

16/2795/FUL



Flood Risk Assessment - 16/2795/FUL



AWP AMENDED - 20/12/2016

k Ward Partnership  
Kensington Court  
Woodwater Park  
Pynes Hill  
Exeter  
EX2 5TY  
Tel: 01392 409007  
[www.awpexeter.com](http://www.awpexeter.com)

Seaton Beach, East Walk

Flood Risk Assessment

Job Title	Seaton Beach, East Walk
Date	19 December 2016
Revision	B
Client	Seaton Beach Developments Ltd
Prepared by	A Harris
Checked by	C Yalden
Authorised by	R Ward
File Reference	p:\0425 trebere, esplanade, seaton\c documents\reports\0425 trebere,esplanade,seaton - fra.docx

AMENDED

EAST DEVON DISTRICT COUNCIL ECONOMY			
20 DEC 2016			
ACK	CIRC	SEEN	FILE

1 Introduction

- 1.1 This site specific Flood Risk Assessment (FRA) has been prepared on behalf of Seaton Beach Developments Ltd by Awcock Ward Partnership (AWP) to assess the potential flood risks which may affect the proposed redevelopment at East Walk, Seaton.
- 1.2 The proposals consists of the redevelopment of the residential dwelling; Trebere into a six-storey block of apartments.
- 1.3 This FRA has been prepared to "identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account" as required by the National Planning Policy Framework (NPPF).

2 Consultation

- 2.1 To scope out any site or catchment specific flood risks or drainage requirements we have engaged with Steve Moore, the Environment Agency's (EA) Flood and Coastal Risk Management Advisor for this area, and have purchased the best available flood mapping from the EA's Customer Engagement team.

2.2 We have also liaised with Martyn Dunn, South West Water's (SWW) Development Planning Co-ordinator regarding the discharge of the surface water and foul drainage from the new development.

2.3 The output of our consultations has been used to inform the FRA.

### 3 Existing Site

#### Site Location

3.1 The brownfield site (shaded on Figure 1 below) is located at Trebere, Esplanade, East Walk, Seaton, Devon at national grid reference SY 248 898.

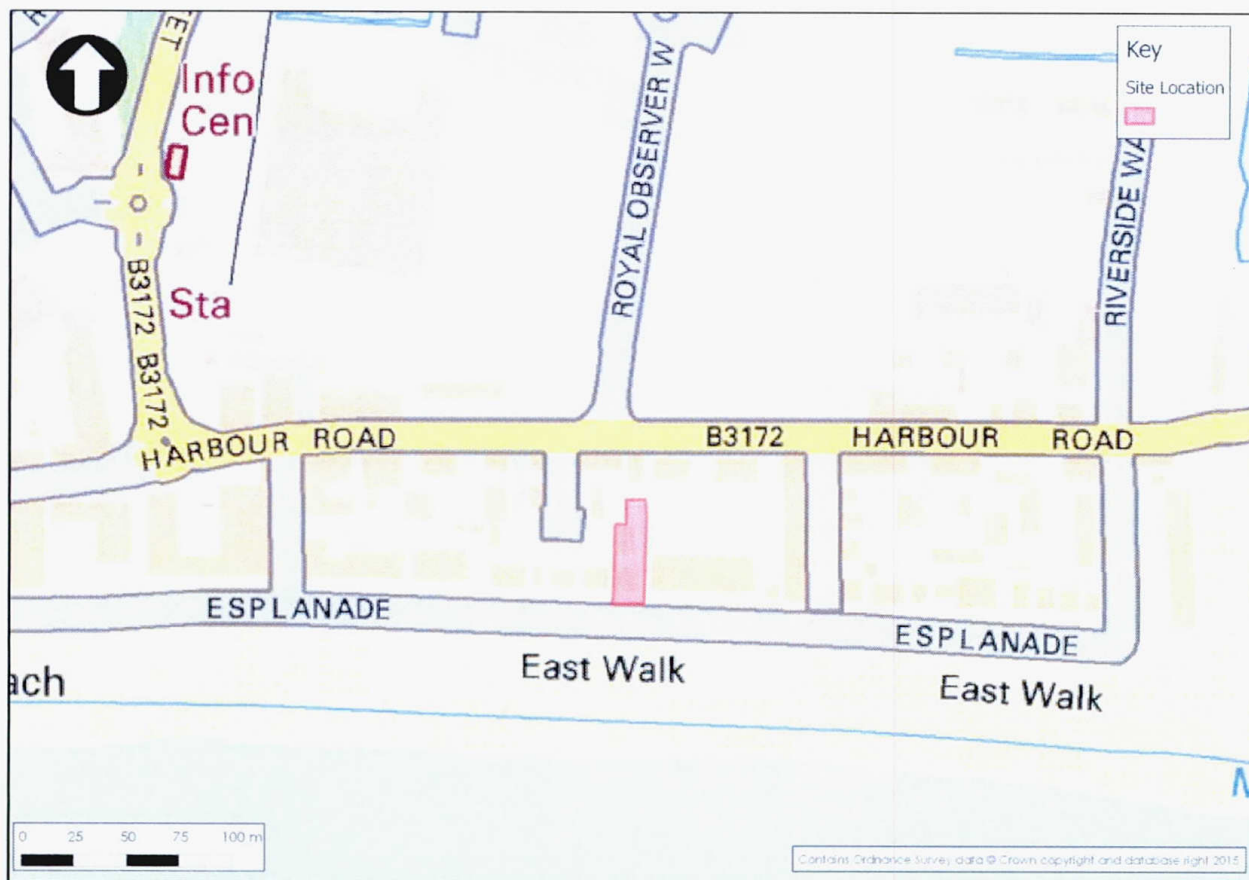


Figure 1 - Site Location Plan

#### Existing and Surrounding Land Use

3.2 The site is currently a two-storey residential property with outbuildings to the rear. The site is almost totally surfaced with hard paved impermeable materials.

3.3 Either side of the site along the Esplanade are three and four storey apartment blocks. To the north of the site on Harbour Road, is a restaurant with apartments above and further housing on either side. Harbour Road is some 3m lower than the Esplanade as can be seen on the cross section included in Appendix A to this report. Further inland, the Tesco superstore and Bovis housing development have been built in recent years on land which was raised to lift it above the fluvial flood plain.



## 4 Proposed Development

- 4.1 The proposals include the demolition of the existing residential dwelling and outbuildings to accommodate a new apartment block.
- 4.2 A copy of the masterplan for the proposed development is provided within Appendix B of this report.
- 4.3 In accordance with Table 2 of the National Planning Practice Guidance (NPPG) which accompanies the NPPF, residential developments have a vulnerability classification of 'More Vulnerable'. Table 3 in the NPPG states that 'More Vulnerable' developments located within 'Flood Zone 3 - High Risk' must pass the Sequential / Exception Test.
- 4.4 The Sequential Test and Exception Test are addressed in Sections 10 and 11 of this FRA respectively.

## 5 Flood Risk

### Surface Water Flooding

- 5.1 The EA's 'Flooding from Surface Water' Map has been reproduced as Figure 2 below. It shows that there are no concentrated overland surface water flows routing through or near to the site. As a result the site is classified as 'very low risk' from surface water flooding.



Figure 2 – EA's 'Flooding from Surface Water' Map

## Fluvial and Tidal Flooding

- 5.2 An extract of the EA's 'Flood Map for Planning' has been reproduced below as Figure 3 and shows the site to be within 'Flood Zone 3 – High Risk'. The 'Flood Map for Planning' shows flooding from rivers and seas but ignores the presence of flood defences.

