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## ENVIRONMENTAL ASSESSMENT

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### Flood Risk Assessment

**#5403**

Park View 2,  
Lower Stand,  
St Marys,  
Isles of Scilly,  
TR21 0LP

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## Document Issue Record

**Project:** Phase 1 Flood Risk Assessment

**Prepared for:** Mr Robert Green

**Reference:** 5403

**Site Location:** Park View 2, Lower Stand, St Marys, Isles of Scilly, TR21 OLP.

**Proposed Development:** It is understood that the development is for the construction of as three-storey residential unit.

Consultant		Date	Signature
Author	Tom Vine	03/06/2020	
Document Check	Lydia Sayers	03/06/2020	
Authorisation	Daniel Cook	11/06/2020	
Amendments v1.1	Nick Drewett	24/02/2021	

### Amendments v1.1:

Following submission of v1.0, the EA were consulted on the planning application and objected as they deemed there to be an unacceptable risk to life and property from flooding. The EA raised concerns that while all living quarters were proposed above the design flood level, there were potentially habitable areas at the ground floor.

As such, in accordance with the EA's request, the developer has altered the scheme so that the ground floor is open to allow flood water to flow through the site, and only contains an external courtyard area and the entrance stairwell. Furthermore, all habitable rooms are now at the first floor and above, which is to be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (High++) flood level of 6.18mAOD) as per the EA's request.

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## 1. Summary

- 1.1 Ambiental Environmental Assessments Limited has been appointed by the client to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Park View 2, Lower Stand, St Marys, Isles of Scilly, TR21 0LP.
- 1.2 The existing site is a concrete yard and classified as 'Less Vulnerable'.
- 1.3 The proposed development is a 3-storey residential dwelling and classified as 'More Vulnerable'.
- 1.4 According to the EA Flood Map for Planning, the site is located in Flood Zone 1. However, previous correspondence with the Environment Agency has confirmed that the site is located in an area considered to be at risk of flooding over the lifetime of the development. The Isles of Scilly Coastal Flood Modelling Report (2019) shows that the site is within an area at risk of flooding during a 1 in 200 year, or greater, event. The site can therefore be considered to be in Flood Zone 3.
- 1.5 Analysis has shown that the flood water level during a 1 in 200 year event is 4.00mAOD. Including the CP18 climate change adjustment gave the following sea water levels:
  - Higher Central: 5.10mAOD
  - Upper End: 5.49mAOD
  - High++: 6.18mAOD
- 1.6 A topographic survey of the site showed the minimum level to be 3.66mAOD. Using the High++ climate change model the site could be inundated by 2.52m of water head.
- 1.7 In accordance with the EA's request (EA Ref DC/2020/121505/01-L0), the developer has altered the scheme so that the ground floor is open to allow flood water to flow through the site, and only contains an external courtyard area and the entrance stairwell. Furthermore, all habitable rooms are now at the first floor and above, which is to be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (High++) flood level of 6.18mAOD) as per the EA's request.
- 1.8 Due to the nature of the development, the effect on runoff rate post-development is deemed to be negligible. Although in line with NPPF, the development should restrict run off rates where possible.
- 1.9 The risk of surface water and groundwater flooding to the development has been deemed to be relatively Low.
- 1.10 The risk of sewer flooding to the development has been deemed Medium.
- 1.11 As such, and given that:
  - The proposed development can incorporate flood resilient design;
  - All habitable rooms will be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level);
  - Given the nature of tidal flooding, prior evacuation could be sought before flood waters reach the site, and,
  - In terms of flood vulnerability, significant 'betterment' can be achieved through the implementation of warning procedures and formalisation of a flood evacuation plan.

- 1.12 Following the guidelines contained within the NPPF, the proposed development could be considered suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
<b>Development Type:</b>	Concrete yard	3-Storey residential development
<b>(Number of Bedrooms):</b>	None	3
<b>EA Vulnerability Classification:</b>	Less Vulnerable	More Vulnerable
<b>Ground Level</b>	Topographic levels vary between 3.66mAOD 3.90mAOD (Source: Client topographic survey).	All habitable rooms/ residential space will be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level)
<b>Level of Sleeping Accommodation:</b>	None	1 <sup>st</sup> floor and above (no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level)
<b>Impermeable Surface Area:</b>	N/A <sup>1</sup>	No change
<b>Surface Water Drainage:</b>	N/A <sup>1</sup>	In line with NPPF, the development should restrict run off rates where possible
<b>Site Size:</b>	N/A <sup>2</sup>	N/A <sup>2</sup>
Risk to Development	Summary	Comment
<b>Flood Zone:</b>	The site is at risk from a 1 in 200 year event and can therefore be considered Flood Zone 3	-
<b>Flood Source:</b>	Tidal	Atlantic Ocean
<b>Extreme water level</b>	4.00mAOD (No Climate Change) 5.10mAOD (Higher Central CC) 5.49mAOD (Upper End CC) 6.18mAOD (High++ CC)	The sea water levels are during a 1 in 200 year event.
<b>Recorded Flood Events in Area:</b>	Yes	
<b>Recorded Flood Events at Site:</b>	No record	No record
Management Measures	Summary	Comment
<b>Ground floor level above extreme flood levels for 1 in 200 year event</b>	No	Ground floor to be used as storage and entrance lobby only. All habitable rooms/ residential space will be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level)
<b>Safe Access/Egress Route:</b>	N/A <sup>2</sup>	Warning system available
<b>Flood Resilient Design:</b>	N/A <sup>2</sup>	Section 7 of this report
<b>Site Drainage Plan:</b>	N/A <sup>1</sup>	In line with NPPF, the development should restrict run off rates where possible
<b>Flood Warning &amp; Evacuation Plan:</b>	Yes	Section 7 of this report
Offsite Impacts	Summary	Comment
<b>Displacement of floodwater:</b>	N/A <sup>1</sup>	The site lies in an area tidal flood risk
<b>Increase in surface run-off generation:</b>	None	No change to impermeable areas, although in line with NPPF the development should restrict run off rates where possible

Table 1: Summary of flood risks, impacts and proposed flood mitigation measures.

N/A<sup>1</sup> not required for this assessment; N/A<sup>2</sup> data not available.

## 2. Development Description and Site Area

### Proposed Development and Location

- 2.1 The proposed development site is on St Mary's and located at Park View 2, Lower Stand, Isles of Scilly, TR21 0LP (Figures 1 and 2). It is understood that the development is for the construction of a three-storey residential unit.

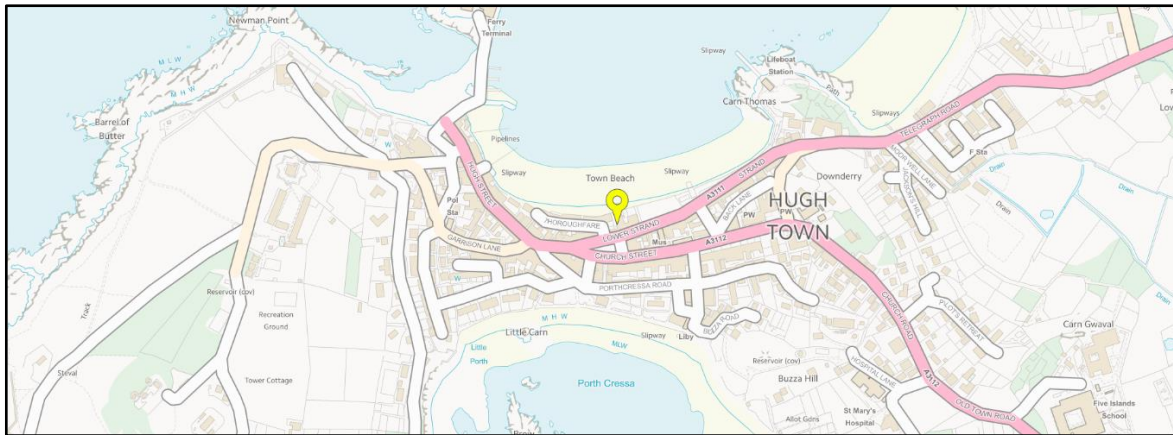


Figure 1: Wider Location Map, identifying the location of the Proposed Development. (Source: OS)



Figure 2: Aerial View of the site (Source: Google Earth)

- 2.2 From a review of 2m LiDAR for the site, topographic levels vary between 3.24mAOD and 4.36mAOD. The client undertook a more accurate topographic survey of the site which displayed the levels to vary between 3.66mAOD 3.90mAOD.

### Vulnerability classification

- 2.3 The existing site is a concrete yard sloping towards Town beach, a 2m high granite wall with an opening provides access the to the beach. The existing site is classified as 'Less Vulnerable'.
- 2.4 Proposed is a 3-storey residential dwelling and is classified as 'More Vulnerable'.



- 2.5 According to the EA Flood Map for Planning (Figure 3), shows the site is located in Flood Zone 1. This is due to the fact the data from the Isles of Scilly Coastal Flood Modelling Report (2019) has not been uploaded to the EA Flood Map for planning.
- 2.6 The Isles of Scilly Coastal Flood Modelling Report (2019) shows the site to be at risk of flooding during a 1 in 200 year event (Figure 4).

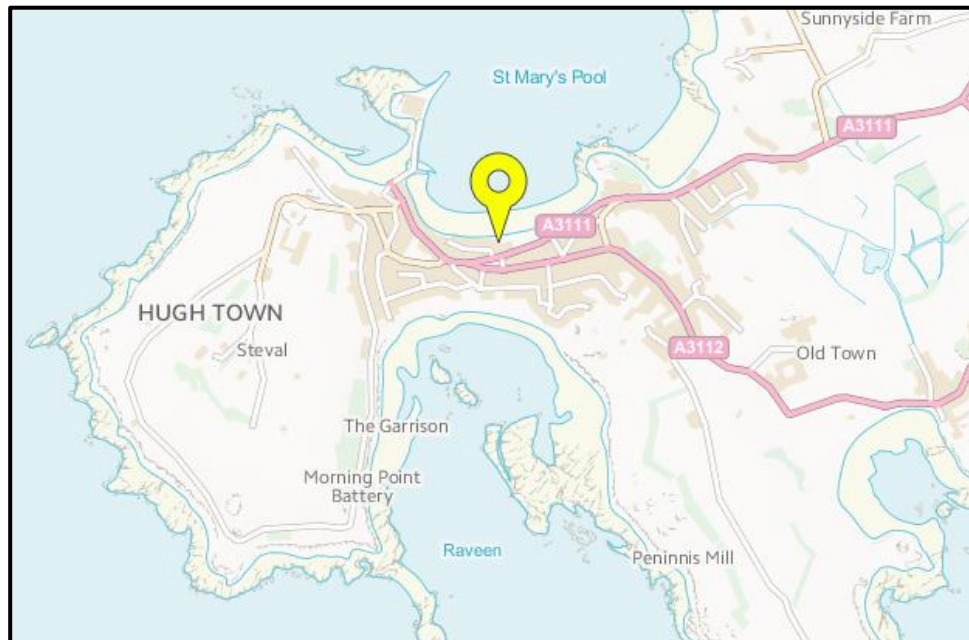


Figure 3: EA Flood Zone Map (Source: EA)

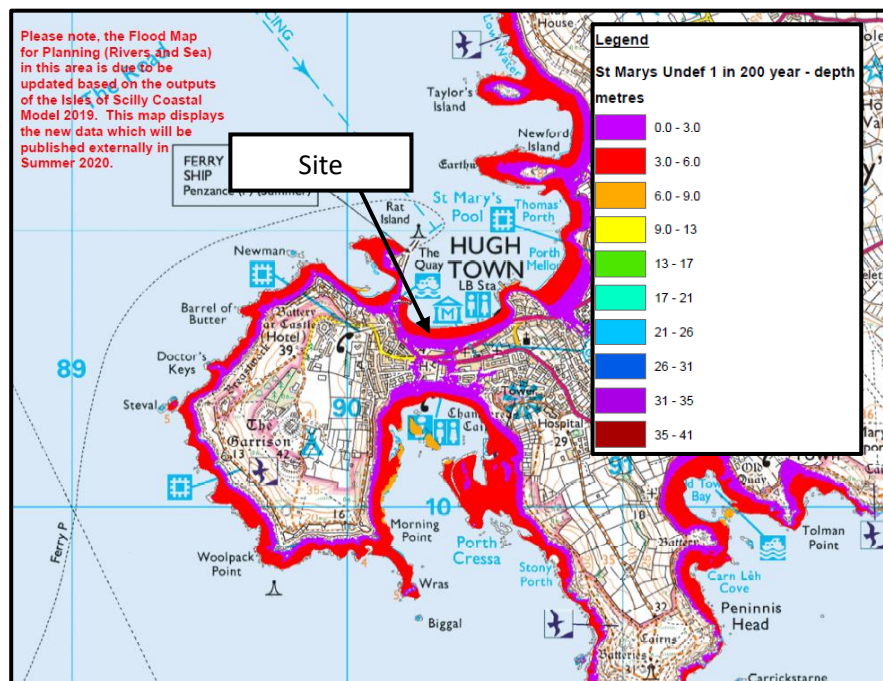


Figure 4: Depth undefended 1 in 200 year (Source: EA)

## Geology

- 2.7 According to the British Geological Survey's (BGS) Geology of Britain online resource the bedrock of the site is Granite. Igneous Bedrock formed approximately 252 to 359 million years ago in the Permian and carboniferous periods. The local environment was previously dominated by intrusions of silica-rich magma. Superficial deposits have been identified as Blown Sand - Sand. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. The local environment was also previously dominated by windblown deposits.
- 2.8 Furthermore, according to the Shoreline Management Plan 2 (SMP 2) 2010, the Isles of Scilly have a primarily hard, rocky coastline with a highly indented form due to the large number of granite headlands and nearshore islands creating local areas of shelter, resistance and entrapment of sediment. The granite exposures will remain resistant to erosion dictating a general stability in the form of the coastline of the islands.

### 3. Sequential Test/Exception Test

- 3.1 Under the NPPF, all new planning applications must undergo a *Sequential Test*. This test must be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.
- 3.2 The test refers to the EA Flood Zones described in Table 6 (Section 5 of this report). For reference, the NPPF *Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table 3* is reproduced below in Table 2 below.
- 3.3 Under the NPPF guidance, the existing concrete yard is classified as “Less Vulnerable”. Given that the proposed development is constructing a 3-storey residential unit, the site is now classified as “More Vulnerable”.

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Zone 3b <i>Functional Floodplain</i>	Exception Test Required	✓	✗	✗	✗

Table 2: The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF. Shaded cells denote the proposed re-development. Please note: ✓ means development is appropriate; ✗ means the development should not be permitted.

- 3.4 The property is at risk of tidal flooding during a 1 in 200 year or greater event, this is deemed high probability and therefore the site is located in flood zone 3. A 'More Vulnerable' development in Flood Zone 3 requires and Exception Test.
- 3.5 The two parts to the Exception Test require the proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall. As a result, a Flood Risk Assessment is required to reduce the risk of flooding.

## 4. Site Flood Hazards

### Sources of Flooding

- 4.1 Correspondence with the EA and the Isles of Scilly flood report show the site is at risk of flooding from tidal flooding during a 1 in 200 year event and therefore is considered to be in Flood Zone 3.
- 4.2 As outlined the proposed development is considered to be “More Vulnerable” post-development, under the NPPF. Communication with the Environment Agency (EA) and a review of sources to be mentioned has identified the following potential sources of flooding to the site:

Source	Description
Tidal	High
Surface	Low
Groundwater	Low
Sewer	Medium

Table 3: Summary of flood sources.

### Mechanisms and History of Flooding

#### Tidal

- 4.3 The EA have provided a product 4 data set. This section comprises of analysis of this data.
- 4.4 The client undertook a topographic survey of the site which displayed the levels to vary between 3.66mAOD and 3.90mAOD.
- 4.5 The results from the Isles of Scilly Coastal Model (2019) show the site to flood during a: 1 in 200 year event (Figure 5), 1 in 200 year event with climate change (Figure 6) and 1 in 1000 year event (Figure 7).  
*Note: the climate change results use the outdated CP09 guidance, Section 5 shows the updated CP18 results.*
- 4.6 Table 4 shows the flood level in each case in relation to the minimum site level. To allow for modelling uncertainties the upper limit of each flood water level band is used.

