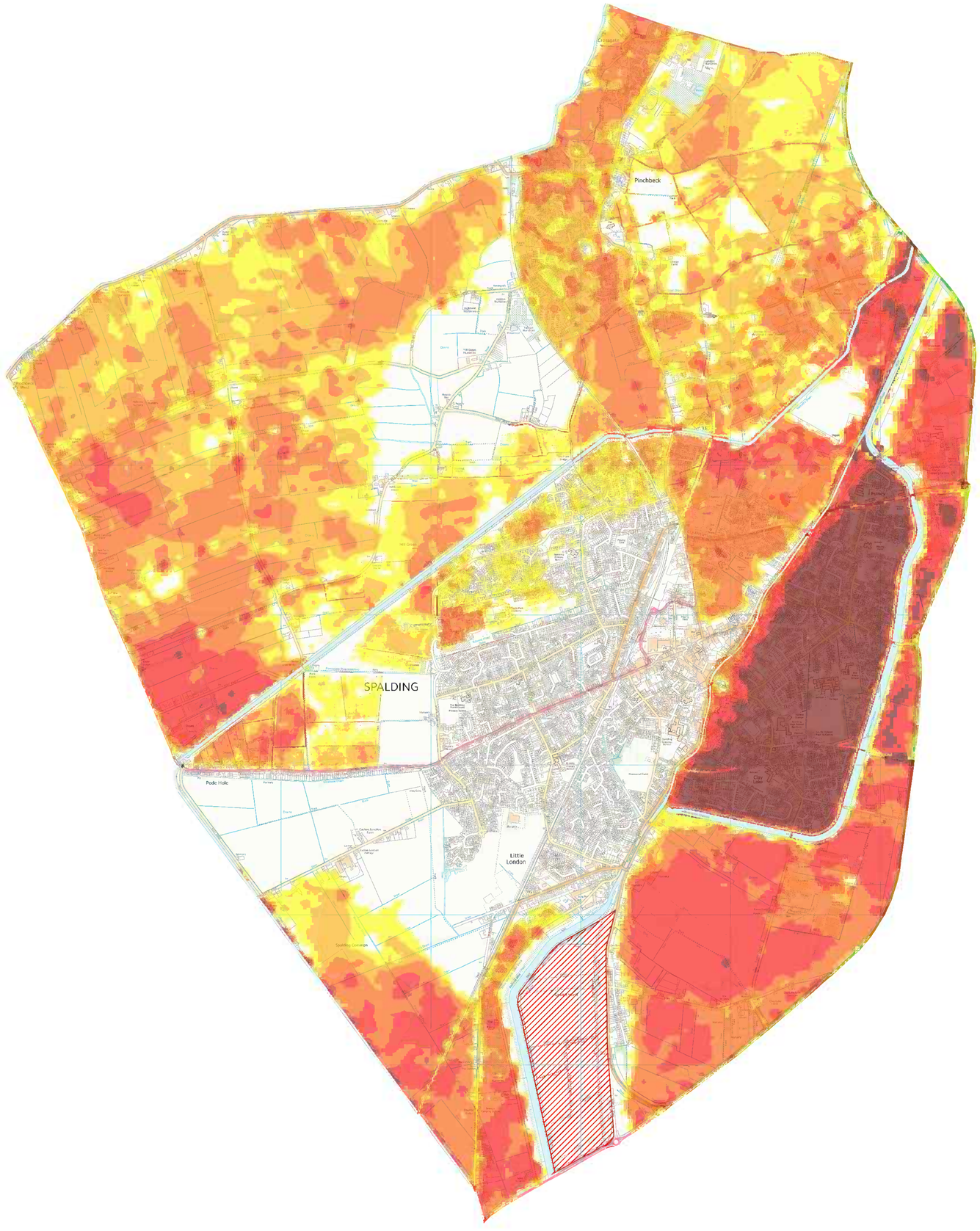
N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Depth

- 0m - 0.25m
- 0.25m - 0.5m
- 0.5m - 1m
- 1m - 2m
- 2m +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

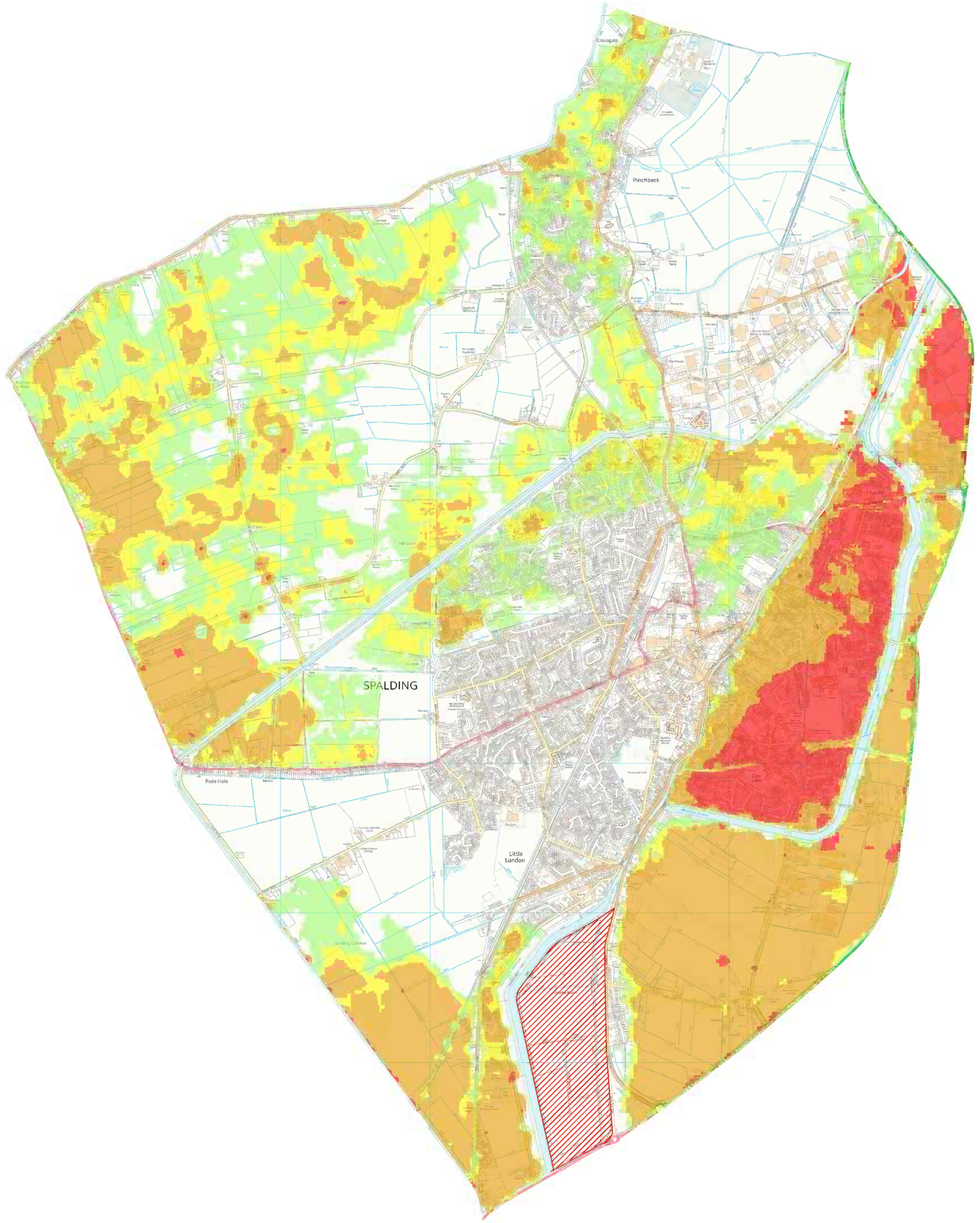
Residual Peak Depth
Spalding - Year 2115
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 15,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

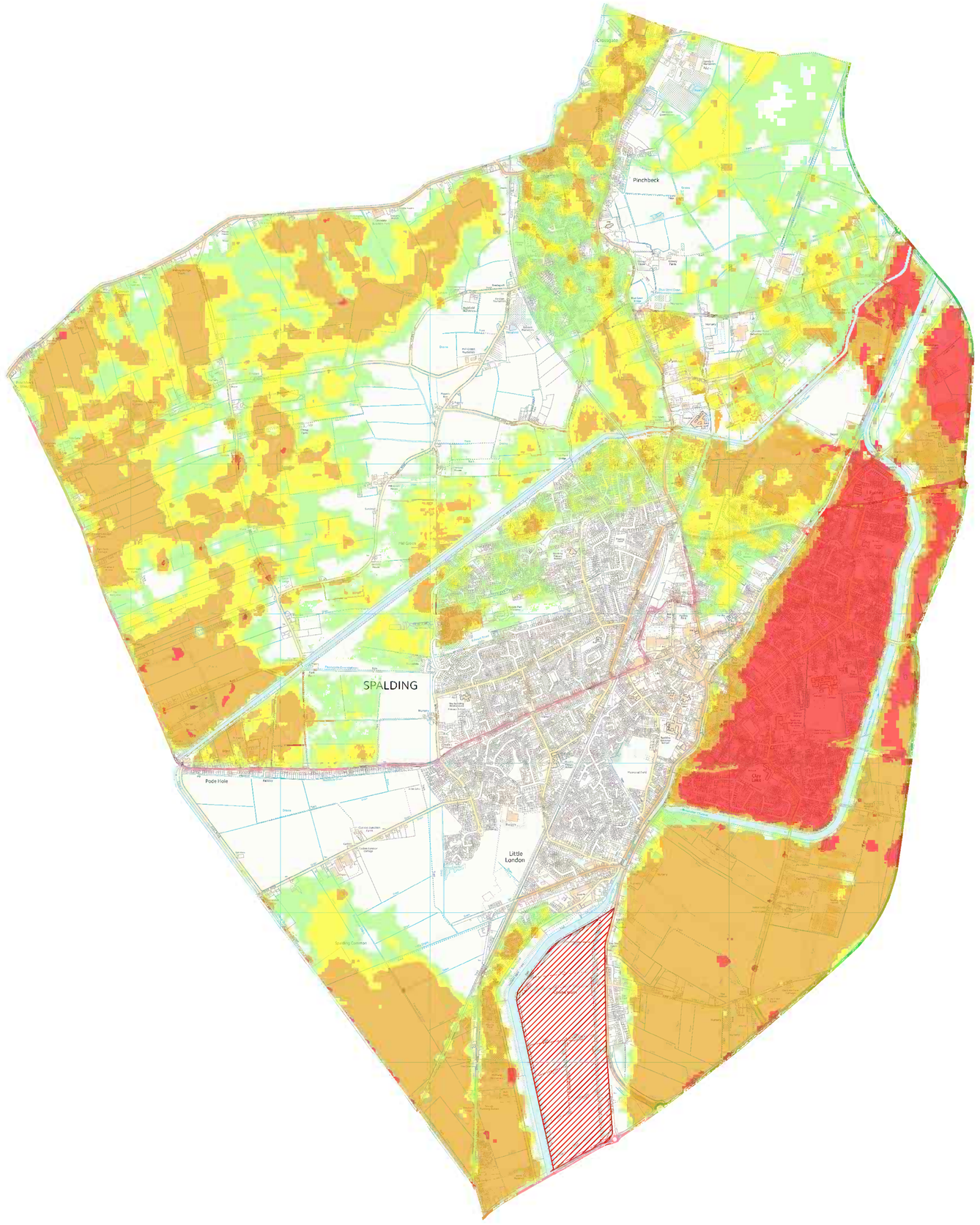
Residual Flood Hazard
Spalding - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

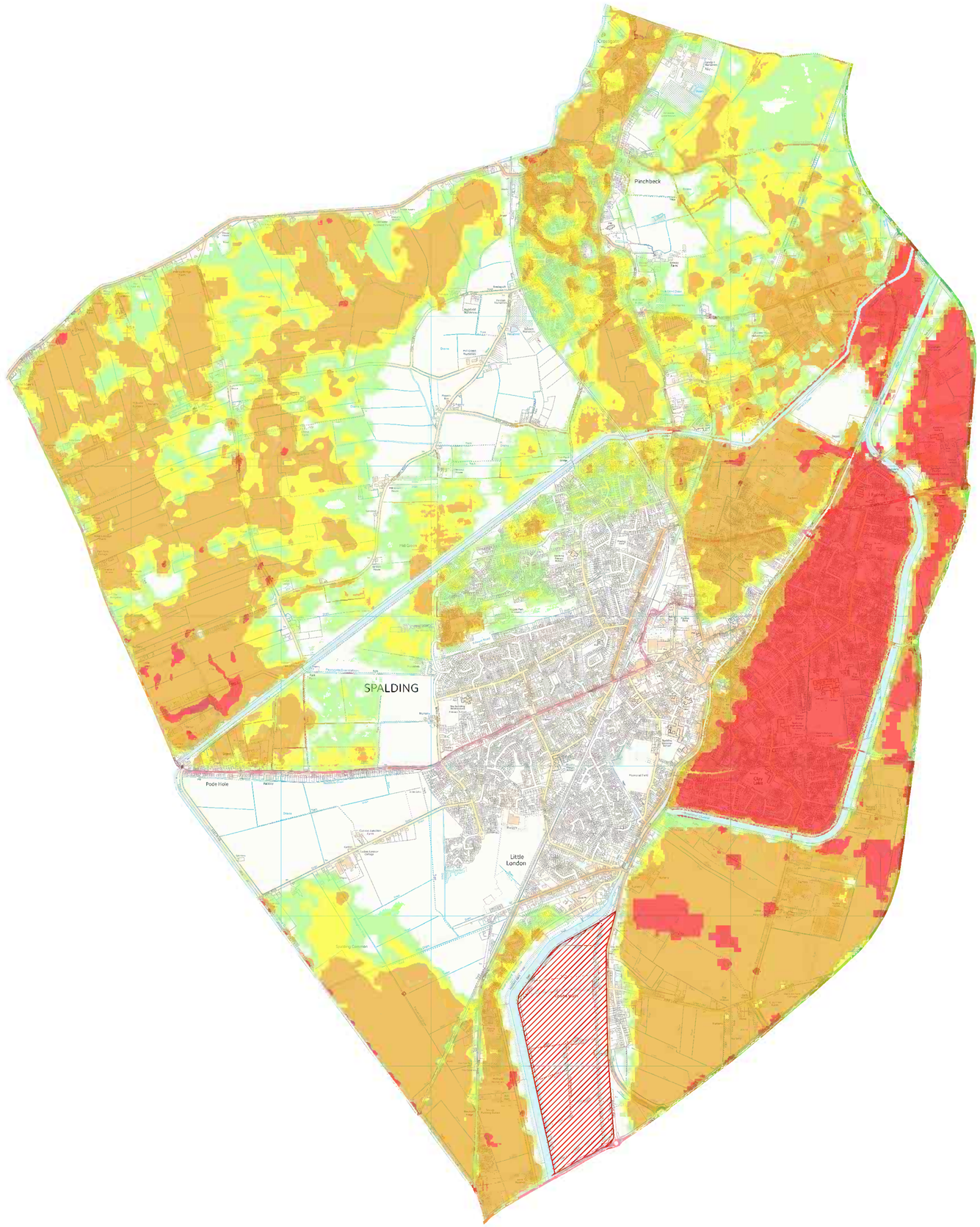
Residual Flood Hazard
Spalding - Present Day
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

