



# Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.

Document no: PR00/006/FR-001  
Revision: 02

KGG  
202505023

Integral Effects Analysis - Supporting Documents  
17 November 2025

## Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.

**Client name:** KGG  
**Project name:** Integral Effects Analysis - Supporting Documents  
**Client reference:** 202505023 **Project no:** 5060.00.00.T  
**Document no:** PR00/006/FR-001 **Project manager:** Allan Dobie  
**Version:** 02 **Prepared by:** R.Tranter & D. Pousada  
**Date:** 17 November 2025  
**Document status:** For Client Comment

### Document history and status

Version	Date	Description	Author	Checked	Reviewed	Approved
01	13/10/25	For Client Comment	RT	DP	FM	AD
02	17/11/25	Final	RT	DP	FM	AD

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## Acronyms and Abbreviations

AP1000	Pressured Water Reactor developed by Westinghouse Electric Company
BCM	Bank Cubic Meters
BoP	Balance of Plant
BoQ	Bill of Quantities
CCM	Compacted Cubic Meters
CI	Conventional Island
CSM	Cutter Soil Mix wall (soil-bentonite wall)
DBFL	Design Basis Flood Level
EDF	Électricité de France S.A.
EPR	European Pressured Reactor (pressured Water Reactor developed by EDF)
GI	Ground Investigation
HPC	Hinkley Point C (NPP construction ongoing in the UK which adopted the EPR technology)
KGG	Ministry of Climate Policy and Green Growth
NAP	Normaal Amsterdam Peils (Amsterdam Ordnance Datum)
NI	Nuclear Island
NPP	Nuclear Power Plant
RAG	Red-Amber-Green
SME	Subject Matter Experts
TPR	Third Party Review

## Executive summary

This report outlines a multi-site technical evaluation for the construction of earthworks platforms, considering seven candidate sites with two alternatives, to support the nuclear power programme in the Netherlands. The overall aim of the study is to provide a preliminary evaluation of each site's capability to accommodate / construct the required Platform for a NPP, to inform early-stage site comparison. This study is part of a series of studies being performed by KGG as part of the site comparison process.

This study was performed at an early stage of the site evaluation process, prior to the confirmation of the Technology Provider. The assessment considers the suitability of each site to accommodate a two unit configuration for both the EDF EPR Reactor and Westinghouse AP1000 Reactor designs. As such, a Bounding Case (i.e. a Platform to accommodate both the EPR & AP1000 plant configurations) was developed and the DBFL estimated for each site both based on available information to:

- 1) Allow modelling of the required Platform (including sea defences) and principal deep excavations within the proposed site boundaries; and,
- 2) Assess the sites suitability for overall earthworks delivery using developed multi-criteria.

Geological information used in the evaluation was acquired from previous reporting commissioned by KGG and available public sources to understand local ground conditions at each site. Existing land use and related features influencing the scoring of multi-criteria were determined by review of publicly available aerial mapping, both historical and present day.

The evaluation of the sites was performed by a panel of ground engineering SMEs, using the developed multi-criteria to assess the suitability of the sites to deliver / construct the Platform earthworks. In addition, a preliminary estimate of the static earthworks quantities for the Platform construction and principal deep excavations was also performed.

All sites were considered sufficient to accommodate a Platform based on the Bounding Case. No site assessed presents a condition whereby development of the Platform and control of groundwater ingress into deep excavations (via cut-off walls and/ or diaphragm walls, with or without supplementary dewatering measures) is considered not feasible, based on the available information, evaluation methodologies and study limitations. Following the evaluation of the seven candidate sites with two alternatives, three sites are considered most favourable for down selection compared to the other sites, these are:

- Terneuzen 1b;
- Maasvlakte 2; and,
- Eemshaven 1b.

These sites are generally favourable presenting good conditions related to, for example, earthworks re-use, greater space for temporary working areas and greater flexibility for earthworks logistics.

Ground risks are present for all sites that affect the suitability of the sites that are related typically to legacy land use (e.g. possibility of buried structures etc.) and the suitability of excavated materials. These risk items are appropriate to be further investigated following down selection in the next phase of the site selection.

For Terneuzen 1a and 1b ground investigation is very limited compared to the other sites and further ground investigation is required to improve the reliability of the findings of this report. This should be performed at the earliest opportunity to best inform the site selection process.

Furthermore, it is recommended to revise earthwork quantities to include tunnel spoil / related earthworks following the finalisation of cooling water infrastructure options and any development in the construction

sequencing. This should be accompanied by confirmation of the necessary licenses and permits for managing surplus materials from tunnelling, as well as the advancement of dewatering strategies for deep excavations.

In addition, further assessments of excavated material suitability, including contamination and soil quality, should be carried out to determine potential reuse or processing, informed by subsequent ground investigations. It is also necessary to verify the presence or absence of buried structures at selected sites with historical industrial activity, such as former power plants.

## 1. Introduction and background information

The following document has been prepared by Amentum to assist KGG with ongoing technical evaluations for various sites to support the nuclear power programme in the Netherlands. This study specifically relates to 'Design Basis Flood Levels and Platforms' in a series of other studies supporting the wider technical evaluation. Outline requirements for the study were described by KGG and the scope developed in collaboration with KGG and Amentum over the initial period.

KGG has identified seven candidate sites with two alternatives in coastal settings that are to be evaluated. This follows previous Westinghouse and EDF Vendor assessments for the Borssele 2 site, that were undertaken in 2024 and reported in the TPR, with Westinghouse proposing the AP1000 technology and EDF proposing the EPR technology.

Terrain remodelling to form Platforms is typically required for sites to make them suitable to accommodate buildings / structures as part of a NPP. The requirements for Platforms to construct the NI, CI, BoP and cooling water related infrastructure is site specific and influenced, in part, by the DBFL (the level defined to prevent flooding based on historical data, hydrological models and event scenarios). In addition, the construction of the NI requires the formation of deep excavations that, when formed within the groundwater table, require groundwater control measures to prevent the ingress of groundwater into the excavation. Both the requirements for Platforms and groundwater control are investigated in this report for the identified sites to support the site evaluations at this early project stage.

KGG wish to evaluate the suitability of the various sites against a 'bounding case' i.e. the requirements to satisfy the site suitability for both Vendor NPP technologies. For the case of Platform evaluations (i.e., the permanent earthworks platform to accommodate the NPP), this would include the greatest spatial footprint to accommodate the NPP, as well as representative deep excavations. These elements allow for appropriate estimation of the static earthworks balance and evaluation of related spatial criteria such as temporary works area. In addition, KGG have requested that the site's suitability of each site for the use of cut-off walls (i.e., diaphragm walls or CSM) to control groundwater water ingress into deep excavations also be considered.

KGG have requested Technical Factsheets for each site to present the technical evaluations. These technical evaluations will comprise a series of criteria to assess the suitability of the sites from a platform construction/earthworks perspective and groundwater control. In addition to scoring of multi-criteria, as part of the evaluations, both the time, referred to as 'Time Impact Classification', and cost, referred to as 'Financial Impact Classification', are required to be assessed against predetermined ranges (as defined by KGG).

It is understood that the findings and recommendations of this study will be integrated into a comprehensive, consolidated evaluation report authored by Antea, that will include evaluations from other studies authored by other Consultants.

## 2. Purpose of report

### 2.1 Aims

The overall aims of the study are to:

- Evaluate and determine key differentiators between the various sites by scoring against selected criteria related to the construction of an earthworks Platform, including groundwater control, to accommodate the NPP;
- Provide a preliminary estimate of the static earthworks quantities for each site;
- Estimate the Time and Financial Impact Classifications for each site;
- Highlight any risks or uncertainties identified during the study; and,
- Provide recommendations for the next phase.

### 2.2 Scope of works

The objectives to achieve the aims are as follows:

- Establish multi-criteria and scoring approach to allow technical evaluation of the sites;
- The formation of a SMEs panel comprising specialists in geotechnical engineering, foundation design and earthworks. This panel brings together technical expertise to ensure appropriate site evaluations. The panel executing the study consisted of 11 no. ground engineering professionals, working collaboratively to achieve project objectives with reach back to a wider ground engineering resource pool;
- SMEs technically assess the sites against the selected multi-criteria and identify limitations in certainty of information/data;
- Develop appropriate presentation of technical factsheets (presenting the multi-criteria assessment) and populate per site;
- Establish the 'Bounding Case' parameters using available information and establish appropriate assumptions where necessary to perform assessments/calculations;
- Configure Platforms, based on the Bounding Case, within the provided site boundaries;
- Generate models to allow preliminary estimation of static earthworks quantities;
- Develop a BoQ using representative unit rates to estimate Financial Impact Classification for each site;
- Estimate productivity of assumed numbers of plant and equipment to estimate the Time Impact Classification for each site;
- Provide preliminary estimates for mass haul components to provide greater understanding of sites capacity to manage earthworks (i.e., temporary stockpiling and surplus fills); and,
- Provide recommendations and next stages that would either improve certainty of the existing technical evaluations and/or be considered for any supplementary stage of site selection.

### 3. Sources of information

The following list includes the key sources of information used in the study:

#### Reports:

- Sloehaven sites: 11209639-013-GEO-0002\_v0.1-Sloehaven Site Evaluation - Geological and geotechnical characteristics and hazards. (Deltares) Date: 17-07-2025.
- Eemshaven sites: 11209639-011-GEO-0003\_v1.0-Eemshaven Site Evaluation – Geological and geotechnical characteristics and hazards. (Deltares) Date: 28-07-2025.
- Maasvlakte 2: 11209639-004-GEO-0003\_v1.0-Maasvlakte 2 Site Evaluation – Geological and geotechnical characteristics and hazards. (Deltares) Date: 01-07-2025.
- Terneuzen Sites: 11209639-013-GEO-0001\_v1.0-Terneuzen Site Evaluation - Geological and geotechnical characteristics and hazards. (Deltares) Date: 04-08-2025.

#### GIS data:

- GKNederlandGeolVlak: A geological polygon layer representing surface geology across the Netherlands. Source: Nationaal Georegister. Geological unit boundaries and classifications used in national subsurface modelling (provided by Deltares).
- BRO-GMM-Geomorfologischekaart\_V2023-01\_1: Geomorphological Map of the Netherlands (GMM), version 2023-01\_1. Source: BROloket – Basisregistratie Ondergrond (1:50,000 scale).

#### Time Impact Classification:

- Unit rates of plant productivity are based on Amentum's experience of similar equipment, engagement with Specialist Contractors and review of various reference literature.
- Quantification of earthworks and volumes for diaphragm walls is based on concept design performed as part of this study.

#### Financial Impact Classification:

- Unit rates of cost for construction items are based on international catalogues and engagement with Specialist Contractors.

#### Additional sources used:

- Geological cross sections were extracted from the Netherlands Geological Survey website <https://www.dinoloket.nl/en>.
- Digital Terrain Mapping was extracted from Actueel Hoogtebestand Nederland (AHN) LiDAR programme, specifically the AHN4 dataset, which provides high-resolution (0.5m) DSM and DTM data for the Netherlands.
- Aerial imagery from ESRI's ArcGIS platform was utilised to provide a general understanding of the site and its surrounding environment.
- Base mapping, i.e. existing site infrastructures e.g. buildings, roads, uses Top10NL 2017 DWG files. Content sourced from Top10NL 2017 and the TU Delft Library's Topographical Maps collection at <https://www.tudelft.nl/en/library/collections/map-room/map-collection/topographical-maps/top10nl/>, accessed on 04 September 2025.

## 4. Assumptions and limitations

A list of the key assumptions is presented below:

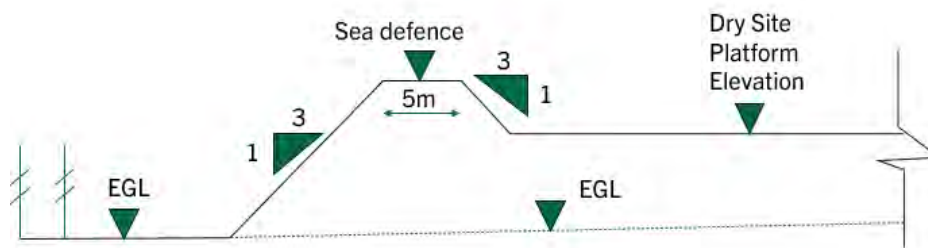
### 4.1 General

- Technical evaluations are based on the available information presented at the time of the study (see sources of information presented in Section 3);
- Site boundaries are developed by Antea and further provided by Deltares to Amentum in digital format;
- Site evaluations are predominantly based on geological/geotechnical site evaluations provided by Deltares and national geological databases (see sources of information presented in Section 3); and,
- The evaluation of sites against multi-criteria is typically qualitative and is based on SMEs technical experience and judgments. For the assessment of logistics, it is assumed existing rail, ports and roads have sufficient capacity to supply the construction activities.

### 4.2 Platform elevations and sea defences

- Amentum have estimated the DBFL for each site. The estimation of these elevations is presented in Appendix A and should be used for the purposes of this report only. For the technical evaluation, and as agreed with KGG, a 'Dry site' elevation is assumed to be consistent across the Platform. A Sea Defence, comprising an earthworks berm, will be positioned on the Platform perimeter crest where required. This will be modelled to achieve an overtopping rate of 10 l/s/m. Figure 1 below illustrates the typical configuration of sea defence and platform.
- Amentum have applied sea defences on Platforms where the existing Main Dyke is below the required sea defence level and where the perimeter of the platform is typically seaward facing to ensure protection unless otherwise noted.

Figure 1 Typical schematic cross section illustration of platform and sea defence.



Notes:

1. EGL= Existing ground level.

2. Slope gradient expressed as a ratio of 1 (Vertical) to 3 (Horizontal).

- Table 4-1 presents a summary of the adopted platform and sea defence levels. The difference between the top of the platform to the existing ground level (i.e. platform thickness) is presented at selected locations indicated on drawings for each site, as presented in Appendix C.

Table 4-1 Summary of Platform, sea defence level and EGL

Site	Dry Site Platform Elevation (m NAP)	Sea Defence (m NAP)	Sea Defense applied (Yes / No)	Existing Ground Level (m NAP)
Sloegebied 1	7.04	9.41	No <sup>2</sup>	5.0
Sloegebied 2	6.94	9.41	Yes	4.6
Eemshaven 1a	6.94	10.49	Yes	1.0 to 4.2
Eemshaven 1b	6.94	10.49	Yes	1.3
Eemshaven 2	7.14	10.49	Yes	4.5
Eemshaven 3	7.14	10.49	Yes	1.7 to 2.6
Maasvlakte 2	6.44	17.11	Yes	5.4
Terneuzen 1a	7.24	8.42	No <sup>3</sup>	4.5
Terneuzen 1b	7.24	8.42	No <sup>3</sup>	1.6

Notes:

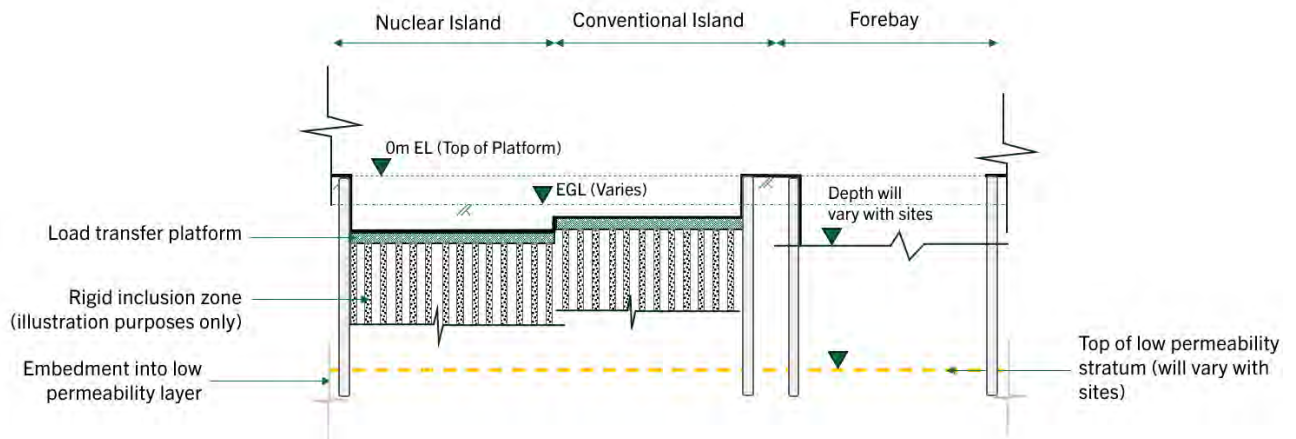
1. To be read in conjunction with DBFL presented in Appendix A.
2. A sea defence is required at the site. However, modelling an earthworks berm within the prescribed site boundary was not feasible while maintaining the minimum spatial requirements for the Platform under the Bounding Case scenario. Therefore, a retaining wall is proposed as the preferred sea defence solution. The earthworks volumes associated with the berm option are considered negligible and do not significantly impact the overall site evaluation.
3. A sea defence is not required at the site. The existing main dyke elevation is above the sea defence level and therefore a sea defence berm on the Platform is not required.

### 4.3 Platform configuration and bounding case development

- For the development of the Bounding Case, the EDF EPR Reactor presents the largest spatial footprint of the two Vendor technologies and has been selected for the Bounding Case, by inspection, a smaller 2 no. Unit AP1000 configuration from Westinghouse would remain compatible for the same site, based on the available AP1000 plant information.<sup>1</sup>
- In the absence of available plant information during the study period the extents of the EPR Plant have been estimated using publicity available documentation for HPC, a two unit NPP in the United Kingdom, that uses the EPR Reactor technology. Although it is understood that EDF made modifications to the HPC plant configuration for the proposed EPR at the Borssele 2 site (aimed at reducing area requirements as part of the Vendor technology submission that was reviewed during the TPR), the overall spatial requirements will remain similar and are considered appropriate for the purposes of the technical evaluations.

- Engagement with EDF was made by KGG during the initial study period and the Bounding Case assumptions were presented. Updates were made based on an EDF response letter provided on 04/08/2025. These include assumptions on temporary excavation depth for the NI and CI, as well as the thickness of load transfer platform above the proposed foundation solution, that comprises Rigid Inclusions as a form of ground treatment. Figure 2 below shows a schematic of illustration of the NI, CI and Forebay.

Figure 2 Schematic Illustration of Nuclear Island, Conventional Island and Forebay



Notes:

1. EGL= Existing Ground Level.

- For the spatial positioning of the Platform a distinction between 'fixed' and 'variable' plant objects was made to allow 'fitting / positioning' of the Platform within the site boundary. Typically, this comprised:
  - NI, CI, Forebay and Discharge Chamber (and local buildings) considered as 'fixed' building objects, and as such the shape and area of the zone was fixed (i.e., a Fixed Zone); The total area of a single NI is circa 7,300m<sup>2</sup> and the CI is circa 7,100m<sup>2</sup>; and,
  - Wider site Ancillary Buildings and Switchyard not being included in the 'fixed' zone. Both considered as 'variable' building objects, meaning their shape and area could be varied to suit the site boundaries (i.e., a Variable Zone).
- Where feasible, the Fixed Zone was orientated to be favourable to the likely alignment of cooling water infrastructure (e.g., tunnels and / or direct inlets).
- The spatial configuration of the Platforms was refined to a level where the feasibility of the site accommodating the Platform was sufficiently demonstrated, noting later optimization of plant configuration is likely by any selected Technology Vendor. Accommodation of a platform perimeter exclusion zones and security requirements is considered part of later design development following down selection of priority sites.
- A typical excavation depth of 18m below Platform top for the Forebay and Discharge Chamber have been assumed, which is appropriate for the preliminary estimate of static earthworks quantities and for the required maturity of the technical evaluation. It is noted that the actual excavation depth will be site specific and defined in later design development.
- Permanent slope profiles for the Platform have been assumed based on engineering judgement, allowing for the acceptability of a wider range of fill materials to form the slopes. Later design development will require consideration of Platform foundation conditions to ensure the stability of slopes. Access and egress permanent ramps onto the platform from the existing ground level are

considered part of later design development following down selection of priority sites and are not required for the technical evaluation.

#### 4.4 Groundwater control

- Groundwater is water that exists beneath the existing ground level within the pores and / or fractures within soil, sand, and rock formations and typically occupies the zone below the natural water table. Groundwater control is required in deep excavations to mitigate the ingress of water (i.e. into excavations), that would otherwise disrupt continued excavation and compromise the construction of foundations and / or structures.
- The control of groundwater by the formation of cut off walls will be considered in the multi-criteria evaluations. This will be based on the feasibility to achieve a cut off into a low permeability stratum using either a CSM wall (for use in combination with open excavations) and / or diaphragm wall techniques. For the purposes of the technical evaluation, the depth achievable for both techniques is considered similar. Detailed constructability assessments will be required to address site-specific technical challenges that is outside the scope of this study.

#### 4.5 Static earthworks quantification

- The static earthworks quantification is a very high level assessment based on the Bounding Case model developed for each site as part of this study and considers the final balance of earthworks at completion (i.e. static balance). The balance of earthworks materials over time is referred to as 'dynamic balance'. This has not been performed as part of the study.
- Extents of existing topsoil and any requirement for topsoil stripping have been based on a review of aerial maps. Where present, topsoil stripping will be performed within the main site boundary across the Platform extents only and not within the wider defined site area (assumed utilised for temporary works) as the purpose of the area has not been defined and the requirements for stripping not confirmed. This assumption has been applied consistently across all sites. Therefore, the final areas identified for topsoil stripping does not influence the comparative assessment, as all sites are evaluated under the same assumption. It is noted that from a cost and time perspective, any topsoil stripping within the site boundary (and outside of the Platform) and wider Construction Area (see Appendix C) required for, for example, temporary facilities to construct the NPP will be broadly similar for all sites and, therefore, will not be a significant differentiating factor between sites.
- Extents of shallow depth surface clearance, in the absence of any topsoil and where industrial historical land use is observed, has been included based on a review of aerial maps.
- It is assumed that all excavated materials can be rendered suitable by either treatment, processing and/or strategic use within the earthworks e.g., landscaping zones typically accepting a wider variety of fill types etc..
- Selected Granular Fill will be imported to the site from an offsite source. For the technical evaluation this is considered to comprise the fill materials for construction of the load transfer platform.
- General fill will be imported for the construction of the Platforms. General fill does not need to meet the stricter requirements of Selected Granular Fill and will have a wider acceptability of particle size distribution and other material limits.
- It is assumed the Platform will first be constructed across the site, after which retaining walls will be constructed through the platform and material excavated to achieve the foundation levels. Applying the same construction sequence for all sites is considered appropriate for the preliminary technical evaluation. Later design development for any selected site(s) should consider possible refinement in the construction sequence.

- Arisings from foundations works and retaining walls has not been included in excavation volumes as these will be relatively minor compared to the principal structures and associated deep excavations.
- Temporary works to enable site access (e.g., Haul roads etc.) and execute foundation works (e.g., temporary piling platforms etc.) have not be included. These will be relatively minor earthworks requirements compared to the principal structures and associated deep excavations.
- Processing, haulage and accommodation of tunnel spoil arisings has not been included. Technical commentary related to the costs associated with tunnelling is discussed in report ref: PR00/005/FR-001. The final cooling water infrastructure proposed for each site is still to be confirmed. Potential variants of cooling water infrastructure, associated volumes and costs are being considered in report ref: PR00/005/FR-001. The potential capacity for accommodating surplus spoils, which could include tunnel spoil, in possible features (e.g., local land raising and/or perimeter bunds) has been assessed and is discussed in Section 5.4 and 6.4.
- The NI and CI excavation base depth below the top of the platform is consistent across all sites, as part of the NPP reference design. However, the depth of cooling water infrastructure, namely the Discharge Chamber and Forebay, is site-specific and will be subject to the cooling water infrastructure approach selected for each site, which is being investigated in report ref: PR00/005/FR-001. Both the Discharge Chamber and Forebay typically require deep excavations to accommodate cooling water systems. For the purposes of this study, and to provide an appropriate earthmoving volume estimates, a typical depth of 18m below the top of the Platform has been modelled. This is considered an appropriate assumption for the technical evaluation study.
- The earthwork volumes presented exclude the requirements for 'double handling' of fill materials (i.e., temporary stockpiling prior to placement and compaction of fills in the final location). This will need to be incorporated into further refinement of detailed mass haul planning when a site(s) is selected for further design development.
- The static earthworks quantification adopts typical shrinkage factors representative of the anticipated materials and levels of compaction.
- It is noted that at Maasvlakte 2, a significant area adjacent to the proposed site is still undergoing land reclamation, supplied by a dredging operation. The associated earthworks to achieve the reclamation is outside of the scope of the technical evaluation. It is assumed that the land will be fully reclaimed and available for the construction phase. Consequently, this has not been considered in the estimation of static earthworks quantities and in both Time and Financial Impact classifications.

## 4.6 Preliminary mass haul considerations

- For the purposes of assessing temporary stockpiling capacity for each site, the following opportunities are considered feasible to accommodate temporary stockpiles if required:
  - 1) Temporary stockpiling can be performed within both the Main site area (outside of the Platform) and the Construction Area (assumed as a 'Temporary Works Area');
  - 2) Topsoil temporary stockpiles are assumed to be 3m in height (to permit later re-use and maintain quality);
  - 3) Bulk fill temporary stockpiles are assumed to be 5m in height;
  - 4) 25% of area outside of the site boundary excluding the Platform can be used for temporary stockpiling;
  - 5) 25 % of the area within the Construction Area' can be used for temporary stockpiling;

- 6) Basic assessment has been used to estimate stockpile volume ( $2/3^{\text{rd}}$  x area x height which is an industry-recognised approximation to calculate stockpile volumes, accounting for irregular shapes and natural material bulking); and,
  - 7) Foundation conditions for temporary stockpiles and the fill materials accommodated are appropriate to accommodate the proposed stockpile heights.
- For the purposes of determining surplus fill capacity for each site the following opportunities are considered to accommodate surplus earthworks if required:
    - 1) Local land raising within the site boundary excluding the Platform;
    - 2) Local land raising within the Construction Area; and,
    - 3) Construction of a Perimeter Bund around the site boundary.

## 4.7 Time impact classification

Programming of construction activities is a complex exercise and is dependent on many factors such as project timing, market pressures, plant availability (e.g. excavators, dozers, piling rigs, articulated dump truck etc.) and contract mechanism. The approach used to consider the construction durations described in this report is appropriate to support the technical evaluation process only and should not be used for any supplementary site assessments and / or project planning.

The approach undertaken to determine the Time Impact Classification relies on inputs from quantitative assessments (i.e. the static earthworks quantities and diaphragm wall requirements) to inform the assignment of a category and class rating. This category and class rating is used to represent the status of a site within the defined Time Impact Classification ranges, based on the proposed Platform configuration, static earthworks quantities and plant numbers and associated plant performance.

Provided that all underlying assumptions and input parameters are applied consistently across all sites, the specific inputs (e.g., methods, plant and equipment etc.) selected for categorization do not influence the outcomes of the comparative assessment. The consistency of application ensures that the classification remains valid for benchmarking and decision-making purposes.

### General assumptions / exclusions:

- Production rates for construction activities are typical rates and are appropriate to guide the technical evaluation of the sites. The rates adopted should not be used for detailed construction planning as part of any wider site assessments and/or construction planning.
- To estimate the time impact classification, the number of plant (e.g. excavators, piling rigs, etc.) and equipment has been estimated and compared to material quantities and typical productivity rates (e.g. Excavators, Continuous Flight Auger rigs, etc.).
- The earthworks assessment uses the static quantification based on the available information. Details and commentary on the static quantification is presented in Section 5.3 and 6.3.
- The estimation of the earthworks programme considers the following sequence:
  - 1) Placement of Platform earthworks;
  - 2) Installation of diaphragm wall; and,
  - 3) Excavation to foundation level.
- The duration requirements for any advance enabling works and temporary works (e.g., haul roads, temporary piling platforms, establishment of slurry mixing plants, temporary cranes etc.) is outside of the scope of this evaluation but is appropriate following down selection to priority sites.

- Effective planning can ensure that sufficient numbers of plant and equipment (e.g., dredges, diaphragm wall rigs, continuous flight auger rigs, large excavators etc.) are available in-country.
- Any possible time impact from the proposed construction of the Platforms, where it affects the Main Dyke, has not been considered.

### **Key earthmoving rate assumptions:**

The following assumptions are appropriate for the technical evaluation:

- The earthworks season is assumed to span 12 months per calendar year, with fill materials managed to ensure consistent productivity. However, applying a seasonal restriction (e.g., no earthworks between Start December to end February) would require a greater volume of earthworks within the same duration and therefore increase the number of plant resources within the active earthworks months. Such considerations would be subject to later detailed planning.
- General fill for Platform construction is not generated from either terrain remodelling and/or deep excavations at early site establishment. To minimise the need of importing large volumes of general fill by road or rail to construct the platform, it has been assumed that the fill will be supplied via a cutter suction dredge, which is a well adopted and understood technique in the Netherlands. With strategic positioning of intermediate booster stations, all sites are within achievable delivery distances. For the technical evaluation, a fill delivery rate of 10,000 m<sup>3</sup> per day has been assumed for a single medium sized cutter suction dredge rig with two rigs operating concurrently. This assumption has been applied consistently across all sites. Therefore, the choice of technique does not influence the comparative assessment, as all sites are evaluated under the same delivery conditions.
- A Prime Mover is a large Excavator that will excavate the existing ground and load material into Articulated Dump Trucks. A Prime Mover (e.g., 45 t Excavator) will typically excavate 320 m<sup>3</sup> per hour at full capacity. Assuming an 80% efficiency, a reduced rate of 256 m<sup>3</sup> per hour is considered appropriate. For the purposes of the technical evaluation, it is assumed that four Prime Movers will operate concurrently.
- Articulated Dump Trucks (e.g., Volvo A40 or similar) will be resourced in numbers to main excavation rates from Prime Movers.
- Daily earthmoving is undertaken in one 12-hour shift and assuming a total of 10 productive hours of earthmoving (e.g., allowing for breaks, mechanical breakdowns etc.).

### **Cut off walls - Diaphragm wall rates**

Diaphragm wall production rates are influenced by the technique, ground conditions and panel design. The production rate adopted is preliminary only to support the technical evaluation and will require further refinement from consultation with specialist Diaphragm Wall Contractors and input from site-specific ground investigation.

- Production rates for diaphragm walls are typically based on linear meters per day. For the purposes of the technical evaluation, a rate of 0.6 linear meters per day per rig have been assumed for a 60m to 70m deep wall with a width of 1.5m and constructed in 6m panels. For walls less than 60m deep, a rate of 1.2 linear meters per day per rig has been assumed under the same panel width conditions. These provides a basic assumption to differentiate the sites.
- The following plant resourcing has been assumed for the Time Impact Classification:
  - 1) Four diaphragm wall rigs operating concurrently on the NI and CI;
  - 2) Three. diaphragm wall rigs operating concurrently on the Forebay; and,
  - 3) Two diaphragm wall rigs operating concurrently on the Discharge Chamber.

It is highlighted that for the Time Impact Classification, the longest duration for diaphragm wall construction is considered, which is the NI and CI.

## 4.8 Financial impact classifications

Cost estimation of construction activities is a complex exercise and is dependent on many factors such as inflation, project timing, market pressures, project financing, contract mechanism, exchange rates and risk management. The approach used to develop the cost estimation described in this report is appropriate to support the technical evaluation process only and should not be used for project planning/cost management.

The approach undertaken to determine the Financial Impact Classification relies on inputs from quantitative assessments (i.e. the static earthworks quantities and diaphragm wall requirements) to inform the assignment of a category and class rating. This category and class rating is used to represent the status of a site within the defined Financial Impact Classification ranges, based on the proposed Platform configuration, static earthworks quantities and plant numbers and performance.

Provided that all underlying assumptions and input parameters are applied consistently across all sites, the specific inputs (e.g., methods, plant and equipment etc.) selected for categorization do not influence the comparative assessment outcomes. The consistency of application ensures that the classification remains valid for benchmarking and decision-making purposes.

A list of key assumptions is presented below:

- The approach used to develop the cost estimate and inform the Financial Impact classification is appropriate to support the technical evaluation process only and should not be used for project planning or cost management as part of any wider site assessment studies.
- Unit rates for construction activities selected are representative at the time of writing, based on the available information and may be subject to future updates or changes.
- Earthworks quantities and diaphragm wall volumes used in the cost estimate are based on concept level design of Platforms and deep excavation requirements, with appropriate maturity to support the technical evaluation.
- The earthworks can be planned to mitigate 'double handing' of materials.
- The processing, transportation, placement and compaction of any tunnel spoil generated as part of the cooling water infrastructure is addressed in report ref: PR00/005/FR-001 and is not included here.
- Preliminary costs and contractors' profits are excluded from the estimate. These will vary subject to the final construction requirements and construction programme, which is not required for the technical evaluation.
- Any possible financial impact resulting from the proposed construction of the Platforms where it affects the Main Dyke has not been considered.
- Assumptions and exclusions associated with the static earthworks quantification and diaphragm wall materials used in the cost estimate are discussed in Section 5.3 and 6.3.

## 5. Methodology of evaluation

### 5.1 Multi-criteria scoring, weighting & technical factsheets

Subject Matter Experts have developed a series of multi-criteria and scoring metrics to allow differentiation of the sites. Table 5-1 below summarises and describes the criteria and sub criteria used in the technical evaluation. The assessment of the static earthworks quantification and related evaluations is presented separately in Section 5.3.

**Table 5-1 Summary of multi-criteria scoring**

Main Criteria	Sub criteria	Description
Groundwater	Groundwater control	The suitability of the site to permit control of groundwater ingress into deep excavations by the construction of a cut-off wall (with additional dewatering measures where limits in depth of technique execution are reached).
Earthworks design	Earthwork re-use potential	The likely potential re-use of excavated materials for incorporation within the Platform and / or other earthworks (e.g., landscaping zones etc.).
	Contaminated soil	The likely presence of contaminated soil from preliminary review of historical land use indicated from aerial mapping.
Earthworks Logistics	Logistics	The suitability of the site to import bulk earthworks materials (e.g., aggregates etc.) using existing infrastructure e.g., roads, marine and / or rail.
	Area for Stockpiling	The likely suitability of a site to accommodate temporary stockpiling of earthworks materials based on the available land.
	Temporary Working areas	The suitability of a site to accommodate temporary working areas within the site perimeter e.g. space around primary NI deep excavations etc..
Onsite Constraints	Existing Utilities	Based on review of current land use, as indicated from aerial mapping, will the presence of existing utilities present a site constraint.
	Existing Structures	Based on review of historical and current land use, as indicated from aerial mapping, will the presence of historical (i.e. demolished) and / or existing structures present a site constraint.

For the above sub criteria, a scoring range of between 1 to 9 was developed to provide sufficient differentiation between sub criteria and to provide an appropriate RAG rating to be presented on Technical Factsheets. Table 5-2 below summarises the scoring in relation to risk rating. Full definitions of the scoring criteria are presented in Appendix B.

It is noted that the scoring criterion ranging from between 1 to 9 represents a gradational approach, meaning it provides a structured scale where each increment reflects a progressive change in risk severity and/ or impact. This type of scale is gradational in level of risk, with lower scores indicating minimal or negligible risk and higher scores signifying increasing levels of risk. Such an approach allows for nuanced evaluation rather than binary judgments/statements, enabling more precise differentiation between varying degrees of risk and supporting informed decision-making for site evaluations.

**Table 5-2 Evaluation scoring and risk rating**

Scoring	Risk Rating
9 to 7	Low Risk
6 to 4	Moderate Risk
1 to 3	High Risk

Subject Matter Experts attended a series of workshops appraising each site against the scoring criteria. In addition to the evaluation scoring, and to provide further distinction for site suitability, a weighting factor was applied to selected sub criteria. Applying a weighting factor ensures that sub criteria that are significant to ensuring feasibility of a criteria are amplified appropriately in the technical evaluation process. The selection of weighting factors was based on SMEs judgement of which sub criteria are considered critical to Platform construction and groundwater control. The range of Impacts of each weighting factor is presented in Table 5-3 below.

**Table 5-3 Summary of weighting factors**

Weighting Factor	Impact	Description
1	Low Impact	These are site constraints that affect construction logistics and planning, but are typically resolvable through design adjustments or temporary measures. They are less likely to cause major delays or cost overruns.
2	Moderate Impact	These criteria influence construction efficiency, cost, and design flexibility, but are generally manageable with standard engineering solutions. They may not pose direct safety risks but can affect programme and budget.
3	High Impact	These are critical geotechnical risks that could significantly affect the safety, design complexity, and cost of the project. They often require extensive mitigation and have direct implications for nuclear safety and regulatory compliance.

During the study, it was observed that the volume of site-specific GI varies between the sites. The sufficiency of the available GI data for each site influences the level of certainty in the ground model (i.e., ground conditions), which in turn informs the evaluation. Sites with a higher level of confidence in the ground model have been identified and are presented in the Technical Factsheets. Table 5-4 below summarises and defines the ground model confidence into three RAG categories based on the available GI.

**Table 5-4 Summary of ground model confidence**

Ground model confidence level	Description
Limited but adequate	At least two deep BHs/CPTs 30m apart and up to 25m depth within the footprint of the site boundary
Very Limited	At least one deep BHs/CPTs up to 25m depth within the footprint of the site boundary
Extremely Limited	No BHs/CPTs up to 25m depth within the footprint of the site boundary

A template for Technical Factsheets, that will replicate the multi-criteria scoring presented in this report, was presented to KGG on 04/07/25 with no objections. As the study has developed, minor modifications to the initial draft of the template has been made since the first issue to best display and communicate the evaluations.

## 5.2 Platform configuration

As discussed in Section 4.3, the Bounding Case consisted of Fixed and Variable Plant Zones. The Platforms were positioned/configured within the site boundary adopting the assumptions presented in Section 4. Platforms were modelled in 3D using AUTOCAD CIVILS 3D to appropriately position them and subsequently generate a 3D models for extracting static earthworks quantities. The platform configurations for each site are shown in drawings presented in Appendix C.

## 5.3 Static earthworks quantification

### Basis of earthworks quantification

Key individual earthworks components used in the static quantification are presented in Table 5-5 below:

**Table 5-5 Summary of earthworks components and design assumptions included in the static quantification.**

Component	Design commentary
<b>Included components:</b>	
Existing ground level	<ul style="list-style-type: none"> <li>Based on Digital Terrain Model (DTM) 0.5m LiDAR survey.</li> </ul>
Topsoil thickness	<ul style="list-style-type: none"> <li>Assumed as 250mm existing thickness for sites where a topsoil area forms the majority of the site.</li> </ul>
Terrain modelling	<ul style="list-style-type: none"> <li>The DTM used for the earthworks quantification is representative of the LiDAR surveys (and processing) performed at the time of the surveys. It is noted that in some sites mounds / potential stockpiles are observed (due to land use). For the purposes of the evaluation it is assumed these are either suitable for direct use or can be processed / treated to make them suitable for re-use.</li> </ul>
Shallow depth surface clearance	<ul style="list-style-type: none"> <li>Assumed as 150mm for sites where topsoil is absent from the site and shallow depth stripping is likely required as preparation prior to earthworks placement.</li> </ul>
Classification of excavated materials	<ul style="list-style-type: none"> <li>All excavated materials can be either directly incorporated into the Platform earthworks, other earthworks zones and/or can be rendered suitable by treatment and/or processing.</li> </ul>
Platform	<ul style="list-style-type: none"> <li>Platform elevations – based DBFL estimate for dry site condition.</li> <li>Slope gradient assumed as 1V:3H (allowing a wide range of acceptable fill materials for construction).</li> <li>Drawings presenting configuration of Platforms are presented in Appendix C.</li> </ul>
Sea defence	<ul style="list-style-type: none"> <li>Will comprise an earthwork berm around the perimeter of the platforms, where required for protection (see section 4.2).</li> <li>External and internal slope gradients of 1V:3H have been selected, allowing a wide range of acceptable fill materials for construction.</li> <li>A crest width of 5m is assumed. A 5m crest has been selected to allow sufficient width for plant to access the sea defence and provide sufficient working area at crest should maintenance be required.</li> </ul>

Component	Design commentary
Retaining walls (NI, CI, Forebay and Discharge Chamber)	<ul style="list-style-type: none"> <li>Retaining walls will comprise diaphragm walls for all structures.</li> <li>The estimated length of diaphragm wall per unit is 2.1 km including NI, CI, forebay and discharge chamber.</li> </ul>
Re-soil topsoil assumption	<ul style="list-style-type: none"> <li>It is assumed all excavated topsoil can be reincorporated into the final site restoration.</li> </ul>
Bounding case Plant configuration	<ul style="list-style-type: none"> <li>Fixed Zone: Includes Plant layout for NI, CI, Forebay and Discharge Chamber.</li> <li>Variable Zone: Includes the wider site Auxiliary Building and Switchyard.</li> </ul>
Nuclear Island	<ul style="list-style-type: none"> <li>Assumed as 17.5m below Platform level inclusive of a 2m thick Load Transfer Platform below the foundation base slab.</li> </ul>
Conventional Island / Turbine Hall	<ul style="list-style-type: none"> <li>Assumed as 15.5m below Platform level inclusive of a 2m thick Load Transfer Platform below the foundation base slab.</li> </ul>
Forebay	<ul style="list-style-type: none"> <li>Assumed as 18m below Platform level.</li> </ul>
Discharge Chamber	<ul style="list-style-type: none"> <li>Assumed as 18m below Platform level.</li> </ul>
Foundations for Balance of Plant and Auxiliary structures	<ul style="list-style-type: none"> <li>Assumed to be supported on either shallow or deep foundations.</li> </ul>
<b>Excluded components:</b>	
Excluded components	<ul style="list-style-type: none"> <li>Any earthworks requirements/demands for rail, road or marine improvements (i.e. associated infrastructure).</li> <li>Surplus spoils generated by Cooling water infrastructure.</li> <li>Pavements.</li> <li>Foundation and diaphragm wall arising.</li> <li>Concrete requirements (i.e. aggregates).</li> <li>Onsite temporary and permanent roads.</li> <li>Onsite borrow pits.</li> </ul>

Earthworks quantities were extracted directly from the 3D model using Leapfrog© software (Version 4.0.4) and AUTOCAD CIVILS 3D, based on the modelled Platforms and deep excavations.

Static earthworks quantities for the following metrics have been generated:

- **Excavation (Bank Cubic Meters - BCM):** The in-situ volume of material in the ground to be excavated.
- **Import requirements (Bank Cubic Meters - BCM):** The high-performance fill required to be imported for the load transfer platform.
- **Available fill (Compacted Cubic Meters - CCM):** The volume of fill material available once placed and compacted (typically clay soils increase in volume from BCM to CCM, while granular soils typically decrease).
- **Required filling (Compacted Cubic Meters - CCM):** The volume of fill material required for backfilling operations
- **Balance:** The volume difference between the available filling in CCM and required filling in CCM.

- **Landscaping requirements (Compacted Cubic Meters - CCM):** The required storage volume in landscaping areas to achieve a balance for the considered earthworks.

The results of the static quantities for each site are presented in Section 6.3.

## 5.4 Preliminary mass haul considerations

Mass haul planning comprises managing the delivery (e.g., using Articulated Dump Trucks etc.), temporary storage (in stockpiles), processing/treatment and construction using earthworks materials within a site. The mass haul planning components assessed for this technical evaluation present a preliminary approach and are based on basic assessments, which are appropriate for the purposes of the technical evaluation.

For the purposes of the technical evaluation the mass haul planning components assessed include:

- Temporary stockpiling & stockpiling capacity for bulk fills (i.e., fills excavated but excluding topsoil given its organic nature) and topsoil; and,
- Opportunities to manage any surplus of fill materials.

Table 5-6 below summarises the preliminary mass haul methodology adopted.

**Table 5-6 Preliminary mass haul methodology**

Component	Methodology approach
Temporary stockpiling & stockpiling capacity for bulk fills	<ol style="list-style-type: none"> <li>1. Main Area outside of Platform and wider Construction Area is calculated.</li> <li>2. Determine if topsoil is present or if shallow depth surface clearance is required.</li> <li>3. Determine area required to accommodate topsoil in temporary 3m high bunds and determine remaining total area.</li> <li>4. Estimate volume for stockpiling for bulk fills using spatial assumptions (see Section 4.6).</li> </ol>
Opportunities to manage any surplus of fill materials	<ol style="list-style-type: none"> <li>1. Main Area outside of Platform and wider Construction Area is calculated.</li> <li>2. Estimate potential volume capacity for 1m land raising and perimeter bunds in areas calculated using spatial assumptions (see Section 4.6).</li> </ol>

## 5.5 Time impact classification

The approach undertaken to estimate the duration of construction activities and define the time impact classification is as follows (to be read in conjunction with Section 4.7):

- Determine typical production rates for the proposed construction activities (i.e., earthmoving using cutter suction dredge and large excavators, diaphragm wall rigs, etc.);
- For estimating earthmoving duration for Platform construction, a proposed plant resourcing was adapted, in particular the number of Prime Movers (i.e., large 45 t excavators) and cutter suction dredges. This approach has been used to estimate the duration of the earthworks period and inform the Time Impact Classification. The assumption has been applied consistently across all sites. Therefore, the choice of earthmoving technique does not influence the comparative assessment, as all sites are evaluated under the same delivery conditions.
- For diaphragm wall activities, an estimate of the possible numbers of diaphragm wall rigs operating on a single structure has been estimated. This has been used to calculate the duration of the activity in and inform the Time Impact Classification. This assumption has been applied consistently across all sites. Therefore, the choice of earthmoving technique does not influence the comparative assessment, as all sites are evaluated under the same delivery conditions.

- For the Time Impact Classification, the longest construction sequence has been selected. This comprises
  - 1) Construction of the Platform;
  - 2) Installation of diaphragm walls for the NI and CI; and,
  - 3) Excavation to foundation level.
- Time Impact Classifications (i.e., Class, Consequence ratings) were determined using the productivity estimates generated and compared against the time ranges defined by KGG, as presented in Table 5-7 below.

**Table 5-7 Time impact classification (in months)**

Class	Consequence	Time Range
0	None	0
1	Low	0 – 6
2	Medium	6 – 12
3	High	12 – 24
4	Very High	24 – 36
5	Exceptional	36 and above

## 5.6 Financial impact classification

The approach undertaken to develop the relative cost comparison and inform the financial impact classification comprised (to be read in conjunction with Section 4.8):

- Acquiring representative unit rates for the anticipated earthworks and diaphragm wall construction activities. These rates were selected based on a review of specialist contractors, international catalogues and Amentum experience;
- Apply the selected unit rates to the quantified earthworks and diaphragm wall volumes to estimate a cost; and,
- Selection of Financial Impact Classifications, i.e., Class, Consequence ratings, based on the generated cost estimates, which were compared to the monetary ranges defined by KGG, as presented in Table 5-8 below.

**Table 5-8 Financial impact classification**

Class	Consequence	Money Range
0	None	€ 0
1	Low	€ 0 - €100,000,000
2	Medium	€ 100,000,000 – € 500,000,000
3	High	€ 500,000,000 – € 1,000,000,000
4	Very High	€ 1,000,000,000 – € 2,000,000,000
5	Exceptional	€ 2,000,000,000 and above

## 6. Summary of findings

### 6.1 Multi-criteria scoring

Table 6-1 and Table 6-2 presents the complete multi-criteria scoring performed, confidence level in the ground model and weighted scoring respectively. Appendix D presents individual Technical Factsheets per site. For brevity, the full review assessment by the SME panel is not included in this report. In summary:

- No site assessed presents a condition whereby development of the Platform and control of groundwater ingress into deep excavations (via cut-off walls and/ or diaphragm walls, with or without supplementary dewatering measures) is considered not feasible, within the limitations of the study (see Sections 2 and 4). However, the engineering measures, associated CAPEX and risk levels will vary significantly, which is reflected in the multi-criteria scoring.
- In Table 6-2, the three sites that show favourable scoring following the addition of weighting factors have been highlighted: Eemshaven 1b, Maasvlakte 2 and Terneuzen 1b.

Table 6-1 Summary of Multi-criteria site scoring (not weighted)<sup>1</sup>

Criteria <sup>2</sup>	Sloegebied 1	Sloegebied 2	Eemshaven 1b	Eemshaven 1a	Eemshaven 2	Eemshaven 3	Maasvlakte 2	Terneuzen 1a	Terneuzen 1b
Groundwater Control	1	2	3	3	3	3	2	6	4
Contaminated Ground	6	5	7	6	6	6	8	6	8
Earthworks re-use	4	6	7	5	5	4	8	5	7
Temporary Working Area	4	8	9	8	2	3	7	8	9
Logistics	6	9	6	7	4	5	8	6	6
Area for stockpiling	7	8	9	7	4	5	7	8	9
Existing Utilities	6	3	8	6	1	3	8	5	8
Existing Structures	3	5	6	4	1	3	7	4	7
<b>Total number of risk criteria in scoring</b>									
Total no. of High Risk criteria	2	2	1	1	4	4	1	0	0
Total no. of Moderate Risk criteria	5	3	2	4	4	4	0	6	2
Total no. of Low Risk criteria	1	3	5	3	0	0	7	2	6
<b>Confidence level in site Ground Model</b>									
Confidence Level	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Extremely Limited	Extremely Limited

Notes:

- To be read in conjunction with main report (Ref: PR00/006/FR-001) and in particular Appendix B which provides a narrative on the scoring criteria.
- Summary description of criteria is presented below:

Criteria	Criteria Description
Groundwater Control	Extent and complexity of the groundwater control measures required
Contaminated Soil	Extent and ease of management
Earthwork Reuse	Suitability and consistency of excavated fill material for reuse
Temporary works area	Availability of land within or adjacent to site boundary for temporary working area
Logistics	Accessibility to site and ease of plant movements across the site
Area for stockpiling	Availability of land within or adjacent to site boundary for temporary stockpiling
Existing utilities	Constraints due to the existing utilities and ease of diversion
Existing structures	Potential constraints due to existing structures

**Table 6-2 Summary of Multi-criteria site scoring (Weighted)<sup>1</sup>**

Criteria <sup>2</sup>	Weighting Factor	Sloegebied 1	Sloegebied 2	Eemshaven 1b	Eemshaven 1a	Eemshaven 2	Eemshaven 3	Maasvlakte 2	Terneuzen 1a	Terneuzen 1b
Groundwater Control	3	3	6	9	9	9	9	6	18	12
Contaminated Ground	2	12	10	14	12	12	12	16	12	16
Earthworks re-use	2	8	12	14	10	10	8	16	10	14
Temporary Working Area	2	8	16	18	16	4	6	14	16	18
Logistics	1	6	9	6	7	4	5	8	6	6
Area for stockpiling	1	7	8	9	7	4	5	7	8	9
Existing Utilities	1	6	3	8	6	1	3	8	5	8
Existing Structures	1	3	5	6	4	1	3	7	4	7
<b>Total score</b>		53	69	84	71	45	51	82	79	90

**Confidence level in site Ground Model**

Confidence Level	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Limited but adequate	Extremely Limited	Extremely Limited
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Notes:

1. To be read in conjunction with main report (Ref: PR00/006/FR-001) and in particular Appendix B which provides a narrative on the scoring criteria.
2. Summary description of criteria is presented below:

Criteria	Criteria Description
Groundwater Control	Extent and complexity of the groundwater control measures required
Contaminated Soil	Extent and ease of management
Earthwork Reuse	Suitability and consistency of excavated fill material for reuse
Temporary works area	Availability of land within or adjacent to site boundary for temporary working area
Logistics	Accessibility to site and ease of plant movements across the site
Area for stockpiling	Availability of land within or adjacent to site boundary for temporary stockpiling
Existing utilities	Constraints due to the existing utilities and ease of diversion
Existing structures	Potential constraints due to existing structures

In summary:

- Eemshaven 1b, Maasvlakte 2, and Terneuzen 1b are the top-performing sites, with the highest weighted scores and the fewest high-risk criteria.
- Sloegebied 1 and Eemshaven 2 rank lowest, with multiple high-risk criteria and lower overall scores. The main risks are related to existing infrastructure and spacing for temporary works and stockpiling areas.
- Terneuzen 1a & 1b are the only sites with no high-risk criteria, indicating strong suitability under the assessed conditions.
- Most sites have “Limited but adequate” ground model confidence, while Terneuzen 1a and 1b are rated “Extremely Limited”, suggesting a need for further GI.