Return Period (Years)	Flood Water Level (mAOD)	Minimum Site Level (mAOD)	Difference (m)
200	4.00	3.66	0.34
200 + Climate Change	5.00	3.66	1.34
1000	4.50	3.66	0.84

Table 4: Summary of the water levels during events

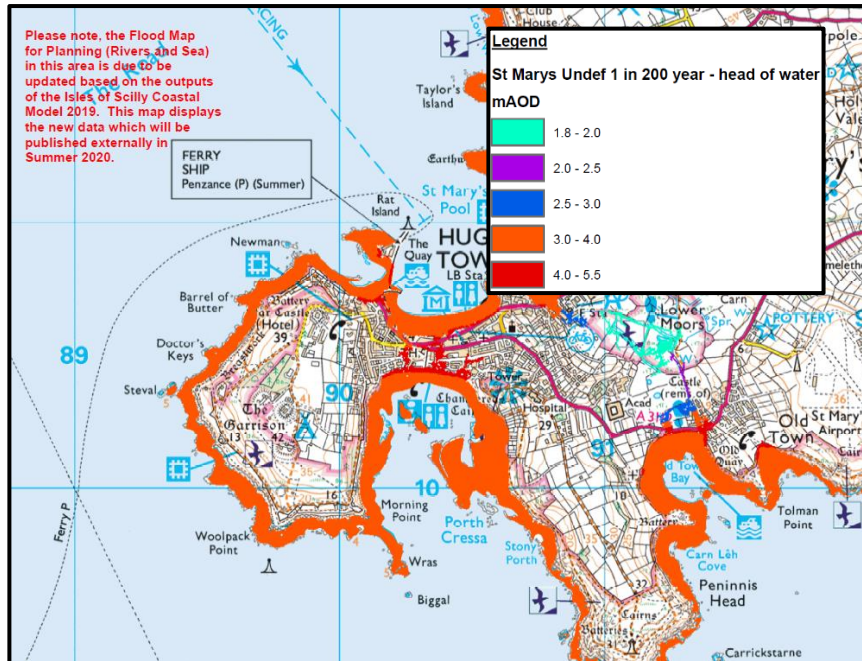


Figure 5: 1 in 200 year event (Isles of Scilly Coastal Model, 2019)

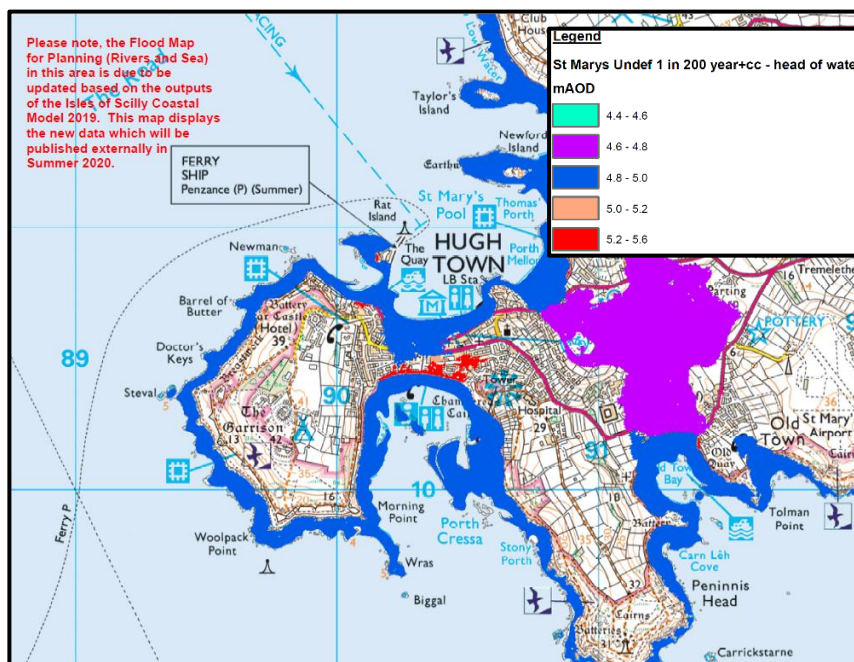


Figure 6: 1 in 200 year event + Climate Change (Isles of Scilly Coastal Model, 2019)

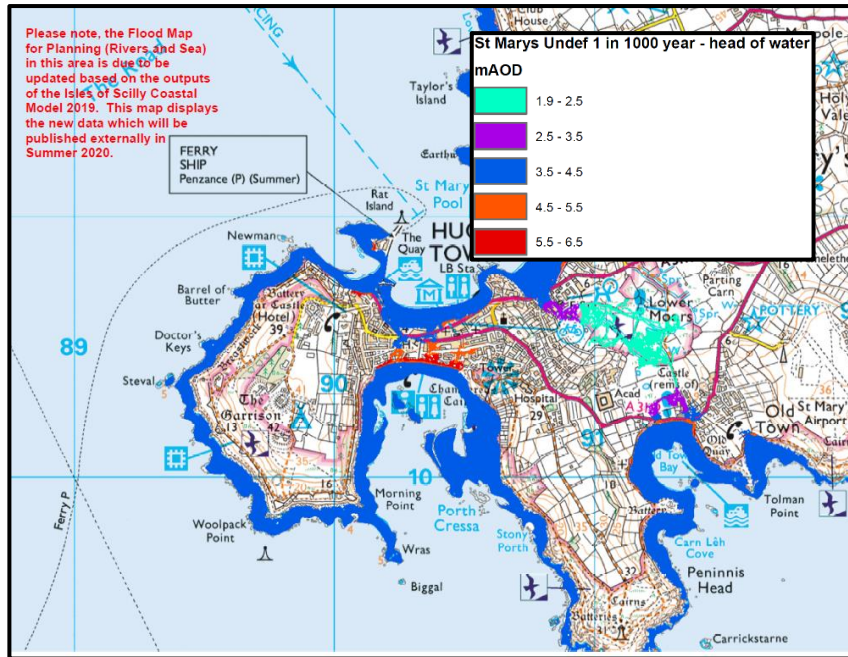


Figure 7: 1 in 1000 year event (Isles of Scilly Coastal Model, 2019)

4.7 A review of the EA spatial data set indicates there is a sea/coastal wall along the frontage of Town Beach, Hugh Town protecting the property (Figure 8).

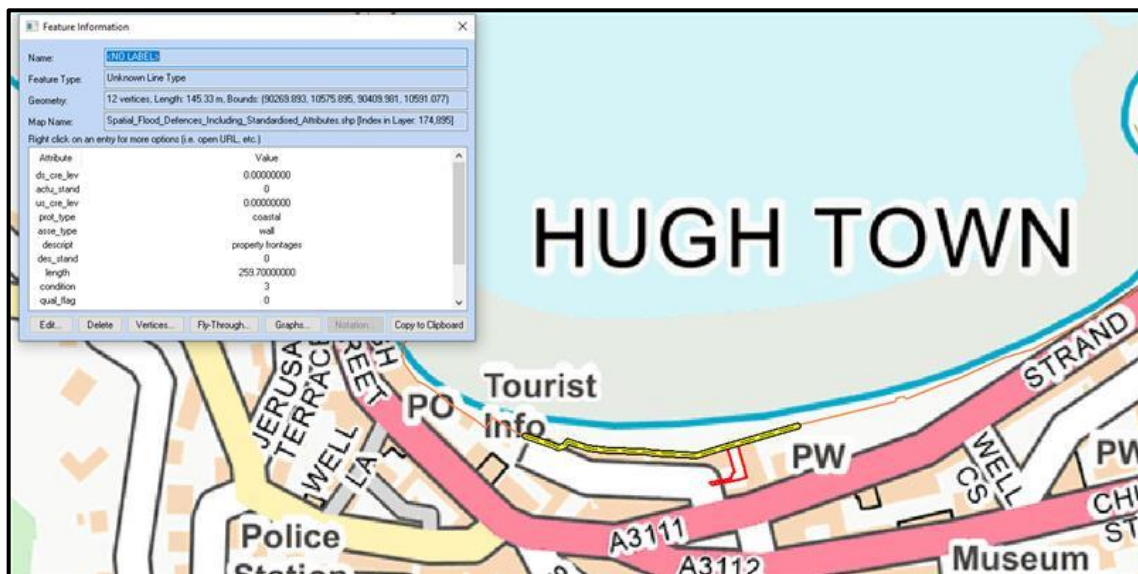


Figure 8: EA spatial data set flood defences

## Surface Water (Pluvial)

- 4.8 The EA's Online Flood Risk from Surface Water Map does not show information in the Isles of Scilly, although the EA deems the site is at medium risk from surface water flooding. This means each year this area has a chance of flooding of between 1% and 3.3%.
- 4.9 The main mechanism of flooding is tidal flooding.
- 4.10 The Isles of Scilly Local Flood Risk Management Strategy (2017) states that the risk from pluvial flooding is considered to be extremely low. There have been no significant past local events from surface water.
- 4.11 Based on the fact the Isles of Scilly Local Flood Risk Management Strategy (2017) is a more detailed analysis of the surface water flood risk, the risk of flooding to the site from pluvial sources is deemed to be **Low**.

## Groundwater

- 4.12 Based on the EA Isles of Scilly Source Protection data set St Mary's delineation of ground water source protection zones (SPZ). The site is not located within a Groundwater Source Protection Zone (Figure 9).

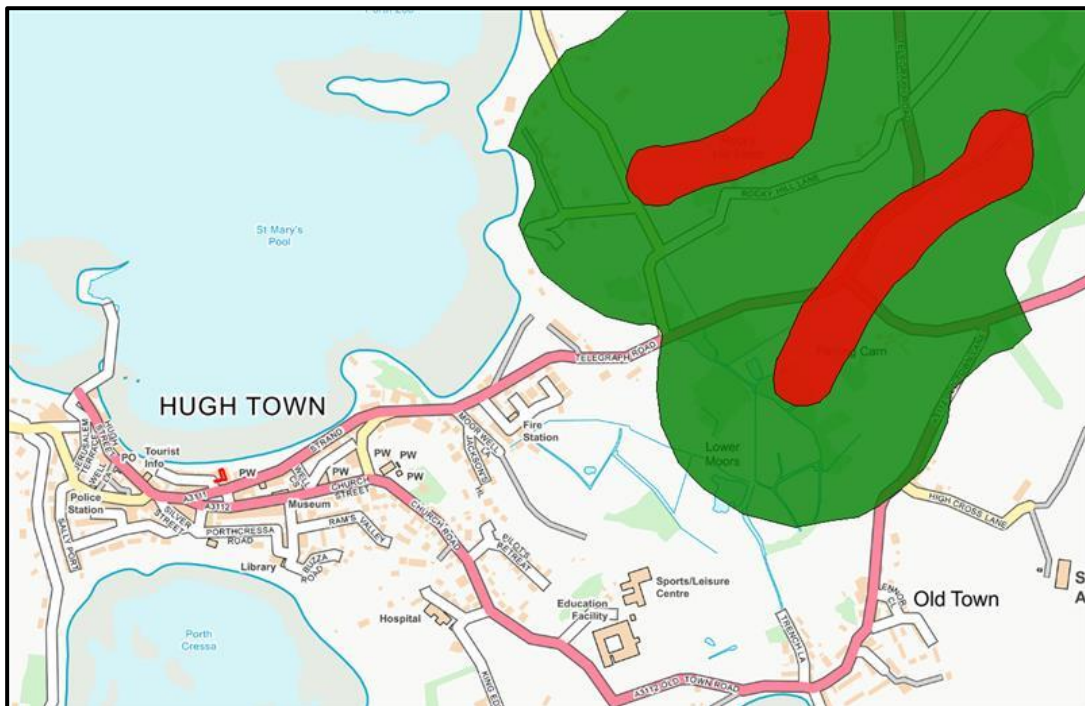


Figure 9: Ground water protection zone (Source: EA Isles of Scilly Source Protection data set)

- 4.13 As such, the risk of flooding to the site from groundwater sources is considered **relatively low**.

## Sewer

- 4.14 Any new sewer connection should be agreed with the local sewer provider and have a non-return valve.
- 4.15 The Isles of Scilly Local Flood Risk Management Strategy (2017) provides the key critical infrastructure locations that are vulnerable to flooding and coastal erosion (Table 5). For Hugh Town and south east Garrison shore to Morning Point, the mains sewerage and pump station is vulnerable.
- 4.16 As such, adopting a conservative approach, the risk of flooding from sewer sources to the proposed development site is considered **Medium**.

Service	Location	Description
Water and Sewerage	St Mary's; Lower and Higher Moors.	Groundwater abstraction wells.
	St Mary's; Pelistry ledges and coastline below Mount Todden Down.	Desalination plant sea water abstraction boreholes and floating inlet with land connections.
	St Mary's; Hugh Town, Old Town, Porth Mellon, Porthloo.	Mains water supply.
	St Mary's; Hugh Town and south east Garrison shore to Morning Point.	Mains sewerage and pump station (located behind Bishop and Wolf).
	St Mary's; Old Town.	Mains sewerage and bio bubble treatment plant.
	Tresco; New Grimsby Palace Row to Timothy's Corner.	Mains water supply and sewerage.

*Table 5: Key critical infrastructure locations that are vulnerable to flooding and coastal erosion (The Isles of Scilly Local Flood Risk Management Strategy, 2017)*

## Surface Water Drainage Strategy

- 4.17 The proposed development is for the construction of a three-storey residential dwelling on an existing concrete yard. As such, there will be no change to the existing runoff rates from the site. However, in line with NPPF the development should restrict run off rates where possible.

## Records of Historical Flooding

- 4.18 The Isles of Scilly Coastal Flood Modelling Report (2019) analysed the historic tidal flooding events. The islands are known to have flooded on the 17/10/2012, (01-04)/01/2014 and 14/02/2014. However, there are no records to show detailed extents and the exact location of the flooding.
- 4.19 No recorded historic incidents of pluvial, groundwater or sewer flooding events were found.



## 5. Probability of Flooding

5.1 Tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low pressure) create a 'bulge' of water which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is likely an early warning will be issued before such an event strikes. As such, it is unlikely that the site would be subject to tidal flooding without several hours of early warning.

Zone	Description
1	<b>Low Probability.</b> This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	<b>Medium Probability.</b> This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	<b>High Probability.</b> This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
3b	<b>The Functional Floodplain.</b> This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Table 6: Definition of the NPPF Flood Zones. Shaded cells denote the proposed development (Source: EA).

### Climate Change on Site

5.2 Climate change is likely to increase the flow in rivers and raise sea levels and storm intensity. The site is mainly affected by tidal flooding.

### Climate Change- Tidal

5.3 Using the CP18 guidance, the climate change impact on the tidal flood water level was analysed.

5.4 The development is to be resistant to a 1 in 200 year event + climate change. The 1 in 200 year event sea water level is 4mAOD. Table 7 shows the water level change due to climate change relative to the sea water level.

	Cumulative sea-level rise 2019 to 2125 (m)	1 in 200 year Sea Water Level (mAOD)	1 in 200 year Sea Water Level + Climate Change (mAOD)	Minimum Site Level (mAOD)	Sea Water Level relative to Minimum Site Level (m)
<b>Higher Central</b>	1.10	4.00	5.10	3.66	1.44
<b>Upper End</b>	1.49	4.00	5.49	3.66	1.83
<b>High++</b>	2.18	4.00	6.18	3.66	2.52

Table 7: Climate change impact on Sea Water Level

5.5 It is important to note that tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low

pressure) create a 'bulge' of water, which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is very likely that an early warning will be issued before such an event strikes. As such, it is very unlikely that the site would be subject to tidal flooding without several hours of early warning.

- 5.6 Following submission of v1.0, the EA were consulted on the planning application and objected as they deemed there to be an unacceptable risk to life and property from flooding. The EA raised concerns that while all living quarters were proposed above the design flood level, there were potentially habitable areas at the ground floor.
- 5.7 As such, in accordance with the EA's request, the developer has altered the scheme so that all habitable rooms are now at the first floor and above, which is to be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (High++) flood level of 6.18mAOD) as per the EA's request

## 6. Residual Risks

6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- The failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- A severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

6.2 There is a residual risk of erosion to the frontage, particularly to the seaward face of the property.

6.3 Furthermore, the (100 year) Shoreline Management Plan (SMP) for this policy unit is Managed Realignment (MR) (Figure 10). The SMP states that: “Increasing pressure upon this part of the frontage may dictate that a longer-term accommodation of rising sea levels is made – this may be done through realignment of the existing defence line.”.

6.4 As such, the site may be at a greater risk of coastal flooding over the next 100 years due to proposed removal of maintenance of existing flood defences. As such, the developer should be aware of the potential increased risk from sea level rise due to the lack of intervention.

