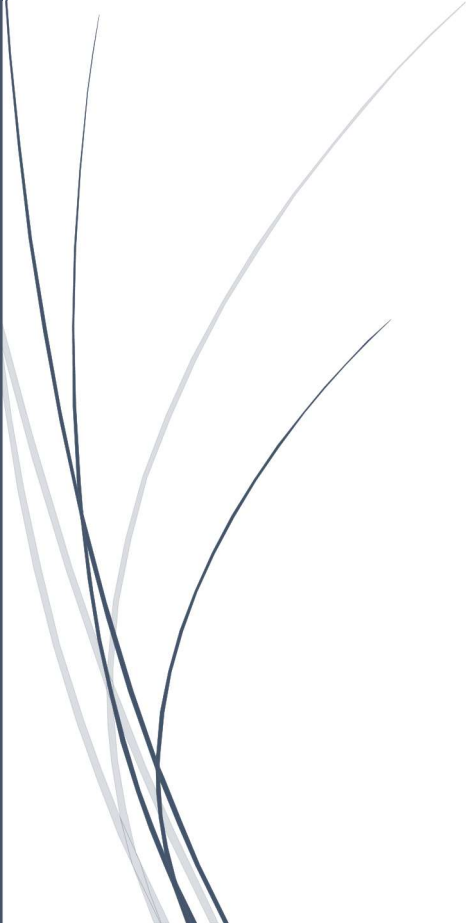


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1/25/2023

CIVILS OPTION B – PEDESTRIAN FOOTBRIDGE WITH MINOR HIGHWAY WORKS FEASABILITY REPORT

FEASABILITY REPORT

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Brett Thomas
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Project Manager
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SPRINGFIELD DESIGNS LTF

DOCUMENT RECORD

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Document Version – V0.1

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1. Introduction

1.1. General Information

With the continuing development and growth of the Prince of Wales Dock and its surrounding areas, a new pedestrian bridge is to be constructed from the Langdon Road roundabout to the Prince of Wales Dock. Currently to gain access between the two points mentioned above, it means a pedestrian walk of 750m taking approximately 9 minutes. The new proposed footbridge will mean this can be reduced to 150m taking approximately 2 minutes.

The moorings will look to further develop the area as a multi-use area and potentially bring further income into the University as the moorings can be hired out.

The feasibility study will ascertain through several initial assessments whether the practicality of the footbridge and additional works is a viable option.

The feasibility study will complete initial investigations which will look at the site location, any development constraints which can be linked to planning (planning consent, environmental issues, National resources Wales etc), the design specifications and initial design ideas for the client, estimates of cost of the programme, the phasing and length of the programme.

This information will be presented to the client with all findings, with feedback to be received at this early stage on design, programme, costings, and any other requirements. The development of the project will also be in accordance with BIM Level 2 which is the national standard.

1.2. Client Information

The client as part of the project has supplied the following information to the Design Team.

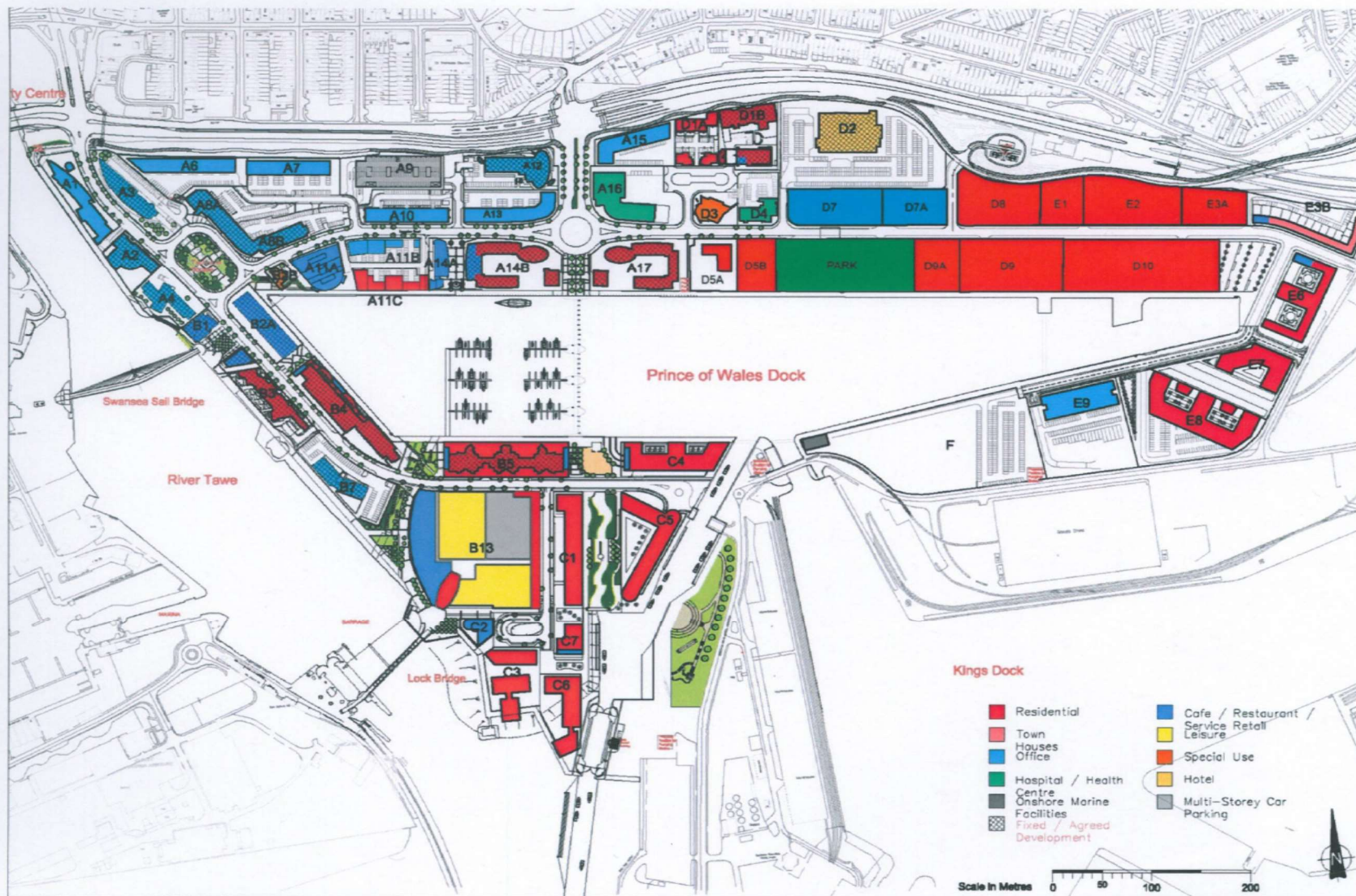
- Project AIR
- Project EIR
- Proposed Preferred Location
- Outline Brief

1.3. Outline Brief

The brief supplied by the client is as follows;

'To meet the desired access requirements of the pedestrian traffic anticipated within the new development, your company is required to provide road access at the Langdon Road roundabout (adjacent to Beacon Health Centre) to the Prince of Wales Dock, and a pedestrian foot bridge crossing

this dock from the plot site A14B to the plot B5. This bridge should be innovative in aesthetic and a landmark structure, it is also required to have a design inspired by the industrial heritage of the city. It is also required that this footbridge is illuminated at nightfall. You are also required to provide walkway-linked moorings for the berthing of 60 motorboats on the eastern side of this bridge, within the Prince of Wales dock.'