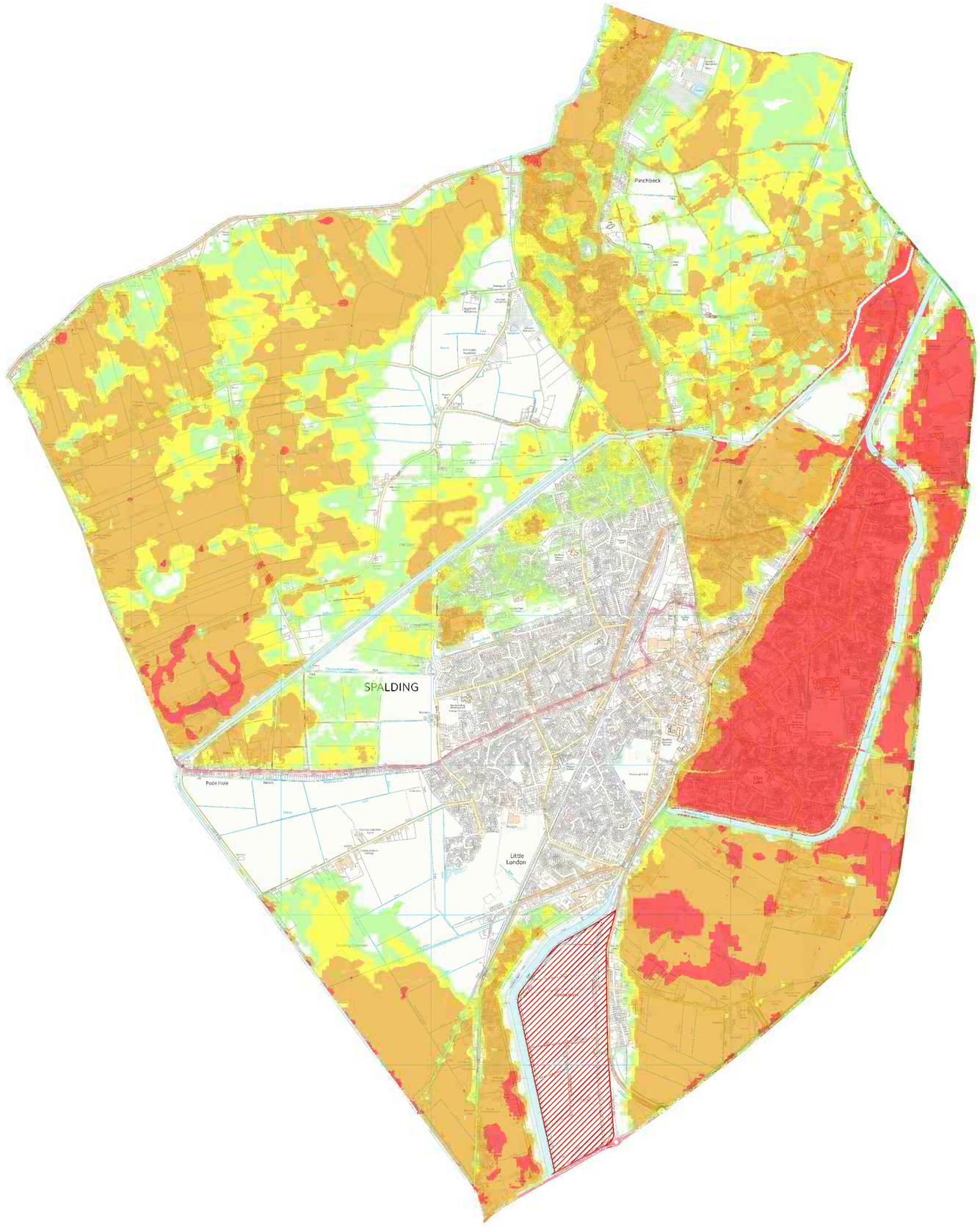
Residual Flood Hazard
Spalding - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Max Hazard
(Flood Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DV
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

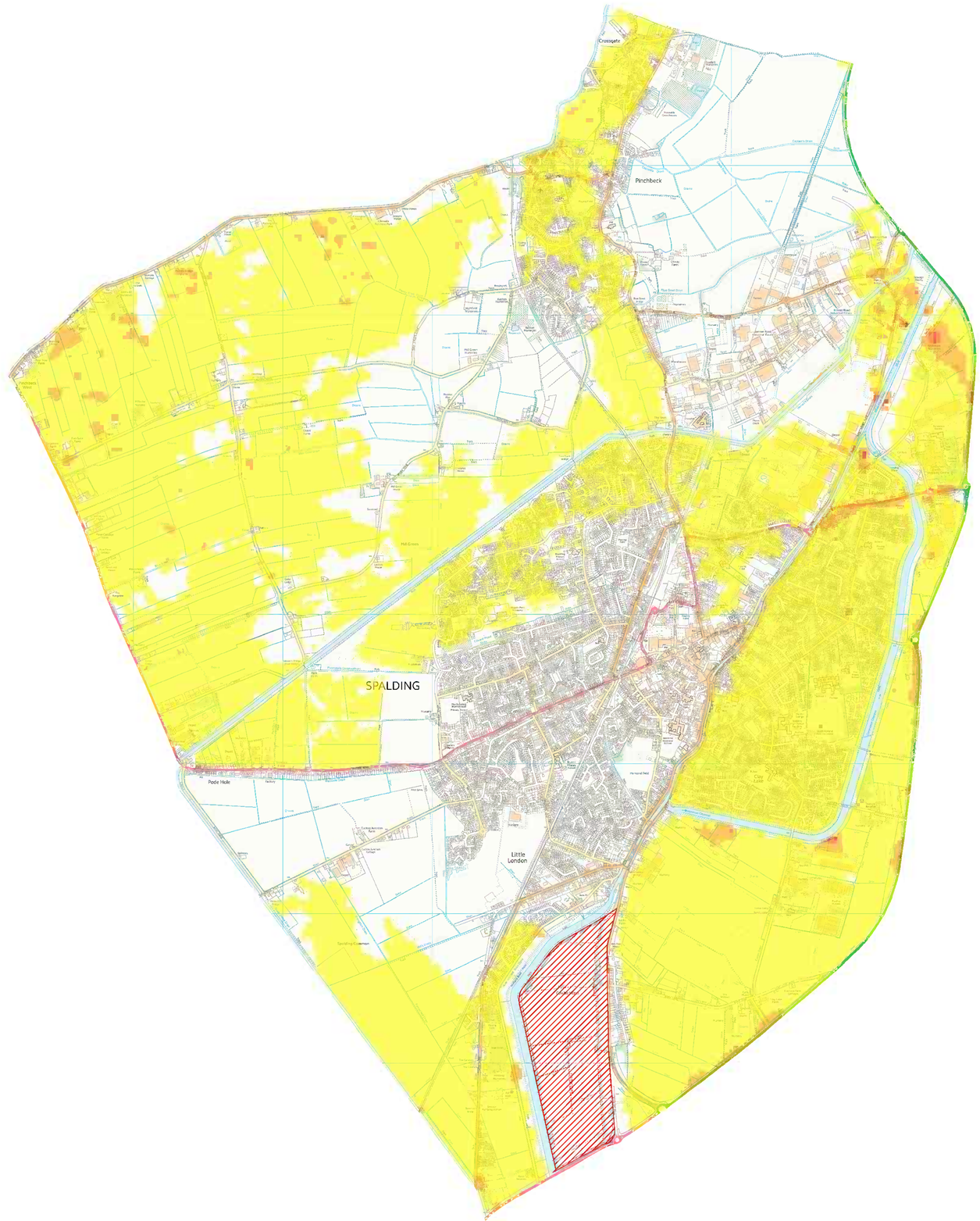
Residual Flood Hazard
Spalding - Year 2115
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

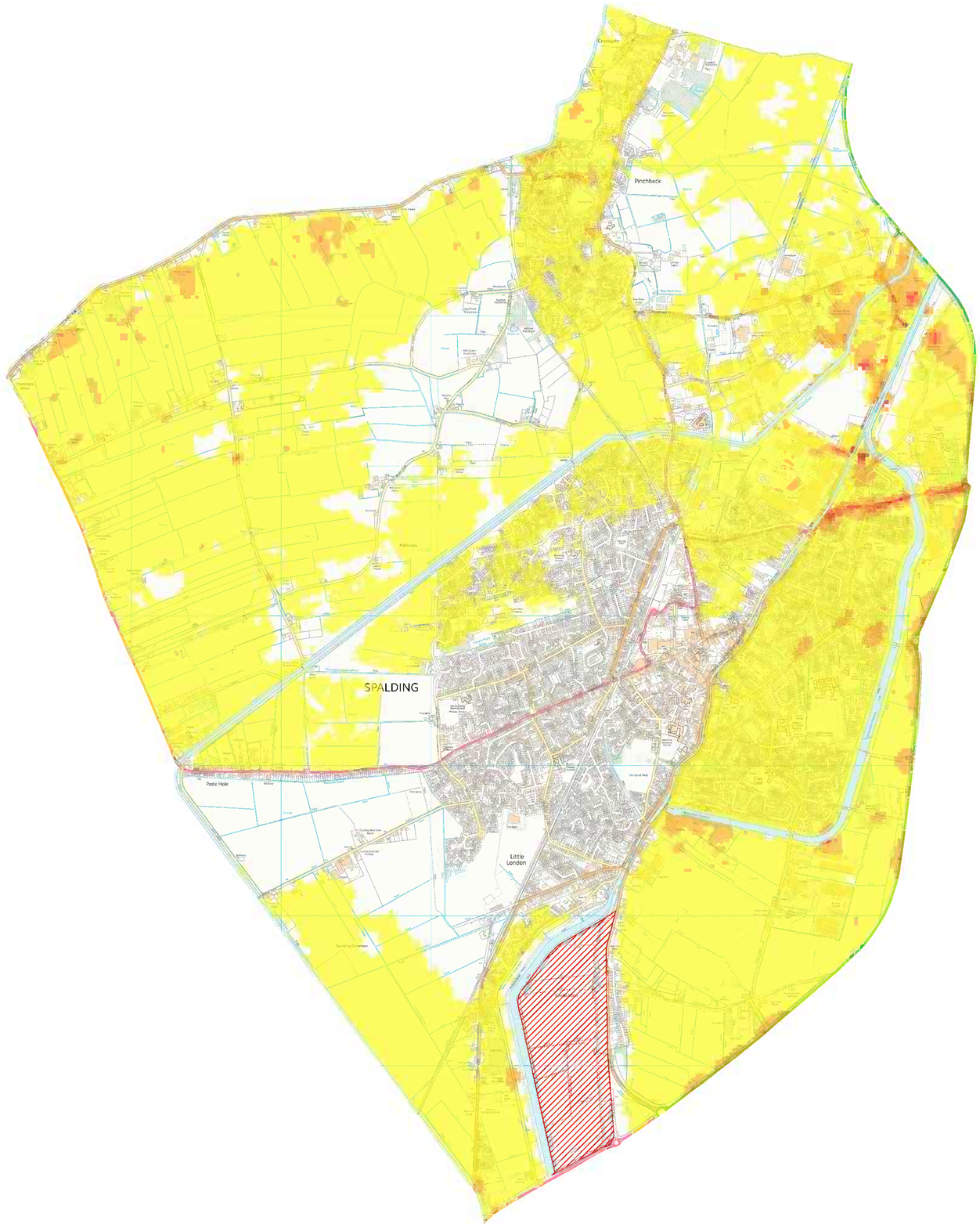
Residual Peak Velocity
Spalding - Present Day
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONING
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

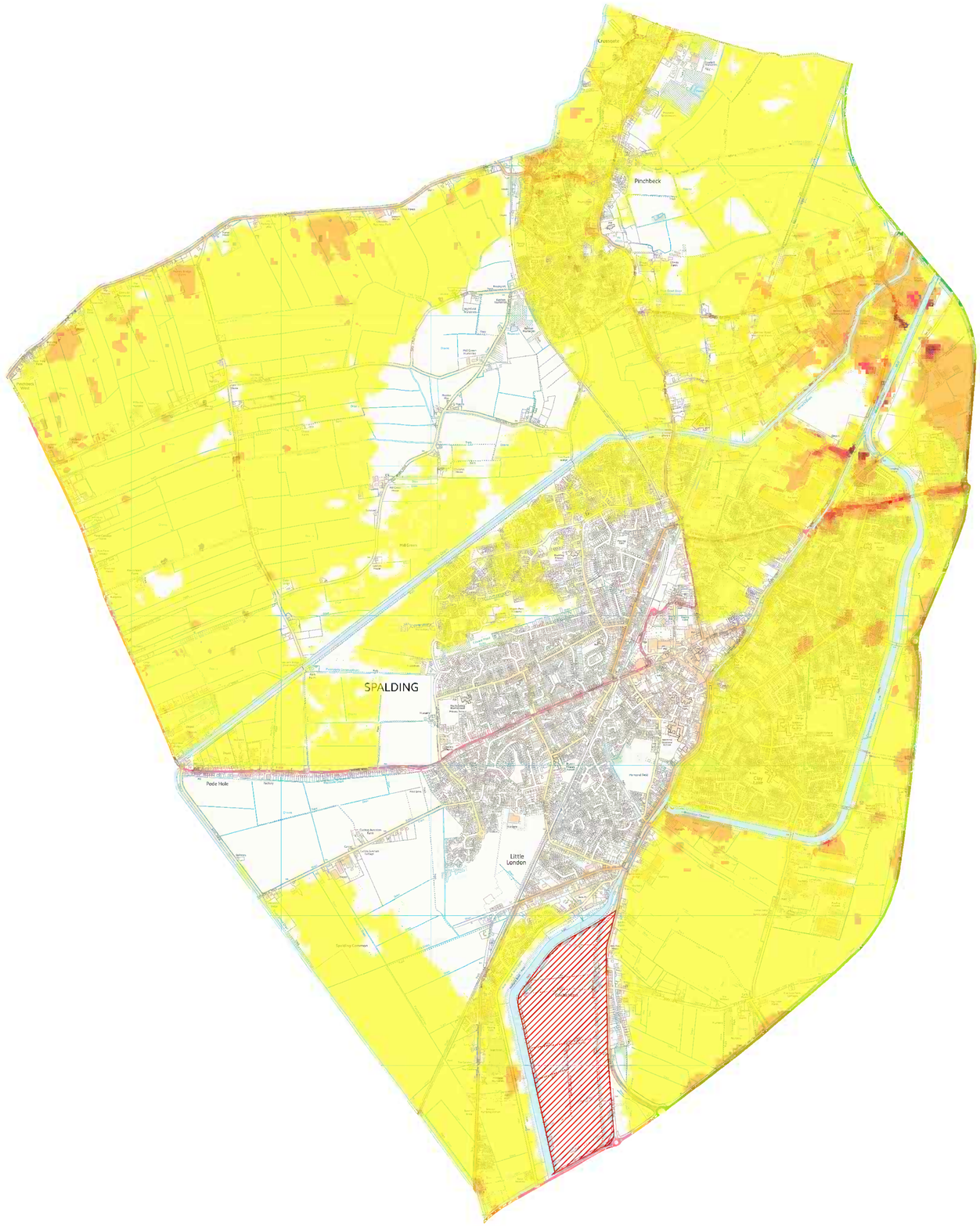
Residual Peak Velocity
Spalding - Present Day
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.
2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.
3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas
4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.
5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.
6. Land outside South Holland District is not considered.
7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

