Report Title	# Flood Risk Assessment
Property Address	12/14 Main Street Haverigg Millom LA18 4EX
Client	MVC Design Ltd
Our Reference	20-165r001_C
Date	4th July 2020
Prepared by	Colin Aimers BEng Hons CEng MICE CEnv Director colin.aimers@kingmoorconsulting.co.uk

Kingmoor Consulting Ltd, 6B Clifford Court, Parkhouse, Carlisle, Cumbria, CA3 0JG
✉ hello@kingmoorconsulting.co.uk ☎ 01228 915900

Contents

SITE LOCATION AND PROPOSED DEVELOPMENT

The site is located on Main Street, Haverigg, Millom, LA18 4EX in the Copeland Borough Council area.

The existing property is a hair studio and vacant shop and it is proposed to convert the properties to 2 bed dwellings within the existing footprint of the site. There is no material change in the size or impact of the property associated with the conversion.

INITIAL FLOOD RISK

An initial flood risk assessment was undertaken adopting mapping available at https://flood-map-for-planning.service.gov.uk/ and this identified the area of the site to be within a Flood Zone 3: Areas benefiting from flood defences.

It is therefore recommended that a more detailed flood risk assessment is undertaken.

DETAILED FLOOD RISK ASSESSMENT

Flood Risk Assessment Criteria

A Flood Risk Assessment Report was requested from the Environment Agency and identified that the site is considered in a Flood Zone 3.

The Flood Zone classifications are as follows :

- Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year.

- Flood Zone 3 - 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.

In respect to the proposed development, this is classified as More Vulnerable and as such the flood risk assessment is required to address :

- Surface water management
- Access and evacuation
- Floor levels

A request was made to the Environment Agency for site specific Product 4 data and at the time of writing, and information has been provided.

Historic Flooding

The site has not experienced direct flooding from either surface water or foul water although there has been a number of flood events near the site associated with the overwhelming of watercourses and drains in the area of the Old Tannery area of Haverigg. Since this event in 2017, United Utilities and others have undertaken significant work to identify and resolve these issues.

SOURCES OF FLOODING

As part of the risk assessment, consideration shall be given to the following sources of flooding and what effect these could have on the development:

Flooding from Rivers / Watercourses

There are a number of watercourses classified by the Environment Agency as Main Rivers around the site. This includes the Haverigg Pool approx 75m from the site to the eastern boundary of the site. It is noted that this is tidal and connectioned hydrolically to the wider cumbrian cost.

As the site is developed and part of the original construction of the wider Haverigg Hamlet, formal drainage is present around the property which would limit or provide a pathway for water to pass back toward the property.

Due to the presence of the fluvial channels, we consider the risk associated with flooding from rivers and watercourses to be **MEDIUM / HIGH**. More information shall be presented in later sections relating to the Flooding from the Sea.

Flooding from Reservoirs

Not applicable.

Flooding from the Sea

From a review of the information obtained from the Environment Agency, it has identified that the site is within the flood zone 3 associated with coastal flooding.

The information obtained includes flood levels for the 1 in 200 year, 1 in 200 year + climate change allowance, events for both defended and non defended scenarios.

The following table provides a summary of the flood levels presented by the Environment Agency associated with the site.

Event	Defended / Undefended	Flood Level (m AOD)
1 in 100 Year	Defended	Outside flood risk
1 in 200 Year	Defended	5.24
1 in 200 Year (+Climate Change to Year 2115)	Defended	6.62
1 in 30 Year	Undefended	5.86
1 in 75 Year	Undefended	6.01
1 in 100 Year	Undefended	6.06
1 in 200 Year	Undefended	6.16
1 in 200 Year (+Climate Change to Year 2115)	Undefended	6.85

From a topographic survey undertaken on the site, the floor levels present are between 5.3m AOD and 5.35m AOD.

For the purposes of analysis, the flood event associated with the 1 in 200 year undefended event shall be considered with calculations undertaken to determine the climate change effect over the lifespan of the development.

Based on the 1 in 200 year undefended flood event, a flood level of 6.16m AOD would be established on the site.

In consideration of the effects of climate change, we have undertaken calculations in accordance with published guidelines, including the updates to such guidelines issued in December 2019.

We have considered that the site would be subject to sea level rise increments based on the Higher Central and Upper End scenarios. We have therefore calculated the increases using the undefended 1 in 200 year flood level model of 6.16m AOD.

Scenario	2020-2035	2035-2065	2066-2095	Final Level
Higher Central	67mm	219mm	300mm	-
Level (m AOD)	6.227	6.379	6.460	**6.460**
Upper End	85.7mm	297mm	426mm	
Level (m AOD)	6.246	6.457	6.586	**6.586**

We have not considered the use of the H++ scenario for the site as the guidance states :

"High++ allowances only apply in assessments for developments that are very sensitive to flood risk, and with lifetimes beyond the end of the century. For example, infrastructure projects or developments that significantly change existing settlement patterns. This includes urban extensions and new settlements."

From a topographic survey undertaken on the site, the site levels across the site are between 5.3m AOD and 5.35m AOD. This would indicate that flood levels within the building would be around 1.286m deep based on the 2095 Upper End scenario.

We consider the risk associated with flooding from the sea to be **HIGH**.

Flooding from the Land

The area around the site is developed and as such no land is likely to discharge water to the site resulting in flooding. We consider the risk associated with flooding from the land to be **LOW.**

Flooding from Groundwater

The site has been developed over a number of years and any affect on groundwater would be negligible. Therefore, we consider the flood risk associated with groundwater to be **LOW**.

Flooding from Sewers

There are a number of foul and surface water sewers located near the site, and following flooding events and failures of pumping stations on the sewer network, United Utilities have upgraded this

infrastructure to resolve any issues and have a high maintenance regime for the plant to eliminate any potential issues occurring again. We consider that the flood risk to be **LOW**.

Summary

The following table indicates a summary of the risks and control measures required:

Source of Flooding	Risk	Control Measures
Rivers / Watercourses	High	● Mitigation measures regarding the construction of the facility ● Site Evacuation Plan
Reservoirs	n/a	-
Sea	High	● Mitigation measures regarding the construction of the properties ● Site Evacuation Plan
Land	Low	As above
Groundwater	Low	As above
Sewers	Low	As above

INCREASE TO OFF SITE FLOODING

The proposed development in its nature is the same footprint than the historic structure present on the site. It is not proposed to enlarge this structure or modify the existing arrangements associated with the site to accommodate the change of use. It would be proposed therefore that the existing surface water runoff from the site would connect to the existing systems on the site and be no worse than existing.

FLOOD RISK VULNERABILITY

Assessment

The vulnerability of the proposed development is assessed in accordance with the Technical Guidance to the National Planning Policy Framework published by the Ministry of Housing, Communities and Local Government published on 27 March 2012 and updated on 19 February 2019.

The proposed development is for the conversion of former retail spaces to dwellings, as 'Minor Development'. From the NPPF, it considers that minor developments are unlikely to raise significant flood risk issues unless:

- They would have an adverse effect on a watercourse, floodplain or its flood defences;
- They would impede access to flood defence and management facilities, or;
- Where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.

We consider that the proposed conversion of the properties would have no effect on the existing flood risk to the site and the wider area around the site.

