Appendices

Appendix A – Authorization and Trade Licenses of EPC

Hitachi Zosen INOVA

Salma Bin Breik
Service Group Manager – Environment
GHD Abu Dhabi
PO Box 45921
Abu Dhabi UAE

Hitachi Zosen Inova AG
Bin Hamoodah Tower
9th floor/office 904
P.O. Box 43199
Abu Dhabi, United Arab Emirates

Roni Araiji
Managing Director
Branch Office Abu Dhabi
Phone +971 2 626 0984
roni.araiji@hz-inova.com

www.hz-inova.com

HZI ref.: GHD06052018

06 May 2018

Dubai Resource Recovery Facility (Waste to Energy) / ESIA Scope of Services

Dear Mrs. Salma,

In line with the agreement dated 5 April 2018 between Hitachi Zosen Inova AG – Abu Dhabi (HZI), a branch office of Hitachi Zosen Inova Ltd registered in Switzerland, and GHD Global Pty Ltd (GHD), we hereby recognize that GHD is engaged as the Project's Environmental Consultant for completion of services related to the Environmental and Social Impact Assessment (ESIA) for the Dubai Resource Recovery Facility (Waste-to-Energy Plant) to be constructed at the existing Dubai Municipality vehicle storage site in Warsan, Dubai.

As you're aware, HZI and NV Besix SA, Sharjah Branch (BESIX) have formed a partnership to build, operate and transfer (BOT) the WtE plant after 30 years' operation.

As per our agreement, GHD scope of services includes the following primary services:

- Phase 1 – Preparation of Scope of Work (SoW) Report
- Phase 2 – Environmental baseline survey and data collection
- Phase 3 – Preparation of ESIA Report, including the following tasks:
  - Task 1 – Stakeholder Consultation
  - Task 2 – Quantitative Analysis (Air and Noise)
  - Task 3 – Greenhouse Gas (GHG) Inventory
  - Task 4 – Impacts Identification and Assessment
  - Task 5 – Human Health Risk Assessment
  - Task 6 – Formulation of Environmental and Social Management and Monitoring Plan
  - Task 7 – ESIA Reporting
  - Task 8 – Project closeout meeting

We look forward to a fruitful cooperation. Should you have any queries or comments, please don't hesitate to contact me directly.

Best regards
Hitachi Zosen Inova AG/Branch Office Abu Dhabi

Roni Araiji

Roni Araiji
Managing Director

Hitachi Zosen INOVA
Abu Dhabi - U.A.E.
HITACHI ZOSEN INOVA AG - ABU DHABI

GOVERNMENT OF SHARJAH
Economic Development Department

حكومة الشارقة
دائرة التنمية الاقتصادية

استثمر في الشارقة
invest in Sharjah

رخصة تجارية
Trading License

531313

License Details تفاصيل الرخصة

Issue Date	2004/11/23	تاريخ الإصدار	License No.	531313	رقم الرخصة
Expiry Date	2018/11/21	تاريخ الإنتهاء	Registration No.	30810	رقم السجل

Trade Name	N.V.BESIX S.A.(COMPANY)(SHJ.BR.)	شركة ان.في.بيسكس اس.ايه فرع الشارقة	الاسم التجاري
Legal status	Branch for Foreign Company	فرع لشركة أجنبية	الشكل القانوني

License Members أطراف الرخصة

Shares الحصص	Type الصفة	ID/Passport No. رقم الهوية / الجواز	Nationality الجنسية	Investor Name إسم المستثمر	Investor No. رقم المستثمر
%0	وكيل خدمات	784195527187066	الإمارات	الشيخ فيصل بن خالد بن سلطان القاسمي	1338
%100	المالك		بلجيكا	شركة ان في بيكس ايه	36186

المدير	اوليفير سي ام كراسون
أنشطة الرخصة	مقاولات فئة أولى إختصاص, مباني
العنوان	الشارقة-المجاز/الشارقة- خلف شارع كورنيش البحيرة برج البطحاء -شقة رقم 2 طابق رقم 17 ملك البطاء للعقارات

رقم الهاتف المتحرك: 0504813314
صندوق البريد: 6256

Notes الملاحظات

رقم المستودع 710041 رقم اللوحة 263848

تاريخ الطباعة 2017/11/01
رقم المستخدم 43417

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GOVERNMENT OF SHARJAH
Economic Development Department

TRADING LICENSE

License No. : 531313 **Issue Date :** 23/11/2004
Registration No. : 30810 **Expiry Date :** 21/11/2018

Trade Name : N.V. BESIX S.A. (COMPANY) (Shj. Br.)
Legal status : Branch for Foreign Company

Investor No.	Investor Name	NATIONALITY	ID/PASSPORT NO.	TYPE	Shares
1338	SH. FAIZAL BIN KHALID SULTANT AL QASSIMI	UAE	784195527187066	Legal Agent	0%
36186	N.V. BESIX S.A. Company	BELGIUM		Owner	100%

Manager : Oliver C M Crasson
Activities : FIRST CLASS BUILDING CONTRACTORS
Address : Flat No. 1702, Al Batha Tower, Buhaira Corniche, Sharjah.

Telephone : 5733111
P.O.Box No : 1472

Notes:
Warehouse Permit No. 710041, Name Board Permit No. 263848

Printing Date : 01/11/2017
User Id : 43417

GOVERNMENT OF SHARJAH
Economic Development Department

حكومة الشارقة
دائرة التنمية الاقتصادية

شهادة سجل تجارية
Trading Register Certificate

License Details تفاصيل الرخصة

License No.	531313	رقم الرخصة	Registration No.	30810	رقم السجل
Expiry Date	2018/11/21	تاريخ الإنتهاء	Issue Date	2004/11/23	تاريخ الإصدار

Trade Name	N.V.BESIX S.A.(COMPANY)(SHJ.BR.)	شركة ان.في.بيسكس اس.ايه فرع الشارقة	الاسم التجاري
Legal status	Branch for Foreign Company	فرع لشركة أجنبية	الشكل القانوني

المدير	اوليفير سي ام كراسون
أنشطة الرخصة	مقاولات فئة أولى إختصاص, مباني
العنوان	الشارقة-المجاز/الشارقة-- خلف شارع كورنيش البحيرة برج البطحاء -شقة رقم 2 طابق رقم 17 ملك البطاء للعقارات

تاريخ الطباعة	2017/11/01
رقم المستخدم	43417

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للتأكد من صحة البيانات يرجى زيارة موقع الدائرة: www.sedd.ae
- يمنع منعاً باتاً توزيع الإعلانات في الاماكن العامة و الأحياء السكنية. التوزيع فقط عن طريق الصحف, المجلات وصناديق البريد.

UNITED ARAB EMIRATES
GOVERNMENT OF SHARJAH
Economic Development Department

TRADING REGISTER CERTIFICATE

Registration NO.	:	30810	License No.	:	531313
Date of Issue	:	23/11/2004	Expiry Date	:	21/11/2018

Trade Name : N.V. BESIX S.A. (COMPANY SHJ. BRANCH)
Legal status : Branch for Foreign Company

Manager : Oliver C M Crasson
Activities : FIRST CLASS BUILDING CONTRACTORS
Address : Flat No. 1702, Al Batha Tower, Buhaira Corniche, Sharjah.

Printing Date : 01/11/2017
User Id : 43417

غرفة تجارة وصناعة الشارقة
Sharjah Chamber of Commerce & Industry

شهادة عضوية
Membership Certificate
United Arab Emirates الإمارات العربية المتحدة

شهادة تسجيل عضوية لعام
Membership Registration Certificate For Year

2017

إن غرفة تجارة وصناعة الشارقة بناءً على قانونها رقم (١) لعام ٢٠٠٣م
Sharjah Chamber of Commerce and Industry according to the law no. (1) 2003

قد سجلت شركه ان فى بيسكس اس ايه فرع الشارقه

Company Name: N.V.BESIX S.A.COMPANY (SHJ.BR)

رقم العضوية / Membership Number: 066022

رقم الترخيص / License NO: 531313

الجنسية / Nationality: الامارات

رقم السجل التجاري / Commercial Registration NO: 30810

الشكل القانوني / Legal Form: فرع لشركة اجنبية

الفئة / Category: الممتازه ا

جنسية الشركاء / Partners Nationality: الامارات , بلجيكا ,

العنوان / Address: الشارقة-المجاز/الشارقة-- خلف شارع كورنيش البحيرة برج البطحاء -شقة رقم 2 طابق رقم 17 ملك البطاء للعقارات
SHARJAH-MAJAZ-- behaindasd -Flat No 2 Floor No 17 Owned By البطاء للعقارات

لممارسة نشاط / Activity: مقاولات فئة أولى إختصاص, مباني,
مقاولات فئة أولى إختصاص, مباني,

ملاحظات / Remarks:

SEDD

تاريخ الإصدار
23/11/2004

تاريخ الإنتهاء
21/11/2018

B 229547

MEMBERSHIP CERTIFICATE
SHARJAH CHAMBER OF COMMERCE & INDUSTRY

MEMBERSHIP REGISTRATION CERTIFICATE FOR YEAR (2017)

Sharjah Chamber of Commerce and Industry according to the law no.(1) 2003

Company Name	:	**N.V. BESIX S.A. COMPANY (SHJ. BR)**			
Member ship No.	:	**66022**	**Licence No.**	:	**531313**
Commercial Registration No.	:	**30810**	**Nationality**	:	**U.A.E.**
Category	:	**Excellent**			

Partner's Nationality : U.A.E. & BELGIUM

Address	:	**Sharjah, Majaz, Behind Corniche Road, Owned BY Al Batha Tower, Flat No. 2, Floor No. 17**
Activity	:	**First class building construction**

Issue Date 23/11/2004 **Expiry Date : 22/11/2018**

مركز أبوظبي للأعمال
Abu Dhabi Business Center

دائرة التنمية الاقتصادية
DEPARTMENT OF ECONOMIC DEVELOPMENT

Commercial License

رخصة تجارية

License No	: CN-2402965	:	رقم الرخصة
ADCCI No	: 357644	:	عضوية الغرفة
Legal Form	: Foreign Branch - Switzerland	: فرع أجنبية - سويسرا	الشكل القانوني
Trade Name	: HITACHI ZOSEN INOVA AG - ABU DHABI	: هيتاشي زوسن انوفا ايه جي - أبو ظبي	الإسم التجاري
Establishment Date	: 20/09/2017	:	تاريخ تأسيس المنشأة
Issue Date	: 20/09/2017	:	تاريخ الإصدار
Expiry Date	: 19/09/2018	:	تاريخ الإنتهاء

الصفة Role	الجنسية Nationality	الملاك / الشركاء Owners / Partners	الرمز No.
مالك Owner	سويسرا Switzerland	هيتاشي زوسن انوفا ايه جي HITACHI ZOSEN INOVA AG	41485713
وكيل خدمات Sponsor	الإمارات العربية المتحدة United Arab Emirates	أفهاد التجارية مملوكة لشركة أفهاد القابضة ذ.م.م. - شركة الشخص الواحد ذ.م.م AFHAD TRADING OWNED BY AFHAD HOLDING L.L.C. - SOLE PROPRIETORSHIP L.L.C.	41485712

Commercial Activities : — الأنشطة التجارية :

- Power Generation Plants Maintenance — صيانة محطات توليد الطاقة
- Constructional And Engineering Contracting Related To Technology Projects - Final Handover — المقاولات الانشائية والهندسية المتعلقة بمشاريع التقنية - تسليم المفتاح
- * Civil Works Of Energy Generation Construction Stations — * مقاولات الأعمال المدنية لمحطات توليد الطاقة وتحلية المياه

General Note : The Contractor is not permitted to practice the activities marked with sign (*) unless these activities are classified — ملاحظة عامة : لا يحق للمقاول ممارسة الأنشطة المشار إليها بعلامة (*) إلا بعد التصنيف فيها

Address : أبوظبي, شرق 6 - C1 - الطابق 9 مكتب 904, وحدة, احمد حمودة علي غان واخرون — العنوان :

تشهد غرفة ابوظبي بموجب القانون رقم 27 لعام 2005 بان المنشأة المذكورة اعلاه قد سجلت لدينا

Abu Dhabi Chamber certifies that the above mentioned establishment has been registered in accordance with the law No.27 of 2005

وثيقة معتمدة وصادرة بدون توقيع أو ختم من دائرة التنمية الاقتصادية - أبوظبي. للتحقق من صحة البيانات الواردة في الرخصة يرجاء زيارة الموقع http://www.ded.abudhabi.ae

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This Document is Considered As Commercial Register — تعتبر هذه الوثيقة بمثابة سجل تجاري

غرفة أبوظبي
ABU DHABI CHAMBER

LLOYD'S REGISTER QUALITY ASSURANCE ISO9001

رخصة تجارية عامة
General Trading License

LICENSE NO.	3369	٣٣٦٩	**رقم الرخصة**
REGISTRATION NO.	610	٦١٠	**رقم السجل التجاري**
LEGAL TYPE	FZE (Limited Liability)	م م ح (ذات مسؤولية محدودة)	**الشكل القانوني**
LICENSEE	Itochu Middle East FZE	ايتوشو الشرق الأوسط م م ح	**صاحب الرخصة**
OPERATING NAME	Itochu Middle East FZE	ايتوشو الشرق الأوسط م م ح	**الاسم التجاري**
DUNS NUMBERS	851196654	٨٥١١٩٦٦٥٤	**الرقم العالمي**
ADDRESS	Office No. LB12121	مكتب رقم١٢١ ال بي ١٢	**العنـوان**
	P.O.Box 61422	ص ب ٦١٤٢٢	
	Jebel Ali,	جبل على	
	Dubai	دبي	
	United Arab Emirates	الامارات العربية المتحدة	
MANAGER	Eiji Nonaka	ايجي نوناكا	**المـدير**
NATIONALITY	Japan	ياباني	**الجنسية**
ISSUE DATE	01/04/2002	٢٠٠٢/٠٤/٠١	**تاريخ الإصدار**
VALID TILL	31/03/2019	٢٠١٩/٠٣/٣١	**تاريخ الانتهاء**
ACTIVITY	General Trading	تجارة عامة	**النشـاط**

CN:9437

(O)

إدارة التسجيل التجاري
COMMERCIAL REGISTRATION DEPARTMENT
وثيقة إلكترونية معتمدة و صادرة بدون توقيع من سلطة المنطقة الحرة لجبل علي
Approved electronic document issued without signature by
JEBEL ALI FREE ZONE AUTHORITY

Appendix B – Letter of Commitment from Dubai Municipality

(Note: Dubai Municpality to provide a copy of the Letter of Commitment for insertion here.)

Appendix C – Trade Licenses and Certification of GHD

CERTIFICATE OF REGISTRATION
FOR ENVIRONMENTAL CONSULTANTS IN THE EMIRATE OF DUBAI
(Registration No. 006/2017)

This certificate is granted to **GHD Global Pty. Ltd.** on **31 January 2017** for satisfying the registration requirements as Environmental Consultant in the Emirate of Dubai. With the issuance of this certificate, Dubai Municipality – Environment Department (DM-ED) recognizes the competence of the company and expects it to conduct environmental consulting services with highest level of professionalism.

As a registered Environmental Consultant, the company is permitted to perform the following services, ***subject to the compliance with the attached conditions.***

Code	Scope of Environmental Services
A	Environmental Impact Assessment (EIA) Report for Category A Projects and Category B-Type A Projects (Major Industrial Activities), as identified under EPSS Technical Guidelines No. 2 and 3, respectively.
B	Land Contamination Investigation and Environmental Site Assessment
C	Waste Audits and Waste Management Studies
E_2	Air Quality Monitoring
F_2	Noise Monitoring
H	Marine and Estuarine Ecology Studies
I	Soil and Hydro-Geological (Groundwater) Studies
J	Terrestrial Ecology and Biodiversity Studies, Wildlife Survey, Capturing and Translocation of Indigenous Flora and Fauna

The registration is non-transferrable and shall remain valid until **31 December 2018** unless otherwise revoked or suspended by DM-ED, or the company ceases operation. It shall be applied for renewal at least ***thirty (30) days*** prior to its expiry.

بلدية دبي
DUBAI MUNICIPALITY
قسم الدراسات والتخطيط البيئي
Environmental Planning & Studies Section

Eng. Hind Mahmoud Ahmed
Head of Environmental Planning and Studies Section

CONDITIONS OF REGISTRATION

GHD Global Pty. Ltd. fully agrees that the following conditions of the registration shall be strictly followed and complied. Failure to do so shall result in the suspension or cancellation of this registration and/or that of a particular registered scope of environmental service.

1. The environmental services shall be limited only to the following activities, to be lead by the specialists as provided herein:

Code	Scope of Environmental Services	Specialists
A	Environmental Impact Assessment (EIA) Report for Category A Projects and Category B-Type A Projects (Major Industrial Activities), as identified under EPSS Technical Guidelines No. 2 and 3, respectively.	*Salma Bin Breik* *Katie Ward* *Edwin Palmer* *Gheeda Jaouhari* *Jennifer Calpo*
B	Land Contamination Investigation and Environmental Site Assessment	*Salma Bin Breik* *Katherine Hahn*
C	Waste Audits and Waste Management Studies	*Salma Bin Breik*
E_2	Air Quality Monitoring	*Katie Ward* *Ben Roa*
F_2	Noise Monitoring	*Salma Bin Breik* *Ben Roa*
H	Marine and Estuarine Ecology Studies	*Katie Ward* *Edwin Palmer* *Amit Nevase*
I	Soil and Hydro-Geological (Groundwater) Studies	*Dana Shashaa*
J	Terrestrial Ecology and Biodiversity Studies, Wildlife Survey, Capturing and Translocation of Indigenous Flora and Fauna	*Edwin Palmer* *Eric Cruz*

Notes:

a. *A registration under Code A does not automatically allow an Environmental Consultant to undertake all/any of the relevant environmental services as provided in other codes, even if these are part/required under an Environmental Impact Assessment (EIA) study. Any environmental report or any portions/sections of an EIA Report prepared by unregistered Environmental Consultant shall not be accepted or reviewed by DM-ED.*

b. *This registration shall automatically lose its validity whenever the DED (Department of Economic Development) license of the Environmental Consultant and/or the UAE residence/employment visa(s) of its registered specialist(s) have expired. The Environmental Consultant shall be solely responsible to update DM-ED for such changes.*

c. *Registered Environmental Consultants are allowed to accept any offer to conduct EIA study for any prescribed activities; however, it must be ensured that the EIA team is sufficiently competent to conduct the study. Therefore, in cases where detailed assessment is needed for certain environmental impacts, the EIA consultant shall consider engaging other registered Environmental Consultant(s). The judgment on the expertise needed shall be based on the nature of the proposed activity, locality and possible significant impacts. Detailed information on team members, such as registration number, academic background and his registered areas/environmental code, must be included as an attachment to the EIA report.*

2. Provide the agreed environmental services to its clients, and satisfy the environmental requirements of Dubai Municipality-Environment Department (DM-ED) with the highest level of professionalism and competence (i.e. submission of the relevant and clearly written reports, inclusion of accurate information and attachments specified in the Technical Guidelines, Local Orders or as required by DM-ED, provision of timely environmental advisory services and appropriately represent its client to DM-ED).

3. Ensure the validity of its DED (Department of Economic Development) license with the activity "*Environmental Consultants and Studies*" and UAE residence/employment visas of its expatriate employees who are registered as specialists with DM-ED.

4. Secure prior approval from the project owner/developer for any sub-contracting of environmental services. Sub-contracting shall be restricted only to Environmental Consultants who are also registered with DM-ED to undertake a particular environmental service.

5. Only Dubai Accreditation Center (DAC)-accredited laboratories (if applicable) shall be commissioned/sub-contracted in all environmental sample collections and analysis. Prior approval from the Environmental Planning and Studies Section (EPSS) shall be secured for laboratory companies sub-contracted for field monitoring (e.g. air quality and noise monitoring, etc.) which are not registered to conduct the relevant activity/analysis and/or without the appropriate accreditation from DAC. This shall be supported by a written acknowledgement from the project owner / developer.

6. Declare the names of the manager and all concerned specialists, with corresponding signatures and contact details, on all environmental reports, and to attend all technical meetings that may be called by the DM-ED. The signatures affixed in the reports signify the accountability of concerned personnel on the accuracy of all information contained therein.

7. Apply for the revalidation of registration in the event of resignation/retrenchment of a registered specialist (i.e. specialist in-charge for a particular environmental service/registration code). The Environmental Consultant is restricted from submitting reports related to the affected service/environmental code, unless a replacement has been employed for the resigned/retrenched specialist in time for the study, and its application for revalidation has been approved by EPSS.

8. Apply for the renewal of registration at least thirty (30) days before its expiry with the submission of updated documentary requirements[1]. The renewal of registration is subject to re-evaluation of the Environmental Consultant's qualifications (either through an oral interview or written exam relevant to the code being applied), submissions, compliance with the conditions of its registration, and performance for each of the environmental services it is registered to.

9. A continuous evaluation process shall be employed with the objective to provide constant evaluation on the Environmental Consultants' performance. To ensure fair and uniform assessment, DM-ED review staff will provide their comments on the Environmental Consultants' performance based on the aforementioned registration requirements, actual performance and submitted reports. All comments including infractions will be channeled to EPSS, and will be used for renewal purposes or reason for registration revocation.

10. Registered environmental consultants can be deregistered or suspended if they fail to comply with the *Code of Conduct for Environmental Consultants,* or fail to fulfill the minimum requirements of the evaluation, and/or providing the necessary expertise or experience, and/or other reasonable grounds. In cases where registration is suspended or revoked, the Environmental Consultant is entitled to appeal in writing. The appeal must be received by EPSS within one (1) month from the date of rejection / revocation.

[1] DM-ED / EPSS will not inform Environmental Consultants for any renewals.

CODE OF CONDUCT FOR ENVIRONMENTAL CONSULTANTS

All Registered Environmental Consultants are obliged to improve the standing of the consultancy profession by rigorously observing this Code of Conduct. Failure to do so shall result in suspension/withdrawal of registration with the Dubai Municipality Environment Department (DM-ED).

Upon registration, the Environmental Consultant agrees and shall adhere to the following set of responsibilities, but not limited to:

1. To act professionally, accurately and in unbiased manner, and not undertake any job that the Environmental Consultant is not competent to perform;

2. To be truthful, accurate and fair to the assigned work, without any fear or favor while striving to increase the competence and prestige of the environmental impact assessment profession;

3. To judiciously use information required by concerned authorities or acquired from the client in the development and preparation of the Environmental Impact Assessment (EIA) and any relevant environmental reports, and maintains confidentiality of information as required;

4. Not to intentionally communicate false or misleading information that may compromise the integrity of any EIA study;

5. To avoid and/or declare any conflict of interest that may affect the work / assignment to be carried out;

6. Not to accept any favor from the clients or other representatives;

7. Not to act in a manner detrimental to the reputation of any of the stakeholders, client and government authorities reviewing the EIA; and

8. To cooperate fully in any formal enquiry procedure of government authority.

Further information is available at the
Environmental Planning and Studies Section (EPSS)
Tel: 04-6066757 / Fax: 04-7033565
or at the Dubai Municipality Website:
www.dm.gov.ae

رخصة مهنية
Professional License

License Details / تفاصيل الرخصة

License No.		رقم الرخصة	526735
		الإسم التجارى	جي اتش دي جلوبال بي تي واي ليمتد - فرع دبي
Trade Name	G H D GLOBAL PTY. LTD.		
Legal Type	Branch of Foreign Company	الشكل القانونى	فرع شركة أجنبية
Expiry Date	26/05/2020 تاريخ الإنتهاء	Issue Date	27/05/2001 تاريخ الإصدار
D&B D-U-N-S ® No	561224312 الرقم العالمى	Main License No.	526735 رقم الرخصة الام
Register No.	رقم السجل التجارى	DCCI No.	119595 عضوية الغرفة

License Members / الاطراف

رقم الشخص/No.	الإسم / Name	الجنسية / Nationality	الصفة / Role	الحصص / Share
133667	جي اتش دي جلوبال بي تي واي ليمتد	استراليا / Australia	مالك / Co. Owner الشركة	
416360	اين انجوس كوشيون	بريطانيا / United Kingdom	مدير / Manager	

License Activities / نشاط الرخصة التجارية

Environmental Consultants & Studies الاستشارات والدراسات البيئية

Architectural Design Consultancy إستشارات هندسة التصميم المعماري

Construction Engineering Services خدمات هندسة إنشاءات الأبنية

Address / العنوان

Phone No	971-4-2949858 تليفون	P.O. Box	35972 صندوق بريد
Fax No	971-4-2949740 فاكس	Parcel ID	392-472 رقم القطعة
Mobile No	971-50-3578979 هاتف متحرك		مكتب رقم 1806 ملك الفن موساييف - مرسى دبي

Remarks / الملاحظات

فرع مكتب هندسي أجنبي يقتصر عمله على مجالات التخصص الدقيق غير المتوفرة في المكاتب الهندسية المحلية.

تم نقل الموقع في 8/5/2018

Print Date	30/05/2019 11:38 تاريخ الطباعة	Receipt No.	0	رقم الإيصال	

يمكنك الآن تجديد رخصتك التجارية من خلال الرسائل النصية القصيرة، أرسل رقم الرخصة إلى 6969 (دو/اتصالات) للحصول على اذن الدفع.