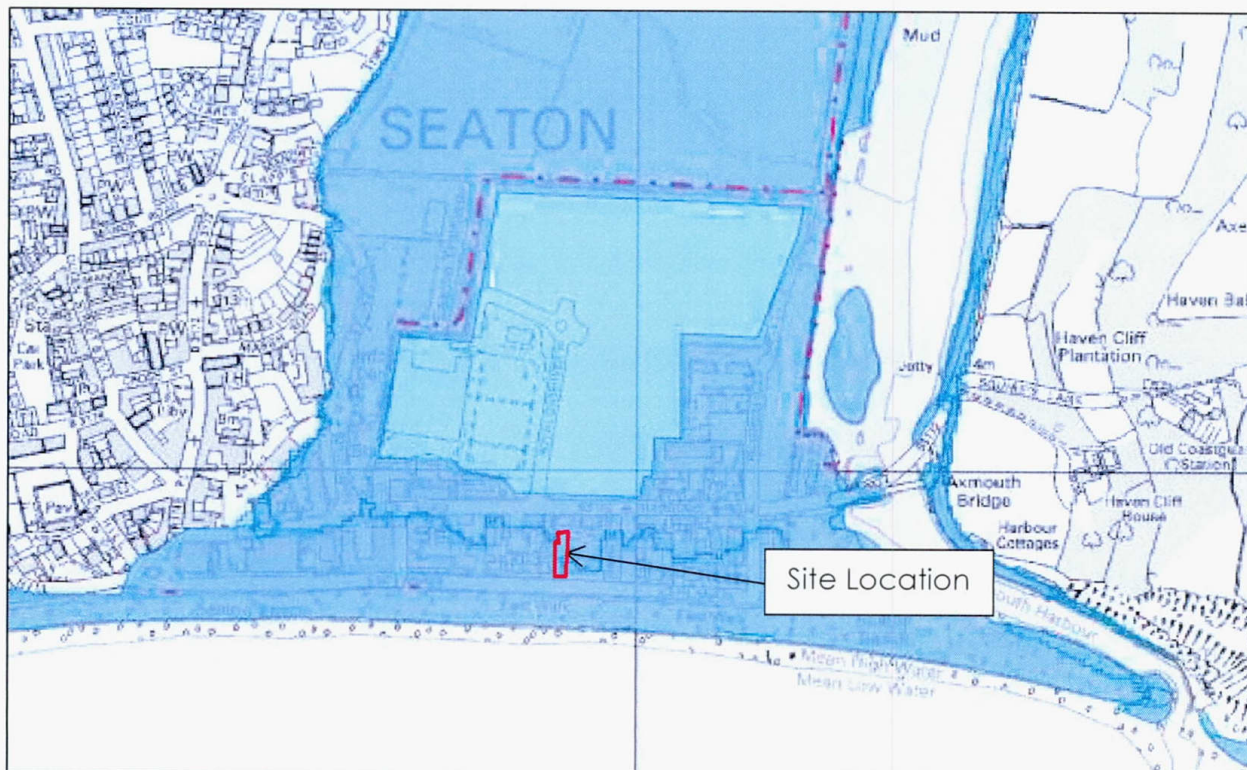


Figure 3 – EA's 'Flood Map for Planning'

- 5.3 Due to the site's close proximity to the seafront, the main flood risk to the site is from coastal waters overtopping the sea wall defence in extreme events.

### Tidal Flooding (Still Water Level)

- 5.4 As the new development is within 'Flood Zone 3 – High Risk', the site must be assessed to ensure the development and its inhabitants are safe from flooding up to the 1 in 200 year return period tidal storm.
- 5.5 Directly to the south of the site the concrete sea wall defence is approximately 0.9m tall. The existing Esplanade road level in front of Trebere is at approximately 5.65m above ordnance datum (AOD) and therefore the crest sea wall is at approximately 6.57m AOD at this location.
- 5.6 To the west and east of the site, at points along the sea wall are four floodgates which in times of flood can be closed to maintain this level of flood defence for all properties along the Esplanade. Closure of the gates will be tied into early flood warnings provided by the EA. This will ensure that the flooding is contained on the outer side of the sea wall and does not flow onto the Esplanade and then onto the site. Details of the defences within the local area can be found in Appendix C.



5.7 Following liaison with the EA a copy of the best available flood data for the site has been purchased (also contained in Appendix C). The predicted sea level rise for the area was calculated using the 2008 baseline tidal still water data and net sea level rises due to climate change. Table 4 in the former Technical Guidance to the NPPF outline the net sea level rise per year in South West England relative to 1990 as below:

- 3.5mm per annum for 2008 – 2025;
- 8mm per annum for 2025 – 2055;
- 11.5mm per annum for 2055 – 2085; and then,
- 14.5mm per annum from 2085 – 2115.

5.8 The current EA guidance defines a design life of 100 years for residential developments. The predicted flood levels within this design life are summarised in Table 1 below (See Appendix D for calculation):

Return Period	Flood level 2008 (m AOD)	Predicted Flood Level 2115 (m AOD)
1 in 200 year	3.20	4.28
1 in 1000 year	3.38	4.46

**Table 1 – Tidal Flood Levels**

- 5.9 LiDAR data has been obtained through the data.gov.uk website to identify existing ground levels in and around the property. The data indicates that existing ground levels on the site range between approximately 5.76m AOD, near to the southern boundary of the site fronting onto the Esplanade down to approximately 3.72m AOD near to the northern boundary with the restaurant fronting onto Harbour Road. The LiDAR levels are accurate to +/- 150mm.
- 5.10 The Esplanade, directly to the south of the site has an existing level of 5.65m, over 1m above the 1 in 1000 year predicted 2115 still water sea level of 4.46m.
- 5.11 The seawall defence provides additional freeboard above the predicted still water level. The crest of the seawall is at approximately 6.57m while the maximum still water level for the 1 in 1000 year 2115 flood level is 4.46m.
- 5.12 A cross section of the profile of the existing site and the surrounding area can be seen in Appendix A.
- 5.13 All properties along the Esplanade and East Walk, Seaton are protected from tidal surges in up to the 1 in 1000 year for the next 100 years of predicted climate change. The flood risk to the proposed development and the existing properties along Seaton Esplanade is therefore focused on wave action overtopping the sea wall.



### Wave Action (Overtopping the sea wall)

- 5.14 All of the flood levels quoted to date are 'still water levels' and do not take into account wave action. Waves hitting this area of coastline in extreme storm events coinciding with high tides can overtop the seawall and flood the Esplanade.
- 5.15 As part of the EA flood data purchased for this Feasibility Study, a number of photographs of flooding events in February 1979 and December 1989 where waves broke over the sea defences were included.
- 5.16 As can be seen in Photograph 1, below, a considerable volume of water and beach material overtopped the sea wall in the December 1989 storm. The return period of the 1989 storm event is not known, but as the proposed site is only a few hundred metres east of the location of this photograph it would have experienced very similar conditions.



**Photograph 1: Looking east along the Esplanade.**

- 5.17 A previous FRA undertaken by Jubb Consulting Engineers in January 2009 for the Tesco superstore and the large residential development built on lower land just north of the site by Bovis Homes, assessed the impact of waves overtopping the sea defences.
- 5.18 Following discussions with Steve Moore at the EA, we have reviewed the Jubb FRA.



- 5.19 A key element of this FRA was the need to maintain the existing overland flood flow routes between the existing buildings along the Esplanade.