Mitigation Measures

We consider that the development should consider the following mitigation measures associated with the management of the residual flood risk on the site.

- Flood resilience and resistance
- Emergency Access

Flood Resilience and Resistance

It would be anticipated that the detailed design of the proposed structure would include flood resilience and resistance measures. These may include :

- Management of potential pathways for water
- Raising of critical services and infrastructure
- Incorporation of suitable building materials and details.

Guidance published by CIRIA[1] should be adopted alongside the requirements to meet the Building Regulations associated with the new structure.

These may include the following suitable construction techniques shall be adopted including :

- Concrete floors and masonry construction associated with the substructure.
- Overhead electrical supplies to the building.
- Locating electrical equipment and other plant at raised levels.
- Adoption of water resisting materials where appropriate.

More detailed considerations to these aspects can be identified as part of the Building Control process and adopted as required during construction. These would include :

- Door and window barriers
- Vent guards
- Drainage valves

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7730/flood_performance.pdf

EMERGENCY ACCESS

An emergency access plan should be adopted for the site and include the following procedures for the property.

- Early Warning Alert system (EA Notifications etc)
- Safe isolation of electrical feeds to the property.
- Safe evacuation of the residents
- Process for site attendance post flood waters

It is understood that a community wide evacuation plan is present for the property and surround areas adopted by all local residents and occupants.

EXCEPTION TEST

Paragraph 160 of the NPPF sets out two requirements in order for the Exception Test to be passed:

The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:
(a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
(b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

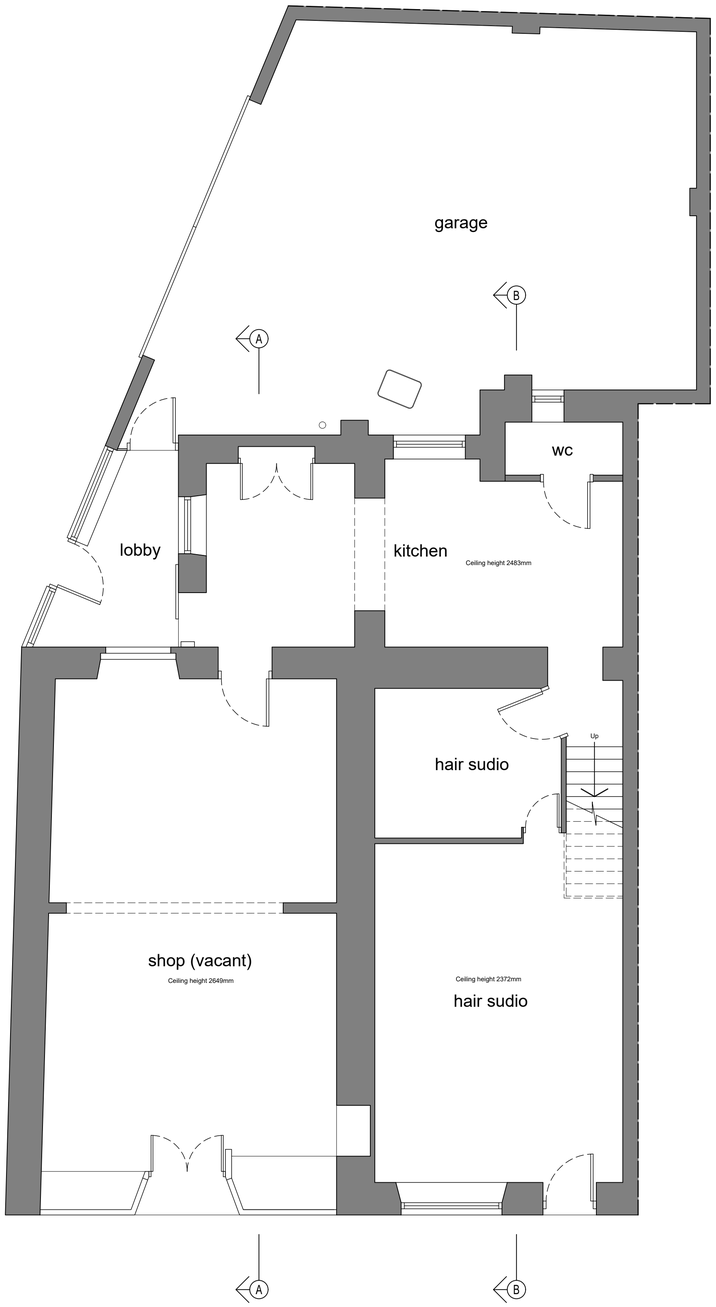
Both elements of the test have to be passed for development to be allocated or permitted. Sustainability Benefits to the Community. Paragraph 024 of Planning Practice Guidance sets out how it should be demonstrated that the wider sustainability benefits of the site outweigh the flood risk associated with the proposal.

We consider that the redevelopment of former retail units no longer suitable for use to residential dwellings for occupation by local familys satisfies the wider community needs and removes the potential for the decline of the property in its unoccupied form. We consider this considers and deals with item a) above.

Item b} above has been addressed elsewhere in this report.

APPENDICES

- Drawings
    - Site Location and Block Plan
    - Site Layout
- Environment Agency Information