Now you can renew your trade license by sending a text message (SMS). Send your trade license number to 6969 (Du/ Etisalat) to receive payment

Dear Trader,

Kindly take into consideration the following instructions

عزيزي التاجر:

نرجو أخذ التعليمات التالية بعين الاعتبار

1. Do not practice a business activity without a license or permit.
2. Do not change the license location or relocate to another site without getting DED approval.
3. Make sure of having a trade name compliant to the name mentioned in the license.
4. Do not place sales, discounts or special offers without permission.
5. Do not make any amendments or changes in the license information unless you request DED approval.
6. Make sure of putting down prices on goods and commodities.
7. Make sure of putting down the date of production and expiry.
8. The consumer has the right to receive an invoice.
9. Announce the sale and purchase policy to the customer using suitable media (noting the replacement, repair and recovery policy)
10. Do not promote or sell or offer any counterfeited or fake goods.
11. Make sure of registering your trade mark at the Ministry of Economy for protection.
12. Report to the Department of Economic Development incidents regarding any counterfeited goods in the local market.
13. In the case of warehouse or store related to the licenses, kindly visit Permits section in our branches (Business Village, AlTowar or Dubai Mall) to get the necessary permission.
14. According to the decision no. 323 of 2012 issued by His Excellency the Minister of Labor all enterprises that employ UAE and GCC nationals have up to a maximum period of three months to register them with the Ministry of Labor.

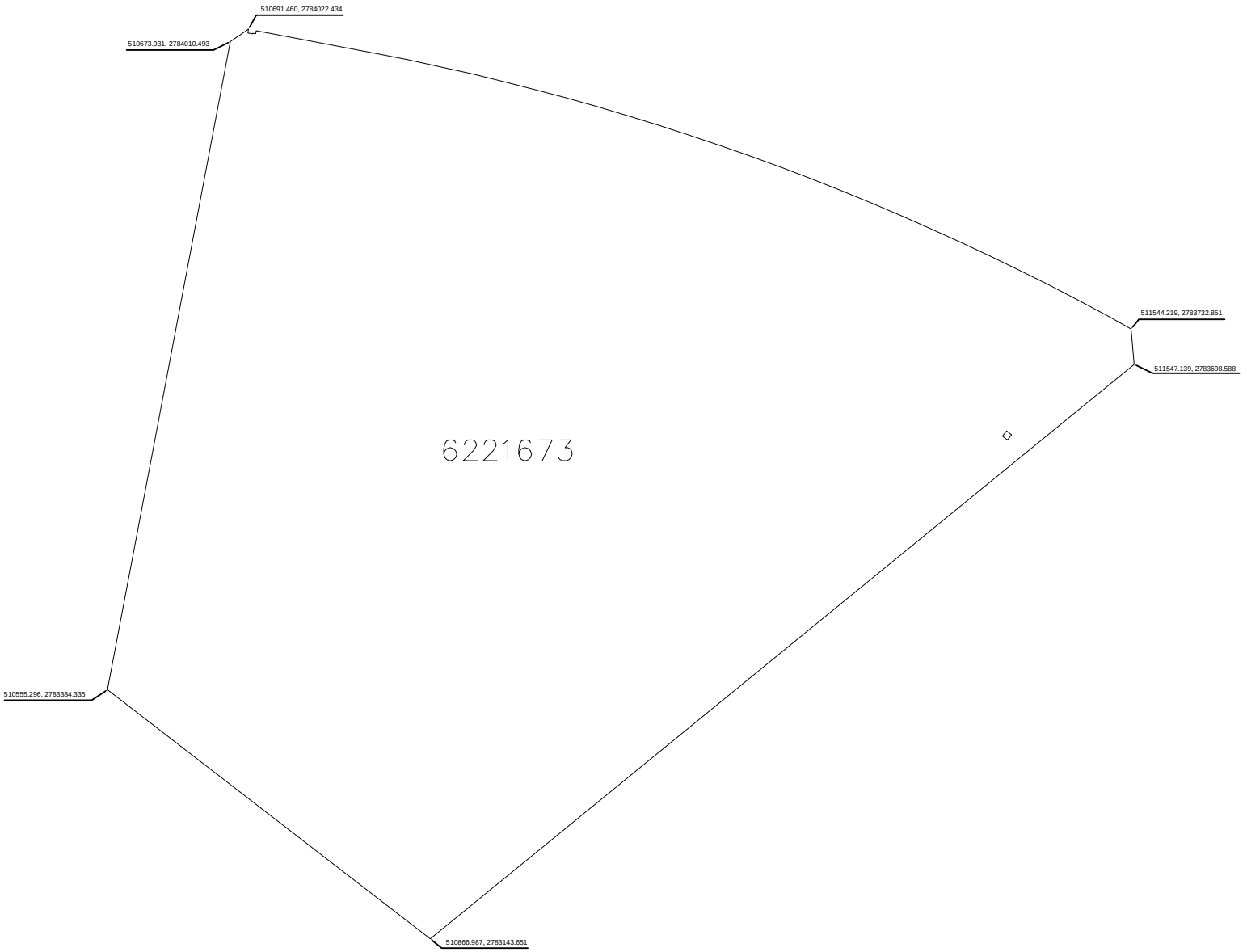
1. عدم مزاولة النشاط في موقع بدون ترخيص أو تصريح.
2. عدم القيام بتغيير موقع الترخيص والانتقال إلى موقع آخر دون الحصول على موافقة الدائرة.
3. ضرورة أن يكون الاسم التجاري المدون على اللافتة مطابق للاسم المدون بالرخصة.
4. عدم إجراء التنزيلات أو التصفيات أو العروض الخاصة بدون تصريح.
5. عدم إجراء أي تعديل أو تغيير بيانات الترخيص إلا بعد الرجوع للدائرة.
6. الالتزام بكتابة الأسعار على السلع والبضائع.
7. الالتزام بكتابة تاريخ الإنتاج والانتهاء على السلع.
8. للمستهلك الحق في الحصول على فاتورة الشراء.
9. الإعلان عن سياسة البيع للمستهلك عبر وسيلة إعلان مناسبة شاملة (لعملية الاسترجاع أو الاستبدال أو الإصلاح للسلع).
10. عدم القيام بالترويج أو البيع أو العرض لأية بضائع مقلدة أو مغشوشة.
11. الحرص على تسجيل العلامة التجارية بوزارة الاقتصاد بهدف حمايتها.
12. إبلاغ الدائرة في حالة وجود أي منتج أو بضائع مقلدة في السوق المحلي.
13- في حال وجود مخزن أو مستودع تابع للرخصة فيرجى التكرم بزيارة قسم التصاريح في فرع قرية الاعمال أو الطوار أو دبي مول للحصول على التصريح اللازم.
14. بناء على قرار معالي وزير العمل رقم 323 لعام 2012، على جميع المنشآت التي توظف مواطنين من دولة الامارات و دول مجلس التعاون أن تقوم بتسجيلهم لدى وزارة العمل خلال مدة أقصاها ثلاثة شهور

Print Date 30/05/2019 11:38 **تاريخ الطباعة** **Receipt No.** 0 **رقم الإيصال**

يمكنك الآن تجديد رخصتك التجارية من خلال الرسائل النصية القصيرة، أرسل رقم الرخصة إلى 6969 (دو/اتصالات) للحصول على اذن الدفع.

Now you can renew your trade license by sending a text message (SMS). Send your trade license number to 6969 (Du/ Etisalat) to receive payment

Appendix D – Affection Plan

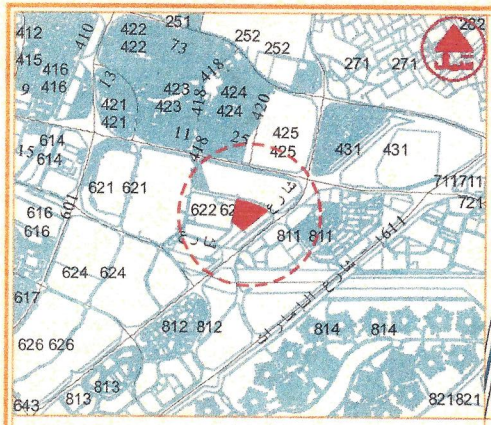


بلدية دبي
DUBAI MUNICIPALITY

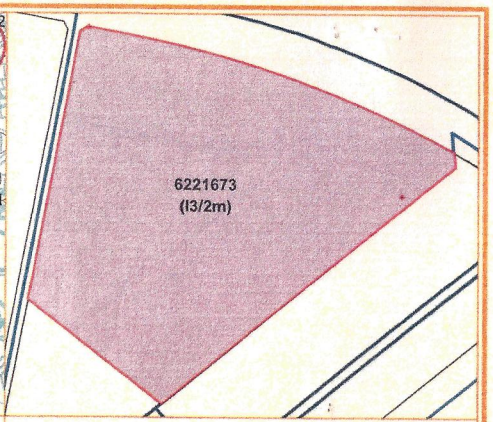
إداره المساحة
SURVEY DEPARTMENT
قسم بيانات الأراضي وإصدار الخرائط
LAND INFORMATION AND MAPS ISSUING SECTION

SCALE	NTS	HEAD OF UNIT	
DATE	16 /09 /2018	HEAD OF SECTION	

N



الموقع العام



تصنيف استعمالات الأرض

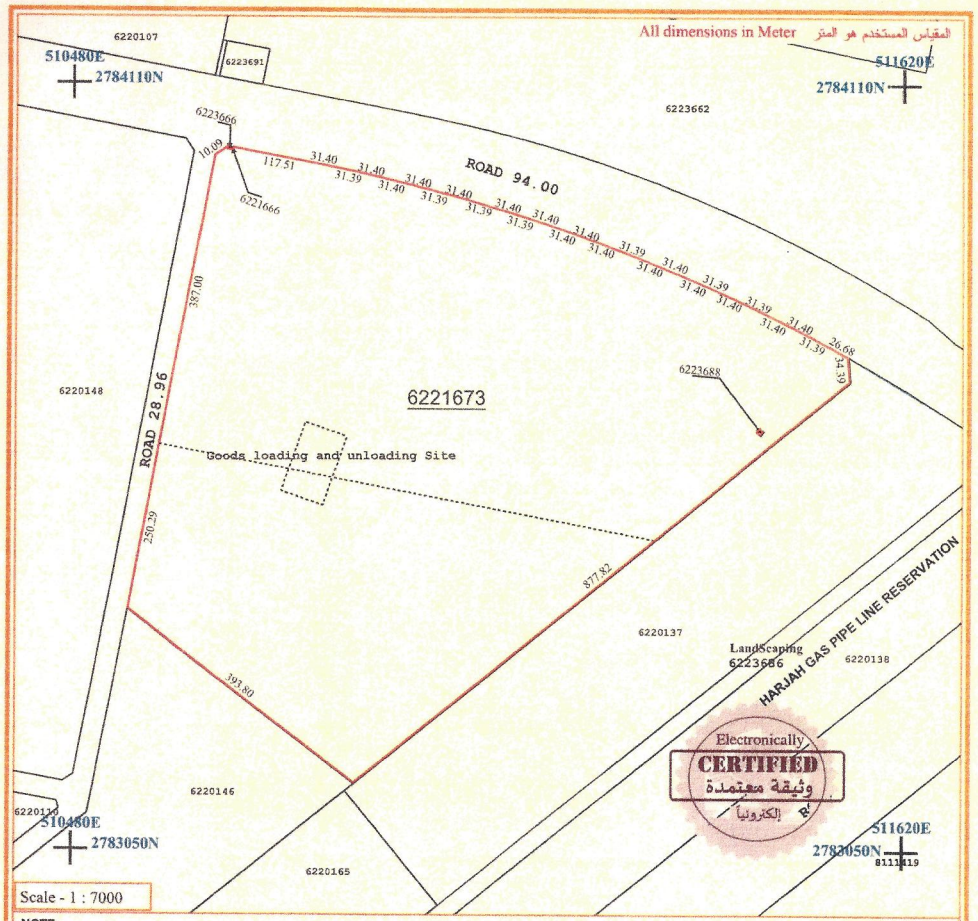
المعلومات التخطيطية لقطعة الأرض رقم 6221673 كما يلي :

الاستعمال :	I3/2m	مشروع تحويل النفايات إلى طاقة
الارتفاع :	I3/2m	---
المواقف :	I3/2m	---
الارتداد :	I3/2m	---
ملاحظات :	I3/2m	---

المنسوب المرجعي = (30) سم من منسوب أي طريق قائم مجاور
يتحمل المالك تكاليف نقل خطوط الخدمات إن وجدت

هذه المعلومات التخطيطيه سارية المفعول مالم تتعارض مع التشريعات التخطيطية المصعده و للتأكد من صلاحيتها قبل البيع والشراء يرجى الدخول إلى موقع البلدية الالكتروني (www.dm.gov.ae) واستخدام تطبيق مكتشف الأراضي أو من خلال تطبيق IDUBAI

The information is applicable as long as it does not conflict with other approved planing regulations, and should always be reviewed for validity upon selling or purchasing. Please visit (www.dm.gov.ae) plot locator Application and IDUBAI app.



NOTE:-
PLAN AS PER PLANNING
FOR DIMENSION DETAILS CONTACT SURVEY DEPARTMENT
THE OWNER WILL BE RESPONSIBLE FOR THE CHECKING OR RELOCATION OF SERVICES FOUND WITHIN THE PLOT

ملاحظة:-
الخارطة بعد إعادة التخطيط
لتحديد الابعاد يرجى مراجعة إدارة المساحة
على المالك تحمل نقل الخدمات إن وجدت

OWNER OF TITLE :

اسم المالك :

بلدية دبي - إدارة الممتلكات
DUBAI MUNICIPALITY - PROPERTIES DEPARTMENT

REF : DM PART OF 622-146 WARSAN SECOND DATED 12-06-2018

المرجع:

TOTAL AREA	sq. m.	506096.14	متر مربع	المساحة الكلية
	sq. ft.	5447573	قدم مربع	
AFFECTED AREA	sq. m.	NIL	متر مربع	المساحة المتأثرة
	sq. ft.	NIL	قدم مربع	
SIKKA SETBACK AREA	sq. m.	NIL	متر مربع	مساحة ارتداد السكة
	sq. ft.	NIL	قدم مربع	
COMPENSATION AREA(MORE THAN 20%)	sq. m.	NIL	متر مربع	مساحة التعويض (أكثر من20%)
	sq. ft.	NIL	قدم مربع	
BALANCE AREA	sq. m.	506096.14	متر مربع	المساحة المتبقية
	sq. ft.	5447573	قدم مربع	

OWNER TITLE : Granted — حيازة المالك: منحه
DATE: 03/09/2018 — تاريخ الاصدار
FIRST PLAN DATE : — تاريخ أول خريطة

مدير عام بلدية دبي
DIRECTOR GENERAL OF DUBAI MUNICIPALITY

www.makani.ae

خريطة التخطيط
AFFECTION PLAN

PARCEL ID. رقم القطعة: 6221673
COMMUNITY المنطقة: ورسان الثانية WARSAN SECOND

بلدية دبي DUBAI MUNICIPALITY

Prepared By : OMSAIF

CONFIDENTIAL

Appendix E – Approved Scope of Work Report

Hitachi Zosen Inova

Dubai Resource Recovery Facility
(Waste to Energy Plant)
Scope of Work Report

July 2018

This report: has been prepared by GHD Global Pty Ltd (GHD) for Hitachi Zosen Inova AG – Abu Dhabi (HZI) and may only be used and relied on by HZI for the purpose agreed between GHD and the HZI as set out Section 1 of this report. As set forth in the Amendment No. 1 to the agreement, there is a relationship between HZI and N.V. BESIX S.A. Sharjah Branch (Besix).

GHD otherwise disclaims responsibility to any person other than HZI arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer Section 1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by HZI, Besix and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

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Appendices

List of Abbreviations

°C	Degree Celsius
ACES	Arab Center for Engineering Studies
BESIX	NV Besix
CEC	Conditional Environmental Clearance
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DAC	Dubai Accredited Centre
DEWA	Dubai Electricity and Water Authority
DIAC	Dubai International Academic City
DIC	Dubai International City
DM	Dubai Municipality
DM-ED	Dubai Municipality Environmental Department
DM-WMD	Dubai Municipality Waste Management Department
DSC	Dubai Statistics Centre
EfW	Energy from Waste
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
DM-EPSS	Dubai Municipality Environmental Planning and Studies Section
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Programme
EMP	Environmental Management Plan
EU	European Union
FGT	Flue Gas Treatment
GCC	Gulf Cooperation Council
GHD	GHD Global Pty Ltd

GHG	Greenhouse Gas
GLC	Ground Level Concentrations
HCl	Hydrochloric acid
HF	Hydrofluoric acid
HHRA	Human Health Risk Assessment
HP	High Power
HZI	Hitachi Zosen Inova
IBA	Incinerated Bottom Ash
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
kg/t	Kilograms per tonne
m^2	square meter
m^3	cubic meter
m^3/h	cubic meter per hour
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MW	Mega Watt
NAAQS	National Ambient Air Quality Standards
NO_2	Nitrogen Dioxide
NOC	No Objection Certificate
NOx	Nitrogen Oxide
NSR	Noise Sensitive Receptor
ODS	Ozone Depleting Substances
O_3	Ozone
OSHA	Occupational Health & Safety Administration
PM_{10}	Particulate Matter 10 micrometers of less in diameter
Q1	Quarter 1
Q2	Quarter 2
Q3	Quarter 3
Q4	Quarter 4

RTA	Road and Transport Authority
SEP	Stakeholder Engagement Plan
SF_6	Sulphur Hexafluoride
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulphur Dioxide
SO_3	Sulphur Trioxide
SoW	Scope of Work
STP	Sewage Treatment Plant
TIS	Traffic Impact Study
tpd	Tonnes per day
tph	Tonnes per hour
TSP	Total Suspended Particulates
VOC	Volatile Organic Compounds
WHO	World Health Organization
WtE	Waste to Energy

1. Introduction

1.1 Overview

Dubai Municipality (DM) proposes the development of the Dubai Resource Recovery Facility (Waste-to-Energy Plant, WtE, plant) (Project) at the existing DM vehicle storage site in Warsan, Dubai, specifically Warsan 2. The proposed Project WtE plant will treat about 1,825,000 tonnes of municipal solid waste (MSW) per year (estimated 5,000 tonnes per day (tpd)) to generate an estimated 200 MW of electricity to power about 120,000 homes.

Hitachi Zosen Inova (HZI), a global leader in Energy-from-Waste (EfW) technology, and NV Besix SA, Sharjah branch (BESIX), a Belgian construction company, formed a partnership to build, operate and transfer (BOT) the WtE plant after 30 years operation.

GHD Global Pty Ltd (GHD) has been engaged by HZI as the Project environmental consultant and has been tasked with undertaking the Environmental Impact Assessment (EIA) and preparing documentation to support applications for environmental clearance for the proposed Project from the Dubai Municipality-Environmental Department (DM-ED).

This report comprises the Scope of Work (SoW) report for the EIA and provides a description of the Project, defines the Project's environmental requirements and specifies the proposed methodology for undertaking the EIA, for comment by the DM-ED.

1.2 Requirement for an EIA

Considering the nature and scale of the proposed Project, it is considered that an EIA is required[1]. As such, HZI has commissioned GHD to prepare an EIA for submission to the DM-ED in accordance with DM requirements.

The EIA process will be undertaken in accordance with DM technical guidelines as follows:

- DM Technical Guideline No. 1 (TG No. 1) – Environmental Impact Assessment (January 2017); and
- DM Technical Guideline No. 2 (TG No. 2) – EIA Requirements for Land Development, Infrastructure and Utility Projects (January 2017).

As HZI and BESIX plan to seek funding from international lending institutions, the Project needs to comply with the Equator Principles 1 to 10 (effective 04 June 2013) and International Finance Corporation (IFC) Performance Standards 1 to 8 (effective 01 January 2012), as well as applicable World Bank Environmental Health and Safety (EHS) Guidelines. As part of the review and due diligence, international lending institutions uses a process of categorization[2] to reflect the magnitude of risk and impacts. Using the categorisation process of IFC, the Project can be considered in the Category B to be confirmed by the project proponent.

At the time of preparation of the EIA, HZI and BESIX had not engaged a project lender. Therefore, at the time the lender/s is/are confirmed, the EIA may require supplemental updates or revisions to address lender requirements.

As per DM's TG No. 1, Section 6.2, a SoW Report or Terms of Reference shall be prepared and submitted to the DM-ED for review and approval prior to conducting the EIA study. It is noted

[1] As per DM-ED's Technical Guideline Number 1: Environmental Impact Assessment System dated March 2014.

[2] Environmental and Social Categorization: Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible, or unprecedented; Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely irreversible and readily addressed through mitigation measures; and Category C: Projects with minimal or no adverse environmental and social risks and/or impacts

that the EIA process shall not commence without prior approval of the SoW Report by DM-ED. Therefore, this Report serves as the SoW Report for the Project.

1.3 Report Objectives

Scoping is an essential first step in the assessment of a proposed project. This SoW is prepared with the following objectives:

- Identify at an early stage what the key receptors are;
- Identify the likely zone of impact;
- Identify key issues for the development in terms of potential environmental and social impacts on component receptors based on the Project description and the nature of components and receptors; and
- Define the methodologies to employ in the baseline data collection and impact assessment and identification.

1.4 Limitations and Assumptions

- The proposed scope and methodology have been developed based on an understanding of the proposed Project, the site, the availability of existing data, and the proposed role of other specialist consultants in their provision of information to be incorporated into the EIA.
- Assessment of the waste storage facility for the bottom ash and flue gas treatment (FGT) residue is not included as part of the study as it is not the responsibility of HZI. DM is undertaking concurrent projects for review of the bottom ash and FGT residue management options, which will integrate appropriate environmental reviews and approvals as per DM requirements. Bottom ash and FGT residue management is under the responsibility of DM-WMD, and the anticipated location of disposal for this material is being evaluated separately by DM-WMD. The scope of the EIA will be limited to the Project site footprint and the area of impact immediately around it as described in Section 2.
- It is assumed that all information provided by HZI and/or the Project consultants for the preparation of this SoW is accurate.
- This SoW was developed prior to finalization of the conceptual design of the proposed Project. Any key impact significant to the design would result in a corresponding change to the SoW for the EIA.

2. Project Description

2.1 Project Entities

The project entities include:

- **Project Proponent:** Dubai Municipality (DM)
  - DM is the lead governmental institution and driver of growth and evolution of the Emirate of Dubai. DM initiated the Project in order to produce electricity from the treatment of municipal solid waste, and in line with the waste management strategy.
- **Engineering, Procurement and Construction (EPC) Contractor:** Partnership between Hitachi Zosen Inova AG – Abu Dhabi (HZI) and NV Besix AD Sharjah branch (BESIX)
  - HZI is a global leader in EfW and has more than 80 years of experience and credentials in delivering waste to energy plants. HZI is the technology provider for the Project.
  - Six Construct and BESIX were involved with some of the most cherished and unique landmark projects in Dubai. BESIX is the construction contractor and civil works design engineer for the Project.
- **Environmental Consultant:** GHD Global Pty Ltd (GHD)
  - GHD is one of the world's leading engineering, architecture and environmental consulting companies. GHD operates under a Practice Quality Management System, ISO 9001:2008 and an Environmental Management System, ISO 14001:2004 which are certified by Lloyds Register Quality Assurance. GHD has been engaged by HZI as the Project environmental consultant.

2.1.1 Project Proponent

DM, as the Project's lead governmental institution and leading driver of growth and evolution of the Emirate of Dubai, contracted a partnership between HZI and BESIX to provide EPC services for the Waste to Energy Project. The details of the key point of contact are provided in Table 2-1.

Table 2-1 Project proponent details

Proponent	Dubai Municipality
Address	PO Box 67 Dubai, UAE
Telephone Number	To be defined at a later stage
Facsimile Number	To be defined at a later stage
Contact Person	To be defined at a later stage

2.1.2 Engineering, Procurement and Construction Contractor

The Proponent commissioned the partnership between HZI and BESIX to provide EPC services, including 30 years operation and ownership of the Project. The details of key contacts are provided in Table 2-2.

Table 2-2 EPC Contractor details

Name	Hitachi Zosen Inova AG (HZI)
Address	Branch Office Abu Dhabi Bin Hamoodah Tower, 9th Floor Office 904 Khalifa Street, PO Box 43199 Abu Dhabi, United Arab Emirates
Telephone Number	+971 2 626 0984
Facsimile Number	+971 2 627 6181
Contact Person	Roni Araiji Managing Director
Name	BESIX Group
Address	11A Street Al Quoz 3 Dubai, United Arab Emirates
Telephone Number	+971 4 509 2222
Facsimile Number	+971 4 347 3512
Contact Person	Nico De Koning Bid Manager

2.1.3 Environmental Consultant

HZI and BESIX engaged GHD as the environmental consultant for the Project. The SoW was prepared by GHD on behalf of HZI. The contact details for GHD are provided in Table 2-3.