2. Site Location

2.1. Site Description

Existing site is located along the Prince of Wales dock, the dock itself is considered as a dry dock with the gate located near the end of Roberts Road (266926 192776) . The site is flanked by 2 carriageways, Langdon Road, and Kings Road.

Langdon Road is a currently a 2-way road with a width greater than 5.5m flanked on northern side by private ownership properties. As part of the levelling up of Prince of Wales Dock area the southern side of Langdon Road will see the construction of several businesses which will see the vehicle and pedestrian traffic within the area increase. The southern areas are currently utilised as car parking and hardstanding areas. (See Photos).

Kings Road is the current location for the University of Wales Trinity St David Swansea Campus currently housing the IQ Building, the YFforum (Library) and several blocks of University Accommodation and associated business premises. Along Kings Road on the south side is the University Campus Car Park which is currently owned by 3rd Party (this could be a location for a Welfare Compound depending on ownership negotiation). Due to the Universities location, and associated accommodation and business use the area is subject to large amounts of pedestrian foot traffic and vehicles with the road width being greater than 5.5m allowing for 2-way traffic flows.

2.2. Site investigations

There have been several boreholes carried out in this area. The boreholes shown on the map below were completed in 1880. Therefore, new boreholes and tests will need to be carried out with modern technologies to collect modern data. This would allow for a better understanding for ground conditions.



Based on the age of the construction of the Dock and the Boreholes, further investigations/tests will need to be completed to determine the chemical properties of the ground. Based on the history in terms of the industrial works in the area, an assumption can be made that there will be some contamination in the ground.

Historical maps have been obtained showing the development of the dock, and can be found on the shared team's page.

2.3. Site Investigation

Initial Site Investigation will be carried out via the below;

- Desk Study
 - Utility Information
 - Land Registry
 - Highway Boundary investigation
- On Site Investigation
 - Topographical Survey of existing site features at Langdon Road and Kings Road.
 - On site walk over investigation

Site investigations Required

- Boreholes to test ground conditions.
- NRW to assess the dock for potential environmental implications.

2.4. Site Photos

Upon completion of site investigation, the below photos were taken showing the existing site.

Langdon Road – North



Figure 1 - Existing Car Park/Hardstanding Area - East of Vehicle Access



Figure 2- Langdon Roundabout



Figure 3 – Vehicle Access off Langdon Roundabout

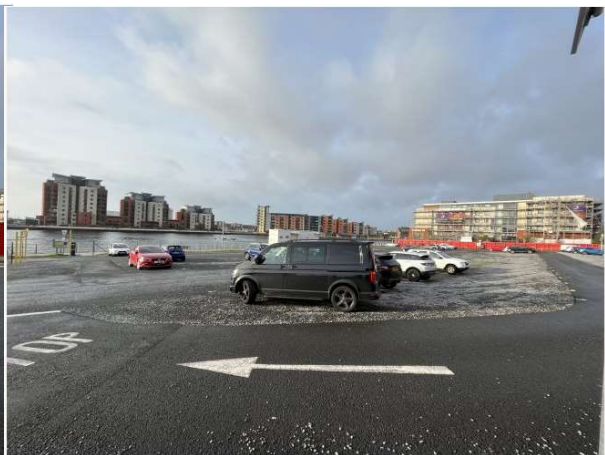


Figure 4 – Car Park/Hardstanding Area West of Vehicle Access

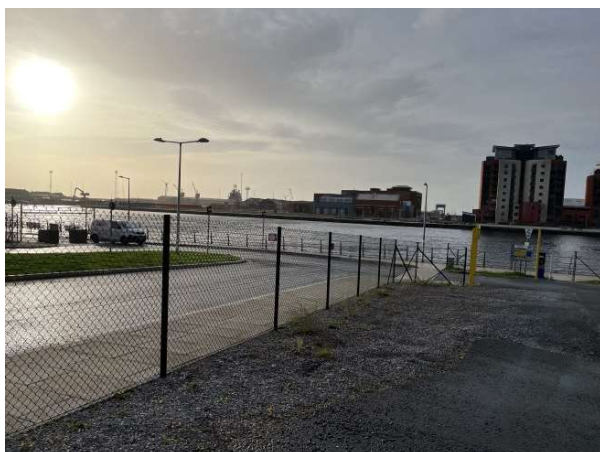


Figure 1 – Car Park/Hardstanding Area – Vehicle Access to car park



Figure 6 – Existing Vehicle Circulatory system off Langdon Roundabout



Figure 7 – Pedestrian footway adjacent to dock wall



Figure 8 – Pedestrian Footway

South Side – Kings Road



Figure 9 – Side of building off Kings Road



Figure 10 – Kings Road Car Park



Figure 11 – Fence Line along Dock Wall- Image shows projected location of bridge



Figure 12 – Footway along Prince of Wales Dock



Figure 13 – Student Accommodation – Proposed Datum Location

2.5. Utility Information

Existing utility Drawings have been obtained. A drawing for Wales and West utilities (GAS), BT (Telecom), Dwr Cymru Welsh Water, and Western Power (Electric) have been obtained.

Looking at the drawings there will not be an issue with BT and Gas, although there may be an issue with Electric and Water. After the design has been finalised, it'll be essential to cross reference with these utility drawings to ensure no clash.

Based on the initial designs, there will not be a need to “tap onto” any existing services such as drainage or electric. The bridge will be self-draining, and lights powered with solar panels. If any changes to the design requires use of existing services, the correct process to do so will be completed.

2.6 Ecology Surve

A visual ecological survey has been carried out. There are no trees, grass, bushes or shrubbery in the area therefore, there will be no ecological implications when considering that. There may be implications due to working near a watercourse. Considerations will need to be made to protect the marine life. NRW will need to be informed and further investigations will need to be carried out to determine the scale of the extent of the measures required.

3. Site Constraints

The closest listed building is a tier-2 building at the western side of the dock which is the J-Shed Waterhouse, protected trees within the area are sparse and due to the nature of our works I do not believe there will be any involvement with protection orders on site. The dock retaining walls around the dock are listed grade II and need to be carefully considered during construction

The adjacent buildings on the north side of the bridge include the HMT Sancta Maria hospital which has a very modern design and is a new build that was developed in 2019-20. On the southern side we have the University of Wales Trinity Saint David SA1 IQ Campus and Student accommodation which are both new builds developed in 2018.

Planning consent from the Swansea council would be required due to planning permission from the UK Government for any development within towns and cities, we would have to submit an application to Swansea Council when we complete planning our build for them to approve it.

CADW will not need to be considered as our build is not in the vicinity of any CADW locations

Through previous ecology reports I have discovered that within the sea there is protected wildlife which include harbour porpoises, common dolphins, basking sharks, grey seals, leatherback turtles and sea birds. An archaeological desk-based assessment was made prior to the wider development of the SA1 Waterfront area commencing that indicate that archaeological remains are likely to be present in the application area which could present difficult development constraints, these include potential buried maritime archaeology, there is also a potential for buried prehistoric archaeology and potential buried inter-tidal archaeology

Foul water discharges must be drained separately from the site and no surface water shall be allowed to connect (either directly or indirectly) to the public foul sewerage system. Grey Water and

Sewage may not be discharged into the dock. Arrangements must be made for disposal to road tanker at a designated berth within the dock system prior to berthing or on departure. All disposals of sewage to shore must be disclosed on the waste return forms.

