richardjackson
engineering consultants

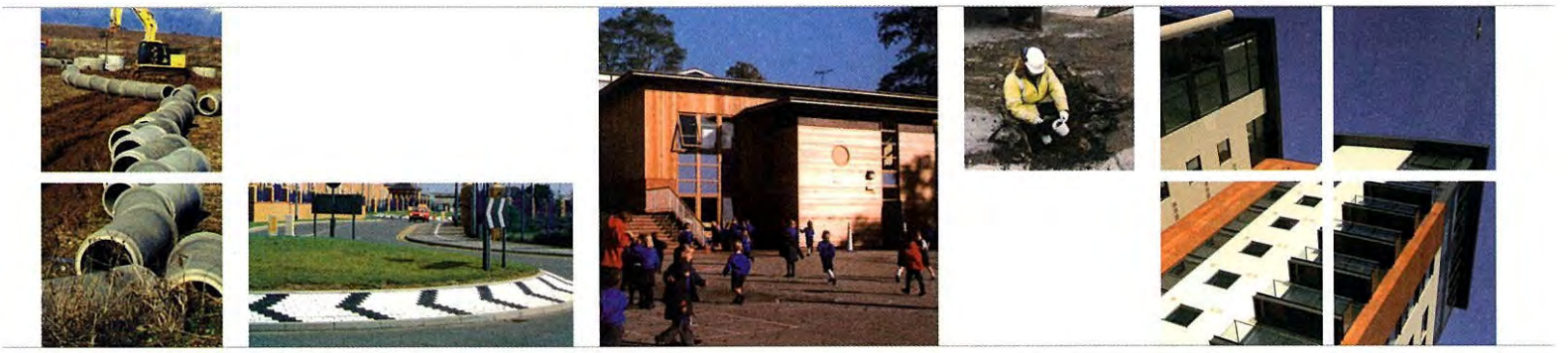
RESIDENTIAL DEVELOPMENT SITE SPECIFIC FLOOD RISK ASSESSMENT

Marsh Lane King's Lynn

Client: Borough Council of King's Lynn and West Norfolk and Lovell Partnership Limited

May 2015

Project no: 45751 – Rev A



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Date: - 26/03/2015

Document Status

DRAFT ☐ FINAL ☒

Revision Status

Issue	Date	Description	Author	Checker	Approved
-	Jan 15	Issued for client comments	MG	SH	MG
A	May 15	Updated following receipt of comments from Environment Agency and Kings Lynn Drainage Board	SH	MG	MG

CONTENTS:-

APPENDIX

1. INTRODUCTION

1.1. Richard Jackson Ltd has been appointed by the Borough Council of King's Lynn and West Norfolk and Lovell to provide a Flood Risk Assessment and Drainage Strategy for the proposed development of a site off Marsh Lane, Kings Lynn for residential use.

1.2. This assessment follows the Site Specific Flood Risk Assessment checklist published on the Planning Practice Guidance website.

2. DEVELOPMENT DESCRIPTION AND SITE LOCATION

2.1. A residential use development is proposed on land in North Lynn. The scheme will provide 130 residential units for a mix of affordable, affordable rent and private sale tenures. The National Planning Policy Framework defines residential use as being 'more vulnerable' to flood risk.

2.2. The development site is within an existing residential area of North Lynn. The site will be accessed from Marsh Lane to the south and Segrave Road to the north. The main access will be from the as yet to be constructed New Access Road which will form the site's western boundary.

2.3. The development of Marsh Lane forms a part of the Local Authority's plan to provide new homes in Kings Lynn. This site is referred to in the LDF by policy 5/38.

2.4. The sequential test and exception tests were applied by the authorities at the Local Plan stage for this development.

2.5. The development area has a level difference ranging from around 2.8m AOD south of centre to 4.2m AOD to the extreme northeast corner of the site.

3. DEFINITION OF THE FLOOD HAZARD

3.1. There are many potential sources of flooding which are listed below and will be discussed in turn,

- Surface water
- Rivers or watercourses
- The sea
- Ground water
- Sewers, water mains and reservoirs

Surface Water

3.2. The Environment Agency (EA) surface water flood plan contained in Appendix C, shows areas of low and medium risk surface water flooding to the eastern portion of the site. These owe largely to a combination of the site's low topography, extent of impermeable paving and limited surface water drainage in the surrounding areas especially to the north.

Rivers and Watercourses

3.3. This area is served by the Kings Lynn Internal Drainage Board (KLIDB) surface water network which ultimately outfalls to the tidal River Great Ouse via the North Lynn pump station. This system is maintained and managed to a high standard. The KLIDB policy statement confirms that a 1 in 25 year event is their urban target level of protection. Events of greater scale may result in water leaving the watercourse system. This water could reach this development site from the nearest watercourse which is situated to the north of the site.

3.4. There are other watercourses which are within and adjacent to the site and these ultimately all outfall to the KLIDB system.

3.5. The KLIDB are carrying out reinforcement works to their existing drainage network in the North Lynn area (subject to a separate planning application). These works will further reduce flood risk in North Lynn.

The Tidal River Great Ouse and the Sea

3.6. The EA has provided details of predicted sea levels, hazard and depth mapping and defence locations and their registered crest heights and condition. These are provided in Appendix D. The level data is restricted to a single event at this time.

Event	Level (m AOD)
1 in 200 year + CC	5.917

The site is currently protected from sea flooding in the design event. Even if the defences are breached by a tidal event the site is currently shown not to be at risk from tidal flooding for the 1 in 200 year event, excluding climate change. The site did not flood in the historic events recorded by the EA in 1978.

Groundwater

3.7. A Ground Investigation has been undertaken at the site, refer to Richard Jackson Ltd's report ref: 45751 dated January 2015. The ground conditions consist of peat, clays and silts which are not suited to ground water heading. In parts of the site made ground exists above the natural strata. Perched ground water has been located above the natural strata at various depths between 0.01mbgl to 1.137mbgl. The appears to be a correlation between this groundwater depth and distance to an existing watercourse. The farther away from watercourses the higher the level of this perched groundwater. Flooding by groundwater in it true sense is a very low risk for this site. The perched water conditions are likely to be increase the risk of surface water flooding.

Reservoir, Water Main and Sewer Flooding

3.8. The EA flood mapping shows that this site is not at risk from reservoir flooding.

3.9. The site is currently serviced by foul and surface water drainage and water main systems. Failure of these is possible at any time, however the volume of water produced would not be as significant as large rainfall events and hence this risk is also considered low.

3.10. The existing surface water arrangements for the site are not formalised. Surface water will follow the topography until such time as it reached a watercourse within the site. From here it will outfall to the KLIDB system.

4. PROBABILITY

4.1. This site can be considered to be in Flood Zone 3 from tidal risk but benefitting from defences.

4.2. The Kings Lynn & West Norfolk Strategic Flood Risk Assessment considered breaches of the tidal flood defences the west of the site. The SFRA and the later information supplied by the EA concur that this site is located in Flood Zone 3. If a breach of these defences were to occur during a design tidal event then water is currently unlikely to reach the site.

4.3. The probability of flooding at the site is low as a result of its well defended situation. The minor surface water risk noted above is related to the topography and limited surface drainage within the site. The risk of flooding from surface water can also be considered low.

4.4. The site is 5.21 Ha in area. The site is currently undeveloped and hence the runoff is in line with Greenfield runoff rates. These rates have been calculated by the ICP SUDS method and range from 6.9 l/s in a 1 in 1 year event to 28.3l/s in a 1 in 100 year event.

5. CLIMATE CHANGE

5.1. As climate change unfolds, sea levels and the impact of surges increases. Therefore the risk to the area that would be inundated following a defence failure increases to include this site. The site is located some 2km from the closest potential breach location. The time of inundation at this site will be the longest for any area of Kings Lynn as the site lies on the landward edge of the 'at risk' area. It is quite possible that this site will not be impacted by the first tide of any breach scenario giving up to 18 hours before the site starts to flood. The breach scenarios thereby considered in the hazard assessment have been combined; other scenarios that may give different answers are possible.