Table 2-3 Contact details of environmental consultant

Name	GHD Global Pty Ltd
Address	3rd Floor Guardian Tower, Danet Community PO Box 45921 Abu Dhabi, UAE
Telephone Number	+971 2 696 8700
Facsimile Number	+971 2 447 2915
Contact Person	Salma Bin Breik Project Director

The professional staff designated for working on the SoW and the EIA and their expertise are provided in Table 2-4.

Table 2-4 Expertise of team members

Name	Key Role in SoW / EIA	Expertise
Salma Bin Breik	*Project Director* Oversee the program management to ensure delivery in accordance with HZI and Besix's expectations.	EIA Study Contract Management Waste Management
David Wright	*Project Manager* Responsible for the day-to-day project activities. David is familiar with project approvals for Dubai Municipality and brings industry leading experience in waste services.	EIA Study Project Management Waste Management
Gheeda Jaouhari	*Project Manager Support* Alternate project manager when the assigned PD and PM are on leave. Baseline survey co-ordinator.	EIA Study Baseline Surveys and Monitoring
Geraldine Squires	*Technical Lead – ESIA* Provides technical advice throughout the Project and reviews all ESIA deliverables. Reviews compliance to international requirements	EIA Study (Impact Assessment Specialist) Environmental Management Social Sustainability and Stakeholder Engagement
Roland Shine	*Principal Environmental Consultant* Completes the terrestrial ecology survey, reviews SoW for consistency with local requirements	EIA Study SoW Report Terrestrial Survey
James Forrest	*Air and Noise Specialist* Undertake the air and noise modelling and impact assessment for the Project.	EIA Study Air and Noise Modelling
Sue Trahair	*Lead Environmental and GHG Auditor* Undertake the greenhouse gas (GHG) assessment for this project.	EIA Study GHG Assessments
Jennifer Calpo	*Environmental Scientist / Stakeholder Engagement Specialist* Undertake stakeholder engagement, social impact assessment and assist with all aspects of Project deliverables.	EIA Study SoW Report Social Sustainability and Stakeholder Engagement Environmental Management
Francis Ramacciotti	*Senior Human Health Risk Assessor* Undertake the qualitative Human Health Risk Assessment for this Project.	Human Health Risk Assessment

Name	Key Role in SoW / EIA	Expertise
April Gowing	*Health, Safety and Environment Specialist / Human Risk Assessment* Undertake the qualitative Human Health Risk Assessment for this Project.	Risk Assessment Human Health and Risk Assessment
Birwa Sanghani	*Project Support* Field and office support	Environmental science and field support
Dr David Maunder	*Technical Advisor* Provide technical advice to Project team on operational aspects related to the Project	Project Development Biomass and Waste-to-Energy Projects Technical and Commercial Advisory

2.1.4 Anticipated Sub-Consultants

GHD will engage sub-consultants to perform baseline sampling and monitoring for the Project. Details are provided in Table 2-5.

Table 2-5 Sub-consultants

Name	Key Role in SoW / EIA	Expertise
Core Laboratories	*Air and Noise Monitoring / Soil, Water and Groundwater Analysis* A Dubai Accredited Center (DAC) laboratory engaged by GHD to undertake baseline air and noise monitoring as well as analysis of soil, water and groundwater samples to be collected from the Project site.	Baseline Survey
Arab Center for Engineering Studies (ACES)	*Geotechnical Investigation* A DAC laboratory engaged by GHD to undertake drilling of land boreholes to specific depths and collect soil and groundwater samples from the Project site.	Baseline Survey

2.2 Project Site

The Project is proposed to be located at the waste landfill site in Warsan, Dubai, specifically Warsan 2 (Figure 2-1). The Project is located approximately 17 km east of Bur Dubai, 10 km southeast of the Dubai International Airport and 13 km south of Al Qusais Landfill.

Paper Size ISO A3

0 1,000 2,000 3,000 4,000

Meters

Horizontal Datum: WGS 1984
Grid: GCS WGS 1984

N

GHD

Hitachi Zosen Inova Ltd
Dubai Resource Recovery Facility
ESIA

Project No. 76-10735
Revision No. A
Date 20/06/2018

Regional setting of the Project site

FIGURE 2-1

G:\71\12289\71228921 (7610735)\GIS\Maps\MXD\7610735_01_LocMap_revA.mxd
Print date: 20 Jun 2018 - 16:08

Data source: GHD - Project Site (2018). Image © 2018 DigitalGlobe/Data SIO, NOAA,U.S. Navy, NGA, GEBCO . Created by: dbbanatin

2.3 Surrounding Land Use and Site Condition

The purpose of this section is to provide information regarding the existing site conditions, and surrounding land uses and facilities, in order to inform the identification of potential environmental impacts from the Project. This section therefore sets-forth an overview of the environmental conditions as background for the methodology to be employed for the EIA study.

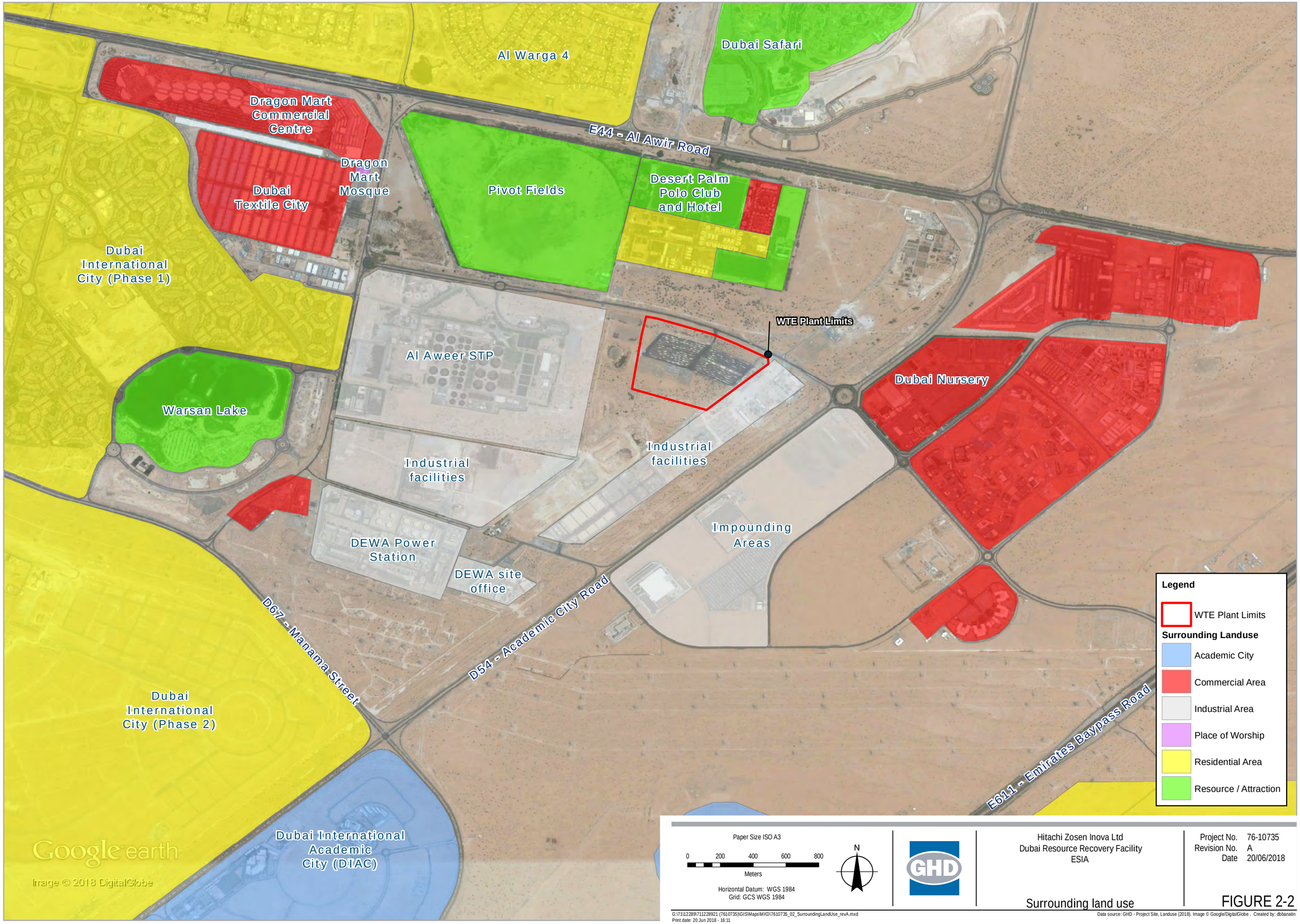
2.3.1 Surrounding Land Use

The Project is proposed to be located at a DM owned site in Warsan, Dubai (specifically Warsan 2). Specifically, the site of the proposed WtE Plant is to the east of the Al Aweer Sewage Treatment Plant (STP).

In general, land uses surrounding the proposed Project site are shown on Figure 2-2 and described as follows:

- **Industrial areas** (grey):
  - To the immediate west of the proposed Project site is the Al Aweer STP. As one of two wastewater treatment plants serving Dubai, the Al-Aweer STP is an essential component of the wastewater treatment capacity of the Emirate. The plant receives both domestic wastewater and septage. The plant performs both tertiary wastewater treatment for irrigation reuse and sludge treatment for reuse as soil amendment. The plant was initially designed with a capacity of 130,000 cubic metres per day, which was later upgraded to 260,000 cubic metres per day.
  - To the southwest is the Dubai Electricity and Water Authority (DEWA) Power Station. Support facilities for the Power Station also include DEWA's corporate office and the DEWA Al Warsan Central Store.
  - Industrial Facilities. To the immediate east and southeast of the Project site are a number of industrial facilities and storage areas such as German Ready Mix-RAK Mix, Arar Store, EEE Warsan Store, Emirates Beton, Readymix LLC, China Asphalt Mixing Plant, DEWA Al Warsan Central Store, among others.
  - To the southeast of the Project is the Dubai Police Transport Impounding Area.
- **Resource / Attraction** (green):
  - To the north of the Project site is the Desert Palm Polo Club and Hotel and Dubai Safari Park, both of these sites include recreational uses.
  - The Dubai Pivot Fields consisted of two circular grassy fields (watered by two pivotal watering structures). It was a location for bird watching. The site used to consist of a turf farm where there was recorded presence of masked shrikes and white-tailed lapwings. However, in the present-day condition, the site is inoperable, and the watering stopped in July 2015. The site is no longer grass covered because it is no longer maintained and not irrigated.
  - Al Warsan Lakes are two lakes connected to each other, located around 1.85 km west of the Project. Al Warsan Lakes used to be one of Dubai's birding sites but with the construction of facilities in the surrounding areas, it has shrunk in size and lost 90% of the birds used to be present (Pedersen, undated).
- **Residential areas** (yellow):
  - Al Warqa 4 Neighbourhood is approximately 2 km north of the Project.
  - Dubai International City (DIC) Phase 1 is located around 2 km west of the Project.
  - DIC Phase 2, which is under construction, is located around 3 km southwest of the Project.

- **Commercial areas** (red):
  - Located around 2 km northwest of the Project is the Dubai Textile City, which consist of modern warehouses, offices and showrooms that exhibits Dubai's textile business.
  - Located northwest of the Project is the Dragon Mart Commercial Centre, which is considered as the largest trading hub for Chinese products outside mainland China and offers a unique platform for traders of Chinese goods in the Middle Eastern and North African markets.
  - The Dubai Municipal Nursery is a plant nursery. At the site there are a variety of plants sold, and other gardening activities.
- Located around 3 km south of the Project is the Dubai International Academic City (DIAC), which has an area of 12,000,000 m^2 where educational institutions are based (light blue).
- Place of Worship (light purple). Located around 1.8 km northwest of the Project is the Dragon Mart Mosque.



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Meters

Horizontal Datum: WGS 1984
Grid: GCS WGS 1984

N

GHD

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ESIA

Surrounding land use

Project No. 76-10735
Revision No. A
Date 20/06/2018

FIGURE 2-2

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Print date: 20 Jun 2018 - 16:11

Data source: GHD - Project Site, Landuse (2018). Image © Google/DigitalGlobe . Created by: dbbanatin

2.3.2 Existing Site Condition

In the existing condition, the Project site is relatively flat and cleared. DM uses the site for storage of a variety of vehicles such as large long-haul trailers and other pedestrian vehicles. Trucks and other vehicles are stored at the site on existing asphalt-paved surfaces. Following is a brief description of the existing physical environment based on GHD site observations on 9 April 2018. General observations from the 9 April 2018 site visit are provided below:

1. **Landfill disposal area** - There is active landfilling taking place at the disposal area to the southwest of the proposed development site. The waste disposal area is covered with mounded sand, and a steep slope rises from a surface water body at the toe of slope. Given the appearance of this water, there exists a potential for leachate impacts in proximity to the landfill cell.
2. **Surface soil impacts** - There was evidence of a possible oil/petroleum spill near the edge of the existing site limits. The oil was running from a point upland near one of the existing cement plants. The oil appeared dried at the surface, so the spill was not recent. In addition, the source of the spill could not be identified, and the oil generally appeared at the surface. Subsurface investigation was not carried out at the time of the site visit.
3. **Cement dust** - There is cement dust, most likely sourced from concrete producing plants, such as blown aggregate, that appears to be across the surface of the sand adjacent to these facilities (eastern boundary of site). There also appears to be concrete washout occurring to the south of the site limits, and adjacent to the existing landfill area. There is concrete along the embankment slope and miscellaneous concrete debris deposited at this location.
4. **Car park** - The car parking area was noted by BESIX to be for DM, without much turnover in vehicles stored on-site. BESIX noted that DM oversees the operations management of this area. There was a recent expansion of asphalt pavement (compacted millings) to the southern boundary of the paved area, which is not reflected in aerial photographs.
5. **Sludge pit** - The sludge disposal areas at the western site boundary appear to be in limited use, but recent sludge deposition was observed at the pit furthest north. The elevation of these pits is much higher than the proposed development site grade. Similar to the landfill cell, pooling surface water with associated reed growth was observed at the foot of the slope leading up to the lower of the pits (closest to the Project site).
6. **Visual resources** - There appears to be a direct line of sight from the polo properties located to the north of the project site, although there exists both a landscape buffer and highway between.
7. **New building construction** - A new building is being constructed to the NW of the project site. It will sit at an elevation above the site grade.

Refer to Appendix A for photo log of the Project site observed.

2.3.2.1 Biodiversity

Biodiversity consists of the presence of natural communities, habitat and species. At the existing site, there is exists both constructed environment and natural habitat. Due to the presence of on-site industrial uses and the surrounding industrial facilities, the site is considered to have a limited capacity to support biodiversity. Furthermore, there are waste deposition activities occurring nearby the site such as the ongoing landfilling and sludge dewatering lagoons, which do not provide historically suitable habitat for wildlife.

No suitable surface water habitats exist within the proposed development footprint. Surface water bodies present are most likely formed from leachate outbreaks from the adjacent waste landfill and the sludge deposition area.

2.3.2.2 Noise

The site and surrounding land uses comprise heavy industrial uses. It is observed that there are both traffic noise and operational noise from the adjacent waste disposal area (compactor and truck deliveries of waste), concrete producing plants (typical cement production equipment noises and truck noise) and road network (vehicle traffic). On-site noise impacts are also attributed to truck traffic within the vehicle storage area and existing generators for office/construction trailers on-site, which generate ambient background noise.

There are no known existing noise monitoring stations at the Project site.

2.3.2.3 Air Quality

Based on observations made by GHD during an initial site walkthrough, the existing air quality indicates the presence of odour impacts, which likely originated from industrial activities occurring near the site.

While there are existing undeveloped areas, the adjacent land uses present odour conditions typical for industrial zoned areas. There were odours from landfilling (waste/refuse), concrete producing plants (industrial/oil smells), the power plant to the south of the site, and organic odours from the Al Aweer STP and sludge disposal areas. Entrained dust was also present given the open area and exposed sand dunes.

There are no known existing air monitoring stations at the Project site.

2.3.2.4 Soil and Groundwater

ACES completed a site soil survey in 2009. An additional site soil survey was completed in 2018 by ACES under contract by BESIX. The site investigation report from the recent survey is currently being prepared. ACES (2009) indicates that surface soils are generally sand in native areas, but there were signs of waste (blowing garbage) and cement dust impacts at the site vicinity adjacent to industrial facilities. The paved parking area is primarily asphalt, stone/aggregate or asphalt millings.

As per BESIX, groundwater depths vary across the Project site, and typically within a range of 7 to 10 metres (m) below existing ground surface. An updated site investigation was completed by ACES in March 2018, and the findings can be further considered for the EIA.

2.3.2.5 Road and traffic network

The Project site can be accessed via the existing E44 highway (also known as Al Khail Road or Dubai-Hatta Highway). The E44 is a dual 4-lane highway and runs from the west to east. The E44 bisects Al Warqa area to the north and Warsan area to the south. The congestion levels on this highway are high during rush hours. From the E44, the Project can be reached via D54 (or the Sheikh Zayed Bin Hamdan Al Nahyan Street) and an internal road to access the Al Aweer STP (Figure 2-3).

The other major routes to the west and east of the Project are E311 (Sheikh Mohammed Bin Zayed Road) and E611 (Emirates Road).

No detailed information is currently available regarding traffic levels on local access roads around the immediate vicinity of the Project, but based on preliminary observations at site, traffic levels appear to be generally low and uncongested.

2.3.2.6 Social and Cultural

The site and surrounding land uses comprise heavy industrial uses. The entire project site, which has a total area of approximately 250 metres by 250 metres, is an industrial area. The northern part of the site, where the WtE plant will be constructed, is currently used for storage of a variety of vehicles. There are no communities within the site limits that would be directly affected by the Project construction and operation.

The Project will be located in Warsan Area, Dubai, specifically Warsan 2. Based on Dubai Statistics Report (2016), Warsan 2 has a population of 616 or about 0.02% of the population in the Emirate. The majority of the population in Warsan 2 are residing in residential villas inside the Desert Palm, Dubai, which is located approximately 300 m away from the proposed site. Individuals accessing the commercial and office facilities within the surrounding industrial areas may potentially be affected during the construction and operation of the Project.

In reference to Dubai Heritage site listing (dubaiculture.gov.ae) there are no cultural sites within or surrounding the site. Based on initial review of literature, the nearest cultural heritage site is the Al Fahidi Historical Neighbourhood, which is about 18 km away from the site.

Note: Emirates Route (E-routes) are highways connecting Dubai to other emirates.
Dubai route (D-route) are highways connecting localities within the city of Dubai

Legend

WTE Plant Limits

Routes

Emirates Routes

Dubai Routes

Internal Roads

E44 - Al Awir Road

WTE Plant Limits

D54 - Academic City Road

D67 - Manama Street

E611 - Emirates Baypass Road

Google earth

Image © 2018 DigitalGlobe

Paper Size ISO A3

0 200 400 600 800

Meters

Horizontal Datum: WGS 1984
Grid: GCS WGS 1984

N

GHD

Hitachi Zosen Inova Ltd
Dubai Resource Recovery Facility
ESIA

Road network

Project No. 76-10735
Revision No. A
Date 20/06/2018

FIGURE 2-3

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Print date: 20 Jun 2018 - 16:10

Data source: GHD - Project Site, Routes (2018). Image © 2018 DigitalGlobe . Created by: dbbanatin

2.4 Project Overview

The estimated nominal design capacity of the WtE plant is 5,000 tonnes per day (tpd), consisting of five lines, each with an operating capacity of 1,000 tpd. With this projected MSW throughput, there will be an estimated 200 MW of electricity generated to the local grid.

The electrical energy to be generated by the proposed WtE Plant will be exported to the electrical grid of DEWA located approximately 3 km south of the Project.

The Al Aweer STP located immediate west of the Project site is intended to provide treated sewage effluent (TSE) to the WtE Plant (as their main process water source) and to receive sanitary waste water (no process water) from the WTE Plant. No sewage sludge from Al Aweer STP will be treated nor sent from WtE plant to Al Aweer STP, no steam generated by the WtE plant will be delivered to any external party.

A summary of the key performance data of the proposed Project is provided in Table 2-6.

Table 2-6 Key performance data of proposed Dubai WTE Project

Performance data	Unit	Per 1 line	Per 5 lines
Design waste throughput capacity (LP N*)	t / h	46.3	231.5
Daily design waste throughput capacity (LP N*)	t / d	1,111	5,555
Thermal power	MW	122.17	610.85
Steam parameters (boiler outlet)	ºC / bar(a)	432 ºC / 77 bar(a)	
Net power production (export to DEWA)	MW	65	171
Wet bottom ash production	t / d	190	950

*LP N stands for nominal load point, which is the design load point of the WTE Plant

Source: HZI and Besix (2016b)

Operations overview

Relative to operations, the following provides a high level overview:

- Typical Operations Scenario
  - WtE plant operations on a 24-hour, 7-day per week schedule
  - 4 shifts anticipated, each shift to be an estimated 12 hours
- Delivery of MSW from Dubai Municipality
  - MSW deliveries from Dubai Municipality anticipating about 23 waste delivery trucks per hour on average (assuming an average capacity of 10 metric tons per truck); and
  - Approximately 70 waste delivery trucks per hour during peak times (assuming average capacity of 10 metric tons per truck).
- Reference Waste Composition
  - Ash in percent by weight (design estimate): 16%, estimated range of 15 to 22%
  - Moisture in percent by weight (design estimate): 39%, estimated range of 25 to 50%
  - Combustible in percent by weight (design estimate): 45%, estimated range 35 to 53%
  - Net Calorific Value (NCV) in MJ/kg (design estimate): 9.5, estimated range 7.0 to 14.0

- Planned Staggering for Construction and Operation Phases
  - There is planned staggering for the construction and operation of the WtE Plant. Lines 1 and 2 will be the first built and operated; followed by Lines 3, 4 and 5 to be built and operated approximately 6 months later (note: the detailed construction programme is still being developed by HZI and BESIX at the time the SoW Report was prepared for the Project).

2.5 Material Balance

The technological concept and the related volume streams of the proposed Project are illustrated in Figure 2-4. The material balance for the Project is presented Figure 2-5. It should be noted that the figures provided in this section are preliminary and will be revised once final design is completed.

The primary input materials include MSW, diesel for start-up and water. The WtE plant with an approximate gross power of 200 MW requiring approximately 5,000 tpd of fuel source (i.e. waste) at a net calorific value (NCV) of 9.5 MJ/kg, approximately 85 to 100 m^3/hour of water and diesel fuel used for auxiliary burners. Details regarding the gross, parasitic, net power, bottom ash generation are shown in Figure 2-5.