## 6 Overland Flood Routes

- 6.1 In an extreme storm event with the prevailing wind generating waves that take water over the defences onto the Esplanade, flood waters would either drain back through the flapped outlets on the sea wall or flow onto the site. The topography of the site and the surrounding area means that any water which does flood onto the site, will continue to flow northwards and onto the lower lying Harbour Road. Therefore any water flooding onto the site from the southern end will travel through but not gather on the site. Due to this and the nature of tidal cycles the extent of site flooding can be assumed to be temporary.
- 6.2 The proposed masterplan in Appendix B shows consideration has been made to ensure overland flood flow routes either side of the property remain available so that flood waters can flow to Harbour Road and flow towards the estuary, replicating the existing situation. A plan of the overland flood flow routing can be seen in Appendix E.

## 7 Access and Egress

- 7.1 In the event of a flood exceedance event, the occupants of the development should stay within the development until such a time that the flood levels have receded and safe access and egress can be resumed. This is likely to be only for a short duration while the tide is at the top of its cycle.

## 8 Flood Mitigation/Resilient Measures

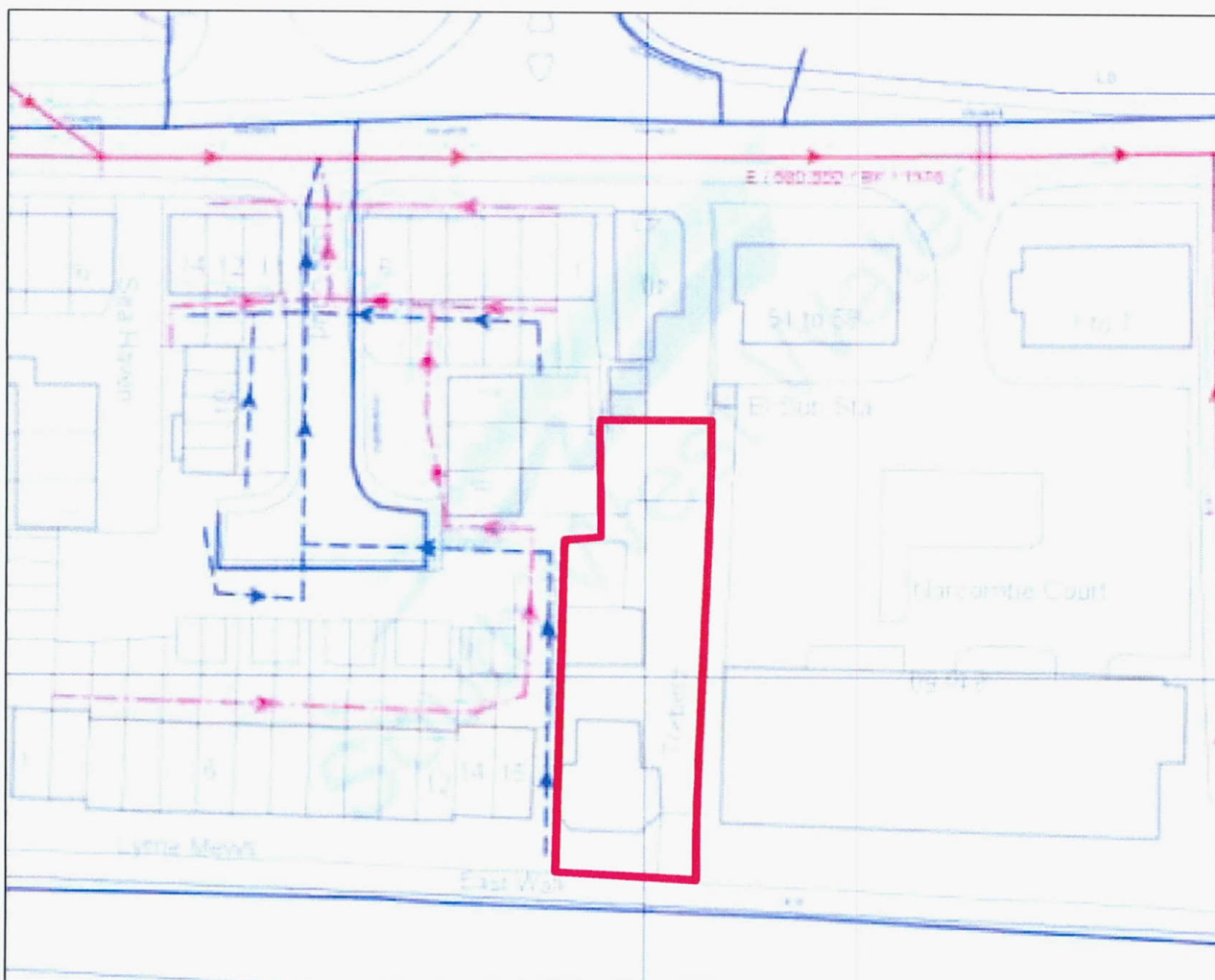
- 8.1 Although the site is clearly in an exposed maritime location, it is considered that the flood risks can be safely managed through the design process to ensure that the proposed development remains safe from flooding during its design life.
- 8.2 The proposed front entrance elevation drawing in Appendix D shows that the development thresholds will be **raised up by 500mm** to provide a safe freeboard and ensure the development is not at risk of flooding. The depth of water ponding on the Esplanade will certainly not reach to the raised threshold level of the proposed new building.
- 8.3 Whilst the application site has been identified as being safe from flooding throughout its design life, it must be acknowledged that it remains susceptible to flooding from greater return period events.
- 8.4 It is recommended that the development implements the following flood resilient measures:

- Ground floor to be made of solid construction;
- Electrical installations / incoming supplies are to be above the level of worktop surfaces;
- Waterproof plaster is to be used throughout the ground floor level; and,
- Construction materials to be such that they cannot be damaged by water or can be easily replaced following a flooding event.

## 9 Surface Water Strategy

### Existing Drainage

- 9.1 It is assumed that the runoff generated by the existing site flows un-attenuated into the existing South West Water combined sewer beneath Harbour Road, as shown below on Figure 4.



**Figure 4: Extract from SWW Asset Records**

- 9.2 An assessment of the existing peak surface water runoff rates for the fully impermeable site have been estimated using the Rational Method, as below:

- 2 Year                    6.97 l/s
- 30 Year                   12.55 l/s



- 100 Year 16.73 l/s

9.3 It should be noted that this assessment has not allowed for any potential throttling of surface water prior to discharge to the SWW combined network.

#### **Proposed Surface Water Strategy**

- 9.4 A desk-top assessment has indicated that the site is underlain by 'loamy and clayey soils of coastal flats with naturally high groundwater' (See Appendix F). Therefore the site is not suitable for the use of soakaways.
- 9.5 To reduce the surface water runoff from the developed site, it is proposed that the car park within the proposed development will be permeable paved and will drain its own footprint directly. As a result the development will provide betterment on the total runoff draining to the public sewer.
- 9.6 The existing site is 735m<sup>2</sup> and is almost entirely impermeable. The use of permeable paving and soft landscaping within proposed development, reduces the footprint of impermeable area and therefore the volume of runoff leaving the site by approximately 50%. This reduces the risk of flooding to the properties on Harbour Road and within the downstream catchment.
- 9.7 The surface water from the remaining impermeable area will be collected from downpipes and gutters before being transferred into the existing surface water sewer via a private storm water network.
- 9.8 A copy of our Preliminary Drainage Layout drawing can be found within Appendix G of this report.
- 9.9 South West Water (SWW) have confirmed that this reduced level of discharge is acceptable and the existing site connection can be retained. A copy of the correspondence with SWW can be seen in Appendix H.