5.2. Climate change will also increase rainfall duration and intensity. This effect has been considered within the drainage strategy proposed below by adding 30% to the 1 in 100 year rainfall event.

6. DETAILED DEVELOPMENT PROPOSALS

6.1. The development layout is appended to this assessment. The layout is typical of that for a residential scheme. The site will provide 130 new dwellings. These will served from a network of new highways. Existing sewers with the site will be maintained and if required diverted in line with the requirements of the sewer authority. The existing watercourses noted above will be removed as they have no strategic function once a new drainage system is installed to serve the site.

6.2. The drainage of the housing development to the east of the development site, known as Millfields, enters the development site via 3 no. connections, these being diameters of 150mm, 225mm and 600mm into a 600mm diameter pipe which is laid adjacent to the eastern boundary and flows in a northerly direction, to outfall to the watercourse to the north, refer to the topographical survey contained within Appendix H. This existing drainage is to be redirected into the new development drainage serving this site before it outfalls to the KLIDB system. This inflow has been included in the drainage calculations included in appendix G.

6.3. A site meeting was held on the 13 January 2015 with George Dann of the KLIDB with regard to the existing watercourses around the perimeter of the site. George Dann advised that the watercourse along the northern boundary is the only one that is the maintenance responsibility of the KLIDB, see their records in appendix E. In principle, he agreed to this watercourse being removed, provided that all positive flows entering it are diverted into the new development drainage. It was agreed that further investigations would be carried out by the developer to determine if any additional outfalls are present.

6.4. These investigations have subsequently been carried out and no outfalls were discovered. The other watercourses to the eastern, western and southern boundaries and through the centre of the site are not maintained by the KLIDB. Investigations were carried out and no positive outfalls into watercourses on the western and southern boundaries were found. These watercourses will therefore be removed and the removal of all watercourses will be subject to an application to the KLIDB to obtain their formal consent. With regard to the watercourse to the eastern site boundary, 3 no. 100mm diameter outfalls were found. This watercourse is within the curtilage of the adjacent Alderman Jackson school site and therefore will remain unaltered. The responsibility for maintaining this watercourse is with the owner of the former Alderman Jackson school site.

6.5. The proposed foul water system will be connected to the adjacent adopted foul water sewer system. Consultation with Anglian Water (AW) under a pre-development application has determined that reinforcement works to the existing AW foul drainage network in the North Lynn catchment will be required. These works will be carried out under a Section 98 requisition. The reinforcement works are currently being designed by Anglian Water.

6.6. The development drainage will connect into the existing AW foul water sewers in and around the development site. Where gravity connections are not possible, an adoptable foul water pumping station is to be provided.

6.7. The main foul water sewers will be offered for adoption to Anglian Water.

6.8. The proposed surface water drainage will outfall into the forthcoming enhanced North Lynn Drain scheme to the west of the development site, see above. These enhancements have been designed by the KLIDB to accept unrestricted flows from this proposed development up to the 1 in 100 year plus climate event as well as other potential housing development sites in North Lynn. An allowance of a drained area of 70% of the total site area has been made by KLIDB when looking at the impacts of the proposed developments in this area. This development has a drained area of approximately 50% (25,870m^2) of the total site area. In addition to this, the existing drainage from the Millfields development, which currently connects to the North Lynn Drain, will be incorporated into the new housing development drainage. The drained area from Millfields is approximately 12,460m^2. A preliminary drainage strategy and calculations have been produced and are appended to this report. The very small volumes of flooding shown for the 1 in 100 year storm will be stored on the public highway and the levels of which shall be designed to ensure that no surface flooding poses a risk to the housing.

6.9. The main surface water sewers will be offered for adoption to Anglian Water.

6.10. In discussions with the KLIDB it has been agreed in principle that the new surface water system will outfall to the adjacent North Lynn Drain at an unrestricted rate, subject to written approval of KLIDB. The KLIDB have permissive powers for maintenance and improvements such that the receiving system has adequate capacity to perform in line with their charter.

6.11. SuDS drainage has been considered for this development. However, given the underlying ground conditions and high groundwater, infiltration SuDS drainage is considered to be unsuitable for this development.

6.12. The finished floor levels of the new buildings have been nominally set above existing site levels to reduce flooding risk, refer to Appendix I. The entrances to the buildings will be carefully considered to ensure that minor flooding externally will not be able to enter the buildings.

6.13. Flood resistant construction techniques will be employed across the site to reduce the possibility of flooding within buildings occurring. These techniques include, but are not limited to the following

- Non return valves on foul sewers
- Telescopic air vents

- Removable barriers on doors.

6.14. It is not considered feasible to attempt to restrict water deeper than 600mm from entering buildings. As the tidal hazard mapping shows this site can be considered to have up to 2.0m depth of water. Flood Resilient construction techniques will be employed up to a level of 5.9m AOD. The existing minimum level on site is around 2.8m AOD and hence the post breach water levels assessed by the EA are 4.8m AOD. All first floor areas will be set above this level to ensure that they are available to residents as a refuge. No sleeping accommodation will be provided on the ground floor of the 2 storey properties.

6.15. The proposed housing mix which responded to the needs of the local community included 1 bed flats and maisonettes. These types of unit by their nature include sleeping accommodation on the ground floor. They are also often designed to accommodate the less able and as such are required to include level access arrangements. The locations of such units have been carefully considered and they have been placed in areas where finished levels which are as high as is possible within the confines of the site location and topography.

7. FLOOD RISK MANAGEMENT MEASURES

7.1. The development proposal responds to the flood risk at this site by raising the finished floor levels of the building as far as is practicable. In this case the water levels in a design sea wall breach event at the site could be as high as 4.8m AOD. To raise floors above this would require very significant volumes of material to be placed. This is not desirable as the underlying ground conditions include a layer of peat up to 1m thick which is a very compressible material and which would increase the risk of differential settlement and impact upon drainage and utilities as well as the building entrances. The buildings have therefore been designed such that they offer a refuge above this level for residents who are trapped by an unforeseen event at the site. Additionally a Flood Warning and Evacuation Response Plan will be put in place to ensure that all residents are made aware of the risks to their properties. The aim of such a plan would be to evacuate residents while safe access and egress can be achieved and to provide local safe centres where their immediate needs can be met with the assistance of the authorities.

7.2. The houses will be provided with measures to restrict water ingress where levels are less than 600mm and flood resilient construction techniques that are suitable for swift post event clean-up will be used up to a level of 5.9m AOD across the site.

7.3. The surface water disposal system for the housing areas may include a combination of rainwater harvesting in the form of water butts within the individual plots, before out falling to the KLIDB system.

8. OFF SITE IMPACTS

8.1. The protection of areas outside of the site from surface water and fluvial flooding lies with the KLIDB who have considered this development before agreeing to accept flows from it at unrestricted rates. They will make whatever improvements to their systems as they deem necessary overtime to continue to serve their area.

9. RESIDUAL RISKS

9.1. The potential for sea defence overtopping and breach remain. This will be managed by a Flood Warning and Evacuation Plan. The local authority will be involved in monitoring this risk along with the Environment Agency who are currently responsible for flood warnings. The purpose of the Plan will be to evacuate residents if a breach of the defences occurs. If residents are surprised by a flood event them refuge on upper floors of the proposed buildings will be possible for the majority of the buildings. Safe access and Egress at the peak of a tidal flood event will be achievable if the defences perform as designed. If there is a breach then access and egress for all will not be possible until water recedes.

9.2. The capacity of the receiving surface water disposal system could be overwhelmed by an extreme event. KLIDB are responsible for this receiving system and have measures in place to protect residential areas by controlling flows.