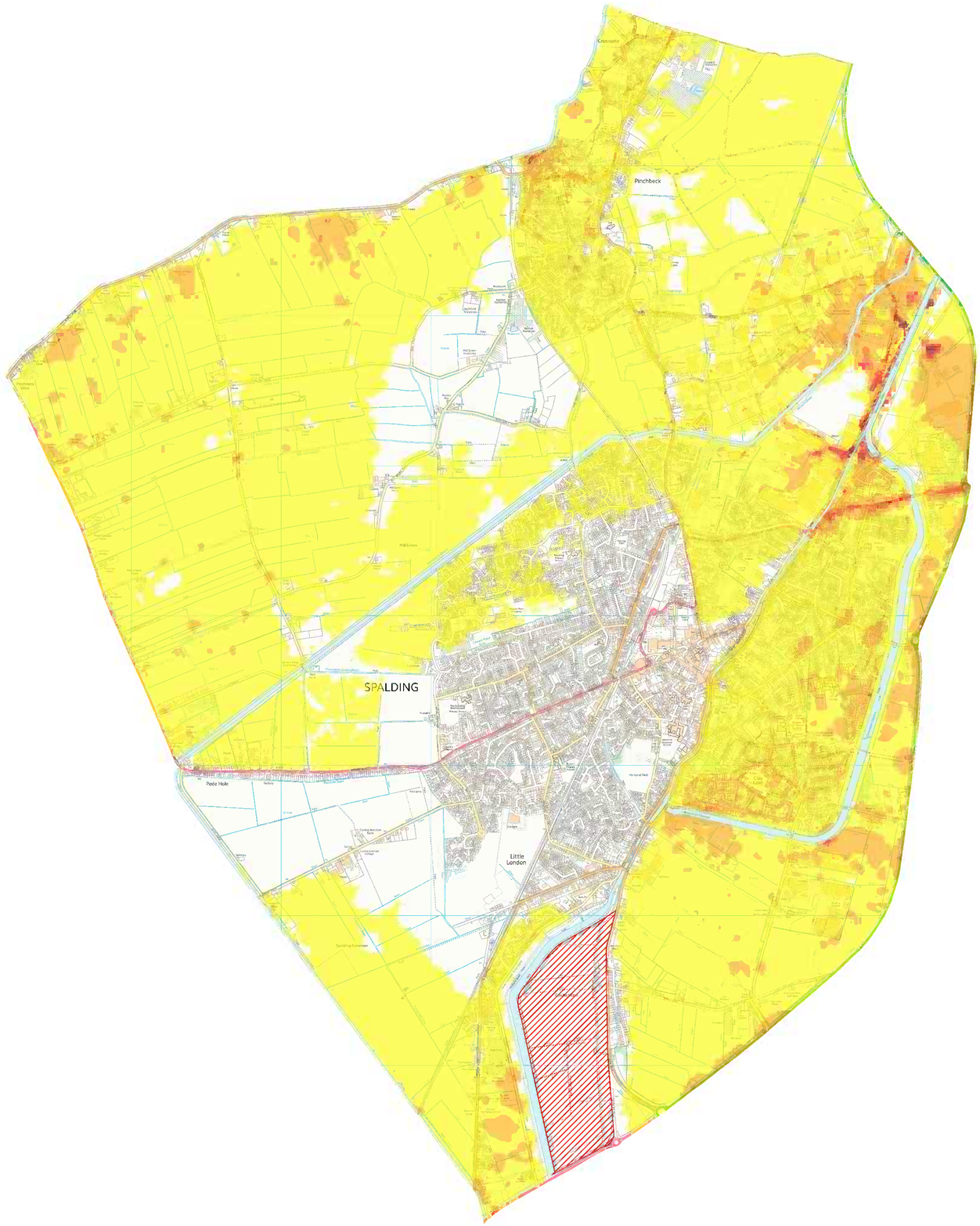
Residual Peak Velocity
Spalding - Year 2115
1% Fluvial / 0.5% Tidal Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

N



NOTES

1. The potential flooding consequences shown on this map primarily relate to flooding from the sea and main rivers taking into account the presence of current flood risk management measures such as flood defences.

2. This update only included new flood risk information from River Welland (Fluvial), River Glen (Fluvial) and Tidal hazard mapping (River Welland, River Nene and the Wash sea defences). No new information from the Internal Drainage Boards and associated systems was used for this update.

3. In addition to the potential flood extents shown on this map, there may be shallow flooding in low-lying rural areas

4. The consequences designated as being a Residual Risk arise from direct overtopping of defences, where this would occur, together with breach failure which is assumed could occur at any point along the defences.

5. Functional Floodplain encompasses areas where water is intended to flow or be stored in times of flood.

6. Land outside South Holland District is not considered.

7. This map shows the extents only of the flooding probability bands relevant to the map Title

Map Legend

Peak Velocity (metres per second)

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- 2.5 +
- Functional Floodplain
- South Holland District Boundary

REV	DATE	REMARKS
2	Feb 17	Modelling and Mapping Update
1	Dec 16	Modelling and Mapping Update

This map is reproduced from the Ordnance Survey map with the permission of the Controller of HM Stationery Office, © Crown Copyright . Unathorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceddings
Licence No: 100018215, 2009

Royal HaskoningDHV
Enhancing Society Together

ROYAL HASKONINGDHV
RIGHTWELL HOUSE
BRETTON
PETERBOROUGH
PE3 8DW
TEL +44 (0)1733 334455
FAX +44 (0)1733 262243

SOUTH HOLLAND DISTRICT COUNCIL
COUNCIL OFFICES
PRIORY ROAD
SPALDING
LINCOLNSHIRE
PE11 2XE

UPDATE OF STRATEGIC FLOOD RISK ASSESSMENT

Residual Peak Velocity
Spalding - Year 2115
0.1% Event Probability

DATE OF ISSUE: Feb 2017 **REV NO:** 2

SCALE: 1 : 16,000 @ A1

MAP NO:

Environment Agency

Philip Baxter

Our ref: CCN/2018/99356

Date: 26/09/2018

Dear Philip Baxter

Provision of Flood Risk Information for Spalding

Thank you for your request to use our flood risk information in the development of the Flood Risk Assessment (FRA) for the above site. The information is set out below and attached. It is important you read any contextual notes on the maps provided.

We aim to review our information on a regular basis, so if you are using this data more than twelve months from the date of this letter, please contact us again to check it is still valid.

Flood Map

The attached map includes the current Flood Map for your area. The Flood Map indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring for fluvial (river) flooding. It also shows the extent of the Extreme Flood Outline which represents the extent of a flood with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

In some locations, such as around the fens and the large coastal floodplains, showing the area at risk of flooding assuming no defences may give a slightly misleading picture in that if there were no flood defences, water would spread out across these large floodplains. This flooding could cover large areas of land but to relatively shallow depths and could leave pockets of locally slightly higher land as isolated dry islands. It is important to understand the actual risk of the flooding to these dry islands, particularly in the event of defence failure.

The Flood Map also shows the location of formal raised flood defences and flood storage reservoirs. It represents areas at risk of flooding for present day only and does not take account of climate change.

The Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered flooding may occur from other sources such as surface water sewers, road drainage, etc.

History of Flooding

With regards to the history of flooding I can advise we do not have any records of flooding in this area. It is possible other flooding may have occurred we do not have records for, and other organisations, such as the Local Authority or Internal Drainage Boards, may have records.

Fluvial Flood Risk Information

Fluvial Defence Information

The fluvial defences reducing the risk of flooding to this site consist of earth embankments. They are in fair condition and reduce the risk of flooding to a 1% (1 in 100) chance of occurring

Ceres House, Searby Road, Lincoln, LN2 4DW
Customer services line: 03708 506 506
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

in any year. We inspect these defences routinely to ensure potential defects are identified.

Modelled Levels and Flows
Available modelled fluvial flood levels and flows for the model nodes shown on the attached map are set out in the data table attached. This data is taken from the model named on the data table, which is the most up-to-date model currently available.

Please note these levels are "in-channel" levels and therefore may not represent the flood level on the floodplain, particularly where the channel is embanked or has raised defences.

Tidal Flood Risk Information

Tidal Defence Information
The tidal defences protecting this site consist of earth embankments. They are in fair condition and reduce the risk of flooding to a 1% (1 in 100) chance of occurring

Tidal/Breach Flood Levels
The attached table shows our current best estimate for extreme tide levels.

Levels for the Humber Estuary have an assessment date of 2014, with others having an assessment date of 2006, which should be used in any consideration of future increases due to climate change.

Modelled Hazard Mapping
Please refer to South Holland District Council's hazard mapping undertaken for their Strategic Flood Risk Assessment (SFRA). Please go to http://www.southeastlincslocalplan.org/2016-update-of-south-holland-strategic-flood-riskassessment-spalding-maps/ for the updated 2016 maps.

Development Planning
If you would like local guidance on preparing a flood risk assessment for a planning application, please contact our Sustainable Places team at Inplanning@environment-agency.gov.uk. It will help if you mention this data request and attach your site location plan.

We provide free preliminary advice; additional/detailed advice, review of draft FRAs and meetings are chargeable at a rate set to cover our costs, currently £100 (plus VAT) per hour of staff time. Further details are available on our website at https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals.

General advice on flood risk assessment for planning applications can be found on GOV.UK at https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

Climate change will increase flood risk due to overtopping of defences. Please note the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in February 2016. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

Supporting Information
Please see the Standard Notice or licence for details of permitted use. The Standard Notice can be found at the link below.
http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

We respond to requests for recorded information we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Further information on flood risk can be found on the GOV.UK website at:
https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

Other Flood Risk Management Authorities
The information provided with this letter relates to flood risk from main river or the sea. Additional information may be available from your Lead Local Flood Authority (ie county council or unitary authority) or, where they exist, the Internal Drainage Board.

Further Contact
I hope we have correctly interpreted your request. If you are not satisfied with our response to your request for information, you can contact us within two calendar months to ask for our decision to be reviewed.

If you have any queries or would like to discuss the content of this letter further please contact Rachael Storey using the details below.

Yours sincerely,

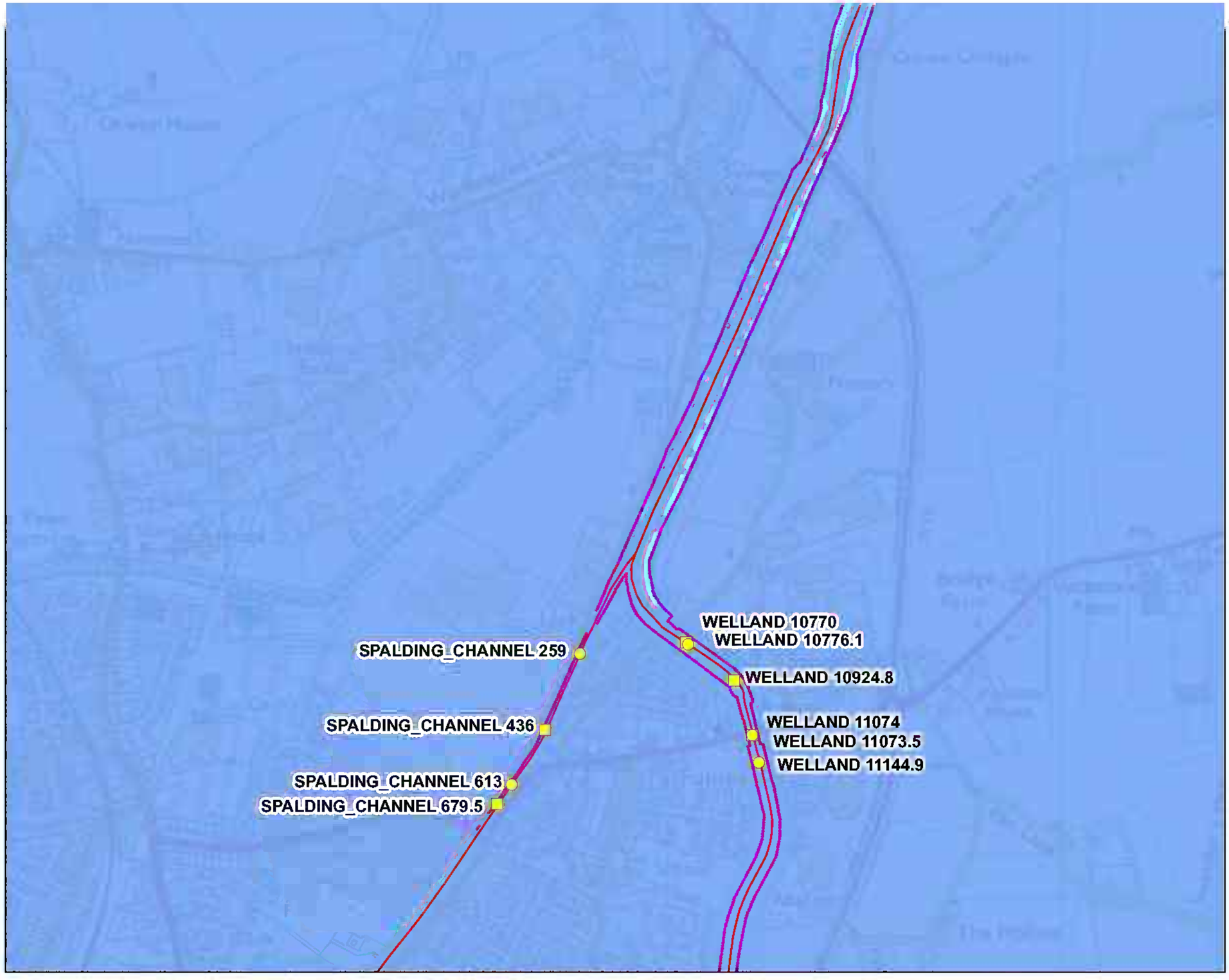
FOR Alastair Windler
Partnerships and Strategic Overview Team Leader - Welland and Nene

Direct dial 02030253535
Direct e-mail PSOWN@environment-agency.gov.uk

Enc.
Flood Map
Modelled Fluvial Levels and Flows Data Sheet
Estimated Tide Levels

FLOODS DESTROY BE PREPARED

Flood Map centred on TF 25867 24417 - created September 2018 [Ref: CCN-2018-99356]



Environment Agency

Scale 1:10,000

N

Legend

- Model Level
- Model Flows
- Main River
- Raised Defences
- Flood Storage Areas
- Area at Risk of Flooding from Rivers or The Sea
- Extreme Flood Outline

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.

- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Sites outside the two extents, but behind raised defences, may be affected by flooding if the defences are overtopped or fail.

Created by the Partnerships and Strategic Overview Team, Kettering

© Environment Agency copyright and / or database rights 2018. All rights reserved. © Crown Copyright and database right. All rights reserved. Environment Agency, 100026380, 2018.

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

Fluvial Flood Levels (mODN)

The fluvial flood levels for the model nodes shown on the attached map are set out in the table below. They are measured in metres above Ordnance Datum Newlyn (mODN).

			Annual Exceedance Probability - Maximum Water Levels (mODN)										
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
SPALDING_CHANNEL 259	525779	323995	3.70	4.00	4.17	4.45	4.51	4.52	4.52	4.68	4.53	4.56	4.68
SPALDING_CHANNEL 613	525605	323662	3.70	4.00	4.17	4.45	4.51	4.52	4.52	4.68	4.53	4.55	4.68
WELLAND 10776.1	526053	324019	3.64	3.90	4.10	4.36	4.38	4.41	4.43	4.68	4.44	4.45	4.68
WELLAND 11073.5	526216	323788	3.65	3.91	4.10	4.36	4.38	4.41	4.43	4.68	4.44	4.45	4.68
WELLAND 11144.9	526232	323719	3.65	3.91	4.10	4.36	4.39	4.42	4.44	4.68	4.45	4.46	4.68

Fluvial Flood Flows (m^3/s)

The fluvial flood flows for the model nodes shown on the attached map are set out in the table below. They are measured in metres cubed per second (m^3/s).

			Annual Exceedance Probability - Maximum Flows (m^3/s)										
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
SPALDING_CHANNEL 436	525690	323802	0.71	1.06	0.91	1.06	1.03	1.15	1.17	1.65	1.10	1.07	1.93
SPALDING_CHANNEL 679.5	525567	323613	1.30	1.99	1.77	2.06	1.93	2.24	2.31	3.19	2.18	2.06	3.61
WELLAND 10770	526048	324023	74.58	91.64	102.46	116.08	121.43	121.70	123.79	124.12	122.86	123.37	236.17
WELLAND 10924.8	526170	323927	74.06	89.60	100.87	115.72	118.85	119.81	121.38	123.20	120.56	120.49	119.34
WELLAND 11074	526216	323788	73.88	89.28	100.54	115.25	118.58	119.51	123.31	124.59	121.86	124.52	119.07

Tidal Level Location Map
Lincolnshire & Northamptonshire Area

Environment Agency



Produced May 2017

Produced by Partnerships & Strategic Overview Team

© Environment Agency copyright and / or database rights 2018. All rights reserved. © Crown Copyright and database right. All rights reserved. Environment Agency,10002638 2018.

Tidal Water Levels for the South Humber, East Coast and The Wash

The table below shows still water levels for locations, from the above location map, around the South Humber Estuary, East Coast and The Wash. It is important to note the following:

- The base date for the data is 2014 for the South Humber and 2006 for the East Coast and The Wash.
- The data are still water levels. Depending on the use of the data it may be necessary to consider wave heights and / or joint probability analysis of water level and other variables.
- The water level quoted is the 'Best Estimate' water level. Depending on the use of the data it may be necessary to carry out sensitivity testing. Upper and Lower 95% confidence bandings are available upon request.
- Levels for other annual chance scenarios are available if required.

Ref	Location	Easting	Northing	Annual Chance (1 in x) of Tide Level metres ODN					
				1	10	50	100	200	1000
HUMBER									
H030	Tetney	535420	403180	3.94	4.29	4.56	4.69	4.82	5.15
H050	Buck Beck	532700	406580	4.03	4.36	4.62	4.74	4.87	5.18
H060	Grimsby	527878	411346	4.10	4.43	4.70	4.82	4.95	5.27
H080	Haborough Marsh	520790	415740	4.26	4.61	4.88	5.01	5.14	5.47
H090	Immingham	519141	417449	4.26	4.61	4.88	5.01	5.14	5.47
H100	South Killingholme	518700	417120	4.41	4.77	5.05	5.18	5.32	5.66
H130	North Killingholme	516530	420000	4.51	4.87	5.15	5.28	5.42	5.77
H150	East Halton	514450	422870	4.59	4.96	5.25	5.39	5.53	5.89
H170	Goxhill	511970	425440	4.67	5.04	5.34	5.47	5.61	5.95
H200	New Holland	508020	424330	4.87	5.26	5.55	5.68	5.81	6.12
H210	Barrow Haven	506380	422620	4.92	5.31	5.60	5.73	5.86	6.17
H220	Ferriby	497550	421150	5.04	5.42	5.67	5.77	5.86	6.04
H230	Winterton	493420	422830	5.14	5.51	5.74	5.83	5.90	6.02
H250	Blacktoft	484247	424190	5.25	5.62	5.83	5.90	5.96	6.04
H270	Goole	474857	422960	5.46	5.85	6.07	6.15	6.21	6.29
East Coast									
~	Great Eau	545500	393800	3.80	4.19	4.46	4.57	4.69	4.96
~	Boygrift	553300	379800	3.84	4.24	4.53	4.65	4.77	5.05
~	Burgh Sluice	555190	358620	4.26	4.45	4.76	4.90	5.03	5.34
Wash									
~	Hobhole	536610	339940	4.82	5.30	5.64	5.78	5.93	6.27
~	Lawyers Sluice	540750	334550	4.84	5.32	5.66	5.80	5.95	6.29
~	West Lighthouse	549150	325750	4.88	5.37	5.71	5.86	6.01	6.35
~	Grand Sluice	532400	344500	4.88	5.33	5.65	5.78	5.93	~
~	Fosdyke Bridge	531700	332200	4.91	5.38	5.71	5.85	5.99	~
~	Marsh Road	526000	324000	5.04	5.44	5.73	5.85	5.98	~
~	Wisbech	546100	310000	4.83	5.25	5.53	5.66	5.78	~
~	Dog In Doublet	527300	299300	3.67	4.00	4.22	4.32	4.42	~

Gareth Crowther

From: LN Planning <LNplanning@environment-agency.gov.uk>
Sent: 04 October 2018 10:40
To: Gareth Crowther
Cc: Gavin Cooper; d.osborne@therpagroup.com; matt@smegroup.co.uk; Nolan, Sharon
Subject: RE: KFC Drive-thru Scheme, Holbeach Road, Spalding (P18-547) - Flood Risk Assessment

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Gareth,

Thank you for your email regarding the above proposal requesting we review your attached flood risk assessment prior to submission of your application.

I would advise you that as your proposal falls within the green cells of the flood risk standing advice matrix, it has been deemed by the Environment Agency to be a low risk proposal and as such I'm afraid that due to limited staff resources we are unable to offer any pre-application review service. However, as you appear to be following the mitigation measures recommended in the standing advice I do not foresee there being any issues with the flood risk assessment from a fluvial/tidal risk perspective – South Holland District Council will determine the application in accordance with this advice, and will not need to contact us for a bespoke response. However, you may wish to contact the Lead Local Flood Authority (Lincolnshire County Council) to review it from a surface water flooding/drainage perspective.

Kind regards,
Annette

Annette Hewitson | Principal Planning Adviser
Lincolnshire & Northamptonshire Area
Environment Agency | Ceres House, Searby Road, Lincoln LN2 4DW

annette.hewitson@environment-agency.gov.uk
☎: 02030 254924

We have recently published new webpages for **LPAs**, **developers** and **Neighbourhood Planning Groups** giving clarification on our planning consultation role. Please refer to this to check if we can provide you with advice on your development proposals. For developments in areas at risk of flooding, please refer to our new **Flood Risk Assessment checklist**.

We're committed to providing excellent customer service and would appreciate your feedback.

Were you happy with the service you received today?



From: Gareth Crowther [mailto:gareth.crowther@simpsoneng.com]
Sent: 28 September 2018 17:02
To: Nolan, Sharon <Sharon.Nolan@environment-agency.gov.uk>
Cc: Gavin Cooper <gavin.cooper@walsingplan.co.uk>; d.osborne@therpagroup.com; matt@smegroup.co.uk
Subject: KFC Drive-thru Scheme, Holbeach Road, Spalding (P18-547) - Flood Risk Assessment

Dear Sharon

Please forgive the email out of the blue but Lucy Buttery of South Holland District Council has advised that we should approach you for a review of the attached flood risk assessment, which has been prepared to prepared to accompany a forthcoming planning application for a proposed KFC Drive-thru scheme at Holbeach Road in Spalding.

The principal findings are summarised below:

- The site is identified to be in Flood Zone 3 and in an area assessed to be at medium probability of fluvial / tidal flooding associated with breach / overtopping of the River Welland's flood defences. With the site in Flood Zone 3, a sequential test will be prepared to demonstrate that there are no other sites suitable for the development in areas at lower risk of flooding (Flood Zone 1 & 2) but based on the NPPF's Planning Practice Guidance, the vulnerability classification of the development has been assessed to be "*less vulnerable*", which does not require an Exception Test in Flood Zone 3.

- The site and surrounding area would be inundated by flood water in the event of breach / overtopping of the flood defences. The SFRA includes a local standing advice matrix, which advises a recommended approach for managing flood risk from this source and based on the matrix the report establishes that the following measures will be required.

    - Finished floor levels should be raised as high as practicable (min. 300mm above the existing ground level). The current proposed floor level of 4.55mAOD achieves this as the building would be set over 300mm above existing levels along the sites eastern and southern boundaries.

    - Flood resilience measures should be incorporated into the building design in accordance with the May 2007 Communities and Local Government Report "Improving the Flood Performance of New Buildings". Such measures would involve using materials in the wall and floor construction that promote easy draining / drying and place emphasis on allowing water into the building. Generally standard methods and good quality building materials will comply with these requirements and recommendations included in the report reflect this.

    - As the development comprises of a single storey KFC drive-thru it would not be practicable to provide a safe refuge for staff or customers during an extreme flood event. On this basis it recommended that the development is evacuated on issue of a flood warning with such an evacuation managed using a flood response plan, which would ensure that management and staff are aware of the risk of flooding and the procedures to be followed in the event of it being necessary to evacuate the site. A flood response plan is included in Appendix E of the report.

- A hierarchical assessment has established that the watercourse located to the north of the site would be the most appropriate destination for the disposal of surface water runoff from the development. Surface water flows would be limited to match greenfield rates as closely as possible with excess runoff stored and attenuated on site for a 1 in 100 year storm return period including a 40% allowance for increase in peak rainfall intensity. It has been established that an attenuation volume of 170m^3 would be required to meet this requirement and the report recommends that a below ground geocellular storage tank is used to provide the required volume. In addition surface water flows would be appropriately treated using Sustainable Drainage Systems (SuDS) with it determined that a combination of permeable paving and gravel filled filter drains would be appropriate.

I trust that following your review of the report you are able to respond positively in respect of flood risk at this site. If, however, you wish to discuss any aspect of the report further, then please do not hesitate to contact me.

Regards

GARETH CROWTHER

OFFICE: 01491 576 221
DIRECT: 01491 635 766
MOBILE: 07920 489 573

Please visit our new website

www.simpsoneng.com

Simpson Associates Consulting Engineers LLP
8 Friday Street | Henley-on-Thames
Oxfordshire | RG9 1AH
www.simpsoneng.com

Offices in London, Henley-on-Thames, Gloucester and Exeter

The information contained within this e-mail is confidential and may be privileged. It is intended for the addressee(s) only. The contents of this e-mail must not be disclosed or copied without the senders consent.

If you have received this e-mail in error please inform the sender, and destroy the message.

The statements and opinions expressed in this message are those of the sender and do not necessarily reflect those of Simpson Associates Consulting Engineers LLP.

Please review our Privacy Policy for details of how we store and use your information.

This message has been scanned and no issues were discovered.
Click here to report this email as spam

Information in this message may be confidential and may be legally privileged. If you have received this message by mistake, please notify the sender immediately, delete it and do not copy it to anyone else.

