Coordinated Assessment for the Construction of a Materials Recovery Facility (MRF)

WASTESERV MALTA LIMITED

CT2050/2019

SERVICE TENDER FOR THE ENGINEERING, PROCUREMENT AND CONSTRUCTION OF A NEW MATERIALS RECOVERY FACILITY

AIS REF. NO: PRJ-ENV483
FIFTH VERSION
PUBLICATION DATE
21 July 2025

ENVIRONMENT & DESIGN CONSORTIUM

DOCUMENT REVISION HISTORY

Date	Revision	Comments	Authors/Contributors
21/06/2024	1.0	First Version	Conor Walsh Sacha Dunlop Dr Francesco Demichele
09/08/2024	2.0	Second Version	
13/06/2025	3.0	Third Version	Sacha Dunlop
01/07/2025	4.0	Fourth Version	
21/07/2025	5.0	Fifth Version	

DISCLAIMER

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

1.0 INTRODUCTION

An Environmental Impact Assessment (EIA) is hereby being presented in relation to a development permit, PA/04863/22 (EA/00042/20). The application is entitled *"The proposed construction of a Material Recovery Facility (MRF) for the processing of grey bag and recovery of different streams of materials. The proposal includes ancillary office space, staff quarters and parking spaces"*

The EIA focuses on the assessment of potential environmental impacts rising from the physical characteristics of the whole project and the land use requirements during the construction, operational and decommissioning phases. Detailed Terms of Reference (ToRs) for this EIA were issued by the Environment and Resources Authority (ERA) in April 2023, in accordance with the ENVIRONMENTAL IMPACT REGULATIONS (S.L. 549.46).

Wasteserv Malta commissioned AIS Environment Ltd. (Malta) to coordinate the EIA process and compile all the necessary technical studies.

1.1 Structure of the EIA

The structure of this EIA is detailed in Table 1, along with the relevant sections of ERA's Terms of Reference (ToRs) for ease of reference.

Table 1: Structure of the EIA

CHAPTER IN COORDINATED ASSESSMENT REPORT (EIA)	DESCRIPTION	RELEVANT SECTIONS OF ERA'S TORS
1	Introduction	N/A
2	Description of the proposed development. This section includes the justification of the proposal and a description of the physical characteristics of the whole project and the land use requirements during the construction and operational phases.	Section 1.0
3	Assessment of alternatives	Section 2.0
4	A description of aspects of the site and its surroundings (i.e., environmental baseline)	Section 3.0

5	Assessment of environmental impacts and environmental risks of the proposed development	Section 4.0
6	Summary of impacts tables	Appendix 3
7	Required measures, identification of residual impacts and monitoring programme	Section 5.0
8	Conclusions	N/A
9	References	N/A

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 General Introduction

According to the LONG-TERM WASTE MANAGEMENT PLAN 2021 - 2030, Malta is currently facing the challenge of significantly improving its performance in the waste sector as it currently ranks among the lowest-performing EU Member States in this area. Population statistics published by NSO[1] show that between 2014 and 2020 the total population of Malta increased by 73,579 inhabitants, while municipal waste increased by circa 58,000 tonnes (Eurostat[2]). When small countries like Malta experience rapid population growth, they tend to experience a surge in waste production which often leads to various waste management issues. Reducing the amount of waste generated at source while maximising the amount of recycling and re-use potential is fundamental to invert this negative trend.

In 2019, the LOCAL GOVERNMENT ACT (Chapter 363 of the Laws of Malta) was amended to establish the function of Regional Councils to issue tenders for waste management services for local councils within their regions. The Waste Management Plan for Malta 2021-2030 highlights several measures aimed at enhancing Malta's waste management performance, including those related to regionalization of waste collection[3]. In accordance with the amended LOCAL GOVERNMENT ACT, these measures aim to promote the establishment of economies of scale through regional waste collection. To facilitate this, six regional service tenders were published on 19th May 2022 for "Household Waste Collection using Low Emission Vehicles," which serve the door-to-door collection of household residual waste (black bag), organic waste (white bag), and recyclables (green/grey bag plus glass). The proposed amendments aim to implement the regionalization reform in the management of packaging waste in line with the aforementioned regional tenders. As a result, Regional Councils are required to establish systems for the regional door-to-door collection, transport, and treatment of all municipal packaging waste generated, achieve the recycling targets for such packaging waste, and report data to ERA accordingly. Producer Responsibility Organisations (PROs) will be responsible for financing these systems based on their market share and maintaining overall management of the recycling points.

---

[1] *News2022_222.pdf (gov.mt) – accessed on 07/03/2024.*

[2] *Database - Waste - Eurostat (europa.eu) – accessed on 07/03/2024.*

[3] *https://era.org.mt/amendments-to-the-packaging-and-packaging-waste-regulations-to-reflect-the-regional-collection-of-waste/ - accessed on 07/03/2024.*

In general, collection systems include door-to-door kerbside collections for different waste streams like recyclables, glass, organic waste, and residual waste, along with a bulky waste service upon request. Alternatively, waste can be deposited at centrally located bring-in banks for paper, plastic, metal, and glass managed by PROs or at civic amenity sites for bulkier waste managed by Wasteserv Malta Ltd.

Over recent years, Malta has been striving to improve its recycling efficiency and reuse of municipal waste in line with the targets set out by the European Commission in 2008 following the publication of the WASTE FRAMEWORK DIRECTIVE. In particular, each EU Member State's goal is to take the necessary measures to achieve a minimum of 60% re-use and recycling of municipal waste by weight by 2030, and 65% by weight by 2035. In order to achieve these targets, Malta's strategic objectives set out through the LONG-TERM WASTE MANAGEMENT PLAN 2021 - 2030 are to:

- Maximise the resource value in waste though different management options;
- Innovate by designing waste prevention initiatives to lower Malta's per capita generation rate;
- Reform the collection system to increase economies of scale, harmonise collection practices and modernise the collection fleet;
- Study the feasibility of an enhanced producer responsibility framework to complement Malta's transition to a circular economy and reflect further on the true cost of waste management;
- Promote further the involvement of the private sector in waste management.
- Build the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta's targets.

In line with the latter point, waste management and resources need to be optimized by ensuring that any waste generated is efficiently and effectively treated in order to minimise its environmental footprint whilst maximising its potential as a resource. Investing in both new and existing waste management facilities will ensure a modern and efficient waste infrastructure that not only meets Malta's current needs but will set in place the required treatment facilities for the sustainability of future waste management in the Maltese Islands.

With the aim of fulfilling European requirements and improve the sustainability of the national waste management of Malta, the construction of a Materials Recovery Facility (MRF) is being proposed (PA/04863/22). The development of a MRF is considered a project of high importance in the country's policy initiatives to reduce landfilling while improving the recycling rates of source-separated and co-mingled dry recyclables. The project is essential to help the Nation meet its' recycling rates of municipal waste targets by 2030 coupled with its broader obligations to combat climate change. In fact, the MRF will be specifically designed to meet the recovery and recycling targets as defined in European Directives. The proposed scheme will also be

designed in such a way to ensure that any emissions and environmental impacts arising from its operations are in conformity with the requirements and standards stipulated in the EU INDUSTRIAL EMISSIONS DIRECTIVE 2010/75/EU (IED).

The IED aims to achieve a high level of protection to human health and the environment by reducing harmful industrial emissions across the EU. On the other end, Malta is already committed to curb GHG emissions under the EU CLIMATE ACTION REGULATION through the LOW CARBON DEVELOPMENT STRATEGY (LCDS), which seeks to reduce the 1990 emission levels by up to 20% in 2020, 55% in 2030 and achieve climate neutrality (net zero carbon emissions) by 2050.

WasteServ Malta Ltd. is tasked with organizing, managing, and operating integrated waste management systems in the Maltese islands to promote a circular economy approach by maximizing recyclable material extraction and generating renewable energy from waste. WasteServ carries out the majority of its operations at the ECOHIVE Complex, the largest investment in Malta's waste management sector aimed at advancing the country towards a circular economy. To achieve these goals, the Waste Management Plan of Malta includes a range of measures, such as establishing a new Material Recovery Facility (MRF).

The new MRF is specifically designed to manage separated recyclable waste streams including paper, cardboard, plastics and metals. Since February 2008, such waste streams were received and processed at the MRF that was located at Sant' Antnin Solid Waste Treatment Plant in Marsaskala. This plant remained in operation until May 2017 when a fire made the full recovery of the building and associated equipment unfeasible. Various temporary solutions within the Malta North Plant at the ECOHIVE complex have been implemented by Wasteserv to circumvent the issue and maintain the country's recycling efforts.

In 2024, WSM commissioned a temporary MRF with a 40,000t capacity at the ECOHIVE complex. The facility is composed of a reception area for recyclable waste, a pre-filtering line, a bag opener& buffer, pre-sorter, ballistic separator, magnetic separator, eddy current separator, optical separators, conveyor belt systems, air compressors and balers[4].

The proposed MRF will be designed to align with environmental sustainability goals while also providing economic and social benefits. The facility will complement the existing waste management plants and assist the Nation in increasing its recovery rates and in meeting its targets and obligations as established by the WASTE FRAMEWORK DIRECTIVE.

[4] *https://era.org.mt/wp-content/uploads/2024/11/WSM-Presentation.pdf*

2.2 Scheme site and immediate surroundings

The proposed development is located in Malta's North-Eastern coast, at about 700m distance away from Qalet Marku, Naxxar (Figure 1). The scheme will form part of the ECOHIVE Complex at Magħtab in conjunction with other waste management plants such as the Anaerobic Digestion Plant (ADP); Waste-to-Energy (WtE); Civic Amenity site; Żwejra and Magħtab landfills. The complex shall also entail the planned Organic Processing Plant (OPP) and Thermal Treatment Facility (TTF) which are currently subject to planning permit procedures (Figure 2).

Figure 1: Map showing the location in Malta (Source: Google Earth, 2020).

Figure 2: Site location (MRF at Maghtab forming part of the ECOHIVE Complex).

2.2.1 A description of the Present Land Uses and Environmental Characteristics of the Site

The site lies within the Naxxar local council boundary in the outskirts of the Magħtab suburb, eastwards of the Żwejra landfill. The town of Naxxar boasts a rich history and offers a diverse range of places of interest for visitors. The exact origins of Naxxar are uncertain, but evidence of habitation dates back thousands of years. This is demonstrated by the Tal-Qattara and Ta' San Brinkaw caves, megalith remains from the Bronze Age period at Tal-Qadi and Qaliet Marku, and the Bronze Age cart ruts that can be seen from Salina to it-Tarġa and near the Għadira tal-Wej. Several chapels also dot the Naxxar area, including the Church of St. Michael the Archangel in Salina, and the churches of St. John the Evangelist and St. Mary of the Angels in Bahar ic-Caghaq[5].

Naxxar's natural geography offers a sheltered environment for its residents. Historically, the area was used as a reconnaissance point, and throughout the ages, various forms of defense have been built to protect against enemies. Coastal defenses, such as towers, trenches, batteries, redoubts, and beach posts, were erected to resist landings from the sea. Inland defenses, such as pillboxes and fortifications were constructed to impede the enemy's advance if they landed successfully.

[5] *Source: https://naxxar.gov.mt/tourism/*

The Scheme Site falls within the purview of the Magħtab Environmental Complex (also known as ECOHIVE Complex), managed by Wasteserv. The area is dominated by various waste management facilities including recycling plants, the Zwejra and Ghallis engineered landfills, along with other commercial, industrial and residential areas in the surroundings.

The footprint of the entire site earmarked for development is around 21,373m^2, whereby the MRF building shall occupy 11,900m^2, welfare, which includes facilities which are not involved in the processing of waste such as reception building, canteen etc. shall occupy 400m^2 whilst the remaining 5,500m^2 shall be used for manoeuvring and access of vehicles. Shallow terraces dipping eastwards to the coastal area of Qalet Marku are separated by rubble walls. Although seemingly of degraded state, these structures are protected under the RUBBLE WALLS AND RURAL STRUCTURES REGULATIONS (S.L.552.01). These rubble walls represent a physical boundary to small parcels of agricultural land. Furthermore, sporadic residential buildings are found within a buffer area of 100m distance from the site extension.

The site is located in close proximity to older sections of the landfill, which are primarily composed of unconsolidated construction waste, with older portions covered by vegetation, including *Acacia* sp. and *Eucalyptus* sp. The dominance of invasive species confirms the frequent and significant disturbance from anthropogenic activity.[6]

The scheme falls under the governance of the CENTRAL MALTA LOCAL PLAN, more specifically within the Baħar iċ-Ċagħaq region of the locality of Naxxar (Figure 3).

[6] *Scott Wilson, Development of Rehabilitation Strategies Maghtab, Qortin and Wied Fulija Landfills Summary Report FINAL, 2004, https://environment.gov.mt/en/Documents/Downloads/05aMepaFinal.pdf*

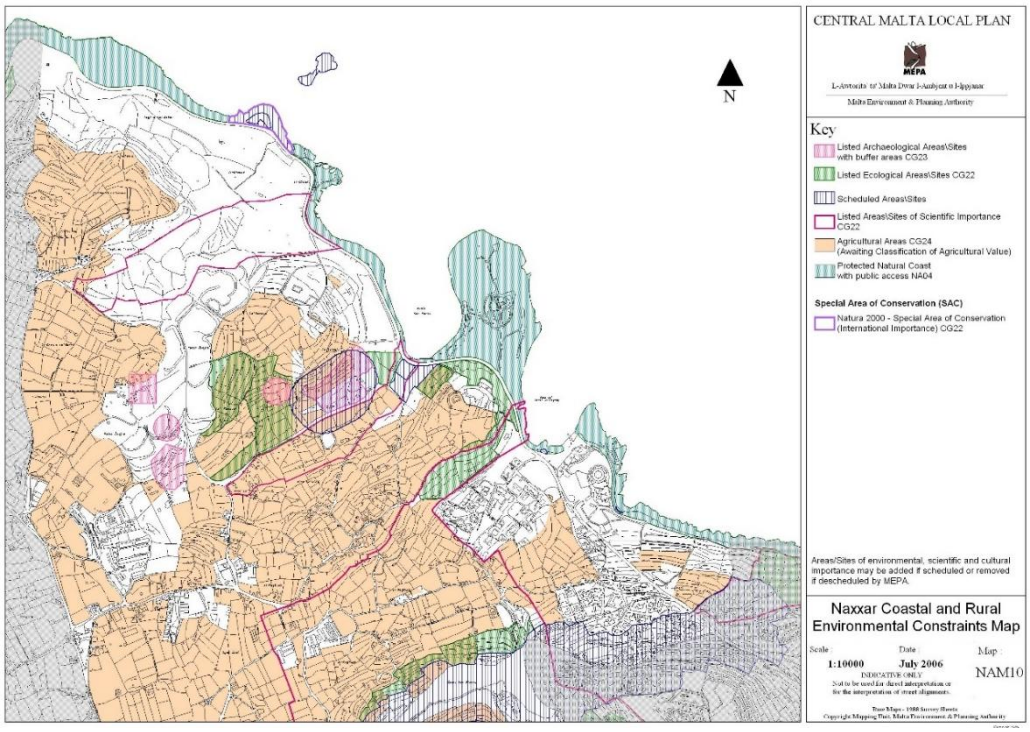


Figure 3: Large-Scale Coastal and Rural policy Map for Baħar ic-Cagħaq, Naxxar (Source: CMLP, 2006)

More importantly, the site is about 1.3km away from a nearby terrestrial Natura 2000 site also known as l-*Għadira is-Safra u l-Iskoll tal-Għallis* (MT0000008) which is designated as a Special Area of Conservation (SAC) via Government Notice 1522 of 2019. Other marine and bird protection areas are present within or in close proximity to the proposed MRF, chiefly:

- Terrestrial Environment:
  - MT0000007 - *Is-Salini* designated as a Special Area of Conservation via Government Notice 1379 of 2016; and
- Marine Environment:
  - MT0000105 - *Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u Il-Qaliet* designated as a Special Area of Conservation of International Importance via Government Notice 682 of 2018; and
  - MT0000112 - *Żona fil-Baħar ta' madwar Għawdex* – Special Protected Area via Government Notice 1311 of 2016.

Natura 2000 sites comprise a network of protected areas established by the EU to conserve wildlife and habitats. The network covers various sites across all EU Member States, including Malta. The main objective of the Natura 2000 network is to protect and conserve threatened species and habitats, and to ensure the long-term survival of Europe's most valuable and threatened species and habitats.

2.3 Justification for the proposal

Data collected through the National Statistics Office exhibit a 4.4% increase in the total quantity of waste generated in Malta in 2022. Such figures amount to approximately 2.6 million tonnes[7]. Decreases in waste generation were noted from the collection of separated waste from Civic Amenity Sites (10.9% or 4,188 tonnes), bring-in sites (7.3% or 265 tonnes), the collection of the organic waste bag (11.5% or 2,678 tonnes) and the grey/green bag (1.5% or 422 tonnes). On the other hand, glass collection increased by 0.9% (30 tonnes). On a positive note, waste treatment reached a total of approximately 2.5 million tonnes, increasing by 6.1% over 2021 levels, while recycling in waste management facilities increased by a further 17.8% accounting for 209,679 tonnes.

Eurostat data[8] was also analysed for statistical analysis to allow for a comparative assessment between EU Member States. Due to its small size, the total amount of waste generated by Maltese households is one of the lowest among EU countries with 0.16 million tonnes in average for a timeframe ranging from 2004 to 2020. On the opposite, Malta's mean yearly recycling rates from 2000 to 2022 reveal one of the worst records at European level compared to an EU average of about 39% (Figure 4).

[7] *NSO Malta | Solid Waste Management: 2022 - NSO Malta (gov.mt) accessed on 15/02/2024.*

[8] *Waste statistics - Statistics Explained (europa.eu) accessed on 15/02/2024.*

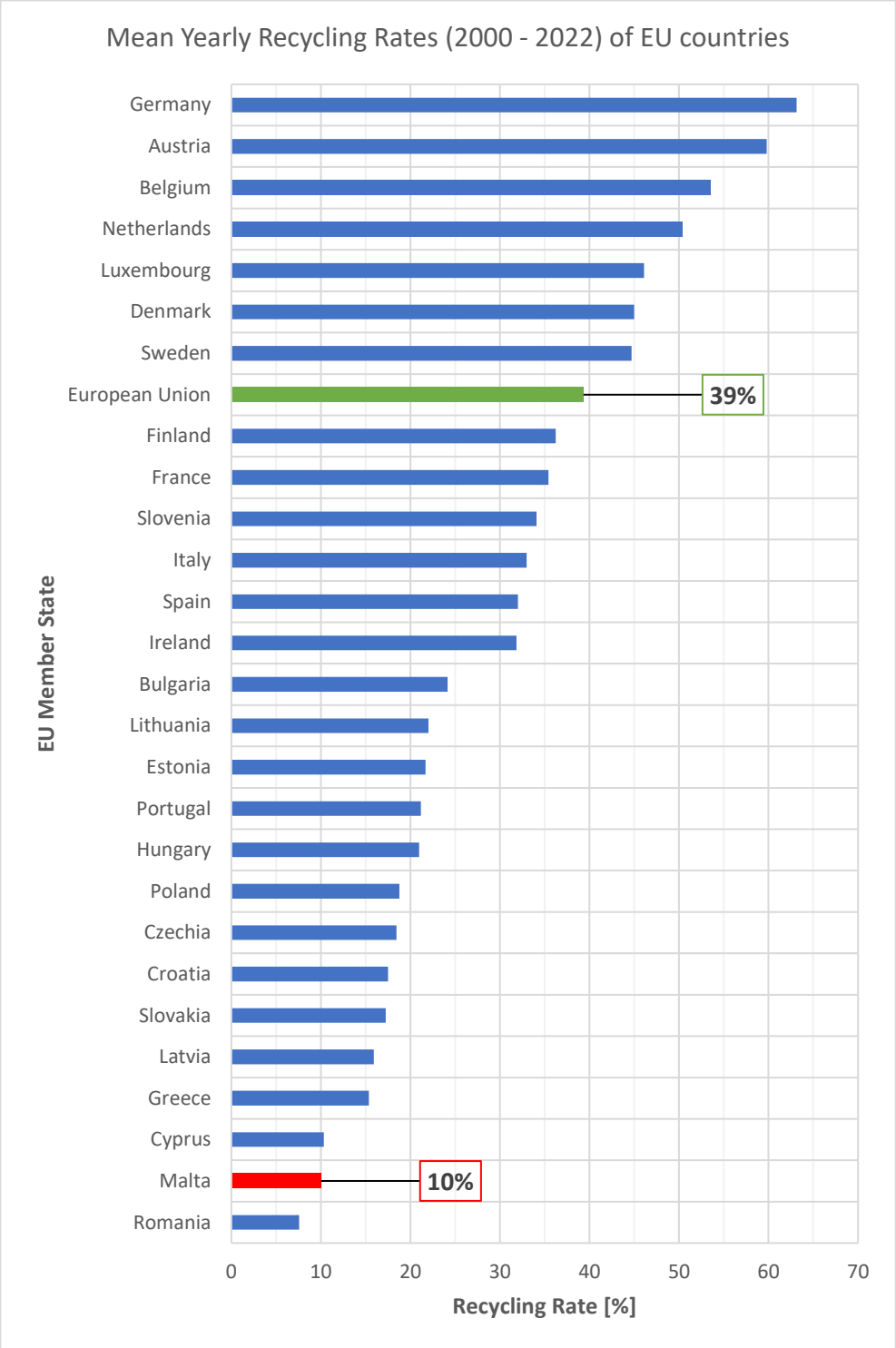


Figure 4: Mean Yearly Recycling Rates for a timeframe of Data Availability from 2000 to 2020 for each EU Member State (Data Source: EU Waste Statistics).

Figure 5 exhibits interesting trends for the Maltese Islands in terms of the total waste generated by households, and landfill and recycling rates.

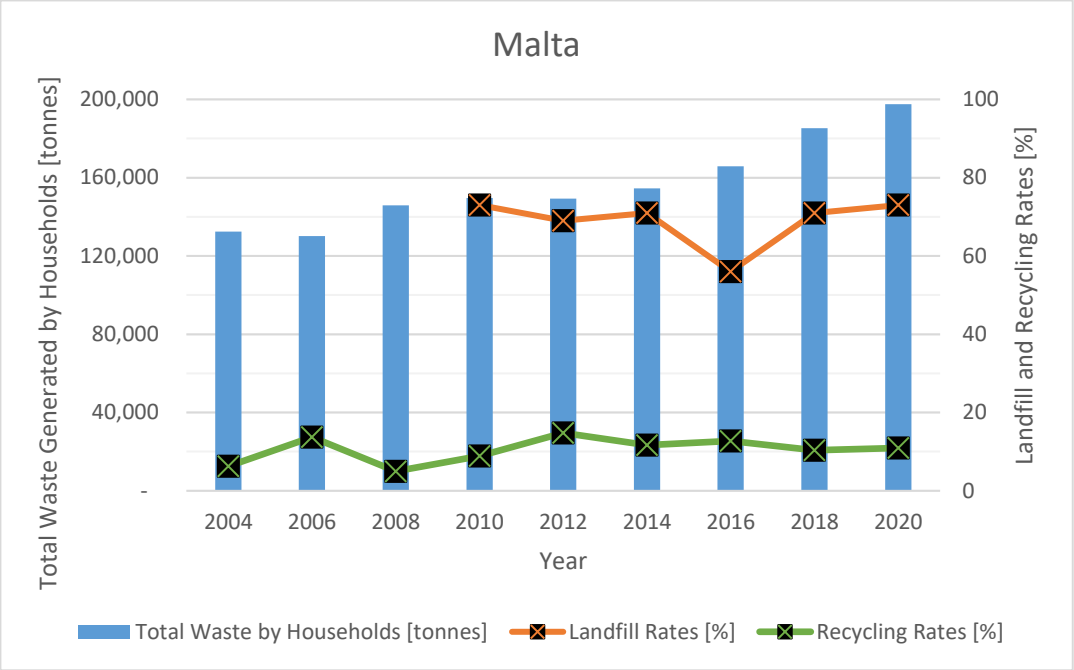


Figure 5: Time Series of Total Waste generated by Households (Blue bars), Landfill Rates (Orange) and Recycling Rates (Green) of the Maltese Islands (Data Source: EU Waste Statistics).

In accordance with Figure 5, the total waste generated by households increases at a mean rate of 2% every year. Spikes in waste production were recorded in between the years 2006 and 2008, and 2016 and 2018 accounting for a 6% growth. Between 2010 to 2020, landfill rates exhibit a neutral variation (e.g., 0% changes) on average. The lowest trough of landfill rates was observed in 2016 (12% landfilled material less compared to 2014) which corresponded to a 4% increase of recycling rate for the same year.

Although recycling rates are generally increasing over the period of analysis (e.g., in between 2004 and 2020) (Figure 5) at a 4% average yearly rate, interannual variabilities are large ranging from -47% to +37% in between 2006/2008 and 2004/2006 respectively, and remained quasi-steady from 2018 onwards. These patterns indicate the need of improving recycling facilities and increasing the entire country capacity of waste treatment. In the final quarter of 2018, Malta launched a countrywide program for collecting organic waste from households. As part of this initiative, legislative changes were implemented in 2018 to establish a set timetable for household MSW collection by waste type, requiring households to dispose of waste in accordance with the designated schedule. In line with S.L.549.40, waste separation became enforceable by law for everyone since April 2023, including

businesses, governmental and non-governmental entities as well as private homes[9]. Nonetheless, during the first six months, between April and October 2023, the authorities conducted an educational campaign to familiarise the public with these new regulations.

Increased efforts to sensitize the Maltese population to waste separation at source have been carried on by the government. An interactive educational centre in Marsaskala is worth mentioning: Wasteserv's visitors' centre was transformed into an interactive activity place for children to have fun while learning about waste management and circular economy. Waste prevention programmes are also incentivised through the WASTE REGULATIONS (S.L. 549.63) transposing Directive 2008/98/EC, and the WASTE MANAGEMENT PLAN 2014-2020.

The European Commission has approved a series of proposals aimed at increasing the EU Member States' recycling and re-use rates of municipal waste by at least 60% in 2030, and 65% by 2035[10]. In line with these European requirements and the need to foster a culture of resource efficiency, Malta is committed to investing in necessary infrastructure. This infrastructure aims to promote the prevention and sustainable management of waste by means of[11]:

- Maximising the resource value in waste through different management options;
- Innovating by designing waste prevention initiatives to lower Malta's per capita generation rate;
- Reforming the collection system to increase economies of scale, harmonise collection practices and modernise the collection fleet;
- Building the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta's targets;
- Studying the feasibility of an enhanced producer responsibility framework to complement Malta's transition to a circular economy and reflect further on the true cost of waste management;
- Promoting further the involvement of the private sector in waste management.

With the development of the new MRF, a significant contribution to the objectives outlined above are expected. When completed, the MRF will form part of and interact

---

[9] *https://era.org.mt/press-releases/mandatory-waste-separation-for-all-from-april/ Accessed on 13/06/2024.*

[10] *https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en accessed on 15/02/2024.*

[11] *Long Term Waste Management Plan 2021 – 2030 - ERA accessed on 15/02/2024.*

with the other treatment facilities at the ECOHIVE Complex. For this reason, short distances are envisaged to be involved in the movements of materials between the waste management plants by offering adequate environmental benefits in terms of energy use, emissions to the atmosphere and noise generated during internal trips.

2.3.1 Demand

The demand for the project is driven by several factors, including the forecasted increase in waste production due to local development and population growth, the increased diversion of recyclable materials from landfills, and the need to continuously invest and upgrade the Nation's waste management facilities. The MRF will also generate economic benefits by creating jobs in waste management and the recycling industry by recovering materials for recycling while conserving energy and raw materials required for manufacturing new products.

In addition to meeting the forecasted increase in waste production, a waste characterisation exercise was carried out as part of this EIA. This characterisation was based on the tonnage of waste received at WasteServ facilities during the year 2019 and revealed that an amount of approximately 94,000 tonnes of municipal solid waste (circa 47% of 200,698 tonnes) is believed to be suitable as a feedstock for the MRF.

A review and determination of waste flow predictions was carried out to quantify the tonnage of different waste categories which will be arriving and processed at the new MRF by 2030. This study showed that the MRF suitable waste per capita is expected to increase by 3.7kg until 2030 together with an additional population of about 33,500 inhabitants. This results in an input to the MRF amounting to approximately 70,000 tonnes by 2030 (Figure 6). This input tonnage was estimated by assuming that:

- 50% of the recyclable content in the black bag will be diverted to the MRF due to proper sensibilization to the public for improving separation at source; and
- Reduction in feedstock due to the Beverage Container Refund Scheme (BCRS).

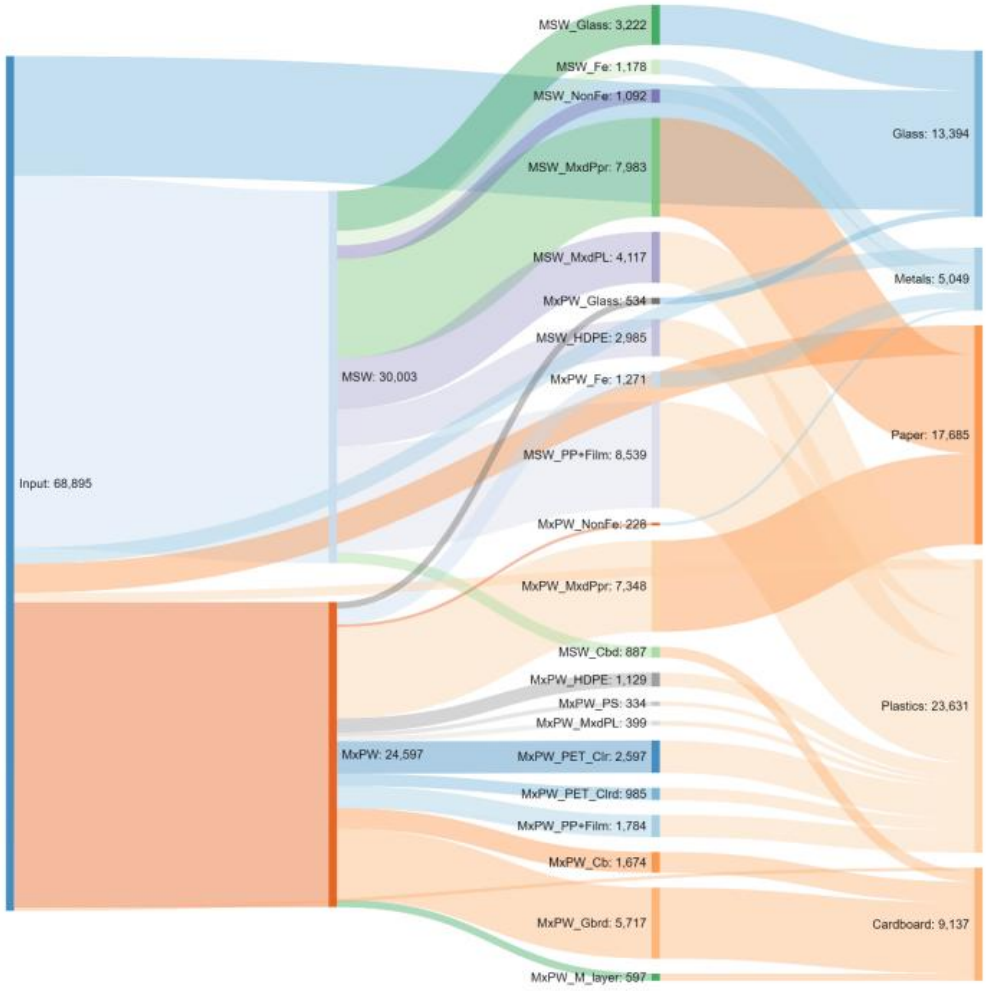


Figure 6: Tonnages of the different sources and components of the MRF input waste in 2030.

2.3.2 Local plan requsites

The coastal area at Naxxar is of high ecological, scientific, and scenic importance, protected by the Coastal Strategy Paper, which seeks to conserve and safeguard the natural and cultural values of the protected coastal areas. The proposed scheme location avoids Qalet Marku Bay and other sensitive areas to ensure preservation of coastal, transitional and land ecosystems. The newly proposed MRF will be part of and interact with the other waste treatment facilities at the ECOHIVE Complex while minimising land consumption of agricultural fields.

Significant improvements have been achieved by the Maltese government in terms of waste management in the recent years. In accordance with S.L. 549.63 and S.L. 549.40, since April 2023 the mandatory waste separation law applies to all individuals, businesses, and both governmental and non-governmental organizations. This legal

requirement prohibits the disposal of organic waste in regular black bags, mandating its proper disposal in designated organic waste bags. Similarly, recyclable materials like plastic, paper, and metals must be placed in grey or green bags. Glass collection is scheduled for municipal door-to-door pickups on the first and third Fridays of each month. Additionally, recycling points are available for the separate collection of plastic, paper, metal, and glass materials.

2.3.2.1 Long-Term Waste Management Plan 2021-2030 of the Maltese Islands

Malta's LONG-TERM WASTE MANAGEMENT PLAN (LTWMP) 2021-2030 aims to enhance resource recovery, reduce environmental impact, and promote sustainable waste management practices in the country. The plan highlights the country's challenges faced with high annual municipal waste generation per capita, predominantly with landfilling rates, and having the lowest recycling rate among EU.

The LTWMP strives to optimize the value of resources within waste through diverse management strategies. It aims to introduce innovative waste prevention initiatives to lower waste generation per person, revamp collection systems for improved efficiency, establish essential waste management facilities for recycling and treatment, explore enhanced producer responsibility frameworks, and engage the private sector in waste management. With a focus on these strategic goals, the plan underscores waste prevention as a key priority to enhance resource efficiency and minimize waste generation. Additionally, it concentrates on reforming waste collection systems to ensure their effectiveness and on optimizing waste management and resources to facilitate the transition towards a more resource-efficient and circular economy.

Ambitious targets are set for recycling certain materials. The plan aims to significantly boost recycling rates by implementing effective collection systems, raising public awareness on recycling practices, investing in infrastructure like MRFs, and fostering collaboration with stakeholders in the waste management sector.

2.3.2.2 Affected Area Policy

The location of the site falls under the provisions of the CENTRAL MALTA LOCAL PLAN, 2006 (CMLP). Policies of the CMLP which are relevant to the scheme are summaries in Table 2.

Table 2: Affected Areas

TITLE	REFERENCE	POLICY GIST:
Coast Road Alignment	NA06	NA06 proposes that the improvement of the Coast Road, between Baħar ic-Ċagħaq and Salina Bay, as indicated on the Naxxar Coast Transport Policy Map, should take the form of an on-line improvement rather than the construction of a new road as indicated in the current Structure Plan. [12]
Protected Natural Coast	NA04	NA04 will not permit urban development along the open coastal area of Naxxar, between Għallis and Baħar iċ-Ċagħaq, as designated in the Naxxar Coastal Policy Map. All efforts will be made in order to retain or reinstate these designated areas in their natural state. [13]
Rural Environment – Protection of SACs, SSIs, AEIs and AHLSs	CG22	The proposed scheme is located within a rural/ODZ area and is a Listed Ecological Area/Site.
Protection of Sites of Archaeological Importance	CG23	Part of the proposed scheme is located within an area of Archaeological Importance on the Eastern side. This area includes archaeological feature number 26. This comprises Megalithic Remains from the Temple Period and is warranted Class B protection with an approximate 50m Buffer Zone.
Protection of Areas of Agricultural Value	CG24	The proposed scheme is located within an area of Agricultural Value

[12] https://parlament.mt/media/100349/03434.pdf - *Partial Local Plan Review of the Central Malta Local Plan*

[13] https://parlament.mt/media/100349/03434.pdf- *Partial Local Plan Review of the Central Malta Local Plan*

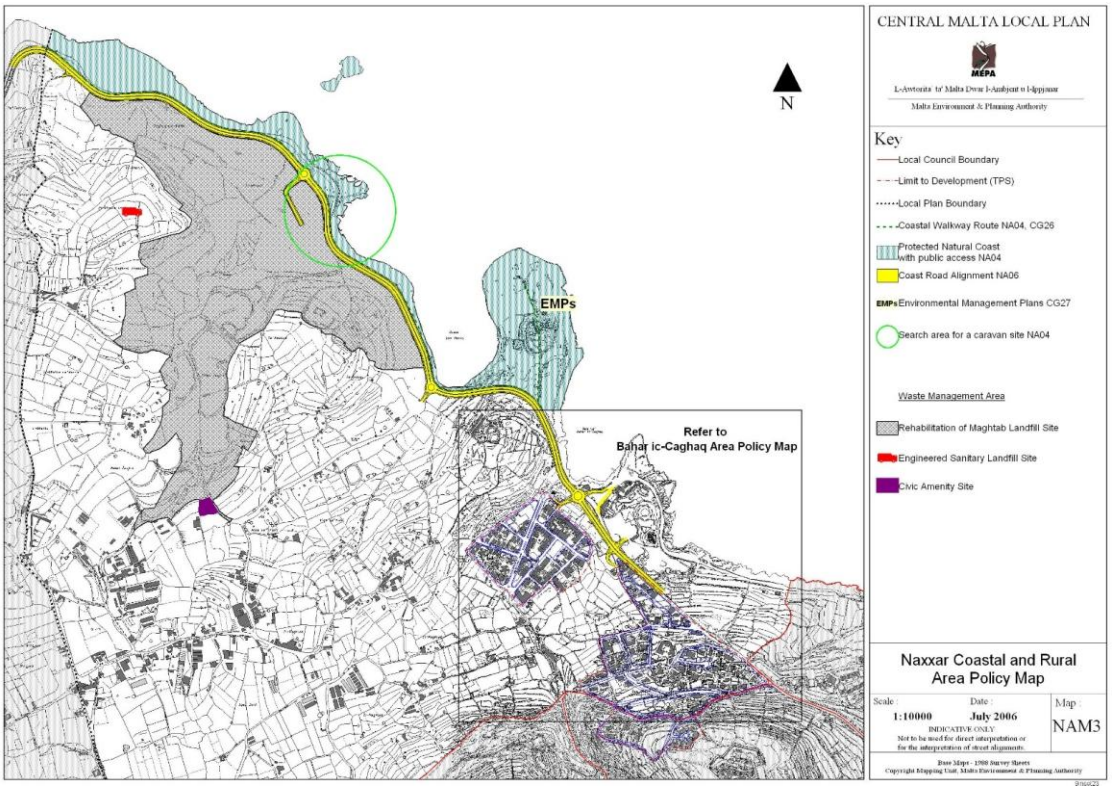


Figure 7: Naxxar Coastal and Rural Area Policy Map (CMLP, 2006)

2.3.3 Other Planning Developments in the Area

It is to be noted that several large-scale development projects are envisaged in the area of influence. Wasteserv Malta is currently driving the ECOHIVE project which represents a significant investment in waste management and sustainability. The proposed project is aimed at reducing the environmental impact of waste while making the most of its potential as a resource to meet the country's national recycling and landfilling targets. The ECOHIVE project is the largest ever investment in the waste management sector, driving Malta towards a circular economy. By processing waste in a sustainable and resource-efficient manner, ECOHIVE will transform waste into valuable resources, including energy and agricultural compost.

Wasteserv has been granted an outline development permit to construct and operate a Waste to Energy (WtE) plant at the ECOHIVE complex (PA3012/20). The project includes the drilling and laying of two HDPE pipes up to about 1km northeast from the shoreline just outside of the Qalet Marku inlet. These pipes shall be used to source the facility's cooling water and to discharge the residual warm water back into the sea. The WtE facility is planned for commissioning in 2024. Since the determination of the outline permit application, the applicant has obtained two separate full development permits to excavate the site (PA/08038/21) and construct the bunker structure (PA/06924/22). In conjunction, there is an ongoing screening process on PA/03422/22

which seeks to upgrade the existing road network within the ECOHIVE Complex to cater for the existing and future waste management operations envisaged on site.

Another plant envisaged within the complex is an Organic Processing Plant (OPP) which shall be used to process organic waste and produce biogas and agricultural compost. The investment is aimed at reducing the volume of biodegradable waste going to the landfill and obtaining valuable resources from waste that would have been otherwise landfilled. The OPP is expected to process about 74kT of organic waste annually.

The ECOHIVE Complex shall also house the Hygienics Thermal Treatment Facility (TTF) that will be designed to process hazardous waste such as clinical, abattoir and pharmaceutical waste streams, generating heat energy in the process. This facility is expected to replace the existing thermal treatment facility in Marsa.

Moreover, the Enemalta terminal station for the Maltese Interconnector 2 (IC2) will be located in the Magħtab area. This new electricity interconnector is designed to meet the future electrical demand of the country while simultaneously helping in reducing the atmospheric emissions currently generated by the existing natural gas and diesel oil power stations at Delimara. The IC2 project will connect the TERNA 220kV substation in Contrada Camillá, Ragusa (Sicily, Italy) to the Magħtab terminal station. The cable link will have a rating of 245kV and will be designed to operate in parallel with the existing link to maximize the power transfer between the two networks. No permanent above-ground structures will be constructed in Malta, and Horizontal Directional Drilling techniques will be adopted to lay cables offshore to minimize environmental impacts at the seafloor.

2.4 Physical characteristics and land use requirements

2.4.1 General Charateristics

The MRF is being designed to process approximately 70kT of co-mingled recyclables annually. The MRF is intended to process a Dry Mixed Recycling (DMR) feedstock (containing paper, plastics, cardboard) through an automated process, leading to the refinement of the material stream and the extraction of specific recyclable materials. The investment in this facility is expected to result in high-quality recycled materials.

In general, the process of waste treatment begins with waste separation at source (typically in grey/green bags) in households and businesses ultimately leading to various forms of collection regimes. Refuse collection vehicles arrive at the ECOHIVE complex and deliver the material to Wasteserv Malta. Material streams are fed into the process through a bag splitter by loading shovels. Through a process of size segregation, magnetic filtering, ballistic separators, and optical sorters, the feedstock is processed and separated in various stages. At each stage, clean products are

extracted from the dry mix. A final screening by manual pickers ensures a higher grade of purity of the final product. Products include plastic film, mixed paper, newspapers and pamphlets, HDPE, PET, mixed plastics, residue, ferrous and non-ferrous metals. Balers and a compactor are provided to size these products using a large ram to compress the material, so it is densified before exportation.

The site identified for the construction of the new MRF within the ECOHIVE Complex offers environmental and management benefits, but also challenges for designing a functional layout of the building. In fact, the site is about 21,373m^2 (Figure 8), a footprint which is significantly smaller than MRFs in Europe typically requiring 55,000m^2 of land. Nonetheless, since the site is characterized by a topographic gradient (Figure 9) of about 11% (e.g., slope of 18m difference in ground elevation across circa 160m length) it is possible to design a facility across varying vertical heights.

Figure 8: Indicative Site Dimensions for the Construction of the New MRF.

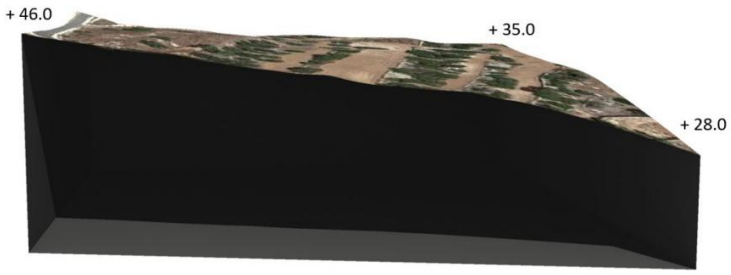


Figure 9: Indicative Ground Level Elevations of the Site for the Construction of the New MRF.

Taking into account the above-mentioned site constraints, the new MRF was designed by staggering and stacking the plant so that the building does not need to be defined as one whole volume. On the contrary, the massing of the MRF is split into smaller volumes hosting a different section of the process without compromising the engineering requirements.

The visual impacts of what are typically described as “ugly but necessary” waste infrastructures were minimized by ensuring a smooth operation with an architectural shift of public perception. In this project, the standard use of concrete and steel is reinterpreted in the different volumes created, pairing these cold materials with translucent polycarbonate, stone cladding and an injection of greenery and open space as illustrated in Figure 10.

Figure 10: 3D Rendering of the New MRF Layout.

The shed-type structure adopted for the MRF was conceptualised with the twofold objective of housing the plant and machinery necessary for the operation, and accommodating more plants and processes than people due to the low manual

requirements to operate the facility. Environmental benefits are also achieved by minimising visual impacts, land consumption, safeguarding protected areas, optimizing processes while reducing emissions in the atmosphere.

2.4.2 Construction Phase

A Construction Management Plan (CMP) will be drafted before commencement of construction works once the EPC Contractor is chosen. The following construction details present a typical schedule of activities for a plant similar to the one being proposed.

The staff requirements during the construction phase will vary depending on the works at the time. The average number of workers during construction is envisaged to be around 30 to 40.

Safety and maintenance strategy for workers employed and equipment deployed is envisaged to be planned, preventative and lean reliability centred.

Electrical power will be supplied throughout the construction phases and sourced from the existing distribution system within the ECOHIVE Complex. Similarly, water will be provided through a supply pipe prior to commencement of works whereas a number of portable toilets will be installed and regularly serviced for the workers' need on-site. Stormwater will be collected and channelized to the WasteServ existing network by means of connection pipes.

Construction works should be completed within a period of 19 months. The construction works are phased as follows in the next chapters.

2.4.2.1 Phase 1: Site Clearing and Preparation

Once the necessary planning permits are obtained, the site will undergo preparation. A variety of machinery will be brought on-site according to the specific construction phase. The machineries required include, but are not limited to: excavators, dumper trucks, backhoe loaders, concrete pumps and mixers, tower and mobile cranes, asphalting machines and rollers. Maintenance of machinery is not expected to take place on-site albeit some emergency repairs could possibly take place. Refuelling of vehicles, through the use of mobile fuel tankers, which are on long term on-site may however be necessary. Precautionary measures need to be in place to prevent spillage and ground contamination.

Electrical power will be supplied by means of a cable connecting the site to the existing infrastructure. The existing distribution network is designed to deliver the required electrical power for the construction phase of the MRF building. Additional power could be provided by portable generators, if necessary.

Soil removal will be secured from the respective authorities and be accompanied by regular archaeological monitoring. Any archaeological findings will be reported accordingly to the Superintendence of Cultural Heritage and as per standard protocols established by the same Authority.

As soon as it is ensured that there are no remains of archaeological importance which need to be preserved, hoarding will be added around the site, the vegetation found within the construction area will be removed and/or redistributed, loose material will be cleared, and excavation works will begin.

2.4.2.2 Phase 2: Excavation and Building Foundation

Once excavations are carried out and archaeological findings (if any) are relocated, the foundation of the building will be laid and lower-level walls will be constructed at various points.

In order to reduce the release of dust to the environment, precautionary measures aimed at containing dust dispersion in the atmosphere will be installed and will employ various modes of filtration systems (dry, wet, etc.).

2.4.2.3 Phase 3: Backfilling

Further excavation and movement of backfill to be utilised in relevant areas may be required. Engineering works of site with backfilling up to the projected elevations is likely to take place.

Excess of backfilling material which will not be utilised for this purpose will be either removed from the site, or reused at subsequent stage if technically feasible. However, at this phase it is not likely to forecast with adequate accuracy the amount of material which can be reused or landfilled.

2.4.2.4 Phase 4: Landscaping

This phase involves formalisation of landscaped areas with transplanted elements, inclusive of further hoarding.

The area will be then landscaped with transplanted vegetation. The recommended species for transplanting are *Ceratonia siliqua* (Carob) and *Olea europaea* (Olive). Transplanting may also be feasible for *Pistacia lentiscus* (Lentisk).

2.4.2.5 Phase 5: Structure Build Up

Prior to commencement of work, such a project would require considerable spatial requirements both for on-site personnel supervising the works as well as storage and assembly zones and parking of vehicles. It is expected that a considerable area outside the MRF site will be necessary to provide sufficient space for these activities, however, the specifics could only be determined once the EPC Contractor is chosen.

Based on the experience from a similarly sized project, the following area prerequisites would be necessary for the construction of the structure of the MRF:

- Storage, which can also be off-site: 5,000m^2;
- Pre-assembly area for piping or similar, which can also be off-site: 500m^2;
- Lay-down/pre-assembly areas on-site: 1,000m^2;
- Site offices and site huts, in site proximity: 500 m^2;
- Site parking space: 1,000 m^2.

The structure hosting the new MRF will be developed over around 27,200m^2 with the baselevel of the building located at an approximate elevation of 10m below current ground level. A topographic gradient of about 11% forced the designers to take advantage of the stepping planes encouraging re-use of excavated material for compaction and space maximization (Figure 11). Spaces can be stacked vertically on top of each other, therefore minimizing footprint and maximizing space efficiency.

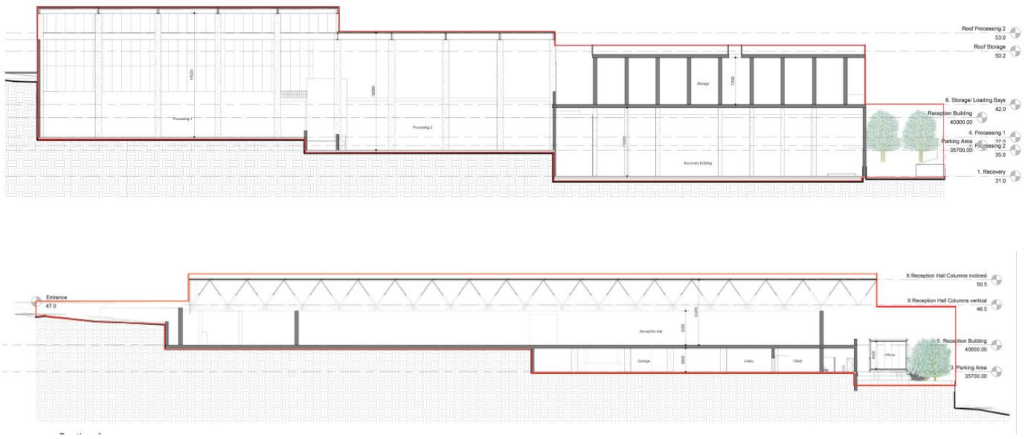


Figure 11: Representative Cross-Sections of the MRF Structure indicating Projected Ground Level Elevations of each Floor.

The staggering and stacking of the building imply that the MRF does not need to be defined as a whole single volume. On the contrary, the massing of the facility can be split into smaller volumes hosting different sections of the waste treatment process without compromising efficiency. From an architectural point of view, the splitting up of volumes leads to some benefits such as:

- Stacked volumes provide more external surface area (i.e., more façades) when compared to a single shed building. More surface area available is translated in the induction of more natural light while creating interesting façades. Nonetheless, outdoor spaces can be formed in the negative spaces between

the staggered volumes, providing greener views and more pleasant working environments for the plant employees.