9.3. The sewers provided to serve this site have an ultimate capacity that may be exceeded by an extreme rainfall event. In this case water will follow the topography of the site. Water will tend to gather in areas such as roads public open space and driveways that are less vulnerable to flood risk until the receiving drainage system conditions allows the water to outfall.

APPENDIX A

MARSH LANE
4.98 HECTARES

LYNNSPORT 1
3.61 HECTARES

LYNNSPORT 3
1.47 HECTARES

LYNNSPORT 2
4.42 HECTARES

LYNNSPORT 4
1.60 HECTARES

LYNNSPORT 5
1.19 HECTARES

Proposed Hockey Pitches

Proposed Hockey Pitches

Relocated Miniature Railway

N

REV	DATE	CHK	AMENDMENTS
A00	07.11.14	ESB	Initial Issue

NOTES

DO NOT SCALE FROM THIS DRAWING ALL DIMENSIONS TO BE CONFIRMED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION

LOVELL

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DRAWING
Location Plan (All Sites)

CLIENT
Lovell

JOB
New Housing
King's Lynn

Preliminary

SCALE	1:2500	PAPER	A1	DATE	Nov 2014
JOB	**7956**	DWG	**001**	REV	**A00**

APPENDIX B

REV	DATE	CHK	AMENDMENTS
A00	10.12.14	ESB	Initial Issue
A01	22.12.14	ABA	Site plan amended post updated below ground services
A02	09.01.15	ABA	Site plan amended post design review. Site s/w services removed / relocated, density increased at east site of site
A03	15.01.15	ABA	Site plan amended post Lovell review
A04	19.01.15	DD	Update to below ground constraints and easement zones, private road moved to align with highways adoption zone. Red line boundary djusted.
A05	21.01.15	ESB	3No. Plots omitted (A2b, A3b Private Rent & P4C Open Market). Gas governor added, easements in greyscale.
A06	13.02.15	ABA	Plots 107 & 108 changed to P2B. Parking at 030, 70-77 & 102 repositioned around turning heads. Numbering added.
A07	18.02.15	ABA	Foot path added between parking & plot 86-87, parking to plot 30 reduced to no.3 spaces, boundary fences revised
A08	17.03.15	ABA	Minor notes amended and colour issue

DO NOT SCALE FROM THIS DRAWING ALL DIMENSIONS TO BE CONFIRMED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION

NOTES

Below ground services based on drawings 14966ea-01 to 07 Topographical Survey, dated 05/11/2014, and updated below ground information from Lovell dated 19/12/2014

- Approximate location of Existing below ground Foul Water services
- Approximate location of Existing below ground Surface Water services
- Location of Proposed below ground Surface Water services
- Existing Tree Removed
- Existing Tree / vegetation
- Adoptable Roads
- Existing Public Foot / Cycle Paths
- Proposed Public Foot / Cycle Paths
- Public Open Spaces
- Private Gardens
- Parking Surface
- Private Road Surface / Private Foot Path
- Site Boundary

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CLIENT
Lovell

JOB
Marsh Lane Housing Development
King's Lynn

DRAWING
Site Plan

Preliminary

SCALE	1:500	PAPER	A1	DATE	Nov 2014
JOB	7956	DWG	003	REV	A08

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APPENDIX C

Environment Agency

Enter a postcode or place name: Other topics for this area...

Go | Risk of Flooding from Surface Water | View other Interactive Maps

Risk of Flooding from Surface Water

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

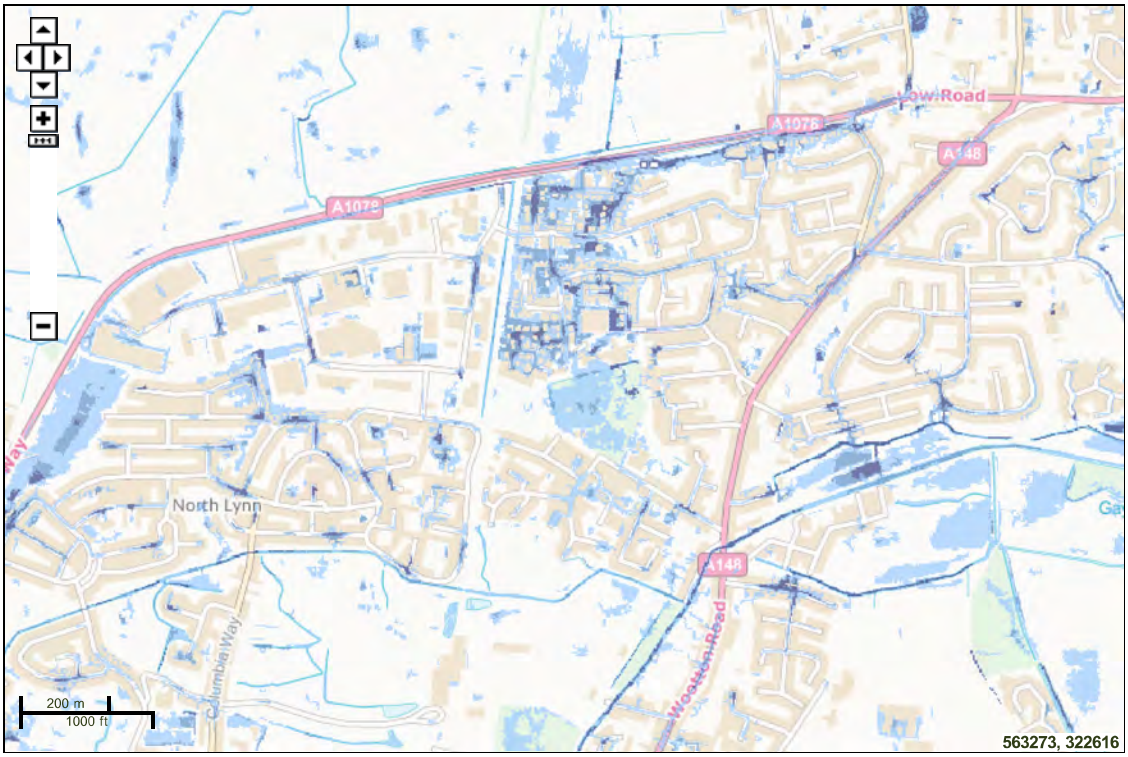
The shading on the map shows the risk of flooding from surface water in this particular area.

Click on the map for a more detailed explanation.

Map of X: 563,477; Y: 321,736 at scale 1:10,000 Data search

Map legend

- Risk of Flooding from Surface Water
  - High
  - Medium
  - Low
  - Very Low



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Last updated: 16 January 2015

Environment Agency

Enter a postcode or place name: **Other topics for this area...**

Go | Risk of Flooding from Rivers and Sea | View other Interactive Maps

Risk of Flooding from Rivers and Sea

River flooding happens when a river cannot cope with the amount of water draining into it from the surrounding land. Sea flooding happens when there are high tides and stormy conditions.

