

FLOOD RISK CONSULTANCY LIMITED

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Client: Colne Town Council

Report No: 2019-113 Revision A

Date: 20/12/2019



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APPRAISING,
MANAGING
& REDUCING
FLOOD RISK

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Document Control

Document Title: Sites Selected for Allocation – Exceptions Test

Project Number: 2019-113

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Contract

This report describes work commissioned by Colne Town Council. Donna Metcalf of The Flood Risk Consultancy carried out the work.

Prepared by..... Donna Metcalf (Managing Director)

Disclaimer

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Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Contents

Document Control.....	i
Contract.....	i
Disclaimer.....	i
Appendices.....	v
1.0 Introduction.....	1
1.1 General.....	1
1.2 The Sites.....	2
1.3 Report Structure.....	2
1.4 Data Sources.....	3
2.0 Assessment of Flood Risk.....	4
2.1 General.....	4
2.1.1 Sources of Flooding.....	4
2.1.2 Flood Zones.....	4
2.1.3 Vulnerability of Different Development Types.....	4
2.1.4 Flood Mapping (Fluvial).....	5
2.1.5 Flood Mapping (Pluvial).....	5
2.1.6 Climate Change.....	6
2.2 Environment Agency Data.....	7
2.3 Site CNDP6/2 Land East of Waterside Road.....	8
2.3.1 Existing Use.....	8
2.3.2 Recent Planning History.....	8
2.3.3 Initial Evaluation of Flood Risk.....	9
2.3.4 Topography.....	9
2.3.5 Fluvial Flood Risk.....	9
2.3.6 Pluvial: Management of Surface Water Runoff.....	11
2.3.7 Pluvial: Surface Water Flooding; Overland Flows; and Ponding.....	12
2.3.8 Mitigation Measures.....	13
2.4 CNDP6/8: Dam Side.....	13
2.4.1 Existing Use.....	13
2.4.2 Recent Planning History.....	13
2.4.3 Initial Evaluation of Flood Risk.....	14
2.4.4 Topography.....	15
2.4.5 Fluvial Flood Risk.....	15
2.4.6 Pluvial: Management of Surface Water Runoff.....	16

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.4.7	Pluvial: Surface Water Flooding; Overland Flows; and Ponding	17
2.4.8	Mitigation Measures	18
2.5	Site CNDP6/9 Spring Gardens Mill, Green Road.....	18
2.5.1	Existing Use.....	18
2.5.2	Recent Planning History	18
2.5.3	Initial Evaluation of Flood Risk	19
2.5.4	Topography.....	20
2.5.5	Fluvial Flood Risk.....	20
2.5.6	Pluvial: Management of Surface Water Runoff.....	23
2.5.7	Pluvial: Surface Water Flooding; Overland Flows; and Ponding	24
2.5.8	Mitigation Measures	25
2.6	Site CNDP6/11 Bridge Street Stoneyard	25
2.6.1	Existing Use.....	25
2.6.2	Recent Planning History	25
2.6.3	Initial Evaluation of Flood Risk	26
2.6.4	Topography.....	26
2.6.5	Fluvial Flood Risk.....	27
2.6.6	Pluvial: Management of Surface Water Runoff.....	29
2.6.7	Pluvial: Surface Water Flooding; Overland Flows; and Ponding	30
2.6.8	Mitigation Measures	31
2.7	Site CNDP6/16 Windy Bank	31
2.7.1	Existing Use.....	31
2.7.2	Recent Planning History	32
2.7.3	Initial Evaluation of Flood Risk	32
2.7.4	Topography.....	33
2.7.5	Fluvial Flood Risk.....	33
2.7.6	Pluvial: Management of Surface Water Runoff.....	36
2.7.7	Pluvial: Surface Water Flooding; Overland Flows; and Ponding	37
2.7.8	Mitigation Measures	37
3.0	The Exceptions Test	39
3.1	National Planning Policy Framework	39
3.2	Exceptions Test Part 1 - How can wider sustainability benefits to the community that outweigh flood risk be demonstrated?	40
3.3	Exceptions Test Part 2 - What needs to be considered to demonstrate that development will be safe for its lifetime?.....	40