- The staggered masses and inclusion of green areas in and around the plant reflect a drastic departure from the expected form of architecture of waste facilities. In fact, the staggered mass typology inferred more a cultural building as a campus, rather than an industrial site.

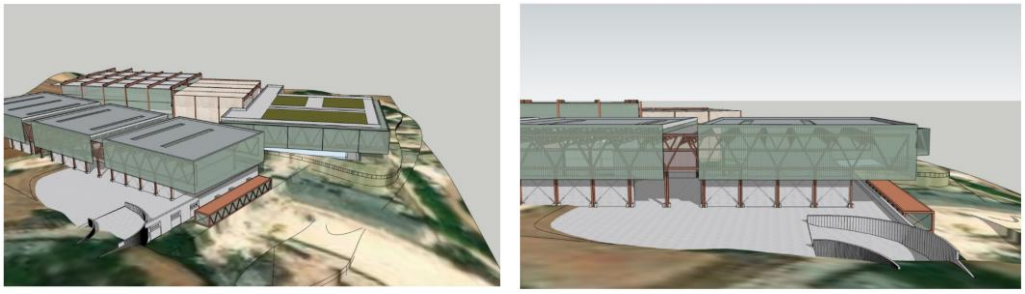


Figure 12: 3D Rendering of Representative MRF Façades.

2.4.3 Operational Phase

The proposed MRF is expected to have a minimum of 40 plant employees and an additional 10 to 15 administrative staff. It will also accommodate additional office staff not directly involved in MRF operations. The current premises do not have sufficient work accommodation within the complex at present. To facilitate an occupancy, the MRF will host facilities such as changing rooms, showers, canteens, toilets and open recreational areas for plant employees, whilst office employees will enjoy similar facilities with the addition of office spaces segregated from the day-to-day functions of the plant (although still connected). Both plant and office employees will have access to a common parking area.

Special emphasis has been dedicated to design the storage compartments fire safety measures to protect employees' health and safety welfare. Storage compartments are isolated, and are fire rated and equipped with fire extinguishing infrastructure. Should a fire break out in any of the compartments, the doors to the compartment will be shut to choke out the fire. Simultaneously, fire cannons or the sprinkler system will be activated to further extinguish the fire.

The raw waste materials to be processed by the MRF will consist of two main categories: Containers and Fibre. Table 3 provides a description of each item designed to be treated at the proposed MRF.

Table 3: Description of Categories of Raw Materials to be Treated at the MRF.

CATEGORY	ITEM	DESCRIPTION
CONTAINERS	Polyethylene and polypropylene	Polyethylene and polypropylene are two members of the polyolefin family. Polyethylene is a type of plastic which is manufactured using fossil fuels and can be used to make buckets, detergent bottles and plastic wrapping. High density polyethylene is typically used to make detergent bottles, milk bottles and some soft drink containers.
		Low Density Polyethylene (LDPE) is most used to make plastic film sold as cling film or shrink wrap.
		Polypropylene is typically used to make shampoo, detergent and medicine container lids and can also be used to make rope, carpet, clothing, and more.
	PET	Polyethylene terephthalate (PET) is a strong, and lightweight plastic mainly used to make soft drink bottles.
	Other Plastics	Typically include polystyrene (PS) and polyvinyl chloride (PVC). PVC is mainly used to manufacture pipes and window frames. Polystyrene is typically used to make packing pellets and foam boards. Polystyrene is also used to make yogurt pots and similar packaging.
FIBRE	Mixed Paper	Paper leaflets, newspapers, magazines, office papers, etc.
	Cardboard	Cardboard boxes of various sizes usually from packaging.
	Tetrapak	Milk cartons and similar.

The waste feedstock at the MRF shall be source separated in grey/green bags collected by Refuse Collection Vehicles (RCVs) from households and local business around the Maltese Islands. Both material streams are fed into the MRF through a bag splitter using loading shovels. The purpose of the bag splitter is to tear bags containing waste so they can be properly processed by the MRF.

Through size segregation, magnetic filtering, ballistic separators, and optical sorters, the waste feedstock is processed and separated in various stages. At each stage, clean products are extracted from the dry mix. A final screening by manual pickers ensures a higher grade of purity of the final product. Products from the Malta MRF would include plastic film, mixed paper, newspapers and pamphlets, HDPE, PET, mixed plastics, residue, ferrous and non-ferrous metals. The volume of these products is

reduced using balers and a compactor. Balers and compactors use a large ram to compress the material, thus densifying the material prior to export.

The MRF plant shall be subdivided into smaller areas where the three main stages of the waste treatment process shall take place (Figure 13):

- Reception hall;
- Processing area; and
- Recovery area.

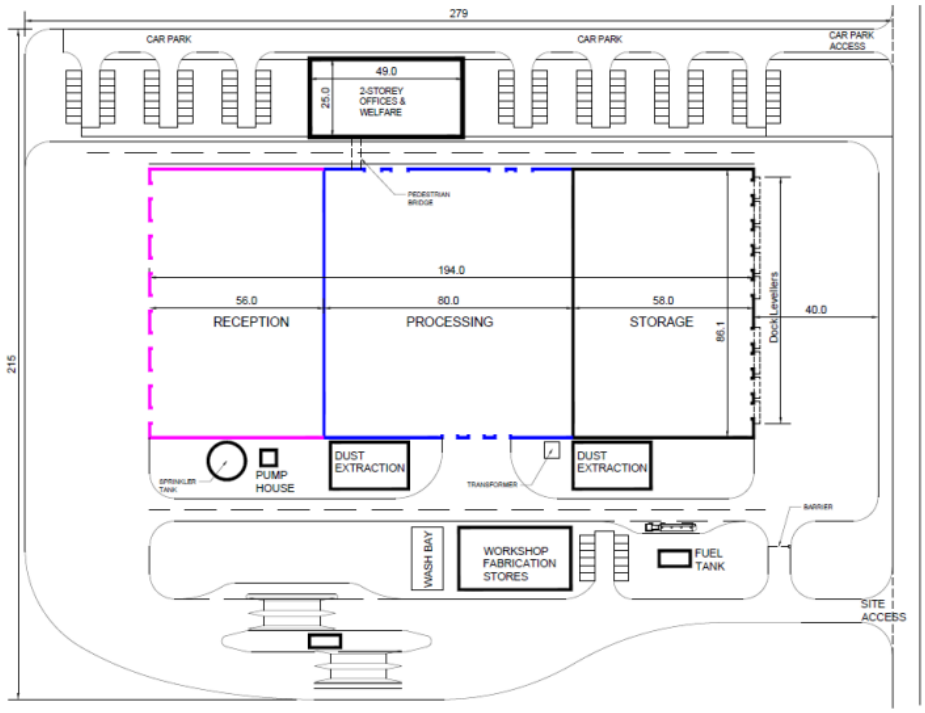


Figure 13: Site Plant exhibiting the location of the Three Waste Treatment Stages.

2.4.3.1 Reception of Waste

The entrance to the MRF facility will connect to the ECOHIVE complex's internal road network and to the maneuvering area of the reception hall. The vehicles making use of this entrance are RCV's (following the scheduled collection of waste in localities around Malta) and maintenance vehicles (large vans or similar). The expected quantity of RCVs is estimated in the region of 90 trips on Tuesday (Fibre collection day) and approximately 70 trips on Thursday (Containers collection day).

Upon entering the facility, the RCVs are directed towards two weighbridges where their load will be recorded and then directed to enter the reception hall to deposit the waste. The maneuvering area has been sized to accommodate various RCVs side-by-side and in queue, to avoid back-tail of vehicles blocking the complex road network.

After depositing the waste in the reception hall, the RCVs once again drive over the exit weighbridge, their weight recorded, and then exit the facility onto the ECOHIVE Complex.

The reception hall building envelope consists of 6m tall concrete push-walls around the perimeter of the footprint which is then capped off with a large-span ceiling that protects the space from the elements (Figure 14). After being deposited on the reception hall floor, front-loaders maneuver the waste against one side of the hall. The hall therefore serves as a bunker for the accumulation of waste deposited on the day (approximately 770 tonnes of Fibre on Tuesday and approximately 580 tonnes of Containers on Thursday).

Figure 14: General Photo of a Reception Hall pointing out Push-Walls.

When enough waste is accumulated, a material handler (a grab) picks up the accumulated waste and begins loading the feedstock into the feed to the bag splitter. Any large items (such as carboard packaging) are separated from the rest of the feedstock and fed directly to the balers in the Recovery Hall via a conveyor.

2.4.3.2 Processing of Waste

Trommel screens, magnetic conveyor belts, eddy current separators, ballistic separators, optical sorters, and other sorting equipment are situated in the Processing Hall of the facility. Waste passes through the bag splitter and then proceeds to a pre-sort area where manual workers initiate the sorting of materials before they enter automated mechanical sorting systems. Incorporating a pre-sort station before the

automated systems enables the MRF to generate a higher quality end-product which is more valuable.

2.4.3.3 Recovery of Waste Streams

The final stage of processing is the recovery of "clean" waste streams and bailing the end-product for storage and eventual exportation. From the Processing building, several conveyors carrying the filtered waste streams are channeled through a final manual sort where plant workers pick items off the line and deposit them into their respective recovery bay (Figure 15). The deposited product is then shoveled onto a feeder to be compressed into bales of paper, or plastic, or other recovered waste stream (approximately 1.2m x 1.2m). The bales are then placed into one of several goods lifts and taken up to the storage level.

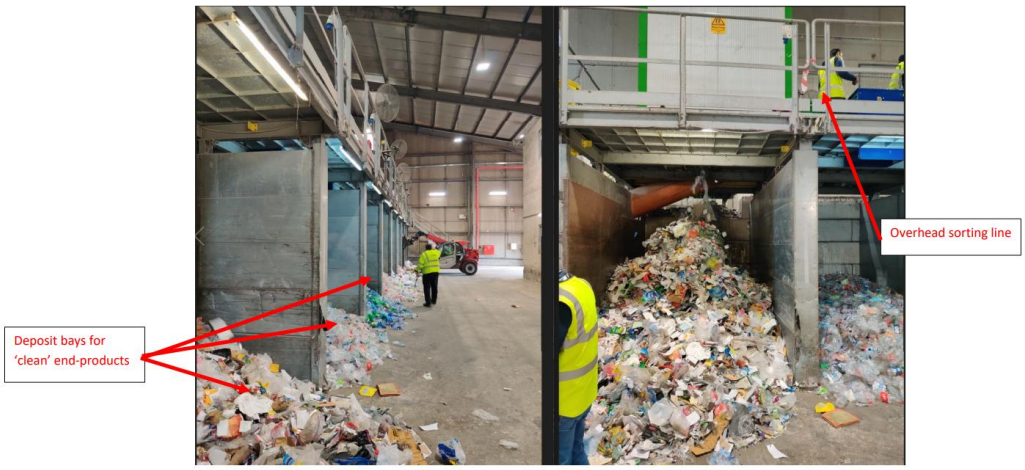


Figure 15: Representative Photo exhibiting Deposit Bays for "Clean" End-Products and Sorting Line.

The goal of the MRF is to extract an end-product that is as clean as possible (within economic feasibility) from the original Dry Mixed Recyclables, therefore, turning waste into a valuable resource. Until they can be sold on the market to a buyer, the bales (the end-product) must be stored at the facility until these are ready to be off-loaded. It is estimated that bales would be stored for approximately one week, although this figure will certainly fluctuate depending on market factors.

The vehicles entering the maneuvering area for goods transportation are hook loaders with empty 40ft containers. The projected number of hook-loaders to enter the facility every day is between 5 and 8, depending on market factors. The hook-loaders will be parked into the loading bays whilst the freight contractor loads up the bales directly from the front facing storage compartments. The storage area was designed such that the freight workers may operate simultaneously and independently from the internal operations of the MRF. Ater the freight worker empties one storage compartment and moves onto the next, the facility's operators may open access to the empty storage

compartment and re-stock the compartment without conflicting operations with the freight workers.

2.4.4 Decommissioning phase

The new MRF shall be designed with a lifetime of 20 years. Decommissioning of the facility must follow acceptable standards required for eliminating environmental and health hazards during site decommissioning and clean-up. These requirements include:

- Removal of structures on or beneath the ground;
- Disposal or secure isolation and/or treatment of contaminated equipment in-situ or off-site;
- Remediation of aesthetics (back-fillings, stained soil removal, waste disposals, etc.);
- Access controls for physical structures remaining on-site that are unsafe or hazardous to humans or animals;
- Remediation of aesthetically unacceptable portions of the site (filling of pits, removal of stained soil and odorous material, levelling of mounds, disposal of waste rock, etc.);
- Clean-up of the site to a level which will provide long-term environmental protection and will be safe for the intended future use;
- Submission to the applicable regulatory agency and other required jurisdictions of a report confirming that decommissioning and clean-up has been completed.

The area may be utilised by Wasteserv Malta for other waste management operations as deemed fit at that time of decommissioning.

2.4.5 Project Management

2.4.5.1 Timescales and Phasing

It is estimated that around 50 persons will be employed to construct the proposed Scheme, although this will depend on how the Construction Management Plan is set out by the winning works contractor.

The construction target date for the Scheme is still unknown but the overall construction phase is not expected to take more than 19 months as per contract.

The construction project shall be phased. The Site will be cleared and prepared for the subsequent phases by setting up temporary offices and mobilising construction equipment on-site. Excavation up to 10m below current ground level will be followed by the laying of the building foundations. Once foundations are completed, the site

will undergo backfilling up to the desired topographic level followed by landscaping activities. Finally, the site will be ready to accommodate the construction of the building which happens to be the longest phase of works on site.

The MRF shall be designed for an operational lifetime of 20 years.

2.4.6 Access, Trasportation and related Infrastructure

Since the proposed MRF forms part of the ECOHIVE Complex, existing internal routes will be utilised for vehicular movements during the construction and operational stages of the project. Upon completion of works, access requirements are limited to authorised Wasteserv personnel and third-party RCVs with appropriate waste carrier permits.

The expected quantity of RCVs is estimated in the region of 90 trips on Tuesday (Fibre collection day) and approximately 70 trips on Thursday (Containers collection day). The traffic influx towards the MRF is not likely to generate significant impacts on public and internal routes.

During the operation stage, the entrance of the MRF will be connected to the complex's internal road network (Figure 16), hence, public roads shall only be impacted to a minor extent. Once inside the ECOHIVE Complex, workers and truck drivers will be directed towards parking zones or to the manoeuvring area of the reception hall where the incoming waste will be stocked. Trucks will transport the recycled material off-site by making use of the same routes.

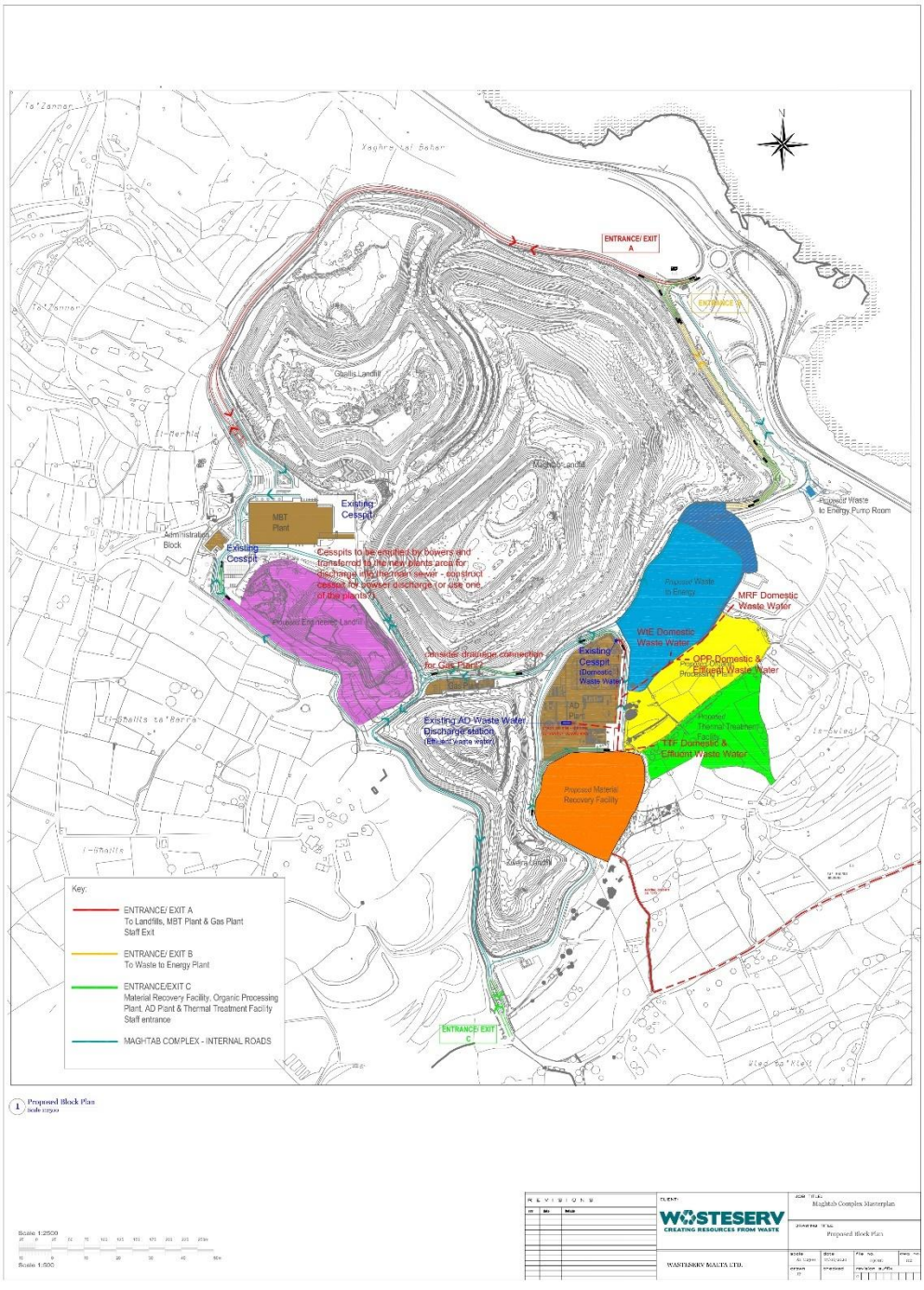


Figure 16: Maghtab Masterplan indicating Public and Internal Routes of the ECOHIVE Complex.

2.4.7 Sewerage, runoff management, energy, telecommunications, and ancillary infrastructure

2.4.7.1 Construction Phase

The ECOHIVE Complex is already connected to the necessary infrastructure and utilities. During the construction phase, a slight increase in discharges of water or wastewater is envisaged compared to the existing flow rates for mobile toilets and build-up of the MRF structure like concreting works. During the construction phase, all the generated wastewater streams will be collected and conveyed towards treatment plants.

2.4.7.2 Operational Phase

No discharge or flow of surface water or other substances sourced within the facility during its normal functioning is foreseen. The MRF is designed to operate without producing any run-off which can have negative impacts on the environment and surrounding ecosystems. The system is designed to retain all surface water run-offs and materials such as oils and lubricants, within its boundaries and prevent them from escaping into the surrounding environment. This helps to ensure that the system is environmentally friendly and sustainable over the long term. Household and sanitary wastewaters are discharged to the public sewer system.

Water reuse at ECOHIVE Complex is highly encouraged. An interconnected network of rainwater harvesting and water treatment systems ensures minimal supplies of water from external sources. Wastewater streams sourced with rainwater are collected and properly treated to provide high quality water within the Complex. The process flow diagram of water, drainage and sewage is shown in Figure 17.

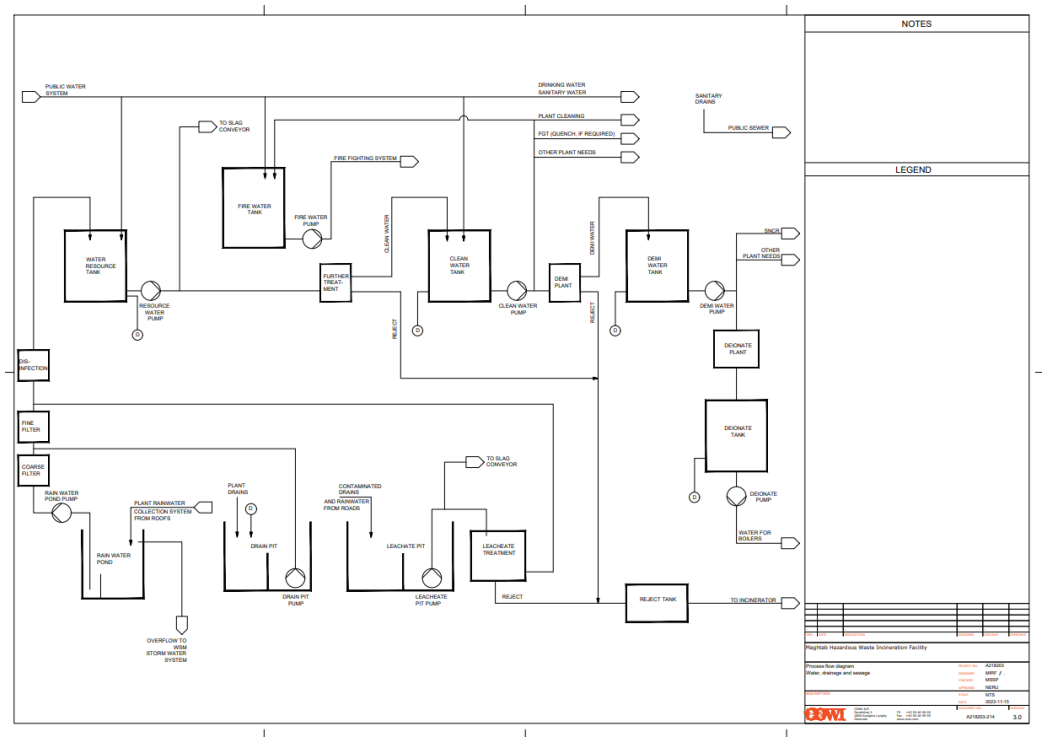


Figure 17: Process Flow Diagram of Water, Drainage and Sewage at the ECOHIVE Complex.

A leachate pit occupies a volume of 200m^3 storing drain waters originated from the tank yard, the wet ash conveyor, the cleaning of floors in waste area, and the rainwater flowing through roads and parking areas. Prior to reuse, wastewater undergoes pre-treatment stages with focus on the removal of oils, heavy metals, particles, and microorganisms. Further treatment is applied once the leachate is pumped to the water resource tank while the reject stream is directed to the incinerator for final disposal.

The drain pit is 20m^3 and collects all the drains from the boiler, e.g., drains from the water steam cycle and from the flash tank. The stored water is conditioned with NH_3 and NaOH, and contains magnetite and dirt from the boiler. Microfiltration, pH adjustment and disinfection are applied prior to consumption.

Rainwater falling on roofs is conveyed towards the 200m^3 rainwater pit. Although cleaner than the previously described water sources, harvested rainfall passes through coarse and fine filtration for removing small particles. Upon disinfection, this water stream is pumped to the water resource tank for further treatment and final reuse. Excess of rainwater overflows towards the stormwater reservoir.

Potable water is produced in the demineralization plant. This treatment plant combines ultrafiltration, degassing and reverse osmosis processes to generate demineralized water suitable for human consumption. Depending on the inlet water

quality, from 10 to 25% of the inflow is rejected. The reject stream is disposed of in the wet slag conveyor.

The treated water streams are stored in separate tanks to accommodate various consumptions in line with their quality.

2.4.8 Waste management

The waste management facility in question is a state-of-the-art MRF that is designed to handle and process waste from various sources in a sustainable and environmentally responsible manner. Unlike traditional waste management facilities, this MRF is not expected to produce significant amounts of waste on its own, apart from minor quantities generated by its employees and during the construction phase.

The MRF is subject to stringent environmental and waste management regulations. The facility is designed to meet the highest standards of waste management and to minimize its environmental impact. This is achieved through a combination of advanced technologies and processes, as well as a strong focus on waste prevention, reduction, and recycling.

During the construction phase, the facility will implement a comprehensive waste management plan to minimize waste generation and ensure that any waste that is produced is recovered or disposed of in an environmentally responsible manner. This may include measures such as recycling construction materials, reducing packaging waste, and implementing a waste segregation system to ensure that different types of waste are recovered or disposed of properly.

Once the facility is operational, it will receive waste from various sources. The MRF will use advanced sorting technologies and processes to separate and process the waste, with a focus on maximizing recycling and minimizing waste disposal. The facility is expected to have a high recovery rate for recyclable materials which will be sorted and prepared for marketing to end-user manufacturers.

The MRF will also implement a comprehensive waste management plan for its own operations, with a focus on reducing waste generation and ensuring that any waste that is produced is recovered or disposed of in an environmentally responsible manner. This may include measures such as implementing a recycling program for employees, reducing paper use, and minimizing food waste.

In summary, the waste management facility in question is a modern and sustainable MRF that is designed to handle and process waste from various sources in a responsible and environmentally friendly manner. The facility is expected to have minimal waste generation of its own, and will implement comprehensive waste management plans during construction and operation to ensure that any waste that is produced is recovered or disposed of in an environmentally responsible manner.

2.4.8.1 Waste Management Regulations

The WASTE FRAMEWORK DIRECTIVE (2008/98/EC) provides a legal framework for waste management in the EU, including definitions of waste, hazardous waste, and recovery operations, as well as guidelines for waste prevention, reuse, and recycling. The national legislation S.L. 549.63 of 2011 (WASTE REGULATIONS) transposes the aforementioned directive, which provides a comprehensive strategy to manage waste through increased prevention, re-use, recycling and recovery schemes.

As part of EU Member States, Malta is committed to reach an overall recycling rate of 60% by 2030 while reducing landfilling. The construction of the new MRF is to be considered as a pillar to achieve this target.

2.4.8.2 Waste During Construction Activities

During the construction and excavation phase, waste will be generated. It is not expected that the Scheme will generate any electrical or electronic waste. If any, such waste will be recovered in line with the WEEE Directive 2012/19/EU as transposed into S.L. 549.89 of 2014 (WASTE MANAGEMENT [ELECTRICAL AND ELECTRONIC EQUIPMENT] REGULATIONS) and later amendments. Any batteries and accumulators will be recovered as per Directive 2006/66/EU, transposed into local legislation by S.L. 549.54 of 2010 (WASTE MANAGEMENT [WASTE BATTERIES AND ACCUMULATORS] REGULATIONS) and subsequent amendments.

The information regarding types and quantities of waste that are expected to be generated during the different construction phases of the project is summarised in Table 4. The quantities are listed in cubic meters (m^3) for each type of work. Although the excavated material is envisaged to be reused for backfilling as much as technically and economical feasible, an excess of about 30,000m^3 is foreseen to be generated and subsequently discarded.

Table 4: Volumes of excavated material and backfilling

WORK	UNIT	VOLUME
Total excavation	m^3	-51,462.87
Backfilling to projected Ground Level	m^3	21,576.68
Net cut/fill	m^3	-29,886.19

Ground contamination assessments and characterisation tests on the material to be excavated reveal that the limits stipulated in Decreto 152 of 2006 have not been exceeded. Consequently, the material excavated from the site is suitable for backfilling. Any excess inert material can be backfilled in quarries permitted to accept such waste given that leachate results also reveal full compliance with the EU limits stipulated in 2003/33/EC.

2.4.8.3 Waste During Operations

Minimal waste quantities shall be generated during the operation stage. Waste generated during the operational phase will be mostly limited to maintenance waste. The type and quantities of waste will depend on the maintenance work required, and is therefore unlikely to specify and quantify at this stage.

Small quantities of waste will also be generated from operators working within the Maghtab Offices. This waste will be of a domestic nature. The operators will be encouraged to implement the Four R Principle (Reduce, Reuse, Recover and Recycle) to limit the amount of domestic waste generated.

3.0 ASSESSMENT OF ALTERNATIVES

3.1 Alternative sites

In this section, the outcomes of an Alternative Site Assessment carried out to assess the suitability of various sites across Malta to accommodate the proposed MRF are summarised. The site suitability assessment was based on the filtering of technical, economic and environmental factors.

By taking into account the fact that the majority of WSM's operations in Malta are located at the Maghtab Environmental Complex (ECOHIVE Complex) and the Sant'Antnin Waste Treatment Plant (SAWTP), four areas were shortlisted for the proposed project, namely:

- Site 1: to the North East of the proposed WtE facility (Figure 18);
- Site 2: to the West of the Zwejra landfill (Figure 18);
- Site 3: to the East of the Zwejra landfill (Figure 18);
- Site 4: a direct replacement of the previous MRF facility at Sant' Antnin (Figure 19).

Figure 18: Three out of Four Alternative Location Sites Located in the Surroundings of the ECOHIVE Complex considered for the project

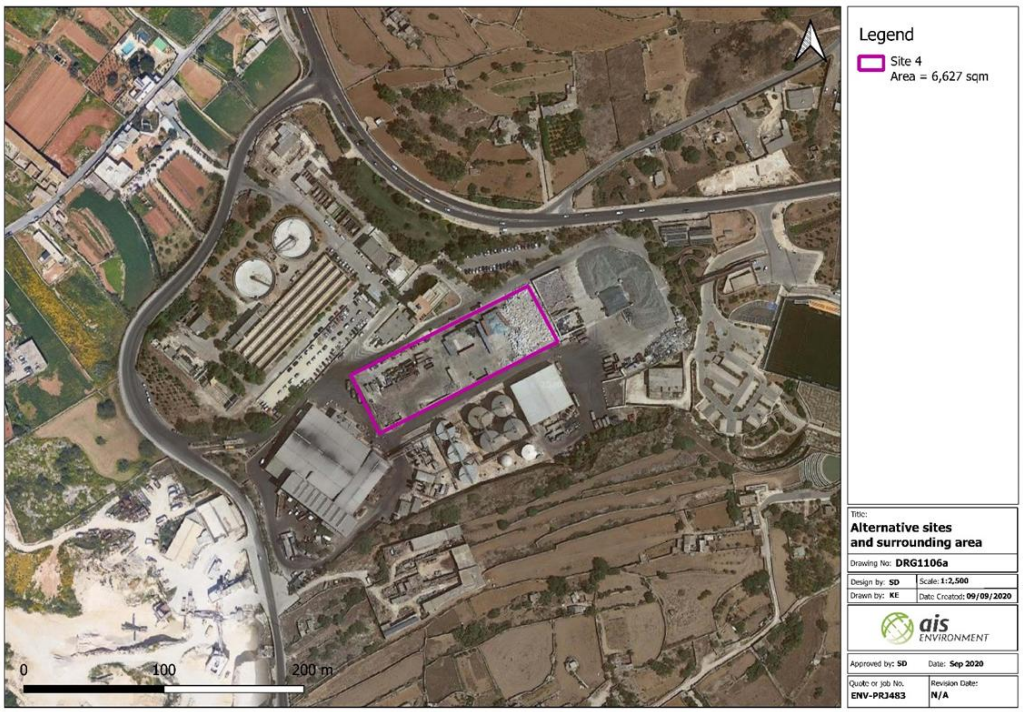


Figure 19: One out of Four Alternative Location Sites Located in Sant' Antnin Waste Treatment Plant (SAWTP)

Since Site 4 is already developed and has already accommodated another MRF which was destroyed by a fire in 2017, the Sant' Antnin Waste Treatment Plant (SAWTP) is fully compliant with policy designations regarding the development of a new MRF at SAWTP. Furthermore, the development of an MRF at Site 4 would not give rise to any significant adverse construction impacts associated with the take up of undisturbed land. Additionally, the existing traffic and pavement conditions within SAWTP are considered to be sufficient to accommodate the redevelopment of a new MRF at Site 4. However, the old MRF occupied a footprint of about 6,700m^2 which is way less than the minimum areal extension requirements established for an effective recycling standing at 10,000m^2. Given the site constraints, further expansions of the plant may be technically unfeasible. Opting for Site 4 would also mean that a huge portion of the Municipal Solid Waste generated in Malta would need to be directed towards this facility. Due to the site proximity to residential areas (circa 400m), the increase in traffic and scale of operations is foreseen as a major inconvenience to the surrounding resident population. Based on the above-mentioned limitations, Site 4 was deemed to be not suitable for the construction of a new MRF.

The outcome of the Alternative Site Assessment shows that major road works would be required to prepare Site 1 to host the MRF while taking over agricultural land. Besides, the close proximity to residential areas and protected zones depicts Site 1 as unsuitable for this project. Both Site 2 and Site 3 are suitable to develop the new MRF.

These sites are sufficiently located away from nearby residential areas, such that social inconveniences during construction and operational activities will be minimal and largely unnoticeable.

Since Site 3 is located closer to other waste treatment facilities at the ECOHIVE complex, Site 3 offers shorter distances for material movements between the facilities when compared to Site 2. Moreover, the location of Site 3 offers some environmental benefits in terms of energy use, emissions to the atmosphere and noise generated during the transportation of waste within the complex.

Building the MRF on Site 3 would also take up less agricultural land than Site 2. The current landform of Site 3 also provides better design possibilities to mitigate negative visual impacts. Site 3 is also located further away from known archaeological features than Site 2, although the possibility of uncovering any subsurface cultural heritage/archaeological features during excavation is equally possible at both sites.

3.2 Alternative Technologies

3.2.1 Construction phase

There are several ways to approach the construction phase of a MRF project depending on its size, location, and specific functionalities required. Common alternatives include a single building with co-located functions using precast concrete panels for quick installation and improved structural integrity, as well as insulated metal panel walls for excellent thermal insulation. For larger projects with multiple buildings, poured-in-place concrete foundations ensure stability, while steel framing offers high load capacity and easy expansion. Below-grade development can benefit from waterproof membranes to protect against water intrusion and proper drainage systems to prevent flooding. In multi-storey facilities, elevator shafts enhance vertical transportation, and robust roof structures support heavy loads and accommodate rooftop installations. Dock levellers, whether hydraulic or rubber systems, streamline container loading processes reducing physical strain on employees. Alternatively, roller doors and sliding gates provide secure seals and versatile loading configurations in facilities without dock levellers. These technologies cater to diverse MRF designs, offering tailored solutions to meet specific project requirements and ensure adaptability for future growth and changes.

A single building MRF with fire compartmentalization and dock levellers is considered optimal for this project due to its practicality and alignment with safety regulations. During construction, fire-rated walls and fire doors should be implemented to contain potential fires and limit their spread. Additionally, dock levellers should be utilized for efficient loading procedures, which minimize risks associated with manual handling of containers. This approach ensures safety, efficiency, and compliance with existing guidelines. To adapt the project to the site's topography and layout, necessary

modifications can be made while preserving the core principles of the single building design. Overall, this strategy balances innovation with conventional wisdom, resulting in a well-functioning MRF that meets both present and future needs.

3.2.2 Operational phase

Alternative technologies for the MRF include clean MRFs and dirty MRFs.

A dirty MRF accepts a mixed solid waste stream and then proceeds to separate out designated recyclable materials through a combination of manual and mechanical sorting. The sorted recyclable materials may undergo further processing required to meet technical specifications established by end-markets while the balance of the mixed waste stream is landfilled.

In Malta waste is separated at source from municipal solid waste, therefore, a clean MRF is proposed. Some advantages of clean MRFs include low technology requirements, job creation through manual pickers, community involvement in source separation, and strong buy-back markets for by-products.

Robotic units within worldwide MRFs demonstrate a progressive shift towards automation to optimize recycling processes, improve recovery rates, and address challenges such as labour shortages. However, these alternative technologies were ultimately discarded because robotization mechanisms remain in an early stage of development and have yet to prove themselves in real-world applications.

A Cost-Benefit Analysis was undertaken to identify pros and cons of each technology to operate the MRF at the desired throughput. However, it has to be noted that the final selection of the full series of technologies to be implemented for the recycling facility shall be addressed at procurement stage.

Alternative solution technologies to run the proposed MRF were investigated with the objective of optimizing process throughputs while maximizing quality and quantity of end-products. Different solutions were selected and filtered in compliance with the site-specific conditions and best technological advances. The selected technological solutions were further ranked through the assignment of a score to each feature while taking into consideration Health & Safety, technical, operability, commercial and financial factors. The final determination of the operating systems and recommended technological solutions to achieve high quality and quantity of recycled end-products was based on both a Cost-Benefit Analysis (CBA) and technical expertise. However, in some cases the choice of selecting a specific technology rather than another shall be addressed at procurement stage of the project.

Following the above methodology, it was determined that both a one line and a two lines option would be adequate to treat the desired capacity of 70,000 tonnes per year as feedstock to the waste treatment facility. This was based on a running period of the

plant of 5 days per week with two shifts per day (or 16 hours/day) leading to a throughput of about 19.8 tonnes/hour of waste.

Different viable technical options for the prospective ECOHIVE MRF plant entailing varying operating regimes and levels of automation were analysed through a comparative analysis of the Prime Dynamic Cost based on a plant capacity of 70,000 tonnes when operated for 2 shifts. The CBA revealed that, among other options, a high degree of automation of the plant as well as high throughput incurs the lowest Prime Dynamic Cost mainly due to the incurrence of comparatively low O&M costs and sorting reject rate, thus contributing the most financially favourable option.

Among the storage options of waste input to the plant, the utilisation of a bunker was deemed too expensive and only effective at higher throughputs than those assessed for this facility; therefore, this alternative was discontinued for economic reasons. Although a flat floor is usually considered the best option for the waste reception area, the steep topographic gradient of the site would generate a split level between the delivery point and the reception area. A split level with a single bay was ultimately chosen as the preferred option.

Options for loading material into the plant included cranes, loading shovels, walking floor, and loading shovel and excavator. Cranes and walking floors were excluded due to their high cost while no significant advantages were forecasted for this type of operation. The use of a mobile plant in combination with a loading shovel and excavators is recommended due to the split level and loading arrangements of the plant.

The composition data suggests that poor quality material will need to be fully assessed before entering to the plant. This can be done in the delivery area but an inspection on a belt in a picking cabin would be ideal. Besides, a minimal check and the removal of residue WEE and/or metal is to be undertaken for reducing the costs of the pickers and the required space. Although the deployment of robots in pre-sort was considered, it was concluded that this technology is too premature to be adopted in line with the current best technological advances.

It is anticipated that a combination of disc screens or a trommel and ballistic separator is required. The different technologies have diverse benefits and constraints, and different types of screens will be required for various materials. There is no need to select a screening option at this stage since this should be assessed at the procurement stage.

Optical sorting on paper and plastics are cost effective at the estimated throughput. Although the analysis suggests not to fully rely on optical sorting, this is not recommended as manual pickers are more flexible. A more detailed assessment at

procurement stage would be ideal to select the most feasible option in between optics and manual.

Initially, robotic sorting was considered but ultimately discarded because it remains in an early stage of development and has yet to prove itself in real-world applications. Although some organizations currently offer commercial units, they face challenges in operating environments. Potential benefits of this innovative technology include improvements in health and safety, but cost savings must be evaluated carefully considering the mass balance and picker numbers. Meanwhile, leaving room in the design for possible retrofitting at a later date ensures flexibility.

There is no real alternative to traditional conveyors to transport material around the plant. Some pneumatic/air systems will be used for air knives and dust control. The design of the conveyors will be reviewed to ensure they are fit for purpose particularly in terms of capacity, maintenance and access.

The storage of recycled material in open space is not recommended because it creates extra costs and environmental issues. The existence of multiple buildings within the same plant add cost in terms of capital and the operating costs of moving materials between different areas. According to the current market conditions, just in time storage would be challenging going forwards and hence excluded. Racked warehouse was also considered for reducing the space required, but it was discounted since this option is difficult to be applied from an operational perspective and not used in the recycling industry in general. It was finally determined that the material shall be stored in a single building on-site.

3.3 Alternative Layouts

In general, MRF layouts are categorized into linear, centralized and modular designs.

In a linear layout, the different stages of the recycling process are arranged in a straight line, allowing materials to flow through the facility sequentially from one end to the other. Located at one end of the facility, the receiving area is designed to store incoming waste where inspections can be carried out. On the other end of the facility, the storage area hosts end-products prior to sale or further treatment (if required). In between these two end-storage areas, the sorting and processing areas take place whereby the waste is checked and eventually separated, and then processed for recycling.

In a centralized layout, all processing equipment and operations are concentrated in a common area, with materials being transported to and from this central hub. Smaller satellite stations or sorting areas may be distributed throughout the facility for initial sorting or temporary storage.

A modular layout consists of prefabricated or modular units that can be assembled or rearranged to accommodate changing processing needs or site constraints. This layout arrangement was chosen for the proposed MRF at the ECOHIVE Complex due to the site's spatial constraints. Moreover, special emphasis was dedicated to the compartmentalisation of each unit in order to comply with strict fire extinguishing measures.

3.4 Downscaling of the project or elimination of project components

One of the main challenges for the design of this MRF was to accommodate the project on a downscaled and non-optimally sized plot. The MRF plant as proposed has been optimised to make effective use of the site's spatial limitations whilst taking into account the facility's operational needs. Further downsizing of any of its components is not feasible, as it could negatively impact the overall performance of the recycling facility.

Any free space available on site shall be dedicated for accommodating future advances in waste recycling technologies. For instance, the MRF may be subject to increased robotization components which could require more space in the future. Such advancements and upgrades would be subjected to a new CBA to assess the costs of operation together with the reliability of the technologies being considered with respect to improving the quality of the end-product.

3.5 Zero Option (do-nothing scenario)

Current EU targets require that Malta achieves an overall recycling rate of 60% by 2030. Since 2013, Malta has not manged to attain its overall recycling target on waste management. This outcome was further exacerbated by the fire accident that occurred at the SAWTP in 2017. This demonstrates that Malta will continue to struggle to reach its' ever-ambitious recycling EU targets in the coming years if no further action is taken.

Therefore, from a National Waste Management perspective, the development of a new MRF is a mandatory requirement and the do-nothing option is counter to Malta's legal obligations towards the EU Council. The construction of a new MRF is also endorsed through the Long-Term Waste Management Plan 2021-2030 to meet a minimum of 60% of total MSW generated by weight by 2030. It is for this reason that a makeshift-temporary MRF line has been set up recently at the Malta North facility.

In summary, the do-nothing scenario is not favorable as the MRF project is vital to helping Malta increase the country's recycling rates and hence achieve the so sought after targets established by EU.

3.6 Hybrids/combination of the above

There are a number of hybrid or combined options for the above technologies. In fact, the project's CBA entailed a ranking system to identify the best technological set up for the new MRF. Notwithstanding the combined efforts undertaken through the CBA and the ranking method, the final sequence of technologies is still under preparation at the time this report is compiled and some of them can be addressed only at procurement stage.

The integration of waste management strategies that emphasize waste prevention, reduction, reuse, and recycling will be achieved through the design and implementation of advanced sorting and processing equipment, including optical sorting systems, magnetic separators, and eddy current separators. These technologies will enhance waste sorting and processing efficiency, reduce waste generation, and improve recycling rates, thereby minimizing the facility's environmental impact.

In addition to this, the MRF will prioritize energy efficiency by incorporating features such as LED lighting, high-efficiency heating and cooling systems, and renewable energy sources. This will help to reduce the facility's carbon footprint and minimize its impact on the environment.

Community engagement will be an essential component of the MRF's design and construction process. The facility will work closely with the local community to ensure that its needs are met, and that education and outreach programs are in place to promote waste reduction and recycling. The MRF will collaborate with local schools, businesses, and community organizations to promote sustainable waste management practices.

Lastly, the MRF will monitor and report on its environmental performance, including waste generation, recycling rates, energy usage, and water usage. This information will be made available to the public through annual sustainability reports, ensuring transparency and accountability. By prioritizing these elements, the MRF will be designed and built to minimize waste generation, improve recycling rates, and minimize its environmental impact.

4.0 A DESCRIPTION OF ASPECTS OF THE ENVIRONMENT LIKELY TO BE SIGNIFICANTLY AFFECTED BY THE PROPOSED PROJECT

The Area of Influence (AoI) for the terrestrial component of the study comprised of a 100m buffer zone around the proposed site for the development. The buffer zone is limited to terrestrial habitats and thus a sea cover use element was not relevant to the study. The AoI is mapped in Figure 20.

Figure 20: Area of Influence for the majority of the environmental studies

4.1 Land/sea cover and land/sea uses

4.1.1 Study Methodology

4.1.1.1 Preliminary Literature Review

A preliminary literature review focused on the existing information on historic land cover and land use studies within the AoI. A particularly important component during the review process was the analysis of satellite images on the *Google Earth* platform.

The preliminary literature review also included a review of the relevant national policy. The most important documents which were consulted included the STRATEGIC PLAN FOR THE ENVIRONMENT AND DEVELOPMENT (SPED, 2015) and the CENTRAL MALTA LOCAL PLAN (2006). This helped to provide a wider context for the proposed development.

4.1.1.2 Site Survey

A site walk-over survey, held on the 25th of August 2023 took into account all of the features and attributes which contribute towards the character of an area. It focused on the present use/s of the proposed Scheme site and surrounding area. Revisions to the draft map which had been designed during the initial literature review stage were made on site.

4.1.1.3 Secondary Literature Review

The map and general observations made during the site survey underwent a process of integration and analysis. Emphasis was placed on the assimilation and synthesis of information to be used to develop integrated descriptions of the area and its component landscape types and land uses. Geographic Information Systems (GIS) were used to create the land cover and land uses map.

4.1.1.4 Evaluation

An evaluation of the current land cover and land use categories was undertaken to assess and provide judgement related to the inherent sensitivity of the landscape. This included analysis based on the proximity of the different land uses to the Scheme. Current landscape condition (or quality) was based on qualitative judgements about the physical state of the landscape from visual, functional and ecological perspectives. It also reflected the state of repair of individual features and elements which make up the character of the area.

4.1.1.5 Impact Assessment Criteria

The qualitative assessment determines the potential impacts on the present land uses. The potential impacts that may arise from the Scheme could result in a restriction or limited accessibility to current land use activities, along with the permanent loss of certain land uses.

The tables presented in this section (Table 5 to Table 12) provide a definition for each of the criteria used in Table 54, which summarises the assessment of impacts on land use activities.

Table 5: Criteria for the duration of the impact

Duration of Impact	
Level	Definition
Permanent	Impact would still be detectable during the concerned phase.
Temporary	Impact would not persist through the whole duration of the concerned phase.

Table 6: Extent of Impact Criterion Description

Extent of Impact	
Level	Definition
Widespread	Impact is expected to affect in the entire area of study and/or may extend beyond the boundaries of direct intervention into adjacent areas
Localised	Impact is expected to affect receptors in the immediate vicinity of its source

Table 7: Criteria for the probability of the impact occurring

Probability of Impact Occurring	
Level	Definition
Inevitable	Level of certainty that impact will occur is greater than 90%
Likely	Level of certainty that impact will occur ranges between 50-90%
Unlikely	Level of certainty that impact will occur ranges between 30-50%
Remote	Level of certainty that impact will occur is below 30%

Table 8: Criteria for the nature of the impact

Effect of Impact	
Level	Definition
Adverse	Land and/or sea uses would suffer consequences as a direct result of the proposed development.
Beneficial	Land and/or sea uses would benefit as a direct result of the proposed development.

Table 9: Criteria for the consequences of the impact

Consequences of the Impact	
Level	Definition
Direct	Changes that result from direct cause-effect consequences of interactions between the result of action under consideration and the proposed project.
Indirect	Result from cause-effect consequences of interactions between the action under consideration and direct impacts.
Cumulative	Impacts resulting from an accumulation of the project impacts and other past, present or known planned developments, activities and land uses and with other relevant baseline situations.

Table 10: Criteria for the sensitivity & Severity of receptors to the impact

Severity, Sensitivity & Resilience of Receptors to the Impact	
Level	Definition
High	This action is a major contributor to the activities in the area of influence.
Medium	This action is a moderate contributor to the activities in the area of influence.
Low	This action is a minor contributor to the activities in the area of influence.

Table 11: Criteria for the reversibility of the impact

Reversibility of Impact	
Level	Definition
Reversible	State of the activity/action is potentially expected to return to baseline background level following cessation of the source of impact.
Irreversible	Impact is expected to cause partial or total destruction of the action under consideration and a return of the state of the resource to baseline levels should be considered highly improbable.

Table 12: Criteria for the impact significance

Impact Significance	
Level	Definition
Negligible	No significant impact.
Minor Significance	Low order impact and therefore likely to have little real effect on land/sea use. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both.
Moderate Significance	Impact on land/sea use is real but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible.
Major Significance	Of the highest order possible within the bounds of impacts on land/sea use that could occur. In the case of adverse impacts, there is little or no possible mitigation that could offset the impact. A substantial change in the use, or intensity of use, of land/sea including, or in its capacity to support existing uses.

4.1.2 Baseline data

The site currently comprises agricultural land with low-lying trees and remnants of local maquis/advanced garigue community. The site contains shallow terraced fields separated by rubble walls, some of which are in a degraded state. These walls are protected under the Rubble Walls and Rural Structures Regulations (S.L.552.01). The fields slope downwards towards the coastal area of Qalet Marku.

To the north-west and west lie the engineered Għallis and ta' Żwejra landfill sites, respectively. To the North, 100 meters away, lies the recently constructed Anaerobic Digestion Plant. To the East, the landscape is composed of agricultural land subdivided into small parcels by rubble walls. A paved access road runs along the south and west of the Scheme providing access to both the site and the landfill. A dirt track provides access from the road to the Scheme. A map

was created to depict the existing land cover and land uses within the Area of Interest (Figure 21).

4.1.2.1 Surrounding uses at the AoI

Figure 21 shows the current land cover and land uses within the Area of Interest. In Figure 22 to Figure 31 photographic evidence of each observed land use/cover observed during the site visit. The subsequent sections describe the observed categories.

Figure 21: land uses in the study area (based on walkover survey held on the 25th of august 2023)

ECOHIVE Complex

The Complex can be accessed from two entrances, the main being the South gate which lies to the South West of the Area of Interest. Access into the site is restricted to registered waste carriers and permitted vehicles.

Vehicle use of the Wasteserv site is currently intensive, as the site contains various complexes where the storage and processing of various waste streams is carried out. The use of the main landfill (known as 'Għallis') will, in the near future, be discontinued and a landscaping plan put in place. In its stead, plans for the expansion of the Complex are in place which include the Materials Recovery Facility covered by this report, as well as a new Waste-to-Energy plant, engineered landfill, Organic Processing Plant and Thermal Treatment Facility.

Figure 22: ECOHIVE complex adjacent to the proposed site (25th August 2023)

Figure 23: Anaerobic digesters adjacent to the proposed site (25th August 2023)

Access Road

The ECOHIVE complex can be accessed through a newly-tarmacked private access road. The road is flanked with a gutter and a perimeter of limestone boulders to the West, delineating the divide between the road and the landfill site.

Figure 24: Tarmacked road access to ECOHIVE complex (25th August 2023)

Dirt Path

The Scheme site is currently accessible via an unsurfaced dirt path, which winds across a number of fields which currently cover the main land use of the site.