We have checked this email and its attachments for viruses. But you should still check any attachment before opening it.
We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act or for litigation. Email messages and attachments sent to or from any Environment Agency address may also be accessed by someone other than the sender or recipient, for business purposes.
Click here to report this email as spam

APPENDIX E
FLOOD RESPONSE PLAN

simpson
CONSULTING ENGINEERS

8 Friday Street
Henley-on-Thames
Oxfordshire
RG9 1AH
Tel: +44 (0)1491 576 221
Email: mail@simpsoneng.com
www.simpsoneng.com

FLOOD RESPONSE PLAN

KFC DRIVE-THRU DEVELOPMENT

HOLBEACH ROAD

SPALDING

PREPARED FOR: SME CORPORATION (2) LTD

JOB NO: P18-547

DATE: 21 SEPTEMBER 2018

DOCUMENT HISTORY

Revision	Description	Date
-	First Issue	21.09.18

CONTENTS

1. INTRODUCTION 3
2. BACKGROUND 3
3. PREPARING FOR FLOODING 3
4. LINES OF COMMUNICATION 3
5. EVACUATION TRIGGER 4
6. EVACUATION PROCEDURE 5
7. RETURNING TO SITE 7

APPENDICES

APPENDIX A: LIST OF CONTACTS & ITEMS / MATERIALS

1. INTRODUCTION

1.1 This report has been prepared by Simpson Associates on behalf of SME Corporation (2) Ltd to provide details of an appropriate evacuation procedure for the KFC Drive-thru development at Holbeach Road, Spalding in the event of a flood warning.

1.2 This Flood Response Plan should be incorporated within the sites Operation and Maintenance Manual and should be treated as a live document, which should be reviewed annually and immediately after any internal procedure changes or following an actual evacuation.

2. BACKGROUND

2.1 The September 2018 Flood Risk Assessment (ref. P18-547) by Simpson Associates identified the site to be in Flood Zone 3 and in an area assessed to be at medium probability of fluvial / tidal flooding associated with breach / overtopping of the local flood defences.

2.2 It was established that the site and surrounding area could be inundated by floodwater in extreme flooding conditions and as a result it would be necessary to ensure that the site is vacated prior to the occurrence of a flood on the issue of a flood warning by the Environment Agency (EA).

3. PREPARING FOR FLOODING

3.1 The Environment Agencies (EA) Floodline Warnings Direct service monitors rainfall, river levels and tides to forecast the possibility of flooding. They aim to provide a minimum of two hours warning prior to the onset of a flood event, through automated flood warnings by telephone, SMS text, email, fax or pager. EA Flood warnings are also issued through the media on TV or radio bulletins.

3.2 The drive thru should be registered with this service by calling the EA's Floodline on 08459881188 or by using the link:

https://fwd.environment-agency.gov.uk/app/olr/register.

3.3 Prior to opening, staff awareness training should be carried out with refresher training undertaken annually and on employment of any new staff. The list of contacts and list of items / materials to protect from flooding included in *Appendix A* should also be completed before opening.

3.4 The Flood Plan should be reviewed annually and immediately after any internal procedure changes or following an actual evacuation.

4. LINES OF COMMUNICATION

4.1 The site will have a full time manager and appropriately trained staff capable of dealing with standard evacuation procedures for fire or other hazards when open. The following lines of communication are generally available in the event of an emergency.

Regional Manager

- Overall responsibility for evacuation and re-opening of the site.

Site Manager:

- Responsible for safe evacuation of all customers and staff.
- Reports to Regional Manager.

5. EVACUATION TRIGGER

5.1 On issue of a flood warning by the EA, the Regional Manager and Site Manager would receive notification via the EA's Floodline Warnings Direct service.

5.2 The EA's Floodline Warnings Direct service uses a variety of warnings to help prepare for flooding, which are identified in *Table 1* below.

Table 1: EA Flood Warning Codes

EA FLOOD WARNING CODES	DESCRIPTION
ONLINE FLOOD RISK FORECAST	- Be aware – Monitor weather situation. - Updated on daily basis.
	- Flooding is possible – Be prepared. - Used two hours to two days in advance of flooding.
	- Flooding is expected – Immediate Action Required. - Used half an hour to one day in advance of flooding.
	- Severe flooding – Danger to life. - Used when flooding poses a significant risk to life.
WARNING NO LONGER IN FORCE	- No further flooding is expected. - Used when river or sea conditions begin to return to normal.

5.3 Below *Table 2* confirms the procedures that should be employed by management for each warning code issued by the Floodline Warnings Direct service.

Table 2: Flood Warnings Direct Warning Code Procedures

EA FLOOD WARNING CODES	TRIGGER PROCEDURES
ONLINE FLOOD RISK FORECAST	- Monitor flood risk though EA's Floodline Warnings Direct Service and Media.
	- Prepare to implement Flood Plan but continue to monitor flood risk though media and EA's Floodline Warnings Direct Service. - Notify Regional Manager that preparations are being made to evacuate the restaurant. - Notify staff / customers, informing them of flood risk and possibility of evacuation. - Establish presence of any coach parties and any guests with special mobility requirements who may require assistance in event of an evacuation. - Prepare flood kit of essential items.
	- Close site, implement flood plan and carry out evacuation of customers and staff. - Store electrical items as high as practically possible. - Turn off gas and electricity. - Notify staff due to start shifts of site closure. - Continue to monitor flood risk though media and EA's Floodline Warnings Direct Service.
	- Any remaining staff to vacate site.
WARNING NO LONGER IN FORCE	- Return to site once emergency services has confirmed it is safe to do so. - Assess damage caused by the floodwater and contact insurers. - Re-open restaurant once it has been confirmed safe to do so.

6. EVACUATION PROCEDURE

6.1 The restaurant should be evacuated on issue of '*Flood Warning*' by the Flood Warnings Direct Service, which is indicated by the symbol below:



6.2 The initial phase of the evacuation would follow standard evacuation procedures as identified for fire or other hazards, which would be familiar to staff and management.

6.3 Staff and customers should follow the advice disseminated by Emergency Services and other Agencies who would deploy traffic management signage as the flood situation develops.

6.4 Gas, water and electricity supplies should be turned off during a Flood Warning, to reduce the risk of fire, however it is important to maintain communication throughout the event and emergency communication systems should be made available to site staff.

6.5 Below *Table 3* confirms the procedures to be followed in the event of it being necessary to evacuate the restaurant.

Table 3: Flood Evacuation Procedure

Stage 1: Evacuation of site
From alarm to evacuation this process should take 15 to 30 minutes.

PROCEDURE	RESPONSIBILITY
1.1 Audible alarm to be sounded.	Site Manager
1.2 Follow standard fire evacuation policy procedures.	Site Manager
1.3 Co-ordinate staff and customers at fire assembly point.	Site Manager
1.4 Advise staff and customers to follow signage erected by Emergency Services.	Site Manager
1.5 Signs to be erected in building that are clearly visible from entrance points, showing site is closed with telephone number of Head Office for emergency information.	Site Manager

Stage 2: To be undertaken on successful evacuation of restaurant.
With the exception of process 2.1, all the below processes should be complete prior to change of shift.

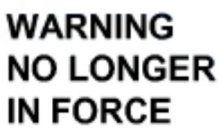
PROCEDURE	RESPONSIBILITY
2.1 Site Manager to contact non shift staff and future bookings to inform them site is closed.	Site Manager

Stage 3: To be undertaken on completion of building evacuation.

PROCEDURE	RESPONSIBILITY
3.1 Regional Manager to confirm re-opening of site. This is to be undertaken after flood water has receded and is not anticipated to return in short term. This decision is to be undertaken in consultation with Emergency Services.	Regional Manager
3.2 Standard post emergency procedures to be followed. In addition to standard safety checks all manholes should be checked to ensure they have not lifted during the flooding and hence provide a site hazard.	Regional Manager

7. RETURNING TO SITE

7.1 When no further flooding is expected and conditions have returned to normal, the Flood Warnings Direct Service will issue a '*Warning No Longer in Force*' status, which is indicated by the symbol below:



7.2 On issue of this status, Management should consult with the emergency services to confirm it is safe to return to site.

7.3 Upon returning to the site, Management should take the following action:

- Assess any damage caused by the floodwater.

- Open doors and windows to ventilate the building.

- Make a list of the extent of the damage (with photographic evidence).

- Contact the insurance company's 24 hour Emergency Helpline.

- Dispose of contaminated food (do not eat food which has been in contact with flood water).

- Check with local authority to find out about "cleaning up" and investigate temporary solutions such as cleaning materials and pumps (look up "Flood Damage" in Yellow Pages).

7.4 A structural survey of building may be required in order to assess any damage due to prolonged periods of flood water exposure. The CIRIA guidance document (C623) entitled Standards for the repair of buildings following flooding, published in 2005, outlines the various approaches and a professional consultant may need to be appointed.

7.1 The site should only be re-opened once it has been confirmed safe to do so.

APPENDIX A
LIST OF CONTACTS &
LIST OF ITEMS / MATERIALS TO PROTECT FROM FLOODING

LIST OF IMPORTANT CONTACTS

	Company name	Telephone Number
Environment Agency	Environment Agency	0845 988 1188
Customer Contact Centre		
Electricity supplier and meter number		
Gas supplier and meter number		
Water supplier and meter number		
Telephone provider		
Local Authority Emergency Services		
Insurance company and policy number		
Insurance Agent		
Local radio station for news alerts and weather updates.		

LIST OF CONTACTS THAT MAY BE ABLE TO HELP AFTER A FLOOD

	Company name	Telephone Number
Insurance company and policy number		
Insurance agent		
Electrician		
Plumber		
Builder		
Equipment repair / suppliers		
Security services		
Water pumping services		
Emergency power suppliers		

LIST OF STAFF CONTACTS

Name	Address	Telephone / mobile	Emergency contact	Emergency Telephone & Address

LOCATION OF SERVICE SHUT OFF POINTS

Service Shut-off	Description of Location
Electricity	
Gas	
Water	

PROTECTION OF ITEMS & MATERIALS FROM FLOODING

Materials	Description of location	How to protect from a flood (i.e. move, cover, tie down)
First Aid Kit		Move to safer location or off the ground.
Chemicals (including cleaning products)		Move to safer location or off the ground.
Oil based products (gasoline, oil, cooking oil etc.)		Move to safer location or off the ground.

PROTECTION OF VALUABLES FROM FLOODING

Identify stock, equipment and possessions that may need special protective measures, and describe the actions you will take to prevent their damage in the event of a flood. We have suggested items and ways to protect them, but make sure you follow through on your plans.

Items to consider

Vehicles
Tables / heavy furniture
Computers
Computer files
Chairs / stools
Databases
Electrical items
Paper files
Vehicles
Movable goods
Food
Fittings Soft furnishings
Staff files

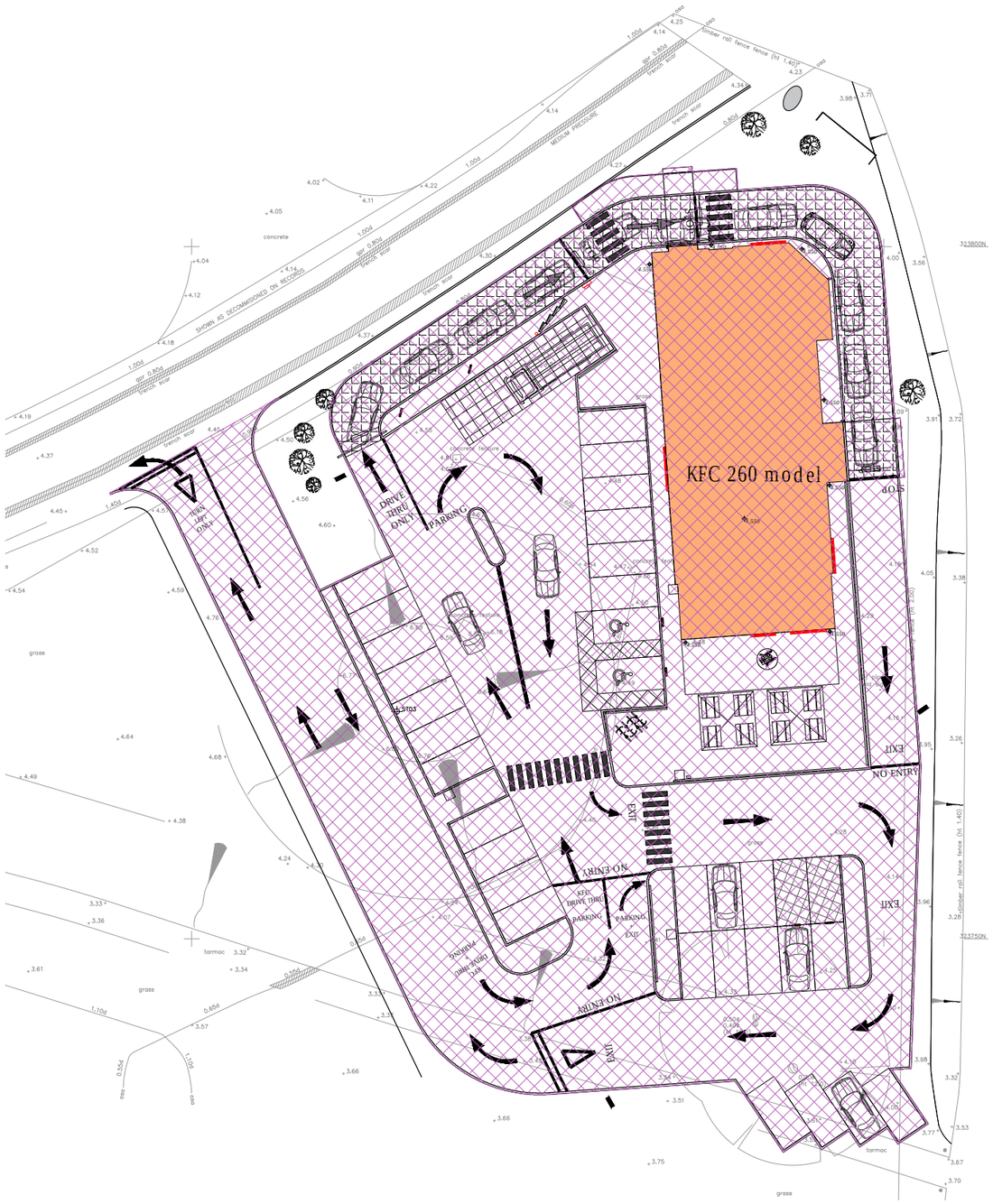
Ways to protect items

- Move to safer location
- Buy flood protection products
- Raise above ground level
- Make a copy and store in safe location
- Buy a new flood resistant item

Item	Protective action	New location (if applicable)	Done

APPENDIX F
DRAINED AREA LAYOUT

DO NOT SCALE





LEGEND

PROPOSED DRAINED AREA = 2663m²

MK	REVISION	BY	DATE
...	...	...	...