The services in the area are adequate due to drainage in the dock already existing, Feeder pillars for power are also in the area. There is also a need for utilities like rigging machines, platforms and lifts, generators and power-generating systems, and specialized tools and vehicles. Our bridge design also serves the purpose that it is intended and provides adequate service to pedestrians.

3.1. Highway Implications

Pedestrian and Vehicle Access must be maintained as part of the proposed brief. The existing footway is above minimum width requirements as outlined in design standards. As such minimal width capacity must be maintained during the design process.

The existing northern circulatory system is single file which is currently above design requirements for a single vehicle system. Langdon Road is above 5.5m width allowing for full access, Kings Road carriageway is above 5.5m allowing for 2-way vehicle flows.

Traffic management systems will need to be put into place to allow the proposed construction to take place, these systems will be placed in accordance with Chapter 8 (Traffic Management Regulations). Footway closures will need to be put into place to allow construction along the dock wall, there is currently alternative footway routes as such the placement of these systems will cause pedestrian disruption however is not envisioned to require additional measures except as those outlined in Chapter 8.

The SA1 Area has been in constant development for the past few years, the development has been a mix of commercial and residential builds. It has provided around 2,000+ new apartments and houses, business/offices, commercial leisure, there has also been hotel development, institutional facilities, and the planned construction of an onshore facility called the tidal lagoon. We will need to be mindful towards specific development during construction due to proximity like the development of private hospital HMT Sancta Maria, the new lock tidal basin connecting the Prince of Wales Dock directly with the River Tawe, the Discovery Leisure Quarter, with a multi-storey car park is also being part of the plan. a range of office developments and housing on King's road and a 645-bedroom student apartment complex. Thankfully it is predicted that none of these will clash with our project, so we won't need to be too cautious.

3.2. Contractors Site Compound

Proposed Site Compound would be as below;

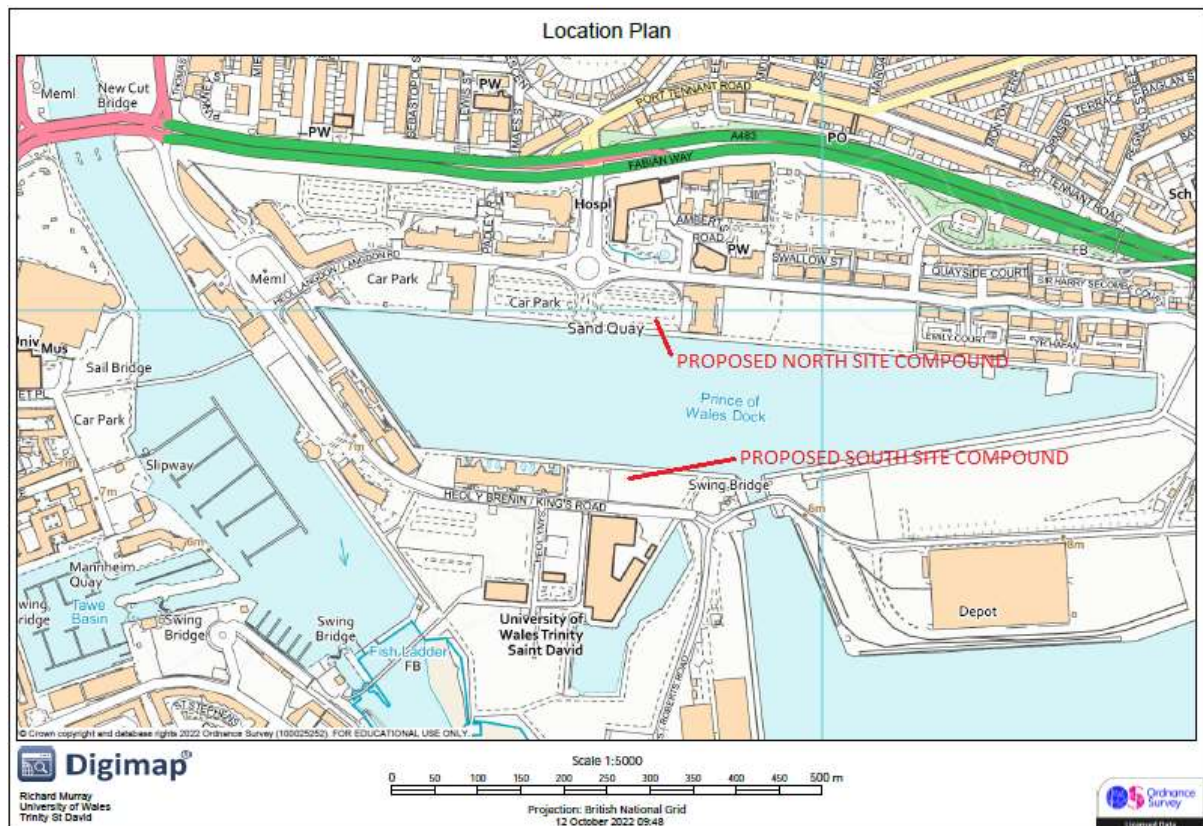


Figure 13 – Possible Site Compound

North Site Compound

Proposed northern site compound would utilise the existing hardstanding area located east of the existing vehicle access off Langdon Roundabout, this would allow easy access to the site. However, the car park is surrounded by chain link fencing. The fencing should therefore be removed to allow easy access to the proposed construction site.

Additionally, the existing access to the site would be through the proposed minor highway works off Langdon roundabout, a recommendation would be to create a temporary access to the site compound along Langdon Road involving removal of fence line and installation of temporary ramp facilities for the existing 125mm Half Battered Kerb line.

This area is also not publicly owned, as such additional site investigation would be required and negotiation with landowner would need to be considered with possible financial or accommodation works requiring to be carried out depending on results of negotiation.

South Compound

Proposed south compound would be directly adjacent to the proposed site with existing access shown in Figure 10. The height restriction would need to be removed with additional barriers (Harras Fencing or Banding) utilised along edge of site compound. Access would be provided from Kings Road with sufficient width to allow construction machinery to access the site.

Large vehicles utilising the site would need to make sure of Kings Road junction with Langdon Road or crossing A483, as A483 is a busy major road delivery of bridge base would need to be programmed to be during quiet period (i.e., outside of rush hour).

This area is also not publicly owned, as such additional site investigation would be required and negotiation with landowner would need to be considered with possible financial or accommodation works requiring to be carried out depending on results of negotiation.

4. Design Specification

4.1. Design Specification

From the brief the main components of the pedestrian bridge are as below;

- Pedestrian Footway/footbridge connecting A148 to Plot B5 – Width must be suitable to allow pedestrians to utilise footway/footbridge
- Road Access from Langdon Roundabout
- Night-time Illumination to be provided
- Walkway linked moorings for berthing of 60 motorboats
- Bridge should be innovative in aesthetic and a landmark structure with design inspired by the industrial heritage of the city.
- Note – With Welsh Government development of Active Travel links, ensuring that the footbridge is compliant with Active Travel Wales will provide future proofing for the scheme, as such this will be considered during the design process.