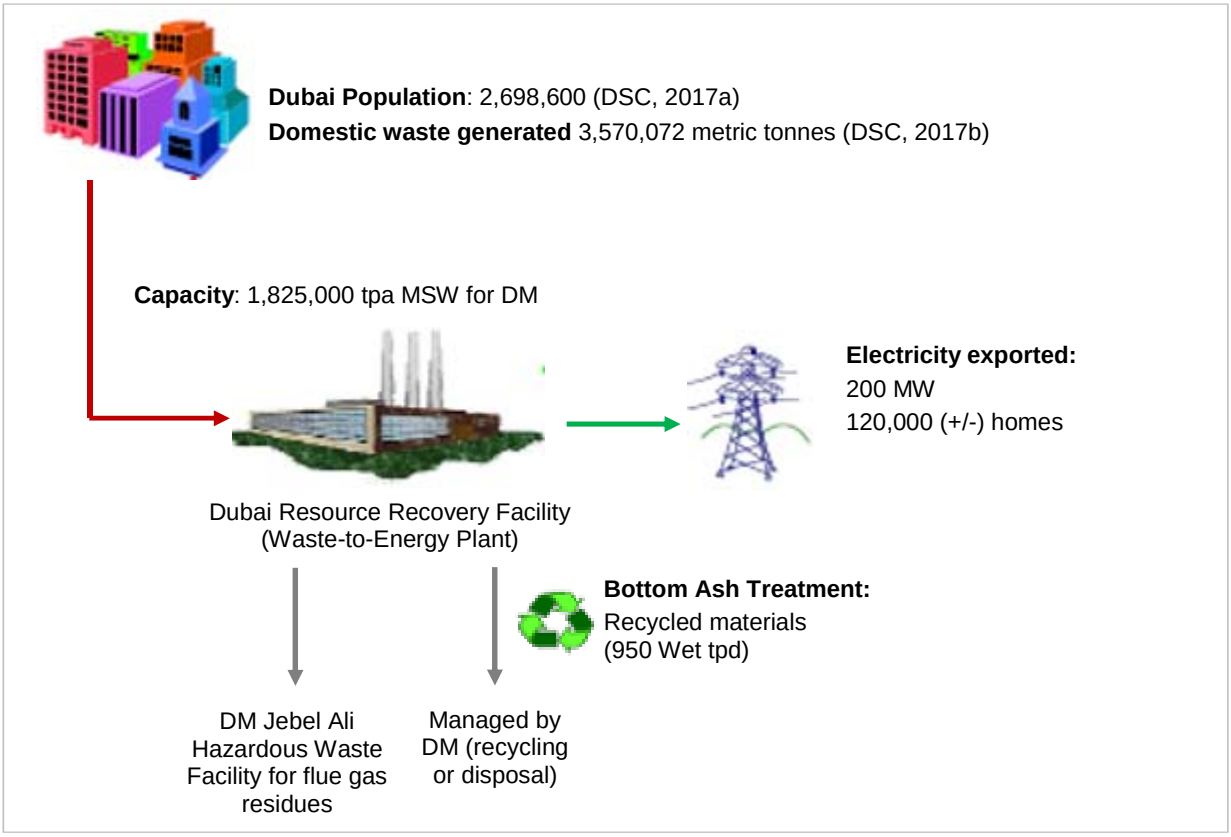


Figure 2-4 Technological concept diagram

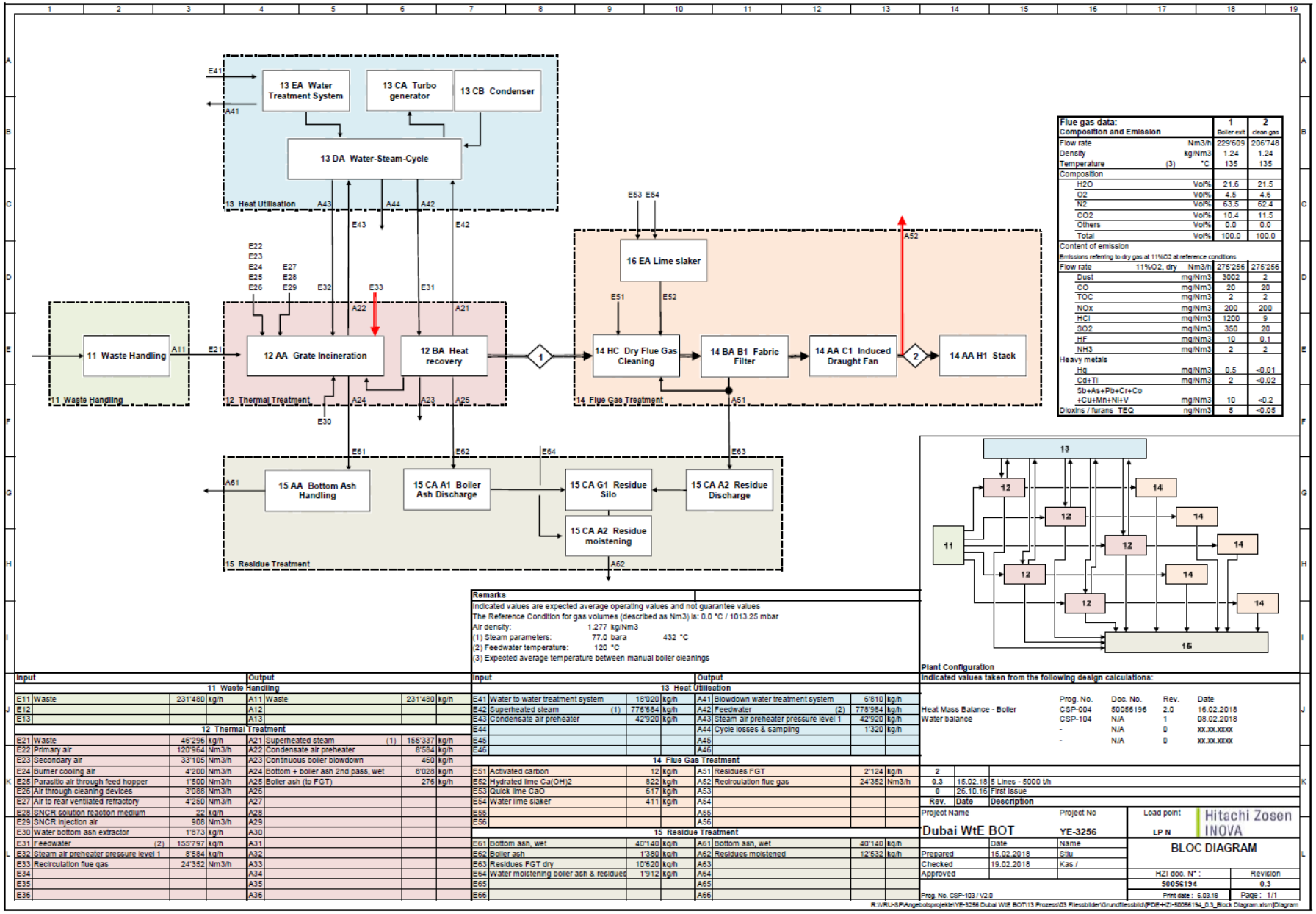


Figure 2-5 Material balance diagram (preliminary design to be finalised)

2.6 Technology

As per HZI, the proposed technology is based on the most reliable and continuously improved solution that complies with European Regulations/Industrial Emission Directive (Directive 2010/75/EU), allows for economically and ecologically optimised operation, and provides for maximum flexibility. In 2016 Fichtner, as the technical adviser of DM, defined the IED 2010/75/EU as the basis for the design compliance. The design of the WtE plant, therefore, is based on IED.

The proposed Project consists of five lines each comprising a furnace equipped with the Selective Non Catalytic Reduction (SNCR) process for nitrogen oxide (NOx) control, a HZI 4-pass heat recovery boiler, the HZI-dry flue gas treatment system and, for all units, a common water-steam-cycle with an effective turbine-generator set for the heat utilisation.

A block diagram of incinerator-boiler and semi-dry flue gas treatment system is provided in Figure 2-6.

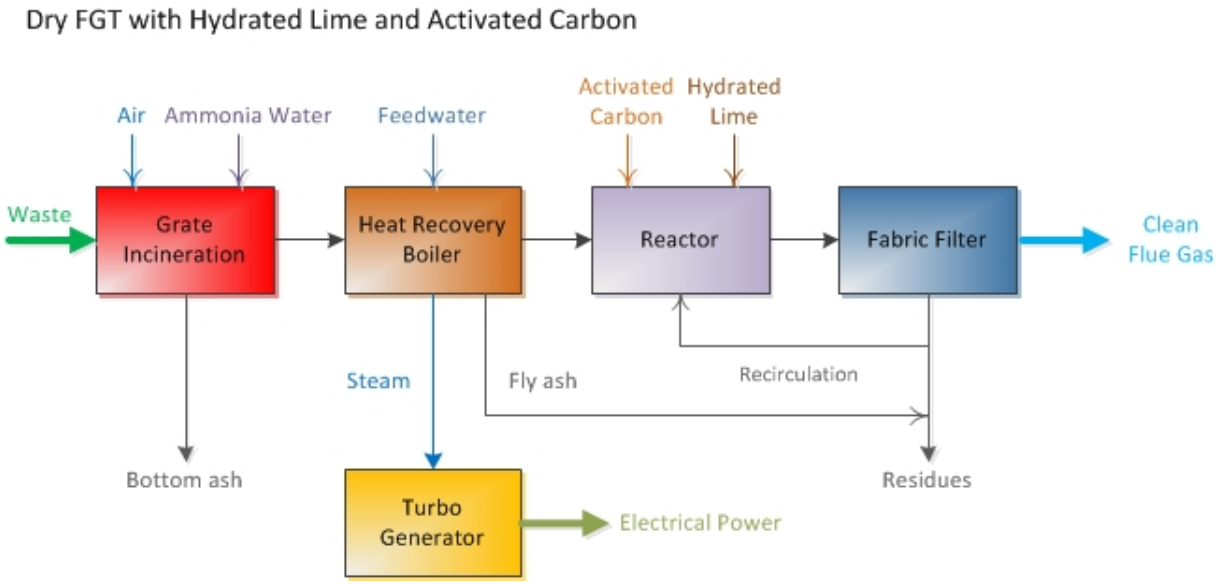


Figure 2-6 Figure of incineration-boiler and semi-dry flue gas treatment system

Source: HZI and Besix (2016a)

2.6.1 Waste Handling

MSW will be sourced from Dubai Municipality. The current location of disposal is the Al Qusais Landfill, which is approximately 13 km north of the Project site. Transportation of MSW will be via the existing routes, but not necessarily rerouted from the landfill because trucks can deliver directly to the WtE plant.

A traffic impact study will be undertaken as part of the EIA to assess the impacts associated with transporting of waste.

At the Project site, the waste handling system will consist of tipping bays, and waste crane. Vehicles can be identified by means of an electronic card (or barcode).

2.6.2 Thermal Treatment

Thermal treatment consists of an air-cooled grate, combined with the 4-pass tail end heat recovery boiler, which forms the basis for this Project (Figure 2-7).

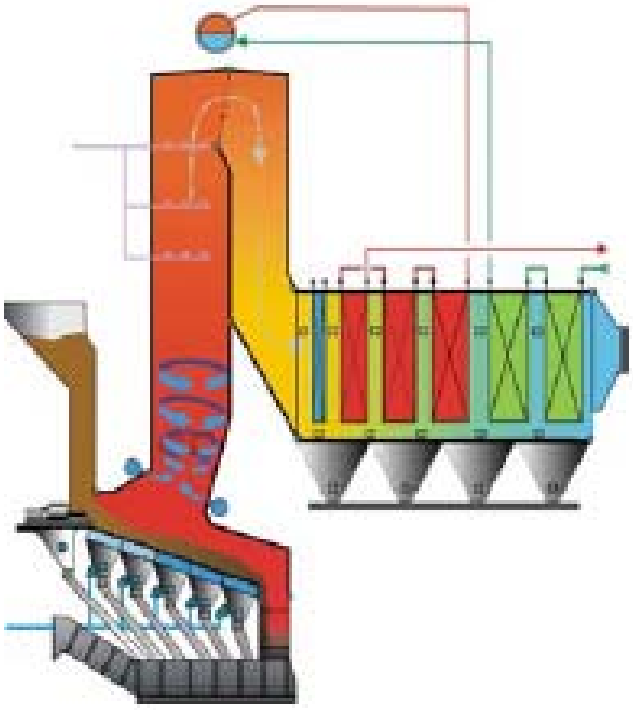


Figure 2-7 Thermal treatment schematic

For the project: 4 pass heat recovery boiler with 2 vertical empty passes, 1 horizontal pass and 1 vertical economiser pass (VVHV)

Source: HZI and Besix (2016a)

The combustion control is fully automatic (Figure 2-8). The operator only selects the desired steam output and all other parameters (waste feeding, grate speed, amount of combustion air etc.) are handled by the control system itself. This secures that the plant operates continuously at an optimum regarding efficiency, environmental protection and life expectancy of the equipment.

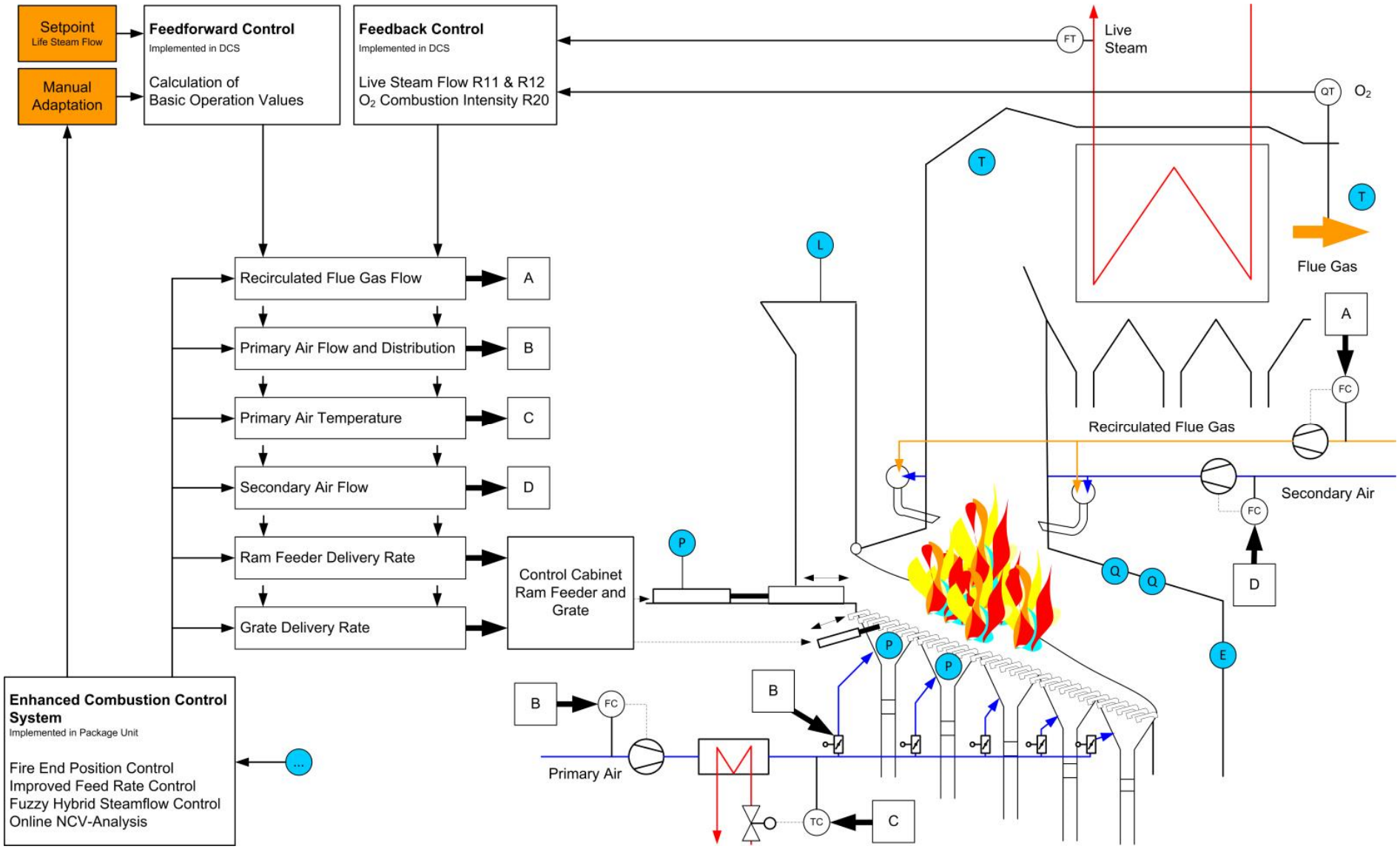


Figure 2-8 Combustion Control System for a 5-zones grate with recirculated flue gas

Source: HZI and Besix (April 2018)

2.6.3 Heat Utilisation

The steam is transformed into electrical energy in a turbo-generator set that is used to cover the plant's own electricity needs and to feed the public electric grid (Figure 2-9). The primary elements of the heat utilization include:

- *Turbine Unit*. A steam turbine transforms the thermal energy of the high-pressure steam into a rotary motion and, coupled with a generator, electricity can be produced. Bleed pipes located at three locations on the turbine body allow to extract steam at several pressure levels, so that different internal steam consumers within the WtE plant can be supplied.
- *Control and Lubrication Oil Supply*. This system supplies the turbine with oil to lubricate the bearings of the turbine shaft and to operate the control valves.
- *Generator*. The generator system transforms the mechanical energy into electrical energy.
- *Cooling System*. This is designed as a closed circuit to cool down the oil circuit of the steam turbine, the generator, the steam / water sampler as well as other process equipment that requires active cooling.

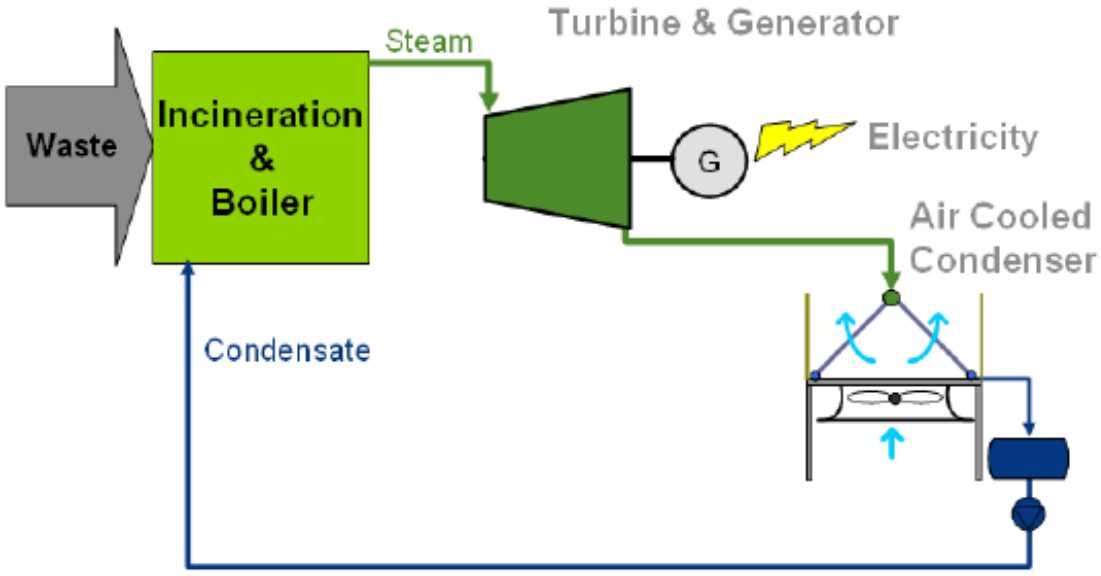


Figure 2-9 Turbine generator within the WtE plant

Source: HZI and Besix (2016b)

2.6.4 Flue Gas Treatment

2.6.4.1 Particle Separation

A fabric filter will be used for the separation of solids from the flue gas. In the physical process of separation, the solids are filtrated on the surface of a gas-permeable fabric. Due to the intensive contact of the flue gas and the adsorbents in the filter layer, the removal of pollutants from the flue gas is further improved.

The fabric filter is a pulse jet, multi chamber bag filter with several compartments (Figure 2-10). It is designed to reduce welding work and mounting time on site: the compartments are assembled to a high degree in the workshop, with a positive effect to final quality.

Figure 2-10 Principal function of bag filter and pulse-jet on-line cleaning

Source: HZI and Besix (2016b)

2.6.4.2 Dry Flue Gas Cleaning with Lime and Activated Carbon

The dry flue gas treatment process is designed by HZI specialists to remove all dust particles, most of the acidic gaseous contaminants by neutralisation with hydrated lime and organic pollutants (PCDD/F) as well as mercury and other heavy metals by adsorption on activated carbon (Figure 2-11). The system consists of a reactor with additive injection, fabric filter for solid-gas separation and residue recirculation. To achieve the best adsorption performance with minimum additive consumption, solids from the fabric filter are recirculated into the reactor.

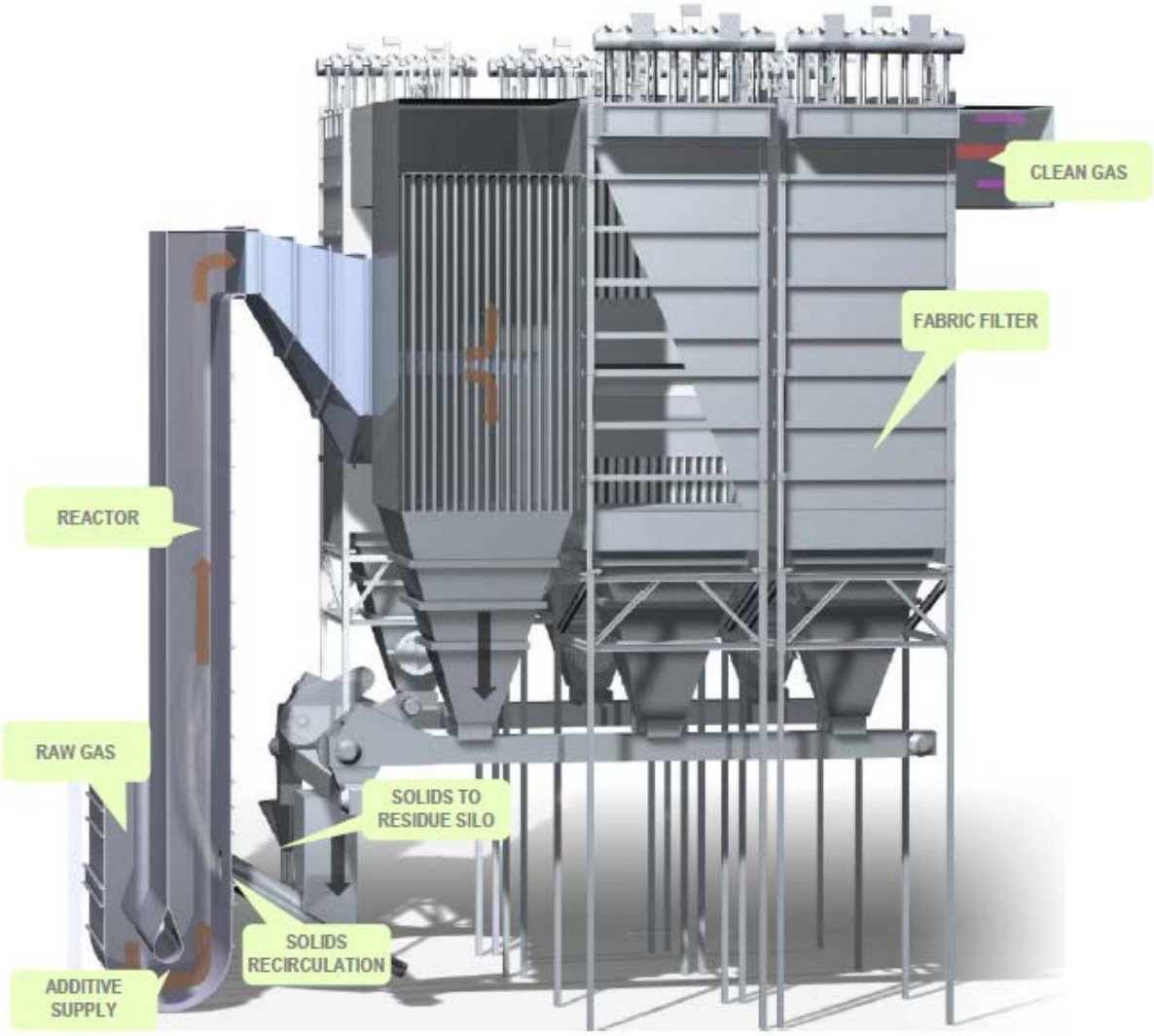


Figure 2-11 Principle of HZI Dry Process – XeroSorp®

Source: HZI and Besix (2018)

The fabric filter separates solid reaction products from the flue gas. Solids collected in the filter hoppers are transported with chain conveyors to collecting bins. From the first collecting bin the solids are recirculated back to the reactor. Overflown residues coming directly from the first to the second collecting bin are pneumatically transported to the residue silos.

2.6.5 Residue Treatment

2.6.5.1 Bottom Ash

Incinerated Bottom Ash (IBA) Treatment

The handling system will transport the bottom ash from the extractor to the ash treatment facility and will remove coarse parts from the bottom ash. The bottom ash will be handled through the use of vibrating conveyors.

The incinerated bottom ash (IBA) is transported to the covered area where it is stored up to four days to reduce moisture content to 8 to12%. At this moisture content, the metal separation is typically more efficient and dust emissions are low.

The IBA will be collected by DM for treatment / disposal. Treatment and final disposal is not included in the scope of the proposed Project; as such a separate approval process will be obtained by DM.

2.6.5.2 Boiler Ash

Residue Discharge

The boiler ash will be discharged and conveyed partly to the ash silo and partly to the bottom ash extractor. The residue from the flue gas treatment are discharged and conveyed to the residue silo.

The residual material discharged from the reactor will be transported into a collecting container via a walking floor, a screw conveyor, impact crusher and a tail end conveyor. The residual material from the fabric bag filters will be fed into the collecting container via residue rotary valves from the recirculation channels.

Residue Storage Silo

The residue storage silo is an interim storage for the flue gas treatment residues[3]. Five silos are foreseen for the Project. The silos are placed on an elevated steel structure prepared for direct loading into trucks / to big bags / or to the moistening system for open truck discharge. A continuous weighing device and analogue level measurement are fitted underneath the silo to monitor the filling level of the silo. A binary level switch is installed for overfill protection.

A safety valve is installed to protect the silo against over and under pressure. The entire residue loading is performed locally by the truck driver using a local teach pendant. The silo is designed with a special discharging device. The application of the loading station on the silo truck is carried out locally using a motorised winch. A fluidisation system is fitted in the silo cone to assist the residue discharge.

