH PROTECTIVE COATING
= 15.94 x 6.64 x 1.55 = 164.05 M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x 0.50 = 0.13 M3

PLATFORM VOLUME (C)
= LENGTH x WIDTH x HEIGHT + BEAM WIDTH x BEAM LENGTH x BEAM HEIGHT
= 6.64x 1.80 x 0.15 + 0.45 x 6.64 x 0.30= 2.70 M3

PLINTH VOLUME (D)
= LENGTH x WIDTH x HEIGHT
= 12.91 x 3.90 x 0.20 = 10.07 M3

COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= (0.40 X 0.20) X 4
= 0.32 x 1.55= 0.50 M3

VOLUME OCCUPIED BY EQUIPMENT (F) (3% OF TOTAL QUANTITY OF CHEMICAL)
= 0.03 x 138 = 4.14 M3

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F)
= 164.05 + 0.13 - 2.70 - 10.07 - 0.50- 4.14 = 146.77 M3 > 46.00 x 3 = 138.00 M3

Rev	Description	By	Date
Z0	DG - INSPECTION (AS-FITTED)	ZC	05 MAY 2023
F2	FSD SUBMISSION	KWK	20 NOV 2022
F1	FSD SUBMISSION	KWK	19 AUG 2022
F0	FSD SUBMISSION	KWK	22 JUL 2022

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

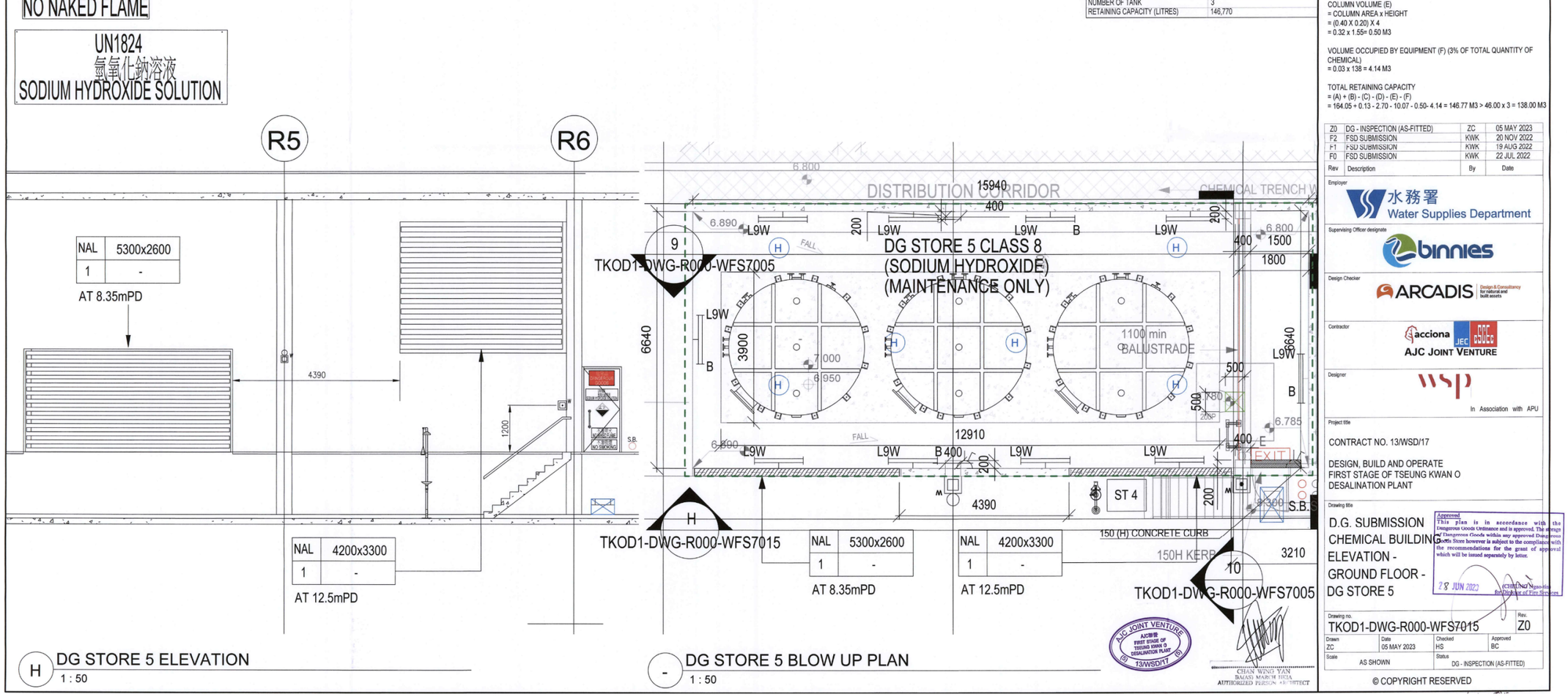
Drawing title:
D.G. SUBMISSION
CHEMICAL BUILDING
ELEVATION - GROUND FLOOR - DG STORE 5

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
28 JUN 2022
(CHEUNG Ngau-fai)
for Director of Fire Services

Drawing no.: TKOD1-DWG-R000-WFS7015 Rev. Z0

Drawn	Date	Checked	Approved
ZC	05 MAY 2023	HS	BC

Scale: AS SHOWN Status: DG - INSPECTION (AS-FITTED)



H DG STORE 5 ELEVATION
1 : 50

- DG STORE 5 BLOW UP PLAN
1 : 50

Appendix A-28 Bund Arrangement for Sodium Hypochloride Storage in Chemical Building

NOTES ON SIGNAGES

THE FOLLOWING SIGNS, NOTICES ETC. SHALL BE DISPLAYED AT THE DOOR OF EACH DANGEROUS GOODS STORE WITH DETAILS AS FOLLOWS:-

DISPLAY OF PICTORIAL PLATES COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE PICTORIAL PLATE SHALL BE SQUARE-SHAPED, WITH THE MINIMUM LENGTH OF EACH SIDE MEASURING 150MM;
2. THE PICTORIAL PLATE SHALL BE DISPLAYED ON A BACKGROUND OF CONTRASTING COLOUR, OR IF A BACKGROUND OF CONTRASTING COLOUR CANNOT BE PROVIDED, HAVE A DOTTED OR SOLID OUTER BOUNDARY LINE; AND
3. THE PICTORIAL PLATE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH CLASS 8 DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

危險品
DANGEROUS GOODS

DISPLAY OF A DANGEROUS GOODS NOTICE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE HEIGHT AND WIDTH OF THE NOTICE SHALL NOT BE LESS THAN 300MM AND 400MM RESPECIVELY;
2. THE NOTICE SHALL BE MADE OF WHITE OR SILVER CHARACTERS ON A RED BACKGROUND; AND
3. THE NOTICE SHALL BE ADHERED TO THE SAMPLE AT THE LEFT FOR EACH DANGEROUS GOODS STORE IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLE.

不准吸煙
NO SMOKING

不准明火
NO NAKED FLAME

DISPLAY OF NOTICES 'NO SMOKING', 'NO NAKED FLAME' AND NOTICE FOR CHEMICAL STORED INSIDE THE DANGEROUS GOODS STORE COMPLYING WITH THE FOLLOWING REQUIREMENTS:

1. THE NOTICES SHALL HAVE CHARACTER SIZES NOT LESS THAN 120MM IN HEIGHT;
2. THE NOTICES SHALL BE ADHERED TO THE SAMPLES AT THE LEFT FOR CLASS 8 DANGEROUS GOODS STORES IN THE CHEMICAL BUILDING OF THE TSEUNG KWAN O DESALINATION PLANT, AND IN APPROPRIATE SCALE AS SHOWN IN THE SAMPLES.

UN1791
次氯酸鹽溶液
SODIUM HYPOCHLORITE SOLUTION

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORES
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- HOSE REEL CABINET
- 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW:
  "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW:
  "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUB SCRIPTION "X" AS FOLLOW:
  "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW:
  "E" EMERGENCY POWER SUPPLY
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AIR FILTER
- SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- A-XXX / B: A-TYPE OF EQUIPMENT; B-AIR FLOW RATE (l/s); XXX-EQUIPMENT NUMBER
- AIR FLOW DIRECTION
- L9W: TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- DENOTES WALL-MOUNTED LUMINAIRE(AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B: DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

STORE	NO.6
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 X 8.5 m^3(17,000 LITRES) SODIUM HYPOCHLORITE
DIMENSIONS (m)	6.54 (L) x 6.41 (W) x 8.075 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	N/A
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	N/A
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	N/A
LOUVRE AREA: TOTAL AREA	N/A
ROOM VOLUME (m^3)	6.54 x 6.41 x 8.075 = 338.52
VENTILATION RATE (ACH)	6
MECHANICAL VENTILATION FLOW RATE (L/S)	564 < 580 (PROVIDED)
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	580 / (6.54 x 6.4) = 13.86 > 5 (FSD REQUIREMENT)
USEFUL CAPACITY OF EACH TANK(m^3)	8.50
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	23,010

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.

ABBREVIATION

C/W	COMPLETE WITH	FAL	FRESH AIR LOUVRE
EAD	EXHAUST AIR DUCT	H/L	HIGH LEVEL
EAG	EXHAUST AIR GRILLE	L/L	LOW LEVEL
EXF	EXHAUST FAN	NAL	NATURAL VENTILATION LOUVRE
EAL	EXHAUST AIR LOUVRE	ST	STAIR

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= LENGTH x WIDTH x HEIGHT WITH PROTECTIVE COATING
= 6.54 x 6.41 x 0.60 = 25.15 M3

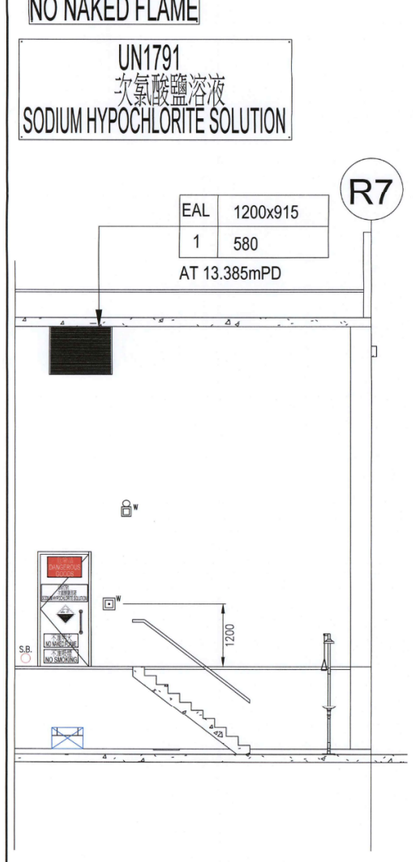
SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x 0.50 = 0.13 M3

PLINTH VOLUME (D)
= LENGTH x WIDTH x HEIGHT
= 4.45 x 1.93 x 0.20 = 1.72 M3

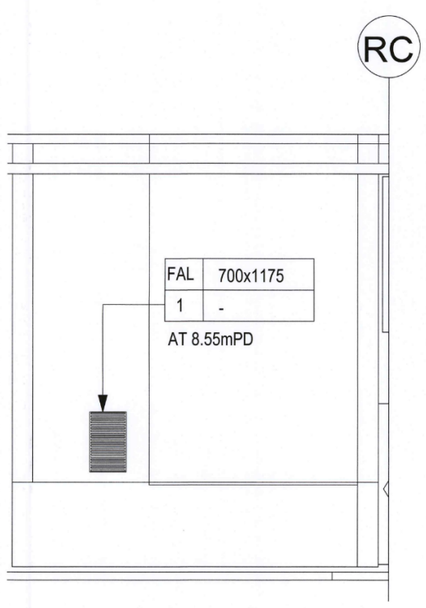
COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= (0.20 x 0.20 + 0.20 x 0.10) x 0.6
= 0.06 x 0.6= 0.04 M3

VOLUME OCCUPIED BY EQUIPMENT (F) (3% OF TOTAL QUANTITY OF CHEMICAL)
= 0.03 x 17 = 0.51 M3

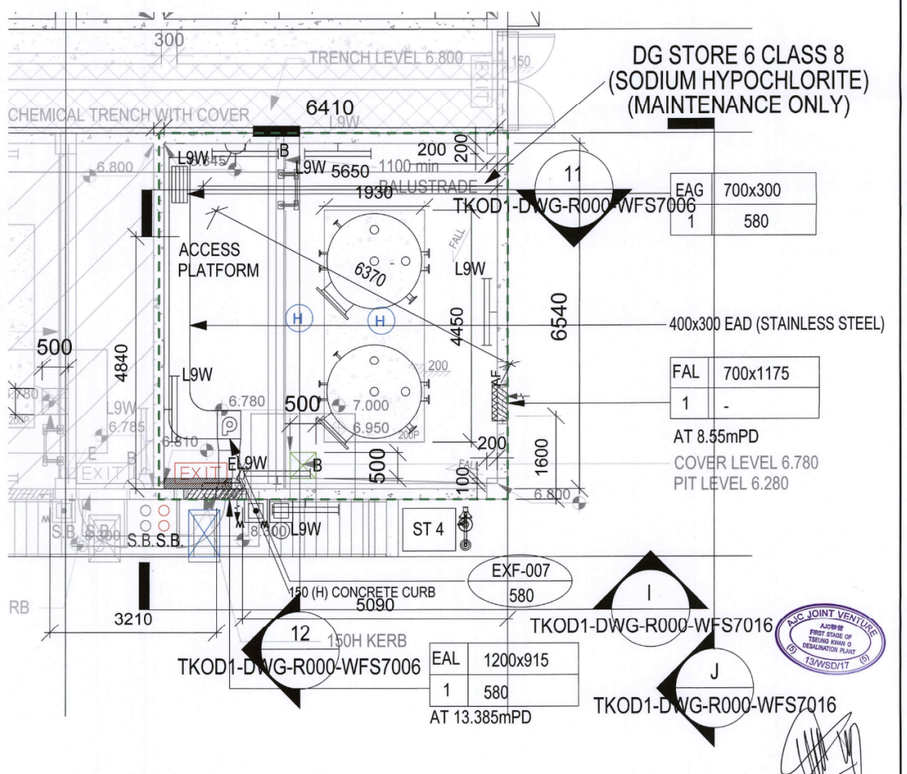
TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F)
= 25.15 + 0.13 - 1.72 - 0.04 - 0.51 = 23.01 M3 > 8.5 x 2 = 17 M3



I DG STORE 6 ELEVATION
1 : 50



J DG STORE 6 ELEVATION
1 : 50



- DG STORE 6 BLOW UP PLAN
1 : 50

Rev	Description	By	Date
Z0	DG - INSPECTION (AS-FITTED)	ZC	05 MAY 2023
F2	FSD SUBMISSION	KWK	20 NOV 2022
F1	FSD SUBMISSION	KWK	19 AUG 2022
F0	FSD SUBMISSION	KWK	22 JUL 2022

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CRCE AJC JOINT VENTURE
Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
D.G. SUBMISSION CHEMICAL BUILDING ELEVATION - GROUND FLOOR - DG STORE 6

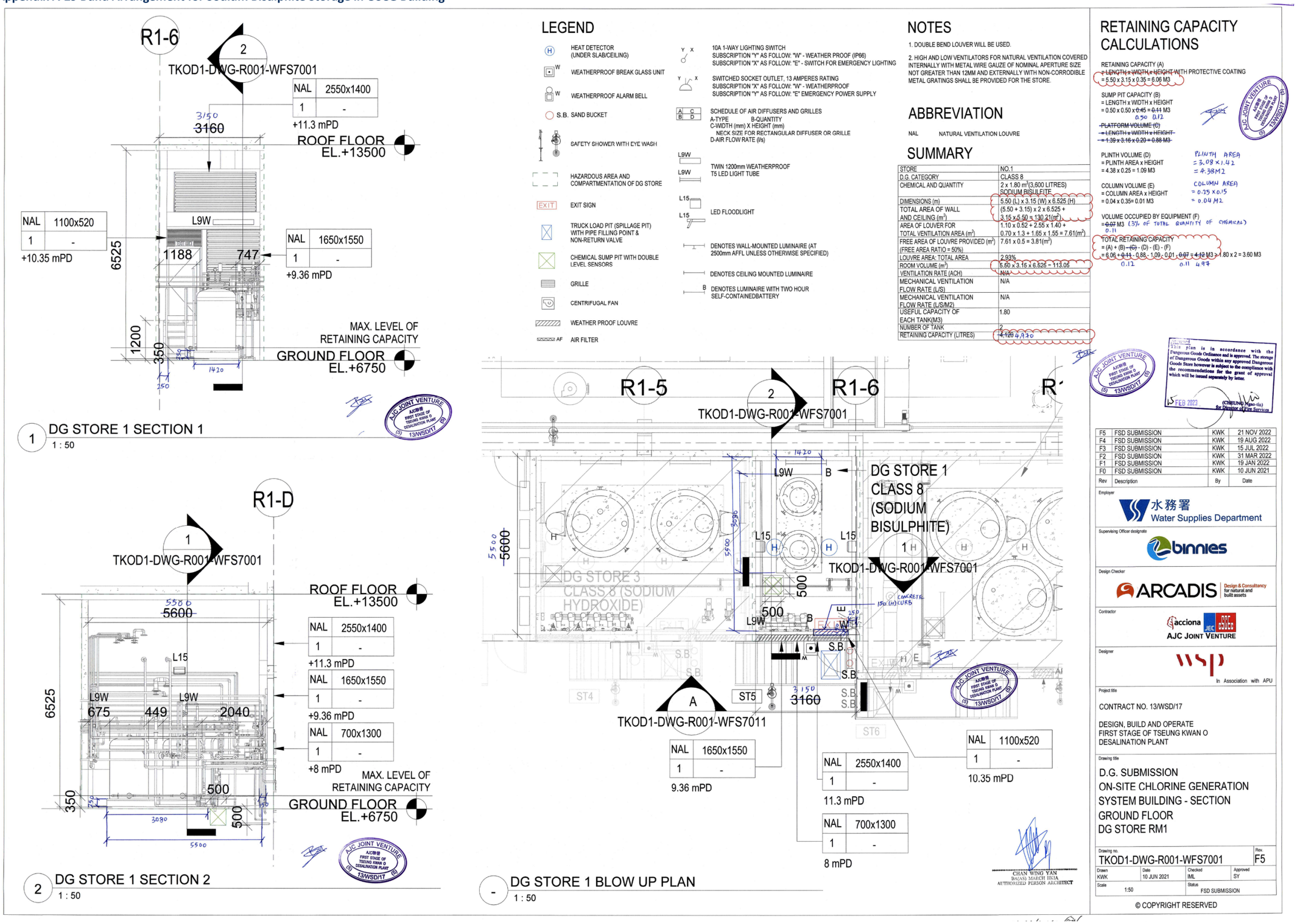
Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
7 JUN 2023
(CHEUNG Yuk-lin)
for Director of Fire Services

Drawing no.: TKOD1-DWG-R000-WFS7016
Rev.: Z0

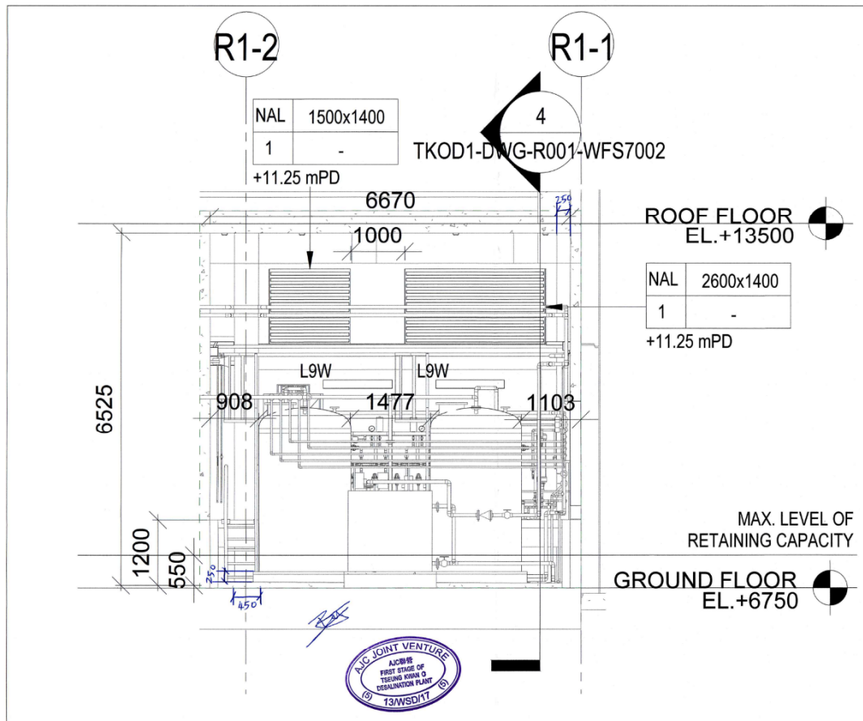
Drawn	Date	Checked	Approved
ZC	05 MAY 2023	HS	BC

Scale: AS SHOWN
Status: DG - INSPECTION (AS-FITTED)

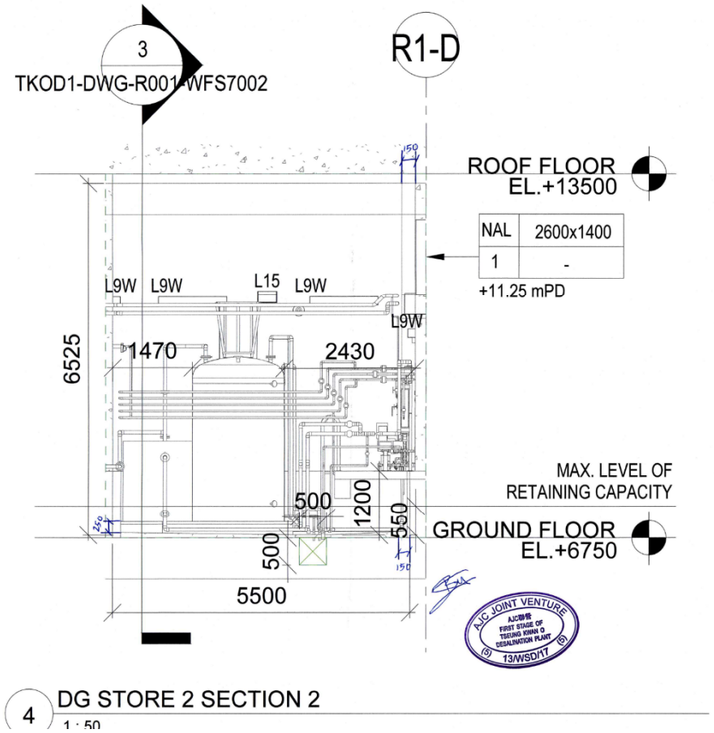
Appendix A-29 Bund Arrangement for Sodium Bisulphite Storage in OSCG Building



Appendix A-30 Bund Arrangement for Hydrochloric Acid Storage in OSCG Building



3 DG STORE 2 SECTION 1
1 : 50



4 DG STORE 2 SECTION 2
1 : 50

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORE
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AIR FILTER
- 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW: "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW: "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUBSCRIPTION "X" AS FOLLOW: "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW: "E" EMERGENCY POWER SUPPLY
- SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- L9W TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- L15 LED FLOODLIGHT
- DENOTES WALL-MOUNTED LUMINAIRE (AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.
2. HIGH AND LOW VENTILATORS FOR NATURAL VENTILATION COVERED INTERNALLY WITH METAL WIRE GAUZE OF NOMINAL APERTURE SIZE NOT GREATER THAN 12MM AND EXTERNALLY WITH NON-CORRODIBLE METAL GRATINGS SHALL BE PROVIDED FOR THE STORE.

