

**New commercial
buildings at Broughton
Lane/Willow Street
Salford**

Flood Risk Assessment

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1.0 Introduction

The site is a new two storey building plus rear yard areas at the junction of Broughton Lane and Willow Street. It is in flood zone 3a but defended against flooding by the Irwell defences. The proposals are already built and the consent applied for is retrospective for the new commercial buildings. The proposal is 'commercial' and 'less vulnerable' as defined by the National Planning Policy Framework and as such the proposal is 'appropriate' subject to conditions.

2.0 Executive summary

Lower Broughton is an area at risk of flooding from spills over existing defences when river flows are very high. It is protected by defences and the 2 Salford flood storage basins to a 1 in 100 year standard, however it can be affected by floods more serious than this and has been in the past. All warehouse unit personnel must thus be aware of flood risk and trained in evacuation procedures as the area has a flood warning system and warning can be given in reasonable time. Commercial use is acceptable in flood zone 3a.

3.0 Existing site

The existing site is a new two storey commercial building. The ground floor levels of the new building are approx 26.5 with Broughton Lane road levels being approx 26.82 which is the manhole cover level marked on the United Utilities public sewer records.

4.0 Flood risk from the Irwell

The river Irwell has flooded low lying parts of Salford in the past and the standard of protection for Broughton Lane is currently approx 1 in 100 year.

The area has been studied extensively by Jeremy Benn Associates in conjunction with the Environment Agency. The Irwell catchment is in excess of 500 km² and it reacts to long slow storms of duration 10 to 15 hours. During the annual 'wet weather' periods of October/November and February/March the catchment area can be quite wet prior to a storm and this increases risk.

The areas next to the Irwell have flood defence walls or embankments of varying heights and the way that the river behaves is that it can pass high flows up to near a 1 in 70 to 80 year risk flow. If more flow than this is coming down the river then there are now 2 flood storage basins in Salford which take controlled spills from the Irwell and lessen the peak flow passing forward that would otherwise overtop the existing defences downstream. Lower Broughton has been protected in this way in the past by one basin and now the second basin is in use the protection standard is better.

It is however quite possible for a severe storm to occur as happened on Boxing Day 2015 and flooding is still a risk. What the above means is that Broughton Lane is at

risk of spill flooding as it is effectively low lying land behind existing defences of walls and now also storage basins.

Irwell data has been obtained from the Environment Agency and at node points 6 and 7 defended risk levels are:

	1 in 100 yr	1 in 1000 yr
Node 6	26.78	30.30
Node 7	26.66	30.24

The flood map for planning shows the site as floodzone 3a as the maps are prepared as if flood defences are not there. The effect of existing defences is shown on the flood risk from rivers or sea mapping 'extent of flooding' and this classifies the site as 'low risk' with the risk as between 1 in 100 year and 1 in 1000 year. The surface water risk mapping prepared using Jflow software shows a ponding risk to the local streets.

5.0 Development and flooding emergencies and drainage.

New commercial units are now on the site to the rear of the existing building number 13. The site area is approx 200m². The units are two storey with commercial storage space on the ground floor and office space and kitchen/ toilet facilities on the first floor. Any development proposal to be given consent must ensure the safety of people in a flood. We attach a public sewer records extract plus cover level data to give general road levels for the surrounding area and to show that walking east and north along Waterloo Road will take personnel to higher ground.

Any commercial organisation owning or tenanting the new buildings must therefore take the following steps;

1. Link to the EA's flood warning service-Irwell area B
2. Prepare an evacuation plan to be written into management procedures, telling everyone what to do, where to assemble, and which way to go to reach higher ground which in this case is north uphill along Ramsgate Street or across Bury New Road and up Waterloo Road.
3. It is essential that in the case of a flood warning everyone leaves the site on receipt of the warning. This is because of the risk of a 1 in 1000 year flood of risk level 30.3 or more which would reach up to the first floor.
4. Practise the evacuation procedure regularly.

Power intakes and meters are recommended to be at first floor level.

Prior to the new building the site was a concrete slab with existing drainage. New drainage will connect to the existing drainage of no. 13. The existing hard area will not increase and will generate surface water runoff of:-

1 in 2 year storm $200\text{m}^2 \times 0.014 \text{ l/sec/m}^2 = 2.8 \text{ l/sec}$
1 in 30 year storm- growth factor $Q_{30}/Q_2=1.8$ so $2.8 \times 1.8 = 5.04 \text{ l/sec}$
The minimum flow rate for a vortex flow control to minimise repetitive blockages is 5 l/sec so the drainage should be gravity without a flow limiter. To comply with CDA area policy new runoff rates should reduce to 50% of existing however this is below the practical limiting minimum rate of a vortex flow controller which is 5 l/sec.