Figure 25: Dirt road access to the proposed site (25th August 2023)

Landfill

Ta' Żwejra landfill lies to the West of the proposed site. This landfill was in operation primarily between 2004 and 2006 as Malta's first engineered landfill. Operations within this area of the Wasteserv Complex have since ceased, and municipal or mixed waste is now landfilled in the adjacent site further North, known as Għallis.

Figure 26: LANDFILL SITE TO THE WEST OF THE PROPOSED SITE (25TH AUGUST 2023)

Agricultural Land

The agricultural land which makes up the area of the site itself consists of predominantly bare fields bordered by what appear to be planted or severely limited remnants of maquis species. The borders of the rubble walls which delineate each field contained the remnants of plant species typical of disturbed ground.

Figure 27: Bare fields flanked with maquis species (25th August 2023)

Figure 28: A typical bare field close-up (25th August 2023)

Tree Plantations

There are trees present on site, bordering the bare agricultural land. The species present are for the most part indigenous species typical of Maltese maquis habitat. They are arranged as dense patches which extend considerably downhill in parallel strips, with fields in between each patch of vegetation. The mature trees are interspersed with low-lying bushes and wild plants typical of disturbed habitats.

Figure 29: Dense patches of indigenous species (25th August 2023)

The perimeter of the existing Anaerobic Digester Plant is landscaped with various species, including indigenous species such as carob and olive trees.

Figure 30: Landscaped area around the existing anaerobic digester plant (23rd August 2023)

Degraded Agricultural Land

Two extensive patches of degraded land were observed on site, one to the North East and one to the South East of the proposed site. The former appeared to be exposed bedrock following

the removal of the soil layer (Figure 31), while the latter is a field containing an extensive amount of fine gravel material.

Figure 31: Exposed bedrock to the North-East of the site (23rd August 2023)

4.2 Landscape Character and Visual Amenity

4.2.1 Study Methodology

The Zone of Theoretical Visual Influence (ZTVI) within a 3.0km radius from the Scheme was delineated using ArcGIS Software, as depicted in Figure 32. The ZTVI was established based on the highest structure on site, which stands at +57.1m above mean sea level (amsl). This software delineates an area where a human observer (sensitive receptor) would have a line of sight to the highest point of the proposed development. The basemap utilized integrates a Digital Terrain Model (DTM) for the Maltese Islands with a 1m resolution, accounting for topographical elevations while excluding surface obstacles such as trees, buildings, and other visual obstructions.

The receptors identified along the selected viewpoints include:

- Residents with views of the Scheme from their homes or residences;
- Pedestrians on streets and roads offering views of the Scheme;
- Passengers and drivers on roads with visibility of the Scheme;
- Farmers tending to their fields.

Given the popularity of the Coast Road area and its coastal surroundings, it is anticipated that thousands of sensitive receptors will view the proposed development daily.

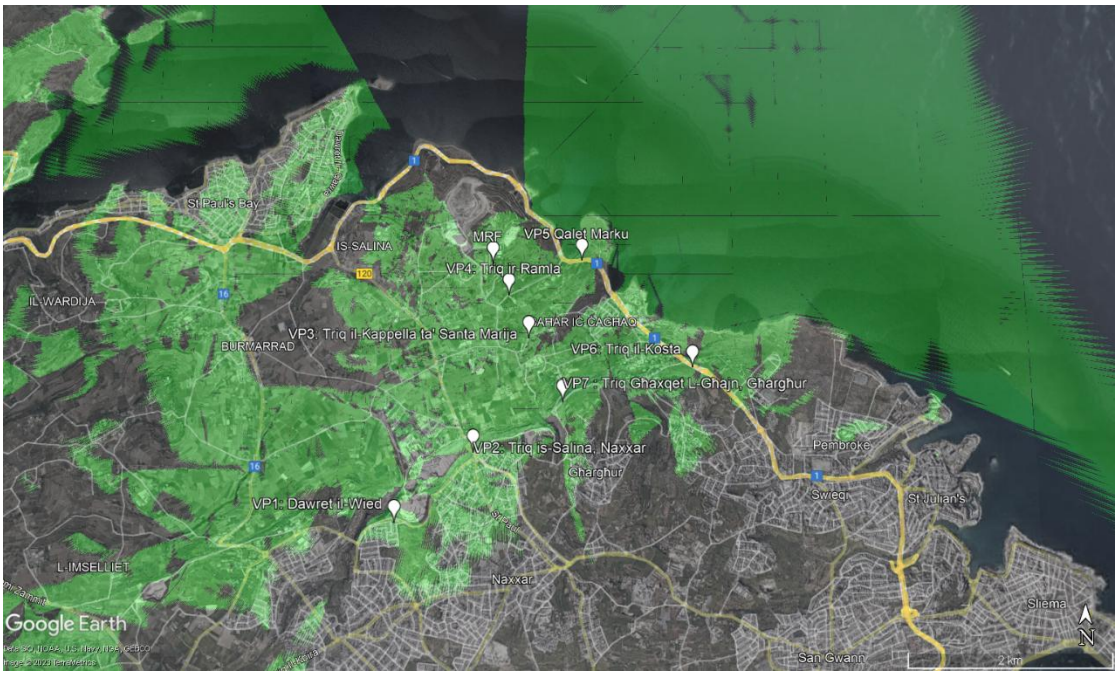


Figure 32: Viewshed Analysis (in Green) showing the selected Viewpoint Locations

The chosen viewpoints also align with those used for the visual and landscape assessment of the Organic Processing Plant (OPP) proposed within the ECOHIVE Complex in close proximity to the Scheme site. Consequently, the same seven baseline viewpoints depicted in Figure 32 were utilized to evaluate the cumulative impacts of all proposed waste management infrastructure in the vicinity. Each photograph, captured at a height of 1.8m above ground level with a horizontal angular field of view of 39.60°, was taken on October 29th, 2022, between 10:00hrs and 11:45hrs. Each viewpoint is object of analysis to evaluate its unique characteristics and the key visual elements contributing to the site's visual identity. The chosen ViewPoints (VP) are hereunder listed:

- VP1: Triq Dawret il-Wied, Mosta
- VP2: Triq is-Salina, San Pawl tat-Tarġa
- VP3: Triq il-Kappella ta' Santa Marija, Magħtab
- VP4: Triq ir-Ramla, Magħtab
- VP5: Qalet Marku, Naxxar
- VP6: Triq il-Kosta, St Andrew's
- VP7: Triq Għaxqet l-Għajn, Għarghur

The comprehensive landscape and visual impact assessment followed the GUIDELINES FOR LANDSCAPE AND VISUAL IMPACT ASSESSMENT (The Landscape Institute and IEMA, 2013). The assessment focused on how changes in the landscape, including the loss of existing elements or introduction of new ones, could impact the surroundings of these sensitive receptors.

Baseline photos were taken according to the ERA Terms of Reference and the aforementioned guidelines. The expert created photomontages illustrating the proposed development's appearance from each viewpoint. The visual impact assessment was based on these photomontages, which included nearby facilities under construction or still in the permitting stage to evaluate cumulative impacts.

The desk study incorporated a review of the following literature:

- A review of the features present within satellite images (aerial photographs) of the area to analyse land use trends;
- Reference to land use maps presented in the PDS and EIA;
- Research on previous environmental and planning studies undertaken in the area, historic maps and legislation and policy documents.

The analysis involved:

- A review of the LANDSCAPE ASSESSMENT STUDY OF MALTESE ISLANDS REPORT, the CENTRAL MALTA LOCAL PLAN (CMLP), and the STRATEGIC PLAN FOR ENVIRONMENT AND DEVELOPMENT (SPED),
- Identification of the key landscape elements in the area.
- Conducting a field survey and taking photos from selected viewpoints.
- Identification of sensitive receptors, such as physical landscape elements directly affected by development.
- Assessment of the condition and value of the existing landscape.

A 3D model of the proposed development using 3D software (3D Studios Max), based on scaled plans and drawings submitted by the project architects was used for the photomontages. Materials and lighting were applied to the model to obtain photo-realistic renders. Virtual cameras were set up on the 3D software to replicate the same field of view and lens properties as recorded when the original baseline photos were taken, and positioned using coordinates equivalent to those taken on site, with camera angles and heights set accordingly.

After rendering the model, a 2D image was created to replicate the position of the scheme with respect to the location of the baseline viewpoints. This image was then imported into a 2D photo editor, layered on top of the baseline viewpoint photo, and alpha channels were used to replace the background of the object with the photo of the site. The model was positioned in the photo using reference geographical points, and hidden parts of the structure were erased to fit the object in the environment of the photo. Finally, additional effects and colour correction were used to blend the object with the photo.

4.2.2 Baseline data

Two extensive landscape evaluations have been previously submitted for the ECOHIVE complex area, covering the Organic Processing Plant (OPP) and Waste to Energy (WtE) facility.

The Structure Plan of the Maltese islands defines landscape as the *"visual aesthetic component of the surrounding environment, as perceived and interpreted through the sense of sight"* [14]. The Landscape Assessment Study of the Maltese Islands[15] divides the islands into 61 landscape character units, each with distinct features confined to a specific area of land. With reference to Figure 34, the landscape units within the Scheme's area of influence are listed and described in Table 13.

---

[14] *Landscape Assessment Study of Maltese Islands (MEPA).*

[15] *https://era.org.mt/wp-content/uploads/2019/05/LandscapeAssessment-MalteseIslands-MEPA-2004.pdf (Accessed on 10/04/2024).*

Table 13: Landscape Units

SITE	GENERAL FEATURES	ENHANCING FEATURES	DETRACTING FEATURES
M9, M57, M58 St' Paul's Bay – Buġibba-Qawra	Formerly agricultural, now a densely built tourist area between St. Paul's Bay and Salina Bay. It features tall holiday flats, restaurants, and hotels, making it highly urbanized. The core area is less developed and visually hidden by taller buildings.	The entire coastline, especially the northeastern tip, is experiencing rapid development. However, the area near Il-Maħruq and Il-Ponta tal-Qawra remains relatively unspoiled. The promenade and colorful boats add vibrancy, while the villas in the north offer a break from mass tourism.	The area faces issues like excessive development, disorganized layout, and low-quality architecture. Construction debris litters the coast, dominated by unattractive structures and cluttered skylines. Traffic, waste, and pollution further degrade the area's appeal.
M14 Magħtab	This flat area near the eastern coast combines agriculture, garrigue, and scattered buildings. It's bordered by the coastal road, a key link between north and south, and is home to many farms and industrial units.	The area is dotted with churches, chapels, coastal towers, and historical sites, adding character when seen up close. Though not prominent, archaeological remains are present. Well-kept farmland and carob tree groves enhance the area's positive attributes.	The Maghtab waste disposal site dominates the area, visually impacting it and emitting unpleasant odors. Industrial activities, farms, concrete processing plants, and quarries further degrade the scenery. Additionally, scattered tipping and the Magħtab Earth Station's contrast contribute to the negative visual impact.
M21/M22 Għargħur – San Ġwann hinterland	An elevated area with a dramatic north-western escarpment merging into Baħar iċ-Ċagħaq. Għargħur and Madliena are the main settlements, surrounded by picturesque valleys. Moderate slopes are developed with dwellings, while San Gwann is mostly flat with former quarries. The area features transmission towers and valleys draining towards Bahar ic-Caghaq and St. Julians.	Għargħur is surrounded by beautiful scenery and historic buildings, including military fortifications, caves, chapels, and country houses. Terraced fields with large carob trees adorn the valley sides intersecting the great fault escarpment. Additionally, there are archaeological sites in the area, best appreciated up close.	New developments at the edge of Għargħur and Madliena starkly contrast with the rural valleys. Dereliction occurs in rural and newly constructed areas, with little amenity. Industrial plants, storage depots, greenhouse complexes, and former quarries exist in the area, impacting the scenery.

M58 North-Eastern rocky coast	Stretching from Buġibba to Tigne Point, this low-lying coast features shallow bays, some ending in sandy beaches. The area around Pembroke-St. Julians-Sliema is heavily developed, while the Baħar iċ-Ċagħaq stretch remains largely free from permanent residential settlements. Natural coastal rock formations vary from rugged to smooth.	The undeveloped coast, including Qawra and Sliema, remains pleasant, offering a break from nearby development. The bays are splendid with colorful underwater features and marine activity. Upgraded promenades, coastal parks, and facilities enhance the area, but some beach facilities limit public enjoyment. Historic features have suffered from surrounding development. Recent coastal projects and landscaping are of higher quality than the early 1990s development.	The extensive development at Sliema, St. Julians, and Paceville detracts from the coastal stretch, with construction sites obstructing public access and beach facilities becoming eyesores. Coastal areas are marred by construction debris, littering, and degrading features like the nearby landfill and caravan sites.

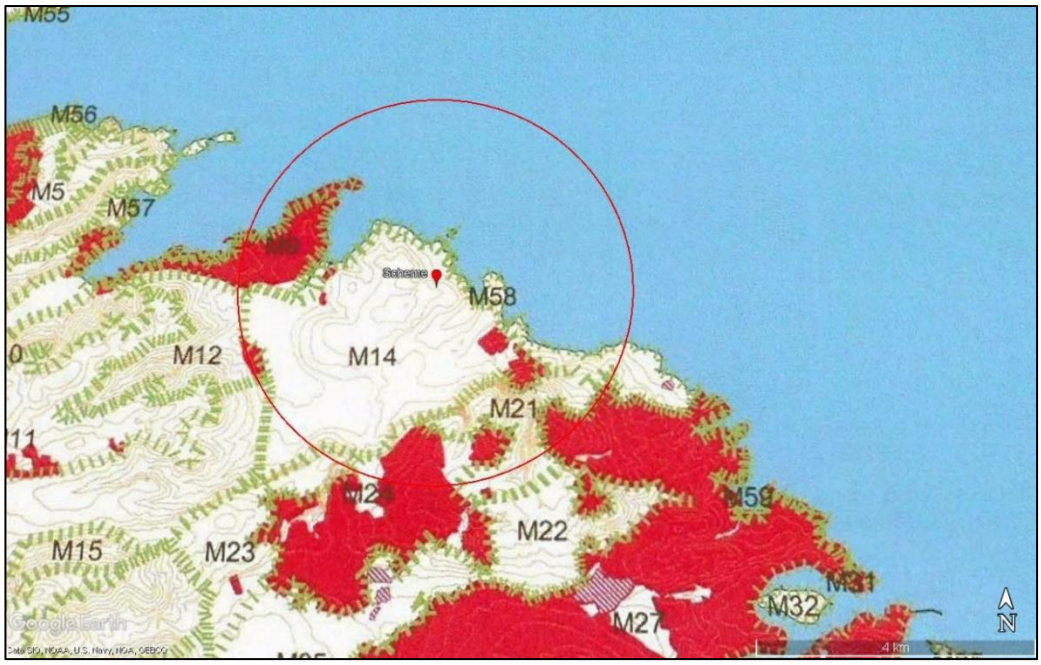


Figure 33: landscape character areas within 3km from the ECOHIVE complex

Of particular note is the identification of Areas of High Landscape Sensitivity (AHLSs) under CG22 in the CMLP (Figure 34). According to CG22, developments situated within AHLSs must comply with the provisions detailed in MEPA's Supplementary Guidance document titled 'LANDSCAPE ASSESSMENT STUDY OF THE MALTESE ISLANDS'. There is a general

presumption against development on sites listed within the Local Plan as AHLSs, especially on crests, fault sides, valleys, and coastal edges. Additionally, activities with the potential to introduce pollution or damage risks to AHLSs are discouraged. These designated sites also include buffer zones to regulate development near AHLSs. MEPA will assess developments affecting AHLSs in accordance with the requirements outlined in the aforementioned documents.

Although the Scheme site itself is not situated within an Area of High Landscape Sensitivity, some viewpoints are located within these designated AHLSs.

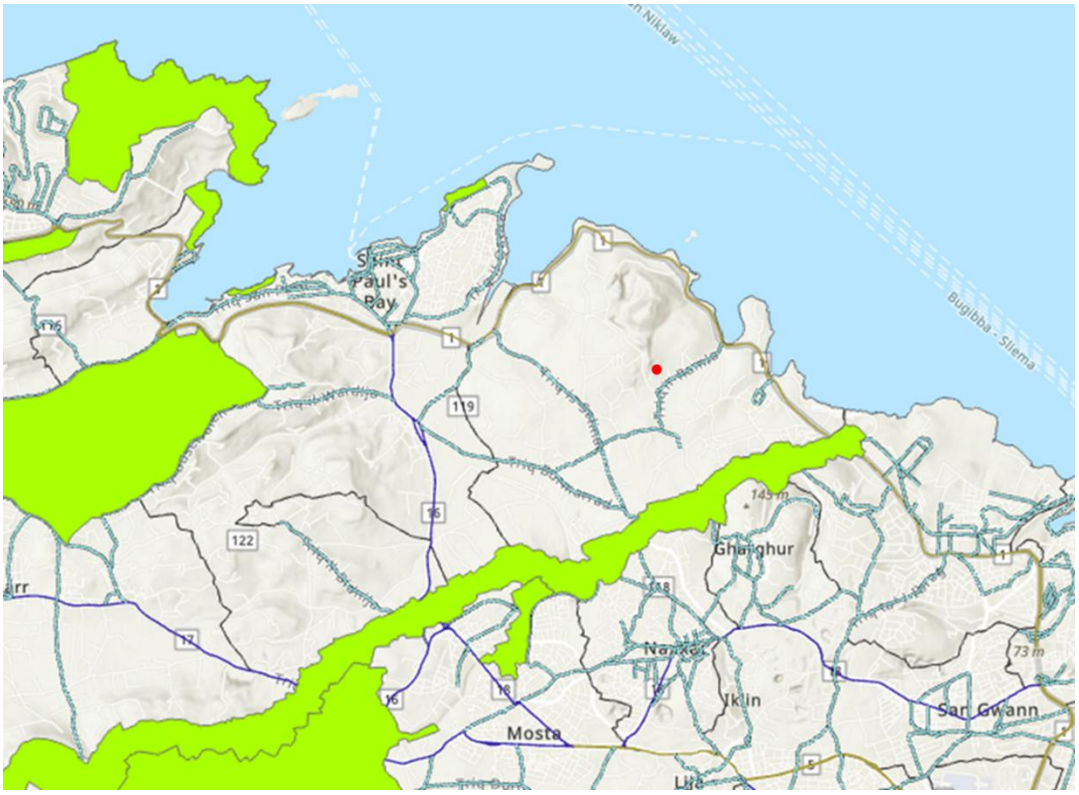


Figure 34: Areas of High Landscape Sensitivity (AHLSs) (Green) around the scheme site (red circle) (Source: PA Mapserver, 2024)

The potential visual receptors that may be impacted by the proposed development are:

- Motorists and passengers traveling in vehicles and other forms of transportation along nearby roads.
- Residents residing within the ZTVI of the Scheme site, particularly those in high-altitude areas such as Għargħur, San Pawl tat-Tarġa, Madliena, and the nearby Magħtab hamlet. The impact may also affect short-stay tourists staying in nearby guest-houses and hotels.

- Swimmers, divers, fishermen, vessel users/owners, and visitors at the Bahar iċ-Ċagħaq area.

The degree of exposure to the potential impacts from the proposed development varies among the identified receptors within the ZTVI. This exposure is influenced by the strategic location of the receptor in relation to the proposed Scheme and the duration of the impact on the receptor. Receptors that are not fixed, such as motorists, passengers, and pedestrians, are less exposed to visual amenity impacts compared to workers, residents, and frequent visitors to the area.

4.3 Geology, Geomorphology, Hydrogeology and Soils

4.3.1 Study Methodology

The assessment of the geological, geomorphological, hydrogeological, and soil features within the AoI (approximately 500-600m radius) of the proposed MRF was conducted (Figure 35). Special attention was paid to the downstream part of the water catchment basin encompassing the site for the hydrological and hydrogeological components of the study.

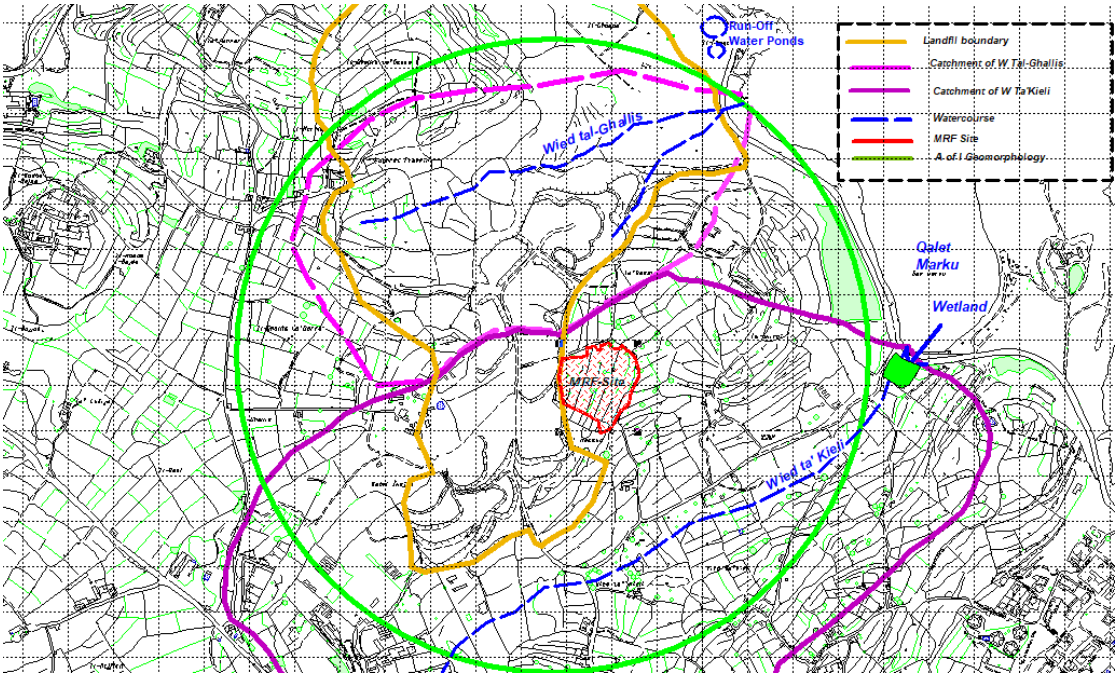


Figure 35: Map of the site and its environs showing area of influence for geomorphology, hydrogeology, geology and soils

There is no well-defined watercourse and the run-off generated on the Magħtab–Għallis slopes will be discharged down the Għallis slopes to Wied ta' Kieli as well as along the coastline in a diffuse manner.

A literature review was undertaken, and the following relevant reports were identified:

- Previous studies in connection with the construction of the Coast Road;
- Geological map of the Maltese Islands (Continental Shelf Department, 2022);
- EIA related to Waste to Energy (WtE) facility.

A field survey was conducted to determine the geology, geomorphology, and soils of the site. Additionally, ground contamination analysis was carried out in December

2023, involving the sampling of soil and rock cores from four exploratory boreholes. Three soil and rock samples were collected from each of the four areas (A, D, J, and F) at different depths to assess ground contamination (Figure 36).

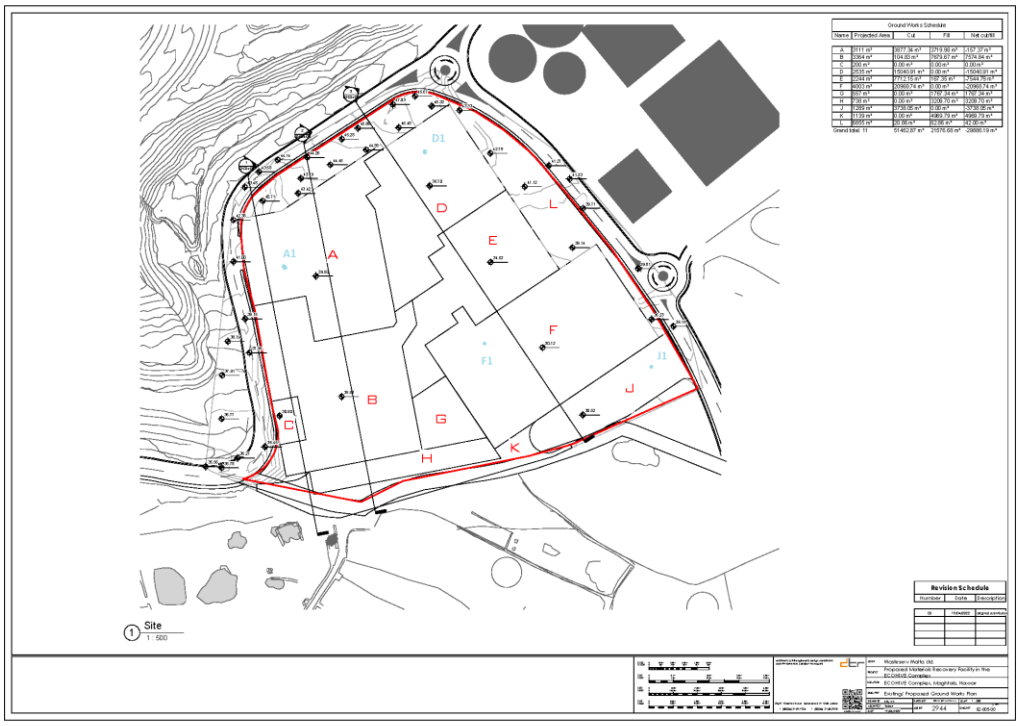


Figure 36: Map of the MRF site showing the location of the boreholes at Area A, Area D, Area F and Area J

Three soil and rock samples were collected from areas A, D, J and F (Figure 36) at the following depths from ground level:

- Sample No.1: <0.5m
- Sample No.2: 1.5/2.5m
- Sample No.3: 5.5m

Protocols for core samples preservation are provided in Table 14.

Table 14: Soil and rock sampling protocol at the MRF site undertaken in December 2023

AREA	DEPTH 1 (S)	DEPTH 2 (M)	DEPTH 3 (D)	NO OF SAMPLES	PROFILE 2	PROFILE 3
Area A (A1)	<0.5m	1.5m	NA	2	2x 500g PET jar	1x 500g PET jar 2x 500g glass jar 2x Vials – fill only 1/10 of the capacity volume
Area D (D1)	<0.5m	2.5m	5.5m	2	2x 500g PET jar	1x 500g PET jar 2x 500g glass jar 2x Vials – fill only 1/10 of the capacity volume
Area F (F1)	<0.5m	2.5m	5.5m	2	2x 500g PET jar	1x 500g PET jar 2x 500g glass jar 2x Vials – fill only 1/10 of the capacity volume
Area J (J1)	<0.5m	2.5m	5.5m	2	2x 500g PET jar	1x 500g PET jar 2x 500g glass jar 2x Vials – fill only 1/10 of the capacity volume

In order to assess the ground stability of the site bearing the projected structural loads, geotechnical analysis undertaken on the adjacent WtE scheme were deemed suitable for the MRF Scheme. Geotechnical investigations were carried out in compliance with the following standardized tests:

- BS 5930: 2015; Code of practice for geological site investigations;
- BS-EN 1997:2004 Geotechnical design- PART 1 General rules;
- BS EN 1997 - 2: 2007 Geotechnical Design – Part 2: Ground investigation and testing;
- Uniaxial compressive strength tests shall be under taken were done according to BS 5930 and ISRM suggested methods.

Guidance on applicable legislation safeguarding hydrogeomorphological conditions was provided by:

- The Water Framework Directive;
- Marine Strategy Framework Directive and related instruments;

- Standards related to chemical analysis of groundwater and seawater;
- Standards related to waste classification outline in Appendix 2 of the ERA terms of reference;
- "DECRETO LEGISLATIVO 3 aprile 2006, n. 152 Norme in materia ambientale. (GU Serie Generale n.88 del 14-04-2006 - Suppl. Ordinario n. 96)";
- Cap 549 Environment Protection Act;
- Cap 236 Fertile Soil Preservation Act;
- S.L. 236.01 List of Places where Fertile Soil may be deposited Notice; and
- S.L. 236.02 Preservation of Fertile Soil Regulations.

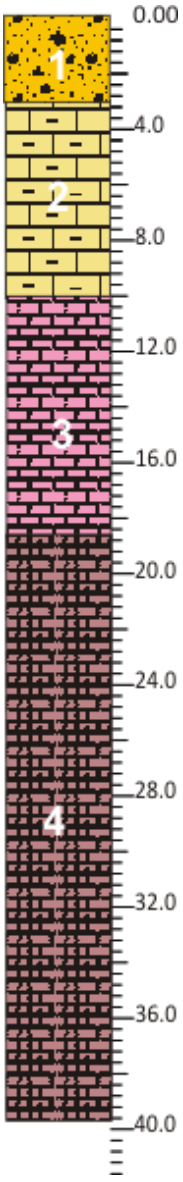
4.3.2 Description of the area of influence

Ground investigation and testing were undertaken in 2020 in connection with the Waste to Energy facility, currently under construction. Considering that the WtE facility site lies close to the MRF site under study, the ground investigation of the former together with a field survey undertaken on 27 and 26 November 2022, has been utilised to assess the quality of the stone material that shall be extracted from the MRF site.

Geotechnical testing results suggest that the top layers (Lower Globigerina Limestone) are stronger than the deeper beds (Lower Coralline Limestone).

- Top layers – Lower Globigerina Limestone (Approximate) average strength= 13Mpa
- Deeper beds –Lower Coralline Limestone (Approximate) average strength= 7Mpa
- High water content in both rock units

The subsurface is the lateral continuation of the rock beds from the WtE facility and the MRF site next to it.



The rock sequence at the site is described in (Figure 37):

- (1) The topsoil on average about 0.3 to 0.4m thick (seen during field survey) for the MRF site, 3m were recorded in the WtE ground investigations;
- (2) The Lower Globigerina Limestone in exposures at the site, about 5m thick;
- The Lower Coralline Limestone (in the subsurface);
    - (3) Xlendi Mb: 9m to 11m thick;
    - (4) Attard Mb which, is about 22m thick, extends down to sea level.

Figure 37: General lithologic column of the surface and subsurface geology at il-Ghallis and Maghtab 1: Top soil; 2: Lower Globigerina Limestone; 3: Lower Coralline Limestone-Xlendi Mb; 4: Lower Coralline Limestone –Attard Mb

The area under investigation is a low and broad spur of agricultural land situated at the foot of the landfill hill, which gradually rises from approximately 40m to 60m above sea level and eventually reaches a height of 100m. The proposed MRF site will be developed on the Lower Globigerina Limestone. The Lower Coralline Limestone (Xlendi Mb and Attard Mb) exhibits weathering primarily through dissolution, as it is composed almost entirely of Calcium Carbonate. Consequently, no substantial soil thickness forms on this rock formation. This type of limestone pavement is commonly

referred to as "Xaghra." In other areas, exposures of the Xlendi Mb are typically bare. The soil covering rock exposures of the Xlendi Mb below the site must have been transported from elsewhere.

The geomorphological features that once could be seen in the Study Area are listed below and depicted in Figure 38.

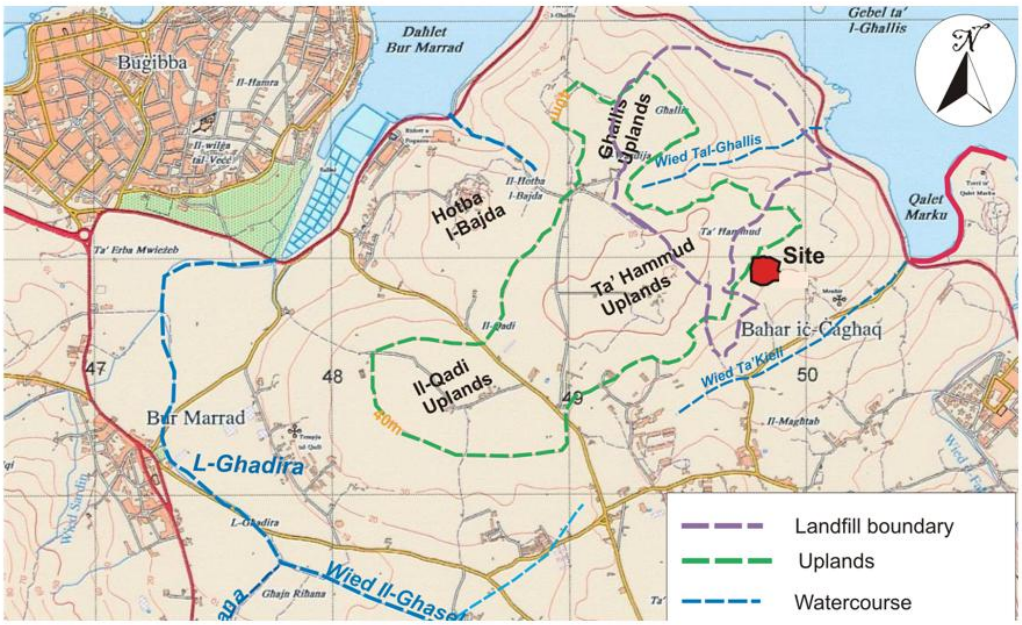


Figure 38: Map showing area of influence for geomorphology. For scale grid squares measure 1000m by 1000m

Most of the above listed features are now buried beneath the Maghtab and Ghallis Landfill and what remains are:

- Wied Ta Kieli: a primarily agricultural tenement parcelled into terraced fields. No watercourse is developed except at the coastline.
- The eastern slopes of Ta'Ħammud Uplands: the upper sector of these rounded slopes is terraced and covered by a topsoil while the lower part which exposes Lower Coralline Limestone constitutes mainly a limestone pavement as inland exposures of Lower Coralline Limestone, being a pure limestone, are barren and form a limestone pavement locally known as Xaghra.
- The Qalet Marku and Għallis Coastline is set on the Xlendi mb of the lower coralline limestone formation. The coastal belt that forms a corridor between the Coast Road and the coastline is characterised by its serrated character and

rugged marine karst landscape forming a dense network of rock pools up to about 5m in diameter. It is a rugged bare shore platform with scattered ponds best represented by Għadira s-Safra. Shallow embayments form the offshore extension of the valleys mainly represented by Baħar iċ-Ċaghaq and Qalet Marku.

Owing to the high resistance to erosion of the limestone exposures along the coastline, only a small pocket cobble beach is developed at Qalet Marku.
In structural geological terms these uplands are known as the Għallis high as despite their location on the hanging wall of the Victoria Lines Fault, the Lower Coralline Limestone rises way above sea level. The high is dissected by a radial drainage system of which, Wied ta' Kieli and Wied tal-Għallis are the most relevant to this report.

The site is located next to broad spur roughly oriented North South and forms part of the Għallis structural high. This high is marked by a well-developed Lower Coralline Limestone with a reduced thickness of the Globigerina Limestone. Past ground investigations at the WtE facility, now under construction, has revealed that the Lower Globigerina Limestone is about 17m to 22m thick.

The proposed site is set on a number of terraced fields underlain by Lower Globigerina Limestone. The soil associated with such a geomorphological setting is the L-Inglin man-made complex associated with terraced slopes exposing Lower Globigerina Limestone (Figure 34).

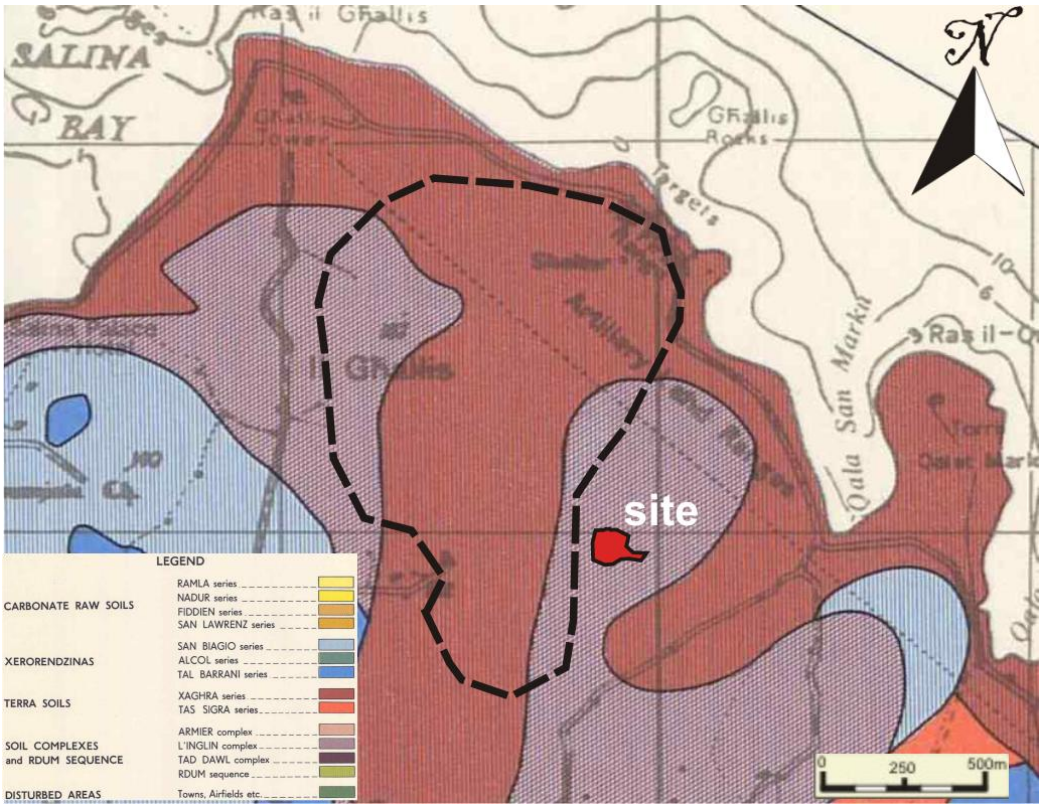


Figure 39: Soil map of the environs of the site from Lang (1962). Black line indicates the approximate extent of the land fill

A typical profile of the soil that has been exposed at the site during the archaeological survey is shown in Figure 40.

Figure 40: Photograph of a typical soil profile at the OPP site about 0.4m thick

The field survey and geological map of the site have revealed that there are no impermeable beds, such as marl or clay, above sea level within the site or its catchment area. As a result, no perched aquifer has developed beneath the site. The only aquifer present beneath the site is the mean sea level water table, which lies approximately 30 to 45 meters below ground level. This mean sea level water table represents the closest hydrogeological feature to the site.

The hydrogeological and hydrological features close to the site are shown in (Figure 42) and are listed below:

- Wied tal-Għallis: a shallow valley covered by landfill and limestone pavement in which no watercourse is developed suggesting scarce run-off events;
- Wied ta'Kieli drainage system which discharges into Qalet Marku;
- The catchment of the site. The site lies partly within the catchment of Wied ta'Kieli about 15% of the area within the catchment of Wied Tal-Għallis and approximately 15% is diffuse;
- The catchment of the site is represented by its boundary and has an area of approximately 21,373m^2;
- The Mean Sea Level Aquifer represented by Lower Coralline Limestone;
- Water Services Corporation (WSC) and private boreholes;
- Wetlands.

The mean sea level water body is a lens-shaped water body reaching some 2.5m above sea level in central Malta and thins out to zero thickness at the coastline (Figure 41).

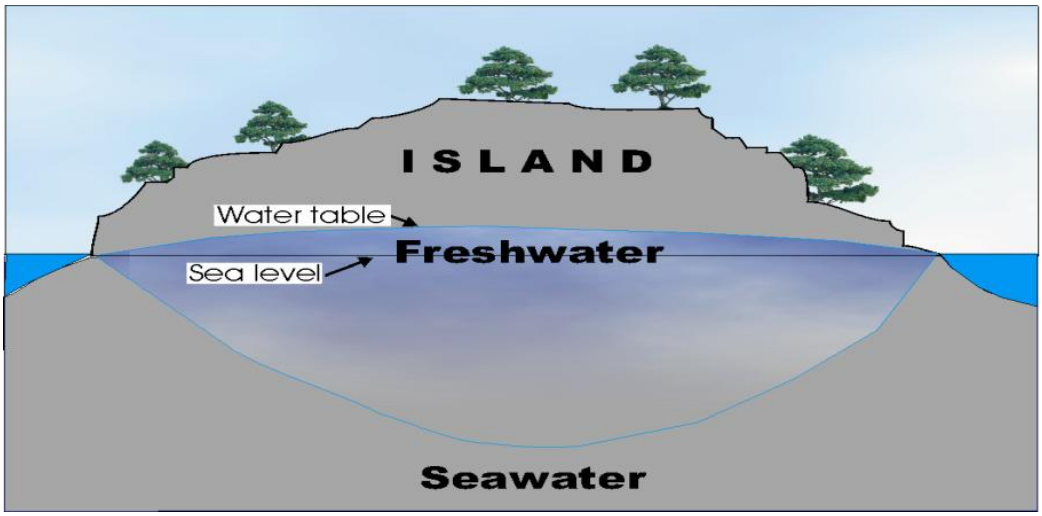


Figure 41: Schematic representation of the mean sea level aquifer developed beneath an island

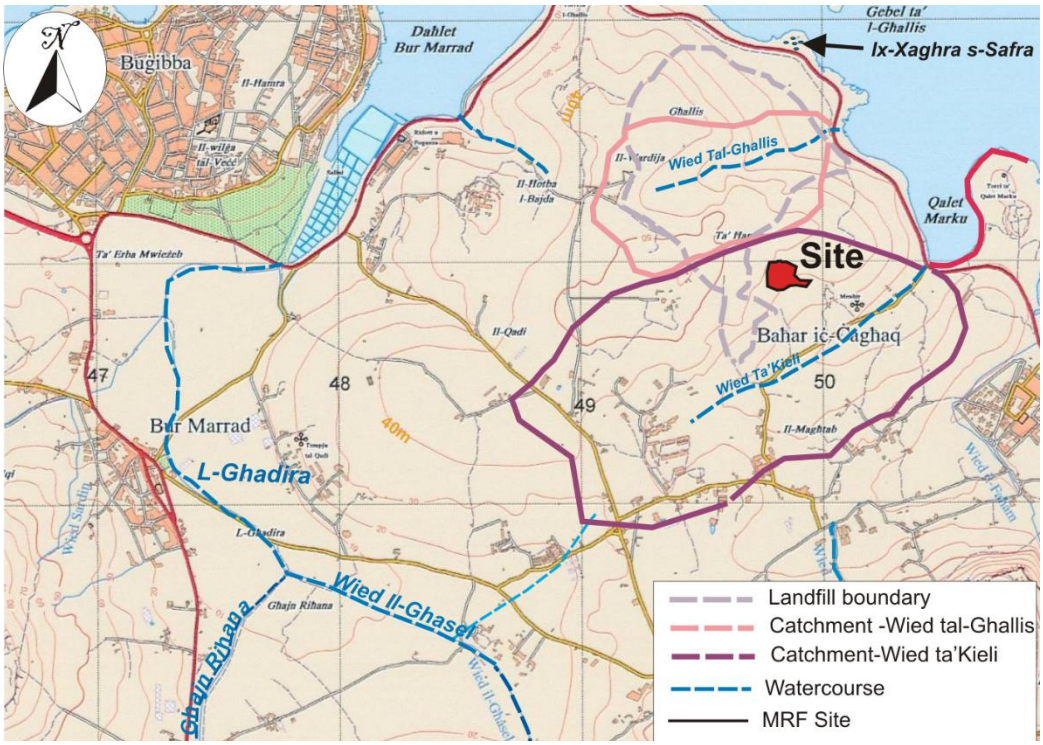


Figure 42: Map showing hydrological features including the catchments of Wied tal-Ghallis and Wied ta'Kieli

4.4 Water bodies

4.4.1 Study Methodology

Similarly to the Geology Technical Study, the AoI for Water Bodies is of 500-600m around the facility (Figure 35). Previous studies in connection of the construction of the Coast Road next to the site were consulted especially with regards to the protected areas. Other studies undertaken are related to the water quality of the groundwater beneath the Magħtab and Għallis Landfills.

During the ground investigation for the Water Bodies Report two (2) groundwater samples were collected as described in Chapter 4.3.1. The two groundwater samples collected from the MRF site were analysed for the chemicals listed in the table below.

Table 15: List of Analytes of Water Samples Laboratory Analysis

CHEMICAL PARAMETER	CHEMICAL PARAMETER	CHEMICAL PARAMETER
Metals	Carcinogenic Chlorinated	PAHs
Arsenic	Aliphatic Compounds	*Benzo(a)anthracene*
Chromium	*Chloromethane*	*Benzo(a)pyrene*
Iron	*Trichloromethane*	*Benzo(b)fluoranthene*
Nickel	*Vinyl chloride*	*Benzo(k)fluoranthene*
Lead	*1,2-Dichloroethane*	*Benzo(g,h,i)perylene*
Copper	*1,1-Dichloroethylene*	*Chrysene*
Zinc	*1,1,2-Trichloroethane*	*Dibenzo(a,h)anthracene*
Inorganic Pollutants	*1,2,3-trichloropropane*	*Fluoranthene*
Fluorides	*Tetrachloroethylene*	*Indeno(1,2,3-c,d)pyrene*
Sulphates	*Hexachlorobutadiene*	*Pyrene*
	Sum Organohalogens	*Naphthalene (C10)*
Aromatic Organic Compounds		
Benzene	Carcinogenic Halogenated Aliphatic Compounds	Sum polycyclic aromatic Hydrocarbons
Ethylbemzene		*hydrocarbons*
Toluene	*Tribromomethane (Bromoform)*	*Total hydrocarbons*
Styrene	*1,2-Dibromoethane*	
Para- Xylene	*Dibromochloromethane*	
Tetrachloroethylene	*Bromodichloromethane*	

The principal guidance for this study shall be the:

- Water Framework Directive (2000/60/EC), transposed into *Maltese* legislation as Legal Notice 194 of 2004 (Water Policy Framework Regulations, 2004);

- Strategic Plan for Environment and Development (SPED) drawn in 2015 to replace the Structure Plan for the Maltese Islands drawn up in 1990;
- The EU Marine Strategy Framework Directive (2008/56/EC) – MSFD, published in June 2008, establishes a framework for community action in the field of marine environmental policy. Marine Strategy Framework Directive and related instruments);
- Standards related to chemical analysis of groundwater and seawater;
- Standards related to waste classification.

4.4.2 Description of the results

The hydrological features in the environs of the site are:

- The Catchment of Wied Ta' Kieli, the catchment in which the site is located
- Downstream catchment of the site
- Coastal Waters
- The mean sea level aquifer
- Private and public water boreholes
- Wetlands

The catchment area downstream of the site represents the region where any surface discharges from the site will flow until they are eventually discharged at the coastline. Similarly, surface discharges from the landfill that fall within the catchment of Wied ta'Kieli will also be discharged at Qalet Marku.

It is important to note that the prevailing wind direction in the Maltese Islands is predominantly from the northwest. As a result, any discharges at the coastline would be driven by longshore currents towards Qalet Marku, rather than towards Salina Bay.

The Maghtab Għallis Landfill site (which encompasses the Scheme) is underlain by the Lower Coralline Limestone which constitutes the Mean Sea Level Aquifer but it does not lie within the boundary of the water protection zone (Figure 43).

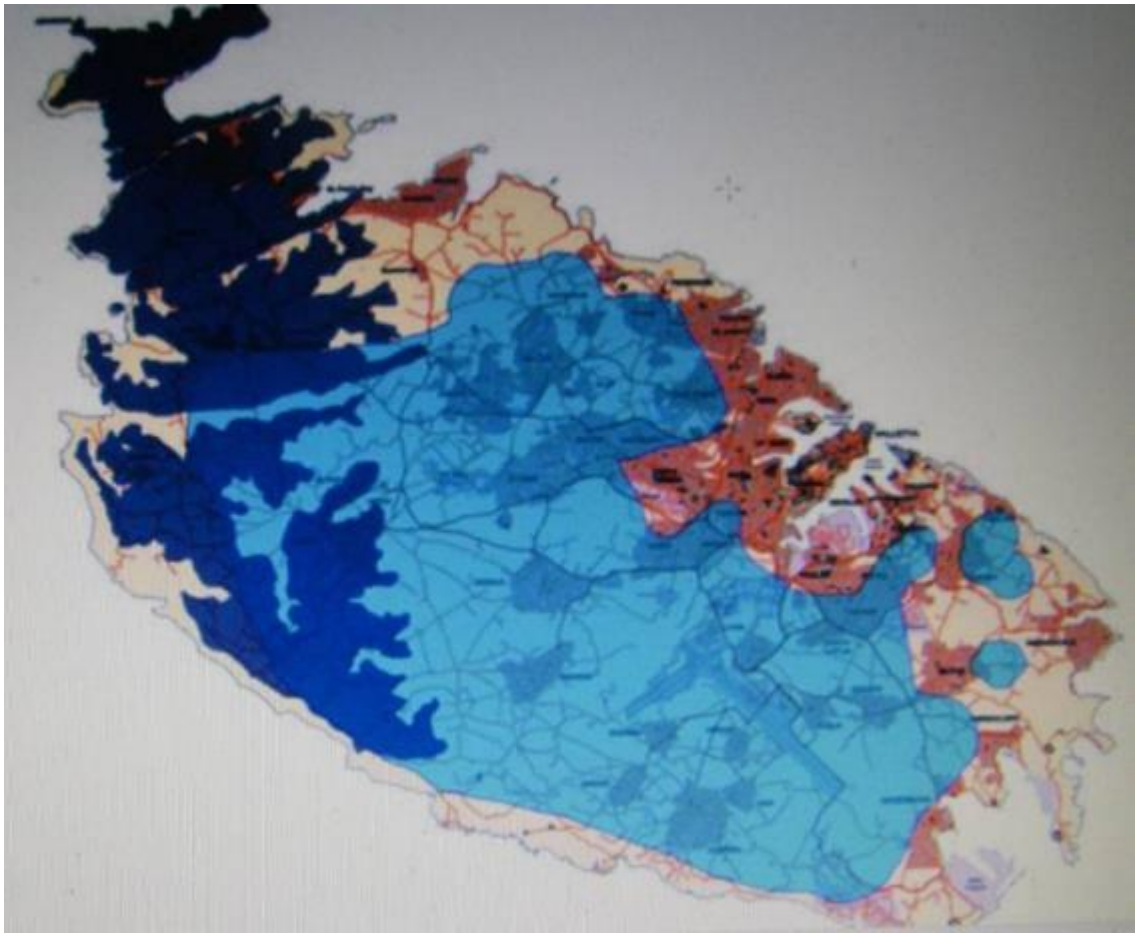


Figure 43: Map showing the water protection zone extending over the island

The site falls within the catchment of Wied ta Kieli (Figure 44). The watershed of this watercourse passes just north of the site as shown in the map. The hydrogeological and hydrological features close to the site are listed below:

- Wied ta Kieli: a shallow valley covered by landfill and limestone pavement in which no watercourse is developed suggesting scarce run-off episodes.
- The Mean Sea Level Aquifer (MSLA)
- Water reservoirs

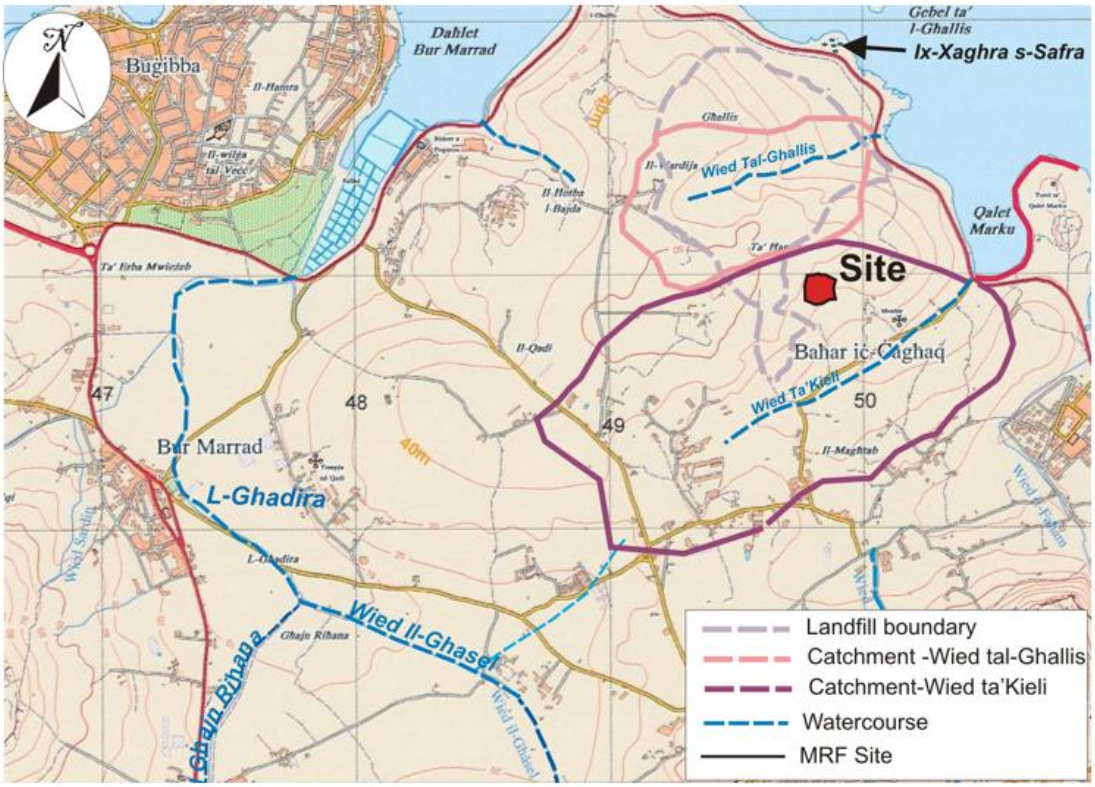


Figure 44: Map showing the catchments of Wied tal-Għallis and Wied ta'Kieli

Field survey as well as the geological map of the site has revealed that at the site or within its catchment, there are no impermeable beds above sea level such as the Blue Clay formation. Therefore, no perched aquifer is developed beneath the site. The only aquifer beneath the site that may be developed is the Mean Sea Level Aquifer, which lies some 30m to 40m below ground level. This also represents the hydrogeological feature closest to the site.