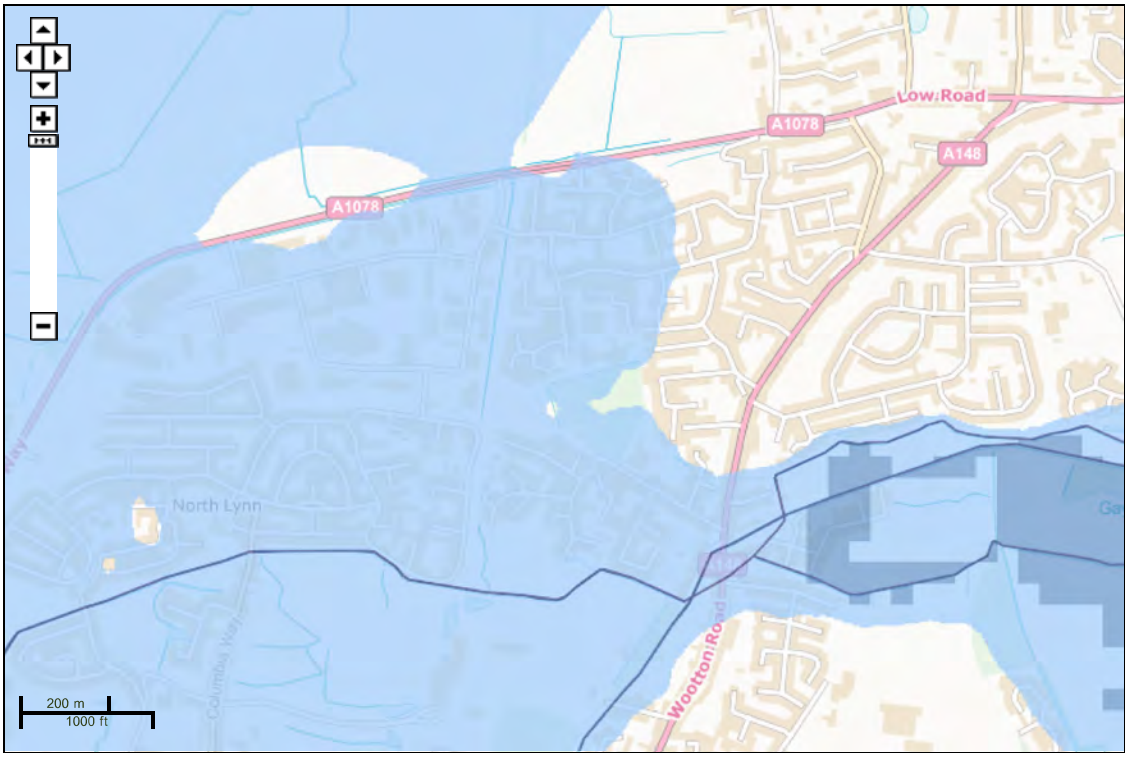
The shading on the map shows the risk of flooding from rivers and the sea in this particular area.

Click on the map for a more detailed explanation.

Map of X: 563,477; Y: 321,736 at scale 1:10,000 **Data search**

Map legend

- Risk of Flooding from Rivers and Sea
- High
- Medium
- Low
- Very Low



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Go

Other topics for this area...

Risk of Flooding from Reservoirs

View other Interactive Maps

Risk of Flooding from Reservoirs

Reservoir flooding is extremely unlikely to happen.

The shading on the map shows the area that could be flooded if a large reservoir were to fail and release the water it holds. A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools. Since this is a worst case scenario, it's unlikely that any actual flood would be this large.

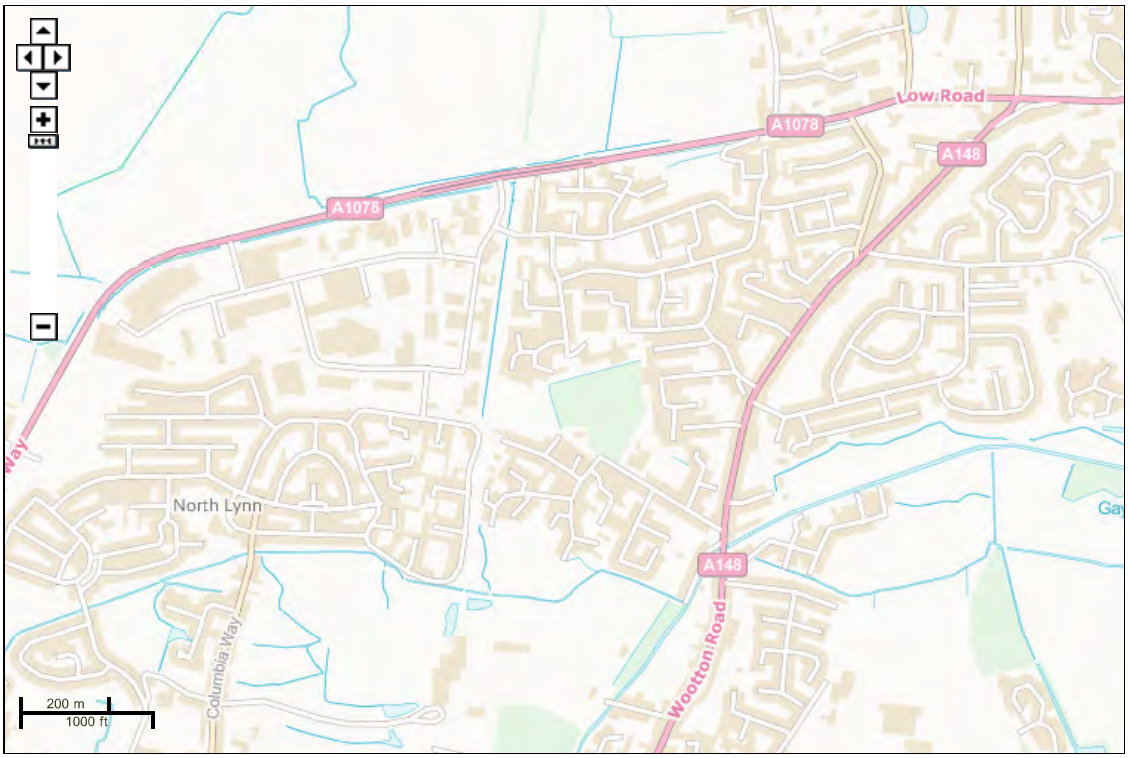
Click on the shading to see details of reservoirs that could cause flooding in this area.

Map legend

- Risk of Flooding from Reservoirs
- Maximum extent of flooding

Map of X: 563,477; Y: 321,736 at scale 1:10,000

Data search



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Enter a postcode or place name:

Go

Other topics for this area...

Flood Map for Planning (Rivers and Sea)

Flood Map for Planning (Rivers and Sea)

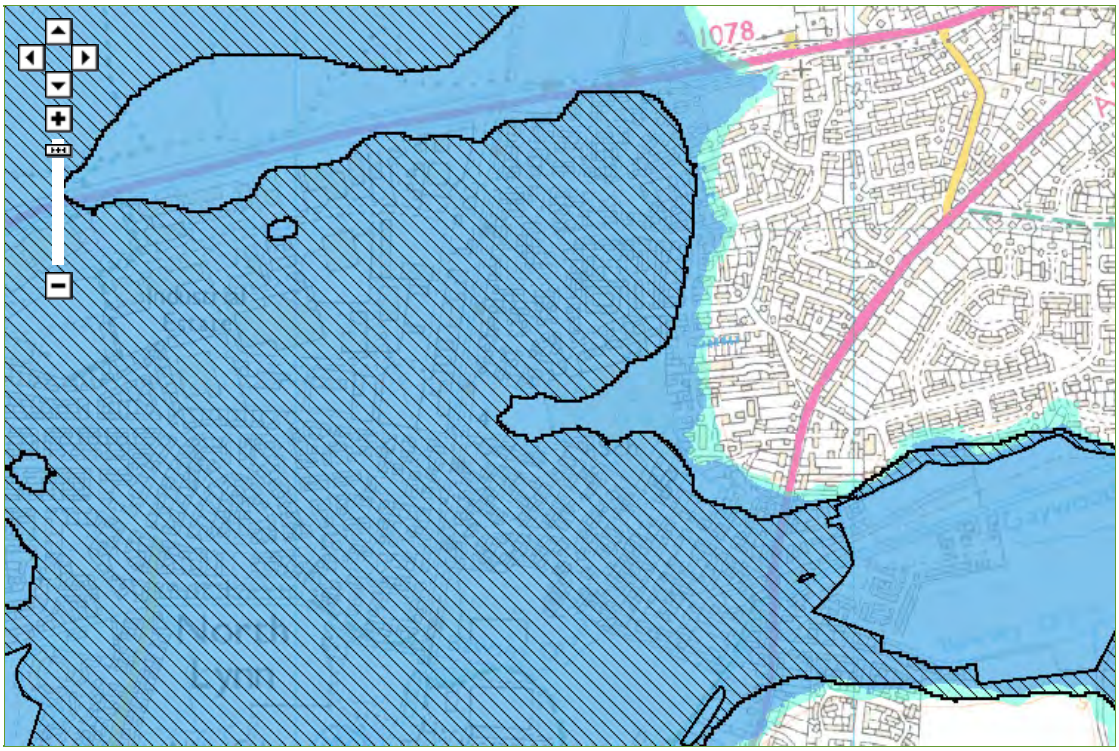
Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

- Flood Map for Planning (Rivers and Sea)
- Flood Zone 3
- Flood Zone 2
- Flood defences (Not all may be shown*)
- Areas benefiting from flood defences (Not all may be shown*)
- River and Sea levels
- Main rivers

Map of X: 563,477; Y: 321,736 at scale 1:10,000

Other maps Data search Text only version



More about flooding:

Understanding the Flood Map for Planning (Rivers and Sea)

A more detailed explanation to help you understand the flood map shown above.