EXISTING GROUND FLOOR PLAN

Scale 1:50

500mm 1500mm

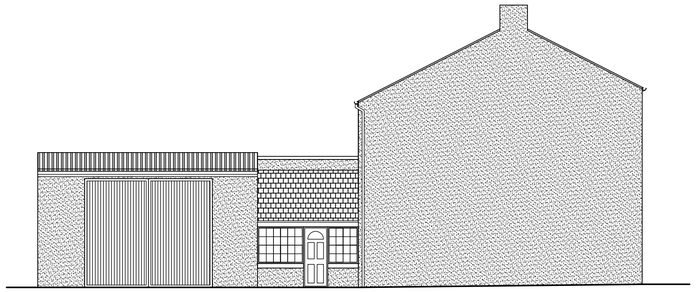
0 1000mm 2000mm

EXISTING FRONT ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

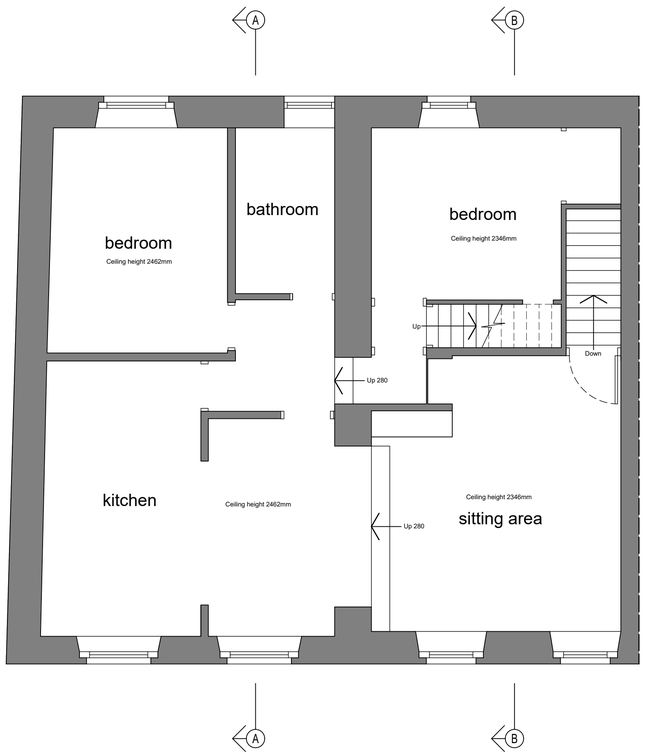


EXISTING SIDE ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

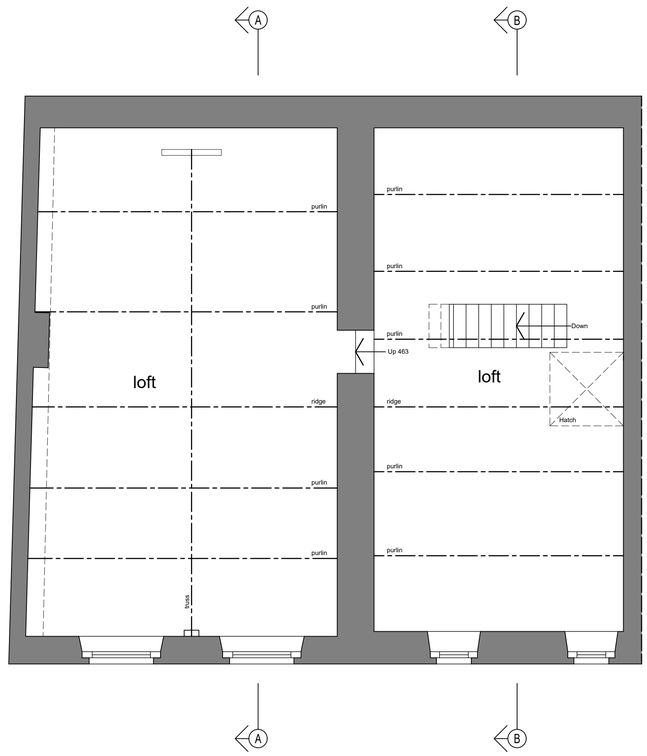


EXISTING FIRST FLOOR PLAN

Scale 1:50

500mm 1500mm

0 1000mm 2000mm

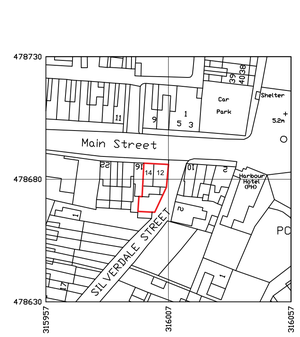


EXISTING LOFT PLAN

Scale 1:50

500mm 1500mm

0 1000mm 2000mm



Location plan

Scale 1:1250

No.	Revision/Issue	Date
B	Elevations and location plan added.	18/5/20
A	Draft issue	20/4/20

Site location

12 & 14 Main Street
Haverigg
Millom
LA18 4EX

Project

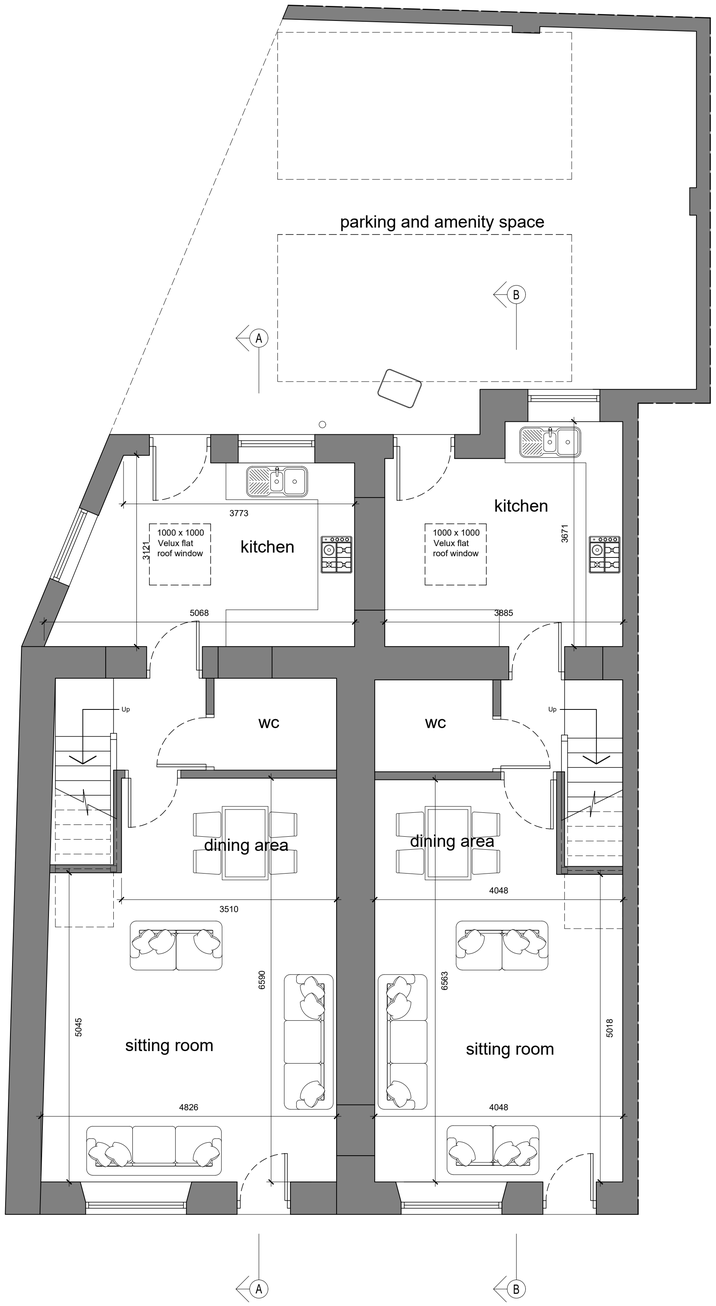
Change of use from shops and dwelling to two 3 bedroom houses.

Drawing title

Existing plans, elevations and location plan.

MVC Design Ltd
ARCHITECTURAL DESIGN
11 Meadowside
Swarthmoor
Ulverston
Cumbria
LA12 0XD
Mob: 07730661656
Tel: 01229 588208
Email: mark@mvcdesign.co.uk