Laboratory analysis was carried out to assess the qualitative status of the underlying Mean Sea Level Aquifer. Groundwater laboratory test results were compared with the thresholds established by the Italian D.Lgs. 152/06 and revealed the exceedance of three compounds (i.e., iron,one hydrocarbon analyte and sulphate). The Expert associates the presence of the first two pollutants to historical contamination likely sourced upstream the study area. No direct impacts linked to waste treatment operations were inferred. High sulphate content is likely linked to seawater intrusion mechanisms due to the vicinity of the Scheme to the coastline.

4.5 Ecology – Terrestrial

4.5.1 Methodology

This study focuses on the existing ecology present within the project footprint and surrounding areas. The Consultant first carried out a thorough literature review of readily available data and previous studies in the Area of Influence (AoI). This involved a review of readily available data and previous research studies carried out for the AoI.

The AoI for the terrestrial component of the study comprised of a 100m buffer zone around the proposed MRF Scheme.

Subsequently, the Consultant conducted a broad-brush terrestrial survey within the AoI in August 2023 and January 2024. The Consultant recorded the vegetation assemblages and any faunal species encountered during the survey. The baseline survey also included a survey of all species present within the site and buffer zone, including their scientific and vernacular name to identify species protected in line with the TREES AND WOODLANDS PROTECTION REGULATIONS (S.L.549.123) and the FLORA, FAUNA, AND NATURAL HABITATS PROTECTION REGULATIONS (S.L.549.44). Photographic evidence was collected during the field survey, including aerial drone shots.

The report details the conservation status and ecological condition of the area and the state of health of its habitats, species and ecological features. All protected, endangered, rare, unique, endemic, high-quality, keystone, invasive/deleterious, or otherwise important species, habitats, ecological assemblages, and ecological conditions found in the area under study were also studied.

4.5.1.1 Impact assessment criteria

The Consultant evaluated the potential impacts arising from the construction and operation of the proposed Scheme on the local terrestrial ecology. The potential impacts also provided a basis for comparison between the existing conditions and the new conditions established during the operation of the Scheme.

The following information have been provided for each of the identified impacts:

- Project phase (construction or operational phase)
- Policy importance
- Extent of effect (local, national or international)
- Duration (temporary or permanent)
- Type (beneficial or adverse)
- Reversibility (reversible or irreversible)
- Sensitivity of receptors (high, medium or low)
- Probability of occurrence (certain, likely, uncertain, unlikely or remote)
- Scope for mitigation or enhancement (very good, good or none)

Based on the above criteria, the Consultants assessed the significance level of each of the identified impacts. Different criteria were used for the different components of the study, as summarised in Table 16 to Table 24.

Table 16: Duration of Impact Criterion Description

DURATION OF IMPACT	
Permanent	Impact would still be detectable following decommissioning of project
Temporary	Impact would persist throughout the phase of project under consideration only

Table 17: Extent of Impact Criterion Description

EXTENT OF IMPACT	
Widespread	Impact is expected to affect in the entire area of study and/or may extend beyond the boundaries of direct intervention into adjacent areas
Localised	Impact is expected to affect receptors in the immediate vicinity of its source

Table 18: Consequences of Impact Criterion Description

CONSEQUENCES OF IMPACT	
Direct	Changes that result from the cause-effect consequences of interactions between the environment and project activities
Indirect	Changes that result from cause-effect consequences of interactions between the environment and direct impacts
Cumulative	The cumulative consequences of ecological impact refer to the gradual and long-term effects that result from the combined impact of various ecological disturbances or stressors on an ecosystem over time.

Table 19: Effect of Impact Criterion Description

EFFECT OF IMPACT	
Adverse	A negative effect on the sustainability of the resource under consideration, which are distinguishable from background fluctuations
Beneficial	A positive effect on the sustainability of the resource under consideration, which are distinguishable from background fluctuations

Table 20: Reversibility of Impact Criterion Description

Reversibility of Impact	
Reversible	The state of the resource is expected to return to baseline state following cessation of the source of impact
Irreversible	The state of the resource is not expected to return to baseline state following cessation of the source of impact

Table 21: Sensitivity of Resources to Impact Criterion Description

Sensitivity and Resilience of resources to impact	
High	The resource under consideration is highly susceptible to a detectable deviation from the background state and its general dynamics
Moderate	The resource under consideration is vulnerable but able to tolerate a degree of detectable deviation from the background state and its general dynamics
Low	The resource under consideration is highly tolerant to a detectable deviation from the background state and its general dynamics

Table 22: Probability of Impact Occurring Criterion Description

Probability of Impact Occurring	
Inveitable	Impact will occur irrespective of any mitigation measures taken
Likely	Impact may occur despite the implementation of mitigation measures
Unlikely	Impact would only occur in cases of major mitigation failure
Remote	Impact would only occur in exceptional circumstances
Uncertain	Probability of impact cannot be predicted reliably due to missing information or unknown factors

Table 23: Impact Significance Criterion Description

Impact Significance	
Major	The effect on the existing state of the feature under consideration will lead to a high or large-scale change in its resilience
Moderate	The effect of the existing state of the feature under consideration will lead to an observable but contextually restricted change, which is sufficiently important for its long-term resilience
Minor	The effect on the existing state of the feature under consideration will lead to no, low or small-scale change that will not alter its resilience

Table 24: Residual Impact Significance Criterion Description

Residual Impact Significance	
Major	The effect on the existing state of the feature under consideration will lead to a high or large-scale change in its resilience after application of mitigation measures (if any) and impact cessation
Moderate	The effect of the existing state of the feature under consideration will lead to an observable but contextually restricted change, which is sufficiently important for its long-term resilience after application of mitigation measures (if any) and impact cessation
Minor	The effect on the existing state of the feature under consideration will lead to low or small-scale change that will not alter its resilience after application of mitigation measures (if any) and impact cessation
Negligilbe	The effect on the existing state of the feature under consideration will lead to no significant change that will alter its resilience after application of mitigation measures (if any) and impact cessation

4.5.2 Baseline study

The area which will host the new MRF is mostly rural in character, dominated primarily by the engineered landfills and waste management operations conducted by Wasteserv. The site currently comprises agricultural land, a dense cover of low-lying trees and remnants of local maquis/advanced garigue community.

The ecological features surrounding the site area include small pockets of afforested areas, coastal garigue, and other natural communities similar to garigue, steppe, and degraded areas. Although the scheme site and buffer do not directly overlap with any protected areas, several terrestrial, avian, and marine Natura 2000 sites are located within walking distance of the proposed development.

The area of influence and its surroundings were assessed through a desktop review of local plans, legislations, and policy documents. The Central Malta Local Plan (Malta Environment and Planning Authority, 2006) shows that the scheme site is located within an Ecological Area (CG22) and surrounded by Agricultural Areas (CG24) awaiting classification of agricultural value (Figure 45). Two Sites of Scientific Importance (CG22) are nearby, with one located outside the scheme's AoI and the other near the ECOHIVE Complex. The coastal stretch of Qalet San Marku is protected as a "Protected Natural Coast with public access" (NA04), but it is sufficiently detached from the scheme and not considered within the assessment.

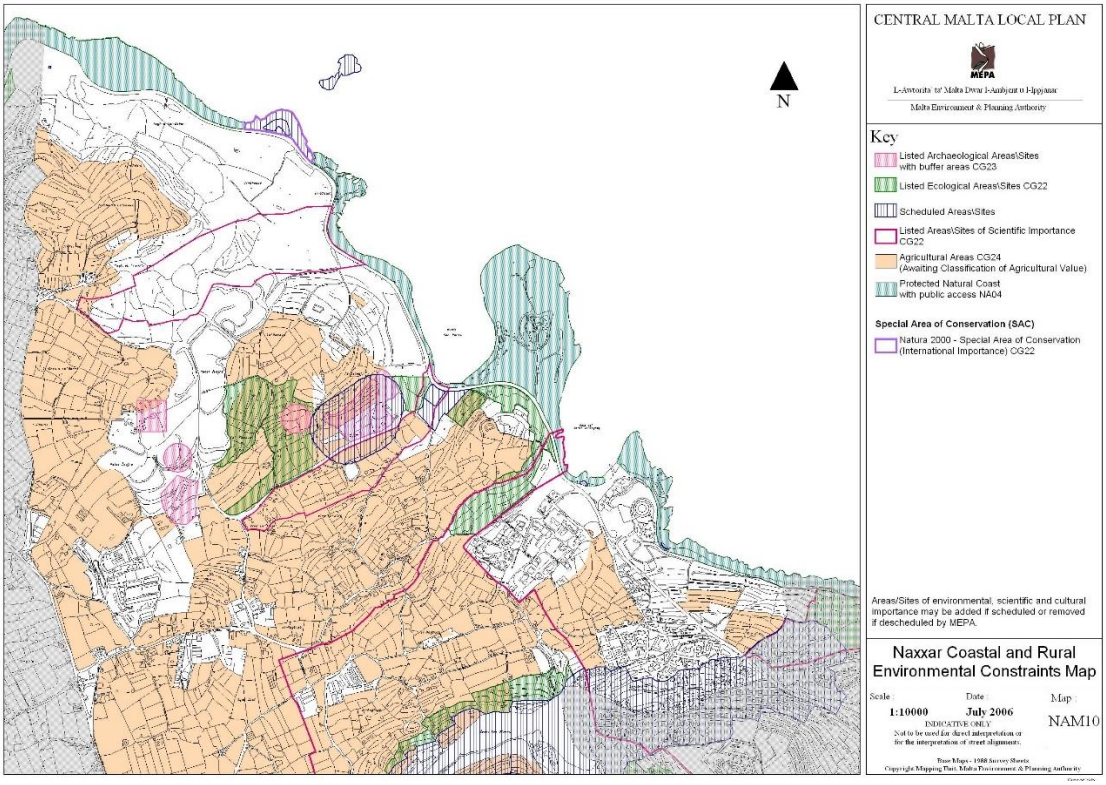


Figure 45: Naxxar coastal and rural environmental constraints map (Central Malta Local Plan, 2006)

In Figure 46, there are seven Areas of Ecological Importance (AEI) marked as A to G that intersect with both the AoI and the scheme site at various points. These AEIs were identified through the North Harbor Local Plan (NHLP) survey in 1996 and have been used to designate protection areas in the Local Plans of 2006.

Site A, characterized by dense vegetation of maquis-like shrubs and trees intermingled with agricultural land, is granted a level 4 degree of environmental protection. Both the scheme site and the majority of the AoI fall within Site A's boundaries. The remaining six designated sites are located in the vicinity of the scheme site, but due to their considerable distance

from the scheme and access roads, it is unlikely that the scheme will have any significant impacts on these sites.

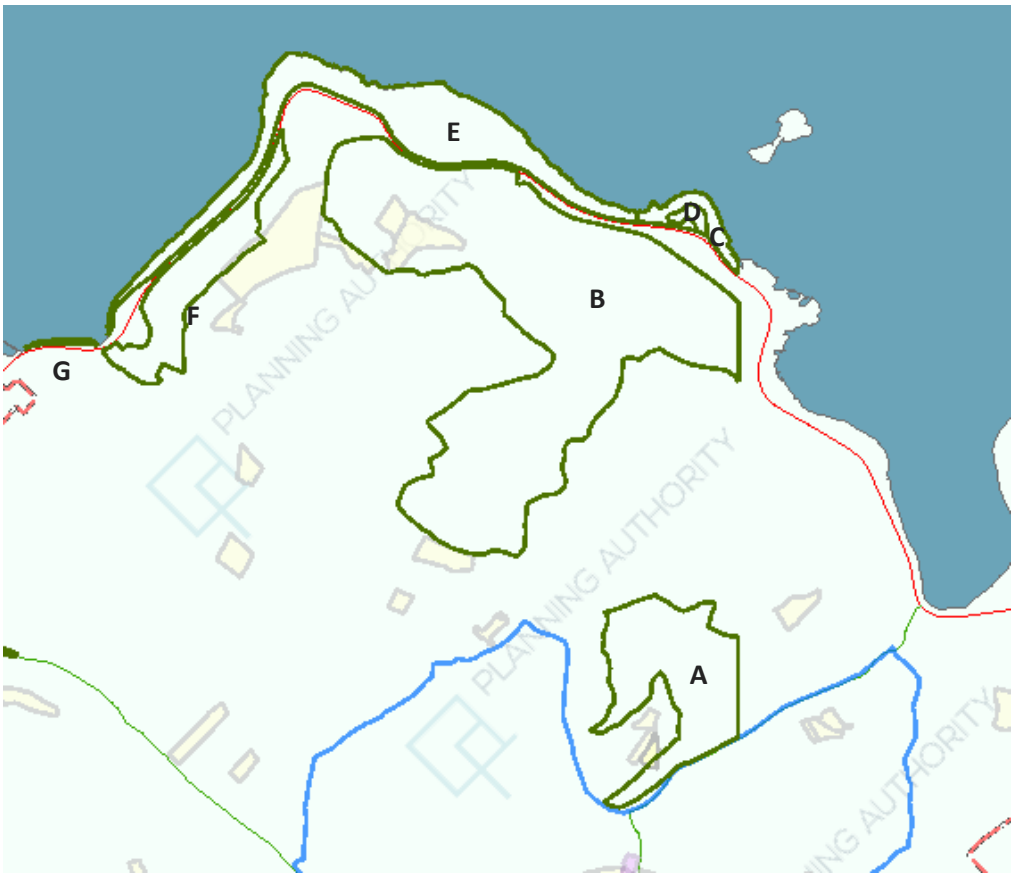


Figure 46: Areas of Ecological Importance (A-G) around the site are marked with a green outline (PA Geoserver)

The SPED (Strategic Plan for Environment and Development) issued by the Planning Authority in 2015 outlines Malta's strategic vision on planning, environmental, economic, and social matters to address sustainable management of land and sea resources and environmental protection. Several thematic objectives in the SPED are directly relevant to the project and its impact on biodiversity:

- Socio-Economic Development Objective 1: Manage available land and sea resources sustainably to meet socio-economic needs while protecting the environment and limiting land take-up in rural areas.
- Socio-Economic Development Objective 7: Promote efficient use of resources like stone, water, and soil, and manage waste to safeguard natural processes and minimize impacts on cultural heritage, landscape, and human health.
- Socio-Economic Development Objective 8: Safeguard and enhance biodiversity, cultural heritage, geology, and geomorphology.
- Rural Objective 3: Guide development in rural areas away from protected and high landscape sensitivity areas, preferably on previously developed land or existing buildings, while enhancing the rural environment.

The proposed development is inconsistent with the SPED's Socio-Economic Development Objective 7, which aims to control the location of development to prevent soil sealing and erosion, and protect agricultural land. It is also inconsistent with Rural Objective 1, which seeks to protect good quality agricultural land from development.

However, the centralization of waste management in Malta brings operational advantages in terms of logistics and transportation. Additionally, grouping similar developments may reduce environmental impacts by concentrating effects in one location rather than spreading them across multiple areas. Furthermore, the MRF project helps Malta achieve improved recycling rates, reducing pressure on landfilling and the need for additional land for future landfills.

The S.L. 549.44 (repealing the Flora, Fauna and Natural Habitats Protection Regulations, 2006 [LN 311 of 2006]) establishes a National Ecological Network of special areas of conservation having National or International Importance. The Legal Notice transposes the obligations of the Habitats Directive, establishing a European Network of Special Areas of Conservation (Natura 2000) composed of sites with natural habitat types and species. The notice includes several schedules that outline criteria for selecting sites, species of community and national importance, and provisions for identification and monitoring. There are no Special Areas of Conservation within the scheme site or its Area of Interest, but the closest protected areas under the Natura 2000 framework are shown in Figure 47.

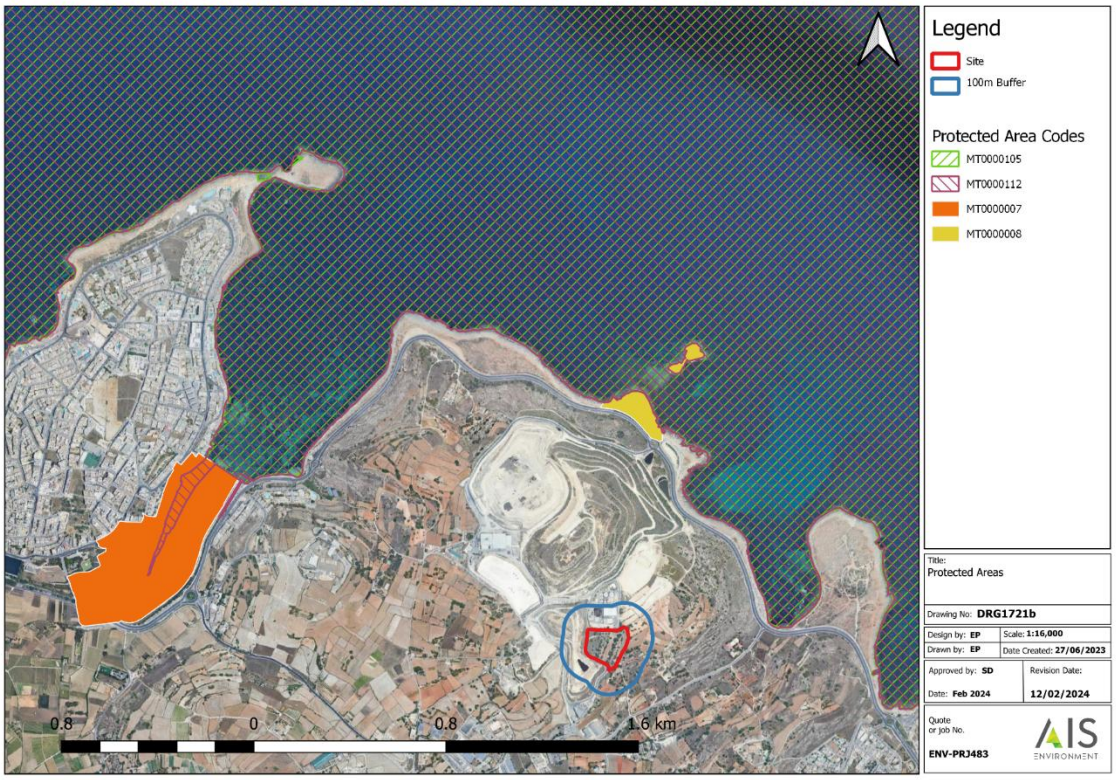


Figure 47: Sites protected within the Natura 2000 framework in close proximity to the site and AoI

The S.L.549.123 (Trees and Woodlands Protection Regulations) safeguards trees and woodlands in Malta by regulating activities that may impact them. It identifies protected areas and species, categorizing them into distinct schedules based on their level of protection. The legislation includes:

- First Schedule Part A: Table 1 lists trees protected in all locations in Malta, while Table 2 lists species protected within specific areas such as protected areas, ODZ, green areas, natural or rural/green enclaves in urban areas, or urban public open spaces.
- Second Schedule: Lists invasive, alien, or environmentally incompatible species.
- Third Schedule: Specifies fees for registration and permit applications.
- Fourth Schedule: Outlines penalties for contravening these regulations.

The scope of Ta' Ħammud vegetation report II (AGL Design Landscape Architects, 2018) was to identify, map and assess the status of trees likely affected by the proposed development. The consultants conducted a site survey in the winter of 2017, which was a follow-up to a similar exercise in 2012. The report highlights the differences between the two studies and provides a detailed description of the trees found within the Area of Interest. The survey identified a variety of native trees, including *Ceratonia siliqua* (Carob), *Olea europaea* (Olive), *Pinus halepensis* (Aleppo Pines), and *Pistacia lentiscus* (Lentisk), which are protected within protected areas and ODZ. Any works involving protected plant species must be permitted in advance by ERA in accordance with the relevant regulations. The report also provides recommendations for best practices if the existing trees are considered for transplanting, particularly the Carob and Olive trees, and potentially the Lentisk shrubs. The resulting map of existing trees is shown in

Figure 48: Results OF Vegetation Study Presented In Ta' Ħammud Report (2017)

Wasteserv Malta commissioned a third-party consultant to conduct a Terrestrial Ecology Baseline Study and Impact Assessment (Doublet & Zammit, 2022) for several proposed developments within the ECOHIVE complex, including the Materials Recovery Facility, Organic Waste Processing Plant, Thermal Treatment Facility, storage area, and access road. The study aimed to assess the potential impacts of these schemes on protected sites, natural ecosystems, habitats, and species.

The report assessed the schemes' footprints and identified ecological receptors, discussing the perceived impacts, proposing mitigation measures, and outlining residual impacts and compensatory measures. The assessment was conducted in accordance with the Environment and Resources Authority's Terms of Reference for a terrestrial ecology baseline study and impact assessment, issued in July 2022.

The study recorded a diverse range of flora and fauna within the scheme site and surrounding areas. The report concluded that the proposed developments are likely to have cumulative impacts, primarily due to habitat loss and reduced food availability for protected species during construction, and continued impacts during the operational phase. The illumination of the site and surrounding area may also contribute to additional impacts.

Figure 49 and Figure 50 present the habitats and tree species recorded during the assessment.

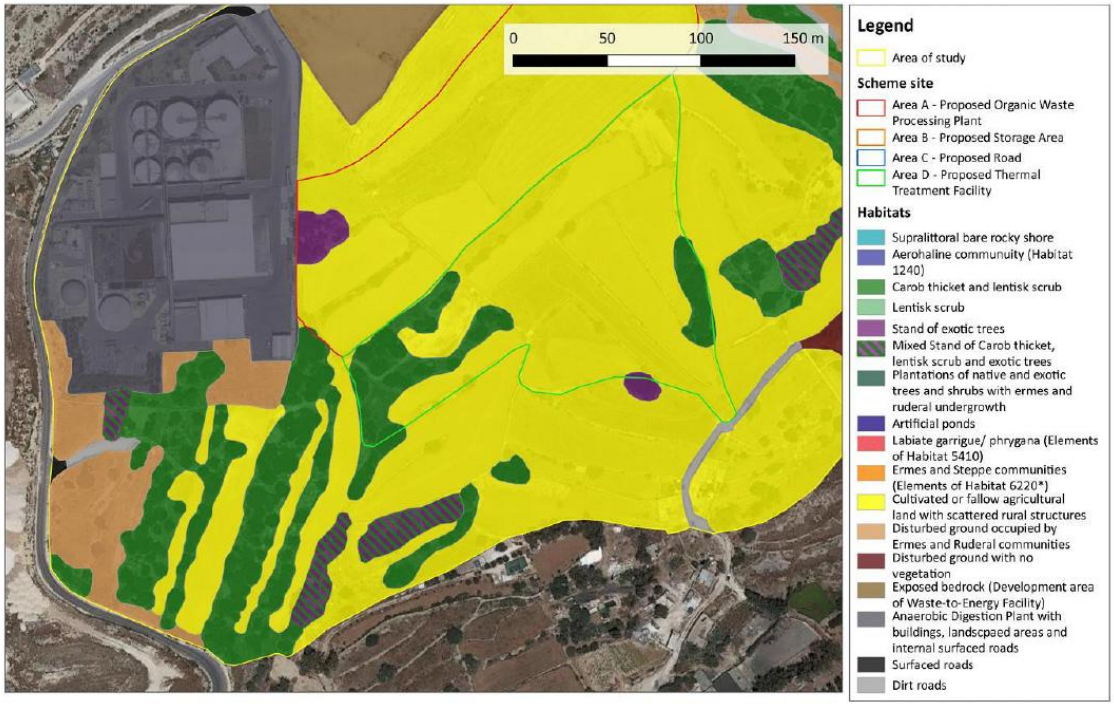


Figure 49: Habitat Map of the AOI (Source: Baseline and Impact Assessment…, Doublet And Zammit, 2022)

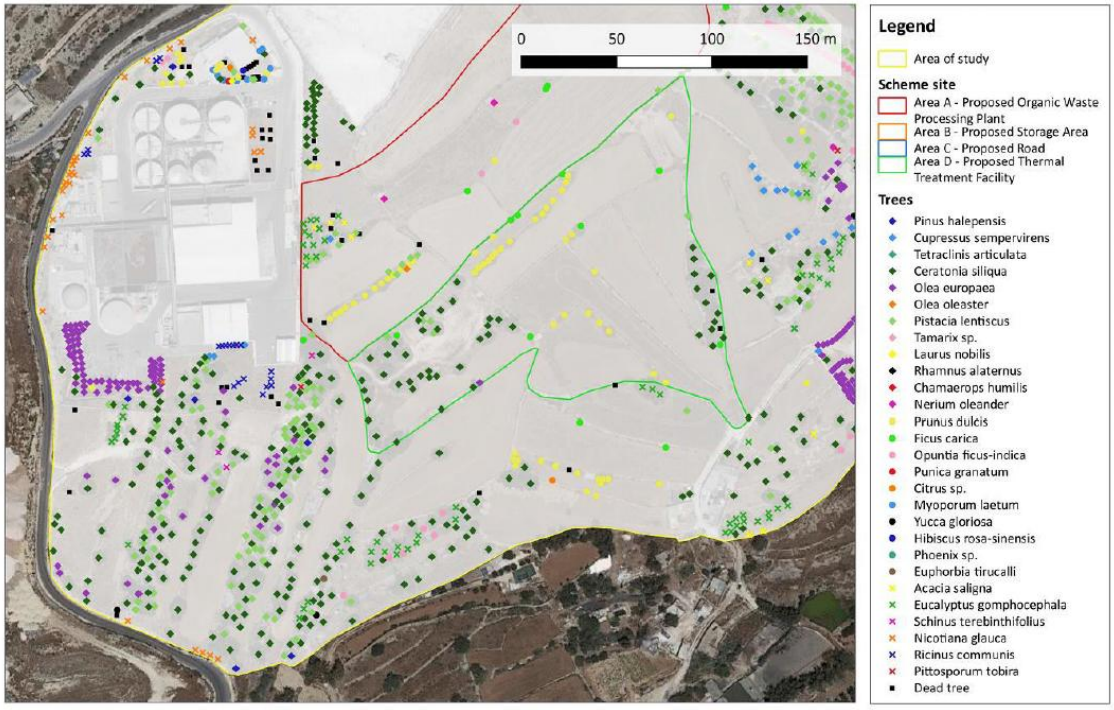


Figure 50: Trees in the AOI (Source: Baseline and impact assessment…, Doublet and Zammit, 2022)

4.5.2.1 Site survey

A terrestrial survey was conducted within the Area of Influence (AoI) in August 2023 and January 2024. The main ecological components of the scheme site and surrounding AOI include:

- The Żwejra landfill border, hosting ruderal and opportunistic species.
- Soft landscaping around the existing bio-digester plant complex.
- Small patches of mature invasive species to the North of the site.
- A considerable area of disturbed ground to the North-East of the site.
- The scheme site and a considerable area to the South-East, comprising remnants of maquis communities bordering bare or fallow fields.

Inside the ECOHIVE Complex, ecological landscape dynamics are significantly influenced by ongoing waste management operations. The area is characterized by dense populations of various species, including *Glebionis coronaria* (White wall-rocket), *Avena sterilis* (Sterile oat), *Arundo donax* (Greater reed), *Diplotaxis tenuifolia* (Perennial wall-rocket), *Borago officinalis* (Borage), *Foeniculum vulgare* (Common fennel), and *Ricinus communis* (Caster oil plant). These species cover the large heaps of the Żwejra landfill to the South-West of the site. The observed species generally hold little ecological importance, while some are considered invasive.

Figure 51: Opportunistic species covering the Southern heaps of the Żwejra landfill

Figure 52: Patches of Opportunistic Species Covering the Western Heaps of Inert Material and the Adjacent Abandoned Fields

The ECOHIVE Complex is surrounded by soft landscaping which incorporates some notable tree species, including a predominance of *Olea europea* (Olive trees) and scattered *Ceratonia siliqua* (Carob trees). A number of invasive species have naturally colonized the spaces in between the native trees.

Figure 53: Soft landscaping, predominantly olive trees around the existing biodigester plant (Taken August 2023)

Figure 54: Soft landscaping, predominantly carob trees, around the existing biodigester plant (Taken August 2023)

Between the proposed site and the ECOHIVE Complex lies a narrow plot of land which is currently dominated by invasive species such as *Arundo donax*. The Eastern border of this area, which is delineated by a shallow rubble wall, contains some specimens of native species such as *Pinus halepensis* (Aleppo pine) and *Ceratonia siliqua* (Carob trees).

Figure 55: Narrow strip of land surrounding the existing Biodigester plant dominated by the invasive *Arundo Donax* (taken January 2024)

Figure 56: Eastern border of the natural area adjacent to the biodigester plant containing native species (Taken January 2024)

Adjacent to the aforementioned area, to the South (within the proposed scheme boundary) is a small patch of mature *Eucalyptus gomphocephala* (Tuart tree), which is listed within the ERA ANNEX II – INDICATIVE LIST OF ALIEN SPECIES THAT SHOULD NOT BE PLANTED IN RURAL AREAS, with the exception of eucalyptus trees intended for use in apiculture.

Figure 57: Small patch of mature Tuart trees South of the existing biodigester plant (Taken January 2024)

To the North-East of the proposed site lies a large area of severely degraded land. The area appears to have been excavated and cleared of any soil or vegetation. The resulting landscape remains as an expanse of exposed bedrock. The motive and entity responsible for this clearing is not known.

Figure 58: Degraded land North East of the proposed site (Taken January 2024)

The agricultural land within the AoI is encircled by low-lying rubble walls. The conservation and maintenance of these rubble walls is governed by LEGAL NOTICE 426 OF 2007 – RUBBLE WALLS AND RURAL STRUCTURES (CONSERVATION AND MANAGEMENT), due to their historical and environmental importance. Rubble walls contribute to soil retention against surface water runoff and provide shelter for small mammals, reptiles, and invertebrates that use the agricultural land as their habitat.

The majority of the rubble walls observed within the buffer zone were quite degraded, with the exception of the boundary wall south of the existing biodigester plant. Vegetation species observed along the rubble walls include *Ferula communis* (Common fennel), *Sonchus oleraceus* (Crown daisy), *Asparagus aphyllus* (Mediterranean Asparagus), and monocot grasses such as *Piptatherum miliaceum* (Smilograss).

Figure 59: Vegetation assemblages on degraded rubble walls and rubble structures

Figure 60: Fallow agricultural land encircled by degraded rubble walls within the AoI

The site boundary and the East-South-East area of the AoI are characterized by fallow fields bordered by corridors of advanced maquis communities. The maquis assemblages are primarily composed of *Olea europaea* (Olive trees), *Ceratonia siliqua* (Carob trees), and *Pistacia lentiscus* (Lentisc).

In the summer months, the fallow fields were bare. However, in January, the area was characterized by fast-growing grasses and flowering plants in the open areas. More specialized assemblages colonized the maquis and rubble wall borders, forming scattered patches where conditions were more sheltered.

Figure 61: Bare land bordered by maquis communities including carob and olive trees (Taken August 2023)

Figure 62: Fallow fields colonised by grasses and flowering plants bordered by maquis communities (Taken January 2024)

Figure 63: Fallow fields colonised by grasses and flowering plants bordered by maquis communities 2 (Taken January 2024)

Figure 64: Lentisc shrubs within the maquis communities (Taken January 2024)

Figure 65: Opportunistic *Portulaca* species colonising fallow fields (Taken January 2024)

Figure 66: *Ferula Communis* (Wild fennel) stands present at maquis borders (Taken January 2024)

Figure 67: Asphodel stands observed in sheltered areas (Taken January 2024)

Based on the broad-brush survey within the AoI, a list of floral species encountered is provided in Table 25. However, no fauna species were directly observed during the survey.

Previous studies with seasonal sampling have recorded the presence of several mammalian, reptile, and insect species in the area, including the Algerian Hedgehog (*Atelerix algirus*), the Western whip snake (*Coluber viridflaviorus*), the Leopard snake (*Elaphe situla*), the Moorish wall gecko (*Tarentola mauritanica*), and the Oscillated skink (*Chalcides ocellatus*).

The presence of avian species has been assessed and presented in a separate chapter of the EIA. Additionally, the presence of bats cannot be excluded, as the old dilapidated farmland buildings in the vicinity of the AoI can provide attractive roosting sites, and the maquis and agricultural land may offer foraging opportunities. While no roosts are publicly documented within the AoI at the time of writing, previous studies have recorded the presence of four bat species using the general area as feeding or commuting grounds.

Table 25: List of vegetative species encountered on site

Species Name	English Name	Protection	Typical habitat in AoI
Antirrhinum tortuosum	Greater snapdragon	None	Agricultural land & disturbed areas
Arundo donax	Greater reed	None	Agricultural land & disturbed areas
Asparagus aphyllus	Mediterranean asparagus	None	Agricultural land, disturbed areas & maquis
Asphodelus aestivus	Summer asphodel	None	Maquis areas
Avena sterilis	Sterile oat	None	Agricultural land, disturbed areas
Borago officinalis	Borage	None	Disturbed areas & agricultural land
Bromus spp.	Brome grass	None	Agricultural land, disturbed areas
Capparis orientalis	Caper bush	Schedule VIII of S.L. 549.44	Soft landscaped areas
Ceratonia siliqua	Carob tree	Schedule I Part A Table 2 S.L.549.123	Maquis
Conyza bonariensis	Hairy Fleabane	None	Soft landscaped area
Cupressus sempervivens	Cypress tree		Soft landscaped areas
Diplotaxis tenuifolia	Perennial wall rocket	None	Agricultural land & disturbed areas
Dittrichia viscosa	False yellowhead	None	Agricultural land & disturbed areas
Ecbalium elaterium	Squirting cucumber	None	Agricultural land & disturbed areas
Eucalyptus gomphocephala	Tuart tree	None (not located in public urban space or used for beekeeping)	Agricultural land

Foeniculum vulgare	Common fennel	None	Disturbed areas, agricultural land & maquis
Galactites tomentosa	Mediterranean thistle	None	Agricultural land & disturbed areas
Glebionis coronaria	Crown daisy	None	Agricultural land & disturbed areas
Ipomoea alba	Moonflower vine	None	Soft landscaping areas
Lavatera arborea	Mallow tree	None	Disturbed areas, & soft landscaped areas
Lonicera implexa	Evergreen honeysuckle	None	Agricultural land
Mercurialis annua	Annual mercury	None	Soft landscaped areas & disturbed areas
Nicotiana glauca	Tree tobacco	Schedule II (invasive) S.L. 549.123	Disturbed area & soft landscaped areas
Olea europaea	Olive tree	Schedule I Part A Table 2 S.L. 549.123	Maquis
Oxalis pes-caprae	Bermuda buttercup	None	Disturbed areas, Agricultural land
Pinus halepensis	Aleppo pine tree	Schedule I Part A Table 2 S.L.549.123	Soft landscaped areas, Maquis
Piptatherum miliaceum	Smilograss	None	Agricultural land, disturbed areas
Pistacia lentiscus	Lentisk tree	Schedule I Part A Table 2 S.L. 549.123	Maquis
Pittisporum tobira	Japanese mock orange	None	Soft landscaped areas
Plantago spp.	Plantain	None	Disturbed areas
Portulaca spp.	Purslane	None	Agricultural land
Ricinus communis	Castor oil tree	Schedule II (invasive) S.L. 549.123	Disturbed areas
Sulla coronaria	Sulla	None	Agricultural land
Sonchus oleraceus	Sow thistle	None	Disturbed areas & garigue

Table 26: Protected Tree Species within the AoI

SPECIES NAME	ENGLISH NAME	PROTECTION	TYPICAL HABITAT IN AOI	AMOUNT IN AOI
Capparis orientalis	Caper bush	Schedule VIII of S.L. 549.44	Soft landscaped areas	Scattered individuals
Ceratonia siliqua	Carob tree	Schedule I Part A Table 2 S.L.549.123	Maquis	162
Cupressus sempervivens	Cypress tree	Schedule I Part A Table 2 S.L.549.123	Soft landscaped areas	1
Olea europaea	Olive tree	Schedule I Part A Table 2 S.L. 549.123	Maquis	24
Pinus halepensis	Aleppo pine tree	Schedule I Part A Table 2 S.L.549.123	Soft landscaped area, Maquis	9

Pistacia lentiscus	Lentisk tree	Schedule I Part A Table 2 S.L. 549.123	Maquis	48
Total protected trees affected by the proposed development				244

Figure 68: Terrestrial Ecology Map showing Habitats and Land Uses within the scheme's AoI

4.6 Ecology – Avifauna

4.6.1 Methodology

The technical study on avifauna focuses on the populations of wild birds, particularly protected species and species with conservation concerns, as relevant sensitive receptors.

The Area of Influence (AoI) for the avifauna assessment of the terrestrial part of the proposed development, referred to as AoI-1, consists of the actual site area of the proposed MRF development and a 0.1 km buffer zone around this area. Additionally, the assessment of potential impacts on avifauna in the wider area, caused by light pollution from the planned development, is evaluated within a 5.0 km buffer around the site area of the proposed development, referred to as AoI-2 (Figure 69).

The assessment of potential impacts on avifauna receptors in the identified AoIs was performed through a literature review. The main references considered include:

- Malta Breeding Bird Atlas 2008 (BirdLife Malta, 2009)
- Malta Breeding Bird Atlas 2018 (Epsilon, 2019)
- The Breeding Birds of Malta (Sultana et al., 2011)
- Malta Marine Important Bird Areas (IBA) Inventory Report (BirdLife Malta, 2015)
- Marine Strategy Framework Directive (MSFD) initial assessment report, seabirds (Borg et al., 2013)
- MSFD second assessment report (ERA, 2020)
- BirdLife International (2020) International Union for the Conservation of Nature (IUCN) Red List for birds (http://www.birdlife.org)
- Bird species of Annex I of the Birds Directive (2009/147/EC)
- Draft Guidelines for the Reduction of Light Pollution in the Maltese Islands (Environment and Resources Authority, 2020)

The Natura 2000 sites that are either situated within or partially overlapping with the AoI-2 are:

- SAC L-Għadira s-Safra (MT0000008)
- SAC Is-Salini (MT0000007)
- SAC Il-Gżejjer ta' San Pawl (Selmunett, MT0000022)
- Marine SPA Żona fil-Baħar madwar Għawdex (MT0000112)

The report details the conservation status of the relevant bird species within the AoIs and in the above-mentioned Natura 2000 sites. A comprehensive analysis of all bird species likely affected by the development of the new MRF can be accessed through the main technical study.

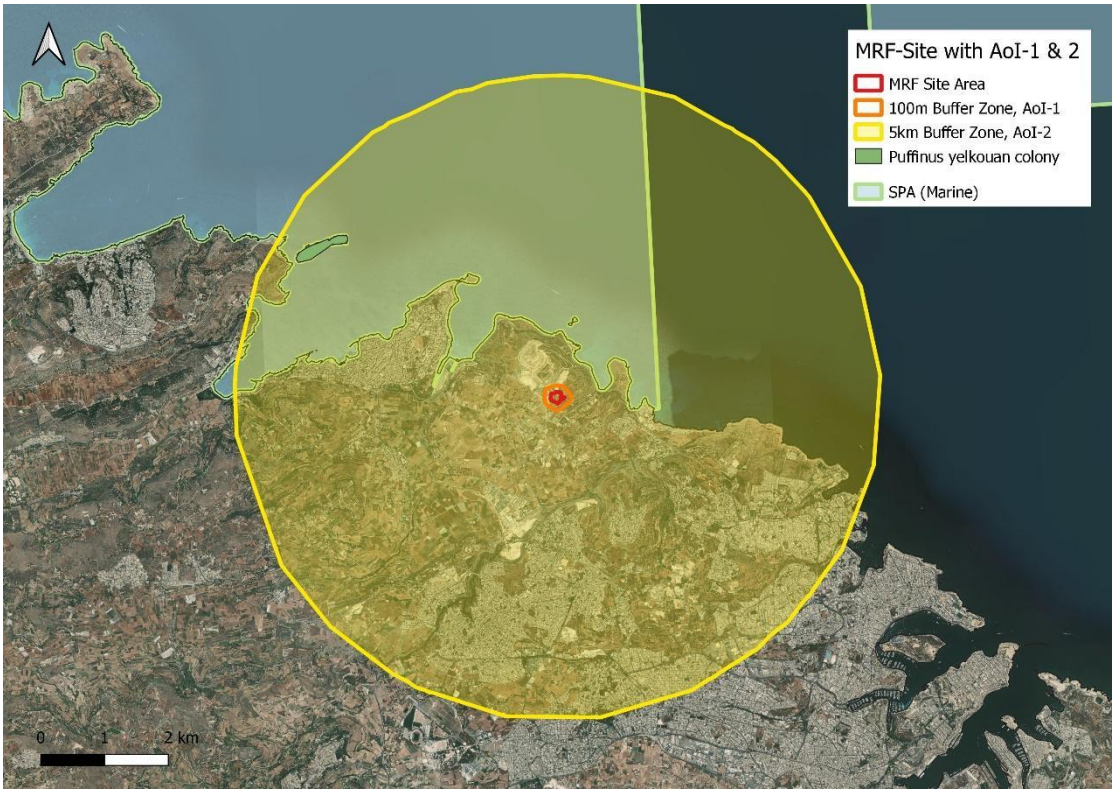


Figure 69: Proposed MRF Site with AoIs relevant to Ecology - Avifauna

4.6.2 Baseline study

The Maltese Islands are home to a diverse range of bird species, with over 400 species recorded within their FMZ (25 NM). Of these, around 200 species occur regularly, with up to 48 species recorded breeding on the islands. Three pelagic seabird species, listed under Annex I of the EU Birds Directive, hold significant breeding populations in the Maltese Islands.

The 5.0 km buffer zone around the proposed development, AoI-2, overlaps with five protected sites within the Natura 2000 network, including SAC Pembroke, SAC Is-Salini, SAC L-Għadira s-Safra u l-Iskoll tal-Għallis, SAC Il-Gżejjer ta' San Pawl (Selmunett), and SPA Żona fil-Baħar madwar Għawdex.

The avifauna baseline study aims to identify the bird species expected to occur in the AoIs, including in the potentially impacted protected areas, to inform conservation efforts.

4.6.2.1 Breeding land birds within the terrestrial part, AoI-1

Four bird species have been reported as confirmed, probably, or possibly breeding within the AoI-1 (Table 27) according to the Malta Breeding Bird Atlas 2008 and 2018, considering the breeding seasons 2008, 2017 and 2018. Two of the four species regularly choose anthropogenic structures as nest sites.

Table 27: List of breeding bird species in the AoI-1 and their status

Species	Breeding status in terrestrial AoI	Abundance status	Trend in Malta	Trend in Europe	Conser-vation status	Annex I (EU Birds Directive)
Blue Rock Thrush *Monticola solitarius*	Possible	Frequent	Stable	Unknown	Least Concern	No
Sardinian Warbler *Curruca melanocephala*	Probable	Common	Decreasing	Stable	Least Concern	No
Zitting Cisticola *Cisticola juncidis*	Probable	Abundant	Stable	Increasing	Least Concern	No
Spanish Sparrow *Passer hispaniolensis*	Confirmed	Abundant	Stable	Decreasing	Least Concern	No

4.6.2.2 Breeding seabirds making use of AoI-2

Three pelagic seabird species from the order *Procellariiformes*, namely the Yelkouan Shearwater (*Puffinus yelkouan*), Scopoli's Shearwater (*Calonectris diomedea*), and Mediterranean Storm-petrel (*Hydrobates pelagicus melitensis*), nest on the Maltese Islands and inhabit Maltese waters in significant population numbers from a global and European perspective. All three species are listed in Annex I of the EU Birds Directive.

One of these species, the Yelkouan Shearwater, is listed as Vulnerable on the IUCN Redlist and holds a breeding colony within the AoI-2. The designation of the marine SPA Żona fil-baħar madwar Għawdex (MT0000112), which partially overlaps with the AoI-2, was triggered by two of these species: the Yelkouan Shearwater and the Scopoli's Shearwater.

In addition to these three procellariform seabird species, Malta also hosts a breeding population of the Yellow-legged Gull (*Larus michahellis*), which is not listed in Annex I of the EU Birds Directive.

Scopoli's Shearwater *Calonectris diomedea – Least Concern, Annex I*

The Scopoli's Shearwater is a seabird species listed as Least Concern by the IUCN and under Annex I of the EU Birds Directive. It is endemic to the Mediterranean basin, with major colonies in the Central Mediterranean. The global population size is estimated to be between 285,000 and 446,000 mature individuals, showing a decreasing trend. The Maltese population is estimated to be around 1.6-1.9% of the global breeding population, with a decreasing trend.

The species is strictly pelagic, foraging frequently together in large numbers on shoaling fish and squid. During the breeding period, Scopoli's Shearwaters congregate in large flocks, sitting on the water's surface exhibiting 'rafting' behaviour within a 4km radius in front of the colonies. GPS-tracking of individuals from Maltese colonies during the chick-rearing period shows that Scopoli's Shearwaters utilize at-sea areas in the Maltese EEZ, including the marine part of the AoI-2.

The species is highly susceptible to plastic ingestion and entanglement, and as long-lived, top-level predators, they are known to bio-accumulate pollutants with potentially detrimental impacts on physiology and reproduction.

Yelkouan Shearwater *Puffinus yelkouan – Vulnerable, Annex I*

The Yelkouan Shearwater is a Vulnerable species listed under Annex I of the EU Birds Directive. It is endemic to the Mediterranean basin and has a global population size estimated to be 15,337-30,519 pairs, roughly equating to 46,000-92,000 individuals. The global population trend is decreasing, but the Maltese population is stable, with an estimated 1,795-2,635 breeding pairs, roughly equating to 10% of the global breeding population.

The species is highly susceptible to by-catch, light pollution, plastic ingestion, entanglement, and bio-accumulation of pollutants. The largest Yelkouan Shearwater colony in Malta is situated at Irdum tal-Madonna (MT0000009), and the closest colony to the proposed development is on Selmunett (MT0000022), within the 5km buffer area of the proposed MRF (AoI-2).

Yelkouan Shearwaters are strictly pelagic, foraging frequently together in flocks on shoaling fish and squid. They congregate in flocks exhibiting rafting behaviour within a 7 km radius in front of the colonies in the evenings. GPS-tracking data suggests that Yelkouan Shearwaters forage predominantly in waters further offshore and partially outside Maltese waters. The species is one of the trigger species for the designation of the relevant marine SPAs at hand, with 3,270-4,650 individuals making regular use of the SPA MT0000112 during the reproductive season as foraging ground and rafting areas in front of the colonies.

Mediterranean Storm-petrel *Hydrobates pelagicus melitensis – Least Concern, Annex I*
The Mediterranean Storm-petrel (*H. p. melitensis*) is a subspecies of the European Storm-petrel, endemic to the Mediterranean basin. It is listed under Annex I of the EU Birds Directive and is considered Least Concern by the IUCN. The global population size is estimated to be 430,000-519,999 mature individuals, with the Mediterranean subspecies accounting for 2-3% of this total.

The closest breeding colony to the proposed development is Irdum tal-Madonna (MT0000009), which is not expected to be directly impacted. The Maltese population is estimated to be around 8,500-15,200 pairs, roughly 7% of the global population and at least 56% of the Mediterranean subspecies.

The species is found in the Maltese EEZ year-round and in the colonies from February to October. It is more commonly seen in Maltese waters during the breeding season, particularly southeast and south of Malta. Adults and fledglings are sensitive to light pollution.

The species is known to make use of the entire Maltese EEZ, as well as areas further offshore between Malta and Libya. While not a trigger species for the designation of the marine SPA MT0000112, Storm-petrels are commonly found in this area, including the marine part of the AoI-2, particularly during the breeding season.

Yellow-legged Gull *Larus michahellis* – *Least Concern*

The Yellow-legged Gull (*Larus michahellis*) is listed as Least Concern by the IUCN with an increasing population trend. The global population numbers are unknown, but the European population is estimated to be 409,000-534,000 pairs, equivalent to 819,000-1,070,000 mature individuals, with an increasing trend.