#### **Proposed Foul Water Strategy**

- 9.10 It is assumed that foul flows from the existing property discharge into the combined sewer beneath Harbour Road.
- 9.11 South West Water have confirmed that this existing foul connection can be retained. SWW have also confirmed that the existing combined sewer network has capacity to accept foul flows from the proposed development. A copy of the correspondence with SWW can be seen in Appendix H.
- 9.12 We have shown the assumed alignment for the foul sewerage system on the preliminary drainage layout included within Appendix G of this report.

---

## Maintenance

- 9.13 Private communal drainage features will be maintained by a 3<sup>rd</sup> party management company.
- 9.14 Maintenance of SuDS features should be undertaken in accordance with the requirements CIRIA C753 – The SUDS manual.

## 10 Sequential Test

- 10.1 Paragraph 101 of the NPPF states that *“The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding.”* As shown clearly in Figure 3 above, much of the eastern part of the town is located in FZ3. It is not considered practical to abandon this part of Seaton. However, the proposed new development will have raised thresholds and other flood mitigation works / resilient design as discussed above to present a lower flood risk to the future inhabitants than those currently living there.
- 10.2 We have also looked at recent comparable schemes granted planning permission by East Devon District Council for precedents in the way in which the Sequential Test has been applied.
- 10.3 The most comparable recent development was Fosseway Court, a few hundred metres to the west of this development and also located on the Esplanade in the high risk Flood Zone 3. The flood risks were very similar and although the Fosseway Court development was far larger (30 additional apartments) the FRA prepared to support this application did not address the Sequential Test. Despite this the site was granted planning permission in 2014.
- 10.4 The Tesco foodstore and the large Bovis development were also both built on considerably lower land to the north of Harbour Road in the last few years. Both of these developments were deemed to pass the Sequential Test.

## 11 Exception Test

- 11.1 Paragraph 102 of the NPPF states that *“if, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with lower probability of flooding, the Exception Test can be applied if appropriate. For the Exception Test to be passed:*

- *it must be demonstrated that the development provides wider sustainability benefits for the community that outweigh flood risk;*
- and,*
- *a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the*



*vulnerability of its users, without increasing flood risk elsewhere, and, if possible, will reduce flood risk overall.*

*Both elements of the test will have to be passed for the development to be allocated or permitted."*

- 11.2 The 1<sup>st</sup> bullet point is always the hardest criterion to satisfy. However in this case we believe there are at least two reasons why East Devon District Council should consider that *'the development provides wider sustainability benefits for the community that outweigh flood risk'*, namely:
- 11.3 The development will offer a number of apartment dwellings in the location of a single existing dwelling. This increase in dwelling numbers will help to support East Devon District Council in achieving their five-year housing supply requirements without using any additional land.
- 11.4 At present East Devon District Council are 'committed to supporting regeneration in the town [Seaton] to create more jobs through the growth of tourism, especially green tourism, along with improving social and community facilities.' We would argue that the proposed development can help to support regeneration in the town. As well as providing new housing stock, some of the apartments could be used as holiday homes. This will benefit the local community as it will provide long-term tourist investment to the area, providing growth of tourism and benefiting the local economy.
- 11.5 Addressing the 2<sup>nd</sup> bullet point, this site specific FRA has demonstrated that the site is safe from flooding for its entire design life. The introduction of permeable paving and soft landscaping will reduce the volume of runoff leaving the site and therefore reduces the flood risk to the lower lying properties in Harbour Road and within the downstream catchment.

## **12 Conclusions**

- 12.1 The site is identified by the EA as being within 'Flood Zone 3 – High Risk'. Due to the site proximity to the sea front the biggest risk to the development is tidal flooding.
- 12.2 Through good design, raising the threshold by 500mm, the new development would present a significantly lower flood risk to inhabitants than the current building.
- 12.3 Consideration has been made to ensure any overland flood flow routes on either side of the property are not blocked and will remain available.
- 12.4 Due to the topography of the site and the nature of tidal cycles, any site flooding will be temporary. It is therefore suggested that during exceedance

flood events residents remain inside until such a time that safe access and egress can be resumed.

12.5 South West Water have confirmed that the existing surface water and foul water connections to the public combined sewer can be retained.

12.6 The introduction of permeable paving will reduce the pluvial flood risk to low lying properties on Harbour Road and to properties within the downstream catchment.

12.7 Although the site is located in the high risk Flood Zone 3, it is maintained that both elements of the Exception Test can be passed.

This Flood Risk Assessment has been assessed in line with the NPPF. It is concluded that the development can be undertaken in a sustainable manner, whilst also reducing the flood risk to existing properties in the downstream catchment.

The FRA does not attempt to present a final design of the surface water system. Detailed design of the surface water network and inherent features will commence upon approval of the outline strategy and will include assessments due to further site investigations, health and safety, CDM etc.

### 13 Recommendations

13.1 As the development is safe from flooding throughout its design life and will reduce the flood risk to properties in the downstream catchment, it is recommended that the Environment Agency advise the local planning authority that they have no objections to the proposed development.