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Figures

Figure 1.1: Exceptions Test - Colne Town Council Allocated Sites	2
Figure 2.1: The Environment Agency Flood Map	5
Figure 2.2: Surface Water Flood Map	5
Figure 2.3: EA Model Node Plan 1	7
Figure 2.4: EA Model Node Plan 2	7
Figure 2.5: Aerial Photograph Site CNDP6/2 (1.42 Hectares)	8
Figure 2.6: Aerial Photograph Viewed West of Site CNDP6/2	10
Figure 2.7: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/2	11
Figure 2.8: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/2	11
Figure 2.9: Surface Water Flood Map for Site CNDP6/2	13
Figure 2.10: Aerial Photograph Site CNDP6/8 (1.42 Hectares)	14
Figure 2.11: Aerial Photograph Viewed East of Site CNDP6/8	15
Figure 2.12: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/8	16
Figure 2.13: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/8	16
Figure 2.14: Surface Water Flood Map for Site CNDP6/8	18
Figure 2.15: Aerial Photograph Site CNDP6/9 (3.11 Hectares)	19
Figure 2.16: Aerial Photograph Viewed West of Site CNDP6/9	20
Figure 2.17: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/9	22
Figure 2.18: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/9	22
Figure 2.19: Surface Water Flood Map for Site CNDP6/9	24
Figure 2.20: Aerial Photograph Site CNDP6/11 (1.20 Hectares)	26
Figure 2.21: Aerial Photograph Viewed South of Site CNDP6/11	27
Figure 2.22: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/11	29
Figure 2.23: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/11	29
Figure 2.24: Surface Water Flood Map for Site CNDP6/1	31
Figure 2.25: Aerial Photograph Site CNDP6/16 (0.99 Hectares)	32
Figure 2.26: Existing site Viewed South from Spring Gardens Road CNDP6/16	33
Figure 2.27: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/16	35
Figure 2.28: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/16	35
Figure 2.29: Surface Water Flood Map for Site CNDP6/16	37

Tables

Table 1: Peak Rainfall Intensity Allowances	6
Table 2: North-West River Basin Peak River Flow Allowances	6
Table 3: CNDP6/2 Possible Flood Mechanisms	9

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Table 4: CNDP6/8 Possible Flood Mechanisms.....	14
Table 5: CNDP6/9 Possible Flood Mechanisms.....	19
Table 6: CNDP6/9 Modelled Flood Levels.....	21
Table 7: CNDP6/11 Possible Flood Mechanisms.....	26
Table 8: CNDP6/11 Modelled Flood Levels.....	28
Table 9: CNDP6/16 Possible Flood Mechanisms.....	32
Table 10: CNDP6/16 Modelled Flood Levels.....	34

Appendices

Appendix A: - Site Location Map

Appendix B: - Environment Agency Data

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

1.0 Introduction

1.1 General

Flood Risk Consultancy Ltd has been appointed by Colne Town Council to undertake an Exceptions Test for a number of sites under review for allocation as residential development within the Neighbourhood Plan; in accordance with the requirements of the National Planning Practice Guidance with regard to flood risk.

The flood risk Exceptions Test considers those sites which are within areas of flood risk, as established by the Flood Map for Planning (<https://flood-map-for-planning.service.gov.uk/>); and detailed flood maps provided by the Environment Agency.

The Test shows how flood risk on each of the allocated sites will be managed; and must show that the sustainability benefits of the site for residential use outweigh the flood risk.

The Exceptions Test must also show that each development can be kept safe for its lifetime; taking into account the vulnerability of its users; and that it won't increase flood risk elsewhere.

The Exceptions Test follows the methodology set out within the NPPF Planning Practice Guidance; and draws on information gathered and detailed within Pendle Borough Council's SFRA document and modelled flood data for Colne Water; which is considered to be the primary source of flood risk at the allocated sites.