The latest assessment of the Maltese YLG population for Malta's Article 12 reporting to the EU lists 250 breeding pairs for the Maltese islands with an increasing trend. The largest colony, with 202 ± 24 apparently occupied nests (5-year mean), is located on Filfla. Smaller colonies at Ta' Ċenċ, Dingli, and Wardija might have expanded in recent years. The species has also established new breeding locations such as Comino, Għarb, and within AoI-2 on Selmunett (MT0000022) recently, so the actual number of breeding pairs might exceed 300 pairs.

Western to Central Mediterranean populations are mainly sedentary and dispersive, but some populations are partially migratory. In the Maltese Islands, a large number of non-breeders are present year-round. Ring recoveries show that birds ringed on Filfla as chicks utilize other locations in Malta and abroad, mainly Sicily and Southern Italy.

Yellow-legged Gulls are highly opportunistic feeders and benefit from human activities such as fishing, discard from fisheries, food-waste, open landfills, aquaculture, and agriculture. In the Maltese islands, they occur in their highest densities and largest abundances in harbour areas, around the largest colony (Filfla), around areas with large aquaculture facilities, especially tuna pens such as those in the vicinity of St Paul's Island and the wider area off Selmun. Large numbers of feeding flocks can be observed in the AoI-2 next to the proposed development at the Magħtab landfill year-round, as well as in adjacent areas in the AoI-2 on land (SACs MT0000007, MT0000008, MT0000022) and at sea (SPA MT0000112).

4.6.2.3 Other avian species expected to occur in the AoIs

For a detailed list of species expected to make use of the AoIs kindly refer to the Avifauna Technical Study.

4.7 Agricultural Land

4.7.1 Methodology

A desktop analysis of available on-line sources was undertaken with the twofold objective of identifying the type of crops cultivated within the study area and the type of soil characterizing the potential crop yield.

Satellite images (e.g., orthophotos from Natura 2000 viewer, PA Geoserver, Google Earth) were collected to infer seasonal patterns of agricultural practices. Furthermore, historical land-use maps were consulted for providing a classification of soil types useful to the assessment of the minimal crop yield surrounding the Scheme.

Finally, a site inspection has been carried out by the Expert for assessing the current soil conditions and the potential impacts which may arise following the construction of the new MRF.

4.7.2 Baseline survey

The Magħtab area features an undulating Globigerina Limestone landscape, typical of northern Malta, with mainly brownish soils and limited depth. According to the WRBS classification system (MALSIS, 2003), this location consists of Regosols (RG), a group of soils with minimal development in virtually unaltered parent material, as shown in Figure 70. The landscape is characterized by lower shallow moderate terraces on Globigerina limestone (GTm), as depicted in Figure 71.

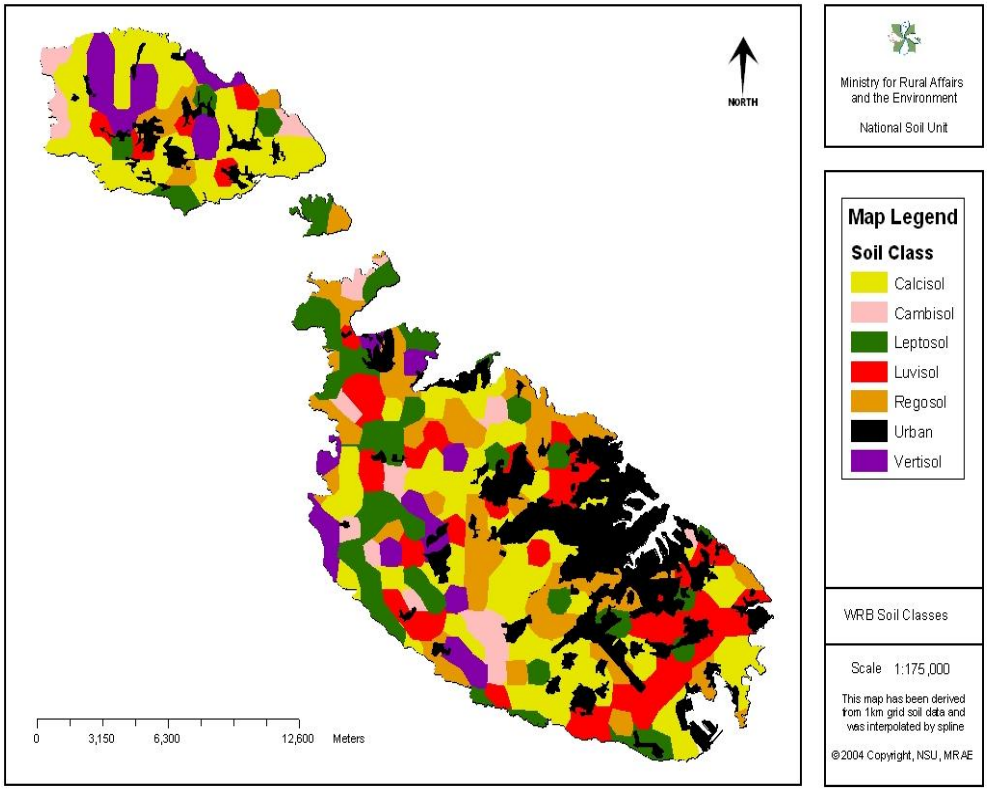


Figure 70: MALSIS Soil Classes (Source: MALSIS)

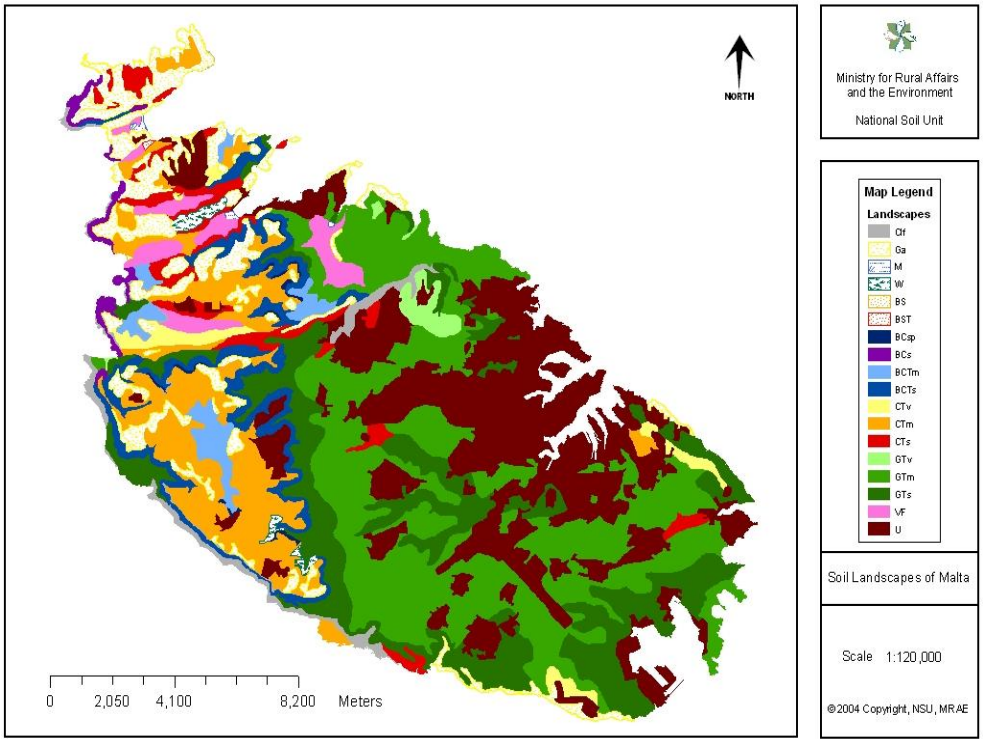


Figure 71: MALSIS Soil Landscapes (Source: MALSIS)

Regosols are characterized by shallow, medium- to fine-textured, unconsolidated parent material, which may be of alluvial origin and lack significant soil horizons. They often show accumulations of calcium carbonate or gypsum in hot, dry climatic zones. From an agricultural perspective, Regosols are weakly developed mineral soils with limited surface horizons, making them sensitive to drought due to their low water-holding capacity and higher permeability to water.

Figure 72 shows the type of top soil found within the AoI. In 1960, Lang's survey classified these soils as the Inglin Complex soils using the Kubiena classification system. These soils are pale brown to red, shallow to moderately deep, and resemble the Xaghra Xagħra soil series but are more disturbed. The Inglin Complex soils are typical anthropogenic soils with rubble content, broken rock surfaces, and a lack of natural horizons, making them highly variable due to disturbance and mixing during formation. The soil structure can be weakly developed, leading to low fertility, and crops grown on these soils can be prone to pests, diseases, erosion, and drought.

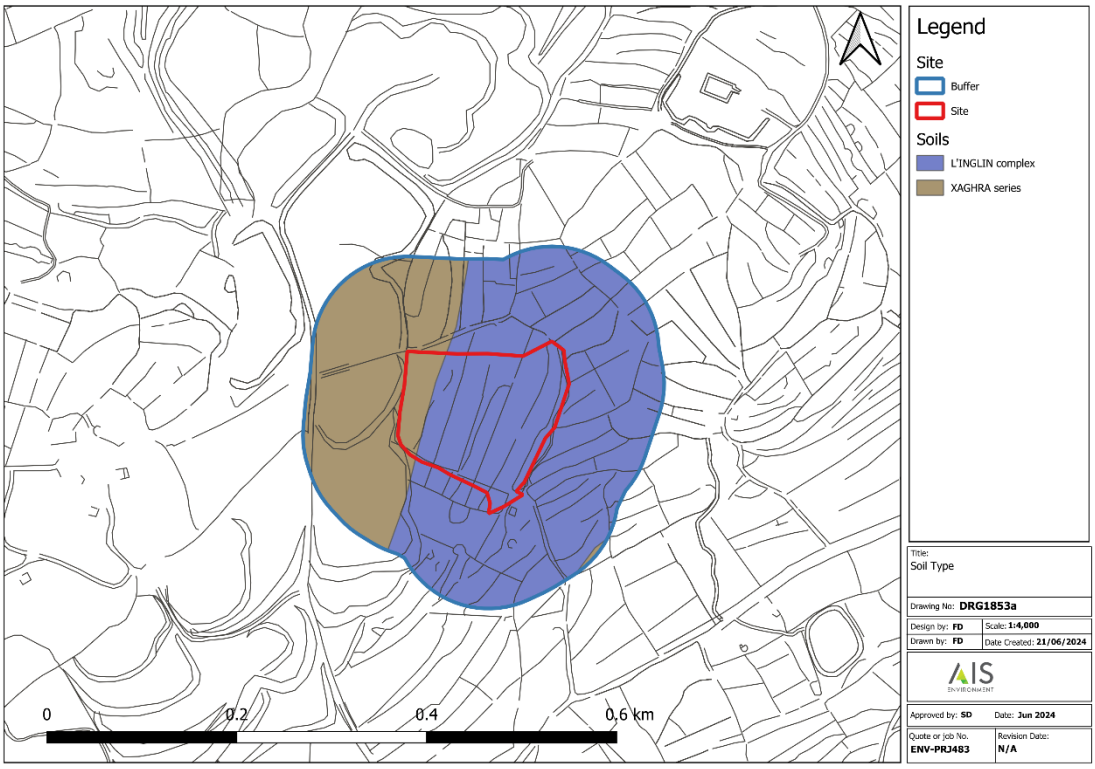


Figure 72: Top Soil Type within the AoI

The Magħtab Area is a narrow agricultural zone situated between the landfill complex and the coastline garigue. The majority of the fields in this area are terraced, unirrigated, and can only produce one dry crop due to the limited soil depth and sea spray influence. The agricultural practices in the area have consistently been dryland farming, with cereals, especially wheat, being the primary crop due to the soil type, climate, and lack of rainfall storage. Historical records indicate that this area was used for cereal cultivation, with no evidence of vegetable,

viticulture, or fruit tree cultivation. The area's agriculture is primarily dictated by the scarcity of water, with no irrigation available, limiting the crops to cereals in years with adequate rainfall. The proximity to the sea further complicates the success of dryland cereal production. The distribution of wasteland in the area corresponds to the exposure of Lower Coralline rocks and the degree of exposure to northerly winds. The less exposed inland depression at Magħtab has facilitated better farming practices.

The lack of water, combined with the high occurrence of winds and sunshine, creates a significant evapotranspiration factor, limiting the crop options. The cultivation of cereals, wheat, and barley has been one of the few viable options for agriculture in this region. However, the success of cereal cultivation depends on adequate rainfall during the growth season. Changing precipitation, temperature, and evapotranspiration are likely to have a significant impact on crop production in areas already prone to heat and drought stress, making the Magħtab Area a typical dryland agricultural system with continuous climatic and economic uncertainty. The evaluation of surrounding fields shows that fields with sufficient soil depth are still being cultivated, while shallower fields are abandoned. Notably, carob trees are found along the rubble walls of abandoned fields, indicating the impact of northerly winds, with the trees being smaller on the northern side and more abundant on the southern side. These trees have been present for a long time and indicate the area's historical agricultural practices.

4.8 Archaeology & cultural heritage

4.8.1 Methodology

The Area of Influence (AoI) for the study comprises the immediate footprint of the new MRF, together with a 100m buffer zone around the proposed site. This area consists of exposed Lower Coralline and Globigerina Limestone rocky outcrops between cultivated terraced fields lying across gently sloping hills.

The methodology employed for the assessment of the cultural heritage in this area first involved a desktop study. This stage included a thorough review of published literature and previous reports carried out in the area. A number of publicly accessible sources of primary and synthesised information were consulted, including:

- National heritage datasets including the National Inventory for Malta and Scheduling (HS) constraints available on the Planning Authority (PA) Geoportal;
- Relevant mapping including survey maps and Local Plans;
- Relevant documentary sources, including Museum Annual Reports (MAR) and grey literature.

Furthermore, The Scheme area was surveyed on the 10th August 2023. The aim of the inspection was to systematically identify and record any cultural/historical features visible in the landscape and identify potential for unknown cultural heritage assets. A photographic record using a Canon EOS 1100D camera with EF-S 18-55mm zoom lens and a DJI Mini 2 Drone was made for each area visited and any identified cultural heritage assets.

4.8.1.1 Policy Considerations

The management and protection of cultural heritage is legally covered by the CULTURAL HERITAGE ACT 2002.

Cultural heritage is defined as ''movable or immovable objects of artistic, architectural, historical, archaeological, ethnographic, palaeontological and geological importance and includes information or data relative to cultural heritage pertaining to Malta or to any other country. This includes archaeological, palaeontological or geological sites and deposits, landscapes, groups of buildings, as well as scientific collections, collections of art objects, manuscripts, books, published material, archives, audio-visual material and reproductions of any of the preceding, or collections of historical value, as well as intangible cultural assets comprising arts, traditions, customs and skills employed in the performing arts, in applied arts and in crafts and other intangible assets which have a historical, artistic or ethnographic value (Part 1.2)

Part 3 of the Act states that “an object shall not be deemed to form part of the cultural heritage unless it has existed in Malta, including the territorial waters thereof, or in any other country, for fifty years, or unless it is an object of cultural, artistic, historical, ethnographic, scientific or industrial value, even if contemporary, that is worth preserving”.

The Maghtab Landfill area, within the Naxxar Council boundaries, also falls under THE CENTRAL MALTA LOCAL PLAN (CMLP 12.1.3), classified as Rural/ODZ Area with an existing Landfill site and an Engineered Sanitary Landfill site towards the main transport Network route (arterial) CG38, a Heritage trails and Walkway route CG26 and the Coastal Area NA04 (Map SE1 and NAM3 on PA Local Plan Details).

The policy map CV1, identifies listed Areas of Scientific and Ecological Importance (CG22), a protected Natural Coast with public access towards North and a Protected Area of Hydrological Importance towards South, while the Naxxar Coastal and Rural Environment Constrains Map NAM10, within the Naxxar Local Plan, shows listed archaeological areas/sites with buffer areas, listed ecological sites, scheduled areas, protected natural coast with public access and listed areas/sites of scientific importance.

4.8.2 Baseline study

The passage of time and intensification of land uses have made it challenging to reconstruct the coastal landscape in prehistoric times. The prehistoric landscape of Malta was likely drastically different than it is today, with numerous significant changes occurring over the millennia. Archaeological indicators, such as cart ruts and Garum production sites, suggest that modern sea levels are higher than those of prehistoric periods. Sea level change has also significantly altered the prehistoric landscape of the Malta-Sicily Channel, with Malta being connected to Italy via a land-bridge during the Last Glacial Maximum but becoming isolated around 14500 years BP due to sea level rise. The discovery of a submerged monolith within the Sicily Channel dated to the Mesolithic Period further demonstrates the impact of sea level change in the area.

In the Magħtab area, riverine sedimentation has significantly impacted the coastline since prehistory, with the Modern Burmarrad plain forming over time, replacing a once much larger Salina Bay. This larger inlet was likely an important port in ancient times, as indicated by the presence of several remaining dolmens (Bronze Age megalithic burials) and cart ruts, which are thought to date to the prehistoric period. The area was also an important centre of activity during the Temple Period, as evidenced by the Tal-Qadi megalithic temple and the discovery of several important cultural artifacts, including an ancient carved representation of the night sky.

The Salina Bay area is thought to have been an important port in antiquity, with historical documents demonstrating the use of Malta's natural harbours during the mid-first century BC. The use of the harbours and the Phoenicians is linked, with Diodorus Siculus stating that Malta "possesses many harbours which offer exceptional advantages" and that the prosperity of the islands' inhabitants is due to the fact that Malta is "well supplied with harbours". The prevalence of ancient shipwrecks, anchors, and pottery scatters on the seabed further attests to the ancient use of Salina Bay as a harbour.

The Magħtab area contains notable traces of activity from antiquity, including surface stone quarries and many rock-cut chamber tombs and catacombs, which are often related, with rock-cut tombs being excavated in the sides of quarries. The quarries are difficult to date directly, but the Salina catacombs are known to date to the Late Roman and Byzantine periods (between the

third and 6th centuries AD). Traces of activity from the medieval period are scarce, with the closest evidence coming from the San Brincat (Għargħur) troglodytic settlement, which is thought to have possibly been a centre of medieval Siculo-Greek monasticism.

During the late medieval and early modern periods, numerous attacks were made on Malta by North African corsairs, rendering the coastline largely bereft of settlements. As a result, the low-lying coastline around Il-Magħtab and the sheltered bay of Salina saw a drastic increase in the investment in coastal defences, particularly by the Knights of St. John. Many of these survive, including the Għallis Tower, at the tip of the promontory, opposite Qawra, the Għallis Battery, the Qalet Marku Battery, as well as the Ximenes Redoubt and the associated rock-hewn mortar (fougasse).

The Salina area also played an increasing importance in the local economy as the salt panning industry was expanded under the Knights of St. John, with significant investment in the salt panning facilities by the Knights, which are in use till this day. Following the takeover of the Maltese Islands by the French and subsequently the British, the area retained its defensive importance, with several new defences being built in the area during the Second World War and others, including the Għallis Battery, being reinforced and augmented with modern anti-aircraft weaponry. A bomb shelter was also excavated in the Salina hamlet.

Archaeological artefacts or deposits recorded were identified as far as possible and their conservation importance given with reference to appropriate legislation, standards and guidance. These included the Structure Plan for the Maltese Islands, the SPED, the Cultural Heritage Act, 2002, as well as international conventions / treaties / standards applicable in Malta.

The results of the survey were mapped through GIS tools and catalogued following standard systems. Details, including descriptions of the cultural heritage features in the area, are available in Figure 73 to Figure 77.

Figure 73: Location and States of Cultural Features identified within AoI

Figure 74: Location of cultural features within proposed development

Archaeological Characteristics

Conditions	**Degree of Protection**
Fair/Good. Abandoned. Some parts partially collapsed	Legal Notice 160 of 1997 prohibits dismantling of such walls except by permission from the competent autority
State of Security	**Proposed Utilization**
N/A	N/A
Basic Bibliography	
N/A	
Compiled by:	**Checked by:**
Samuele Serini Date: 13/10/2023	Vincenzo Cherubini Date: 13/10/2023

Figure 75: Archeological Characteristics of Protected Walls

Archaeological Characteristics

Conditions	**Degree of Protection**
Fair/Good. Abandoned	Legal Notice 160 of 1997 prohibits dismantling of such walls except by permission from the competent autority
State of Security	**Proposed Utilization**
N/A	N/A

Basic Bibliography

Din l-Art Helwa: Abandoned rural buildings available at https://dinlarthelwa.org/heritage-sites/managed-heritage-sites/

Compiled by:	**Checked by:**
Samuele Serini Date: 13/10/2023	Vincenzo Cherubini Date: 13/10/2023

Figure 76: Archeological Characteristics of Abandoned Rural Buildings

Archaeological Characteristics

Conditions	**Degree of Protection**
Some abandoned, some partly collapsed, other repaired and rebuilt.	Legal Notice 160 of 1997 prohibits dismantling of such walls except by permission from the competent autority
State of Security	**Proposed Utilization**
N/A	N/A
Basic Bibliography	
N/A	
Compiled by:	**Checked by:**
Samuele Serini Date: 13/10/2023	Vincenzo Cherubini Date: 13/10/2023

Figure 77: Archeological Characteristics of Rubble Walls

4.9 Noise & Vibrations

4.9.1 Methodology

The assessment methodology for the Noise & Vibrations technical study is summarized as follows:

- The baseline sound levels measured for the EIA of the Maghtab Waste to Energy Facility would be utilised as the basis of the assessment.
- A qualitative (high-level) construction noise assessment would be undertaken, with reference to BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.*
- Noise levels from the operation of the Scheme would be predicted at the nearest human and ecological receptors using the proprietary software-based noise model, CadnaA®, and the calculation algorithms contained in ISO9613-2 Acoustics – *Attenuation of sound during propagation outdoors – Part 2 General method of calculation.*
- The predicted noise levels at the human receptors would be compared to the measured background levels and assessed in accordance with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound.*
- The predicted noise levels at the ecological receptors would be assessed in accordance with the absolute limits contained in AQTAG09 Guidance on the effects of industrial noise on wildlife.

The assessment results would determine whether noise mitigation measures are needed to minimize the identified impacts. If necessary, these measures would be incorporated into the assessment.

Additionally, a cumulative assessment was conducted to evaluate the combined effect of construction and operational noise from nearby proposed developments on the nearest human and ecological receptors.

4.9.1.1 Guidance and Standards

The construction noise levels have been predicted in conjunction with the most appropriate guidance, in this case calculation algorithms contained in BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.*

As previously stated, the predicted noise levels have then been assessed in conjunction with the absolute limits contained in AQTAG09 Guidance on the effects of industrial noise on wildlife.

Construction noise levels have been calculated in accordance with BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. This standard sets out a methodology for predicting noise levels arising from a wide

variety of open site activities and contains tables of sound power levels generated by a wide variety of mobile and fixed plant equipment.

Noise levels generated by open site construction operations and experienced at local receptors will depend upon a number of variables. The most significant of which are likely to be the amount of noise generated by plant and equipment being used during the construction phases, generally expressed as a sound power level:

- The periods of operation of the plant, known as the "on-time";
- The distance between the noise source and the receptor, known as the "stand-off";
- The attenuation due to ground absorption or barrier screening effects;
- Reflections of noise due to the presence of hard vertical faces such as walls.

BS 5228-1 provides several examples of acceptable noise limits for construction or demolition activities. Since baseline noise data is available for this assessment, the ABC method will be used to determine the threshold noise levels at the receptor locations.

The ABC method involves the following steps:

- Establish the existing ambient noise level at each receptor location.
- Round the measured ambient noise level to the nearest whole 5 dB(A).
- Determine the threshold noise value for each receptor from Table E.1 in BS 5228-1. This threshold represents the $L_{Aeq,T}$ noise level that should not be exceeded by operations at the site.

The threshold noise levels for a potentially significant effect, as determined using the ABC method, are detailed in Table 28.

Table 28: Construction Noise Residential Receptors – Example Threshold Values

Assessment Category and Threshold Value Period	Threshold Value in decibels (dB)		
	Category A [A)]	Category B [B)]	Category C [C)]
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends [D)]	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

[B] Category B: threshold values to use when the ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

[C] Category C: threshold values to use when the ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

[D] 19:00-23:00 weekdays, 13:00-23:00 Saturdays and 07:00-23:00 Sundays.

British Standard 4142:2014+A1:2019 (BS4142) is used to assess the potential adverse impact of industrial and commercial sounds on nearby noise-sensitive locations within the existing sound environment. The standard provides a method for rating and assessing the impact of sounds with specific characteristics, such as tonality, impulsivity, and intermittency.

To account for these characteristics, penalties are applied based on their perceptibility. For tonality, a correction of 0, 2, 4, or 6 dB is added, depending on the level of tonality. For impulsivity, a correction of 0, 3, 6, or 9 dB is added, depending on the level of impulsivity. If the sound contains neither tonal nor impulsive characteristics, a penalty of 3 dB is added. Additionally, if the sound has identifiable operational and non-operational periods, a further penalty of 3 dB may be applied.

The assessment of impact involves comparing the sound rating level (the specific sound level plus any penalties) to the measured representative background sound level outside the noise-sensitive location. The context of the existing sound environment is then considered to assess the potential impact.

The standard provides guidance on the interpretation of the results, including the magnitude of the impact and the likelihood of adverse impacts such as annoyance and sleep disturbance. It also outlines considerations for the context of the potential impact, including existing residual sound levels, location, and absolute sound levels.

Furthermore, BS4142 provides guidance on the application of penalties to account for the subjective prominence of the sound characteristics at the noise-sensitive locations. This includes corrections for tonality, impulsivity, intermittency, and other sound characteristics that are readily distinctive against the residual acoustic environment.

The Air Quality Technical Advisory Group 09 (ATAG09) provides guidance on the effects of industrial noise on wildlife. This guidance aims to assist planning and licensing officials in assessing the potential impacts of industrial noise on designated species and habitats. The Habitats Directive (92/43/EEC) sets specific noise levels for industrial activities, which are considered unlikely to have adverse impacts on designated species if they do not exceed the levels in Table 29. If noise levels are exceeded, a more detailed assessment is required to determine potential impacts on wildlife.

Table 29: Specific Noise Levels at Habitat / Nest Sites

PARAMETER	NOISE LEVEL, DB
$L_{Aeq, 1hr}$	55
L_{Amax}	80

The noise levels generated by the Scheme's operation were predicted using the ISO 9613-2:1996 framework. This method considers the distance between sound sources and receptors, as well as the amount of sound absorption by the atmosphere. Additionally, it assumes that the wind direction aids the propagation of sound from the source to the receiver, which is referred to as downwind propagation.

4.9.1.2 Receptor Sensitivity

The level of significance is determined in relation to the magnitude of impact together with the sensitivity of the receptor. Different noise-sensitive receptors (NSRs) can be classified in levels of sensitivity: High, Medium, Low and negligible as described in Table 30 below.

Table 30: Level of Sensitivity associated with Various NSRs

SENSITIVITY	DESCRIPTION OF NSRS
High	Residential properties (night-time), Schools and healthcare building (daytime)
Medium	Residential properties (daytime), SAC, SPA, SSSI (or similar areas of special interest)
Low	Offices and other non-noise producing employment areas
Negligible	Industrial areas

The HABITATS DIRECTIVE (92/43/EEC) specifies that, where specific noise from industry, measured at the habitat/nest site is below the levels in Table 30, it is considered unlikely that it will have an adverse impact on designated species. Where noise levels are exceeded, more detailed assessment may be required. For the purposes of this assessment, the AQTAG daytime limit of 55 dB $L_{Aeq, 1 hr}$ will be used. Although a detailed analysis of the maxima sound pressure levels in terms of $L_{Amax,F}$ is outside of the cope of this assessment, it is considered that the maxima event levels are unlikely to be exceeded at the receptor locations as a result of construction noise, based on the standoff distances and the construction activities involved.

Table 31: Specific Noise Level Limits at Ecological Habitats

PARAMETER	NOISE LEVEL, DB
$L_{Aeq, 1hr}$	55
L_{Amax}	80

Based on the above guidance limits, the impact magnitude of the proposed development during the construction phase is defined in Table 32 and Table 33.

Table 32: Impact Magnitude - AQTAG

MAGNITUDE	DESCRIPTION
Major	Limit value exceeded by more than 5dB
Moderate	Limit value exceeded between 3.0 and 4.9dB
Minor	Limit value exceeded between 1.0 and 2.9dB
Negligible	Limit value exceeded between 0.1 and 0.9dB

Table 33: Impact Magnitude – existing Ambient levels

MAGNITUDE	DESCRIPTION
Major	Greater than 10 dB L_{Aeq} change in sound level at a noise-sensitive receptor
Moderate	A 5 to 9.9 dB L_{Aeq} change in sound level at a noise-sensitive receptor
Minor	A 3 to 4.9 dB L_{Aeq} change in sound level at a noise sensitive receptor
Negligible	Less than 2.9 dB L_{Aeq} change in sound level at a noise-sensitive receptor (inaudible change under normal conditions)

The different levels of effect relating the magnitude of impact with a medium sensitivity for ecological receptors are defined in Table 34.

Table 34: Level of Effect

Magnitude of adverse Impact	Level of effect relative to Ecological Receptor of Medium Sensitivity
Major	Substantial
Moderate	Moderate
Minor	Minor
Negligible/no change	Minor/Neutral

Note: Effects of 'moderate' significance or greater are defined as significant with regards to the EIA Regulations 2017.

4.9.2 Baseline Sound Survey

The assessment is based on the fixed noise limit guidelines established for the identified ecological receptors. For additional context, reference is made to a previous baseline sound survey for the Maghtab Waste to Energy facility carried out in early 2020, which describes the existing sound climate about the development area (document Ref: PA/03012/20 VERSION 1, dated 15/05/2020).

Baseline sound measurements were undertaken during both daytime and night-time periods at four locations as indicated in Figure 78.

- P1: Next to two residential units along the northernmost part of Triq ir-Ramla;
- P2: Next to residential units along the southernmost part of Triq ir-Ramla;
- P3: Inside Salini nature reserve, also to include Hotel Salini;
- P4: Next to a popular bathing area just off Tul il-Kosta.

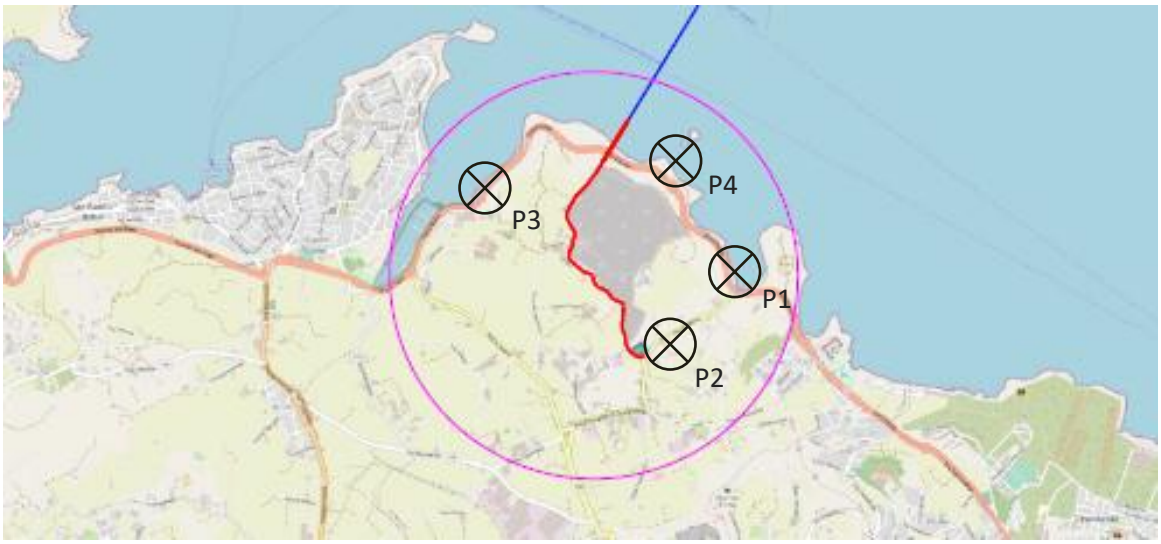


Figure 78: Noise Monitoring Locations

The results of the sound survey are summarised in Table 35 including the median background sound level (L_{A90}), median L_{A10} and the ambient noise level (L_{Aeq}) and the highest L_{AFmax} values. The daytime period is taken between 07:00 and 23:00 hours and the night-time between 23:00 and 07:00 hours

Table 35: Sound Survey Summary

Location	Time Period	L_{AEQ}	L_{A90}	L_{A10}	L_{AFMAX}
P1	Daytime	58.9	41.3	60.1	83.6
	Night-time	46.9	35.9	40.8	75.7
P2	Daytime	70.0	47.7	72.0	95.5
	Night-time	54.7	36.9	45.9	80.6
P3	Daytime	71.7	55.7	75.3	90.1
	Night-time	66.3	42.1	66.2	86.5
P4	Daytime	57.7	54.1	58.8	84.4

Measurement location P4 is representative of the prevailing sound climate at the identified ecological receptors and has been considered most relevant to this assessment in context. The measured daytime level has been summarised as 58 dB $L_{Aeq,16\ hour}$ rounded to the nearest decibel.

4.10Infrastructure & Utilities

4.10.1Methodology

The methodology was composed of four main elements:

1. A preliminary desktop study to familiarise oneself with the study area;
2. A site survey;
3. A secondary literature review to combine the findings of the initial research and site observations;
4. Final evaluation of the current situation.

Initially, a comprehensive literature review was conducted to determine the existing infrastructure and utilities within the project location and its surrounding area. Data was collected from various third-party utility providers and satellite imagery from sources such as Landsat/Copernicus (Google Earth). The findings from the desktop study were then confirmed through a field survey conducted in August 2023, which also included the collection of photographic evidence.

Upon completion of these two components, the Consultant used Geographic Information Systems (GIS) tools to map the existing infrastructure and utilities, as well as any proposed changes if applicable.

4.10.1.1 Impact Significance Criteria

The potential impacts that may arise from the Scheme include the potential physical damage on the existing infrastructure and utilities and service interruptions during the proposed works (construction phase). The operations of the MRF are also expected to increase loads on both the national electricity grid and the water/sewage system.

The tables below (Table 36 to

Table 44: Criteria for the overall impact significance

Table 44) provide a definition for each of the criteria used, which summarises the assessment of impacts on infrastructure and utilities.

Table 36: Criteria for the sensitivity of resources to impact

SENSITIVITY OF RECEPTORS TO IMPACT	
LEVEL	DEFINITION
High	The receptors which will be highly sensitive to the impact and consequently impacted to a major degree.

Medium	The receptors which will be moderately sensitive to the impact and consequently impacted to a moderate degree.
Low	The receptors which will be minimally sensitive to the impact and consequently impacted to a minor degree.

Table 37: Criteria for the consequences of impact

CONSEQUENCES OF IMPACT	
LEVEL	DEFINITION
Direct	Changes that result from direct cause-effect consequences of interactions between the result of action under consideration and the proposed project.
Indirect	Result from cause-effect consequences of interactions between the action under consideration and indirect impacts.
Cumulative	Result from cause-effect consequences of interactions between the action under consideration and other related projects.

Table 38: Criteria for the effect of impact

EFFECT OF IMPACT	
LEVEL	DEFINITION
Adverse	Infrastructure and utilities would suffer consequences as a direct result of the proposed development.
Beneficial	Infrastructure and utilities would benefit as a direct result of the proposed development.

Table 39: Criteria for the severity of impact

SEVERITY OF IMPACT	
LEVEL	DEFINITION
High	This action is a major contributor to the infrastructure and utilities in the area of influence.
Medium	This action is a moderate contributor to the infrastructure and utilities in the area of influence.
Low	This action is a minor contributor to the infrastructure and utilities in the area of influence.

Table 40: Criteria for the physical extent of the impact

Physical Extent of Impact	
Level	Definition
Local	Impact would affect the areas in the nearby surroundings.
National	Impact would affect Malta on a national scale.
International	Impact would affect Malta and/or other countries.

Table 41: Duration of impact

Duration of Impact	
Level	Definition
Permanent	Impact would still be detectable after the concerned phase.
Temporary	Impact would not persist through the whole duration of the concerned phase.

Table 42: Criteria for the reversibility of the impact

Reversibility of Impact	
Level	Definition
Reversible	State of the activity/action is potentially expected to return to baseline background level following cessation of the source of impact.
Irreversible	Impact is expected to cause partial or total destruction of the action under consideration and a return of the state of the resource to baseline levels should be considered highly improbable.

Table 43: Criteria for the probability of impact occurring

Probability of Impact Occurring	
Level	Definition
Inevitable	Level of certainty that impact will occur is greater than 90%
Likely	Level of certainty that impact will occur ranges between 50-90%

Unlikely	Level of certainty that impact will occur ranges between 30-50%
Remote	Level of certainty that impact will occur is below 30%

Table 44: Criteria for the overall impact significance

IMPACT SIGNIFICANCE	
LEVEL	DEFINITION
Not significant	Negligible significance.
Minor significance	Low order impact and therefore likely to have little real effect on infrastructure and utilities. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both.
Moderate significance	Impact on infrastructure and utilities is real but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible.
Major significance	Of the highest order possible within the bounds of impacts on infrastructure and utilities that could occur. In the case of adverse impacts, there is little or no possible mitigation that could offset the impact.

4.10.2Existing infrastructure & utilities on site

Table 45 and Figure 79 to Figure 83 below provide an outline of the existing infrastructure and utilities present within the AoI.

Table 45: Existing infrastructures and utilities – Onshore

FEATURE NAME	FEATURE TYPE	OWNER
Approved 2nd Interconnector (IC2) cable	Underground cable	Interconnect Malta Enemalta
Street lighting	Underground cables, street lamps	Wasteserv Malta
Street infrastructure	Crash barriers, pavements, fencing	Wasteserv Malta
Fire management infrastructure	Pipes to supply fire-hydrants with fluids	Wasteserv Malta

Figure 79 to Figure 83 provide photographic evidence of the infrastructure and utilities observed during the site survey held on the 25th August 2023.

Figure 79: Pavement along the internal access road within the ECOHIVE Complex (25th August 2023)

Figure 80: Street lights along the internal access road within the ECOHIVE complex (25th August 2023)

Figure 81: Fencing and fire hydrant within the ECOHIVE complex (25th August 2023)

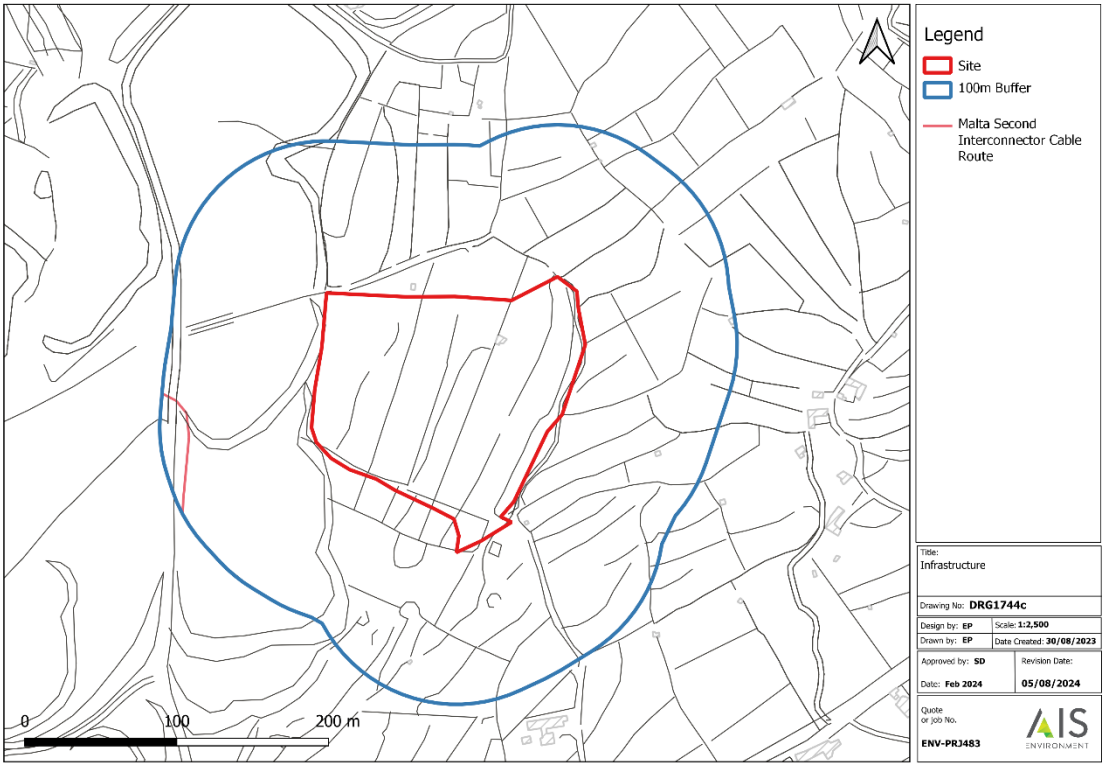


Figure 82: Planned infrastructure within the AOI

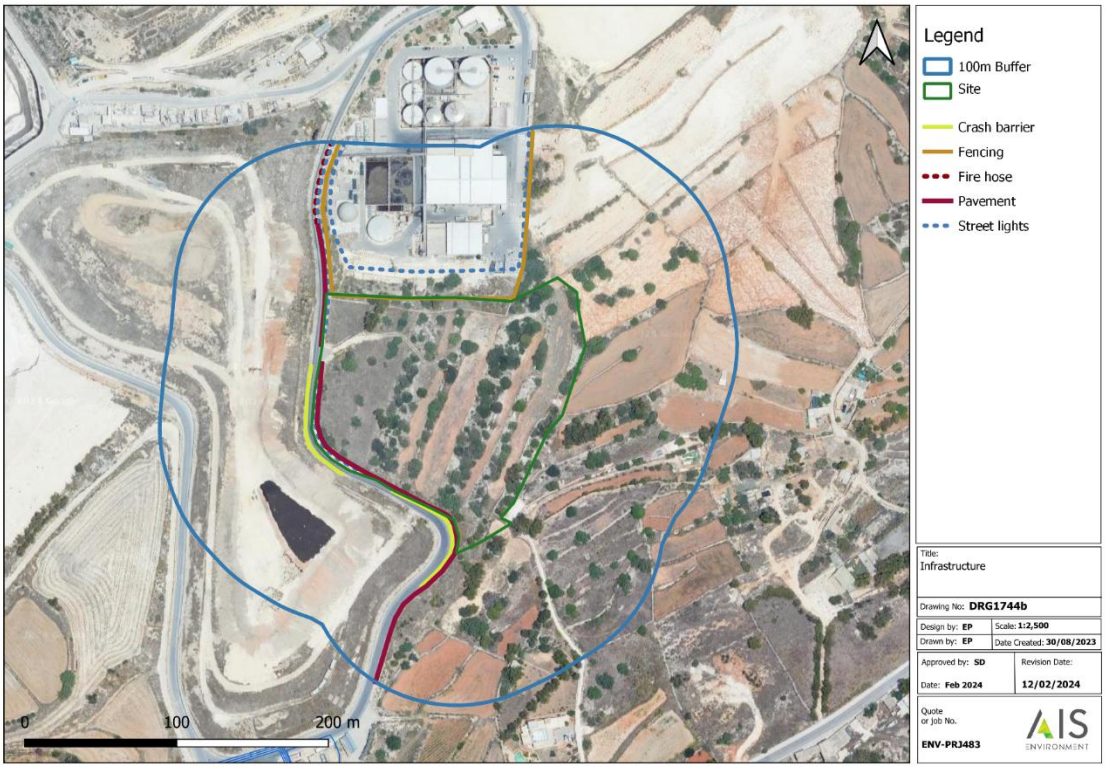


Figure 83: Overview of the existing utilities within the AoI

5.0 ASSESSMENT OF ENVIRONMENTAL IMPACTS AND RISKS

5.1 Land cover and land uses

5.1.1 Construction Phase

The proposed development will result in a permanent shift in land use within the footprint of the new complex. The current 21,373m^2 footprint area, comprising indigenous tree plantations, rubble walls, and agricultural land, will be permanently converted to commercial land. This change is deemed to have a significant adverse impact. To address this, the development plan includes a back-filled landscaped area that will retain a portion of the original trees to mitigate the impact on the tree plantation.

During the construction phase, additional land may be temporarily utilized for storing excavated materials, providing access for construction vehicles, washing facilities, and amenities for construction personnel. These activities are expected to have temporary, reversible, and minor adverse effects, provided that appropriate mitigation measures are implemented.

Within the 100m buffer zone, the agricultural land, trees, and tarmacked access road may experience temporary dust generation during construction, especially during the initial excavation and backfill stages. Dust deposition on crops could potentially reduce yields and impact soil pH if significant amounts accumulate. However, this impact can be managed through the use of suitable site hoarding, making it temporary, reversible, and of minor significance.

5.1.2 Operational Phase

The area under study lies outside the Mean Sea Level Aquifer protection zone. The WSC hydrological feature closest to the site are two boreholes in Wied ta'Kieli. Therefore, no environmental impacts affecting the groundwater quality of abstraction sources have been forecasted by the Expert.

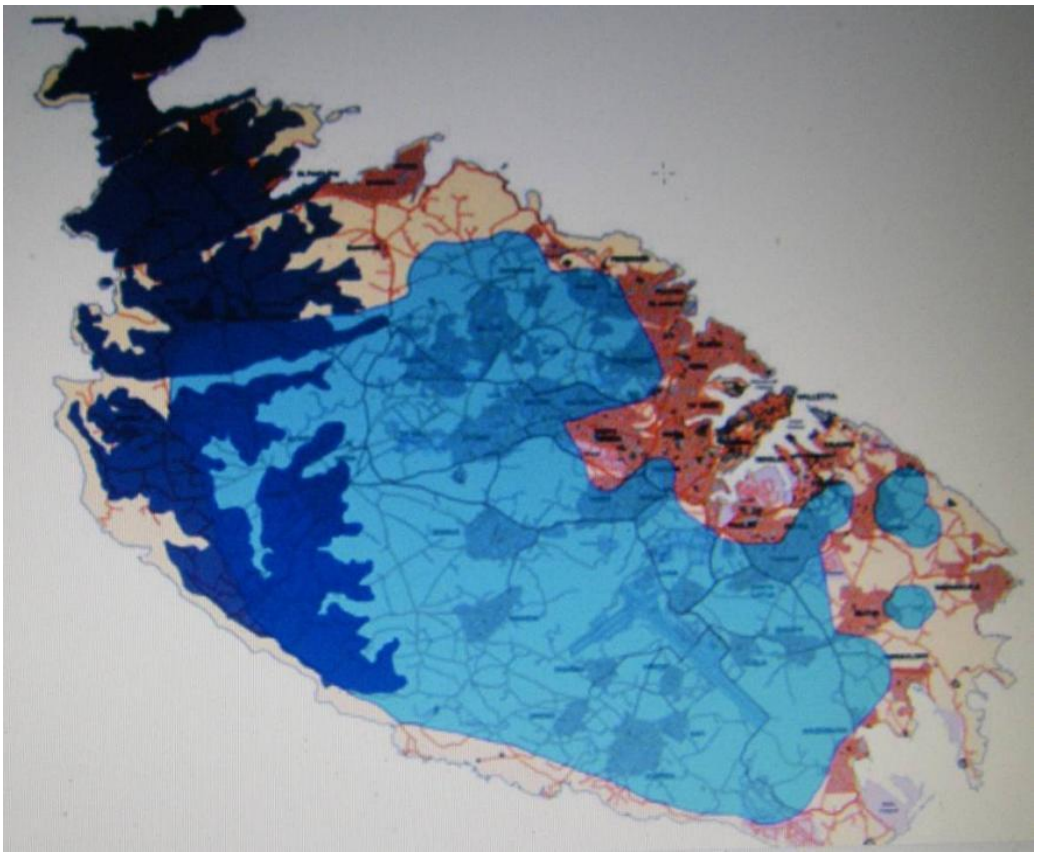


Figure 84: Map showing the water protection zone extending over the island. The approximate location of the site is shown by a red circle

5.2 Landscape Character and Visual Amenity

5.2.1 Construction phase

Construction activities will be highly noticeable from all seven viewpoints, with varying degrees of impact on the visual landscape quality. The presence of large cranes, excavation equipment, fencing, and stockpiles may significantly degrade the visual landscape, particularly at viewpoints close to the construction site, such as VP3 and VP4. The impact is expected to range from moderate to major adverse, depending on the location of the viewpoint and any obstructive elements that may mitigate the visual impact.

The visibility of construction activities is heightened at viewpoints with closer proximity to the site, especially when these activities interfere with the skyline. This is particularly true for VP3 and VP4, where observers have a clear view of the construction activities, and for VP1 and VP7, which offer a clear view of the site and any intersecting machinery or equipment. The variety and quantity of receptors at these viewpoints amplify the impact of the construction activities to major adverse on the overall visual amenity.

At Viewpoints 2 (Figure 86), 5 (Figure 89), and 6 (Figure 90), the construction activities will be less visible due to the rugged terrain of the landfill, which naturally masks the view, and the partial shielding provided by surrounding walls, dense vegetation, or nearby structures. However, the construction activities will still be noticeable and are defined as moderate adverse.

When assessing landscape impacts, it is important to consider the sensitivity of the viewpoints under examination. Although the Scheme site is not located in an Area of High Landscape Sensitivity, Viewpoints 1 (Figure 85), 2, 6, and 7 (Figure 91) are within such designated areas according to the CENTRAL MALTA LOCAL PLAN, CG22. The potential occurrence of simultaneous construction activities alongside the works on the WtE, TTF and OPP facilities will continue to diminish the landscape quality of the region by encroaching upon agricultural land parcels near the landfill. Consequently, the construction-related impacts on the landscape are anticipated to be significantly adverse for these four viewpoints.

The immediate landscape vistas at Viewpoints 3 (Figure 87) and 4 (Figure 88) will be dominated by the presence of construction machinery, potential dispersal of dust, and the influence of non-visual landscape attributes, including noise and vibrations. Similarly, at Viewpoint 5, the construction activities will be highly visible to the thousands of individuals traveling along Triq il-Kosta daily. The combined effect of simultaneous construction at all three waste management facilities cannot be overlooked, resulting in significant adverse effects also observed from these three viewpoints.

Given the frequent visitation by a large number of individuals to these viewpoints, the resultant impact is substantial, affecting a considerable segment of the population.

