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Swansea Mumbles Road Development

Phase 1 Preliminary Study

Phase 1 Preliminary Study for Swansea Mumbles Road Development



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1. Introduction.

The Swansea Mumbles Road development site is set for transformation into a five-storey hotel, bar, restaurant, and conference centre. This Phase 1 preliminary study provides a comprehensive evaluation of the site's historical background, the environmental context, and geotechnical considerations. Recommendations for site investigation and foundation design are proposed to ensure the development's feasibility and to promote sustainability. Particular emphasis is placed on environmental safeguards and community engagement, addressing both the challenges and opportunities posed by this ambitious and prestigious project.

The proposed development will serve as a cornerstone for enhancing the local economy, through contributing to tourism and subsequently creating employment opportunities. By prioritising compliance with environmental regulations and good practice, and engaging the community, this project aims to set a benchmark for sustainable urban redevelopment.

Environmental challenges such as flood risks, potential contamination, and the impact on local ecosystems have been thoroughly considered. The recommendations outlined in this study are designed to ensure long-term stability, safety, and alignment with Swansea's broader regeneration goals, recognising the identified need in Swansea for additional hotel accommodation, attracting a corporate as well as tourist clientele.

2. Historical Background of the Site.

2.1 Historical Land Use.

The Swansea Mumbles Road site, which is currently occupied by a Tesco store and parking facilities, has gone through a number of significant transformations during the past two centuries. Archival research and historical records provide this timeline of development:

19th Century: Ordnance Survey maps from the late 1800s show the area as undeveloped coastal land, characterized by sand dunes and salt marshes. Historical photographs from the Swansea Archives show low amount of residential dwellings and a rural landscape, showing its natural coastal environment. The area was mainly used for agricultural purposes and coastal activities such as fishing and walking. The natural beauty of Swansea Bay attracted occasional visitors for its future as a recreational destination.

Early 20th Century: Urbanization began with infrastructure development, including the construction of a railway line giving access to the Swansea Bay coastline. Small-scale commercial activities started to emerge during this time, but the area remained mostly residential and recreational. The development of transportation links significantly increased the accessibility of Swansea Bay, fostering early tourism and contributing to a slow gradual shift from agrarian use to mixed residential and commercial development. Historical accounts also highlight the area's role in supporting the rapidly developing coal trade, which highly influenced the regional economy.

Post-War Period: After World War 2, urban expansion grew. By the 1970s, the site had transitioned into a mostly commercialised zone. Undergoing a construction of the Tesco superstore and its car park represented a response to the big retail increase of the era. Photographs from this time highlight the large change in land use, as open spaces and smaller structures gave way to large-scale commercial development. This transformation mirrored broader trends in post-war Britain, where urban centres changed to fit to the modern consumer demands.

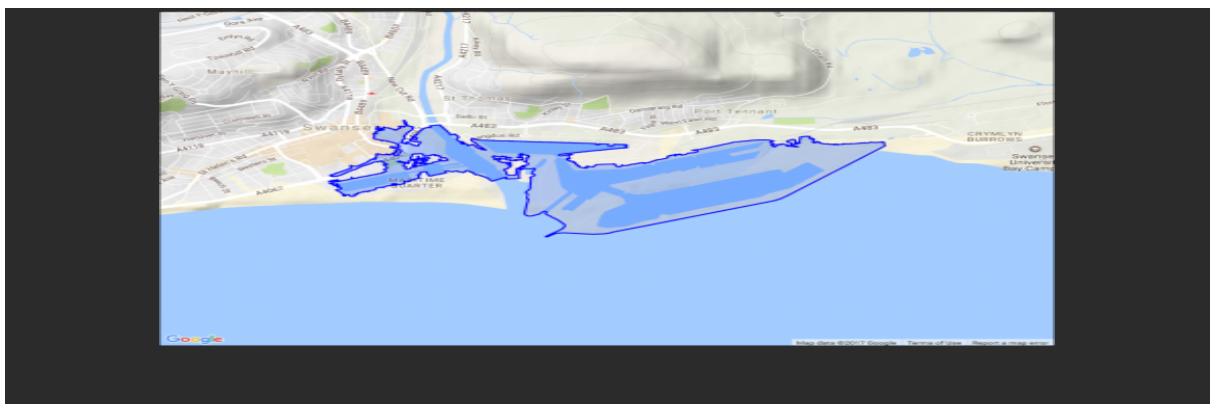
Recent Developments: The LC2 entertainment building and nearby regeneration projects have largely grown the area's appeal as a leisure and tourism location. The close proximity to Swansea Marina and other city-centre amenities has made the site an interesting point of interest for redevelopment opportunities. These developments show Swansea's ongoing efforts to balance economic growth with cultural and environmental preservation, using its coastal location to attract investment and visitors.

2.2 Environmental Context and Geology

Topography: The site's topography is mostly levelled with a small rise in the direction of Swansea Bay. Concerns regarding the stability of the underlying soils are raised by archival data that indicates some areas of the land may have been reclaimed. Although the property is very accessible due to this topographical feature, careful planning is required to control drainage and limit the risk of flooding.