## 6.2 Configuration of platforms

Following the assumptions and methodology outlined in Section 4 and 5 respectively, all sites were considered sufficient to accommodate a Platform based on the Bounding Case. It is highlighted that there are further refinements to optimise the platform positioning within the site boundary, and there is likely scope to reduce the spacing between Building Objects, therefore reducing the platform area requirements. Appendix C presents a series of general arrangement drawings showing the proposed Platform configurations and typical height of the Platform above existing ground level in selected areas.

Certain sites with greater area outside of the Platform offer increased potential for further refinements compared to others. Table 6-3 below summarises the space available outside of the Platform and within the site boundary, highlighting potential opportunities for optimising platform layout and positioning. This surplus area may also be used during the construction phase for purposes such as construction phasing, temporary works and logistics.

**Table 6-3 Site spatial assessment**

Site	Site area covered by Platform	Remaining site area beyond the extents of the Platform
Sloegebied 1	60%	40%
Sloegebied 2	73%	27%
Eemshaven 1b	50%	50%
Eemshaven 1a	39%	61%
Eemshaven 2	62%	38%
Eemshaven 3	48%	52%
Maasvlakte 2	92%	8%
Terneuzen 1a	77%	23%
Terneuzen 1b	39%	61%

As shown above, both Maasvalke 2 and Terneuzen 1a have the lowest remaining area outside of the Platform within the immediate site boundary. As a result, these sites offer the least opportunity for later refinement of the Platform configuration and are likely to face greater challenges during construction phasing, temporary works and logistics compared to other sites.

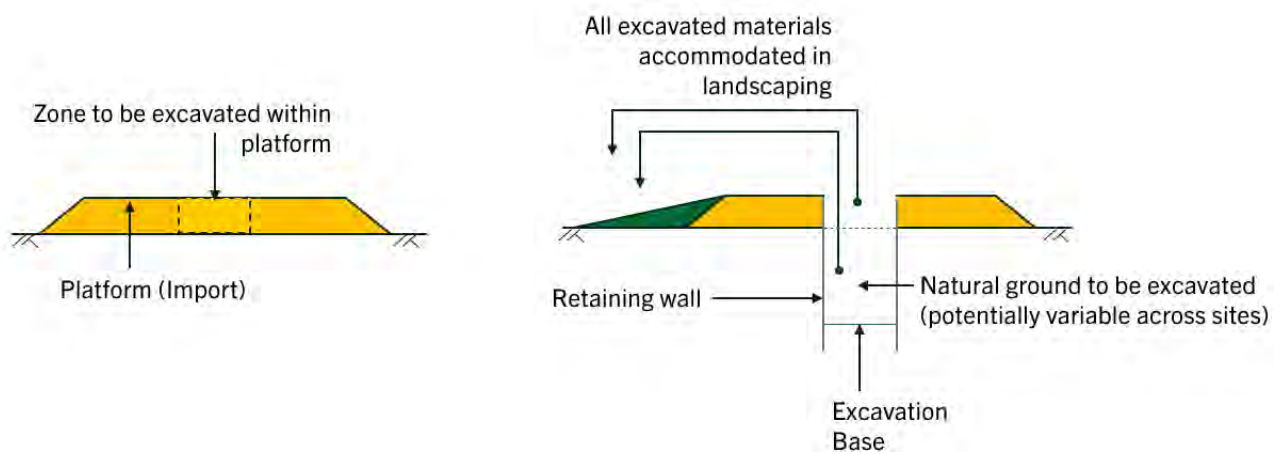
### 6.3 Static earthworks quantification

A static earthworks quantification has been developed for each site to support the technical evaluation, based on the assumptions and methodology presented in Sections 4.5 and 5.3. Table 6-4 presents a summary of the static quantification of both the Bulk Earthworks and Topsoil (noting that topsoil is not present in all sites).

For the purposes of early-stage technical evaluation and consistent site comparison, platform fill has been conservatively assumed to be fully imported across all sites. Excavated materials may be variable across the sites and may not be permissible for direct use in the Platforms. Allowing early establishment of the Platform being beneficial to create an early 'dry site' platform area for concurrent and follow-on construction activities, establish surface water management, provide robust platforms for movement/operation of heavy equipment (e.g., crawler cranes, piling rigs etc.) and removing reliance on potentially variable site-won excavated materials to supply general fill for platform construction. This uniform assumption ensures that comparative assessments remain valid during the initial phases of project development and the technical evaluation study. The approach is presented schematically in Figure 3.

However, as the site evaluation process progresses in the next stages (and likely following down selection to priority sites), and more detailed soil suitability assessments and constructability reviews are undertaken, there is potential opportunity to reduce the volume of imported fill. A proportion of excavated material from deep excavations may be suitable for reuse in platform construction, which would not only reduce import requirements but also help manage any surplus material on site, particularly in relation to the requirement for landscaping fill to achieve a zero earthworks balance. The approach of imported fill for the platform construction is considered to be a bounding conservative case, appropriate for the technical evaluation.

Figure 3 Schematic illustration of static quantification



It is highlighted that the static quantification does not include any allowance for tunnel spoil that may be generated from the final selection of the cooling water variants that involve tunnel boring. Quantities for tunnel spoil are considered Report reference PR00/005/FR-001.

Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.

Table 6-4 Summary of static quantification

Site	Excavation (BCM) m <sup>3</sup>	Import (BCM) m <sup>3</sup>	Available Fill (CCM) m <sup>3</sup>	Required Filling (CCM) m <sup>3</sup>	Balance (CCM) m <sup>3</sup>	Required landscaping to achieve balance (CCM) m <sup>3</sup>
<b>BULK EARTHWORKS</b>						
Sloegebied 1	956,000	1,295,000	2,155,000	2,155,000	-	926,000
Sloegebied 2	961,000	1,042,000	1,920,000	1,920,000	-	931,000
Eemshaven 1a	1,064,000	2,148,000	3,085,000	3,085,000	-	1,045,000
Eemshaven 1b	839,000	3,374,000	4,002,000	4,002,000	-	797,000
Eemshaven 2	979,000	1,257,000	2,145,000	2,145,000	-	951,000
Eemshaven 3	839,000	2,904,000	3,556,000	3,556,000	-	797,000
Maasvlakte 2	958,000	1,845,000	2,680,000	2,680,000	-	928,000
Terneuzen 1a	839,000	1,242,000	1,976,000	1,976,000	-	797,000
Terneuzen 1b	839,000	3,034,000	3,679,000	3,679,000	-	797,000
<b>TOPSOIL</b>						
Sloegebied 1	Not present onsite	N/A	N/A	N/A	N/A	N/A
Sloegebied 2	Not present onsite	N/A	N/A	N/A	N/A	N/A
Eemshaven 1a	Not present onsite	N/A	N/A	N/A	N/A	N/A
Eemshaven 1b	147,000	N/A	125,000	125,000 <sup>2</sup>	N/A	N/A
Eemshaven 2	Not present onsite	N/A	N/A	N/A	N/A	N/A
Eemshaven 3	154,000	N/A	131,000	131,000 <sup>2</sup>	N/A	N/A
Maasvlakte 2	Not present onsite	N/A	N/A	N/A	N/A	N/A
Terneuzen 1a	132,000	N/A	112,000	112,000 <sup>2</sup>	N/A	N/A
Terneuzen 1b	140,000	N/A	118,000	118,000 <sup>2</sup>	N/A	N/A

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Site	Excavation (BCM) m <sup>3</sup>	Import (BCM) m <sup>3</sup>	Available Fill (CCM) m <sup>3</sup>	Required Filling (CCM) m <sup>3</sup>	Balance (CCM) m <sup>3</sup>	Required landscaping to achieve balance (CCM) m <sup>3</sup>
<b>Notes:</b> 1. Variance from excavation + Import (BCM = Bank cubic Meter) to Available Fill (CCM = Compacted Cubic Meter) is due to bulking and shrinkage of different materials during compaction. 2. It is assumed for the purposes of the evaluation process that all excavated topsoil can be re-used in the restoration phase. 3. Bulk Fills only excluding Topsoil.						

## 6.4 Preliminary mass haul considerations

### 6.4.1 Temporary stockpiling and stockpiling capacity for bulk fills and topsoil

Based on the assumptions related to mass haul components (See Section 4.6) the following capacities for temporary stockpiling for each site are presented in Table 6-5.

**Table 6-5 Summary of temporary stockpile capacity per site**

Site	Estimated Topsoil Storage (k m <sup>3</sup> ) requirement (BCM)	Est. Bulk Fill Storage capacity (k m <sup>3</sup> ) (CCM)
Slogebied 1	Topsoil not anticipated	437
Slogebied 2	Topsoil not anticipated	607
Eemshaven 1a	Topsoil not anticipated	2,007
Eemshaven 1b	147,000	1,816
Eemshaven 2	Topsoil not anticipated	1,346
Eemshaven 3	154,000	1,270
Maasvlakte 2	Topsoil not anticipated	804
Terneuzen 1a	132,000	1,712
Terneuzen 1b	140,000	1,556
Notes:		
1. CCM = compacted cubic meters (volume following placement & compaction). BCM = Bank Cubic Meters (Volume at excavation)		
2. Total excavation less any excavation for development of Platforms.		
3. Storage capacity uses a basic assessment for stockpile capacity = Zone area x 0.66 x height		

As expected, sites with higher spatial constraints present lower potential temporary stockpiling capacities. Typically, an earthmoving strategy should be developed to minimise the temporary stockpiling requirements. For the purposes of the technical evaluation, only the import for selected granular materials, comprising potentially a proportion of the load transfer platform granular fill (estimated at approximately 838.000 m<sup>3</sup>) and topsoil (where applicable), has been assumed as requiring temporary stockpiling. However, it is anticipated that additional fill materials will be incorporated at later stages of project development, which may also require temporary stockpiling.

### 6.4.2 Managing surplus fills

Onsite Permanent Landscaping Zones and other strategic uses can accommodate surplus fills and avoid costly offsite disposal & double handling. Most notably, for NPPs, surplus spoils may be generated from tunnelling operations as part of the final selected cooling water infrastructure, this could be up to between circa 0.1 to 1.6 Mm<sup>3</sup> of tunnel spoil generated. This has not been included in the static quantification as the cooling water variant has not been selected for each site; however, Table 6-6 below summarises some storage opportunities to achieve an earthworks balance (i.e. avoid offsite disposal), these comprise:

- Construction of a perimeter bund around the site;
- General land raising within the Main Site and outside of the Platform; and,
- General land raising within the wider Construction Area (see Appendix C for location of proposed Construction Areas).

**Table 6-6 Summary of estimated permanent landscaping capacity**

Site	Estimated required landscaping* (K m <sup>3</sup> )	Perimeter screening bund (K m <sup>3</sup> )	Main site local land raise (1m) (K m <sup>3</sup> )	Construction Area land raise (1m) (K m <sup>3</sup> )	Total Estimated available landscaping (K m <sup>3</sup> )	Landscaping capacity utilised (%)
Sloegebied 1	926	201	312	218	731	127
Sloegebied 2	931	206	220	515	941	99
Eemshaven 1a	1,045	264	923	1,511	2,698	39
Eemshaven 1b	922	230	597	1,653	2,480	37
Eemshaven 2	951	225	356	1,275	1,856	51
Eemshaven 3	927	225	542	1,071	1,838	50
Maasvlakte 2	928	224	68	907	1,199	78
Terneuzen 1a	909	188	161	1,959	2,308	39
Terneuzen 1b	916	244	908	1,025	2,177	43
Notes:						
1. All volumes presented are Compacted Cubic Meters (volume following placement & compaction)						
2. Total excavation less any excavation for development of Platforms.						
3. Uses a basic assessment for stockpile capacity = Zone area x 0.66 x height						
4. K m <sup>3</sup> = x 1000 m <sup>3</sup>						
* Comprises excavated material and topsoil.						

Based on the estimation of the required landscaping to achieve a balanced earthworks (i.e., to avoid offsite disposal), and excluding any external project earthworks, there is a significant storage capacity for surplus fills for all sites apart from Sloegebied 1 due to the lower overall spatial availability (and when adopting only a 1m land raising assumption), however minor increases in land raising would result in adequate storage of fills (based on the static quantification assumptions). As noted in Section 4.6, local regrading within the temporary working area but outside the main boundary has been considered a viable opportunity.

There are additional earthworks components that have not been included in the current earthworks quantification but are likely to be included as the earthworks strategy is developed (such as Jettys, Rail Heads, Road upgrade, rail upgrades etc.). Surplus fill materials can be directed to these components, subject to suitability and compliance with specifications, therefore reducing the pressure for permanent landscaping.

It is noted that, subject to selection of the tunnel boring techniques and separation plant, modifications to permanent platform levels and landscape zones can be viewed as overall balancing volume for surplus fills when additional components are added throughout the earthworks development. However, this is outside the scope and requirements for the technical evaluation.

## 6.5 Time Impact Assessment

Table 6-7 below summarises the Time Impact Assessment based on the assumptions and methodology outlined in Sections 4.7 and 5.5.

**Table 6-7 Summary of time impact assessment**

Site	Class	Consequence
Sloegebied 1	4	Very High
Sloegebied 2	3	High
Eemshaven 1a	4	Very High
Eemshaven 1b	4	Very High
Eemshaven 2	3	High
Eemshaven 3	3	High
Maasvlakte 2	3 <sup>1</sup>	High <sup>1</sup>
Terneuzen 1a	3	High
Terneuzen 1b	3	High

Notes:

1. Excludes the time required for ongoing land reclamation works associated with land immediately adjacent to site.
2. Excludes any time impacts associated with the presence of main dykes.

## 6.6 Financial Impact Assessment

Table 6-8 below summarises the Financial Impact Assessment, based on the assumptions and methodology outlined in Sections 4.8 and 5.6.

**Table 6-8 Summary of financial impact assessment**

Site	Class	Consequence
Sloegebied 1	2	Medium
Sloegebied 2	2	Medium
Eemshaven 1a	2	Medium
Eemshaven 1b	2	Medium
Eemshaven 2	2	Medium
Eemshaven 3	2	Medium
Maasvlakte 2	2 <sup>1</sup>	Medium <sup>1</sup>
Terneuzen 1a	2	Medium
Terneuzen 1b	2	Medium

Notes:

1. Excludes land reclamation costs required for land immediately northeast of site.
2. Excludes any cost impacts associated with the presence of main dykes.

## 6.7 Key risks/uncertainties

Key uncertainties are as follows:

- The level of certainty on the ground model varies between sites, in particular Terneuzen 1a and 1b are characterised by limited GI data.
- For sites whereby deep excavations are planned in Made Ground/reclaimed soils, the chemical quality of the soils will require to be confirmed to ensure suitability for reuse.
- From a construction logistics perspective, the capacity of the ports, road and rail infrastructure to support the construction phase will need to be confirmed.
- Certain sites have an industrial legacy, with potentially buried structures and/or utilities. The extent and degree of any historical demolition of industrial facilities and buildings can vary between sites and may affect the feasibility of any site development.
- The potential time and cost impacts associated with platform construction where it intersects with the Main Dyke remain uncertain and require further investigation.

A summary of the key site risks is presented in Table 6-9 below with associated impacts / consequences. It is noted that the level of information and maturity of designs is currently insufficient to allow assessment of the impact to both cost and programme. This should be developed following down-selection and specification of further targeted investigation studies.

**Table 6-9 Summary of key site risk.**

Site	Key constraints <sup>1</sup>	Impact / Consequences
Sloegebied 1	<ul style="list-style-type: none"> <li>• Existing structures - Proximity to Borssele 1 NPP and impact on Main Dyke.</li> <li>• Earthworks re-use - could be challenging (e.g. presence of organics / peat)</li> <li>• Shallow groundwater &amp; very permeable ground.</li> </ul>	<ul style="list-style-type: none"> <li>• Proximity to Borssele 1 can result in additional design considerations and / or complexity of construction sequencing.</li> <li>• Presence of organics / peat may result in additional ground treatment (excavate and replace) and / or import of fill materials.</li> </ul>
Sloegebied 2	<ul style="list-style-type: none"> <li>• Earthworks re-use- Industrial legacy land use not favourable for earthworks re-use.</li> <li>• Existing Structures:</li> <li>• Existing Gas Powered Plant to SE; and,</li> <li>• Historical Power Plant onsite - could have retained buried foundations / utilities etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Processing / treatment may be required to render existing site earthworks suitable for re-use.</li> <li>• Existing structures may require excavation of legacy foundations, basements and any buried services.</li> </ul>
Eemshaven 1a	<ul style="list-style-type: none"> <li>• Existing Structures - Solar Farm, Gas Tanks &amp; Main Dyke.</li> </ul>	<ul style="list-style-type: none"> <li>• Existing structures may require excavation of foundations, basements and any buried services.</li> </ul>
Eemshaven 1b	<ul style="list-style-type: none"> <li>• Logistics - Likely requires new access roads for construction traffic to access site.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited road access into site from existing roads. New access / roads likely required to be established from existing Major roads (e.g.</li> </ul>

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Site	Key constraints <sup>1</sup>	Impact / Consequences
		N46) suitable to accommodate likely traffic volumes.
Eemshaven 2	<ul style="list-style-type: none"> <li>• Temporary works area – very limited space.</li> <li>• Existing utilities &amp; structures – existing Power Plants.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction sequencing required to manage limited temporary works space.</li> <li>• Existing structures may require excavation of legacy foundations, basements and any buried services.</li> </ul>
Eemshaven 3	<ul style="list-style-type: none"> <li>• Temporary works area – very limited space.</li> <li>• Existing utilities &amp; structures – exiting Power Plant.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction sequencing required to manage limited temporary works space.</li> <li>• Existing structures may require excavation of legacy foundations, basements and any buried services.</li> </ul>
Maasvlakte 2	<ul style="list-style-type: none"> <li>• Need to confirm suitability of landfill material for re-use.</li> <li>• Hydraulic placement of fill material to the northeast of site required to complete land reclamation.</li> </ul>	<ul style="list-style-type: none"> <li>• Processing / treatment may be required to render existing site earthworks suitable for re-use.</li> <li>• If land is not reclaimed to the northeast will require alternative Construction area in land.</li> </ul>
Terneuzen 1a	<ul style="list-style-type: none"> <li>• Existing structures &amp; existing utilities – Solar farm present onsite and adjacent gas tanks.</li> <li>• Logistics – limited road access. Likely requires new access roads for construction traffic to access site (if not rail or marine transport).</li> <li>• Earthworks re-use – need to confirm suitability of landfill materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Existing structures may require excavation of foundations, basements and any buried services.</li> <li>• Limited road access into site from existing roads. New access / roads likely required to be established from existing Major roads (e.g. N61) suitable to accommodate likely traffic volumes.</li> </ul>
Terneuzen 1b	<ul style="list-style-type: none"> <li>• Logistics – limited road access. Likely requires new access roads for construction traffic to access site (if not rail or marine transport).</li> <li>• Earthworks re-use – risk of peat in excavated material.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited road access into site from existing roads. New access / roads likely required to be established from existing Major roads (e.g. N61) suitable to accommodate likely traffic volumes.</li> <li>• Presence of organics / peat may result in additional ground treatment (excavate and replace) and / or import of fill materials.</li> </ul>
<p>Notes:</p> <p>1. To be read in conjunction with overall multi-criteria scoring.</p>		

## 7. Recommendations and next stages.

### 7.1 Recommendations

The technical evaluations have been performed in accordance with the assumption and methodologies outlined in Sections 4 and 5.

If there is to be further investment in site evaluations the short list for site down selection, following the findings of this study, would be:

- Terneuzen 1b;
- Maasvlakte 2; and,
- Eemshaven 1b.

For the down selected shortlist of sites the following recommendations are provided:

- Update of the static earthwork quantifies to include tunnel spoil or related earthworks following final selection of cooling water infrastructure variant;
- Confirm licensing and permitting necessary to manage surplus of earthworks materials (in particular large volumes typically associated with tunnelling activities);
- Further development of dewatering strategies to inform approach for deep excavations;
- Further investigation into earthworks suitability assessments (including contamination / soil quality) for excavated materials to determine suitability for re-use , processing etc.. Potentially informed from later GI; and,
- Confirmation of presence / absence of buried structures for any sites down selected where there are former industrial activities (e.g. legacy power plants etc.).

### 7.2 Next stages

The available GI for Terneuzen 1a and 1b is extremely limited compared to all other sites and therefore it is strongly recommended to carry out limited additional GI for these two sites to improve the reliability of the findings of this report. The additional GI could involve the following as a minimum with in-situ and laboratory testing:

- 1 no. 60m deep borehole (centred near to the Platform); and,
- 4 no. 30m deep cone penetration tests or to refusal.

There may be opportunities for enhanced characterisation of the site using surface non-intrusive geophysical surveys in combination with intrusive exploratory holes, however this may be executed when the final site is selected.

For down selected sites next stages related to platform / earthworks planning may comprise:

- Revision of static earthworks quantification with knowledge of any spoils / earthworks generated from cooling water infrastructure construction activities and any development in construction sequencing; and,
- Development of mass haul planning to further understand the delivery of the earthworks within a programme period. This may include, but not limited to, refinement of permissible stockpiling areas,

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development of construction layouts, specific identification of landscaping zones to manage surplus of any tunnel spoil if generated.

## **Appendix A. Design Basis Flood Level Estimates**

# Design Basis Flood Level

Estimate for site comparison purposes only



## Purpose of Document

Amentum have been engaged by KGG to carry out 3 packages of work related to the site selection for the proposed Nuclear Power Plant (NPP) to be built in the Netherlands. As input to the Work Package on Design Basis Flood Level and Platform Level, KGG were to provide the DBFL to allow further calculations to be carried out. This has not been provided, and therefore this paper sets out the principles used to estimate a valid Design Basis Flood Level (DBFL) for comparison purposes, the level to be assumed for each site and the height of the sea defence required around the site. The paper lays out the results of the platform elevation according to two strategies, and RAG statuses the risk of adopting each strategy for each site.

## Datum

All elevations are relative to Normaal Amsterdam Peil (NAP).

## Dykes

There is an extensive system of dykes in the Netherlands that are crucial to control of the water levels across the country. Along the coast there is a continuous *Dyke* which has been constructed to specifically provide sea defence to the land within, much of which would flood very regularly (sometimes on every high tide) without such protection. The Rijkswaterstaat (RWS) is the governing body for this *Dyke*. To distinguish, we have capitalised and placed in italics the word *Dyke* where it refers to this main sea defence and referred to secondary dykes where there are other similar features inland.

## Dry Site/Wet Site Terminology

For each site, the required DBFL may be based on the principle of the platform level being above probabilistically determined sea level (including climate change allowance) and protected from wave action by the sea defences, potentially including the *Dyke*. We have termed this a Dry Site.

Alternatively, the platform level may be below the statistical highest water level and protected from both high sea levels and wave action by the *Dyke*. We have called this a Wet Site.

In our view, only sites within the *Dyke* can reasonably follow the Wet Site philosophy, as if they are outside of the *Dyke* it follows that they are likely to be subject to wholesale flooding with a probability greater than  $10^{-4}$  typically accepted by regulatory bodies.

In the case of the Wet Site within the *Dyke* the local topographical conditions may be considered to be a mitigation against flooding if the surrounding area is significantly below the platform level. Since the area of low land around the sites may be very large they provide a “sink” for a large volume of water. We have referred to this area of low land around the site as the hinterland in this report.

## Dry Site Platform Elevation

Site elevation is at  $10^{-4}$  probability water level +1.24m climate change

## Wet Site Platform Elevation

Minimum 2.50m above surrounding area

## Height of Sea Defence (Dyke of Sea Wall)

As noted above, the sea defence needs to protect against the probabilistic water level plus climate change allowance plus wave height.

In evaluating the appropriate wave height, an amount of overtopping of the sea defence has been anticipated to be acceptable, given that the water will quickly drain off the site. For the purpose of comparison, 10 and 50 waves with crest height above the sea defence elevation are evaluated.

The number of waves that have crests above the level of the top of the sea defence for a particular sea-state ( $H_s$ ) has been approximated using the Rayleigh Distribution and typical wave steepness.

Deltares have also carried out sophisticated analysis using the Eurotop methodology to evaluate the litres per hour of overtopping based on idealized dyke geometry. They have calculated the height for 1, 10 and 50 l/sec/m of water overtopping the dyke.

In further calculations, the height for 10 l/s/m has been adopted for comparison purposes. This is appropriate for comparison purposes rather than the extreme wave, which is thought to be conservative.

### Top of Sea Defence Elevation

Deltares calculation of dyke height to allow 10 l/s/m ingress.

## Eemshaven

### Eemshaven 1A

As shown below, there are two halves of the site separated by the *Dyke*. The northern half is significantly above the southern half, which appears to be at approximately the same elevation as the surrounding polder. The site must be considered as a special case because it is half within the *Dyke* and half without. There are secondary dykes around the southern part of the site, which must be considered.

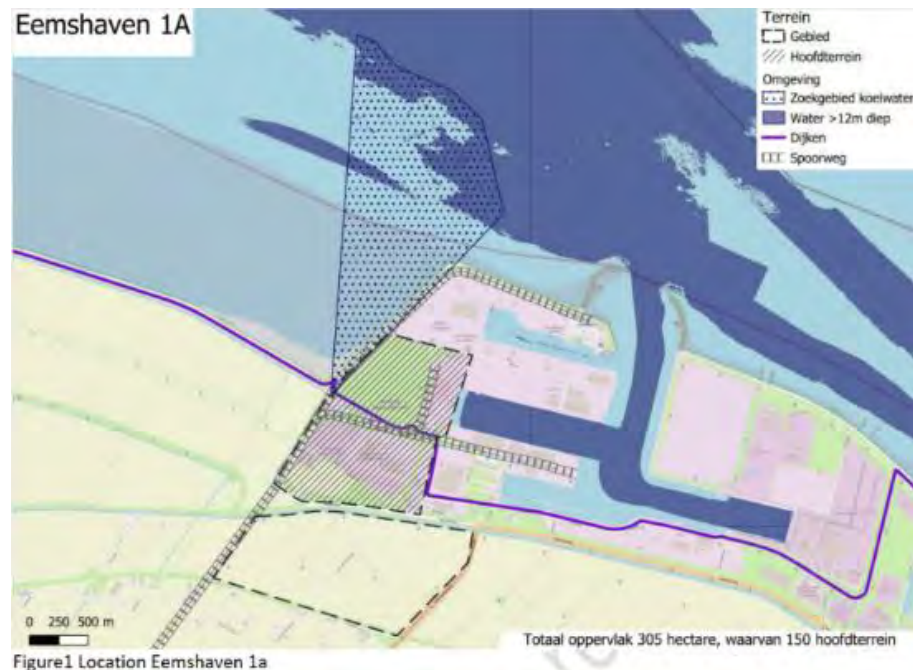
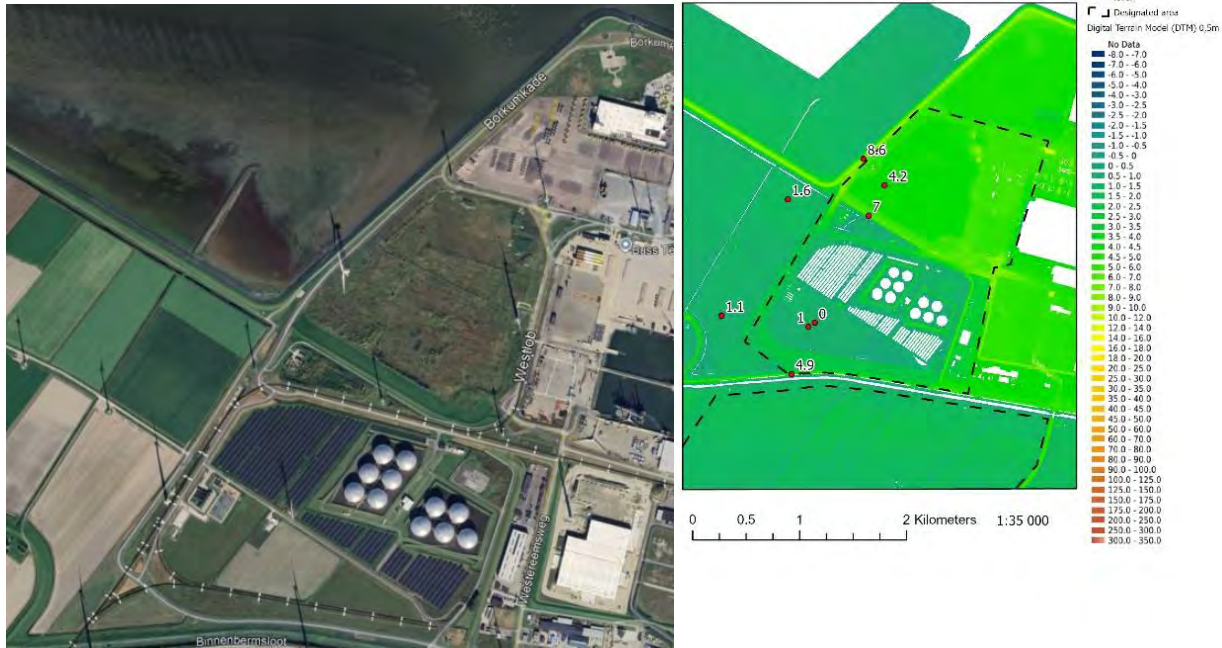


Figure 1 Location Eemshaven 1a

Location: Eemshaven 1a



Map data ©2025 Google

Reviewing the topography, it may be seen that there is a sea defence on the coast at the Northwest boundary of the site which has a top elevation of +8.60m. The site North of the *Dyke* is at a ground elevation of +4.20m while the site South of the *Dyke* is +1.00m. The embankment that the road and rail on the South and Southwest boundaries of the site are at +4.90m. The *Dyke* top is at an elevation of +7.00m across the middle of the site.

**Table 1 – Eemshaven 1A water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	3.70	1.30	2.42		
100	4.40				
1000	5.10				
10000	5.70	2.40	4.46	3.27	3.91
100000	6.40				
1000000	7.10	3.30	5.58		

### Sensitivity check

A sensitivity check was performed at this location to see what effect different wave criteria had. The results are presented below.

10 waves - He= 3.91m Sea Defence elevation = 8.90m

20 waves - He= 3.65 m Sea Defence elevation = 8.76m

50 waves - He=3.27 m Sea Defence elevation = 8.57m

100 waves - He=2.95 m Sea Defence elevation = 8.41m

150 waves - He=2.74 m Sea Defence elevation = 8.31m

200 waves - He=2.59 m Sea Defence elevation = 8.23m

### Wet Site proposal

Proposed platform elevation = +4.20m (height of the northern part of the site and > 2.50m above surrounding land)

If the Wet Site platform elevation is adopted, then it would be necessary to remove the *Dyke* from the middle of the site and divert around the northern boundary. It could not be moved south because that would mean that the site would be exposed to wholesale water level rise. The road at the southern boundary and the secondary dyke that it is located on top of would need to be reduced in height to +4.20m, matching the platform elevation.

It is understood that movement of the *Dyke* is a significant undertaking and that this may cause an impact to the construction programme.

### Dry Site proposal

Proposed platform elevation = +6.94m (10-4 water level = 5.70m + climate change allowance =1.24m)

Since the proposed Dry Site elevation is approximately the same as the *Dyke* elevation, it may be advantageous to make the platform elevation +7.00m which may make it possible to commence construction without interruption, with the *Dyke* being moved South as a parallel activity to other enabling works.

### Sea Defence Elevation

The elevation of the top of the sea defence is shown below for 10No. and 50No. waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 10.49m is selected for use in the site selection report.

**Table 2 – Eemshaven 1A Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
8.90	8.57	12.02	10.49	9.39

### Eemshaven 1B

As shown below, the site is entirely within the *Dyke* appears to be at approximately the same elevation as the surrounding polder.

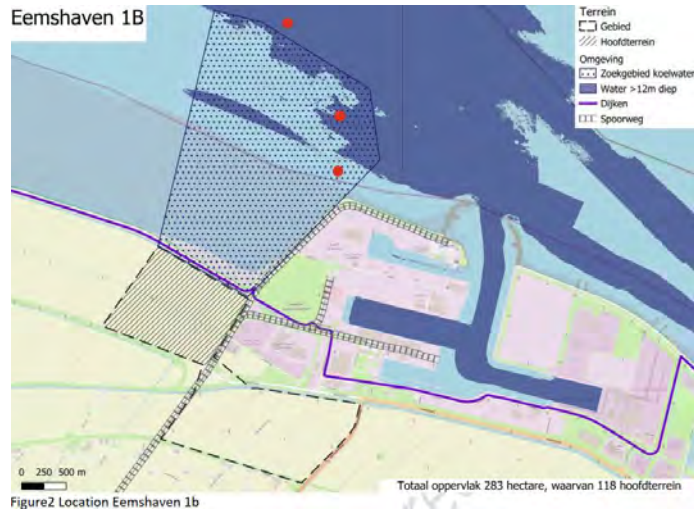
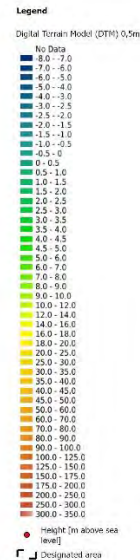


Figure 2 Location Eemshaven 1b

Location: Eemshaven 1b



0 0.5 1 2 Kilometers  
1:35 000



Map data ©2025 Google

Reviewing the topography, the site and polder are both at an elevation of approximately +1.00m and the *Dyke* protects the northern boundary with a top elevation of +8.50m. There is a significant hinterland to the West of the site that would be free draining. There is a secondary dyke South of the site which is at +5.20m and removal or creation of gaps in this secondary dyke should be considered to increase the area of hinterland if a Wet Site is considered.

**Table 3 – Eemshaven 1B water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	3.7	1.3	2.42		
100	4.4				
1000	5.1				
10000	5.7	2.4	4.46	3.27	3.91
100000	6.4				
1000000	7.1	3.3	5.58		

**Wet Site proposal**

Proposed platform elevation = +3.50m

**Dry Site proposal**

Proposed platform elevation = +6.94m (10<sup>-4</sup> water level = +5.70m + climate change allowance =1.24m)

**Sea Defence Elevation**

The elevation of the top of the sea defence is shown below for 10 No. and 50 No. waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 10.49m is selected for use in the site selection report.

**Table 4 – Eemshaven 1B Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
8.90	8.57	12.02	10.49	9.39

## Eemshaven 2

As shown below, the site is entirely outside the *Dyke* and is at the elevation of the rest of the port.

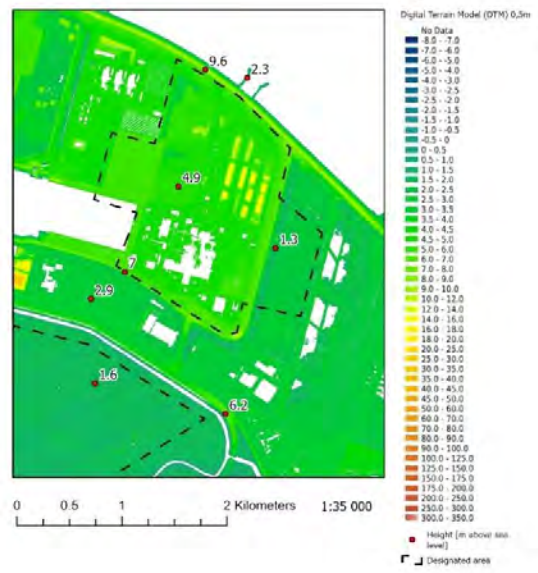


Figure3 Location Eemshaven 2

Location: Eemshaven 2



Map data ©2025 Google



Reviewing the site, the ground elevation is approximately +4.90m and there is a sea defence at +9.60m currently protecting the northern boundary. The *Dyke* goes around the southern boundary and its top is at an elevation of +7.00m.

**Table 5 – Eemshaven 2 water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	3.70	1.90	3.53		
100	4.50				
1000	5.20				
10000	5.90	3.70	6.88	4.89	5.91
100000	6.50				
1000000	7.20	5.00	9.30		

#### Wet Site proposal

Proposed platform elevation = +4.90m, which is the current level. However, as the site is outside of the *Dyke* this implies an acceptance of complete flooding at least once in its lifetime when climate change of 1.24m is allowed for. Therefore, this is not recommended.

#### Dry Site proposal

Proposed platform elevation = +7.14m (10<sup>-4</sup> water level = +5.90m + climate change allowance =1.24m)

#### Sea Defence Elevation

The elevation of the top of the sea defence is shown below for 10 No. and 50 No. waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). +10.49m is selected for use in the site selection report.

**Table 6 – Eemshaven 2 Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
10.10	9.59	12.02	10.49	9.39

### Eemshaven 3

As shown below, the site is entirely inside the *Dyke* and is below the elevation of the rest of the port but above the hinterland.

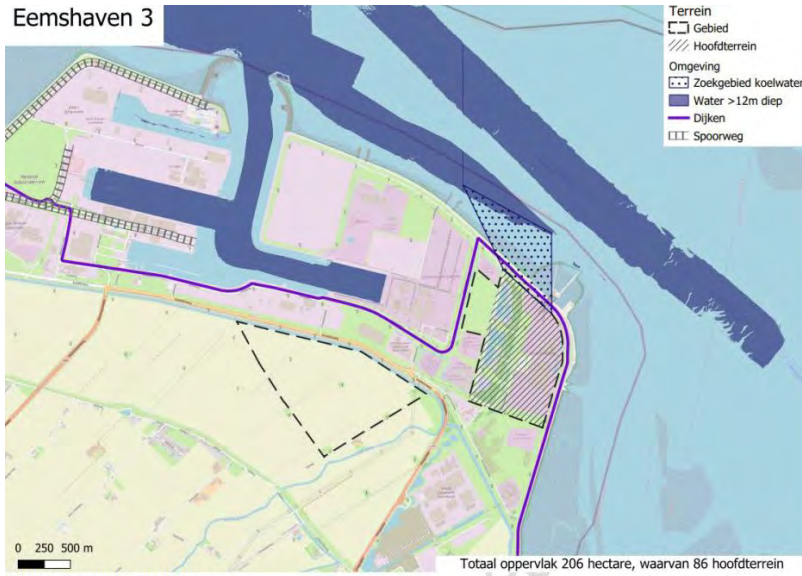


Figure 4 Location Eemshaven 3

Location: Eemshaven 3

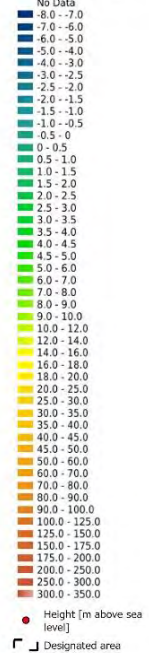


Map data ©2025 Google



#### Legend

Digital Terrain Model (DTM) 0,5m



Reviewing the site, the ground elevation is between +1.70m and +2.60m, and the sea defence on the northern and eastern boundaries is +8.70m and +7.80m elevation respectively. The hinterland to the immediate south is at an elevation of +3.20m, although there is a large lower area (about +1.00m) further to the South which could form a large hinterland if a secondary dyke of around +6.00m was removed or made porous.

**Table 7 – Eemshaven 3 water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	3.70	1.90	3.53		
100	4.50				
1000	5.20				
10000	5.90	3.70	6.88	4.89	5.91
100000	6.50				
1000000	7.20	5.00	9.30		

**Wet Site proposal**

Proposed platform elevation = +3.50m (this assumes that the secondary dyke to the South is made porous. This may not be a robust assumption as it appears to protect an industrial area – Risk item)

**Dry Site proposal**

Proposed platform elevation = +7.14m (10<sup>-4</sup> water level = 5.90m + climate change allowance =1.24m)

**Sea Defence Elevation**

The elevation of the top of the sea defence is shown below for 10 No. and 50 No. waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 10.49m is selected for use in the site selection report.

**Table 8 – Eemshaven 3 Sea Defence heights for various assumptions**

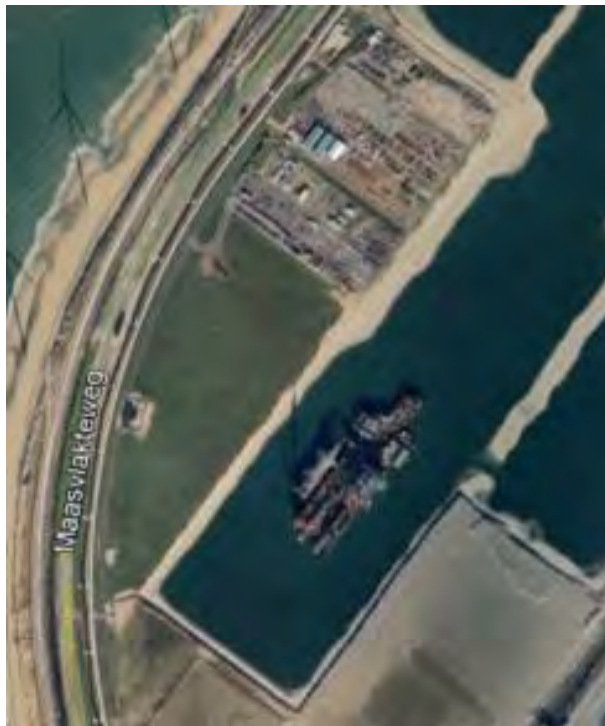
Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
10.10	9.59	12.02	10.49	9.39

## Maasvlakte 2

As shown below, the site is entirely outside the *Dyke* and is at the elevation of the rest of the port, but it is protected by a sea defence.

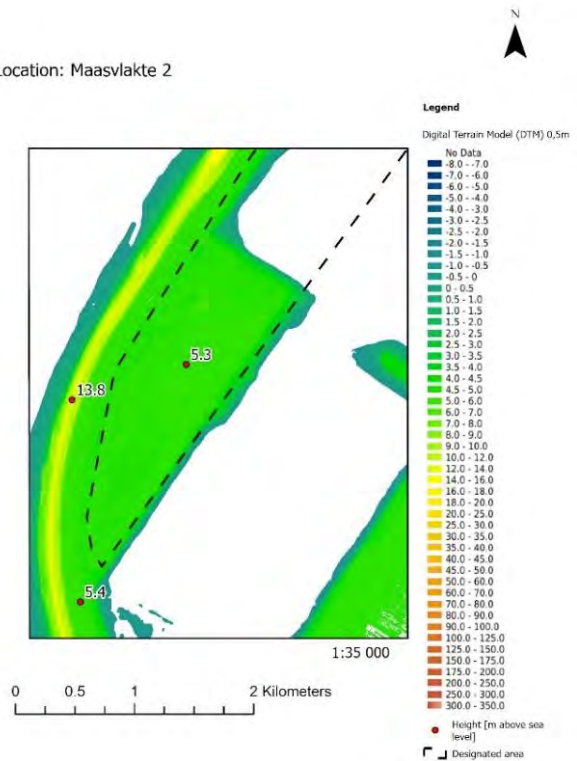


Location: Maasvlakte 2



Map data ©2025 Google

Reviewing the site, the ground elevation is +5.30 m and the top of the sea defence on its western boundary is at elevation +13.80m.



**Table 9 – Maasvlakte 2 water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	3.10	5.50	10.23		
100	3.70				
1000	4.40				
10000	5.20	10.00	18.86	12.25	15.18
100000	6.00				
1000000	6.90	11.90	22.13		

**Wet Site proposal**

Proposed platform elevation = +5.30m - Note that as this site is outside the *Dyke*, it is assumed that it would be flooded if the sea level reached platform level. The site would therefore only be at approximately a  $10^{-3}$  probability of not flooding. Therefore, this is not recommended.

**Dry Site proposal**

Proposed platform elevation = +6.44m ( $10^{-4}$  water level = 5.20m + climate change allowance = 1.24m)

**Sea Defence Elevation**

The elevation of the top of the sea defence is shown below for 10 and 50 waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). +17.11m is selected for use in the site selection report.

**Table 10 – Maasvlakte 2 Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
14.03	12.56	20.09	17.11	14.43

## Slogebied

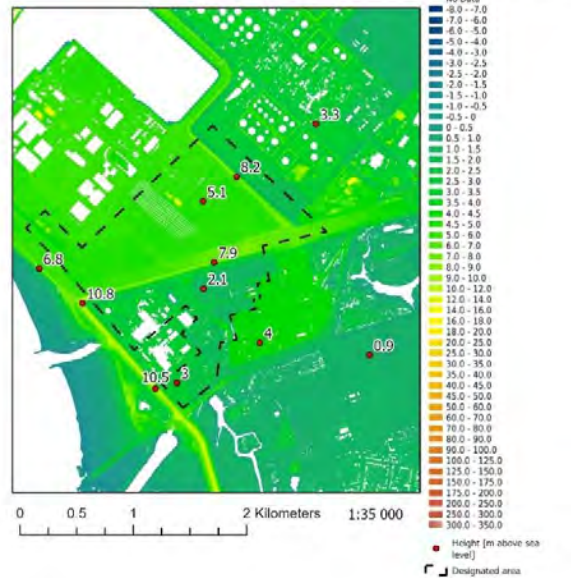
### Slogebied 1

As shown below the site is crossed by the *Dyke* and is at the elevation of the port outside of the *Dyke* and significantly lower inside the *Dyke*.



Figure6 Location Slogebied 1

Location: Slogebied 1



Map data ©2025 Google

Reviewing the site, the *Dyke* runs across the site in an east/west direction with its top at an elevation of +7.90m. To the North of the *Dyke* the existing elevation is +5.10m, while to the South of the *Dyke* it is between +2.00 and +3.00m. Part of the southern boundary is protected by the *Dyke* with a top elevation of +10.80m, while part of it is protected only by a lower sea defence, with a top elevation +6.80m.

**Table 11 – Sloegebied 1 water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	4.00	1.00	1.86		
100	4.60				
1000	5.20				
10000	5.80	2.00	3.72	2.76	3.29
100000	6.50				
1000000	7.20	2.80	5.21		

#### Wet Site proposal

Proposed platform elevation = +5.10m - the height of the northern part of the site, noting that this would require the *Dyke* to be diverted around the western part of the site. It is understood that the re-routing of a *Dyke* that forms part of the national sea defences is significant undertaking and brings with it programme challenges.

#### Dry Site proposal

Proposed platform elevation = +7.04m. (10<sup>-4</sup> water level = 5.80m + climate change allowance = 1.24m). This would allow the *Dyke* to be diverted around the East of the site. It is understood that there may still be programme challenges with this approach.

#### Further Dry Site proposal

It may be possible to build the whole platform level of the site an elevation of +7.90m (the height of the *Dyke*), and this may alleviate the programme challenges by allowing construction to progress without the re-routing of the *Dyke* being a precedent activity.

#### Sea Defence Elevation

The elevation of the top of the sea defence is shown below for 10 No. and 50 No. waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 9.41 m is selected for use in the site selection report.

**Table 12 – Sloegebied 1 Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
8.69	8.42	10.70	9.41	8.55

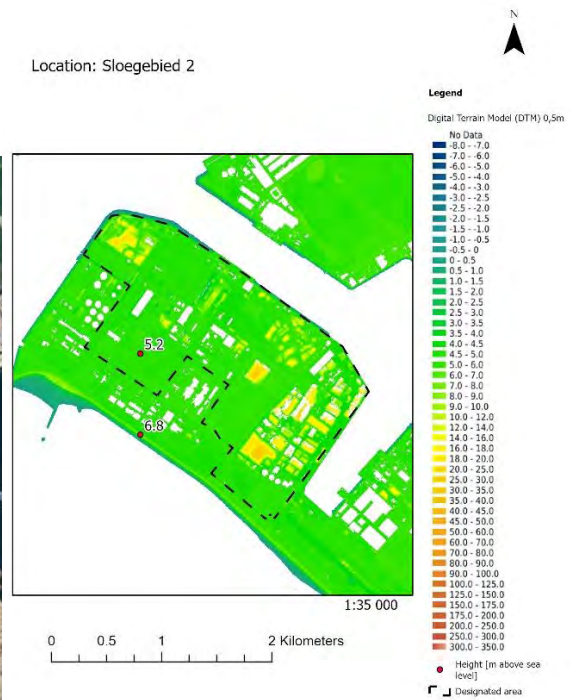
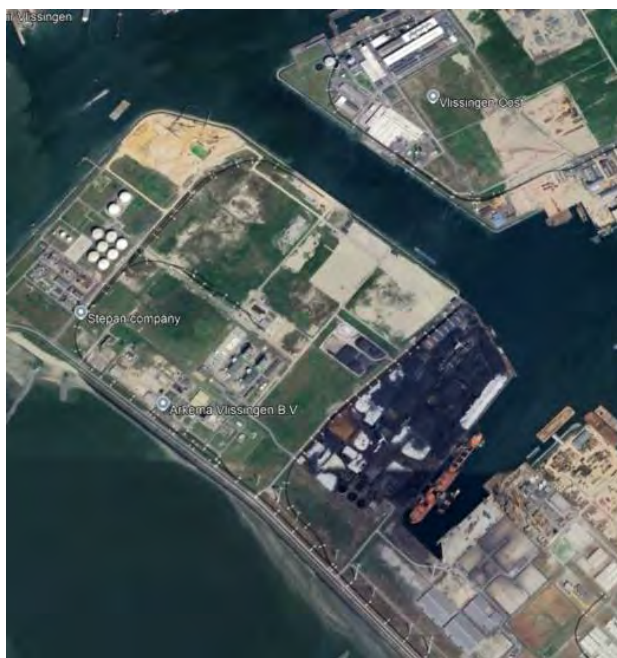
## Slogebied 2

As shown below, the site is entirely outside the *Dyke* and appears to be at the elevation of the rest of the port.



Figure 7 Location Slogebied 2

Location: Slogebied 2



Reviewing the site, the ground elevation is 5.20m and there is a sea defence currently protecting it on the southern boundary with a top at elevation +6.80m.

**Table 13 – Sloegebied 2 water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	3.70	1.50	2.79		
100	4.40				
1000	5.10				
10000	5.70	2.30	4.28	3.14	3.76
100000	6.40				
1000000	7.10	2.70	5.02		

**Wet Site proposal**

Proposed platform elevation = +5.20m which implies flooding during the life of the station when allowance is made for climate change and therefore is not recommended.

**Dry Site proposal**

Proposed platform elevation = +6.94m (10<sup>-4</sup> water level = 5.7m + climate change allowance =1.24m)

**Sea Defence Elevation**

The elevation of the top of the sea defence is shown below for 10 and 50 waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 9.41 m is selected for use in the site selection report.