Figure 85: Viewpoint 1 - Triq Dawret Il-Wied, Mosta

Figure 86: Viewpoint 2 – Triq is-Salina, San Pawl Tat-Targa

Figure 87: Viewpoint 3 – Triq il-kappella ta' Santa Marija, Maghtab

Figure 88: Viewpoint 4 – Triq Ir-Ramla, Maghtab

Figure 89: Viewpoint 5 – Triq il-Kosta, Qalet Marku

Figure 90: Viewpoint 6 – Triq il-Kosta, St Andrew's

Figure 91: Viewpoint 7 – Triq Ghaxqet Il-Ghajn, Gharghur

5.2.2 Operational phase

The proposed Material Recovery Facility (MRF) building will have a significant visual impact on the surrounding landscape, with the extent of impact varying depending on the observer's vantage point and the presence of intervening elements. The MRF's sheer scale and massing will be prominent when viewed in isolation, but its impact will be subdued when juxtaposed against the adjacent Waste-to-Energy (WtE) and Organic Processing Plant (OPP) facilities.

From Viewpoints 1 (Figure 92) and 2 (Figure 93), the MRF will have a minor adverse impact, as it will be partially obscured by the topographical contours of the Ta' Żwejra landfill and will blend reasonably well with the existing and planned ECOHIVE infrastructure.

Viewpoint 3 (Figure 94) will offer a close-up encounter with the MRF, but it will appear seamlessly integrated with the surrounding WSM facilities, resulting in a moderate visual impact. The MRF's horizontal footprint and partial elevation surpass that of the existing AD plant, completely obscuring it from view. However, placed against the backdrop of various existing and planned waste management facilities, the MRF appears seamlessly integrated into the ECOHIVE Complex, without causing major visual disruptions. While the loss of trees and vegetation is noticeable when comparing the photomontage to the baseline photograph, its visual impact remains

moderate in significance due to the broader context of the surrounding industrial infrastructure.

Viewpoint 4 (Figure 95) will feature a significant adverse impact, as the MRF will eclipse the existing AD plant and landfill, contrasting with the rural landscape features in the foreground. Viewpoint 5 (Figure 96) will offer a prominent view of the MRF, OPP, TTF and WtE facilities, contributing to an industrial landscape and resulting in a major adverse impact.

Viewpoint 6 (Figure 97) will provide a partially obstructed view of the MRF, which will integrate into the surroundings without disrupting the skyline, leading to a moderately adverse impact. Efforts should be undertaken to reduce the colour contrast between the MRF's greyish façade and the earth-toned surroundings, particularly the landfill and adjacent fields, to better blend the structure into the natural environment at Viewpoint 6. This adjustment aims to mitigate the moderately adverse visual impact, minimizing disruption to the vista along this road segment.

Viewpoint 7 (Figure 98) offers a panoramic view of the ECOHIVE complex, including the MRF, AD, TTF, OPP, and WtE facilities. The MRF stands out prominently due to its size and massing, but it does not pierce the skyline thanks to the expansive backdrop of the landfill. The grey façade of the MRF contrasts with the earth-toned surroundings, requiring a harmonious colour scheme to blend it into the environment. Despite this, the MRF's presence is still majorly adverse, but thoughtful design adjustments could further mitigate its visual impact on this coastal viewpoint.

When assessing the landscape impacts of the MRF, it is crucial to consider the sensitivity of the viewpoints being analysed. While the Scheme site itself is not within an Area of High Landscape Sensitivity, Viewpoints 1, 2, 6, and 7 are designated as such according to the CENTRAL MALTA LOCAL PLAN, CG22. The concurrent presence of multiple waste management facilities will further degrade the landscape quality observed from these viewpoints, encroaching upon agricultural land adjacent to the landfill. Consequently, operational landscape impacts on the MRF are expected to be major adverse from these four viewpoints.

Viewpoints 3 and 4 will prominently feature the MRF building, while Viewpoint 5 will be conspicuous to daily commuters along Triq il-Kosta. The collective impact of concurrent construction activities at all three waste management facilities will lead to significant adverse effects noted from these three viewpoints.

The operational phase of the MRF may introduce concerns regarding light pollution during nighttime hours. However, the impact assessment cautiously categorizes these concerns as minor adverse, since the facility's operational hours are not anticipated to extend beyond 16 hours daily. Effective mitigation strategies will be implemented to minimize the impact. For instance, appropriate light fixtures will be designed to

minimize light pollution and its associated impacts, thereby ensuring the new development operates harmoniously within its nocturnal environment.

Figure 92: Cumulative view showing photomontage of MRF, TTF, WtE and OPP plant only at viewpoint 1

Figure 93: Cumulative view showing photomontage of MRF, TTF, WTE and OPP plant only at viewpoint2

Figure 94: Cumulative view showing photomontage of MRF, TTF, WTE and OPP plant only at viewpoint3

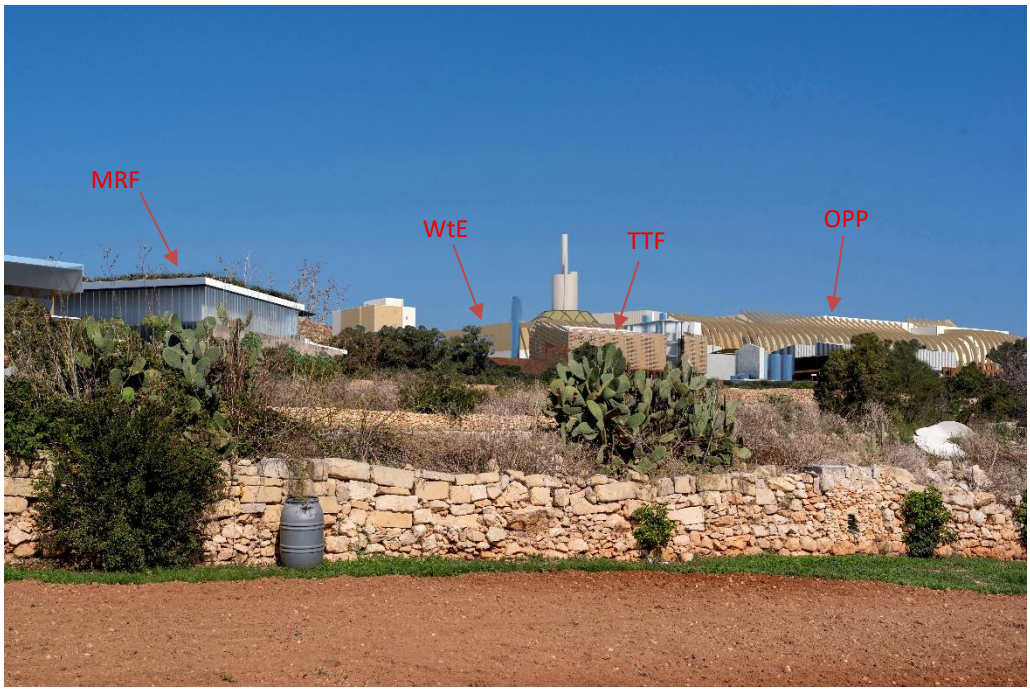


Figure 95: Cumulative view showing photomontage of MRF, TTF, WTE and OPP plant only at viewpoint4

Figure 96: Cumulative view showing photomontage of MRF, TTF, WTE and OPP plant only at viewpoint5

Figure 97: Cumulative view showing photomontage of MRF, TTF, WTE and OPP plant only at viewpoint6

Figure 98: Cumulative view showing photomontage of MRF, TTF, WTE and OPP plant only at viewpoint7

5.3 Geology, geomorphology, hydrogeology and soils

5.3.1 Construction phase

The potential environmental impacts of the proposed construction project on sensitive receptors could include:

- Contamination of the Mean Sea Level Aquifer
- Degradation of coastal waters
- Loss of runoff

To assess the probable geo-environmental impact of the project, the following steps were taken:

- Identification of construction site activities that may potentially impact geo-environmental resources
- Evaluation of the probable geo-environmental impact of each activity
- Suggestion of measures for mitigating such impact

The site works involved during the construction phase of the proposed project that may negatively affect the existing hydrogeomorphological conditions of the area include:

- Demolition of existing structures, excavation of rock, and construction of proposed structures, which may release fines to the environment through wind or runoff
- Storage of excavated stone material and soil, which may release fines to the environment on windy or rainy days
- Storage of contaminating substances, which should not be handled on site
- Use of heavy machinery and heavy vehicles, which may generate dust with negative impacts on runoff and coastal waters
- Paving of the site, which will render it impermeable and generate runoff, leading to loss of recharge to the Mean Sea Level Aquifer
- Application of pesticides and fertilizers for landscaped area maintenance, which may have a negative impact on the Mean Sea Level Aquifer during site operation

Chemical studies on the Mean Sea Level Aquifer have not identified pesticide contamination but have revealed high contents of nitrate.

Ground contamination analysis revealed no hazardous materials buried underground. Further information on ground contamination laboratory analysis is available on the Material Characterization report.

5.3.2 Operational phase

The geo-environmental impacts of various developments are significant and can have far-reaching consequences. The removal or degradation of sites of scientific importance, such as those protected by Rural Conservation Policies RCO11 and RCO12, poses a high risk and cannot be mitigated. On the other hand, projects that protect or enhance these sites, such as nature trails or geological parks, can have a highly beneficial effect.

Developments that involve the removal of substantial quantities of strata from sites of no scientific importance, often requiring extensive excavation works, carry a moderate risk. However, even small-scale excavations can have adverse impacts, particularly when considered cumulatively. For instance, the construction of a new neighbourhood can lead to the removal of extensive quantities of geological strata, resulting in the total obliteration of the geomorphology.

Furthermore, the construction of a new neighbourhood can also result in the removal of substantial quantities of soil, which can lead to dispersal without any possibility of recovery, posing a high risk. Additionally, alterations to the hydrological regime of the catchment basin can increase runoff and accelerate hill slope erosion, leading to silting of watercourses and posing a high risk of flooding.

Moreover, all developments that involve paving, regardless of their scale, can have adverse impacts. For example, excavation for underground floors might seem insignificant, but the cumulative effect of such constructions can lead to flooding in the lower reaches of watercourses. Therefore, it is crucial to consider the cumulative effects of these developments to mitigate their adverse impacts on the geo-environment.

5.4 Water bodies

5.4.1 Construction phase

The construction and operation of a new MRF on the proposed site could have significant environmental impacts on sensitive receptors. The potential risks include contamination of the Mean Sea Level Aquifer, degradation of coastal waters, and loss of runoff. To assess these impacts, a comprehensive evaluation was conducted, involving the identification of construction site activities that may affect geo-environmental resources, the evaluation of the probable geo-environmental impact of each activity, and the suggestion of measures to mitigate such impacts.

During the construction phase of the project, several site works are envisioned. These include the demolition of existing structures, excavation of rock, construction of new structures, storage of excavated stone material and soil, storage of contaminating substances, use of heavy machinery and vehicles, paving of the site, and maintenance activities such as the application of pesticides and fertilizers. Each of these activities poses environmental risks, including the release of fines to the environment through wind or runoff, potential contamination of the Mean Sea Level Aquifer, and degradation of coastal waters.

To minimize these impacts, several measures can be taken. For instance, dust-suppression techniques such as the use of silt fences, collection of fine particulates, covering of stored materials, and controlled water-spraying of active areas can help reduce wind-blown dispersion. Additionally, heavy machinery and vehicles should be used in a way that minimizes dust generation, and pesticides and fertilizers should not be handled on site to prevent contamination of the Mean Sea Level Aquifer.

5.4.2 Operational phase

During the operational phase of the MRF, there is a risk of accidental leakage or discharges that could potentially contaminate the coastline. Regular inspections of effluent discharges can help mitigate such incidents.

The development may lead to significant runoff and negligible aquifer recharge, which could exacerbate saltwater intrusion into the Mean Sea Level Aquifer and negatively impact nearby terrestrial water bodies. However, since there are no pumping wells in the area, there is no risk of water intrusion.

The site under consideration is relatively small, accounting for only 0.011% of the total potential recharge area of the Maltese Islands. Uncontaminated runoff water collected from the site can be used for irrigation purposes, which will indirectly contribute to the recharge of the aquifer and compensate for the lack of direct aquifer recharge due to the site's impermeable surface.

5.5 Ecology – Terrestrial

5.5.1 Construction phase

During the construction phase of the project, the removal and re-distribution of vegetation is envisaged. This activity will require the clearing of the site from any trees and vegetation located within the site boundaries. The project will impact approximately 244 individual protected tree species, which are comprised predominantly by Carob trees (162), followed by Lentisk trees (48), Olive trees (24), Aleppo pines (9) and Cypress trees (1). Some individuals of the Caper bush may also be affected.

Where deemed possible, mature trees will be relocated to the perimeter of the site, which will feature a landscaping scheme of circa 2690sqm. The landscaping scheme as currently proposed features 37 trees and shrubs, as described in Table 46.

Table 46: Proposed Landscaping plan tree species

SCIENTIFIC NAME	ENGLISH NAME	QUANTITY
Olea europaea	Olive tree	14
Ceratonia siliqua	Carob tree	14
Tamarix africana	African tamarisk	3
Laurus nobilis	Bay laurel	2
Rosmarinus officinalis prostratus	Rosemary	4
Total individual trees/shrubs		**37**

The decision to relocate or remove trees will be made based on the soil depth, which will be confirmed at the start of the excavation phase. If the soil depth is too shallow

to remove the full root ball without damage, the trees will be removed and not transplanted due to the low chance of survival. Adequate compensation will be provided as advised by the Environment and Resources Authority (ERA) within the planned planting scheme or in the near vicinity of the site. The compensation will include planting a cohort of species typical of the ecosystems expected within maquis habitats.

During excavations, additional indirect impacts may occur, including significant dust and noise generation. These impacts can be mitigated by using site hoarding around the perimeter of the planned excavation area, employing wheel-washing facilities, and wetting down any exposed stockpiles.

5.5.2 Operational phase

The operational phase of the project will have two primary impacts on the surrounding area: increased vehicular traffic and increased lighting in previously dark areas. These impacts will persist throughout the duration of the works.

The increased vehicular traffic will lead to the deposition of particulate matter and gases related to combustion. However, the expected traffic frequencies will be comparable to the current traffic levels within the wider ECOHIVE Complex.

To mitigate the impacts of increased lighting, measures such as sensor-operated lights, down-turned light fixtures, and other measures outlined in the GUIDELINES FOR ECOLOGICALLY RESPONSIBLE LIGHTING[16] will be implemented to the extent possible. These measures will aim to minimize the potential light spillover into adjacent agricultural areas.

5.6 Ecology – Avifauna

5.6.1 Construction phase

The proposed development will result in a temporary (localised and short-term) loss of potential breeding habitat for up to 4 terrestrial songbird species within the AoI-1. The construction phase will disturb or destroy breeding territories of the Sardinian Warbler, Zitting Cisticola, and Blue Rock Thrush, potentially leading to reproductive failure. Foraging areas and potential colonial nest sites of the Spanish Sparrow will also be reduced temporarily.

The construction phase will cause temporary habitat loss and disturbance, potentially affecting foraging areas for other breeding, wintering, and/or staging species in the

[16] *Source: https://birdlifemalta.org/wp-content/uploads/2020/07/Guidelines-for-Ecologically-Responsible-Lighting.pdf*

AoI-1. The impacts will be localized and short-term, but may still have effects on local breeders of common species.

Artificial light at night (ALAN) will also have negative impacts on seabirds. Adults from all three procellariform species nesting on the Maltese Islands avoid approaching breeding areas under high levels of illumination and may desert colonies as a result. ALAN can cause the stranding of seabird fledglings on their first flight out of the colony, which may be injured or killed by collisions with manmade structures.

The proposed development is not situated within the immediate line of sight of any seabird nest sites, but a Yelkouan Shearwater colony is located within the 5.0 km buffer zone AoI-2. Night-time construction activities during the reproductive season (February to July) may have significant impacts on this colony, affecting 45-70 breeding pairs.

Additionally, ALAN can have negative consequences on nocturnally migrating birds, attracting, disorienting, and grounding them if construction work or operations are carried out at night during spring or autumn migration with no mitigation measures in place.

5.6.2 Operational phase

The proposed MRF development, situated in an ODZ, will have a profound and lasting impact on the local avifauna. The permanent reduction of breeding habitat within the development's footprint, as well as the disturbance, noise, and habitat alteration in the surrounding AoI-1 and along access roads, will result in the loss of several breeding pairs of species such as C. *melanocephala*, C. *juncidis*, and M. *solitarius*. Additionally, the development will lead to a reduction in foraging and roosting habitat, as well as potential nesting sites, for a population of up to a few tens of breeding pairs of P. *hispaniolensis*.

This localized, permanent habitat loss and disturbance will also destroy foraging areas for other breeding, wintering, and/or staging bird species that make use of the development's footprint and buffer zone. However, the overall numbers of birds impacted are not expected to reach levels of significance when considering the local, national, EU, or international populations of the species utilizing the area. As such, no significant impacts on avifauna are anticipated within the development's footprint and buffer zone (AoI-1) during standard operations.

While the proposed development itself is not situated within the immediate line of sight of any seabird nest sites, a significant colony of P. *yelkouan*, holding 45-70 breeding pairs, is located on Saint Paul's Island (MT0000022) within the 5.0 km buffer zone AoI-2. This is of particular concern, as the additional sky glow from ALAN emitted

by the MRF during operation, especially if night-time activities or 24/7 illumination are involved, can have a profound and permanent impact on this seabird colony.

The negative effects of ALAN are not limited to seabirds, as it is also known to have devastating consequences on nocturnally migrating birds in general. Bright lights have a tendency to attract, disorient, and ground birds actively migrating at night. If the MRF carries out night-time operations or remains lit-up during the spring and autumn migration periods without proper mitigation measures, it is highly likely to have a significant impact on the nocturnally migrating birds passing through the AoI-2 buffer zone.

On a more positive note, the waste separation, treatment, and recycling processes within the proposed MRF, if carried out appropriately, can have several indirect beneficial impacts on avifauna compared to the current situation of the open landfill at Magħtab. By reducing the amount of plastic waste that is openly accessible to birds and that can be blown or washed into the sea, the MRF can help decrease the number of birds suffering from entanglement and/or ingestion of macro-plastics, as well as the amount of micro-plastics ingested by avifauna, either directly or indirectly through the food chain.

Furthermore, the MRF's plastic recycling facilities, in conjunction with the Waste to Energy plant and Composting plant, can contribute to the future reduction of greenhouse gas emissions, particularly methane, which is a potent greenhouse gas leaking from the open landfill at Magħtab. This reduction in greenhouse gas emissions can have a positive impact on biodiversity, including avifaunal communities, by mitigating the effects of climate change.

However, the operation of the MRF is not without its risks. Manipulating, preparing, and transporting material destined for recycling can lead to spills of such material into the environment, with potentially detrimental effects on living organisms, including avifauna. The small and lightweight plastic pellets (nurdles) can easily be blown or washed into the environment in large quantities during production, handling, and shipping if the infrastructure and protocols are inadequate.

Additionally, the transporting, manipulating, and storing of flammable material in large quantities at the MRF imposes significant fire hazard risks. Some types of plastics are known to produce toxic fumes when burning, as evidenced by the previous MRF fire in Malta, which released a plume of toxic fumes and residues into the environment, with short- and long-term negative impacts. In the event of a fire at the proposed MRF, the plume of the blaze and the runoff from firefighting water could release toxins into the environment, with detrimental effects on living organisms, including avifauna.

5.7 Agricultural Land

5.7.1 Construction phase

The proposed development is not expected to lead to the adaptation of farming practices for maximizing agricultural production due to the marginality of the land, which is unsuitable for agriculture because of soil characteristics and limited water availability. In the event of negative environmental changes, land abandonment is the likely outcome.

During the construction phase, the following measures should be implemented to mitigate environmental impacts:

- Control of all road runoff to prevent erosion and other ecosystem impacts due to deforestation and desertification, which are major anthropogenic sources of carbon dioxide.
- Agricultural activities in the area are not expected to involve chemical inputs, but if irrigation is necessary, appropriate measures should be taken to prevent groundwater pollution and soil structure damage.

5.7.2 Operational phase

The operational phase of the development is not expected to lead to the adoption of genetically engineered crops or the use of chemical inputs, given the marginal productivity of fodder crops and the government's stance on GMOs. The land management approach of continuous cereal cropping and conventional tillage will determine the presence of organic residues on the soil surface and conditions for crop emergence and growth.

The agricultural land in the Maghtab site is predominantly used for dryland production of fodder or hay crops, with low-to-moderate intensity traditional farming practices and low-to-moderate yields. The area is primarily suitable for dry farming due to the lack of water, prevalence of winds, and soil type.

In summary, the proposed development in the Maghtab site will not significantly impact the agricultural practices in the area, given the marginality of the land for agriculture. The construction and operational phases will require measures to prevent environmental impacts, including controlling road runoff, preventing water table pollution, and managing soil erosion. The land use approach in the area will continue to be suitable for dry farming, with low-to-moderate yields and traditional farming practices.

5.8 Archaeology & cultural heritage

5.8.1 Construction phase

The construction phase of the project involves the development of agricultural parcels of land comprising terraced fields with agricultural structures such as rubble/dry-stone walls and dry-stone huts. The presence of megalithic remains in the vicinity of the proposed scheme suggests that the area was inhabited since prehistoric times, with the landscape undergoing agricultural changes. The rural landscape, despite past landfill use, will be significantly impacted by the development, but there will be no direct impact on the 'Taż-Żebbuġija' Megaliths located 100m away from the proposed development. However, the grade of protection assigned to the area around it is still flagged as a potential archaeological zone. The dry-stone huts within the AoI are at risk of adverse impact or damage, and they are considered a subject of architectural, cultural, and ethnic value.

5.8.2 Operational phase

The project will continue to have minimal or no direct impact on the known cultural features present at the limit of the AoI. However, the project will need to adhere to local and international legislations and other relevant documents related to the protection of cultural heritage. The 'Taż-Żebbuġija' Megaliths, located at the Eastern limit of the AoI, will not be directly impacted by the project's operation. The dry-stone huts within the AoI, which are still well preserved, should be considered a subject of architectural, cultural, and ethnic value, and their stability and integrity should not be endangered during the project's operation. The Planning Authority is declared in the law as the competent authority responsible for the administration and implementation of these regulations.

5.9 Noise & Vibration

5.9.1 Construction phase

The 'high-level' noise impact from construction activities has been predicted as not significant. The impact magnitude, in the worst-case scenario, is minor, and the calculation assumptions tend towards a worst-case scenario. However, to further reduce the potential for adverse noise impacts, the following construction mitigation measures are recommended as good practice, to be implemented where appropriate:

- Consideration will be given to noise emissions when selecting plant and equipment to be used on site.
- All equipment should be maintained in good working order and fitted with the appropriate silencers, mufflers, or acoustic covers where applicable.

- Stationary noise sources will be sited as far away as reasonably possible from noise-sensitive receptors, and where necessary and appropriate, acoustic barriers will be used to screen them.
- The movement of vehicles to and from the site will be controlled, and employees will be instructed to ensure compliance with any noise control measures adopted.

There are many strategies to reduce construction noise by limiting activities that would result in predicted noise levels being reduced. Any such measures should be considered adequate, and the mitigation adopted should not be limited to the measures proposed.

5.9.2 Operational phase

For the closest residential receptors, the operational rating level has been predicted to be below or equal to the daytime and night-time background sound levels, resulting in no significant effect. Similarly, for the closest ecological receptors, no significant effect has been determined. Therefore, no additional mitigation measures are considered necessary, and no residual effects are predicted.

For further information on cumulative noise impacts, kindly refer to the Noise Technical Study. During construction works the cumulative noise level is classified as minor adverse. On the other hand, the cumulative noise impact during operational activities is classified as minor to moderate adverse.

5.10Infrastructure & Utilities

5.10.1Construction phase

During the construction phase of the proposed MRF, accidental damages may occur to the pre-existing infrastructure and utilities present within close proximity of the site development. No infrastructure or utilities are located directly within the development’s footprint.

The proposed route for the second interconnector passes along the edge of a 100-meter buffer zone to the west of the project site. The construction of the second interconnector is expected to start in 2026 and be completed by 2028. A landfill pile is located between the project site and the interconnector route, which reduces the likelihood of any significant impact of the project's construction on the interconnector within the buffer zone. The project's construction vehicles will enter the site from the southern gate, where work on the second interconnector is also planned. The necessary precautions have already been put in place to safeguard the interconnector from construction vehicles and other potential hazards. As a result, no additional measures are needed due to the planned development at this project site.

The proposed development of the project site involves the use of agricultural land that does not have any existing infrastructure. However, there are several utility features present within the buffer area, such as pavements, crash barriers, fire hydrants, street lamps, and fencing owned by Wasteserv Malta. These utilities are located on the access road used by construction vehicles and surround the buildings adjacent to the site. Some of these items require repairs and replacement. Before the commencement of construction, the selected contractor must coordinate with Wasteserv Malta to determine which infrastructure should be retained to avoid accidental damage to functioning utilities by large construction vehicles. Additionally, indirect impacts may occur due to dust generated by construction operations. In the event of accidental damage to the infrastructure, the contractor must report the damage to Wasteserv Malta and the operators to coordinate a timely repair at the contractor's expense. Although the impact is known and can be prevented through discussions and consultations, it is considered adverse and of minor significance.

During the construction phase of the project, connections will be established between the proposed development and the pre-existing water and electricity amenities within the ECOHIVE complex. This may result in temporary disruptions to the water and/or electricity supply in the complex. However, since these interruptions are expected to be localized and temporary in nature, the impact is classified as adverse but of minor significance.

To determine the presence of any utility infrastructure within the proposed site and its 100-meter buffer, the project team contacted companies responsible for telecommunications, sewers, potable water systems, and power supply. The only exception was Enemalta, which owns the second interconnector cable. All other entities confirmed that no infrastructure is located within the development site or its boundary, indicating no anticipated impacts related to utility infrastructure.

5.10.2Operational phase

The implementation of the Scheme will increase ECOHIVE's capacity to process source-separated recyclable waste streams, contributing significantly to Malta's national recycling goals. Consequently, the complex will see an increase in traffic flow to and from the site. However, this heightened activity is not projected to have any adverse effects on the surrounding public infrastructure and utilities.

The operation of the MRF within the proposed site will necessitate new connections to Malta’s national grid system. The project is envisaged to include a dedicated switch gear and transformer to ensure a steady supply to the site. The development will inevitably increase the load on the national grid. However, particularly following the implementation of the second interconnector, this impact is considered to be negligible when compared to the national demand and is well within the capacity of the national grid. Furthermore, due to the close proximity of the site to the Enemalta

Maghtab Terminal substation, additional electrical infrastructure connecting the site to the proposed grid will be minimal.

The operation of the MRF will necessitate new connections to the sewage and potable water systems. The current Masterplan envisages connections between the plants and existing cesspits available within the ECOHIVE complex intended for the collection of domestic and effluent waste water. These cesspits will be emptied periodically by bowsers and transferred between the plants or discharged into the public sewer. Eventually, the sewage system will be connected to the national sewage infrastructure. The impact of the new scheme on the existing public sewer is considered adverse but of minor significance due to the provision of substantial water treatment infrastructure planned for within the ECOHIVE complex which will minimise the outflow of effluent into the public system.

5.11Climate Change and Climate Change Adaptation

Greenhouse gases (GHGs) are a group of gases in the Earth's atmosphere that absorb and trap infrared radiation, thereby causing the Earth's surface temperature to rise above the freezing point. The most significant GHGs are water vapor, carbon dioxide, methane, and ozone. These gases are naturally occurring, and without them, the Earth's surface temperature would be about -18°C instead of the current average of about 15°C.

The natural levels of GHGs are essential for the survival and flourishing of life on Earth. For example, water vapor is the most abundant GHG and plays a crucial role in the Earth's hydrological cycle, including precipitation, evaporation, and transpiration. Carbon dioxide, on the other hand, is an essential component of the carbon cycle and is involved in photosynthesis, which is the process by which plants and other organisms produce food.

However, over the past few centuries, human activities have significantly increased the concentration of GHGs in the atmosphere. The burning of fossil fuels, deforestation, and industrial processes have released massive amounts of CO_2, methane, and other GHGs into the atmosphere, leading to a rapid increase in global temperatures. In fact, ice core samples taken in 2007 revealed that the levels of CO_2 and methane have increased by 36% and 148%, respectively, since 1750 [17].

The increase in CO_2 levels is mainly due to the burning of fossil fuels such as coal, oil, and natural gas. The use of these fuels for transportation, electricity generation, and other purposes has led to a significant increase in CO_2 emissions. Deforestation, on the

[17] *EPA (2007). "Recent Climate Change: Atmosphere Changes". United States Environmental Protection Agency Climate Change Science Program. Archived from the original on 10 May 2009. Retrieved 21 April 2009.gg*

other hand, reduces the number of trees that absorb CO_2 during photosynthesis, leading to even higher concentrations of CO_2 in the atmosphere.

The consequences of these elevated GHG concentrations are severe and far-reaching. Climate Change is leading to rising sea levels, more frequent and intense heatwaves, droughts, floods, and extreme weather events. These changes are already having significant impacts on ecosystems, economies, and human health, and the situation is expected to worsen in the coming decades unless action is taken to reduce GHG emissions.

5.11.1Impacts on Climate Change

The construction of the new MRF can have cumulative consequences on Climate Change. The direct construction impacts of such a project are temporary in nature but involve energy-intensive interventions that inevitably lead to the release of greenhouse gas (GHG) emissions. These interventions include the extraction and production of construction materials, the manufacture of raw materials and machinery, the transportation of these materials, and the operation of machinery during construction.

An increase in GHG emissions cumulatively contributes to accelerating Climate Change effects, including sea ice decline, sea level rise, extreme weather conditions, ecosystem changes, and reduced crop production:

- **Sea ice decline, sea level rise and retreat of glaciers** – global warming causes the shrinking and thinning of ice which melt and cause the sea level to rise.
- **Extreme weather conditions** – heat waves, droughts and monsoons.
- **Ecosystem changes** – earlier timing of spring events, poleward migration of arctic species, expansion of deserts, and a reduction in ocean oxygen levels and an increase in acidity affecting coral reefs, fisheries and protected species.
- **Crop production** – carrying capacity of the biosphere to produce.

The construction of the MRF can also have indirect impacts on Climate Change. The loss of rural land by cemented surfaces leads to a reduction in effective precipitation naturally recharging the underlying groundwater body, with consequent increase in run-off water volumes. By coupling this impact with increased rainfall intensity in shorter time frames (extreme weather events), the risk of flooding exacerbated by CC impacts should not be overlooked.

Despite these impacts, the construction of a new MRF can yield beneficial impacts on Climate Change. Recycling materials at the MRF will reduce the need for raw materials, lower energy consumption, and decrease GHG emissions associated with manufacturing new products. Additionally, by diverting waste from landfills, the MRF

helps reduce methane emissions and minimizes the environmental impact of waste disposal, contributing to overall Climate Change mitigation efforts.

To ensure sustainable development, the construction of the new MRF must be carefully considered and appropriate measures must be taken to mitigate its negative impacts on Climate Change. This can include the installation of Sustainable Urban Drainage Systems (SUDSs) to increase groundwater recharge while reducing run-off volumes.

5.11.2Adaptability to Climate Change

The adaptability of the proposed MRF to future effects of Climate Change can be evaluated by considering its potential impact on Malta's waste management and the country's ability to increase recycling rates. The recycling of materials at the MRF reduces the need for raw material extraction and manufacturing, leading to a significant decrease in energy consumption and greenhouse gas emissions. This helps to mitigate the overall impact of Climate Change by lowering the carbon footprint of waste management operations.

By diverting waste from landfills, the MRF helps reduce methane emissions, a potent greenhouse gas. Methane is produced when organic waste decomposes in anaerobic conditions, such as those found in landfills. Redirecting waste to the MRF for recycling and recovery can substantially lower these methane emissions, contributing to Climate Change mitigation.

The MRF can also play a role in enhancing the country's resilience to the impacts of extreme weather events, which are expected to increase in frequency and intensity due to Climate Change. By ensuring the proper management and recovery of materials, the MRF can help minimize the environmental impact of disasters, such as flooding or storms, on waste systems.

The MRF's focus on recycling and material recovery aligns with the principles of a circular economy, where waste is minimized, and resources are reused and recycled. This approach helps reduce the reliance on virgin materials, conserve natural resources, and promote sustainable waste management practices, all of which contribute to Climate Change adaptation. By integrating the MRF into a country’s waste management system, local authorities can enhance the overall adaptability and resilience of their communities to the impacts of Climate Change.

5.12Environmental Risk

Any relevant risks, including major accident scenarios like contamination, emissions, explosions, blasts, flooding and major spillages, which could originate during the excavation, construction, operational and decommissioning phases of the proposed Scheme are assessed in this chapter. The assessment includes a quantification of the

risk magnitude and probability, and the relevant risk analysis vis-à-vis the aforementioned scenarios.

Potential risk scenarios can be classified as:

- One-time risks
- Recurrent risks during operational phase of the project; and
- Risks associated with extreme or exceptional events (ex: effect of earthquakes or other natural disasters on the project).

The preliminary environmental risk assessment identifies thirteen potential environmental threats or sources of contamination identified throughout the duration of this EIA, as listed in Table 47.

Table 47: Identified environmental risks

Environmental Risk		Project Phase		
Type	Risk	Construction (inc. excavation)	Operational	Decommissioning
One-time Risk	Contamination of geological layers through spillage of oils or fuels	✓	✓	✓
	Contamination of the Malta Mean Sea Level Aquifer through spillage of oil or fuels	✓	✓	✓
	Contamination of the marine environment through spillage of oil, chemicals or fuels	✓	✓	✓
	Generation of dust from works which may affect surrounding sensitive receptors	✓		✓
	Rock/soil instability which could impact nearby ecological/agricultural features of land uses	✓		
	Spillage of excavated material during transportation	✓	✓	✓
	Dust emissions from transportation of waste rock material	✓		✓
	Loss of protected endemic vegetation species	✓		
Exceptional Risks	Instability of the facility, due to earthquakes	✓	✓	
	Damage to surrounding environment from explosion/fire	✓	✓	✓

5.12.1Criteria used to assess environmental risks

The impacts on the environmental receptors were addressed independently to determine the Potential Source of Contamination (PSC), keeping in mind the pathway status. The effects of the various impacts identified were evaluated against the criteria listed in Table 48.

Table 48: Criteria used to assess environmental risks

CRITERION	DESCRIPTION	
Impact	Adverse	Overall negative impact
	Neutral	Neither positive nor negative impact
	Beneficial	Overall positive impact
Geographical extent of impact	Local	Within the confines of the peninsula
	National	Offshore within Maltese territorial waters
	Transboundary	Offshore outside Maltese territorial waters
Duration of impact	Short-term	Impact extends over a brief period
	Medium-term	Impact extends over one phase
	Long-term	Impact extends indefinitely
Type of effect	Temporary	Impact effects cease after activities are halted
	Permanent	Impact effects are felt after activities are halted

5.12.2Environmental Risk Evaluation

The environmental risk was determined in a qualitative manner, which involved the computation of the impact magnitude (Table 49) on the environment and the corresponding probability of occurrence (Table 50). The risk matrix is shown in Table 51 and the final risk assessment shown in Table 52.

Table 49: Parameters used to assess the risk magnitude

MAGNITUDE	EFFECT ON THE ENVIRONMENT
Insignificant	No discernible impact or measurable impairment, for example, not exceeding published guideline values for "normal" or "background" levels.
Minor	Minor effects on biological or physical environment. Minor short-, medium-term damage to a localised area or that ceases once the event is over.
Moderate	Measurable impairment on biological or physical environment but not affecting ecosystem function. Short-, medium-term impacts, where the ecosystem will recover quickly and without intervention.
Major	Serious environmental effects with some impairment of ecosystem function. Relatively widespread medium-, long-term impacts, requiring remediation, where ecosystem will recover over time once clean-up has been completed.
Severe	Very serious environmental effects with significant impairment of ecosystem function. Long term, widespread effects. Remediation required.

Table 50: Parameters used to assess the risk probability

PROBABILITY	DESCRIPTION
Almost certain	The event is expected to occur in most circumstances /commonly repeating / occurs weekly
Likely	The event will probably occur in most circumstances / known to occur / occurs monthly
Possible	The event might occur, say yearly / has a 1 in 20 chance of occurring
Unlikely	The event could occur at some time, say once in every 10 years / say 1 in 100 chance of occurring
Rare	Event may only occur in only exceptional circumstances / less than a 1% chance of occurring

Table 51: Risk assessment matrix

		MAGNITUDE				
		Insignificant	Minor	Moderate	Major	Severe
Probability	**Almost certain**	Med	Med	High	High	High
	Likely	Med	Med	Med	High	High
	Possible	Low	Med	Med	High	High
	Unlikely	Low	Low	Med	Med	High
	Rare	Low	Low	Med	Med	High

Table 52: Environmental risk assessment

PSC/Environmental Threat	Risk description	Pathway status	Receptor	PSC Evaluation											Evaluation of Risk												
				Impact			Extent			Term			Effect		Magnitude					Probability					Risk		
				Adverse	Neutral	Beneficial	Local	National	Transboundary	Short	Medium	Long	Temporary	Permanent	Severe	Major	Moderate	Minor	Insignificant	Almost certain	Likely	Possible	Unlikely	Rare	Low	Moderate	High
One-time environmental risks																											
Oils/fuels used on site during excavation, construction and/or potentially maintenance works during operations	Contamination of geological layers through spillage of oils or fuels	Horizontal/vertical percolation into geological layers	Aquifer system	✓			✓				✓			✓				✓					✓		✓		
	Contamination of the Malta Mean Sea Level Aquifer through spillage of oil or fuels	Horizontal/vertical percolation through geological layers and into the groundwater body	Groundwater body	✓			✓				✓			✓				✓						✓	✓		
	Contamination of the marine environment through spillage of oil, chemicals or fuels	Horizontal/vertical movement to the sea	Marine environment	✓			✓	✓			✓			✓				✓					✓		✓		
Excavation and construction works	Generation of dust from works which may affect surrounding sensitive receptors	Rock/soil excavation	Surrounding areas and uses	✓			✓			✓			✓					✓			✓					✓	
	Rock/soil instability which could impact nearby ecological/agricultural features of land uses	Excavation works potentially causing rockslides	Surrounding areas and uses	✓			✓				✓			✓		✓								✓		✓	
Vehicular transportation of waste material	Spillage of excavated material during transportation	Material dropping off the truck	Surrounding land uses	✓			✓	✓		✓			✓					✓				✓				✓	
	Dust emissions from transportation of waste rock material	Fine particles disperse in the air from the moving truck if not appropriately covered	Surrounding areas and uses	✓			✓			✓			✓					✓			✓					✓	
Exceptional environmental risks																											
Natural earthquake	Instability of the structure, including machineries, due to earthquakes	Direct physical damage to machineries or building structure	Surrounding areas and uses; Malta waste management sector	✓			✓	✓				✓		✓		✓								✓		✓	
Explosion/jet fire	Damage to surrounding environment from explosion/fire at the facility	Flammable cloud engulfing an ignition source before it is diluted below its flammable limits	Personnel, surrounding areas, cliffs, ecology and uses; Malta waste management sector	✓			✓	✓				✓		✓		✓								✓		✓	
Flooding due to extreme weather events	Physical damage to the facility	Anthropogenic third-party interventions	Building structure and operation	✓				✓			✓		✓				✓								✓		✓	

5.13Effects on human populations

As outlined in the previous chapters, the MRF project may lead to various environmental impacts which in turn could affect human populations in several ways. The below table summarises these potential effects:

Table 53: Summary of the effects on human populations

CAUSE	EFFECT	IMPACT
Effects of construction activities	Generation of dust	• Reduced air quality for nearby residents, most notably individuals who suffer from respiratory conditions.
	Noise and vibration	• A minor increase in noise is expected which may affect ECOHIVE personnel and surrounding residential receptors.
Effects during the operational phase of the project	Air quality & climate change	• The potential for the facility to increase the country's recycling rates would reduce the overall GHGs emitted on a national scale. This is likely to reduce the impacts on climate change.
	National waste management sector	• The construction of a new MRF will help the country to meet the European waste recycling targets.

5.14Decommissioning phase

The proposed MRF shall be operating for a period of 20 years. Upon completion of its life cycle, the facility may be terminated instigating decommissioning. The planning for decommission shall begin from the design stage and continue throughout the lifetime of the facility.

In order to minimize potential environmental impacts rising from the decommissioning of the MRF, the planning shall include but not be limited to the following:

- Preparation of an initial decommissioning plan;
- Collection of relevant information and data to facilitate future decommissioning;
- Selection of decommissioning strategy;
- Characterization of the facility;
- Preparation of a final decommissioning plan;
- Estimation of costs;
- Identification of the provision of financial resources for the decommissioning project;
- Submission of the plan to the regulatory body for review and approval;
- Public consultation in accordance with national requirements;
- Consideration of clean up, removal and disposal of materials.

Decommissioning options suitable for the proposed MRF shall include:

- Facility mothballing: its termination involves preserving building structures and machinery in a condition suitable for potential reuse upon reactivation. During this process, government agencies will oversee and regulate access to the industrial site to ensure compliance with relevant regulations. Additionally, contamination at the site will be addressed through rehabilitation and treatment measures.
- Partial facility decommissioning: this approach can be applied in the following scenarios: when a specific section or part of the facility is to be closed, when the facility is extensive and complex, or when the financial and environmental costs of complete decommissioning are prohibitively high. This method involves retaining certain structures and machinery in a state suitable for future reuse, while also addressing environmental contamination and monitoring access to the site in accordance with applicable regulations.
- Complete site decommissioning: it refers to the comprehensive shutdown of an industrial site, encompassing all necessary principles and regulations to safeguard human health and safety, and mitigate environmental risks. This process aims to eliminate or minimize potential hazards associated with the facility's operations and ensure that the site is suitable for future use or redevelopment.

6.0 SUMMARY OF IMPACTS

6.1 Land cover and land use

Table 54: Summary of impacts table - land use

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of impact occurring	Overall impact significance	Proposed mitigation measures	Residual impact significance
Impact type	Specific intervention leading to impact	Project phase	Receptor type	Sensitivity & resilience towards impact	Direct/ indirect/ cumulative	Effect of Impact Beneficial/ adverse	Severity	Physical/ geographic extent of impact	Short/ medium / long term	Duration of Impact Temporary / permanent	Reversible/ irreversible				
Change of land use	Construction of the site	Construction and Operations	Existing agricultural land, practices, and ecological components	High	Direct	Adverse	High	Site	Long term	Permanent	Irreversible	Inevitable	Major	Minimising construction site size and spillover effects, including a landscaping element in project design	Major
Dust emissions	Excavation works	Construction	Access roads, adjacent fields and trees	High	Direct	Adverse	Medium	Local surrounding area	Short	Temporary	Reversible	Likely	Minor	Following L.N. 340 of 2022, construction monitoring	Negligible
Trampling of vegetation, spills	Spill-over effects of construction works	Construction	Access roads, adjacent fields and trees	High	Indirect	Adverse	Low	Local surrounding area	Short	Temporary	Reversible	Likely	Minor	Following L.N. 340 of 2022, Construction monitoring	Negligible
Increased pollution	Use of construction vehicles, Increased flow of waste carriers	Construction and Operations	Surrounding agricultural land	High	Direct	Adverse	Medium	Local surrounding area	Medium	Long term	Permanent	Irreversible	Moderate	Minimising vehicle idling times, Planting of windbreaker species adjacent to access road	Minor
Extreme events	Oil leaks/ spills, accidents, flooding, fires, site failure etc.	Construction and Operations	Existing roads and adjacent tree plantations and agricultural land	High	Direct	Adverse	High	Local surrounding area	Medium	Temporary	Reversible	Remote	Moderate	Emergency Response Plan and prevention practices in place before start of operations	Minor

6.2 Landscape Character and Visual Amenity

Table 55: Summary of impacts table - Landscape

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of Impact Occurring	Overall Impact Significance	Proposed Mitigation Measures	Residual Impact Significance	Other Requirements
Impact Type	Specific Intervention Leading to Impact	Project Phase	Receptor Type	Sensitivity & Resilience Towards Impact	Direct/Indirect/Cumulative	Beneficial/ Adverse	Severity	Physical/ Geographic Extent of Impact	Short/ Medium/ Long Term	Temporary/ Permanent	Reversible/ Irreversible					
Deterioration of the landscape value during construction works at VP1 to VP7	Presence of construction and excavation machinery, cranes; dust; noise; vibration and associated works	Construction & Excavation	Landscape elements	High	Direct	Adverse	Medium	Site and immediate surroundings	Medium	Temporary	Irreversible	Certain	Major	Adherence to Construction Site Regulations S.L.623.08 to reduce visual and landscape inconveniences such as dust dispersion, noise & vibration	Moderate	N/A
Reduced visual amenity during construction works at VP1, VP3, VP4, & VP7	Presence of construction and excavation machinery, cranes; dust; noise; vibration and associated works	Construction & Excavation	Residents, Farmers, Workers, Motorists, Passengers, Recreational activities: campers, joggers, cyclist, casual strollers	High	Direct	Adverse	Medium	Site and immediate surroundings	Medium	Temporary	Irreversible	Certain	Moderate		Minor	N/A
Reduced visual amenity during construction works at VP2, VP5 & VP6		Construction & Excavation		High	Direct	Adverse	Medium	Site and immediate surroundings	Medium	Temporary	Irreversible	Certain	Major		Moderate	N/A
Deterioration of the landscape value during construction works at VP1 to VP7	Presence of MRF Building at ECOHIVE complex and take up of agricultural land	Construction & Excavation	Landscape elements	High	Direct	Adverse	Medium	Site and immediate surroundings	Medium	Temporary	Irreversible	Certain	Major		Major (slight reduction)	N/A
Reduced visual amenity during operations at VP4, VP5 & VP7	Presence of MRF Building at ECOHIVE complex and take up of agricultural land	Operation	Residents, Farmers, Workers, Motorists, Passengers, Recreational activities: campers, joggers, cyclist, casual strollers	High	Direct	Adverse	Medium	Site and immediate surroundings	Long	Permanent	Irreversible	Certain	Major	Earth-toned colours which blend with the surroundings should be used on the building façade.	Major (slight reduction)	N/A
Reduced visual amenity during operations at VP3 & VP6		Operation		High	Direct	Adverse	Medium	Site and immediate surroundings	Long	Permanent	Irreversible	Certain	Moderate		Moderate (slight reduction)	N/A
Reduced visual amenity during operations at VP1 & VP2		Operation		High	Direct	Adverse	Medium	Site and immediate surroundings	Long	Permanent	Irreversible	Certain	Minor		Minor (slight reduction)	N/A

Sustained light pollution at VP1 to VP7	External lighting	Operation	Residents & nearby fauna	High	Direct	Adverse	High	Site and immediate surroundings	Long	Temporary	Reversible	Unlikely	Minor	Strategic placement of external light systems; Shielded and downward lights to avoid residual light pollution.	Negligible	N/A

6.3 Geology, Geomorphology, Hydrogeology and Soils

Table 56: Summary of impacts table - geology

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of impact occurring (inevitable/ likely/ unlikely/ remote/ uncertain)	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase	Receptor type	Sensitivity & resilience towards impact	Direct/ indirect / cumulative	Beneficial/ adverse	Severity	Physical/ geographic extent of impact	Short/ medium/ long term	Temporary/ permanent	Reversible/ irreversible					
Geology: loss of rock strata	Excavation	Construction	Mineral resources	Low	Direct and cumulative	Adverse	High	Localised	Long term	Permanent	Irreversible	Inevitable	Major	Reuse and recycle	Moderate	
Geomorphology: degradation /destruction of surface features	Excavation	Construction	Landscape	Low	Direct and cumulative	Adverse	High	Localised	Long term	Permanent	Irreversible	Inevitable	Moderate	Landscaping of the site/already degraded by landfill	Minor	
Dust Emissions	Excavation	Construction	Landscape	Low	Direct and cumulative	Adverse	Moderate	Localised	Short term	Temporary	Reversible	Unlikely	Minor	Haulage of excavated material in covered trucks	Minor	
Soils	Excavation	Construction	Agriculture and landscape	High	Direct and cumulative	Adverse	High	Localised	Long term	Temporary-lifetime of MRF plant until site is returned to its original state	Reversible	Inevitable	Minor	Soil already degraded by landfill	Minor	
Mineral resources	Excavation	Construction	Limestone resources	High	Direct and cumulative	Adverse	High	Localised	Short term	Permanent	Irreversible	Inevitable	Minor	Reuse and recycle	Minor	
Stability of the walls of the excavation	Excavation	Construction	Operatives and 3rd party property	High	Direct	Adverse	High	Localised	Short term	Temporary	Reversible	Uncertain	Major	Monitor closely during excavation and stabilize if necessary	Minor	
Dust Generation	Excavation	Construction	Rock pools and coastal waters	High	Direct	Adverse	Low	Localised	Short term	Temporary	Reversible	Remote	Minor	There should be no stacked excavation material that could be washed away by run-off during the rainy season	Minor	
Silting	Excavation	Construction	coastal waters	High	Direct	Adverse	Low	Localised	Short term	Temporary	Reversible	Remote	Minor			
Spillage due to a major incident during loading/unloading and transport by run-off	Operation of the MRF plant	Operation	Groundwater and coastal waters	Low	Direct	Adverse	Moderate	Localised	Short term	Temporary	Reversible	Unlikely	Moderate	Care during operation of the plant-employ experienced operatives	Minor	

Seawater intrusion due to loss of recharge from the paving of the site	MRF Plant	Operation	Groundwater	Low	Direct	Adverse	High	Localised	Long term	Temporary	Reversible	Unlikely	Moderate	Groundwater beneath the site is brackish. The paved area compared to the potential recharge area is relatively small. Use of 2nd class water for irrigation may indirectly mitigate recharge.	Minor	

6.4 Water bodies

Table 57: Summary of impacts table – water bodies

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of impact occurring (inevitable/ likely/ unlikely/ remote/ uncertain)	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase	Receptor type	Sensitivity & resilience towards impact	Direct/ indirect/ cumulative	Beneficial/ adverse	Severity	Physical/ geographic extent of impact	Short/ medium/ long term	Temporary/ permanent	Reversible/ irreversible					
Dust emissions	Excavation	Construction	Runoff and seawater	Low	Direct	Adverse	Moderate	Catchment	Short term	Temporary	Reversible	Likely	Moderate	Cart excavation material away as soon as it is generated for reuse or disposal depending on outcome of contamination study	Minor	
Dust emissions	Storage of Excavation material	Construction	Runoff and seawater	Low	Direct	Adverse	Moderate	Catchment	Short term	Temporary	Reversible	Likely	Moderate	dust-suppression measures may be considered to minimize wind-blown dispersion. These include use of silt fences, collection of fine particulates generated during any on-site working of stone, covering of stored material, and controlled water-spraying of active areas	Minor	
Contamination of runoff and groundwater	Storage of hazardous substances	Construction	Runoff and groundwater	Low	Direct	Adverse	High	Subsurface and Catchment downstream of the site	Long term	Temporary	Reversible	Unlikely	Moderate	Run-off system collection and adequate discharge in compliance with applicable legislation.	Minor	
Spillage of sewer and other fluids produced during the operation of the MRF plant and transport by run-off.	Operation of the MRF plant	Operation	Ground water and coastal waters	Low	Direct	Adverse	Moderate	Downstream catchment of the site and coastal waters	Short term	Temporary	Reversible	Unlikely	Minor	No hazardous substances should be stored on site	Minor	