ABBREVIATION

NAL NATURAL VENTILATION LOUVRE

SUMMARY

STORE	NO.2
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 x 5.30 m³ (10,600 LITRES) HYDROCHLORIC ACID
DIMENSIONS (m)	6.67 (L) x ~~5.52~~ (W) x 6.525 (H)
TOTAL AREA OF WALL AND CEILING (m²)	(6.67 + ~~5.52~~) x 2 x 6.525 + ~~195.90~~ (m²)
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m²)	3.09 x 1.975 + 2.60 x 1.40 + 1.50 x 1.40 = 11.84 (m²)
FREE AREA OF LOUVRE PROVIDED (m²) (FREE AREA RATIO = 50%)	11.84 x 0.5 = 5.92(m²)
LOUVRE AREA: TOTAL AREA	3% ~~5.50~~ 239.37
ROOM VOLUME (m³)	6.67 x ~~5.52~~ x 6.525 = ~~240.24~~
VENTILATION RATE (ACH)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	N/A
USEFUL CAPACITY OF EACH TANK(M3)	5.30
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	~~12,500~~ 15,920

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
~~= LENGTH x WIDTH x HEIGHT~~ WITH PROTECTIVE COATING
= 6.67 x ~~5.52~~ x 0.55 = ~~20.25~~ M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x ~~0.45~~ = ~~0.11~~ M3

~~PLATFORM VOLUME (G)~~
~~= LENGTH x WIDTH x HEIGHT~~
~~= 1.39 x 6.67 x 0.20 = 1.85 M3~~

PLINTH VOLUME (D)
= PLINTH AREA x HEIGHT
= ~~12.22~~ x 0.25 = ~~3.06~~ M3

PLINTH AREA
= 5.07 x 2.41 + 1.20 x 0.32
= 13.53 M2

COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= 0.11 x 0.55= 0.06 M3

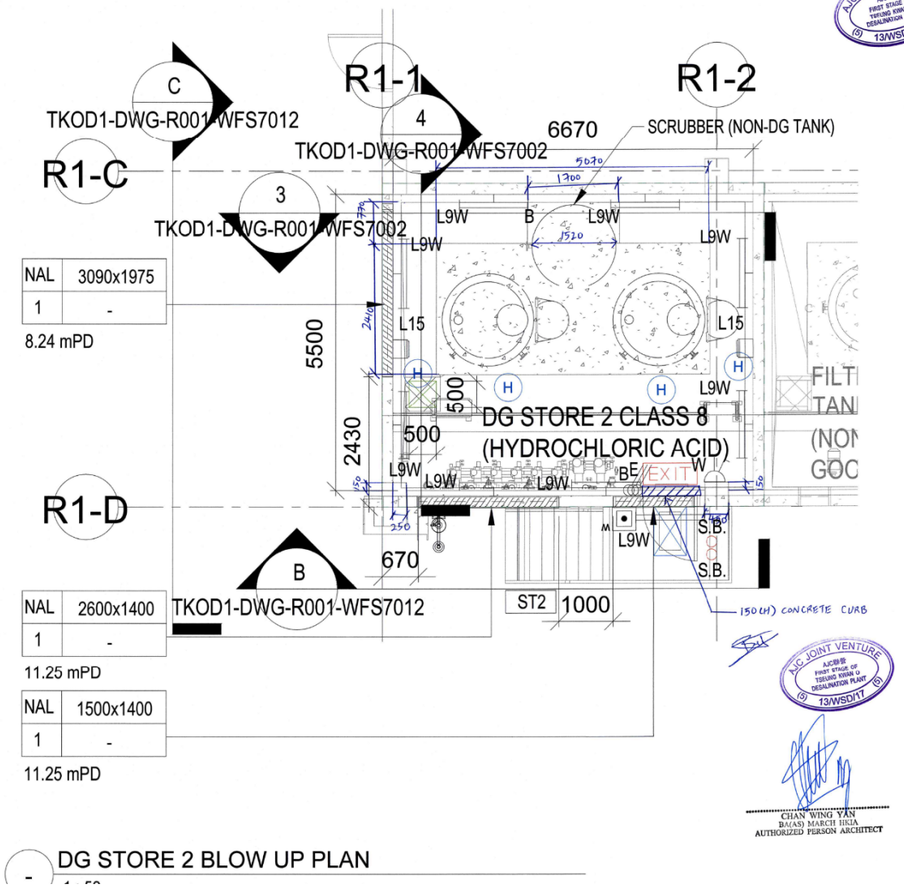
COLUMN AREA
= 0.45 x 0.15 + 0.35 x 0.15
= 0.11 M2

VOLUME OCCUPIED BY EQUIPMENT (F)
= ~~0.158~~ M3 (3% OF TOTAL QUANTITY OF CHEMICAL)

SCRUBBER VOLUME (G) (AREA x HEIGHT)
= ~~2.73~~ M3 (3.14 x (1.52/2)² x 0.55)

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F) - (G)
= ~~20.25~~ - 0.11 - 1.85 - 3.06 - 0.06 - 0.158 - ~~2.73~~
= ~~12.50~~ M3 > 5.30 x 2 = 10.60 M3

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
15 FEB 2023
(CHEUNG Ngau-chi)
for Director of Fire Services



NAL	3090x1975		
1	-		
8.24 mPD			
NAL	2600x1400		
1	-		
11.25 mPD			
NAL	1500x1400		
1	-		
11.25 mPD			

CHAN WING YAN
B(ARCH) MARCH 1988A
AUTHORIZED PERSON ARCHITECT

- DG STORE 2 BLOW UP PLAN
  1 : 50

Rev	Description	By	Date
F5	FSD SUBMISSION	KWK	21 NOV 2022
F4	FSD SUBMISSION	KWK	19 AUG 2022
F3	FSD SUBMISSION	KWK	15 JUL 2022
F2	FSD SUBMISSION	KWK	31 MAR 2022
F1	FSD SUBMISSION	KWK	19 JAN 2022
F0	FSD SUBMISSION	KWK	10 JUN 2021

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: Acciona JEC AJC JOINT VENTURE
Designer: wsp In Association with APU

Project title
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

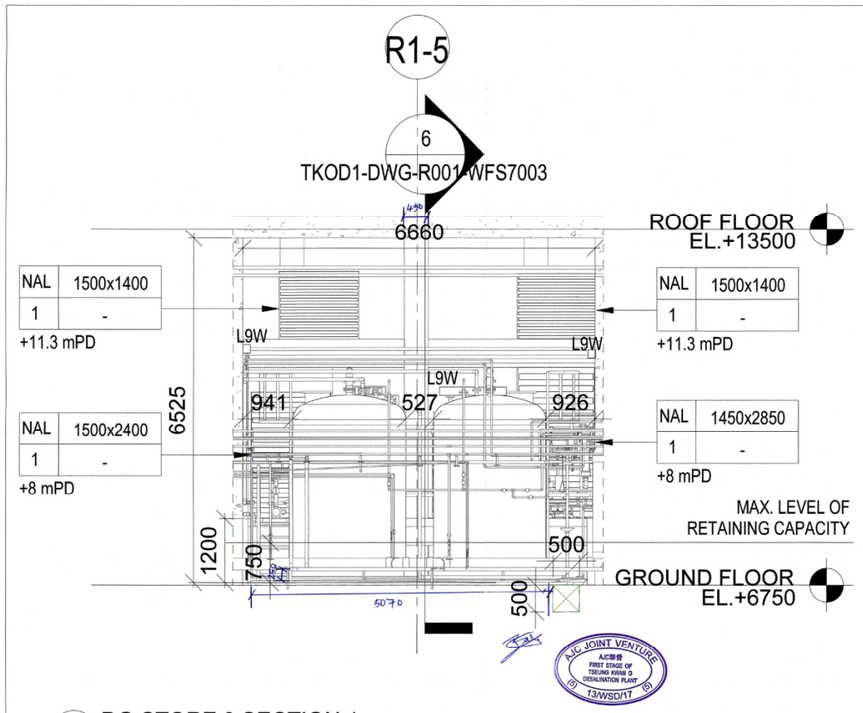
Drawing title
D.G. SUBMISSION
ON-SITE CHLORINE GENERATION
SYSTEM BUILDING - SECTION
GROUND FLOOR
DG STORE RM2

Drawing no. TKOD1-DWG-R001-WFS7002 Rev. F5

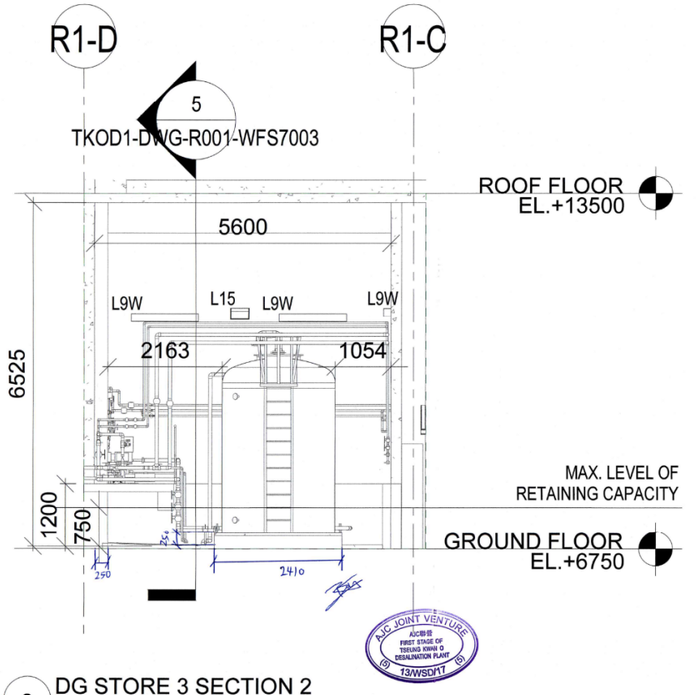
Drawn	Date	Checked	Approved
KWK	10 JUN 2021	IML	SY

Scale 1:50 Status FSD SUBMISSION

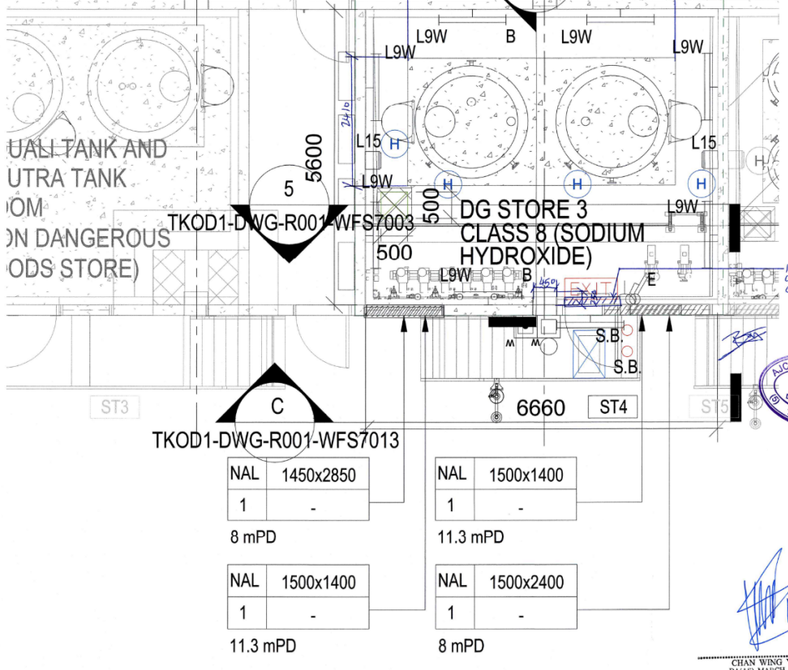
Appendix A-31 Bund Arrangement for Sodium Hydroxide Storage in OSCG Building



5 DG STORE 3 SECTION 1
1 : 50



6 DG STORE 3 SECTION 2
1 : 50



- DG STORE 3 BLOW UP PLAN
1 : 50

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORE
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AF AIR FILTER
- 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW: "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW: "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUBSCRIPTION "X" AS FOLLOW: "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW: "E" EMERGENCY POWER SUPPLY
- SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- L9W TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- L15 LED FLOODLIGHT
- DENOTES WALL-MOUNTED LUMINAIRE (AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

NOTES

1. DOUBLE BEND LOUVER WILL BE USED.
2. HIGH AND LOW VENTILATORS FOR NATURAL VENTILATION COVERED INTERNALLY WITH METAL WIRE GAUZE OF NOMINAL APERTURE SIZE NOT GREATER THAN 12MM AND EXTERNALLY WITH NON-CORRODIBLE METAL GRATINGS SHALL BE PROVIDED FOR THE STORE.

ABBREVIATION

NAL NATURAL VENTILATION LOUVRE

SUMMARY

STORE	NO.3
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 X 9.66 m^3 (19,320 LITRES) SODIUM HYDROXIDE
DIMENSIONS (m)	6.66 (L) x 5.60 (W) x 6.525 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	(6.66 + 5.60) x 2 x 6.525 + 6.66 x 5.60 = 197.29(m^2)
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	1.50 x 1.40 + 1.50 x 2.40 + 1.50 x 1.40 + 1.45 x 2.85 =11.93(m^2)
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	11.93 x 0.5 = 5.97(m^2)
LOUVRE AREA: TOTAL AREA	3%
ROOM VOLUME (m^3)	6.66 x 5.60 x 6.525 = 243.36
VENTILATION RATE (ACH)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	N/A
USEFUL CAPACITY OF EACH TANK(M3)	9.66
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	~~23,550~~ 24,370

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
~~= LENGTH x WIDTH x HEIGHT WITH~~ PROTECTIVE COATING
= 6.66 x 5.60 x 0.75 = 27.97 M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x ~~0.45~~ 0.54 M3

~~PLATFORM VOLUME (C)~~
~~= LENGTH x WIDTH x HEIGHT~~
~~= 1.39 x 6.67 x 0.20 = 1.85 M3~~

PLINTH VOLUME (D)
= PLINTH AREA x HEIGHT
= 12.2 x 0.25 = 3.05 M3

PLINTH AREA = 5.07 x 2.41 = 12.2 M2

COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= ~~0.07~~ x 0.75 = ~~0.05~~ M3

COLUMN AREA = 0.45 x 0.35 = 0.12 M2

VOLUME OCCUPIED BY EQUIPMENT (F)
BY ASSUMPTION (5% OF TOTAL QUANTITY OF CHEMICAL)
= ~~0.087~~ M3

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F)
= 27.97 + ~~0.14~~ - ~~1.85~~ - 3.05 - ~~0.05~~ - ~~0.087~~ = ~~23.05~~ M3 > 9.66 x 2 = 19.32 M3

AJC JOINT VENTURE
AJC聯營
FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT
13/WSD/17

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
15 FEB 2023
(CHEUNG Ngao-tin)
for Director of Fire Services

Rev	Description	By	Date
F4	FSD SUBMISSION	KWK	21 NOV 2022
F3	FSD SUBMISSION	KWK	19 AUG 2022
F2	FSD SUBMISSION	KWK	15 JUL 2022
F1	FSD SUBMISSION	KWK	31 MAR 2022
F0	FSD SUBMISSION	KWK	19 JAN 2022

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CRCE AJC JOINT VENTURE
Designer: WSP In Association with APU

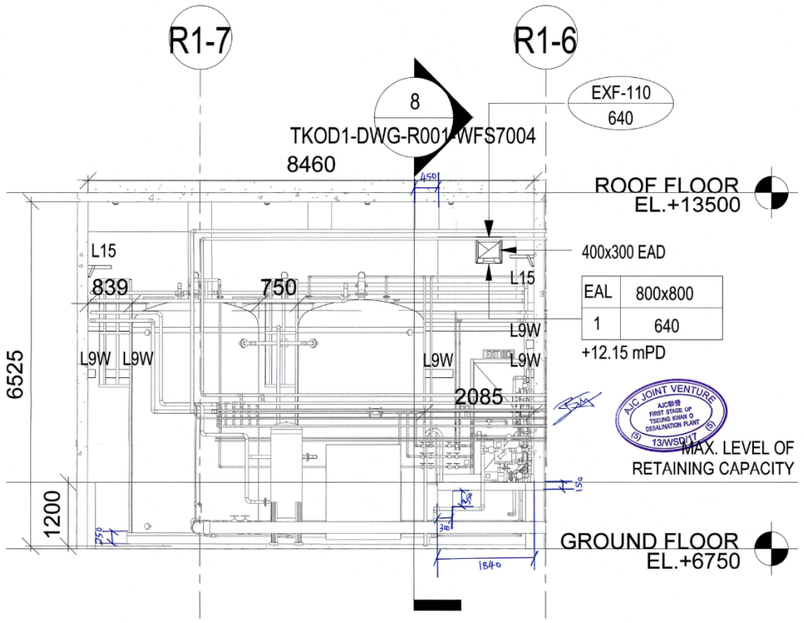
Project title
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title
D.G. SUBMISSION
ON-SITE CHLORINE GENERATION
SYSTEM BUILDING - SECTION
GROUND FLOOR
DG STORE RM3

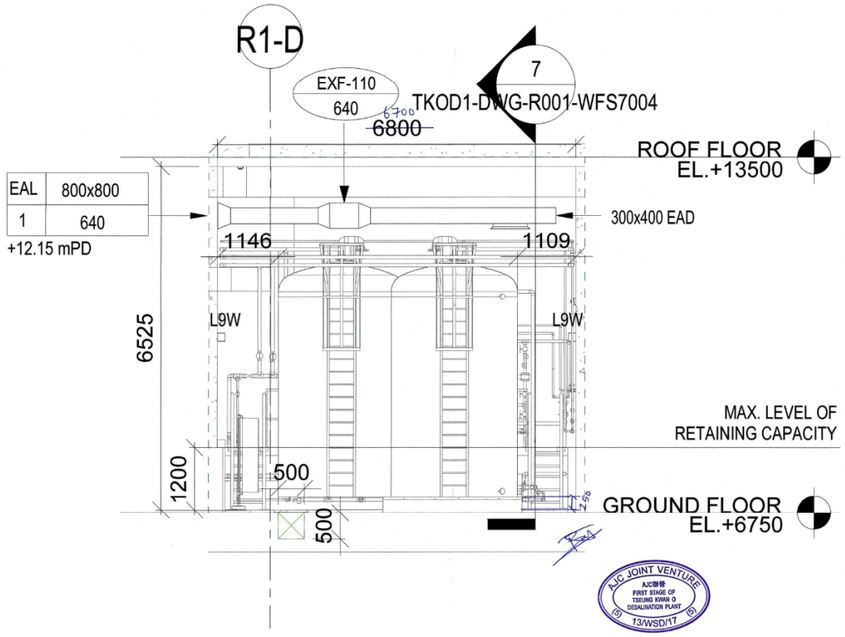
Drawing no. TKOD1-DWG-R001-WFS7003 Rev. F5
Drawn KWK | Date 19 JAN 2022 | Checked IML | Approved SY
Scale 1:50 | Status FSD SUBMISSION

CHAN WING YAN
BAJAJ MARCH HKIA
AUTHORIZED PERSON ARCHITECT

Appendix A-32 Bund Arrangement for Sodium Hypochlorite Storage in OSCG Building



7 DG STORE 4 SECTION 1
1 : 50



8 DG STORE 4 SECTION 2
1 : 50

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORE
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AF AIR FILTER
- 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW: "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW: "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUBSCRIPTION "X" AS FOLLOW: "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW: "E" EMERGENCY POWER SUPPLY
- SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- A-XXX / B — A-TYPE OF EQUIPMENT, B-AIR FLOW RATE (l/s), XXX-EQUIPMENT NUMBER
- AIR FLOW DIRECTION
- L9W TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- L15 LED FLOODLIGHT
- DENOTES WALL-MOUNTED LUMINAIRE (AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

NOTES

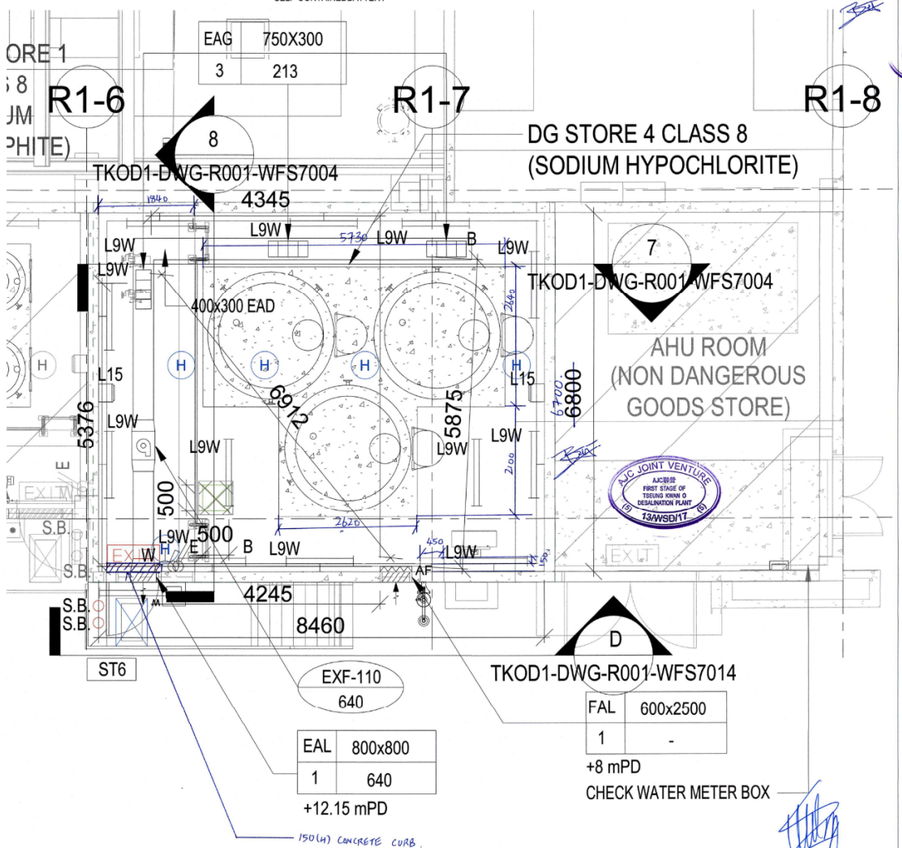
1. DOUBLE BEND LOUVER WILL BE USED.

ABBREVIATION

C/W	COMPLETE WITH	FAL	FRESH AIR LOUVRE
EAD	EXHAUST AIR DUCT	H/L	HIGH LEVEL
EAG	EXHAUST AIR GRILLE	L/L	LOW LEVEL
EXF	EXHAUST FAN	NAL	NATURAL VENTILATION LOUVRE
EAL	EXHAUST AIR LOUVRE		

SUMMARY

STORE	NO.4
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	3 X 19.11 m^3 (57,330 LITRES) SODIUM HYPOCHLORITE
DIMENSIONS (m)	8.46 (L) x 6.70 (W) x 6.525 (H)
TOTAL AREA OF WALL AND CEILING (m^2)	N/A
AREA OF LOUVER FOR TOTAL VENTILATION AREA (m^2)	N/A
FREE AREA OF LOUVRE PROVIDED (m^2) (FREE AREA RATIO = 50%)	N/A
LOUVRE AREA: TOTAL AREA	N/A
ROOM VOLUME (m^3)	8.46(L)x6.70(W)x6.525(H)=369.85
VENTILATION RATE (ACH)	6
MECHANICAL VENTILATION FLOW RATE (L/S)	616 < 640 (PROVIDED)
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	640 / (8.46 X 6.70) = 11.29 > 6
USEFUL CAPACITY OF EACH TANK(M3)	19.11
NUMBER OF TANK	3
RETAINING CAPACITY (LITRES)	~~60,300~~ 57,330



- DG STORE 4 BLOW UP PLAN
  1 : 50

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
~~= LENGTH x WIDTH x HEIGHT~~ WITH PROTECTIVE COATING
= 8.46 x 6.70 x 1.20 = 68.02 M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x ~~0.45~~ = 0.11 M3
0.59 0.12

PLATFORM VOLUME (C)
= LENGTH x WIDTH x HEIGHT + BEAM HEIGHT x BEAM WIDTH x BEAM LENGTH
= ~~4.72 x 6.73 x 0.20 = 2.32 M3~~
= 1.84 X 6.70 X 0.15 + 0.55 X 0.30 X 6.70 = 2.35

PLINTH VOLUME (D)
= PLINTH AREA x HEIGHT
= ~~20.00~~ x 0.25 = ~~5.15~~ M3
20.63 5.16

PLINTH AREA
= 5.93X2.64 + 2.62X2.10
= 20.63M2

COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= 0.07 x 1.20 = 0.08 M3

COLUMN AREA
= 0.45 x 0.15
= 0.07M2

VOLUME OCCUPIED BY EQUIPMENT (F)
= ~~0.281~~ M3 (3% OF TOTAL QUANTITY OF CHEMICAL)
1.72

TOTAL RETAINING CAPACITY
= (A) + (B) - (C) - (D) - (E) - (F)
= ~~68.02 + 0.11 - 2.32 - 5.15~~ - 0.08 - ~~0.281~~ = ~~60.30~~ M3 + 19.11 x 3 = 57.33 M3
0.12 3.09 5.16 1.72 58.83

AJC JOINT VENTURE
AJC合營
FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT
13/WSD/17

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
15 FEB 2023
(CHEUNG Kin-sin)
for Director of Fire Services

Rev	Description	By	Date
F4	FSD SUBMISSION	KWK	21NOV 2022
F3	FSD SUBMISSION	KWK	19 AUG 2022
F2	FSD SUBMISSION	KWK	15 JUL 2022
F1	FSD SUBMISSION	KWK	31 MAR 2022
F0	FSD SUBMISSION	KWK	19 JAN 2022

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CRCC AJC JOINT VENTURE
Designer: wsp In Association with APU

Project title
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title
D.G. SUBMISSION
ON-SITE CHLORINE GENERATION
SYSTEM BUILDING - SECTION
GROUND FLOOR
DG STORE RM4

Drawing no. TKOD1-DWG-R001-WFS7004 Rev. F4
Drawn KWK | Date 19 JAN 2022 | Checked IML | Approved SY
Scale 1:50 | Status FSD SUBMISSION

CHAN WING YAN
BA(AS) MARCH 1926
AUTHORIZED PERSON ARCHITECT

Appendix A-33 Photo Records of Chemical Storage Bund (Page 1 of 3)

Chemical Building:

Ferric Chloride Storage Bund

Sodium Bisulphite Storage Bund

Sulphuric Acid Storage Bund

Hypochlorite Storage Bund

Fluorosilicic Acid Storage Bund

Sodium Hydroxide Storage Bund

Appendix A-33 Photo Records of Chemical Storage Bund (Page 2 of 3)

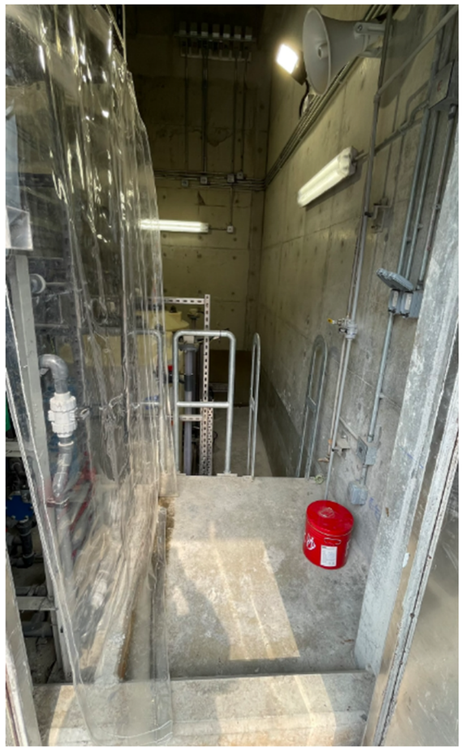
OSCG Building

Hydrochloric Acid Bund Area

Sodium Hydroxide Bund Area

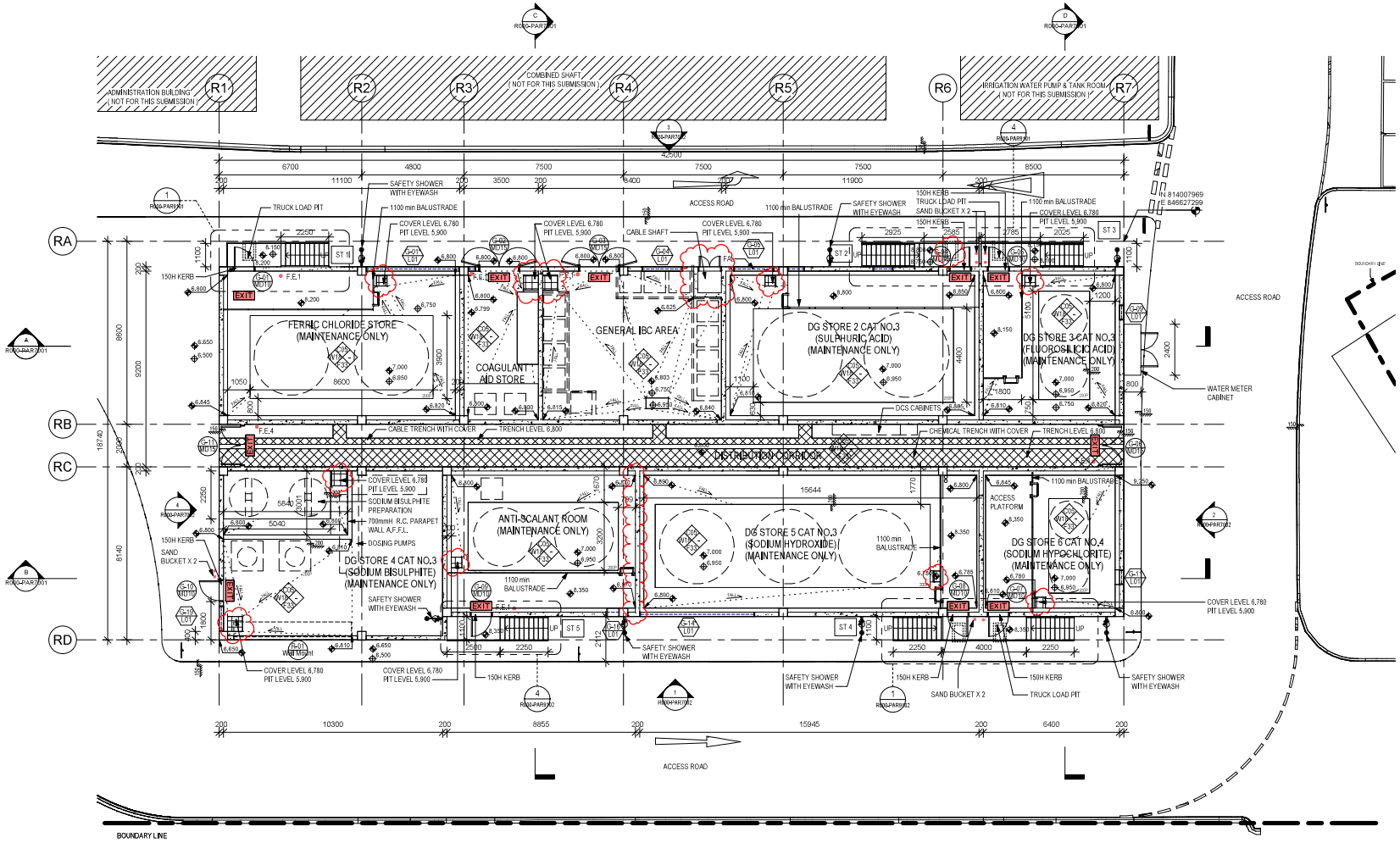
Appendix A-33 Photo Records of Chemical Storage Bund (Page 3 of 3)

Sodium Bisulphite Bund Area

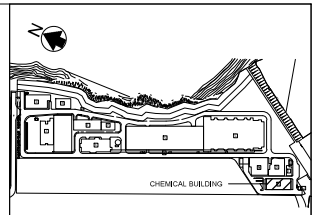


Sodium Hypochlorite Bund Area

Appendix A-34 Architectural Chemical Building Floor Plan



1 GROUND FLOOR PLAN
1 : 100



NOTE:

1. PROTECTIVE COATING TO BE PROVIDE FOR FLOORS, WALLS, BUNDS, PLINTHS, SUMP PITS AND TANKS, ETC. THAT WOULD BE EXPOSED TO CHEMICALS.