We note the EA March 2016 'application of allowances and local considerations' circular -the new building is 'less vulnerable' and light industrial and as such a basic approach is suitable with a flood risk rise due to climate change of 0.15m. In terms of flood resilience this is not advised for the ground floor as the risk flood depths are likely to be over 600mm depth and under those circumstances it is advised by the DEFRA flood resilience report to allow floodwater in to avoid structural damage.

6.0 National Planning Policy Framework and Technical Guidance.

The proposals are commercial and classed as 'less vulnerable' in Table 2 and are 'appropriate' as per Table 3. The exception test is not required.

All forms of flooding are:-

Rivers – Irwell, see above.

Sea – no tidal influence.

Land – no undrained land slopes towards the site.

Groundwater – no springs or weep areas visible in yard areas.

Sewers – no local reports of regular sewer surcharge.

Reservoirs, canals – none nearby but see EA mapping.

Surface water risk- see Jflow mapping which indicates the local streets may pond however in accord with DEFRA notes Jflow mapping is not to be used at site specific level.

7.0 Attachments

A4

Location plan + sewer records extract

New building plans

Flood risk from rivers plan

Flood risk from surface water plan-Jflow

Flood warning service plan

A3

Floodmap for planning plus Irwell EA river model nodes

Defences map

Historical floods map

Risk levels table March 2019

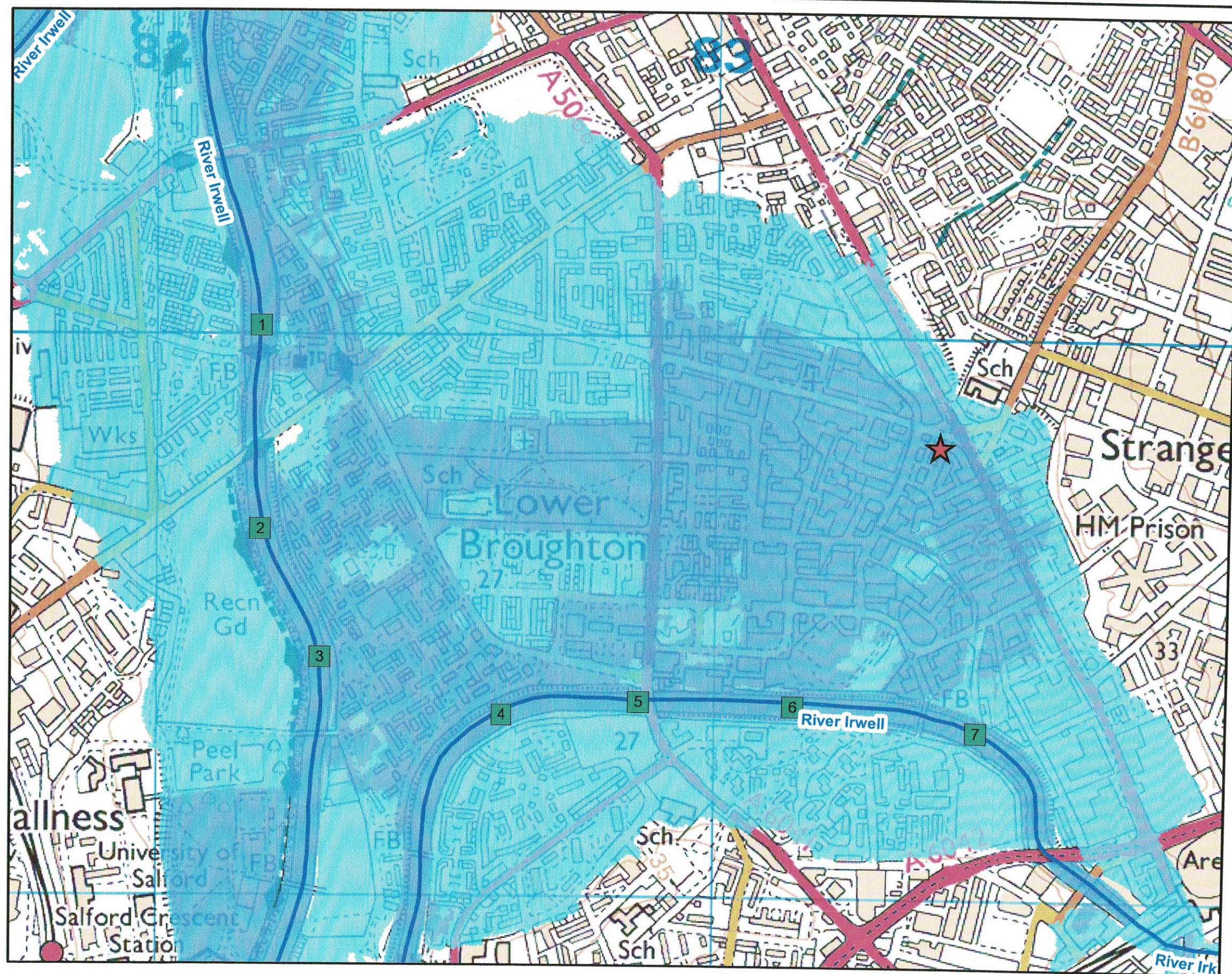
Email files

190319fra02

190319attach1-A4

190319attach2-A3

Detailed Flood Map centred on Willow Street, Manchester, M8 9SN. Created 11/03/2019 [GMMC119208AB]



1:10,001



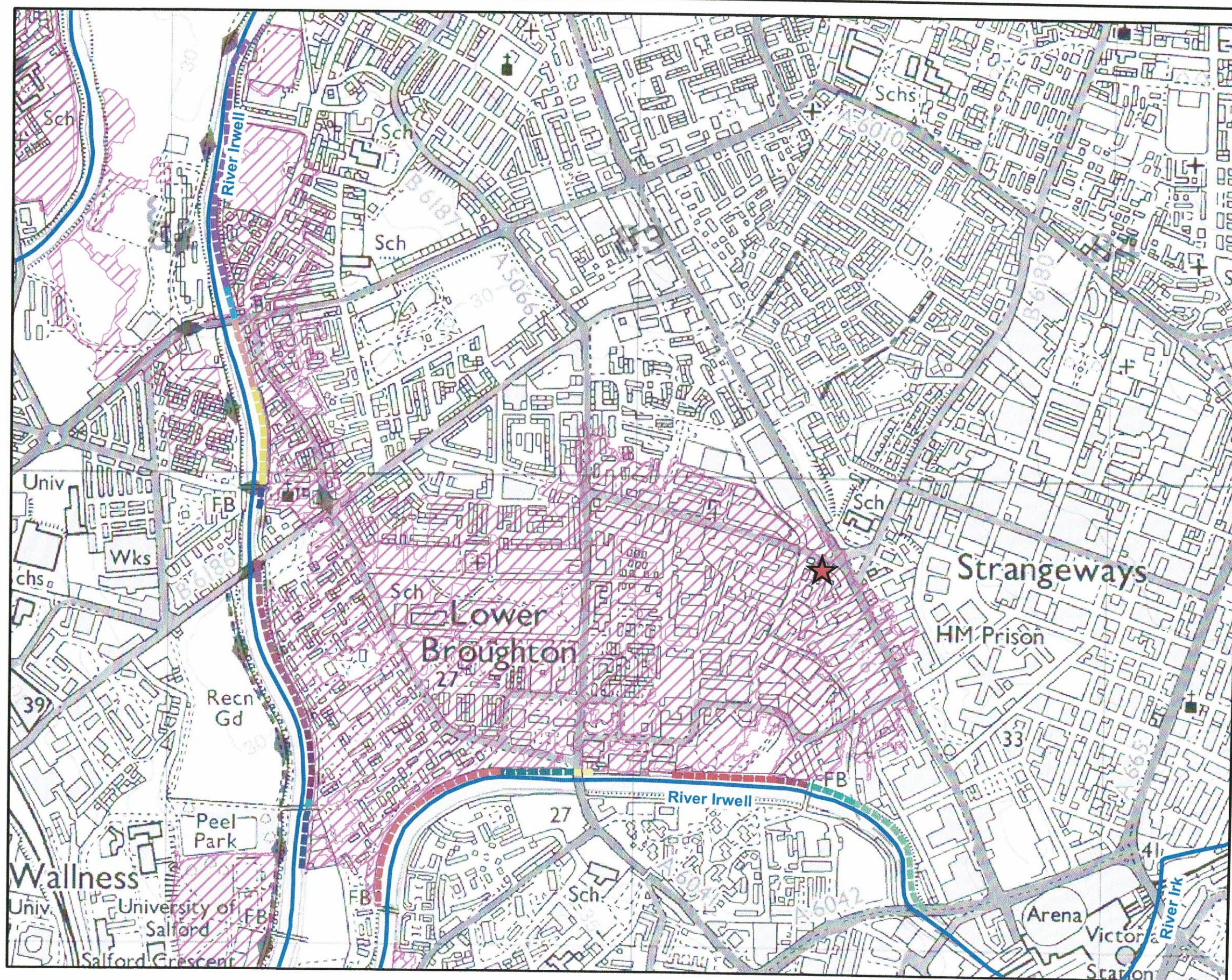
Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