**AWP**



# Indicative Profile

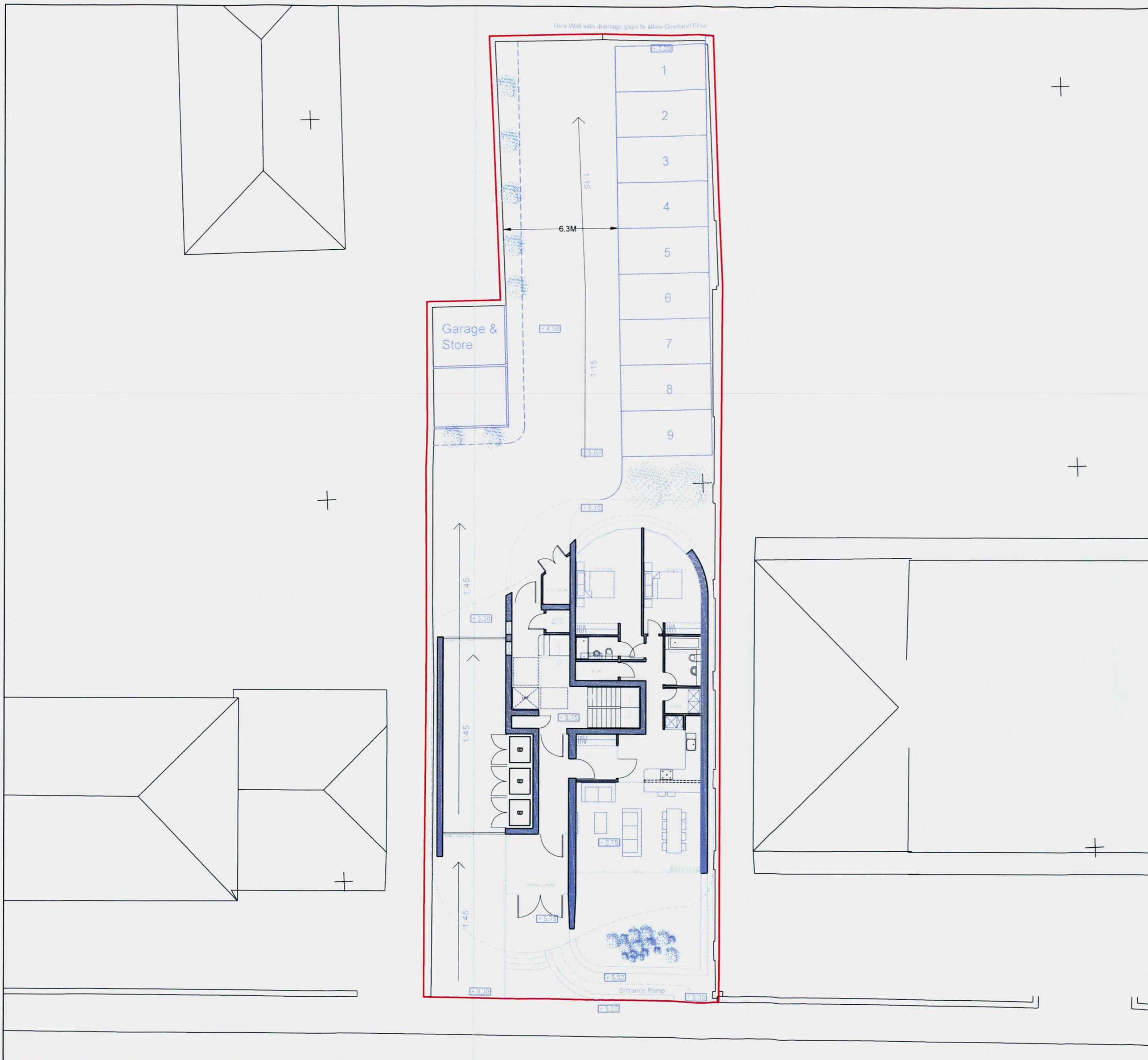


**Key**

- 1 in 200 Year , 2008 Flood Level (3.20m AOD)
- 1 in 200 Year , 2115 Flood Level (4.28m AOD)

**Note**

- Drawing based on a combination of OS and LIDAR data and is **INDICATIVE** only.



REV	NOTES	DATE
G	Scale bar added	16.11.21
F	1. Garage / store amended 2. Additional roller shutter door added	16.11.16
E	1. Access handed 2. Building outline amended 3. Entrance amended 4. Parking layout amended 5. Garage amended to store 6. Apartment layout amended 7. Application boundary added	16.11.15
D		16.10.17
C	(i) Outline of existing garage shown (ii) Ground Floor Plan updated	24.10.2016
B		16.10.17

SEATON BEACH, SEATON		G
Proposed Site Plan		TS / MT
150703 L 01.03	1:200@A3	APRIL 2016

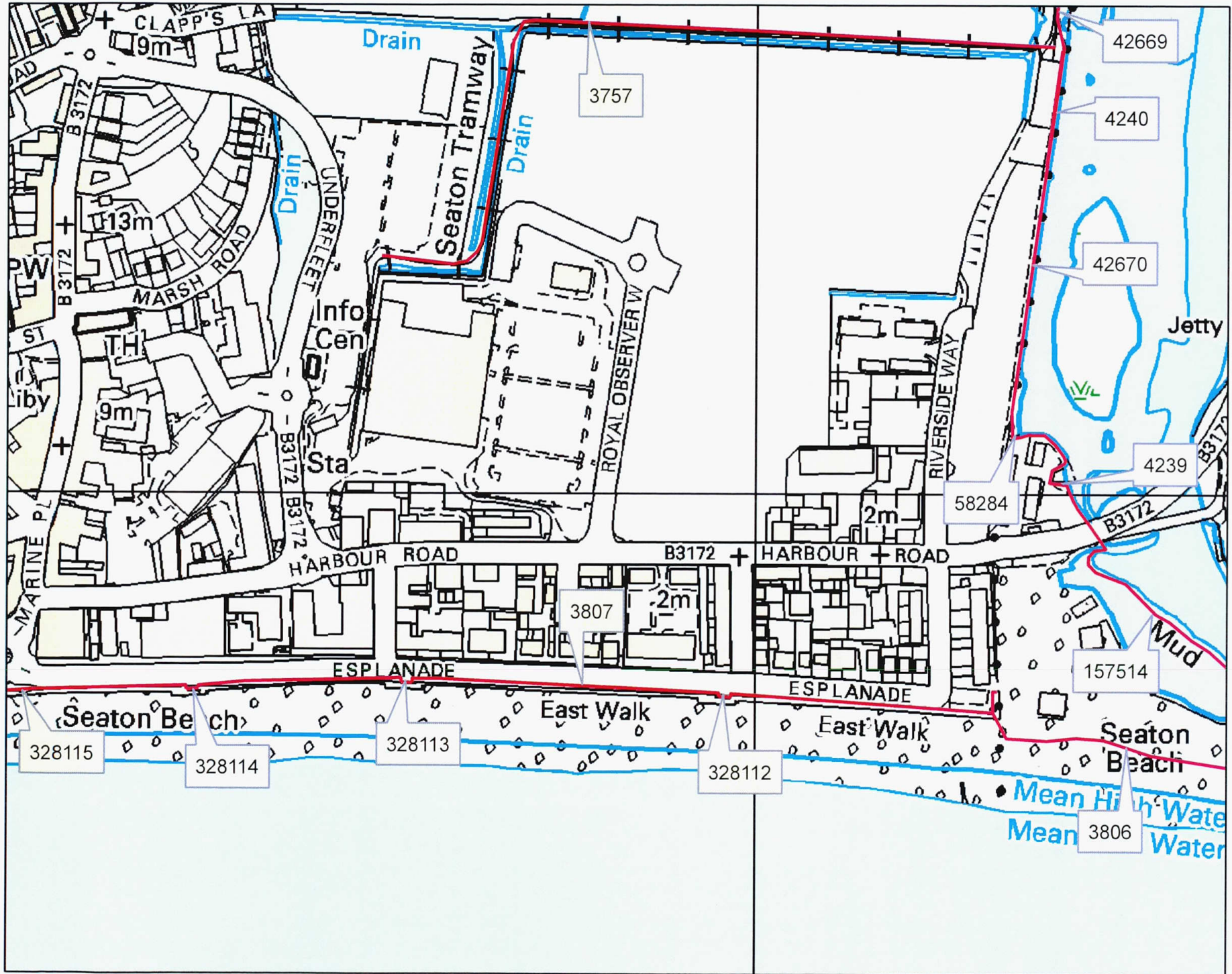
**CliftonEmerydesign**

Ground Floor, Number 3, Silverdown Office Park, Fair Oak Close, Exeter, EX5 2UX  
T: 01392 368866 W: www.cliftonemerydesign.co.uk M: mail@cliftonemerydesign.co.uk

**DRAWING-STATUS PLANNING**  
CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. THIS DRAWING IS COPYRIGHT.



# Flood Defences Map centred on Seaton - created 05.10.2015 Ref: 1583



Scale 1:4,000



## Legend

— Line of Flood Defences



AIMS Defences Data Sheet for Seaton Ref: 1518

Asset ID	Asset Reference	Type	Maintainer	Protection	Comments
3807	113FAS3201002C02	wall	environment_agency		Min Crest Level=6.93mODN, 5th%=6.94, Mean=6.96, 95th%=6.98, Max=6.99. Levels taken by Halcrow Group in Apr 2008. Spatially defined based on crest of Splash wall (0.92m higher than promenade). Actual toe level 4.76.
328115	113FAS3201002C02008	flood_gate	environment_agency		Double stainless steel floodgate.
328114	113FAS3201002C02004	flood_gate	environment_agency		Stainless steel gate.
3757	1132608000101R06	high_ground	private		Tramway, hardly above ambient ground level. Bank is breached at bridge near tram workshops so not FDA. Reclass as non-FDA 15/04/2011
328113	113FAS3201002C02003	flood_gate	environment_agency		Stainless steel gate on ramped access to beach.
328112	113FAS3201002C02002	flood_gate	environment_agency		Stainless flood gate. By ice cream kiosk.
3806	113FAS3201002C01	embankment	private		Maintenance of harbour on inside, some revetment and walling. Lowest point = 6.35 (mODN) (325230, 89827). Levels taken by Halcrow Group July 2006.
42670	1132608000101R05	wall	private		Wall fronts factory premises, car park and road. Low ground behind in Holiday Park. Lowest point = 2.84 (mODN) (325187.2, 90088.34). Levels taken by Halcrow Group July 2006.
58284	1132608000101R04	high_ground	private		-
4239	1132608000101R01	wall	private		Lowest point = 3.24 (mODN) (325223.4, 90022.54). Levels taken by Halcrow Group on July 2006.
4240	1132608000101R02	wall	private		Lowest point = 3.69 (mODN) (325208, 90239). Levels taken by Halcrow Group on 21/03/2007.
42669	1132608000101R03	embankment	private		Tramway. Lowest point = 3.44 (mODN) (325280.2, 90817.43). Levels taken by Halcrow Group July 2006.
157514	1132608009999R01	high_ground	private		Shingle spit