Dwg No.	MVC445-01
Date	20.4.20
Scale	As shown at A1
Rev	B

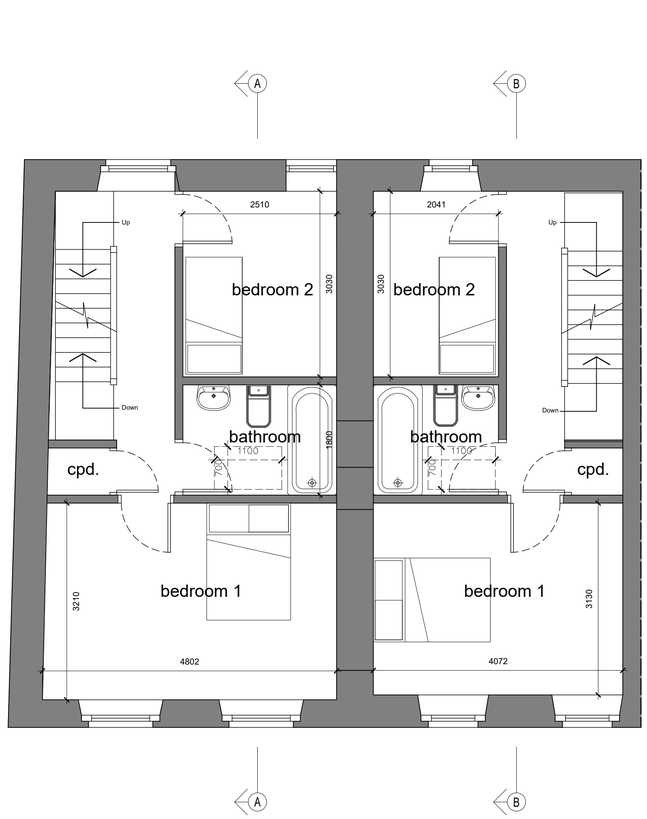


PROPOSED GROUND FLOOR PLAN

Scale 1:50

500mm 1500mm

0 1000mm 2000mm

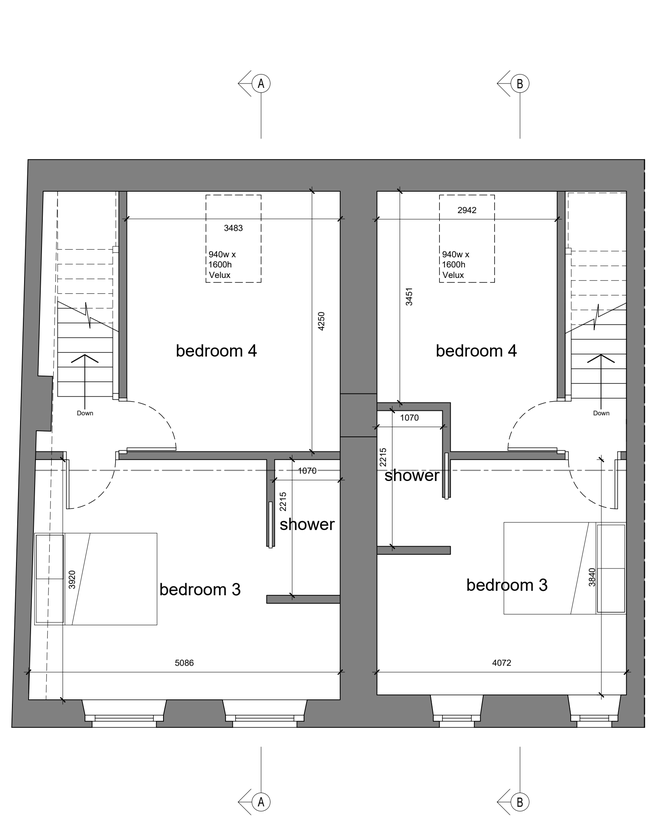


PROPOSED FIRST FLOOR PLAN

Scale 1:50

500mm 1500mm

0 1000mm 2000mm

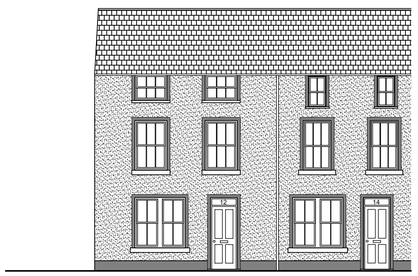


PROPOSED LOFT PLAN

Scale 1:50

500mm 1500mm

0 1000mm 2000mm

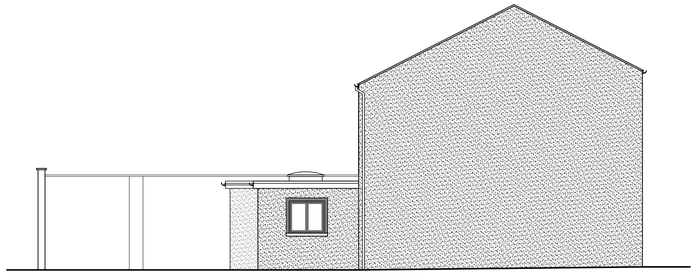


PROPOSED FRONT ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

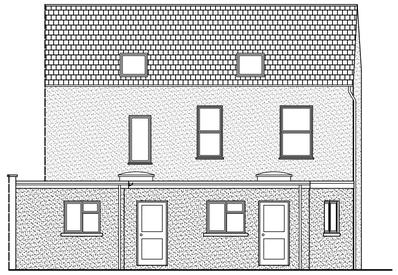


PROPOSED SIDE ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm



PROPOSED REAR ELEVATION

Scale 1:100

1000mm 3000mm

0 2000mm 4000mm

No.	Revision/Issue	Date
C	Elevations added.	18/5/20
B	Draft issue	4/5/20
A	Draft issue	20/4/20

Site location

12 & 14 Main Street
Haverigg
Millom
LA18 4EX

Project

Change of use from shops and dwelling to two 3 bedroom houses.

Drawing title

Proposed plans and elevations.

MVC Design Ltd
ARCHITECTURAL DESIGN
11 Meadowside
Swarthmoor
Ulverston
Cumbria
LA12 0XD
Mob: 07730661656
Tel: 01229 588208
Email: mark@mvcdesign.co.uk

Dwg No.	MVC445-02
Date	20.4.20
Scale	As shown at A1
Rev	C

Flood map for planning

Your reference	Location (easting/northing)	Created
20-165	**315990/478681**	**20 May 2020 8:30**

Your selected location is in flood zone 3 – an area with a high probability of flooding that benefits from flood defences.

This means:

- you may need to complete a flood risk assessment for development in this area
- you should ask the Environment Agency about the level of flood protection at your location and request a Flood Defence Breach Hazard Map (You can email the Environment Agency at: enquiries@environment-agency.gov.uk)
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (find out more at www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Environment Agency