Geology: Carboniferous limestone bedrock is covered by thin layers of marine and estuarine sediments, based on data from the British Geological Survey. Although the bedrock provides a solid base, the superficial layers need to be thoroughly assessed for settlement worries and load-bearing abilities. The existence of marine deposits indicates the possibility of compressible soils, which, if ignored, could compromise the integrity of buildings. Seasonal changes in soil moisture content and possible groundwater interactions must also be taken into mind in geotechnical studies.

Flood Risk: Due to its proximity to Swansea Bay, the location is in a flood-risk area. Effective flood defences and drainage systems are crucial, according to an analysis of historical tide data and storm surge data. The importance of adding resilient designs into nearby developments is further increased by rising sea levels and weather patterns linked to climate change. Determining the severity of potential hazards and providing information for the construction of mitigation methods, such as potential flood defences and sustainable drainage systems (SuDS), will involve the analysis of flood data.



This graph by River Levels UK shows the major areas which are affected by flooding in Swansea. The area follows the coastline towards the University , and associated housing which is located near the sea.

2.3 Adjacent Developments and Infrastructure.

Key surrounding features include:

LC2 Entertainment Building: A major recreational area with lots of tourists.

Because of its near proximity, the new building must blend in well with the region's current tourism infrastructure. Working together with LC2 stakeholders could lead to collaborations that improve the site's appeal.

Residential Areas: Because of the nearby mixed-density buildings, construction noise and disturbance must be reduced. Maintaining community support will depend on making sure there is no impact on locals. To reassure local neighbours, measures including clear communication, set operating hours, and noise reduction techniques should be prioritised. In this case, promoting the "Considerable Contracting" program would be advantageous.

Special Sites of Scientific Interest (SSSI): The ecosystems of Swansea Bay require strict environmental protections throughout the development process. The area's ecological significance is made clear by its designation as an SSSI, which calls for precautions against habitat disturbance. By ensuring that thorough environmental impact assessments (EIAs) are undertaken, the bay's biodiversity will be considered and preserved. This will ensure the development's integrity with regard to ethical and legal regulations in respect of the area's ecology and environment through close cooperation with environmental authorities.

3. Recommendations for Detailed Site Investigation.

3.1 Key Components of the Site Investigation.

Geotechnical Assessment:

- **Borehole Drilling and Sampling:** Drilling boreholes deep enough to assess the bedrock buildings, identify the groundwater table, and analyse the stratigraphy of the soil will be crucial. In order to determine characteristics like strength, compressibility, and permeability, undisturbed soil samples must be gathered for laboratory analysis. The foundation design will be informed by the findings, ensuring compatibility with the subsurface conditions.
- **Cone Penetration Testing (CPT):** CPT provides continuous soil resistance profiles, offering high-resolution data on stratigraphy, relative density, and undrained strength. This method is particularly valuable in identifying weak soil layers and potential liquefaction risks, thereby complementing borehole data for comprehensive geotechnical analysis.
- **Plate Load Tests:** Plate load testing evaluates the bearing capacity and settlement behavior of surface soils. These tests simulate the loads that will be imposed by temporary construction structures and provide critical data for designing site preparations and temporary works.

Contamination Survey:

Samples of groundwater and soil must be tested for hydrocarbons, heavy metals, and other contaminants due to the site's past commercial use to recognise possible health risks ensuring remediation plans. Such safeguards for the environment and potential inhabitants must ensure compliance to BS 10175: Investigation of Potentially Contaminated Sites.

Hydrogeological Study:

- Groundwater flow, aquifer properties, and possible interactions along foundations should be explored. This also includes determining the depth to the water table, seasonal variations, and potential impacts of excavation on groundwater. Mitigating water ingress risks is critical to avoid structural issues and environmental harm.

Environmental Impact Assessment:

- Ecological surveys should identify protected species and habitats in the vicinity, including flora and fauna within the SSSI-designated Swansea Bay. Mitigation measures should include timing construction to avoid breeding seasons and implementing buffer zones to protect sensitive ecosystems.
- Baseline air and noise quality levels should be established to monitor and manage construction impacts. This includes deploying monitoring stations to assess compliance with local environmental standards throughout the project lifecycle.

3.2 Most Significant Elements

1. **Contamination Analysis:** Compliance with environmental regulations and safeguarding future occupants from hazardous substances is paramount. The contamination survey will advise any pollutants and suggest remediation, in line with regulatory standards and public health priorities.
2. **Flood Risk and Groundwater Management:** Detailed hydrogeological studies are important for designing effective drainage systems and flood defences. These measures will address surface runoff, tidal influences and groundwater intrusion, reducing risks to the structure and surrounding areas.
3. **Geotechnical Stability:** Determining the soil's load bearing capacity and settlement characteristics will be crucial for selecting and designing the foundations. By looking at the variability in soil conditions, the development can lower risks associated with differential settlement and ensure long-term stability.