**Table 14 – Sloegebied Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
8.82	8.51	10.70	9.41	8.55

## Terneuzen

### Terneuzen 1A

As shown below, the site is entirely inside the *Dyke* and is at approximately the elevation of the rest of the port, with a significant hinterland that is at a lower elevation.

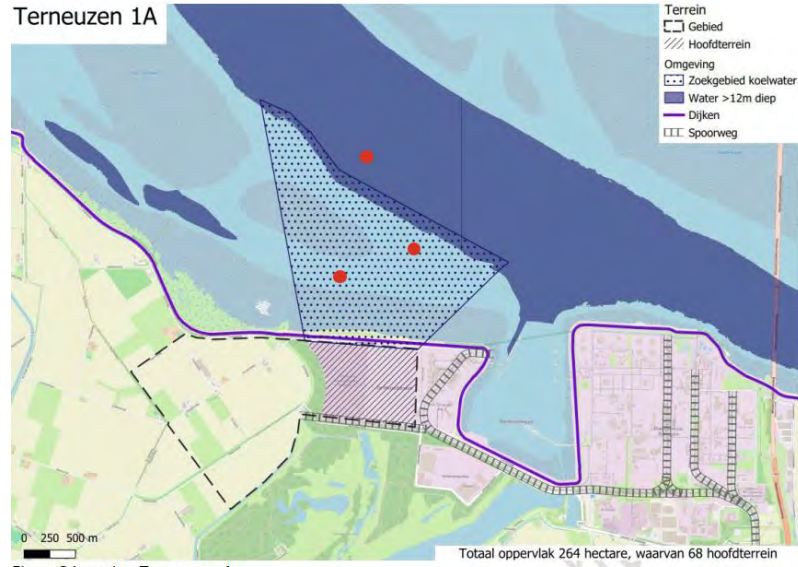


Figure8 Location Terneuzen 1a

Location: Terneuzen 1a



Map data ©2025 Google

Reviewing the topography, the elevation of the site is +4.40m and the *Dyke*, elevation +10.00m, currently protects its northern boundary from the sea. There is also a secondary dyke, elevation +9.60m which separates it from the Paulina-polder which is the hinterland to this site. The elevation of the Paulina-polder is +1.50m (see figure in Terneuzen 1B)

**Table 15 – Terneuzen 1A water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	4.10	1.40	2.60		
100	4.70				
1000	5.30				
10000	6.00	2.60	4.84	3.52	4.22
100000	6.70				
1000000	7.40	3.50	6.51		

**Wet Site proposal**

Proposed platform elevation = +4.40m - current height of the site and >2.50m higher than the hinterland. This strategy requires the secondary dyke to be removed or to be made porous to allow floodwater drainage.

**Dry Site proposal**

Proposed platform elevation = +7.24m (10<sup>-4</sup> water level = 6.00m + climate change allowance =1.24m)

**Sea Defence Elevation**

The elevation of the top of the sea defence is shown below for 10 and 50 waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 8.42m is selected for use in the site selection report.

**Table 16 – Terneuzen 1A Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
9.35	9.00	9.04	8.42	7.99

### Terneuzen 1B

As shown below, the site is entirely inside the *Dyke* and is significantly below elevation of the rest of the port.

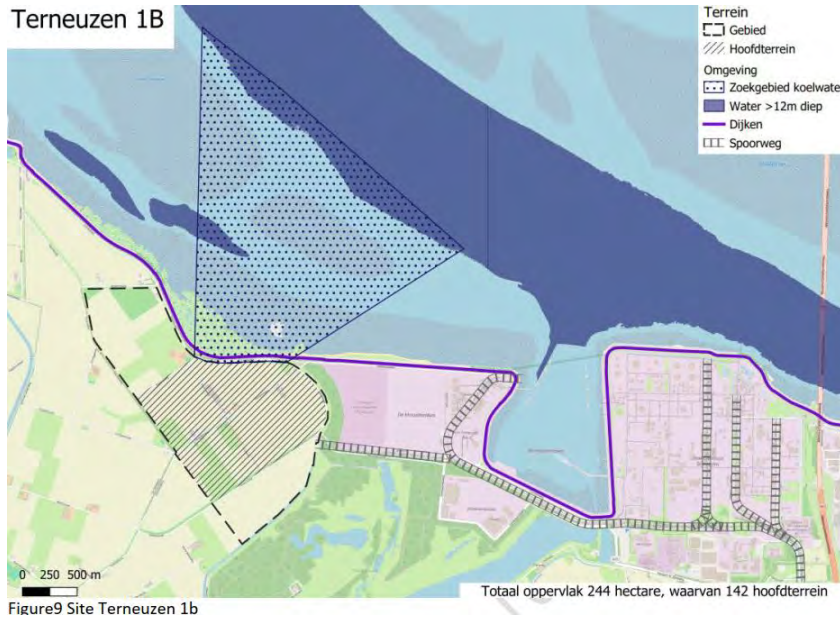
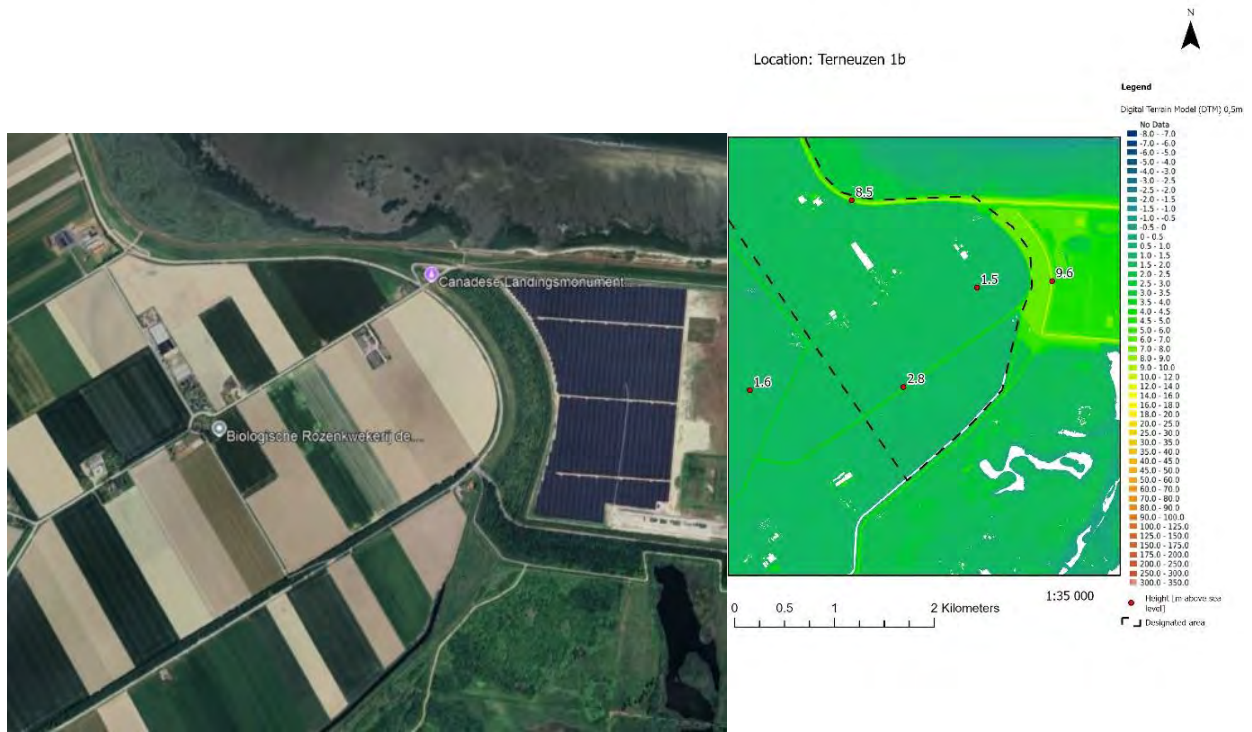


Figure9 Site Terneuzen 1b

Location: Terneuzen 1b



Reviewing the site, the surface elevation is +1.50m and the *Dyke* protects it on the northern boundary, with a top elevation of +8.50m. The Paulina-polder that forms the hinterland is a significant area at an elevation of +1.50m. There are secondary dykes with top elevations +2.80m.

**Table 17 – Terneuzen 1B water levels and wave climate**

Return Period (yrs)	Water Level (m above NAP)	Significant Wave Height (m)	Extreme Wave Height (m)	Wave Height for 50 No. waves overtopping (m)	Wave Height for 10 No. waves overtopping (m)
10	4.10	1.30	2.42		
100	4.70				
1000	5.30				
10000	6.00	2.40	4.46	3.27	3.91
100000	6.70				
1000000	7.40	3.30	6.14		

**Wet Site proposal**

Proposed platform elevation = +4.00m

**Dry Site proposal**

Proposed platform elevation = +7.24m (10<sup>-4</sup> water level = 6.00m + climate change allowance =1.24m)

**Sea Defence Elevation**

The elevation of the top of the sea defence is shown below for 10 and 50 waves with crest elevation higher than the sea defence (calculated as part of the preparation of this report) and for overtopping rates of 1, 10 and 50 l/s/m (prepared by Deltares). 8.42m is selected for use in the site selection report.

**Table 18 – Terneuzen 1B Sea Defence heights for various assumptions**

Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)
9.20	8.87	9.04	8.42	7.99

## Summary

**Table 19 – Summary of Proposed platform levels**

Site	Wet Site Platform Elevation (+m NAP)	Inside the Dyke (Y/N)	Secondary dyke alteration (Y/N)	Dry Site Platform Elevation (+m NAP)	Platform Elevation inc Dyke	Existing Site elevation (+m NAP)
Eemshaven 1A	4.20	N	Y	6.94	7.00	1.00-4.200
Eemshaven 1B	3.50	Y	Optional	6.94		1.00
Eemshaven 2	4.90	N	N	7.14		4.90
Eemshaven 3	3.50	Y	Y	7.14		1.70-2.60
Maasvlakte 2	5.30	N	N	6.44		5.30
Sloegebied 1	5.10	N	N	7.04	7.90	5.10
Sloegebied 2	5.20	N	N	6.94		5.20
Terneuzen 1A	4.40	Y	Y	7.24		4.40
Terneuzen 1B	4.00	Y	N	7.24		1.50

RAG status has been applied as follows:

Wet Site is red if it is wholly or partially outside of the *Dyke*.

Wet Site is amber if secondary dykes may need alteration. The severity of risk needs reviewing on a case by case basis with some knowledge of the local context.

Dry Site is amber if the *Dyke* runs across it, meaning that there is some risk entailed in dealing with the RWS. This situation only occurs at Eemshaven 1A and at Sloegebied 1, with all other sites the entirety of the site is either inside or outside the *Dyke*.

**Table 20 – Summary of proposed sea defence levels**

Site	Crest elevation exceedance 10 No. waves (+m NAP)	Crest elevation exceedance 50 No. waves (+m NAP)	Sea Defence Height 1 l/s/m overtopping (+m NAP)	Sea Defence Height 10 l/s/m overtopping (+m NAP)	Sea Defence Height 50 l/s/m overtopping (+m NAP)	Existing Sea Defence Elevation (+m NAP)
Eemshaven 1A	8.90	8.57	12.02	10.49	9.39	8.60
Eemshaven 1B	8.90	8.57	12.02	10.49	9.39	8.50
Eemshaven 2	10.10	9.59	12.02	10.49	9.39	9.60
Eemshaven 3	10.10	9.59	12.02	10.49	9.39	7.80/8.70
Maasvlakte 2	14.03	12.56	20.09	17.11	14.43	13.80
Sloegebied 1	8.69	8.42	10.70	9.41	8.55	7.90/10.80
Sloegebied 2	8.82	8.51	10.70	9.41	8.55	6.80
Terneuzen 1A	9.35	9.00	9.04	8.42	7.99	10.00
Terneuzen 1B	9.20	8.87	9.04	8.42	7.99	8.50

Sea Defence height based on different calculation methodologies is presented in Table 20. It is noted that the calculation by Deltares is more accurate than the Amentum approximation, and it is recommended that 10 l/s/m is adopted for the purposes of comparison.

A RAG status has been allocated based on the difference between the current height of the sea defence and the 10 l/s/m level, with red indicating that the height needs to be built up. In reality, the decision may be more nuanced, with the current condition, construction considerations, and other factors requiring inclusion in the decision-making process.

## Appendix - Example of calculation of number of waves exceeding a specific height

Based on a 10-year return significant wave height of 2.4 meters at Eemshaven, an estimate can be made of the number of waves higher than the sea defence per 3 hours. First, estimate the mean zero-crossing period ( $T_z$ ) using regional wave climatology and empirical relationships and then use the Rayleigh distribution to estimate the number of waves that overtop a particular height of sea defence.

### Estimation Methods for $T_z$

Empirical Formula (deep water approximation):

$$T_z \approx 3.4 \times \sqrt{H_s}$$

For  $H_s = 2.4\text{m}$ :

$$T_z \approx 3.4 \times \sqrt{2.4} \approx 3.4 \times 1.55 \approx 5.27 \text{ seconds}$$

### Calculation of height exceeded by 10 waves per 3 hrs

Find the wave height exceeded by 10 waves in a 3-hour period, given:

Significant wave height ( $H_s$ ) = 2.4 m

Mean zero-crossing period ( $T_z$ ) = 5.27 s

Duration = 3 hours = 10,800 seconds

### Step-by-step Calculation

1. Total number of waves:

$$N = 10800 / 5.27 = 2049$$

2. Target exceedance probability:

$$P = 10 / 2049 \approx 0.004880$$

3. Convert  $H_s$  to RMS wave height:

$$H_{rms} = H_s / \sqrt{2} \approx 1.697 \text{ m}$$

4. Use Rayleigh exceedance formula:

$$P(H' > H) = \exp\left[-\frac{H^2}{H_{rms}^2}\right]$$

Solving for  $H$ :

$$H = H_{rms} \times \sqrt{-\ln(P)} = 1.697 \times \sqrt{-\ln(0.004880)} \approx 1.697 \times \sqrt{5.32} \approx 1.697 \times 2.306 \approx 3.91 \text{ m}$$

### Final Answer:

Expectation is circa 10 waves higher than 3.91 meters in a 3-hour period under these conditions. This is reflected in the final columns in Table 1 and 2.

## Appendix B. Multi-criteria scoring definitions

### GROUNDWATER - Groundwater Control

Criterion	Assessment Considerations	Scoring	Risk Category
Extent and complexity of groundwater control measures required  Weighting factor = 3	Water table below the excavation level or ad-hoc groundwater control measures adequate to control the water during excavation in cohesive ground.	7 to 9	Low Risk
	Moderate groundwater control measures may be required including deep well points and or deep cut-off walls to control the water flow and to maintain the base stability.	4 to 6	Moderate Risk
	Sophisticated groundwater control measures required together with extensive monitoring strategy due to the complex hydrogeology of the ground or uncertainty in the mass permeability of the ground.	1 to 3	High Risk

### EARTHWORKS DESIGN - Earthworks re-use potential

Criterion	Assessment Considerations	Scoring	Risk Category
Suitability and consistency of excavated fill material for reuse  Weighting factor = 2	All excavated fill material suitable and consistent quality for direct re-use without processing	7 to 9	Low Risk
	Localised contaminated or organic material could be encountered but easily separable	4 to 6	Moderate Risk
	Complex processing will be required to make the excavated fill material suitable for re-use	1 to 3	High Risk

### CONTAMINATED SOIL

Criterion	Assessment Considerations	Scoring	Risk Category
Extent and ease of management  Weighting factor = 2	Contaminated soil not widespread or limited to shallow depth.	7 to 9	Low Risk
	Contaminated soil to limited extent but present at depth that could affect the foundation design.	4 to 6	Moderate Risk
	Contaminated soil to widespread extent and depth and not easily separable and manageable during excavation.	1 to 3	High Risk

### EARTHWORKS LOGISTICS – Logistics

Criterion	Assessment Considerations	Scoring	Risk Category
Accessibility to site and ease of plant movements across the site  Weighting factor = 1	Well established access route available to site and some flexibility for plant movements within the site.	7 to 9	Low Risk
	Moderate upgrades required for access route and limited utility diversion to facilitate plant movements within the site.	4 to 6	Moderate Risk
	Major upgrade or new access route required and or significant utility diversion to facilitate plant movements within the site.	1 to 3	High Risk

### EARTHWORKS LOGISTICS – Temporary working area

Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.

Criterion	Assessment Considerations	Scoring	Risk Category
Availability of land within or adjacent to site boundary for temporary working area.  Weighting factor = 2	Sufficient land is available within the site boundary for temporary working area	7 to 9	Low Risk
	Sufficient land is NOT available within the site boundary for temporary working area but adjacent land available	4 to 6	Moderate Risk
	Sufficient land is NOT available within or adjacent to site boundary for temporary working area	1 to 3	High Risk

**EARTHWORKS LOGISTICS - Area for stockpiling**

Criterion	Assessment Considerations	Scoring	Risk Category
Availability of land within or adjacent to site boundary for temporary stockpiling	Sufficient land is available within the site boundary for temporary stockpiling	7 to 9	Low Risk
	Sufficient land is NOT available within the site boundary for temporary stockpiling but adjacent land is available	4 to 6	Moderate Risk
Weighting factor = 1	Utilities diversion is complex and difficult and re-design of plant configuration might be required instead.	1 to 3	High Risk

**ONSITE CONSTRAINTS - Existing Utilities**

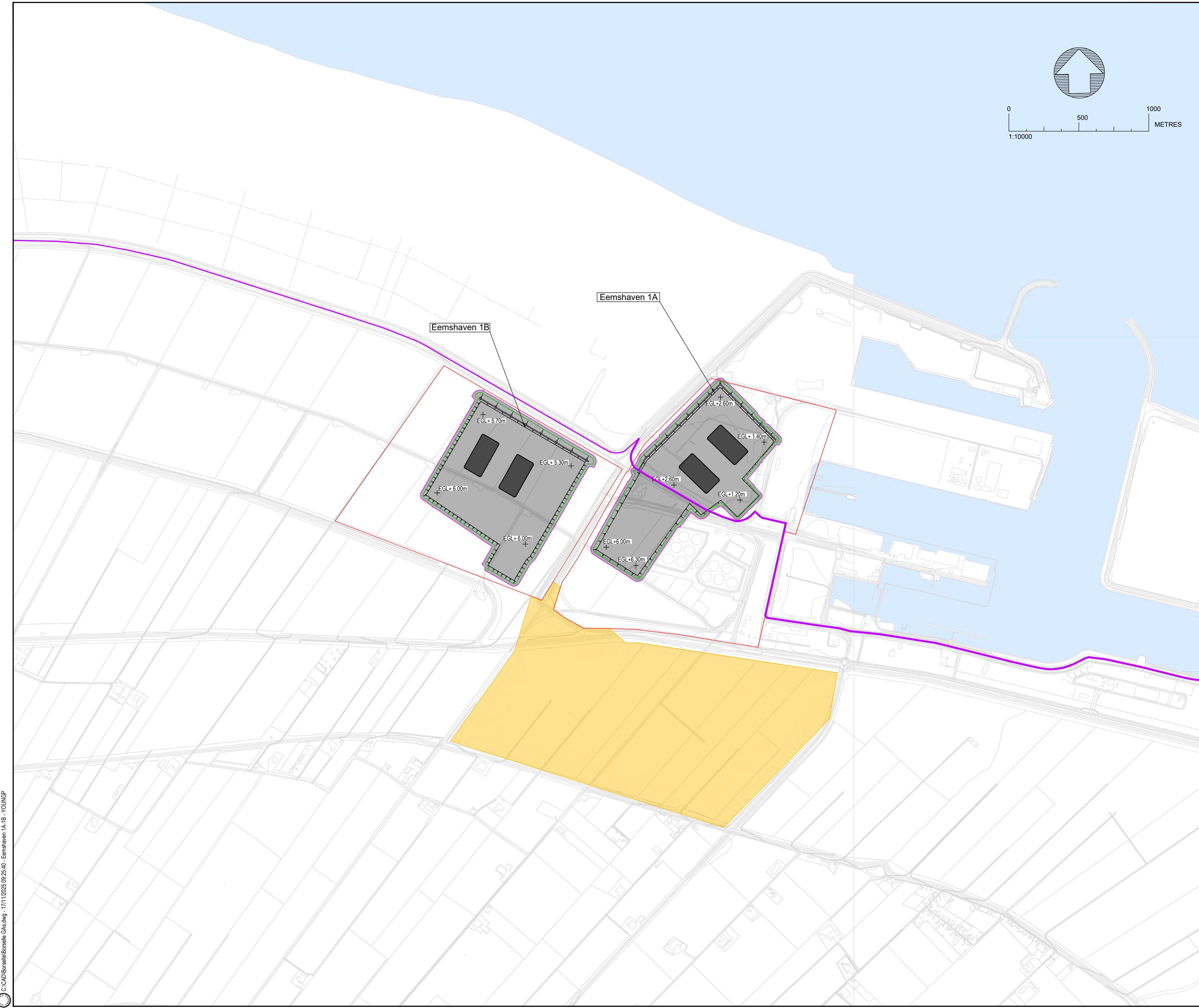
Criterion	Assessment Considerations	Scoring	Risk Category
Constraints due to the existing utilities and ease of diversion	Few or limited number of utilities present within the site and easily divertible.	7 to 9	Low Risk
	Large number of utilities present within the site and diversion requires extensive planning and coordination.	4 to 6	Moderate Risk
Weighting factor = 1	Sufficient land is NOT available within the site boundary and land adjacent to site boundary is not available directly for temporary stockpiling.	1 to 3	High Risk

**ONSITE CONSTRAINTS - Existing Structures**

Criterion	Assessment Considerations	Scoring	Risk Category
Constraints due to the existing structures	No existing structures in the vicinity that could constraint the construction or operation of the facility	7 to 9	Low Risk
Weighting factor = 1	Number of low profile or prominent or sensitive structures exist in the vicinity that would influence the method of construction at some cost but not the operation of the facility	4 to 6	Moderate Risk
	Number of low profile or prominent or sensitive structures exist in the vicinity that would influence the method of construction at some cost but not the operation of the facility.	1 to 3	High Risk

It is highlighted that there is further granularity in the scoring ranges that has not been included in the above tables for brevity.

## **Appendix C. Platform configuration drawings**



- Legend:**
- Site Boundary
  - Proposed Fenceline
  - Proposed Earthworks Extents
  - Reactor Building
  - Main Dyke
  - Construction area
  - EGL+ 2.50m Approximate level above/below Existing Ground Level (EGL)

- Notes**
1. To be read in conjunction with the Report (ref:PR00/006/FR-001).
  2. Platform configurations shown are based on fixed and variable plant configurations for the developed Bounding Case and align, where feasible, with favourable connections to potential cooling water solutions (assessed in PR00/005/FR-001).
  3. Platform configurations are not optimized for other factors outside the scope of the PR00/006/FR-001 report.
  4. Platform configurations have been developed to demonstrate that there is credible land / space available to accommodate the bounding case platform. Detailed refinements are outside the scope of the study.
  5. The Platform configurations do not constitute any final site layout and are produced for the site selection process only as part of PR00/006/FR-001 report.
  6. Site boundaries are based on GIS information provided by Deltares.
  7. Base mapping uses Top10NL 2017 DWG files. Content sourced from Top10NL 2017 and the TU Delft Library's Topographical Maps collection at <https://www.tudelft.nl/en/library/collections/map-room/map-collection/topographical-maps/top10nl/> accessed on 04 September 2025. Licensed under Creative Commons Attribution 4.0 International (CC BY 4.0). No changes were made. © Original creator(s) as credited on the source. No endorsement implied.

Rev	Rev Date	Purpose of revision	Drawn	Check	Review	App'd
P02	17/11/2025	Final				
P01	10/10/25	Draft for Client Comment				



Client  
**Ministry of Climate Policy and Green Growth**

Project  
**Design Basis Flood Level (DBFL) and Platform Level**

Drawing Title  
**General Arrangement  
Eemshaven 1 & 1A**

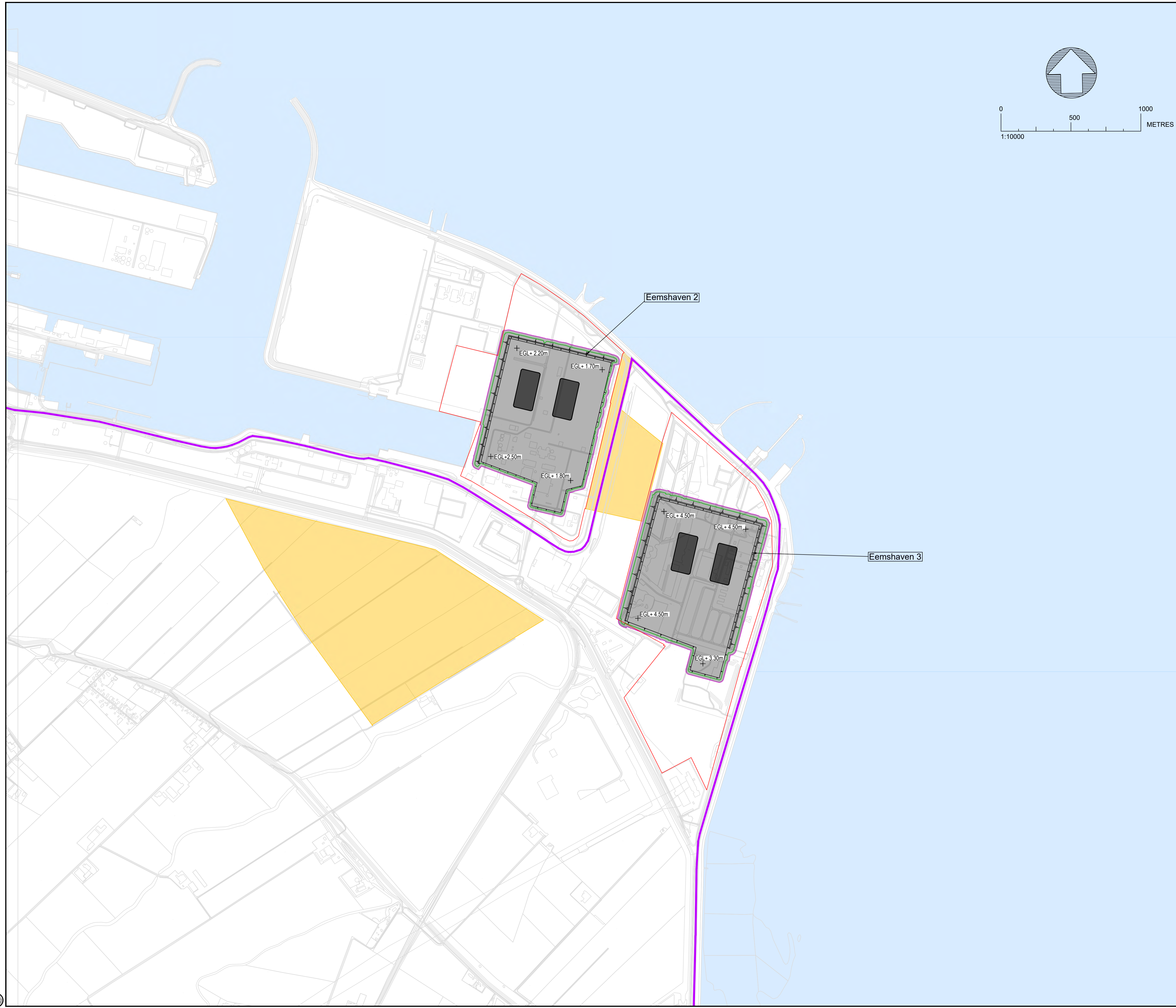
Protective Marking  
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Drawing Status  
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Scale  
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Amentum No. PR00-006  
Client No. N/A  
Drawing Number  
**PR00-006-SK001**

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- Legend:**
- Site Boundary
  - Proposed Fenceline
  - Proposed Earthworks Extents
  - Reactor Building
  - Main Dyke
  - Construction area
- EGL+ 2.50m  
+ Approximate level above/below Existing Ground Level (EGL)

- Notes**
1. To be read in conjunction with the Report (ref:PR00/006/FR-001).
  2. Platform configurations shown are based on fixed and variable plant configurations for the developed Bounding Case and align, where feasible, with favourable connections to potential cooling water solutions (assessed in PR00/005/FR-001).
  3. Platform configurations are not optimized for other factors outside the scope of the PR00/006/FR-001 report.
  4. Platform configurations have been developed to demonstrate that there is credible land / space available to accommodate the bounding case platform. Detailed refinements are outside the scope of the study.
  5. The Platform configurations do not constitute any final site layout and are produced for the site selection process only as part of PR00/006/FR-001 report.
  6. Site boundaries are based on GIS information provided by Deltares.
  7. Base mapping uses Top10NL 2017 DWG files. Content sourced from Top10NL 2017 and the TU Delft Library's Topographical Maps collection at <https://www.tudelft.nl/en/library/collections/map-room/map-collection/topographical-maps/top10nl/> accessed on 04 September 2025. Licensed under Creative Commons Attribution 4.0 International (CC BY 4.0). No changes were made. © Original creator(s) as credited on the source. No endorsement implied.

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P02	17/11/2025	Final	PY	RT	FM	AD
P01	10/10/25	Draft for Client Comment	PY	RT	FM	AD



Client  
**Ministry of Climate Policy and Green Growth**

Project  
**Design Basis Flood Level (DBFL) and Platform Level**

Drawing Title  
**General Arrangement  
Eemshaven 2 & 3**

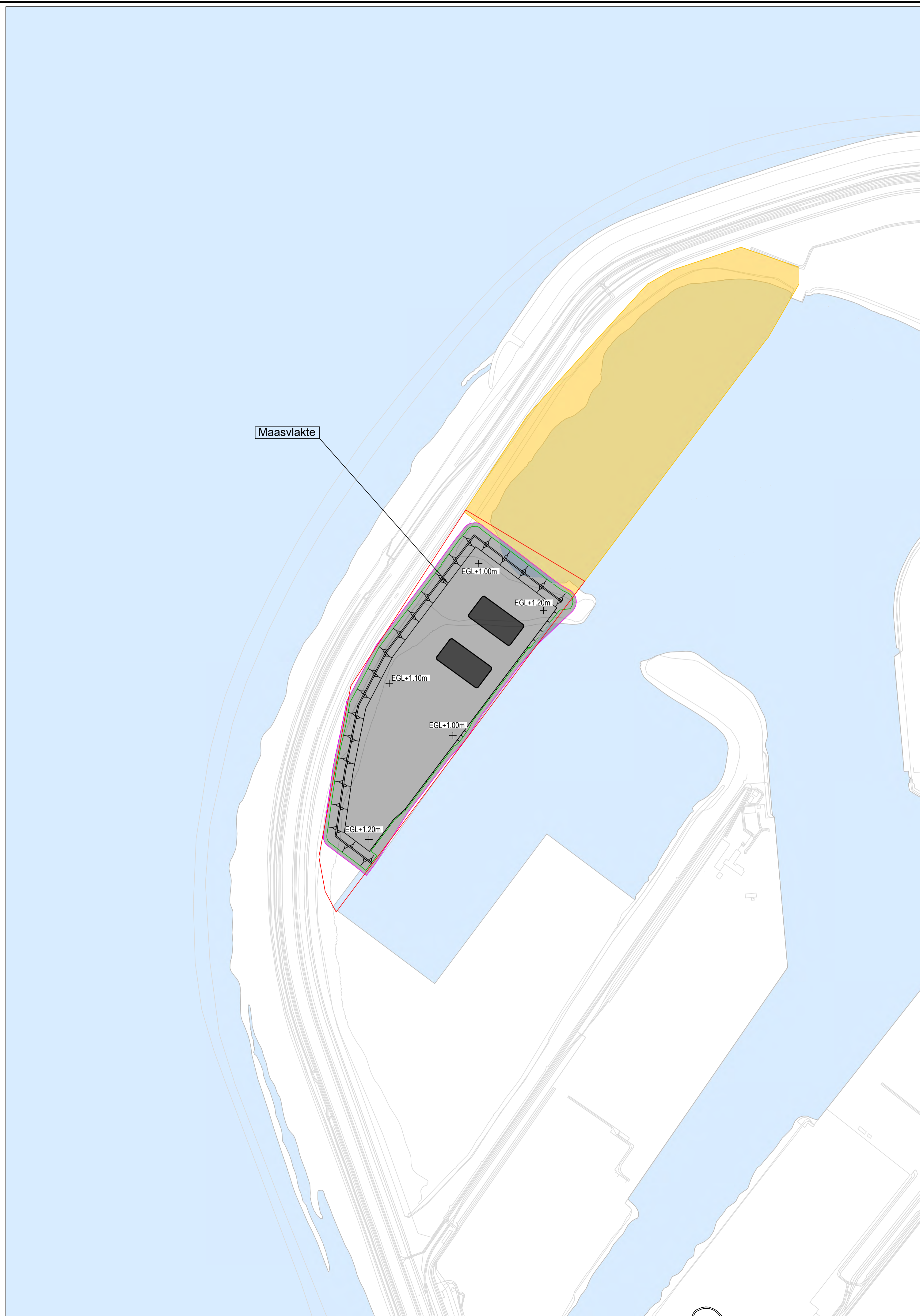
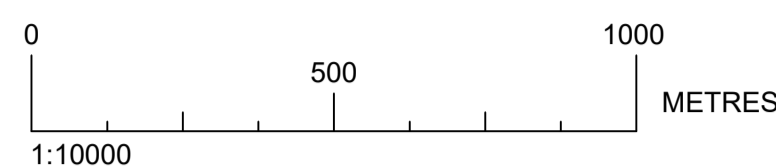
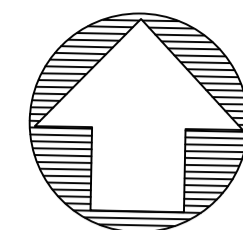
Protective Marking  
**OFFICIAL**

Drawing Status  
**FINAL** Suitability  
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Scale  
1:10,000 **DO NOT SCALE**

Amentum No. PR00-006 Rev  
**P02**

Client No. N/A  
Drawing Number  
**PR00-006-SK002**



Legend:

- Site Boundary
- Proposed Fenceline
- Proposed Earthworks Extents
- Reactor Building
- Construction area
- EGL + 2.50m — Approximate level above/below Existing Ground Level (EGL)

Notes

1. To be read in conjunction with the Report (ref:PR00/006/FR-001).
2. Platform configurations shown are based on fixed and variable plant configurations for the developed Bounding Case and align, where feasible, with favourable connections to potential cooling water solutions (assessed in PR00/005/FR-001).
3. Platform configurations are not optimized for other factors outside the scope of the PR00/006/FR-001 report.
4. Platform configurations have been developed to demonstrate that there is credible land / space available to accommodate the bounding case platform. Detailed refinements are outside the scope of the study.
5. The Platform configurations do not constitute any final site layout and are produced for the site selection process only as part of PR00/006/FR-001 report.
6. Site boundaries are based on GIS information provided by Deltares.
7. Base mapping uses Top10NL 2017 DWG files. Content sourced from Top10NL 2017 and the TU Delft Library's Topographical Maps collection at <https://www.tudelft.nl/en/library/collections/map-room/map-collection/topographical-maps/top10nl/> accessed on 04 September 2025. Licensed under Creative Commons Attribution 4.0 International (CC BY 4.0). No changes were made. © Original creator(s) as credited on the source. No endorsement implied.

Rev	Rev Date	Purpose of revision	Drawn	Check	Review	App'd
P02	17/11/2025	Final		PY	RT	FM AD
P01	10/10/25	Draft for Client Comment		PY	RT	FM AD



Client: Ministry of Climate Policy and Green Growth

Project: Design Basis Flood Level (DBFL) and Platform Level

Drawing Title: General Arrangement Maasvlakte

Protective Marking: OFFICIAL

Drawing Status: FINAL

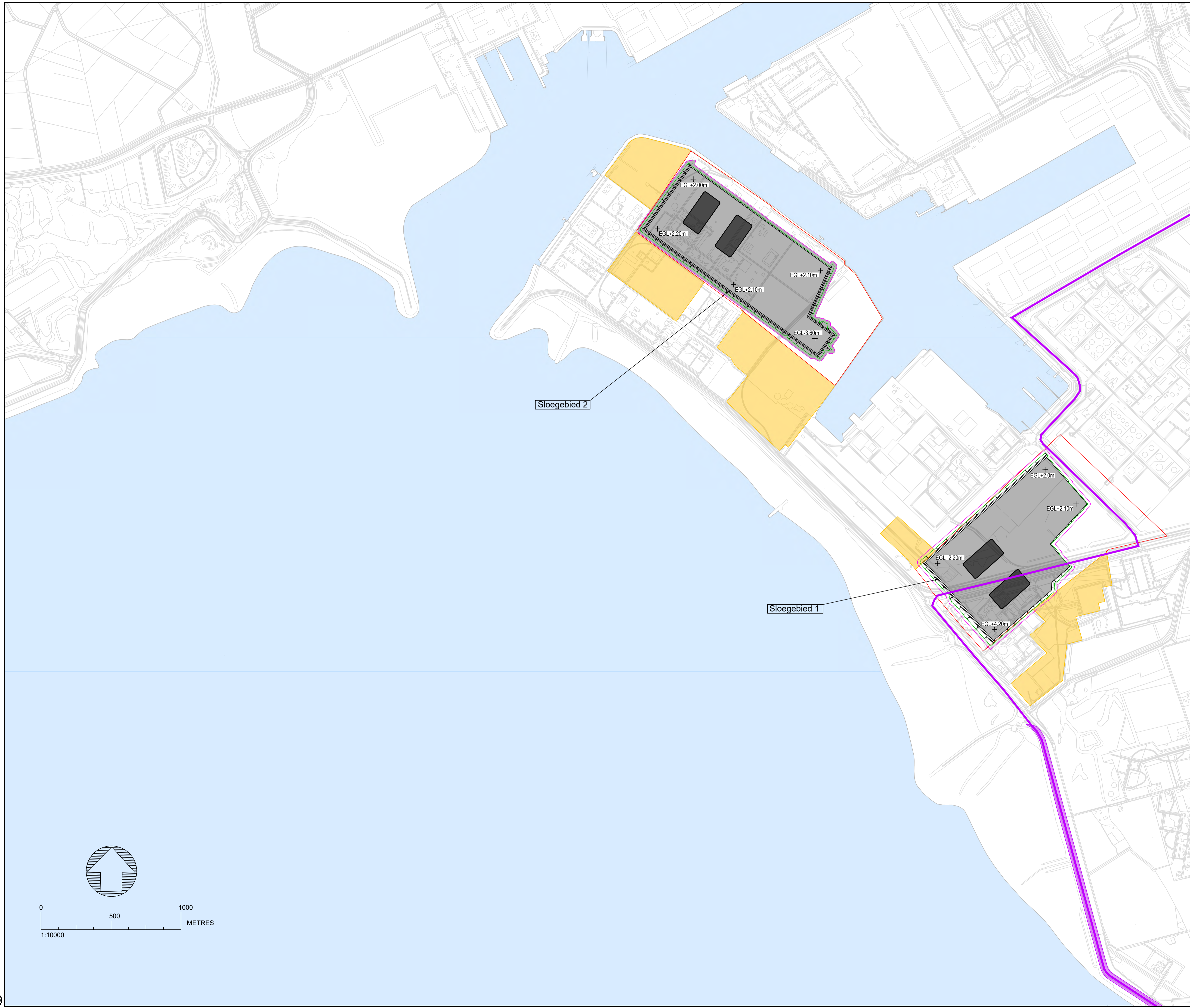
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Amentum No. PR00-006 Client No. N/A

Drawing Number: PR00-006-SK003

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C:\CD\Borselle\Borselle\_Gas.dwg - 17/11/2025 09:27:42 - Maasvlakte - YOUNGP



- Legend:**
- Site Boundary
  - Proposed Fence Line
  - Proposed Earthworks Extents
  - Reactor Building
  - Main Dyke
  - Construction area
- EGL + 2.50m    Approximate level above/below Existing Ground Level (EGL)

- Notes**
1. To be read in conjunction with the Report (ref-PR00/006/FR-001).
  2. Platform configurations shown are based on fixed and variable plant configurations for the developed Bounding Case and align, where feasible, with favourable connections to potential cooling water solutions (assessed in PR00/005/FR-001).
  3. Platform configurations are not optimized for other factors outside the scope of the PR00/006/FR-001 report.
  4. Platform configurations have been developed to demonstrate that there is credible land / space available to accommodate the bounding case platform. Detailed refinements are outside the scope of the study.
  5. The Platform configurations do not constitute any final site layout and are produced for the site selection process only as part of PR00/006/FR-001 report.
  6. Site boundaries are based on GIS information provided by Deltares.
  7. Base mapping uses Top10NL 2017 DWG files. Content sourced from Top10NL 2017 and the TU Delft Library's Topographical Maps collection at <https://www.tudelft.nl/en/library/collections/map-room/map-collection/topographical-maps/top10nl/> accessed on 04 September 2025. Licensed under Creative Commons Attribution 4.0 International (CC BY 4.0). No changes were made. © Original creator(s) as credited on the source. No endorsement implied.

Rev	Rev Date	Purpose of revision	Drawn	Check	Review	App'd
P02	17/11/2025	Final				
P01	10/10/25	Draft for Client Comment				



Client  
**Ministry of Climate Policy and Green Growth**

Project  
**Design Basis Flood Level (DBFL) and Platform Level**

Drawing Title  
**General Arrangement Sloegebied 1 & 2**

Protective Marking  
**OFFICIAL**

Drawing Status  
**FINAL**

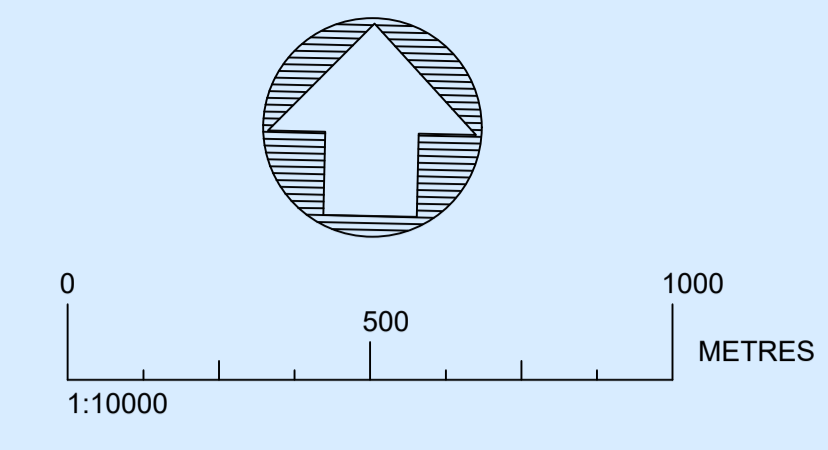
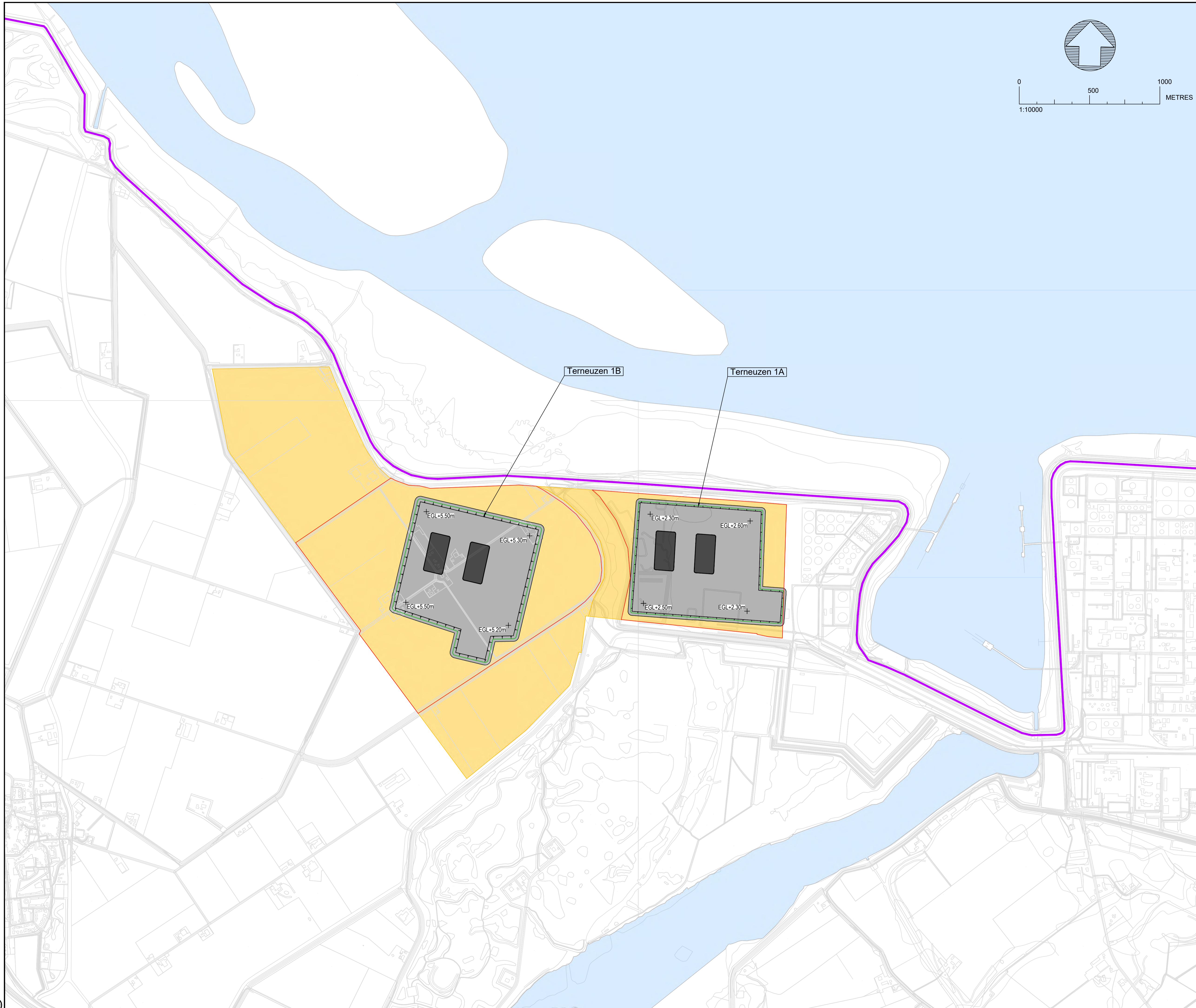
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Amentum No. PR00-006    Rev

Client No. N/A    P02

Drawing Number  
**PR00-006-SK004**

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- Legend:**
- Site Boundary
  - Proposed Fenceline
  - Proposed Earthworks Extents
  - Reactor Building
  - Main Dyke
  - Construction area
  - EGL+ 2.50m — Approximate level above/below Existing Ground Level (EGL)

- Notes**
1. To be read in conjunction with the Report (ref:PR00/006/FR-001).
  2. Platform configurations shown are based on fixed and variable plant configurations for the developed Bounding Case and align, where feasible, with favourable connections to potential cooling water solutions (assessed in PR00/005/FR-001).
  3. Platform configurations are not optimized for other factors outside the scope of the PR00/006/FR-001 report.
  4. Platform configurations have been developed to demonstrate that there is credible land / space available to accommodate the bounding case platform. Detailed refinements are outside the scope of the study.
  5. The Platform configurations do not constitute any final site layout and are produced for the site selection process only as part of PR00/006/FR-001 report.
  6. Site boundaries are based on GIS information provided by Deltares.
  7. Base mapping uses Top10NL 2017 DWG files. Content sourced from Top10NL 2017 and the TU Delft Library's Topographical Maps collection at <https://www.tudelft.nl/en/library/collections/map-room/map-collection/topographical-maps/top10nl/> accessed on 04 September 2025. Licensed under Creative Commons Attribution 4.0 International (CC BY 4.0). No changes were made. © Original creator(s) as credited on the source. No endorsement implied.