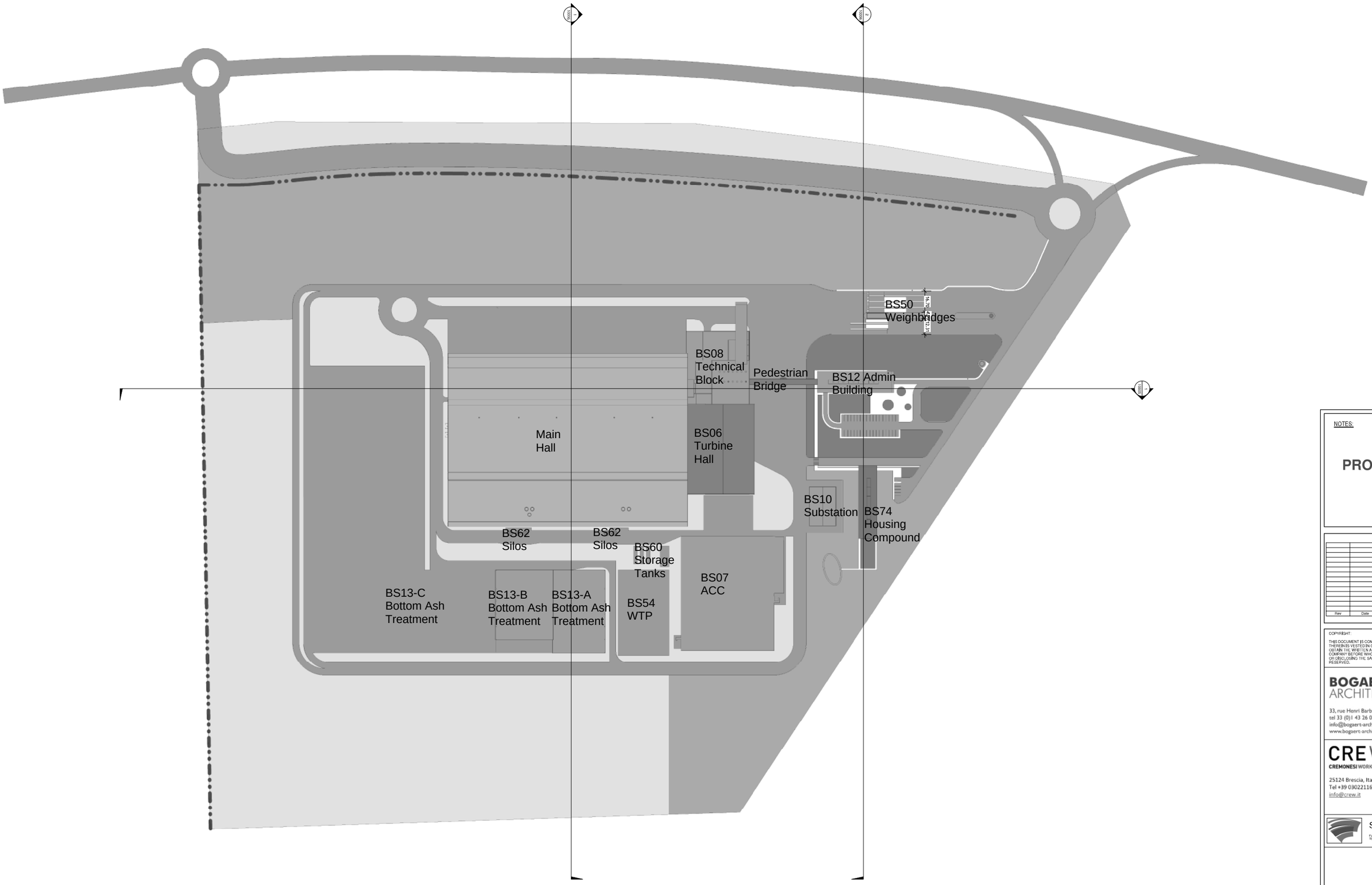
2.7 Project Layout

A preliminary Project layout is presented in Figure 2-12 (DWG. No. DWE_CRW_ARC_DWG_10003). The final layout will be provided in the EIA report. The preliminary Project layout is draft, for illustrative purposes, and under further review.

2.8 Project Schedule

The proposed Project is currently in the preparation phase where finance, design, permitting and approval from various government authorities are obtained. Detailed engineering is expected to be completed in Q4 2018. Construction is expected to commence in Q1 2019, and commissioning and trial run is anticipated 36 months after the start of construction.

[3] On-site FGT residue management will be clarified within the EIA; off-site disposal of FGT residue is under separate review by the DM Waste Management Department (WMD).



NOTES:

PROVISORY

Rev	Date	Description

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SIX CONSTRUCT

PROJECT NO.	DWG. NO.	REV.
140900	DWE_CRW_ARC_DWG_10003	
DWG. NAME	General Layout - top overview	A0

3. Construction Activities

Given that the Project is still in the concept design phase, detailed information on construction activities and associated methodologies are not available. However, an overview of the general anticipated construction activities is provided below.

- *Site Development Works*. This includes earthmoving, clearing, excavation, fill placement, grading and other ground preparation works.
- *Construction Activities*. This includes construction and installation of the power plant components, its auxiliary and the temporary ash storage facility.

Further detail on the above activities will be provided within the EIA.

3.1 Duration of Construction

As provided in Section 2.7, construction will be completed in approximately 36 months. This includes civil and mechanical construction as well as fabrication. To minimise noise at the Project site, mechanical fabrication will be undertaken outside the site and pre-fabricated materials will be transported.

A detailed traffic route and management plan will be presented in the EIA to address any issues arising from the transport of materials.

3.2 Manpower Requirements

The proponent is committed to enhance socio-economic condition by implementing the Emiratisation Policy, paying appropriate salary and benefits to the workers and minimising environmental and social impacts. It is projected that approximately 500 to 1000 construction workers, both skilled and unskilled, will be required. At certain times, more than 1000 construction workers are estimated during the peak of construction.

3.3 Temporary Facilities

Temporary facilities to be established during the construction phase include laydown and storage areas, security facilities, temporary site offices and water tanks. Temporary laydown areas will be situated within the Project site immediately south and west of the WtE plant while temporary offices will be located north of the facility.

During the construction phase, workers will be housed in existing accommodation facilities outside the Project site. Transportation services to and from the camp will be provided.

4. Impact Identification

This section considers the potential environmental and social impacts associated with the construction and operational phases of the proposed Project. Based on the initial site assessment, the environmental sensitive receptors that will be considered in the assessment process are:

- Existing residents in the vicinity of the Project;
- Teachers, students and visitors of the Academic City located around 3 km of the Project;
- Employees and guests at the recreational areas north of the Project;
- Warsan Lake located 2 km of the proposed site; and
- Future workers to be housed at the proposed labour accommodation.

A complete list and location of the identified sensitive receptors are provided in Section 5.3.4.

4.1 Construction Phase Impacts

The most significant adverse impacts anticipated as a result of the construction phase of the Project (based on anticipated construction methodologies described in Section 3) are detailed in Table 4-1. It should be noted that is an initial list of impacts and additional impacts may be added once construction methodologies are completed.

Table 4-1 Potential impacts during construction phase

Environmental and social component	Potential impacts
Air	• Emission of combustion gases and particulates from fuel combustion in fossil fuel running construction vehicles, equipment and machinery / plant • Generation of airborne particulates during site clearance and preparation, excavation and filling, open site erosion, concreting and handling and transportation of construction materials
Noise	• Increase in ambient noise levels as a result of increased construction activities
Soil and Groundwater	• Soil erosion • Potential soil and groundwater contamination
Waste	• Generation of construction wastes • Increased demand on waste disposal and treatment facilities • Deterioration of air quality and increased ambient noise level associated with the transportation of wastes
Utilities	• Use of water and energy resources, which may cause resource competition with other users / consumers
Traffic	• Increased strain on existing traffic infrastructure as a result of construction traffic accessing the site

Environmental and social component	Potential impacts
Socio-Economic	• Temporary economic benefits (employment and business opportunities) (positive impact) • Utilisation of existing site facilities (e.g. road, place of worship, transportation, residential units) used by community at the adjacent areas • Exposure of workers and community to health (air emission and noise generation) and safety risks (occupational risks, traffic impact)

4.2 Operation Phase Impacts

The major impacts anticipated as a result of the operation of the Project (based on the initial description provided in Section 2) is provided in Table 4-2. It should be noted that is an initial list of impacts and additional impacts may be included once a complete Project description is available.

Table 4-2 Potential impacts during operation phase

Environmental and social component	Potential impacts
Air	• Emission of combustion gases and particulates from plant operation • Emission of combustion gases and particulates from fuel combustion in fossil fuel running vehicles and equipment: – Vehicles transporting MSW from landfill to the Project site; and – Vehicles transporting bottom ash and flue gas residue from the Project site to final disposal area.
Noise	• Operational noise generated by furnace stacks, air-cooled condensers, component coolers, steam valve/pipe, ventilation, boiler, steam turbine, stacker, among others • Traffic noise generated by loading and unloading trucks
Soil and Groundwater	• Accidental spillage or leakage from storage of waste on site • Inappropriate storage and disposal of waste (e.g. flue gas residue and IBA)
Waste	• Overall reduction of waste disposed to the landfill (positive impact) • Generation of operation wastes (e.g. food and office waste, IBA residue, flue gas residue, sewage) • Increased demand on waste disposal and treatment facilities (i.e. landfilling of IBA and hazardous waste facility for flue gas residue) • Deterioration of air quality and increased ambient noise level associated with the transportation of wastes

Environmental and social component	Potential impacts
Utilities	• Plant operation is considered to have a significant impact in terms of energy efficiency, diversification of energy and contribution to additional power supply (positive impact) • Use of water resources, which may cause resource competition with other users / consumers
Traffic	• Increased strain on existing traffic infrastructure as a result of construction traffic accessing the site: – Vehicles transporting MSW from landfill to the Project site; and – Vehicles transporting bottom ash and flue gas residue from the Project site to final disposal area.
Socio-Economic	• Provision of long-term employment opportunities (positive impact) • Reduction of Dubai's reliance on energy supplied by other emirates • Occupational and community health (air emissions and noise generation) and safety (heat, electrical, traffic) risks

5. EIA Methodology

5.1 EIA Objective

The EIA Report will be undertaken in accordance with all the Dubai Municipality Environmental Planning and Studies Section (DM-EPSS) Technical Guideline No. 2 *EIA Requirements for Land Development, Infrastructure and Utility Projects* (January 2017) as well as international guidelines such as the IFC Performance Standards 1 to 8 (effective January 2012) and the Equator Principles 1 to 10 (effective June 2013).

The EIA will be developed with the following objectives:

- Undertake the EIA in a manner that is consistent with the regulatory requirements of DM-ED in order to obtain approval (e.g. Conditional Environmental Clearance (CEC)) from DM-EPSS as the first step in the approvals process to obtain a No Objection Certificate (NOC) for the construction and development of the WtE plant.
- Identify potential significant environmental, social and cultural impacts associated with both the construction and operational phases of the proposed Project and develop corresponding mitigation measures to reduce, offset and, where possible, eliminate negative environmental impacts.
- Develop an Environmental and Social Management and Monitoring Plan as part of the EIA that provides a framework for environmental management and/or monitoring during both the construction and operational phases of the Project.
- Develop an EIA report that provides relevant stakeholders with a thorough understanding of the key elements, impacts and mitigation measures of the proposed Project.

5.2 EIA Scope

Given the existing site conditions, project nature and likely environmental impacts of the Project, the EIA will focus on the following aspects, which are considered to be significantly impacted if appropriate mitigation measures are not implemented:

- Air Quality;
- Noise;
- Water resources (reuse);
- Subsurface soils;
- Water quality (surface waters and groundwater);
- Waste management;
- Traffic; and
- Social.

The proposed Project will be located within an industrial area; as such, significant impacts are not considered on the aspects listed below. Nevertheless, these aspects will be addressed at a high level in the EIA report:

- Climate and meteorology;
- Geology, seismicity;
- Biodiversity and conservation;

- Land use, landscape and visual impact; and
- Archaeology and cultural resources.

The Project is located approximately 20 km away from the coastal area of Dubai. Further, the potential impacts no water quality, soil and groundwater are expected to be localised and therefore, the coastal area is not anticipated to be impacted. As such, marine ecosystem is excluded from the scope of the EIA.

The nature of the Project requires that baseline information be gathered via the following mechanisms:

- Literature review, principally of previous environmental assessments undertaken by GHD and others (e.g. existing industrial facilities surrounding the project site) in determining the proposed location of the Project;
- Consultation with DM and consultants (appointed by HZI to conduct other surveys / modelling for the Project);
- Initial walkover assessment of areas surrounding the Project site; and
- Field surveys to collect environmental baseline data.

Furthermore, a literature review of existing data or the use of data from public sources, such as Dubai Airport Meteorological and Dubai Statistics Centre (DSC), will be used.

5.3 EIA Process

The key process of an EIA comprise:

- Liaising with DM-ED;
- Literature review;
- Review of legislative framework;
- Identification of sensitive receptors;
- Baseline data collection;
- Impact prediction / assessment and evaluation of findings;
- Identification of mitigation measures;
- Establishment of an EMMP; and
- Identification of project alternatives.

A description of how each of the above items will be undertaken is detailed in Sections 5.3.1 to 5.3.11, while further detail on the environmental baseline collection and impact assessment methodologies for each environmental aspect is provided in Section 6.

Any limitations associated with preparation of this study will be clearly defined within the EIA report. The extent to which study limitations may influence the conclusions of the environmental assessment will also be presented and discussed.

5.3.1 Liaising with DM-ED

In order to engage DM-ED early on in the project, a technical scoping meeting will be requested between the DM-ED, the EPC and the EIA Team. The EPC and the EIA Team will provide an introduction to the proposed Project, the proposed EIA methodology and schedule. All submissions to the DM-ED will be made in writing for formal review and acceptance.

5.3.2 Literature Review

A literature review will be carried out to identify the status of the Project site, its surroundings and the identified environmental sensitive receptors. The literature review will include, but will not be limited to, a review of aerial photography, EIA reports for development projects near the proposed Project site, journals, environmental monitoring results issued by DM and the UAE Ministry of Environment and Water, information published by the DSC and theme maps (where available).

The following studies will be requested from DM-ED:

- Historic environmental studies for the Project site (if any);
- Environmental studies undertaken for adjacent facilities (if available);
- Environmental monitoring, including weather data, from adjacent facilities (if available); and
- Land use plan of Dubai, including proposed developments surrounding the Project (if any).

5.3.3 Review of Legislative Framework

The EIA will identify and discuss the relevant federal, local and international laws and guidelines expected to govern the environmental performance of the Project, including:

- UAE federal laws;
- Dubai Emirate's legislation, policies and procedures; and
- Relevant international conventions and guidelines.

Specific environmental standards and guidelines will be compiled to provide quick reference for the evaluation of baseline survey results and later environmental monitoring.

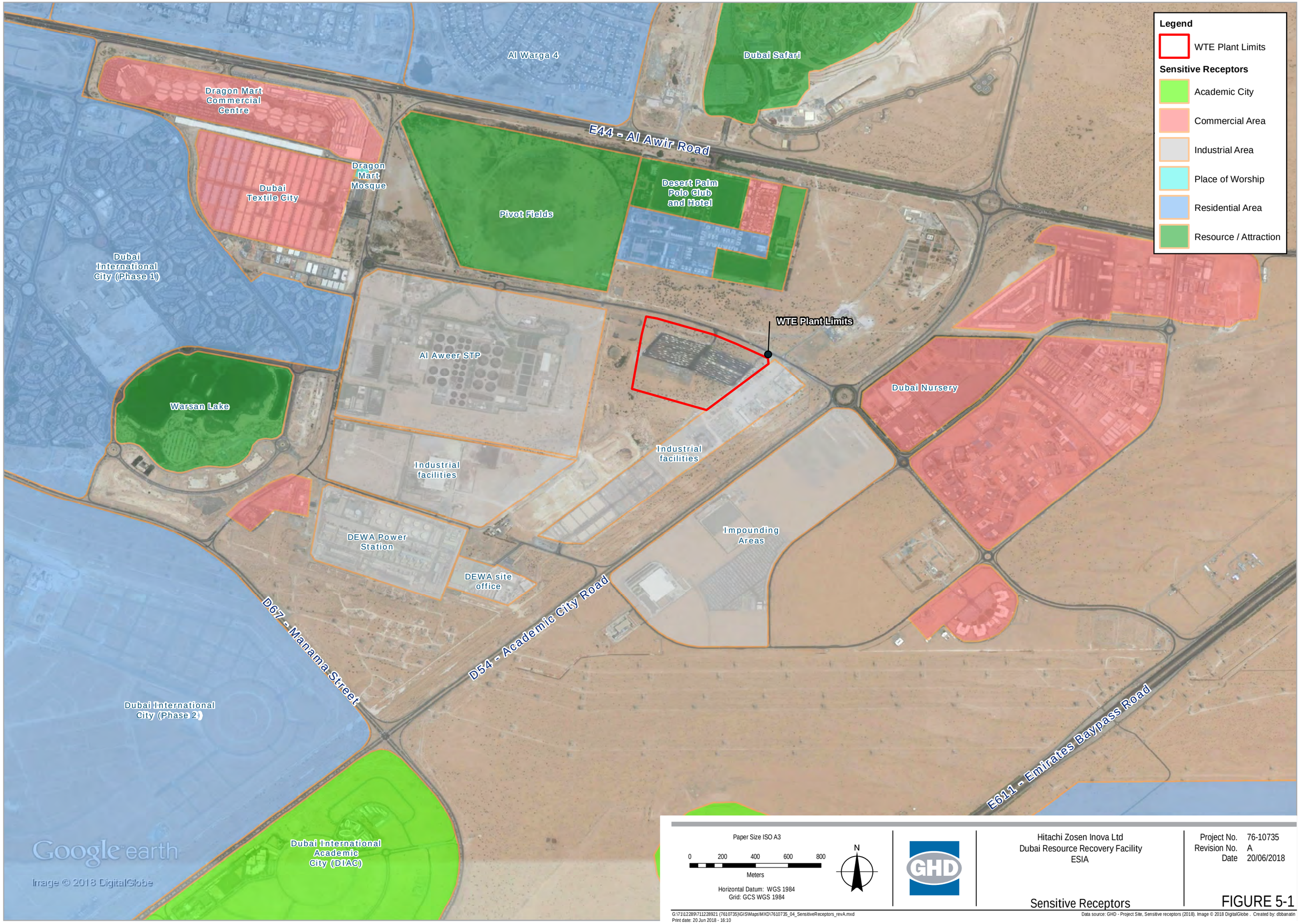
5.3.4 Identification of Sensitive Receptors

Based on the initial site assessments, the primary sensitive receptors during the construction and operation phases of the Project are considered to be:

- Existing residents in the vicinity of the Project:
  - DIC Phase 1 – approximately 2 km west of the proposed site;
  - Al Warqa 4 Neighbourhood – approximately 2 km north of the proposed site; and
  - International City Phase 2 (under construction) – approximately 3 km southwest of the proposed site.
- Teachers, students and visitors of the DIAC located approximately 3 km south of the Project. Academic institutions include Manipal University, Birla Institute of Technology and Science, Heriot-Watt University, American University in the Emirates, Amity University Dubai, Emirates Aviation University, University of Dubai, Dubai English Speaking College, Zayed University, and International Center for Biosaline.
- Employees and guests at the recreational and commercial areas surrounding the Project.
- Al Warsan Lake located 1.85 km west of the proposed site.
- Employees and worshippers at the Dragon Mart Mosque located around 1.8 km northwest of the site.
- Workers to be housed at the proposed labour accommodation during the operation phase, which will be located adjacent the proposed WtE plant.

An assessment of the sensitive receptors most at risk from the Project will be included within the EIA. Further, air and noise baseline data collection will be undertaken at select sensitive receptor locations to assess potential impacts during the construction and operation phases of the Project.

The geographical scope for the EIA includes the areas directly under the Project footprint, the extent of potential impact areas (as predicted by modelling), and the wider area (e.g. socio-economic and traffic impact).



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Meters

Horizontal Datum: WGS 1984
Grid: GCS WGS 1984

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Sensitive Receptors

Project No. 76-10735
Revision No. A
Date 20/06/2018

FIGURE 5-1

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Print date: 20 Jun 2018 - 16:10

Data source: GHD - Project Site, Sensitive receptors (2018). Image © 2018 DigitalGlobe . Created by: dbbanatin

5.3.5 Baseline Data Collection

Baseline assessments form the backbone of environmental assessments, with data collection required to provide an accurate indication of the condition of environmental systems prior to development. Baseline data will be used to make predictions on the degree of impact associated with the construction and operation of the Project, and will help dictate the degree of mitigation and monitoring required to minimise the negative environmental impact of the Project.

Baseline surveys that will be undertaken for the EIA are provided Table 5-1. Proposed locations and detailed methodologies for baseline sampling are provided in Section 6.

In parallel with the EIA study, GHD is assisting HZI for preparation of a Stakeholder Engagement Plan (SEP) as a separate document for review by the project lenders. This is not part of the scope of review by DM.

Table 5-1 Sampling breakdown for baseline surveys

Parameter	Total No. locations
Air	
Air Monitoring	3 locations
Odour	
Odour monitoring	4 locations
Noise	
Noise Monitoring	4 locations
Soil and Groundwater	
Phase 1 site survey	Half-day Phase 1 site survey
Soil sampling and analysis	10 grab samples (2 locations per boring, plus 2 surface soil samples)
Groundwater sampling and analysis	4 grab samples (1 location per bore hole)
Terrestrial	
Terrestrial environment	One-day site assessment of the Project footprint
Dioxins and Furans	
Realtime active sampling	2 locations

5.3.6 Impact Identification

Potential impacts will be identified through an assessment of planned activities associated with construction and operational activities, but also unplanned activities that can also affect sensitive receptors and environmental aspects. Credible unplanned activities will be determined and assessed similarly to planned activities.

5.3.7 Impact Prediction and Assessment

Key findings of the impact identification and evaluation will be presented in tabulated form classifying the relevant environmental significance of each impact. Each environmental impact associated with the proposed development will be rated in terms of the level of significance of the impact on the environment or other identified receptors. The existing site conditions and surrounding land-uses will influence the hazard assessment.

Mitigation strategies, where appropriate, will be defined and the impact of the mitigation rated in general terms. Taking the mitigation impact into account, a final discussion regarding the significance rating for each residual, unavoidable or cumulative impact will be provided, and results tabulated.

The degree of impacts associated with the Project both prior to and following implementation of mitigation measures will be assessed. Assessment of the level of impact is based on two criteria:

- Likelihood of the impact occurring – rare, unlikely, possible, likely or almost certain (Appendix B Table B-8-1); and
- Consequence of the impact – insignificant, minor, moderate, major or catastrophic (Appendix B Table B-8-2).

The impact significance level is then based on the following calculation:

Significance of impact = Likelihood Level x Consequence Level

Based on the above calculation, the level of the impact is classified in the following five levels and can be expressed in a matrix (Table 5-2):

- Extreme
- High
- Medium
- Low
- Negligible.

Table 5-2 Significance of environmental impact matrix

Likelihood Rating	Consequence Rating				
	1 = Insignificant	2 = Minor	3 = Moderate	4 = Major	5 = Catastrophic
5 = Almost Certain	Low	Medium	High	Extreme	Extreme
4 = Likely	Low	Medium	High	High	Extreme
3 = Possible	Negligible	Low	Medium	High	High
2 = Unlikely	Negligible	Low	Medium	Medium	High
1 = Rare	Negligible	Negligible	Low	Medium	Medium

Overall, the following will be considered in the evaluation of impacts:

- Direct / indirect impacts
- Adverse / beneficial impacts
- Temporary, short-term or long-term impacts
- Reversible / irreversible impacts

- Cumulative impacts over time (as well as the combined impacts of the proposed project with existing developments and other land use activities in the project areas)

5.3.8 Identification of Mitigation Measures

The EIA will develop and recommend mitigation measures to avoid, reduce or offset the identified environmental impacts. These will be categorised according to “clearly defined” and “ongoing” mitigating measures.

The recommended mitigation measures will be developed with the following objectives:

- Avoidance or prevention, where possible, of negative impacts;
- Reduce likelihood, frequency and severity of negative impacts;
- Enhance positive impacts; and
- Maximise the probability of Project compliance with the relevant environmental regulatory requirements.

The EIA will identify and evaluate the final residual environmental impacts that are anticipated after the mitigation measures have been implemented.

5.3.9 Development of Environmental Management and Monitoring Plan (EMMP)

All identified and assessed mitigation measures will form the basis of a framework EMMP for the construction and operation phases of the development. In addition, the framework EMMP will determine and integrate potential ways and means to facilitate Project compliance with relevant DM regulations, policies and guidelines.

The EMMP will provide an adequate mechanism for:

- Maximising the probability of Project compliance with relevant DM standards for the management and mitigation procedures and processes required;
- Monitoring the implementation and effectiveness of proposed mitigation measures; and
- Monitoring residual wastewater discharge, air emissions, noise level generation, etc.

The EMMP will also define roles and responsibilities for implementing the recommended mitigation measures, carrying out monitoring activities, preparation of environmental reports and performing environmental audits throughout the Project phases.

5.3.10 Identification of Project Alternatives

The EIA report will present the alternatives examined in the course of developing the proposed Project. A comparative discussion of the advantages and disadvantages of each alternative will be discussed in sufficient detail as to enable an understanding of the reasons for preferring certain options and courses of action. In order to demonstrate environmental conditions without the Project, a “No Project” alternative will also be considered, and will be assessed against the “With the Project” alternative.

5.3.11 Key Deliverables

The key deliverables of the proposed Project will include the following:

- Draft SoW for the EIA (for DM-ED comment) (this report);
- Final SoW for the EIA (incorporating DM-ED’s comments, if any; and for DM-ED approval prior to conduct of EIA);

- Draft EIA Report (for DM-ED comment); and
- Final EIA Report (incorporating DM-ED's comments, if any; and for DM-ED approval and issuance of Certificate of Environmental Condition (CEC)).