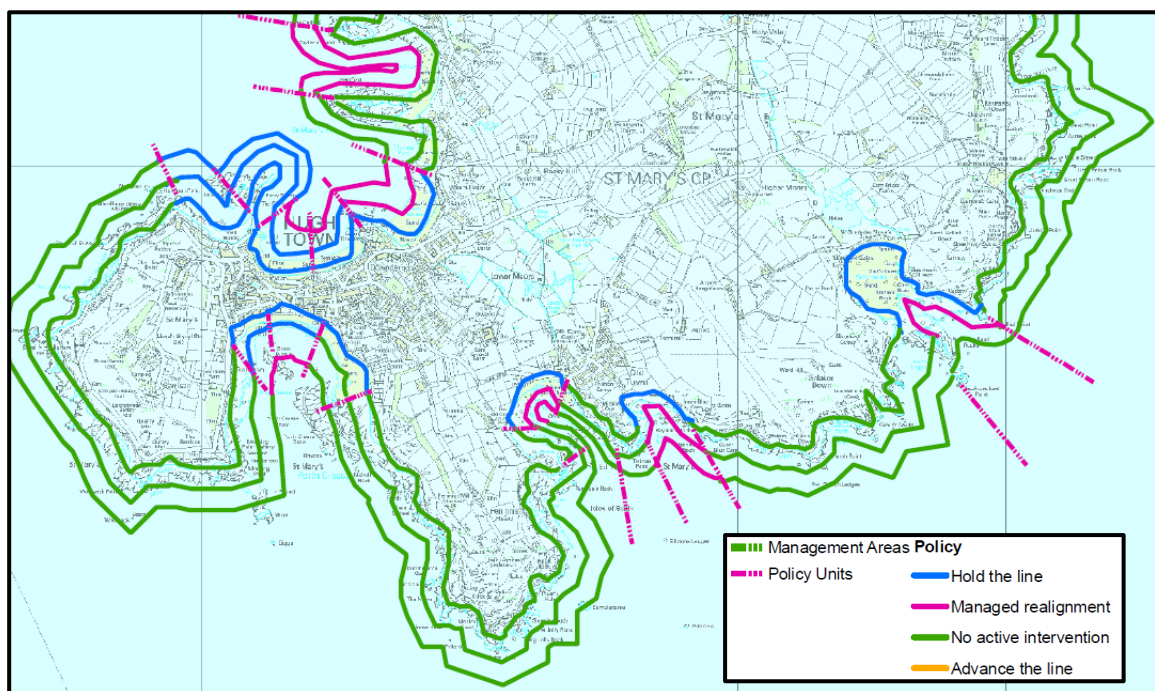


Figure 10: Shoreline management plan (SMP2)

## 7. Flood Risk Management Measures

- 7.1 The analysis of this assessment has indicated a 1 in 200 year tidal flood level of 4.00mAOD. The high++ climate change tidal flood water level is 6.18mAOD. As such, in line with policy, it is recommended that all habitable/ residential spaces have FFLs set no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level as per the EA's request).
- 7.2 In addition, the proposed dwelling should be constructed in a flood resilient manner in accordance with the Communities and Local Government *Improving the Flood Performance of New Buildings – Flood Resilient Construction* document. The following mitigation measures are recommended:
- all habitable/ residential spaces have FFLs set no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level);
  - Bringing down electrical services from ceilings, towards sockets, where possible;
  - All plumbing insulation to be of closed-cell design;
  - Solid, impermeable (concrete) walls and floors at ground level of the proposed building, where possible;
  - Non-return valves to be fitted on sewers to prevent back-flow;
  - The residents sign up to the EA flood warning service.

### Flood Evacuation Plan

- 7.3 The site resides within Flood (tidal) and the EA has been advised to take into account the 1 in 200 year event annual probability of tidal flooding Table 6.
- 7.4 Due to the nature of tidal flooding, it is likely that there will be sufficient warning and prior evacuation will be sought before flood waters reach the site.
- 7.5 The flood plan for the Isles of Scilly is part of the Devon, Cornwall and Isles of Scilly Local Resilience Forum Multi-Agency Flood Plan and can be found in Appendix 2 of the Isles of Scilly Local Flood Risk Management Strategy (2017). The flood plan details that Hugh Town is a high-risk community.
- 7.6 The Isles of Scilly Council also receives Severer Weather Warnings from the Meteorological Office via the National Severe Weather Warning Service (NSWWS).
- 7.7 The Isles of Scilly Council also monitor the weather forecasts themselves, particularly when there are significant Spring tides.
- 7.8 Weather/flood warnings are disseminated as follows:
- Council website
  - Community Message Board
  - Tourist Information Office
  - Town Hall
  - Radio Scilly and Cornwall
  - Posters

- Door knocking in specific vulnerable locations or by telephone for the off-islands
- Direct to the Isles of Scilly Fire and Rescue Service

7.9 It is recommended the site owner(s) signs up to the EA Flood Warning Service if they have not done so already, in order to provide betterment to the site. It is recommended that all new site owners or residents are made aware of the potential flood risk to the site and that they sign up to the EA Flood Warning Service.

- On receipt of a **FLOOD ALERT**, the owners/occupiers of the property should;
  - Monitor Weather/flood warnings are outlined above;
  - Make themselves aware of forecast local weather conditions;
  - Alert others resident in the property of the situation;
  - Prepare to evacuate if necessary.
- On receipt of a **FLOOD WARNING**, the owners/occupiers of the property should:
  - Follow advice to “go in, stay in, and tune in”;
  - Be prepared to follow instruction from the Emergency Services.
- On receipt of a **SEVERE FLOOD WARNING**, the owners/occupiers of the properties should:
  - Follow advice to “go in, stay in, and tune in”;
  - Remain attentive to local media forecasts and news bulletins;
  - Do not evacuate unless instructed to do so by the Emergency Services;
  - Only when instructed to evacuate by the Emergency Services, leave the property and follow the agreed evacuation route.

## 8. Off Site Impacts

### Impact of Flood Risk Elsewhere

8.1 The development's primary flood risk is from the sea. The increased sea water level due to the development displacing water is negligible and therefore the impact of flood risk elsewhere is low.

### Generation of Runoff

8.2 The proposed development is for the construction of a three-storey residential dwelling on an existing concrete yard. As such, there will be no change to the existing runoff rates from the site. However, in line with NPPF the development should restrict run off rates where possible.

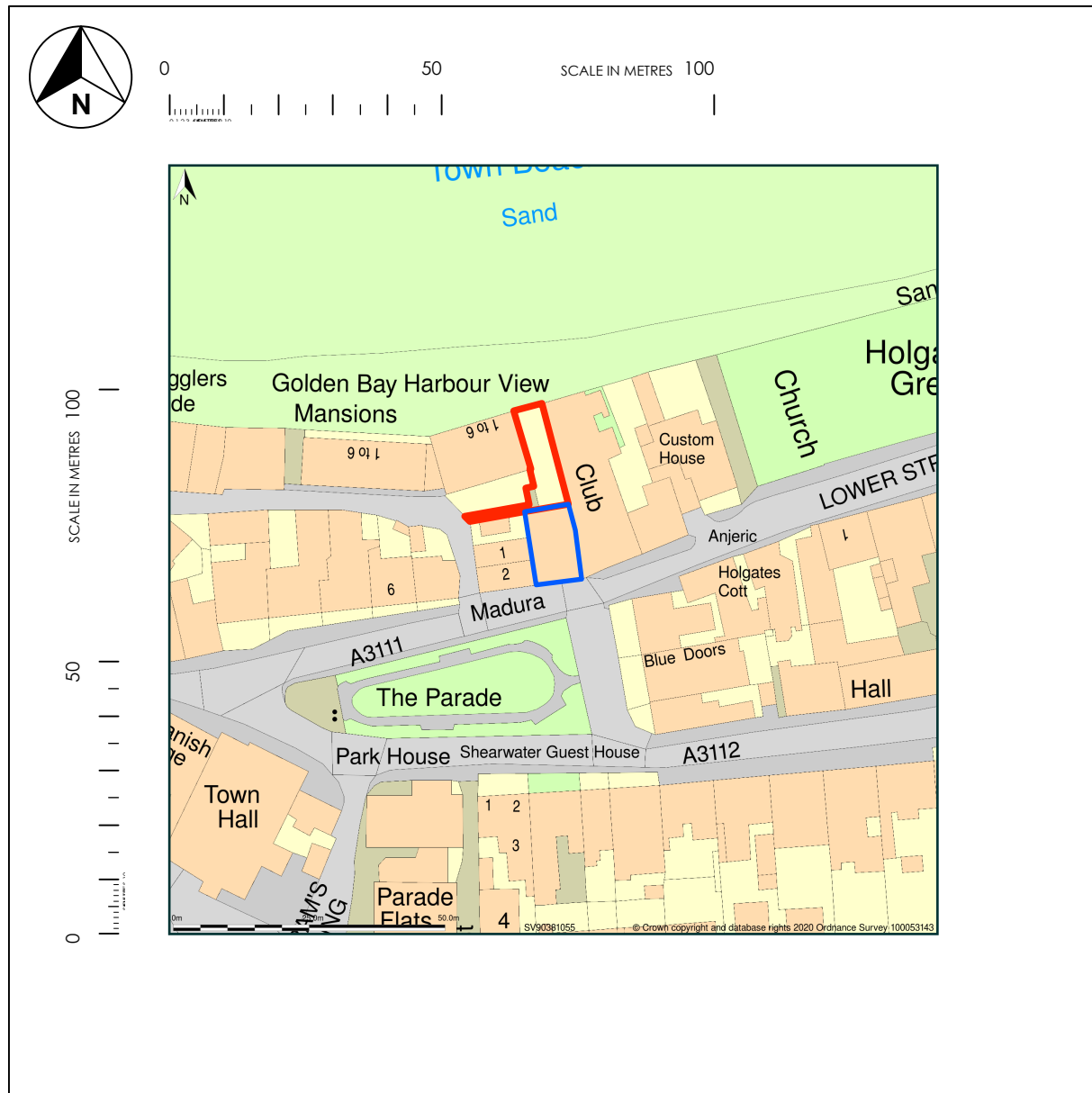
## 9. Conclusion

- 9.1 Ambiental Environmental Assessments Limited has been appointed by the client to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Park View 2, Lower Stand, St Marys, Isles of Scilly, TR21 0LP.
- 9.2 The existing site is a concrete yard and classified as 'Less Vulnerable'.
- 9.3 The proposed development is a 3-storey residential dwelling and classified as 'More Vulnerable'.
- 9.4 According to the EA Flood Map for Planning, the site is located in Flood Zone 1. However, previous correspondence with the Environment Agency has confirmed that the site is located in an area considered to be at risk of flooding over the lifetime of the development. The Isles of Scilly Coastal Flood Modelling Report (2019) shows that the site is within an area at risk of flooding during a 1 in 200 year, or greater, event. The site can therefore be considered to be in Flood Zone 3.
- 9.5 Analysis has shown that the flood water level during a 1 in 200 year event is 4.00mAOD. Including the CP18 climate change adjustment gave the following sea water levels:
- Higher Central: 5.10mAOD
  - Upper End: 5.49mAOD
  - High++: 6.18mAOD
- 9.6 A topographic survey of the site showed the minimum level to be 3.66mAOD. Using the High++ climate change model the site could be inundated by 2.52m of water head.
- 9.7 In accordance with the EA's request (EA Ref DC/2020/121505/01-L0), the developer has altered the scheme so that the ground floor is open to allow flood water to flow through the site, and only contains an external courtyard area and the entrance stairwell. Furthermore, all habitable rooms are now at the first floor and above, which is to be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (High++) flood level of 6.18mAOD) as per the EA's request.
- 9.8 Due to the nature of the development, the effect on runoff rate post-development is deemed to be negligible. Although in line with NPPF, the development should restrict run off rates where possible.
- 9.9 The risk of surface water and groundwater flooding to the development has been deemed to be relatively Low.
- 9.10 The risk of sewer flooding to the development has been deemed Medium.
- 9.11 As such, and given that:
- The proposed development can incorporate flood resilient design;
  - All habitable rooms will be set no lower than 6.48mAOD (300mm above the 1:200 year +CC (H++) flood level);
  - Given the nature of tidal flooding, prior evacuation could be sought before flood waters reach the site, and,
  - In terms of flood vulnerability, significant 'betterment' can be achieved through the implementation of warning procedures and formalisation of a flood evacuation plan.

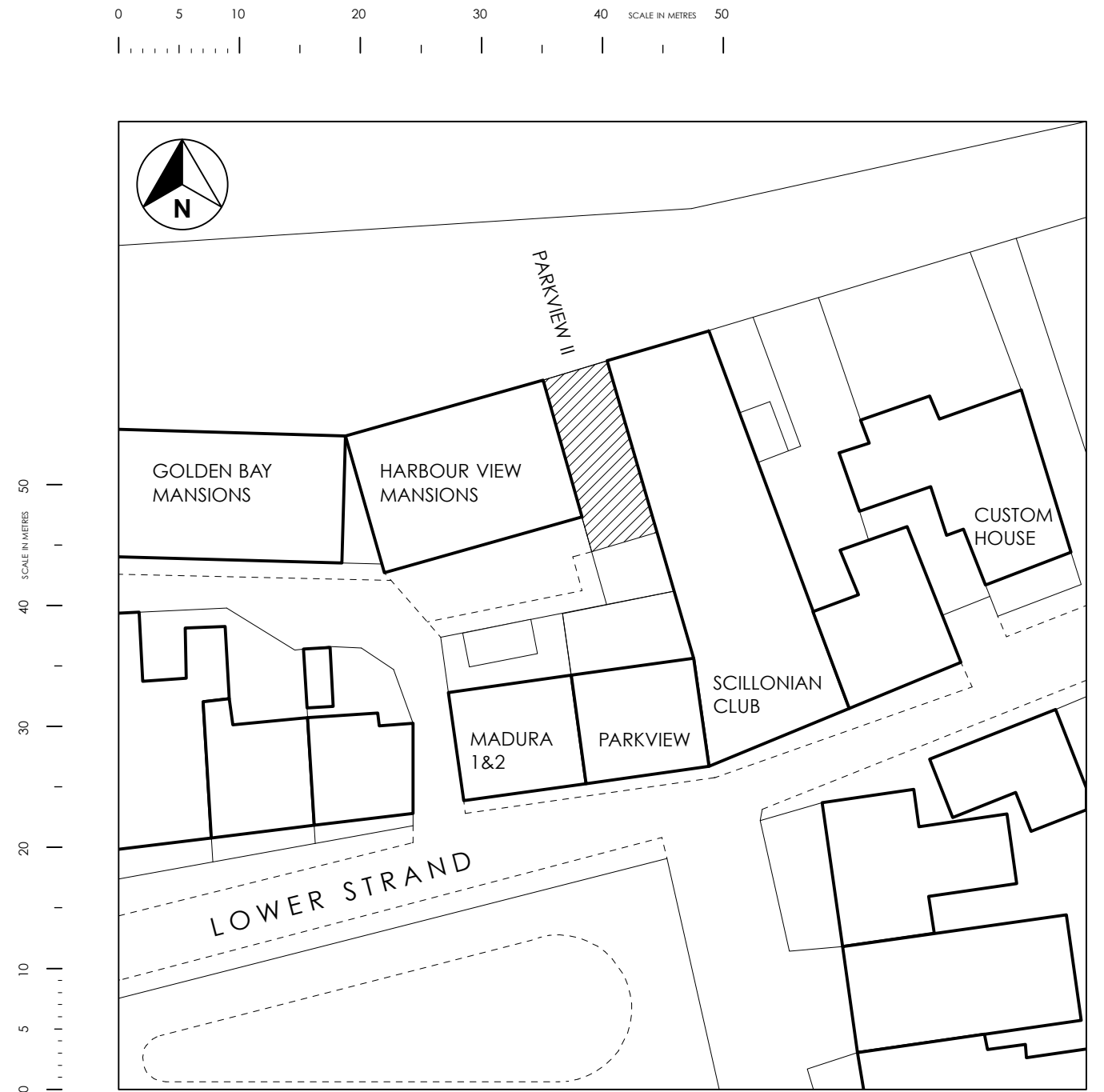
9.12 Following the guidelines contained within the NPPF, the proposed development could be considered suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.