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Flood Defence Map centred on Willow Street, Manchester, M8 9SN. Created 11/03/2019 [GMMC119208AB]



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Legend



Defences (EA maintained)

Asset ID

59942

88831

88832

88893

89019

89056

90250

90454

90457

90459

123679

125011

181081

185864

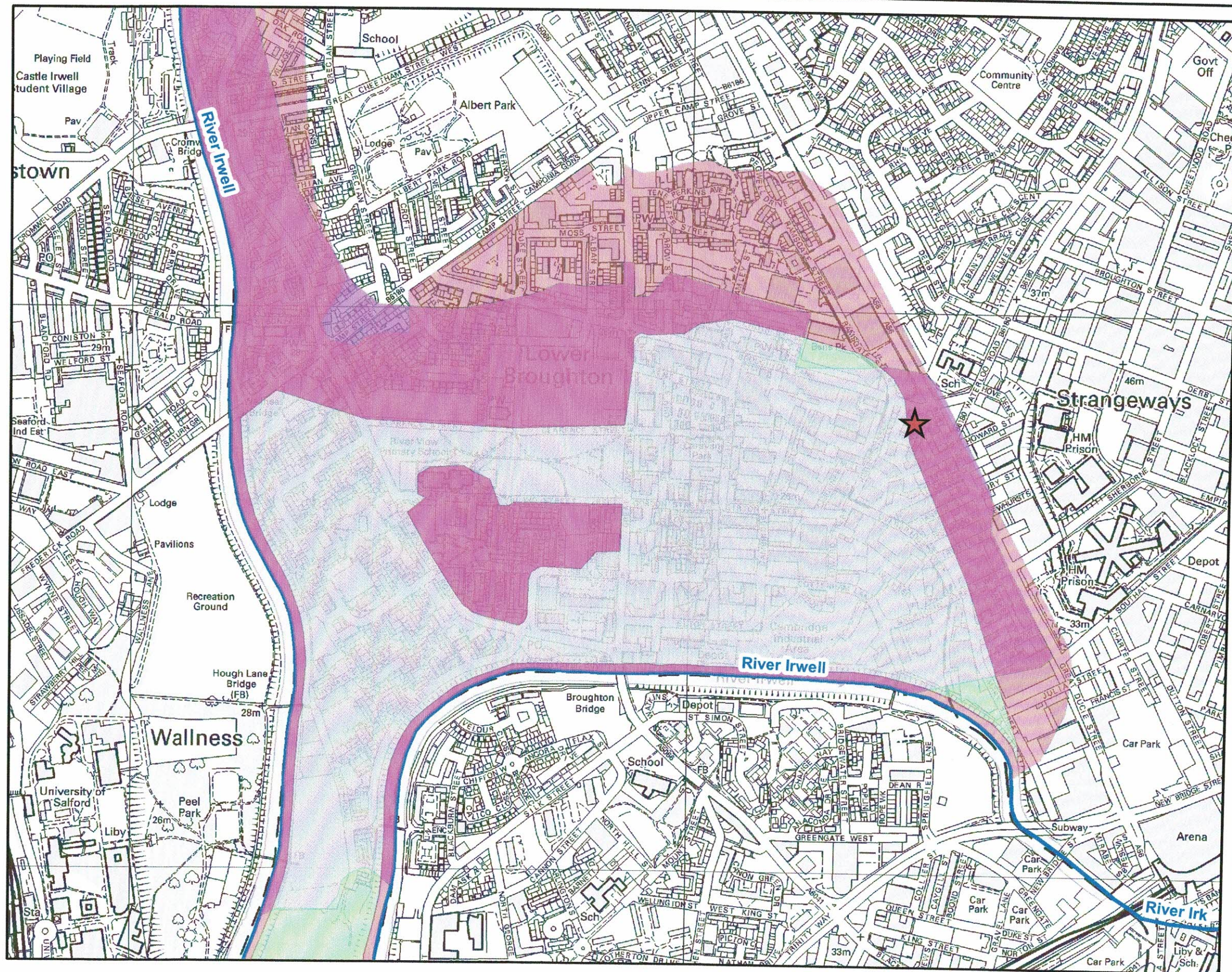
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AREAS BENEFITING