The contents of the EIA Report will be in accordance with Annex I "Contents Outline of an Environmental Impact Assessment Report" of the DM-EPSS Technical Guideline No. 2 (TG 2) – *EIA Requirements for Land Development, Infrastructure, and Utility Projects* (January 2017).

6. Environmental Baseline Data Collection and Impact Prediction Approach

This section describes the environmental baseline data collection and impact prediction approaches that will be undertaken in developing the EIA Report.

6.1 Climate and Meteorology

6.1.1 Desktop Review

In describing the existing regional climate and meteorology, the EIA will utilize available information from Dubai Municipality (e.g. Dubai Airport Meteorological data). The information will include at a minimum, data on:

- Rainfall;
- Temperature (maximum and minimum);
- Relative humidity;
- Wind conditions (direction and speed);
- Net radiation; and
- Atmospheric stability.

This data will assist in the evaluation of potential impacts on air quality, noise and storm event runoff. These studies will also include the identification of any climatic conditions that may influence the air quality at the Project site.

6.1.2 Greenhouse Gas (GHG) Inventory

Given the scale of the Project, generation of GHGs during both construction and operation phases are reasonably anticipated. Through design, material selection and construction procedures, it is possible to minimize possible GHG emissions. Furthermore, there are comparative advantages of employing WTE technologies as opposed to landfilling when considering “net” life-cycle GHG impacts to the environment.

The proposed GHG assessment will consider emissions from the following sources:

- Construction:
  - Fuel and electricity consumption during construction activities; and
  - Construction personnel commuting.
- Operation (annual emission):
  - Energy (fuel and electricity) consumption during operation of the WtE plant:
    - materials handling from the waste management facilities (e.g. landfill) to the WtE plant;
    - backup generators; and
    - ancillary electricity use (such as for buildings, ancillary equipment and water treatment plant) and own-use electricity.
  - Sulphur hexafluoride (SF_6) in electrical equipment
  - Employee commuting

For operational emissions, Scope 1 and 2 emissions will be considered:

- Scope 1: Emissions from direct energy use; and
- Scope 2: Indirect energy use from imports and exports of electricity, heat or steam.

The predicted annual operational emissions will be compared with the existing landfill disposal of wastes, including:

- Reduction in GHG from avoided transport of wastes to landfill;
- Reduction in GHG from avoided landfill methane emissions; and
- Reduction in GHG emissions from on-site electricity generation displacing existing sources.

6.1.2.1 Methodology

The GHG assessment will be undertaken in accordance with the Intergovernmental Panel for Climate Change (IPCC) guidelines. The following tasks will be undertaken:

- Define an appropriate scope for the assessment, considering the possible emission sources of GHGs, including carbon dioxide (CO_2), nitrous oxide (NOx), methane (CH_4), and SF_6.
- Identify relevant aspects of energy use and emissions from construction and operation.
- Identify and apply appropriate international emission factors. If required information is not available in a reasonable time period, GHD will flag this, and make assumptions as appropriate to provide the most reasonable estimate possible.
- Outline the calculation procedures used to create the GHG emissions inventory.
- Determine the CO_2 equivalent emissions for each GHG and sum these values to estimate the total GHG emissions attributable to the project.
- Discuss potential GHG mitigation and reduction opportunities.
- Determine the Impact Assessment Significance Score.
- Provide input to the EMMP.
- Scope 3 emissions are not be considered for the Project because they are not required by DM.

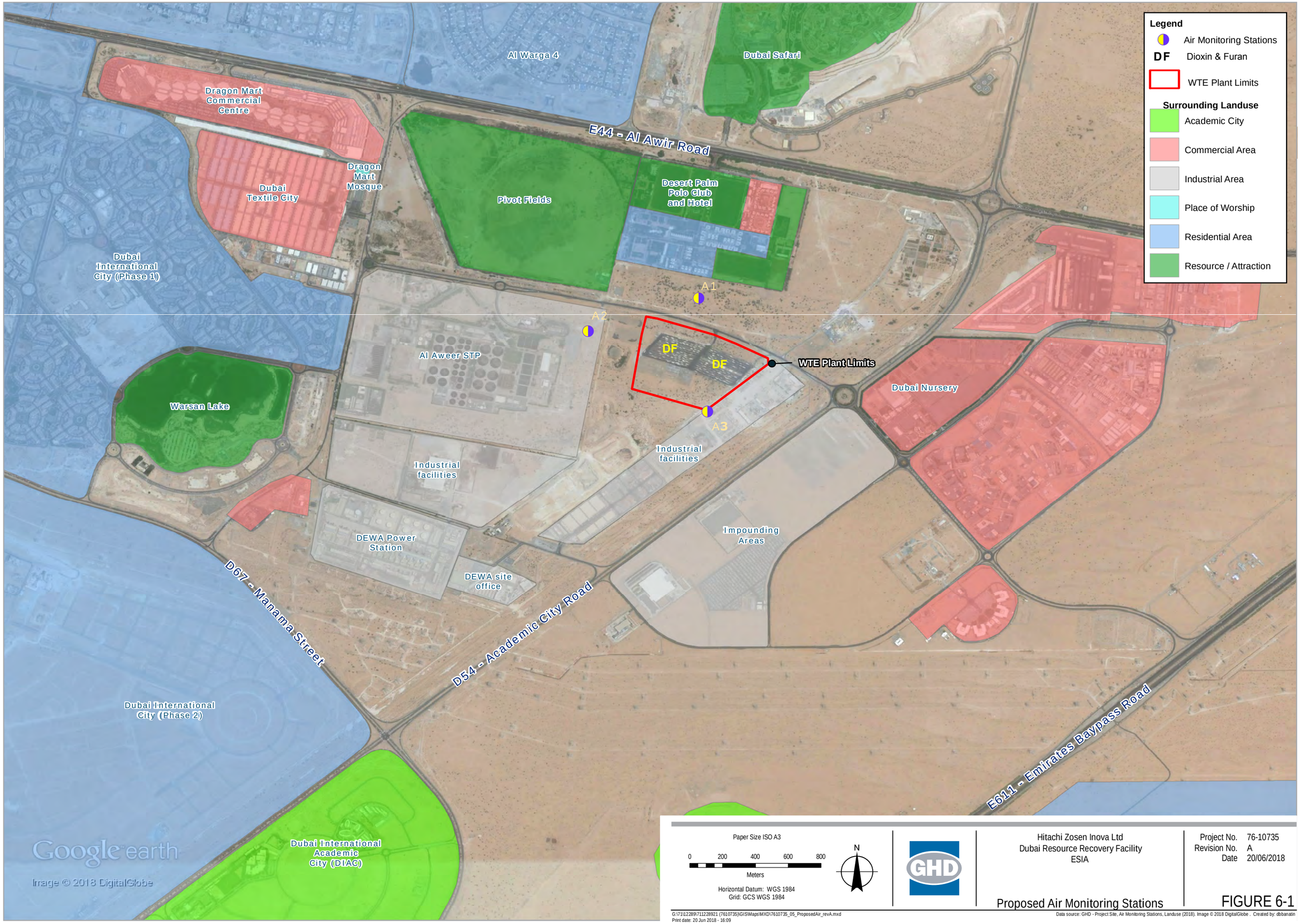
6.2 Air Quality

The air quality data for the proposed Project site will be acquired via the following means:

- Undertaking a field survey to monitor and define baseline ambient air quality; and
- A review of historical data provided by DM-ED or available via DSC.

6.2.1 Baseline Ambient Air Monitoring

A two-week baseline real-time continuous monitoring programme is proposed for three locations as illustrated in Figure 6-1 and discussed in Table 6-1. The monitoring parameters and methodologies are provided in Table 6-2. The parameters to be monitored are based on UAE Federal Ambient Air Quality Standards.



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Proposed Air Monitoring Stations

Project No.	76-10735
Revision No.	A
Date	20/06/2018

FIGURE 6-1

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Print date: 20 Jun 2018 - 16:09

Data source: GHD - Project Site, Air Monitoring Stations, Landuse (2018). Image © 2018 DigitalGlobe . Created by: dbbanatin

Table 6-1 Description of proposed air monitoring stations

Monitoring station	Description
Station A1 (25.162863; 55.444350)	Station A1 is located between the project site and the existing Desert Palm Dubai Resort and Hotel. This station represents the closest sensitive receptor to the Project site, and includes residential uses (i.e. located inside the Desert Palm Dubai Resort and Hotel).
Station A2 (25.161046; 55.438407)	Station A2 is located between the Project site and existing Al Aweer STP. During the initial site walkthrough, GHD personnel observed prevailing wind direction from the STP towards the proposed WtE plant. Therefore, there is a need to consider the up-gradient wind impacts from the existing facilities to the west. There is also a new commercial building being developed to the northwest of the area. Furthermore, the existing DIC Phase 1 is further to the west, and A2 should be between the DIC Phase 1 and the proposed WtE plant.
Station A3 (25.156631; 55.444078)	Station A3 is located in the vicinity of the southeast edge of the site, nearby existing concrete producing facilities. This air monitoring station is located down-wind of the project.

Table 6-2 Proposed air quality monitoring methodology

Parameter	Methodology
Particulate Matter (PM_{10})	PM_{10} and TSP will be drawn through a conditioned glass fibre filter paper at the flow rate of 1.10 – 1.4 m^3 per minute using a high volume air sampler. The amount of PM_{10} collected in the glass fibre filter paper will be determined gravimetrically by the weight difference before and after sampling.
Total Suspended Particles (TSP)	
Oxides of Nitrogen (NOx)	NOx will be determined by bubbling the air at a rate of one litre per minute through a sodium hydroxide and sodium arsenite midget impinger using a high volume air sampler. The nitrogen dioxide present will react with the sodium hydroxide and sodium arsenite to form a stable solution of sodium nitrite, which will be determined through a spectrophotometer.
Sulphur Dioxide (SO_2)	SO_2 will be determined by bubbling the air at a rate of one litre per minute through a tetrachloromercurate (TCM) in midget impinger using a high volume air sampler. The sulphur dioxide present will react to the TCM to form a stable solution of monochlorosulphiromercurate, which will be determined through a spectrophotometer.
Total Volatile Organic Compounds (VOC)	A known volume of air will be drawn using a sampling pump at 0.5-1liter/min. The sample will be adsorbed on activated charcoal tubes using a high/low volume air sampler with a rota meter. The VOC present will be adsorbed by the activated charcoal tubes

Parameter	Methodology
	and analysed using the gas chromatography method after they are desorbed by desorbing agents.
Carbon monoxide (CO)	Air will be absorbed at a definite flow rate through a portable digital gas meter that can detect the CO concentration.
Ozone (O_3)	O_3 will be determined by bubbling the air at a rate of one litre per minute through 1% potassium iodide in midget impinger using a high volume air sampler. The ozone present will react will the potassium iodide to form a tri-iodide ion, which will be determined through a spectrophotometer.

6.2.2 Dioxin and Furans

The intent of this baseline survey is for a limited observational period of up to two (2 No.) months duration and at up to two (No. 2) locations, in line with the timeline for the EIA study.

There is not an existing guideline for ambient air monitoring of dioxins and furans in the Emirate of Dubai, so this represents a new precedent for the Project. Accordingly, we propose the use of international standards by the United States Environmental Protection Agency (US EPA), as recommended by Exova, a DAC qualified laboratory.

The duration for sample collection is usually defined by detection limits and in consideration of the proximity or relative contribution of “source generators” for the emissions of interest. Specifically, the sample duration is specified considering a toxic equivalency, which can be measured by accumulating analytes in a high volume sampler over specified duration.

Table 6-3 Location and Duration

Location	Sampling approach	Duration of sampling	Number of sampling events
2 Locations	Realtime active	24 hours	2 sample events

The sample equipment, analysis and reporting will be provided by Exova who is a DAC-registered laboratory, and testing analysis shall be completed in accordance with US EPA Method TO-9A.

- Use of high volume samplers (HVS) and poly-urethane foam (PUF) sampling heads.
- Estimated 2 to 3 weeks for scope approval by DM-EPSS
- Estimated 3 weeks for site equipment provided from outside of UAE
- Estimated 1 to 2 weeks for equipment installation at site
- For each unit, a portable power system will be required from HZI/Besix (generator, or equivalent) to power the unit.

Table 6-4 Parameters and Equipment

Parameter	Equipment
Dioxin and Furan	High volume samplers (HVS) and poly-urethane foam (PUF) sampling heads

Table 6-5 Dioxin and Furans to be considered

Analyte	WHO-97 TEF(1)
2,3,7,8-TCDD	1
1,2,3,7,8- PeCDD	1
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1
1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.0001
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.05
2,3,4,7,8-PeCDF	0.5
1,2,3,4,7,8-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.0001

(1) WHO-97 TEF means World Health Organization (1997) Total Equivalency Factor

The data obtained will be attached to the EIA report.

Note: The data will be included in the EIA as an attachment. No comparative analysis, cumulative impact assessment, quantitative (e.g., modelling), or semi-quantitative analysis will be completed.

6.2.3 Historical Data Collection

In addition to the proposed baseline survey, historical air monitoring data available for Dubai will be reviewed (where available). Historical monitoring data will supplement data collected by GHD and provide a broader picture of conditions in the area around the project site and information required for air impact modelling against which potential impacts can be assessed.

6.2.4 Air Quality Assessment

The air quality of the proposed project site and its surrounding will be assessed against:

- Ambient Air Quality Standards specified in Regulation concerning Protection of Air from Pollution (Council of Ministers Decree No. (12) of 2006) – UAE Federal Law; and
- DM ambient air quality standards.

6.2.5 Impact Prediction and Assessment

The EIA will generally identify the potential sources of air emissions during the construction and operation phases of the Project, and discuss their likely impacts on the sensitive receivers identified in the immediate vicinity of the Project site.

Quantitative assessment will be undertaken to predict the impacts of the proposed Project on ambient air quality. The methodology for air impact modelling (dispersion) is provided below.

6.2.4.1 Air Impact Modelling

The purpose of the air dispersion modelling is to assess predicted pollutant ground level concentrations (GLCs) on nearby sensitive receivers.

The air assessment will be completed as follows:

- Meteorological data will be used to develop a meteorological input file for the AERMOD dispersion model.
- Source emissions data provided by the HZI in the form of expected emissions or vendor emissions specifications to calculate emission rates for each operating source. Emission characteristics such as stack height, stack diameter, stack exit temperature and exhaust flow rate, will be provide by HZI and used to characterise emissions in AERMOD.
- Significant buildings and structures will be incorporated into the model to account for possible building wake effects and potential resultant grounding of the plume.
- Air dispersion modelling will be completed for one scenario with the WtE plant operating at full capacity and in a “worst case” scenario.
- Model predicted GLCs will be assessed against relevant ambient air quality and occupational exposure criterion, including:
  - Ministerial Order No. 12, 2006, (Air Pollution Control);
  - US Occupational Health & Safety Administration (OSHA), 29 CFR, Part 1910; and
  - US EPA National Ambient Air Quality Standards (NAAQS) 40 CFR Part 50.
- A report will be prepared outlining meteorological file development, source emission characterisation, air dispersion modelling and assessment against relevant criteria. This will be incorporated into the EIA.

Air modelling excludes review of storage areas, such as bottom ash storage or FGT residue storage area.

6.3 Odour Assessment

6.3.1 Field Observations via Deployment of Odour Monitoring Stations (Ambient Air)

Provide one (1) environmental scientist over half day to complete site visit to document odour perception during the deployment of odour monitoring stations.

Allow for the deployment of four (No. 4) odour monitoring stations (Table 6-6). The monitoring programme will follow the sample numbers as detailed in the table below. The testing will be conducted following the requirements specified in the local regulations on indoor air quality. Reported results will be benchmarked against air quality standards where they exist, reference being made to relevant international standards (if available).

Table 6-6 Odour Monitoring Review

Number of locations	Parameters to be tested	Duration of sampling per location	Number of sample events
4 Locations	H_2S, NH_3, Mercaptans, Dimethyl Suphide, Dimethyl disulphide, VOC	8 hours	1 event

Table 6-7 Odour Monitoring Parameters

Parameter	Technique	Instrument
H_2S	Electrochemical cell	Graywolf analyser
NH_3	Electrochemical cell	Graywolf analyser
Mercaptans	Pumped Filter	Treated filter with GCMS analysis
VOCs	Realtime PID	Graywolf analyser
DMS/DMDS	Pumped Tube	Charcoal tube with GCMS analysis

6.3.2 Desktop Data Analysis and Literature Review

Reference odour emission rates from other odour assessment data sources (landfill tipping face, landfill capped areas, landfill gas, leachate), consider the relevance of olfactory studies for previous sites.

6.3.3 Qualitative Impact Analysis (added to overall EIA Study)

After completion of the desktop data analysis, GHD will undertake a qualitative impact analysis relative to odours, and in consideration of odour mitigation measures considered for the project and as specified by the design engineers.

The findings will be presented in the EIA report.

6.4 Noise

6.4.1 Baseline Ambient Noise Assessment

A baseline noise survey is proposed for the EIA at four locations as illustrated in Figure 6-2. The selection of noise monitoring locations is based on the presence of Noise Sensitive Receptors (NSR). NSR are receptors which would be most affected by an increase in noise levels as a result of either the construction or operational phases of the proposed development. Typical NSR would include schools, hospitals, residential areas or areas of ecological sensitivity. It should be noted that the exact monitoring locations may alter slightly if the field survey is affected by local conditions such as local noise sources or security and access constraints.

The proposed noise monitoring locations are selected for the following reasons:

- Station N1 is located between the project site and the existing Desert Palm Dubai Resort and Hotel, which represents the closest sensitive receptor to the project site that include residential uses (i.e. residential villas are located inside the Desert Palm Dubai Resort and Hotel).
- Station N2 is located between the project site and the existing Al Aweer STP. During the initial site walkthrough, GHD observed prevailing wind direction from the STP towards the proposed WTE project site. Therefore, there is a need to consider up-gradient wind impacts from the existing facilities to the west. There is also a new office building being developed to the northwest of this area. Furthermore, the existing DIC Phase 1 is further to the west, and this site should be between the WTE and DIC Phase 1 development.
- Station N3 is located to the southeast of the Project site near the existing concrete producing plants. This location is proposed, as it is important to consider the existing noise from the adjacent facilities relative to cumulative impacts.

- Station N4 is located near the internal road access and northeast corner of the Project site. This site is proposed, as it is important to document the existing traffic noise from the highway relative to cumulative impacts.

The objective of conducting a baseline noise survey is to characterize existing noise levels at the proposed project site and adjacent area by:

- Capturing the background noise level of the Project area prior to the start of construction works; and
- Capturing road traffic noise (to acquire information needed for modelling the impacts of traffic noise on the project area and its surrounding environment during the operational phase of the Project)

A total of four measurements will be taken for a duration of 15 minutes as described in Table 6-8 in accordance with DM Technical Guideline for the *Reduction of Construction and Demotion Noise* (2011).

Table 6-8 Noise monitoring schedule

	Day time (7 am – 8 pm)	Night time (8 pm – 7 am)
Weekday (Sunday to Thursday)	1 x 15 minutes	1 x 15 minutes
Weekend (Friday to Saturday)	1 x 15 minutes	1 x 15 minutes

The parameters to be measured will include the following:

- L_{Aeq};
- L_{Amax};
- L_{Amin};
- L_{A10}; and
- L_{A90}.

Measurements will be taken using a SVANTEK 977 Type 1 Sound Level Meter (or equivalent) in accordance with *ISO 1996-1:2003 - Acoustics - Description, Measurement and Assessment of Environmental Noise - Part 1: Basic quantities and assessment procedures*. Readings will be taken at approximately 1.5 m above the ground level. The Global Positioning System (GPS) position of the monitoring location, surrounding activities (e.g. activities on site during measurement, intrusive noise from unwanted sources) and noise sources at the time of measurement will be recorded.

Immediately prior to and following each noise measurement, the accuracy of the sound level meter will be checked by a sound level calibrator generating a known sound pressure level at a known frequency. Measurements will be accepted as valid only if the calibration levels before and after the noise measurements agree to within 1.0 dB. Noise level data obtained during rain and wind with an average speed exceeding 5 m/s or wind with gusts exceeding 10 m/s will not be accepted.

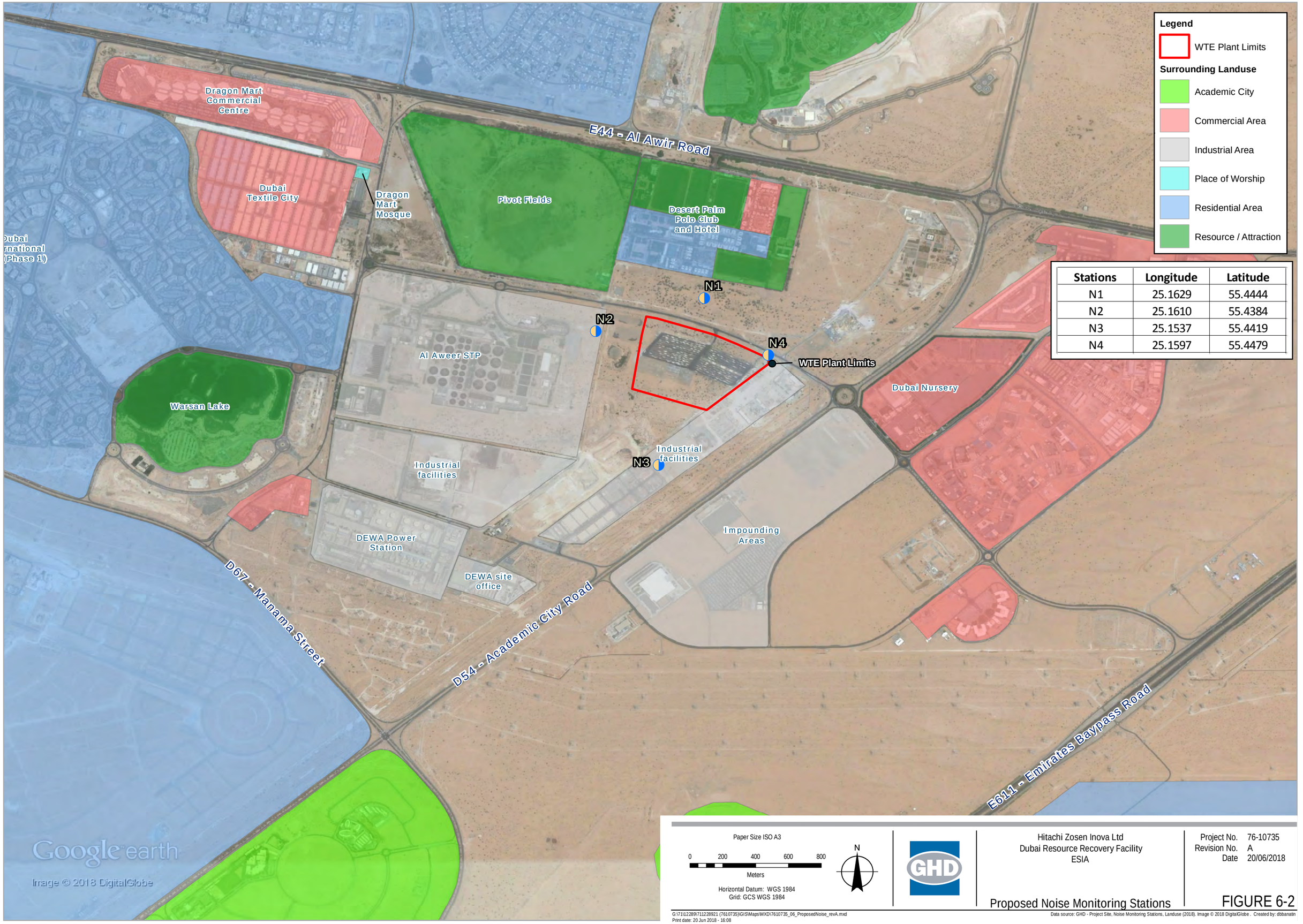
6.4.2 Impact Prediction and Assessment

The noise assessment will consist of the following tasks:

- Desktop review to identify key environmental NSRs from aerial and terrestrial photography.

- Review of project specific noise goals for the operation of the WtE plant with consideration to local guideline, including:
  - Federal Law No. 24 of 1999 – Protection and Development of the Environment;
  - Council of Minister Decree No. 12 of Year 2006 under Federal Law No. 24 (Allowable Limits for Noise level in Different Areas – Regulation concerning Protection of Air from Pollution); and
  - World Bank General Environmental Health and Safety Guidelines: Environmental.
- Identify the likely principal noise and vibration sources during construction and operation and their potential impacts on sensitive receptors.
- Undertake a qualitative desktop assessment of construction noise and vibration impacts based on the proposed construction activities and program (no noise modelling involved).
- Undertake a qualitative desktop assessment of the proposed road transport route and road traffic noise impacts due to increased traffic volume as a result of the WtE plant operation.
- Undertake one noise modelling scenario using the SoundPLAN noise model, to predict sound pressure levels emanating from the proposed operation of the WtE plant.
- Should the noise assessment suggest adopted operational noise goals may be exceeded, undertake one additional CADnaA noise modelling scenario incorporating in-principle noise mitigation measures to predict sound pressure levels emanating from the WtE plant.