Flood map for planning

Your reference
20-165

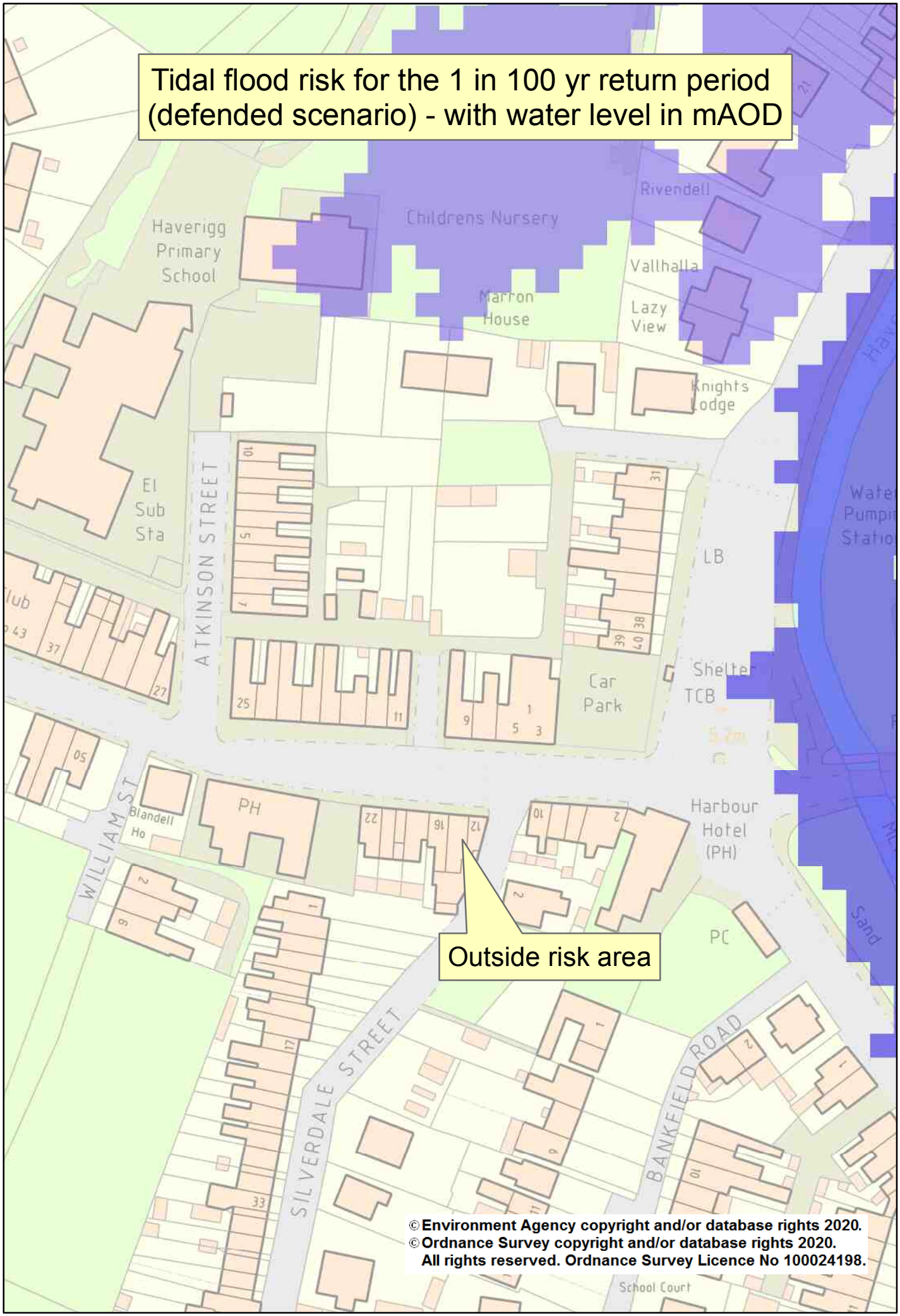
Location (easting/northing)
315990/478681