Rev	Description	By	Date
B3	DDA SUBMISSION	DT	16 JUN 2021
B2	DDA REVISION	BH	05 MAY 2021
B1	DDA REVISION	BH	25 MAR 2021
B0	DDA SUBMISSION	SC	18 DEC 2020

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CRCC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title

CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title

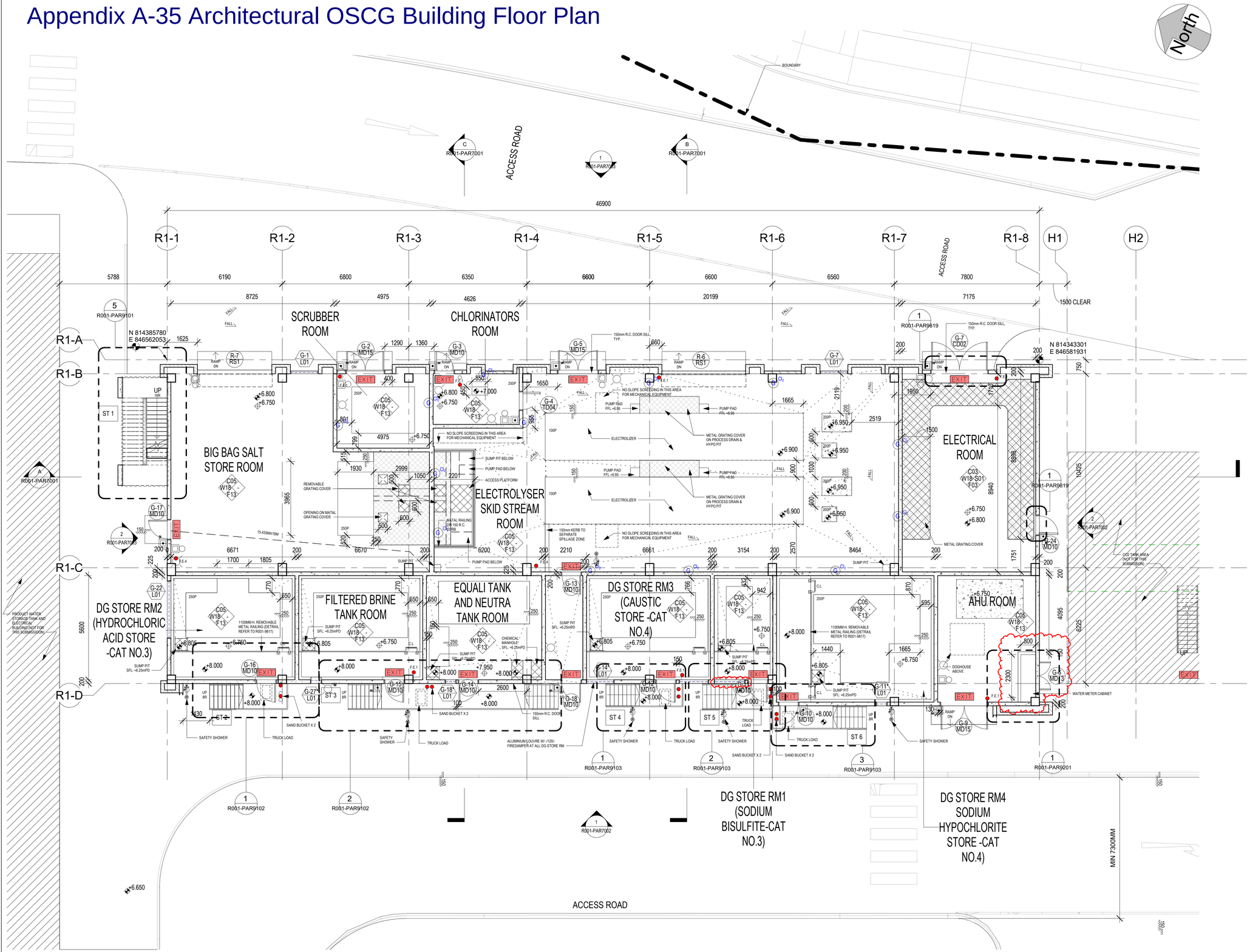
ARCHITECTURAL
CHEMICAL BUILDING
GROUND FLOOR PLAN

Drawing no.	Rev.
TKOD1-DWG-R000-PAR3101	B3

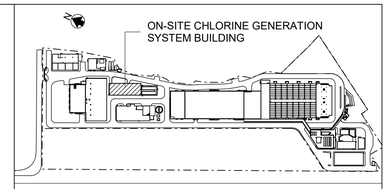
Drawn	Date	Checked	Approved
SC	18 SEP 2020	DM	AC

Scale: 1 : 100
Status: DDA SUBMISSION

Appendix A-35 Architectural OSCG Building Floor Plan



1 GROUND FLOOR PLAN
1 : 100



LEGEND:

- FLOOR OPENINGS TO BE PROVIDED WITH FIXED OR REMOVABLE CHECKER PLATE COVERS AS DETAILED IN DDA FOR C&S DESIGN
- FLOOR OPENINGS TO BE PROVIEDED WITH REMOVALBLE GRATING COVER AS DETAILED IN DDA FOR C&S DESIGN
- ELEVATION OF DfMA PANEL FOR REFERENCE ONLY
- IN SITU FACADE
- GREEN ROOF
- GREEN ROOF

NOTE:
1. T0P SURFACE OF CHECKER PLATE COVER AND REMOVAL GRATING COVERS SHALL FLUSH WITH FINISHES FLOOR LEVEL
2. DETAIL DESIGN OF DfMA PANEL SHALL REFER TO DDA ON DfMA DESIGN.
3. ALL EXTERNAL SURFACE OF UNDERGROUND STRUCTURE SHALL BE SURROUNDED BY 2 COATS OF BITUMEN PAINT WATERPROOFING

Rev	Description	By	Date
B4	DDA SUBMISSION	DT	TBD
B3	DDA REVISION	DT	17 JUN 2021
B2	DDA REVISION	DT	30 APR 2020
B1	DDA REVISION	BH	25 FEB 2020
B0	DDA SUBMISSION	BH	13 NOV 2020

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CRCC AJC JOINT VENTURE

Designer: wsp — In Association with APU

Project title

CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title

ARCHITECTURAL - ON-SITE CHLORINE GENERATION SYSTEM BUILDING - GROUND FLOOR PLAN

Drawing no.	Rev.
TKOD1-DWG-R001-PAR3101	B4

Drawn	Date	Checked	Approved
BH	13 NOV 2020	DM	BC

Scale	Status
1 : 100	DDA SUBMISSION

Appendix A-36 Photo Records of Sump Pits

Chemical Building:

Ferric Chloride

Sodium Hypochlorite

Sodium Bisulphite

OSCG Building:

Sodium Hypochlorite

Sodium Bisulphite

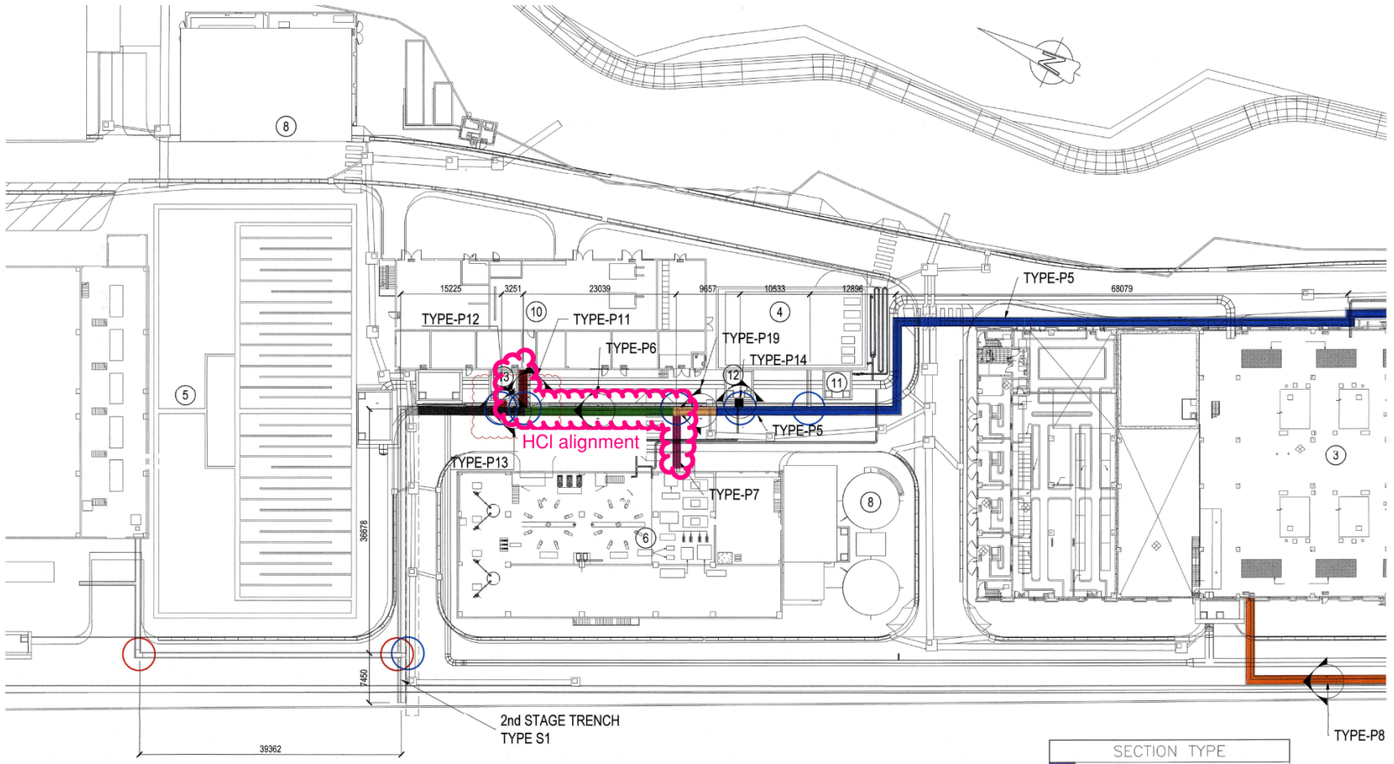
Hydrochloric Acid

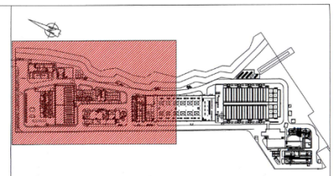
Sodium Hydroxide

Main Skid Room

Appendix A-37 Trench HCl Pipe Alignment in DP1

Nº	AREA/BUILDING NAME
1	COMBINED SHAFT
2	ACTIDAFF
3	REVERSE OSMOSIS & ELECTRICAL BUILDING
4	CO2 TANKS AREA
5	PRODUCT WATER STORAGE TANK & ELECTRICAL BUIDING
6	POST-TREATMENT BUILDING
7	ADMINISTRATION BUILDING & INSPECTION CORRIDOR
8	MAIN ELECTRICAL & CENTER CHILLER PLANT BUILDING
9	CHEMICAL BUILDING
10	ON-SITE CHLORINE GENERATION SYSTEM BUILDING
11	STATIC MIXER 1
12	STATIC MIXER 2
13	STATIC MIXER 3
14	STATIC MIXER 4
15	WORKSHOP





KEY PLAN | DWG AREA

NOTES

Note 1: Interface with 13/WSD/400 located at coordinates XY: "846459.65" "814460.91". Those coordinates refers to Center of Pipe.

Note 2: Plant Reference Coordinate is referred as Coordinate J located at XY: "846459.65" "814448.83"

Note 3: All dimensions are in millimeters, unless otherwise noted.

Note 4: All elevations and coordinates are in meters, unless otherwise noted.

Note 5: All elevations refer to Hong Kong Principal Datum (HKPD).

Note 6: All chemical´s pipes are equidistant, both horizontal & vertical according to trench dimension.

Note 7: HCL Double-containment, with outer diameter DN50

Note 8: S8 Material: HDPE SDR11 (PN16).

Note 9: Pipe connections to Buildings to have pipe loop to absorbed building settlement.

Note 10: Trench low point will have level switches.

Note 11: Piping class and services can see in DWG: TKOD1-DWG-A000-WGN0001.

Note 12: Redundant sensor cable liquid detector for leakage detection along the trenches

- Low point at acid trench
- Low point at base trench

Rev	Description	By	Date
B6	DDA SUBMISSION	XMR	18/11/2022
B5	DDA SUBMISSION	XMR	24/01/2022
B4	DDA SUBMISSION	XMR	08/10/2021
B3	DDA SUBMISSION	JAG	22/07/2021
B2	DDA SUBMISSION	XMR	20/03/2021
B1	DDA SUBMISSION	XMR	11/12/2020

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title: CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title: GENERAL PIPING LAYOUT CHEMICAL NETWORK

Drawing no.: TKOD1-DWG-A000-ACD0501 Part 1 of 2 | Rev.: B6

Drawn	Date	Checked	Approved
CAD	08/05/2020	J.A.	J.B.

Scale: 1:400 | Status: PRELIMINARY DESIGN

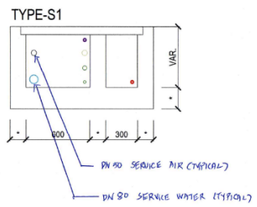
SECTION TYPE

FERRIC CHLORIDE	DN25	T1GAC08BR003-25-W7	
SOD.HYPOCHLORITE	DN50	T1GCM38BR005-40-V7	
SOD.HYPOCHLORITE	DN80	T1GAC16BR009-80-V7	
COAGULANT AID	DN25	T1GAC20BR008-25-W7	
COAGULANT AID	DN25	T1GAC20BR006-25-W7	
SODIUM HYDROXIDE	DN25	T1GCN37BR012-25-V7	
SODIUM HYDROXIDE	DN40	T1GCN36BR010-40-V7	
FLOUROSILICIC ACID	DN15	T1GCN25BR008-15-V7	
SODIUM BISULPHITE	DN32	T1GCN41BR009-32-W7	
SODIUM BISULPHITE	DN40	T1GCN41BR010-40-W7	
SODIUM BISULPHITE	DN40	T1GCN41BR011-40-W7	
SODIUM BISULPHITE	DN25	T1GCN41BR012-25-W7	
SULPHURIC ACID	DN50	T1GAC18BR007-50-C0	
SULPHURIC ACID	DN25	T1GAC18BR008-25-C0	
SERVICE AIR	DN50	-	
SERVICE WATER	DN80	-	

TYPE P5

SOD.HYPOCHLORITE	DN50	T1GCM38BR005-40-V7
SODIUM HYDROXIDE	DN25	T1GCN37BR012-25-V7
SODIUM HYDROXIDE	DN40	T1GCN36BR010-40-V7
FLOUROSILICIC ACID	DN15	T1GCN25BR008-15-V7
SODIUM BISULPHITE	DN25	T1GCN41BR012-25-W7

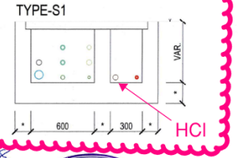
TYPE-S1



TYPE P6

SOD.HYPOCHLORITE	DN40	T1GCM39BR014-25-V7
SOD.HYPOCHLORITE	DN50	T1GCM38BR005-40-V7
SODIUM HYDROXIDE	DN25	T1GCN37BR012-25-V7
SODIUM HYDROXIDE	DN25	T1GCM41BR017-25-V7
FLOUROSILICIC ACID	DN15	T1GCN25BR008-15-V7
CHLORINATED WATER	DN40	T1GCM05BR007-40-W7
CHLORINATED WATER	DN40	T1GCM05BR006-40-W7
HYDROCHLORIC ACID	DN25	T1GCM47BR006-25-W4

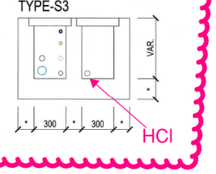
TYPE-S1



TYPE P7

SOD.HYPOCHLORITE	DN40	T1GCM39BR014-25-V7
SODIUM HYDROXIDE	DN40	T1GCN36BR010-40-V7
SODIUM HYDROXIDE	DN25	T1GCM41BR017-25-V7
SODIUM BISULPHITE	DN25	T1GCN41BR012-25-V7
HYDROCHLORIC ACID	DN25	T1GCM47BR006-25-W4

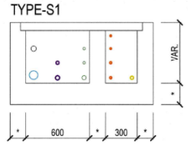
TYPE-S3



TYPE P8

ANTISCALANT	DN15	T1GCN45BR014-15-W7
ANTISCALANT	DN15	T1GCN45BR015-15-W7
ANTISCALANT	DN15	T1GCN45BR012-15-F8
ANTISCALANT	DN20	T1GCN45BR013-20-W7
SODIUM HYDROXIDE	DN25	T1GCN36BR008-25-V7
SODIUM HYDROXIDE	DN25	T1GCN36BR009-25-V7
SODIUM HYDROXIDE	DN40	T1GCN37BR011-40-V7
SODIUM BISULPHITE	DN32	T1GCN41BR006-32-F8
SODIUM BISULPHITE	DN40	T1GCN41BR007-40-W7
SULPHURIC ACID	DN32	T1GCN30BR007-32-C0

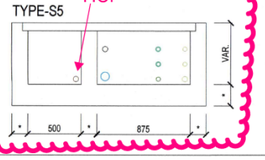
TYPE-S1



TYPE P11

SOD.HYPOCHLORITE	DN40	T1GCM39BR014-25-V7
SOD.HYPOCHLORITE	DN40	T1GCM39BR012-25-V7
SOD.HYPOCHLORITE	DN50	T1GCM38BR005-40-V7
SODIUM HYDROXIDE	DN25	T1GCM41BR017-25-V7
CHLORINATED WATER	DN40	T1GCM05BR007-40-W7
CHLORINATED WATER	DN40	T1GCM05BR006-40-W7
HYDROCHLORIC ACID	DN25	T1GCM47BR006-25-W4

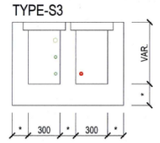
TYPE-S5



TYPE P12

SOD.HYPOCHLORITE	DN40	T1GCM39BR012-25-V7
SODIUM HYDROXIDE	DN25	T1GCN37BR012-25-V7
SODIUM HYDROXIDE	DN25	T1GCN41BR013-25-V7
FLOUROSILICIC ACID	DN16	T1GCN26BR008-15-V7

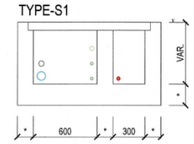
TYPE-S3



TYPE P13

SOD.HYPOCHLORITE	DN40	T1GCM39BR012-25-V7
SODIUM HYDROXIDE	DN25	T1GCN37BR012-25-V7
SODIUM HYDROXIDE	DN25	T1GCN41BR013-25-V7
FLOUROSILICIC ACID	DN15	T1GCN26BR008-15-V7

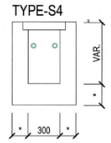
TYPE-S1



TYPE P14

CHLORINATED WATER	DN40	T1GCM05BR007-40-W7
CHLORINATED WATER	DN40	T1GCM05BR006-40-W7

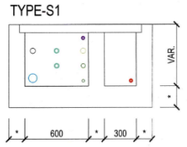
TYPE-S4

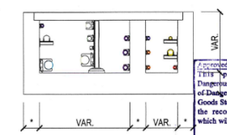


TYPE P19

SOD.HYPOCHLORITE	DN50	T1GCM38BR005-40-V7
SODIUM HYDROXIDE	DN25	T1GCN37BR012-25-V7
SODIUM HYDROXIDE	DN40	T1GCN36BR010-40-V7
FLOUROSILICIC ACID	DN15	T1GCN25BR008-15-V7
SODIUM BISULPHITE	DN25	T1GCN41BR012-25-W7
CHLORINATED WATER	DN40	T1GCM05BR007-40-W7
CHLORINATED WATER	DN40	T1GCM05BR006-40-W7

TYPE-S1

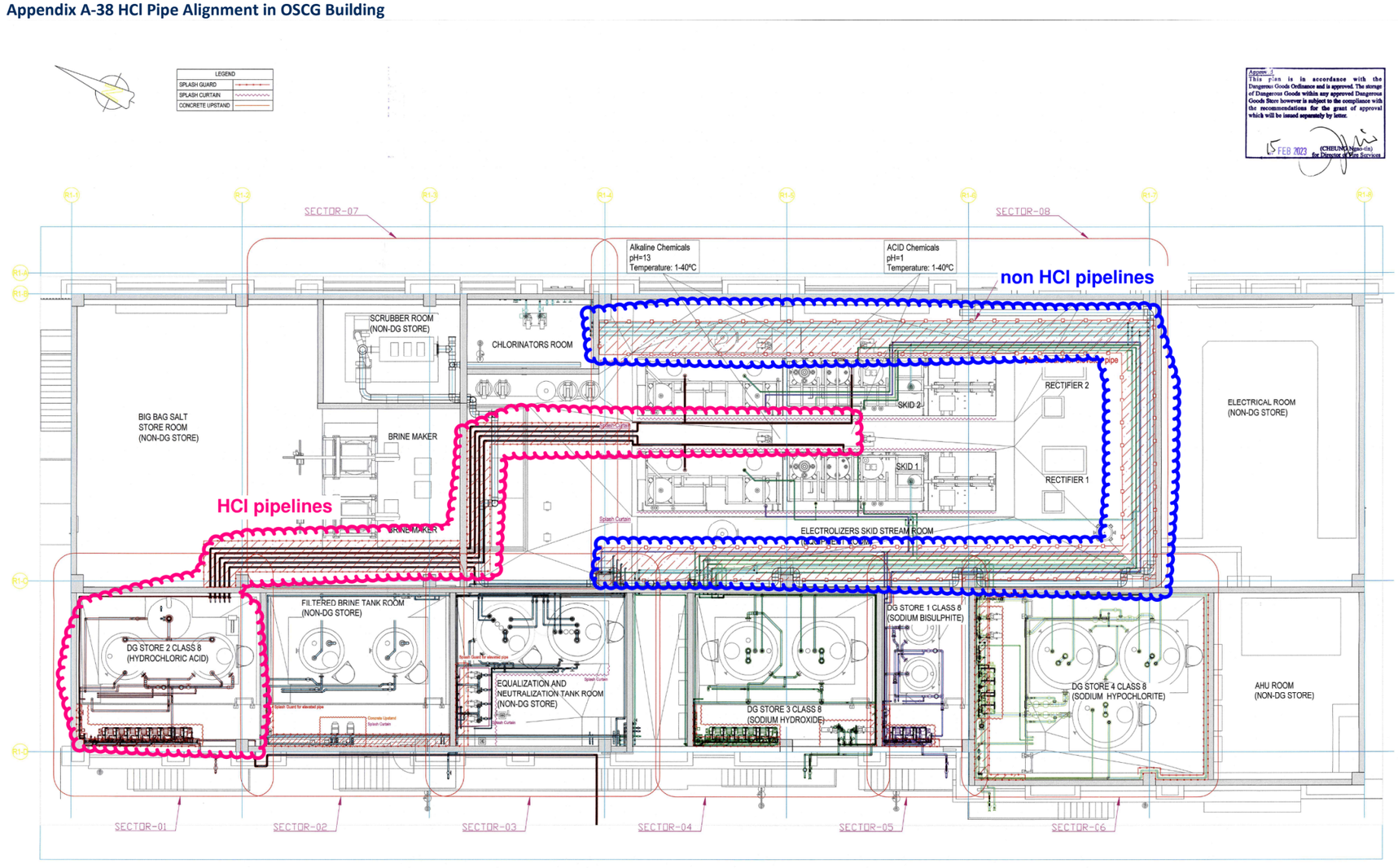




Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
15 FEB 2023
(CHEUNG Ngao-tin)
for Director of Fire Services

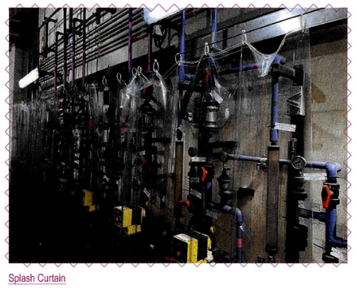
CHAN WING YAN
BSAD MARCH HUIA
AUTHORIZED PERSON ARCHITECT

Appendix A-38 HCl Pipe Alignment in OSCG Building



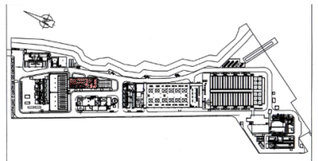
GENERAL PLAN VIEW Elev. +12.780
Scale 1:75

Splash Guard for elevated pipe



Splash Curtain

CHAN WING YAN
BAAS) MARCH HKIA
AUTHORIZED PERSON ARCHITECT



KEY PLAN | DWG AREA

NOTES:

NOTE 1: ALL CIVIL ENGINEERING REFERENCE ELEVATIONS ARE IN METERS, UNLESS OTHERWISE INDICATED.

NOTE 2: ALL PIPELINE ELEVATIONS AND DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.

NOTE 3: ALL ELEVATIONS REFER TO HONG KONG PRINCIPAL DATUM (HKPD).

NOTE 4: THE SPLASH GUARD WILL BE PROVIDED AS INDICATED IN THE DRAWING.