Element	Sub Element	Specification	Ref
Carriageway	Existing geometry	Existing carriageway has a combination of freestanding and retaining walls, a building at Point X having the boundary of the building.	
		Point A = 4.492m	
		Point B = 3.284m	
		Point C = 3.760m	
		Point D = 3.607m	
		Point E = 4.140m	
		Point F = 4.132m	
	Clearance	Clearance off street furniture is noted as being between a maximum of 600mm and a minimum of 450mm. in order to ensure that any vehicle that drives down the carriageway has a factor of safety off any structural component. The recommended distance will be 500mm.	Guide to siting and specification of street furniture 2001
		Due to horizontal curvature this may fluctuate, as such 600mm will be the upper maximum with 450mm being the absolute minimum clearance. (For horizontal curvature standards see design sheet).	CD109

	Width	The carriageway is a single-track road, as such the minimal width is recommended as 2.750m as outlined in Manual for Streets	Manual for Streets
		However, if wider vehicle turns down the road this would take some of the factor for safety. As such a recommended minimum width of the carriageway will be 3m in addition to the factor of safety Clearance.	Manual for Streets
		Proposed width of carriageway (with safety buffer/strip) >3.45 but <3.6	
Langdon Roundabout	Existing geometry	Existing vehicle access off Langdon Roundabout width is as below	
Vehicle Access		5.9m 5.9m	
		The carriageway off Langdon Roundabout is part of the access/exit arm of the roundabout, as such the system is a single circulatory system, as such having a wide carriageway would encourage high vehicle speeds and overtaking. Recommendation to reduce carriageway width.	
	Proposed	Manual for streets advise a width of 2.75 for a single track carriageway and a minim of 4.1 for 2 way traffic. Due to the above an absolute minimum of 2.75m is acceptable, however due to the nature of the carriageway this should be increased to a minimum of 3m due to larger vehicles (i.e. buses to accommodate turning and additional margin of safety.)	Manual for Streets. p80
Pedestrian Access	Existing Footway along Langdon Road	Existing Footway within area is; 2.1 2.15 2.75	
		From the above the width of the footway is more than 2m.	
	Proposed	Wide footways are normally utilised where high pedestrian flows are expected, or where joint use (i.e. Shared Use Paths) are expected to be utilised, Manual for streets	Manual for Streets. P.69

		indicates that absolute minimum of 1.5m is acceptable to allow a walker and buggy to pass. Due to the expected pedestrian flows a wider footway will be accommodated, a absolute minimum of 1.8m, will be adopted,	
	Proposed	Minimum width to be retained at 1.8-2.5m depending on use of site. As proposal being built to account for Active Travel conditions a minimum width of 2.5m for a Shared Use Path (SUP) will be utilised.	Active Travel Wales
Carriageway Width	Existing		
	Proposed	As carriageway is single access suitable deflection splay is required at entry/exit points to the roundabout. Carriageway widths will be maintained at minimum of 3.4m at entry/exit arms of roundabout.	
		Single circulatory route around area will be maintained at minimum 3m allowing for single file circulatory system.	
Vehicle Parking	Existing	Parking at Langdon Roundabout is currently achieved by 2 parking areas each privately owned.	
	Proposed	Short stay vehicle pick up and drop of parking areas proposed to be incorporated into proposal to reduce congestion on Langdon Road, this in turn will allow vehicles to pull into single circulatory system, drop off pedestrians then continue round.	
		Width of proposed Parking areas as outlined in Traffic Manual Guidance = 1.8-2m.	Traffic Signs Manual Chapter 5
		Greater width of parking area will be accounted for of 2m allowing for larger vehicle sizes and accounting for parking tolerances for road users with safety clearance.	
Proposed Footbridge Access	Existing	No Footbridge Access is present	

	Proposed	Water Level within Harbour is often high, this will result in a bridge with a moveable deck to allow boats to traverse the dock and utilise the moorings. Suggested to utilise ramp access at Dock Wall to raise projected bridge providing a raised centre point.	
		Ramp access will be in accordance with inclusive mobility standards to ensure compliance with disability regulations	
		1:20 ramp	
Retaining Structure	Retaining Wall	Small dwarf retaining structure will need to be constructed to provide structural support for ramp on approach to bridge.	
Footbridge	Proposed width	Width of footbridge should account for future use.	
		Pedestrians = 1.8	Manual For Streets
		Cyclists =2.5 (SUP)	Active Travel Wales
		Construction of bridge deck at 2.4m would allow for the creation of a SUP bridge, however this width if utilised by a cyclist would not be inclusive for pedestrians utilising the footbridge at the same time.	
		Recommendation is that footbridge utilises segregated pedestrian and cycle sections with SUP for cyclists and dedicated pedestrian facilities, this in turn will create a wider section allowing for greater pedestrian capacity and allow for inclusive and future proofing for Active Travel standards	
		Nominated Width =2.5	
Night time Illumination		Due to location of bridge mains powered lighting could be used, this would however add an ongoing cost to the bridge in the form of electrical charge.	

		Solar Lighting could be utilised with would add cost and maintenance of Solar Panels to be project.	
	Proposal	Utilisation of low-level, low-cost mains into proposed architecture of proposed bridge.	
		Acrospire Rail Light to be utilised where available (or similar)	Acrospire – Rail Light
		Acrospire Defender Solar Lights to be utilised along bridge to provide night-time illumination to moorings (or similar)	Acrospire Defender
Moorings	Access	Access to moorings must be securable.	
		Propose to use electronic lock/fob system for door. Access control system as shown in https://doorentryonline.co.uk/acatalog/Access-control-kit-18.html	
Bridge Design and Aesthetic		See below	

4.2. Bridge Design

Aesthetics' and Landmark Structure

Due to the requirement for the bridge to have a cultural link to Swansea, be aesthetically pleasing, and be a landmark structure, additional research has been carried out into the history of Swansea.

Swansea has a long history of copper excavation, utilising industrial processes to process copper as such Swansea can gained the name Copperopolis.



Figure 14 Gregory. R (2021) Work Progresses on Hafod –Morfa Copperworks Site

Due to copper being important to the Swansea identity the proposed bridge construction should utilise copper within the design. A proposal would be to utilise Copper as a form of cladding, however as indicated above in the Copper works utilising the large wheel system or Cog may also be applicable.

Utilising the appearance of copper within the development of the site has also been recently tried and utilised through the recent development in Swansea with the Copr Development as shown below. Copper cladding was utilised on the building shown in figure 15 and utilised to great effect on the bridge shown in figure 16.



Figure 15 Sheehan. D (2022) Copr Bay welcomes the new Swansea Arena



Figure 16 BBC (2021) Swansea landmark bridge lifted into place

Proposal

Utilisation of the copper could be utilised as a cladding, (as shown in figure 15), however it would be of better use if this material could be incorporated as a structural feature within the proposed footbridge. This structural feature could provide longer maintenance and prolong the life of the bridge.

Due to this we would propose to utilise a Copper-nickel alloy as outlined by Mark. L (2015) which has been previously used on Garden Bridge at Heatherwick, this copper-nickel alloy will be applied as a coating to the exposed steel work and concrete supports providing it with a maintenance free 120-year life, which in turn will provide protection from weathering.

Vertical Clearance

As indicated in the design specification the vertical clearance of the bridge is an issue, as the water level within the Prince of Wales dock does not allow for large (10m high masts) to pass underneath the bridge, as such a design consideration must be made to accommodate this.