DRAWING STATUS

INFORMATION

DRAWING TITLE

DRAINED AREA LAYOUT

PROJECT Project Number P18-547

KFC DRIVE-THRU
HOLBEACH ROAD
SPALDING

simpson
8 Friday Street
Henley on Thames
Oxfordshire RG9 1AH
T.01491 576221

London, Henley-on Thames, Gloucester and Exeter

Drawn	Chkd	Scales	Date
G.S.C	G.S.C	1:200@A1	SEP 18

Purpose of Issue

PLANNING

Drawing Number	Revision
P18-547-SK01	-

A1

APPENDIX G
RUNOFF CALCULATIONS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.266	Urban	0.000
SAAR (mm)	567	Region Number	Region 5

Results l/s

QBAR Rural	0.7
QBAR Urban	0.7
Q100 years	2.5
Q1 year	0.6
Q30 years	1.7
Q100 years	2.5

©1982-2018 Innovyze

Greenfield Runoff Volume

FSR Data

Return Period (years)	1
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	0.266
SAAR (mm)	564
CWI	79.080
Urban	0.000
SPR	30.000

Results

Percentage Runoff (%)	18.52
Greenfield Runoff Volume (m^3)	10.190

©1982-2018 Innovyze

Greenfield Runoff Volume

FSR Data

Return Period (years)	30
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	0.266
SAAR (mm)	564
CWI	79.080
Urban	0.000
SPR	30.000

Results

Percentage Runoff (%)	20.10
Greenfield Runoff Volume (m^3)	24.587

©1982-2018 Innovyze

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	19.000
Ratio R	0.400
Areal Reduction Factor	1.00
Area (ha)	0.266
SAAR (mm)	564
CWI	79.080
Urban	0.000
SPR	30.000

Results

Percentage Runoff (%)	22.16
Greenfield Runoff Volume (m^3)	35.249

©1982-2018 Innovyze

P18-547, KFC Drive-thru, Holbeach Road, Spalding - Modified Rational Method Runoff Calculations (Post-Development)

Peak Runoff Rate = 3.61 x Runoff Volume Coefficient (Cv) x Area (A) x Peak Rainfall Intensity (I_{peak})

Runoff Volume = Runoff Coefficient (C) x Area (A) x Average Rainfall intensity (I_{ave}) x Storm Duration

Post-development Runoff

Return Period	Cv	$I_{(peak)}$ (mm)	$I_{(ave)}$ (mm)	A (Ha)	Peak Runoff Rate (l/s)	Runoff Volume (m^3)
1	0.75	13.515	3.448	0.2663	9.7	41.3
30	0.75	30.050	7.666	0.2663	21.7	91.9
100	0.75	39.071	9.967	0.2663	28.2	119.4
100+40%	0.75	54.699	13.954	0.2663	39.4	167.2

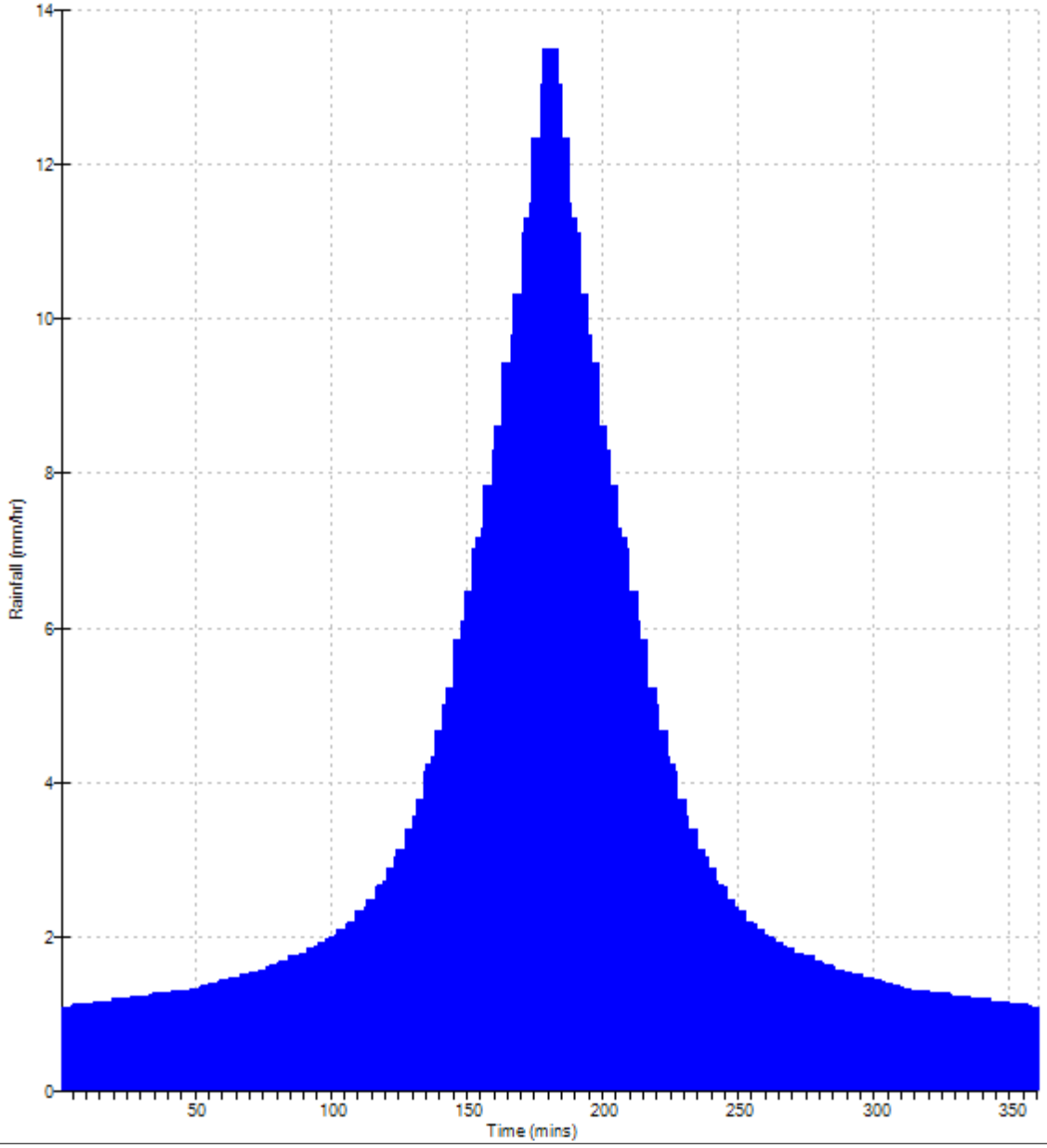
Notes

1. Rainfall intensities generated from the FSR rainfall model facility in MicroDrainage.
2. Peak rainfall intensities are based on the following FSR data:
   Storm Duration: 360 min (6hrs)
   M5-60 (mm): 19.000
   Ratio R 0.400
3. Average rainfall intensities are based on the following FSR data:
   Storm Duration: 360 min (6hrs)
   M5-60 (mm): 19.000
   Ratio R 0.400

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60(mm)	19.000
Ratio R	0.400
Peak Intensity (mm/hr)	13.515
Ave. Intensity (mm/hr)	3.448
Return Period (years)	1.0

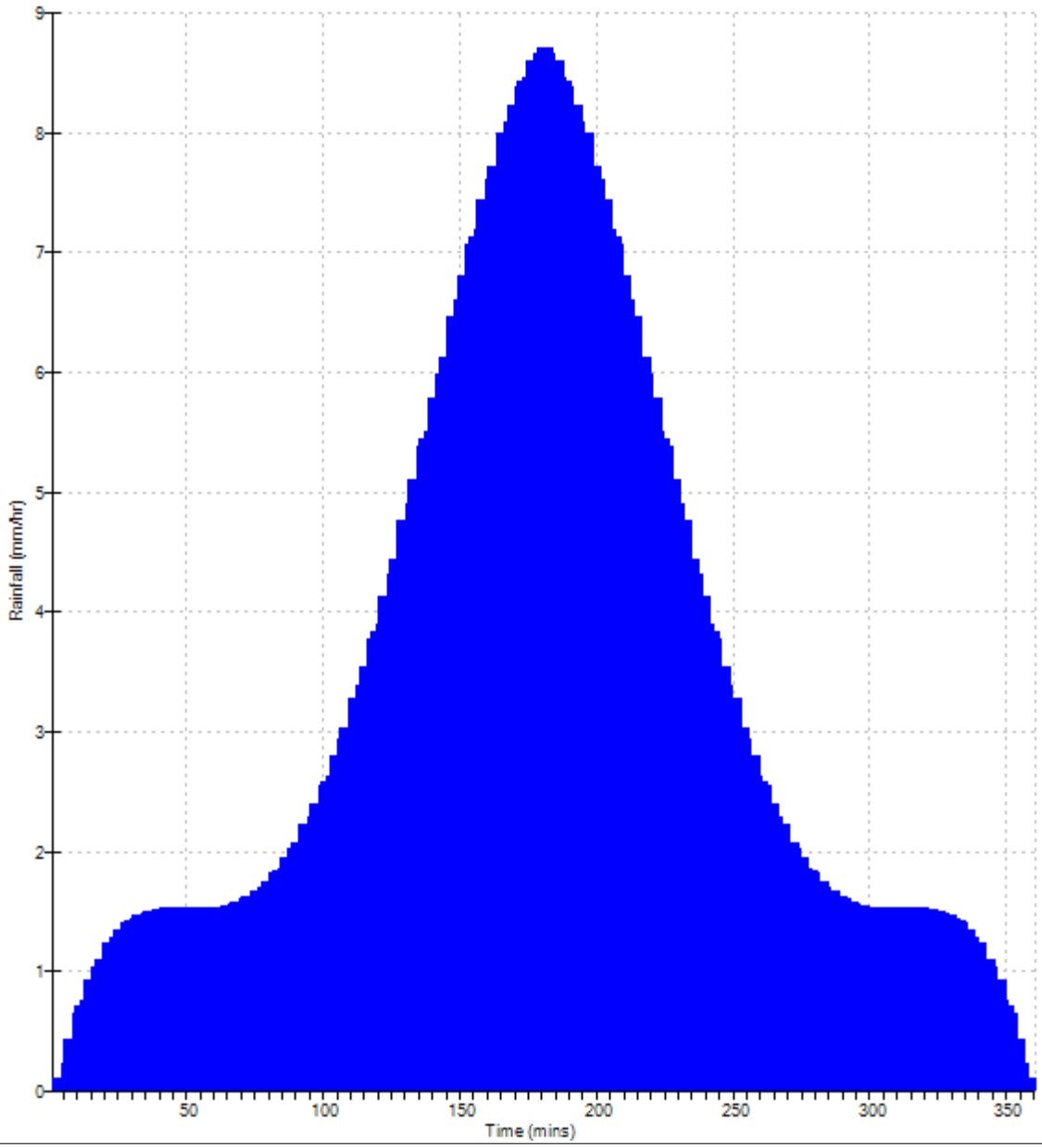


©1982-2018 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60(mm)	19.000
Ratio R	0.400
Peak Intensity (mm/hr)	8.719
Ave. Intensity (mm/hr)	3.448
Return Period (years)	1.0

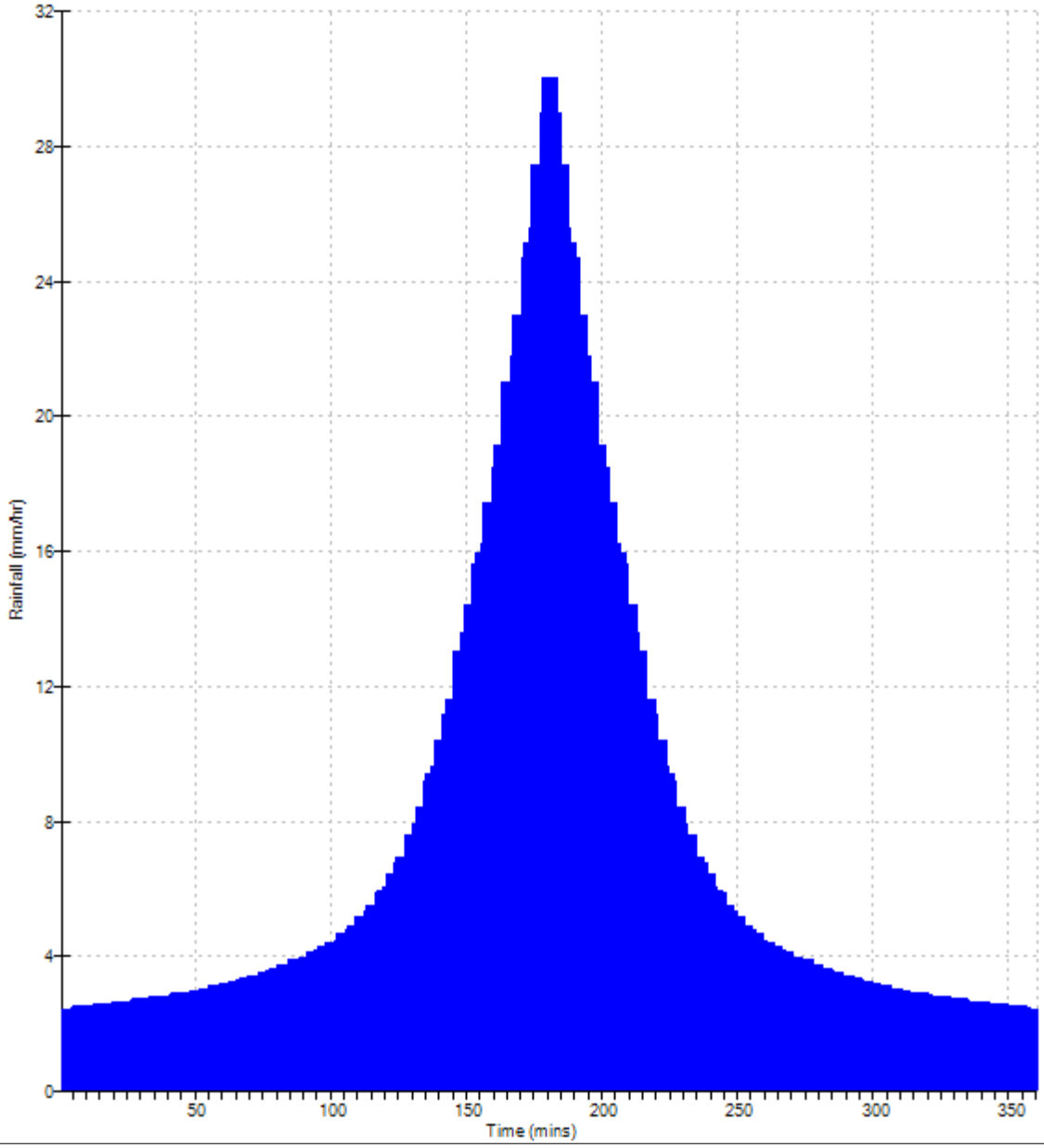


©1982-2018 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60(mm)	19.000
Ratio R	0.400
Peak Intensity (mm/hr)	30.050
Ave. Intensity (mm/hr)	7.666
Return Period (years)	30.0