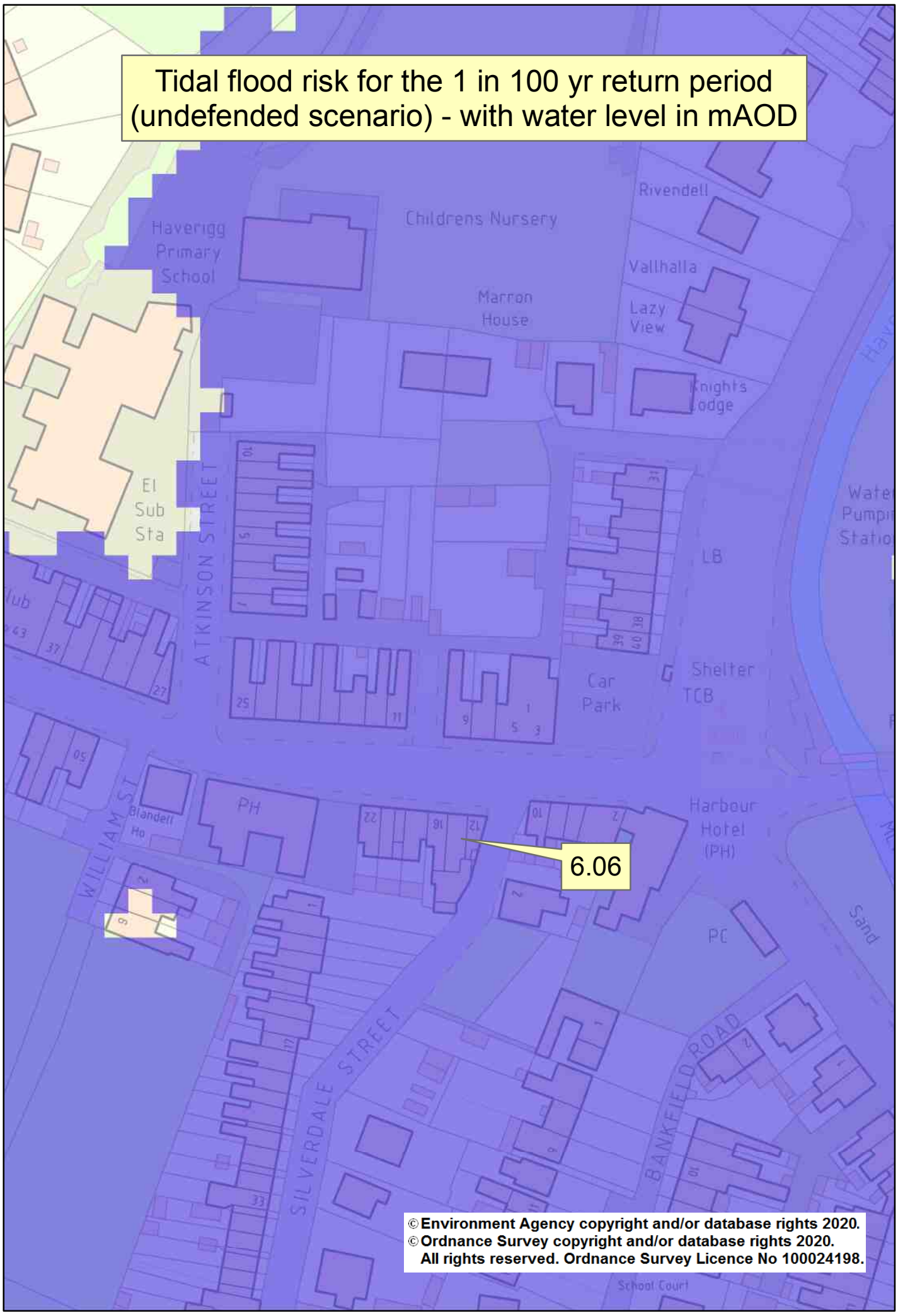
Scale
1:2500

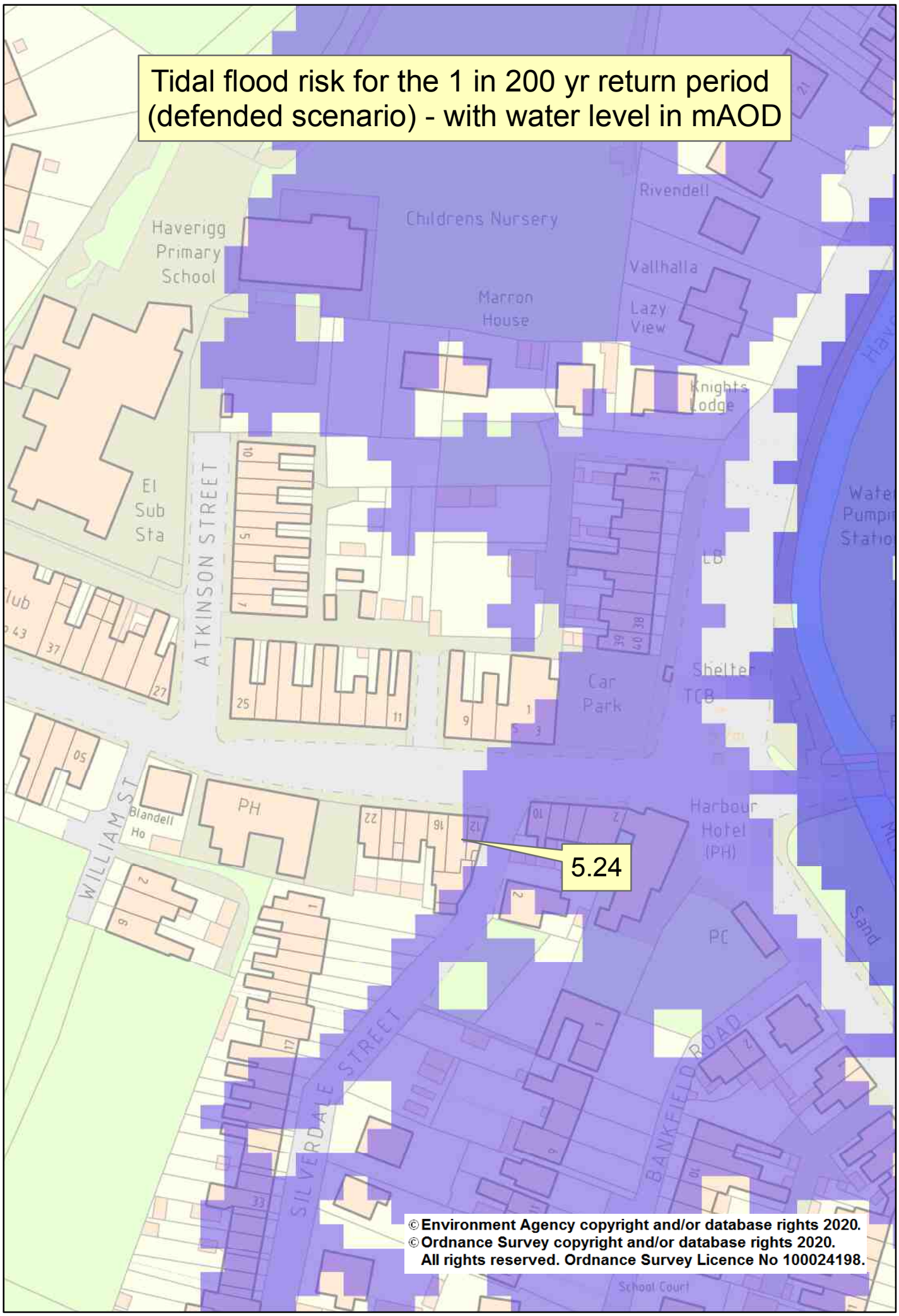
Created
20 May 2020 8:30

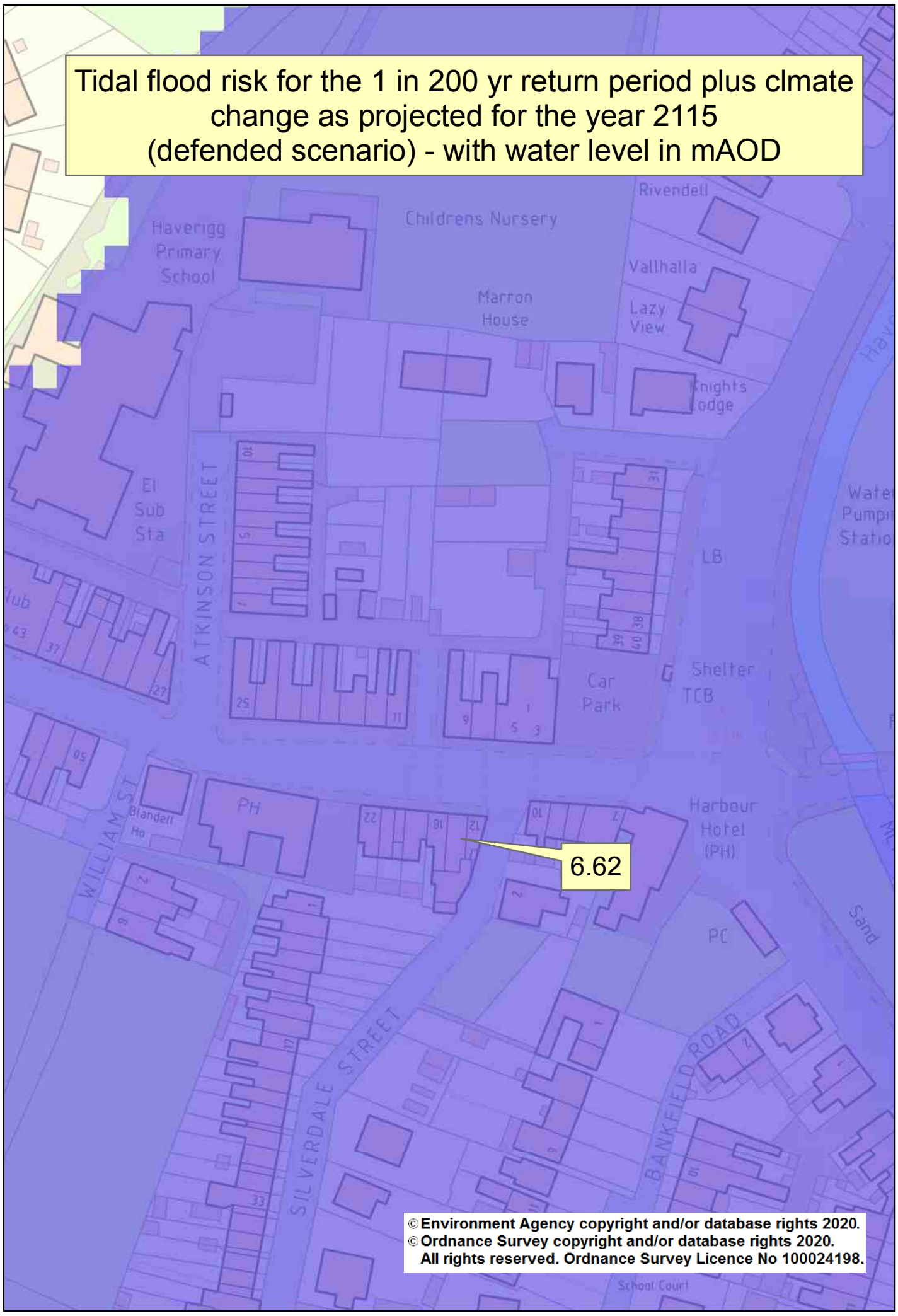
- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