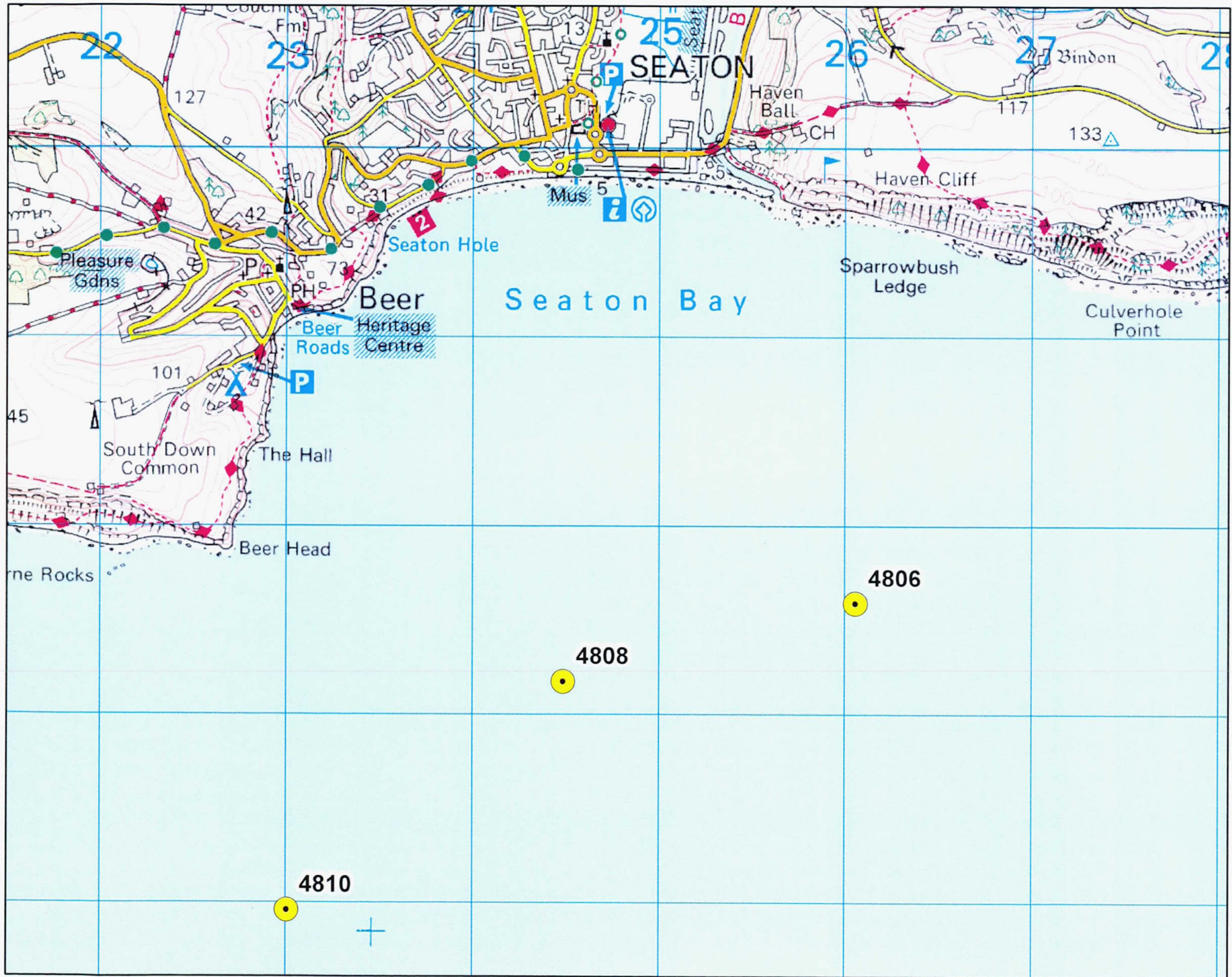


Asset ID	Description	Location	Exposure	Bank	Build Year	Fluvial		Coastal
						D/S Crest Level	U/S Crest Level	Crest Level
3807	CONCRETE WAVE WALL, Primary Defence: Concrete Seawall with Parapet, Secondary Defence (Landward): Concrete Splash wall with Recurve	Seaton, Esplanade				-	-	
328115	floodgate	SEATON SEA FRONT				-	-	
328114	FLOOD GATE	SEATON SEA FRONT				-	-	
3757	bank protection	DOWN STREAM OF SEATON MARSHES				-	3.39	
328113	FLOOD GATE	SEATON SEA FRONT				-	-	
328112	FLOOD GATE	SEATON SEA FRONT				-	-	
3806	SHINGLE EMBANKMENT	Mouth of R. Axe, SEATON				-	-	
42670	Masonry Wall	D/S SEATON MARSHES				2.84	3.32	
58284	Rock Revetment	Boatyard				3.06	2.89	
4239	Rock revetment	U/S Seaton Bridge				3.4	3.44	
4240	Masonry Wall	Tramway workshops				3.72	3.78	
42669	Embankment	BEGINNING OF SEATON MARSHES				3.54	3.44	
157514	Natural Bank	-				-	-	

Asset ID	Grid Ref	SOP	Condition Grade
3807	SY2497489856		2
328115	SY2448289860		2
328114	SY2459289860		2
3757	SY2473190168		2
328113	SY2474689866		2
328112	SY2498389855		2
3806	SY2553089759		3
42670	SY2521490336		3
58284	SY2518490039		3
4239	SY2519090040		2
4240	SY2521890314		3
42669	SY2528090817		2
157514	SY2523889979		2



# Coastal Flood Boundary (CFB) Extreme Sea Level Nodes Map centred on Seaton - Created on 2 October 2015 Ref:1583



Scale 1: 30000



Legend

● CFB\_Extreme\_Sea\_Levels

**Coastal Flood Boundary (CFB) Extreme Sea Level Node data for  
Seaton Ref: 1583**

SOFTWARE	Coastal Flood Boundary Dataset					
DATE	2008					
NODE (CHAINAGE)	4806	4808	4810			
1yr (metres)	2.64	2.66	2.67			
2yr (metres)	2.70	2.72	2.73			
5yr (metres)	2.80	2.82	2.83			
10yr (metres)	2.87	2.89	2.90			
20yr (metres)	2.94	2.96	2.97			
25yr (metres)	2.96	2.98	2.99			
50yr (metres)	3.04	3.06	3.07			
75yr (metres)	3.07	3.09	3.10			
100yr (metres)	3.10	3.12	3.13			
150yr (metres)	3.16	3.17	3.19			
200yr (metres)	3.18	3.20	3.21			
250yr (metres)	3.21	3.22	3.24			
300yr (metres)	3.22	3.24	3.25			
500yr (metres)	3.29	3.30	3.32			
1000yr (metres)	3.36	3.38	3.39			
10000yr (metres)	3.64	3.66	3.68			
ISLAND	MAIN	MAIN	MAIN			