## Appendix I - Site Plans



LOCATION PLAN 1:1250



BLOCK PLAN 1:500

**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S

**SITE PLAN**  
**BLOCK PLAN**

DRW NO. PV01  
 DATE - FEB 2021  
 SCALE AS SHOWN @ A3

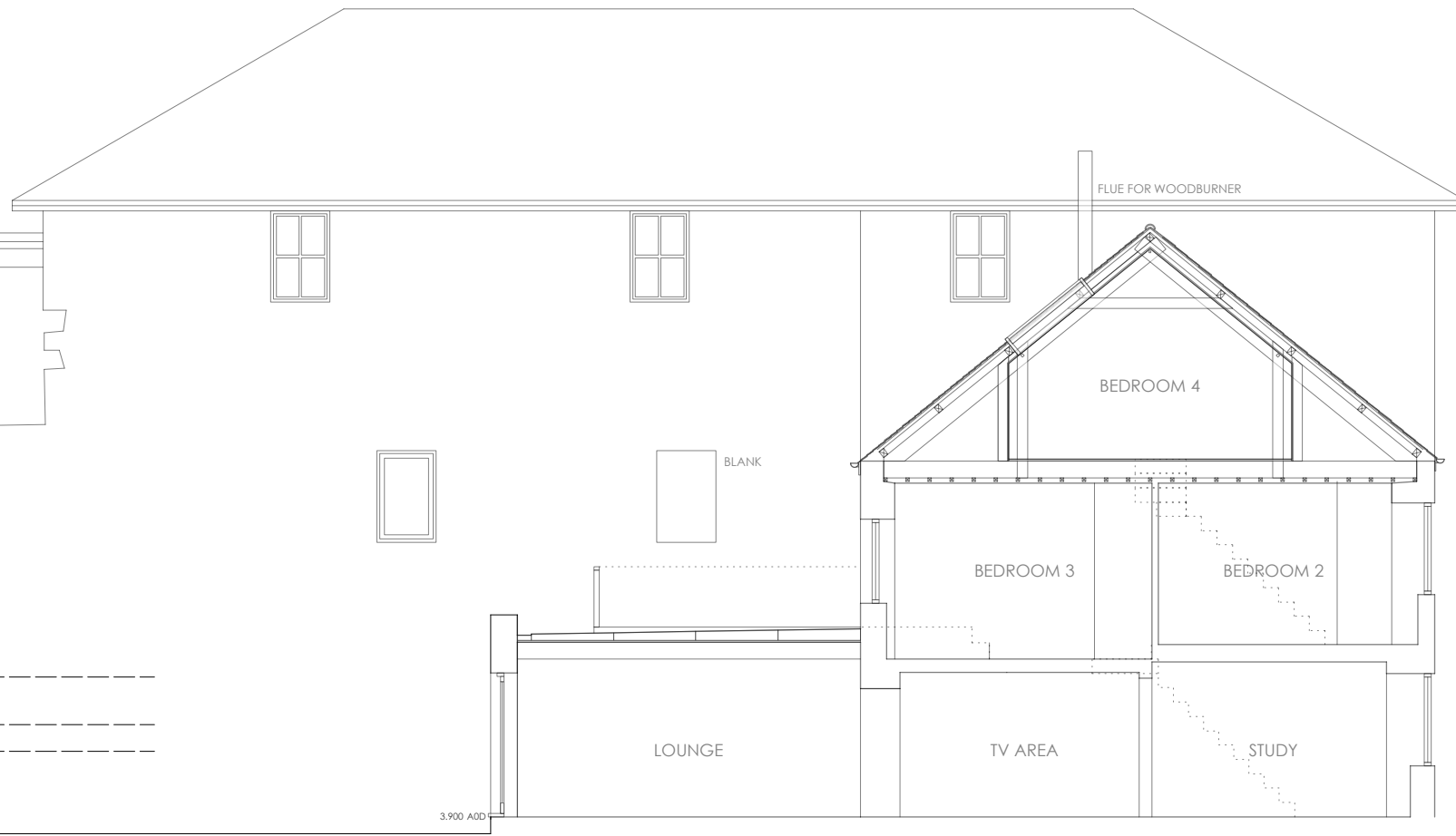
0 5 10 SCALE IN METRES 20 30

SCALE IN METRES 10

5

0

6.180 AOD HIGH ++ CC  
5.490 AOD UPPER END CC  
5.100 AOD HIGHER-CENTRAL CC  
3.659 AOD LOWEST POINT SITE LEVEL

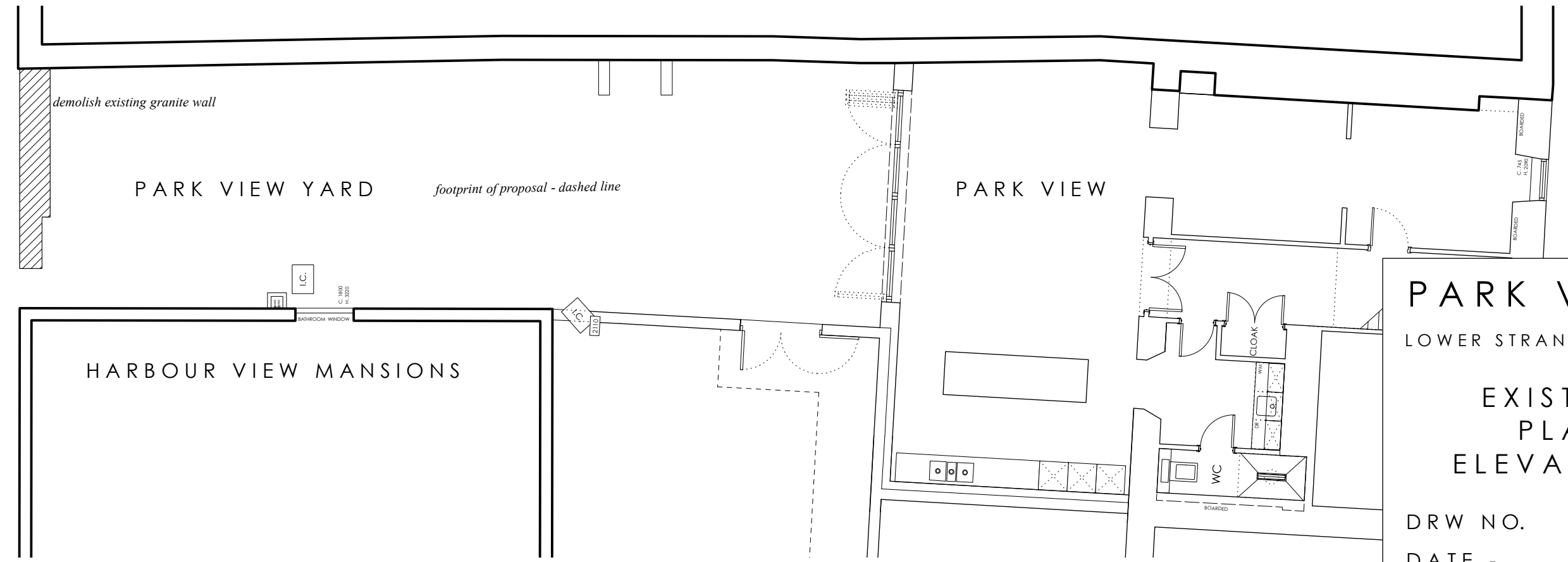


SCILLONIAN CLUB ELEVATION

0

5

SCALE IN METRES 10



EXISTING GROUND FLOOR PLAN

**PARK VIEW 2**  
LOWER STRAND, ST MARY'S  
**EXISTING  
PLAN  
ELEVATIONS**  
DRW NO. PV02  
DATE - FEB 2021  
SCALE - 1:100 @ A3

30

20

10 SCALE IN METRES

5

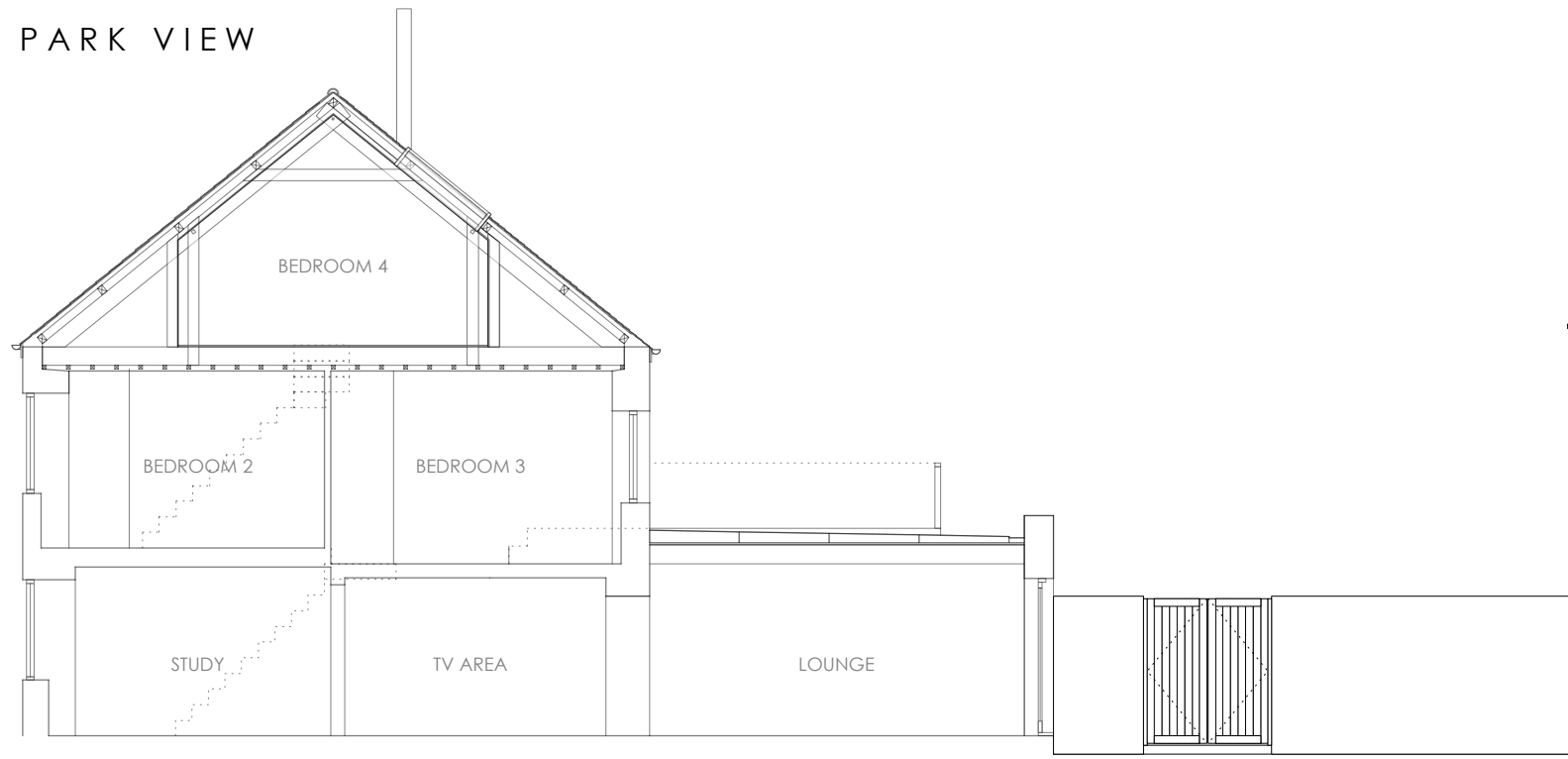
0

SCALE IN METRES  
10

5

0

PARK VIEW



HARBOUR VIEW



HARBOUR VIEW ELEVATION

SCALE IN METRES  
10

5

0

SCILLONIAN CLUB



HARBOUR VIEW



TOWN BEACH ELEVATION

**PARK VIEW 2**

LOWER STRAND, ST MARY'S

**EXISTING  
ELEVATIONS**

DRW NO. PV03

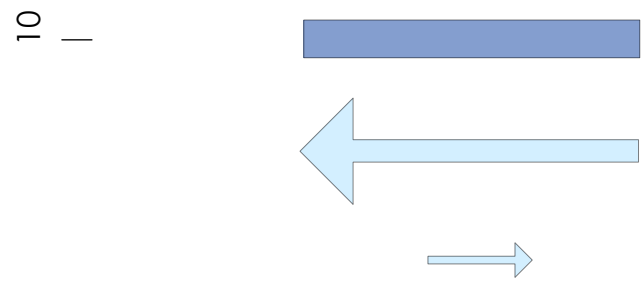
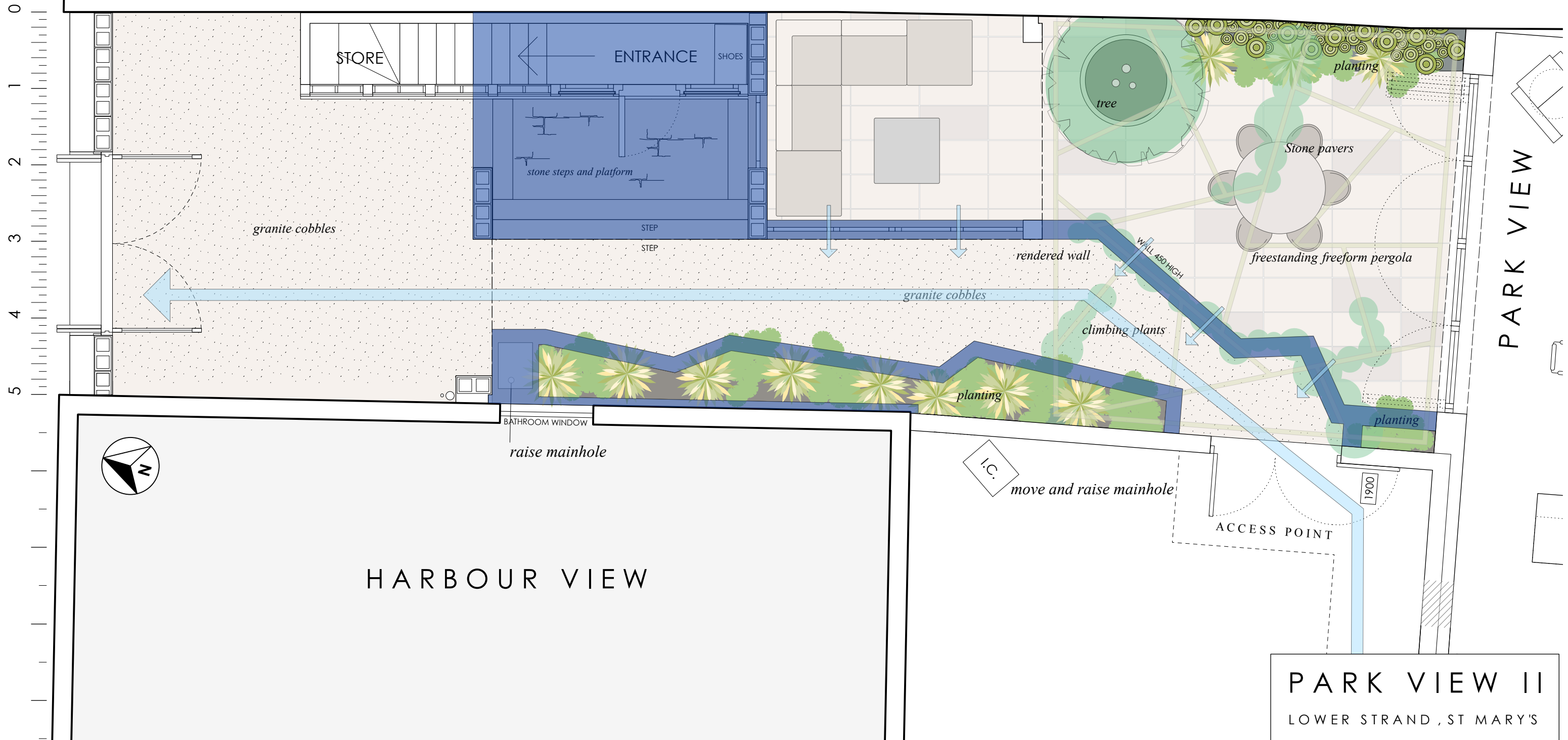
DATE - FEB 2021