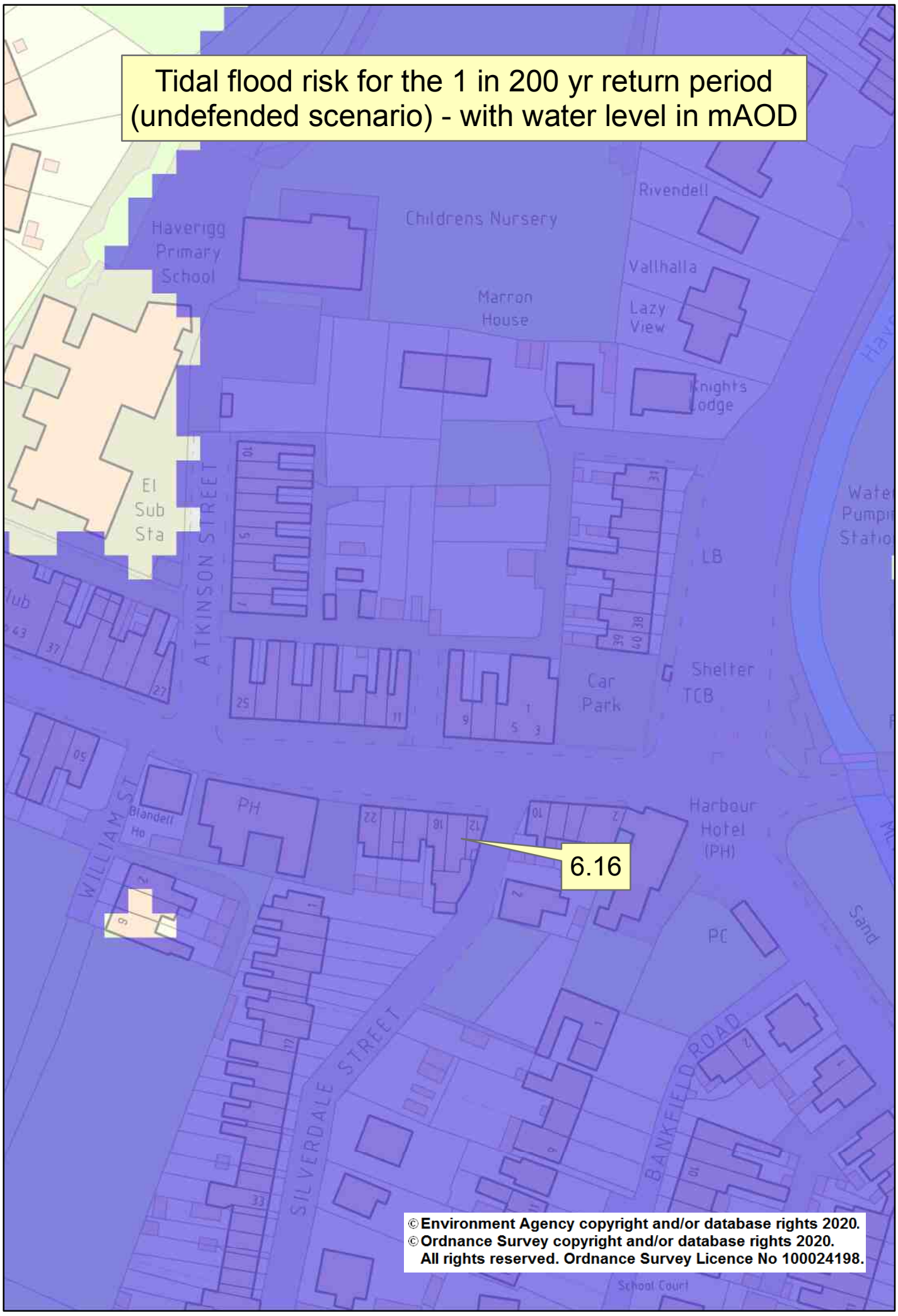

Tidal flood risk for the 1 in 100 yr return period (defended scenario) - with water level in mAOD
Childrens Nursery
Rivendell
Haverigg Primary School
Vallhalla
Marron House
Lazy View
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
PC
Outside risk area
SILVERDALE STREET
BANKFIELD ROAD
School Court
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.


Tidal flood risk for the 1 in 100 yr return period (undefended scenario) - with water level in mAOD
Childrens Nursery
Haverigg Primary School
Rivendell
Vallhalla
Lazy View
Marron House
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
SILVERDALE STREET
BANKFIELD ROAD
PC
6.06
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.