64 24946 89875

SEASON





SEASON

16/17 Dec-1989

SY 24887 89865

SEA WALL 2 ESPRANADE LOOKING WEST







SUR WITH 4 ESPRADADE LOOKING WEST

SPOT ON CAPE ON LEFT

SY 24915 89867





SY 24465 89861

SEATTLE  
17 Dec 1959



Tidal still water levels (mAOD) at Seaton


Year	Sea Level Rise (mm)	1 in 200 Level (m)	1 in 1000 Level (m)
2008	0	3.20	3.38
2009	3.5	3.20	3.38
2010	7	3.21	3.39
2011	10.5	3.21	3.39
2012	14	3.21	3.39
2013	17.5	3.22	3.40
2014	21	3.22	3.40
2015	24.5	3.22	3.40
2016	28	3.23	3.41
2017	31.5	3.23	3.41
2018	35	3.24	3.42
2019	38.5	3.24	3.42
2020	42	3.24	3.42
2021	45.5	3.25	3.43
2022	49	3.25	3.43
2023	52.5	3.25	3.43
2024	56	3.26	3.44
2025	59.5	3.26	3.44
2026	67.5	3.27	3.45
2027	75.5	3.28	3.46
2028	83.5	3.28	3.46
2029	91.5	3.29	3.47
2030	99.5	3.30	3.48
2031	107.5	3.31	3.49
2032	115.5	3.32	3.50
2033	123.5	3.32	3.50
2034	131.5	3.33	3.51
2035	139.5	3.34	3.52
2036	147.5	3.35	3.53
2037	155.5	3.36	3.54
2038	163.5	3.36	3.54
2039	171.5	3.37	3.55
2040	179.5	3.38	3.56
2041	187.5	3.39	3.57
2042	195.5	3.40	3.58
2043	203.5	3.40	3.58
2044	211.5	3.41	3.59
2045	219.5	3.42	3.60
2046	227.5	3.43	3.61
2047	235.5	3.44	3.62
2048	243.5	3.44	3.62
2049	251.5	3.45	3.63
2050	259.5	3.46	3.64
2051	267.5	3.47	3.65
2052	275.5	3.48	3.66
2053	283.5	3.48	3.66
2054	291.5	3.49	3.67
2055	299.5	3.50	3.68
2056	311	3.51	3.69
2057	322.5	3.52	3.70
2058	334	3.53	3.71
2059	345.5	3.55	3.73
2060	357	3.56	3.74
2061	368.5	3.57	3.75

Year	Rise (mm)	1 in 200 Level (m)	1 in 1000 Level (m)
2062	380	3.58	3.76
2063	391.5	3.59	3.77
2064	403	3.60	3.78
2065	414.5	3.61	3.79
2066	426	3.63	3.81
2067	437.5	3.64	3.82
2068	449	3.65	3.83
2069	460.5	3.66	3.84
2070	472	3.67	3.85
2071	483.5	3.68	3.86
2072	495	3.70	3.88
2073	506.5	3.71	3.89
2074	518	3.72	3.90
2075	529.5	3.73	3.91
2076	541	3.74	3.92
2077	552.5	3.75	3.93
2078	564	3.76	3.94
2079	575.5	3.78	3.96
2080	587	3.79	3.97
2081	598.5	3.80	3.98
2082	610	3.81	3.99
2083	621.5	3.82	4.00
2084	633	3.83	4.01
2085	644.5	3.84	4.02
2086	659	3.86	4.04
2087	673.5	3.87	4.05
2088	688	3.89	4.07
2089	702.5	3.90	4.08
2090	717	3.92	4.10
2091	731.5	3.93	4.11
2092	746	3.95	4.13
2093	760.5	3.96	4.14
2094	775	3.98	4.16
2095	789.5	3.99	4.17
2096	804	4.00	4.18
2097	818.5	4.02	4.20
2098	833	4.03	4.21
2099	847.5	4.05	4.23
2100	862	4.06	4.24
2101	876.5	4.08	4.26
2102	891	4.09	4.27
2103	905.5	4.11	4.29
2104	920	4.12	4.30
2105	934.5	4.13	4.31
2106	949	4.15	4.33
2107	963.5	4.16	4.34
2108	978	4.18	4.36
2109	992.5	4.19	4.37
2110	1007	4.21	4.39
2111	1021.5	4.22	4.40
2112	1036	4.24	4.42
2113	1050.5	4.25	4.43
2114	1065	4.27	4.45
2115	1079.5	4.28	4.46



**Key**

	Indicative Site Boundary
	Existing SWW Combined Sewer
	Overland Flood Flow Route

PROJECT No: 0425	DRAWING No: OFFR-100	REV: B	DATE 19.12.2016	DESIGN BY: 
TITLE: OVERLAND FLOOD FLOW ROUTE			BY AJH	
			CHECKED CPY	
			APPROVED RW	

Awcock Ward Partnership, Kensington Court, Woodwater Park, Pynes Hill, Exeter, EX2 5TY  
Tel: 01392 409007 Web: [www.awpexeter.com](http://www.awpexeter.com)



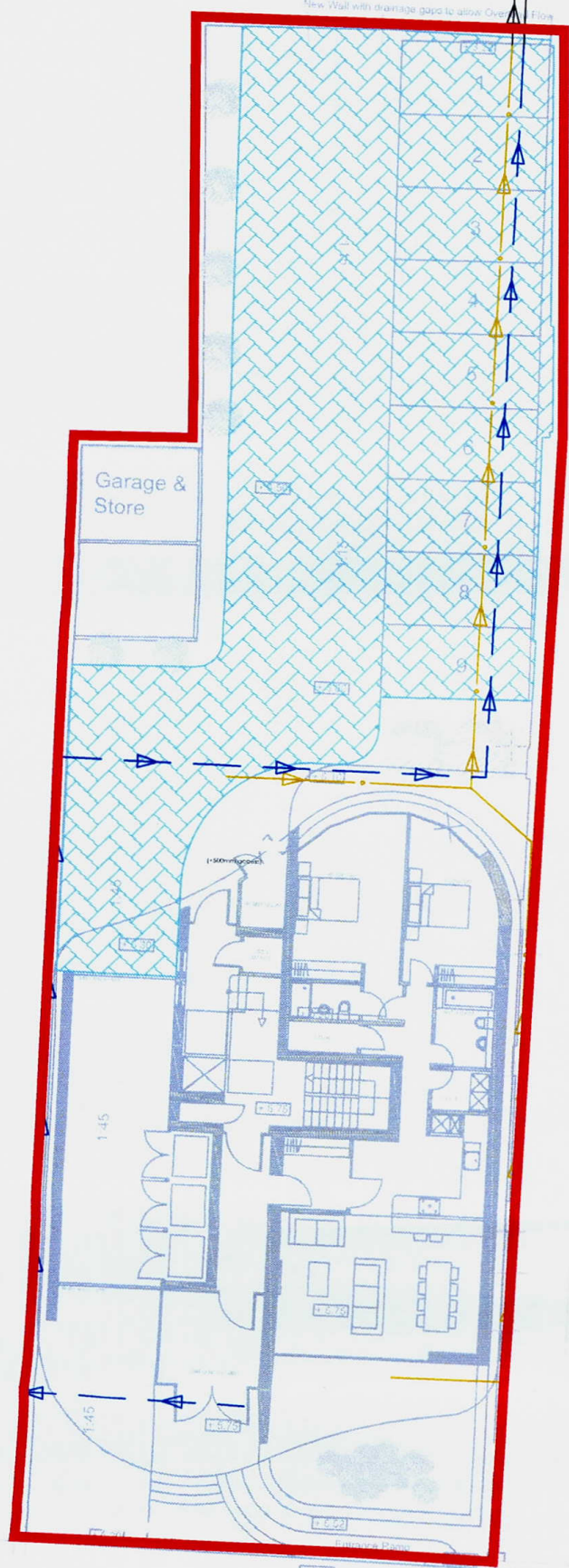
Site Check Report Report generated on Thu Nov 19 2015  
You selected the location: Centroid Grid Ref: SY248899  
The following features have been found in your search area:

**Soilscape (England)**

<b>Reference</b>	21
<b>Name</b>	LOAMY AND CLAYEY SOILS OF COASTAL FLATS WITH NATURALLY HIGH GROUNDWATER
<b>Main Surface Texture Class</b>	LOAMY
<b>Natural Drainage Type</b>	NATURALLY WET
<b>Natural Fertility</b>	LIME-RICH TO MODERATE
<b>Characteristic Semi-natural Habitats</b>	WET BRACKISH COASTAL FLOOD MEADOWS AND GRAZING MARSH
<b>Main Land Cover</b>	ARABLE SOME GRASSLAND
<b>Hyperlink</b>	<a href="#">/Metadata for magic/soilscape summary.pdf</a>



Harbour Road



Foul and surface water drainage networks to retain existing connection to public sewer. The existing alignment shown is indicative only and will be verified prior to construction.

**Drainage Features**

Type	Permeable Paving
Ownership	Private
Plan Area	280m <sup>2</sup>
Depth	0.35m
Porosity	35%
Storage Volume	34.30m <sup>3</sup>

**Notes**

- The site is located within Flood Zone 3 - High Risk.
- The predicted sea level projections for the 100 year design life with an allowance for climate change were calculated as:
  - 1 in 200 year - 4.28m AOD
  - 1 in 1000 year - 4.46m AOD
- The development building threshold will be raised by 500mm compared to existing levels to provide a safe level of freeboard above the predicted maximum tidal water level.
- The alignment of existing drainage is based on SWW's sewer record plans.
- It is assumed that the existing surface and foul water from the site discharge into the SWW combined sewer beneath Harbour Road.
- Permeable paving will be utilised within the parking area of the proposed development.
- The use of permeable paving and soft landscaping within the development has reduced the impermeable catchment and therefore the volume of runoff leaving the site by approximately 50%. This will reduce flood risk to properties on Harbour Road and within the downstream catchment.
- SWW have confirmed that this reduced level of surface water runoff can be discharged into the existing combined sewer beneath Harbour Road.
- SWW have also confirmed that the foul flows generated by the development can be accommodated by the existing combined sewer.
- Any private communal drainage networks and/or features will be designed in accordance with Building Regulations Part H and CIRIA 753 - 'The SuDS Manual' and will be operated and maintained by a 3rd party management company.

**Key**

- Indicative Site Boundary
- Existing SWW Combined Sewer
- Existing indicative Foul Water Drain
- Existing indicative Surface Water Drain
- Proposed Permeable Paving
- Proposed indicative Foul Water Drain
- Proposed indicative Surface Water Drain

Esplanade

REV	DATE	DESCRIPTION	BY	CHK	APD
C	19.12.2016	UPDATED TO SUIT REVISED LAYOUT	A/JH	CPY	RW
B	18.01.2016	UPDATED TO SUIT REVISED LAYOUT	A/JH	CPY	RW
A	16.12.2015	INITIAL ISSUE	A/JH	CPY	RW

CLIENT:  
SEATON BEACH DEVELOPMENTS LTD

DRAWING STATUS:  
FOR INFORMATION ONLY

PROJECT: SEATON BEACH, EAST WALK		
TITLE: PRELIMINARY DRAINAGE STRATEGY		
PROJECT No: 0425	DRAWING No: PDL-100	REV: C
SCALE @ A0 1:250 12.5 metres		



Awcock Ward Partnership, Kensington Court, Woodwater Park, Pynes Hill, Exeter, EX2 3JY  
Tel: 01392 409607 Web: [www.awpexeter.com](http://www.awpexeter.com)





---

# Appendix H

## SWW Correspondence

## Annabel Harris

---

**From:** Developer Services Planning  
**Sent:** 08 January 2016 09:38  
**To:** Annabel Harris  
**Subject:** RE: Development at Trebere Harbour Road Seaton, Devon

Annabel apologies for not having responded to this but would confirm the existing combined discharge can be retained in terms of the surface water runoff based on the reduction in impermeable areas and foul capacity is available to serve the redevelopment.

Regards

Martyn Dunn  
Development Coordinator

South West Water, Peninsula House, Rydon Lane, Exeter, EX2 7HR



---

**From:** Annabel Harris  
**Sent:** 07 January 2016 16:33  
**To:** Developer Services Planning  
**Subject:** RE: Development at Seaton, Devon

Dear Martyn,

I was just wondering if anyone has had the chance to look at the below surface water and foul pre-development enquiry and would be able to provide us with an update?

Many Thanks,

**Annabel Harris**  
Graduate Engineer



awcockward  
awards winning property



Kensington Court, Woodwater Park, Pynes Hill, Exeter EX2 5TY

AWP is a regional engineering consultancy providing development planning and infrastructure services to developers and house builders across the south west.



---

**From:** Annabel Harris  
**Sent:** 14 December 2015 12:47  
**To:** 'Developer Services Planning'  
**Subject:** Development at Seaton, Devon

Dear Martyn,

We are currently working on a drainage strategy for a redevelopment of a brownfield site in Seaton, Devon. The existing residential dwelling and outbuildings will be demolished and a block of 9 apartments will be built.

The existing site is approximately 740m<sup>2</sup> and almost entirely impermeable. Surface water flows from the existing development are assumed to discharge unattenuated into the South West Water combined sewer beneath Harbour Road, just north of the site.

The ground conditions on site are unsuitable for the use of soakaways and therefore we are looking to retain the existing connection to the combined sewer. The proposed development makes use of permeable paving and soft landscaping which reduces the impermeable area and therefore volume of runoff from the site by approximately 60%.

*Please can you confirm whether this reduced level of surface water discharge is acceptable and whether the existing connection to the public combined sewer can be retained?*

We are also looking to retain the existing foul water connection for the development, which is also assumed to currently discharge into the combined sewer beneath Harbour Road. Please see the attached pre-development enquiry form for further details.

*Please can you confirm whether the existing connection can be retained and whether foul flows from the proposed development can be accommodated by the existing sewer network?*

Many Thanks,

**Annabel Harris**  
Graduate Engineer



awcockward  
PARTNERSHIP



Kensington Court, Woodwater Park, Pynes Hill, Exeter EX2 5TY

AWP is a regional engineering consultancy providing development planning and infrastructure services to developers and house builders across the south west.

**Private and confidential**

This email is sent on behalf of Awcock Ward Partnership Consulting Limited (AWP) and its contents are private and confidential to the named recipient. If you receive this communication in error, please notify the sender immediately and delete any copies without disclosing the contents to any other person.

Awcock Ward Partnership Consulting Limited  
Registered Office: Southgate House, 59 Magdalen Street, Exeter, EX2 4HY  
Registered in England: Company No. 8230346