Terneuzen 1B      Terneuzen 1A



Rev	Rev Date	Purpose of revision	Drawn	Check	Review	App'd
P02	17/11/2025	Final				
P01	10/10/25	Draft for Client Comment				



Client: Ministry of Climate Policy and Green Growth

Project: Design Basis Flood Level (DBFL) and Platform Level

Drawing Title: General Arrangement Terneuzen 1A & 1B

Protective Marking: OFFICIAL

Drawing Status: FINAL Suitability: --

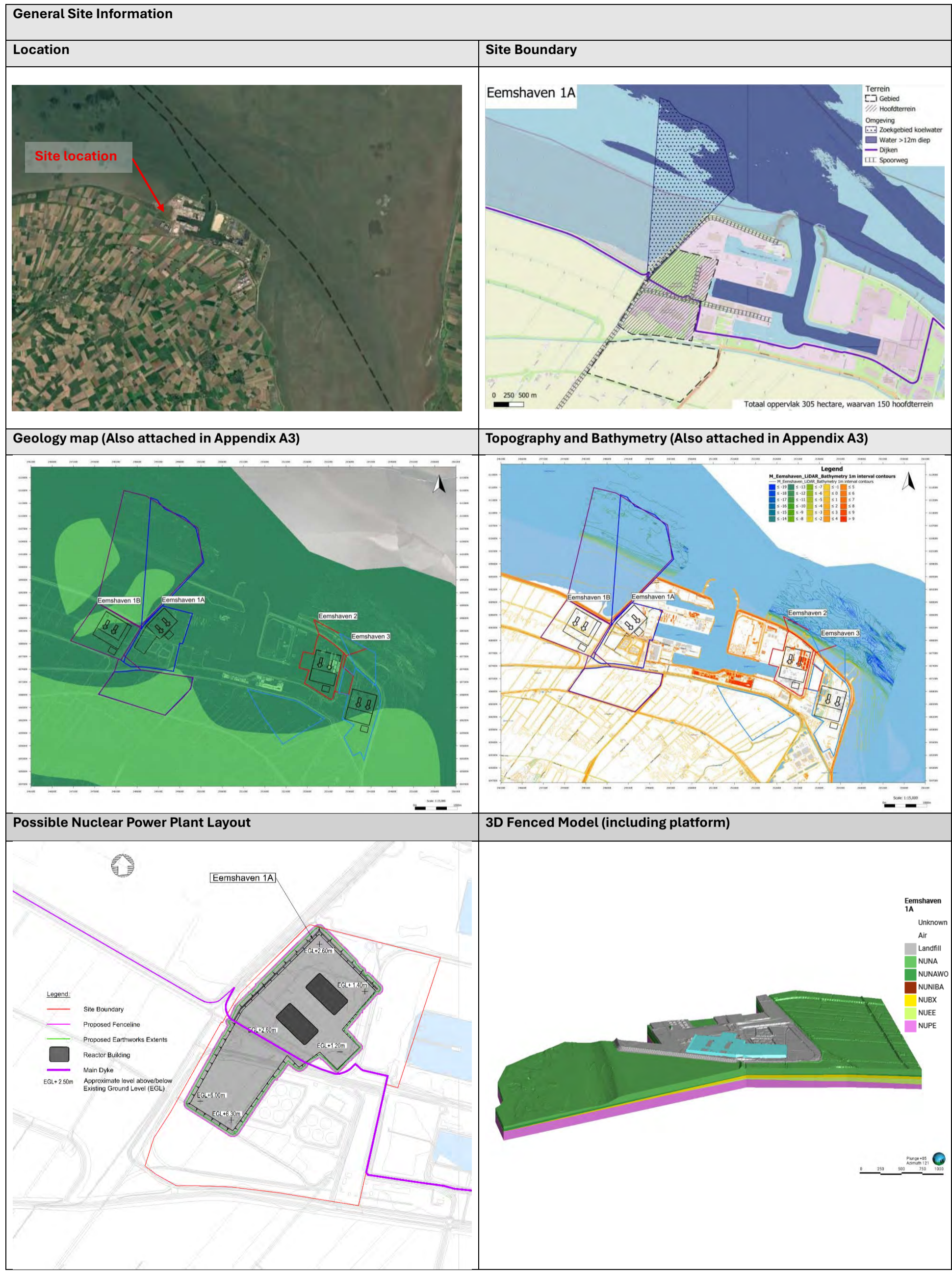
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Amentum No. PR00-06 Rev: P02

Client No. N/A

Drawing Number: PR00-006-SK005

## **Appendix D. Technical Factsheets**



Geology, soil conditions and Deep Foundations			
<p><b>Geological cross Sections</b></p>	<p>Note: The geological section has been produced based on Geological Sections provided in the Deltares Site Evaluation Reports. For more details on the assumptions refer to section 4.3 of the Report: <i>Multi-site Preliminary Technical Evaluation of Site Suitability for Geology, soil conditions and deep foundations (PR00/003/FR-001)</i>. Section is also presented in Appendix A3.</p>		
<p><b>Simplified section through nuclear island and showing foundation levels</b></p>	<p><b>NOT TO SCALE</b></p> <p>Notes:  NI: Nuclear Island  CI: Conventional Island</p>		
Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	6	2	12
Open battered excavation	2	1	2
<b>Ground risks</b>			
Liquefaction	6	3	18
Ground variability	3	2	6
<b>Total weighted score = 38</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Limited but adequate: At least two deep BHs/CPTs 30m apart and up to 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 (Low) based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Key risks</b>			
<ul style="list-style-type: none"> <li>Weak layer identified below the foundation level (i.e. Peat).</li> <li>Open battered excavation is challenging due to proximity to the main dyke and complex geohydrological conditions.</li> </ul>			

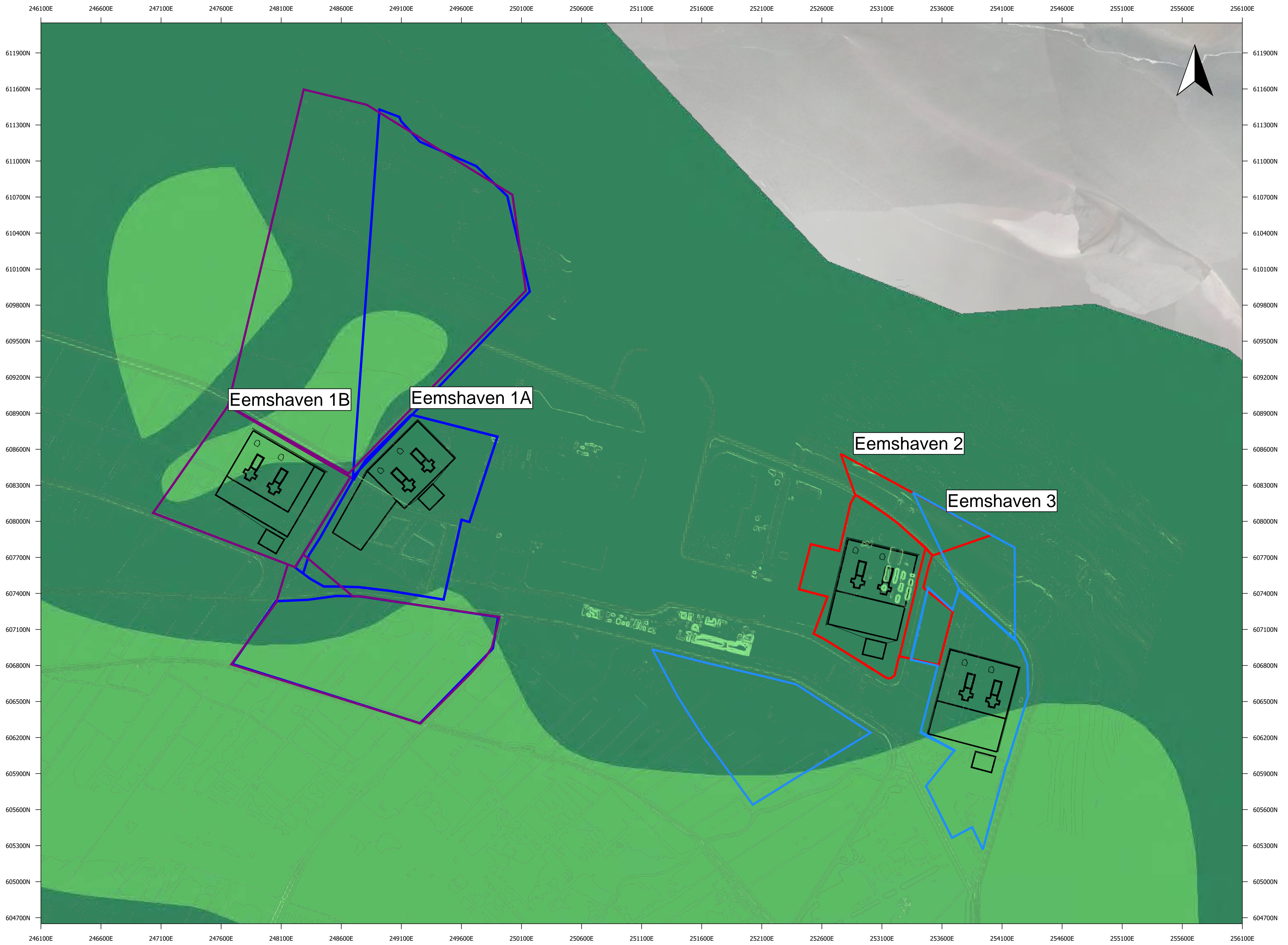
Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>	<b>Required landscaping (CCM) - m<sup>3</sup></b>
	-	1,064,00	2,148,000	3,085,000	3,085,000	-	1,045,000
Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters							
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	3		3		9		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	7		1		7		
Area for stockpiling	7		1		7		
Temporary works area	8		2		16		
<b>Earthworks design</b>							
Earthworks re-use potential	5		2		10		
Contaminated soils risk	6		2		12		
<b>Onsite constraints</b>							
Existing utilities	6		1		6		
Existing structures	4		1		4		
<b>Total Weighted score = 71</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 4 (Very High) based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Key risk</b>							
<ul style="list-style-type: none"> <li>Existing Structures – Solar Farm, Gas Tanks, &amp; Main Dyke.</li> </ul>							

Overall Scoring summary (PR00/003/FR-001 & PR00/006/FR-001)	
Total score	109
Total number of Red (High risk) criteria	3
Total number of Amber (Medium risk) criteria	6
Total number of Green (Low risk) criteria	3

# APPENDIX A3

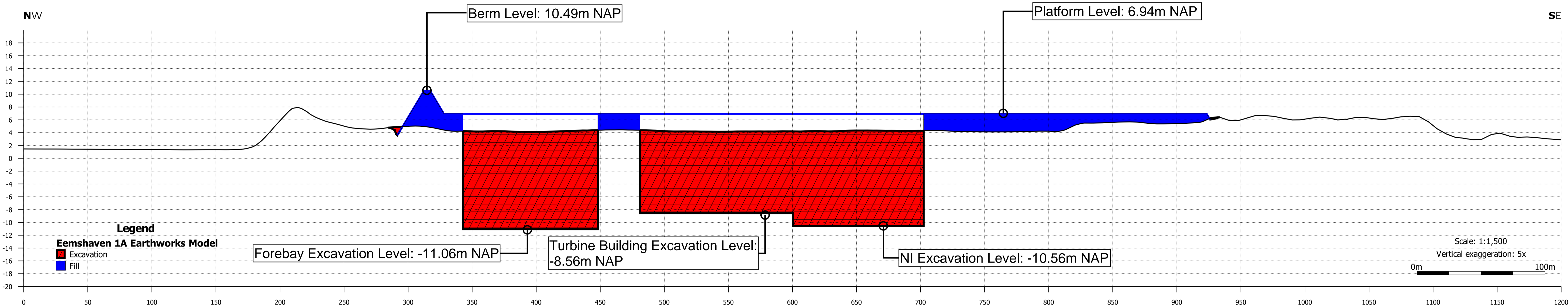
Units geological map			
<b>Holocene units</b>			
d	Coastal dune sand	ds	dg
s	Beach and foreshore deposits	s	
g	Tidal channel deposits	g	
o	Tidal deposits	o	ovg* ovo* oo*
<p><i>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</i></p>			
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>			
BX1-4	Various glacial (aeolian) sand units (Boxtel Fm)	BX1	BX2 BX3 BX4
SY	Middle Pleistocene sandy fluvial sediments (Stramproy Fm)	SY	
WA	Early and Middle Pleistocene fluvial sediments (Waalre Fm)	WA	
MO	Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations)	MO	
BR	Miocene fine shallow-marine glauconite sands (Breda Fm)	BR	
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD	
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>			
KR2	Coarse-grained Late Pleistocene fluvial deposits	KR2	
EE2	Open marine sandy and shell-rich Last Interglacial sediments.	EE2	
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD	

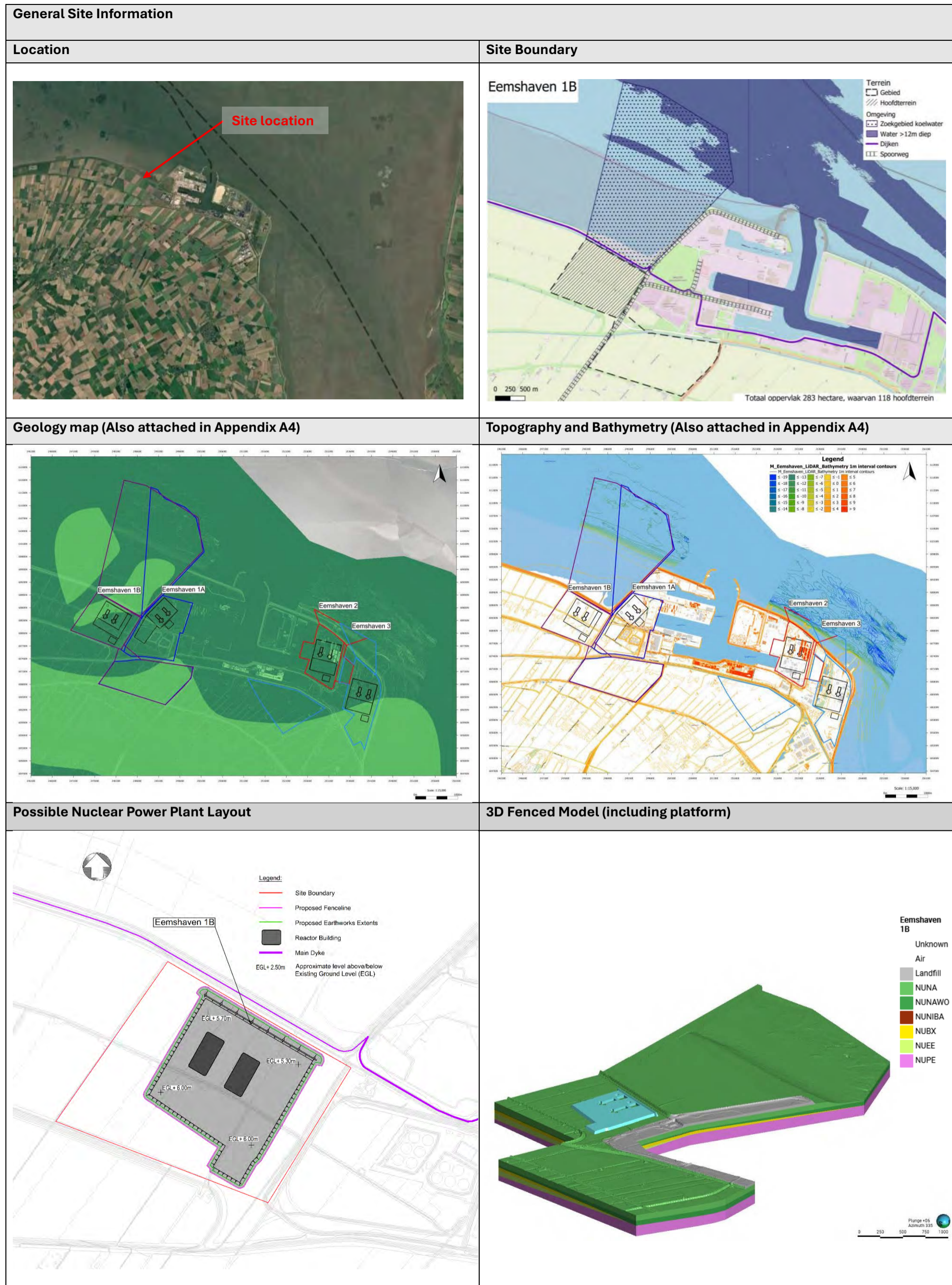
# Eemshaven Plan View



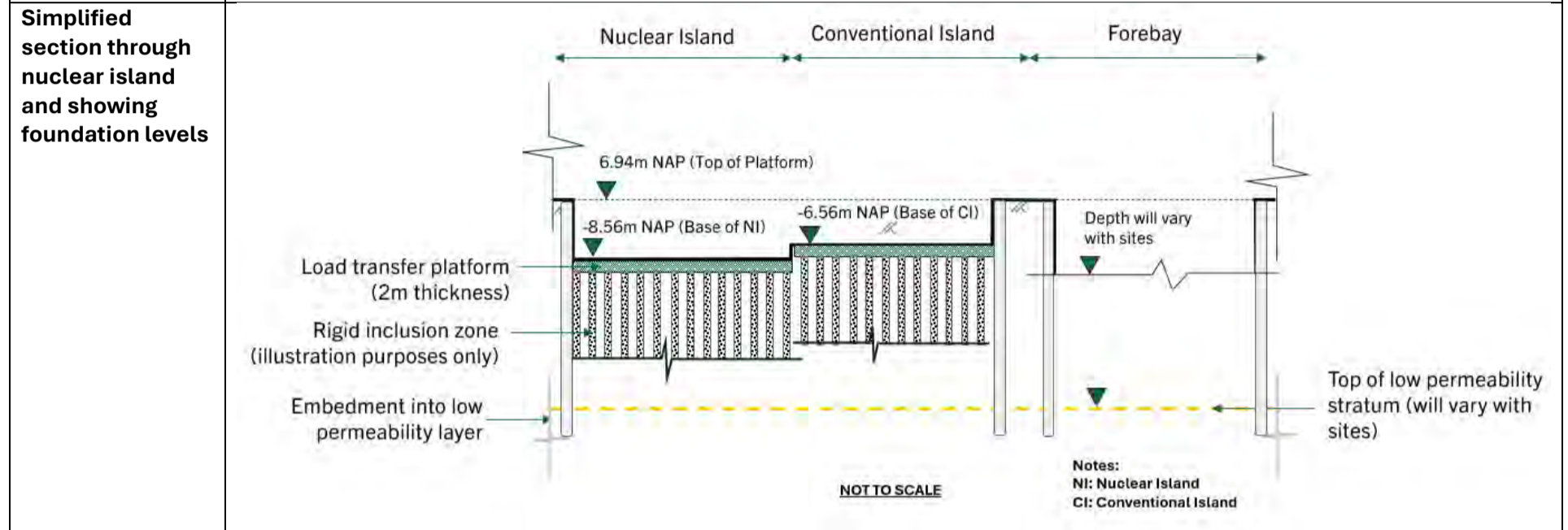
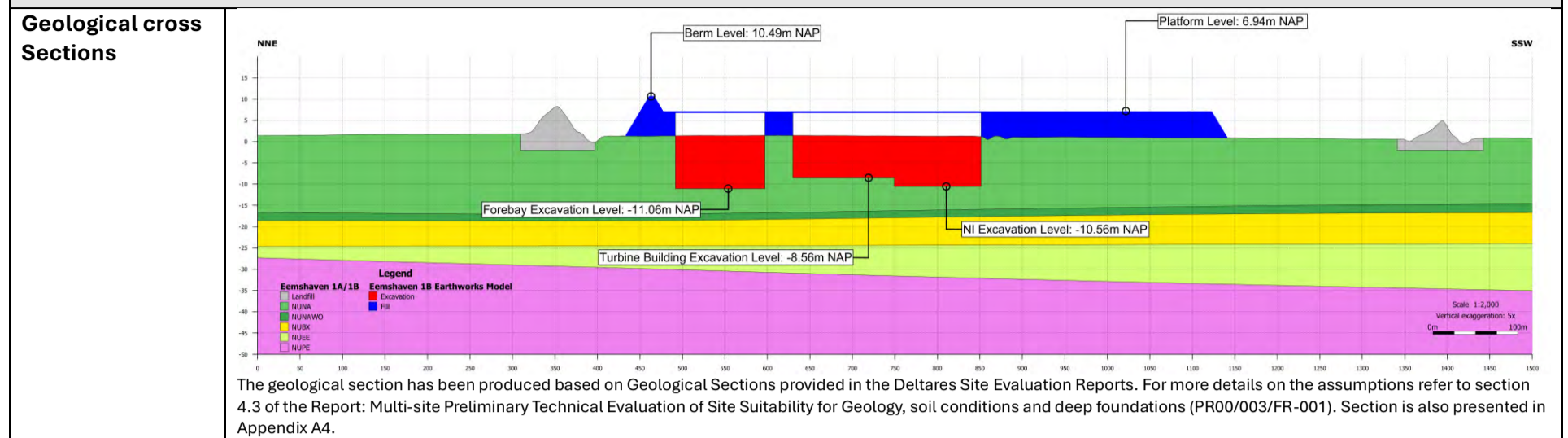


# Eemshaven 1A Earthworks Long Section (N-S)





Geology, soil conditions and Deep Foundations



Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	6	2	12
Open battered excavation	3	1	3
<b>Ground risks</b>			
Liquefaction	7	3	21
Ground variability	6	2	12
<b>Total weighted score = 48</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Limited but adequate: At least two deep BHs/CPTs 30m apart and up to 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 (Low) based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Key risks</b>			
<ul style="list-style-type: none"> <li>Open battered excavation presents challenges due to granular slope conditions and hydraulic connectivity with the sea.</li> </ul>			

Design Basis Flood Level and Platform								
<b>Schematic Typical Section</b>								
<b>Static earthworks quantities</b>		<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>	<b>Required landscaping (CCM) - m<sup>3</sup></b>
		147,000	839,000	3,374,000	4,002,000	4,002,000	-	797,000
		Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>			<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>								
Groundwater control requirements	3			3		9		
<b>Earthworks logistics</b>								
Logistics (Accessibility and plant movement)	6			1		6		
Area for stockpiling	9			1		9		
Temporary works area	9			2		18		
<b>Earthworks design</b>								
Earthworks re-use potential	7			2		14		
Contaminated soils risk	7			2		14		
<b>Onsite constraints</b>								
Existing utilities	8			1		8		
Existing structures	6			1		6		
<b>Total Weighted score = 84</b>								
<b>Financial impact classification</b>								
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>								
<b>Time impact classification</b>								
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 4 (Very High) based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>								
<b>Key risks</b>								
<ul style="list-style-type: none"> <li>Logistics – likely requires new access roads for construction traffic to access site.</li> </ul>								

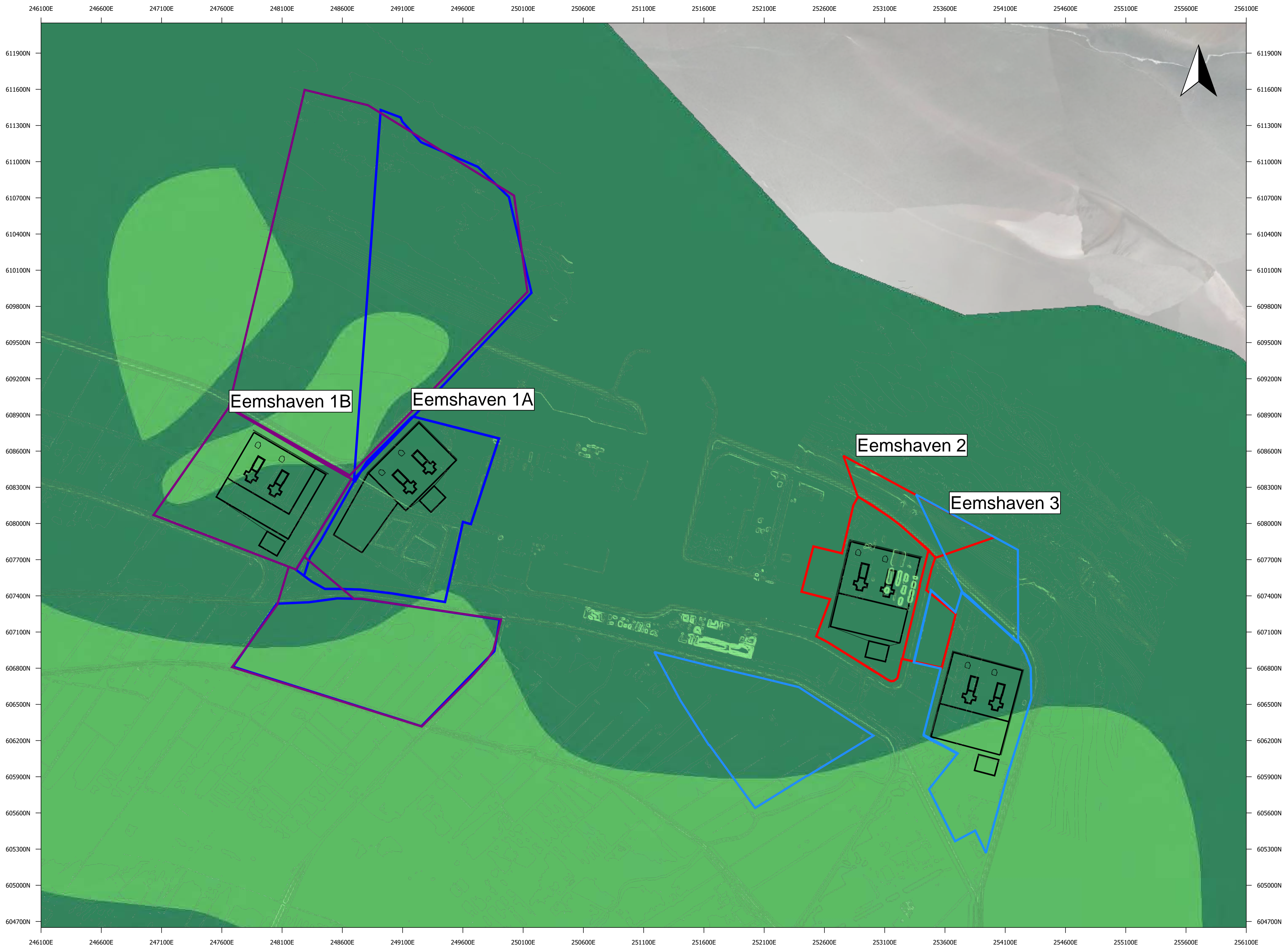
**Title: Eemshaven 1B Technical Factsheet**

<b>Overall Scoring summary (WP03 &amp; WP06)</b>	
<b>Total score</b>	<b>132</b>
<b>Total number of Red (High risk) criteria</b>	<b>2</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>4</b>
<b>Total number of Green (Low risk) criteria</b>	<b>6</b>

# APPENDIX A4

Units geological map	
<b>Holocene units</b>	
d Coastal dune sand	ds dg
s Beach and foreshore deposits	s
g Tidal channel deposits	g
o Tidal deposits	o ovg* ovo* oo*
<p><i>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</i></p>	
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>	
BX1-4 Various glacial (aeolian) sand units (Boxtel Fm)	BX1 BX2 BX3 BX4
SY Middle Pleistocene sandy fluvial sediments (Stramproy Fm)	SY
WA Early and Middle Pleistocene fluvial sediments (Waalre Fm)	WA
MO Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations)	MO
BR Miocene fine shallow-marine glauconite sands (Breda Fm)	BR
RTD Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>	
KR2 Coarse-grained Late Pleistocene fluvial deposits	KR2
EE2 Open marine sandy and shell-rich Last Interglacial sediments.	EE2
RTD Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD

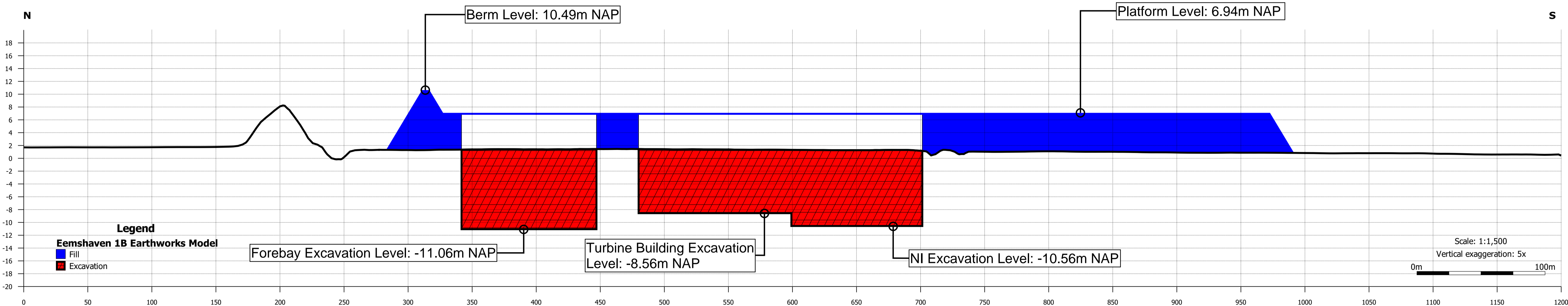
# Eemshaven Plan View

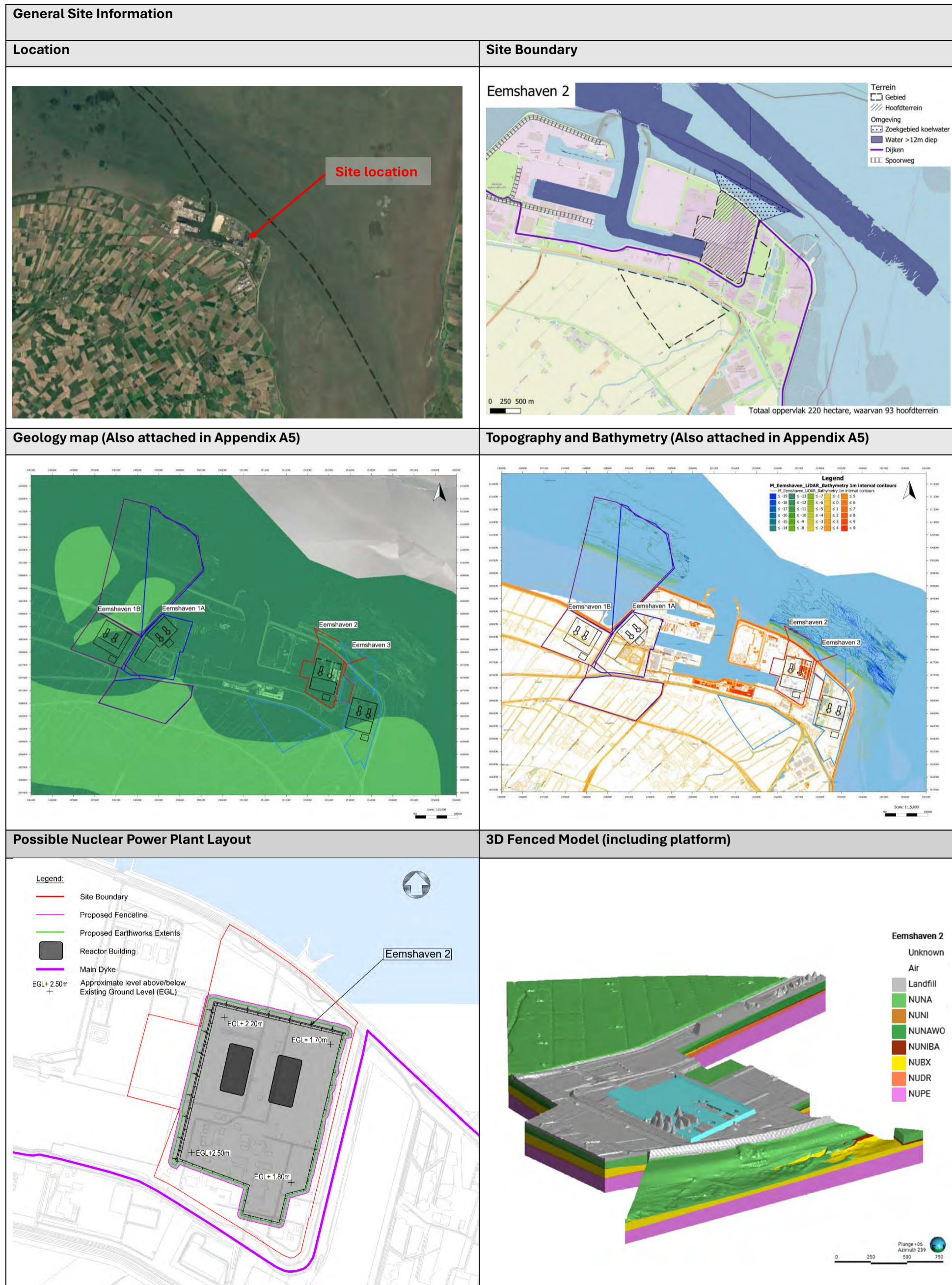


Scale: 1:15,000  
0m 1000m



# Eemshaven 1B Earthworks Long Section (N-S)





Geology, soil conditions and Deep Foundations			
<p><b>Geological cross Sections</b></p>	<p>The geological section has been produced based on Geological Sections provided in the Deltares Site Evaluation Reports. For more details on the assumptions refer to section 4.3 of the Report: Multi-site Preliminary Technical Evaluation of Site Suitability for Geology, soil conditions and deep foundations (PR00/003/FR-001). Section is also presented in Appendix A5.</p>		
<p><b>Simplified section through nuclear island and showing foundation levels</b></p>	<p>NOT TO SCALE</p> <p>Notes: NI: Nuclear Island CI: Conventional Island</p>		
Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	3	2	6
Open battered excavation	1	1	1
<b>Ground risks</b>			
Liquefaction	7	3	21
Ground variability	1	2	2
<b>Total weighted score = 30</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Limited but adequate: At least two deep BHs/CPTs 30m apart and upto 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 Low based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Key risks</b>			
<ul style="list-style-type: none"> <li>High lateral variability of ground conditions may require local adjustment of Rigid Inclusion lengths to control differential settlements.</li> <li>Weak layer identified below the foundation level (i.e., Peat).</li> <li>Open battered excavation presents challenges.</li> </ul>			

Title: Eemshaven 2 Technical Factsheet

Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>	<b>Required landscaping (CCM) - m<sup>3</sup></b>
	-	979,000	1,257,000	2,145,000	2,145,000	-	951,000
	Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	3		3		9		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	4		1		4		
Area for stockpiling	4		1		4		
Temporary works area	2		2		4		
<b>Earthworks design</b>							
Earthworks re-use potential	5		2		10		
Contaminated soils risk	6		2		12		
<b>Onsite constraints</b>							
Existing utilities	1		1		1		
Existing structures	1		1		1		
<b>Total Weighted score = 45</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 3 High based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Key risks</b>							
<ul style="list-style-type: none"> <li>Temp. works area – very limited space.</li> <li>Existing utilities &amp; structures – existing Power Plants</li> </ul>							

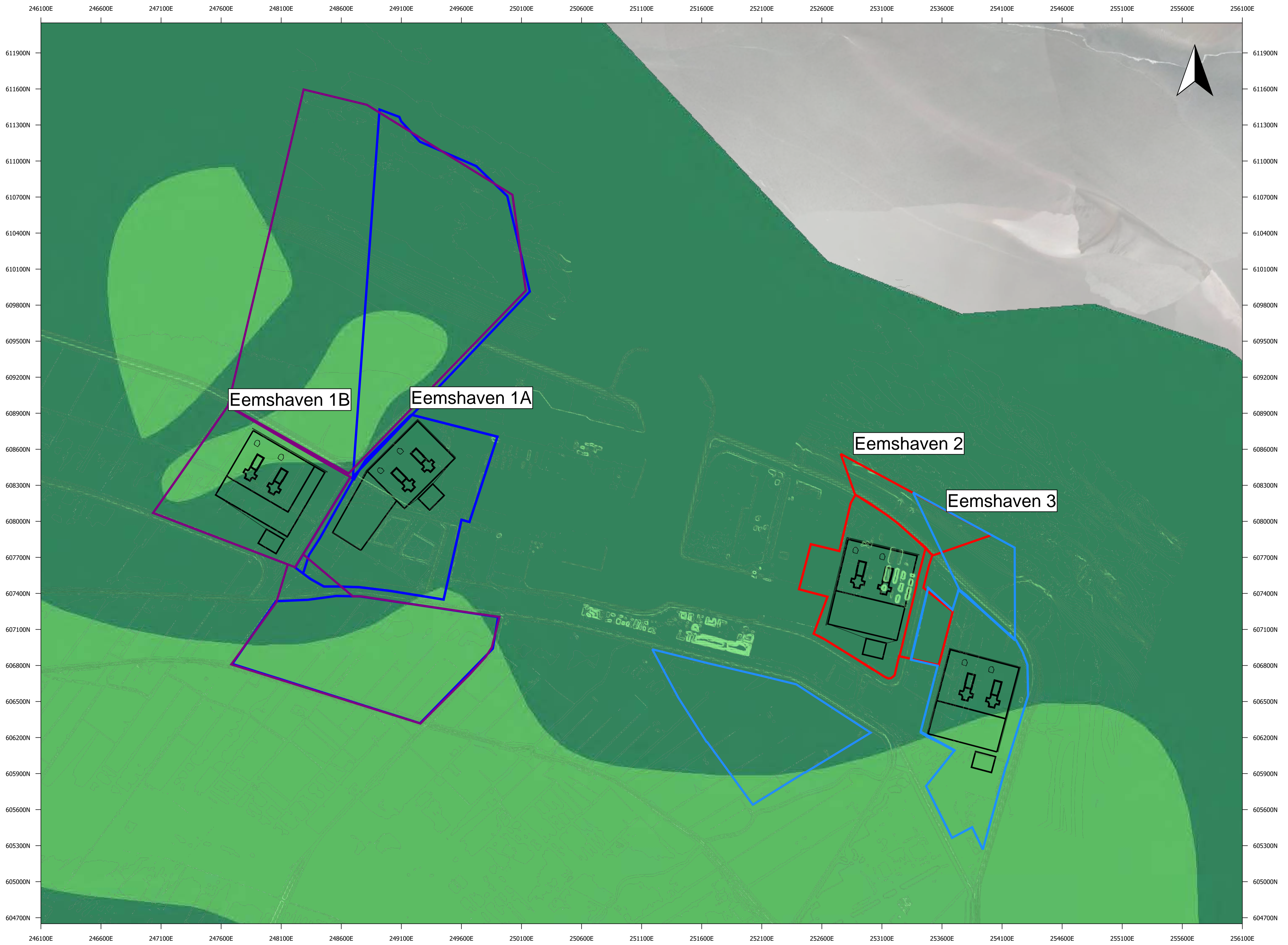
**Title: Eemshaven 2 Technical Factsheet**

<b>Overall Scoring summary (PR00/003/FR-001 &amp; PR00/006/FR-001)</b>	
<b>Total score</b>	<b>75</b>
<b>Total number of Red (High risk) criteria</b>	<b>7</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>4</b>
<b>Total number of Green (Low risk) criteria</b>	<b>1</b>

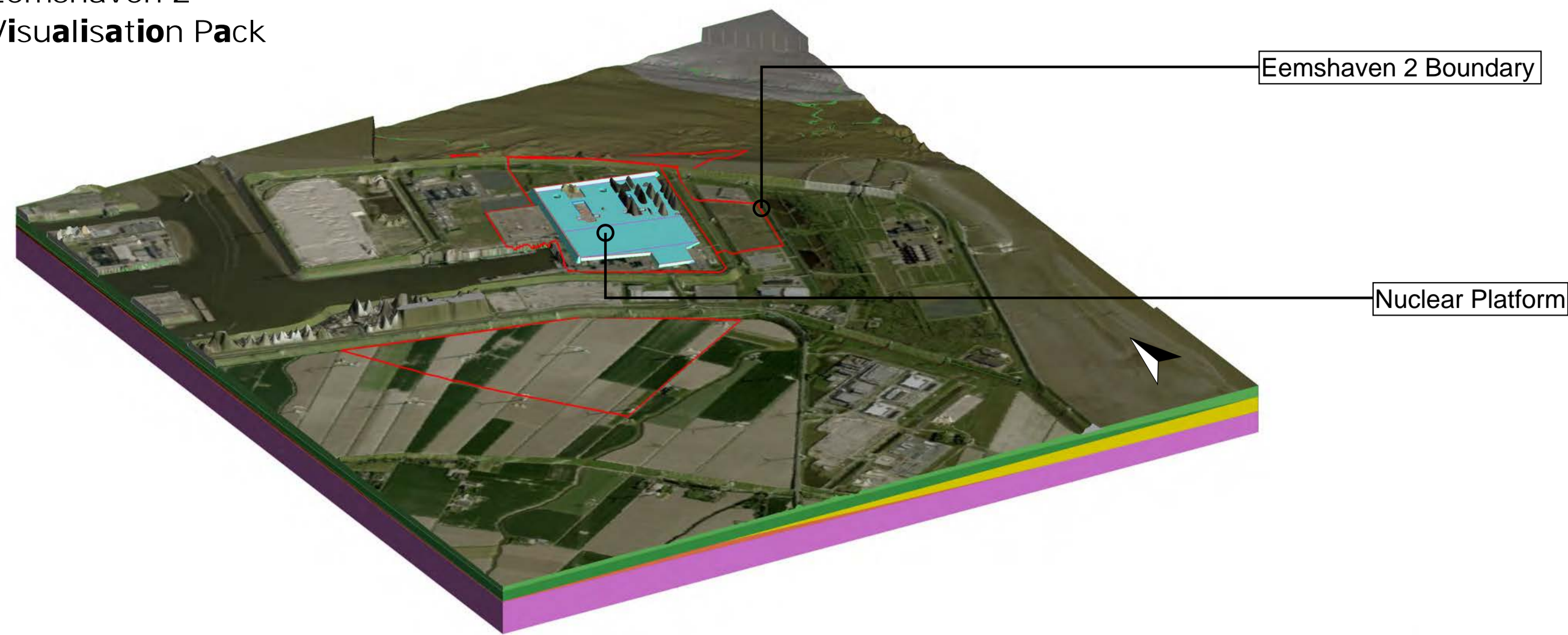
# APPENDIX A5

Units geological map	
<b>Holocene units</b>	
d	Coastal dune sand <span style="margin-left: 100px;">ds</span> <span style="margin-left: 20px;">dg</span>
s	Beach and foreshore deposits <span style="margin-left: 100px;">s</span>
g	Tidal channel deposits <span style="margin-left: 100px;">g</span>
o	Tidal deposits <span style="margin-left: 100px;">o</span> <span style="margin-left: 20px;">ovg*</span> <span style="margin-left: 20px;">ovo*</span> <span style="margin-left: 20px;">oo*</span>
<p><i>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</i></p>	
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>	
BX1-4	Various glacial (aeolian) sand units (Boxtel Fm) <span style="margin-left: 100px;">BX1</span> <span style="margin-left: 20px;">BX2</span> <span style="margin-left: 20px;">BX3</span> <span style="margin-left: 20px;">BX4</span>
SY	Middle Pleistocene sandy fluvial sediments (Stramproy Fm) <span style="margin-left: 100px;">SY</span>
WA	Early and Middle Pleistocene fluvial sediments (Waalre Fm) <span style="margin-left: 100px;">WA</span>
MO	Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations) <span style="margin-left: 100px;">MO</span>
BR	Miocene fine shallow-marine glauconite sands (Breda Fm) <span style="margin-left: 100px;">BR</span>
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations) <span style="margin-left: 100px;">RTD</span>
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>	
KR2	Coarse-grained Late Pleistocene fluvial deposits <span style="margin-left: 100px;">KR2</span>
EE2	Open marine sandy and shell-rich Last Interglacial sediments. <span style="margin-left: 100px;">EE2</span>
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations) <span style="margin-left: 100px;">RTD</span>

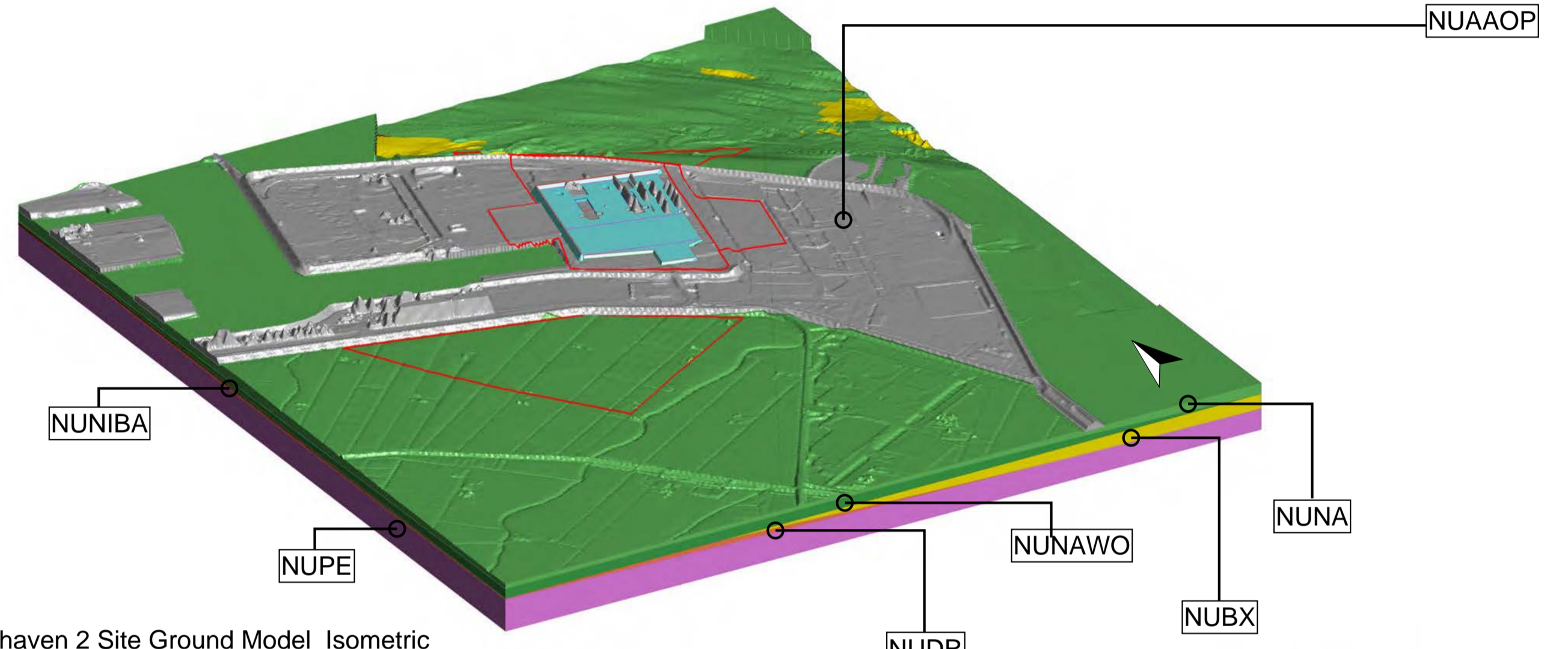
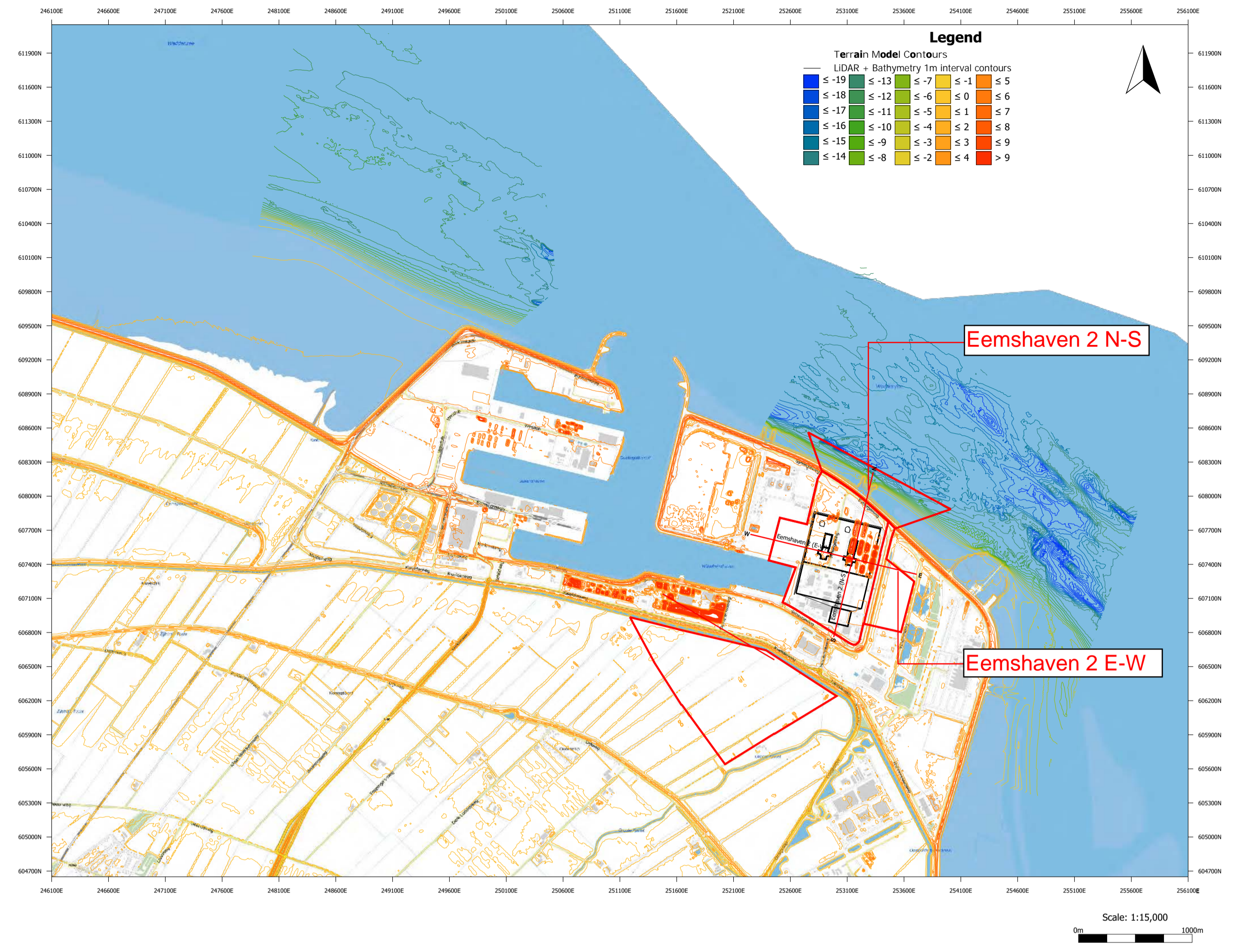
# Eemshaven Plan View



# Eemshaven 2 - Visualisation Pack



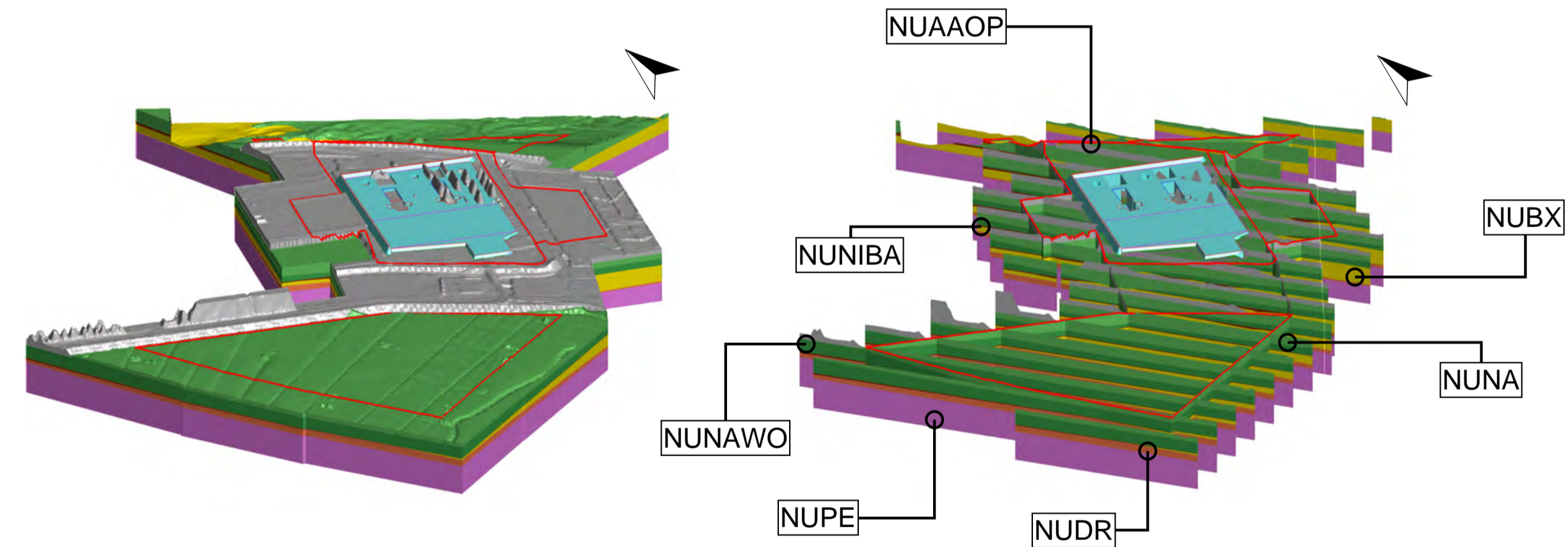
Aerial Isometric View



Eemshaven 2 Site Ground Model Isometric View

Geological Code	Formation Name	Description	Depth Top (m bg)	Depth Base (m bg)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUAA (Landfill)	Anthropogenic Ground	Reworked anthropogenic material	0.0	6.4	4.5	-2.0	6.4
NUNA	Naaldwijk Formation	Highly variable, grey fine to medium sand, with grey to blue silt and clay layers, discontinuous peat layers	6.4	23.9	-2.0	-19.4	17.4
NUNAWO	Wormer Member of the Naaldwijk Formation	Fine sand, silty, clayey, intercalated silt and clay layers	n/a	n/a	n/a	n/a	n/a
NUNI	Niuekoop Formation	Brown to black peat and other organics	23.9	24.8	-19.4	-20.4	1.0
NUNIBA	Niuekoop Formation basal peat	Basal peat found on-shore from -14 to -15m NAP	n/a	n/a	n/a	n/a	n/a
NUBX	Boxtel Formation	Light yellow to dark brown very fine to medium sand, silty, some peat and gyttja layers	24.8	28.1	-20.4	-23.7	3.3
NUDR	Drente Formation	Clay and fine-grained to coarse sand, locally gravel or peat and brown-coal seams. There is a general trend from coarse- to fine-grained sediments towards the north and west.	28.1	31.6	-23.7	-27.1	3.4
NUPE	Peelo Formation	Yellowish/brownish grey very fine to very coarse sand, with subordinate gravel layers	31.6	Not proven	-27.1	Not proven	Not proven