Main River

Recorded Flood Outline Map centred on Willow Street, Manchester, M8 9SN. Created 11/03/2019 [GMMC119208AB]



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Legend



Recorded Flood Outline

Start Date

26/12/2015

20/09/1946

01/11/1866

Main River

Map Reference	Model Node Reference	Easting	Northing	Data	Undefended								
					20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flows	1 % AEP (1 in 100 year) + 35% increase in flows	1 % AEP (1 in 100 year) + 70% increase in flows
1	ea013_0208_IRW16964	382212	399979	Modelled Water Level (m aodN)	27.93	28.25	28.69	28.89	28.96	29.01	29.46	29.55	
				Modelled Flow (cumecs)	294.56	333.88	394.72	441.15	465.62	485.09	607.51	627.87	
2	ea013_0208_IRW16597	382272	399619	Modelled Water Level (m aodN)	27.65	27.96	28.39	28.56	28.63	28.67	29.09	29.17	
				Modelled Flow (cumecs)	294.44	333.71	393.73	432.39	450.31	463.92	549.05	565.06	
3	ea013_0208_IRW16346	382390	399362	Modelled Water Level (m aodN)	27.56	27.87	28.30	28.49	28.57	28.63	29.15	29.24	
				Modelled Flow (cumecs)	294.50	333.74	389.45	414.72	424.56	431.47	461.59	468.80	
4	ea013_0208_IRW14520	382718	399214	Modelled Water Level (m aodN)	25.92	26.24	26.74	27.03	27.14	27.40	28.60	28.80	
				Modelled Flow (cumecs)	294.20	332.87	386.88	412.53	421.36	426.86	438.14	439.02	
5	ea013_0208_IRW14294	382958	399198	Modelled Water Level (m aodN)	25.69	26.01	26.53	26.82	26.94	27.20	28.54	28.76	
				Modelled Flow (cumecs)	294.27	332.89	387.84	416.33	427.57	436.79	455.89	455.65	
6	ea013_0208_IRW13949	383158	399320	Modelled Water Level (m aodN)	25.45	25.77	26.29	26.59	26.72	26.96	28.34	28.59	
				Modelled Flow (cumecs)	294.41	332.96	387.92	416.52	427.78	440.39	460.20	458.67	
7	ea013_0208_IRW13665	383521	399232	Modelled Water Level (m aodN)	25.30	25.62	26.15	26.46	26.59	26.80	28.16	28.42	
				Modelled Flow (cumecs)	294.55	333.02	388.03	416.72	434.26	460.26	525.61	522.09	

Model data taken from Lower Irwell 2017 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

Flood Defences

Start Date	Asset Type	Asset ID	Standard of Protection	†Overall Condition Grade	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
01/01/2003	Wall	59942	75	3	29.93	29.97
01/01/2003	High Ground	88831	75	3	27.66	27.44
01/01/2003	Embankment	88832	75	3	28.91	28.78
01/01/2003	High Ground	88893	75	2	27.44	27.20
01/01/2003	Wall	89019	75	3	28.80	28.80
01/01/2003	High Ground	89056	75	2	27.06	28.33
01/01/2003	Wall	90250	75	3	29.76	29.98
01/01/2003	Wall	90454	75	3	30.07	28.88
01/01/2003	Wall	90457	75	3	29.69	29.48
01/01/2003	Wall	90459	75	3	29.69	29.95
01/01/2003	Embankment	123679	75	3	27.77	27.48
01/01/2003	Embankment	125011	75	3	30.54	29.91