DS: DOUBLE CONTAINMENT

TANKS		
TANK	TAG	VOLUME m3
HYDROCHLORIC ACID	T1GCM46 BB001	5.3
HYDROCHLORIC ACID	T1GCM46 BB002	5.3
SODIUM HYDROXIDE	T1GCM40 BB001	9.66
SODIUM HYDROXIDE	T1GCM40 BB002	9.66
EQUALIZATION	T1GCM42 BB001	11.3
NEUTRALIZATION	T1GCM42 BB002	11.3
SUDIUM HYPOCHLORITE	T1GCM38 BB001	19.11
SUDIUM HYPOCHLORITE	T1GCM38 BB002	19.11
SUDIUM HYPOCHLORITE	T1GCM38 BB003	19.11
FINISHED BRINE	T1GCM10 BB001	5
FINISHED BRINE	T1GCM10 BB002	5
SODIUM BYSULPHITE	T1GCM46 BB001	1.8
SODIUM BYSULPHITE	T1GCM46 BB002	1.8

Rev	Description	By	Date
F0	FSD SUBMISSION	XMR	09-12-2022

Employer: 水務署 Water Supplies Department

Supervising Officer designate: binnies

Design Checker: ARCADIS Design & Consultancy for natural and built assets

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

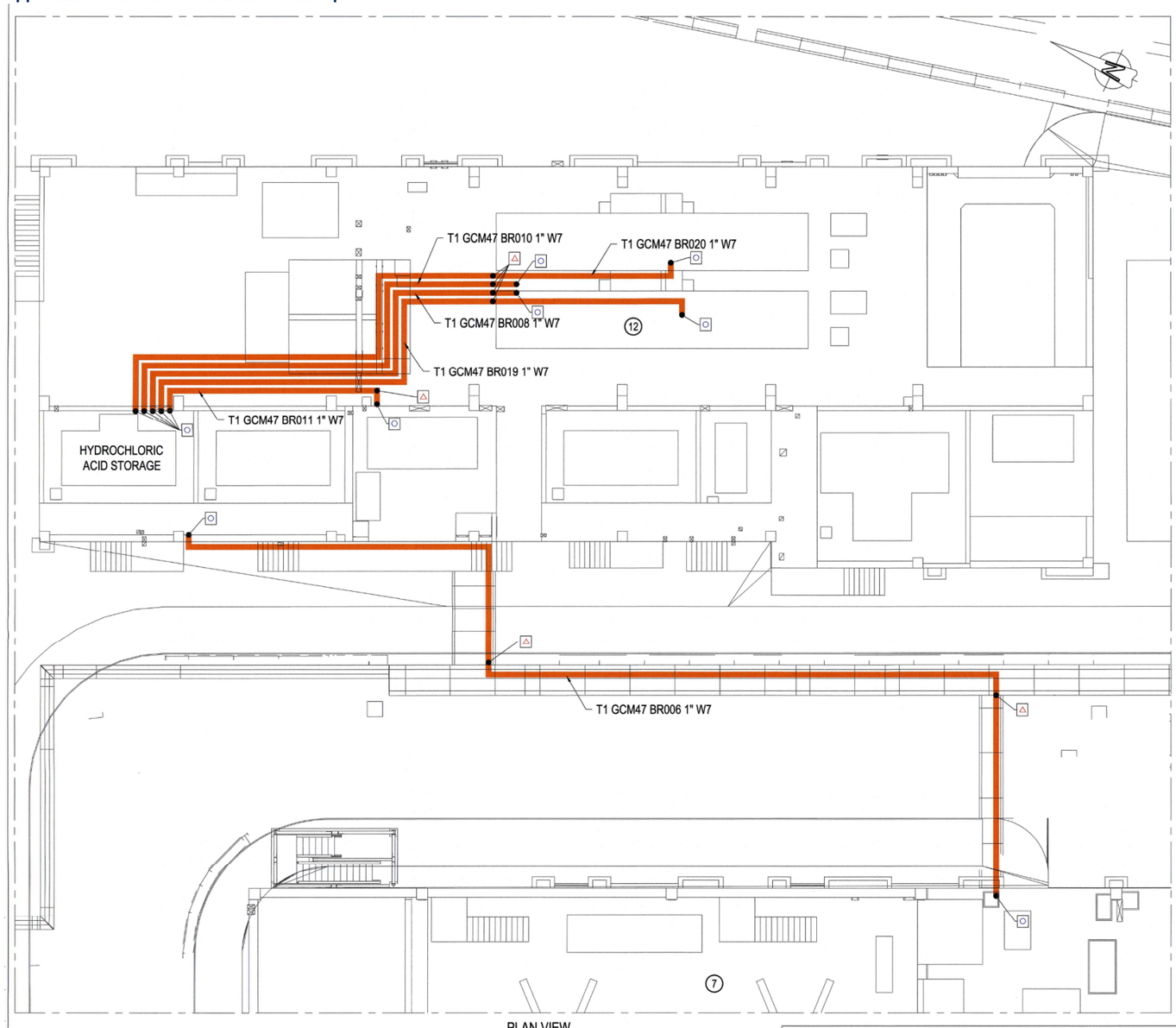
Drawing title:
ON SITE CHLORINE GAS PLANT BUILDING
FSD SUBMISSION
GENERAL PLAN VIEW

Drawing no.	Rev.
TKOD1-DWG-R001-AFS0002A	F0

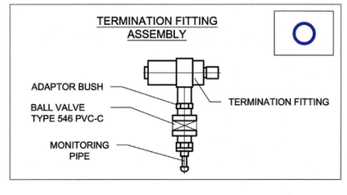
Drawn	Date	Checked	Approved
XMR	9-12-2022	JA	JB

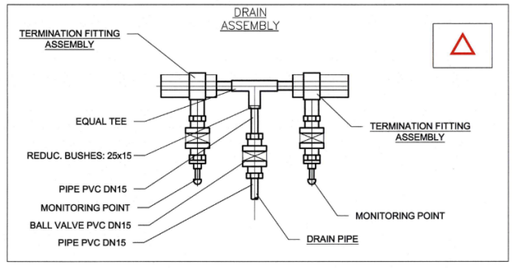
Scale	Status
-	FSI/314 DRAWING

Appendix A-39 Double Containment HCl Pipe

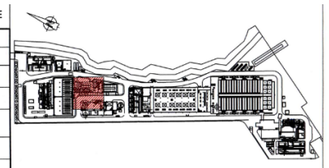


PLAN VIEW





Nº	AREA/BUILDING NAME	AREA CODE
1	INTAKE AND OUTFALL BUILDING	B000
2	ACTIDAFF	C000
3	RO BUILDING (INCLUDING ELECTRICAL BUILDING)	G000
4	CO2 TANK AREA	H000
5	PRODUCT WATER PUMPING STATION & ELECTRICAL BUIDING	J000
6	PRODUCT WATER STORAGE TANK	J001
7	POST TREATMENT BUILDING & TANK AND PUMP ROOM	K000
8	SLUDGE TREATMENT	K002
9	ADMIN. BUILDING & ELEC. BUILDING C	M000
10	DIESEL EMERGENCY GENERATOR AREA	N001
11	CHEMICAL BUILDING	R000
12	ELECTROCHLORINATION BUILDING	R001
13	132 kV SUBSTATION	S000
14	INSPECTION GALLERY	V000
15	WASTE WATER TREATMENT PLAN	Z000



KEY PLAN | DWG AREA

Approved
This plan is in accordance with the Dangerous Goods Ordinance and is approved. The storage of Dangerous Goods within any approved Dangerous Goods Store however is subject to the compliance with the recommendations for the grant of approval which will be issued separately by letter.
15 FEB 2023 (CHEUNG Ngao-tin)
for Director of Fire Services

CHAN WING YAN
BA(AS) MARCH HKIA
AUTHORIZED PERSON ARCHITECT

Rev	Description	By	Date
B0	DDA SUBMISSION	JAG	27/10/2021

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CSUCE AJC JOINT VENTURE
Designer: wsp In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

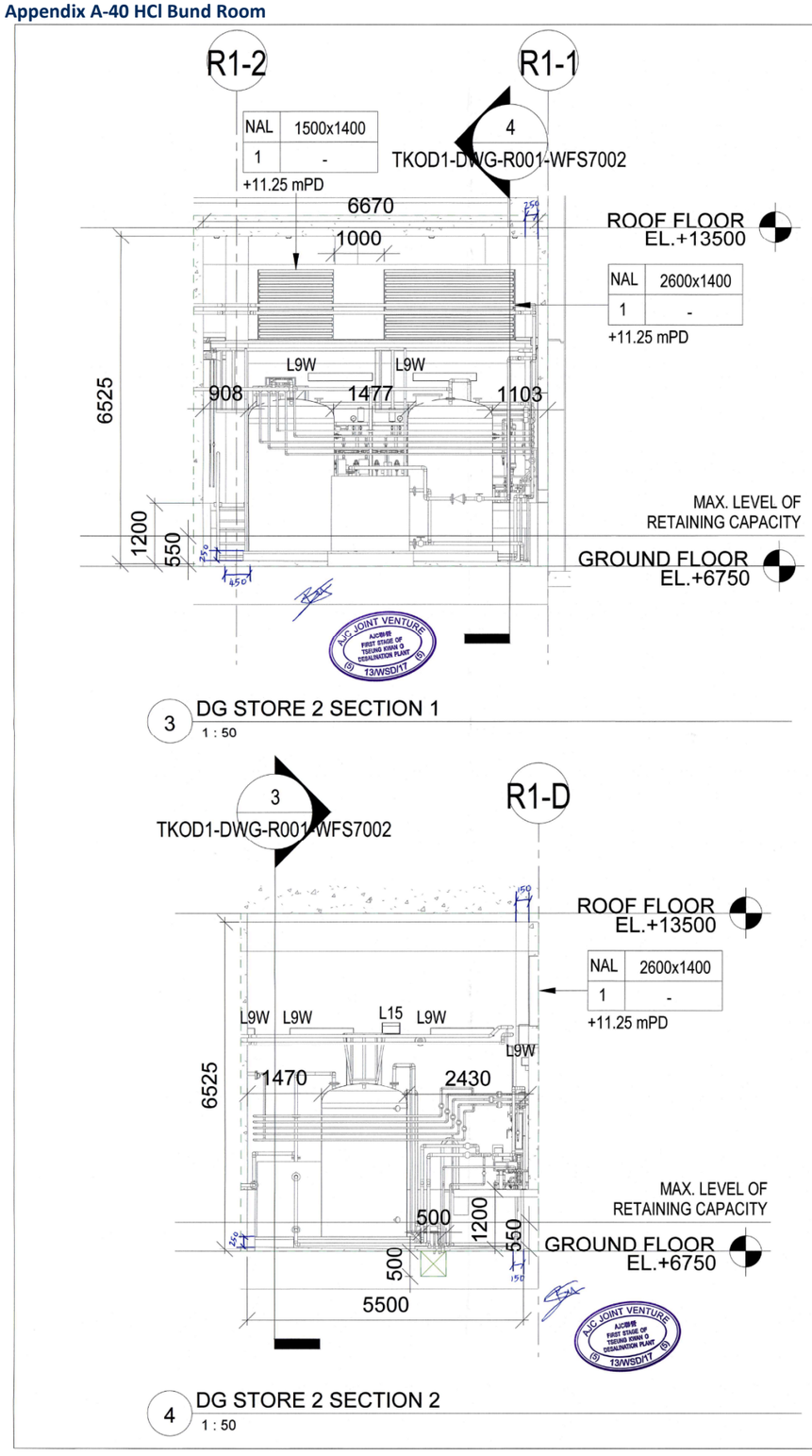
Drawing title:
ON SITE CHLORINE GAS PLANT BUILDING DOUBLE CONTAINMENT PIPING

Drawing no.	Rev.
TKOD1-DWG-R001-AME0502	B0

Drawn	Date	Checked	Approved
J.A.G.	27/10/2021	J.A.	J.B.

Scale: 1:100 | Status: PRELIMINARY DESIGN

Appendix A-40 HCl Bund Room



3 DG STORE 2 SECTION 1
1 : 50

4 DG STORE 2 SECTION 2
1 : 50

LEGEND

- HEAT DETECTOR (UNDER SLAB/CEILING)
- WEATHERPROOF BREAK GLASS UNIT
- WEATHERPROOF ALARM BELL
- S.B. SAND BUCKET
- SAFETY SHOWER WITH EYE WASH
- HAZARDOUS AREA AND COMPARTMENTATION OF DG STORE
- EXIT SIGN
- TRUCK LOAD PIT (SPILLAGE PIT) WITH PIPE FILLING POINT & NON-RETURN VALVE
- CHEMICAL SUMP PIT WITH DOUBLE LEVEL SENSORS
- GRILLE
- CENTRIFUGAL FAN
- WEATHER PROOF LOUVRE
- AF AIR FILTER

- 10A 1-WAY LIGHTING SWITCH
  SUBSCRIPTION "Y" AS FOLLOW: "W" - WEATHER PROOF (IP66)
  SUBSCRIPTION "X" AS FOLLOW: "E" - SWITCH FOR EMERGENCY LIGHTING
- SWITCHED SOCKET OUTLET, 13 AMPERES RATING
  SUBSCRIPTION "X" AS FOLLOW: "W" - WEATHERPROOF
  SUBSCRIPTION "Y" AS FOLLOW: "E" EMERGENCY POWER SUPPLY
- SCHEDULE OF AIR DIFFUSERS AND GRILLES
  A-TYPE B-QUANTITY
  C-WIDTH (mm) X HEIGHT (mm)
  NECK SIZE FOR RECTANGULAR DIFFUSER OR GRILLE
  D-AIR FLOW RATE (l/s)
- L9W TWIN 1200mm WEATHERPROOF T5 LED LIGHT TUBE
- L15 LED FLOODLIGHT
- DENOTES WALL-MOUNTED LUMINAIRE (AT 2500mm AFFL UNLESS OTHERWISE SPECIFIED)
- DENOTES CEILING MOUNTED LUMINAIRE
- B DENOTES LUMINAIRE WITH TWO HOUR SELF-CONTAINEDBATTERY

NOTES

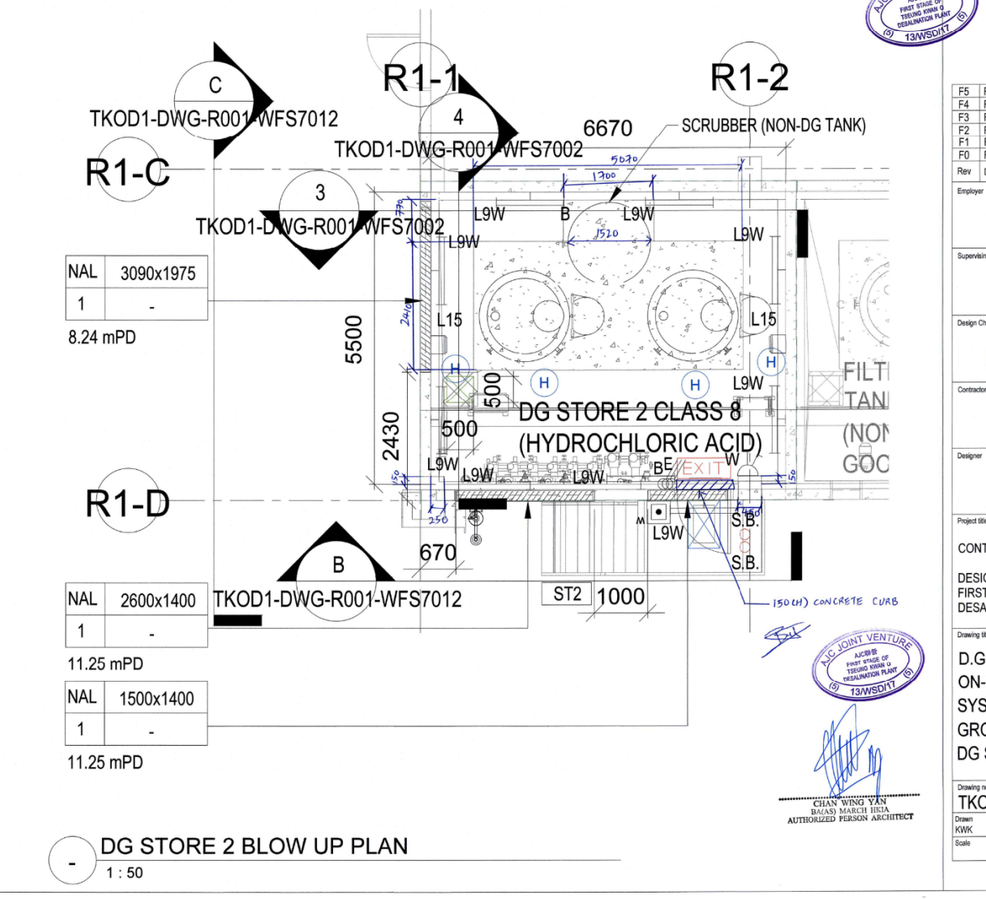
1. DOUBLE BEND LOUVER WILL BE USED.
2. HIGH AND LOW VENTILATORS FOR NATURAL VENTILATION COVERED INTERNALLY WITH METAL WIRE GAUZE OF NOMINAL APERTURE SIZE NOT GREATER THAN 12MM AND EXTERNALLY WITH NON-CORRODIBLE METAL GRATINGS SHALL BE PROVIDED FOR THE STORE.

ABBREVIATION

NAL NATURAL VENTILATION LOUVRE

SUMMARY

STORE	NO.2
D.G. CATEGORY	CLASS 8
CHEMICAL AND QUANTITY	2 x 5.30 m³ (10.600 LITRES) HYDROCHLORIC ACID
DIMENSIONS (m)	6.67 (L) x 5.52 (W) x 6.525 (H)
TOTAL AREA OF WALL AND CEILING (m²)	(6.67 + 5.52) x 2 x 6.525 + 195.90 = 195.90 (m²)
AREA OF LOUVER FOR	3.09 x 1.975 + 2.60 x 1.40 +
TOTAL VENTILATION AREA (m²)	1.50 x 1.40 = 11.84 (m²)
FREE AREA OF LOUVRE PROVIDED (m²) (FREE AREA RATIO = 50%)	11.84 x 0.5 = 5.92(m²)
LOUVRE AREA: TOTAL AREA	3% 5.50 239.37
ROOM VOLUME (m³)	6.67 x 5.52 x 6.525 = 240.24
VENTILATION RATE (ACH)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S)	N/A
MECHANICAL VENTILATION FLOW RATE (L/S/M2)	N/A
USEFUL CAPACITY OF EACH TANK(M3)	5.30
NUMBER OF TANK	2
RETAINING CAPACITY (LITRES)	12,500 15,920



- DG STORE 2 BLOW UP PLAN
  1 : 50

RETAINING CAPACITY CALCULATIONS

RETAINING CAPACITY (A)
= ~~LENGTH x WIDTH x HEIGHT~~ WITH PROTECTIVE COATING
= 6.67 x ~~5.52~~ 5.50 x 0.55 = ~~20.25~~ 20.17 M3

SUMP PIT CAPACITY (B)
= LENGTH x WIDTH x HEIGHT
= 0.50 x 0.50 x ~~0.45~~ 0.11 M3

~~PLATFORM VOLUME (C)~~
~~= LENGTH x WIDTH x HEIGHT~~
~~= 1.39 x 0.67 x 0.20 = 1.85 M3~~

PLINTH VOLUME (D)
= PLINTH AREA x HEIGHT
= ~~12.22~~ x 0.25 = ~~3.06~~ M3
PLINTH AREA = 5.07 x 2.81 + 1.30 x 0.37 = 15.55 M2
COLUMN AREA = 0.45 x 0.15 + 0.35 x 0.15 = 0.111 M2

COLUMN VOLUME (E)
= COLUMN AREA x HEIGHT
= 0.11 x 0.55= 0.06 M3

VOLUME OCCUPIED BY EQUIPMENT (F)
= ~~0.158~~ M3 (3% OF TOTAL QUANTITY OF CHEMICAL) 0.32

SCRUBBER VOLUME (G) (AREA x HEIGHT)
= ~~2.73~~ M3 (3.14 x (1.52/2)² x 0.55) 1.00

TOTAL RETAINING CAPACITY
= (A) + (D) - (E) - (F) - (G)
= ~~20.25~~ + 0.11 - 1.85 - 3.06 - 0.06 - 0.158 - ~~2.73~~ 20.13 + 0.32 - 3.39 - 0.06 - 0.32
= ~~12.50~~ M3 > 5.30 x 2 = 10.60 M3
15.51

AJC JOINT VENTURE 13/WSD/17

Approved
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15 FEB 2023
for Director of Fire Services

Rev	Description	By	Date
F5	FSD SUBMISSION	KWK	21 NOV 2022
F4	FSD SUBMISSION	KWK	19 AUG 2022
F3	FSD SUBMISSION	KWK	15 JUL 2022
F2	FSD SUBMISSION	KWK	31 MAR 2022
F1	FSD SUBMISSION	KWK	19 JAN 2022
F0	FSD SUBMISSION	KWK	10 JUN 2021

Employer: 水務署 Water Supplies Department
Supervising Officer designate: binnies
Design Checker: ARCADIS Design & Consultancy for natural and built assets
Contractor: acciona JEC CRCEC AJC JOINT VENTURE
Designer: WSP In Association with APU

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title:
D.G. SUBMISSION
ON-SITE CHLORINE GENERATION
SYSTEM BUILDING - SECTION
GROUND FLOOR
DG STORE RM2

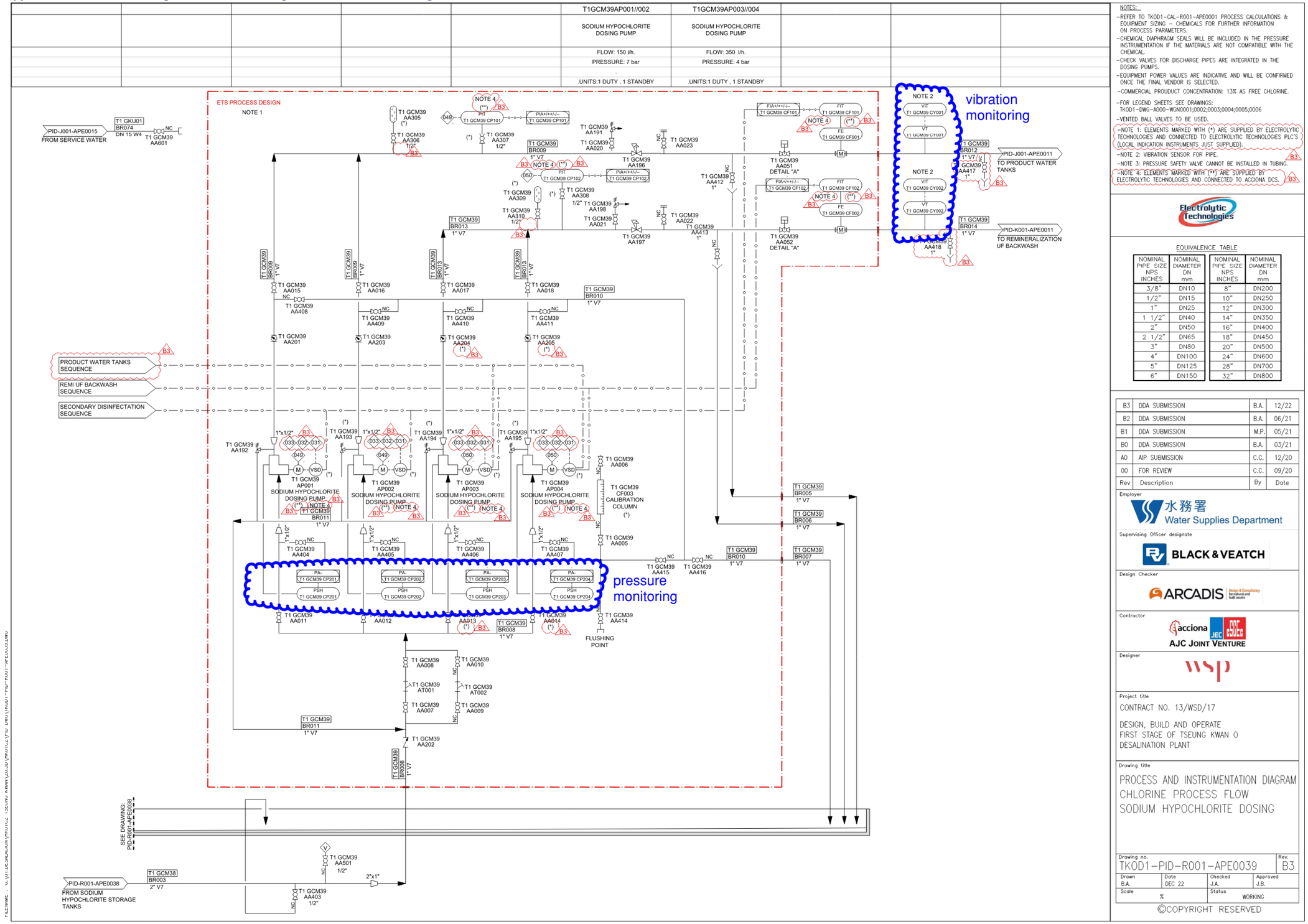
Drawing no. TKOD1-DWG-R001-WFS7002 Rev. F5

Drawn	Date	Checked	Approved
KWK	10 JUN 2021	IML	SY

Scale 1:50 Status FSD SUBMISSION

CHAN WING YAN
BAAS) MARCH HKIA
AUTHORIZED PERSON ARCHITECT

Appendix A-41 P&ID Showing Pressure Monitoring and Vibration Monitoring



NOTES:
- REFER TO TKOD1-CAL-R001-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING - CHEMICALS FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- CHEMICAL DIAPHRAGM SEALS WILL BE INCLUDED IN THE PRESSURE INSTRUMENTATION IF THE MATERIALS ARE NOT COMPATIBLE WITH THE CHEMICAL.
- CHECK VALVES FOR DISCHARGE PIPES ARE INTEGRATED IN THE DOSING PUMPS.
- EQUIPMENT POWER VALUES ARE INDICATIVE AND WILL BE CONFIRMED ONCE THE FINAL VENDOR IS SELECTED.
- COMMERCIAL PROUDUCT CONCENTRATION: 13% AS FREE CHLORINE.
- FOR LEGEND SHEETS SEE DRAWINGS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
- VENTED BALL VALVES TO BE USED.
- NOTE 1: ELEMENTS MARKED WITH (*) ARE SUPPLIED BY ELECTROLYTIC TECHNOLOGIES AND CONNECTED TO ELECTROLYTIC TECHNOLOGIES PLC'S (LOCAL INDICATION INSTRUMENTS JUST SUPPLIED).
- NOTE 2: VIBRATION SENSOR FOR PIPE. B3
- NOTE 3: PRESSURE SAFETY VALVE CANNOT BE INSTALLED IN TUBING.
- NOTE 4: ELEMENTS MARKED WITH (**) ARE SUPPLIED BY ELECTROLYTIC TECHNOLOGIES AND CONNECTED TO ACCIONA DCS. B3

Electrolytic Technologies

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B3	DDA SUBMISSION	B.A.	12/22
B2	DDA SUBMISSION	B.A.	06/21
B1	DDA SUBMISSION	M.P.	05/21
B0	DDA SUBMISSION	B.A.	03/21
A0	AIP SUBMISSION	C.C.	12/20
00	FOR REVIEW	C.C.	09/20

Employer: 水務署 Water Supplies Department
Supervising Officer designate: BLACK & VEATCH
Design Checker: ARCADIS
Contractor: acciona JEC AJC JOINT VENTURE
Designer: wsp