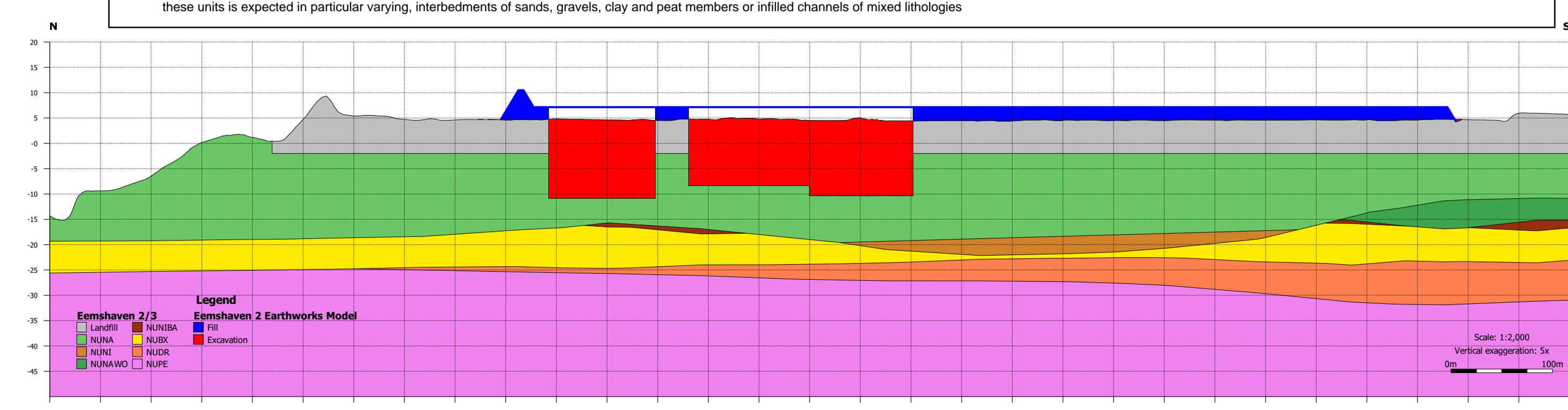
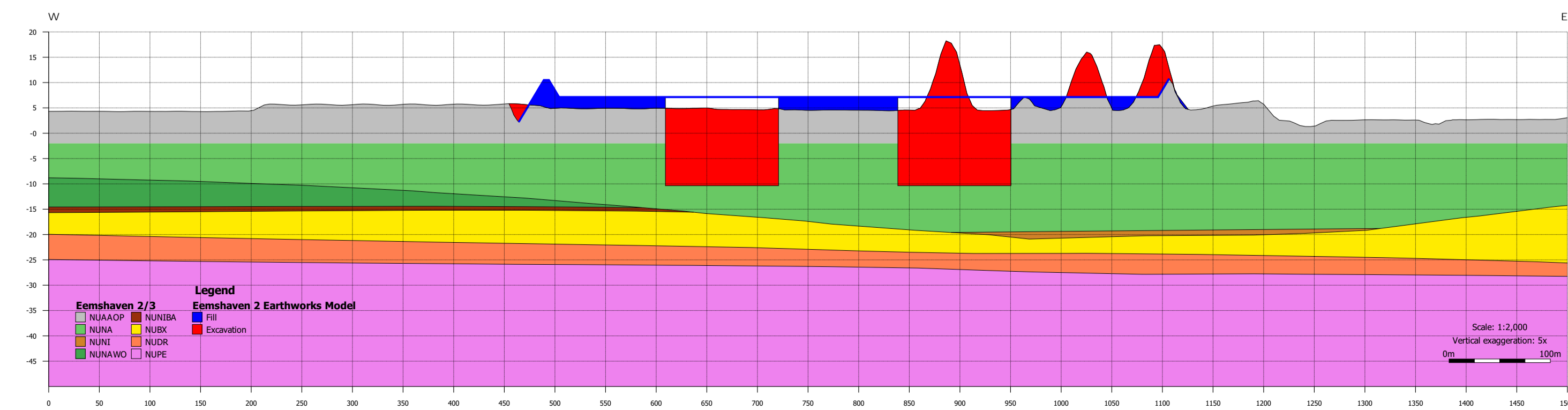
n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location



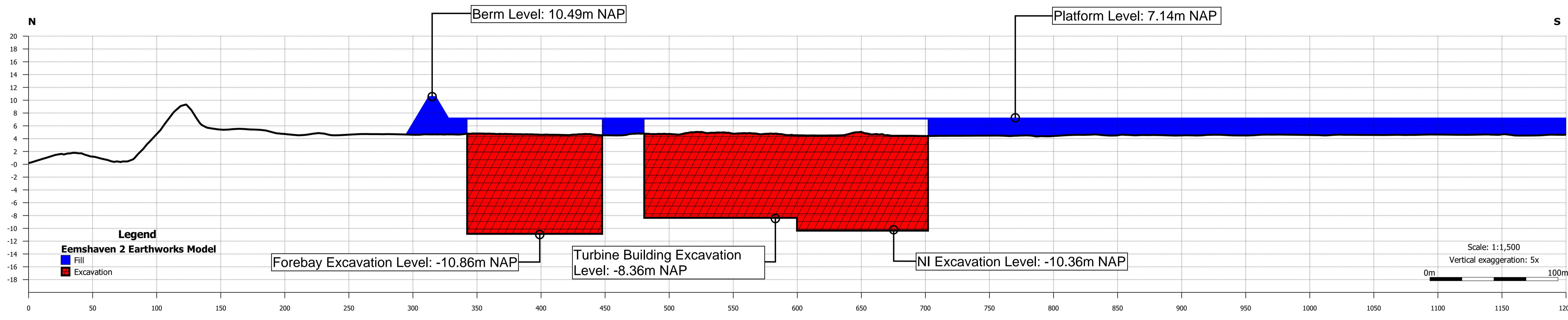
Eemshaven 2 Site Boundary Ground Model Isometric View

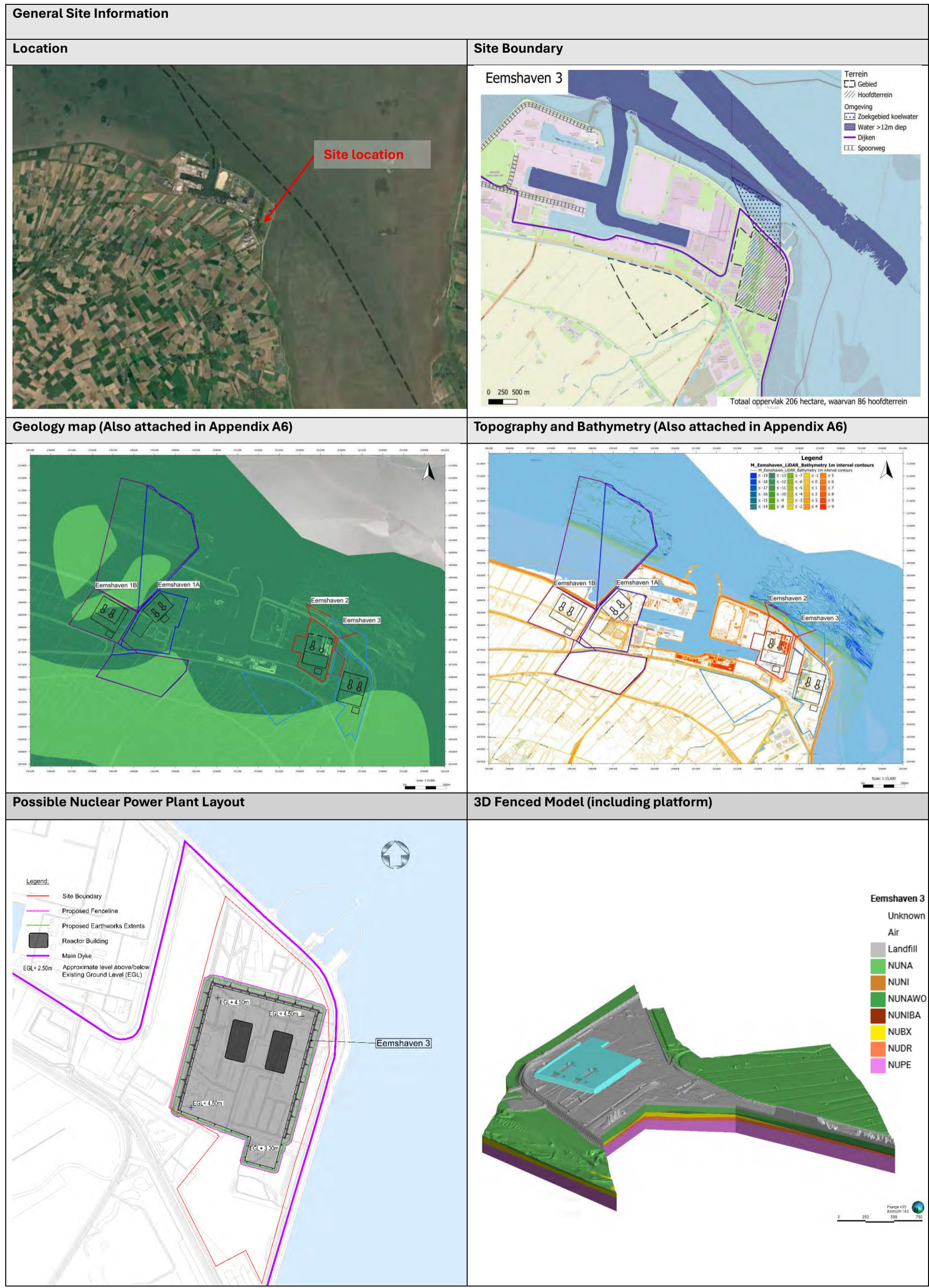
Eemshaven 2 Site Boundary Fence Ground Model Isometric View

- Notes:
- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
  - Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
  - Initial geological interpretation based on TNO – GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
  - The geological detailed interpretation is based on Deltares detailed geological sections.
  - Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
  - There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
  - The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies

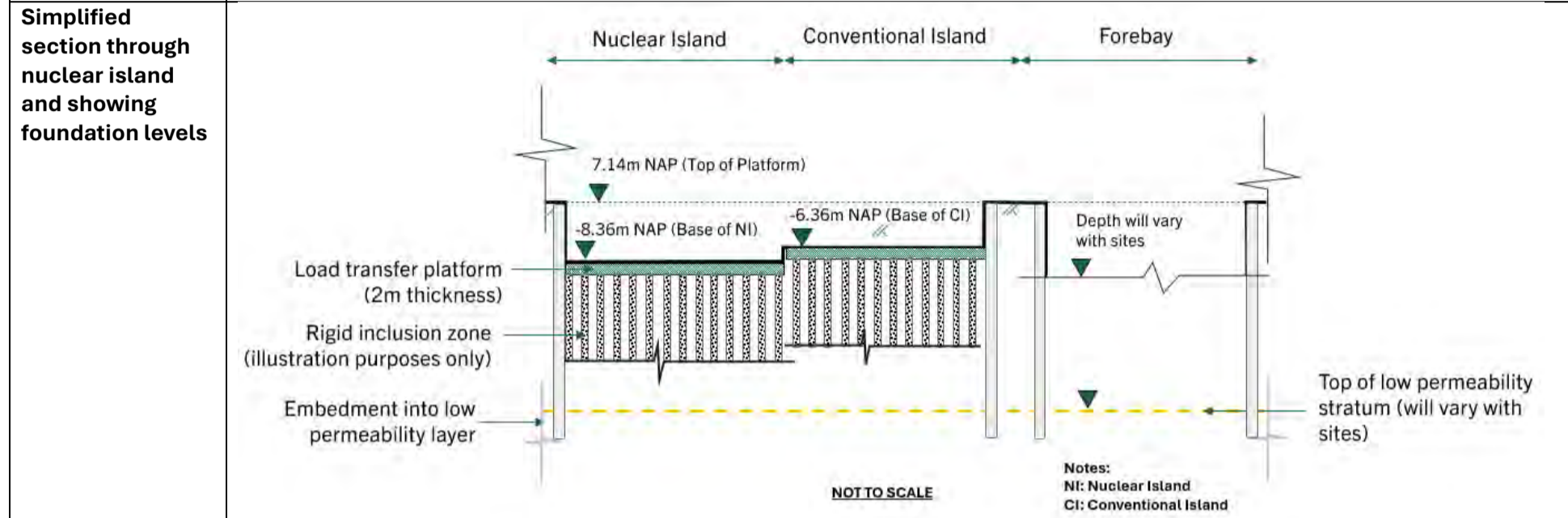
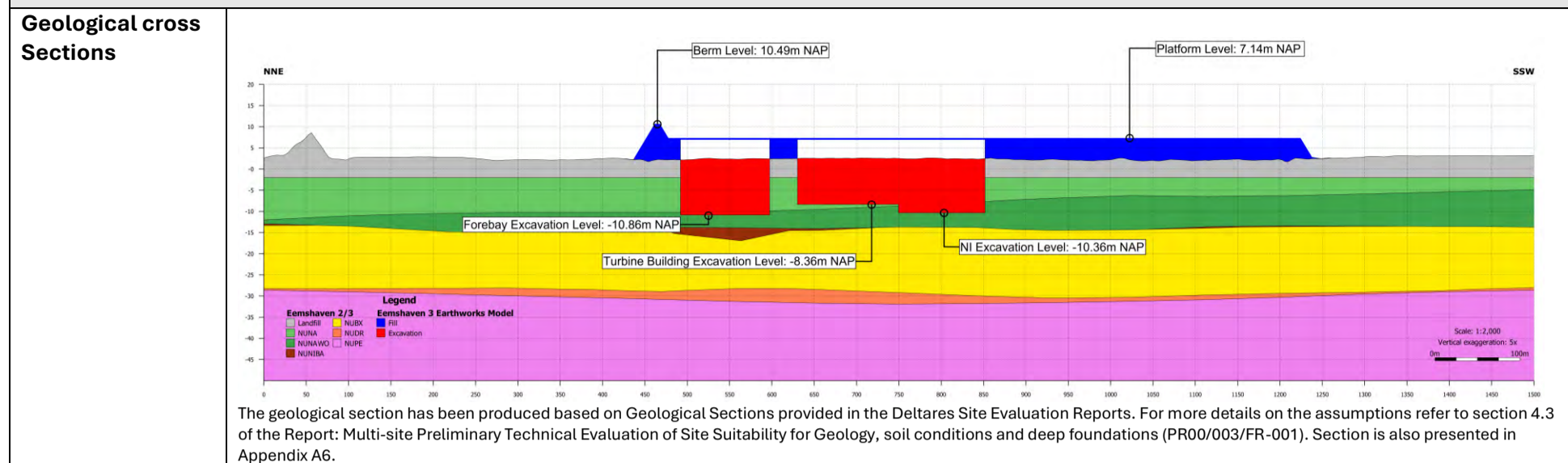


# Eemshaven 2 Earthworks Long Section (N-S)





Geology, soil conditions and Deep Foundations



Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	5	2	10
Open battered excavation	2	1	2
<b>Ground risks</b>			
Liquefaction	8	3	24
Ground variability	2	2	4
<b>Total weighted score = 40</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Limited but adequate: At least two deep BHs/CPTs 30m apart and upto 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 Low based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001).</li> </ul>			
<b>Key risks</b>			
<ul style="list-style-type: none"> <li>High lateral variability of ground conditions may require local adjustment of Rigid Inclusion lengths to control differential settlements.</li> <li>Weak layer below the foundation level (i.e., Peat).</li> <li>Open battered excavation presents challenges due to granular slope conditions and hydraulic connectivity with the sea.</li> </ul>			

Title: Eemshaven 3 Technical Factsheet

Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
	<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) - m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>
	154,000	839,000	2,904,000	3,556,000	3,556,000	-	797,000
Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters							
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	3		3		9		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	5		1		5		
Area for stockpiling	5		1		5		
Temporary works area	3		2		6		
<b>Earthworks design</b>							
Earthworks re-use potential	4		2		8		
Contaminated soils risk	6		2		12		
<b>Onsite constraints</b>							
Existing utilities	3		1		3		
Existing structures	3		1		3		
<b>Total Weighted score = 51</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 3 High based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Key risks</b>							
<ul style="list-style-type: none"> <li>Temp. works area – very limited space.</li> <li>Existing utilities &amp; structures – exiting Power Plant.</li> </ul>							

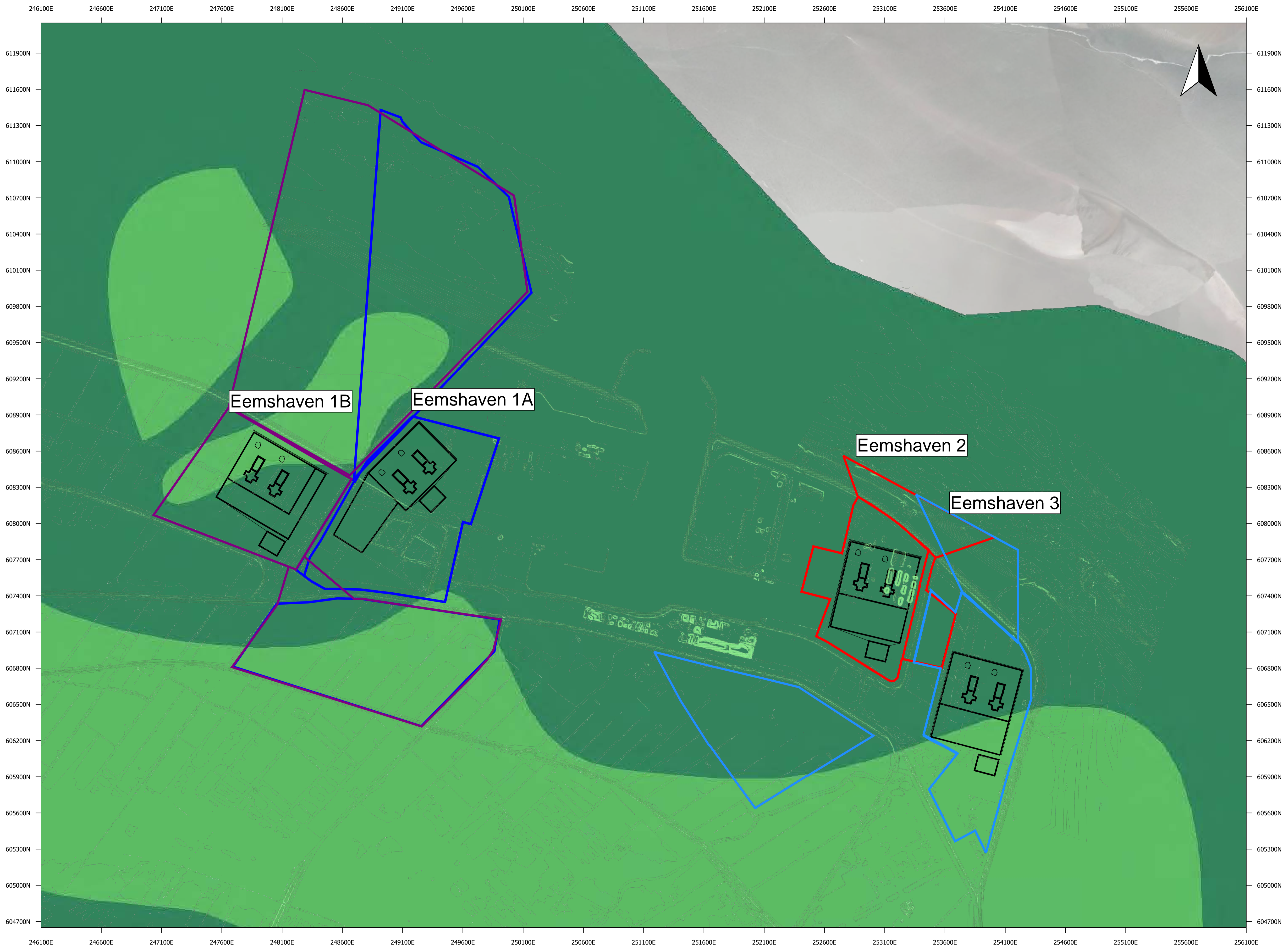
**Title: Eemshaven 3 Technical Factsheet**

<b>Overall Scoring summary (PR00/003/FR-001 &amp; PR00/006/FR-001)</b>	
<b>Total score</b>	<b>91</b>
<b>Total number of Red (High risk) criteria</b>	<b>6</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>5</b>
<b>Total number of Green (Low risk) criteria</b>	<b>1</b>

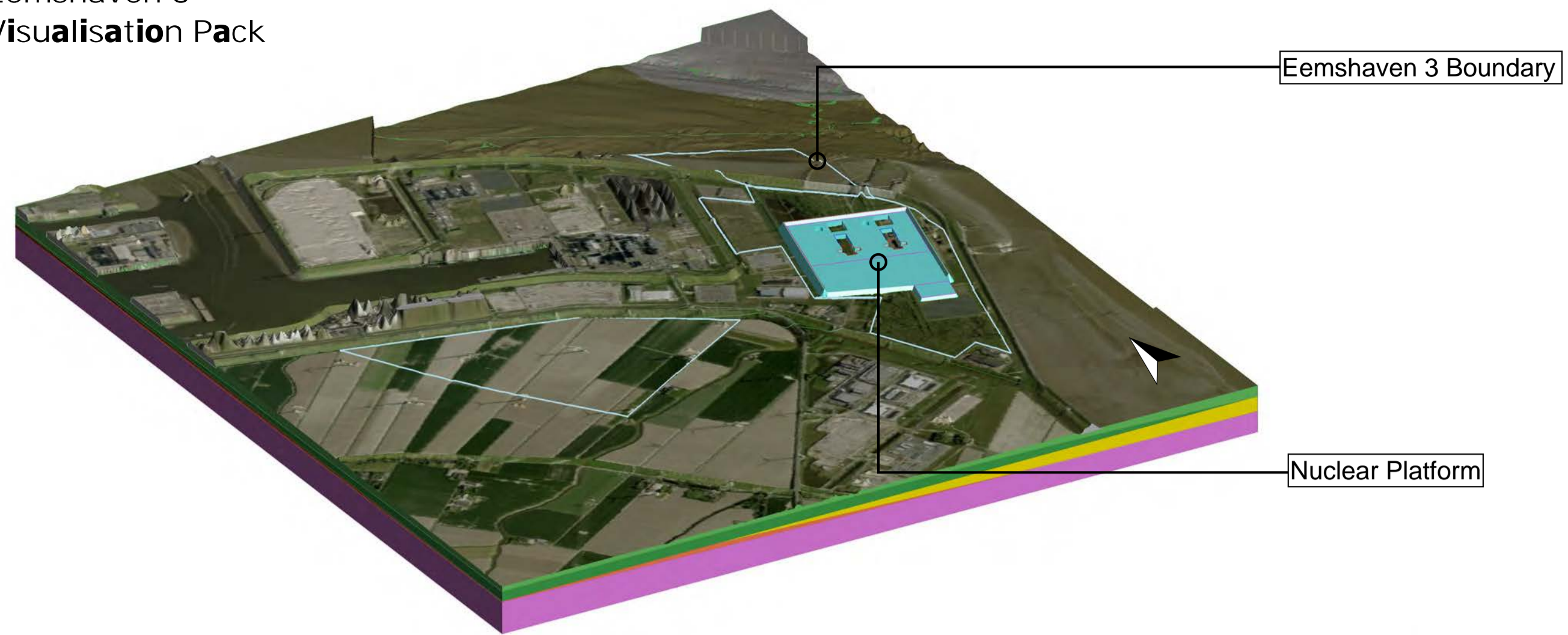
# APPENDIX A6

Units geological map	
<b>Holocene units</b>	
d	Coastal dune sand <span style="background-color: yellow;">ds</span> <span style="background-color: yellow;">dg</span>
s	Beach and foreshore deposits <span style="background-color: yellow;">s</span>
g	Tidal channel deposits <span style="background-color: green;">g</span>
o	Tidal deposits <span style="background-color: green;">o</span> <span style="background-color: green;">ovg*</span> <span style="background-color: green;">ovo*</span> <span style="background-color: green;">oo*</span>
<p><i>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</i></p>	
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>	
BX1-4	Various glacial (aeolian) sand units (Boxtel Fm) <span style="background-color: yellow;">BX1</span> <span style="background-color: yellow;">BX2</span> <span style="background-color: yellow;">BX3</span> <span style="background-color: yellow;">BX4</span>
SY	Middle Pleistocene sandy fluvial sediments (Stramproy Fm) <span style="background-color: pink;">SY</span>
WA	Early and Middle Pleistocene fluvial sediments (Waalre Fm) <span style="background-color: purple;">WA</span>
MO	Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations) <span style="background-color: blue;">MO</span>
BR	Miocene fine shallow-marine glauconite sands (Breda Fm) <span style="background-color: orange;">BR</span>
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations) <span style="background-color: grey;">RTD</span>
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>	
KR2	Coarse-grained Late Pleistocene fluvial deposits <span style="background-color: blue;">KR2</span>
EE2	Open marine sandy and shell-rich Last Interglacial sediments. <span style="background-color: green;">EE2</span>
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations) <span style="background-color: grey;">RTD</span>

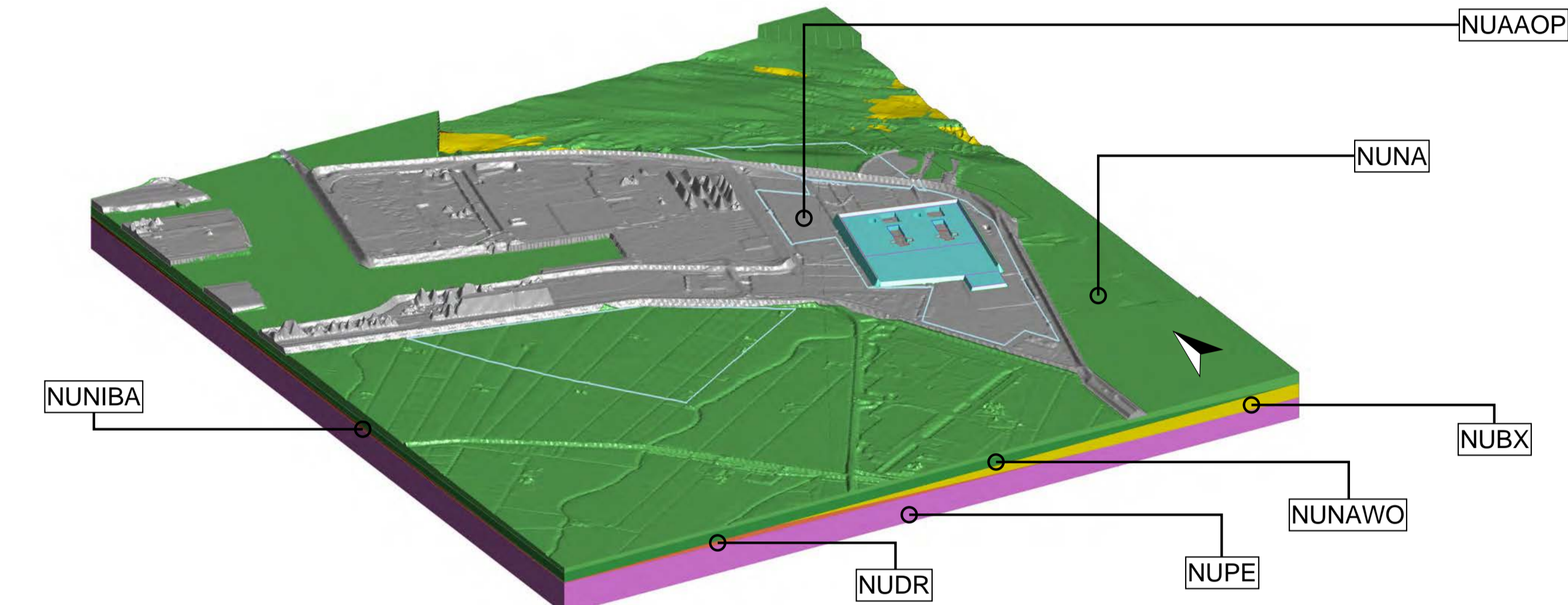
# Eemshaven Plan View



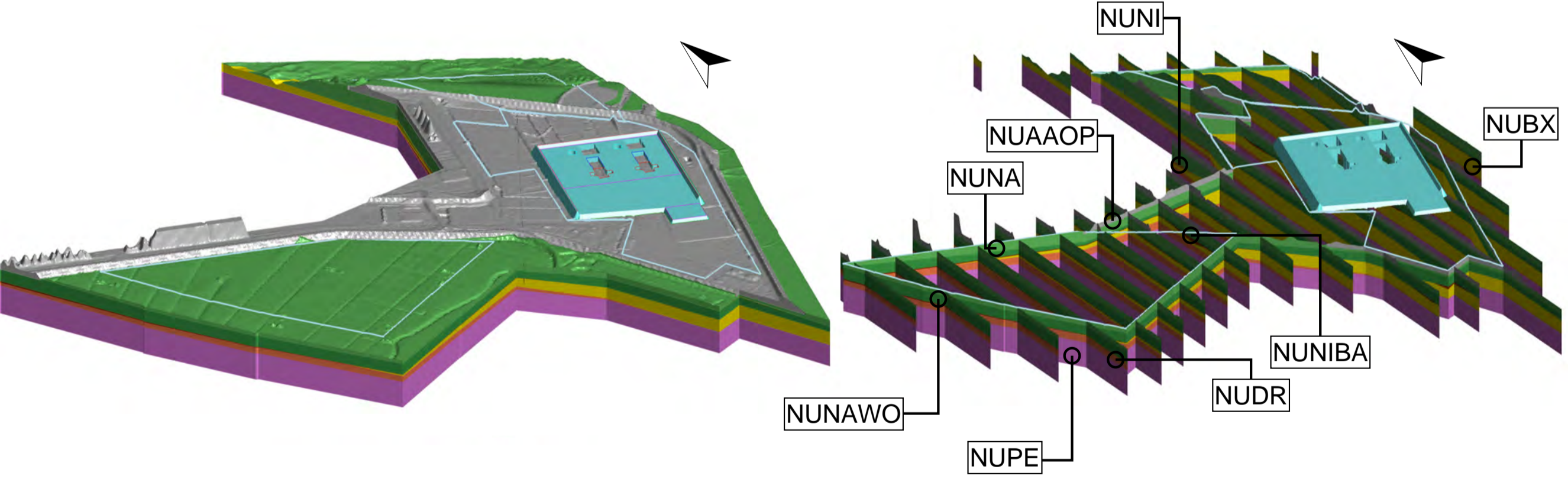
# Eemshaven 3 - Visualisation Pack



Aerial Isometric View

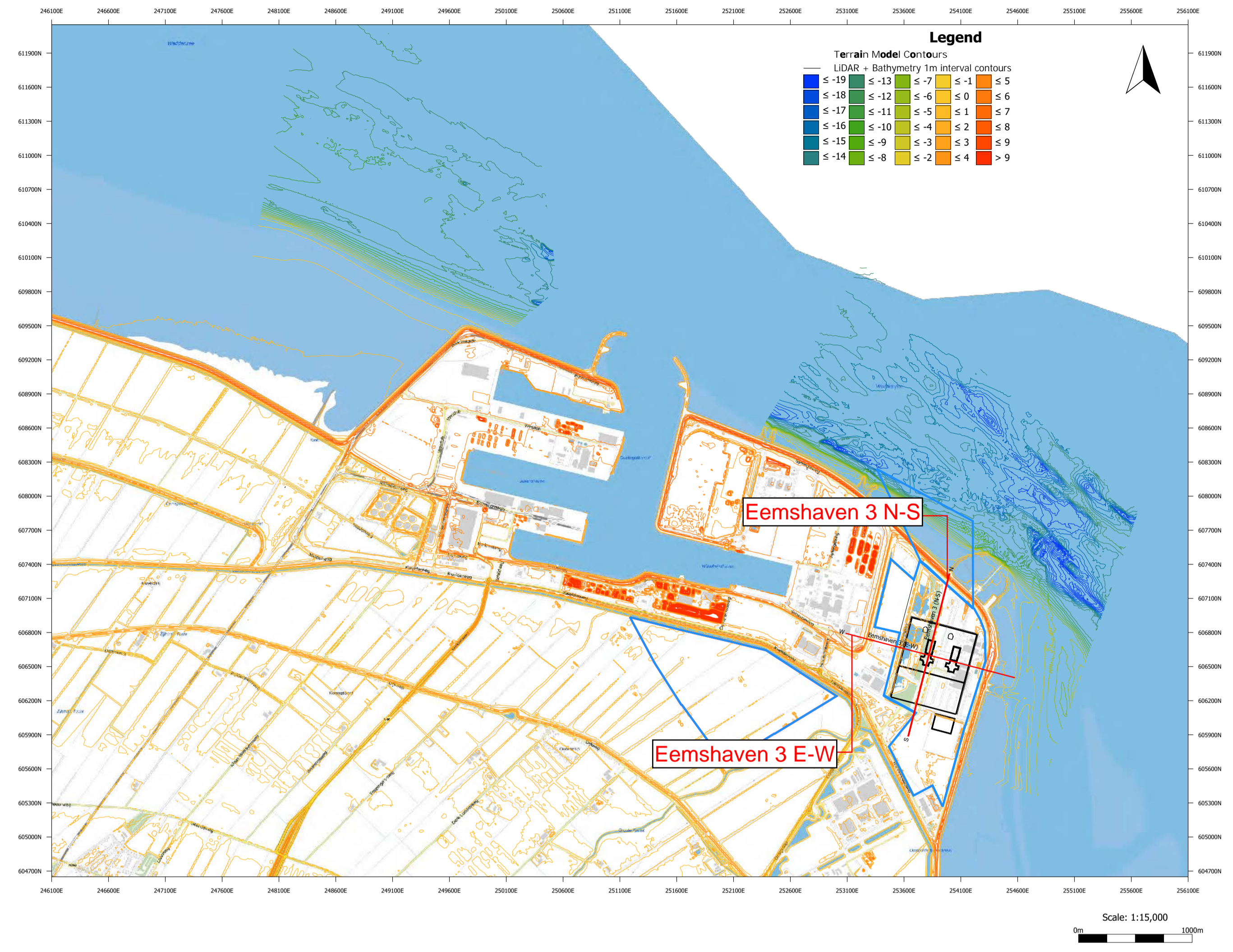


Eemshaven 3 Site Ground Model Isometric View



Eemshaven 3 Site Boundary Ground Model Isometric View

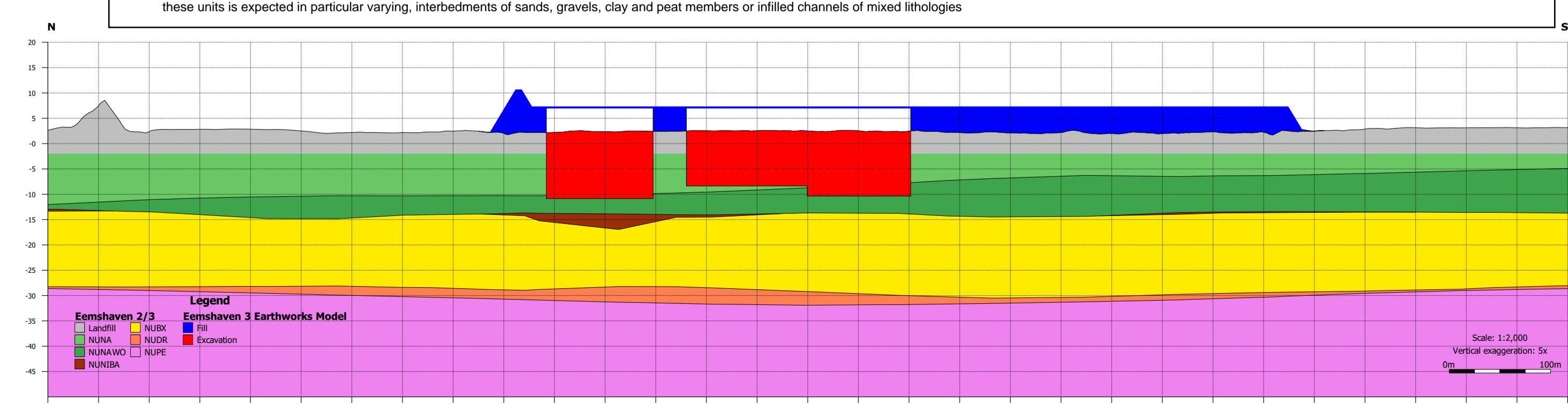
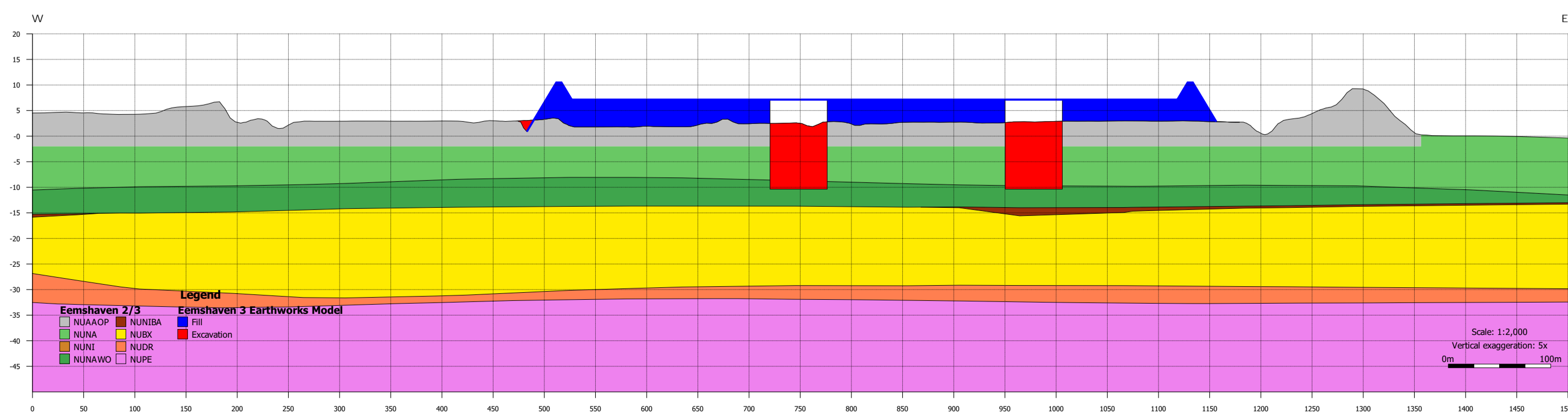
Eemshaven 3 Site Boundary Fence Ground Model Isometric View



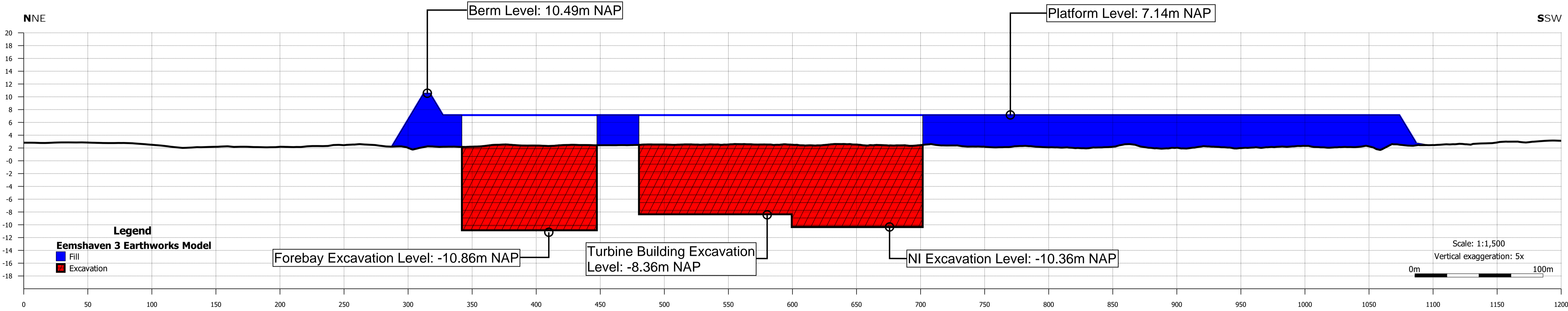
Geological Code	Formation Name	Description	Depth Top (m bgj)	Depth Base (m bgj)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUA A (Landfill)	Anthropogenic Ground	Reworked anthropogenic material	0.0	4.5	2.5	-2.0	4.5
NUNA	Naaldwijk Formation	Highly variable, grey fine to medium sand, with grey to blue silt and clay layers, discontinuous peat layers	4.5	10.7	-2.0	-8.2	6.2
NUNAWO	Wormer Member of the Naaldwijk Formation	Fine sand, silty, clayey, intercalated silt and clay layers	10.7	16.3	-8.2	-13.8	5.6
NUNI	Niuekoop Formation	Brown to black peat and other organics	n/a	n/a	n/a	n/a	n/a
NUNIBA	Niuekoop Formation basal peat	Basal peat found on-shore from -14 to -15m NAP	n/a	n/a	n/a	n/a	n/a
NUBX	Boxtel Formation	Light yellow to dark brown very fine to medium sand, silty, some peat and gyttja layers	16.3	32.2	-13.8	-29.7	15.9
NUDR	Drente Formation	Clay and fine-grained to coarse sand, locally gravel or peat and brown-coal seams. There is a general trend from coarse- to fine-grained sediments towards the north and west.	32.2	34.3	-29.7	-31.8	2.2
NUPE	Peelo Formation	Yellowish/brownish grey very fine to very coarse sand, with subordinate gravel layers	34.3	Not proven	-31.8	Not proven	Not proven

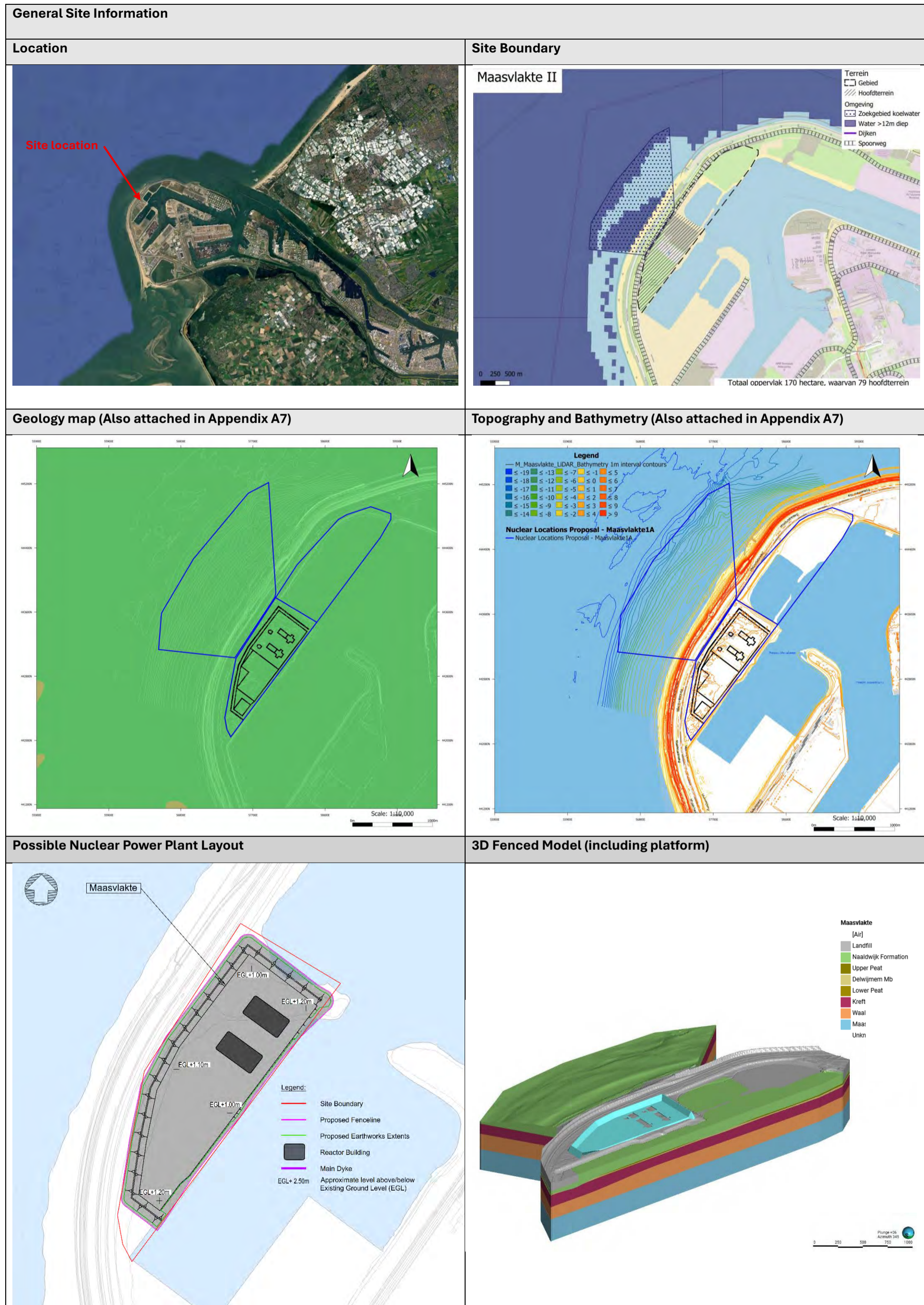
n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location

- Notes:
- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
  - Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
  - Initial geological interpretation based on TNO – GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
  - The geological detailed interpretation is based on Deltares detailed geological sections.
  - Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
  - There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
  - The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies



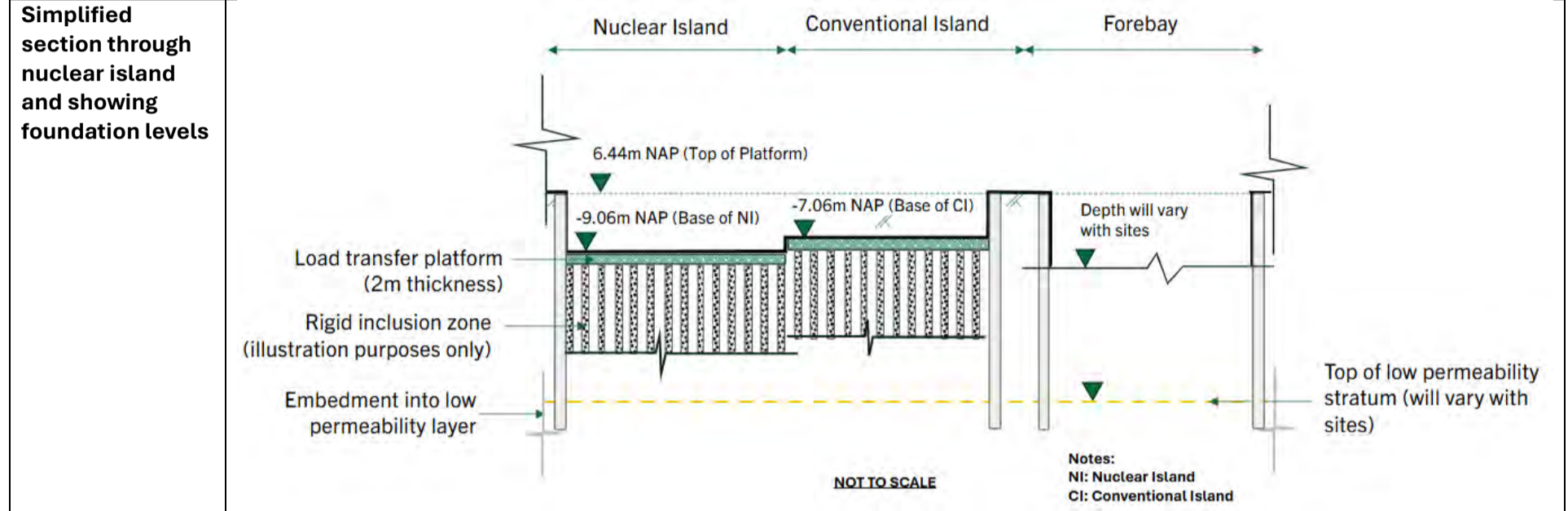
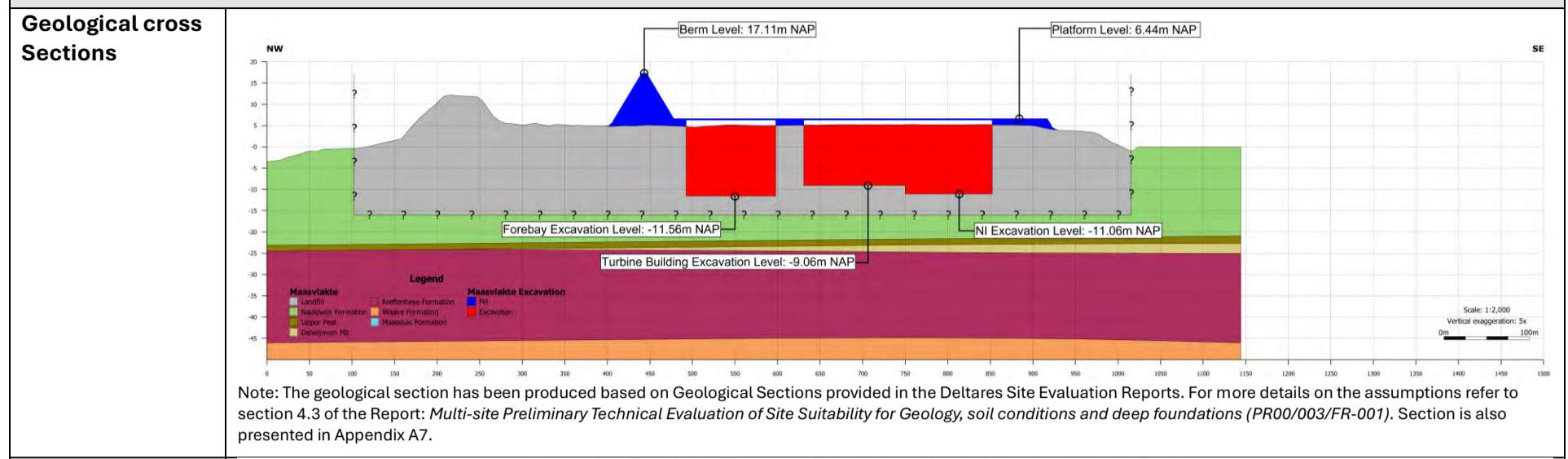
# Eemshaven 3 Earthworks Long Section (N-S)





**Title: Maasvlakte Technical Factsheet**

**Geology, soil conditions and Deep Foundations**



Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	1	2	2
Open battered excavation	2	1	2
<b>Ground risks</b>			
Liquefaction	4	3	12
Ground variability	4	2	8

**Total weighted score = 24**

**Confidence Level of Ground model (RAG)**

Limited but adequate: At least two deep BHs/CPTs 30m apart and up to 25m depth within the footprint of the site boundary

**Financial impact classification (Rigid Inclusions as baseline)**

- Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 (Low) based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).
- Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001).