SCALE - 1:100 @ A3

0 1 2 3 4 5 10

SCALE IN METRES

# THE SCILLONIAN CLUB



DARK BLUE SHADED AREA DENOTES AREAS AT 450MM ABOVE GROUND LEVEL

FREE FLOW OF SURFACE AND FLOOD WATERS

ONE WAY FLOW VALVES TO LOW LEVEL WALL

## PARK VIEW II

LOWER STRAND, ST MARY'S

### GROUND FLOOR CONTEXTUAL

DRW NO. PV04

DATE - FEB 2021

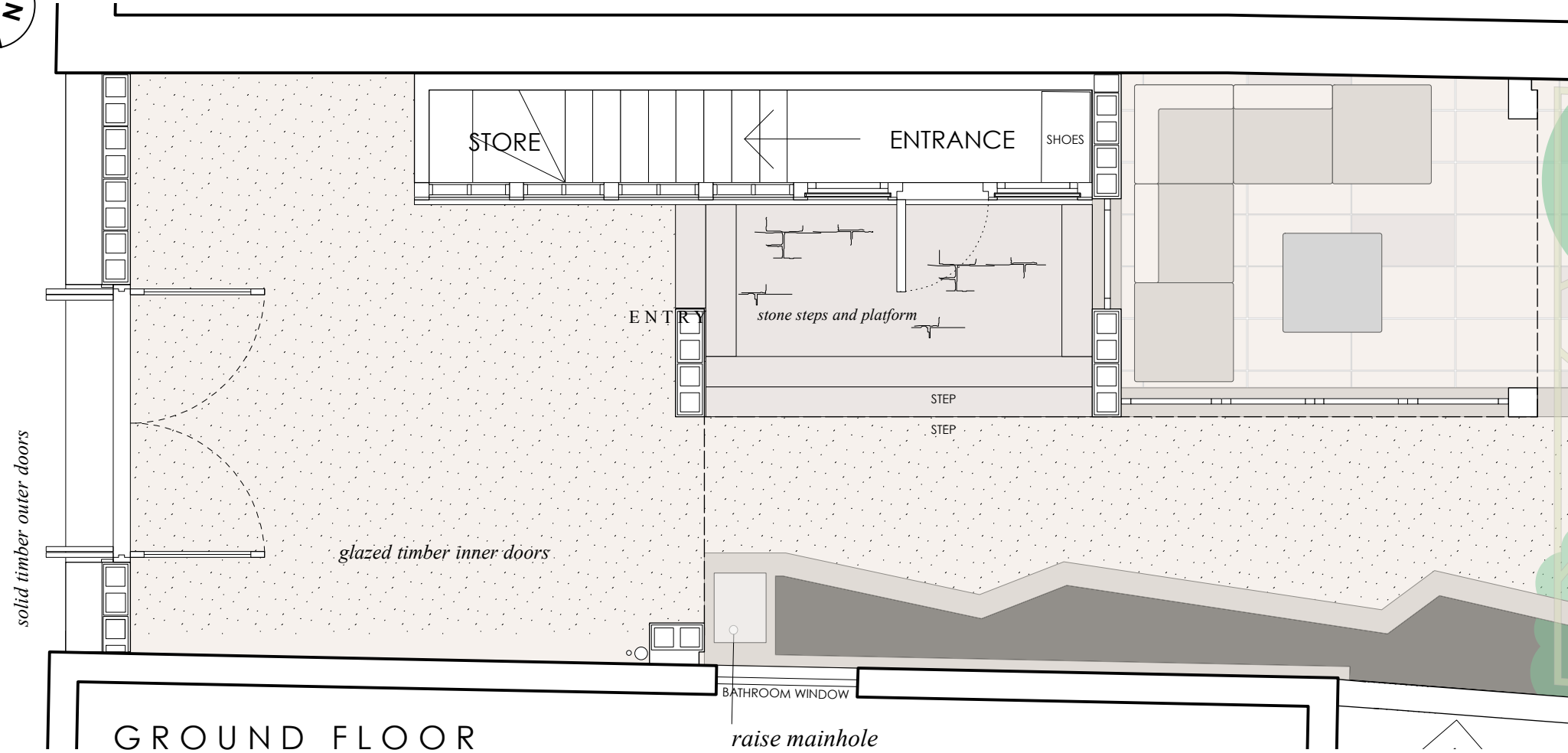
SCALE - 1:50 @ A3



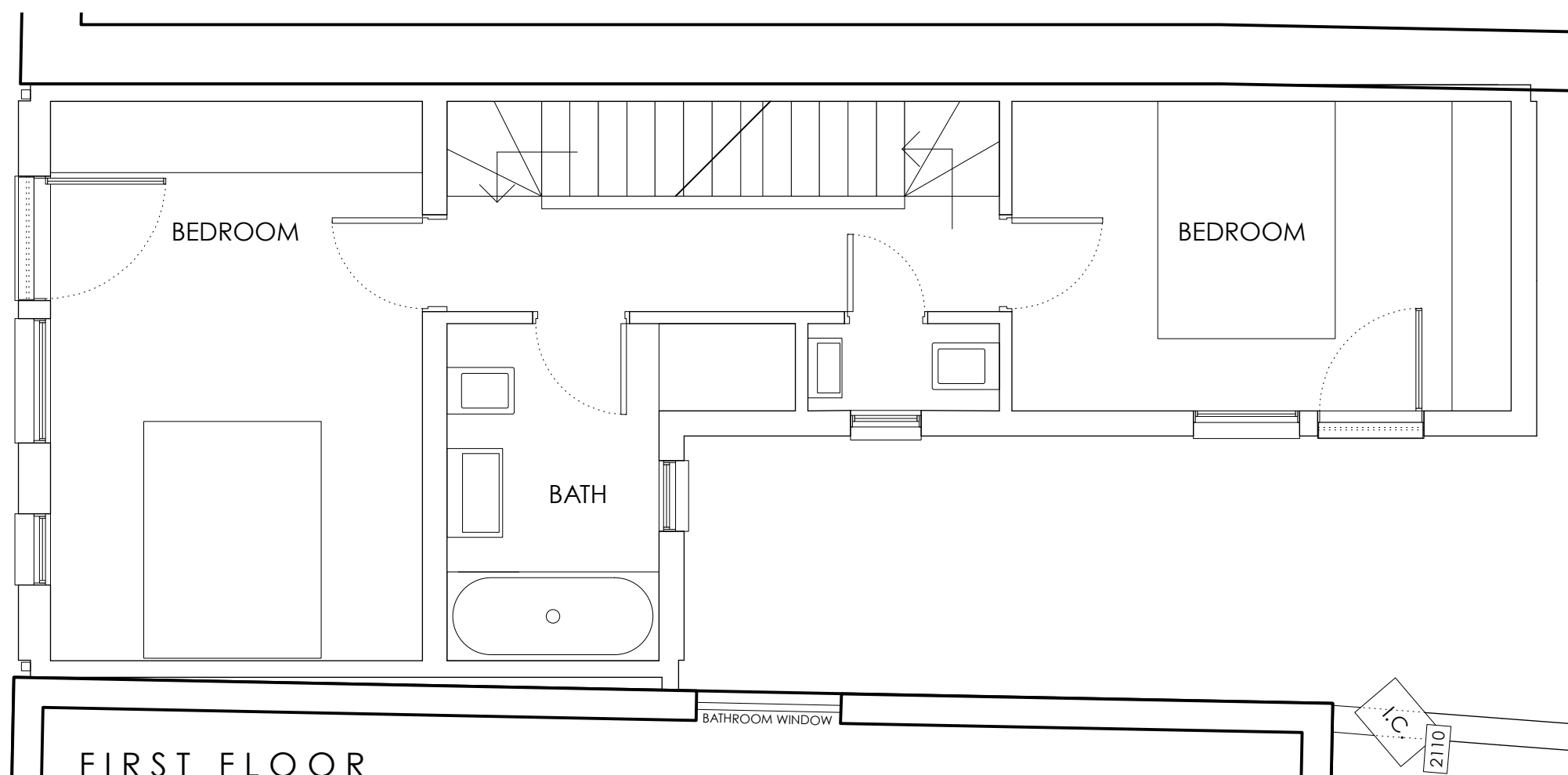
0 1 2 3 4 5 10

SCALE IN METRES

0  
1  
2  
3  
4  
5

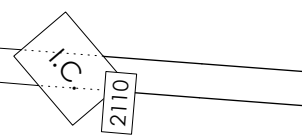


0  
1  
2  
3  
4  
5



**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S  
**PROPOSED  
 GROUND / FIRST**

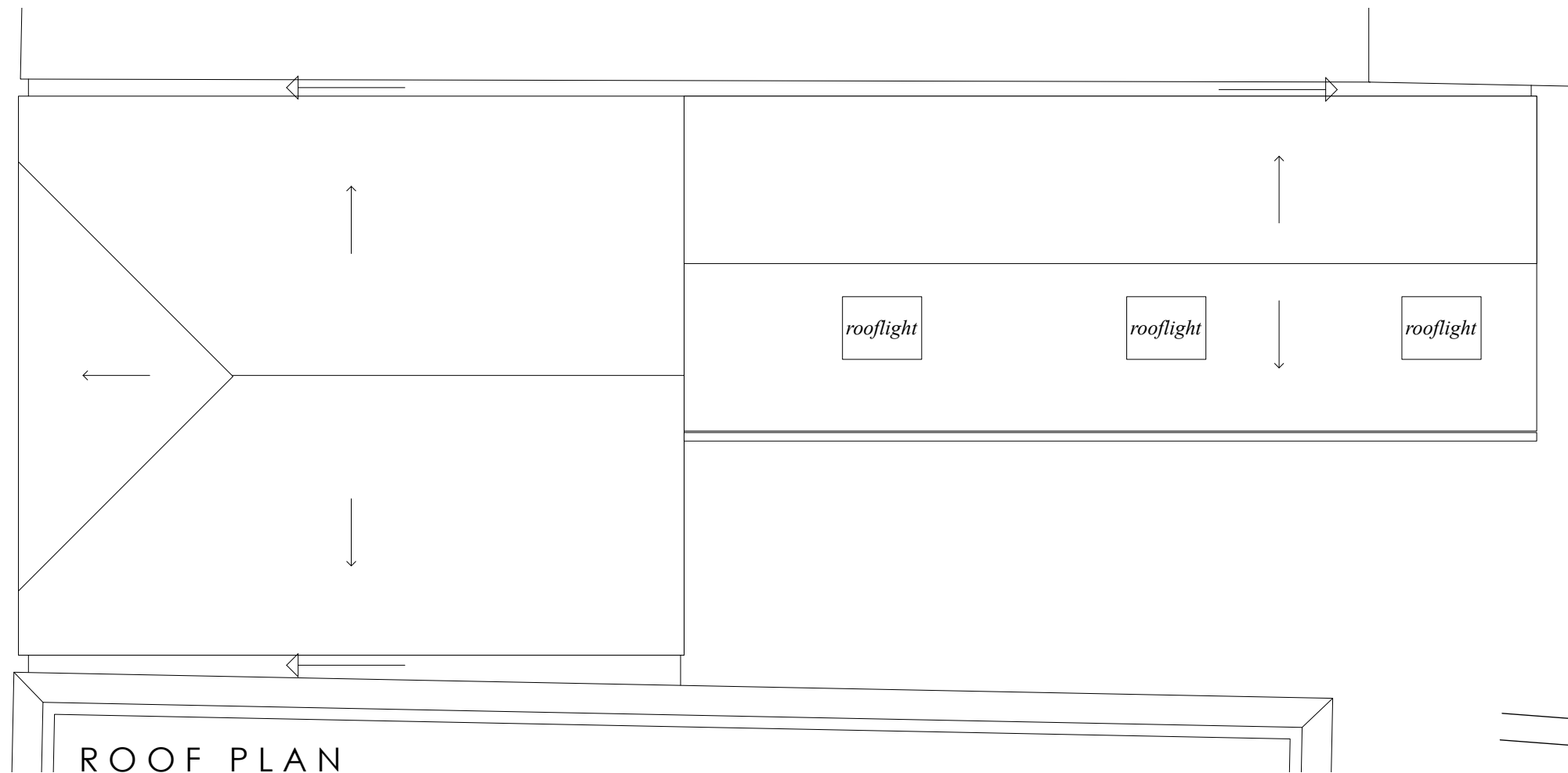
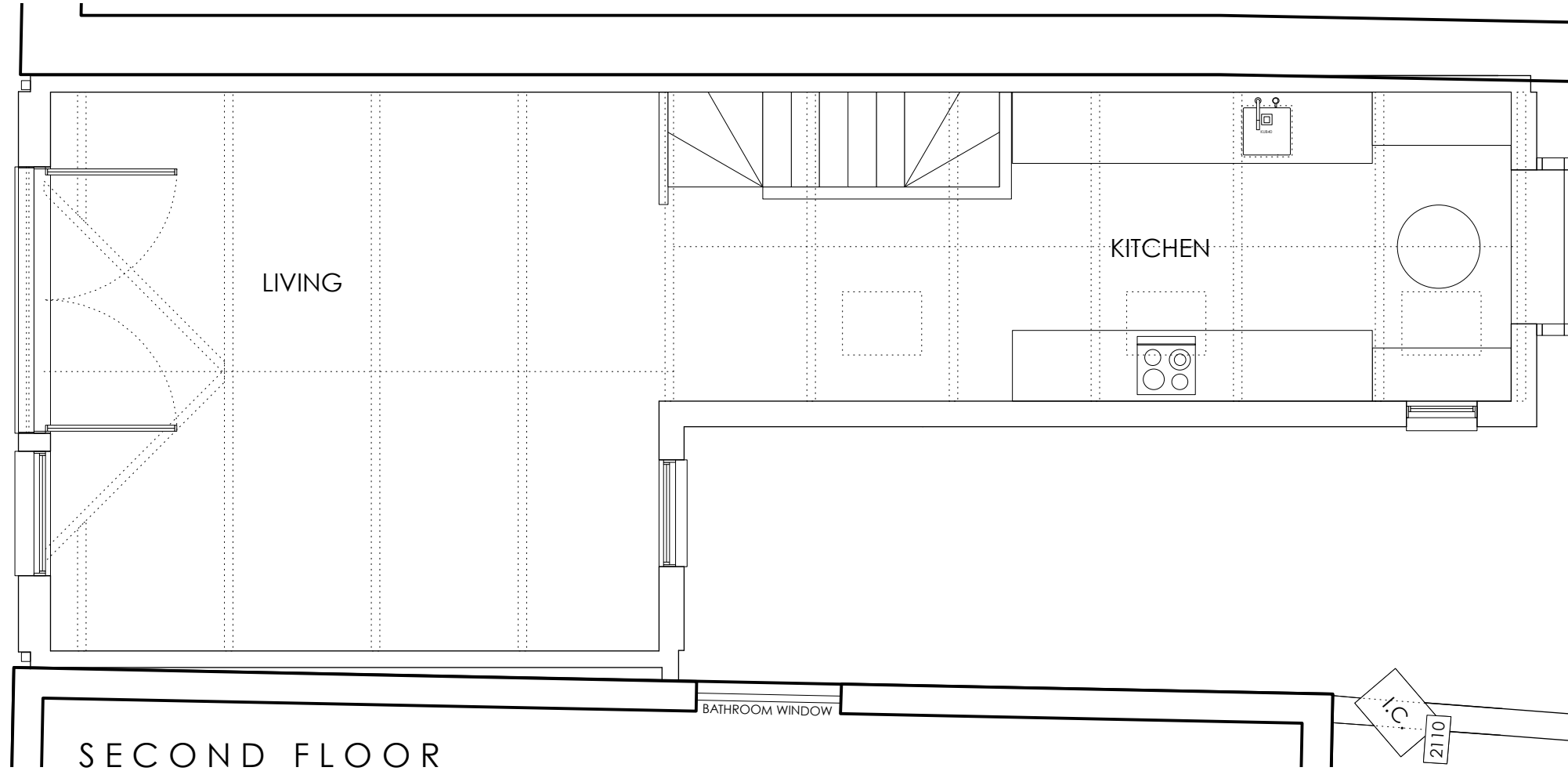
DRW NO. PV05  
 DATE - FEB 2021  
 SCALE - 1:50 @ A3





0 1 2 3 4 5 10

SCALE IN METRES



# PARK VIEW 2

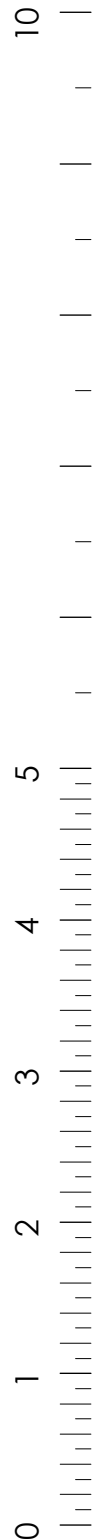
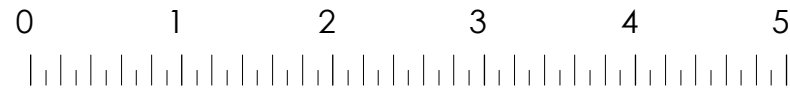
LOWER STRAND, ST MARY'S

## PROPOSED SECOND / ROOF

DRW NO. PV06

DATE - FEB 2021

SCALE - 1:50 @ A3



*furniture hoist in green oak*

*butt jointed 150 x 20 mm timber rainscreen and edging timbers  
Stainless steel nail fixings*