This feature will form the main difference between the nominated bridges as this design consideration is addressed as indicated below;

1. Vertical Lift Bridge

A vertical lift bridge is a typical truss style bridge with a feature which allows a section/or the full bridge to lift under power, this allows for the bridge deck to be typically near water, then raised to allow boats to travel underneath. Typically, this requires large motors and extensive motors, however due to the proposed footbridge only requiring supporting its own weight, this system to be utilised to lift a small section of the proposed bridge.

An example of a vertical lift bridge is shown below;



Figure 17 Horgan. R (2019) Exclusive | TfL wants to build world's longest vertical lift bridge across Thames (Photo).

2. Tilt Bridge

A tilt bridge is a helical or curved bridge which is connected to large motors. When a vessel needs to utilise the bridge the system 'tilts' the bridge decking. This tilt system allows for the clearance height to be accommodated via the use of the designed curvature of the bridge.

The most famous tilt bridge the Gateshead Millennium Bridge is an example of this. This system utilised a cable splayed system with the large steel support providing a counterweight to be the bridge.

This system could be utilised at the central 'apex' of the bridge; however, this would require additional steel on site or a curved system as well as large complex motors to be installed on concrete supports within the area of the Prince of Wales Dock.



Figure 18 The engineer (2013) Gateshead Millennium Bridge – A Bridge That Rotates

5. Estimates

Bridge Works

$$\text{Footbridge} = £4100 \times 816(\text{m}^2) = £3,345,600$$

per m² of deck maximum span between piers or abutments; include for the works described to the bridge decks and abutments, but exclude any approach works

Rate acquired from Spon's chose to go with higher band of estimate due to the expensive material chosen in the design.

Tilt & Vertical lift designs to be priced by specialist contractor at later date.

Approach works

$$\text{Roadworks} = £3700 \times 15(\text{m}) = £55,500$$

Tarmacadam or reinforced concrete roads, including all earthworks, drainage, lighting, signs, fencing and safety barriers 7.30m wide two-lane carriageway

$$\text{Tarmac Footpath} = £100 \times 50(\text{m}^2) = £5000$$

Tarmacadam paving two layers; limestone or igneous chipping finish paving on subbase; including excavation and type 1 subbase

$$\text{Granite Footpath} = £180 \times 20(\text{m}^2) = £3600$$

granite setts on 100mm thick concrete subbase; including excavation; pointing mortar joints

$$\text{Zebra crossing} = £25,000(\text{number}) \times 2$$

Costs include road markings, beacons, lights, signs, advance danger Signs.

TOTALS

BRIDGE WORKS = £3,345,600

APPROACH WORKS = £114,100

TOTAL (x WALES REGION FACTOR 0.86) = £2,975,342

6. Proposed Project Programme

6.1. Programme

The below programme has been developed and broken down to show high level information of the proposed programme. The programme will include some specific milestones of the project and discussion around phasing of the works may be discussed around these milestones.

- ❖ **Initiation Phase** – Initial meetings around the proposed project between the client and the team – 05/10/2022 - 01/11/2022 (4 Weeks)
- ❖ **Design Development and Planning** – Information gathering around the site, planning permissions, planning issues, development constraints, cost estimations, the design options for client review, feasibility report completion – 02/11/2022 - 25/01/2023 (13 Weeks)
- ❖ **Technical Design** – Following feasibility report and feedback, the technical design will be produced – 26/01/2023 - 31/03/2023 (10 Weeks)
- ❖ **Sub-Contractor Appointments** – Specialist Sub Contractor Tender / Appointments – 01/04/2023 - 03/07/2023 (12 Weeks)
- ❖ **Procurement** – The procuring of materials and planning on long lead items 01/06/2023 - 14/07/2023 (6 weeks) - Phasing Option 1
- ❖ **Construction Phase**
 - Site Set Up – Welfare units, compound, hoarding, site security, equipment, and materials 03/07/2023 - 02/08/2023 (4 Weeks)
 - Initial Investigations – Trial holes on embankments to confirm any other utilities etc 03/08/2023 - 10/08/2023 (1 week)
 - Specialist Marine Piling – Sheet Piling Construction – 03/08/2023 - 30/09/2023 (8 Weeks)
 - Approach Work preparations – Clearance and groundworks for approach works – 03/08/2023 - 30/09/2023 (8 Weeks)
 - Tower/Pier Construction – Tower Construction – 01/10/2023 - 22/12/2023 (12 Weeks)
 - Utility Connections for Power – 01/10/2023 - 14/10/2023 (2 Weeks) -
 - **** Christmas Break**** 23/12/2023 - 08/01/2023
 - Bridge Deck Construction – delivery and installation of the bridge decks 08/01/2023 - 30/03/2023 (12 Weeks)
 - Movement and Power Installation for Bridge Deck – 01/04/2023 - 30/05/2023 (8 Weeks) - Phasing Option 2
 - Mooring Access and moorings construction – 01/04/2023 - 30/05/2023 (8 Weeks)
 - Construction of Entrance Vehicle Access on Langdon Road – 01/05/2023 - 10/06/2023
 - Installation of drainage and services to Deck – 30/05/2023 - 10/06/2023 (2 Weeks)
 - Installation of Covering – 11/06/2023 - 25/06/2023 (2 Weeks)
 - Retaining wall and access ramps approach works – 11/06/2023 - 25/06/2023 (2 Weeks)
 - Solar Installation to covering and walkways – 26/06/2023 - 02/07/2023 (1 Week)

- Final Installation of Footway and Markings on Bridge – 02/07/2023 - 09/07/2023 (1 Week)
- CCTV and Security Access for Moorings Completion – 10/07/2023 - 14/07/2023 (4 Days)
- ❖ Snagging/Float – 15/07/2023 - 31/07/2023 (2 Weeks)
- ❖ Handover/Completion - 01/08/2023 - Final Payment – 3% Retention

The programme above is high level and some activities have taken into consideration some aspects of high-risk activities. These activities have had additional time added to the activity to allow for these.

For example,

- ◆ Location – due to the location on the dock and risk of adverse weather conditions additional float has been built into some of the activities to allow for down time due to poor weather conditions.
- ◆ Marine Life – there may be a requirement to have watching briefs from the NRW when works are ongoing within the dock area.
- ◆ External Utilities – delays on site regularly occur due to external utilities etc.

The scope currently has no weekend working and the full Christmas break. Dependant on the programme there are sufficient areas to make up any delays on site if required.

Comparisons were made on the two options of the bridges in terms of the programme.