**Time impact classification (Rigid Inclusions as baseline)**

- Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).
- Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001).

**Key risks**

- Weak layer below the foundation level (i.e., Peat)
- Lateral variability of ground conditions may require local adjustment of Rigid Inclusion lengths to control differential settlements
- Subsidence risk is present and ongoing, primarily due to the recent construction of the port over organic soils. This may affect long-term settlement behaviour and foundation performance.
- Open battered excavation very challenging (space constrains, granular non compacted slopes with high hydraulic connectivity with the sea).

**Title: Maasvlakte Technical Factsheet**

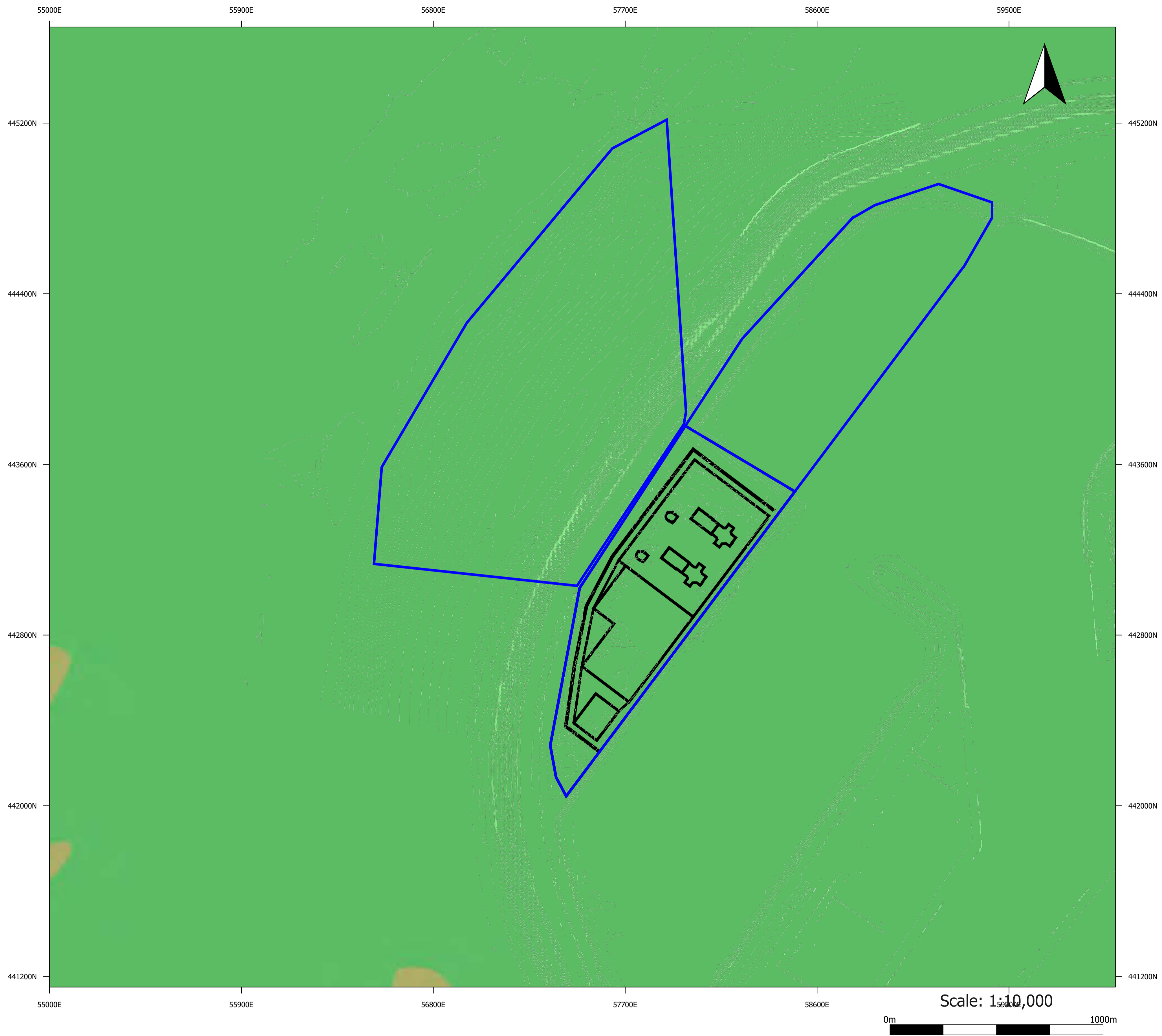
Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>	<b>Required landscaping (CCM) - m<sup>3</sup></b>
	-	958,000	1,845,000	2,680,000	2,680,000	-	928,000
	Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	2		3		6		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	8		1		8		
Area for stockpiling	7		1		7		
Temporary works area	7		1		1		
<b>Earthworks design</b>							
Earthworks re-use potential	8		2		16		
Contaminated soils risk	8		2		16		
<b>Onsite constraints</b>							
Existing utilities	8		1		8		
Existing structures	7		1		7		
<b>Total Weighted score = 82</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 3 (High) based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Key risks</b>							
<ul style="list-style-type: none"> <li>Need to confirm suitability of landfill material for re-use.</li> <li>Hydraulic placement of fill material to the North-East required to complete land reclamation.</li> <li>Ground water control measures extremely challenging.</li> </ul>							

**Title: Maasvlakte Technical Factsheet**

<b>Overall Scoring summary (PR00/003/FR-001 &amp; PR00/006/FR-001)</b>	
<b>Total score</b>	<b>106</b>
<b>Total number of Red (High risk) criteria</b>	<b>3</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>2</b>
<b>Total number of Green (Low risk) criteria</b>	<b>7</b>

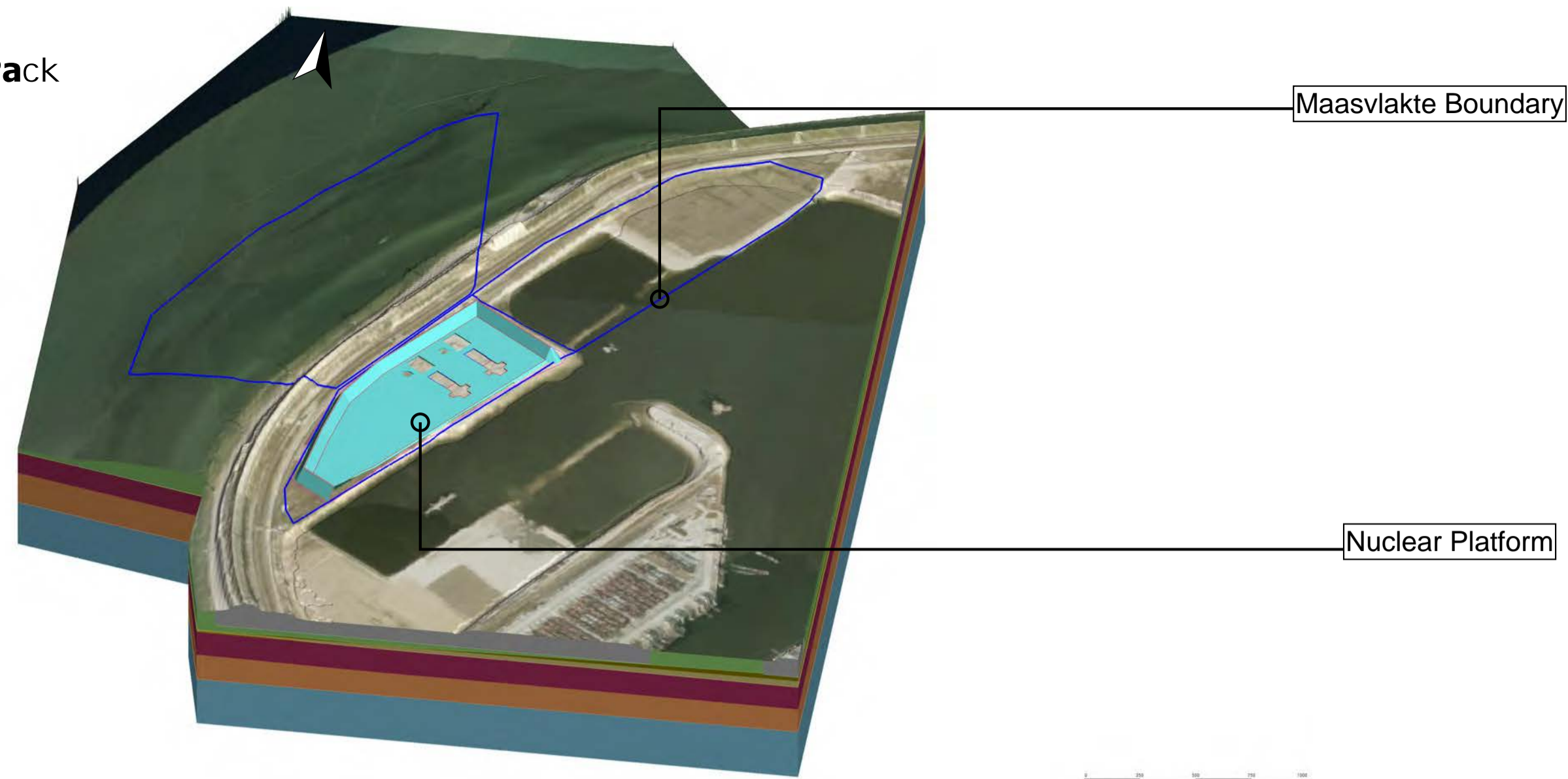
# APPENDIX A7

Units geological map						
<b>Holocene units</b>						
d	Coastal dune sand	ds	dsg	dg	da	
s	Beach and foreshore deposits	s	sg			
g	Tidal channel deposits	g				
o	Tidal deposits	o	os	ovg*	ovo*	oo*
v	Coastal peat	vg*	vo*			
b	Sandy fluvial channel deposits	b				
k	Overbank deposits	kvo*	kg*			
*	Indicating older deposits	g*	o*			
<p>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</p>						
<b>Pleistocene units (underneath Holocene marine deposits)</b>						
KR1	Solid fine-grained Late Pleistocene flood deposits			KR1		
KR2	Coarse-grained Late Pleistocene fluvial deposits			KR2		
EE2	Open marine sandy and shell-rich Last Interglacial sediments.			EE2		

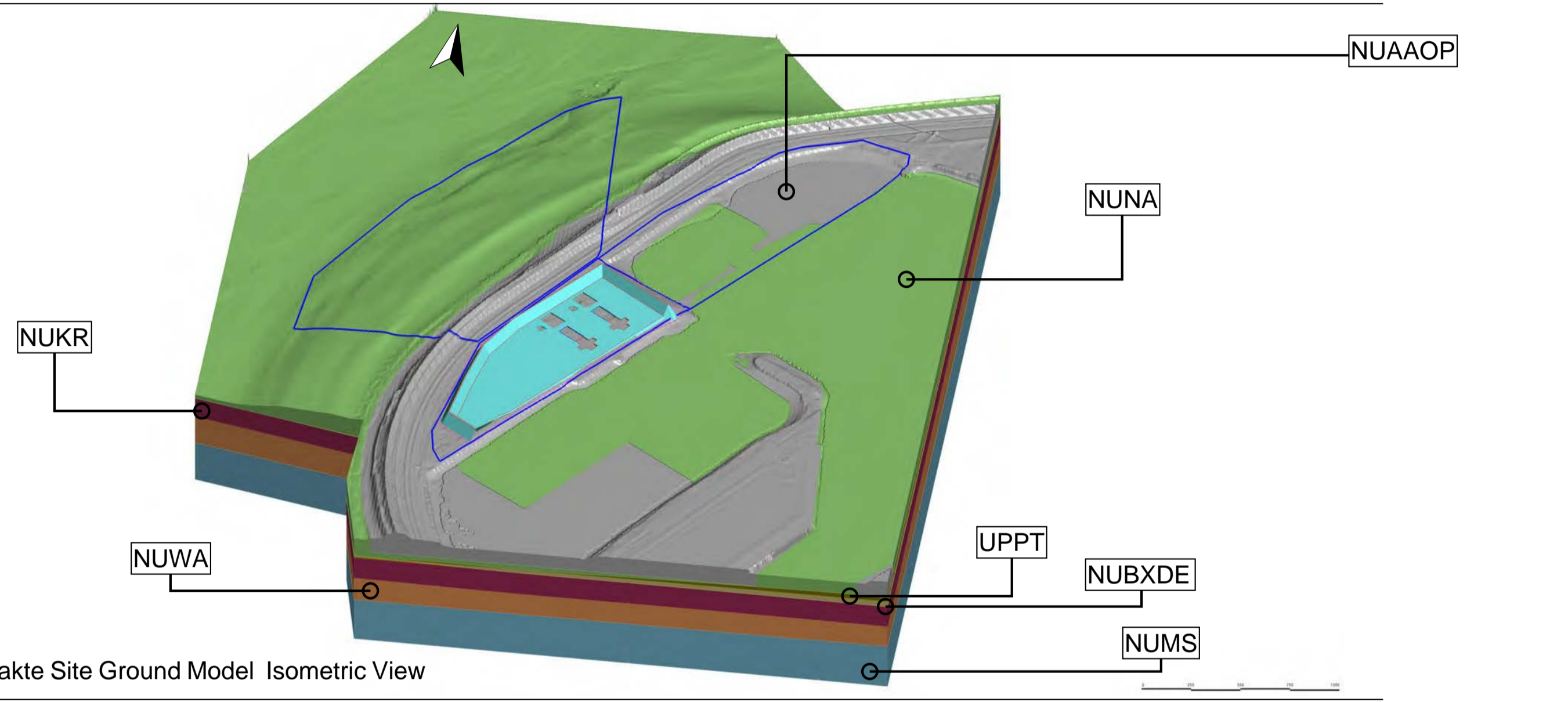


**Maasvlakte Plan View**

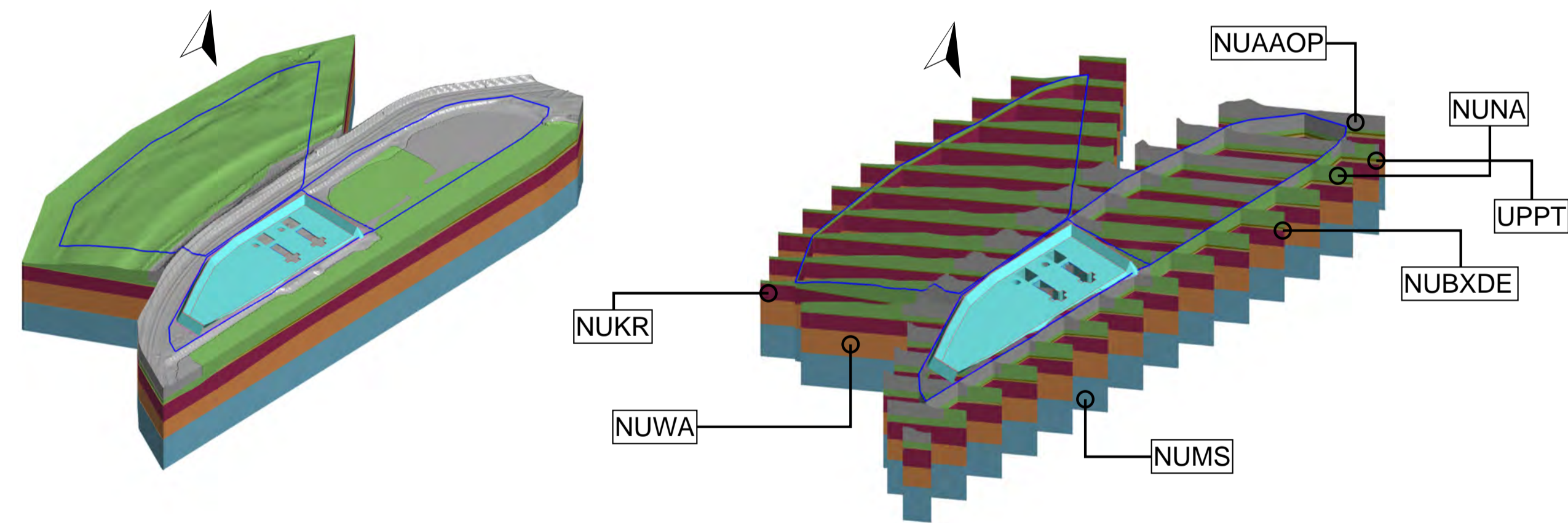
Maasvlakte -  
Visualisation Pack



Aerial Isometric View

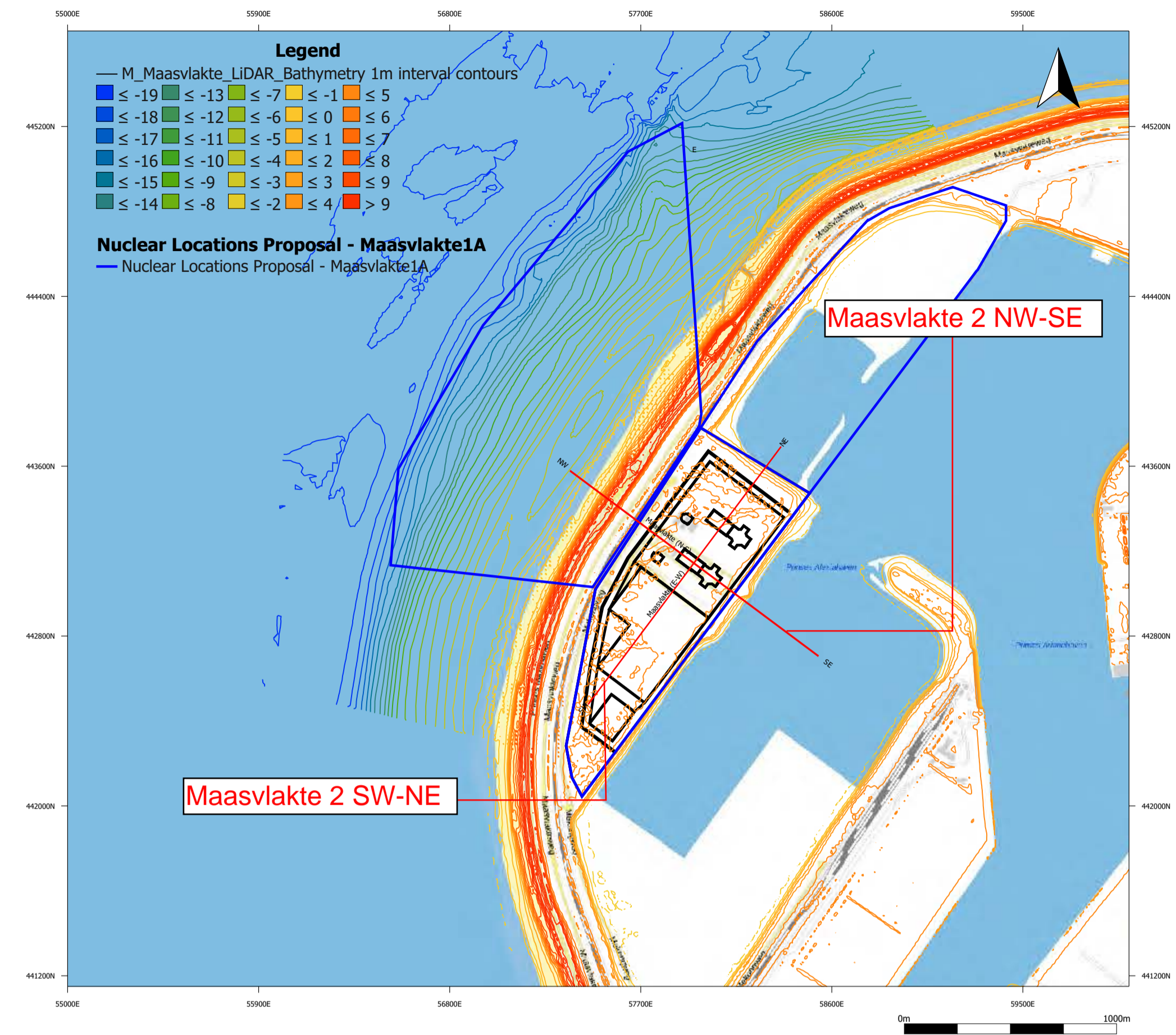
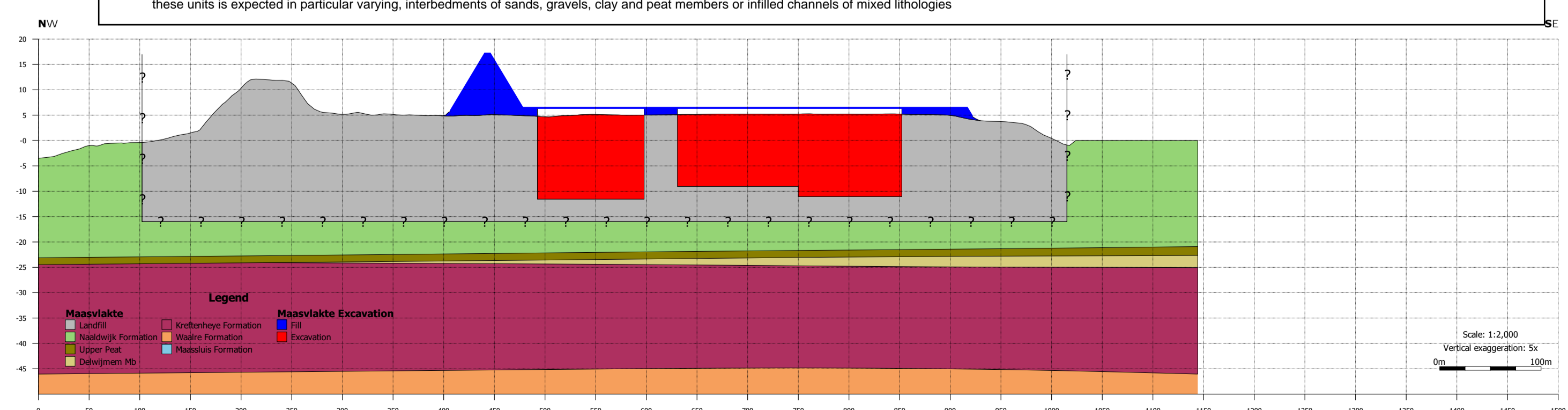
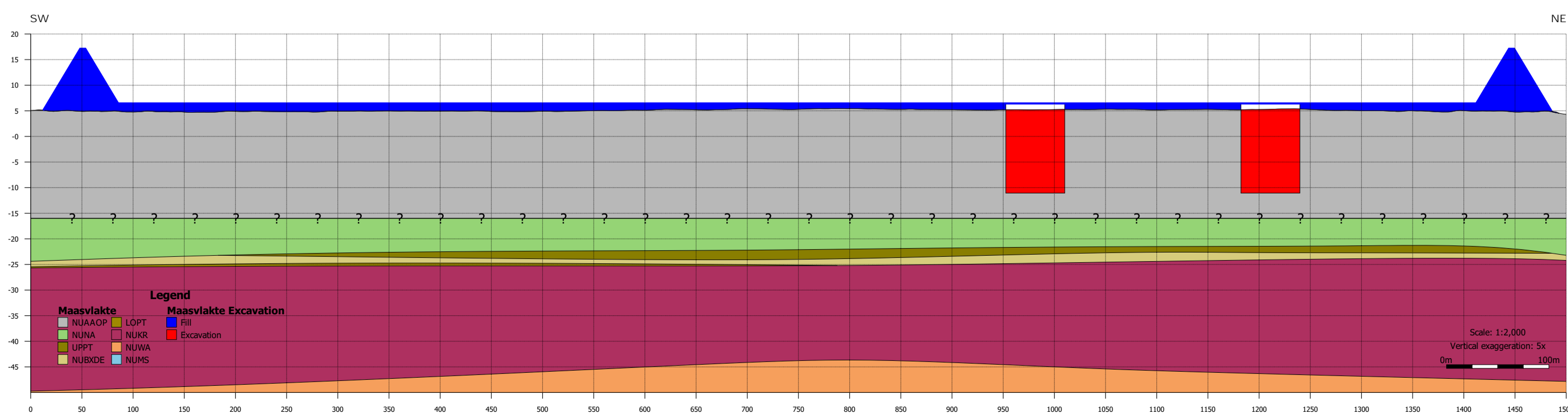


Maasvlakte Site Ground Model Isometric View



Maasvlakte Site Boundary Ground Model Isometric View

Maasvlakte Site Boundary Fence Ground Model Isometric View

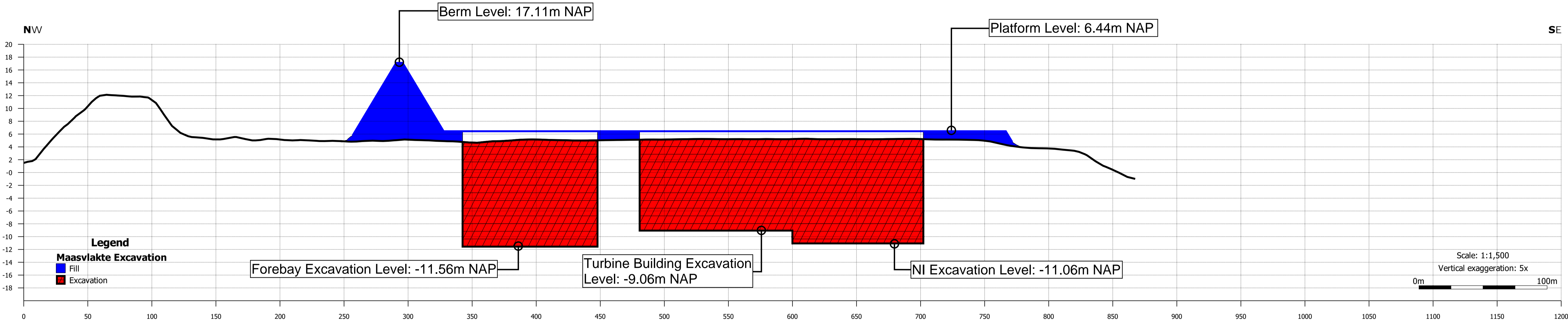


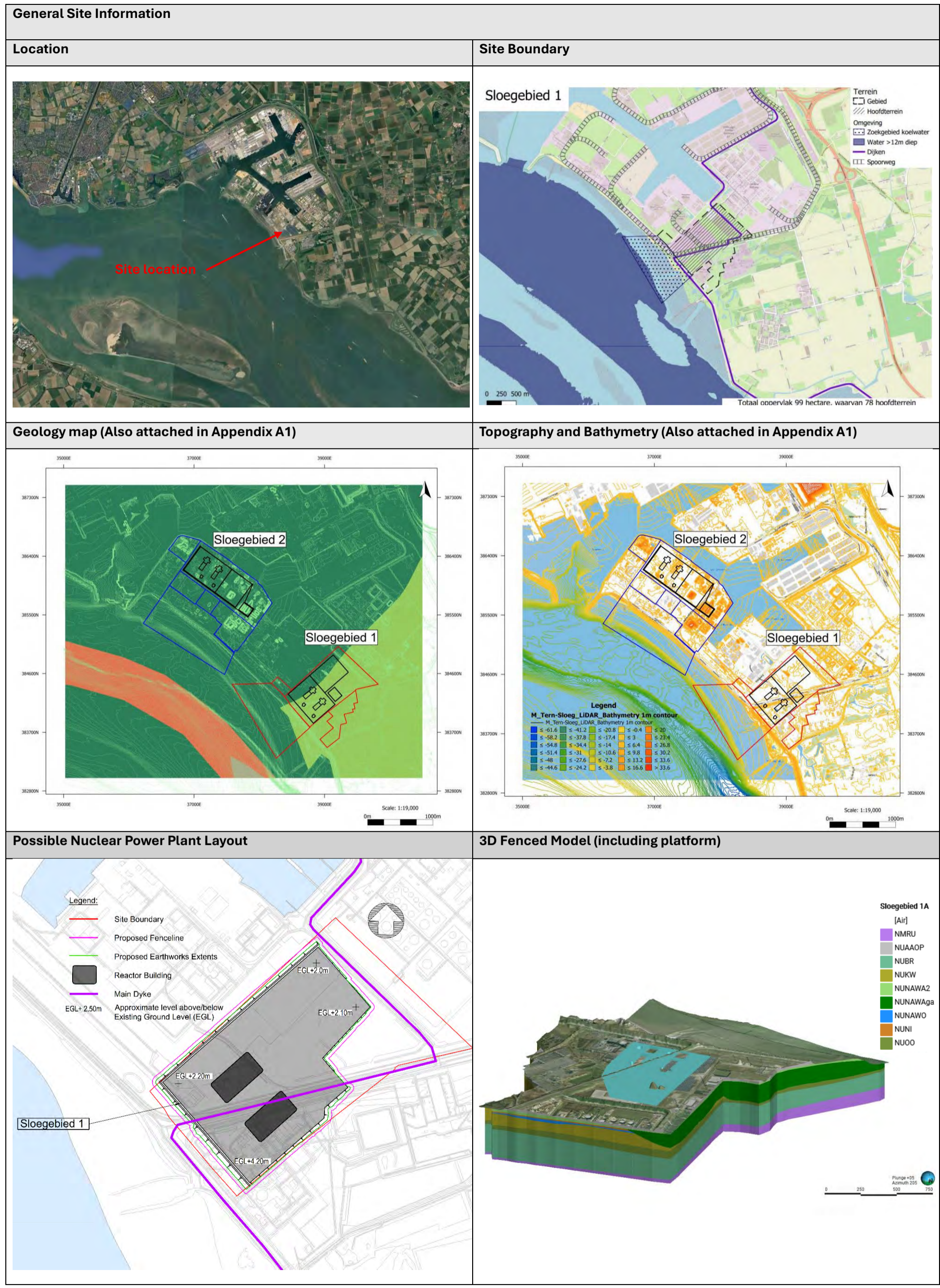
Geological Code	Formation Name	Description	Depth Top (m bgf)	Depth Base (m bgf)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUAA(Landfill)	Anthropogenic Ground	Reworked anthropogenic material	0.0	21.2	5.2	-16.0	21.2
NUNA	Naaldwijk Formation	Highly variable, grey fine to medium sand, with grey to blue silt and clay layers, discontinuous peat layers	21.2	26.8	-16.0	-21.6	5.6
UPPT	Various	Undifferentiated peat horizons	26.8	28.2	-21.6	-23.0	1.4
NUBXDE	Delwinjen Member	Grey to brown fine to medium sand, moderately sorted, mostly non-calcareous but calcareous near base, sporadic silt layers or granule laminae.	28.2	30.0	-23.0	-24.8	1.8
NUKR	Krefenheye Formation	Yellowish grey to greyish brown medium to very coarse sand, moderately to very gravelly. Locally, fine to coarse gravel in lags. Subordinate silty clay beds and sporadic clayey peat layers.	30.0	50.1	-24.8	-44.9	20.1
NUWA	Waalre Formation	Stacked fining-upward sequences. Grey to greyish white very fine to very coarse sand, micaceous, multi-coloured with reddish particles in coarse fraction, locally gravelly (in lags). Bluish grey to brownish grey clay beds and laminae, silty to sandy, with sporadic peat layers and siderite.	50.1	87.9	-44.9	-82.6	37.8
NUMS	Maasvlakte Formation	Coarsening upward. Fining from southeast to northwest. Grey very fine to medium sand, usually micaceous and calcareous, shelly, slightly glauconitic. Intercalated light to dark grey clay, commonly silty or sandy, micaceous and calcareous with marine shells. Locally, basal gravel. Near the top, freshwater shells mixed with marine shells.	87.9	Not proven	-82.6	Not proven	Not proven

n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location

- Notes:
- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
  - Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
  - Initial geological interpretation based on TNO - GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
  - The geological detailed interpretation is based on Deltares detailed geological sections.
  - Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
  - There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
  - The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies

# Maasvlakte Earthworks Long Section (NW-SE)





Title: Sloegebied 1 Technical Factsheet

Geology, soil conditions and Deep Foundations			
<p><b>Geological cross Sections</b></p>	<p>Note: The geological section has been produced based on Geological Sections provided in the Deltares Site Evaluation Reports. For more details on the assumptions refer to section 4.3 of the Report: <i>Multi-site Preliminary Technical Evaluation of Site Suitability for Geology, soil conditions and deep foundations (PR00/003/FR-001)</i>. Section is also presented in Appendix A1.</p>		
<p><b>Simplified section through nuclear island and showing foundation levels</b></p>	<p>NOT TO SCALE</p> <p>Notes: NI: Nuclear Island CI: Conventional Island</p>		
Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	2	2	4
Open battered excavation	1	1	1
<b>Ground risks</b>			
Liquefaction	4	3	12
Ground variability	1	2	2
<b>Total weighted score = 19</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Limited but adequate: At least two deep BHs/CPTs 30m apart and up to 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 (Low) based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Key risks</b>			
<ul style="list-style-type: none"> <li>High lateral variability of ground conditions may require local adjustment of Rigid Inclusion lengths to control differential settlements.</li> <li>Presence of glauconitic sands (NUBR), with associated uncertainties in soil behaviour under load.</li> <li>Adjacent to the existing nuclear power plant, where deep excavation activities could pose risks of induced settlements or ground movement.</li> <li>Open battered excavation presents challenges due to granular slope conditions and hydraulic connectivity with the sea.</li> </ul>			

**Title: Slogebied 1 Technical Factsheet**

Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
	<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>
	-	956,000	1,295,000	2,155,000	2,155,000	-	926,000
	Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	1		3		3		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	6		1		6		
Area for stockpiling	7		1		7		
Temporary works area	4		2		8		
<b>Earthworks design</b>							
Earthworks re-use potential	4		2		8		
Contaminated soils risk	6		2		12		
<b>Onsite constraints</b>							
Existing utilities	6		1		6		
Existing structures	3		1		3		
<b>Total Weighted score = 53</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 4 (Very High) based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Key risks</b>							
<ul style="list-style-type: none"> <li>High lateral variability of ground conditions may require local adjustment of Rigid Inclusion lengths to control differential settlements.</li> <li>Presence of glauconitic sands (NUBR), with associated uncertainties in soil behaviour under load.</li> <li>Adjacent to the existing nuclear power plant, where deep excavation activities could pose risks of induced settlements or ground movement.</li> <li>Open battered excavation presents challenges due to granular slope conditions and hydraulic connectivity with the sea.</li> </ul>							

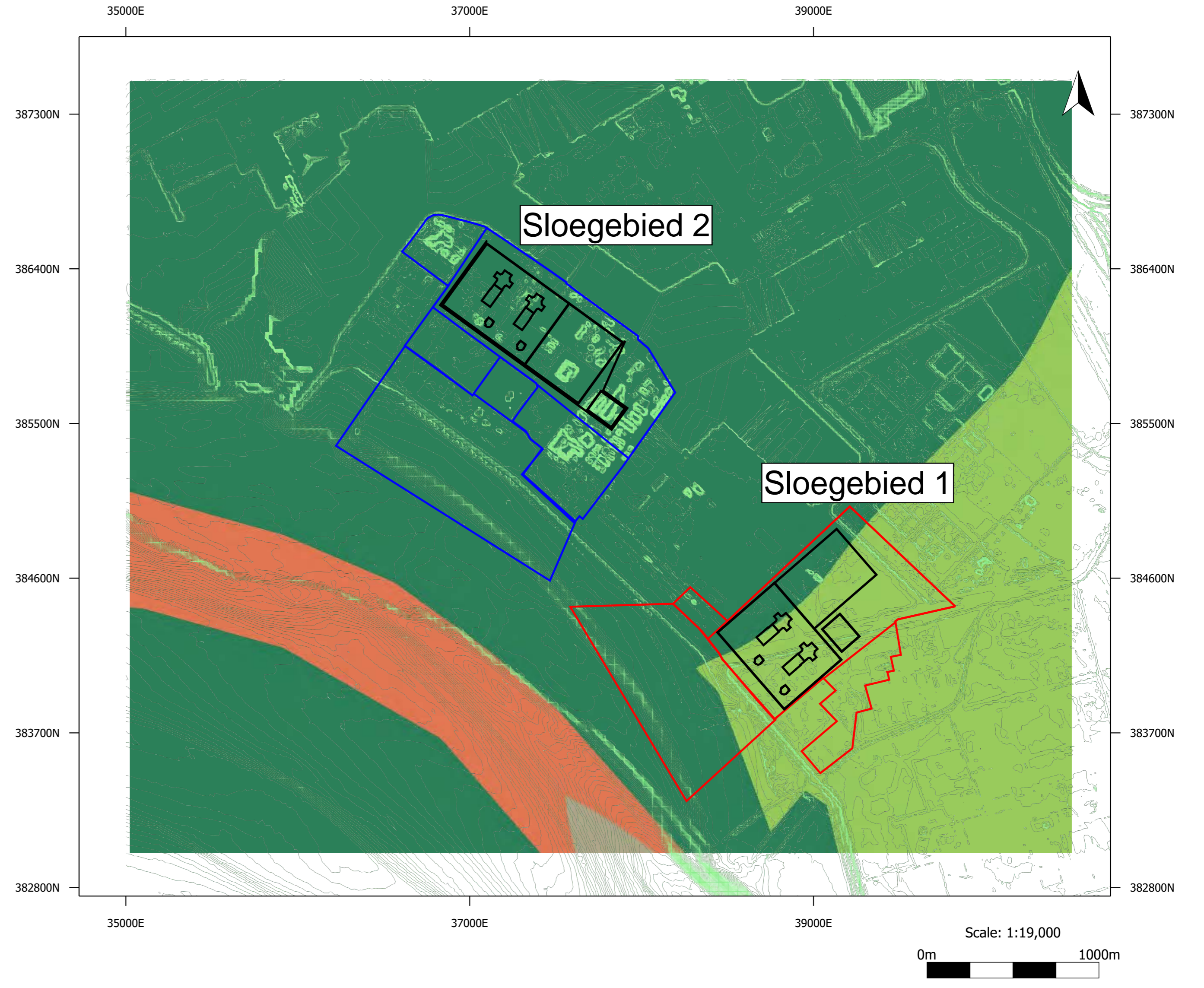
**Title: Sloegebied 1 Technical Factsheet**

<b>Overall Scoring summary (PR00/003/FR-001 &amp; PR00/006/FR-001)</b>	
<b>Total score</b>	<b>72</b>
<b>Total number of Red (High risk) criteria</b>	<b>5</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>6</b>
<b>Total number of Green (Low risk) criteria</b>	<b>1</b>

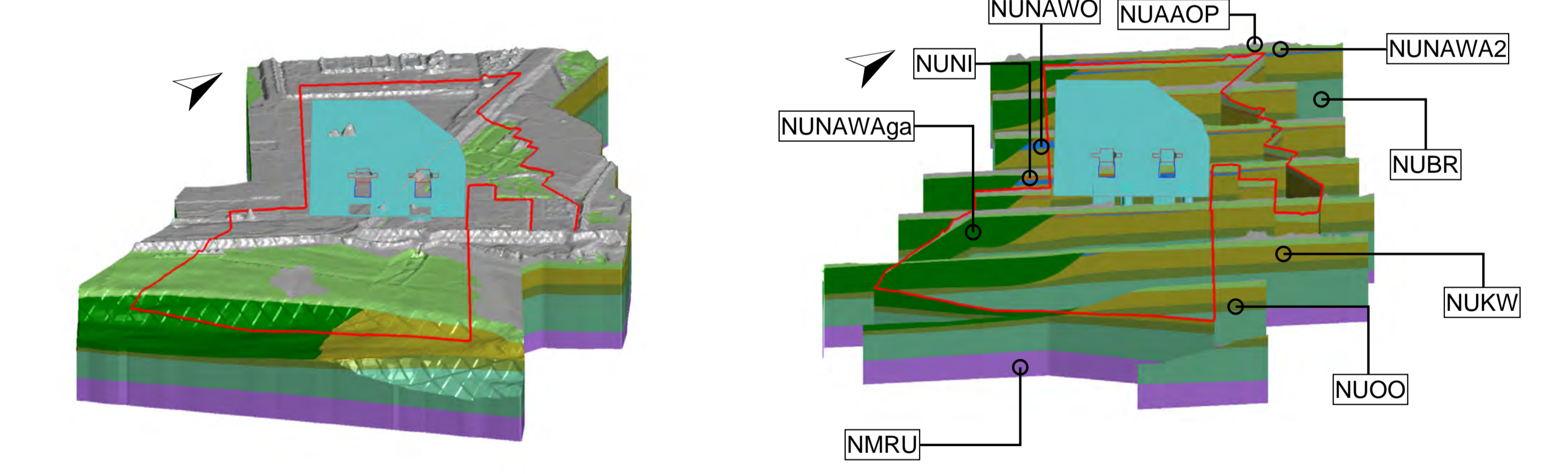
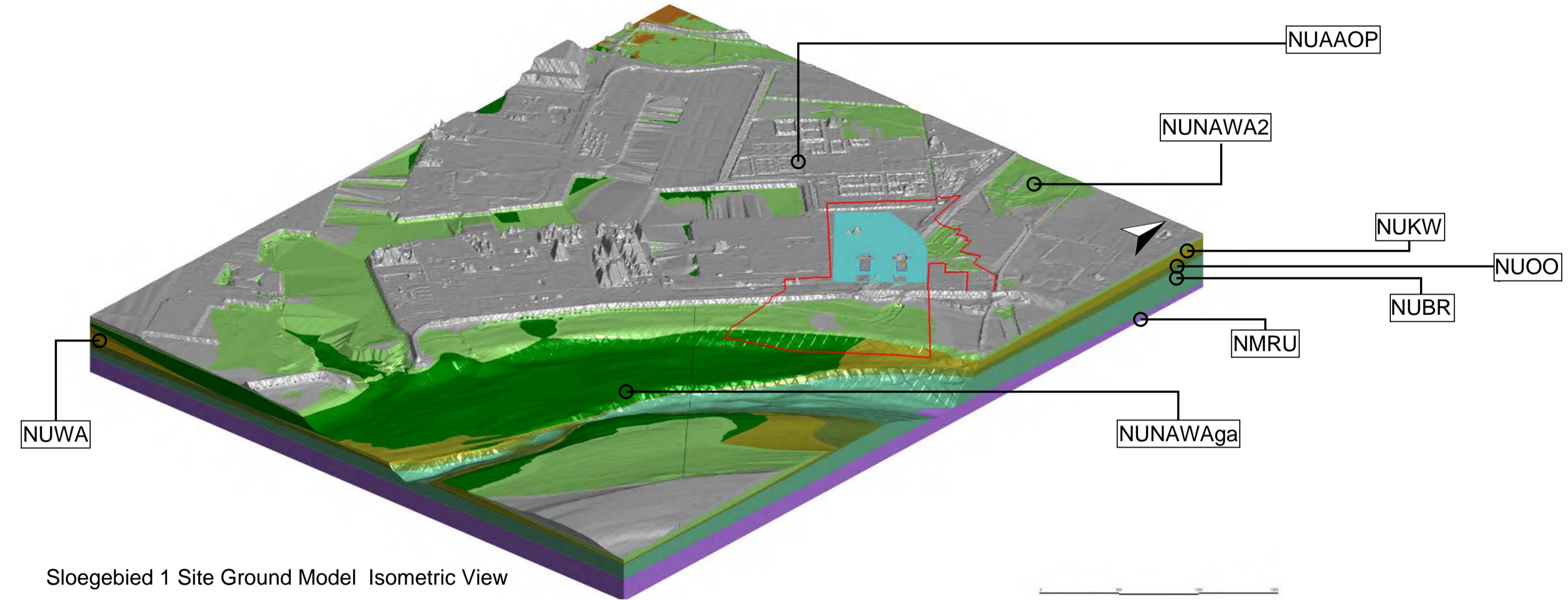
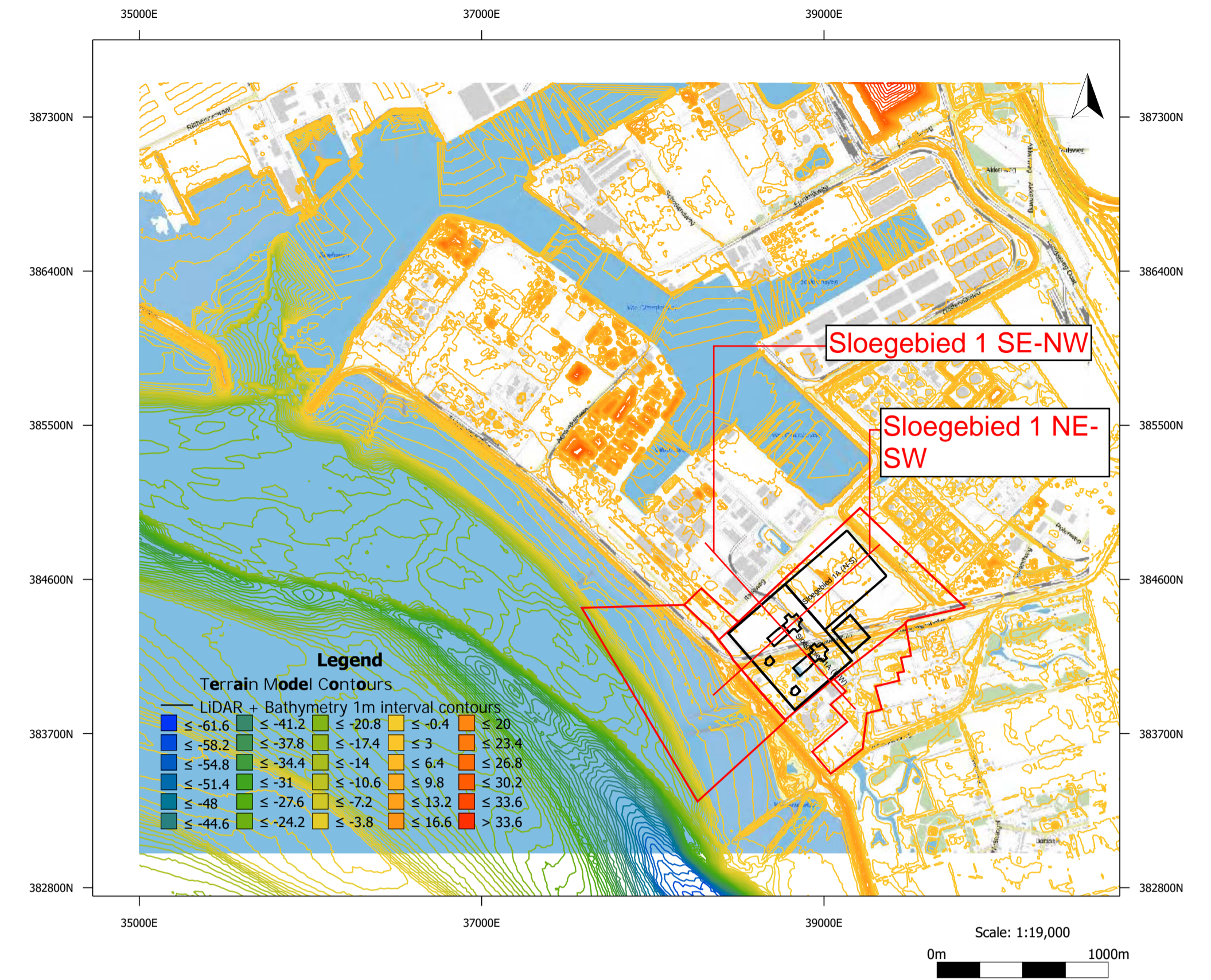
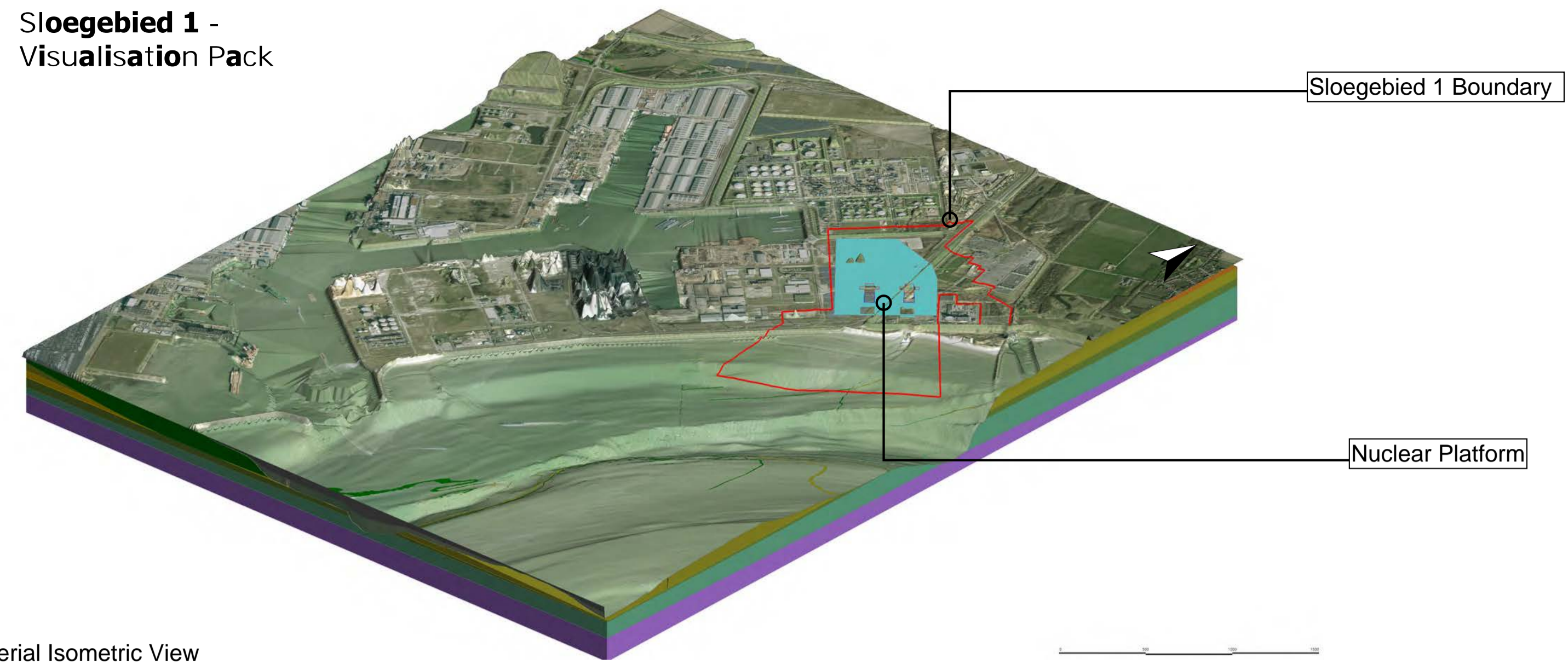
# APPENDIX A1

Units geological map			
<b>Holocene units</b>			
d	Coastal dune sand	ds	dg
s	Beach and foreshore deposits	s	
g	Tidal channel deposits	g	
o	Tidal deposits	o	ovg* ovo* oo*
<p>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</p>			
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>			
BX1-4	Various glacial (aeolian) sand units (Boxtel Fm)	BX1	BX2 BX3 BX4
SY	Middle Pleistocene sandy fluvial sediments (Stramproy Fm)	SY	
WA	Early and Middle Pleistocene fluvial sediments (Waalre Fm)	WA	
MO	Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations)	MO	
BR	Miocene fine shallow-marine glauconite sands (Breda Fm)	BR	
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD	
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>			
KR2	Coarse-grained Late Pleistocene fluvial deposits	KR2	
EE2	Open marine sandy and shell-rich Last Interglacial sediments.	EE2	
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD	