Current flood warnings

We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

* **Legend Information:** Flood defences and the areas benefiting from them are gradually being added through updates. Please contact your local environment agency office for further details.

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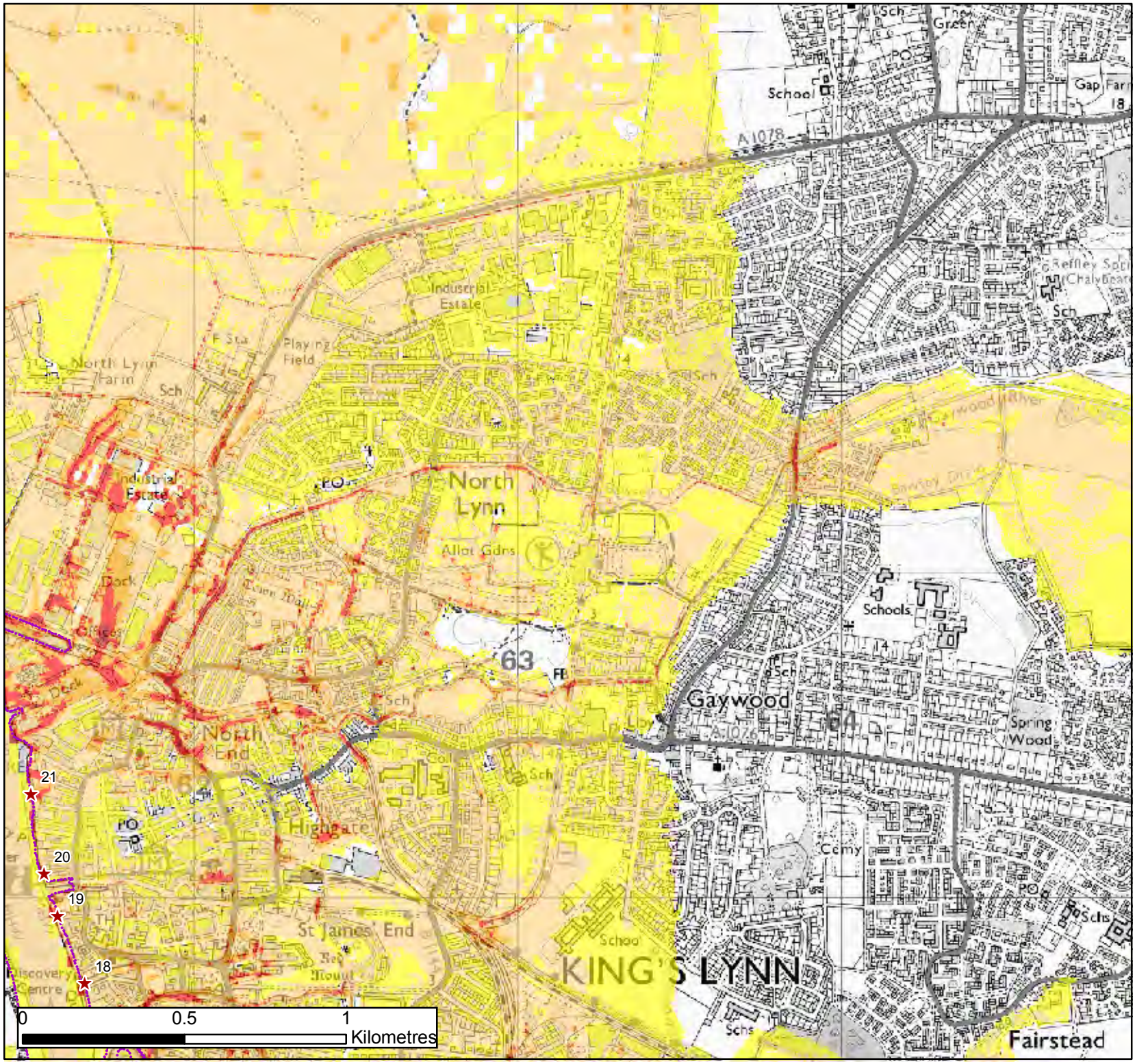
APPENDIX D