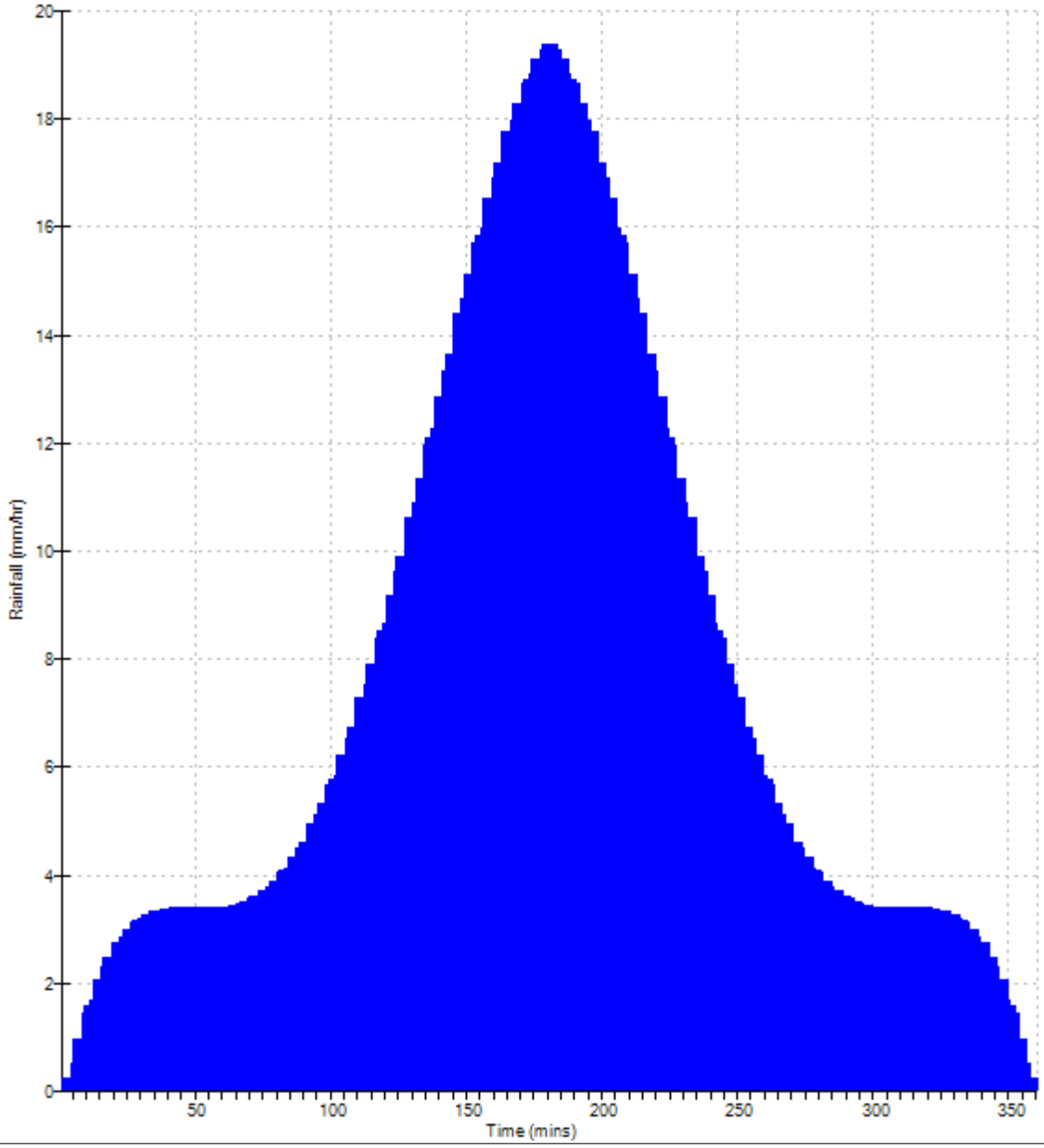


©1982-2018 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60(mm)	19.000
Ratio R	0.400
Peak Intensity (mm/hr)	19.388
Ave. Intensity (mm/hr)	7.666
Return Period (years)	30.0

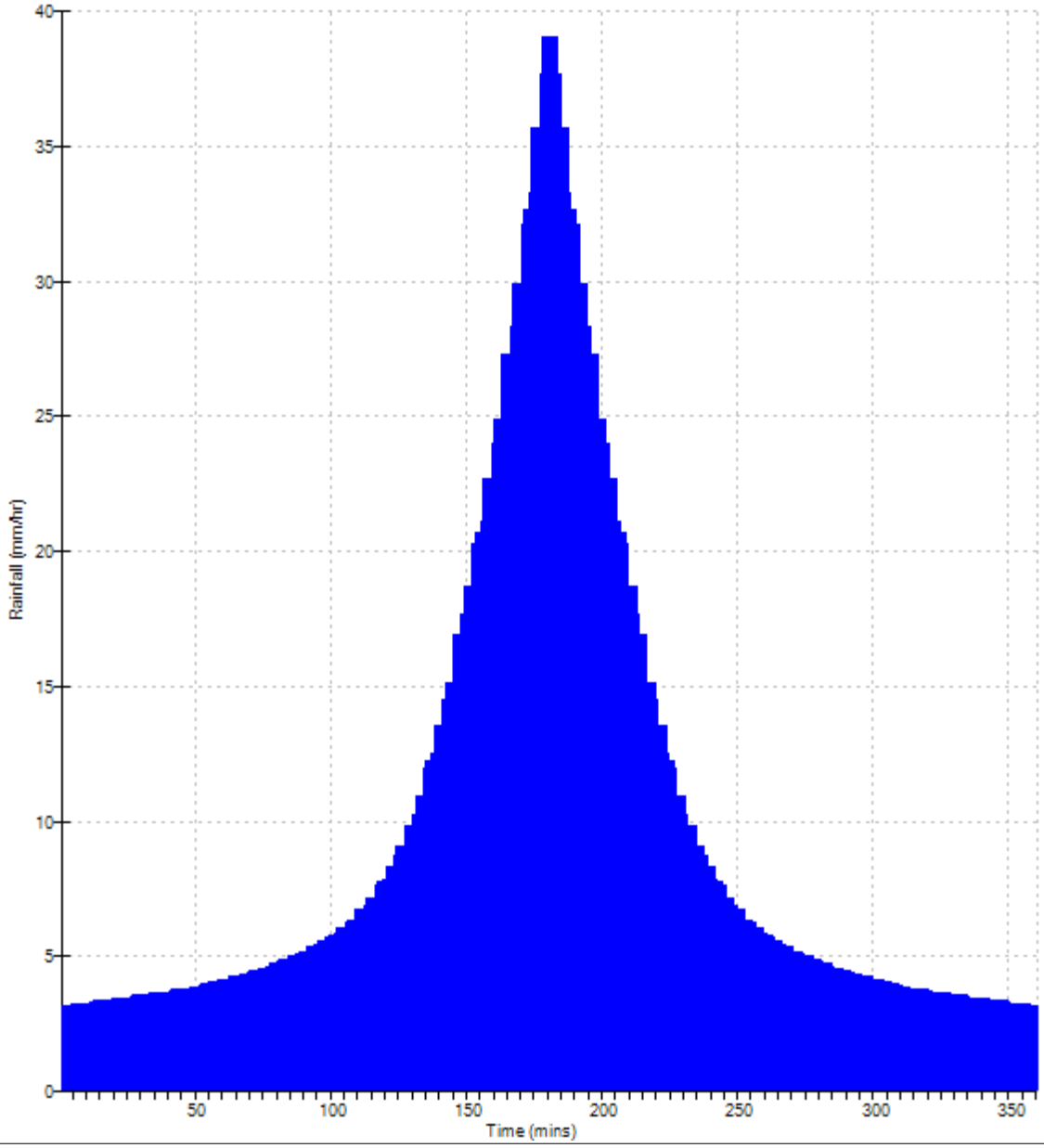


©1982-2018 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60(mm)	19.000
Ratio R	0.400
Peak Intensity (mm/hr)	39.071
Ave. Intensity (mm/hr)	9.967
Return Period (years)	100.0

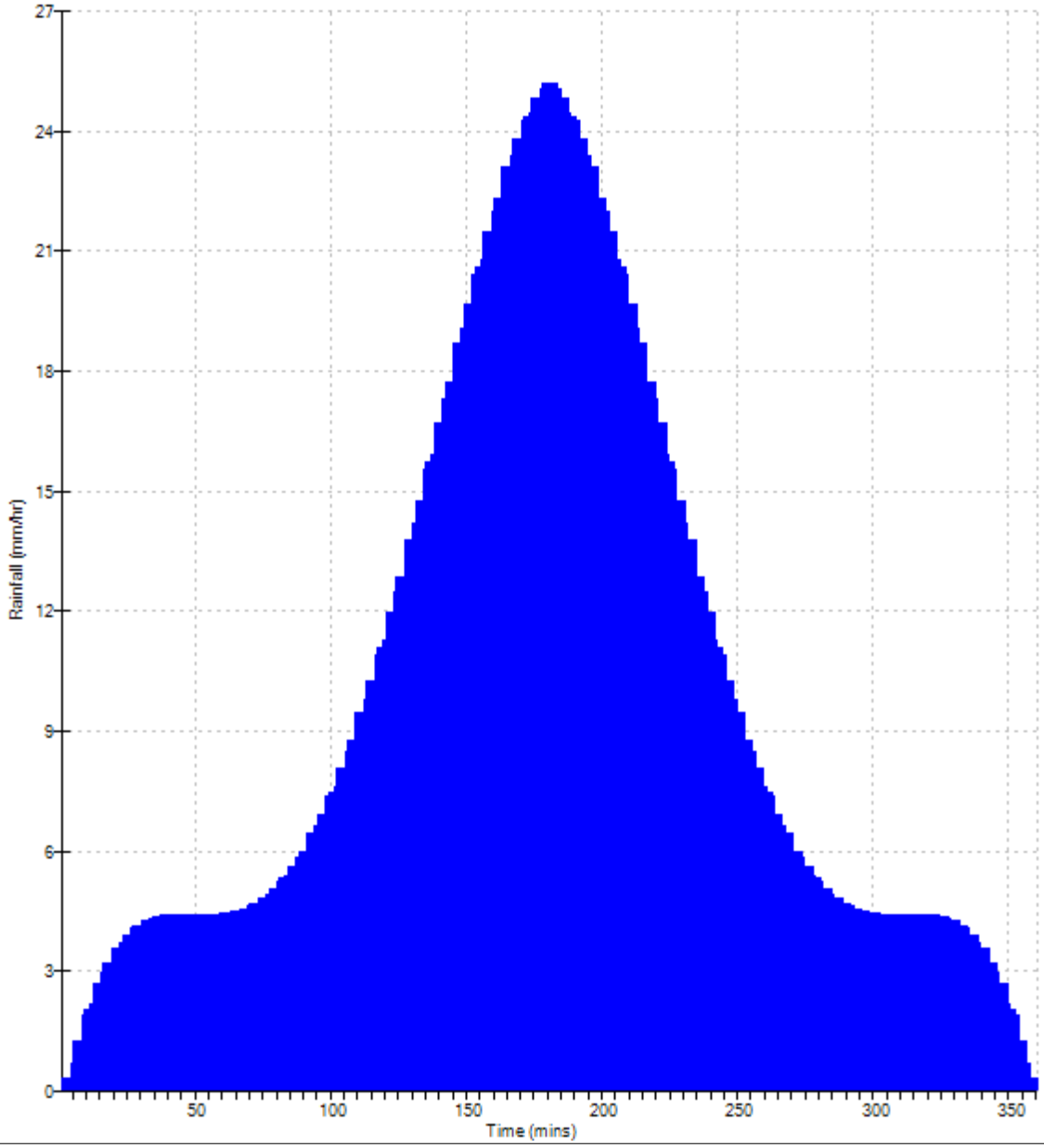


©1982-2018 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60(mm)	19.000
Ratio R	0.400
Peak Intensity (mm/hr)	25.208
Ave. Intensity (mm/hr)	9.967
Return Period (years)	100.0



©1982-2018 Innovyze

APPENDIX H
PROPOSED DRAINAGE LAYOUT

DO NOT SCALE



DRAINAGE LEGEND

- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FILTER DRAIN
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED FOUL RISING MAIN
- PROPOSED SW INSPECTION CHAMBER
- PROPOSED FW INSPECTION CHAMBER
- PROPOSED SW SILT TRAP CHAMBER
- PROPOSED SW CATCHPIT
- PROPOSED SW FLOW CONTROL CHAMBER
- PROPOSED SW MANHOLE
- PROPOSED FW MANHOLE
- PROPOSED PERMEABLE PAVING (TANKED)
- EXCEEDANCE FLOOD ROUTE
- FFL 4.55 FINISHED FLOOR LEVEL

MK	REVISION	BY	DATE
A	SURFACE WATER OUTFALL RELOCATED	G.S.C	28.09.18

DRAWING STATUS

INFORMATION

DRAWING TITLE

DRAINAGE LAYOUT

PROJECT — Project Number P18-547

KFC DRIVE-THRU
HOLBEACH ROAD
SPALDING

simpson
8 Friday Street
Henley on Thames
Oxfordshire RG9 1AH
T.01491 576221
London, Henley-on Thames, Gloucester and Exeter