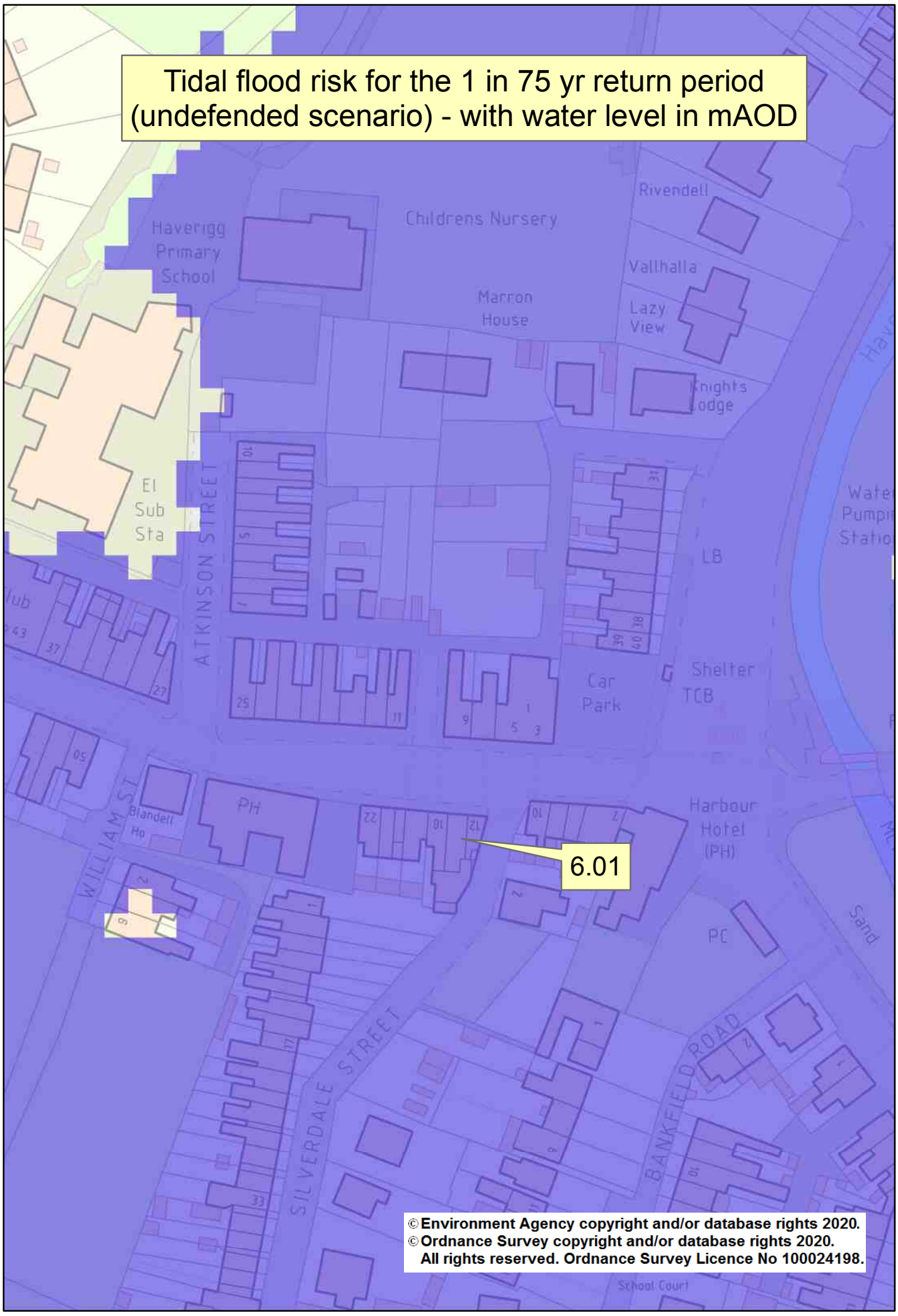

Tidal flood risk for the 1 in 200 yr return period (defended scenario) - with water level in mAOD
Childrens Nursery
Rivendell
Haverigg Primary School
Vallhalla
Marron House
Lazy View
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter
TCB
PH
Blandell Ho
WILLIAM ST
Harbour Hotel (PH)
PC
5.24
SILVERDALE STREET
BANKFIELD ROAD
School Court
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.


Tidal flood risk for the 1 in 200 yr return period plus clmate change as projected for the year 2115 (defended scenario) - with water level in mAOD
Childrens Nursery
Haverigg Primary School
Marron House
Rivendell
Vallhalla
Lazy View
Knights Lodge
ATKINSON STREET
El Sub Sta
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
SILVERDALE STREET
BANKFIELD ROAD
PC
6.62
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.


Tidal flood risk for the 1 in 200 yr return period plus clmate change as projected for the year 2115 (undefended scenario) - with water level in mAOD
Rivendell
Childrens Nursery
Haverigg Primary School
Vallhalla
Marron House
Lazy View
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
6.85
PC
SILVERDALE STREET
BANKFIELD ROAD
School Court
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.


Tidal flood risk for the 1 in 200 yr return period (undefended scenario) - with water level in mAOD
Childrens Nursery
Rivendell
Haverigg Primary School
Vallhalla
Marron House
Lazy View
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
SILVERDALE STREET
BANKFIELD ROAD
PC
6.16
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.


Tidal flood risk for the 1 in 30 yr return period (undefended scenario) - with water level in mAOD
Childrens Nursery
Rivendell
Haverigg Primary School
Vallhalla
Marron House
Lazy View
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
PC
Sand
5.86
SILVERDALE STREET
BANKFIELD ROAD
School Court
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.

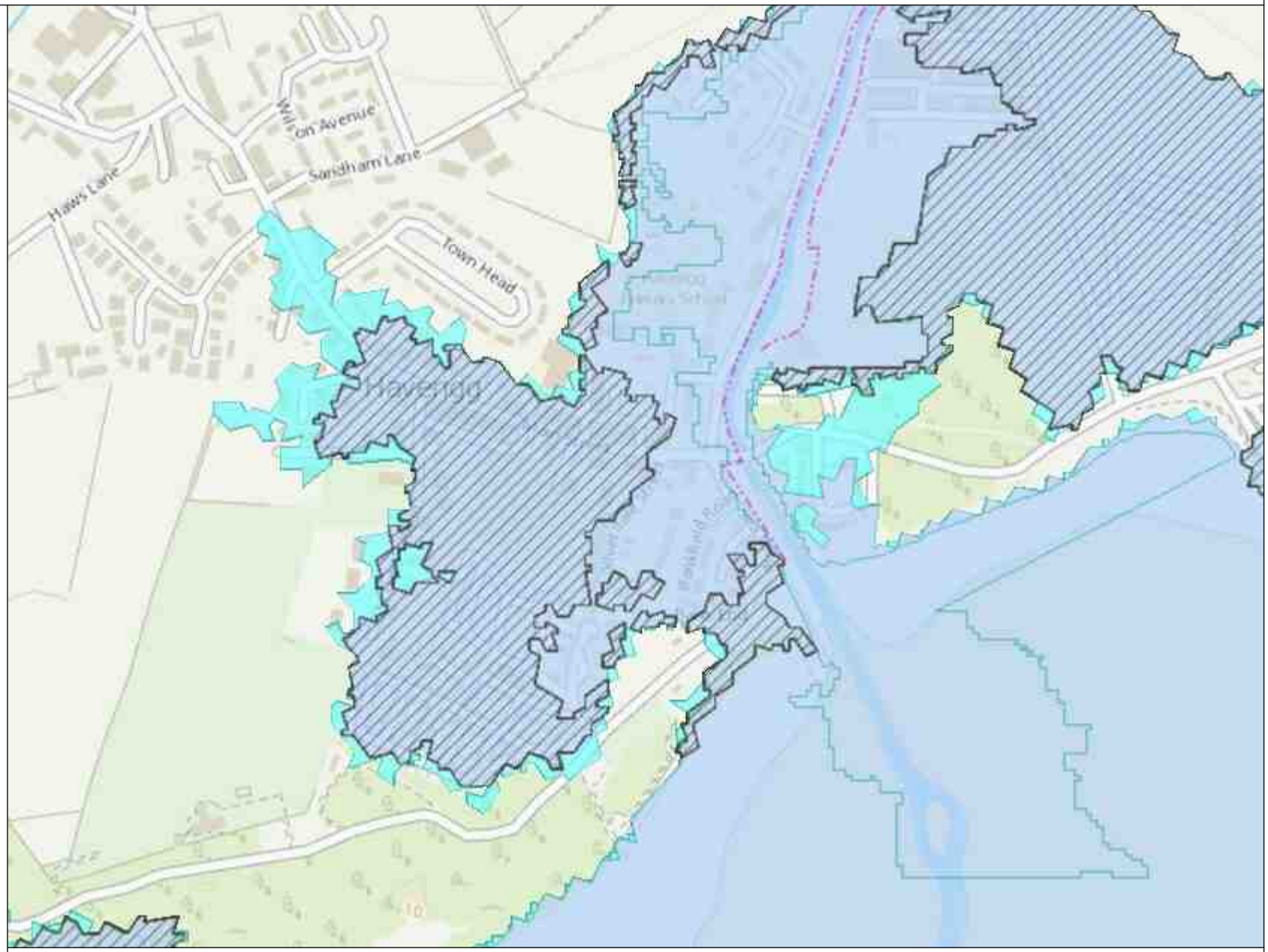

Tidal flood risk for the 1 in 75 yr return period (undefended scenario) - with water level in mAOD
Childrens Nursery
Haverigg Primary School
Rivendell
Vallhalla
Lazy View
Marron House
Knights Lodge
El Sub Sta
ATKINSON STREET
LB
Car Park
Shelter TCB
Harbour Hotel (PH)
PH
Blandell Ho
WILLIAM ST
SILVERDALE STREET
BANKFIELD ROAD
PC
6.01
© Environment Agency copyright and/or database rights 2020.
© Ordnance Survey copyright and/or database rights 2020.
All rights reserved. Ordnance Survey Licence No 100024198.

Flood Map for Planning

Environment Agency

Legend

- Defences
- Flood Storage Areas
- Areas benefiting from flood defence
- Flood Zone 3
- Flood Zone 2



1: 5,000

0 125

Metres

N W E S

Maximum extent of modelled fluvial flood risk (undefended scenario)