*Powder coated aluminium doors and fixed panel*

*glass juliet balcony with oak handrail*

*Powder coated aluminium door and fixed panel*

*glass juliet balcony with oak handrail*

*square aluminium rainwater pipes with powder coating finish*

*Timber storm doors*

*local granite*

*recesses / boundary junctions in powder coated aluminium flashing*

*Powder coated aluminium side hung window*

SCILLONIAN CLUB

BEACH ELEVATION

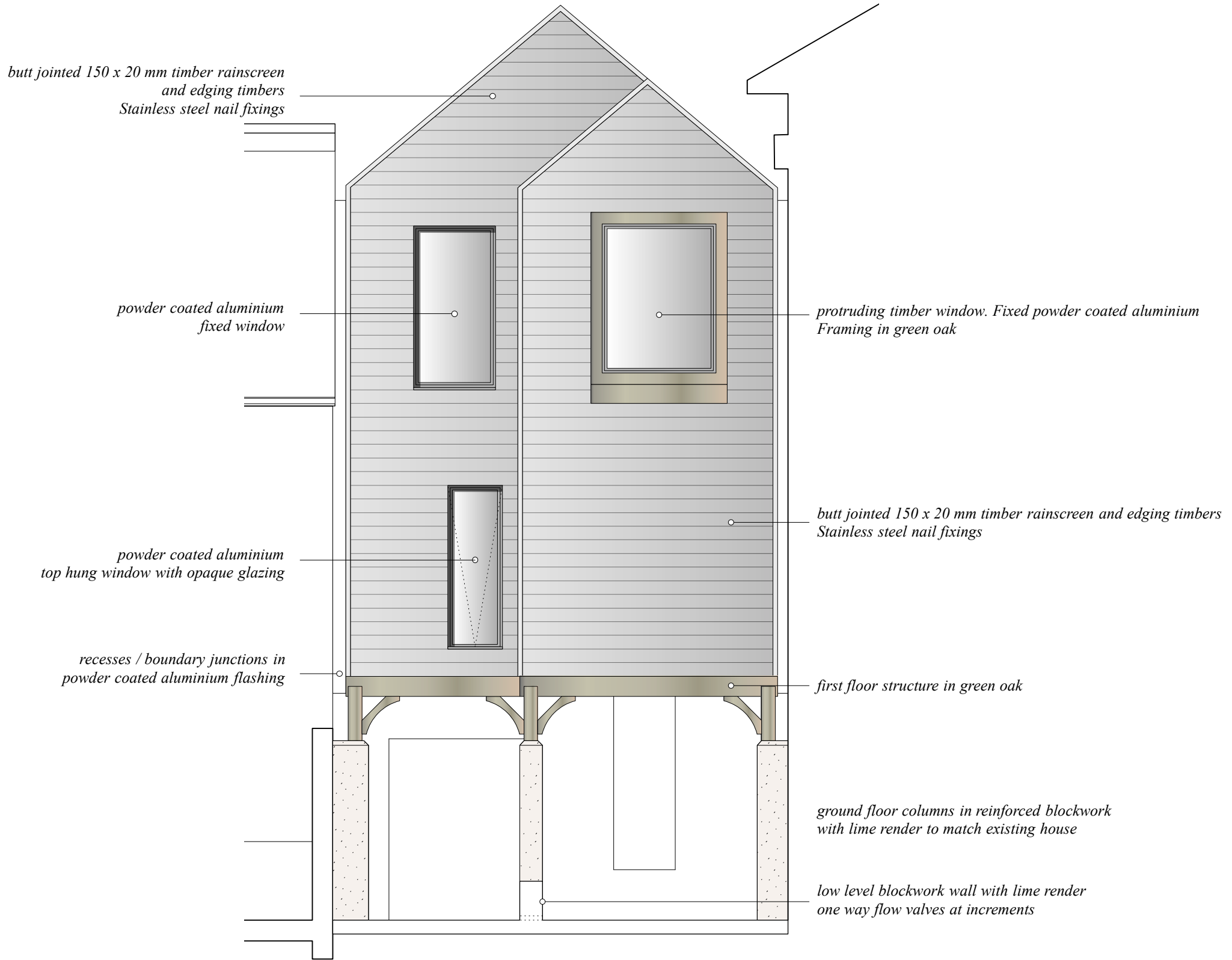
HARBOUR VIEW

**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S

**ELEVATION  
 BEACH FACING**

DRW NO. PV07  
 DATE - FEB 2021  
 SCALE - 1:50 @ A3





REAR ELEVATION

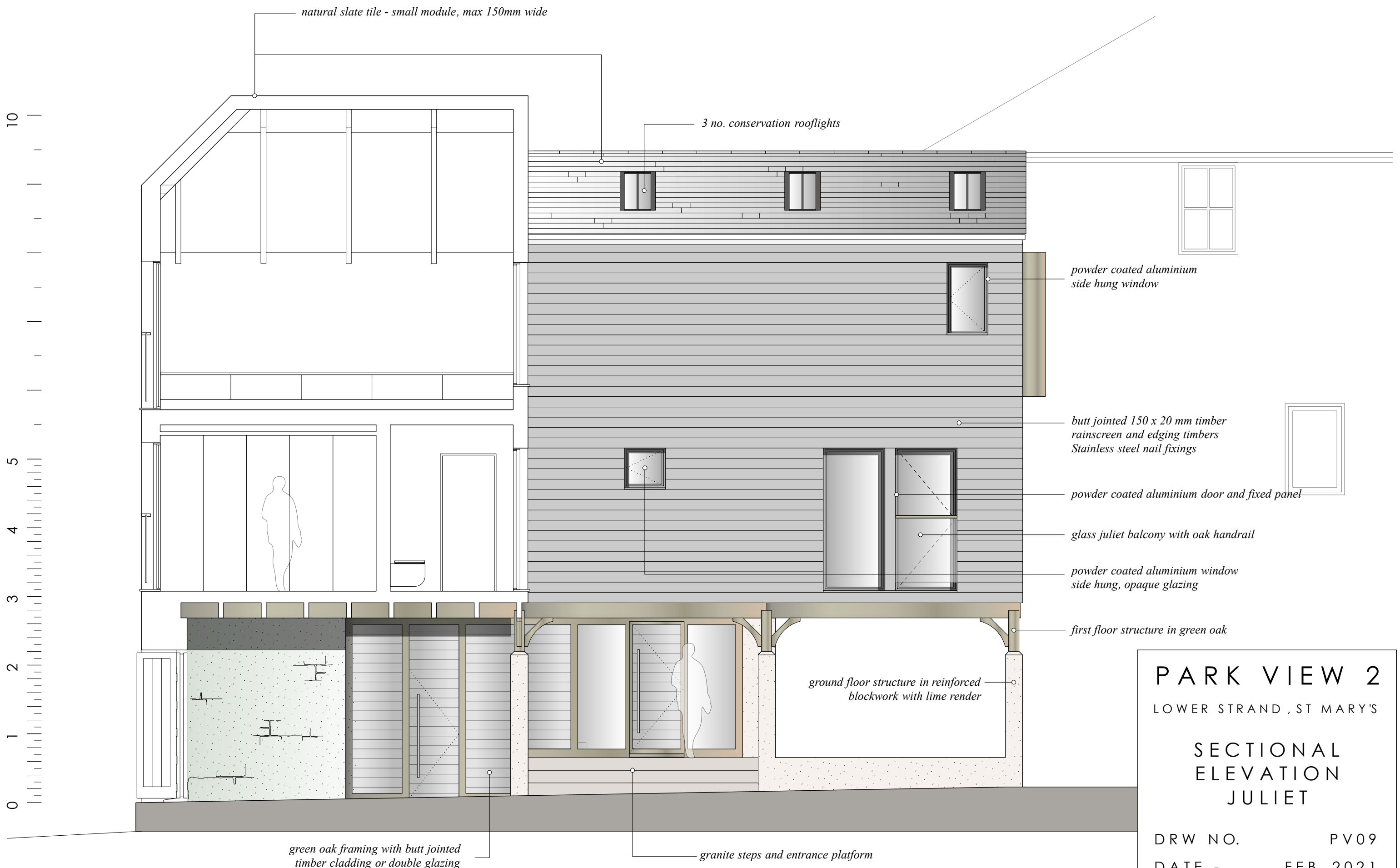
**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S

**REAR ELEVATIONS**

DRW NO. PV08  
 DATE - FEB 2021  
 SCALE - 1:50 @ A3

0 1 2 3 4 5 10

SCALE IN METRES



green oak framing with butt jointed timber cladding or double glazing

granite steps and entrance platform

ground floor structure in reinforced blockwork with lime render

first floor structure in green oak

powder coated aluminium window side hung, opaque glazing

glass Juliet balcony with oak handrail

powder coated aluminium door and fixed panel

butt jointed 150 x 20 mm timber rainscreen and edging timbers  
Stainless steel nail fixings

powder coated aluminium side hung window

3 no. conservation rooflights

natural slate tile - small module, max 150mm wide

# SECTIONAL ELEVATION

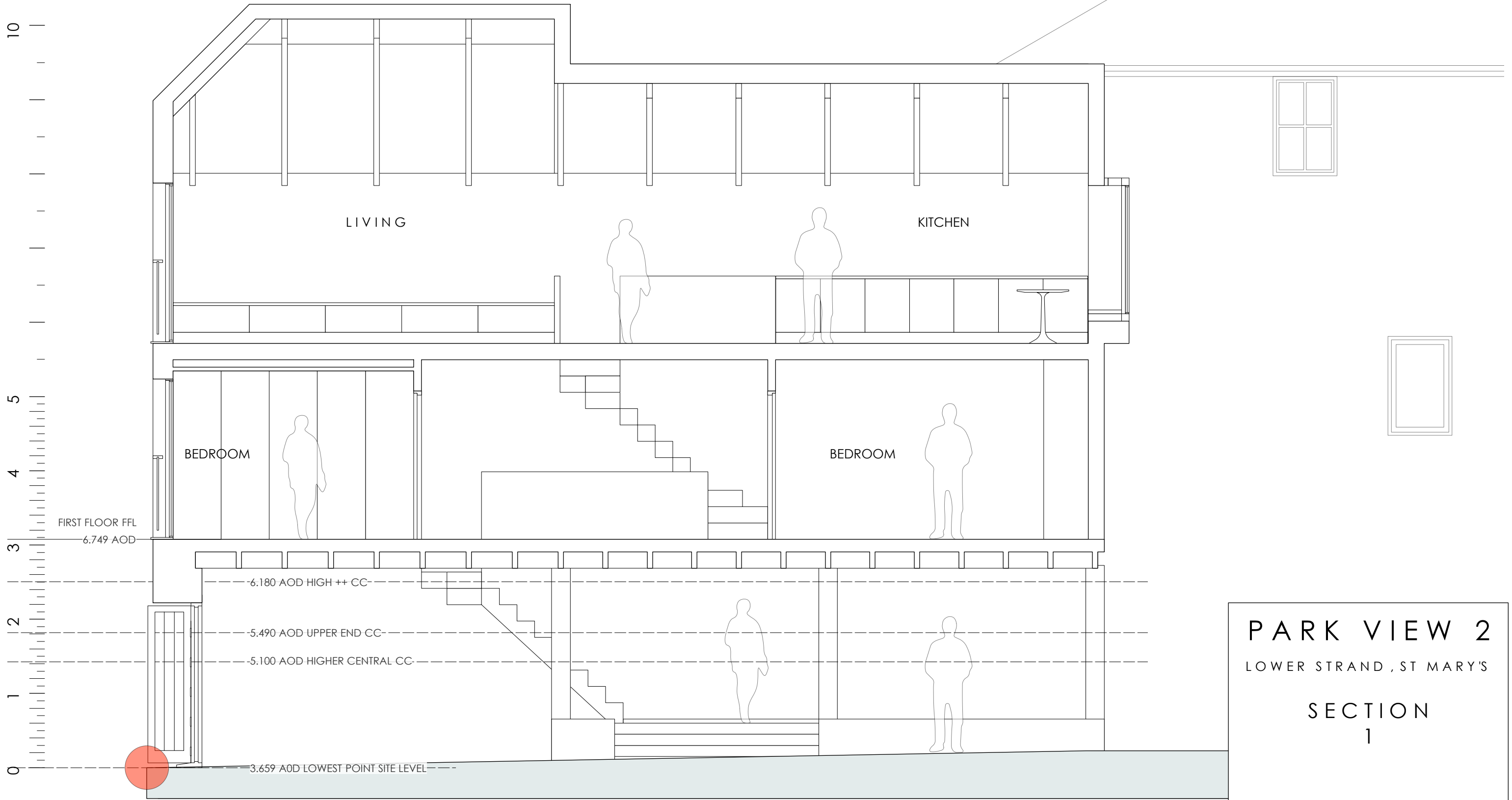
**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S

**SECTIONAL ELEVATION JULIET**

DRW NO. PV09  
 DATE - FEB 2021  
 SCALE - 1:50 @ A3



SCALE IN METRES



LIVING

KITCHEN

BEDROOM

BEDROOM

FIRST FLOOR FFL  
6.749 AOD

-6.180 AOD HIGH ++ CC-

-5.490 AOD UPPER END CC-

-5.100 AOD HIGHER CENTRAL CC-

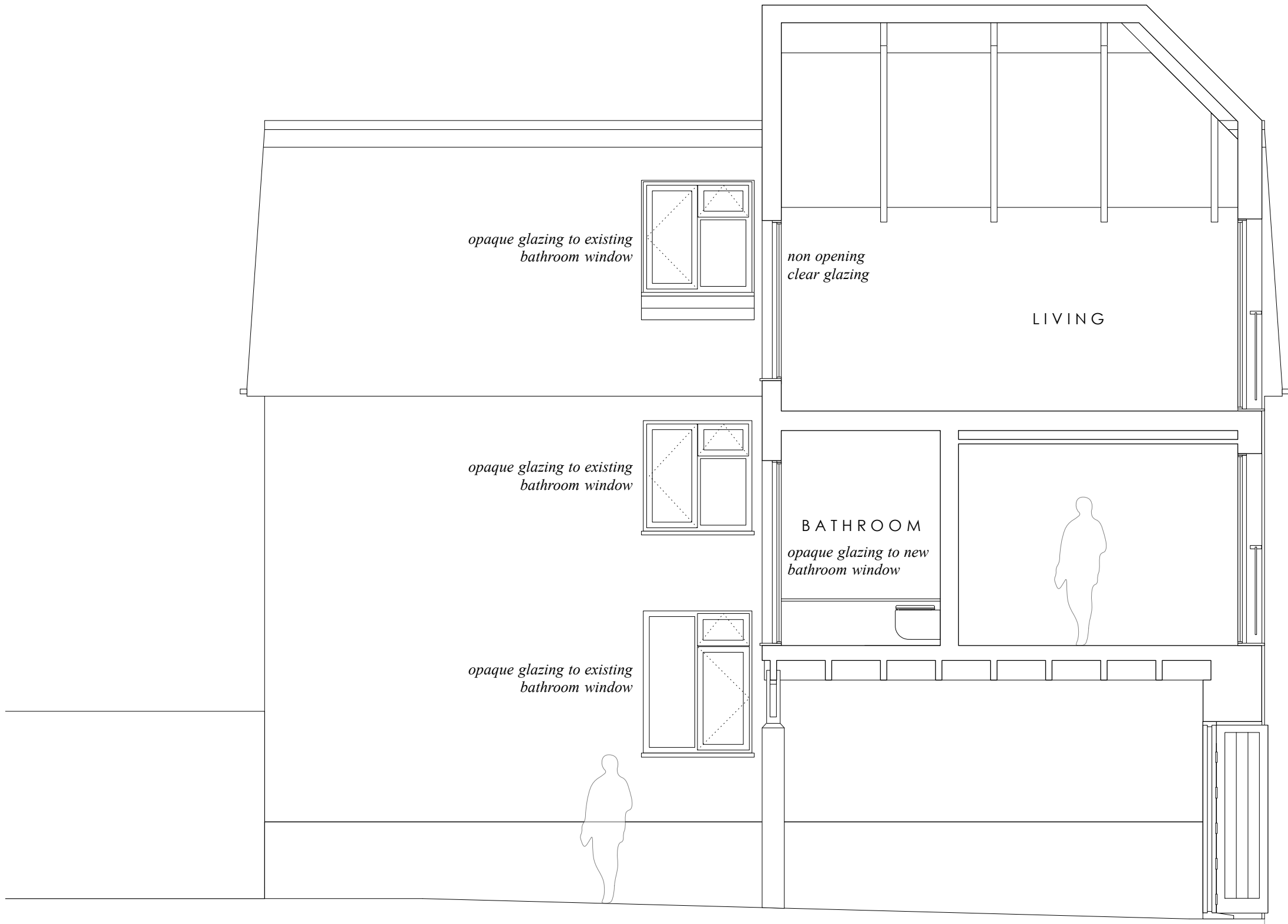
-3.659 AOD LOWEST POINT SITE LEVEL-

**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S  
**SECTION 1**

DRW NO. PV10  
 DATE - FEB 2021  
 SCALE - 1:50 @ A3

10 5 4 3 2 1 0

10 5 4 3 2 1 0



**PARK VIEW 2**  
 LOWER STRAND, ST MARY'S

**SECTION 2**

DRW NO. PV11  
 DATE - FEB 2021  
 SCALE - 1:50 @ A3

## Appendix II - EA Data and Climate Change Calculations

Model Year  
 Catchment

2019
South west

Modify only the ORANGE CELLS. All others will update automatically

		Year				
Start Year		2019	2036	2066	2096	
End Year		2035	2065	2095	2125	
<i>Length of time (years)</i>		16	30	30	30	
Sea level rise per year (mm)	Higher Central	5.8	8.8	11.7	13.1	Cumulative sea-level rise 2019 to 2125 (metres)
	Upper End	7	11.4	16	18.4	
	High++	6	12.5	24	33	
Cumulative rise (mm)	Higher Central	93	264	351	393	1.10
	Upper End	112	342	480	552	1.49
	High++	96	375	720	990	2.18

Note tha High++ allowance has not been updated by EA in 2019. It remains a blanket allowance across the country, based on old CP09 data

Table 5 Mean sea level allowance (compared to 1990 baseline, includes land movements)

Change to relative mean sea level	Sea level rise mm/yr up to 2025	Sea level rise mm/yr 2026 to 2050	Sea level rise mm/yr 2051 to 2080	Sea level rise mm/yr 2081 to 2115
H++ scenario	6	12.5	24	33
Upper end estimate	4	7	11	15
Change factor	Use UKCP09 relative sea level rise medium emission 95% projection for the project location available from the user interface.			
Lower end estimate	Use UKCP09 relative sea level rise low emission 50% projection for the project location available from the user interface.			