		Defended										
0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flows	1 % AEP (1 in 100 year) + 35% increase in flows	1 % AEP (1 in 100 year) + 70% increase in flows	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
29.17	30.88	28.13	28.45	28.71	28.87	28.97	29.04	29.77	29.80	30.24	29.56	30.63
530.85	709.84	318.27	356.45	386.30	405.52	416.00	423.55	533.84	537.72	652.74	482.81	672.22
28.86	30.73	27.85	28.16	28.41	28.58	28.67	28.75	29.33	29.35	29.79	29.18	30.34
497.19	634.41	318.17	356.33	386.25	405.49	415.98	423.52	523.51	527.13	622.64	480.80	640.52
28.86	30.73	27.75	28.07	28.32	28.48	28.58	28.66	29.26	29.30	29.79	29.09	30.38
444.88	516.39	318.24	356.44	386.43	405.71	416.22	423.80	512.75	515.02	539.71	479.70	541.44
27.93	30.71	26.13	26.49	26.79	26.99	27.11	27.18	28.08	28.21	29.73	27.55	30.38
433.31	439.90	318.14	356.39	386.73	406.17	416.84	424.50	481.78	480.79	473.98	472.12	464.43
27.79	30.66	25.91	26.27	26.59	26.80	26.92	26.99	27.97	28.13	29.67	27.36	30.33
451.23	450.32	318.19	356.46	386.87	406.34	417.03	424.71	482.65	480.80	464.80	472.23	441.17
27.51	30.64	25.67	26.04	26.37	26.59	26.71	<u>26.78</u>	27.69	27.86	29.61	27.08	<u>30.30</u>
459.66	444.25	318.30	356.60	387.08	406.60	417.34	425.03	482.71	480.79	462.24	472.38	436.74
27.32	30.59	25.52	25.90	26.24	26.47	26.59	<u>26.66</u>	27.50	27.66	29.52	26.96	<u>30.24</u>
507.94	489.16	318.43	356.77	387.32	406.88	417.65	425.36	526.40	532.84	523.37	472.53	494.47

Undefended													
10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flows	1 % AEP (1 in 100 year) + 35% increase in flows	1 % AEP (1 in 100 year) + 70% increase in flows	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)
28.25	28.69	28.89	28.96	29.01	29.46	29.55	30.41	29.17	30.88	28.13	28.45	28.71	28.96
333.88	394.72	441.15	465.62	485.09	607.51	627.87	702.15	530.85	709.84	318.27	356.45	386.30	407.81
27.96	28.39	28.56	28.63	28.67	29.09	29.17	30.13	28.86	30.73	27.85	28.16	28.41	28.67
333.71	393.73	432.39	450.31	463.92	549.05	565.06	630.52	497.19	634.41	318.17	356.33	386.25	407.71
27.87	28.30	28.49	28.57	28.63	29.15	29.24	30.11	28.86	30.73	27.75	28.07	28.32	28.58
333.74	389.45	414.72	424.56	431.47	461.59	468.80	514.20	444.88	516.39	318.24	356.44	386.43	407.74
26.24	26.74	27.03	27.14	27.40	28.60	28.80	30.12	27.93	30.71	26.13	26.49	26.79	27.05
332.87	386.88	412.53	421.36	426.86	438.14	439.02	444.87	433.31	439.90	318.14	356.39	386.73	407.69
26.01	26.53	26.82	26.94	27.20	28.54	28.76	30.06	27.79	30.66	25.91	26.27	26.59	26.85
332.89	387.84	416.33	427.57	436.79	455.89	455.65	461.41	451.23	450.32	318.19	356.46	386.87	407.71
25.77	26.29	26.59	26.72	26.96	28.34	28.59	30.02	27.51	30.64	25.67	26.04	26.37	26.63
332.96	387.92	416.52	427.78	440.39	460.20	458.67	459.68	459.66	444.25	318.30	356.60	387.08	407.78
25.62	26.15	26.46	26.59	26.80	28.16	28.42	29.95	27.32	30.59	25.52	25.90	26.24	26.50
333.02	388.03	416.72	434.26	460.26	525.61	522.09	502.07	507.94	489.16	318.43	356.77	387.32	407.85

allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

Downstream Actual Crest Level (m aod)
29.97
27.44
28.78
27.20
28.80
28.33
29.98
28.88
29.48
29.95
27.48
29.91
27.07
27.60
28.78
27.10

ats' for interpretation of score given.