The EIA will generally identify the potential sources of noise during the construction and operation phases of the Project, and discuss the likely impacts on the sensitive receptors identified in the immediate vicinity of the proposed site. Quantitative methods will be employed for predicting the noise impacts of the Project's operation on NSRs.



Stations	Longitude	Latitude
N1	25.1629	55.4444
N2	25.1610	55.4384
N3	25.1537	55.4419
N4	25.1597	55.4479

Paper Size ISO A3

0 200 400 600 800

Meters

Horizontal Datum: WGS 1984
Grid: GCS WGS 1984

N

Hitachi Zosen Inova Ltd
Dubai Resource Recovery Facility
ESIA

Project No. 76-10735
Revision No. A
Date 20/06/2018

Proposed Noise Monitoring Stations

FIGURE 6-2

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Print date: 20 Jun 2018 - 16:08

Data source: GHD - Project Site, Noise Monitoring Stations, Landuse (2018). Image © 2018 DigitalGlobe . Created by: dbbanatin

6.5 Soil and Groundwater

6.5.1 Baseline Condition Assessment

6.4.1.1 Previous Studies

GHD was provided with copies of the following site investigation reports:

- *Geotechnical Site Investigation for Proposed Warsan Landfill Waste to Energy Project on Plot No- 622-146, Al Warsan Second Dubai - UAE* (Report No. SS18000022, Rev. 00) – Draft Factual Report, dated 15 April 2018, prepared for M/S. Six Construct, Sharjah, UAE; and
- *Site Investigation, Proposed Warsan Landfill Waste to Energy Project, Plot No- 622-146, Al Warsan Second, Dubai - UAE* (Report No. S/D08-178, Rev. 0) – Final Interpretative Report, dated 7 April 2009, prepared for M/S. Dubai Municipality, Dubai, UAE.

For the 2018 site investigation, the following was completed by ACES:

- Excavation of four (04 Nos.) trial pits to varying depths;
- Conducting thirty nine (39 Nos.) cone penetration tests (CPT); and
- Monitoring groundwater levels at two (02 Nos.) existing standpipe piezometers.

Of interest for the EIA baseline survey, during the 2018 site investigation, ACES took groundwater level readings from previous borings numbers BH-01 and BH-14 (existing piezometers), using a dip meter, as summarized in Table 6-9:

Table 6-9 Summary of soil investigation taken by ACES

BH No.	Elevation (m DMD)	Date	Time	Ground Water Depth [Below EGL (m)]	GW Reduced Level (DMD) (m RL)
BH-01	44.92	05 April 2018	10:30 AM	15.70	29.22
BH-14	38.07	05 April 2018	10:40 AM	7.32	30.75

Taken from Appendix E, Site Investigation Report (Draft) prepared by ACES dated 15 April 2018 Revision 00

In general, groundwater levels at the above two locations were reported in a range of 7.32 to 15.70 m below existing ground level, but the groundwater elevation was relatively consistent at 29.22 m and 30.75 m, at BH-01 and BH-14, respectively.

For the 2018 site investigation, it is GHD understanding that there were no surface soil or groundwater samples taken by ACES. However, groundwater sampling was carried out during the 2009 site investigation. The chemical testing completed in 2009 is provided in Table 6-10. Findings of the 2009 survey were limited.

Table 6-10 Summary of chemical testing

No.	Chemical Testing
1	Determination of Sulphate for Soil and Groundwater – BS 1377: Part 3; 1990, Cl.5 (Amd. 9028/96)
1	Determination of Chloride for Soil and Groundwater – BS 1377: Part 3: 1990, CL.7 (Amd. 9028/96)

No.	Chemical Testing
1	Determination of pH for Soil and Groundwater – BS 1377: Part 3: 1990, CL.9 (Amd. 9028/96)
1	Determination of Carbonate Content – BS 1377: Part 3: 1990, CL.6.3 (Amd. 9028/96)
1	Determination of Organic Matter Content – BS 1377: Part 3: 1990, CL.3 (Amd. 9028/96)
2	Determination of Magnesium Content of Soil by using AA/Spectro Photometer APHA/AAS
2	Determination of the Ammonia Content APHA / Ammonia Chem Kit
2	Determination of Water Soluble Salt Content BA 1377: Part 3, Cl.8, 1990 & Eart Manual, Des. 8
2	Determination of Bicarbonate Content ASTM D 1067-92, Text Method B

Taken from Section 6.0 Laboratory Testing, Site Investigation Report prepared by ACES (2009)

6.4.1.2 Site Walkthrough

During the site walkthrough by GHD staff on 9 April 2018, the following general observations were made, and inform our proposed sample collection locations for groundwater and soil:

- It was observed that along the western site boundary there is presence of standing surface water at the toe of the landfill slope and base of the sludge fill area. While the extent of the proposed Project development will not disturb these existing areas, this indicates a potential that groundwater may exhibit potential contamination in this vicinity. Given the proximity of the landfill and sludge disposal areas to the west, GHD has planned for two borings (or test pits) to be provided in this area. The exact locations will be determined in the field on the date of drilling.
- In the vicinity of the proposed footprint of the WtE plant, GHD has planned for two borings (or test pits) to be provided for subsurface soil samples. Given the vehicle traffic and storage of vehicles in this area, there is potential for petroleum impacts below asphalt or at the edge of the asphalt paved areas. The exact locations will be determined in the field on the date of drilling.

6.4.1.3 Preliminary Site Assessment

For the EIA study, a preliminary site assessment will be completed as a component of the baseline surveys. The site assessment will provide a screening-level review in consideration of potential groundwater or subsurface soil contamination.

Soil Survey

GHD proposes that soil samples will be collected at five locations at the project site. These shall be tested against a full suite of parameters as provided in Appendix C. Samples shall be collected at regular intervals: surface, 0.5 m and 1 m; therefore, 10 samples will be collected for soil analysis. Where there is visible change in strata or 'horizon' from each discrete layer within the boring or where there is visual or olfactory evidence of potential contamination, one sample will be collected and analysed.

The soil samples will be digested and analysed in a Dubai Accredited Centre (DAC) laboratory in accordance with the methods stated in Appendix C. Standards for soil assessment is not available in Dubai, as such, results of the analysis will be assessed against the EAD Soil Contamination Guidelines for Abu Dhabi Emirate (2016) and Dutch Soil Remediation Circular (2009).

Groundwater

Five groundwater samples will be collected from new groundwater wells and shall be analysed for the full suite of parameters as provided in Appendix C. Boreholes will be drilled to the specified depths and groundwater samples recovered from select boreholes:

- A new disposable bailer will be used for each borehole to ensure that there is no cross contamination between monitoring locations, disposable sampling bailers will be used.
- Before sampling, each well will be purged by removing a volume of groundwater to approximately three times the theoretical volume of each well. After the purge volume has been removed samples will be taken using the bottom end sampling method.
- The groundwater sample in the bailer (one sample per each of the sampling locations) will be poured into suitable sample bottles with pre-added chemical preservatives appropriate to the tests (where applicable).

The groundwater samples will be analysed in a DAC laboratory and in accordance with the methods stated in Appendix C. The groundwater quality will be assessed against the Target and Intervention values specified in Dutch Soil Remediation Circular (2009), which is accepted by DM-ED.

Additionally, a qualified field technician will be provided for analysis and data gathering for the field parameters listed in Table 6-11.

Table 6-11 Field parameters to be considered for groundwater samples

Item	Parameter	Method	MDL
1	pH @ 25 °C *	APHA AWWA 4500 H+B	0.1 -
2	Electrical Conductivity @ 25 °C *	APHA AWWA 2510 B	0.1 µS/cm
3	Salinity	APHA AWWA 2520 B	0.1 ppt
4	Total Dissolved Solids @ 180 °C *	APHA AWWA 2540 C	9 mg/L
5	Dissolved Oxygen	Polarographic Method	0.10 mg/L
6	Temperature @ Site	APHA AWWA 2550 B	-

The procedure for metals analysis of all parameters will be completed by first filtering the sample in a filter paper, and then digestion using high purity acid, finally the analysis will be completed by the analysing instrument.

The findings will be presented in the EIA report.

Screening

For screening of existing conditions, GHD will provide a qualified technician to be present during the installation of the originally planned four (4 No.) groundwater sampling piezometers (i.e., 2 new and 2 existing).

Data observations will be made from the ground surface using a portable handheld multi-gas meter for measurement of methane (CH_4), hydrogen sulphide (H_2S), carbon monoxide (CO), oxygen (O_2) and carbon dioxide (CO_2). A GA2000 (or equivalent device) will be used. The initial observations made at the time of piezometer establishment will be the first sample event. The

budget also allows for measurements to be taken at two (2) weeks following the initial well establishment (second sample event), for comparison.

The findings will be presented in the EIA report.

Proposed Sampling Locations

GHD proposes the following Phase 1 sampling:

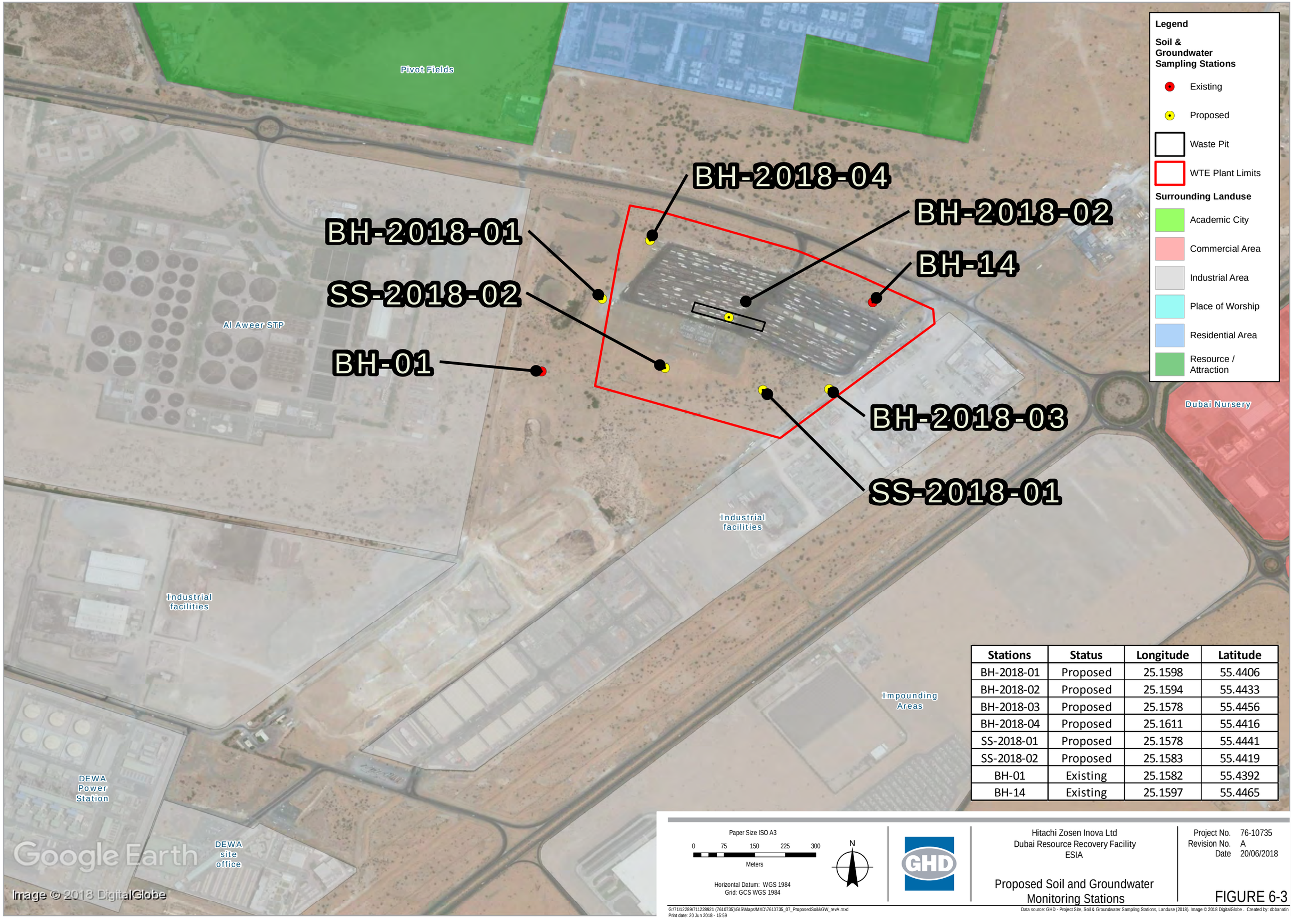
- 2 borings, each to an estimated depth of 10 to 15 m (or until groundwater encountered), with piezometers installed for groundwater sampling;
- 2 borings (or test pits) for soil sample recovery, each to 5 m depth, soil samples to be collected from 1 m and 3 m depths below existing ground surface level and
- Additional groundwater samples to be collected from the 2 existing piezometer locations at BH-01 and BH-14.

A summary of the proposed baseline sampling is provided in Table 6-6 while approximate sampling locations is provided in Figure 6-3. Locations for sampling are subject to change pending site conditions and accessibility.

Table 6-12 Proposed environmental baseline sampling

Description	LABEL / ID	Assumed depth	Groundwater sample	Soil sample(s)
Existing Piezometer	Existing BH-01	--	1 sample	--
Existing Piezometer	Existing BH-14	--	1 sample	--
New Groundwater Well with Piezometer	BH-2018-01(P)	15 m BGS	1 sample, 1-week after purge	1 sample at 1 m BGS 1 sample at 5 m BGS
New Groundwater Well with Piezometer	BH-2018-02(P)	15 m BGS	1 sample, 1-week after purge	1 sample at 1 m BGS 1 sample at 5 m BGS
New Bore Hole (no Piezometer)	BH-2018-03	5 m BGS	--	1 sample at 1 m BGS 1 sample at 5 m BGS
New Bore Hole (no Piezometer)	BH-2018-04	5 m BGS	--	1 sample at 1 m BGS 1 sample at 5 m BGS

Description	LABEL / ID	Assumed depth	Groundwater sample	Soil sample(s)
Surface soil sample	SS-2018-01	0.5 to 1 m BGS	--	1 sample from surface soil, hand auger method
Surface soil sample	SS-2018-02	0.5 to 1 m BGS	--	1 sample from surface soil, hand auger method
Totals			Anticipated 4 groundwater samples	Anticipated 10 soil samples



Stations	Status	Longitude	Latitude
BH-2018-01	Proposed	25.1598	55.4406
BH-2018-02	Proposed	25.1594	55.4433
BH-2018-03	Proposed	25.1578	55.4456
BH-2018-04	Proposed	25.1611	55.4416
SS-2018-01	Proposed	25.1578	55.4441
SS-2018-02	Proposed	25.1583	55.4419
BH-01	Existing	25.1582	55.4392
BH-14	Existing	25.1597	55.4465

Paper Size ISO A3

0 75 150 225 300

Meters

Horizontal Datum: WGS 1984
Grid: GCS WGS 1984

N

GHD

Hitachi Zosen Inova Ltd
Dubai Resource Recovery Facility
ESIA

Proposed Soil and Groundwater Monitoring Stations

Project No. 76-10735
Revision No. A
Date 20/06/2018

FIGURE 6-3

G:\71\12289\711228921 (7610735)\GIS\Maps\MXD\7610735_07_ProposedSoil&GW_revA.mxd
Print date: 20 Jun 2018 - 15:59

Data source: GHD - Project Site, Soil & Groundwater Sampling Stations, Landuse (2018). Image © 2018 DigitalGlobe . Created by: dbbanatin

6.5.2 Impact Prediction and Assessment

GHD will identify and qualitatively assess the impact of the Project on soil and groundwater. Qualitative impact assessment will be undertaken using the methodology presented in Section 5.3.7.

6.6 Water Quality

GHD will identify any water resources near the site and assess the potential impacts resulting from the construction and operation of the proposed project. Potential sources of water supply and volume of water required during the construction and operation phases of the Project will also be defined in the EIA.

The following approach will be adopted:

- Documentation of the existing condition of water quality around the proposed site based on the relevant available information from DM-ED; and
- Development and evaluation of strategies that could mitigate potential effects of the project on water quality.

6.7 Biodiversity and Conservation

6.7.1 Desktop Review

A review of available secondary data on terrestrial ecology will be undertaken to describe the existing biodiversity within the project site. GHD will obtain secondary data and available historical studies in the project vicinity undertaken for the adjacent sites/existing facilities from DM-ED such as those completed for other nearby facilities.

6.7.2 Preliminary Survey

A half-day walkover was undertaken by a GHD field scientist with the following objectives:

- Ecological sensitive habitats and flora;
- Presence of flora and fauna species of conservation significance; and
- Description of local geomorphology, topography and soil substrate.

A memorandum summary describing the baseline condition of the site is provided in Appendix D. There is no ecologically significant flora and fauna species observed at the site; therefore, additional field survey is not proposed to be undertaken.

6.7.3 Baseline Survey

A terrestrial ecology survey will be completed over a single site visit as per Brown and Boer 2004 methodology. The survey will aim at identifying species of flora and fauna present and any rare or endangered species of special conservation interest. The following methodology will be adopted during the survey:

- **Habitats**: General habitat type will be assessed by walk or drive over surveys by a qualified terrestrial ecologist. Where specifically sensitive habitats are identified, further surveys may be recommended based on the health and regional importance of the habitat identified. The survey will aim to describe the structure and composition of the broad habitat types and the floristic diversity of the proposed development with specific focus on threatened/endemic/protected/invasive plant species. The vegetation of the survey area shall be recorded by identifying the main habitat types and their plant communities.

- **Birds**: Areas identified as providing suitable habitats for birds will be monitored briefly during the survey. Monitoring will include surveys to identify any activity; namely calling, singing, nesting and flight. Areas considered favourable for bird species will be visited to record any breeding activity, subject to the survey season.
- **Mammals**: Mammal surveys will be undertaken during transect and quadrat assessments. Mammals will be recorded by visual sightings as well as signs, inclusive of tracks, burrows, scats, and other signs, if identifiable. Nocturnal mammal surveys will be undertaken to determine the presence of any mammal species such as rodents, foxes and larger ungulates inclusive of gazelle. Remote infra-red camera traps will be deployed at each location for the survey to assist in the identification of species, and if deemed suitable, One Anabat bat detector will also be deployed during the day time survey and collected the next day. The calls recorded will then be analysed to assess present or absence of species, and a rough indication of numbers. Anabat detector is to ascertain the presence/absence of bat species. In addition, up to 10 Sherman small mammal traps will be placed along a chosen transect within the survey alignment.
- **Reptiles**: Reptile surveys will be undertaken concurrently with the mammal surveys during transect and quadrat assessments. An effort will be made to search under discarded plywood sheets and other anthropogenic debris as well as under more natural shelters such as rocks and dead wood. Nocturnal torchlight surveys for reptiles will be carried out over a single evening to determine the presence/absence of species inclusive of gecko and snake.

Scope includes completion of the template form provided by DM-EPSS (Appendix I). The findings will be presented in the EIA.

6.7.4 Impact Prediction and Assessment

Using the secondary data and result of the baseline survey, GHD will identify and qualitatively assess the potential impacts of the construction and operation of the Project on biodiversity. Qualitative impact assessment will be undertaken using the methodology presented in Section 5.3.7.

6.8 Waste Management

6.8.1 Baseline Condition

The EIA will assess the estimated types and quantities of waste to be generated from the construction and operation of the WtE plant. The EIA will also review existing waste management issues and facilities within the surrounding area to develop options for managing waste generated during these phases. HZI will provide details regarding the permitted disposal facility for disposal of operational wastes and prepare summaries to be incorporated in the EIA.

6.8.2 Impact Prediction and Assessment

The assessment of waste impacts is usually associated with the impacts on receptors and resources including waste infrastructure. The indirect impacts of waste management will be addressed in other environmental components such as air quality, noise and soil and groundwater.

The methodology for the waste assessment to be considered in the EIA include:

- Describing existing waste generation and management practices in the UAE and Dubai Emirate based on a review of available data (e.g., solid waste generated and waste management facilities) as well as the existing and proposed waste management facilities at the site.

- Identifying waste types and streams (e.g., solid, liquid; hazardous or non-hazardous) and quantities produced during construction and operation of the WtE plant and how they will be managed.
- Assessing impacts associated with waste generation and management (such as health hazards, odour emissions, soil and groundwater contamination and impacts to existing waste management infrastructure in the Emirate of Dubai) using the impact assessment criteria methodology outlined in Section 5.3.7 and discussing the benefits of the Project.
- Identifying mitigation measures to reduce the waste impacts including consideration of the legislation and guidelines.
- Summarising impacts along with the mitigation measures and identifying the residual impacts.
- Developing a monitoring program to monitor waste generated and how it is managed.

6.9 Utilities

6.9.1 Baseline Condition

The EIA will identify the existing and available utilities in the local and regional area. Where data is available, any current issues on the operating capacities of relevant utilities will be considered in the EIA.

The EIA will discuss, and where possible quantify, the Project's requirement for utilities including the following:

- Power supply;
- Water supply;
- Sewage treatment; and
- Landscape irrigation water supply.

6.9.2 Impact Prediction

Environmental impacts, such as air and noise emissions, and potential soil and water contamination resulting from the operation of the associated utilities will be qualitatively assessed.

6.10 Traffic and Transport

Dubai Road and Transport Authority (RTA) will be consulted relative to the Traffic Impact Study (TIS) requirements. Key findings of the TIS, particularly relating to the projected increase in road traffic volume within the Project vicinity, will be incorporated into the EIA. This will also be utilised for dispersion modelling of noise impacts associated with the increased traffic during the operation of the Project.

The EIA will further provide a qualitative assessment of other potential impacts such as reduced amenity, safety issues and nuisance to sensitive receptors associated with potential increased traffic.

6.11 Land Use, Landscape and Visual Impact

The general objective of land use assessment is to evaluate the potential impact of the project in relation to the current land use of the area. With regard to this objective, the EIA will:

- Describe the present land use and development patterns in the project area;

- Identify protected areas of other ecological conservation sites that may be affected by the project; and
- Identify any cultural heritage sites present that may be affected by the project, through desktop.

The Project is an industrial development and will be located in an industrial site; as such, visual impact assessment is not proposed.

6.12 Socio-Cultural Environment

6.12.1 Baseline Condition

6.11.1.1 Socio-Economic[4] Data

The EIA will describe the proposed Project in the context of the surrounding land uses and facilities of the local area. Secondary data from DM and other relevant agencies (DSC) will be used to characterise the socio-economic and cultural condition in the vicinity of the proposed site. Socio-economic and cultural information that will be included in the EIA are:

- Population and community structure;
- Areas of conservation, heritage or indigenous cultural significance;
- Areas of existing economic significance to the local business and residential community;
- Existing community and government facilities including educational, recreational, cultural, welfare, social and emergency services;
- Other developments nearby the Project site (e.g. DIC Phase 2);
- Proposed facilities within the site (e.g. labour accommodation during the operation phase); and
- Labour conditions and employment rights in accordance with the requirements of IFC and Equator Principle.

6.11.1.2 Public Health Data

The EIA will describe the proposed Project and the existing industrial facilities. The following information will be presented to inform the human health assessment:

- Raw materials and methods of transport to the facilities;
- Industrial processes conducted at the facilities;
- Emissions records;
- Waste materials generated and method of disposal;
- On-site waste material storage areas, contents and approximate quantity;
- Wastewater discharges from the facilities; and
- Methods of off-site transport.

6.12.2 Impact Prediction

6.11.2.1 Social Impact Assessment

The socio-cultural investigation will aim to gain an appreciation of the relevance of the Project in the context of the existing facilities and future land use in the local area. It will discuss the

[4] Economic inputs to be included in the EIA comprise of employment opportunities and benefits as a result of Project construction and operation. Other economic aspects such as market analysis will be addressed separately by other consultants.

impacts of the construction and operational activities on the social and cultural infrastructure in the region including:

- Population and demographics (e.g. describe the workforce numbers and arrangement if there is any impact on community services and facilities);
- The national, regional and local economies in terms to employment and business opportunities;
- Community services and facilities;
- Any areas identified with conservation, heritage or indigenous cultural significance; and
- Any area identified of visual amenity importance, including existing land based visual catchments / sensitive receivers (such as mainland residential communities, parks).

Socio-economic impacts and benefits will be identified and strategies will be proposed to mitigate and manage or alternatively enhance social opportunities. Pressure on existing infrastructure and services form the new influx residential population together with surrounding existing pressures for the current residential population will also be assessed.

6.11.2.2 Human Health Risk Assessment (HHRA)

The purpose of the HHRA is to evaluate the potential health risks and concerns of existing residents and workers in order to determine and evaluate the potential health risks to sensitive receptors. Based on the existing information provided and the meteorological and geographical information of the area, the exposure pathways will be determined and the likelihood and consequence of potential exposure at the proposed WtE plant evaluated.