Environment Agency

Central Area Tidal Hazard Mapping - Max Velocity plus Climate Change

Map Centred on: TF6316021124

Printed on: 8 December 2014

Legend

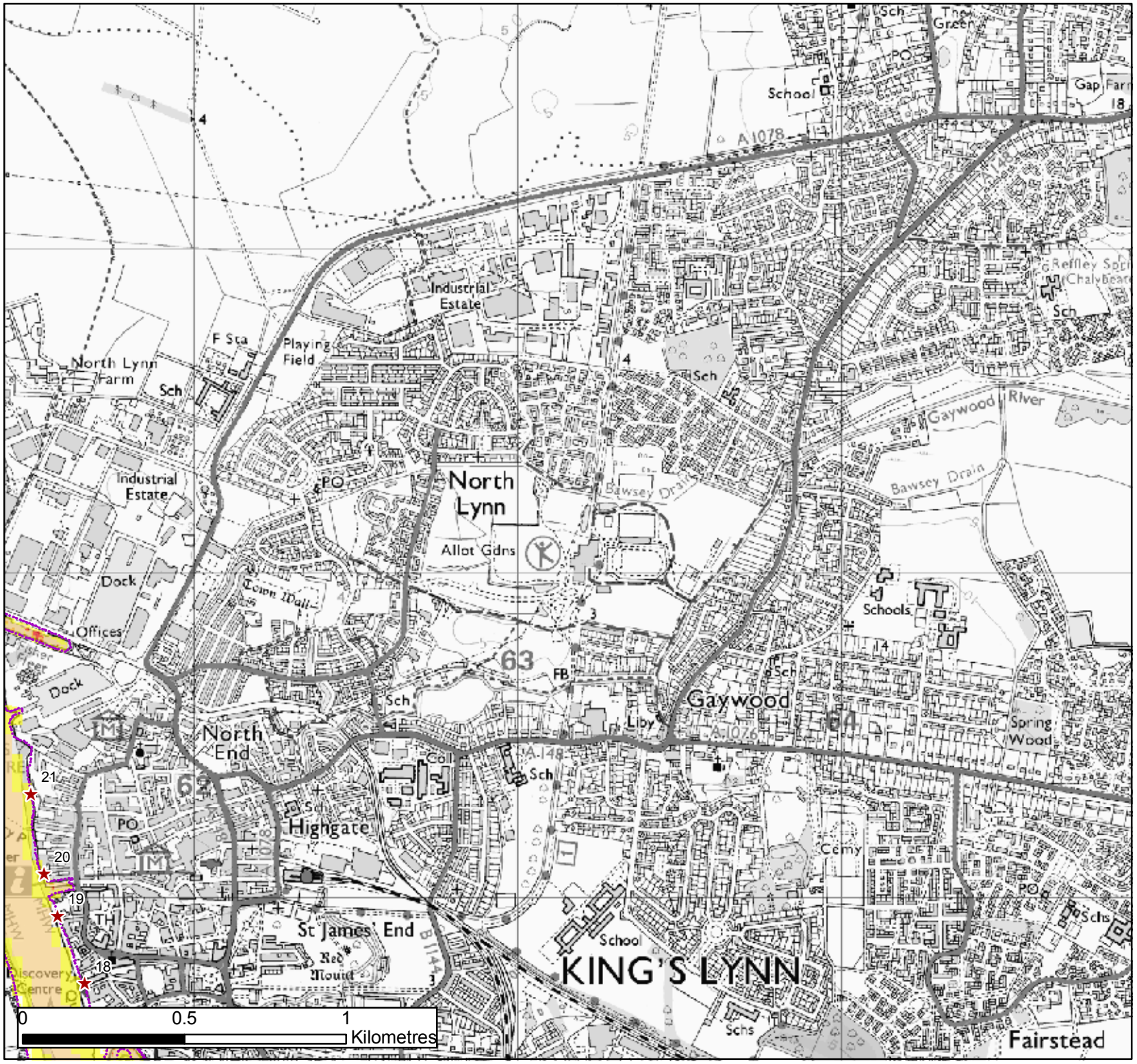
- Breach Locations
- Defences

1:200 Annual Chance +CC: Breach 21 Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

Please Note: The climate change scenarios indicate the expected increase in flood risk up to the year 2115 based on the currently accepted estimates of sea-level rise published by Defra.

1. The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.
2. The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.
3. Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.



Environment Agency

Central Area Tidal Hazard Mapping - Max Velocity

Map Centred on: TF6316021124

Printed on: 8 December 2014

Legend

- Breach Locations
- Defences

1:200 Annual Chance: Breach 21 Velocity (m/s)

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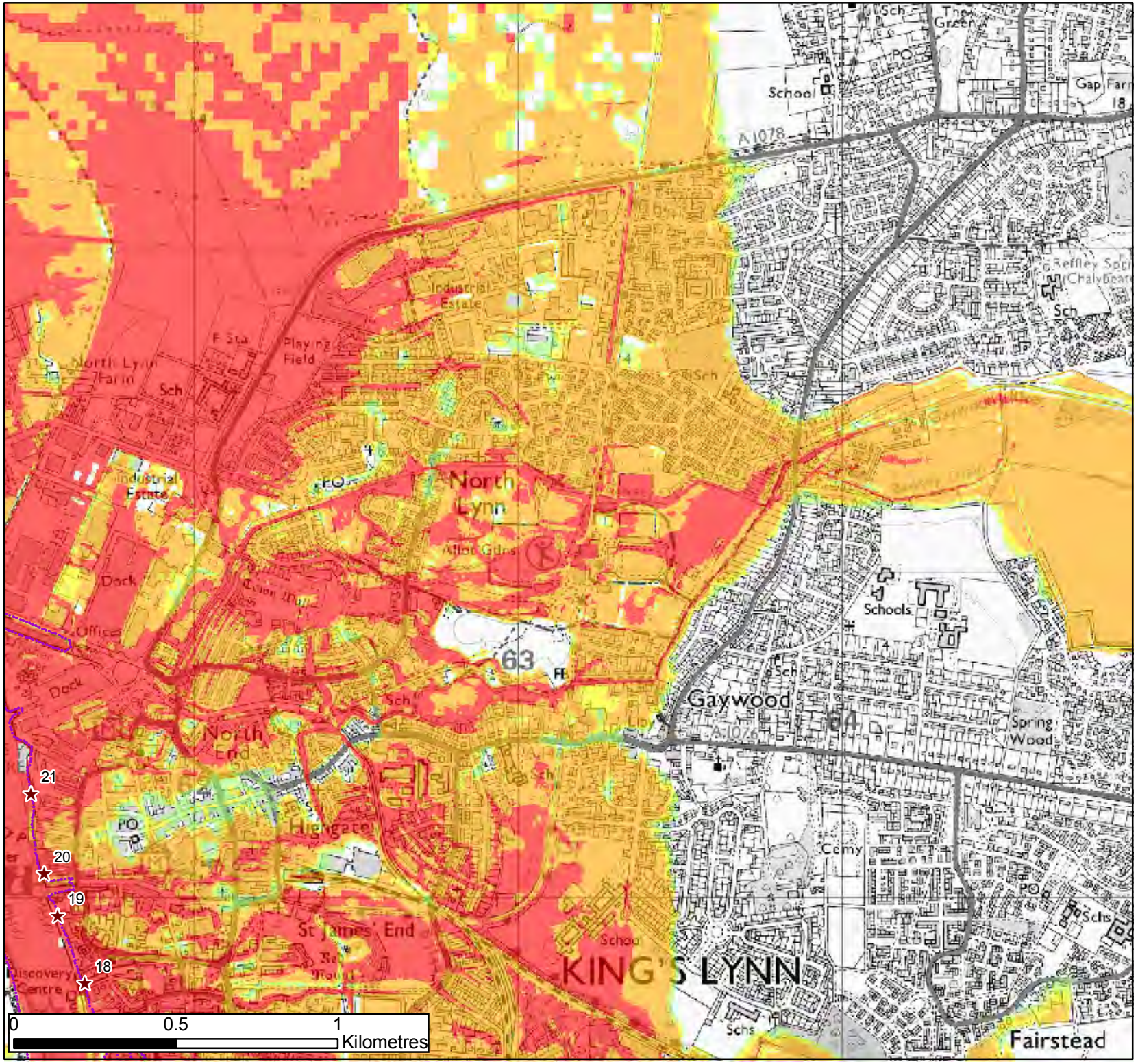