# Sloegbied Plan View



**Sloegebied 1 -  
Visualisation Pack**



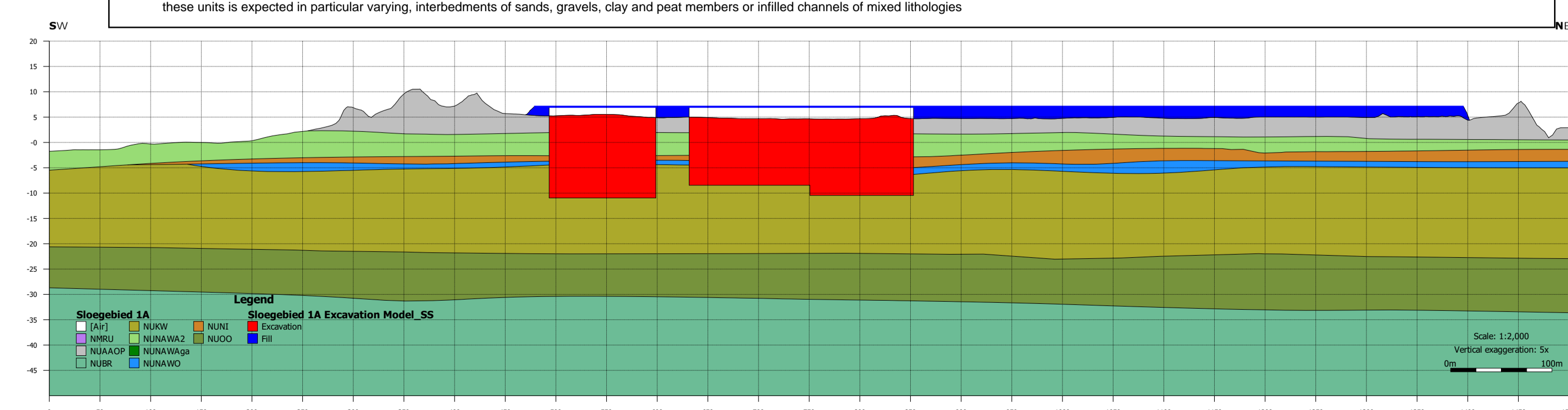
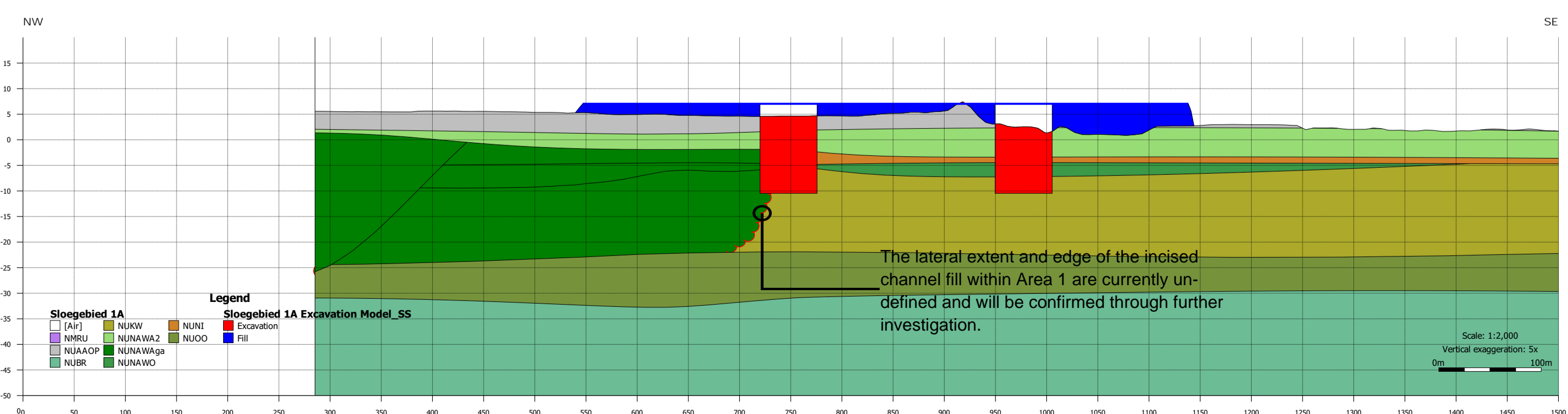
Sloegebied 1 Site Boundary Ground Model Isometric View

Sloegebied 1 Site Boundary Fence Ground Model Isometric View

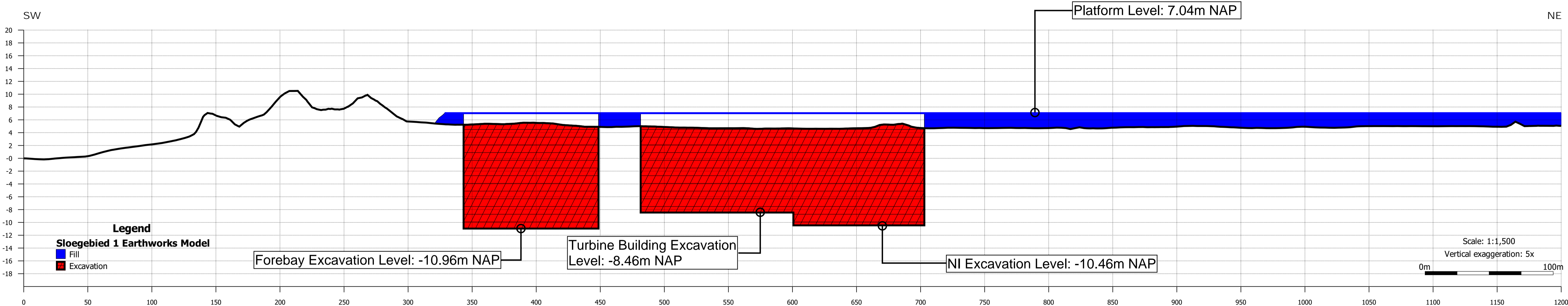
Geological Code	Formation Name	Description	Depth Top (m bg)	Depth Base (m bg)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUAAOP	Anthropogenic sand	Reworked sand used as engineering fill for land reclamation. Has thin clay layers too	0.0	2.9	4.7	1.7	2.9
NUNAWA	Walcheren Member of the Naaldwijk Formation	Fine sand, clayey or silty, partly organic	2.9	6.3	1.7	-1.6	3.3
NUNUNI	Niuekoop Formation	Brown to black peat and other organics	6.3	9.7	-1.6	-5.0	3.4
NUNAWO	Wormer Member of the Naaldwijk Formation	Fine sand, silty, clayey, intercalated silt and clay layers	9.7	11.0	-5.0	-6.4	1.4
NUKW	Koewacht Formation	Greenish grey to light brown fine to medium sand, slightly silty with local shell grit. Generally fining upward	11.0	26.6	-6.4	-21.9	15.6
NUOO	Oosterhout Formation	Light grey to greyish green very fine to medium sand, locally clayey	26.6	35.9	-21.9	-31.2	9.3
NUBR	Breda Formation	Greyish to blackish green very fine to medium sand, silty	35.9	68.9	-31.2	-64.3	33.1
NMRU	Rupel Formation	Dark brown-grey silty clays, rich in pyrite (Part of NM - Middle North Sea Group)	68.9	Not proven	-64.3	Not proven	Not proven

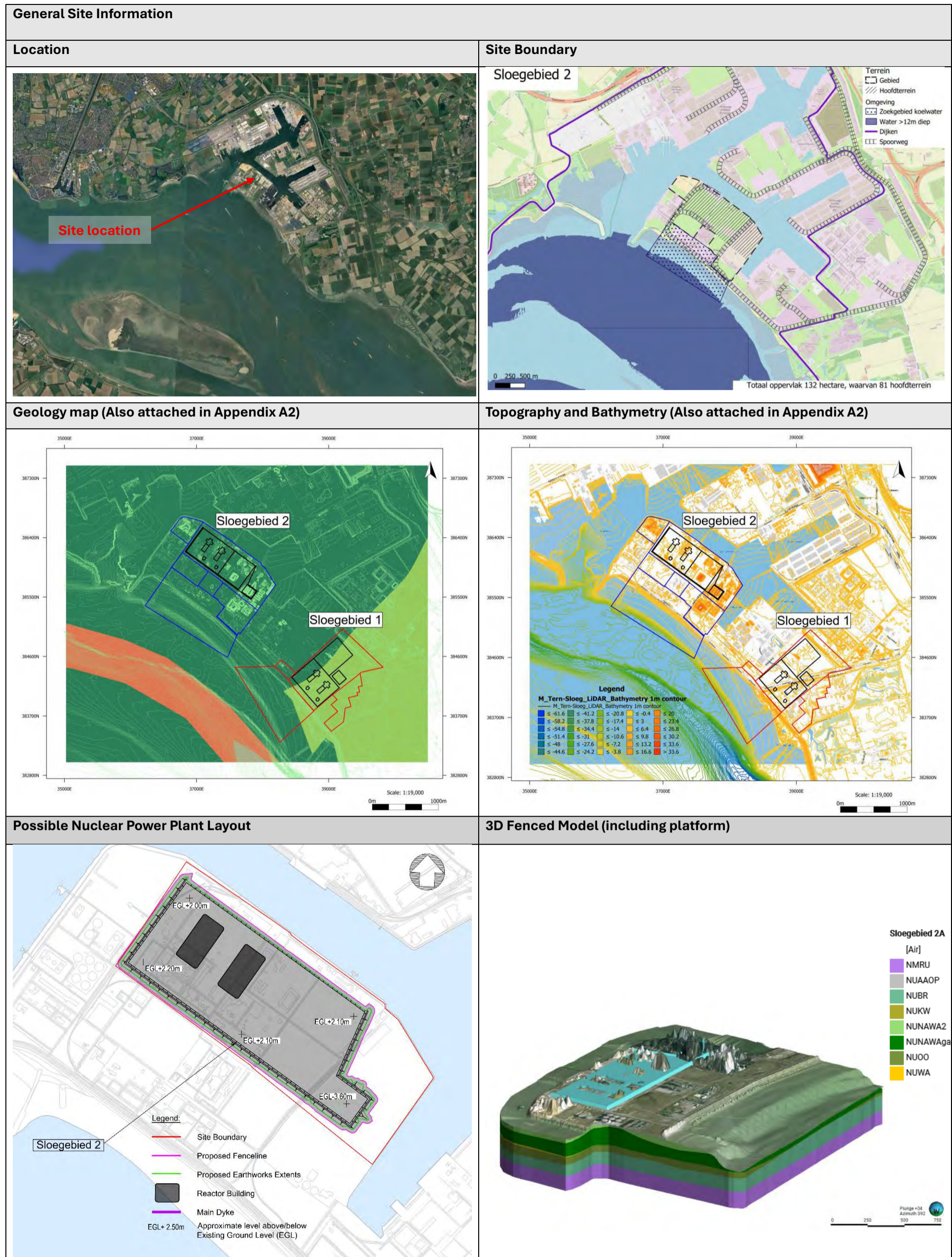
n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location

- Notes:
- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
  - Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
  - Initial geological interpretation based on TNO - GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
  - The geological detailed interpretation is based on Deltares detailed geological sections.
  - Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
  - There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
  - The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies



# Sloegebied 1A Earthworks Long Section (N-S)





**Title: Sloegebied 2 Technical Factsheet**

Geology, soil conditions and Deep Foundations			
<b>Geological cross Sections</b>	<p>Note: The geological section has been produced based on Geological Sections provided in the Deltares Site Evaluation Reports. For more details on the assumptions refer to section 4.3 of the Work Package 3 Report: <i>Multi-site Preliminary Technical Evaluation of Site Suitability for Geology, soil conditions and deep foundations (PR00/003/FR-001)</i>. Section is also presented in Appendix A2.</p>		
<b>Simplified section through nuclear island and showing foundation levels</b>	<p>NOT TO SCALE</p> <p>Notes: NI: Nuclear Island CI: Conventional Island</p>		
Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	5	2	10
Open battered excavation	3	1	3
<b>Ground risks</b>			
Liquefaction	5	3	15
Ground variability	5	2	10
<b>Total weighted score = 38</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Limited but adequate: At least two deep BHs/CPTs 30m apart and up to 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 (Low) based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001)</li> </ul>			
<b>Key risk</b>			
<ul style="list-style-type: none"> <li>Proximity of existing Gas Power Plant may complicate temporary excavation works.</li> <li>Presence of glauconitic sands (NUBR), with associated uncertainties in soil behaviour under load.</li> <li>Open battered excavation presents challenges due to granular slope conditions and hydraulic connectivity with the sea.</li> </ul>			

**Title: Sloegebied 2 Technical Factsheet**

Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>	<b>Required landscaping (CCM) - m<sup>3</sup></b>
	-	961,000	1,042,000	1,920,000	1,920,000	-	931,000
	Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	2		3		6		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	9		1		9		
Area for stockpiling	8		1		8		
Temporary works area	8		2		16		
<b>Earthworks design</b>							
Earthworks re-use potential	6		2		12		
Contaminated soils risk	5		2		10		
<b>Onsite constraints</b>							
Existing utilities	3		1		3		
Existing structures	5		1		5		
<b>Total Weighted score = 69</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 (Medium) based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 3 (High) based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001)</li> </ul>							
<b>Key risk</b>							
<ul style="list-style-type: none"> <li>Earthworks re-use – Industrial legacy land use not favourable for earthworks re-use.</li> <li>Existing structures:                             <ul style="list-style-type: none"> <li>Existing Gas-Powered Plant to SE; and,</li> <li>Historical Power Plant onsite – could have retained buried foundations/utilities etc.</li> </ul> </li> </ul>							

**Title: Sloegebied 2 Technical Factsheet**

<b>Overall Scoring summary (PR00/003/FR-001 &amp; PR00/006/FR-001)</b>	
<b>Total score</b>	<b>107</b>
<b>Total number of Red (High risk) criteria</b>	<b>3</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>6</b>
<b>Total number of Green (Low risk) criteria</b>	<b>3</b>

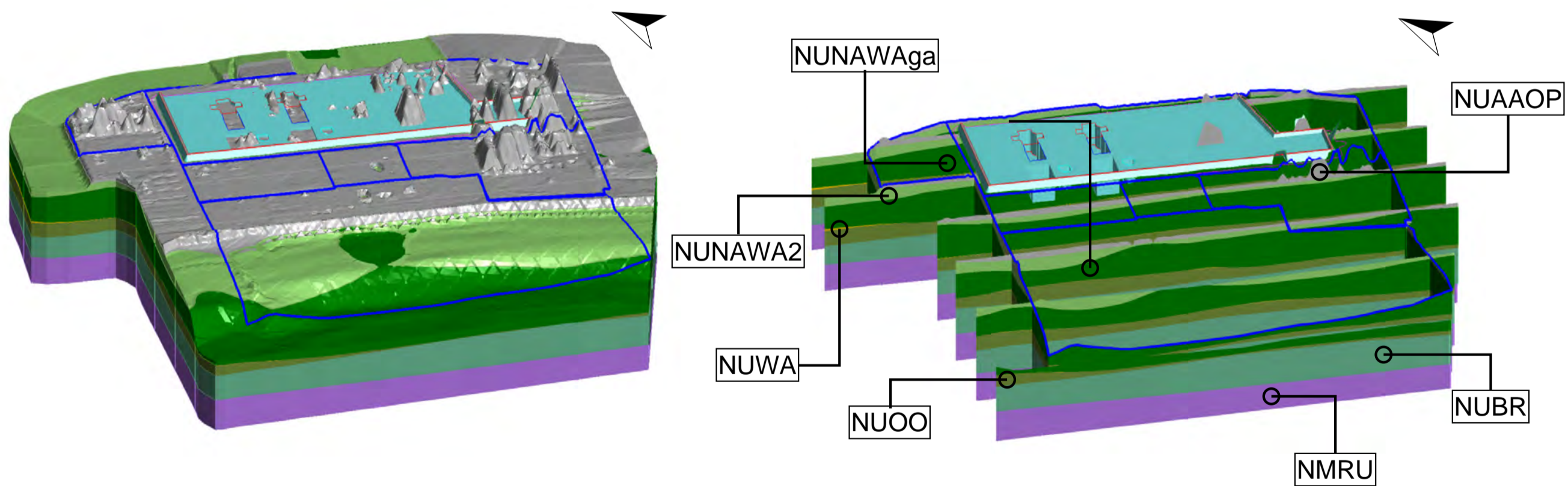
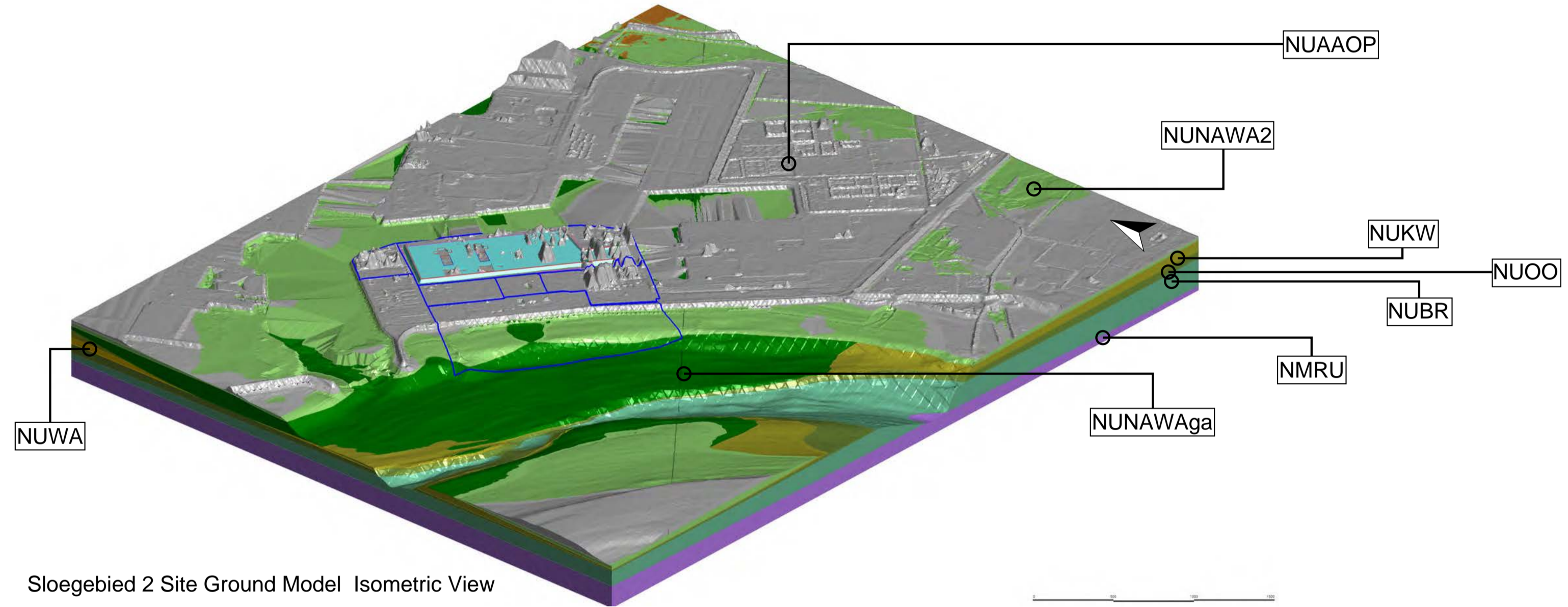
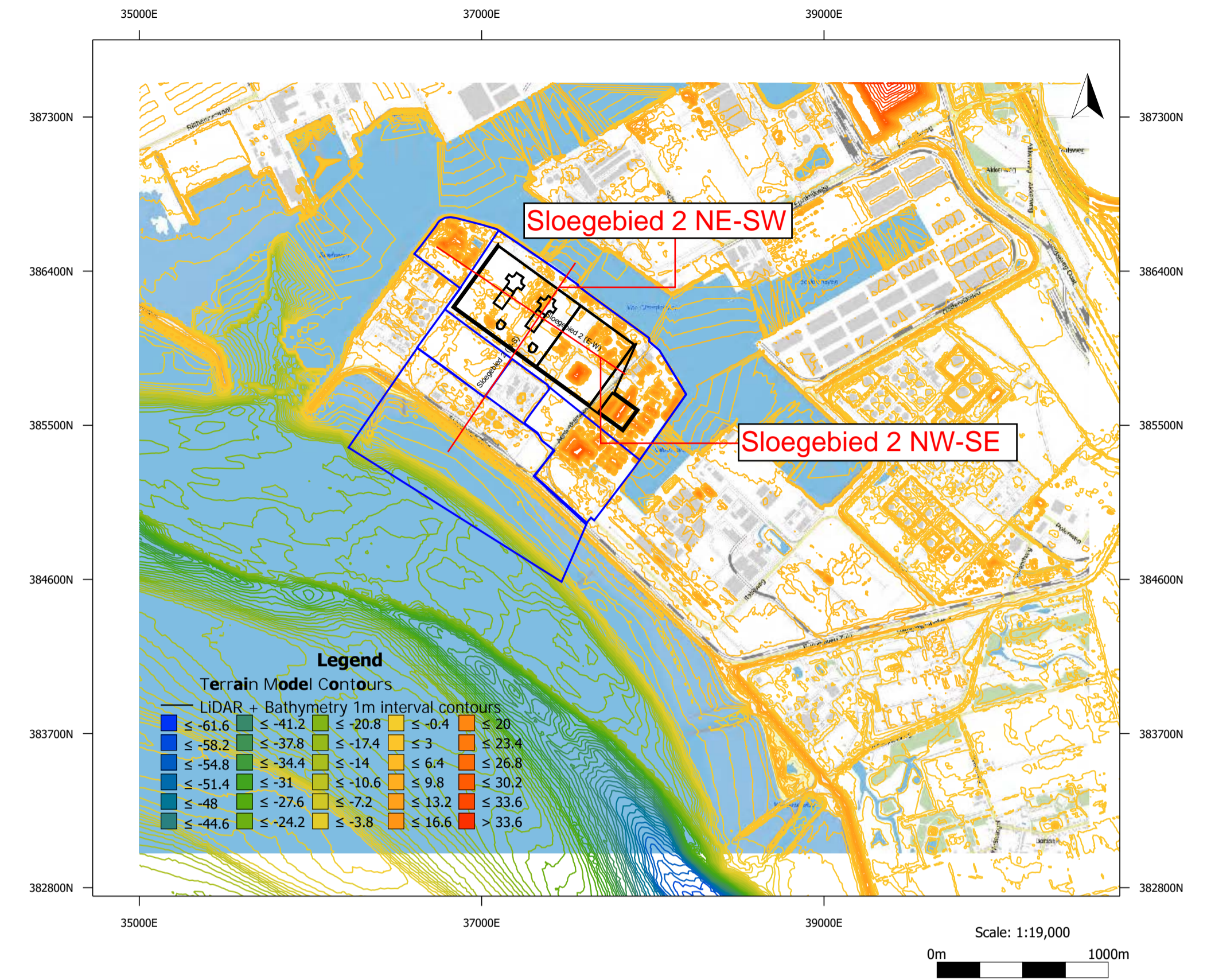
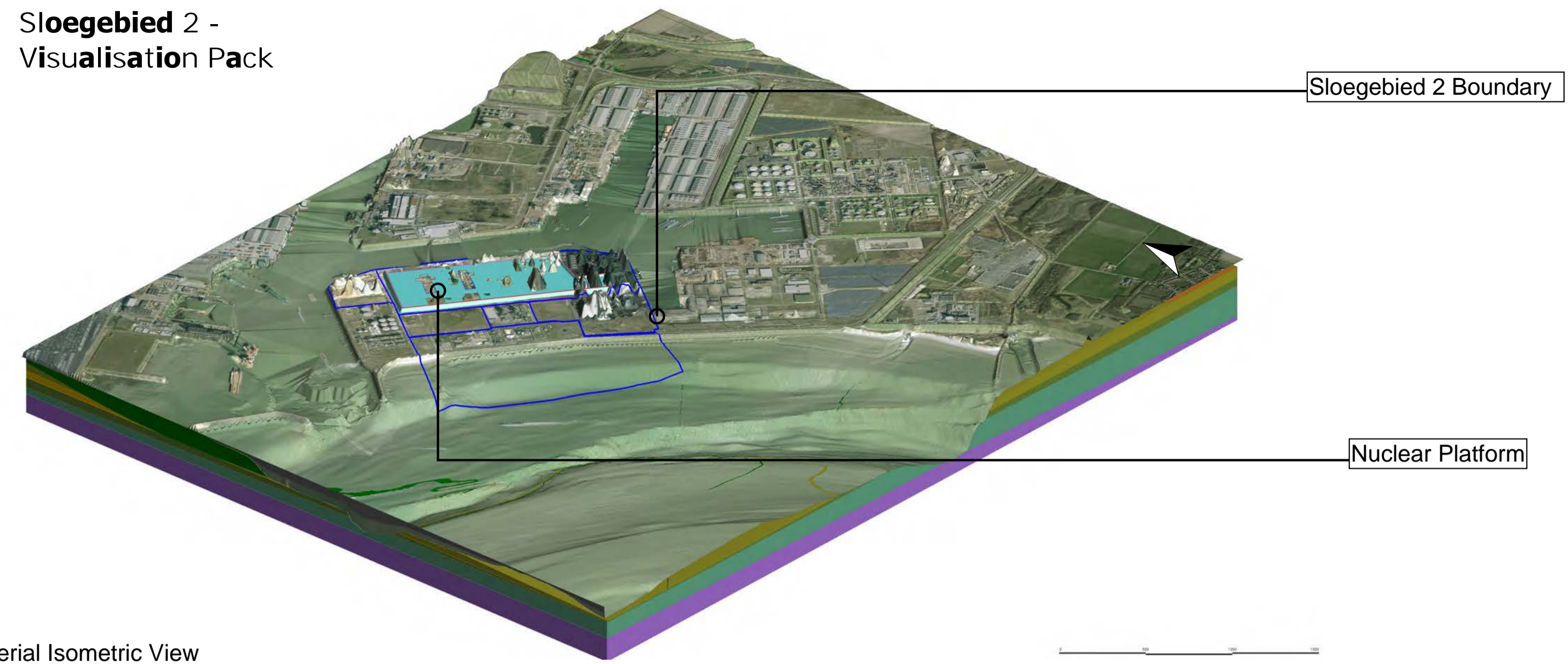
# APPENDIX A2

Units geological map	
<b>Holocene units</b>	
d Coastal dune sand	ds dg
s Beach and foreshore deposits	s
g Tidal channel deposits	g
o Tidal deposits	o ovg* ovo* oo*
<p><i>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</i></p>	
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>	
BX1-4 Various glacial (aeolian) sand units (Boxtel Fm)	BX1 BX2 BX3 BX4
SY Middle Pleistocene sandy fluvial sediments (Stramproy Fm)	SY
WA Early and Middle Pleistocene fluvial sediments (Waalre Fm)	WA
MO Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations)	MO
BR Miocene fine shallow-marine glauconite sands (Breda Fm)	BR
RTD Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>	
KR2 Coarse-grained Late Pleistocene fluvial deposits	KR2
EE2 Open marine sandy and shell-rich Last Interglacial sediments.	EE2
RTD Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD

# Sloegbied Plan View



Sloegebied 2 - Visualisation Pack



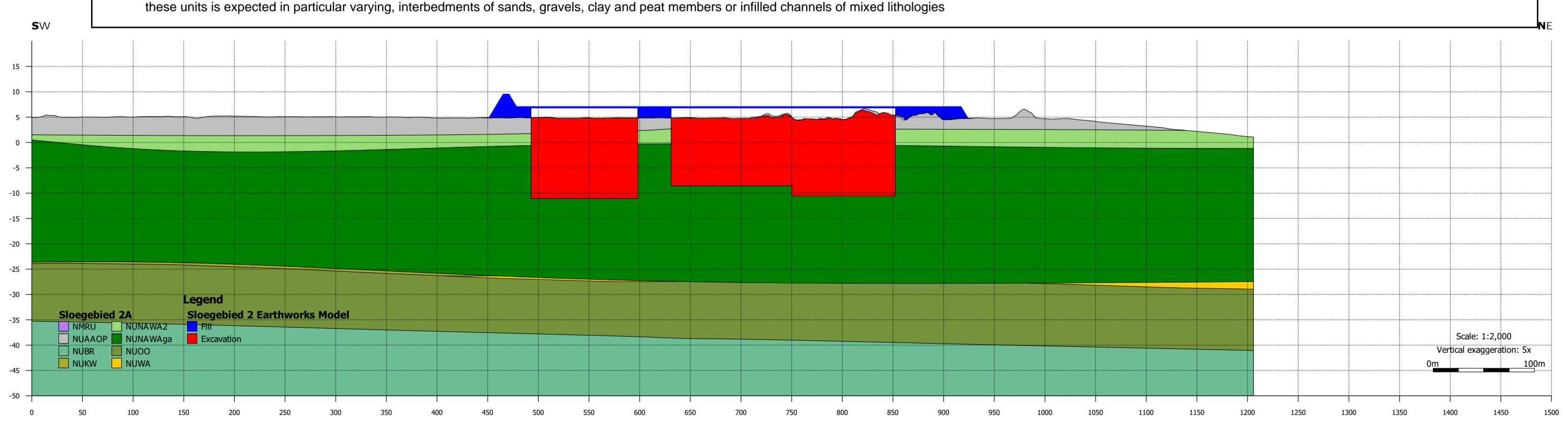
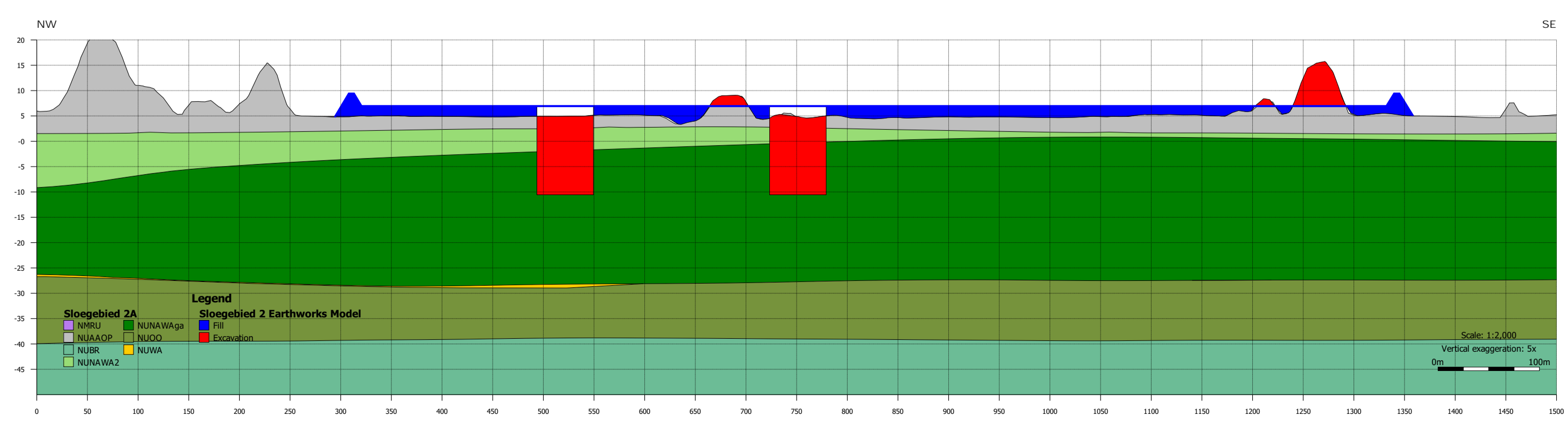
Geological Code	Formation Name	Description	Depth Top (m bg)	Depth Base (m bg)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUA AOP	Anthropogenic sand	Reworked sand used as engineering fill for land reclamation. Has thin clay layers too	0.0	1.9	4.5	2.6	1.9
NUNAWO	Member of the Naaldwijk F	Fine sand, silty, clayey, intercalated silt and clay layers	1.9	4.9	2.6	-0.4	3.0
NUNAWA	n Member of the Naaldwijk F	Fine sand, clayey or silty, partly organic	n/a	n/a	n/a	n/a	n/a
NUNAWAga	Tidal sand (channel infill)	Loose and medium dense sands, may be prone to liquefaction	4.9	32.3	-0.4	-27.8	27.4
NUOO	Oosterhout Formation	Light grey to greyish green very fine to medium sand, locally clayey	32.3	43.8	-27.8	-39.3	11.5
NUNI	Niuewkoop Formation	Brown to black peat and other organics	n/a	n/a	n/a	n/a	n/a
NUKW	Koewacht Formation	Greenish grey to light brown fine to medium sand, slightly silty with local shell grit. Generally fining upward	n/a	n/a	n/a	n/a	n/a
NUWA	Waalre Formation	Sacked fining-upward sequences. Grey to greyish white very fine to very coarse sand, micaceous, multi-coloured with reddish particles in coarse fraction, locally gravelly (in lags). Bluish grey to brownish grey clay beds and laminae, silty to sandy, with sporadic peat layers and siderite.	n/a	n/a	n/a	n/a	n/a
NUBR	Breda Formation	Greyish to blackish green very fine to medium sand, silty	43.8	62.6	-39.3	-58.1	18.8
NMRU	Rupel Formation	Dark brown-grey silty clays, rich in pyrite (Part of NM - Middle North Sea Group)	62.6	Not proven	-58.1	Not proven	Not proven

n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location

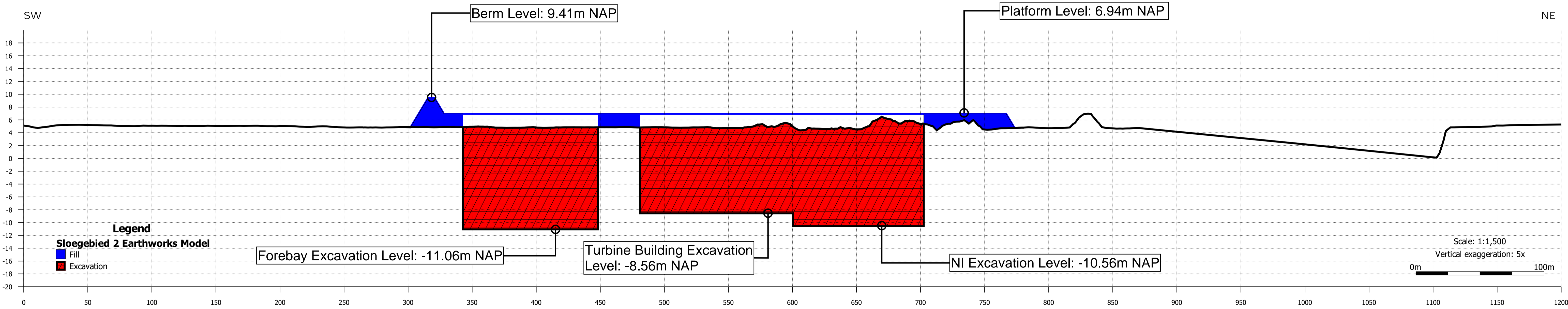
Sloegebied 2 Site Boundary Ground Model Isometric View

Sloegebied 2 Site Boundary Fence Ground Model Isometric View


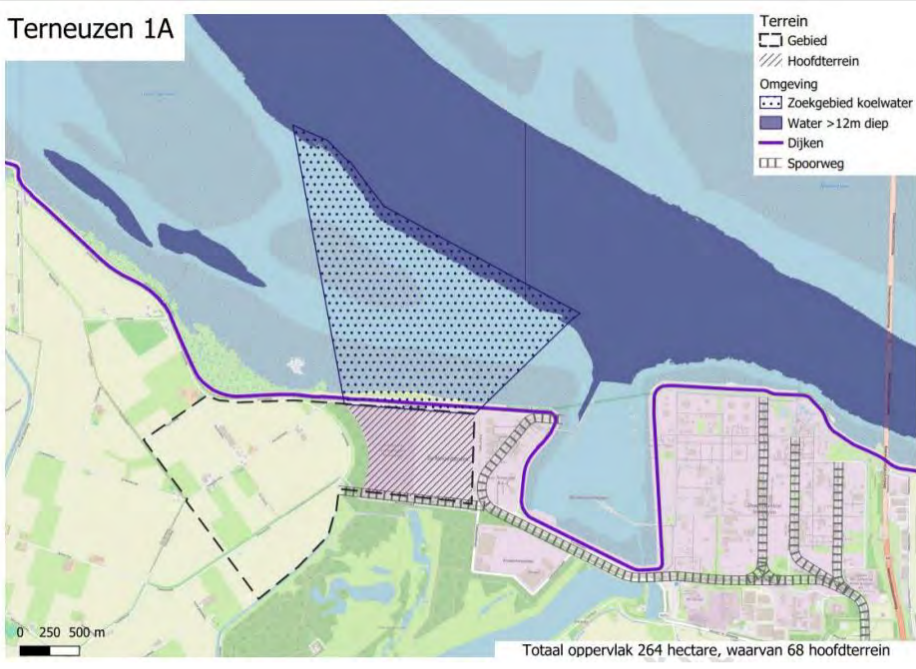
- Notes:
- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
  - Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
  - Initial geological interpretation based on TNO - GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
  - The geological detailed interpretation is based on Deltares detailed geological sections.
  - Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
  - There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
  - The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies




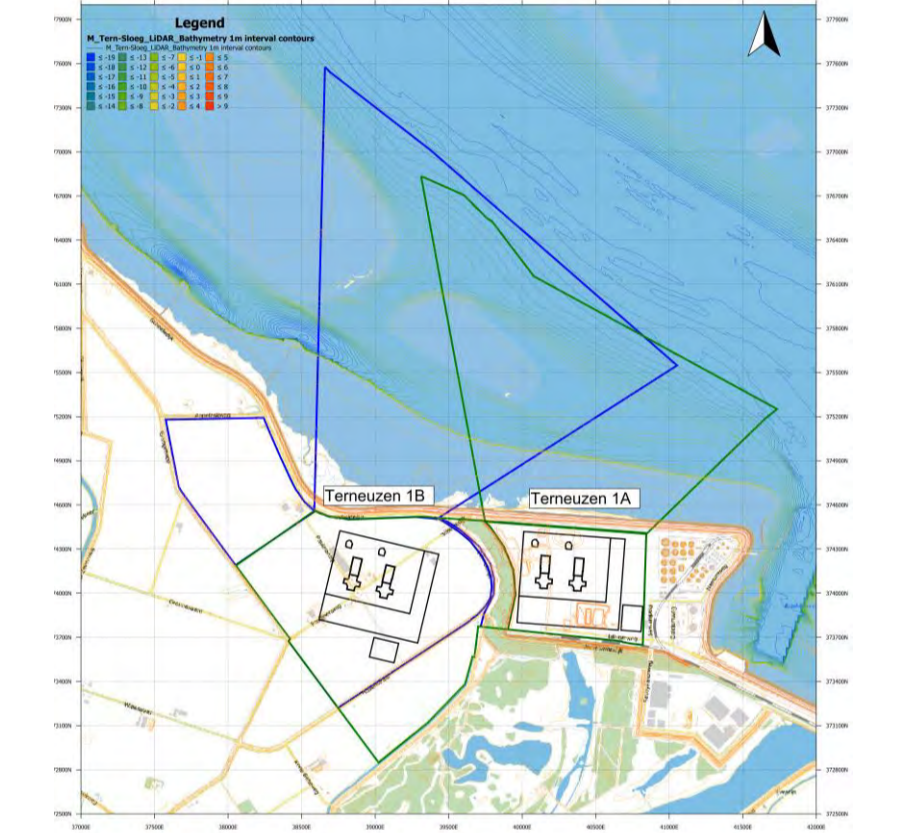
# Slogebied 2 Earthworks Long Section (SW-NE)



General Site Information

<p><b>Location</b></p> 	<p><b>Site Boundary</b></p>  <p>Totaal oppervlak 264 hectare, waarvan 68 hoofdterrein</p>
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Geology map (Also attached in Appendix A8) | Topography and Bathymetry (Also attached in Appendix A8)

	
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Possible Nuclear Power Plant Layout | 3D Fenced Model (including platform)

 <p><b>Legend:</b></p> <ul style="list-style-type: none"> <li>Site Boundary</li> <li>Proposed Fenceline</li> <li>Proposed Earthworks Extents</li> <li>Reactor Building</li> <li>Main Dyke</li> <li>EGL+2.50m</li> <li>Approximate level above/below Existing Ground Level (EGL)</li> </ul>	 <p><b>Terneuzen 1A</b></p> <ul style="list-style-type: none"> <li>[Air]</li> <li>NUAAOP</li> <li>NUNAWAga</li> <li>NUNI</li> <li>NUBX</li> <li>NUKW</li> <li>NUBR</li> <li>NUEE</li> <li>NMRU</li> <li>NMTORU</li> <li>NMTOWA</li> <li>NMTOBA</li> <li>NLDOAS</li> <li>Unknown</li> </ul>
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**Title: Terneuzen 1A Technical Factsheet**

Geology, soil conditions and Deep Foundations			
<p><b>Geological cross Sections</b></p>	<p>Note: The geological section has been produced based on Geological Sections provided in the Deltares Site Evaluation Reports. For more details on the assumptions refer to section 4.3 of the Report: <i>Multi-site Preliminary Technical Evaluation of Site Suitability for Geology, soil conditions and deep foundations (PR00/003/FR-001)</i>. Section is also presented in Appendix A8.</p>		
<p><b>Simplified section through nuclear island and showing foundation levels</b></p>	<p>Notes: NI: Nuclear Island CI: Conventional Island</p>		
Criteria	Score (RAG)	Weighting	Weighted score
<b>NI Foundation Suitability</b>			
Rigid Inclusions	7	2	14
Open battered excavation	2	1	2
<b>Ground risks</b>			
Liquefaction	4	3	12
Ground variability	6	2	12
<b>Total weighted score = 40</b>			
<b>Confidence Level of Ground model (RAG)</b>			
Extremely Limited: No BHs/CPTs up to 25m depth within the footprint of the site boundary			
<b>Financial impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for execution of the foundations is estimated to be Class 1 Low based on the ranges identified by KGG (See section 5.4 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/003/FR-001).</li> </ul>			
<b>Time impact classification (Rigid Inclusions as baseline)</b>			
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for execution of the foundations is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.3 of PR00/003/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Technical Feasibility Report (Ref: PR00/003/FR-001).</li> </ul>			
<b>Key risks</b>			
<ul style="list-style-type: none"> <li>Limited Ground Investigation.</li> <li>Glaucinitic sands (NMTORU and NMRUBO) with associated uncertainties in soil behaviour under load.</li> <li>Soil parameters are not provided for NMTORU and NMRU.</li> <li>Open battered excavation challenging due to lack of space.</li> </ul>			

Title: Terneuzen 1A Technical Factsheet

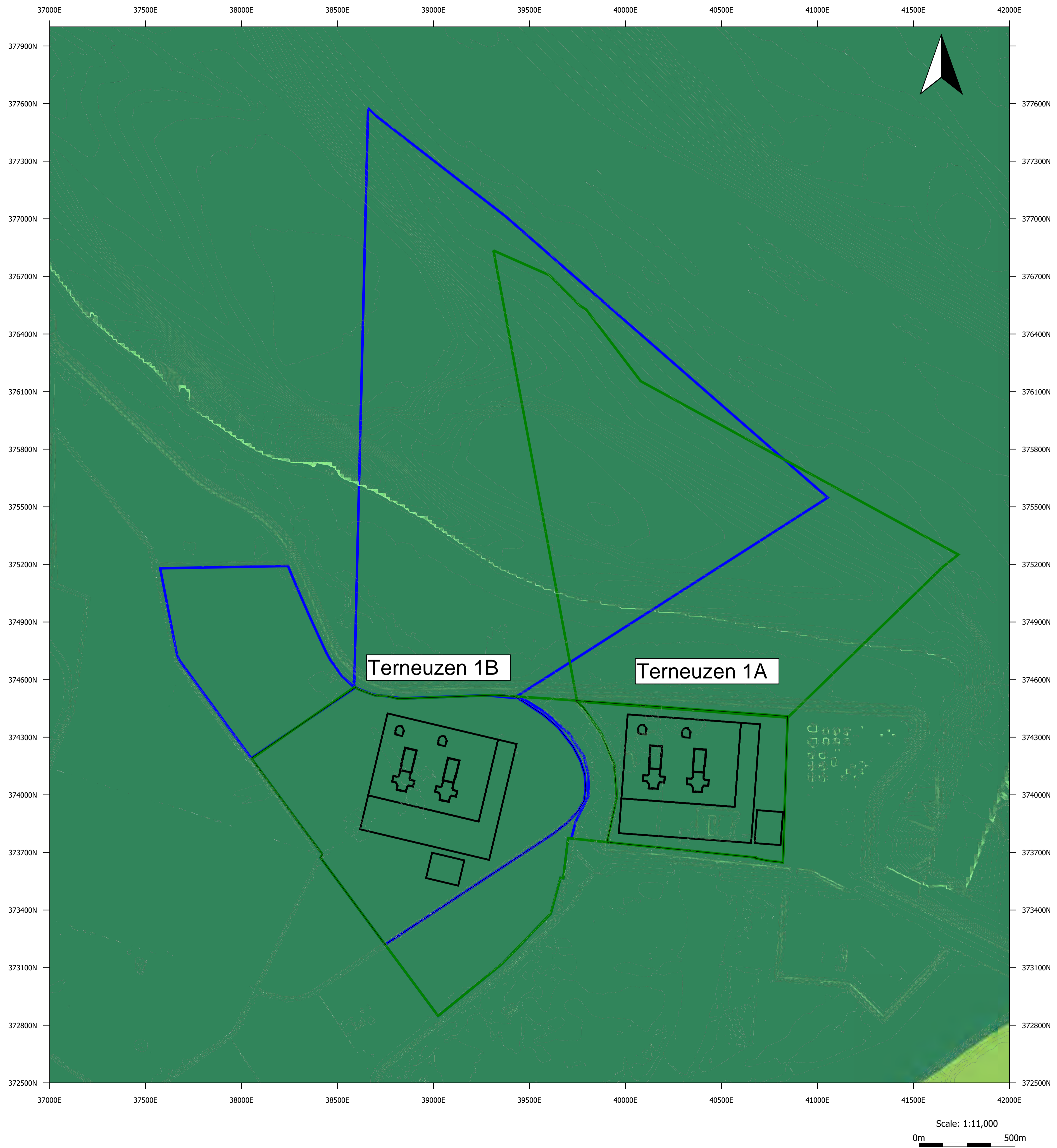
Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>	<b>Required landscaping (CCM) - m<sup>3</sup></b>
	172,000	839,000	1,242,000	1,976,000	1,976,000	-	797,000
	Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	6		3		18		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	6		1		6		
Area for stockpiling	8		1		8		
Temporary works area	8		2		16		
<b>Earthworks design</b>							
Earthworks re-use potential	5		2		10		
Contaminated soils risk	6		2		12		
<b>Onsite constraints</b>							
Existing utilities	5		1		5		
Existing structures	4		1		4		
<b>Total Weighted score = 79</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 3 High based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Key risks</b>							
<ul style="list-style-type: none"> <li>Existing structures &amp; existing utilities – Solar farm present onsite and adjacent gas tanks.</li> <li>Logistics – limited road access. Likely requires new access roads for construction traffic to access site (if not rail or marine transport).</li> <li>Earthworks re-use – need to confirm suitability of landfill materials.</li> </ul>							

Overall Scoring summary (PR00/003/FR-001 & PR00/006/FR-001)	
Total score	119
Total number of Red (High risk) criteria	1
Total number of Amber (Medium risk) criteria	8
Total number of Green (Low risk) criteria	3

# APPENDIX A8

Units geological map	
<b>Holocene units</b>	
d Coastal dune sand	ds dg
s Beach and foreshore deposits	s
g Tidal channel deposits	g
o Tidal deposits	o ovg* ovo* oo*
<p>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</p>	
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>	
BX1-4 Various glacial (aeolian) sand units (Boxtel Fm)	BX1 BX2 BX3 BX4
SY Middle Pleistocene sandy fluvial sediments (Stramproy Fm)	SY
WA Early and Middle Pleistocene fluvial sediments (Waalre Fm)	WA
MO Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations)	MO
BR Miocene fine shallow-marine glauconite sands (Breda Fm)	BR
RTD Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>	
KR2 Coarse-grained Late Pleistocene fluvial deposits	KR2
EE2 Open marine sandy and shell-rich Last Interglacial sediments.	EE2
RTD Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations)	RTD