Project title
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title
PROCESS AND INSTRUMENTATION DIAGRAM
CHLORINE PROCESS FLOW
SODIUM HYPOCHLORITE DOSING

Drawing no.			Rev.
TKOD1-PID-R001-APE0039			B3
Drawn: B.A.	Date: DEC 22	Checked: J.A.	Approved: J.B.
Scale: %		Status: WORKING	

Appendix A-42 Hoses and Couplers for Chemical transfer (Page 1 of 2)

Sizes of coupling cam locks for chemical filling at OSCG and Chemical Buildings are summarized as below:

Chemicals	OSCG Building	Chemical Building
Sodium hypochlorite	2”	2"
Sodium hydroxide	2-½”	2-½"
Sodium bisulphite	1”	N/A (powder)
Fluorosilicic acid	N/A	1-1/4"
Ferric chloride	N/A	3"
Sulphuric acid	N/A	1-½”
Hydrochloric acid	3/4"	N/A

Chemical Building

A. Ferric Chloride Filling Point – 3” Coupling Camlock for chemical filling

B. Sulphuric Acid Filling Point – 1-1/2” Coupling Camlock for chemical filling

Appendix A-42 Hoses and Couplers for Chemical transfer (Page 2 of 2)

OSCG Building

C. Hydrochloric Acid Filling Point – 3/4" Coupling Camlock for chemical filling

Appendix A-43 Warning Signs (Page 1 of 4)

Chemical Building

A. Ferric Chloride Filling Point – 3" Coupling Camlock for chemical filling

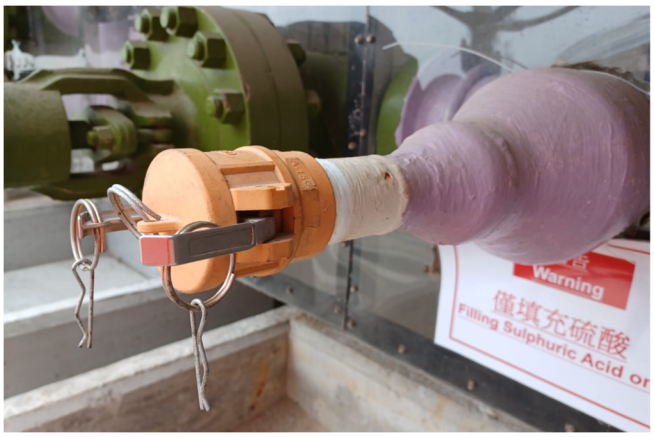
B. Sodium Hydroxide – 2-1/2" Coupling Camlock for chemical filling

C. Sodium Hypochlorite – 2" Coupling Camlock for chemical filling

Appendix A-43 Warning Signs (Page 2 of 4)

D. Fluorosilicic Acid – 1-1/4" Coupling Camlock for chemical filling

E. Sulphuric Acid – 1-1/2" Coupling Camlock for chemical filling



OSCG Building

F. Hydrochloric Acid – ¾" Coupling Camlock for chemical filling

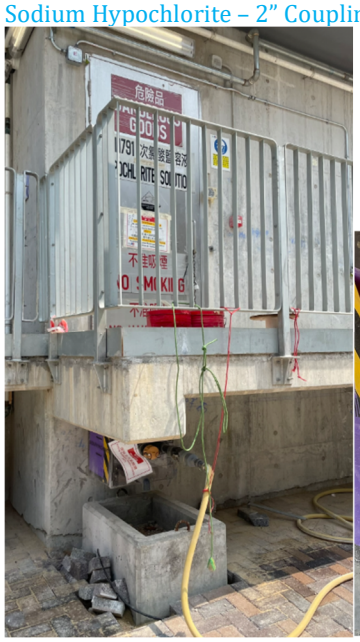
Appendix A-43 Warning Signs (Page 3 of 4)

G. Sodium Hydroxide – 2-1/2" Coupling Camlock for chemical filling

H. Sodium Bisulphite – 1" Coupling Camlock for chemical filling

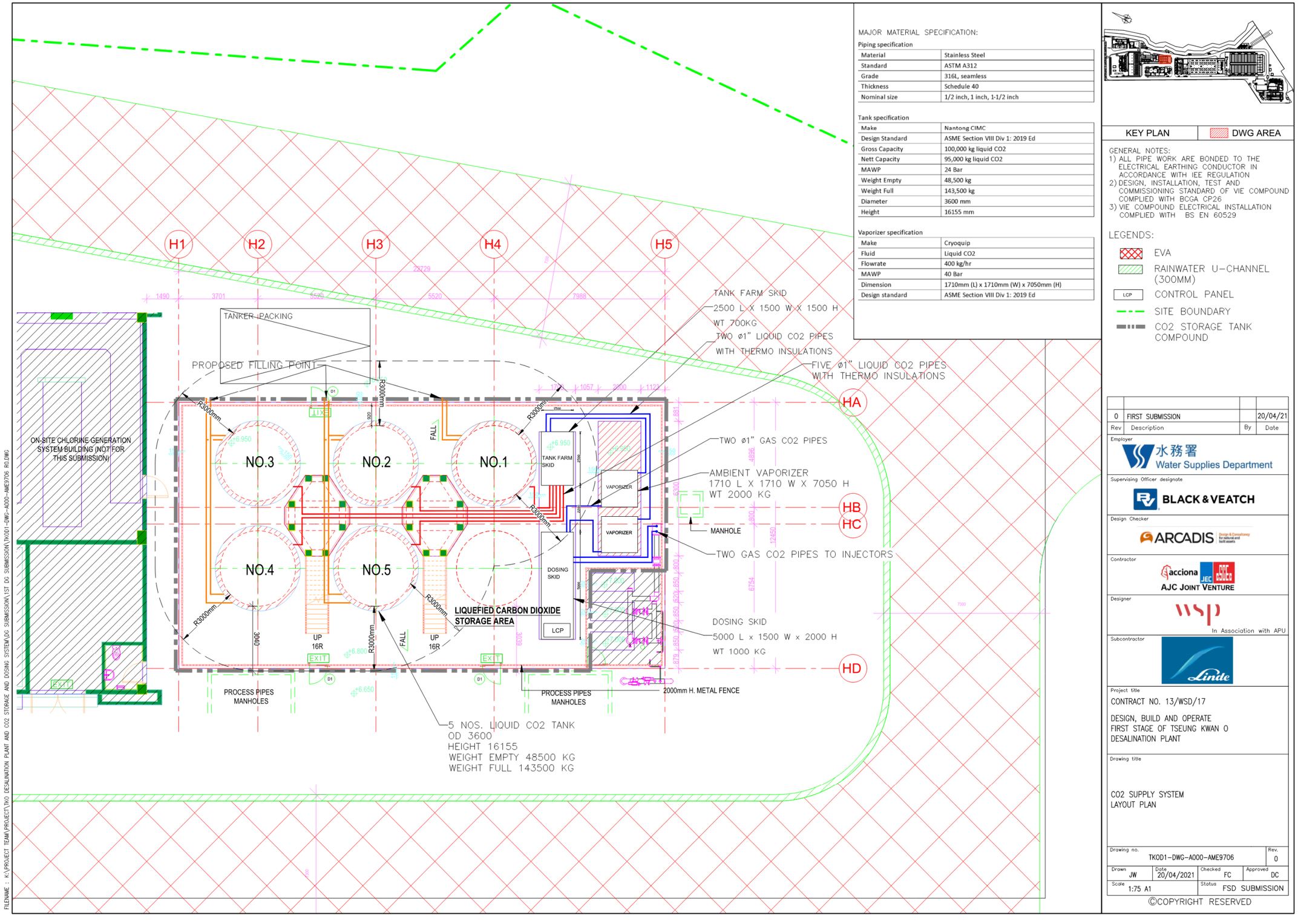
Appendix A-43 Warning Signs (Page 4 of 4)

I. Sodium Hypochlorite – 2" Coupling Camlock for chemical filling



Appendix B
Design Requirements and Measures for CO_2 Storage

Appendix B-1 Actual CO_2 System Layout and Tank Capacity



MAJOR MATERIAL SPECIFICATION:

Piping specification

Material	Stainless Steel
Standard	ASTM A312
Grade	316L, seamless
Thickness	Schedule 40
Nominal size	1/2 inch, 1 inch, 1-1/2 inch

Tank specification

Make	Nantong CIMC
Design Standard	ASME Section VIII Div 1: 2019 Ed
Gross Capacity	100,000 kg liquid CO2
Nett Capacity	95,000 kg liquid CO2
MAWP	24 Bar
Weight Empty	48,500 kg
Weight Full	143,500 kg
Diameter	3600 mm
Height	16155 mm

Vaporizer specification

Make	Cryoquip
Fluid	Liquid CO2
Flowrate	400 kg/hr
MAWP	40 Bar
Dimension	1710mm (L) x 1710mm (W) x 7050mm (H)
Design standard	ASME Section VIII Div 1: 2019 Ed

KEY PLAN | DWG AREA

GENERAL NOTES:
1) ALL PIPE WORK ARE BONDED TO THE ELECTRICAL EARTHING CONDUCTOR IN ACCORDANCE WITH IEE REGULATION
2) DESIGN, INSTALLATION, TEST AND COMMISSIONING STANDARD OF VIE COMPOUND COMPLIED WITH BCGA CP26
3) VIE COMPOUND ELECTRICAL INSTALLATION COMPLIED WITH BS EN 60529

LEGENDS:
- EVA
- RAINWATER U-CHANNEL (300MM)
- LCP CONTROL PANEL
- SITE BOUNDARY
- CO2 STORAGE TANK COMPOUND

Rev	Description	By	Date
0	FIRST SUBMISSION		20/04/21

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS

Contractor: acciona JEC AJC JOINT VENTURE

Designer: wsp In Association with APU

Subcontractor: Linde

Project title:
CONTRACT NO. 13/WSD/17

DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O
DESALINATION PLANT

Drawing title:
CO2 SUPPLY SYSTEM
LAYOUT PLAN

Drawing no.	Rev.
TKOD1-DWG-A000-AME9706	0

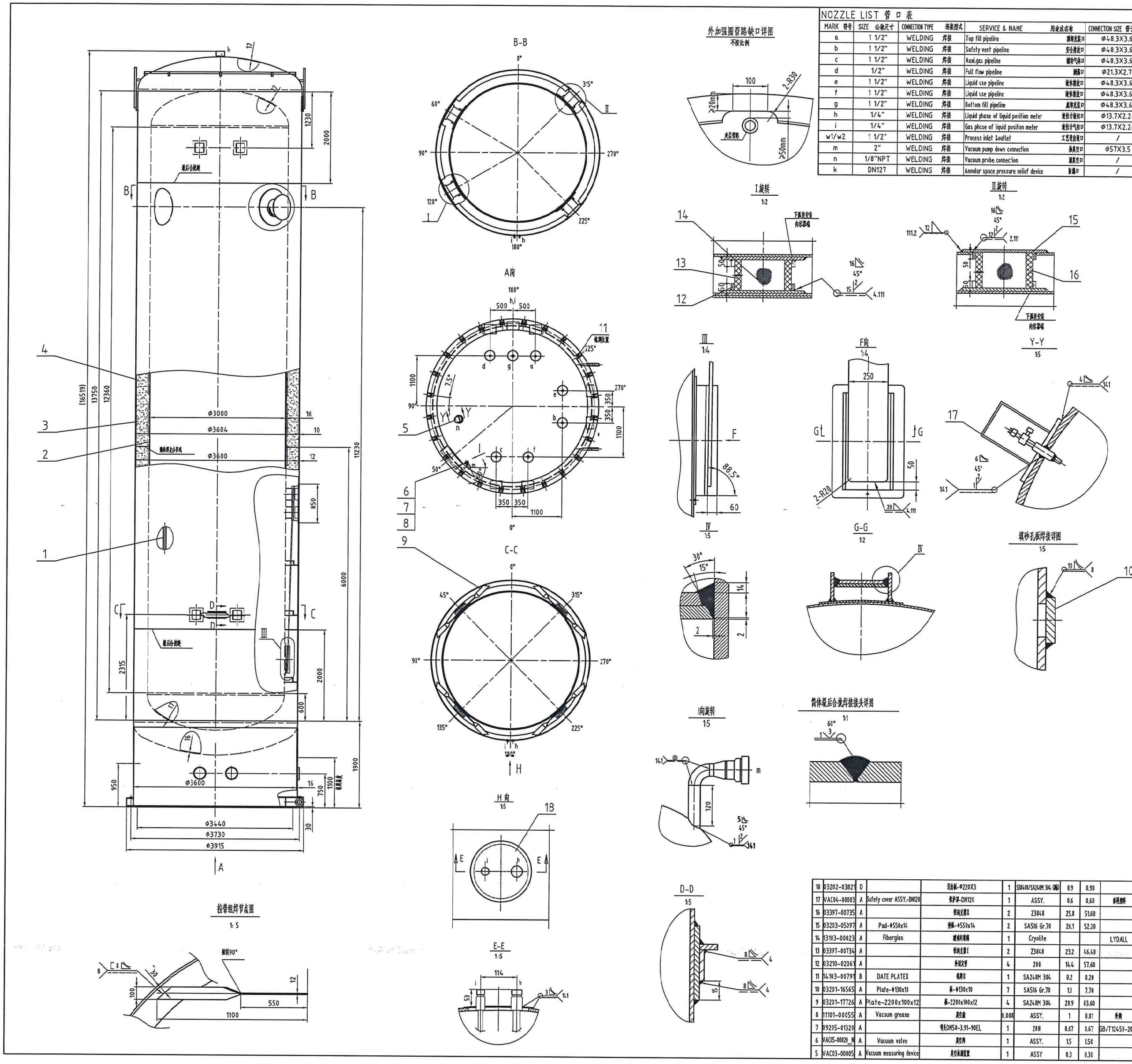
Drawn	Date	Checked	Approved
JW	20/04/2021	FC	DC

Scale: 1:75 A1 | Status: FSD SUBMISSION

FILENAME K:\PROJECT TEAM\PROJECT\TKO DESALINATION PLANT AND CO2 STORAGE AND DOSING SYSTEM\06 SUBMISSION\1ST DG SUBMISSION\TKOD1-DWG-A000-AME9706 R0.DWG

Appendix B-2 Photo Record of CO_2 Tanks in DP1

Appendix B-3 Specifications of CO2 Tanks in DP1 (Sheet 1 of 2)



NOZZLE LIST 管口表

MARK 符号	SIZE 公称尺寸	CONNECTION TYPE 连接型式	SERVICE & NANE 用途或名称	CONNECTION SIZE 管子尺寸
a	1 1/2"	WELDING 焊接	Top fill pipeline 顶部充装口	Φ48.3X3.68
b	1 1/2"	WELDING 焊接	Safety vent pipeline 安全排放口	Φ48.3X3.68
c	1 1/2"	WELDING 焊接	Auxi.gas pipeline 辅助气体口	Φ48.3X3.68
d	1/2"	WELDING 焊接	Full flow pipeline 测满口	Φ21.3X2.77
e	1 1/2"	WELDING 焊接	Liquid use pipeline 液体排放口	Φ48.3X3.68
f	1 1/2"	WELDING 焊接	Liquid use pipeline 液体排放口	Φ48.3X3.68
g	1 1/2"	WELDING 焊接	Bottom fill pipeline 底部充装口	Φ48.3X3.68
h	1/4"	WELDING 焊接	Liquid phase of liquid position meter 液位计液相口	Φ13.7X2.24
i	1/4"	WELDING 焊接	Gas phcse of liquid position meter 液位计气相口	Φ13.7X2.24
w1/w2	1 1/2"	WELDING 焊接	Process inlet &outlet 工艺进出液口	/
m	2"	WELDING 焊接	Vacuum pump down connection 抽真空口	Φ57X3.5
n	1/8"NPT	WELDING 焊接	Vacuum probe connection 测真空口	/
k	DN127	WELDING 焊接	Annular space pressure relief device 防爆口	/

SPECIFICATIONS 技术特性表

DESCRIPATION 项目		INNER VESSEL 内容器	JACKET 外容器
DESIGN, MANUFACTURE, TESTING AND INSPECTION STANDARD AND CODE 设计、制造、试验和检验标准和规范		1. ASME SECTION VIII DIV 1 2019 ED. 2. NB REGISTRATION	
VESSEL CATEGORY 容器类别		N/A 不适用	
WORKING PRESSURE 工作压力	: MPa	2.4	-0.1
MAWP 最大允许工作压力	: MPa	2.4 at 50 ℃	-0.1
WORKING TEMPERATURE 工作温度	: ℃	-40	AMBIENT TEMPERATURE 环境温度
DESIGN TEMPERATURE 设计温度	: ℃	50	50
MIN.DESIGN METAL TEMPERATURE 最低设计金属温度	: ℃	-196 at 2.4 MPa	-20
MEDIUM 介质		LCO_2 液态二氧化碳	N/A
MEDIUM PERFORMANCE 介质特性		NON-LETHAL 非致死	N/A
MEDIUM DENSITY 介质密度		1030	N/A
MAIN MATERIAL 主体材料	STEEL TYPE & STANDARD 钢板牌号及标准	SA240M 304	SA516 Gr.70
		ASME SECT.II PART A 2019 ED.	
	RETEST 复验	N/A 不需要	N/A 不需要
WELDED JOINT EFFICIENCY 焊接接头系数		1.0/0.9	0.7/0.65
NDT 无损检测	TYPE A, B JOINTS A、B类焊接接头 — ASME VIII-1 UW-51 MANDANDATORY APPENDIX 6/8	100%RT+PT	100%MT/PT
	TYPE C JOINTS C类焊接接头; TYPE D JOINTS D类焊接接头 — ASME VIII-1 MANDANDATORY APPENDIX 6/8	100%PT	100%MT/PT
HEAT TREATMENT 热处理		N/A 不需要	N/A 不需要
IMPACT TEST 试件与试样		N/A 不需要	N/A 不需要
CORROSION ALLOWANCE 腐蚀裕量	: mm	0	0
CALCULATED THICKNESS 计算厚度	: mm	vessel筒体: 14.76 (名义厚度16) head封头: 14.69 (名义厚度17)	vessel筒体: 9.7/11.7 (名义厚度10/12) head封头: 10.44 (名义厚度12/16)
GROSS CAPACITY 全容积	: m^3	95	54.9 interlayer夹层
NET CAPACITY 有效容积	: m^3	90.25	N/A 不需要
FILLING RATE 充装系数		0.95	N/A 不需要
SEISMIC CODE & ZONE 地震设计规范及设防烈度		GB5011 7(0.15g)	
WIND CODE & BASIC WIND SPEED 风载设计规范及风速		Code of Practice on Wind Effects in Hong Kong 2004 45m/s	
TEST PRESSURE 试验压力	COLD-STRETCHING PRESSURE 强化压力 : MPa	3.99(3.96-4.22)	N/A
	PNEUMATIC 气压试验 : MPa	2.75	
	LEAK 气密性试验 : MPa	N/A	
SAFETY RELIEF DEVICE 安全泄放装置	SAFETY VALVE SET PRESSURE 安全阀整定压力 : MPa	2.4	N/A
CLEAN PROCEDURE 表面处理		PICKLING 不锈钢表面作脱脂处理	Carbon steel shot blast Sa2.5
PAINTING 油漆		N/A 不需要	YES 需要
LEAK RATE OF VACUUM INTERSPACE 真空夹层漏气速率		$\leq 1\times10^{-7}$ Pa.m³/s	
OUTGASSING AND LEAK RATE OF VACUUM INTERSPACE 真空夹层漏放气速率		$\leq 5\times10^{-5}$ Pa.m³/s	
INSULATION 绝热形式		Vacuum powder insulation 真空粉末绝热	
STATIC PRESSURE VALUE 静态升压值	kPa/d	≤35kPa	
TARE MASS 空重		48200	
PAYLOAD 装载质量		92958	
RATED MASS 额定质量		141158	
SIZE(OD.xL) 罐体外形尺寸(外直径x总长)		Φ3624×16519	
PACKAGING AND TRANSPORTATION 包装及运输		JB/T4711-2003	
NOZZLE &. ORIENTATION 管口及方位		SEE NOZZLE LIST &.THIS DRAWING 按本图	
DESIGN USING LIFE 设计使用年限	YEAR 年	20	
SEALED-OFF VACUUM DEGREE 封结真空度	: Pa	≤5	

NOTE:技术要求:

1. The main material should conform to ASME SECT. II PART A 2019Ed.
1. 主要受压元件材料必须符合ASME SECT. II PART A 2019Ed.
2. Welding shall be conform to WPS base on PQR.
2. 焊缝须按焊接工艺进行,而且焊接工艺有焊接评定支持。
3. Coaxial level for central line of outer bottom head and inner vessel shall be <10mm;
3. 外壳下封头中心线的延长线与内容器中心线的同轴度应<10mm;
4. The groove for a,b type's weld at inner vessel and out shell should conform to WELD MAP.
4. 内外筒体A、B类焊接接头的坡口型式以焊接图为准。
5. The interval between the pipeline and the outer reinforcing ring is more than 50mm. If it is not satisfied, the outer reinforcing ring is allowed to be cut into notches to ensure this size.(the notch size can be seen in the detailed drawing of the outer reinforcing ring notches).
5. 夹层管路与外加强圈间距≥50mm，如若不满足，允许将外加强圈割缺口以保证此尺寸(缺口尺寸见外加强圈缺口详图)。
6. It is generally not allowed to weld on the tank body when the tank body interlayer is in vacuum state.
6. 罐体夹层在真空状态时一般不允许在罐体上施焊。
7. Vessel perpendicularity tolerance ± 12.5mm.
7. 容器垂直度允差±12.5mm。
8. After Coldstretching procedure, the pneumatic test pressure of inner tank is 2.75MPa.
8.应变强化完成后，内容器做气压试验，其压力值为2.75MPa (在接完夹层管路后一起进行)。
9. After vacuum formed or during service period, the pneumatic test pressure of inner tank is 2.65MPa.
9.在役期间或真空夹层形成后，内容器做气压试验，其压力值为2.65MPa。

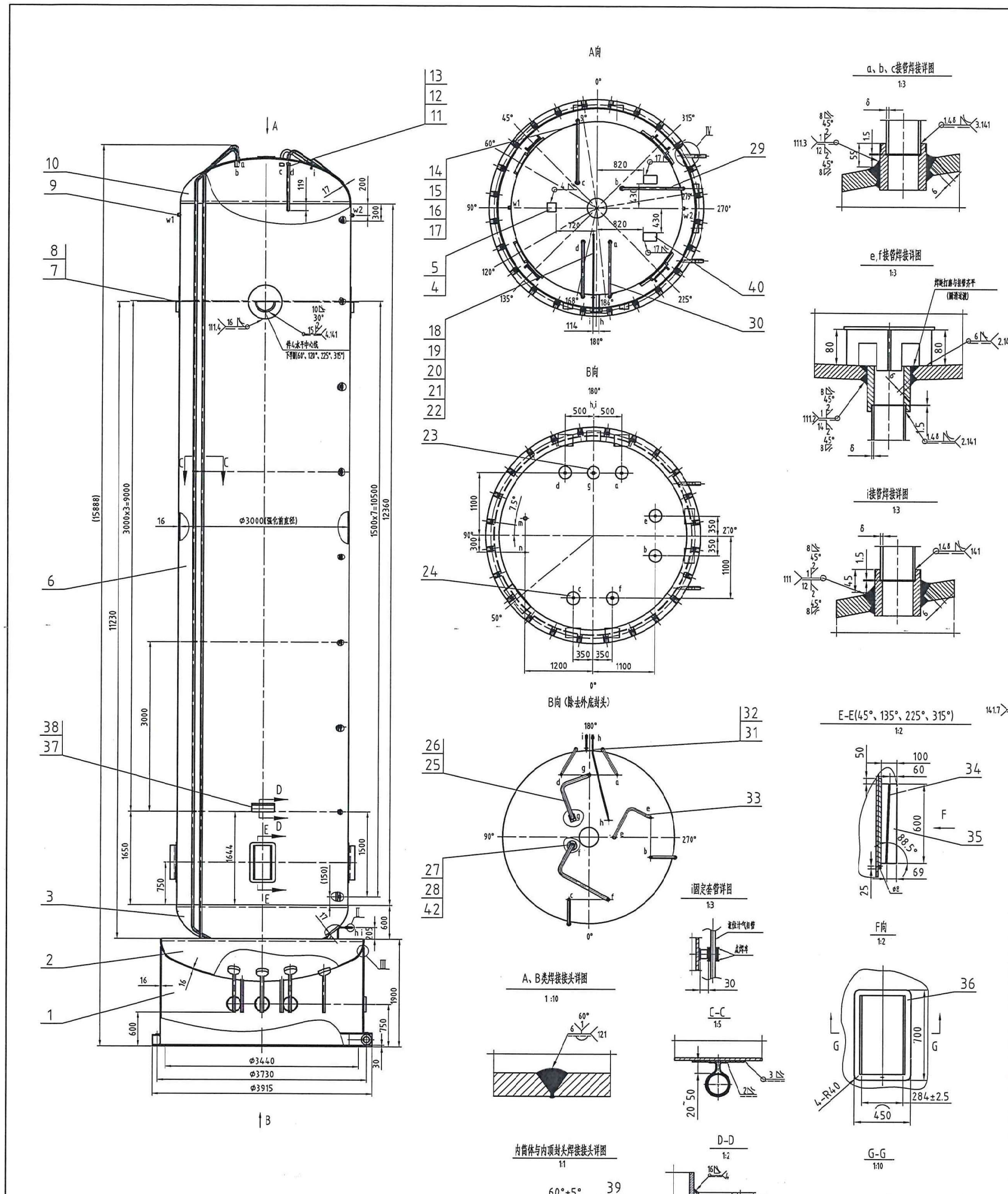
序号 ITEM NO.	图号 DWG NO.	版本 Issu	英文名称 ENGLISH NAME	中文名称和标准号 CHINESE NAME & STANDARD NO	数量 QTY	材料 MATERIAL	单件 重量	总计 重量	备注 REMARK
18	03202-03821	D		引出板-Φ220X3	1	S30408/SA240M 304 (双标)	0.9	0.90	
17	VAC04-00003	A	Safety cover ASSY.-DN120	保护罩-DN120	1	ASSY.	0.6	0.60	南港塑料
16	03397-00735	A		径向支撑II	2	Z3848	25.8	51.60	
15	03203-05097	A	Pad-Φ550x14	垫板-Φ550x14	2	SA516 Gr.70	26.1	52.20	
14	13103-00023	A	Fiberglas	玻璃纤维棉	1	Cryolite			LYDALL
13	03397-00734	A		径向支撑I	2	Z3848	23.2	46.40	
12	03210-02061	A		外固定管	4	20#	14.4	57.60	
11	14103-00791	B	DATE PLATEII	铭牌II	1	SA240M 304	0.2	0.20	
10	03201-16565	A	Plate-Φ130x10	板-Φ130x10	7	SA516 Gr.70	1.1	7.70	
9	03201-17726	A	Plate-2200x100x12	板-2200x100x12	4	SA240M 304	20.9	83.60	
8	11101-00055	A	Vacuum grease	真空脂	0.008	ASSY.	1	0.01	外购
7	09205-01320	A		弯头DN50-3.91-90EL	1	20#	0.67	0.67	GB/T12459-2017
6	VAC05-00020_N	A	Vacuum valve	真空阀	1	ASSY.	1.5	1.50	
5	VAC03-00005	A	Vacuum measuring device	真空检测装置	1	ASSY	0.3	0.30	
4	13106-00001	A	Heat Insulating Material	保温材料	98.8	膨胀珍珠岩	50	4940.00	外购(Unit: 50KG/M3)
3	OUV36-00067	A	Outer shell ASSY	外壳	1	ASSY.	18700	18700.00	
2	INV90-00008	A	Inner Vessel	内容器	1	ASSY.	24100	24100.00	
1	VAC02-00283	A		真空过滤器装置	1	组合件	138	138.00	

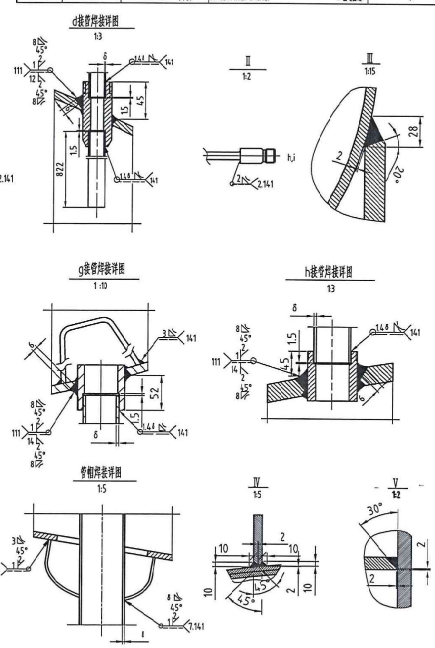
CIMC 南通中集能源装备有限公司 NANTONG CIMC ENERGY EQUIPMENT CO., LTD.