Environment Agency

Central Area Tidal Hazard Mapping - Max Hazard plus Climate Change

Map Centred on: TF6316021124

Printed on: 8 December 2014

Legend

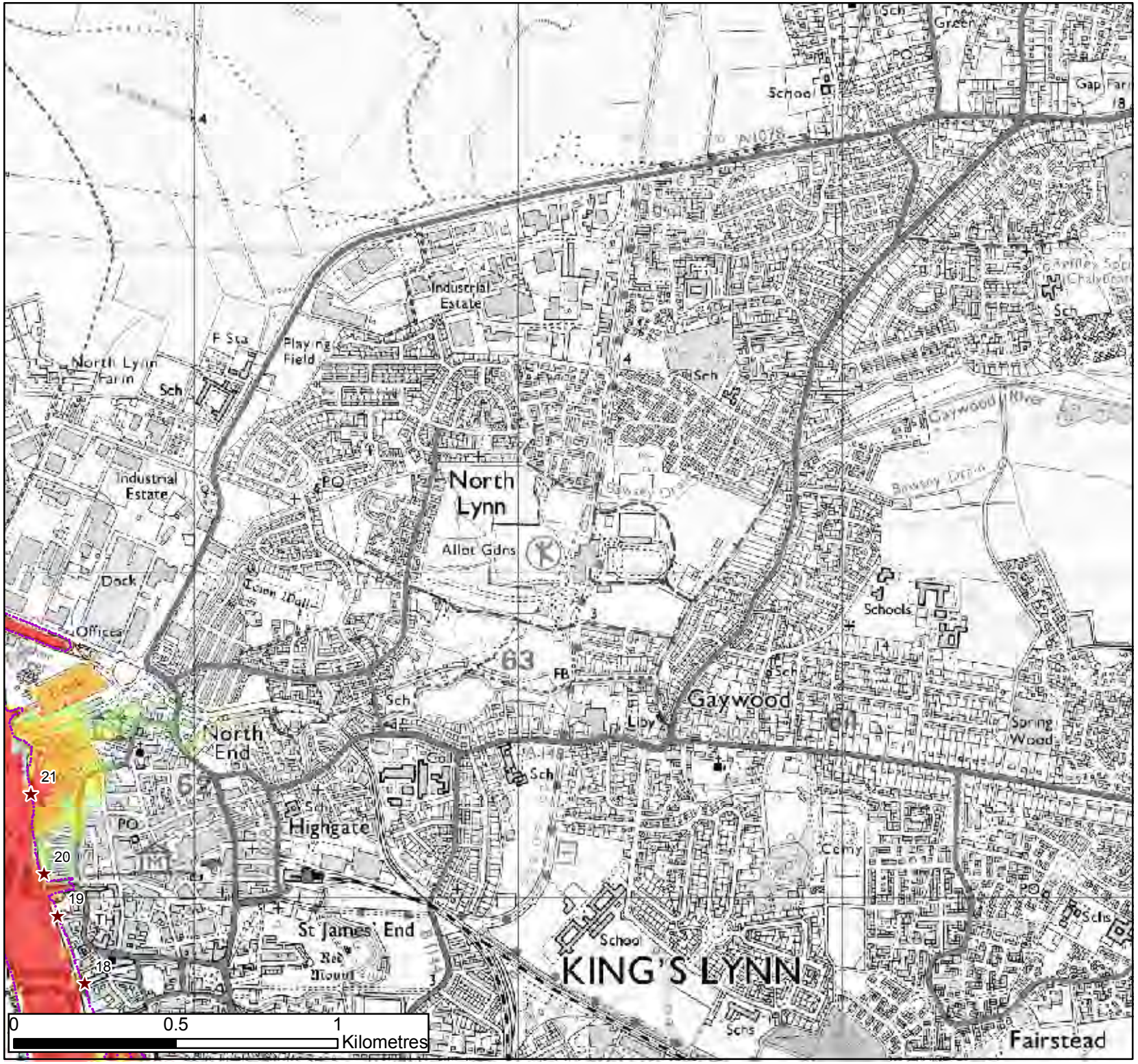
- Breach Locations
- Defences

1:200 Annual Chance +CC: Breach 21 Hazard Rating

- Less than 0.75 - Low Hazard
- Between 0.75 and 1.25 - Danger to Some
- Between 1.25 and 2.0 - Danger to Most
- Greater than 2.0 - Danger to All

Please Note: The climate change scenarios indicate the expected increase in flood risk up to the year 2115 based on the currently accepted estimates of sea-level rise published by Defra.

1. This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.
2. The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.
3. The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.
4. Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.



Environment Agency

Central Area Tidal Hazard Mapping - Max Hazard

Map Centred on: TF6316021124

Printed on: 8 December 2014

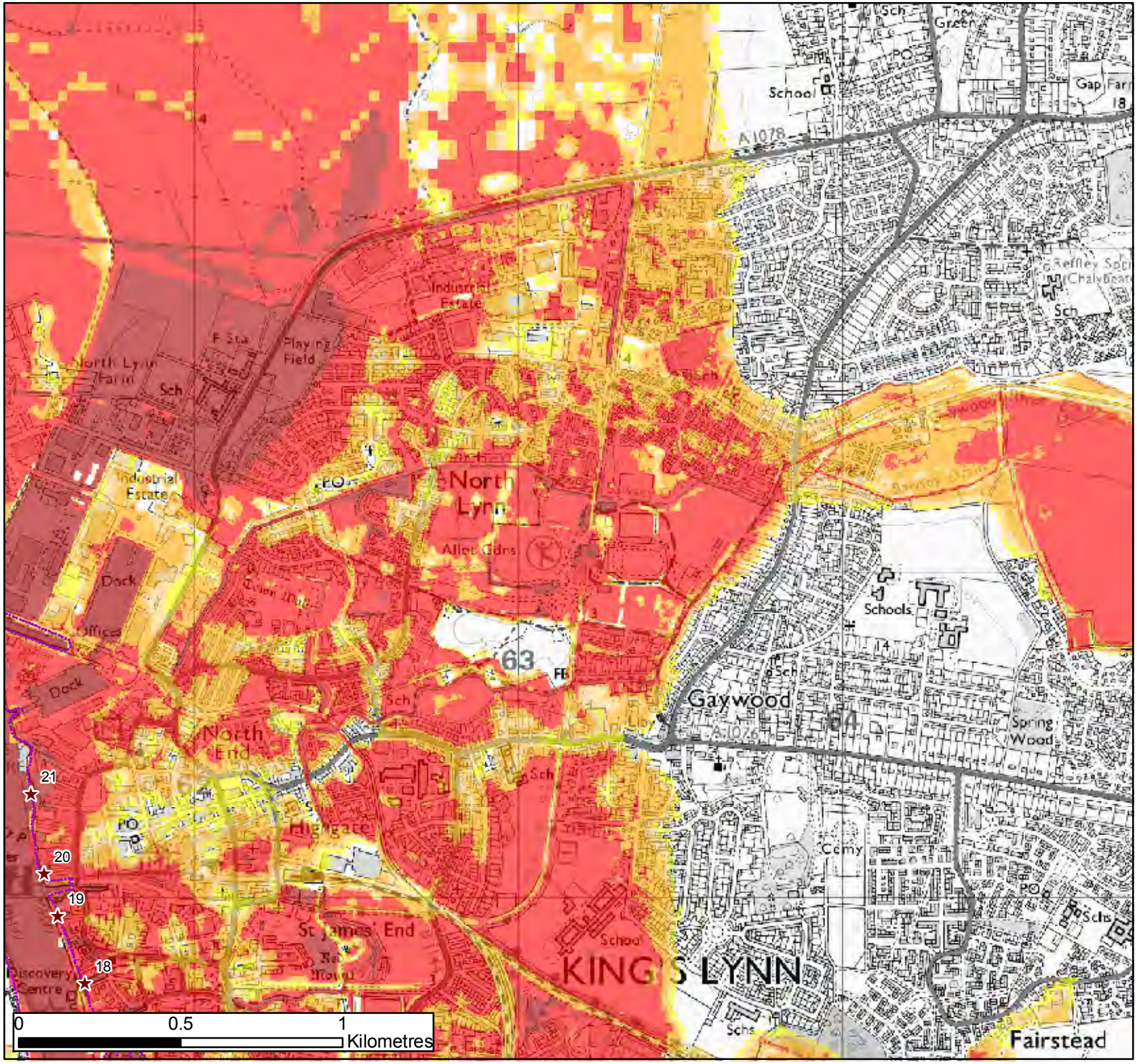
Legend

- Breach Locations
- Defences

1:200 Annual Chance: Breach 21 Hazard Rating

- Less than 0.75 - Low Hazard
- Between 0.75 and 1.25 - Danger to Some
- Between 1.25 and 2.0 - Danger to Most
- Greater than 2.0 - Danger to All

1. This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.
2. The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.
3. The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.
4. Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.