3.3 Relevant Regulations and Codes of Practice

The site investigation must adhere to the following standards and guidelines to ensure best practices and regulatory compliance:

- **BS 10175:** Investigation of potentially contaminated sites, providing a framework for assessing and mitigating contamination risks.
- **BS 5930:** Code of practice for ground investigations, outlining procedures for site characterization and data collection.
- **BS 8533:** Flood risk management, focusing on sustainable design and risk mitigation strategies.
- **Building Regulations Approved Document C:** Site preparation and resistance to contaminants and moisture, ensuring the development is resilient to environmental challenges.
- **Considerate Constructors Scheme (CCS):** Guidelines for minimizing disruption to the local community, promoting sustainable and respectful construction practices.

4. Foundation Type Recommendations.

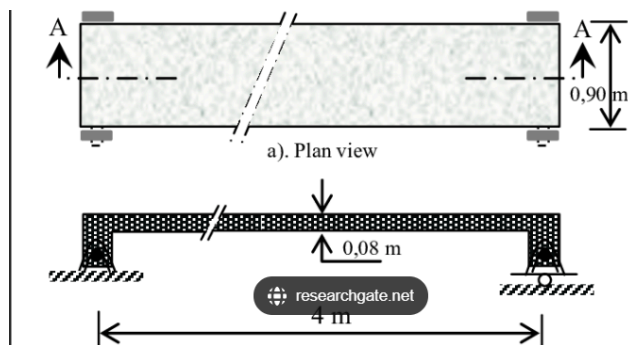
4.1 Justification for Piled Foundations.

Load-Bearing Capacity: The five-storey hotel, with 400 rooms, conference facilities, and public amenities, requires foundations capable of supporting significant loads. Piled foundations transfer these loads to stable strata, bypassing weaker superficial deposits.

Mitigating Settlement Risks: The variability of the site's superficial soils poses risks of differential settlement. Piles penetrating uniform, load-bearing layers mitigates these risks.

Flood and Groundwater Considerations: Piles provide stability in flood-prone areas by reducing the impact of hydrostatic pressures.

4.2 Justification for Reinforced Concrete Slab



Structural Stability: By distributing structural loads equally, an elevated foundation improves overall stability.

Flood Resilience: By managing surface water, integrated drainage systems may reduce the danger of flooding.

Cost-effectiveness: Although initially more costly, a combined raft foundation and building foundation method lowers long-term maintenance costs and flooding problems.

4.3 Supporting Drawings

Detailed drawings that could be used will include:

- **Geotechnical Cross-Sections:** Shows the depths of pile penetration, groundwater levels, and soil stratigraphy.
- **Foundation plan :** The reinforced concrete platform layout, pile placements, and pile cap are shown on this.
- **Drainage Integration:** demonstrating how the site drainage systems and the platform are connected.

Waste Management:

A comprehensive plan for managing waste will focus on reusing materials from the existing Tesco store. Structural steel, concrete, and other usable materials will be salvaged to minimize landfill waste and support sustainability goals. Contaminated soil will be handled carefully, complying with BS 10175 standards, ensuring safe disposal and/or treatment at licensed facilities. Establishing a sorting station on-site will make recycling easier and ensure compliance with environmental regulations.

Flood Mitigation:

Managing flood risks is an important part of this project's environmental plan. Sustainable drainage systems (SuDS) will be incorporated into the design to control surface water runoff. Solutions like permeable paving, green roofs, and bioretention areas will help water soak into the ground, easing pressure on local drainage systems. These features will also reduce the risk of flooding caused by storm surges and rising sea levels, protecting the site and nearby areas.

5.2 Social Considerations.**Considerate Contracting:**

Engaging with the local community is important to making positive relationships and lowering the disruptions caused by construction activities. Regular interactions and consultations with residents and businesses will be used to address concerns, provide transparency, and gather feedback from the public. Using a dedicated communication officer will ensure consistent communication and quick resolution of issues. Additionally, sensitive scheduling of noisy operations will demonstrate consideration to the community's needs and improve relations with the local community.

Access and Traffic Management:

To comply with Health and Safety regulations in and around the site, a detailed traffic management plan should be developed. The plan will prioritise lowering congestion,

mess and disruption caused by construction vehicles. Designated delivery hours and optimized routes for heavy machinery will be implemented to avoid peak traffic periods. Alternative pedestrian routes will be established to maintain public access to nearby needs such as shops, parks, and facilities. Clear signage and temporary crossings will enhance safety for pedestrians and cyclists.

Community Benefits:

The new development gives significant economic and social advantages for the Swansea community, leading to job creation in both the construction and operational phases which will boost local employment rates. Furthermore, the hotel's addition into the tourism infrastructure will attract visitors, improve the local economy, and highlight Swansea as a tourist destination. Community engagement initiatives, such as partnerships with local suppliers and training programs for workers, will ensure that the project delivers long-lasting benefits to the area.

6. Conclusion.

The Phase 1 preliminary study highlights the importance of a comprehensive approach to site investigation and foundation design for the Swansea Mumbles Road development. By integrating historical insights, geotechnical data, and environmental considerations, the study provides a basis for the project's next phases. Prioritising sustainability, community engagement, and compliance with relevant regulations will ensure the successful realisation of this development. The recommendations provided in this report aim to address potential challenges while considering opportunities for positive impact, allowing for a project that aligns with City and County of Swansea's vision for a vibrant and sustainable city.

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