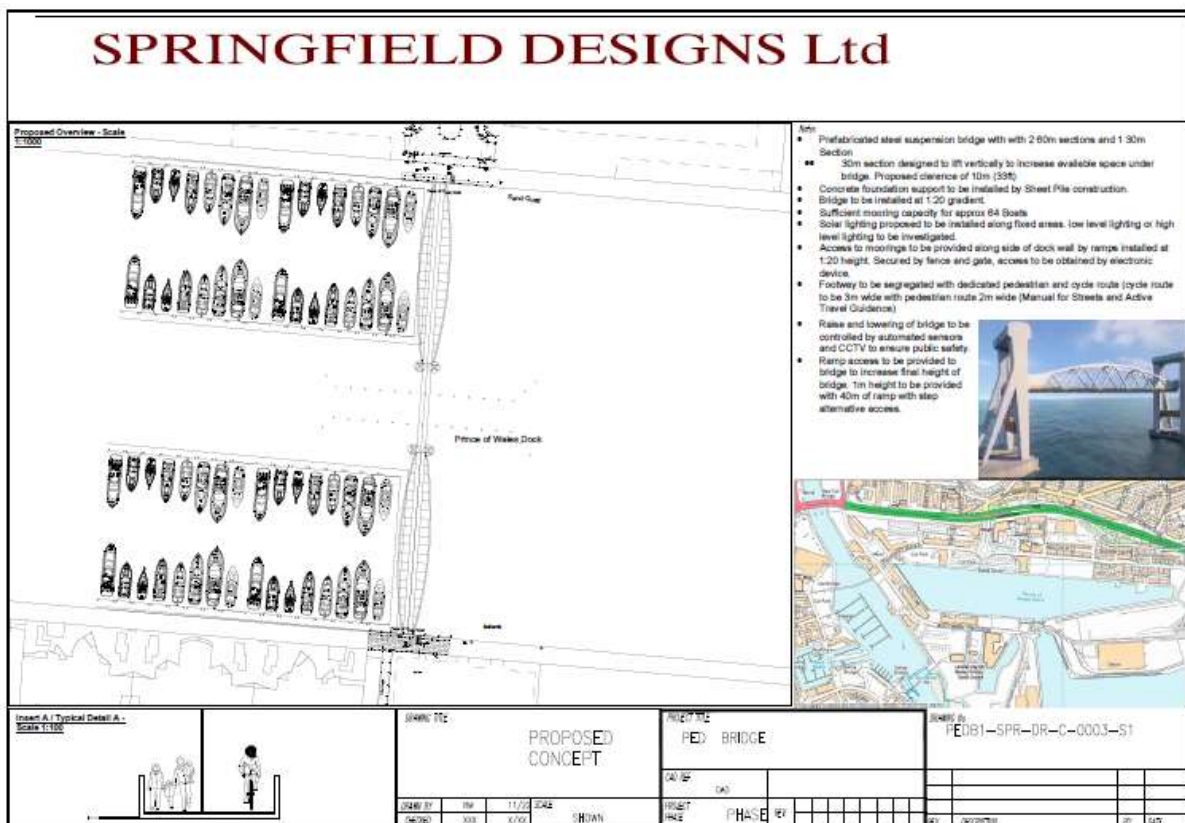
There would be minimal difference in the terms of programme as reduction in some construction processes on the tilt bridge would be gained in some other activities on the vertical lift bridge.

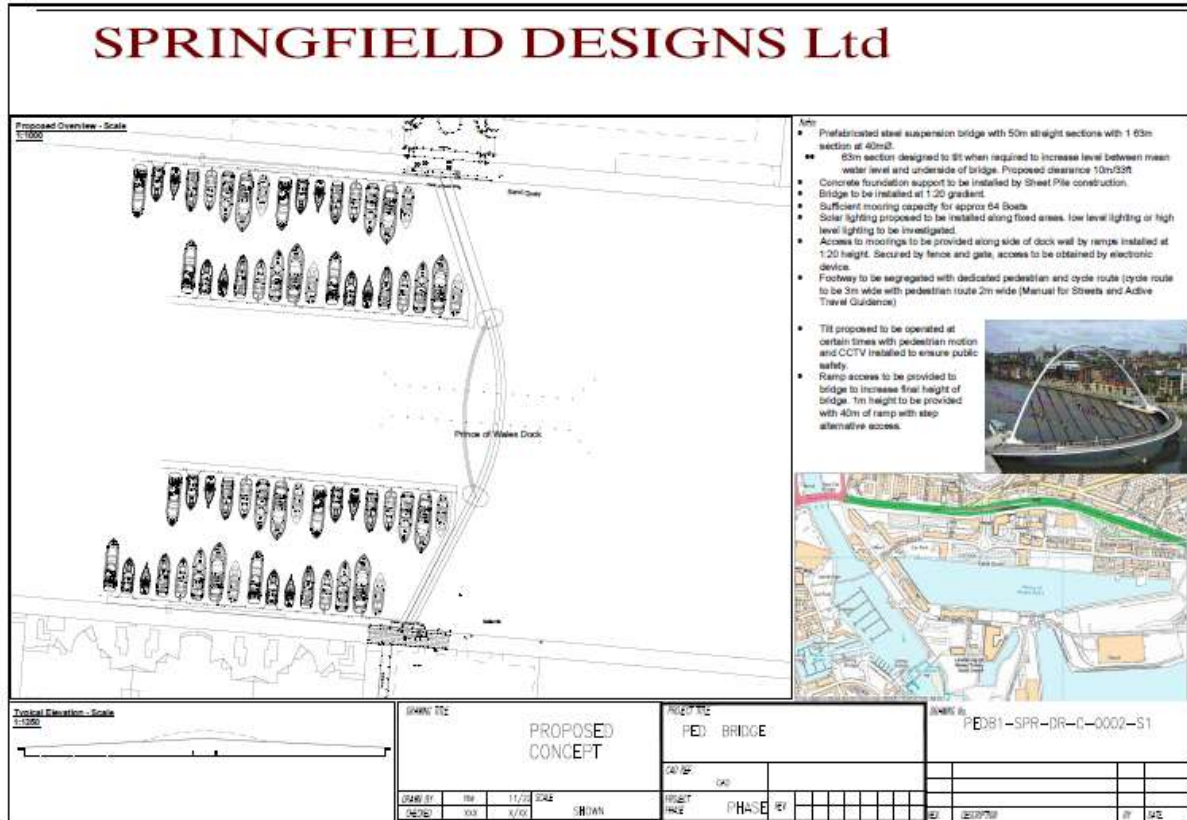
7. Proposed Design Options

7.1. Introduction

Utilising the design requirements outlined in the brief, and design constraints the following designs have been created. Concept designs were proposed to the client team. With the below nominations proposed to be advanced.