# Terneuzen Plan View

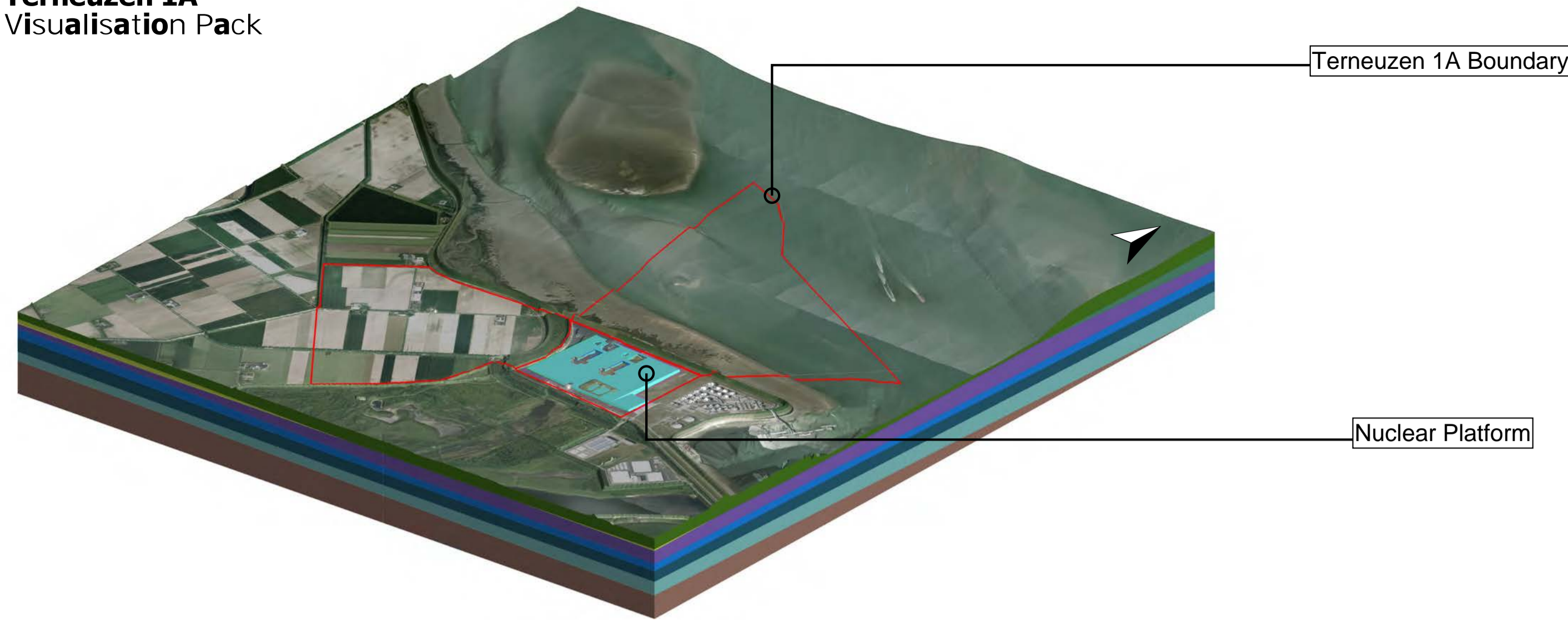


Terneuzen 1B

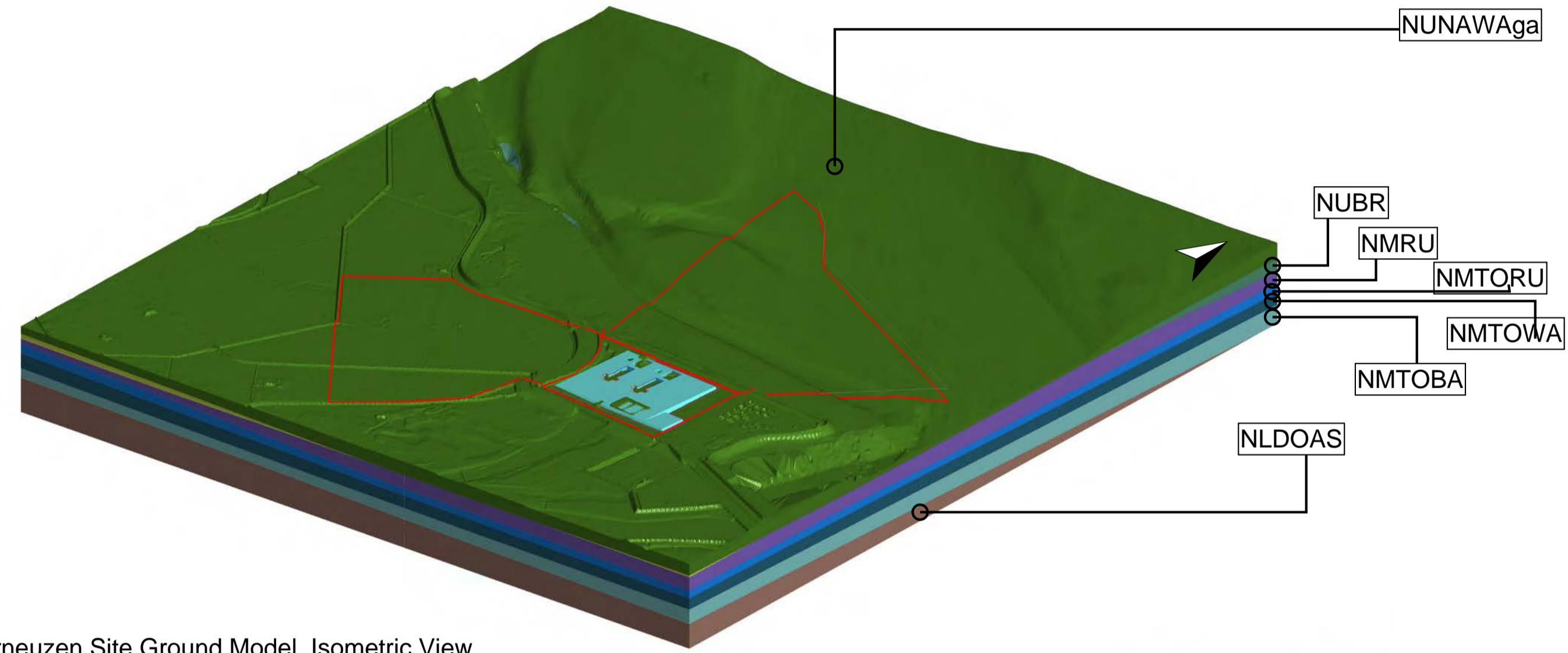
Terneuzen 1A

Scale: 1:11,000  
0m 500m

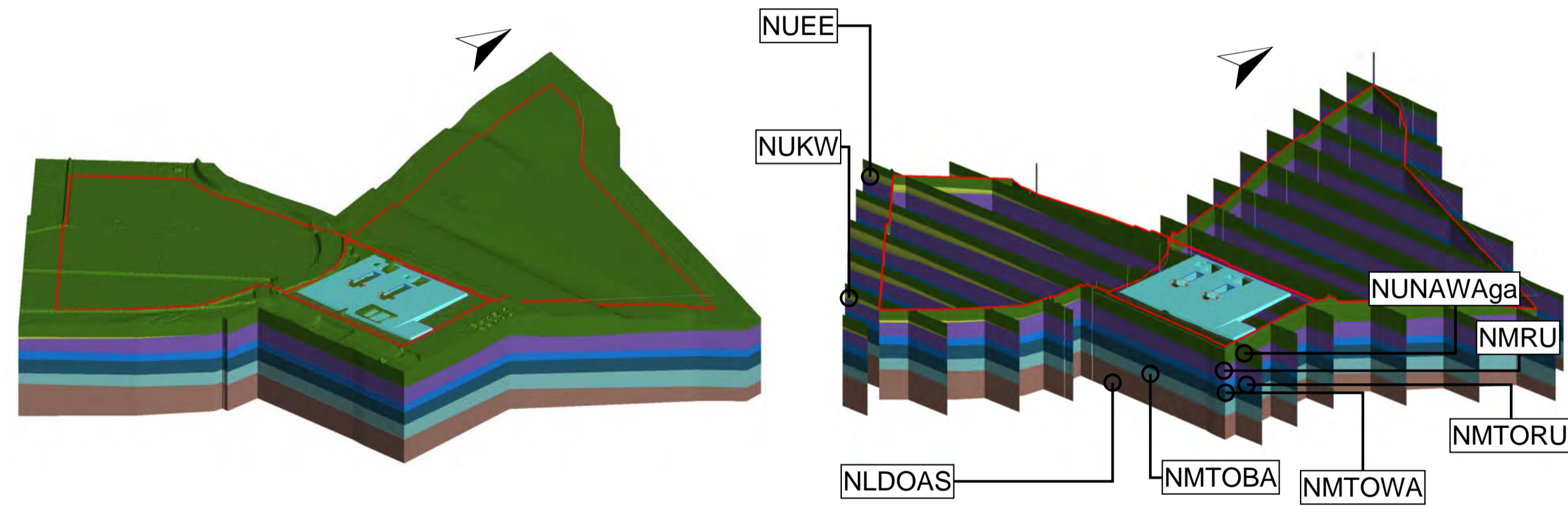
# Terneuzen 1A - Visualisation Pack



Aerial Isometric View

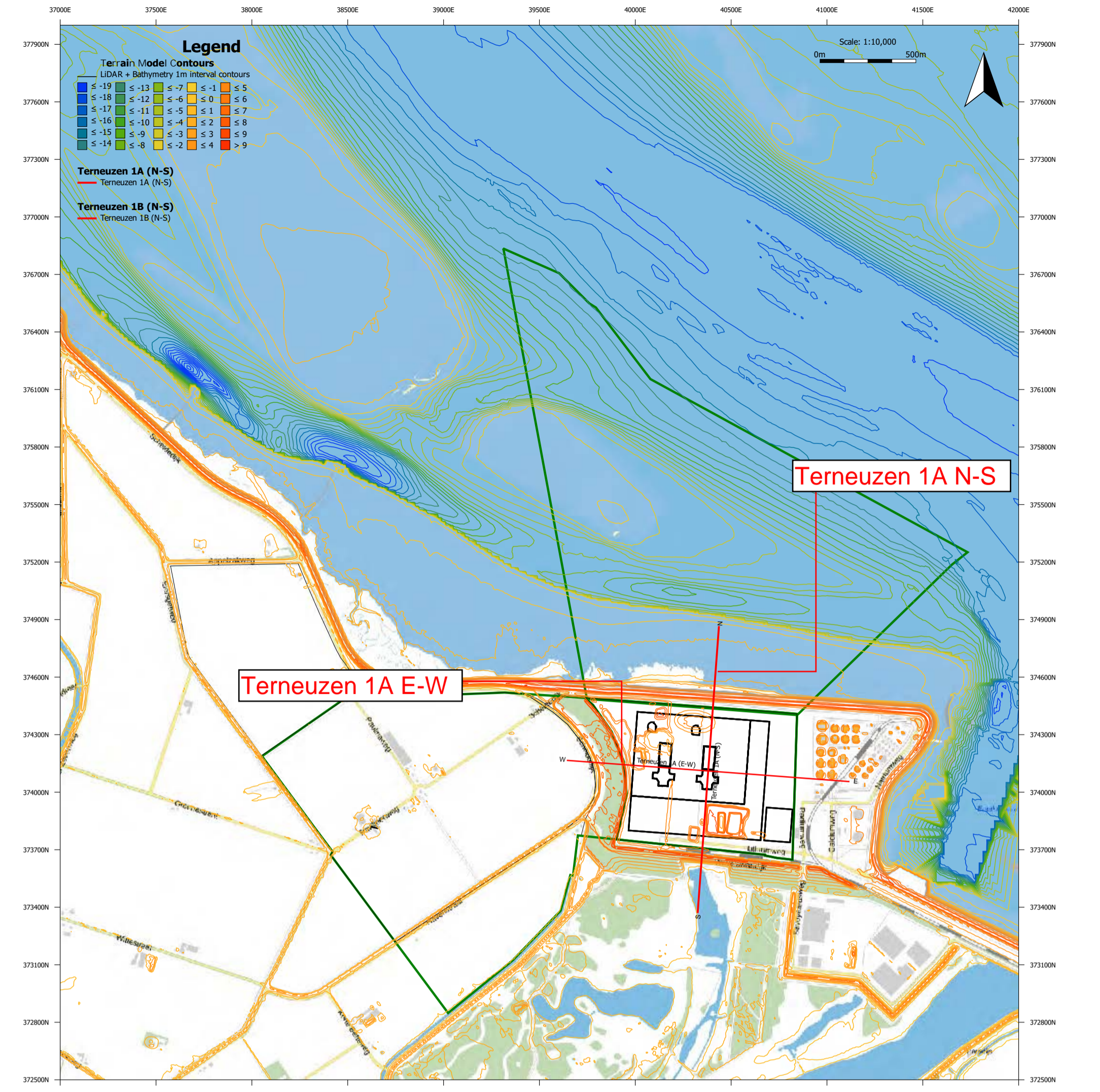
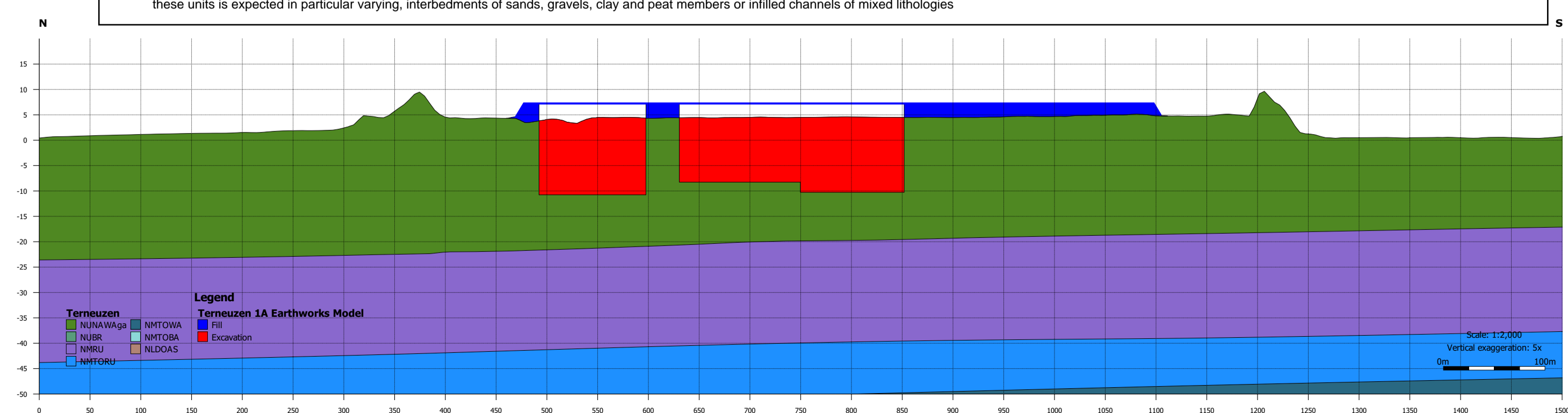
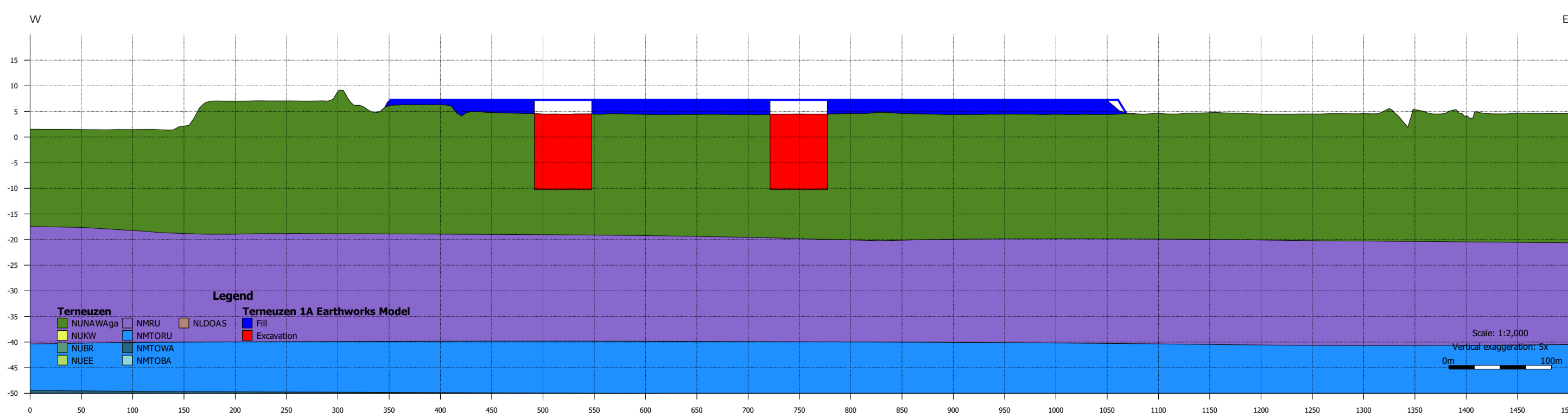


Terneuzen Site Ground Model Isometric View



Terneuzen 1A Site Boundary Ground Model Isometric View

Terneuzen 1A Site Boundary Fence Ground Model Isometric View



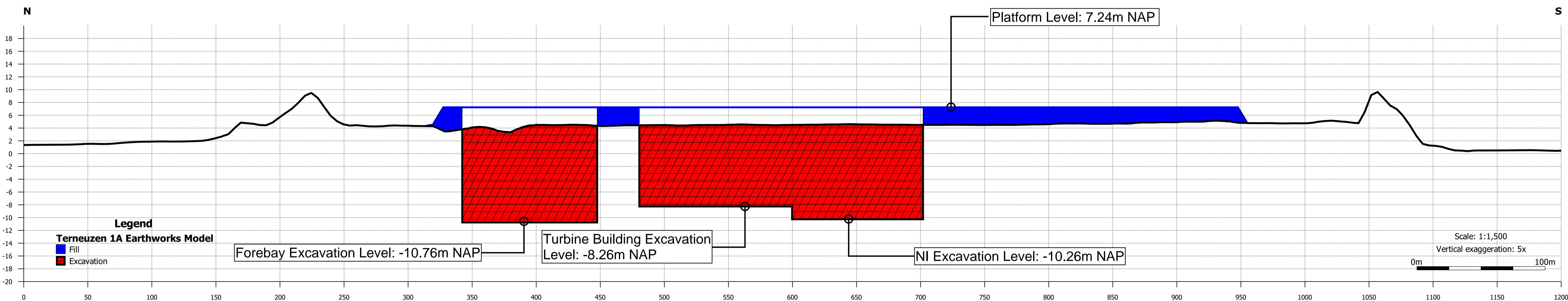
Geological Code	Formation Name	Description	Depth Top (m bg)	Depth Base (m bg)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUIAOP	Anthropogenic sand	Reworked sand used as engineering fill for land reclamation. Has thin clay layers too	n/a	n/a	n/a	n/a	n/a
NUNAWaGa	Tidal sand (channel infill)	Loose and medium dense sands, may be prone to liquefaction	0.0	24.3	4.6	-19.7	24.3
NUNI	Niuekoop Formation	Brown to black peat and other organics	n/a	n/a	n/a	n/a	n/a
NUBX	Boxtel Formation	Light yellow to dark brown very fine to medium sand, silty, some peat and gytja layers	n/a	n/a	n/a	n/a	n/a
PT	Various	Undifferentiated peat horizons	n/a	n/a	n/a	n/a	n/a
NUKW	Koewacht Formation	Greenish grey to light brown fine to medium sand, slightly silty with local shell grit. Generally fining upward	n/a	n/a	n/a	n/a	n/a
NUEE	Eem Formation	Grey fine to medium sand, some clay and silt	n/a	n/a	n/a	n/a	n/a
NUBR	Breda Formation	Greyish to blackish green very fine to medium sand, silty	n/a	n/a	n/a	n/a	n/a
NMRU	Rupel Formation	Dark brown-grey silty clays, rich in pyrite (Part of NM - Middle North Sea Group)	24.3	44.4	-19.7	-39.8	20.0
NMTORU	Ruisbroek Member	Alternating sand and clay layers - noted to have glauconite in Terneuzen report (presumed to be coarser sand as part of NMTO)	44.4	54.6	-39.8	-50.0	10.3
NMTOWA	Watervliet Member	Alternating sand and clay layers (presumed to be coarser sand as part of NMTO)	54.6	70.7	-50.0	-66.1	16.1
NMTOBA	Bassevelde Member	Alternating sand and clay layers (presumed to be coarser sand as part of NMTO)	70.7	87.0	-66.1	-82.5	16.3
NLDOAS	Asse Member	Dark-grey, green and brown, slightly calcareous clays, with an intercalated, glauconitic sand to sandstone body, which grades distally (north and northwest) into a marly unit. The lowermost part of the formation is characterised by tuffaceous clays and silts and is fine-grained (63-210 µm) sandy in a proximal position (mid and southern part NL).	87.0	Not proven	-82.5	Not proven	Not proven

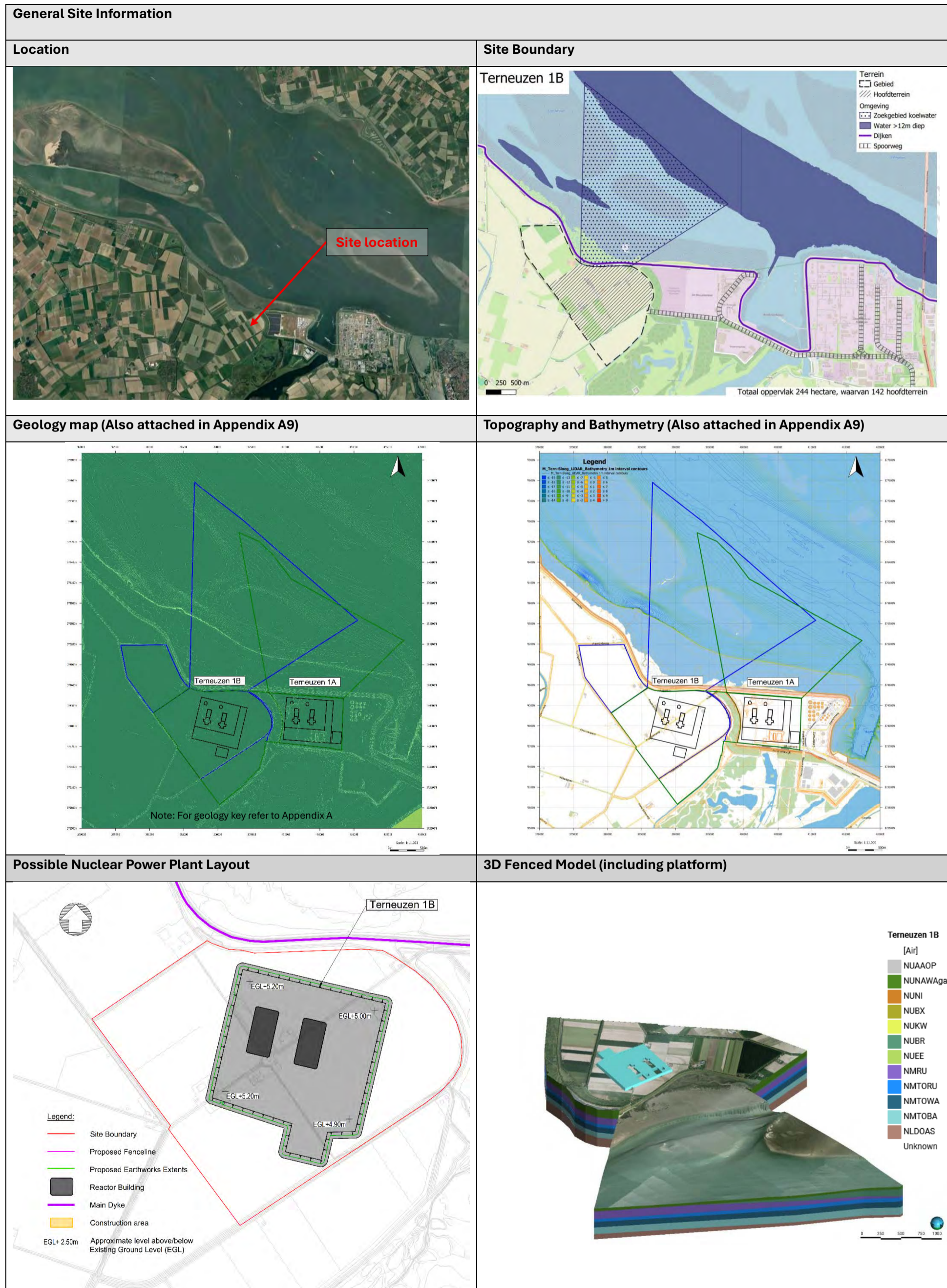
n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location

Notes:

- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
- Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
- Initial geological interpretation based on TNO - GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
- The geological detailed interpretation is based on Deltares detailed geological sections.
- Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
- There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
- The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies

# Terneuzen 1A Earthworks Long Section (N-S)







**Title: Terneuzen 1B Technical Factsheet**

Design Basis Flood Level and Platform							
<b>Schematic Typical Section</b>							
	<b>Static earthworks quantities</b>	<b>Topsoil stripping (BCM) – m<sup>3</sup></b>	<b>Bulk earthworks Excavation (BCM) - m<sup>3</sup></b>	<b>Import (BCM) - m<sup>3</sup></b>	<b>Available Fill (CCM) - m<sup>3</sup></b>	<b>Required filling (CCM) - m<sup>3</sup></b>	<b>Balance - m<sup>3</sup></b>
	356,000	839,000	2,879,000	3,531,000	3,531,000	-	797,000
	Notes: BCM = Bank Cubic Meters CCM = Compacted Cubic Meters						
<b>Criteria</b>	<b>RAG</b>		<b>Weighting</b>		<b>Overall Risk rating</b>		
<b>Groundwater</b>							
Groundwater control requirements	4		3		12		
<b>Earthworks logistics</b>							
Logistics (Accessibility and plant movement)	6		1		6		
Area for stockpiling	9		1		9		
Temporary works area	9		2		18		
<b>Earthworks design</b>							
Earthworks re-use potential	7		2		14		
Contaminated soils risk	8		2		16		
<b>Onsite constraints</b>							
Existing utilities	8		1		8		
Existing structures	7		1		7		
<b>Total Weighted score = 90</b>							
<b>Financial impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed, the financial impact classification for the earthworks phase is estimated to be Class 2 Medium based on the ranges identified by KGG (See section 5.6 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Time impact classification</b>							
<ul style="list-style-type: none"> <li>Based on the assessment performed the time impact classification for the earthworks phase is estimated to be Class 3 High based on the ranges identified by KGG (See section 5.5 of PR00/006/FR-001 for classification).</li> <li>Further supporting commentary is provided in the Report (Ref: PR00/006/FR-001).</li> </ul>							
<b>Key risks</b>							
<ul style="list-style-type: none"> <li>Logistics – limited road access. Likely requires new access roads for construction traffic to access site (if not rail or marine transport).</li> <li>Earthworks re-use – risk of peat in excavated material.</li> </ul>							

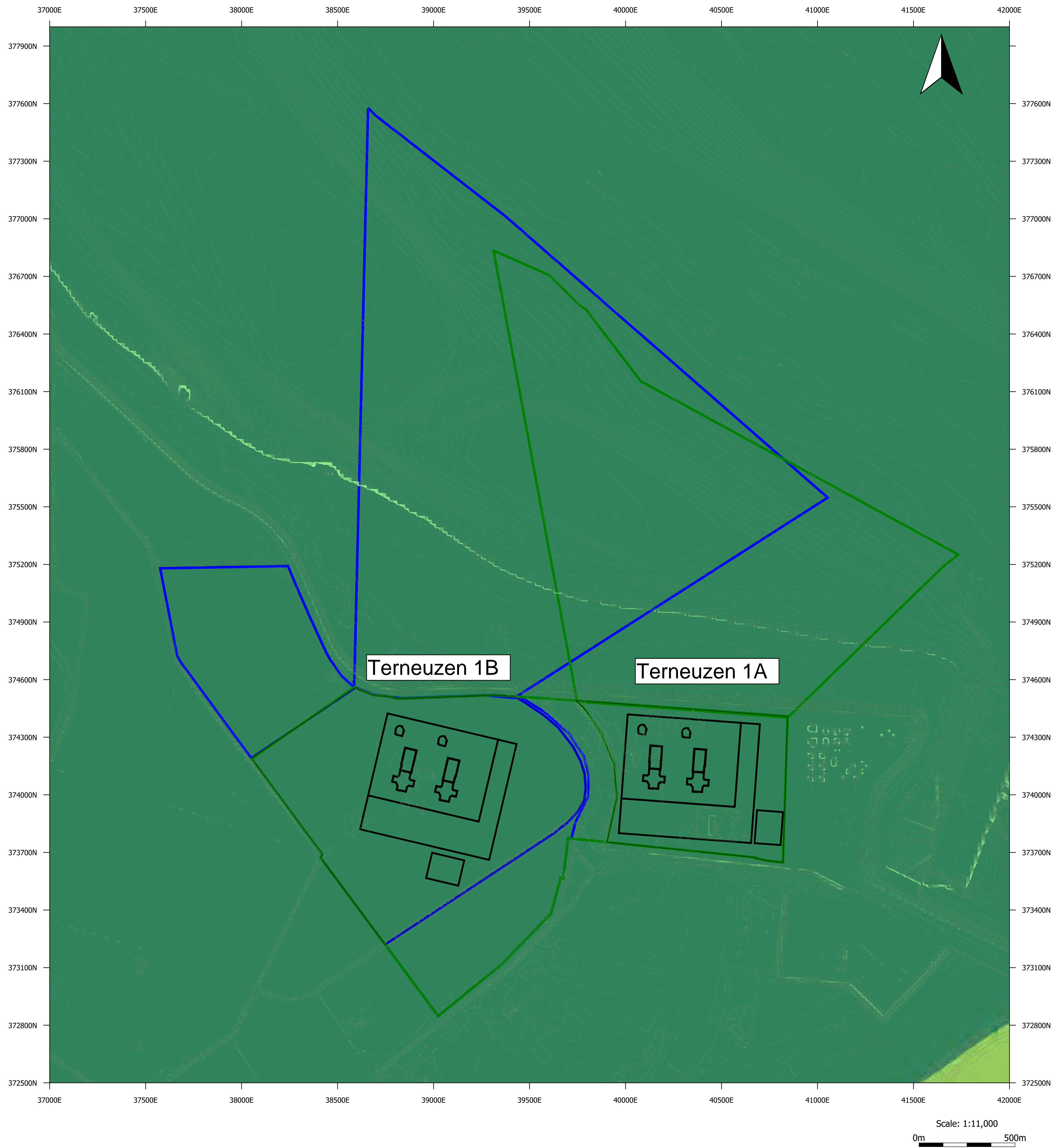
**Title: Terneuzen 1B Technical Factsheet**

<b>Overall Scoring summary (PR00/003/FR-001 &amp; PR00/006/FR-001)</b>	
<b>Total score</b>	<b>133</b>
<b>Total number of Red (High risk) criteria</b>	<b>0</b>
<b>Total number of Amber (Medium risk) criteria</b>	<b>6</b>
<b>Total number of Green (Low risk) criteria</b>	<b>6</b>

# APPENDIX A9

Units geological map	
<b>Holocene units</b>	
d	Coastal dune sand <span style="background-color: yellow;">ds</span> <span style="background-color: yellow;">dg</span>
s	Beach and foreshore deposits <span style="background-color: yellow;">s</span>
g	Tidal channel deposits <span style="background-color: green;">g</span>
o	Tidal deposits <span style="background-color: green;">o</span> <span style="background-color: green;">ovg*</span> <span style="background-color: green;">ovo*</span> <span style="background-color: green;">oo*</span>
<p><i>Note: The order of the letters in the multiletter codes indicates the top-to-bottom stacking order of the deposits. e.g. ds = Coastal dune sand (d) on top of beach and foreshore deposits (s). The star behind a letter indicates that this part of the code (e.g. g in ovg*) represents older Holocene deposits.</i></p>	
<b>Pleistocene and older units (onshore and at base of tidal channels)</b>	
BX1-4	Various glacial (aeolian) sand units (Boxtel Fm) <span style="background-color: yellow;">BX1</span> <span style="background-color: yellow;">BX2</span> <span style="background-color: yellow;">BX3</span> <span style="background-color: yellow;">BX4</span>
SY	Middle Pleistocene sandy fluvial sediments (Stramproy Fm) <span style="background-color: purple;">SY</span>
WA	Early and Middle Pleistocene fluvial sediments (Waalre Fm) <span style="background-color: purple;">WA</span>
MO	Plio-Pleistocene coastal and shallow-marine sands (Maassluis and Oosterhout formations) <span style="background-color: blue;">MO</span>
BR	Miocene fine shallow-marine glauconite sands (Breda Fm) <span style="background-color: red;">BR</span>
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations) <span style="background-color: grey;">RTD</span>
<b>Pleistocene and older units (offshore underneath Holocene marine deposits)</b>	
KR2	Coarse-grained Late Pleistocene fluvial deposits <span style="background-color: blue;">KR2</span>
EE2	Open marine sandy and shell-rich Last Interglacial sediments. <span style="background-color: green;">EE2</span>
RTD	Eocene and Oligocene marine and clay-rich sediments (Rupel, Tongeren and Dongen formations) <span style="background-color: grey;">RTD</span>

# Terneuzen Plan View

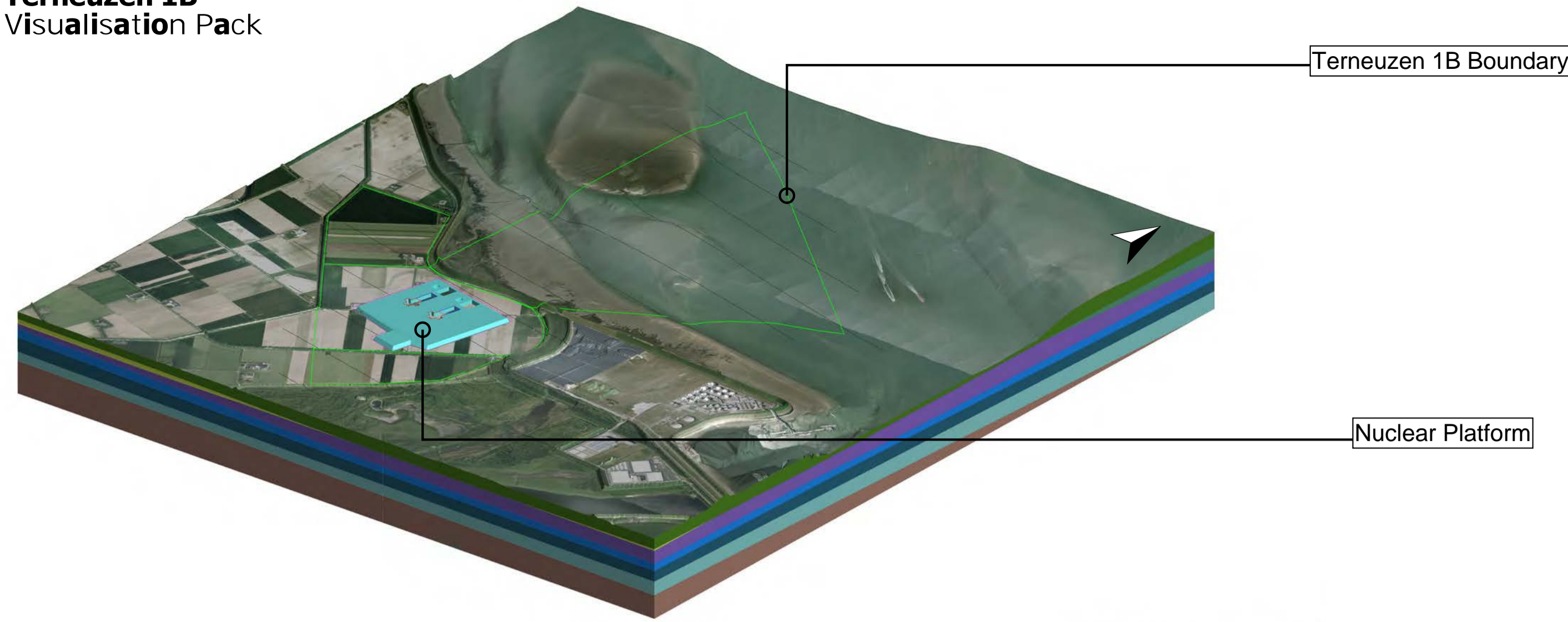


Terneuzen 1B

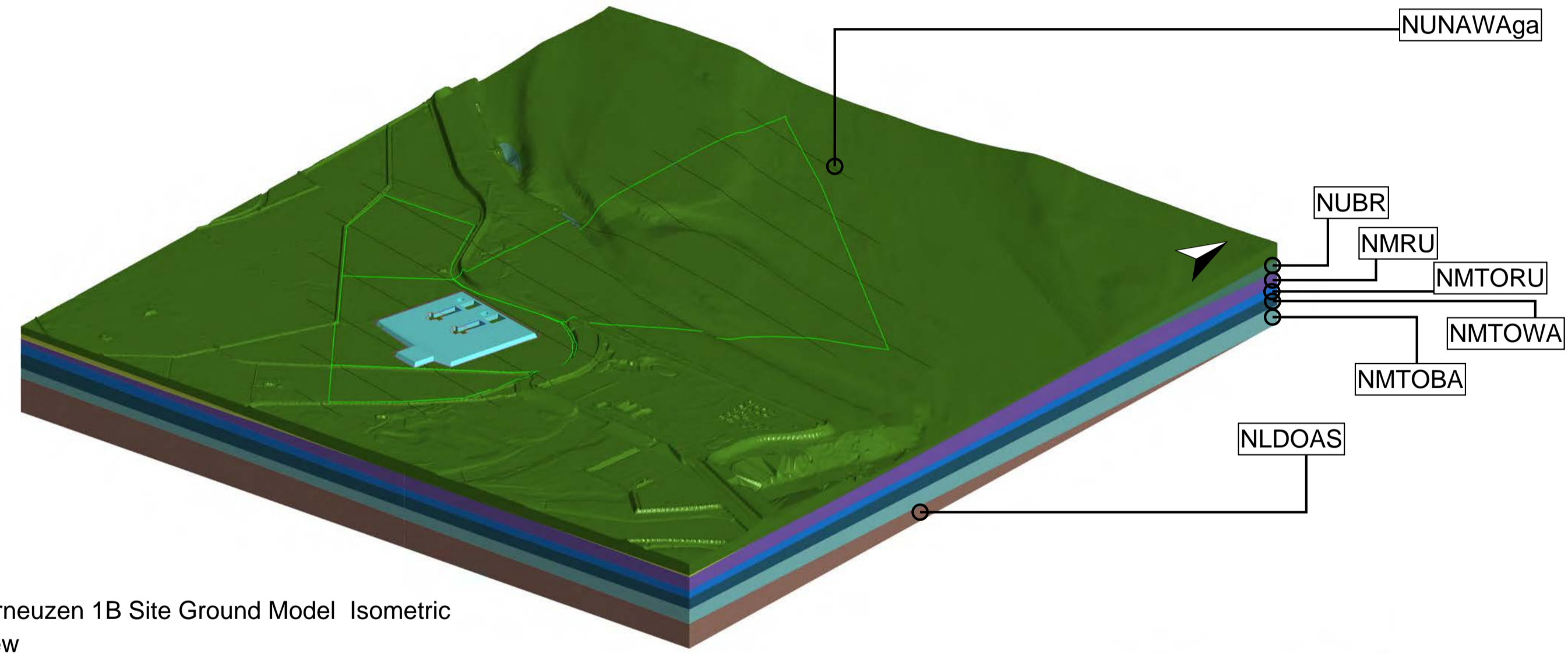
Terneuzen 1A

Scale: 1:11,000  
0m 500m

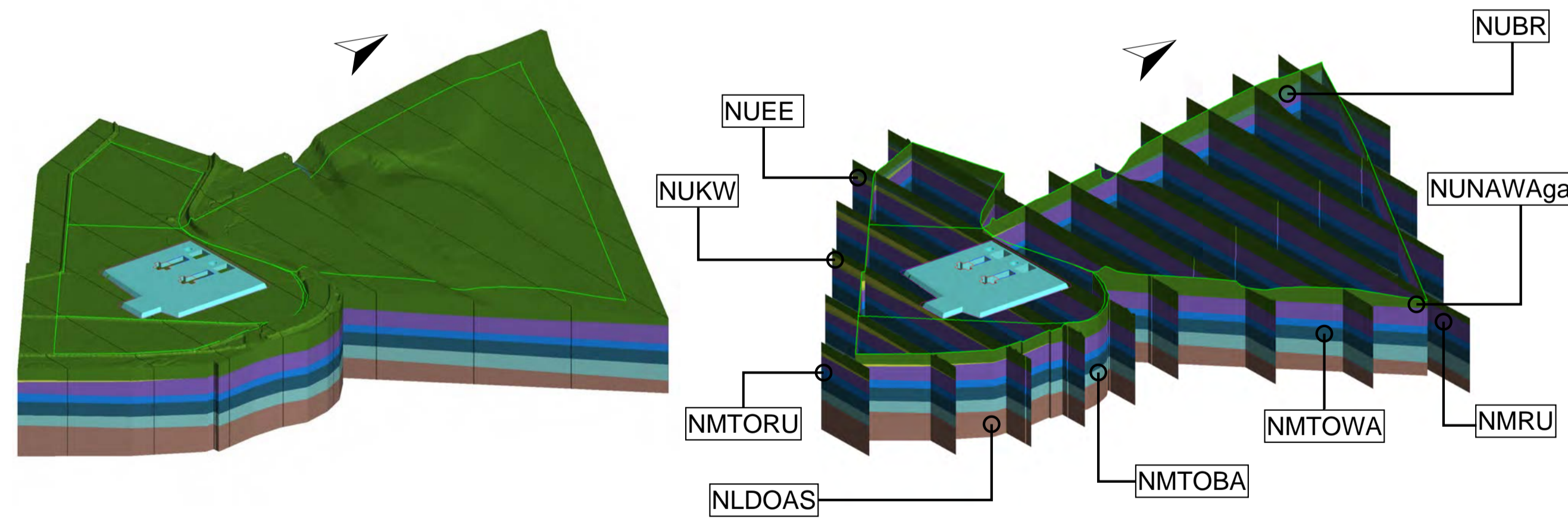
# Terneuzen 1B - Visualisation Pack



Aerial Isometric View

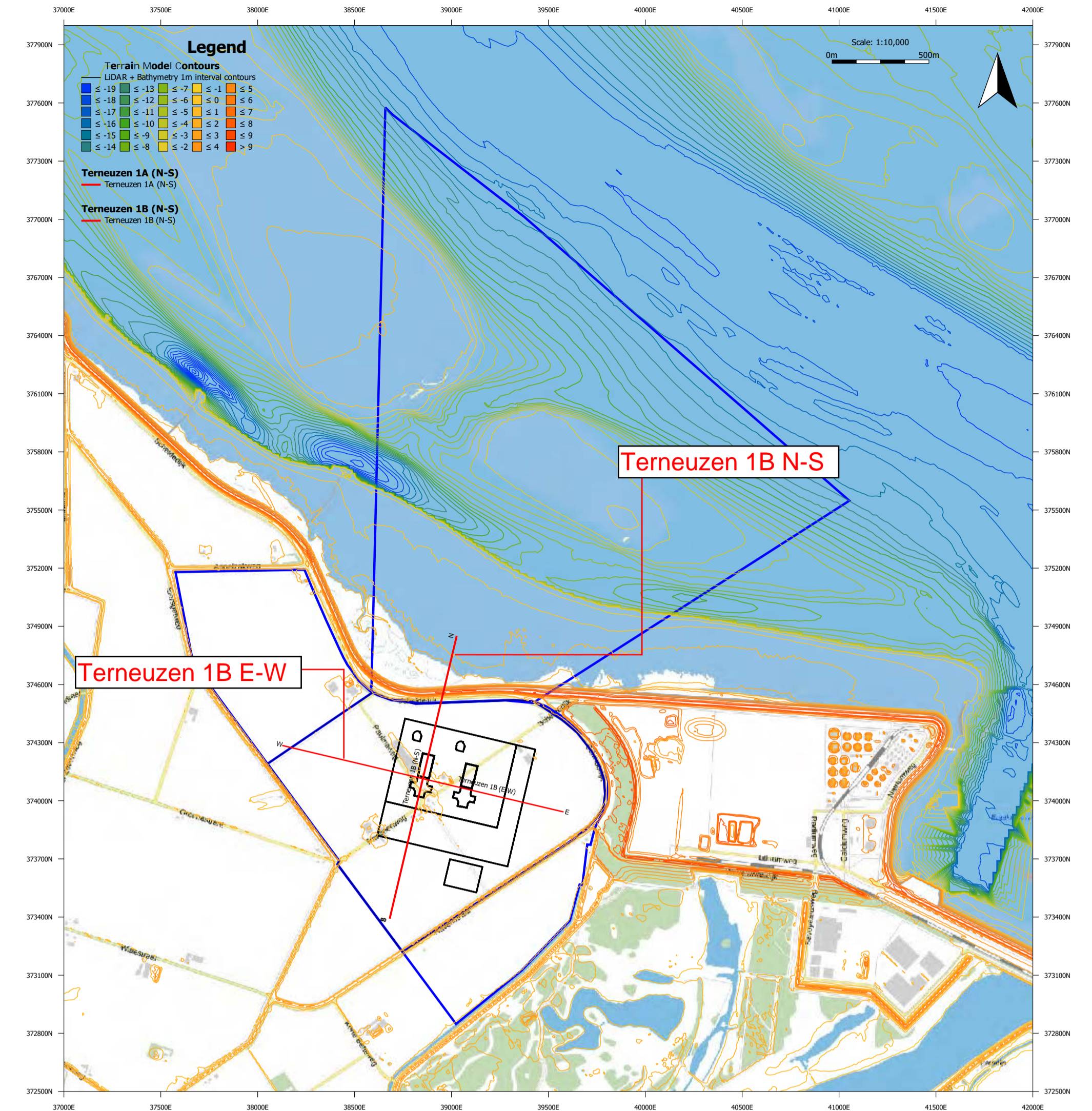


Terneuzen 1B Site Ground Model Isometric View



Terneuzen 1B Site Boundary Ground Model Isometric View

Terneuzen 1B Site Boundary Fence Ground Model Isometric View

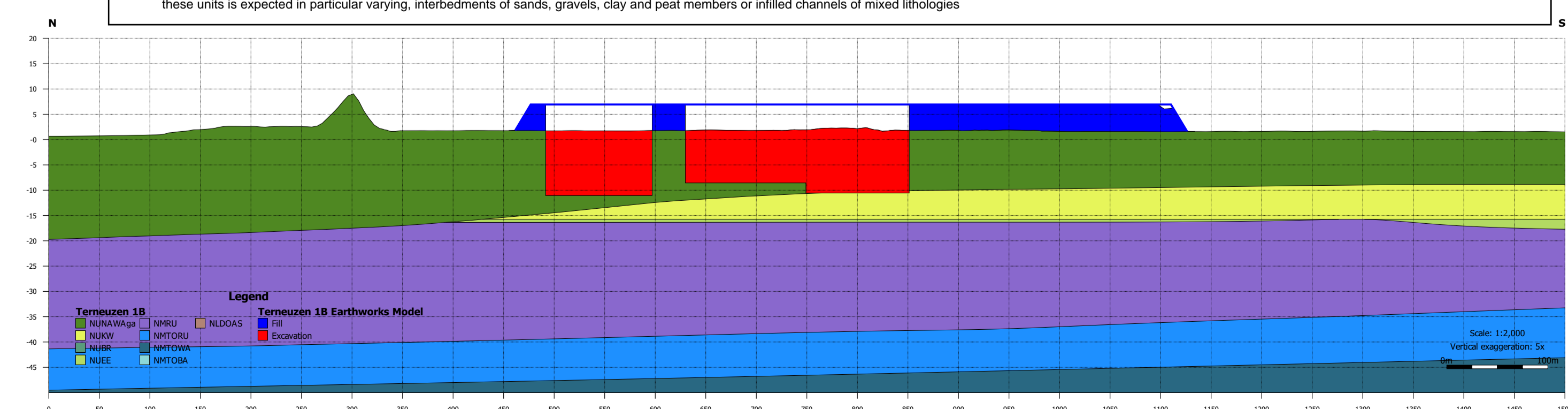
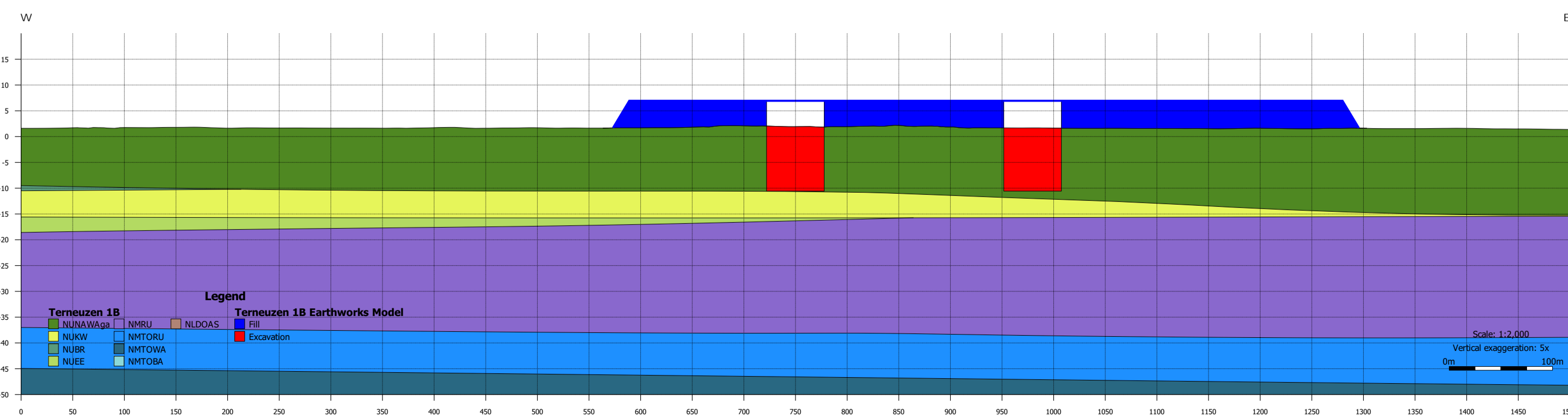


Geological Code	Formation Name	Description	Depth Top (m bg)	Depth Base (m bg)	Elevation Top (m NAP)	Elevation Base (m NAP)	Thickness (m)
NUIAOP	Anthropogenic sand	Reworked sand used as engineering fill for land reclamation. Has thin clay layers too	n/a	n/a	n/a	n/a	n/a
NUNAWaGa	Tidal sand (channel infill)	Loose and medium dense sands, may be prone to liquefaction	0.0	12.5	2.2	-10.4	12.5
NUNI	Nieuwkoop Formation	Brown to black peat and other organics	n/a	n/a	n/a	n/a	n/a
NUBX	Boxtel Formation	Light yellow to dark brown very fine to medium sand, silty, some peat and gyttja layers	n/a	n/a	n/a	n/a	n/a
PT	Various	Undifferentiated peat horizons	n/a	n/a	n/a	n/a	n/a
NUKW	Koewacht Formation	Greenish grey to light brown fine to medium sand, slightly silty with local shell grit. Generally fining upward	12.5	17.9	-10.4	-15.8	5.4
NUUE	Eem Formation	Grey fine to medium sand, some clay and silt	17.9	18.5	-15.8	-16.3	0.6
NUBR	Breda Formation	Greyish to blackish green very fine to medium sand, silty	n/a	n/a	n/a	n/a	n/a
NMRU	Rupel Formation	Dark brown-grey silty clays, rich in pyrite (Part of NM - Middle North Sea Group)	18.5	40.1	-16.3	-37.9	21.6
NMTORU	Ruisbroek Member	Alternating sand and clay layers - noted to have glauconite in Terneuzen report (presumed to be coarser sand as part of NMTO)	40.1	48.5	-37.9	-46.4	8.5
NMTOWA	Watervliet Member	Alternating sand and clay layers (presumed to be coarser sand as part of NMTO)	48.5	66.0	-46.4	-63.9	17.5
NMTOBA	Bassevelde Member	Alternating sand and clay layers (presumed to be coarser sand as part of NMTO)	66.0	81.2	-63.9	-79.0	15.2
NLDOAS	Asse Member	Dark-grey, green and brown, slightly calcareous clays, with an intercalated, glauconitic sand to sandstone body, which grades distally (north and northwest) into a marly unit. The lowermost part of the formation is characterised by tuffaceous clays and silts and is fine-grained (63-210 µm) sandy in a proximal position (mid and southern part NL).	81.2	Not proven	-79.0	Not proven	Not proven

n/a Geological Unit not initially expected immediately beneath the proposed Nuclear Island location

Notes:

- To be read in conjunction with Work Package 6: Multi-site Preliminary Technical Evaluation for the Construction of Earthworks Platforms.
- Topography generated from the Actueel Hoogtebestand Nederland (AHN) dataset. Resolution has been reduced to 5m for modelling efficiency. Bathymetry generated from Deltares based on Netherlands Hydrographic Office (NLHO). Site boundaries are based on GIS information provided by Deltares.
- Initial geological interpretation based on TNO - GDN (2025) BRO GeoTOP v1.6.1. TNO geological model.
- The geological detailed interpretation is based on Deltares detailed geological sections.
- Conceptual ground model depths, elevations and thickness expected at the nuclear island location, based on the interpretation of the geological model, high variability is expected outside the area.
- There is limited verification that can be undertaken on the historical ground investigation data and the varying levels of detail that has been used by the Geological Survey of the Netherlands and Deltares
- The continuity and variability of ground model units between exploratory holes is unknown. Although there is a relatively high confidence in the lateral extent of the broad Geological Units defined in Deltares interpretation reports, variation within these units is expected in particular varying, interbedments of sands, gravels, clay and peat members or infilled channels of mixed lithologies



# Terneuzen 1B Earthworks Long Section (N-S)