Spillage due to a major incident during loading/unloading and transport by run-off	Operation of the MRF plant	Operation	Ground water and coastal waters	Low	Direct	Adverse	moderate	Downstream catchment of the site and coastal waters	Short term	Temporary	Reversible	Unlikely	Minor	Care during operation of the plant-employ experienced operatives. Handling area shall be impermeable	Minor	
Use of Pesticides and fertilisers	Landscape areas	Operation	Ground water and runoff	high	Direct	Adverse	moderate	Downstream catchment of the site and groundwater	Short term	Temporary	Reversible	Unlikely	Moderate	Use of environment friendly pesticides and fertilizers in the appropriate amounts	Minor	

6.5 Ecology - Terrestrial

Table 58: Summary of Impacts – Terrestrial ecology

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of impact occurring (inevitable/ likely/ unlikely/ remote/ uncertain)	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase	Receptor type	Sensitivity & resilience towards impact	Direct/ indirect/ cumulative	Beneficial/ adverse	Severity	Physical/ geographic extent of impact	Short/ medium/ long term	Temporary/ permanent	Reversible/ irreversible					
Destruction of habitats and species (circa 244 individuals)	Excavation, backfilling	Construction	Vegetation & Fauna	High	Direct	Adverse	High	Localised	Long-term	Permanent	Irreversible	Inevitable	Major	Transplanting trees where possible, compensatory planting as an alternative. Monitoring construction activities to minimise avoidable impacts	Moderate	N/A
Dust generation	Excavation, backfilling, building construction	Construction	Vegetation & Fauna	Moderate	Direct	Adverse	Moderate	Localised	Short-term	Temporary	Reversible	Likely	Minor	Dust suppression techniques, regular clearing of affected areas, construction monitoring	Negligible	N/A
Light & Noise	Excavation, backfilling, building construction	Construction	Fauna	High	Direct	Adverse	Moderate	Local and near vicinity	Short-term	Temporary	Reversible	Likely	Minor	Works will be limited to daylight hours. Use of lighting for safety reasons should be limited to downward facing, shielded and low-frequency lights. Equipment well maintained to avoid excessive noise.	Negligible	N/A

Light, Air Pollution & Noise	Operation of the MRF	Operation	Vegetation & Fauna	High	Direct	Adverse	Moderate	Local and near vicinity	Long-term	Permanent	Irreversible	Likely	Minor	Minimising noise spillover by using BAT and keeping apertures shut during operational hours. Ensure equipment is well-maintained and within national emission limits. Limit night-time lighting to the bare minimum and use of down-facing lights.	Negligible	N/A

6.6 Ecology - Avifauna

Table 59: Summary of impacts Table - Avifauna

Impact type and source			Impact receptor		Effect & Scale							Probability of impact occurring	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase	Receptor type	Sensitivity & resilience toward impact	Direct/ Indirect/ Cumulative	Beneficial / Adverse	Severity	Physical/ geographic extent of impact	Short-/ Medium-/ Long-term	Temporary / Permanent	Reversible/ Irreversible					
Loss of habitat for terrestrial avian species	Destruction of (disused) agricultural land in ODZ	Construction	Terrestrial avian species	High & Low	Direct	Adverse	Low	Local in footprint and AoI-1	Short-term	Temporary	Reversible	Inevitable	Moderate	Keep time short, keep footprint low, avoid (if possible) reproductive season, habitat restoration	Minor	N/A
Noise, vibration, and light pollution negatively affecting terrestrial avian assemblages in AoI-1	Construction activities, operation	Construction	Terrestrial avian species	Moderate & Moderate	Direct	Adverse	Low	Local, in footprint and AoI-1	Short term	Temporary	Reversible	High	Moderate	Limit night-time activities, reduce light pollution, avoid (if possible) sensitive periods	Minor	N/A
Light pollution negatively impacting nocturnally migrating birds	Lighting during construction	Construction	Nocturnally migrating birds	Moderate & Moderate	Direct	Adverse	Low	Broad (AoI-1 and AoI-2)	Short-term	Temporary	Reversable	High	Moderate	Limit night-time activities, reduce light pollution, avoid (if possible) sensitive periods	Minor	N/A

Colony disturbance grounding of seabird fledgling, associated induced mortality caused by ALAN	Lighting during construction and operation	Construction, operation	Procellariform seabirds, specifically *P. yelkouan*	High & Low	Direct	Adverse	High	Broad (AoI-2)	Short-term, potentially long term	Temporary, potentially permanent	Reversible	High	Major	Limit night-time activities, reduce light pollution, avoid (if possible) sensitive periods.	Minor	Strictly follow guidelines for the reduction of light pollution
Loss of habitat for terrestrial avian species	Destruction of (disused) agricultural land in ODZ	Operation	Terrestrial avian species	High & Low	Direct	Adverse	High	Local in footprint and AoI-1	Long-term	Permanent	Irreversible	Inevitable	Moderate	Breeding and foraging habitat loss is minimised through landscaping and compensated with nesting installations.	Minor	N/A
Exposure of (marine) avifauna to macro-/ microplastics, other harmful substances	Spills, leakage of material from MRF into the environment during standard operations including transport or during accidents	Operation	Marine avian species and others	High & Low	Direct	Adverse (beneficial as compared to current open landfill situation)	high	Broad (AoI-2 and beyond)	Long term	Permanent	Reversible	Inevitable	Moderate	Infrastructure & protocols in place to minimize spills of any harmful material into the environment	Minor	N/A
Contribution or otherwise to climate change, impacting biodiversity	Reduction in methane from open landfill, reduction in CO2	Operation	Biotic and abiotic environment	Moderate & Moderate	Indirect/ Cumulative	Beneficial	Moderate	Very broad	Long-term	Permanent	Reversible, with difficulty	High	Moderate	N/A	Moderate	N/A

6.7 Agricultural Land

Table 60: Summary of Impacts Table – Agriculture

Impact type and source			Impact receptor		Effect & Scale							Probability of impact occurring (Inevitable/ Likely/ Unlikely/ Remote/ Uncertain)	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase (construction/ operation/ decommissioning)	Receptor type	Sensitivity & resilience toward impact	Direct/ Indirect/ Cumulative	Beneficial / Adverse	Severity	Physical/ geographic extent of impact	Short-/ Medium-/ Long-term	Temporary (indicate duration) / Permanent	Reversible (indicate ease of reversibility)/ Irreversible					
Agriculture	Land taken up Wasteserv expansion	Construction & operation	Agricultural land	Moderate	Direct	Adverse	Major	Development area	Long-term	Permanent	Irreversible	Inevitable	Major	Adherence to PA and ERA regulations and instructions to protect surrounding areas	Major to moderate	None
Agriculture	Clearing and building	Construction	Agricultural land	High	Direct	Adverse	Major	Development area	Long-term	Permanent	Irreversible	Inevitable	Major	Adherence to PA and ERA regulations and instructions to protect surrounding areas	Moderate	None

6.8 Archaeology & Cultural Heritage

Table 61: Summary of impacts table – Archaeology & Cultural Heritage

Impact type and source			Impact receptor		Effect & Scale							Probability of impact occurring (Inevitable/ Likely/ Unlikely/ Remote/ Uncertain)	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase (construction/ operation/ decommissioning)	Receptor type	Sensitivity & resilience toward impact	Direct/ Indirect/ Cumulative	Beneficial / Adverse	Severity	Physical/ geographic extent of impact	Short-/ Medium-/ Long-term	Temporary (indicate duration) / Permanent	Reversible (indicate ease of reversibility)/ Irreversible					
Loss of features and change in the context and cultural landscape	Excavation works – Superficial demolition/ dismantling of rural structures	Construction	Identified cultural features	High	Direct	Adverse	High	Limited	Long term	Permanent	Irreversible	Likely	Major	Relocation of significant features if technically possible and as instructed by the SCH.	Moderate	N/A
Potential damage to cultural and/or archaeological features below the ground:	Excavations works – Below the ground	Construction	Unknown potential archaeological features	High	Direct	Adverse	High	Limited	Long term	Permanent	Irreversible	Uncertain	Major	Constant monitoring and use of sensitive construction methods.	Moderate (depending on the outcome of the proposed interventions)	N/A

6.9 Noise & Vibration

Table 62: Summary of impacts table – Noise & Vibration

Impact type and source			Impact receptor		Effect & Scale							Probability of impact occurring (Inevitable/ Likely/ Unlikely/ Remote/ Uncertain)	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Impact type	Specific intervention leading to impact	Project phase (construction/ operation/ decommissioning)	Receptor type	Sensitivity & resilience toward impact	Direct/ Indirect/ Cumulative	Beneficial / Adverse	Severity	Physical/ geographic extent of impact	Short-/ Medium-/ Long-term	Temporary (indicate duration) / Permanent	Reversible (indicate ease of reversibility)/ Irreversible					
Noise	Site preparation	Construction	Residential /Human	Medium	Direct	Adverse	Low	Approx 100m from each boundary of the Site*	Short (19-months)	Temporary	Reversible (temporary noise)	Inevitable	Minor	Follow construction good practice	Not significant	N/A
Noise	Site preparation	Construction	Wildlife Habitat	Medium	Direct	Adverse	Low	Approx 300m from each boundary of the Site**	Short (19 months)	Temporary	Reversible (temporary noise)	Inevitable	Not significant	Follow construction good practice	Not significant	N/A
Noise	Operational Plant and On-site Vehicle Movements	Operation	Residential /Human	High – Night-time Medium - Daytime	Direct	Adverse	Low	Approx 400m from each boundary of the Site***	Long-term	Permanent	Irreversible	Inevitable	Not significant	No addition measures proposed other than those embedded into the scheme	Not significant	N/A
Noise	Operational Plant and On-site Vehicle Movements	Operation	Wildlife Habitat	Medium	Direct	Adverse	Low	Approx 100m from each boundary of the Site****	Long-term	Permanent	Irreversible	Inevitable	Not significant	No addition measures proposed other than those embedded into the scheme	Not significant	N/A

* At distances greater than 100m from the Site boundary the predicted construction noise level falls below the 65dB Construction Noise Limit Threshold for Human Receptors

** At distances greater than 300m from the Site boundary the predicted construction noise level falls below the 55dB AQTAG Limit for Ecological Receptors

*** Distance from boundary of the Site to the nearest human receptor (NSR01)

**** At distances greater than 100m from the Site boundary the predicted operational noise level falls below the 55dB AQTAG Limit for Ecological Receptors

6.10Infrastructure & Utilities

Table 63: Summary of impacts table – Infrastructure & utilities

Impact Type and Source			Impact Receptor		Effect and Scale											
Impact type	Specific intervention leading to impact	Project phase	Receptor type	Sensitivity & resilience towards impact	Direct/ indirect/ cumulative	Beneficial/ adverse	Severity	Physical/ geographic extent of impact	Short/ medium/ long term	Temporary/ permanent	Reversible/ irreversible	Probability of impact occurring	Overall impact significance	Proposed mitigation measures	Residual impact significance	Other requirements
Potential interruptions of second interconnector cable	Dust-generating activities, traffic	Construction	National power supply	High	Direct & Indirect	Adverse	High	National	Medium	Temporary	Reversible	Remote	Negligible	N/A	Negligible	N/A
Damage to existing infrastructures/utilities	Mechanical damage	Construction	Existing infrastructure and utilities within the access route	High	Direct	Adverse	Low	Local	Short	Temporary	Reversible	Unlikely	Moderate	Liaison between WSM and contractor, Precautions taken	Minor	N/A
Damage to existing infrastructures /utilities	Dust-generating activities	Construction	Existing infrastructure and utilities within the buffer zone	Medium	Indirect	Adverse	Medium	Local	Short	Temporary	Reversible	Unlikely	Minor	Liaison between WSM and contractor, Dust-mitigation measures	Negligible	N/A
Interruptions to water and electricity supply	Connection of services to electricity grid & water network	Construction	Existing facilities within the ECOHIVE Complex	Medium	Direct	Adverse	Medium	Local	Short	Temporary	Reversible	Inevitable	Minor	Liaison between WSM and contractor	Negligible	N/A
Increase in Malta's waste recovery capacity	Operation of a new MRF	Operation	Existing waste recovery capacity	High	Direct	Beneficial	High	National	Long	Permanent	Irreversible	Inevitable	Major	N/A	Major	N/A
Increased load on national electricity grid	Operation of a new MRF	Operations	National electricity grid	Low	Cumulative	Adverse	Low	National	Long-term	Permanent	Irreversible	Inevitable	Negligible	Direct liaison between WSM and Enemalta regarding the connections and loads	Negligible	N/A
Increased load on national potable water and sewage systems	Operation of a new MRF	Operations	National sewage and potable water network	Low	Cumulative	Adverse	Low	National	Long-term	Permanent	Irreversible	Inevitable	Minor	Direct liaison between WSM and Water Services Corporation regarding connections and loads	Negligible	N/A

7.0 MITIGATION MEASURES, RESIDUAL IMPACTS AND MONITORING PROGRAMME

7.1 Mitigation measures

7.1.1 Land cover and land uses

During the construction phase, the following mitigation measures will be put in place:

- Reducing the construction footprint to the minimum possible
- Use of equipment and methods that minimise the generation of dust
- Dust mitigation measures such as site hoarding with dust curtains in place around the trench, wetting of the working area, etc.
- Spill trays in place underneath any equipment that may cause oil leaks
- Restoring surrounding natural areas to their pre-existing condition
- Compensating for the loss of native trees
- Close communication with land-owners (such as farmers in the surrounding area) throughout the construction phase
- Adhering to all construction codes of best practice
- Emergency response plans in place for the prevention, containment and mitigation of any extreme events (flooding, heatwaves, oil spills etc).

All indirect impacts related to the construction phase will be reduced to minor significance should the aforementioned mitigation measures be in place.

7.1.2 Landscape Character and Visual Amenity

As part of the finishing works, the MRF building facades and structures must be painted using neutral earth-toned colours that harmonize with the natural aesthetics of the surrounding terrain. This measure is essential to mitigate the visual impact of the proposed development, facilitating seamless integration into the landscape.

The Contractor must strategically install all on-site light fixtures to pre-empt any potential complaints or adverse impacts on nearby residents and fauna. The selection of outdoor lighting systems by the Applicant should prioritize shielded fixtures directed downwards onto internal road areas. This precaution is crucial in minimizing spillover lighting effects that could otherwise result in undesirable glare and disturbances to the nightscape.

7.1.3 Geology, geomorphology, hydrogeology and soils

Subsurface investigation has revealed that the rock mass is dissected by fissures. Any excavation undertaken will lie in Lower Globigerina Limestone. Monitoring of the walls of the excavation as deepening proceeds is recommended. It is recommended to monitor the walls of the excavation, preferably by an experienced geologist due to presence of potentially unstable rock wedges or slabs created due to daylighting of particular joints as

the excavation proceeds. This is required for health and safety reasons and to safeguard third party property on the margins of the site.

7.1.4 Water Bodies

In compliance with the EU Water Framework Directive, any developments shall be designed with the aim of not negatively impacting the quantitative and qualitative status of the water bodies. The main environmental risk which requires the deployment of mitigation measures is wind-blown dispersion.

To minimize wind-blown dispersion and hence mitigate the negative impacts on the geo-environment, several dust-suppression measures can be considered:

- Use of silt fences
- Collection of fine particulates generated during on-site working of stone
- Covering of stored material
- Controlled water-spraying of active areas.

7.1.5 Ecology – Terrestrial

Ecological impacts during construction must be minimised through strict enforcement of site regulations (S.L. 522.09), including dust suppression, controlled storage and transport of materials, and restricted machinery movement. Protective practices include bunded chemical storage, proper waste handling, and avoiding trampling and storage in natural areas. Tree and habitat protection is ensured through phased and ecologically guided transplanting, using native species like *Olea europaea* and *Ceratonia siliqua*. Night works should be avoided to protect nocturnal fauna, and lighting is to be downward-facing. Regular environmental monitoring and well-maintained equipment will reduce risks of degradation and habitat disturbance.

7.1.6 Ecology – Avifauna

During construction, works should avoid the bird breeding season (March–August), minimise site footprint, and limit dust, noise, and artificial light, especially at night. Native landscaping will help restore disturbed areas, while lighting must follow ERA's light pollution guidelines.

During the operational phase, habitat loss must be minimised through green landscaping and nest box installation. Sound barriers are recommended to reduce noise and light spill, while infrastructure should be in place to prevent pollution, manage stormwater, and contain accidental releases, particularly of plastic and toxic materials.

7.1.7 Agricultural Land

An inevitable loss of agricultural land has been forecasted by the Expert. Adherence to PA and ERA regulations and instructions to protect surrounding areas are to be effective to prevent further impacts arising from this development.

7.1.8 Archaeology & Cultural Heritage

According to the impact assessment, the proposed development will directly impact cultural or archaeological features in the area. To prevent any irreversible damage or loss, it is recommended to relocate these features within the development site, if possible.

Furthermore, due to the possibility of undiscovered cultural remains beneath the surface growth and underlying deposits, it is advisable to have an archaeological monitor present during any ground-disturbing works. This will ensure the preservation of any cultural features that may be uncovered during the development process.

Additionally, it is recommended to maintain a minimum distance of 50 meters from any listed cultural heritage interests during the works to ensure their safety and protection.

The consultant does not foresee any impacts on the surrounding archaeology during the projects operational phase.

7.1.9 Noise & vibration

The predicted 'high-level' noise impact from construction activities has been assessed as not significant. The impact magnitude, in the worst-case scenario, is considered minor, with the calculation assumptions tending towards a conservative, worst-case approach.

To further reduce the potential for adverse noise impacts, the following construction noise mitigation measures are recommended as good practice, to be implemented where appropriate:

- Equipment Selection: Consideration will be given to noise emissions when selecting plant and equipment to be used on site.
- Equipment Maintenance: All equipment should be maintained in good working order and fitted with the appropriate silencers, mufflers, or acoustic covers where applicable.
- Noise Source Positioning: Stationary noise sources will be sited as far away as reasonably possible from noise-sensitive receptors. Where necessary and appropriate, acoustic barriers will be used to screen these noise sources.
- Vehicle Movement Control: The movement of vehicles to and from the site will be controlled, and employees will be instructed to ensure compliance with any noise control measures adopted.

There are many strategies that can be employed to further reduce construction noise, such as the limitation of activities that would result in predicted noise levels being reduced. Any such measures should be considered adequate, and the mitigation adopted should not be limited to the measures proposed.

The implementation of these noise mitigation measures, along with the consideration of additional strategies, should help to effectively manage and minimize the potential for adverse noise impacts during the construction phase.

For the closest residential receptors, the operational rating level has been predicted to be below or equal to the daytime and night-time background sound levels. As a result, this assessment has determined that there will be no significant effect. For the closest ecological receptors, the assessment has also determined that no significant effect will occur.

Based on the above, no residual effects are predicted from the operational noise of the Scheme.

In summary, the noise impact assessment has concluded that the operational noise levels are expected to be within acceptable limits for both residential and ecological receptors. As a result, no further mitigation measures are required.

7.1.10 Infrastructure & Utilities

During the construction phase, a range of mitigation measures should be implemented to reduce the likelihood of adverse impacts upon the existing local infrastructures and utilities. Recommended mitigation measures include:

- Liaising with the operators of the existing infrastructure and utilities of the proposed work to open up communication channels.
- Taking extra precautions when working in close proximity to existing infrastructures and utilities to avoid accidental damage.
- Informing Wasteserv Malta of any accidental damage to existing infrastructure and utilities so that damages can be repaired at the expense of the Contractor.
- Site hoarding and other dust mitigation measures should be implemented as necessary to avoid indirect impacts from dust accumulation on existing infrastructure.

The consultant does not envisage the rising of any significant impacts during the operational phase.

7.2 Residual impacts

7.2.1 Land cover and land uses

The residual impacts to the land use and cover remain of major significance due to the change of use of workable agricultural land and tree plantations into commercial uses. However, all indirect impacts related to the construction phase will be reduced to minor significance should the listed mitigation measures be in place.

7.2.2 Landscape Character and Visual Amenity

Despite the Applicant's implementation of a monitoring program and mitigation measures, it is expected that some residual impacts will persist. These are mainly due to the permanent nature of the building and the utilization of rural land in the vicinity.

7.2.3 Geology, Geomorphology, Hydrogeology, Soils & Water Bodies

While a single development site may be considered to have little impact on the various components of the geo-environment, such as geology (including mineral resources), geomorphology, palaeontology, soils, hydrology, and hydrogeology, the residual impact is always present. Even the construction of a house or a larger development site, often accompanied by excavation for a basement, can lead to the following:

- Loss of mineral resource reserves
- Increase in waste stone material
- Loss of geological strata
- Loss of geomorphology
- Loss of soil
- Increase or decrease in runoff, depending on the availability of stormwater storage reservoirs
- Degradation of groundwater quality due to leakage from sewers or pollution of runoff (e.g., from traffic or acid rain)
- Loss of recharge to aquifers

These impacts, when considered individually for a single building or development site, may be very small and not cause a significant change to the geo-environment. However, when these impacts are collectively considered for a larger complex or a town, they can produce a significant and negative cumulative impact on the geo-environment, which is usually associated with the development of towns and large villages.

7.2.4 Water bodies

Although a development site may seem to have a minimal impact on each component of the geo-environment, including hydrological conditions, the residual impact is always present.

The construction of the MRF accompanied by excavation for a basement, will inevitably lead to:

- Loss of mineral resources
- Increase in waste stone material
- Loss of geological strata
- Loss of geomorphology
- Loss of soil
- Increase or decrease in runoff, depending on the availability of stormwater storage reservoirs
- Loss of aquifer recharge
- Degradation of groundwater quality due to leakage from sewers or pollution of runoff (e.g., from traffic or acid rain)

These impacts, when considered individually for a single building or development site, may be very small and not cause a significant change to the geo-environment. However, when these impacts are collectively considered for a larger complex or a town, they can produce a

significant and negative cumulative impact on the geo-environment, which is typically associated with the development of towns and large villages.

7.2.5 Ecology – Terrestrial

Despite the comprehensive adoption of mitigation measures, a number of unavoidable residual impacts are still expected to occur, including:

- Impact on Ecologically Sensitive Terrestrial Ecosystems: The construction site will still have an impact on ecologically sensitive terrestrial ecosystems and assemblages within its footprint.
- Dust, Vibration, and Noise Impacts: Minimal levels of dust, vibration, and noise are expected to persist within the immediate terrestrial ecosystems abutting the construction site boundary.
- Night-Time Light: The construction site will still increase night-time light in previously dark agricultural areas in the surroundings.

7.2.6 Ecology – Avifauna

The proposed Materials Recovery Facility (MRF) development is expected to have minimal negative residual impacts on avifauna if mitigation measures are implemented. The key considerations include reducing the risk of materials ending up in the marine environment during standard operations and in the event of accidents, as well as minimizing light pollution from the MRF.

While the proposed development may have indirect positive effects on avifauna in the wider area and in the longer run compared to the current situation where large proportions of material still end up in open landfills, the permanent destruction of habitat available for breeding and foraging as a result of the proposed development has negative cumulative effects.

It is crucial to acknowledge that the MRF is not a standalone development in the area. It forms part of Wasteserv's larger ECOHIVE Complex, which includes a Waste to Energy (WtE) plant, an Organic Processing Plant (OPP), and a Thermal Treatment Facility (TTF). These facilities will be situated in direct vicinity of the MRF within the AoI-2. Additionally, construction works for the Second Sicily-Malta Interconnector are planned in the wider area, with the onshore cable route partially situated within the AoI-1. Cumulative effects can be expected both during the construction and operational phases of the ECOHIVE Project, originating from increased habitat loss and modification, disturbance (e.g., from noise, increased traffic in the area), and additive light pollution, among other factors.

7.2.7 Agricultural Land

The unique combination of location, aspect, topography, geology, and soil characteristics in this specific site has resulted in a state of limited agricultural potential, as the area seems unable to sustain crop production without sufficient rainfall. Therefore, it can be inferred that the proposed development is expected to result in the loss of some agricultural land.

However, given the small size and low quality of the agricultural land involved, the impact is considered to be relatively limited.

7.2.8 Noise & vibration

The predicted noise impact from the construction of the Scheme, based on BS5228-1:2009+A1:2014, indicates that the noise levels are unlikely to generate an adverse impact. Consequently, no residual effect is currently anticipated.

The predicted noise impact from the operational noise of the Scheme, based on BS4142:2014+A1:2019, also suggests that the noise levels are unlikely to generate an adverse impact. Therefore, no residual effect is currently anticipated.

The predicted noise impact upon wildlife once the proposed development is operational has been evaluated based on the $L_{Aeq,1hr}$ 55dB limit. Since the noise prediction is below this limit for both daytime and night-time, it is believed that there will be no adverse impact on wildlife. Consequently, no residual effect is currently anticipated.

In summary, the noise impact assessments for both construction and operations, as well as the predicted impact on wildlife, indicate that the noise levels are unlikely to generate an adverse impact. Therefore, no residual effect is currently foreseen.

7.2.9 Infrastructure & Utilities

If the Contractor operates diligently, implements additional safety measures around the current infrastructure and utilities, and conducts any necessary repair work accurately in case of accidents, the Scheme should not cause any residual impacts.

7.3 Monitoring programme

7.3.1 Land cover and land uses

It is recommended that general construction site monitoring is carried out during the construction phase. Such monitoring will ensure that the Contractor is abiding by the ENVIRONMENTAL CONSTRUCTION SITE REGULATIONS OF 2007 (S.L.552.09) to help keep the adverse impacts of the works to a minimum.

Monitoring during the operational phase is not deemed necessary.

7.3.2 Landscape Character and Visual Amenity

The Applicant should engage an environmental expert to monitor the works during the construction phase to ensure compliance with the ENVIRONMENTAL CONSTRUCTION SITE REGULATIONS OF 2007 (S.L.552.09). Attention should be given to the erection of appropriate site boundary walls, the mitigation of dust dispersion and the containment of stockpiles and machinery within the site boundaries. This will ensure that the Contractor manages the works effectively to reduce the visual impacts.

7.3.3 Geology, Geomorphology, Hydrogeology and Soils

It is recommended that general construction site monitoring is carried out during the construction phase. Such monitoring will ensure that the Contractor is abiding by the ENVIRONMENTAL CONSTRUCTION SITE REGULATIONS OF 2007 (S.L.552.09) to help keep the adverse impacts of the works to a minimum.

Monitoring during the operational phase is not deemed necessary by the Expert.

7.3.4 Water Bodies

Periodic checks of effluents, second-class water effluents, and other waste disposal systems would be crucial to ensure that no harmful substances are leaked into the ground. Conducting groundwater analysis as part of the baseline study would establish a baseline water quality, which would then serve as a reference point for future monitoring of the water quality.

By regularly monitoring the effluents and groundwater, any potential contamination or degradation of the water resources can be promptly identified and addressed. The baseline water quality data obtained from the initial groundwater analysis would provide a benchmark against which future water quality can be compared, allowing for the detection of any changes or impacts that may arise from the construction and operation of the proposed project.

This proactive approach to monitoring and maintaining water quality would help safeguard the sensitive receptors, such as the Mean Sea Level Aquifer and coastal waters, from potential contamination or degradation. By implementing these measures, the project can minimize the risk of adverse impacts on the geo-environment and ensure the protection of critical water resources.

7.3.5 Ecology

Should the Scheme be permitted to proceed, a comprehensive monitoring program will be implemented during the construction phases to ensure compliance with environmental regulations and minimize potential impacts. The construction management plan prepared at the project planning phase will be updated by the chosen contractor to ensure that the best practicable environmental options are followed throughout the development process.

Periodic monitoring is recommended during the construction phase to verify that mitigation measures are in place and functioning as intended. This will help prevent any unwarranted impacts that may arise due to deviations from proposed working practices, which could have additional impacts beyond those originally predicted. All monitoring data will be presented to the relevant authorities at pre-agreed frequencies to ensure transparency and compliance with regulatory requirements.

A tree specialist is recommended to oversee and enact interventions directly related to the pruning or relocation of native tree species. All interventions related to protected native trees are subject to permits provided by the Environment and Resources Authority.

7.3.6 Agricultural Land

Given that land loss is regarded as an inevitable event during the construction of a new Materials Recovery Facility (MRF), the consultant does not perceive the necessity of monitoring agricultural fields as part of the monitoring programme.

7.3.7 Archaeology & Cultural heritage

Given the possibility of underlying cultural remains at undisturbed levels within the overgrowth and underlying deposits, it is crucial to have an archaeological monitor present during any ground disturbance works. This monitoring will ensure the preservation of any cultural features that may be discovered during the development process.

Overall, the role of an archaeological monitor is essential in ensuring the preservation and protection of cultural features during ground disturbance works, and their presence and vigilance can help prevent irreversible damage or loss to these valuable resources.

7.3.8 Noise & vibration

Due to the forecasted noise levels far below the applicable thresholds established by current legislations, the Expert does not envisage the need to install temporary or permanent monitoring stations.

7.3.9 Infrastructure & Utilities

In the event that the Contractor inadvertently damages the infrastructure and utilities during the construction phase, it is advisable to have a technically competent individual supervise the repair work. This will ensure that the repairs meet the required standards and that the damaged items are returned to their original state with minimal disruption.

However, monitoring of infrastructure and utilities is not necessary during the operational phase.

8.0 CONCLUSION

The proposed project involves the construction of a new Materials Recovery Facility (MRF) which aims to increase the recycling rates of the Maltese Islands. The MRF will be located within the ECOHIVE Complex where other waste treatment facilities are present. It is designed to operate in parallel with the existing waste treatment facilities, minimizing landfilling. The project will adhere to national and European technical standards throughout all stages of design, construction, and testing with special emphasis on fire protection measures.

Malta has been actively working towards improving overall recycling rates, intensifying public awareness, and reducing landfilled waste in line with European objectives. To achieve these goals, significant strides have already been made in improving the waste management sector. These include the planned Organic Processing Plant (OPP) and Thermal Treatment Facility (TTF) which are currently subject to planning permit procedures.

The MRF is considered a high-priority project in Malta's efforts to improve the countrywide waste management sector, meet environmental targets, and fulfil climate change obligations. It is specifically mentioned in the LONG-TERM WASTE MANAGEMENT PLAN 2021-203 as an important project for achieving the nation's long-term vision of recycling rates established by EU. The proposed MRF will not only meet the forecasted recycling rates but also significantly reduce landfilling rates, thus contributing to greenhouse gas emissions with limited methane generation from landfills.

However, it must be noted that the construction of a new MRF is expected to yield some adverse impacts on the environment. The project has been purposely designed to optimise the vehicular activities and to minimize impacts on terrestrial and marine features of ecological, cultural, infrastructural and social importance.

The development of a new Materials Recovery Facility (MRF) in Malta is expected to have certain environmental impacts that cannot be mitigated. One of the most notable concerns is the visual impact of the facility, which will be compounded by the presence of other waste treatment facilities in the area. This cumulative effect may significantly alter the aesthetic appeal of the landscape, potentially affecting the tourist and traditional visitor experience of this region.

Furthermore, the take-up of land for development is a critical issue that cannot be overlooked. The construction of the facility will lead to the irreversible loss of habitats and species while altering the use of the land, which was previously dedicated to agriculture. This change in land use may also pose risks to the future exploitation of underground resources, including mineral resources, and the status of the underlying groundwater body. The altered land use may also lead to reduced rainfall infiltration, resulting in increased run-off volumes and potentially causing flooding issues.

The cumulative impact of these environmental concerns underscores the need for careful planning of a monitoring scheme for identifying mitigation measures that can further reduce the negative effects of the MRF during its development. It is essential to strike a balance between the need for waste management infrastructure and the protection of the environment and the local ecosystem.

During operations no significant interventions are expected on a day-to-day basis, excluding when maintenance is required and/or to address emergency situations, such as the occurrence of a fire. Mitigation measures and adherence to legislation will ensure the sustainable operation of the waste treatment process throughout its lifetime.

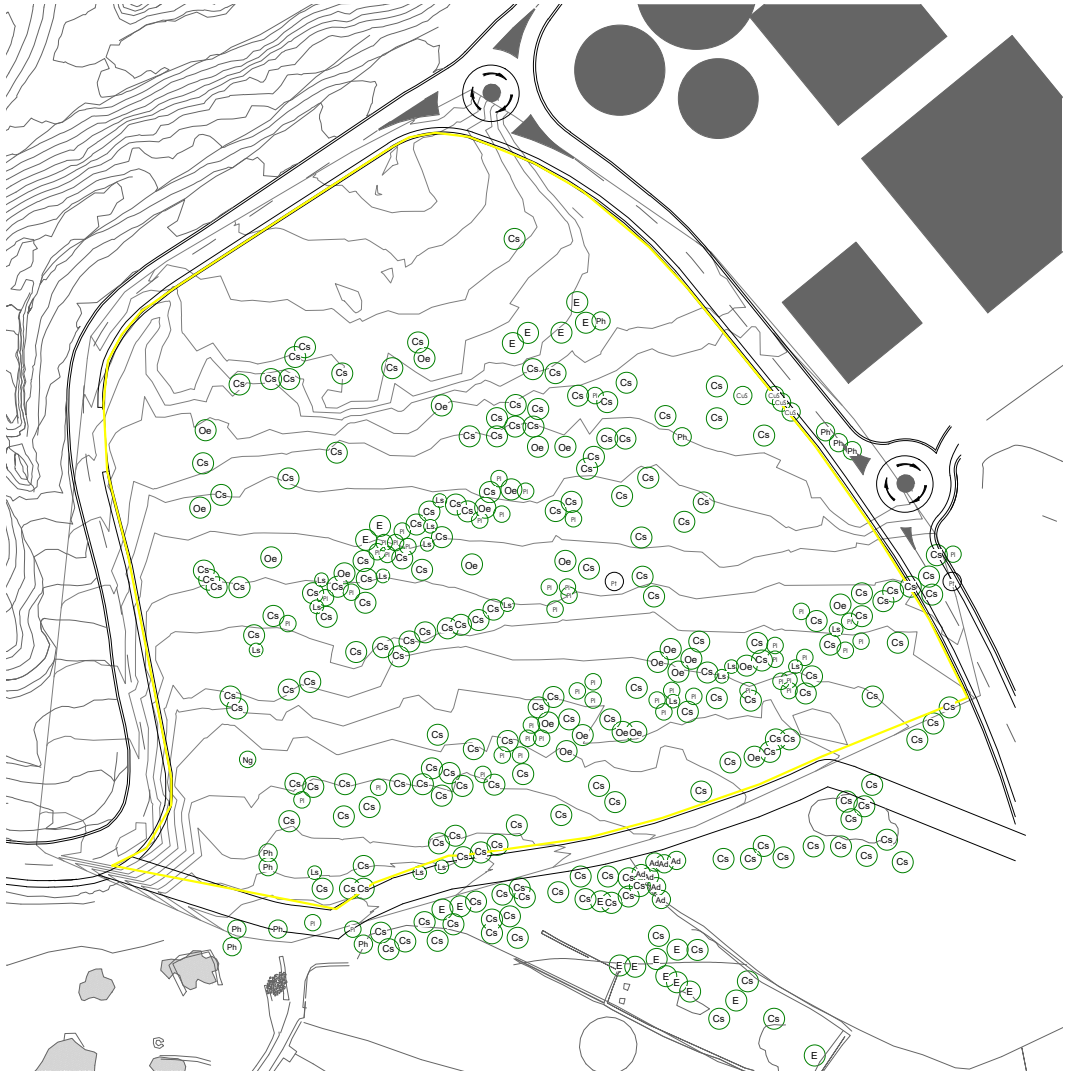
In conclusion, the development of the new MRF is a vital project for Malta's waste management sector and efforts to improve recycling rates, minimize landfilling rates, and reduce GHGs emissions. It aligns with the country's environmental targets, climate change obligations, and long-term vision of carbon neutrality. The project holds significant potential for Malta's sustainable waste management future.

APPENDIX 1

High-resolution Drawings and Plans

Ad	Arundo donax
Ng	Nicotiana glauca
Cs	Ceratonia siliqua
Oe	Olea europaea
E	Eucalyptus sp.
Ph	Pinus halepensis
CuS	Cupressus sempervirens
Ls	Loncera sp.
Ple	Pistaccia terebintus
Pl	Pistaccia lentiscus

Legend- Landscaping
1 : 100



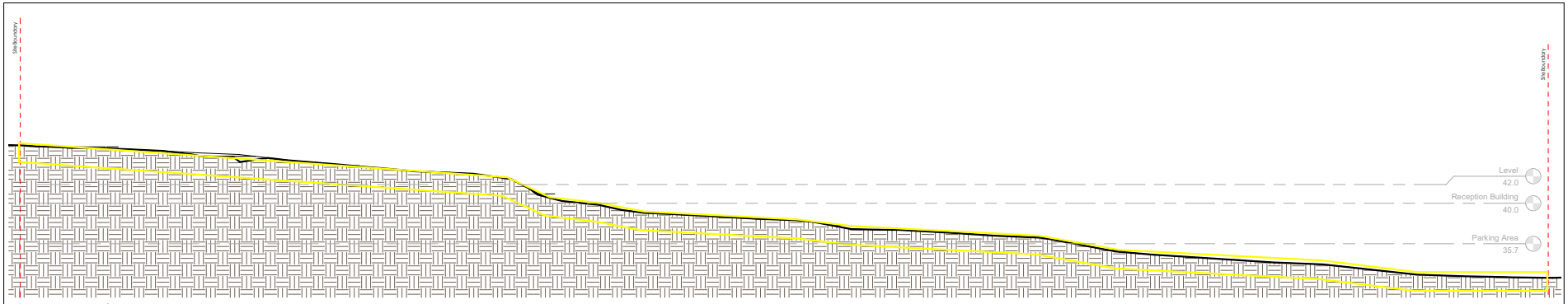
1 Existing Site- Landscaping
1 : 500

Revision Schedule

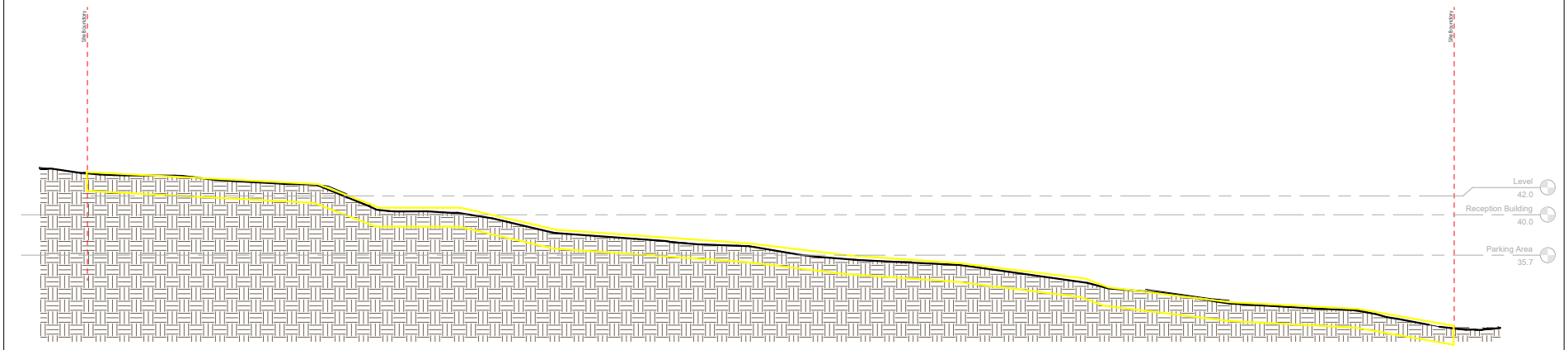
Number	Date	Description
00	28/03/2022	original submission

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
T. [00356] 2149-1934 F. [00356] 2148-2978

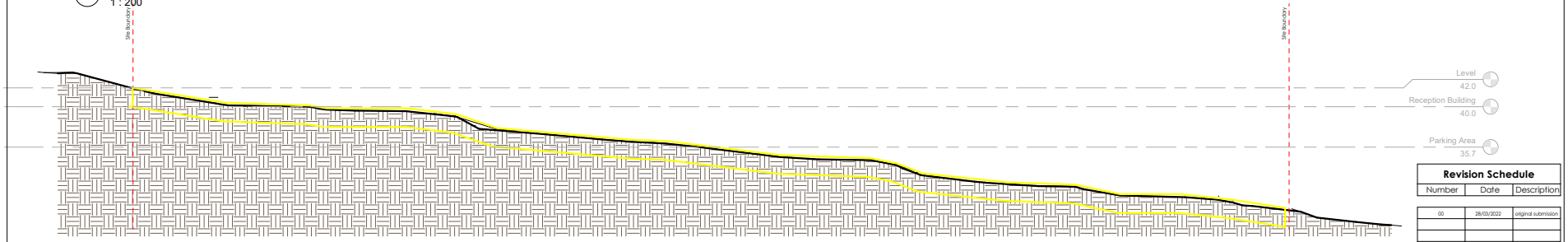
CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Existing Site
DRAWN BY	ADJ SN
CHECKED	Robert Sant
DATE	19/04/2022
PAPER SIZE	ISO A1 (594 x 841mm)
JOB REF	2944
SCALE	As Indicated
DWG REF	02-003-00
REV	



1 Section A
1 : 200



2 Section B
1 : 200



3 Section C
1 : 200

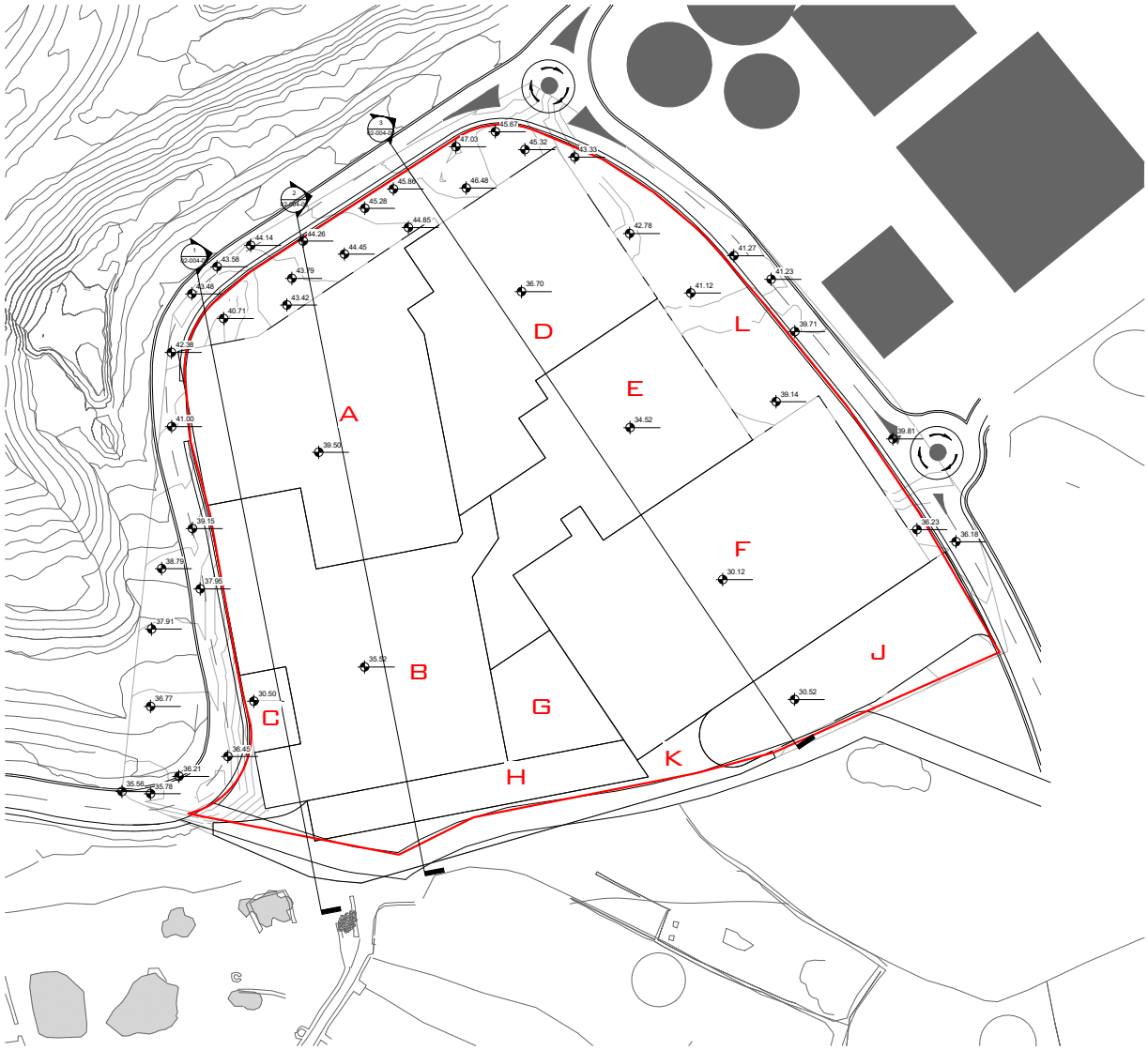
Revision Schedule

Number	Date	Description
00	28/03/2022	original submission

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t. [00356] 2149-1934 f. [00356] 2148-2978

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Existing Sections
DRAWN BY	ADJ SN
PAPER SIZE	ISO A1 (594 x 841mm)
SCALE	1 : 200
ARCHITECT	Robert Sant
JOB REF	2944
DWG REF	02-004-00
DATE	19/04/2022



1 Site
1 : 500

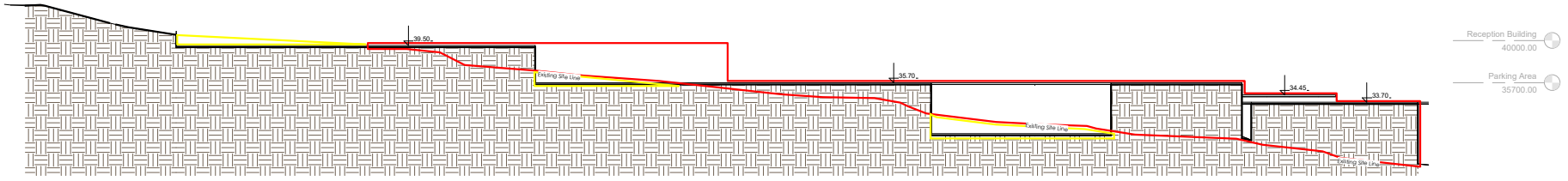
Ground Works Schedule				
Name	Projected Area	Cut	Fill	Net cut/fill
A	3111 m²	3877.34 m³	3719.98 m³	-157.37 m³
B	3364 m²	104.83 m³	7679.67 m³	7574.84 m³
C	200 m²	0.00 m³	0.00 m³	0.00 m³
D	2535 m²	15040.91 m³	0.00 m³	-15040.91 m³
E	2244 m²	7712.15 m³	167.35 m³	-7544.79 m³
F	4003 m²	20968.74 m³	0.00 m³	-20968.74 m³
G	557 m²	0.00 m³	1767.34 m³	1767.34 m³
H	738 m²	0.00 m³	3209.70 m³	3209.70 m³
J	1289 m²	3738.05 m³	0.00 m³	-3738.05 m³
K	1139 m²	0.00 m³	4969.79 m³	4969.79 m³
L	6855 m²	20.86 m³	62.86 m³	42.00 m³
Grand total: 11		51462.87 m³	21576.68 m³	-29886.19 m³

Revision Schedule

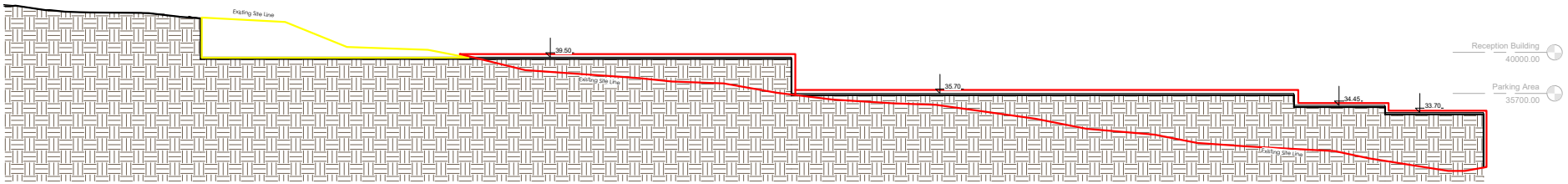
Number	Date	Description
00	19/04/2022	original submission

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t. [00356] 2149-1934 f. [00356] 2148-2978

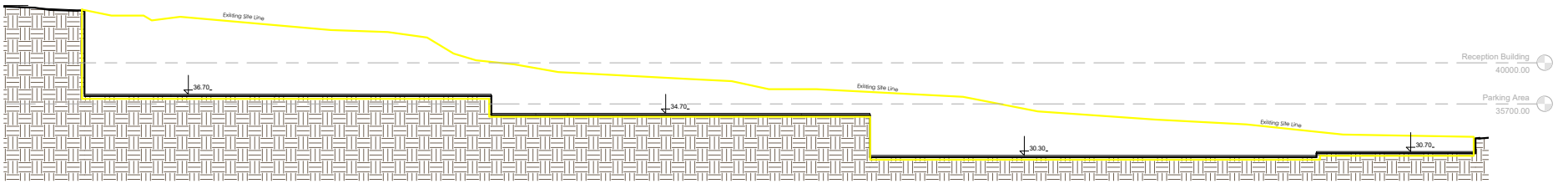
CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Existing/ Proposed Ground Works Plan
DRAWN BY	ADJ SN
PAPER SIZE	A0 (841 x 1189 MILLIMETRES)
SCALE	1 : 500
CHECKED	Robert
DATE	19/04/2022
JOB REF	2944
DWG REF	02-005-00
REV	