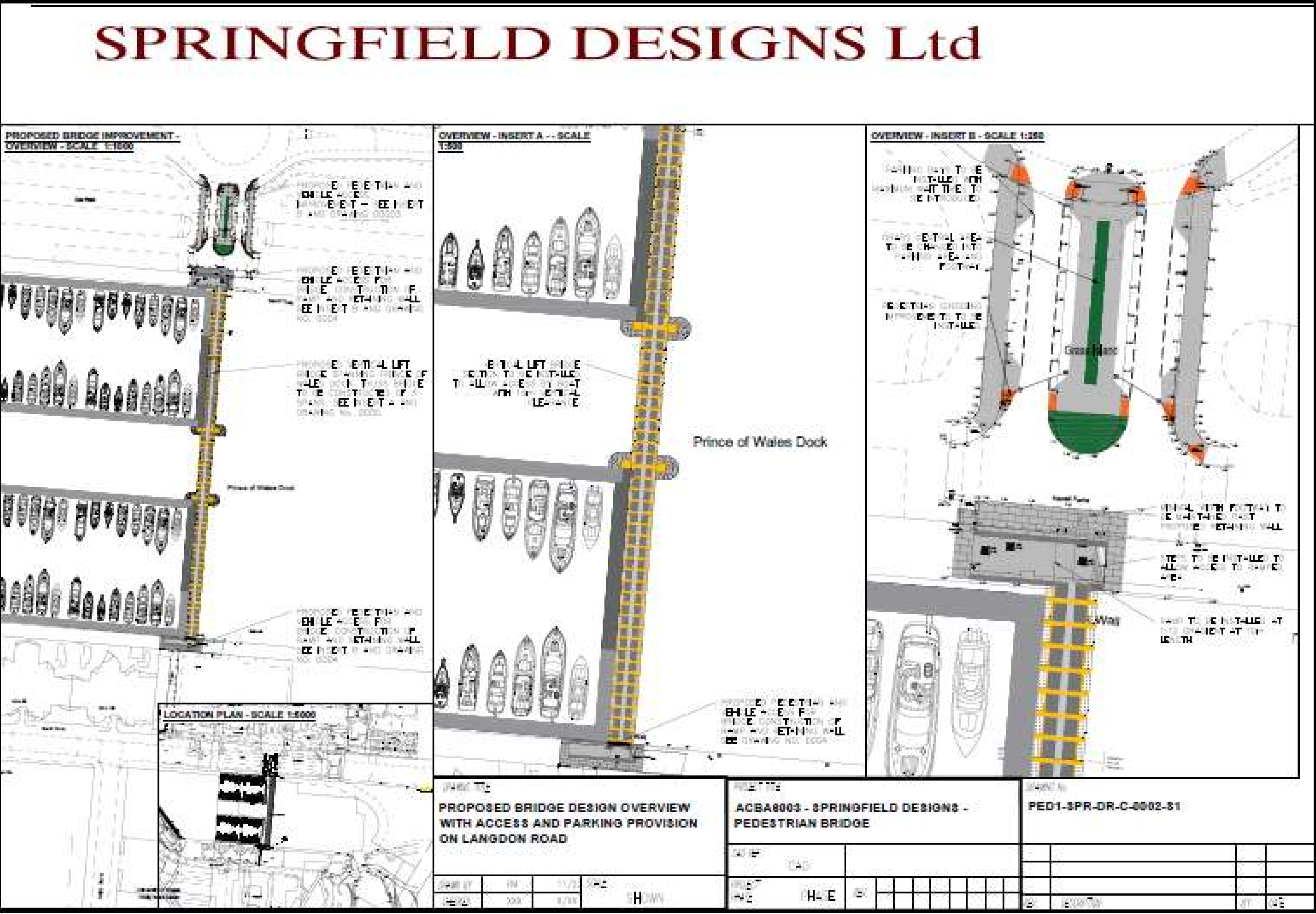
7.2. Concept Designs

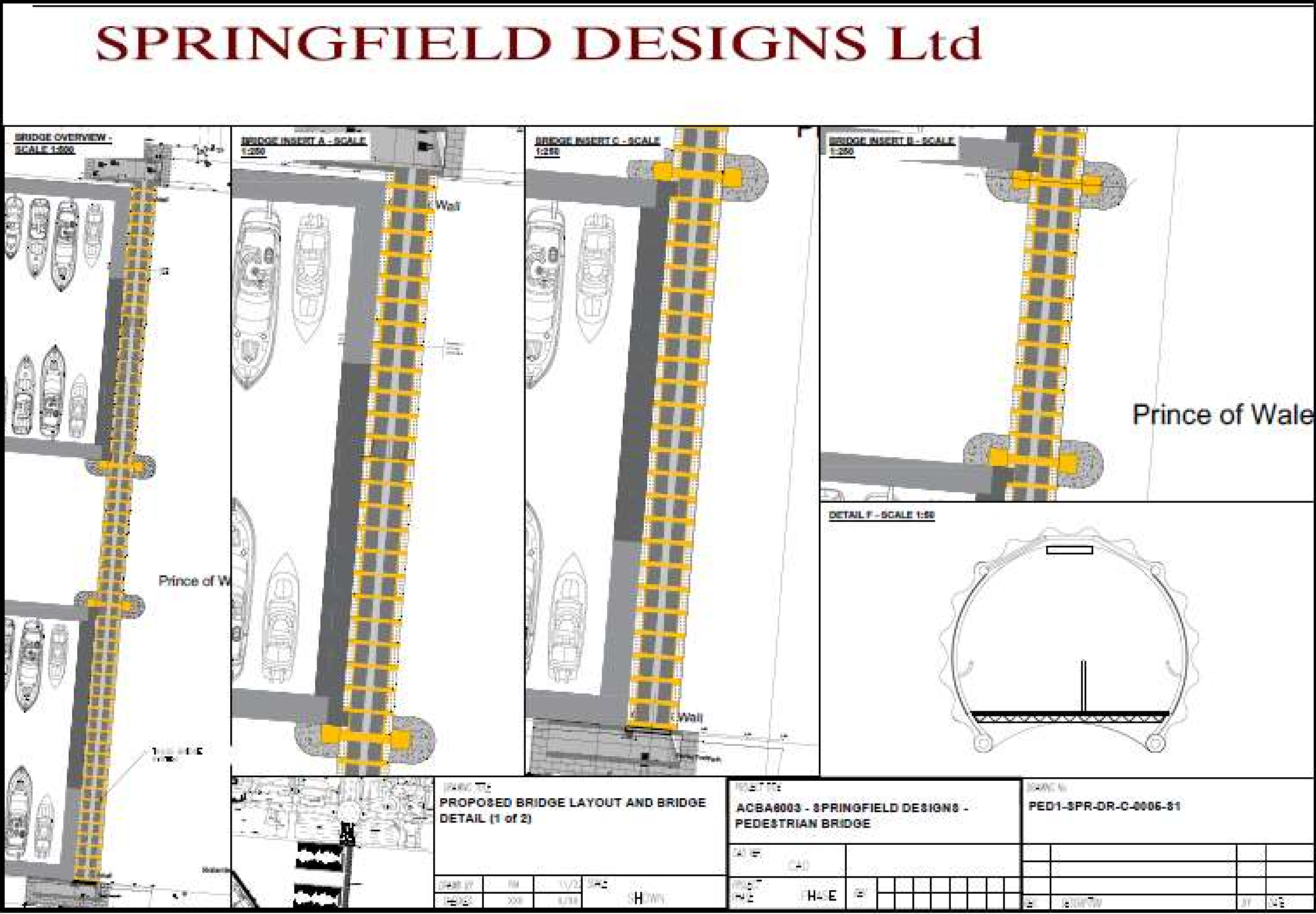




7.3. Option 1 – Vertical Lift Bridge

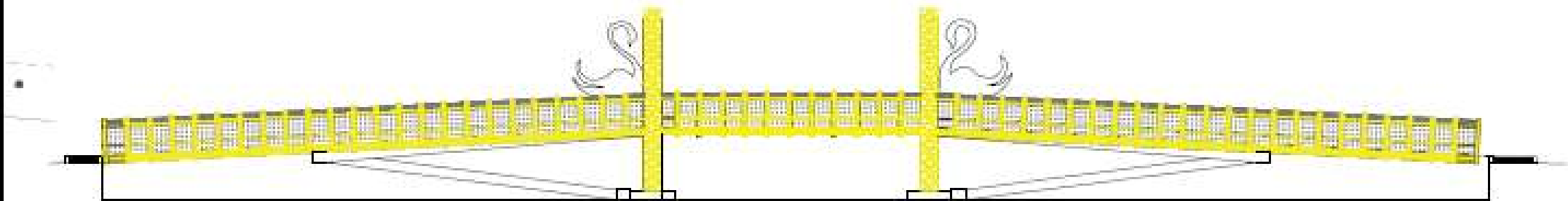
Option 1 - Evaluation



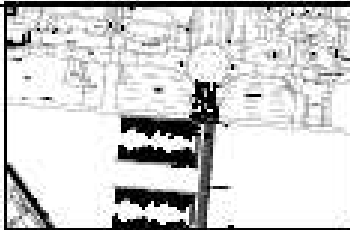


SPRINGFIELD DESIGNS Ltd

BRIDGE ELEVATION -
A1-A1-NTE



SUPERSTRUCTURE
DETAIL - SCALE 1:100



PROJECT:
PROPOSED BRIDGE LAYOUT AND BRIDGE
DETAIL (2 of 2)
BRIDGE FOUNDATION DETAIL AND
ELEVATIONS

DATE	BY	11/23	REV	HOWN
12/23	001	1/24		

PROJECT:
ACBA8003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

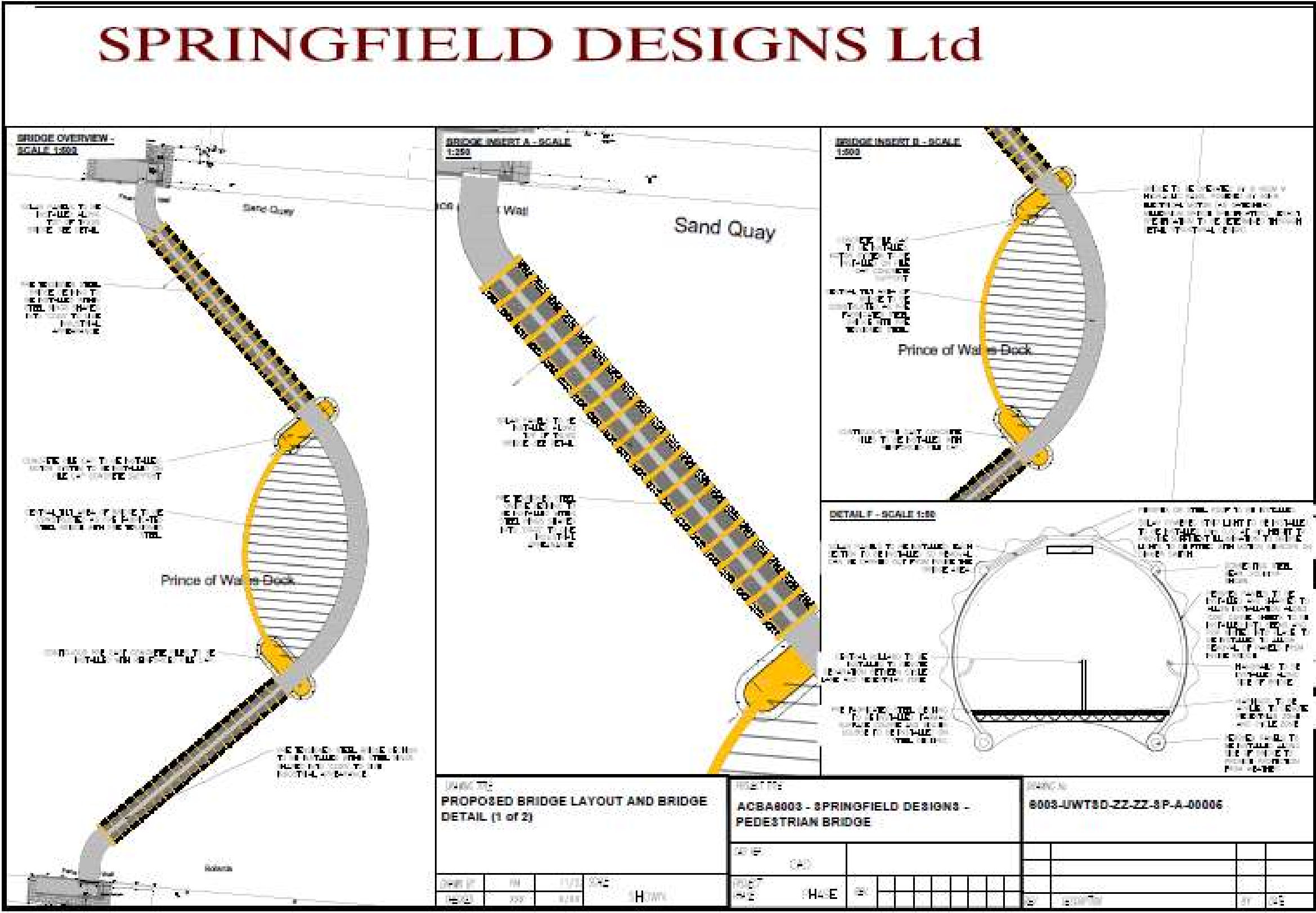
DATE	BY	11/23	REV	HOWN
12/23	001	1/24		

PROJECT:
PED1-SPR-DR-C-0008-S1

DATE	BY	11/23	REV	HOWN
12/23	001	1/24		

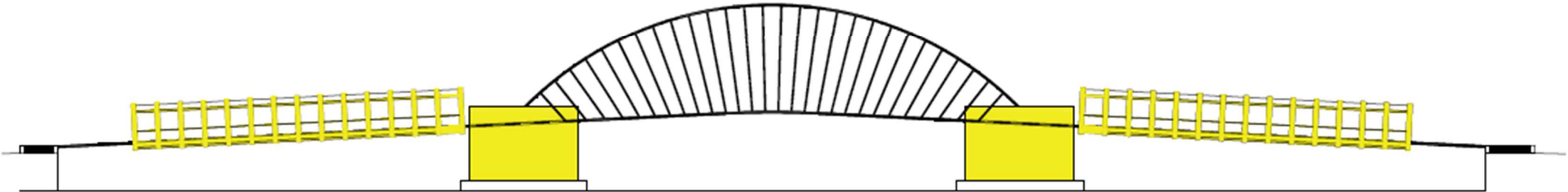
Option 2 – Evaluation

3



SPRINGFIELD DESIGNS Ltd

BRIDGE ELEVATION -
A1-A1 - NTS



DRAWING TITLE
**PROPOSED BRIDGE LAYOUT AND BRIDGE
DETAIL (2 of 2)
BRIDGE FOUNDATION DETAIL AND
ELEVATIONS**

DRAWN BY	RM	11/22	SCALE
CHECKED	XXX	X/XX	SHOWN

PROJECT TITLE
**ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE**

CAD REF.	CAD
PROJECT PHASE	PHASE
REV.	

DRAWING No.
PED2-SPR-DR-C-0006-S1

REV.	DESCRIPTION	BY	DATE

8. Design Team Conclusion

From initial investigations outlined in the above feasibility scheme, we (Springfield Designs) feel that the vertical lift bridge would be the most feasible to proceed, this is due to the below;

- Brief is achieved
 - Footbridge installed across the dock
 - Provision of moorings is achieved
 - Night-time illumination achieved.
 - Copper appearance would tie into Copr Development project throughout Swansea.
- Simple construction methodology – less potential for unforeseen costs on site
- Lifting mechanism would only need to lift the self-weight of the bridge
 - Lifting mechanism would be easier to maintain and potentially cheaper during the lifecycle of the bridge as motors would be smaller when compared to tilt bridge.
- Feature would act as a gateway into the dock.

However, both systems are potentially able to be installed within the bay, however the Tilt system would potentially endure additional and higher unforeseen costs as the system would require specialist structural design outside the confines of Springfield design, as outside specialist structural consultants would need to be employed.

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