设备重量 TARE WEIGHT(Kg)	48200	设备名称 EQUIPMENT NAME	罐体组件
材料 MATERIAL	ASSY.		
版次 REV.	A		
比例 SCALE	1:40	图号 DWG.NO.	VSL90-00008
第 1 张 SHEET NO.	共 1 张 OF		

标记 MARK / 处数 NUM. / 更改单号 ALT.NO. / 签名 SIG. / 日期 DATE
设计 DES. / 标准化 STAND. / 校核 CHK. / 批准 APPD. / 审核 REV. / 会签 SIG. / 工艺 CRA. / 日期 DATE 2021.6.21

Appendix B-3 Specifications of CO2 Tanks in DP1 (Sheet 2 of 2)





NOZZLE LIST 管口表

MARK 符号	SIZE 公称尺寸	CONNECTION TYPE 连接型式	SERVICE & NAME 用途或名称	CONNECTION SIZE 管子尺寸
a	1 1/2"	WELDING 焊接	Top fill pipeline 顶部充装口	Φ48.3X3.68
b	1 1/2"	WELDING 焊接	Safety vent pipeline 安全排放口	Φ48.3X3.68
c	1 1/2"	WELDING 焊接	Auxi.gas pipeline 辅助气体口	Φ48.3X3.68
d	1/2"	WELDING 焊接	Full flow pipeline 测满口	Φ21.3X2.77
e	1 1/2"	WELDING 焊接	Liquid use pipeline 液体排放口	Φ48.3X3.68
f	1 1/2"	WELDING 焊接	Liquid use pipeline 液体排放口	Φ48.3X3.68
g	1 1/2"	WELDING 焊接	Bottom fill pipeline 底部充装口	Φ48.3X3.68
h	1/4"	WELDING 焊接	Liquid phase of liquid position meter 液位计液相口	Φ13.7X2.24
i	1/4"	WELDING 焊接	Gas phase of liquid position meter 液位计气相口	Φ13.7X2.24
w1/w2	1 1/2"	WELDING 焊接	Process inlet &outlet 工艺进出液口	/

SPECIFICATIONS 技术特性表

DESCRIPATION 项目			INNER VESSEL 内容器
DESIGN, MANUFACTURE, TESTING AND INSPECTION STANDARD AND CODE 设计、制造、试验和检验标准和规范			1. ASME SECTION VIII DIV 1 2019 ED 2. NB REGISTRATION
VESSEL CATEGORY 容器类别			N/A 不适用
WORKING PRESSURE 工作压力		: MPa	2.4
MAWP 最大允许工作压力		: MPa	2.4 at 50 ℃
WORKING TEMPERATURE 工作温度		: ℃	-40
DESIGN TEMPERATURE 设计温度		: ℃	50
MIN.DESIGN METAL TEMPERATURE 最低设计金属温度		: ℃	-196 at 2.4 MPa
MEDIUM 介质			LCO_2 液态二氧化碳
MEDIUM PERFORMANCE 介质特性			NON-LETHAL 非致死
MEDIUM DENSITY 介质密度			1030
MAIN MATERIAL 主体材料	STEEL TYPE & STANDARD 钢板牌号及标准		SA240M 304 ASME SECT.Ⅱ PART A 2019 ED.
	RETEST 复验		N/A 不需要
WELDED JOINT EFFICIENCY 焊接接头系数			1.0/0.9
无损检测	TYPE A、B JOINTS A、B类焊接接头	ASME VIII-1 UW-51 MANDANDATORY APPENDIX 8	100%RT+PT(note 6 注6)
	TYPE C、E JOINTS C、E类焊接接头 TYPE D JOINTS D类焊接接头	ASME VIII-1 MANDANDATORY APPENDIX 8	100%PT(note 7 注7)
HEAT TREATMENT 热处理			N/A 不需要
IMPACT TEST 试件与试样			N/A 不需要
CORROSION ALLOWANCE 腐蚀裕量		: mm	0
CALCULATED THICKNESS 计算厚度		: mm	vessel筒体: 14.76 (名义厚度16) head封头: 14.69 (名义厚度17)
GROSS CAPACITY 全容积		: m³	95
NET CAPACITY 有效容积		: m³	90.25
FILLING RATE 充装系数			0.95
TEST PRESSURE 试验压力	COLD-STRETCHING PRESSURE 强化压力	: MPa	3.99(3.96-4.22)
	LEAK 气密性试验	: MPa	N/A 不需要
CLEAN PROCEDURE 表面处理			PICKLING 不锈钢表面作脱脂处理
TARE MASS 空重			24100
SIZE(OD.xL) 罐体外形尺寸(外直径x总长)			Φ3032x14178

NOTE:技术要求:

1.The main material should conform to ASME SECT. Ⅱ PART A 2019Ed;
1. 主要受压元件材料必须符合ASME SECT. Ⅱ PART A 2019Ed;
2.Welding shall be conform to WPS base on PQR;
2. 焊缝须按焊接工艺进行,而且焊接工艺有焊接评定支持;
3.PWHT is not required per UHA-32;
3. 无需焊后热处理;
4.Impact test for Base Metals and Heat Affected Zones are not required per ASME Mardatory Appendix 44 ,and Impact test for forging are not required per UHA-51(d)(1).
4.母材、热影响区和锻件无需做冲击试验;
5. Coldstretching procedure shall be conformed to ASME sction VIII DIV.1 Mandatory appendices 44.
5. 冷拉伸过程需符合ASME SECTION VIII DIV.1 强制性附录44;
6.Category A & B weld joints shall be RT entirety before coldstretching. and PT entirety. after coldstretching according to UW-51 and APPENDIX 8.
6. A、B类对接焊缝应变前必须进行100%RT，应变后必须进行100%PT检测；探伤根据ASME第Ⅷ卷第一册的UW51及附录8的要求;
7. Category C & D weld joints shall be PT entirety after coldstretching according to APPENDIX 8.
7. C、D类焊缝应变强化后必须进行100%PT，探伤根据ASME第Ⅷ卷第一册的附录8的要求;
8. All insert Category D joint must be full penetration;
8. 所有插入式管接头全部采用全焊透结构型式;
9.The groove for a,b type's weld at inner vessel should conform to WELD MAP;
9. 内筒体A、B类焊接接头的坡口型式以焊接图为准;
10.No marked welding feet high take as long sheet thickness.
10.未注焊脚高度取较薄板厚度。
11.Scope: code jurisdiction terminates at the end of nozzle of inner vessel.
11.管辖范围：只到内容器接管端部。
12.Overpressure is protected by system design per UG-140(b).
12.根据UG-140(b)，通过系统设计进行超压保护。

Reviewed by Al Hawais
June 25 - 2021

序号 ITEM NO	图号 DWG NO.	版本 Issu	英文名称 ENGLISH NAME	中文名称和标准号 CHINESE NAME & STANDARD NO	数量 QTY	材料 MATERIAL	单件 重量	总计 重量	备注 REMARK
42	03203-05522	A	Plate-Φ350x9	板-Φ350x9	2	SA240M 304	6.85	13.70	
41	09105-13698	A		内容器夹层管路	1				无用途, 工艺用
40	03202-04040	A	Pad-250x150x17	垫板-250x150x17	2	SA240M 304	5.05	10.10	
39	03203-05120	A	PLT,RAD-4x50xΦ2998	衬环-4	1	SA240M 304	14.9	14.90	
38	03201-15706	A	Pad-400x30x10	垫板-400x30x10	4	SA240M 304	0.96	3.84	
37	03202-04643	A	Pad-400x150x16	垫板-400x150x16	4	SA240M 304	7.6	30.40	
36	03203-05089	A	Plate--700x450x16	垫板-700x450x16	4	SA240M 304	39.9	159.60	
35	03201-16526	A	Plate-600x107x18	侧板I	4	SA240M 304	18.4	73.60	
34	03201-16525	A	Plate-18	连接板I	4	SA240M 304	24	96.00	
33	09105-11179	A	Pipe-Φ48.3x3.68	液体排放管2-Φ48.3x3.68	1	SA312M TP304	9.48	9.48	
32	09212-00176	B	Slotted double-welded-1/4"	带槽双面接头-1/4"	1	SA182 F304	0.24	0.24	
31	09105-11181	A	Pipe-Φ13.7x2.24	液位计液相管-Φ13.7x2.24	1	SA312M TP304	1.30	1.30	
30	09105-14329	A	Pipe-Φ48.3x3.68	顶部充装管-Φ48.3x3.68	1	SA312M TP304	67.05	67.05	
29	09105-14328	A	Pipe-Φ48.3x3.68	安全排放管-Φ48.3x3.68	1	SA312M TP304	66.36	66.36	
28	03201-16408	A	PLATE	防涡流挡板-DN50	2	SA240M 304	1.26	2.52	
27	09105-11178	A	Pipe-Φ48.3x3.68	液体排放管-Φ48.3x3.68	1	SA312M TP304	11.4	11.40	L≈2790mm
26	09105-11177	A	Pipe-Φ48.3x3.68	底部进液管-Φ48.3x3.68	1	SA312M TP304	9.85	9.85	
25	03206-03152	A	Impact-proof board -4	防冲板-4	1	SA240M 304	0.63	0.63	
24	09202-00598K_N	A	Joint	管帽DN40B	6	S30408	3.99	23.94	
23	09202-00598D_N	A	Joint	管帽DN15B	1	S30408	1.58	1.58	
22	03201-15732	A	Plate-600x30x4	板-600x30x4	4	S30408/SA240M 304 (双标)	0.6	2.40	
21	09212-00012	B	Single-welded joint-1/4"	单面接头-1/4"	2	SA182 F304	0.17	0.34	通用件
20	03302-00162	D	fixed device	液位计气相管固定装置	9	组合件	0.12	1.08	
19	09212-01021	B	Double-welded joint-1/4"	双面接头-1/4"	1	SA182 F304	0.24	0.24	
18	09105-14327	A	Pipe-Φ13.7x2.24	液位计气相管-Φ13.7x2.24	1	SA312M TP304	9.53	9.53	
17	03201-15573	B	Plate-200x30x4	板-200x30x4	14	S30408/SA240M 304 (双标)	0.2	2.80	
16	02109-00098	B	CLAMP-K40	抱箍-K40	16	S30408/SA240M 304(双标)	0.05	0.80	
15	09212-00018	C	Single-welded joint-1 1/2"	单面接头-1 1/2"	6	SA182M F304	1.12	6.72	
14	09105-14325	A	Pipe-Φ48.3x3.68	辅助气相管-Φ48.3x3.68	1	SA312M TP304	67.05	67.05	
13	09105-14324	A	Pipe-Φ21.3x2.77	测满管-Φ21.3x2.77	1	SA312M TP304	20.75	20.75	
12	09212-00802	B	Double-welded joint-1/2"	双面接头-1/2"	1	SA182M F304	0.8	0.80	通用件: TYA05-005
11	09101-08495	A	Pipe-Φ21.3x2.77 L=822	管-Φ21.3x2.77 L=822	1	S30408	1.06	1.06	GB/T 14976, 无[illegible]
10	01206-01310	A	Ellipse End-EHA3000x17	内顶封头EHA3000x17	1	SA240M 304	1380	1380.00	
9	09212-00705	M	Processing plug	工艺进出液堵头-1 1/2"	2	ASSY.	1.0	2.00	通用件: TYH03-001
8	03210-02059	A	Fixed tube	内固定管	4	SA240M 304	7.1	28.40	
7	03201-16516	A	Plate-16	板-16	4	SA240M 304	0.3	1.20	
6	01103-00815	A	VESSEL-DN3000x16	内筒体-DN3000x16	1	SA240M 304	14860	14860.00	
5	14103-00788	B	DATE PLATE	铭牌	1	SA240M 304	0.2	0.20	
4	03202-03768	A	PLT,FLT-4x155x155	铭牌垫板-4	1	SA240M 304	0.8	0.80	
3	01206-01309	A	Ellipse End-EHA3000x17	内底封头-EHA3000x17	1	SA240M 304	1380	1380.00	
2	01202-03277	A	Dished End-THA3600x16	外底封头-THA3600x16	1	SA516 Gr.70	1687	1687.00	
1	SAD10-00034	A	Skirt	裙座	1	ASSY.	4010	4010.00	

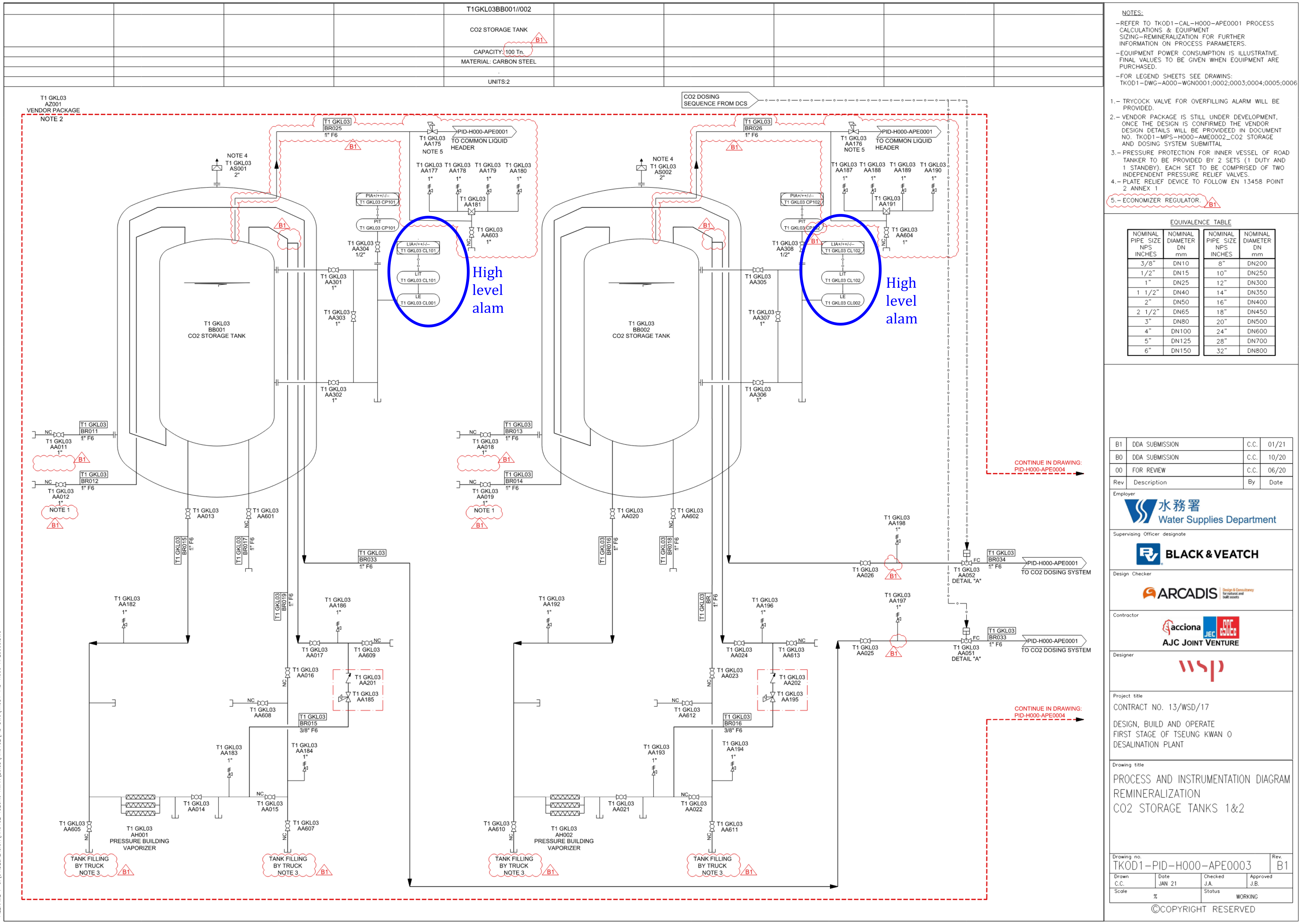
CIMC 南通中集能源装备有限公司
NANTONG CIMC ENERGY EQUIPMENT CO., LTD.

标记 MARK / 处数 NUM. / 更改单号 ALT.NO. / 签名 SIG. / 日期 DATE	设备重量 TARE WEIGHT(Kg)	24100	设备名称 EQUIPMENT NAME: 内容器 Inner Vessel
设计 DES. / 标准化 STAND.	材料 MATERIAL	ASSY.	
校核 CHK. / 批准 APPD.	版次 REV.	A	
审核 REV. / 会签 SIG.	比例 SCALE	1:40	图号 DWG.NO.: INV90-00008
工艺 CRA. / 日期 DATE 2021. 6.21	第 1 张 SHEET NO. 共 1 张 OF		

DIMENSIONAL TOLERANCE 尺寸公差

LINEAR SIZE 线性尺寸	DIMENSIONAL 基本尺寸	>30~120mm	>120~400mm	>400~1000mm	>1000~2000mm	>2000~4000mm
	TOLERANCE 偏差数值	±1.5mm	±3mm	±4mm	±6mm	±8mm
ANGLE SIZE 角度尺寸	DIMENSIONAL 基本尺寸	0~10°	>10~50°	>50~120°	>120~400°	>400°
	TOLERANCE 偏差数值	±3°	±2°	±1°	±30'	±20'

Appendix B-4 P&IDs of Remineralisation CO2 Storage Tanks and Related Systems (Sheet 1 of 5)


T1GKL03BB001//002
CO2 STORAGE TANK
CAPACITY: 100 Tn.
MATERIAL: CARBON STEEL
UNITS:2
T1 GKL03 BB001
CO2 STORAGE TANK
T1 GKL03 BB002
CO2 STORAGE TANK
High level alam
High level alam
CO2 DOSING SEQUENCE FROM DCS
TO COMMON LIQUID HEADER
TO CO2 DOSING SYSTEM
CONTINUE IN DRAWING: PID-H000-APE0004
TANK FILLING BY TRUCK NOTE 3
T1 GKL03 AH001 PRESSURE BUILDING VAPORIZER
T1 GKL03 AH002 PRESSURE BUILDING VAPORIZER
NOTES:
-REFER TO TKOD1-CAL-H000-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING-REMINERALIZATION FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
-EQUIPMENT POWER CONSUMPTION IS ILLUSTRATIVE. FINAL VALUES TO BE GIVEN WHEN EQUIPMENT ARE PURCHASED.
-FOR LEGEND SHEETS SEE DRAWINS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006
1.- TRYCOCK VALVE FOR OVERFILLING ALARM WILL BE PROVIDED.
2.- VENDOR PACKAGE IS STILL UNDER DEVELOPMENT. ONCE THE DESIGN IS CONFIRMED THE VENDOR DESIGN DETAILS WILL BE PROVIDEED IN DOCUMENT NO. TKOD1-MPS-H000-AME0002_CO2 STORAGE AND DOSING SYSTEM SUBMITTAL
3.- PRESSURE PROTECTION FOR INNER VESSEL OF ROAD TANKER TO BE PROVIDED BY 2 SETS (1 DUTY AND 1 STANDBY). EACH SET TO BE COMPRISED OF TWO INDEPENDENT PRESSURE RELIEF VALVES.
4.- PLATE RELIEF DEVICE TO FOLLOW EN 13458 POINT 2 ANNEX 1
5.- ECONOMIZER REGULATOR.
EQUIVALENCE TABLE
B1 DDA SUBMISSION C.C. 01/21
B0 DDA SUBMISSION C.C. 10/20
00 FOR REVIEW C.C. 06/20
水務署 Water Supplies Department
BLACK & VEATCH
ARCADIS
acciona JEC AJC JOINT VENTURE
wsp
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT
PROCESS AND INSTRUMENTATION DIAGRAM REMINERALIZATION CO2 STORAGE TANKS 1&2
TKOD1-PID-H000-APE0003 B1
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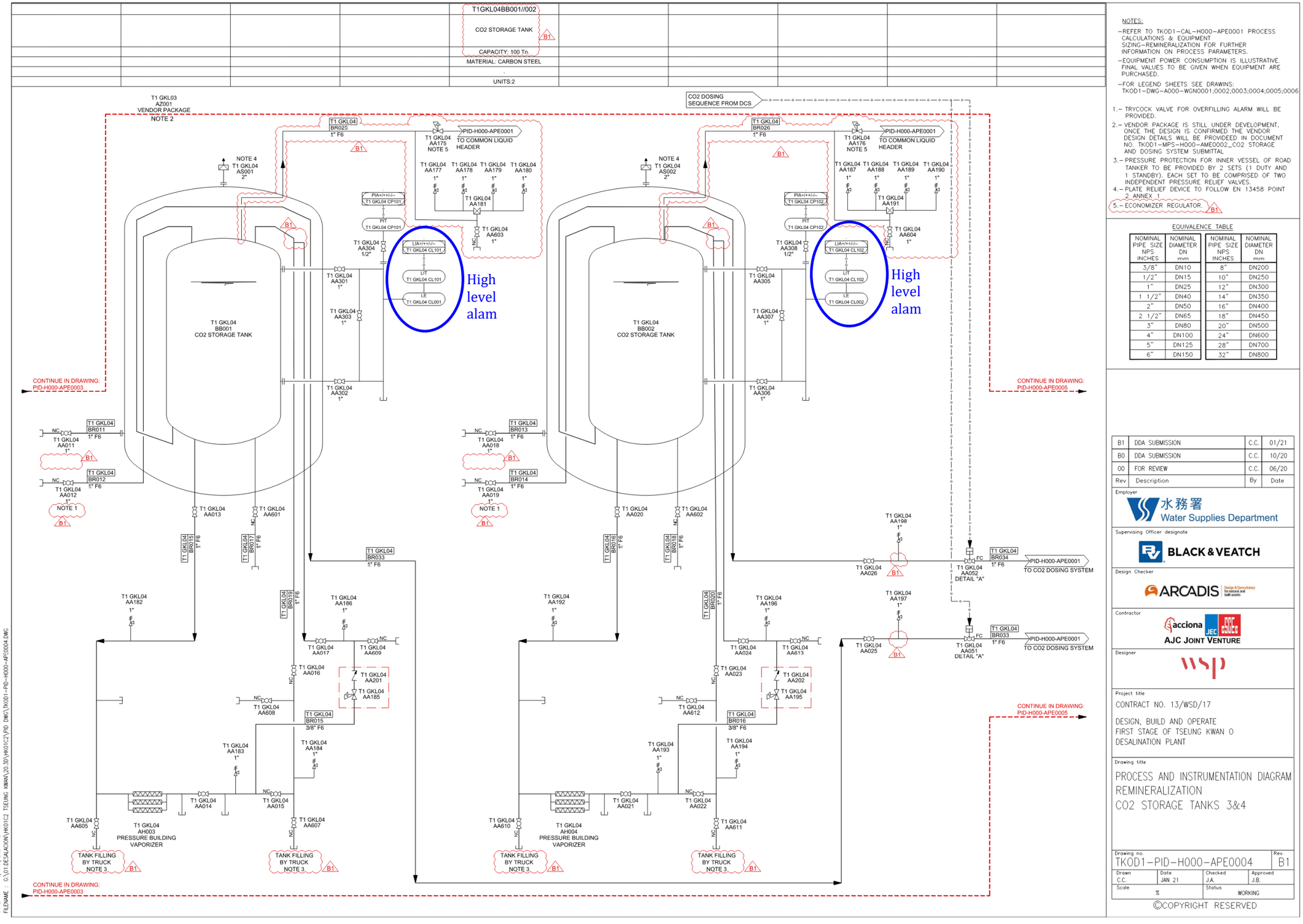
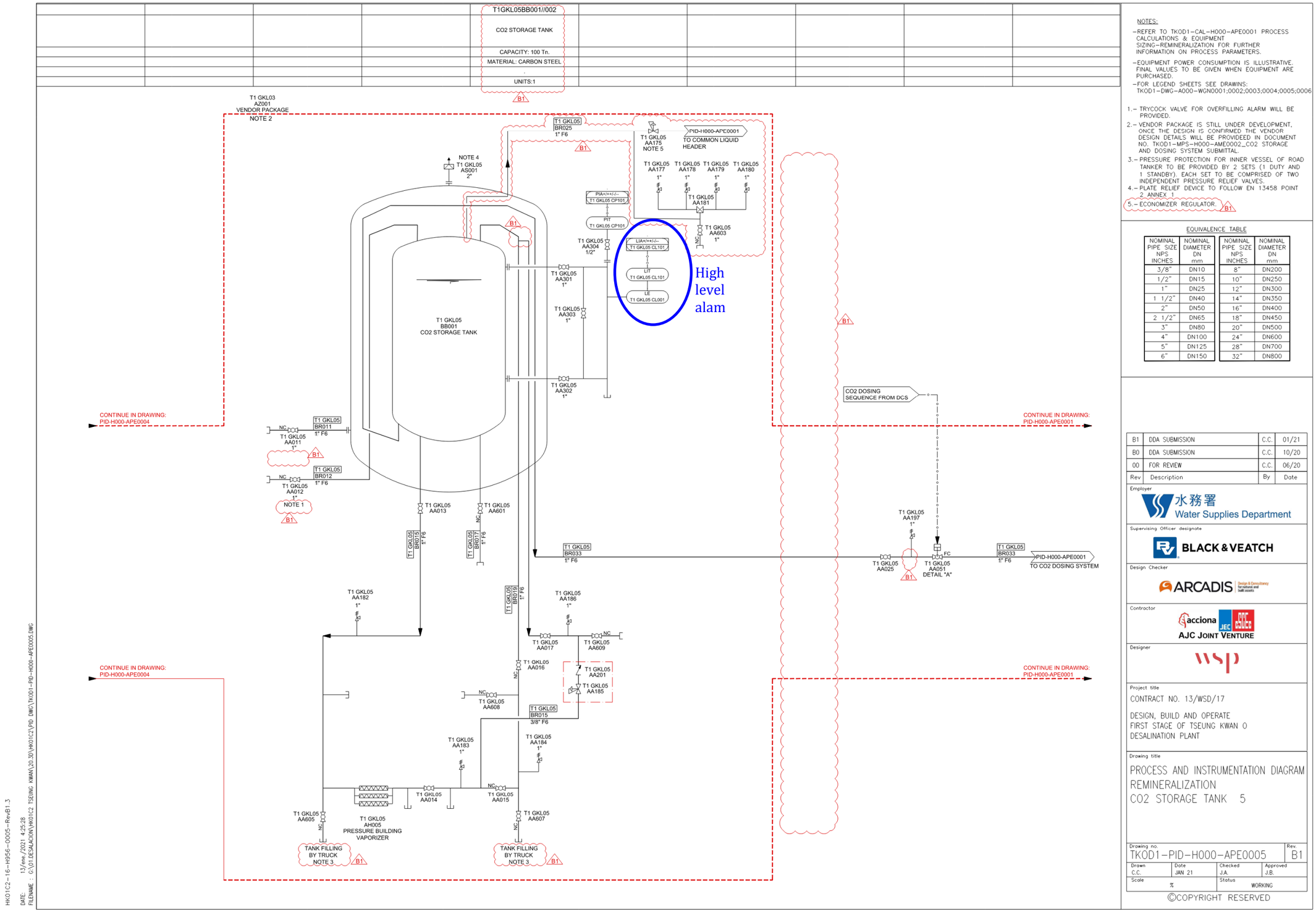
NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