1 Section A
1 : 200



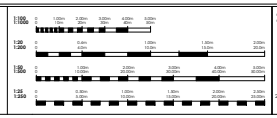
2 Section B
1 : 200



3 Section C
1 : 200

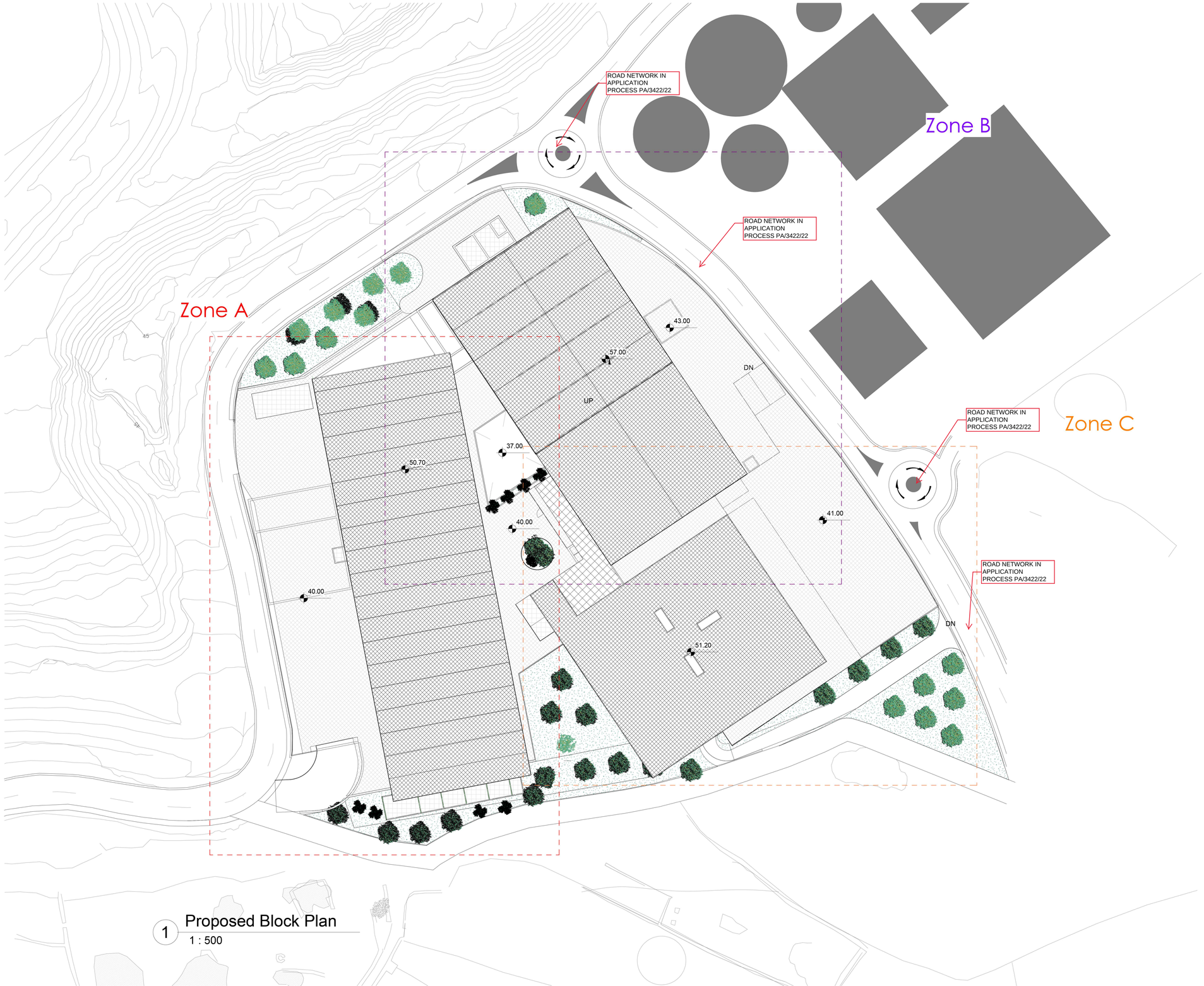
Revision Schedule

Number	Date	Description
00	28/03/2022	original submission



architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t. [00356] 2149-1934 f. [00356] 2148-2978

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Existing/ Proposed Ground Works Sections
DRAWN BY	ADJ SN
PAPER SIZE	A1
SCALE	1 : 200
CHECKED	Robert Sant
DATE	20/04/2022
JOB REF	2944
DWG REF	02-005a-00



1 Proposed Block Plan
1 : 500

Revision Schedule

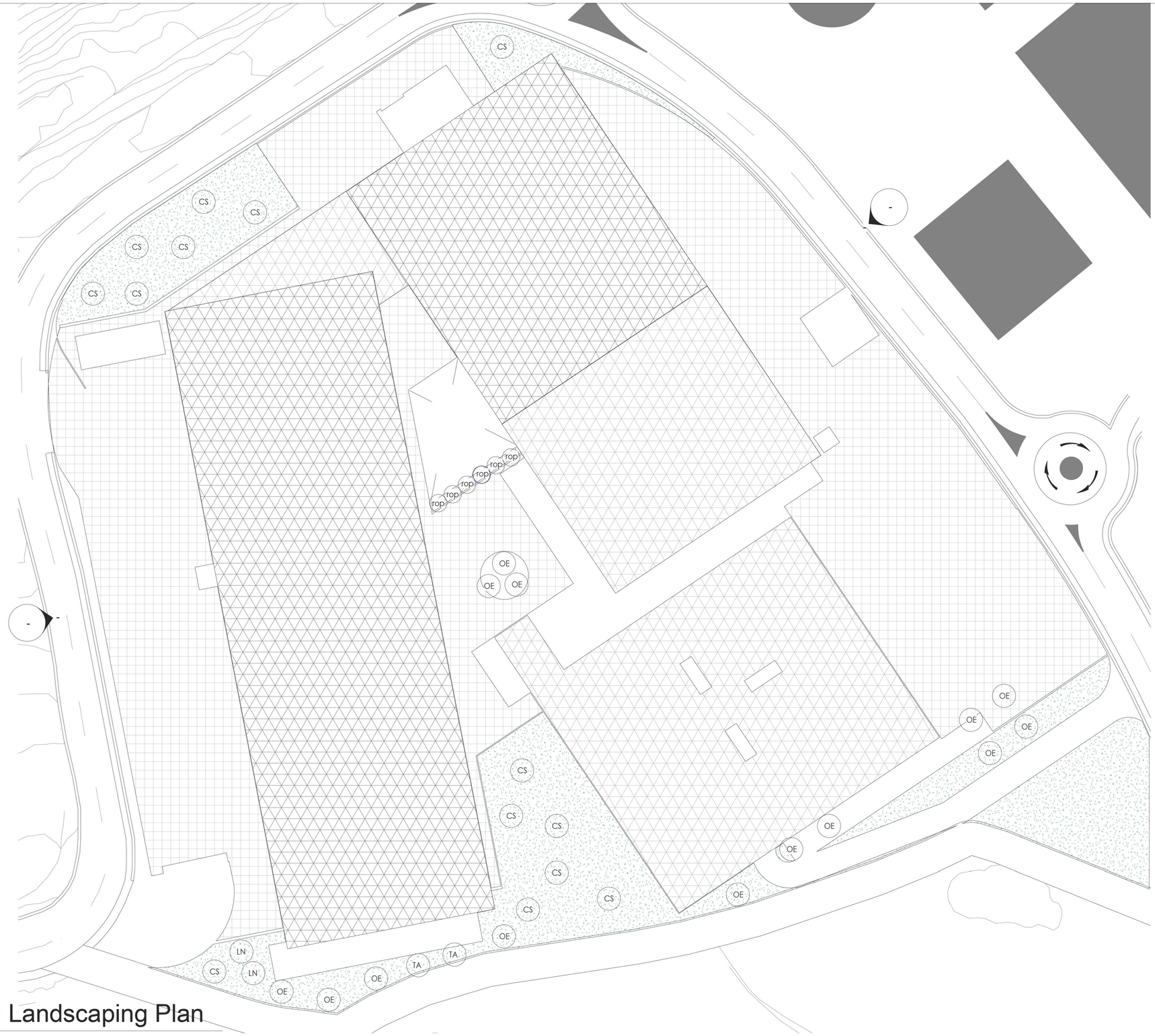
Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Block Plan
DRAWN BY	AD / SN
ARCHITECT	Robert Sant
DATE	19/04/2022
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 500 @ 1189
DWG REF	02-006-00



Symbol	Scientific Name	English Name	Maltese Name	Qty
OE	Olea Europaea	olive	Żebbuġ	14
CS	Ceratonia siliqua	carob	Ħarrub	14
TA	Tamarix africana	African tamarix	Bruk	3
LN	Laurus nobilis	bay laurel	Rand	2
ROP	Rosmarinus officinalis prostratus	rosemary	Klin	6
	N/A	landscaped area	N/A	2690sqm

1 Proposed Landscaping Plan

1 : 500

Revision Schedule		
Number	Date	Description
00	19/04/2022	original submission

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m

1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m

1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m

1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

dtr

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Preliminary Landscape Plan
DRAWN BY	Author
ARCHITECT	Checker
DATE	04/19/22
PAPER SIZE	ISO-A2 [420 x 594mm]
SCALE	1 : 500
JOB REF	2944
DWG REF	02-026-00 rev

1 Vehicular Flows Level +40.00

1 : 400

Revision Schedule		
Number	Date	Description

1:100 1:1000 | 1:20 1:200 | 1:50 1:500 | 1:25 1:250

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Vehicular Flows Level +40.00
DRAWN BY	AD / SN
ARCHITECT	RS
DATE	04/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 400
DWG REF	02-018-00
REV	-

Key:

Maintenance

Employee / Visitor

1 Vehicular Flow Level +37.00

1 : 400

Revision Schedule

Number	Date	Description

1:100 1:1000 — 0 1.00m 10m 2.00m 20m 3.00m 30m 4.00m 40m 5.00m 50m

1:20 1:200 — 0 0.4m 4.0m 1.00m 10.0m 1.50m 15.0m 2.00m 20.0m

1:50 1:500 — 0 1.00m 10.00m 2.00m 20.00m 3.00m 30.00m 4.00m 40.00m 5.00m 50.00m

1:25 1:250 — 0 0.50m 5.00m 1.00m 10.00m 1.50m 15.00m 2.00m 20.00m 2.50m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

dtr

25/27, Carmel Street, Birkirkara BKR 1248, Malta

t [00356] 2149-1934 f [00356] 2148-2978

info@dtrmalta.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Vehicular Flows Level +37.00
DRAWN BY	AD / SN
ARCHITECT	RS
DATE	04/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 400
DWG REF	02-019-00
REV	1

2 Pedestrian Flows Workshop Area
1 : 250

1 Pedestrian Flows Reception Area
1 : 250

Key: Plant Workers Office Workers Visitors

Revision Schedule		
Number	Date	Description

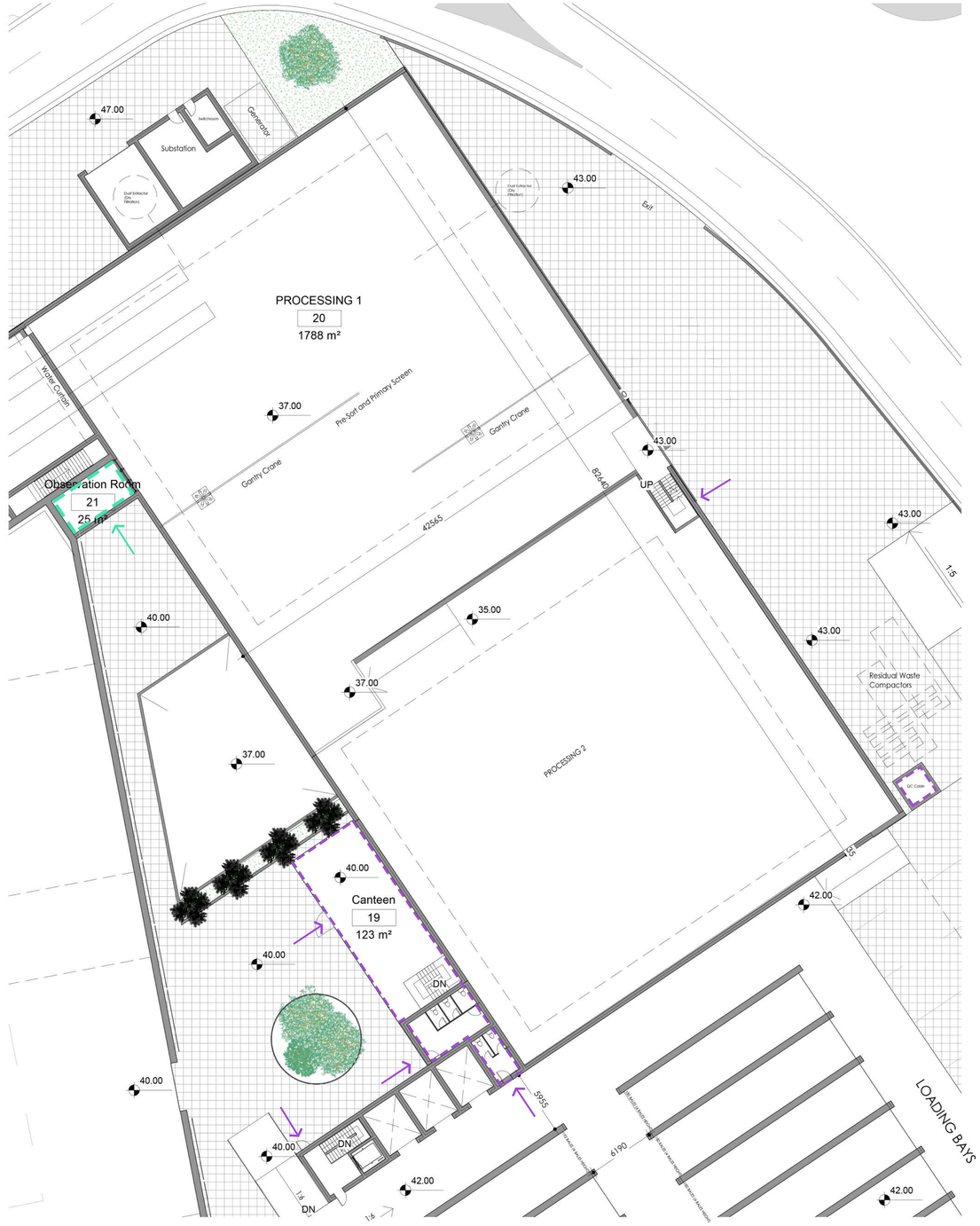
1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Pedestrian Flows 1
DRAWN BY	AD / SN
ARCHITECT	RS
DATE	08/04/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 250
DWG REF	02-020-00
REV	

1 Pedestrian Flows_Parking and Office Spaces

1 : 250



2 Pedestrian Flows Processing Building

1 : 250

Revision Schedule

Number	Date	Description

Key: Plant Workers · Office Workers · Visitors

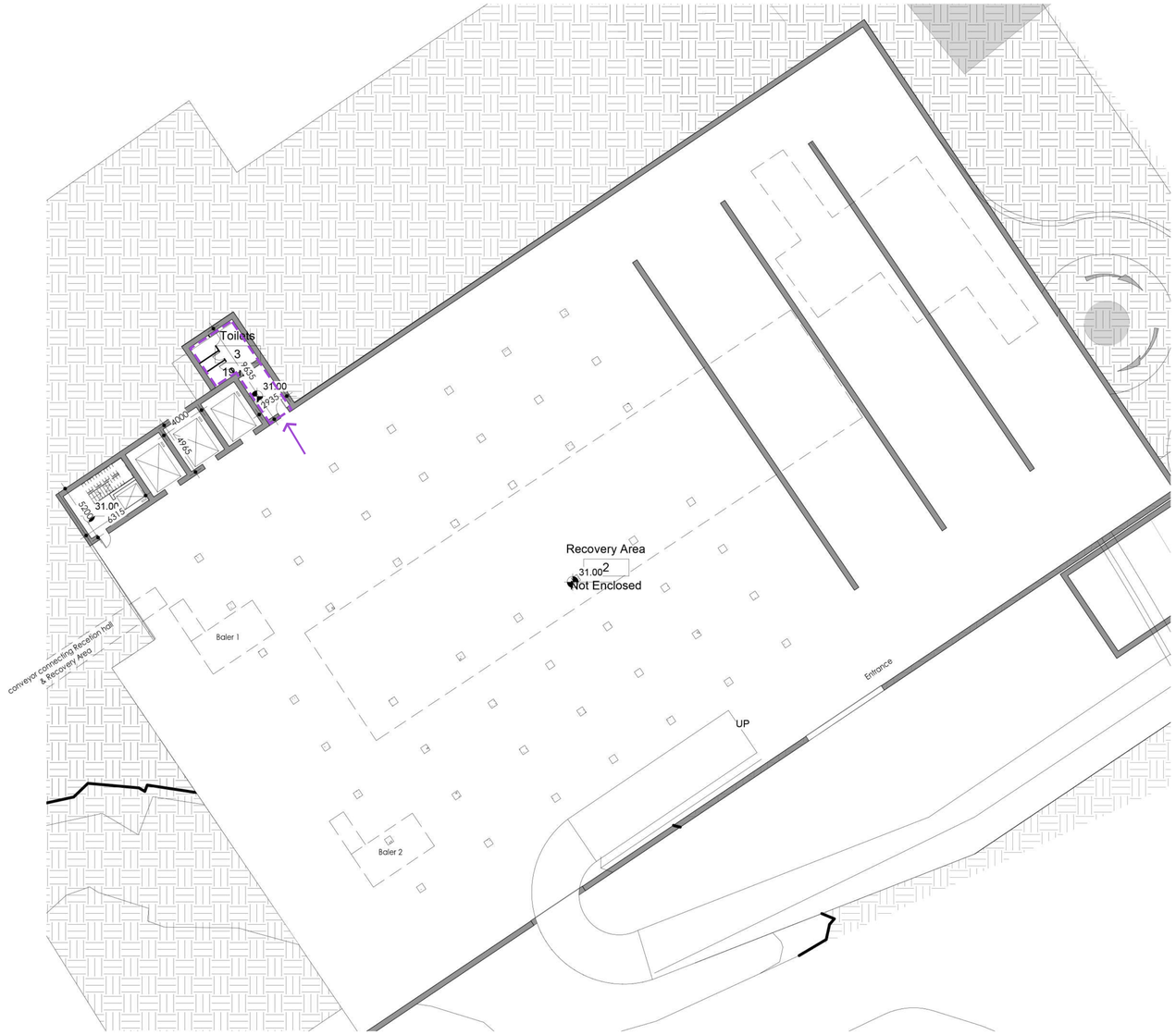
1:100 1:1000 · 1:20 1:200 · 1:50 1:500 · 1:25 1:250

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Pedestrian Flows 2
DRAWN BY	AD / SN
ARCHITECT	RS
DATE	08/04/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 250
DWG REF	02-021-00
REV	1

1 Pedestrian Flows Storage Area
1 : 250



2 Pedestrian Flows Recovery Building
1 : 250

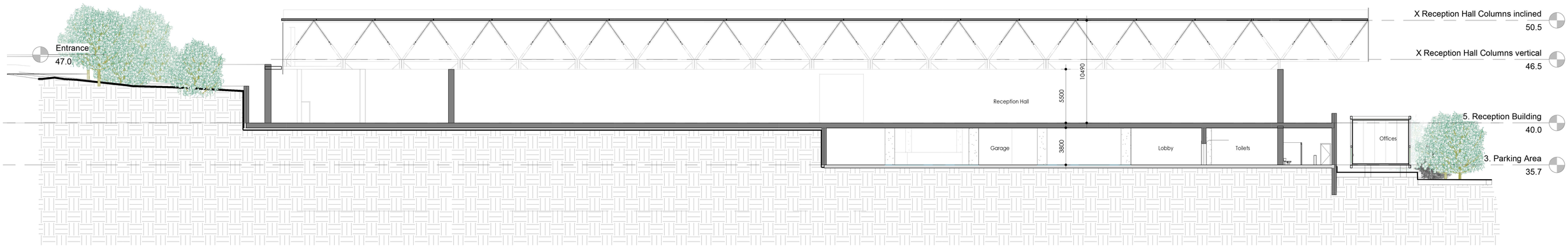
Revision Schedule		
Number	Date	Description

Key: Plant Workers Office Workers Visitors

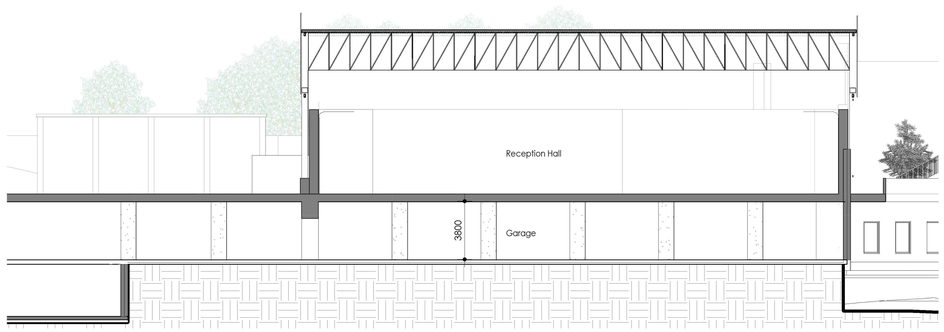
1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

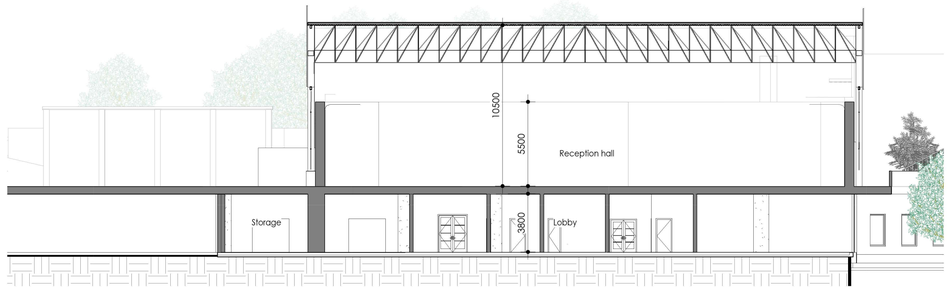
CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Pedestrian Flows 3
DRAWN BY	AD / SN
ARCHITECT	RS
DATE	08/04/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 250 @ A1
DWG REF	02-022-00



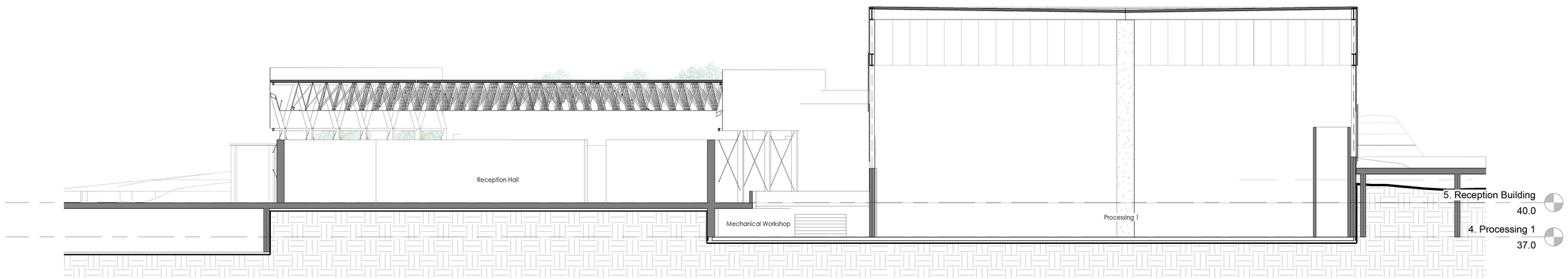
1 Section A
1 : 200



2 Section B
1 : 200



3 Section C
1 : 200



4 Section D
1 : 200

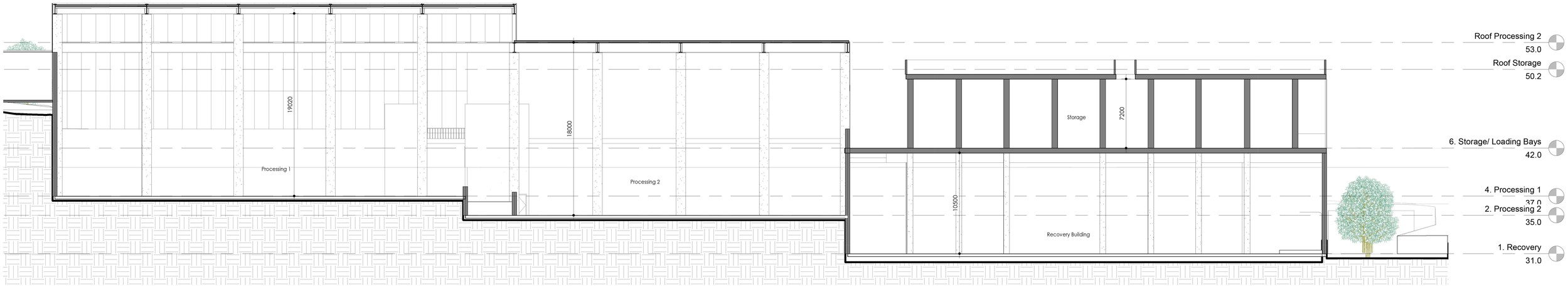
Revision Schedule

Number	Date	Description

1:100 / 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m; 0 10m 20m 30m 40m 50m
1:20 / 1:200 — 0 0.4m 1.00m 1.50m 2.00m; 0 4.0m 10.0m 15.0m 20.0m
1:50 / 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m; 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 / 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m; 0 5.00m 10.00m 15.00m 20.00m 25.00m

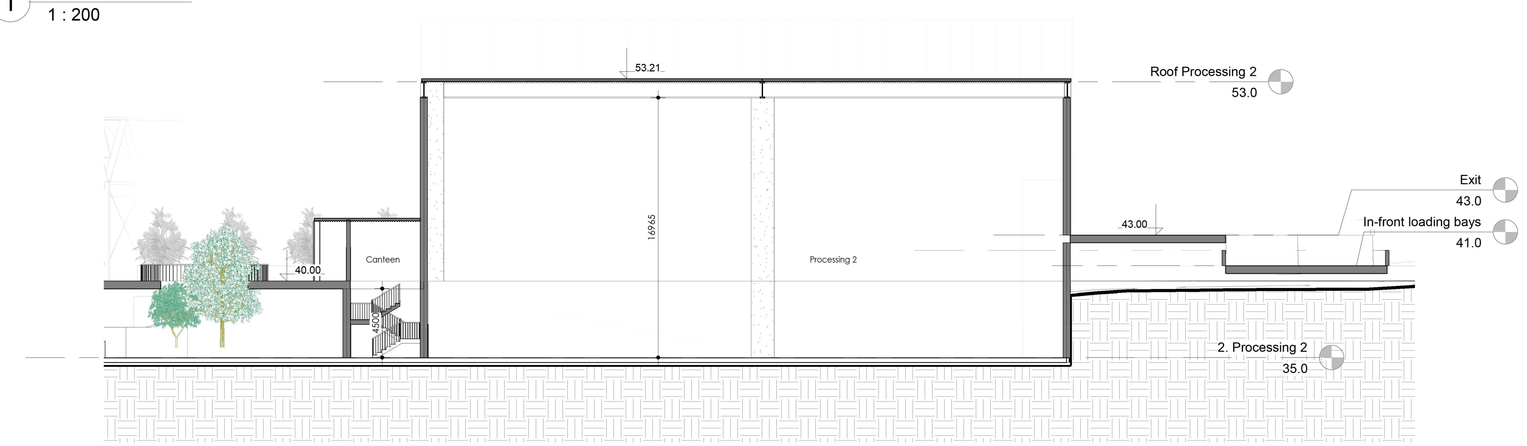
architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Sections
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 200
DWG REF	02-024-01
REV	



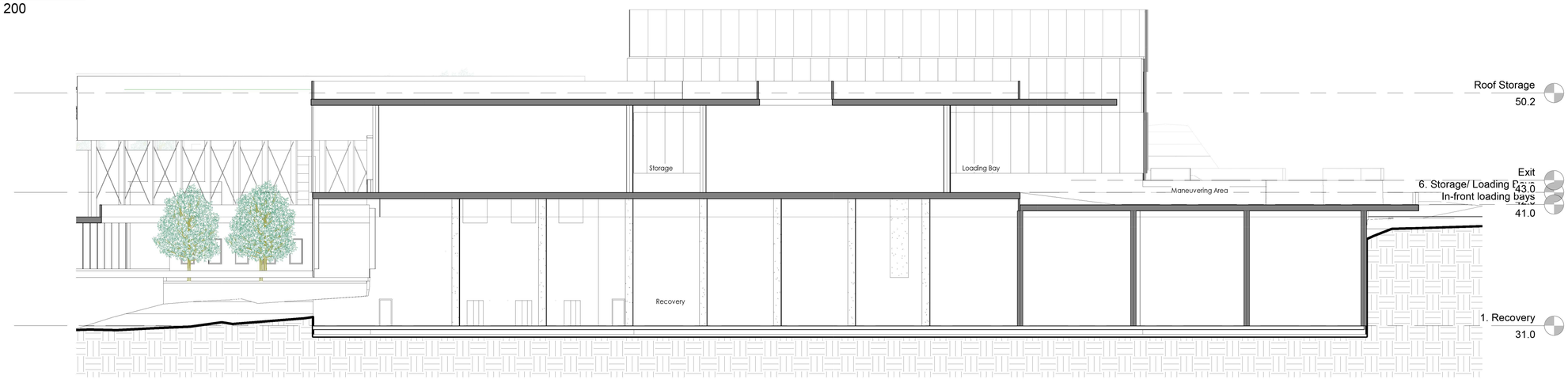
1 Section E

1 : 200



2 Section F

1 : 200



3 Section G

1 : 200

Revision Schedule		
Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m; 0 10m 20m 30m 40m 50m

1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m; 0 4.0m 10.0m 15.0m 20.0m

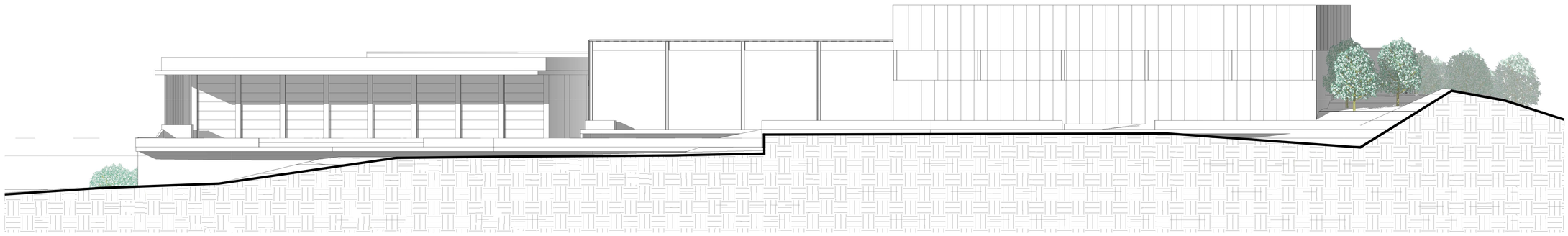
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m; 0 10.00m 20.00m 30.00m 40.00m 50.00m

1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m; 0 5.00m 10.00m 15.00m 20.00m 25.00m

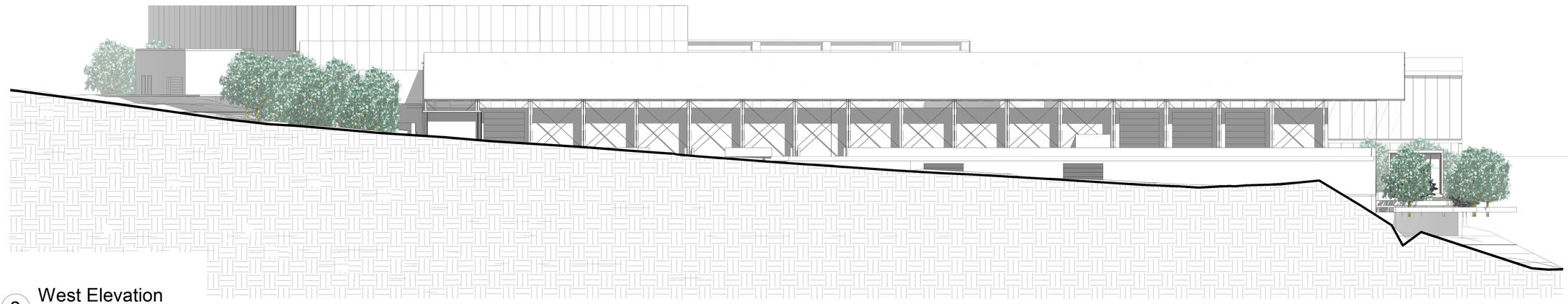
architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Sections 2
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
SCALE	1 : 200
JOB REF	2944
DWG REF	02-025-01
REV	



1 East Elevation
1 : 250



2 West Elevation
1 : 250

Revision Schedule

Number	Date	Description

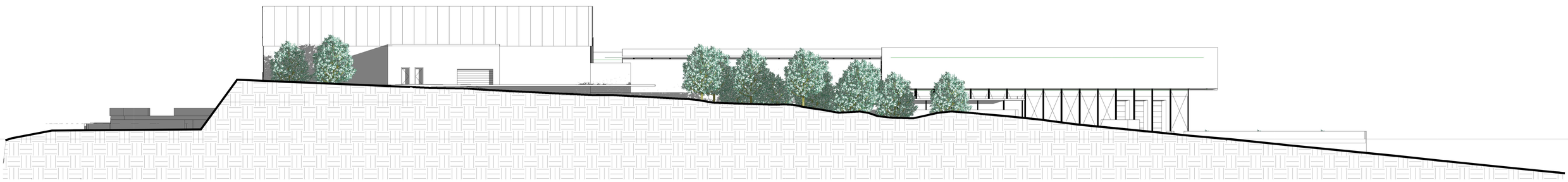
1:100 1:1000 — 0 1.00m 10m 2.00m 20m 3.00m 30m 4.00m 40m 5.00m 50m
1:20 1:200 — 0 0.4m 4.0m 1.00m 10.0m 1.50m 15.0m 2.00m 20.0m
1:50 1:500 — 0 1.00m 10.00m 2.00m 20.00m 3.00m 30.00m 4.00m 40.00m 5.00m 50.00m
1:25 1:250 — 0 0.50m 5.00m 1.00m 10.00m 1.50m 15.00m 2.00m 20.00m 2.50m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Elevations
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	07/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 250
DWG REF	02-026-01
REV	

1 Front Elevation
1 : 250



2 Back Elevation
1 : 250

Revision Schedule

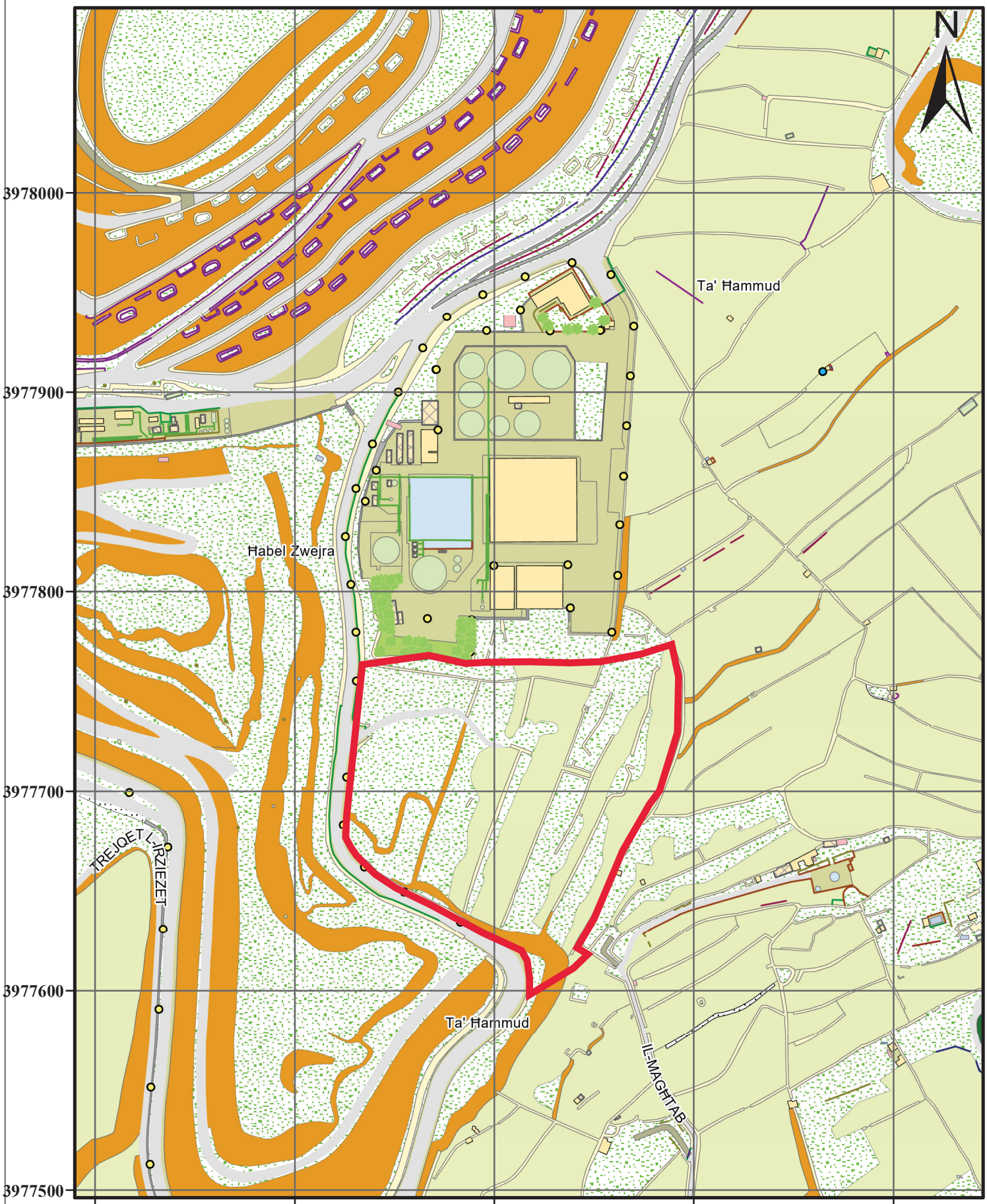
Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.20m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Proposed Elevations 2
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	13/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	1 : 250
DWG REF	02-027-01
REV	1



Date Printed: 26/09/2022

Compiled and published by the Mapping Unit, Planning Authority.
ERDF.02.030 - SIntegraM data, (2018), Developing Spatial Data Integration for the Maltese Islands, Planning Authority.

WGS 1984 UTM Zone 33N EPSG: 32633 M.S.L. (Mean sea level).Scale factor at the central meridian 0.9996.
Central meridian has a false origin of 500,000m at 150 East of Greenwich.
Northern coordinates have an origin of 0m at the Equator.

PLANNING AUTHORITY
St.Francis Ravelin, Floriana.
Tel: +356 2290 0000, Fax: +356 2290 2295
www.pa.org.mt, mappingshop@pa.org.mt

1 Reception Hall Roof Plan
1 : 250

2 Zone A RefPlan
1 : 1000

Revision Schedule		
Number	Date	Description

1:100 0 1.00m 2.00m 3.00m 4.00m 5.00m
1:1000 0 10m 20m 30m 40m 50m

1:20 0 0.4m 1.00m 1.50m 2.00m
1:200 0 4.0m 10.0m 15.0m 20.0m

1:50 0 1.00m 2.00m 3.00m 4.00m 5.00m
1:500 0 10.00m 20.00m 30.00m 40.00m 50.00m

1:25 0 0.50m 1.00m 1.50m 2.00m 2.50m
1:250 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmc.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Reception Building Roof Plan Level +50.70
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-007-01
REV	1

1 Reception Hall
1 : 250

2 Zone A Ref Plan
1 : 1000

Revision Schedule		
Number	Date	Description

1:100 1:1000 | 1:20 1:200 | 1:50 1:500 | 1:25 1:250

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrs.com

CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Reception Hall Level +40.00
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-008-01
REV	1

1 Parking Area and Offices
1 : 250

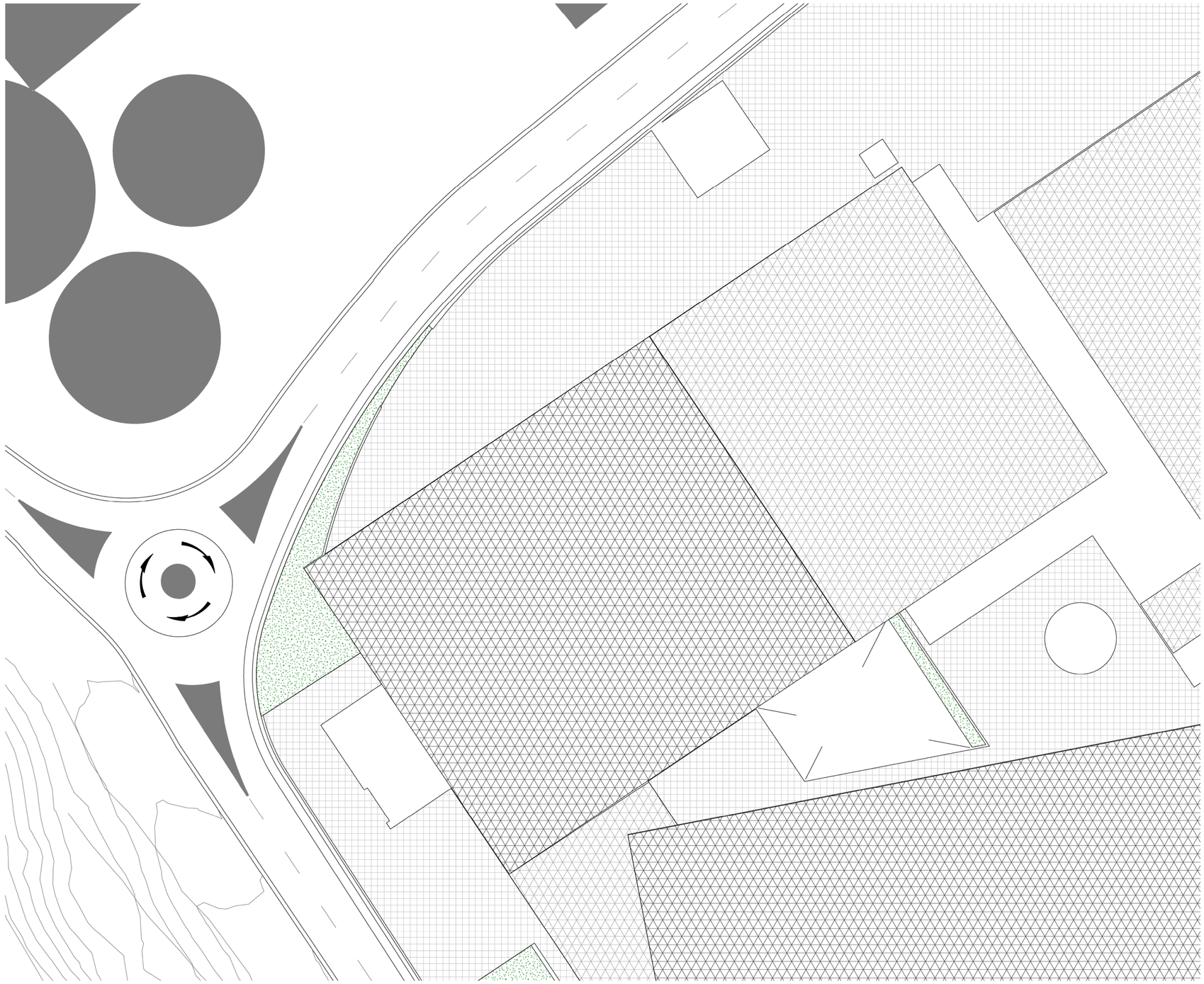
2 ZoneA Ref Plan
1 : 1000

Revision Schedule		
Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmc.com

CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Parking Garage and Office Space Level +37.40
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	06/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-009-01
REV	1



1 Processing Building Roof Plan
1 : 250

2 Zone B RefPlan
1 : 1000

N

Revision Schedule		
Number	Date	Description

1:100 1:1000 — 0 1.00m 10m 2.00m 20m 3.00m 30m 4.00m 40m 5.00m 50m
1:20 1:200 — 0 0.4m 4.0m 1.00m 10.0m 1.50m 15.0m 2.00m 20.0m
1:50 1:500 — 0 1.00m 10.00m 2.00m 20.00m 3.00m 30.00m 4.00m 40.00m 5.00m 50.00m
1:25 1:250 — 0 0.50m 5.00m 1.00m 10.00m 1.50m 15.00m 2.00m 20.00m 2.50m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmc.com

CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Processing Building Roof Plan Level +56.91
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	06/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-010-01
REV	1

1 Processing Building
1 : 250

2 Zone B Ref Plan
1 : 1000

N

Revision Schedule		
Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

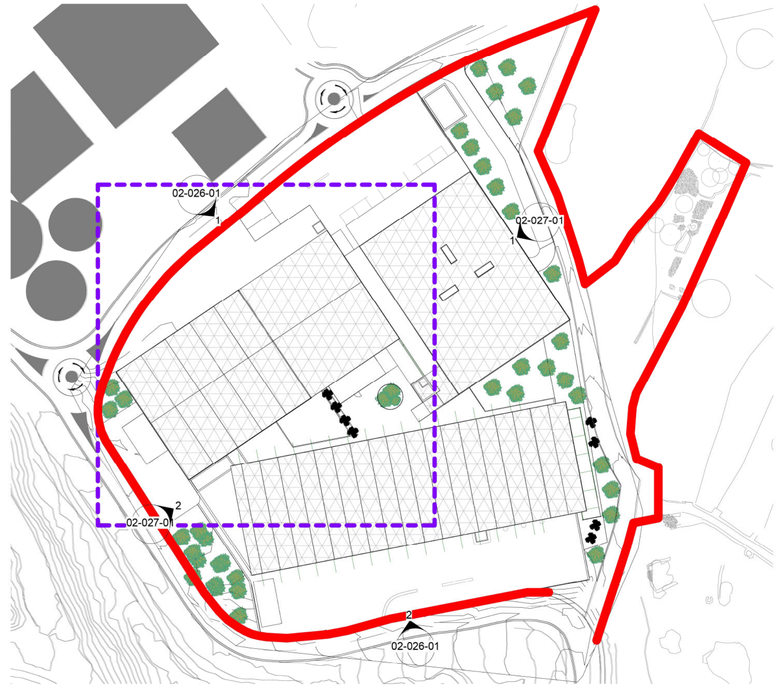
architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmlt.com

CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Processing Building Level +40.00
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-011-01
REV	1

1 Processing Building and Workshop area

1 : 250



2 ZoneB Ref Plan

1 : 1000

Revision Schedule

Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m; 0 10m 20m 30m 40m 50m

1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m; 0 4.0m 10.0m 15.0m 20.0m

1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m; 0 10.00m 20.00m 30.00m 40.00m 50.00m

1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m; 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrs.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Processing Building Level +37.00
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	07/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-012-01
REV	

1 Processing Building (Rooms under workshops)
1 : 250

2 ZoneB RefPlan
1 : 1000

Revision Schedule

Number	Date	Description

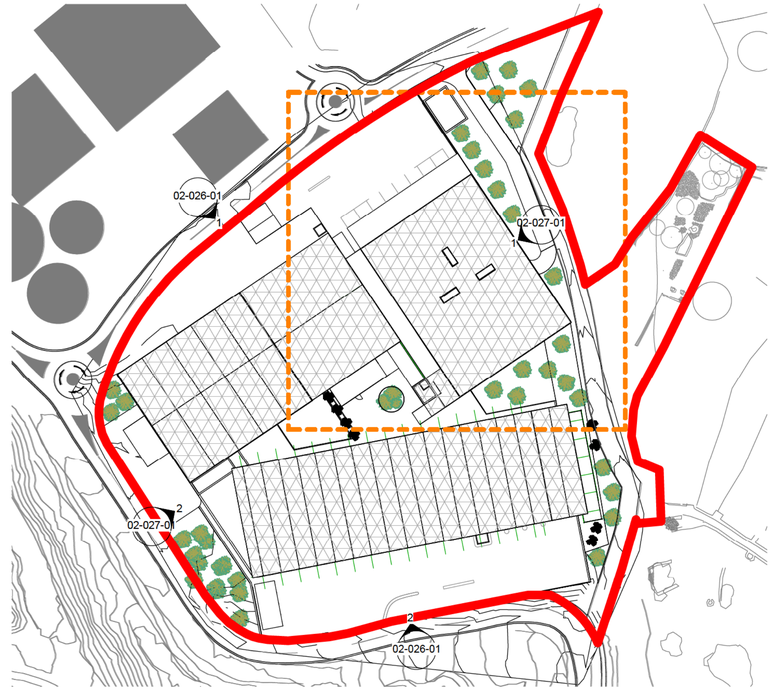
1:100 1:1000 | 1:20 1:200 | 1:50 1:500 | 1:25 1:250

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmlt.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Processing Building Level +35.00
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	06/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-013-01
REV	1

1 Storage Area Roof Plan
1 : 250



2 Zone C RefPlan
1 : 1000

N

Revision Schedule		
Number	Date	Description

1:100 1:1000 — 0 10m 1.00m 20m 2.00m 30m 3.00m 40m 4.00m 50m 5.00m
1:20 1:200 — 0 4.0m 0.4m 10.0m 1.00m 15.0m 1.50m 20.0m 2.00m
1:50 1:500 — 0 10.00m 1.00m 20.00m 2.00m 30.00m 3.00m 40.00m 4.00m 50.00m 5.00m
1:25 1:250 — 0 5.00m 0.50m 10.00m 1.00m 15.00m 1.50m 20.00m 2.00m 25.00m 2.50m

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmc.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Storage Area Roof Plan Level +49.70
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-014-01
REV	1

1 Storage Area
1 : 250

2 Zone C Ref Plan
1 : 1000

Revision Schedule		
Number	Date	Description

1:100 1:1000 | 1:20 1:200 | 1:50 1:500 | 1:25 1:250

architects | civil engineers | design consultants
quantity surveyors | project managers

25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrmc.com

CLIENT	Wasteserv Malta Ltd.
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Storage Area Level +42.00
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594 x 841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-015-01
REV	

1 Recovery Building
1 : 250

2 ZoneC Ref Plan
1 : 1000

Revision Schedule

Number	Date	Description

1:100 1:1000 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10m 20m 30m 40m 50m
1:20 1:200 — 0 0.4m 1.00m 1.50m 2.00m / 0 4.0m 10.0m 15.0m 20.0m
1:50 1:500 — 0 1.00m 2.00m 3.00m 4.00m 5.00m / 0 10.00m 20.00m 30.00m 40.00m 50.00m
1:25 1:250 — 0 0.50m 1.00m 1.50m 2.00m 2.50m / 0 5.00m 10.00m 15.00m 20.00m 25.00m

architects | civil engineers | design consultants
quantity surveyors | project managers
25/27, Carmel Street, Birkirkara BKR 1248, Malta
t [00356] 2149-1934 f [00356] 2148-2978
info@dtrms.com

CLIENT	**Wasteserv Malta Ltd.**
PROJECT	Proposed Materials Recovery Facility in the ECOHIVE Complex
LOCATION	ECOHIVE Complex, Maghtab, Naxxar
DWG TITLE	Recovery Building Level +31.00
DRAWN BY	AD/SN/LB
ARCHITECT	RS
DATE	12/07/22
PAPER SIZE	ISO-A1 (594x841mm)
JOB REF	2944
SCALE	As indicated
DWG REF	02-016-01
REV	-