Area of England	Allowance	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres)
<b>Anglian</b>	Higher central	5.8 (203)	8.7 (261)	11.6 (348)	13 (390)	1.2
<b>Anglian</b>	Upper end	7 (245)	11.3 (339)	15.8 (474)	18.1 (543)	1.6
<b>South east</b>	Higher central	5.7 (200)	8.7 (261)	11.6 (348)	13.1 (393)	1.2
<b>South east</b>	Upper end	6.9 (242)	11.3 (339)	15.8 (474)	18.2 (546)	1.6
<b>South west</b>	Higher central	5.8 (203)	8.8 (264)	11.7 (351)	13.1 (393)	1.21
<b>South west</b>	Upper end	7 (245)	11.4 (342)	16 (480)	18.4 (552)	1.62
<b>Northumbria</b>	Higher central	4.6 (161)	7.5 (225)	10.1 (303)	11.2 (336)	1.03
<b>Northumbria</b>	Upper end	5.8 (203)	10 (300)	14.3 (429)	16.5 (495)	1.43
<b>Humber</b>	Higher central	5.5 (193)	8.4 (252)	11.1 (333)	12.4 (372)	1.15
<b>Humber</b>	Upper end	6.7 (235)	11 (330)	15.3 (459)	17.6 (528)	1.55
<b>North west</b>	Higher central	4.5 (158)	7.3 (219)	10 (300)	11.2 (336)	1.01
<b>North west</b>	Upper end	5.7 (200)	9.9 (297)	14.2 (426)	16.3 (489)	1.41

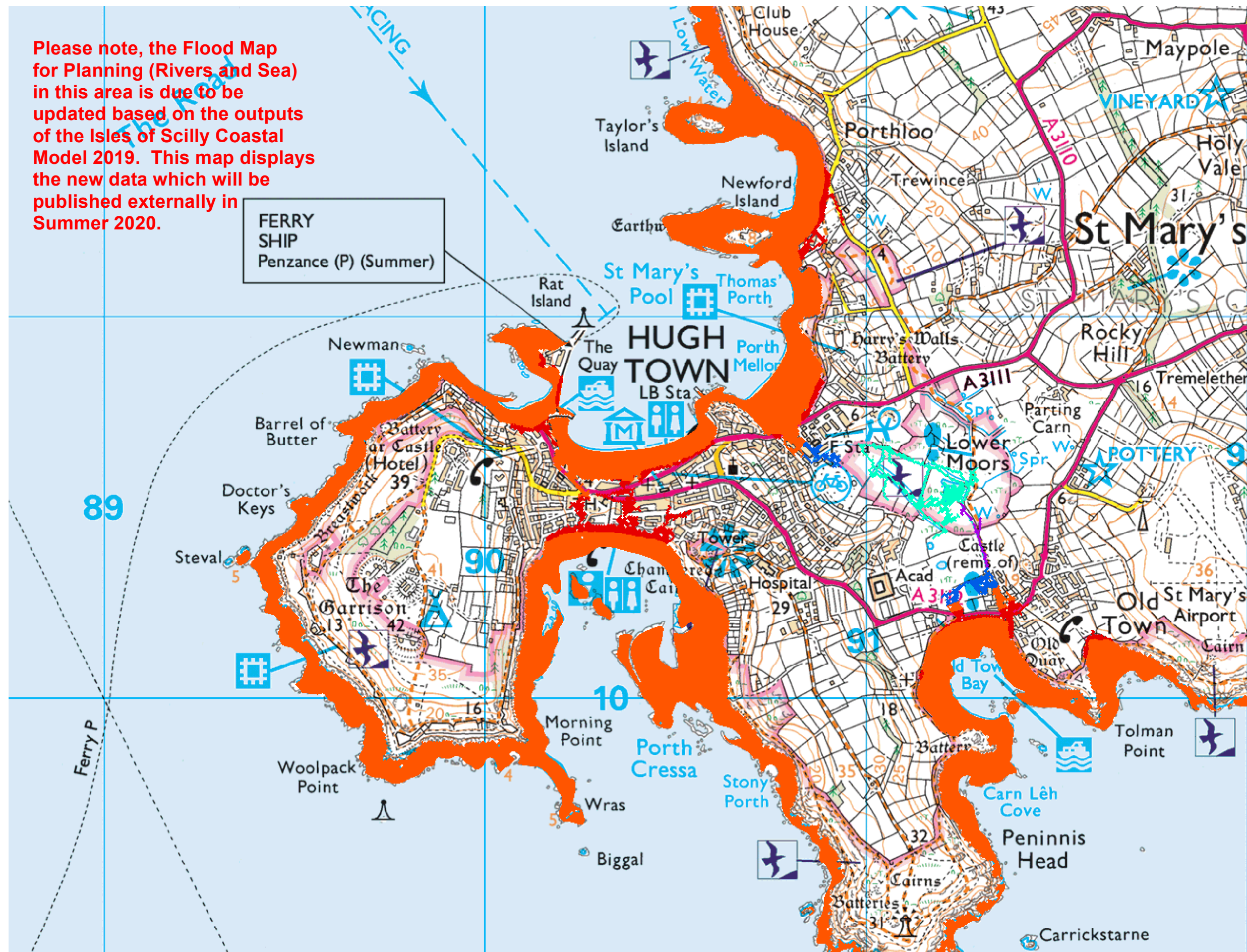
# ENQ20/DCIS/169339 - Head of Water Map undefended 1 in 200 year taken from the Isles of Scilly Coastal Model 2019 centred on Lower Strand, St Mary's



Please note this map is intended only as a guide - it is not accurate at individual property level

Please note, the Flood Map for Planning (Rivers and Sea) in this area is due to be updated based on the outputs of the Isles of Scilly Coastal Model 2019. This map displays the new data which will be published externally in Summer 2020.

FERRY SHIP  
Penzance (P) (Summer)



### Legend

St Marys Undef 1 in 200 year - head of water

mAO

- 1.8 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 4.0
- 4.0 - 5.5

Head of Water  
This map displays the head of water (mAO) across the site for a 1 in 200 year (0.5% AEP) event, taken from the Isles of Scilly Coastal Model 2019 and includes an allowance for wave overtopping.

1:10,000 Correct as of the 27<sup>th</sup> April 2020

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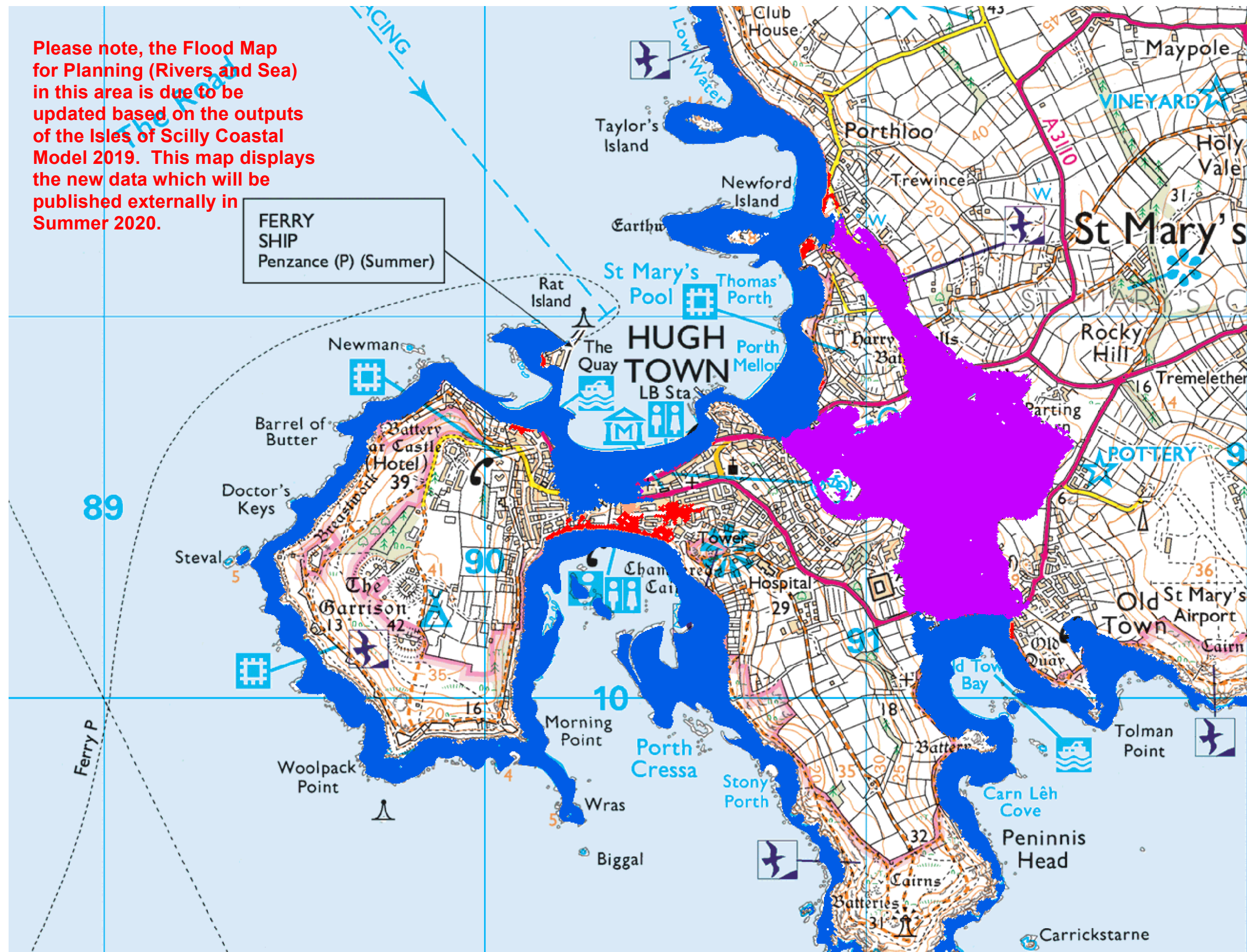
# ENQ20/DCIS/169339 - Head of Water Map undefended 1 in 200 year+cc taken from the Isles of Scilly Coastal Model 2019 centred on Lower Strand, St Mary's



Please note this map is intended only as a guide - it is not accurate at individual property level

Please note, the Flood Map for Planning (Rivers and Sea) in this area is due to be updated based on the outputs of the Isles of Scilly Coastal Model 2019. This map displays the new data which will be published externally in Summer 2020.

FERRY SHIP  
Penzance (P) (Summer)



### Legend

St Marys Undef 1 in 200 year+cc - head of water mAO

- 4.4 - 4.6
- 4.6 - 4.8
- 4.8 - 5.0
- 5.0 - 5.2
- 5.2 - 5.6

**Head of Water**  
This map displays the head of water (mAO) across the site for a 1 in 200 year (0.5% AEP) event, taken from the Isles of Scilly Coastal Model 2019 and includes an allowance for wave overtopping.

**Climate change scenarios**  
To calculate the impact of climate change on wave overtopping discharge rates, changes were applied to the water level, wind speeds and wave heights. For more information, please see the attached caveat.

1:10,000 Correct as of the 27<sup>th</sup> April 2020

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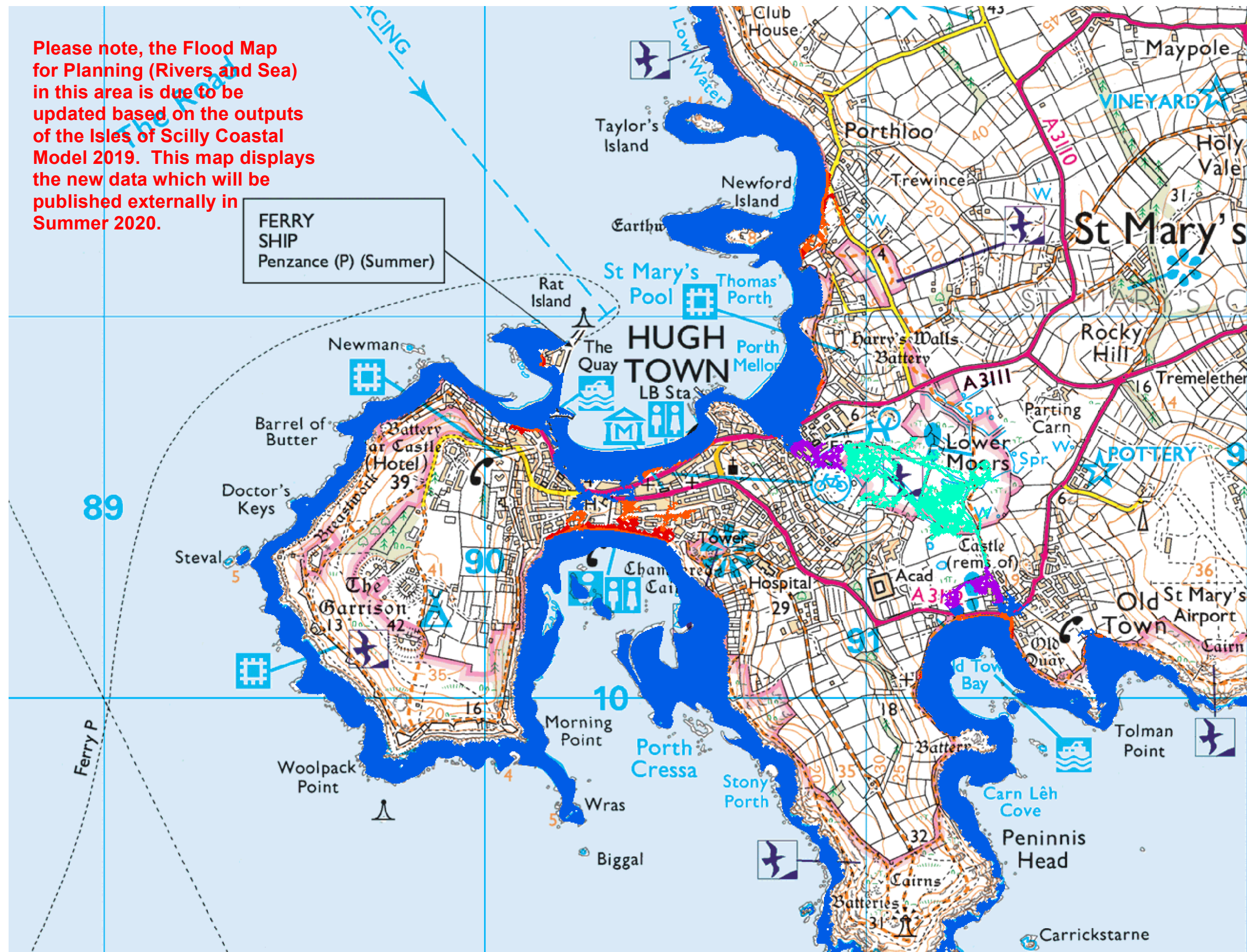
# ENQ20/DCIS/169339 - Head of Water Map undefended 1 in 1000 year taken from the Isles of Scilly Coastal Model 2019 centred on Lower Strand, St Mary's



Please note this map is intended only as a guide - it is not accurate at individual property level

Please note, the Flood Map for Planning (Rivers and Sea) in this area is due to be updated based on the outputs of the Isles of Scilly Coastal Model 2019. This map displays the new data which will be published externally in Summer 2020.