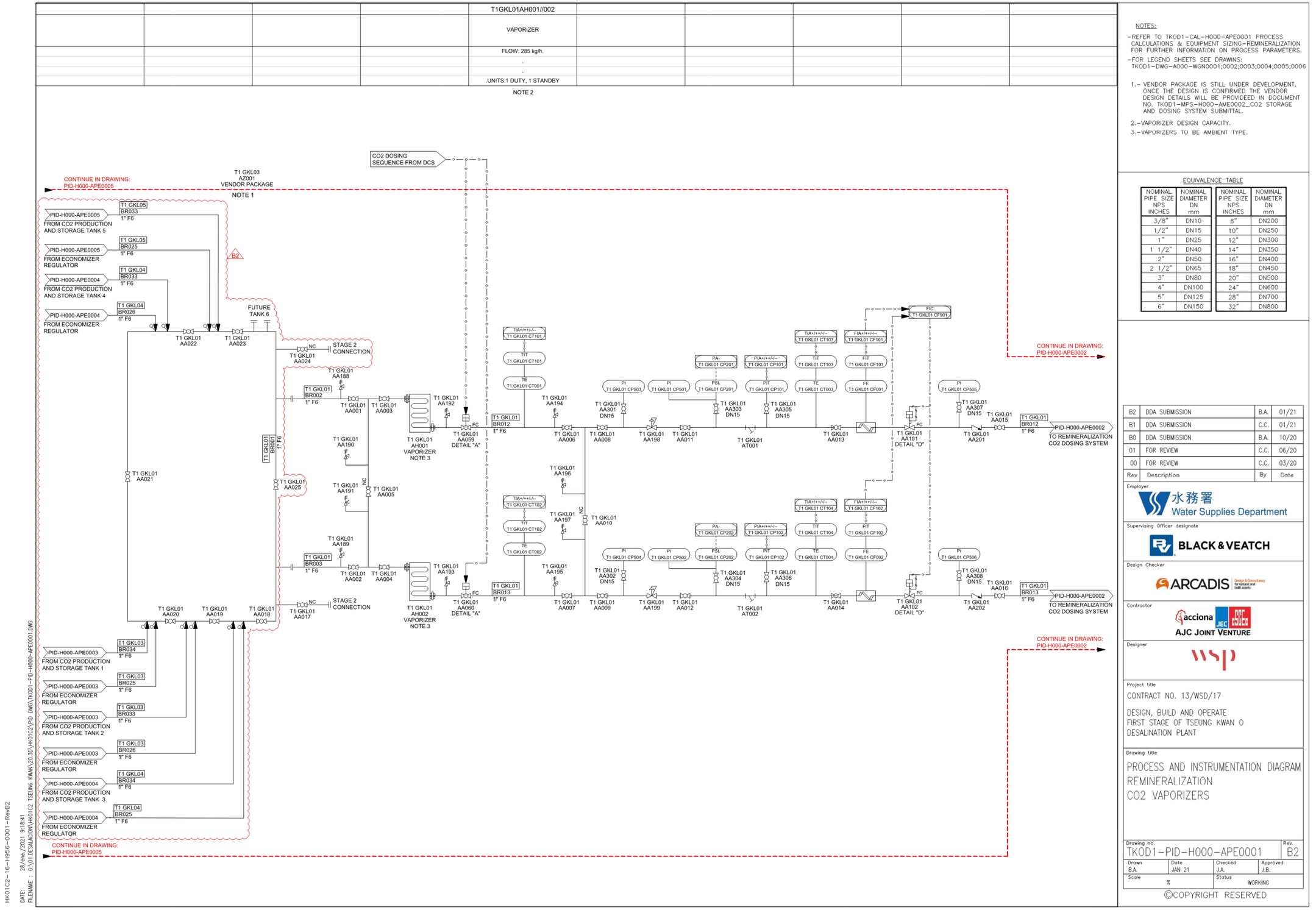
Appendix B-4 P&IDs of Remineralisation CO2 Storage Tanks and Related Systems (Sheet 2 of 5)



Appendix B-4 P&IDs of Remineralisation CO2 Storage Tanks and Related Systems (Sheet 3 of 5)



Appendix B-4 P&IDs of Remineralisation CO2 Storage Tanks and Related Systems (Sheet 4 of 5)



NOTES:

- REFER TO TKOD1-CAL-H000-APE0001 PROCESS CALCULATIONS & EQUIPMENT SIZING-REMINERALIZATION FOR FURTHER INFORMATION ON PROCESS PARAMETERS.
- FOR LEGEND SHEETS SEE DRAWINS: TKOD1-DWG-A000-WGN0001;0002;0003;0004;0005;0006

1. – VENDOR PACKAGE IS STILL UNDER DEVELOPMENT, ONCE THE DESIGN IS CONFIRMED THE VENDOR DESIGN DETAILS WILL BE PROVIDEED IN DOCUMENT NO. TKOD1-MPS-H000-AME0002_CO2 STORAGE AND DOSING SYSTEM SUBMITTAL.
2. – VAPORIZER DESIGN CAPACITY.
3. – VAPORIZERS TO BE AMBIENT TYPE.

EQUIVALENCE TABLE

NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm	NOMINAL PIPE SIZE NPS INCHES	NOMINAL DIAMETER DN mm
3/8"	DN10	8"	DN200
1/2"	DN15	10"	DN250
1"	DN25	12"	DN300
1 1/2"	DN40	14"	DN350
2"	DN50	16"	DN400
2 1/2"	DN65	18"	DN450
3"	DN80	20"	DN500
4"	DN100	24"	DN600
5"	DN125	28"	DN700
6"	DN150	32"	DN800

Rev	Description	By	Date
B2	DDA SUBMISSION	B.A.	01/21
B1	DDA SUBMISSION	C.C.	01/21
B0	DDA SUBMISSION	B.A.	10/20
01	FOR REVIEW	C.C.	06/20
00	FOR REVIEW	C.C.	03/20

Employer: 水務署 Water Supplies Department

Supervising Officer designate: BLACK & VEATCH

Design Checker: ARCADIS

Contractor: acciona JEC CSCEC AJC JOINT VENTURE

Designer: wsp

Project title:
CONTRACT NO. 13/WSD/17
DESIGN, BUILD AND OPERATE
FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT

Drawing title:
PROCESS AND INSTRUMENTATION DIAGRAM
REMINERALIZATION
CO2 VAPORIZERS

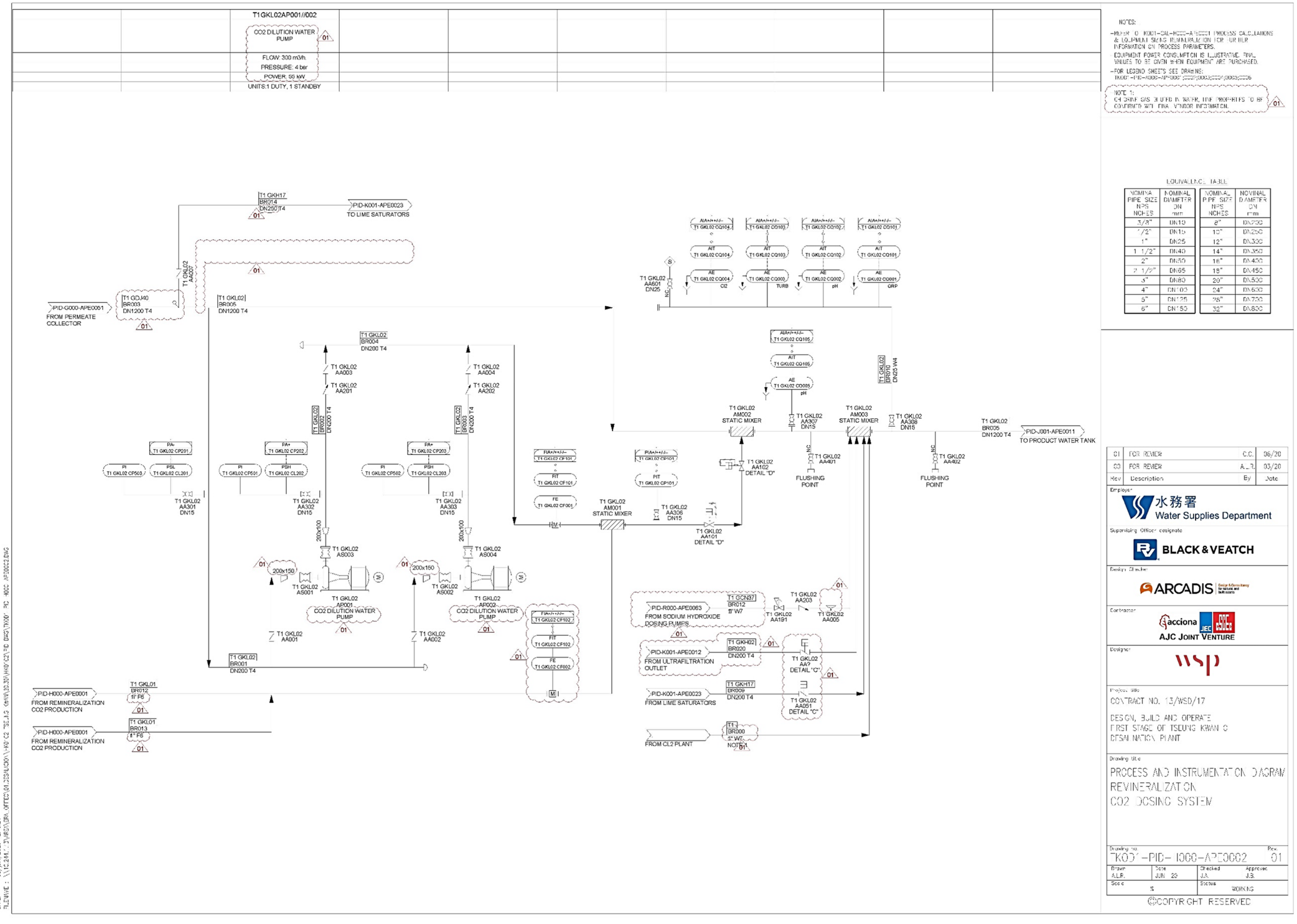
Drawing no.: TKOD1-PID-H000-APE0001 Rev.: B2

Drawn	Date	Checked	Approved
B.A.	JAN 21	J.A.	J.B.

Scale: % Status: WORKING

HK01C2-16-H956-0001-Rev62
DATE: 28/ene./2021 9:18:41
FILENAME: G:\01.DESALACION\HK01C2 TSEUNG KWAN\20.3D\HK01C2\PID DWG\TKOD1-PID-H000-APE0001.DWG

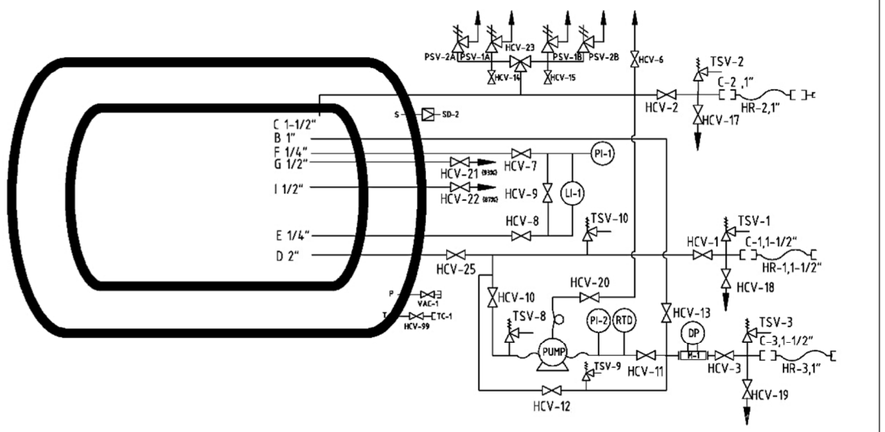
Appendix B-4 P&IDs of Remineralisation CO2 Storage Tanks and Related Systems (Sheet 5 of 5)



Appendix B-5 P&ID of CO_2 Road Tanker

代号				
HCV-1	液相充液阀	MECA-INOX #PS4LSWVI050	2"	1
HCV-2	气体回气阀	MECA-INOX #PS4LSWVI025	1"	1
HCV-3	液体出口阀	MECA-INOX #PS4LSWVI025	1"	1
HCV-6	手动排放阀	HEROSE#01321.2533.001	1"	1
HCV-7	气相针型阀	REGO #CMM250A B31.3	1/4"	1
HCV-8	液相针型阀	REGO #CMM250A B31.3	1/4"	1
HCV-9	平衡针型阀	SWAGELOK #B-1RM4-SC11	1/4"	1
HCV-10	泵进液阀	MECA-INOX #PS4LSWVI050	2"	1
HCV-11	泵出口阀	MECA-INOX #PS4LSWVI025	1"	1
HCV-12	压力出液阀	MECA-INOX #PS4LSWVI025	1"	1
HCV-13	回流阀	MECA-INOX #PS4LSWVI025	1"	1
HCV-14,15	排压阀	REGO #CMM250A B31.3	1/4"	2
HCV-17,18,19	排残阀	MECA-INOX #PS4LSWVI015	1/2"	3
HCV-20	泵体回流阀	REGO#C009464DAS PI-MARK	3/8"	1
HCV-21,22	溢满阀	MECA-INOX #PS4LSWVI015	1/2"	2
HCV-23	三通切换阀	BESTOBELL#CJF60SS7CLE1T	DN32	1
HCV-25	液相根部阀	MECA-INOX #PS4LSWVI050	2"	1
HCV-99	规管截止阀	HOKE 4111L2B BRS 1/8MPTX1/8FP	1/8"	1
TC-1	真空规管	HASTINGS 1415671S #DV-6	1/8"	1
VAC-1	抽真空阀	LANSHI #ZK-30/40-1Q(KF40)	1-1/2“	1
TSV-1,2,3	安全阀	REGO #PRV9432T450	1/4"	3
TSV-8,9,10	安全阀	REGO #PRV9432T450	1/4"	3
PSV-1A,B	安全阀	HEROSE #06388.1510.6040 UV	1"	2
PSV-2A,B	安全阀	HEROSE #06388.1510.6040 UV	1"	2
PI-1	储罐压力表	WIKA #233.50 1/4MPT W/ PANNEL	0-4Mpa	1
PI-2	泵出口压力表	WIKA #232.50 1/4MPT W/ PANNEL	0-4Mpa	1
LI-1	液位计	WIKA #712.15 W/PANEL	0-2500MM	1
PUMP	泵	PUMP CO2 R83-316H4BM-0405T1-	TEIKOKU	1
C-1,3	CGA接头	YCLB #CGA-CO-40-001	1-1/2“	2
C-2	CGA接头	YCLB #CGA-CO-25-001	1”	1
M-1	流量计	FLOWCOM 3000 #SWM33.4*	1”	1
DP	压差变送器	ROSEMOUNT 3051CD3A02A2BH2P2		1
RTD	温度传感器	BURNS#200A 10BN035		1

B	VAPOR RETURN
C	VENT
D	BOTTOM FILL
E	LIQUID PHASE
F	GAS PHASE
G	TRYCOCK
I	TRYCOCK
P	PUMPOUT
S	JACKET RELIEF
T	VACUUM GUAGE



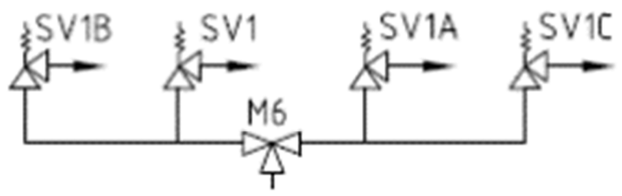
标记	处数	分区	更改文件号	签字	年月日			
设计			标准化			阶段标记	重量	比例
校对								
审核								
工艺			批准			共 页	第 页	

[redacted]

P&ID FOR LCO2 OR
FL3000标准版

版本 FD

Pressure relief system of the inner vessel is as below:



Characteristics :

1. Two sets of relief valves, one duty and one standby. Such design allows annual calibration without interrupting the system.
2. There is a 3-way diverter valve to switch between duty and standby. Design of valve ensure opening at either side (ie. Either to left or right). There will not be accidental closing of both streams.
3. Each side consists of two relief valves in two settings, usually at 22 barg and 24 barg. The two stage design allows double protection. In case pressure rises too quickly that the first stage valve cannot release the pressure, there is the second stage relief valve for protection.

Above designs fulfills the requirement of Table 1 - List of design requirements / measures for chlorine and carbon dioxide storage extracted from Annex 13L of the EIA Report (Register No. AEIAR-192/2015))-Item 2.4.

At outer vessel of vacuum insulated tank, there will be a burst disc plate, usually set at 1.0 barg. This is for protection of outer vessel. The design fulfills requirement of Environmental Permit Clause 2.4 part 2.

Appendix B-7 Photo Record of Pressure Relief Valves on CO_2 Tank

Appendix B-8 Details of Trycock Valve

Globe Valves

Type 01321 - Globe Valve

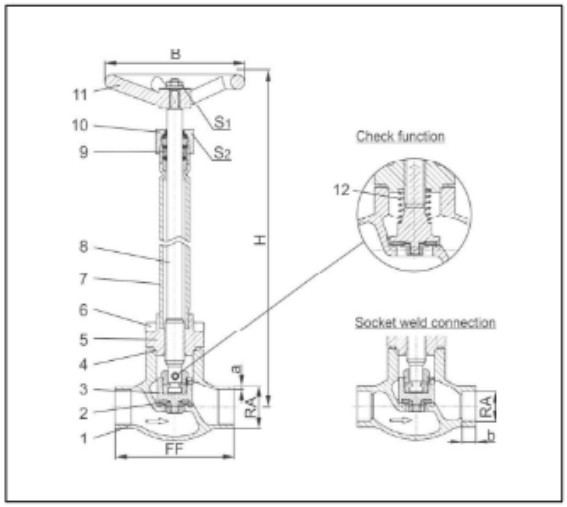
Cryogenic-Globe and Globe/Check Valves, PN50 (DN150=PN40)

Stainless steel body and bronze topwork
"live loaded" gland packing
"cleaned and degreased for oxygen service"
Part No. 01321.X.001* (H = 270mm)
Part No. 01321.X.002* (H = 370mm)
Part No. 01321.X.501* (H = 270mm) Globe/Check Valve
Part No. 01321.X.502* (H = 370mm) Globe/Check Valve
*Butt weld connection for stainless steel pipes acc. to ISO 1127 or ASTM A312
Part No. 01321.X.0014 (H = 270mm)
Part No. 01321.X.0024 (H = 370mm)
Part No. 01321.X.5014 (H = 270mm) Globe/Check Valve
Part No. 01321.X.5024 (H = 370mm) Globe/Check Valve
Socket weld connection for stainless steel pipes acc. to ISO 1127 or ASTM A312
Available options - on request only:
· Welded stainless steel stubs acc. to ISO 1127 or ASTM A312 - length FF + 200mm
· Extension H up to 900mm
· Valve with control disc (tapered design)
· Further pipe wall thicknesses

Applications:
Approved for air gases, vapours and cryogenic liquefied gases incl. LNG.
Working temperature: -196°C / -321°F (77K) up to +120°C / +248°F (393K)

Materials		DIN EN	ASTM
1	Body	1.4308	A 351 CF8
2	Valve seal up to DN50	PTFE / Carbon filled (25%)	
2a	Valve seal from DN65	PTFE	
3	Disc	CW614N	B 283 UNS C38500
4	Bonnet gasket	PTFE	
5	Headpiece	CC493K	B 505 UNS C93200
6	Bolts	1.4301/A2	A 194 B8
7	Elongation tube	1.4541	A 213 TP 321
8	Stem	1.4301	A 276 Grade 304
9	Gland packing	Graphite / PTFE	
10	Gland nut	CW614N	B 283 UNS C38500
11	Handwheel	Aluminium alloy	
12	Spring	CW452K	B 159 UNS C51900

Standard marking acc. to Pressure Equipment Directive 2014/68/EU (PED). CE



Type 01321 - Standard design	Technical data													
Nominal size	**DN**	**10**	**15**	**15**	**20**	**25**	**32**	**40**	**40**	**50**	**65**	**80**	**100**	**150**
Dimension code	.X.	1012	1517	1521	2026	2533	3238	4042	4048	5060	657x	8088	0114	0168
Face-to-face dimension	FF	70	85	85	100	115	115	130	130	155	205	245	280	400
Height	H	270mm or 370mm											370	420
Outside pipe-Ø ISO 1127	RA	12.0	17.2	21.3	26.9	33.7	38.0	42.4	48.3	60.3	76.1	88.9	114.3	168.3
Wall thickness pipe ISO 1127	a	1.0	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.6	3.2	6.0	7.1
Outside pipe-Ø ASTM A312	RA	13.72	17.15	21.34	26.67	33.40	-	42.16	48.26	60.32	73.02	88.90	114.30	168.27
Wall thickness pipe ASTM A312	a	dimensions acc. to S10 or S40												
Socket depth	b	6	10	10	13	13	-	13	13	16	16	16	20	20
Handwheel-Ø	B	100	100	100	100	100	125	125	125	125	200	250	315	360
Wrench size across flats	S_1	7	7	7	7	7	10	10	10	10	10	10	12	15
Wrench size across flats	S_2	30	30	30	30	30	36	36	36	36	36	36	41	41
Weight	ca. kg	1.4	1.65	1.7	2.1	2.4	3.3	4.7	4.7	7.2	12.7	17.0	24.5	54.0
Kvs-Value	m^3/h	1.6	3.8	4.3	6.7	11.5	14.0	20.6	22.6	37.1	71.1	104.0	170.0	350.0
Cv-Value	gal/min	1.9	4.4	5.0	7.8	13.4	16.2	23.9	26.3	43.2	82.7	120.9	195.2	401.8

Dimensions in mm. Compliance of tightness requirements acc. to EN 1626 for DN150 up to 20 bar differential pressure. In the range of >20-40 ba
350-700ml (1 bar, 20°C [68°F]) are reached.

HEROSE GMBH Phone +49 4531 509-0 Fax +49 4531 509 120 info@herose.com www.herose.com

Edition 2018-04

Appendix B-9 Photo Record of Trycock Valve

Appendix B-10 Photo Record of Security Fence

Appendix B-11 Inspection Report for Vaporizers (Sheet 1 of 7)

INFORME DE INSPECCION
INSPECTION REPORT

acciona

GIS GLOBAL INSPECTION SERVICES www.ginspectionservices.com

Proyecto: *Project:*	FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Report Page:	Pag.1 /6
		Ref. Proj.	HK01C1 (P.019)
Cliente: *End User:*	ACCIONA AGUA	Inspec. date:	2021.08.04
		Report date:	2021.09.29

GENERAL:

INFORME REPORT:	**IRn1_P.019_190 CO2 System CRYOQUIP_Rev02** *(HK01C1-00-WQ-A13LC -LINDE-IR1_Rev02)*	**NOTIFICACION INSPECCION:** INSPECTION NOTIFICATION:	HK01C1-A13LC CO2 SYSTEM_Notice_for_inspection_ LINDE- 1
SUMINISTRADOR: SUPPLIER:	**LINDE HKO LTD.**	**PEDIDO/ SUB-PEDIDO No.:** ORDER / SUB-ORDER No.:	HK01C1-A13LC
LUGAR INSPECCION: PLACE OF INSPECTION:	**CRYOQUIP CHINA CO., LTD** LEIDIAN TOWN, DEQING COUNTY, HUZHOU CITY, ZHEJIANG PROVINCE	**PROGRAMA (PPI) No.:** TEST PLAN (ITP) No.:	TKOD1-ITP-A000-AGN9701
ASISTENTES: ATTENDANTS:	- Zhajinhe (obo Acciona) - Chenyue xin	**ESPECIFICACION No.:** TECH. DATA SHEET No.:	TKOD1-TDS-H000-AME0006_Rev C1 (10/02/21)
SUMINISTRO: SUPPLY:	**2 X VAPORIZER**		

INSPECTION:

OK	NOT	NA	ITP No.	COMENTARIOS / COMMENTS
☒	☐	☐	1	Material certificates
☒	☐	☐	2	Pressure test certificate
☒	☐	☐	3	Visual and dimensional check
☒	☐	☐	4	Final dossier of manufacturing quality control
☐	☐	☒	5	Acceptance Note
☐	☐	☒	6	Shipping authorization

OK: performed & correct NOT:requested by ITP but Not performed /Performed but Not correct NA: Not Applicable acc. ITP

ESTADO INSPECCION: INSPECTION STATUS:	☒ **FINAL** / FINAL	☐ **PARCIAL** / PARTIAL	PROCUREMENT: 100 % MANUFACTURING: 100 % TESTING: 100 %
RESULTADO INSPECCION: OVERALL INSPECTION RESULT:	☒ **SATISFACTORIA** *SATISFACTORY*	☐ **DESVIACION MENOR** *MINOR DEVIATIONS*	☐ **NO SATISFACTORIA** *NOT SATISFACTORY*

SIGNATURE:

Realizado por (inspector GIS): *Submitted by (GIS inspector):* Zha Jinhee **Fdo.**/*Sign*: Zha JInhe GIS Inspector obo Acciona	**Certificación (sólo TPI):** *Certification (only TPI):*

TIPO INSPECCION: TYPE OF INSPECTION:	☐ **TPI** / THIRD PARTY	☒ **SPI** / SECOND PARTY	☐ **OTROS** / OTHERS

Appendix B-11 Inspection Report for Vaporizers (Sheet 2 of 7)

INFORME DE INSPECCION
INSPECTION REPORT

Proyecto: *Project:*	FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Report Page:	Pag.2 /6
		Ref. Proj.	HK01C1 (P.019)
Cliente: *End User:*	ACCIONA AGUA	Inspec. date:	2021.08.04
		Report date:	2021.09.29

1.0 DESCRIPCION DETALLADA EQUIPO / DETAILEDEQUIPMENT DESCRIPTION:

2 X VAPORIZER:

- **Model:** CV400-CO2
- **Serial No.:** 67320101 / 67320102
- **Tag No:** T1 GKL01 AH001 / T1 GKL01 AH002
- **Fluid:** CO2
- **MAWP:** 31BARG

2.0 DOCUMENTOS DE REFERENCIA / APPLICABLE DOCUMENTATION:

- **ITP:** TKOD1-ITP-A000-AGN9701
- **Datasheet:** TKOD1-TDS-H000-AME0006_Rev C1 (10/02/21)
- **Drawings:** 225180361 (22/04/2021)
- **Purchase order:** HK01C1-A13LC (19/03/2021)
- **Nameplate vaporizer**
- **Vendor´s DS vaporizer**

3.0 DETALLE TRABAJOS REALIZADOS / DETAIL OF INSPECTION ACTIVITIES:

The inspector arrived at CRYOQUIP China Co., Ltd on August 4, 2021 to inspect the two vaporizers. The inspection results are as follows:

ITP 1 / Review of Material Certificates

The factory submitted relevant raw material quality certificates to our inspectors for review, and the review results met the requirements of technical specifications and EN1024 standards.