Drawn	Ch'kd	Scales	Date
G.S.C	G.S.C	1:200@A1	SEP 18

Purpose of Issue: PLANNING

Drawing Number: P18-547-SK02 — Revision: A

A1

APPENDIX I
MICRODRAINAGE SOURCE CONTROL RESULTS

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 674 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	3.198	0.198	0.0	2.0	2.0	63.8	O K
30 min Summer	3.257	0.257	0.0	2.0	2.0	83.1	O K
60 min Summer	3.317	0.317	0.0	2.0	2.0	102.2	O K
120 min Summer	3.371	0.371	0.0	2.0	2.0	120.0	O K
180 min Summer	3.398	0.398	0.0	2.0	2.0	128.5	O K
240 min Summer	3.412	0.412	0.0	2.0	2.0	133.1	O K
360 min Summer	3.422	0.422	0.0	2.0	2.0	136.4	O K
480 min Summer	3.423	0.423	0.0	2.0	2.0	136.7	O K
600 min Summer	3.419	0.419	0.0	2.0	2.0	135.3	O K
720 min Summer	3.414	0.414	0.0	2.0	2.0	133.8	O K
960 min Summer	3.403	0.403	0.0	2.0	2.0	130.1	O K
1440 min Summer	3.377	0.377	0.0	2.0	2.0	121.8	O K
2160 min Summer	3.337	0.337	0.0	2.0	2.0	108.7	O K
2880 min Summer	3.298	0.298	0.0	2.0	2.0	96.4	O K
4320 min Summer	3.234	0.234	0.0	2.0	2.0	75.4	O K
5760 min Summer	3.185	0.185	0.0	2.0	2.0	59.6	O K
7200 min Summer	3.149	0.149	0.0	1.9	1.9	48.1	O K
8640 min Summer	3.123	0.123	0.0	1.8	1.8	39.7	O K
10080 min Summer	3.105	0.105	0.0	1.7	1.7	33.8	O K
15 min Winter	3.222	0.222	0.0	2.0	2.0	71.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	130.597	0.0	61.9	19
30 min Summer	85.825	0.0	81.7	33
60 min Summer	53.779	0.0	105.7	64
120 min Summer	32.595	0.0	128.2	122
180 min Summer	24.012	0.0	141.8	182
240 min Summer	19.224	0.0	151.3	242
360 min Summer	13.954	0.0	164.8	360
480 min Summer	11.125	0.0	175.1	480
600 min Summer	9.325	0.0	183.4	546
720 min Summer	8.069	0.0	190.3	598
960 min Summer	6.417	0.0	201.6	716
1440 min Summer	4.640	0.0	217.8	980
2160 min Summer	3.350	0.0	239.5	1384
2880 min Summer	2.656	0.0	253.1	1784
4320 min Summer	1.912	0.0	272.6	2512
5760 min Summer	1.513	0.0	289.1	3232
7200 min Summer	1.261	0.0	301.1	3960
8640 min Summer	1.086	0.0	310.9	4592
10080 min Summer	0.957	0.0	319.0	5256
15 min Winter	130.597	0.0	69.5	19

©1982-2018 Innovyze

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	3.289	0.289	0.0	2.0	2.0	93.3	O K
60 min Winter	3.356	0.356	0.0	2.0	2.0	115.0	O K
120 min Winter	3.419	0.419	0.0	2.0	2.0	135.4	O K
180 min Winter	3.451	0.451	0.0	2.0	2.0	145.6	O K
240 min Winter	3.469	0.469	0.0	2.0	2.0	151.3	O K
360 min Winter	3.484	0.484	0.0	2.0	2.0	156.4	O K
480 min Winter	3.490	0.490	0.0	2.0	2.0	158.1	O K
600 min Winter	3.488	0.488	0.0	2.0	2.0	157.6	O K
720 min Winter	3.482	0.482	0.0	2.0	2.0	155.6	O K
960 min Winter	3.463	0.463	0.0	2.0	2.0	149.6	O K
1440 min Winter	3.427	0.427	0.0	2.0	2.0	138.0	O K
2160 min Winter	3.367	0.367	0.0	2.0	2.0	118.5	O K
2880 min Winter	3.309	0.309	0.0	2.0	2.0	99.7	O K
4320 min Winter	3.214	0.214	0.0	2.0	2.0	69.1	O K
5760 min Winter	3.150	0.150	0.0	1.9	1.9	48.5	O K
7200 min Winter	3.111	0.111	0.0	1.8	1.8	35.8	O K
8640 min Winter	3.091	0.091	0.0	1.6	1.6	29.4	O K
10080 min Winter	3.079	0.079	0.0	1.4	1.4	25.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	85.825	0.0	91.6	33
60 min Winter	53.779	0.0	118.4	62
120 min Winter	32.595	0.0	143.7	120
180 min Winter	24.012	0.0	158.8	180
240 min Winter	19.224	0.0	169.5	238
360 min Winter	13.954	0.0	184.5	352
480 min Winter	11.125	0.0	196.0	466
600 min Winter	9.325	0.0	205.3	576
720 min Winter	8.069	0.0	213.0	684
960 min Winter	6.417	0.0	225.5	780
1440 min Winter	4.640	0.0	243.2	1068
2160 min Winter	3.350	0.0	268.3	1512
2880 min Winter	2.656	0.0	283.5	1908
4320 min Winter	1.912	0.0	305.6	2676
5760 min Winter	1.513	0.0	323.9	3344
7200 min Winter	1.261	0.0	337.3	3968
8640 min Winter	1.086	0.0	348.4	4584
10080 min Winter	0.957	0.0	357.6	5344

©1982-2018 Innovyze

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.266

Time (mins) From:	To:	Area (ha)
0	4	0.266

©1982-2018 Innovyze

Model Details

Storage is Online Cover Level (m) 4.000

Cellular Storage Structure

Invert Level (m) 3.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	340.0	340.0	0.600	0.0	384.0
0.500	340.0	384.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCL-0064-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise blockage risk
Application	Surface
Sump Available	Yes
Diameter (mm)	64
Invert Level (m)	3.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0
Flush-Flo™	0.259	2.0
Kick-Flo®	0.569	1.6
Mean Flow over Head Range	-	1.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	2.2	3.000	3.3	7.000	4.9
0.200	2.0	1.400	2.3	3.500	3.5	7.500	5.0
0.300	2.0	1.600	2.5	4.000	3.8	8.000	5.2
0.400	1.9	1.800	2.6	4.500	4.0	8.500	5.4
0.500	1.8	2.000	2.7	5.000	4.2	9.000	5.5
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.6
0.800	1.8	2.400	3.0	6.000	4.5		
1.000	2.0	2.600	3.1	6.500	4.7		

©1982-2018 Innovyze

APPENDIX J
SUDS IMPLEMENTATION & MAINTENANCE PLAN

DRAINAGE IMPLEMENTATION PLAN

KFC DRIVE THRU, HOLBEACH ROAD, SPALDING

4.1 This Drainage Implementation Plan sets out measures to be implemented during construction of the drainage system for the scheme to ensure the site and areas downstream are protected from runoff during construction of the development. It is recommended that the plan is incorporated into the Contractors Construction Health and Safety Plan with the development carried out in accordance with the measures proposed.

4.2 During construction, it is normal practice for a drainage system to be installed at an early stage in the programme. However, it is not always possible to ensure that new impermeable areas created as part of the development are immediately connected to the new drainage system.

4.3 To ensure areas downstream of the development are protected during construction of the development it is recommended that the following management measures are implemented during construction:

- A straw barrier or silt fence should be placed along the sites southern and eastern boundary to prevent sediment such as soil and mud from washing onto neighbouring land.

- Protective coverings should be used to help prevent runoff stripping material stockpiles.

- Plant and wheel washing should take place in a designated location. The area should be tanked and not allowed to discharge into the drainage system or infiltrate into the ground. Effluent should be treated as contaminated waste and disposed off site by a licensed waste management operator.

- Surfaces used as access roads and storage areas during construction should be swept regularly to prevent the accumulation of dust and mud.

- Should groundwater be encountered in excavations such water should not be discharged to the drainage system until the amount of suspended solids has been reduced though the controlled use of skips or tanks, which will act as stilling basins.

- To prevent contamination associated with the use of oils and hydrocarbons during construction, the Contractor should ensure that the following precautionary measures are employed during construction:

    - Regular maintenance of machinery and plant.
    - Use of drip trays.
    - Regular checking of machinery and plant for oil leaks.
    - Use of correct storage facilities.
    - Regular checks for signs of wear and tear on tanks.
    - Specific procedures are followed when refuelling.
    - Use of a designated area for refuelling.
    - Emergency spill kit to be located near refuelling area.

- Regular emptying of bunds.
- Tanks should be located in secure areas to stop vandalism.

4.4 The above measures would help to ensure that untreated construction runoff would not be discharged to the surface water drainage system.

4.5 The use of permeable paving will require changes to conventional construction practices and procedures used for traditional car parking and other paved areas, which during the initial stages of the development are often used as access roads and storage areas. Together with runoff from the construction site, which can be heavily laden with silt, such activities are likely to block the permeable paving systems, therefore, the following measures should be implemented to address this issue.

- Permeable paving should be carried out at the end of the development programme, when most construction activities are complete, thus minimising the risk of clogging.

- Should it be necessary to construct areas of permeable paving at an early stage in the construction programme, an impermeable layer of Dense Bitumen Macadam (DBM) should be laid beneath the surfacing materials to act as a temporary road surface. When most construction activities are complete, holes would be punched through the impermeable layer with final surfacing then laid.

4.6 During construction, all components of the drainage system should be constructed in accordance with relevant drawings, specifications and manufacturer's guidelines. Further to this Building Control should visit site on a regular basis to inspect completed works and ensure that the drainage system is installed correctly.

DRAINAGE MAINTENANCE & MANAGEMENT PLAN

KFC DRIVE THRU, HOLBEACH ROAD, SPALDING

4.1 This Drainage Management and Maintenance Plan provides details of the plan proposed for maintenance and management of the sites drainage scheme.

4.2 KFC would be the owners / operators of the drive-thru and have an established estates team who are responsible for the management / maintenance of their estate infrastructure throughout the UK. The estates team would ensure that the sites drainage system is operated and maintained in accordance with this plan.

4.3 On occupation of the development, the maintenance and management plan should be incorporated into the sites Operation and Maintenance Manual with the as-built drainage system operated and maintained in accordance with the regime set out in the tables below.

Table 1: Below Ground Drainage System - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove all litter and debris from external hard landscaped areas and adjacent landscaping, which may pose a risk to the performance of the system.	Monthly.
	Remove build-up of sediment / silt in catch-pits and dispose of oils / petrol residues using safe standard practices.	As required.
	Stabilise and mow adjacent landscaped areas and remove weeds.	
Remedial actions	Repair or rehabilitate inlet and outlets to ensure they are in good condition and operating as designed.	
	Remediate any landscaping, which has raised to within 50mm of the level of adjacent hard landscaping.	
Monitoring	Check of all inlets / outlets for blockages or evidence of physical damage with any necessary remedial action or clearance carried out if required.	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.
	Inspect all surfaces for ponding, or silt accumulation. Record areas where water is ponding for more than 48 hours and carry out any remedial work deemed necessary.	After severe storms.

Table 2: Permeable Paving - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove all litter and debris from drained surfaces areas and adjacent hard / soft landscaping, which may pose a risk to the performance of the system.	Monthly.
	Sweep permeable paved areas. If necessary use jet wash or suction sweeper. Any jointing aggregate lost from the joints must be replaced as necessary with 2/6.3mm single sized aggregate, brushed into joints.	Three times a year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging.
	Stabilise and mow adjacent landscaped areas and remove weeds.	As required.
Remedial actions	Remediate any landscaping, which has raised to within 50mm of the level of adjacent hard landscaping.	
	Carry out remedial work to any depressions, rutting and cracked or broken paving blocks within the permeable paved areas that are considered detrimental to the structural performance or a hazard to users.	
	Carry out repair / rehabilitation works to inlets, outlets, overflows and vents.	
Monitoring	Inspect silt accumulation rates within the permeable paved areas and establish appropriate brushing frequencies.	Annually.
	Check of all inlets, outlets, overflows and vents for blockages or evidence of physical damage with any necessary remedial action or clearance carried out if required.	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.
	Inspect and identify any areas that are not operating correctly	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.

Table 3: Geocellular Storage Tank- Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for first 3 months of operation, then every 6 months.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly.
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly / after severe storms.
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually and after large storms.

Table 4: Flow Control Chamber - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning off the flow control device of any debris/ sediment	As required
Remedial Actions	Flow control device repairs.	As required
	Repair of erosion damage, or damage to chamber.	
Monitoring	Inspection of the chamber for debris and sediment build up.	Monthly for first 3 months, thereafter, every 6 months and following severe storm events.

Table 5: Grease Separator - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Chambers should be desludged (grease / sediment removed) by vacuum tanker to remove sediment or grit from the bottom of the unit and accumulated grease from the surface.	Every 3, 6 or 12 months depending on site conditions (or following poor performance).
Remedial actions	Repair of erosion damage, or damage to the separator.	As required.
	Separator repairs.	
Monitoring	Inspection of the separator for build up of grease and sediment.	Every 3, 6 or 12 months depending on site conditions (or following poor performance).

Table 6: Pumping Station - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning off the pumps and floats of any debris/ sediment	As required
Remedial Actions	Pump repairs.	As required
	Repair of erosion damage, or damage to tank.	
Monitoring	Checking current resistance to see if there is any indication of motor degradation.	Every 6 months (Unless poor site conditions, therefore every 3 months)
	Checking the impellers to see if they require replacing due to wear.	
	Checking the float switches are set and operating correctly.	
	Inspection of the tank for debris and sediment build up.	
	Inspection of inlets & outlets.	
	Inspection of areas receiving overflow, for evidence of erosion.	

Table 7: Gravel Filter Drains / Trenches Soakaways - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming of any roots that may be causing blockages.	Annually (semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required)
Occasional Maintenance	Removal of sediment from pre-treatment devices.	Every 6 months.
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Every 5 years.
Remedial actions	Clear perforated pipework of blockages.	As required.
	Rehabilitate infiltration or filtration surfaces.	
	Excavate trench walls to expose clean soils if infiltration performance reduces to unacceptable levels.	
	Replace geotextiles and clean and replace filter media, if clogging occurs.	
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	Monthly
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for	Every 6 months.

	silt accumulation. Establish appropriate silt removal frequencies.	

4.4 The Site Manager should ensure that the Maintenance Contractor tasked with carrying out any maintenance works provides a risk assessment and method statement that adopts best practice health and safety policies for maintenance personnel throughout the duration of any maintenance works. Measures may include:

- Ensure the use of safe systems of work and procedures are followed.
- Certificated operatives only to be used for all confined space entry.
- Ensure appropriate ppe is worn at all times including the use of safety goggles, ear defenders and other relevant equipment when using high pressure jetting.
- Do not work in weather conditions where flooding or surging is likely.
- Erect barriers where appropriate and provide adequate lighting.
- No operations to be carried out by operatives working alone.
- Time maintenance to not conflict with other on-site activities.
- Method statement to be prepared and approved prior to entry into confined space.