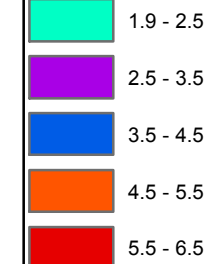
FERRY SHIP  
Penzance (P) (Summer)



### Legend

St Marys Undef 1 in 1000 year - head of water

mAO



Head of Water  
This map displays the head of water (mAO) across the site for a 1 in 1000 year (0.1% AEP) event, taken from the Isles of Scilly Coastal Model 2019 and includes an allowance for wave overtopping.

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## Isles of Scilly Coastal Model (2019)

We have provided data from the Isles of Scilly Coastal Model, 2019. Please consider the following information when using this model data:

- This is coastal model, and does not consider the risk of flooding from other source, including fluvial or surface water flooding.
- Model scenarios were completed with increases to the still water levels, wind speeds and wave heights to represent the impacts of climate change.
- The maps and digital data supplied should be considered only a summary of the conclusions of the study. It will be necessary to collect more detailed topographic information for particular sites where development is proposed and undertake a more detailed site-specific hydrological and hydraulic analysis for the location using guidance from the National Planning Policy Framework (NPPF)
- In this commission the focus has been on flooding from the sea rather than from fluvial sources. It is important that consideration is given to fluvial flooding for any development sites if appropriate. The impact of combined fluvial and tidal events should be examined to understand the impact that this has upon flood depth extent and the duration of inundation
- Any assessment of Flood Risk undertaken must be appropriate for the decisions that need to be based upon it, consider the risks and also take into account any limitations of the data used.
- Please be aware that the Environment Agency does not guarantee that this data is suitable for your purposes.

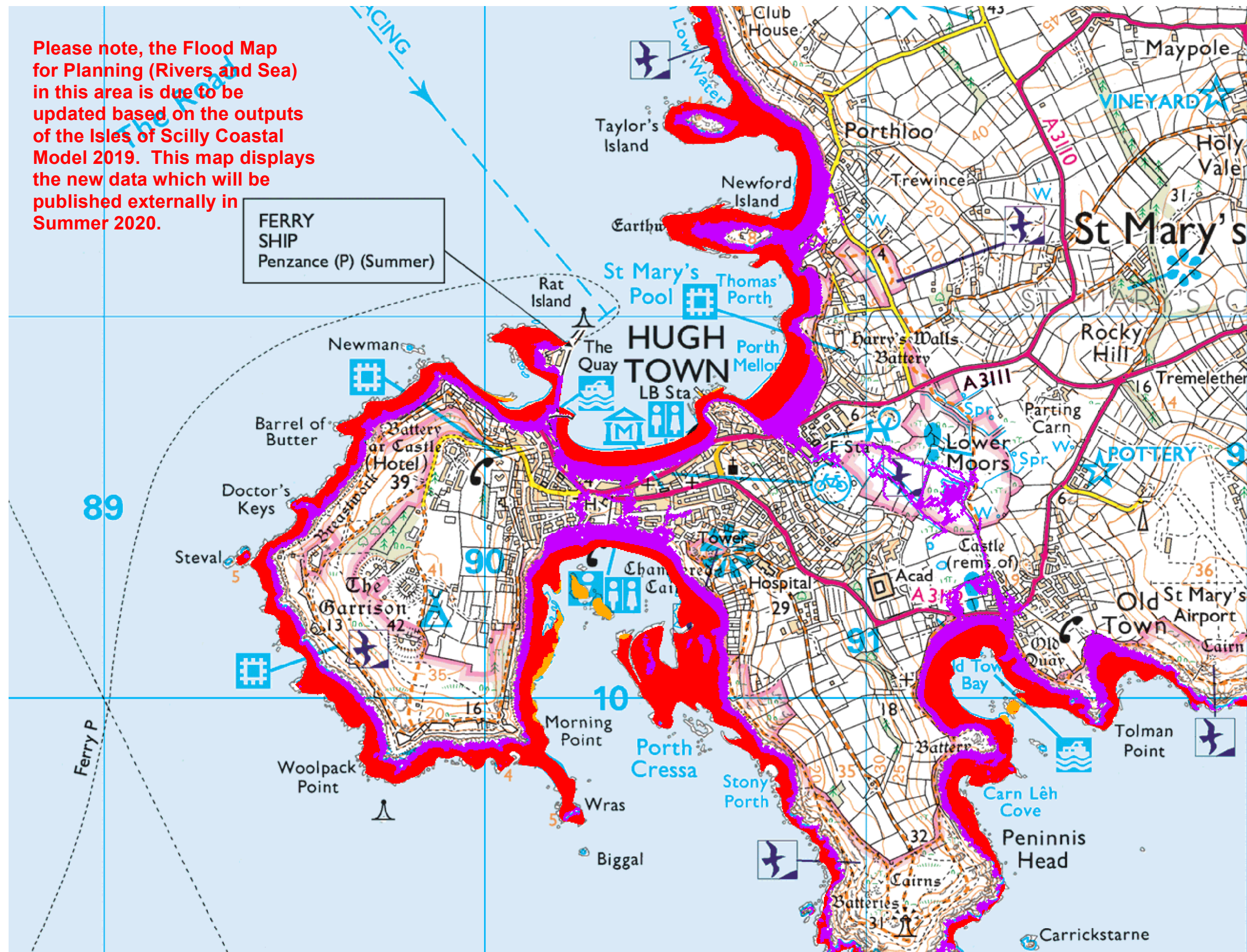
# ENQ20/DCIS/169339 - Depth Map undefended 1 in 200 year taken from the Isles of Scilly Coastal Model 2019 centred on Lower Strand, St Mary's



Please note this map is intended only as a guide - it is not accurate at individual property level

Please note, the Flood Map for Planning (Rivers and Sea) in this area is due to be updated based on the outputs of the Isles of Scilly Coastal Model 2019. This map displays the new data which will be published externally in Summer 2020.

FERRY SHIP  
Penzance (P) (Summer)



### Legend

St Marys Undef 1 in 200 year - depth metres

- 0.0 - 3.0
- 3.0 - 6.0
- 6.0 - 9.0
- 9.0 - 13
- 13 - 17
- 17 - 21
- 21 - 26
- 26 - 31
- 31 - 35
- 35 - 41

This map displays the depths (m) across the site for a 1 in 200 year (0.5% AEP) event, taken from the Isles of Scilly Coastal Model 2019 and includes an allowance for wave overtopping.

1:10,000 Correct as of the 27<sup>th</sup> April 2020

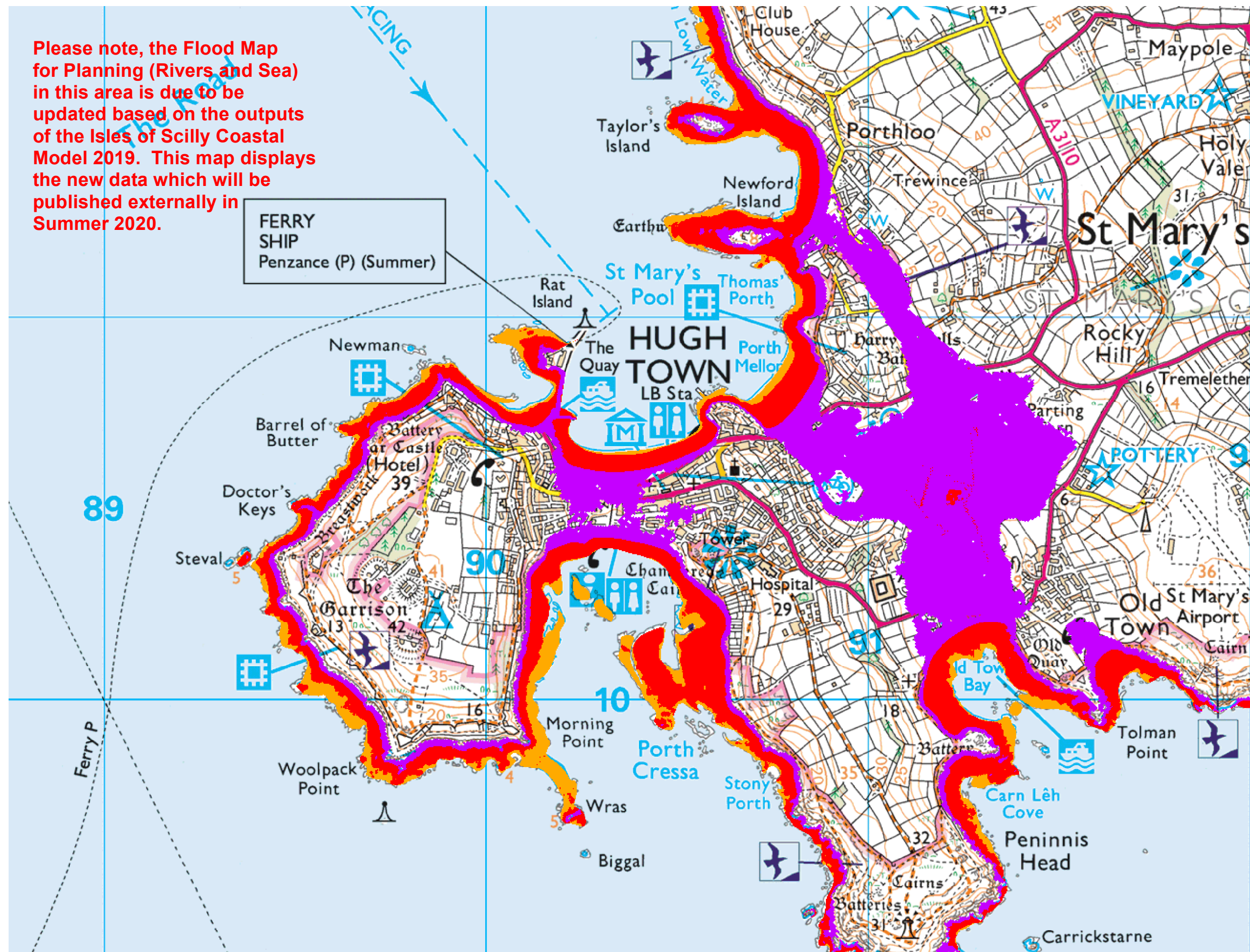
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# ENQ20/DCIS/169339 - Depth Map undefended 1 in 200 year + cc taken from the Isles of Scilly Coastal Model 2019 centred on Lower Strand, St Mary's

Please note this map is intended only as a guide - it is not accurate at individual property level

Please note, the Flood Map for Planning (Rivers and Sea) in this area is due to be updated based on the outputs of the Isles of Scilly Coastal Model 2019. This map displays the new data which will be published externally in Summer 2020.

FERRY SHIP  
Penzance (P) (Summer)



### Legend

St Marys Undef 1 in 200 year+cc - Depth metres

- 0.0 - 3.0
- 3.0 - 6.0
- 6.0 - 9.0
- 9.0 - 13
- 13 - 17
- 17 - 21
- 21 - 26
- 26 - 31
- 31 - 35
- 35 - 41

This map displays the depths (m) across the site for a 1 in 200 year (0.5% AEP) event, taken from the Isles of Scilly Coastal Model 2019 and includes an allowance for wave overtopping.

Climate change scenarios  
To calculate the impact of climate change on wave overtopping discharge rates, changes were applied to the water level, wind speeds and wave heights. For more information, please see the attached caveat.

1:10,000 Correct as of the 27<sup>th</sup> April 2020

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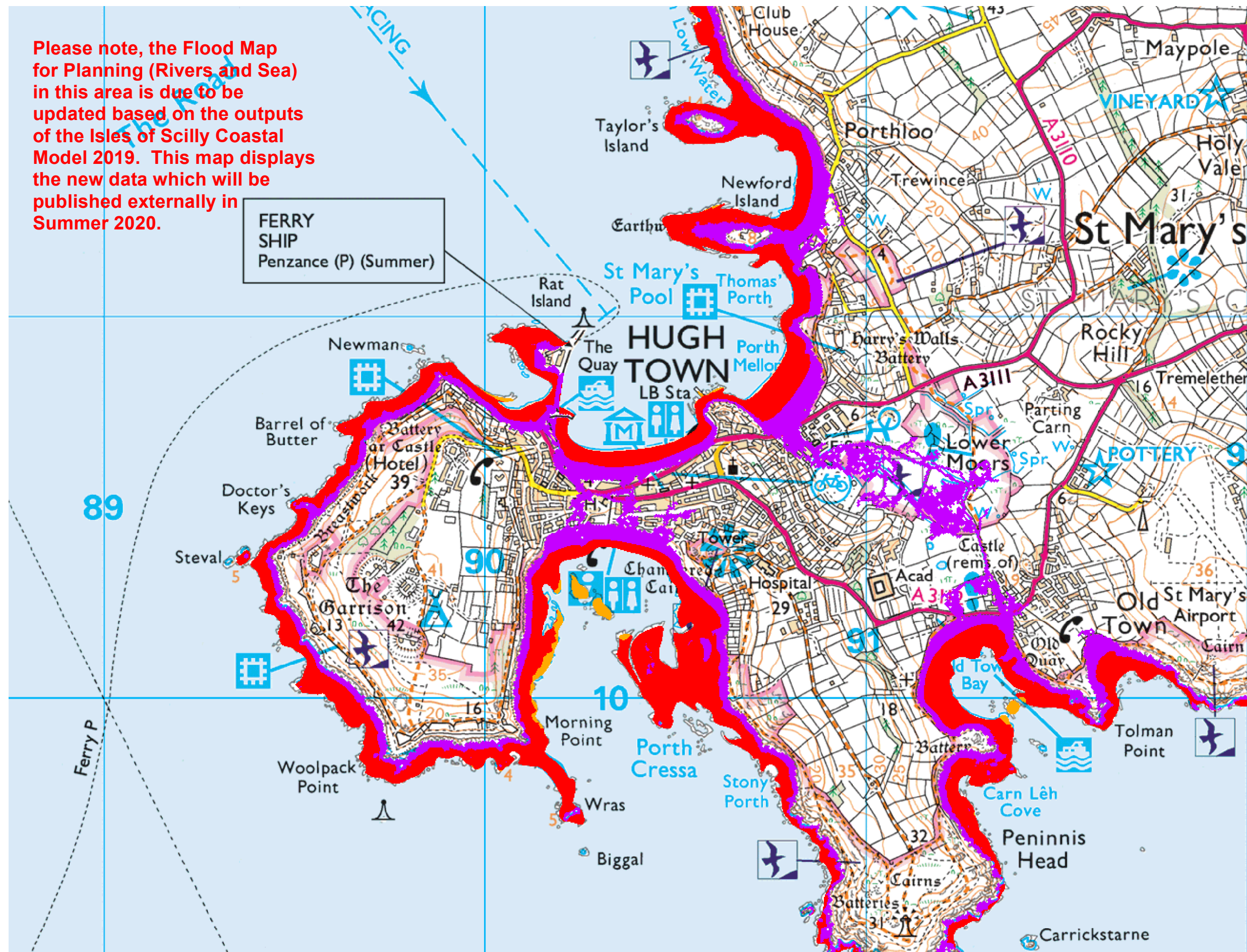
# ENQ20/DCIS/169339 - Depth Map undefended 1 in 1000 year taken from the Isles of Scilly Coastal Model 2019 centred on Lower Strand, St Mary's



Please note this map is intended only as a guide - it is not accurate at individual property level

Please note, the Flood Map for Planning (Rivers and Sea) in this area is due to be updated based on the outputs of the Isles of Scilly Coastal Model 2019. This map displays the new data which will be published externally in Summer 2020.

FERRY SHIP  
Penzance (P) (Summer)



### Legend

St Marys Undef 1 in 1000 year - depth

metres

- 0.0 - 3.0
- 3.0 - 6.0
- 6.0 - 9.0
- 9.0 - 13
- 13 - 17
- 17 - 21
- 21 - 26
- 26 - 31
- 31 - 35
- 35 - 41

This map displays the depths (m) across the site for a 1 in 1000 year (0.1% AEP) event, taken from the Isles of Scilly Coastal Model 2019 and includes an allowance for wave overtopping.

1:10,000 Correct as of the 27<sup>th</sup> April 2020

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