Current mapping divides flood risk from river sources into different zones:

- Flood Zone 1 – low risk
- Flood Zone 2 – medium risk
- Flood Zone 3a – high risk
- Flood Zone 3b – functional floodplain

Surface water flooding is categorised similarly:

- Very low risk
- Low risk – 1 in 1000-year flood event
- Medium risk – 1 in 100-year flood event
- High risk – 1 in 30-year flood event

Colne Town Council's Neighbourhood Plan is currently under preparation and has not yet been finalised; however, a map indicating the sites under consideration and a copy of the draft plan document is available:

- <https://www.colnetowncouncil.org.uk/grows/>
- <https://www.colnetowncouncil.org.uk/wp-content/uploads/2018/05/CTC-Policies-Map-02.05.18-no-key.pdf>
- <https://www.colnetowncouncil.org.uk/wp-content/uploads/2018/05/Colne-Draft-04.05.18.pdf>

Covering the wider area, Pendle Borough Council's Local Plan together with the Strategic Flood Risk Assessment, Sustainability Appraisal and other consultation documents can be found at:

- Local Plan: https://www.pendle.gov.uk/info/20072/planning_policies/273/local_plan
- Strategic Flood Risk Assessment:

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

https://www.pendle.gov.uk/downloads/download/2718/strategic_flood_risk_assessment

- Development Plan Documents:

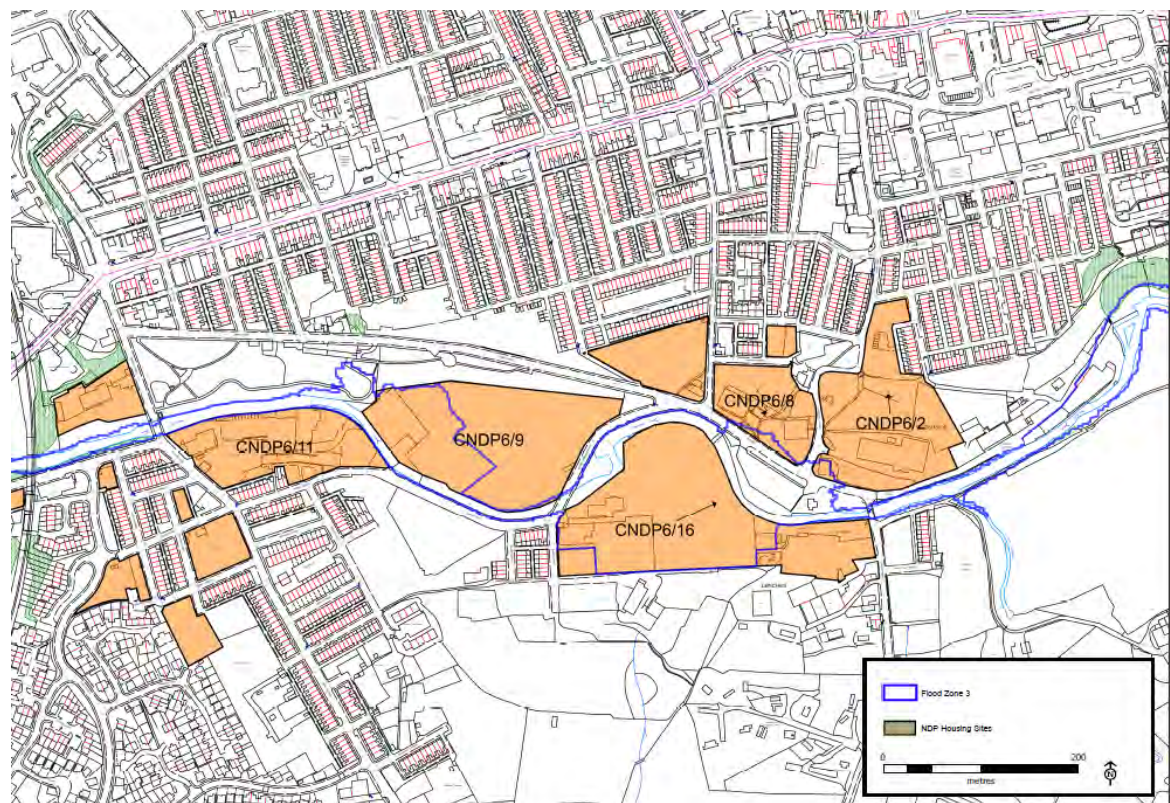
https://www.pendle.gov.uk/info/20072/planning_policies/275/development_plan_documents