Result: **satisfactory**

ITP 2 / Review of Pressure test certificate

Pressure test witness:

Specification requirements		Measured			
Equipment	**Test pressure**	**Pressure gauge No**	**Test medium**	**Pressure holding time**	**Test pressure**
VAPORIZER-1	44 Barg (pneumatic)	1810P-32681-10223 1810P-32681-10224	compressed air	≥60min	3.4MPa
VAPORIZER-2	44 Barg (pneumatic)	1810P-32681-10229 1810P-32681-10230	compressed air	≥60min	3.4MPa

Remark no.1-closed: inspector asked the factory to conduct the pressure test according to the technical specification, which requires the pressure test to be 44 barg (pneumatic). The factory indicated that this was carried out in accordance with the requirements of the drawing. The pressure test required by the drawing is 34 barg. ~~The measured field pressure test is inconsistent with the technical specifications.~~ The specification that indicates that the test pressure must be 44 barg is not a document approved by Acciona, but the drawing that indicates the 34 Barg is, so this remark is closed. ~~Also pending to review pressure test certificate.~~ Pressure test report has been reviewed.

Explanatory note: The pressure test was carried out according to GB / 151-20141, holding time:30 minutes.

Appendix B-11 Inspection Report for Vaporizers (Sheet 3 of 7)

INFORME DE INSPECCION
INSPECTION REPORT

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Proyecto: *Project:*	FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Report Page:	Pag.3 /6
		Ref. Proj.	HK01C1 (P.019)
Cliente: *End User:*	ACCIONA AGUA	Inspec. date:	2021.08.04
		Report date:	2021.09.29

Design standard is ASME Section VIII Div 1: 2019 Ed, in which ASME UG-100 code requires that the pressure test needs enough time, and the factory shall issue the test report according to 30 minutes.

However, during the on-site witness, the pressure holding time of the factory actually adopts the test pressure is 1 hour.

Result: **satisfactory**

ITP 3 / Visual and dimensional check

The appearance of the two carburetors was inspected, and the external surface was free of scratch and collision. The overall appearance was qualified.

Inspector checked the dimensions of the two vaporizers.

Some dimensions differ from the drawing but are within the specified tolerances.

VAPORIZER-1 (TAG: T1 GKL01 AH001 / S/N: 67320101):

	Equipment size (mm)		Total length (mm)	Support size (mm)		Bolt hole spacing (mm)	
Drawing requirements	L=1699	H=1699	L=7044	L=1305	H=1333	L=848	H=1130
Actual measurement	L=1706	H=1705	L=7058	L=1306	H=1335	L=854	H=1135

VAPORIZER-2 (TAG: T1 GKL01 AH002 / S/N: 67320102):

	Equipment size (mm)		Total length (mm)	Support size (mm)		Bolt hole spacing (mm)	
Drawing requirements	L=1699	H=1699	L=7044	L=1305	H=1333	L=848	H=1130
Actual measurement	L=1708	H=1707	L=7055	L=1305	H=1334	L=854	H=1135

Result: **satisfactory**

ITP 4 / Review of final Dossier of manufacturing quality control

~~Pending to review final quality dossier.~~

The following documentation has been reviewed:

- Material certificates
- Cleaning certificate
- Certificate of compliance
- Pressure test reports

Result: **satisfactory**

Appendix B-11 Inspection Report for Vaporizers (Sheet 4 of 7)

INFORME DE INSPECCION
INSPECTION REPORT

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Proyecto: *Project:*	FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Report Page:	Pag.4 /6
		Ref. Proj.	HK01C1 (P.019)
Cliente: *End User:*	ACCIONA AGUA	Inspec. date:	2021.08.04
		Report date:	2021.09.29

4.0 INSTRUMENTACION UTILIZADA/ USED TEST EQUIPMENT:

Type:	Model / Identification:	Calibration status:
Tape measure	0-7000mm	N/A
Pressure gauge	0-6MPa	13/07/2021
Pressure gauge	0-10MPa	13/07/2021
Pressure gauge	0-10MPa	13/07/2021

5.0 DESVIACIONES - PENDIENTES / REMARKS - PUNCH LIST:

OBSERVACIONES / DESVIACIONES MENORES:
REMARKS / MINOR DEVIATIONS:

Remark no.1-closed: inspector asked the factory to conduct the pressure test according to the technical specification, which requires the pressure test to be 44 barg (pneumatic). The factory indicated that this was carried out in accordance with the requirements of the drawing. The pressure test required by the drawing is 34 barg. ~~The measured field pressure test is inconsistent with the technical specifications.~~ The specification that indicates that the test pressure must be 44 barg is not a document approved by Acciona, but the drawing that indicates the 34 Barg is, so this remark is closed. ~~Also pending to review pressure test certificate.~~ Pressure test certificate has been reviewed.

NO CONFORMIDADES / DESVIACIONES MAYORES:
NON CONFORMITIES / MAYOR DEVIATIONS:

N/A

Appendix B-11 Inspection Report for Vaporizers (Sheet 5 of 7)

INFORME DE INSPECCION
INSPECTION REPORT

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Proyecto: *Project:*	FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Report Page:	Pag.5 /6
		Ref. Proj.	HK01C1 (P.019)
Cliente: *End User:*	ACCIONA AGUA	Inspec. date:	2021.08.04
		Report date:	2021.09.29

6.0 ANEXO FOTOGRAFICO/ PICTURE APENDIX:

A) GENERAL VIEW & IDENTIFICATION

Pic.1: Workshop

Pic.2: Appearance inspection (ITP no.3)

Pic.3: Appearance inspection (ITP no.3)

Pic.4: Appearance inspection (ITP no.3)

Pic.5: Appearance inspection (ITP no.3)

Pic.6: Appearance inspection (ITP no.3)

B) TESTS

Pic.7: Test 1 (ITP no.2) pressure test

Pic.8: Test 2 (ITP no.2) pressure test

Pic.9: Test 3 (ITP no.2) pressure test

Pic.10: Test 4 (ITP no.2) pressure test

Pic.11: Test 5 (ITP no.2) pressure test

Pic.12: Test 6 (ITP no.2) pressure test

Appendix B-11 Inspection Report for Vaporizers (Sheet 6 of 7)

INFORME DE INSPECCION
INSPECTION REPORT

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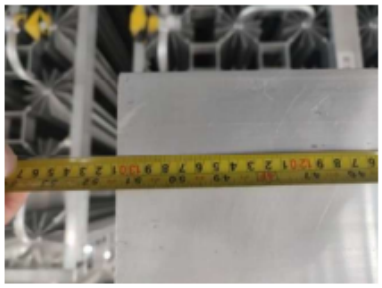
Proyecto: *Project:*	FIRST STAGE OF TSEUNG KWAN O DESALINATION PLANT	Report Page:	Pag.6 /6
		Ref. Proj.	HK01C1 (P.019)
Cliente: *End User:*	ACCIONA AGUA	Inspec. date:	2021.08.04
		Report date:	2021.09.29

C) MANUFACTURING DETAILS



Pic.13: Dimensional inspection (ITP no. 3)

Pic.14: Dimensional inspection (ITP no. 3)

Pic.15: Dimensional inspection (ITP no. 3)

Pic.16: Dimensional inspection (ITP no. 3)

Pic.17: Dimensional inspection (ITP no. 3)

Pic.18: Dimensional inspection (ITP no. 3)

D) DEVIATIONS & REMARKS

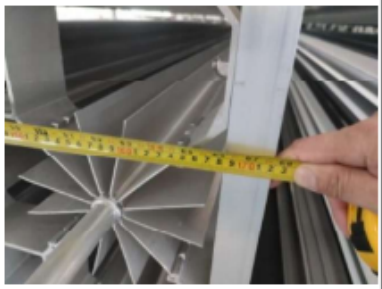
Pic.19: Dimensional control. Remark no.2

Pic.20: Dimensional control. Remark no.2

Pic.21: Dimensional control. Remark no.2

Pic.22: Dimensional control. Remark no.2

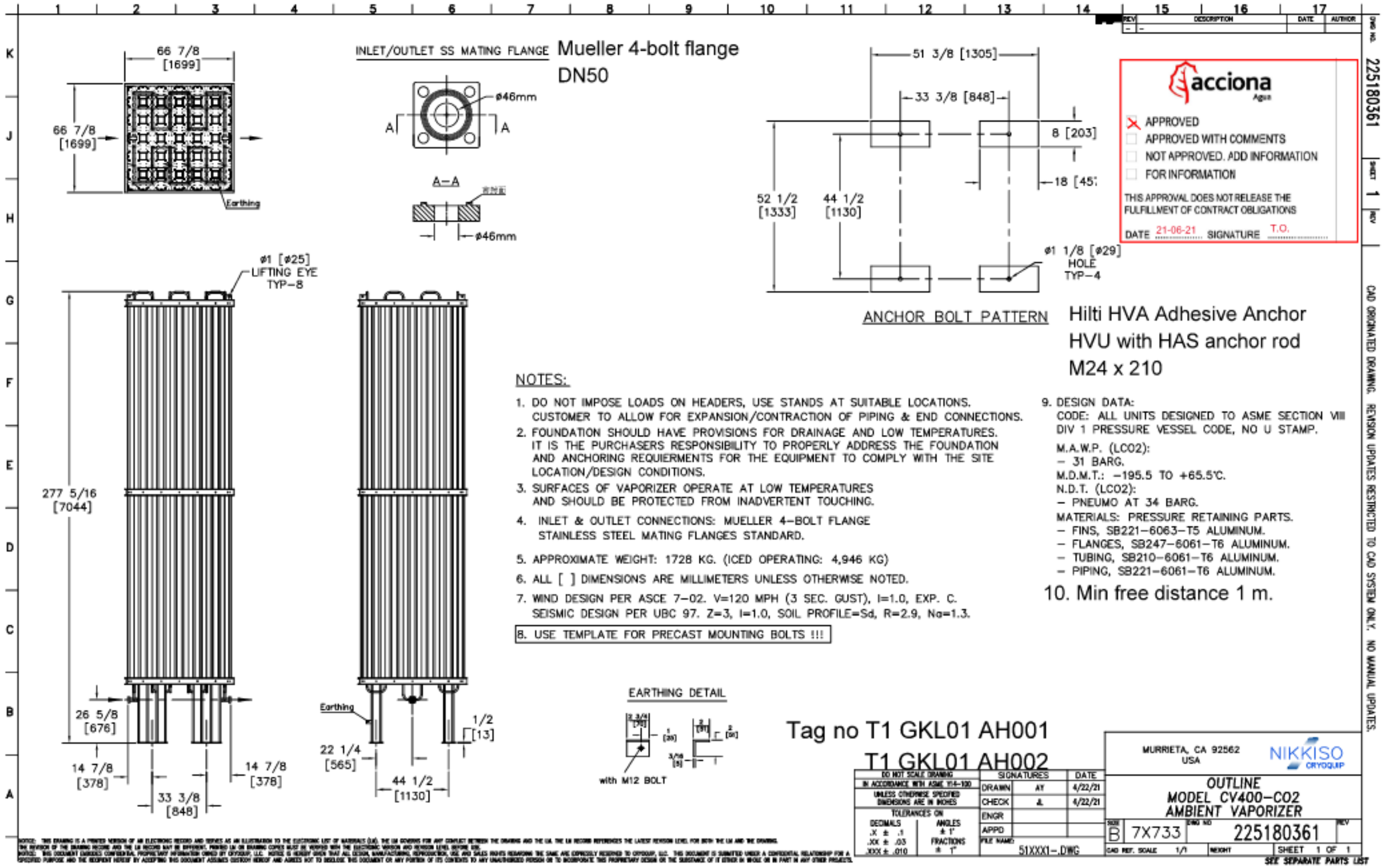
Pic.23: Dimensional control. Remark no.2



Pic.24: Dimensional control. Remark no.2

FIN INFORME / END OF REPORT

Appendix B-11 Inspection Report for Vaporizers (Sheet 7 of 7)



Appendix B-12 CO_2 Tanker License

Licence No. V000001190
牌照編號

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION
香港特別行政區政府
Dangerous Goods Ordinance
Chapter 295
Section 6 and Section 9
危險品條例
第二百九十五章
第六條及第九條
LICENCE FOR THE CONVEYANCE OF DANGEROUS GOODS IN CATEGORY 2/5 BY VEHICLES
載運第二/五類危險品車輛牌照

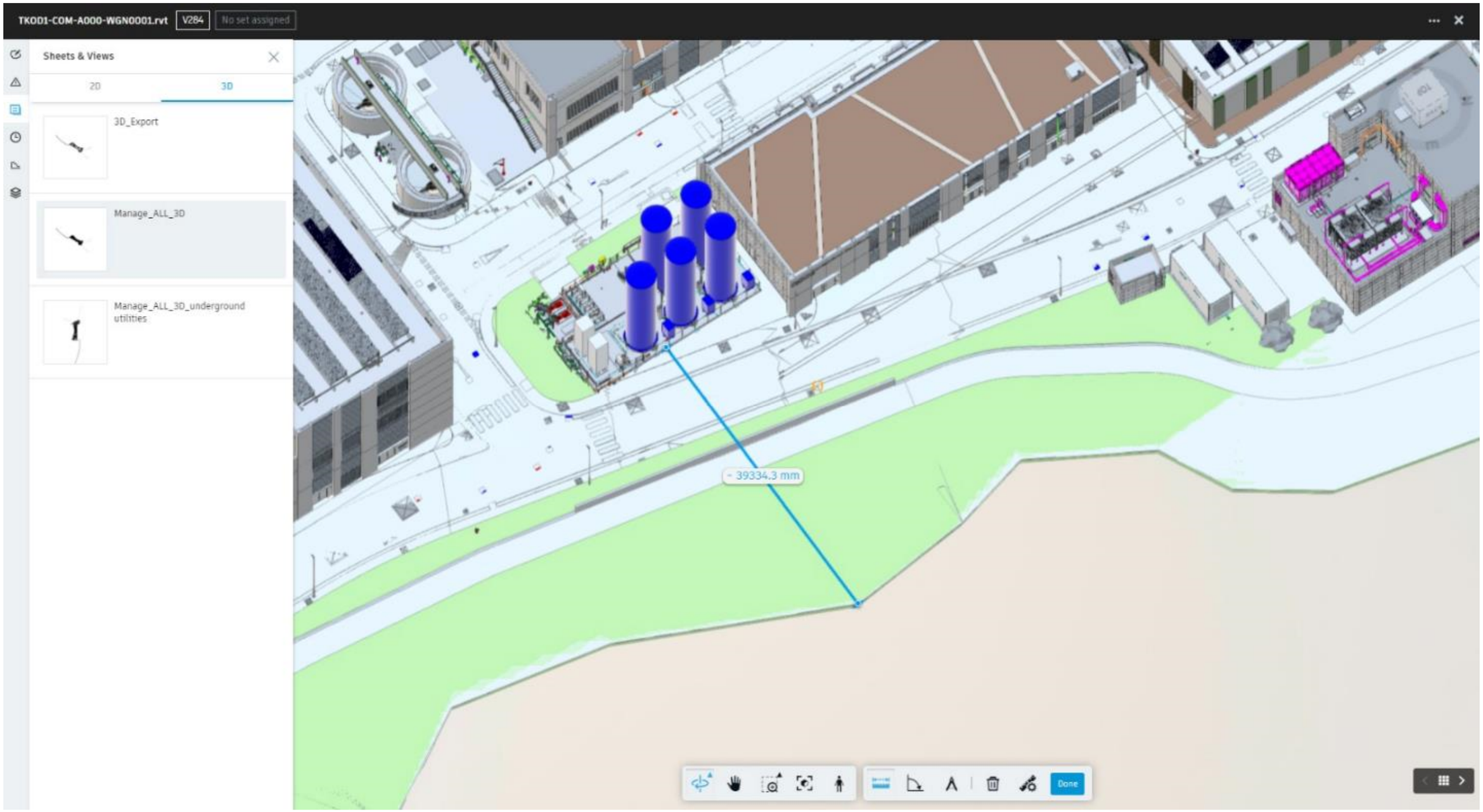
1. Name of Licensee 持牌人姓名 Linde HKO Limited
2. Address of Licensee 持牌人地址 12 Chun Yat Street, Tseung Kwan O Industrial Estate, Kowloon
3. Dangerous Goods:- (Classification): 危險品:- (分類): Category 類別 2 (Excluding Electronic Gases, LPG & Chlorine)
4. Vehicle Registration Mark 車輛登記號碼 TG5222
5. Engine No. 引擎號碼 GH7*207183* Chassis No. 底盤號碼 PKC8E-30083
6. Annual Licence Fee 每年牌費 $960.00
7. Date of first issue 首次發牌日期 19/08/2015
8. Valid period of this licence 本牌照有效日期 26/05/2021 - 25/05/2022
9. This licence is issued subject to the conditions specified overleaf.
本牌照係依照後頁之規條而發

(CHAN Wai-kay)
for Director of Fire Services,
Licensing Authority.
消防處處長（發牌當局）
（陳偉基 代行）

FSD Ref. (29) in 11/12995(I)
消防處檔案編號

FS 272 (Rev. 4/2012)

Appendix B-13 Separation Distance from Slope Toe from BIM Model

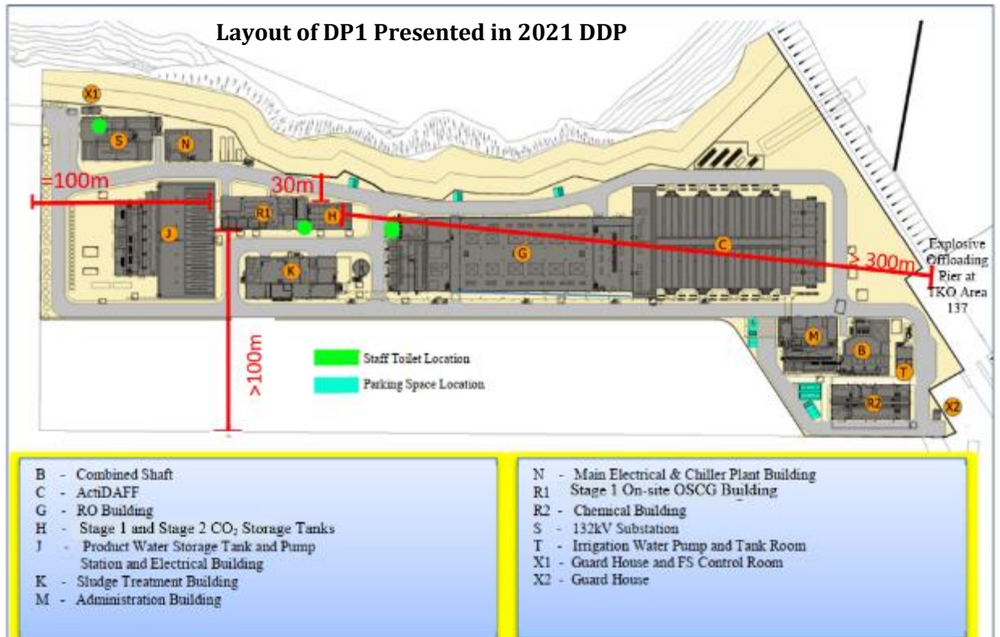


Appendix B-14 Photo Record of 1.5 m High Barrier Behind CO2 tank

Appendix C
Separation Distances Between Major Facilities in DP1

Appendix C Separation Distances Between Major Facilities in DP1

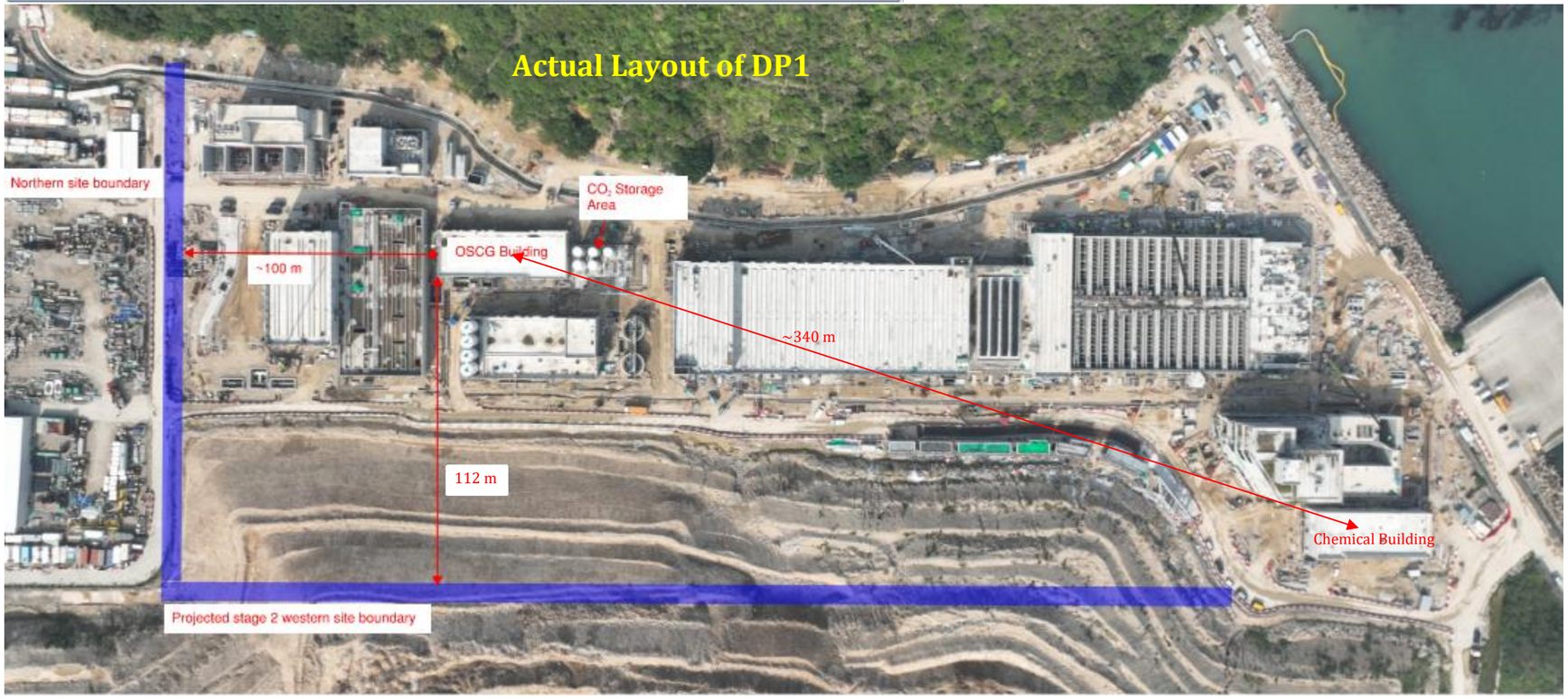
Layout of DP1 Presented in 2021 DDP



B - Combined Shaft
C - ActiDAFF
G - RO Building
H - Stage 1 and Stage 2 CO_2 Storage Tanks
J - Product Water Storage Tank and Pump Station and Electrical Building
K - Sludge Treatment Building
M - Administration Building

N - Main Electrical & Chiller Plant Building
R1 - Stage 1 On-site OSCG Building
R2 - Chemical Building
S - 132kV Substation
T - Irrigation Water Pump and Tank Room
X1 - Guard House and FS Control Room
X2 - Guard House

Actual Layout of DP1



Member of the Aurecon Group

Our Ref: PL-202405006

Date: 3 May 2024

AJC Joint Venture
5/F, Tower A, Manulife Financial Centre,
223-231 Wai Yip Street,
Kwun Tong,
Kowloon,
Hong Kong

Attn: Mr. Brian Kam

Dear Sir,

Contract No. 13/WSD/17
Design, Build and Operate First Stage of Tseung Kwan O Desalination Plant
Certification of Audit Report on Measures for Mitigating Hazard to Life (Issue 3)

We refer to the revised Audit Report on Measures for Mitigating Hazard to Life (Issue 3) issued on 30th April 2024 for the captioned project.

We have no further comment and hereby certify the captioned submission in accordance with Condition 2.20 of Environmental Permit EP-503/2015/B and Further Environmental Permit FEP-01/503/2015/B.

Yours Faithfully,
For and on behalf of
Acuity Sustainability Consulting Limited

Jacky C. H. Leung
Environmental Team Leader

Acuity Sustainability Consulting Limited
Flat/RM E, 12/F, Ford Glory Plaza,
Nos. 37-39 Wing Hong Street, Kowloon, Hong Kong
el +852 2698 6833
fax +852 2698 9383 | e-mail admin@acuityhk.com
http www.acuityhk.com | www.aurecongroup.com

Our ref.: LES/J2024-01/CS/L011
Date : 3 May 2024

By Post and Email

Water Supplies Department
New Works Branch
Consultants Management Division
6/F, Sha Tin Government Offices,
1 Sheung Wo Che Road, Sha Tin,
New Territories

Attn: Mr. Sam Hui/ Mr H L Lai

Dear Sirs,

Independent Environmental Checker (IEC) for Construction and Operation of the First Stage Desalination Plant at Tseung Kwan O (Quotation Ref. No. TKO1/IEC/003)

Verification of Audit Report on Measures for Mitigating Hazard to Life

We refer to the revised Audit Report on Measures for Mitigating Hazard to Life (Issue 3) for the captioned project prepared by Binnies Hong Kong Limited.

We have no further comment and hereby verify the captioned report in accordance with Condition 2.20 of Environmental Permit EP-503/2015/B and Further Environmental Permit FEP-01/503/2015/B.

Yours sincerely,
For and On Behalf Of
Lam Environmental Services Limited

Serena Shek
Independent Environmental Checker

Encl.

Lam Environmental Services Limited
19/F, Remex Centre, 42 Wong Chuk Hang Road, Hong Kong
Tel: 2882 3939 Fax: 2882 3331 Web Site: http://www.lamenviro.com