Environment Agency

Central Area Tidal Hazard Mapping - Max Depth plus Climate Change

Map Centered on: TF6316021124

Printed on: 8 December 2014

Legend

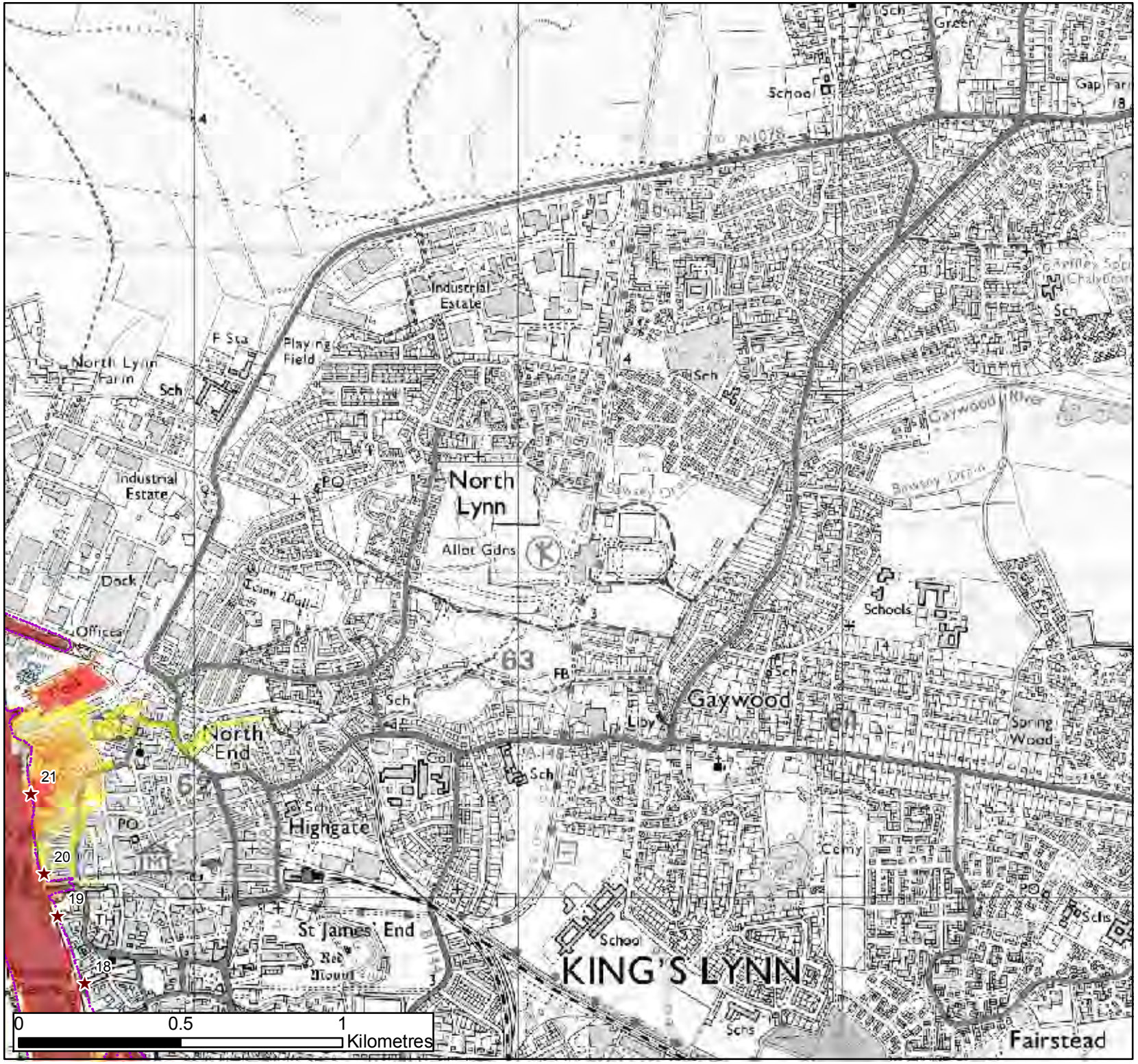
- Breach Locations
- Defences

1:200 Annual Chance +CC: Breach 21 Max Depth (m)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- 2.0 +

Please Note: The climate change scenarios indicate the expected increase in flood risk up to the year 2115 based on the currently accepted estimates of sea-level rise published by Defra.

1. The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.
2. The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.
3. Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.



Environment Agency

Central Area Tidal Hazard Mapping - Max Depth

Map Centred on: TF6316021124

Printed on: 8 December 2014

Legend

- Breach Locations
- Defences

1:200 Annual Chance: Breach 21 Max Depth (m)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- 2.0 +

1. The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.
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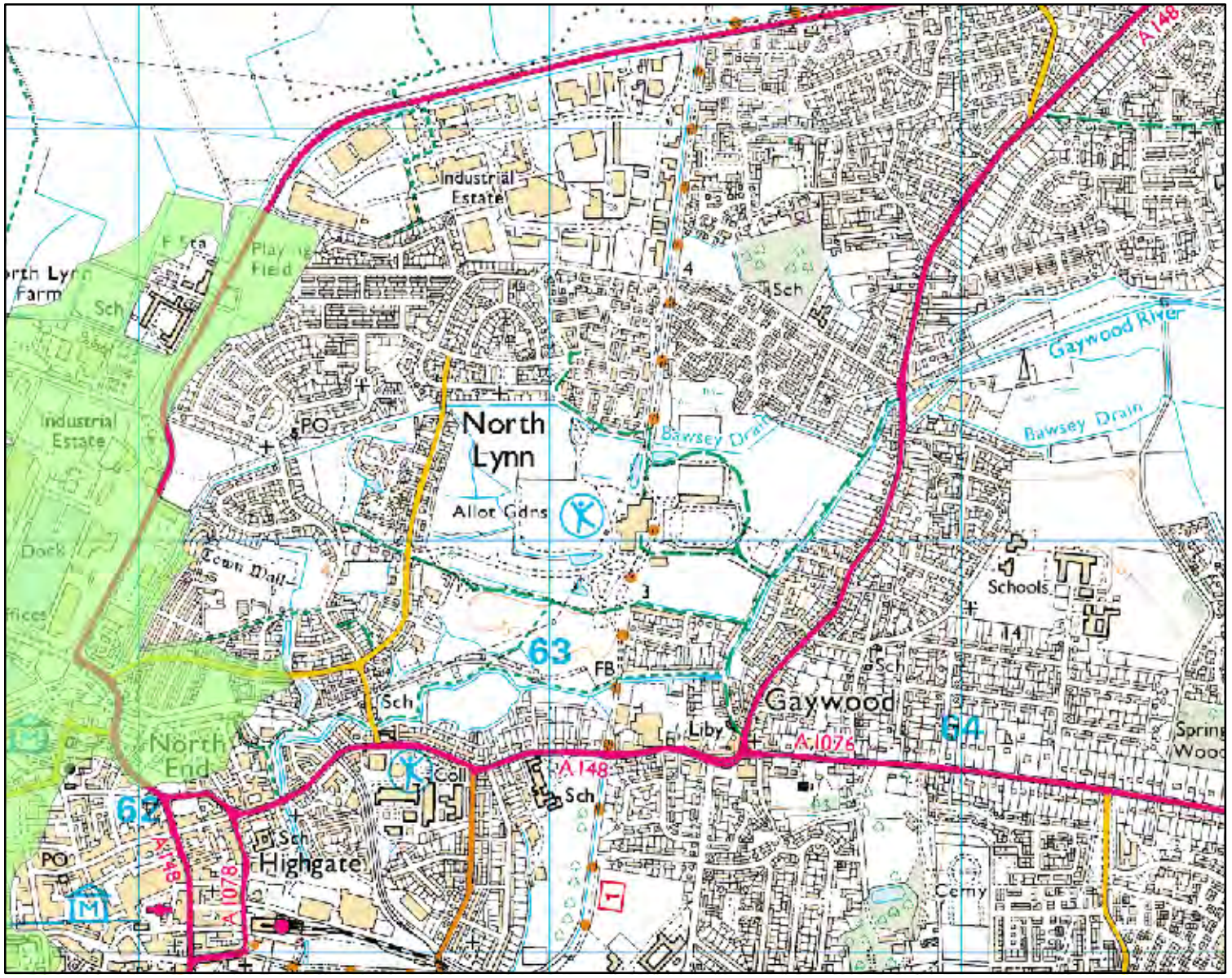
Recorded Flood Event Outlines centred on TF6316021124 - created 05 December 2014. Ref: CCC/2014/21422



Environment Agency

Scale:1:15,000

N W E S

Legend

January 1978 Tidal Event

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Product Four – Datasheet

Our Reference	Enquirer	Site	Grid Reference
21422	Mark Geddes	Various sites at North Lynn, Kings Lynn	TF6316021124

This datasheet provides all the information we hold relating to a product 4, relevant to the above site. Where we have no relevant data for your site we will clearly state this.

Model Information

The following table shows a summary of all the model information relevant to the area of interest.

Model Code	Model Name	Release Date
EA052326	Tidal hazard mapping project defended scenario	01/10/2012