A summary qualitative report will be developed and included in the EIA. The assessment will compare emitted concentrations of Nitrogen Dioxide (NO_2), SO_2, CO, TSP, Acid Gases [Hydrogen Chloride (HCl), Hydrofluoric acid (HF) and ammonia (NH_3)], Dioxins [2,3,7,8 Tetrachlorodibenzodioxin (TCDD)], Mercury (Hg), and Cadmium (Cd) to regulatory screening levels available from sources such as the World Health Organization (WHO). The inhalation exposure pathway will be semi-quantitatively evaluated within the assessment.

7. Summary

The proposed Dubai Resource Recovery Facility will require the preparation of an EIA.

GHD has been commissioned by HZI to undertake the baseline data collection and impact assessment for the Project. The EIA will be prepared according to DM Technical Guideline No. 1 - *Environmental Impact Assessment* (January 2017) and DM Technical Guideline No. 2 - *EIA Requirements for Land Development, Infrastructure and Utility Projects* (January 2017).

This SoW Report presents a brief description of the proposed Project, the proposed scope and methodology for the baseline data collection, and subsequent impact assessment. Baseline data will be collected through field surveys and review of available secondary data. Field baseline surveys will be conducted for air and noise monitoring and limited soil/groundwater sample analysis. The results of the field surveys will be included in the EIA Report. Should additional surveys or assessment be requested by DM-ED, GHD can include them, as required in consultation with our client.

The EIA will be prepared with a view to providing accurate, detailed information in a clear and concise manner in order to allow DM-ED to make an informed assessment of the potential impact of the Project on the environment. The EIA will also identify appropriate mitigation and management measures to minimise impact.

8. References

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Appendices

Appendix A – Photo Log of Surrounding Land Uses

Appendix B – Likelihood and Consequence Level of Impact

Appendix C – Soil and Groundwater Parameters

Sr	Description	Method	MDL
Laboratory Analysis on Soil			
1	Cyanide as CN	Pyridine Pyrazalone Method	0.002
2	Nitrate Nitrogen as NO3-N	Cadmium Reduction Method £	1.5
3	Nitrite Nitrogen as NO2-N	Diazotization Method £	0.010
4	Phosphate Phosphorus as PO4	USEPA PhosVer 3 Method £	0.10
5	Benzene	USEPA 8260	0.05
6	Toluene	USEPA 8260	0.05
7	Ethylbenzene	USEPA 8260	0.05
8	Xylene	USEPA 8260	0.05
9	Gasoline Range (C5 - C10)	USEPA 8015	2.0
10	Diesel Range (C11 - C28)	USEPA 8015	20.0
11	Motor Oil Range (C29 - C40)	USEPA 8015	50.0
12	Antimony as Sb	APHA AWWA 3120 B	1.0
13	Arsenic as As *	APHA AWWA 3120 B	5.0
14	Beryllium as Be	APHA AWWA 3120 B	1.0
15	Boron as B *	APHA AWWA 3120 B	1.0
16	Cadmium as Cd *	APHA AWWA 3120 B	2.0
17	Trivalent Chromium as Cr III	APHA AWWA 3120 B / Calculat	1.0
18	Hexavalent Chromium as Cr VI	USEPA 3060 / APHA AWWA 3120	5.0
19	Cobalt as Co *	APHA AWWA 3120 B	2.0
20	Copper as Cu *	APHA AWWA 3120 B	1.0
21	Iron as Fe *	APHA AWWA 3120 B	1.0
22	Lead as Pb *	APHA AWWA 3120 B	1.0
23	Manganese as Mn *	APHA AWWA 3120 B	2.0
24	Mercury as Hg	APHA AWWA 3120 B	1.0
25	Nickel as Ni *	APHA AWWA 3120 B	2.0
26	Selenium as Se *	APHA AWWA 3120 B	1.0
27	Zinc as Zn *	APHA AWWA 3120 B	2.0

Sr.	Description	Method	MDL
Laboratory Analysis on Groundwater			
1	Benzene	USEPA 8260	1
2	Toluene	USEPA 8260	1
3	Ethylbenzene	USEPA 8260	1
4	Xylene (o,p)	USEPA 8260	1
5	TPH Gasoline Range (C5 - C10)	USEPA 8015	0.02
6	TPH DIesel Range (C11-C28)	USEPA 8015	0.10
7	TPH Motor Oil Range (C29 - C40)	USEPA 8015	0.50
8	Antimony as Sb *	APHA AWWA 3030 E / 3120 B	0.10
9	Arsenic as As *	APHA AWWA 3030 E / 3120 B	0.01
10	Barium as Ba	APHA AWWA 3030 E / 3120 B	0.01
11	Cadmium as Cd *	APHA AWWA 3030 E / 3120 B	0.002
12	Chromium as Cr *	APHA AWWA 3030 E / 3120 B	0.006
13	Cobalt as Co *	APHA AWWA 3030 E / 3120 B	0.002
14	Copper as Cu *	APHA AWWA 3030 E / 3120 B	0.006
15	Lead as Pb *	APHA AWWA 3030 E / 3120 B	0.015
16	Manganese as Mn *	APHA AWWA 3030 E / 3120 B	0.002
17	Mercury as Hg	APHA AWWA 3030 E / 3120 B	0.001
18	Nickel as Ni *	APHA AWWA 3030 E / 3120 B	0.005
19	Zinc as Zn *	APHA AWWA 3030 E / 3120 B	0.006
Additional Parameters as per DM-EPSS Comment Item No. 12			
1	Total Coliforms	APHA AWWA 9222 B	1 CFU/100ml
2	Total Dissolved Solids @ 180 °C *	APHA AWWA 2540 C	9 mg/L
3	Biochemical Oxygen Demand @ 5 Days	ASTM D 888	6 mg/L
4	Oil & Grease (Free) *	Gravimetric / IP-13	0.001 %
5	Oil & Grease (emulsified) *	APHA AWWA 5520 B	10 mg/L
6	Chloride as Cl- *	APHA AWWA 4500 Cl B	1 mg/L
7	Total Sulfates as SO4 *	APHA AWWA 4500 SO4 C	8 mg/L
8	Total Chlorine	USEPA DPD Method	0.01 mg/L
9	Cyanide as CN *	Pyridine Pyrazalone Method	0.002 mg/L
10	Dissolved Oxygen	APHA AWWA 4500-O H/G	0.1 mg/L
11	Nitrate as NO3 *	Cadmium Reduction Method	0.01 mg/L
12	Phosphate - Phosphorus as PO4 *	USEPA Phos Ver 3	0.02 mg/L
13	Sulfide as S2- *	USEPA Methylene Blue Method	0.5 mg/L
14	Pesticide (Non-Chlorinated)	USEPA 8081	0.01 mg/L

15	Phenol	USEPA 528	0.025 mg/L
16	1,2-Dichloroethane	USEPA 8260	0.001 mg/L
17	Dichloromethane	USEPA 8260	0.001 mg/L
18	Aluminum as Al *	APHA AWWA 3030 E / 3120 B	0.01 mg/L
19	Boron as B *	APHA AWWA 3030 E / 3120 B	0.01 mg/L
20	Beryllium as Be	APHA AWWA 3030 E / 3120 B	0.01 mg/L
21	Calcium as Ca	APHA AWWA 3030 E / 3120 B	0.10 mg/L
22	Iron as Fe *	APHA AWWA 3030 E / 3120 B	0.011 mg/L
23	Magnesium as Mg	APHA AWWA 3030 E / 3120 B	0.10 mg/L
24	Molybdenum as Mo *	APHA AWWA 3030 E / 3120 B	0.01 mg/L
25	Potassium as K *	APHA AWWA 3030 E / 3120 B	0.10 mg/L
26	Sodium as Na *	APHA AWWA 3030 E / 3120 B	0.10 mg/L
27	Escherichia coli	APHA AWWA 9222 G	1 CFU/100ml

Appendix D – Results of Biodiversity Survey

Appendix E – DM-approved Site Affection Plan

(Note: Dubai Municipality Waste Management Department to provide copy of Affection Plan for insertion here)

Appendix F – Authorization from HZI

Appendix G – Project Proponent's Trade License

Appendix H – GHD's Trade License and Certification

Appendix I – Baseline Survey Format (Terrestrial)

Annex 2. BASELINE SURVEY FORMAT

Date and Time	Habitat (according to Brown G. and Boer B. [2004*] habitat classification)	GPS Coordinates	Species	Number	Activity	Methods

*Brown G. and Boer B. (2004). Interpretation Manual for the Major Terrestrial Natural and Semi-natural Habitat Types of Abu Dhabi Emirate. Environmental Research and Wildlife Development Agency, Abu Dhabi

*Al Dhaheri, S., Javed, S., Alzahlawi, N., Binkulaib, R., Cowie,W., Grandcourt, E. and Kabshawi, M. (2007). Abu Dhabi Emirate Habitat Classification and Protection Guideline. Environment Agency Abu Dhabi

Appendix F – Scope of Work Approval and DM Correspondence

Scope of Work Conditional Approval

EIA Outline as per DM-ED Technical Guideline No. 2 (August 2018)

Ref: 812/02/02/1/1810704

08/08/2018

GHD Global Pty Ltd
P.O Box 35972
Dubai
Tel: 04-2949858
Fax: 04-2949740

Attention: ***Eng. David Wright***
Environmental Engineer

Dear Engineer,

Project	**: Dubai Resource Recovery Facility (Waste-to-Energy Plant)**
Subject	**: Conditional Approval of the Revised Environmental Impact Assessment (EIA) Scope of Work (SoW)**

With reference to the submitted revised Environmental Impact Assessment (EIA) Scope of Work (SoW, ref: G:\76\10735\Wp\43022.docx received on 17 July 2018), please be informed that it has been conditionally approved with the strict requirement that the attached comments shall be clearly and completely integrated in the EIA Report (EIAR).

On the other hand, you are directed to commit with the project schedule and not to cause any further delay as it has been noticed that despite you have been informed in the meeting held on 19 June 2018 to directly submit the EIAR, a revised SoW was submitted on 17 July 2018 which did not provide any additional technical information nor has addressed the majority of the requirements stipulated in our previous response (ref: EPSS/L/2018/215) causing a delay of 1 month to the project.

This is for your information and necessary action.

Yours faithfully,

Eng. Alya Abdulrahim Al Marmoudi
Director of Environment Department

Encl *Detailed Comments*
Minutes of the Meeting (MoM)
Cc *Environmental Planning and Studies Section Manager*
Natural Resources Conservation Section Manager
File (WtE Plant)

No	Section	Page	Comment	GHD Response & Revised SoW		EPSS Remarks
1.	Section 1.4	Page 2	Clarify the following statements which are conflicting: – *"Assessment of the waste storage facility for the bottom ash and fly ash is not included as part of the study as it is not the responsibility of HZI..... Bottom ash and fly ash management is under the responsibility of DM..... The scope of the EIA will be limited to the Project site footprint and the area of impact immediately around it as described in Section 2."* (Page 2)	The scope of the EIA is focused on the Waste-to-Energy Plant site. Under a coordinated effort, it is our understanding that the Dubai Municipality Waste Management Department (WMD) will be undertaking a concurrent project for review of the bottom ash and fly ash management and disposal options, which will integrate appropriate environmental reviews and approvals as per DM requirements. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Client is seeking further input from DM Waste Management Department relative to fly ash and bottom ash management and disposal. Further clarification to be provided to DM-EPSS as the EIA study progresses.	**Closed**
			– *"Treatment and final disposal is not included in the scope of the proposed Project..."* (Page 24)	The referenced paragraph in the Draft SoW report stated that "The IBA [Incinerated Bottom Ash] will be collected by DM [Dubai Municipality Waste Management Department] for treatment / disposal. Treatment and final disposal is not included in the scope of the proposed Project; as such a separate approval process will be obtained by DM." As noted in our response above, the evaluation of suitable management options is being considered separately by the WMD. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to above.	**Closed**
			– *"Flue gas management is not part of the scope of the proposed Project..."* (Page 24)	Reference to "flue gas" was a mistake in the Draft SoW report text. Flue gas management is included in the scope of the WTE Plant's environmental emissions controls. This sentence will be revised with the submission of the Final Scope of Work report.	No further action.	**Closed**
2.	Section 2.3	Page 10	Clarify the facility boundaries as the site general layout (Page 25) does not match with the Project boundaries plotted in Figure 2-2.	The original limits shown on figures are the Plot limits. For clarification purposes, the facility boundary will be coordinated with the facility general layout. Updated figures will be included with the submission of the Final Scope of Work report.	GHD will update all figures to show the boundary of the WTE Plant, and not the Affection Plan plot limits. Revised figures are to be included in the EIA. As per our meeting, EPSS indicated that a final SoW Report would not be required, but the additional scope could be approved via this letter submission.	Facility boundary clarified **(Closed).** **Updated (separated) Affection Plan is not yet provided.**
3.	Section 2.3.1	Pages 8-10	The location of the Facility is not compliant with Article 5 of the Cabinet Decree No. 12 of 2006 – Regulation Concerning Protection of Air from Pollution, which states that "The Incinerator.....shall be located 5,000 meters away from the nearest residential, commercial, industrial and / or agricultural area..."	The site of the facility has been specified by the Dubai Municipality as per the Tender Documents for the Waste-to-Energy project. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Client is seeking input from DM Waste Management Department relative to facility siting as per Cabinet Decree requirements. Further clarification to be provided to DMEPSS as the EIA study progresses.	**Clarification should be provided in the EIAR.**
4.	Section 2.3.2	Page 11	Provide any plans for detailed assessment of the potential contaminants within from the active landfill disposal area and the sludge pit, and assessment of explosion potential of any landfill gas (e.g. methane).	As discussed in the original Scope of Work report (Section 6.4 Soil and Groundwater), two soil borings to 15-meter depth are proposed for the baseline survey. During drilling, a handheld PID will be used to screen soil samples, including methane observations for extracted soil. Kindly clarify the basis for requesting such a detailed assessment.	Kindly refer to Attachment 1 (hereto) for scope description.	**Since the active landfill disposal area and the sludge pit are outside the project footprint, detailed assessment of the potential contaminants within the active landfill disposal area and the sludge pit, is no longer required.**
5.	Section 2.4	Page 15	It was indicated that the anticipated municipal solid wastes (MSW) delivery rate is 230 t/h (average) to 700 t/h (peak). Clarify how the wastes can be manage onsite during peak hours considering that the daily design waste throughput capacity is only 231.5 t/h.	Noted. The management practices during peak hours will be further described in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Client will provide clarification for this item within EIA.	**Clarification should be provided in the EIAR.**
			Provide location and details (e.g. whether open or covered, odor and leachate control, etc.) of the MSW staging area, if any. Further, assess any potential impacts of methane generation from the received MSW.	Noted. The facilities descriptions, including odor management and leachate control, will be further described in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Client will provide clarification for this item within EIA.	**Clarification should be provided in the EIAR.**
			Provide details of the incineration specifications and conditions that will show compliance with Article 5 of the Cabinet Decree No. 12 of 2006 – Regulation Concerning Protection of Air from Pollution, as follows:	A 2016 report by Fichtner as the technical adviser of Dubai Municipality defined the grate combustion technology and the IED 2010/75/EU as the basis for the design compliance. The design of the WtE Plant, therefore, is based on IED.	Client is seeking input from DM Waste Management Department relative to facility siting as per Cabinet Decree requirements. Further clarification to be provided to DMEPSS as the EIA study progresses.	**Clarification should be provided in the EIAR. It is expected that EIA should include the full design of the system and should have an operational emergency procedure during events of system component and process failure.**
			– The Incinerator shall include two rooms at least;	Noted. The plant accommodates multiple facilities and buildings typical of a modern WTE complex. More than two rooms are provided. This criteria is considered satisfied. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to above.	**"More than two rooms are provided" but supporting drawings are not provided. Clarification should be provided in the EIAR.**
			– The burning temperature inside the Incinerator shall be no less than 900 degree Celsius, and wastes shall be burnt for at least three seconds at such temperature inside the Incinerator.	The design of the WtE Plant is based on IED 2010/75/EU. This standard represents international best management and compliance with the stringent of global requirements. Details of the combustion process will be further described in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to above.	"The design of the WtE Plant is based on IED 2010/75/EU." "Details of the combustion process will be further described in the EIA." **Clarification should be provided in the EIAR.**
			– The Incinerators shall be wide enough to allow for burning all the solid wastes transported to it in 24 hours.	The facility is sized to accommodate the daily average throughput of solid waste of 5,000 tonnes per day. The facility sizing and contingency measures to address peak operating conditions will be described in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to above.	"The facility sizing and contingency measures to address peak operating conditions will be described in the EIA." **Clarification should be provided in the EIAR.**
			– There should be enough space inside the location of the	Noted. The plant accommodates multiple facilities and buildings	Kindly refer to above.	"The plant accommodates multiple facilities and buildings typical of a modern WTE

No	Section	Page	Comment	GHD Response & Revised SoW		EPSS Remarks
			Incinerator for the reception of the solid wastes and for carrying out the processes to be done in the location according to the nature of activities, the residential area, and its population.	typical of a modern WTE complex. Sufficient space is accommodated in the design. This criterion is considered satisfied. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.		complex. Sufficient space is accommodated in the design." **Clarification should be provided in the EIAR.**
			– Plastic and rubber materials shall be sorted out to be recycled, and may not be burnt to prevent the Hazardous Emissions in ambient air.	Inputs to the WTE Plant will be provided from the Dubai Municipality. The facility inputs are to be outlined in the EIA. Hazardous emissions are to be mitigated through the employment of best available technologies and continuous emissions monitoring systems. Further details of the emissions management are to be included in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to above.	"The facility inputs are to be outlined in the EIA." "Further details of the emissions management are to be included in the EIA." **Clarification should be provided in the EIAR.**
6.	Section 2.6.5	Pages 23 & 24	In relation to Comment No. 1, clarify the components of the Flue Gas Management excluded in the scope of the EIA	Flue gas management is part of the process controls for the facility. Comment No. 1 is clarified above. Flue Gas management will be further described in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to response to Comment No. 1 above.	**Closed.**
			Are the excluded scopes to be carried out within the Project plot or offsite?	Please see above clarifications.	Kindly refer to response to Comment No. 1 above.	**Closed.**
7.	Section 2.7	Page 25 (Figure)	Provide details of the "WTP" and the "Main Hall" (e.g. activities inside the hall, open or enclosed, etc.). Any potential impacts shall be assessed.	Noted. Additional details and potential impacts to be described in EIA. Scope of Work report revisions will include descriptions of the noted elements. WTP means Water Treatment Plant and is for pre-treatment of wastewater from the facility. The Main Hall is the primary combustion area, and a generic description will be added to the Final Scope of Work report.	Client will provide clarification regarding this item within EIA. Kindly refer to the Attachment 2 documents: – DWE-DSG-PCS-SPC-06004-00 – WTP specification – DWE-SAN-PCS-DDN-06070-00 - Water treatment plant technical description	**New documents were submitted. These should be described and assessed in EIAR including but not limited to:** - **Clear consolidated process description of the WTP;** - **Fate of the RO reject water and the assessment of all wastes (including hazardous) that will be generated shall be included;** - **Clarification between the statement in the revised SoW (page 15) that "No sewage sludge from Al Aweer STP will be treated nor sent from WtE plant to Al Aweer STP", which contradicts with the figure on "Tie-In Points" in the Technical Document (after page 48) showing TP-04: sanitary discharges from WtE to Al Aweer STP;** - **Only building design and civil works were provided for the main hall, combustion activities were not provided (i.e. to include no. of stacks, how NOx will be reduced, details if the system including the conveyors are completely enclosed, details of the receiving/storage room ventilation – positive/negative pressure, etc.).** **Nonetheless, it is expected that EIA should include the full design of the system. Note that only the information relevant to the EIA shall be included in the report.**
8.	Section 6.2.1	Page 41 (Figure 6-1)	Amend baseline monitoring locations as necessary with reference to the clarified project boundaries.	The originally proposed monitoring locations were coordinated in consideration of sensitive receptors. At this time, no change is proposed to the air and noise monitoring station locations previously considered.	Baseline locations have been coordinated with the WTE Plant site. No further action required. Final locations to be reflected in EIA report.	- **Baseline D&F should be 1 upwind offsite and 1 downwind offsite, based on the prevailing wind direction.** - **Baseline odour monitoring locations were provided on 26 July 2018. It is coinciding with the noise monitoring locations. (Closed)**
			Additional air monitoring location down-wind of the project shall be required	Kindly clarify the definition of "downwind" and the number of additional locations required. Our suggestion is up to two additional locations, but only one additional is preferred near the SE corner of the facility. The originally proposal of two monitoring locations were coordinated with consideration of sensitive receptors of residential uses.	Additional air monitoring location is added. Separate request to be made by letter for allocation of the Air Quality Monitoring Station operated by the DM Environment Department. Such request is forthcoming.	**Request to be made by letter for allocation of the Air Quality Monitoring Station operated by the DM Environment Department. (Closed)**
		Page 42 (Table 6-2)	Include dioxins & furans in the baseline air quality monitoring. The detection limit shall be below the relevant standard.	The proposed baseline air monitoring is believed to be consistent with the typical requirements of the DM. Kindly clarify the need for monitoring of dioxins and furans. The proposed emissions controls for the WTE Plant are to be designed to meet applicable emissions standards for dioxins and furans.	Kindly refer to Attachment 1 (hereto) for scope description.	Number of locations: 2 Sampling approach: Realtime active Duration of sampling: 24 hours Number of sampling events: 2 Equipment: High volume samplers (HVS) and poly-urethane foam (PUF) sampling heads Standard: WHO *Note: The data will be included in the EIA as an attachment. No comparative analysis, cumulative impact assessment, quantitative (e.g., modeling), or semi-quantitative analysis will be completed.* - **Number of locations is OK, but location should be 1 upwind offsite and 1 downwind offsite, based on the prevailing wind direction;** - **The baseline should be used as input data to the quantitative assessment (modeling) of D&F.**
9.	Include odor assessment (baseline odorous gas concentrations, cumulative odor impact considering the presence of nearby odor generating facilities, odor control measures)			Kindly clarify the intent of this request. For the proposed facility, odor management is of primary importance, and is considered for the design of the WTE Plant. The WTE Plant odor management strategies are to be further described in the EIA. Based on the foregoing, we feel that no change will be needed to the Scope of Work report for this item.	Kindly refer to Attachment 1 (hereto) for scope description.	- **Baseline odour monitoring locations were provided on 26 July 2018. It is coinciding with the noise monitoring locations. (Closed)** - **Odour assessment should be both qualitative and quantitative (to include odour modeling)**
10.	Section 6.6.2	Page 53	Employment of standard transect methodologies apart from the usual walk-thru surveys described to have a "detailed terrestrial ecology survey" for conducting EIA. The data should be collected in prescribed format (Annex 2)	A terrestrial walkthrough of the site was completed relative to ecology considerations and described in the original Scope of Work report submission. Based on this walkthrough, there were not readily apparent indication of possible endangered species of concern. Kindly clarify the scope for the requested detailed ecology survey.	Kindly refer to Attachment 1 (hereto) for scope description.	"Scope includes completion of the template form provided by DM-EPSS (Annex 2)." **Findings should be provided in the EIAR.**
11.	The assessment should include necessary measures to protect any wildlife with conservation status categorized higher than "Least Concern" that may be encountered during the construction works on-site. This should be in line with the requirements of Natural Resources Conservation Section (NRCS) Technical Guideline No. 3, on the Capture, Rescue, Translocation, Release and Restoration of Wildlife in the Emirate of Dubai. The Translocation Report shall be submitted to the NRCS within fifteen (15) days from the date the translocation was conducted.			Similar comment as Item No. 10, above.	Translocation Report, if required, would be prepared as an element of the Construction Environmental Management Plan. For the EIA, no further action is required.	**Closed.**
12.	Appendix C	Page 68	Include groundwater baseline quality parameters pH, Temp, Color,	Parameters presented in Appendix C were considered given the nature	Kindly refer to Attachment 1 (hereto) for scope	**Findings should be provided in the EIAR.**

No	Section	Page	Comment	GHD Response & Revised SoW		EPSS Remarks
			Turbidity, E. Conductivity, TDS, Residual chlorine, Na, K, Ca, Mg, SO4, Cl, NO3, PO4, Al, Fe, Mo, B, Be, Oil & Grease-Free oil, Pesticides-Non Chlorinated, Phenols, Hydrogen sulphide,Total Cyanide, Dissolved Oxygen, Biochemical Oxygen Demand, 1, 2 dichloroethane, Dichloromethane, E. Colie, Total Coliform.	of the proposed development. The additional parameters may be considered, but represent a change	description.	
13.	Include permanent groundwater lowering plan for the facility.			Kindly clarify what is defined as "groundwater lowering plan for the facility" and the duration of such plan.	Kindly refer to Attachment 2 (hereto), documents: – HZI-VZA-50073596_0.2_Building Section Requirements – chapter 2.2 on crack width limitation (latest document version produced by HZI) – DWE-DSG-GPR-BOD-00002-02 – Structural Basis of Design – chapter 8.2.4 on crack width used for bunker	**Since the waste bunker and other waste management areas will be concreted, water-tight structures with no possibility of groundwater intrusion, the Groundwater Lowering Plan is no longer required (Closed)**