1.2 The Sites

Colne Town Council have identified 5no sites for inclusion within the Neighbourhood Plan, which will be required to pass the Exceptions Test, as follows:

- CNDP6/2: Land east of Waterside Road (1.42Ha 43 units)
- CNDP6/8: Dam Side (0.76Ha 23 units)
- CNDP6/9: Walk Mill, Green Road (2.99Ha 101 units)
- CNDP6/11: Bridge Street Stoneyard (1.20Ha 36 units)
- CNDP6/16: Spring Gardens Mill (3.11Ha 207 units)

Figure 1.1: Exceptions Test - Colne Town Council Allocated Sites



Source: Colne Town Council

1.3 Report Structure

Section 2 of the report undertakes an appraisal of flood risk at each of the allocated sites; in order to ascertain the risk associated with various sources of flood risk and assist with preparation of the Exceptions Test.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Section 3 of the report describes the process for application of the Exceptions Test to each of the respective allocation sites listed above.

1.4 Data Sources

This assessment is based on desk-top study of information from the following sources:

- National Planning Policy Framework (Updated 2018)
- Planning Practice Guidance at www.gov.uk (Updated March 2019)
- Flood Map for Planning
- Long-Term Flood Maps
- Pendle Borough Council Local Plan Core Strategy
- Environment Agency Flood Model Data and Mapping
- Colne Town Council Draft Neighbourhood Plan
- LiDAR Data (DEFRA Data Services Platform)
- Flood Modeller Pro (Version 4.5)

2.0 Assessment of Flood Risk

2.1 General

2.1.1 Sources of Flooding

- **Rivers (fluvial):** Flooding occurs when flow within river channels exceeds capacity; and the type of flood event experienced e.g. flash flooding; depends upon the characteristics of the river catchment.
- **The Sea (tidal):** Flooding at low lying coastline and tidal estuaries is caused by storm surges and high tides; with overtopping and breach failure of sea defences possible during extreme storm events.
- **Pluvial (surface flooding or overland flows):** Heavy rainfall, which is unable to soak away via infiltration or enter drainage systems can flow overland, resulting in localised flooding. Topography generally influences the direction and depth of flooding caused by this mechanism.
- **Groundwater:** Caused when ground water levels rise to the surface; and is most likely to occur in low lying areas underlain by aquifers.
- **Sewers and drains:** Generally occurs in more urban areas; where sewers and drains are overwhelmed by heavy rainfall or blocked pipes and gullies.
- **Artificial Sources (reservoirs, canals, lakes and ponds):** Reservoir and canal flooding may occur as a result of capacity exceedance or structural failure.

2.1.2 Flood Zones

- **Flood Zone 1:** Low probability (less than 1 in 1000 year (<0.1% AEP) annual probability of river or sea flooding in any year).
- **Flood Zone 2:** Medium probability (between 1 in 100 year (1.0% AEP) and 1 in 1000 year (0.1% AEP) annual probability of river flooding; or between 1 in 200 year (0.2% AEP) and 1 in 1000 year (0.1% AEP) annual probability of sea flooding in any year).
- **Flood Zone 3a:** High probability (1 in 100 year (1.0% AEP) or greater annual probability of river flooding in any year or 1 in 200 year (0.5% AEP) or greater annual probability of sea flooding in any year).
- **Flood Zone 3b:** This zone comprises land where water has to flow or be stored in times of flood. Land which would flood with an annual probability of 1 in 20 (5% AEP), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

2.1.3 Vulnerability of Different Development Types

- **Essential Infrastructure:** Transport infrastructure (railways and motorways etc...); utility infrastructure (primary sub-stations, water treatment facilities; power stations; and wind turbines).
- **Water Compatible Development:** Flood control infrastructure; water and sewage infrastructure; navigation facilities.
- **Highly Vulnerable:** Emergency services; basement dwellings; mobile home parks; industrial or other facilities requiring hazardous substance consent.
- **More Vulnerable:** Hospitals; **residential dwellings**; educational facilities; landfill sites caravan and camping sites.
- **Less Vulnerable:** Commercial premises; emergency services not required during a flood; agricultural land.

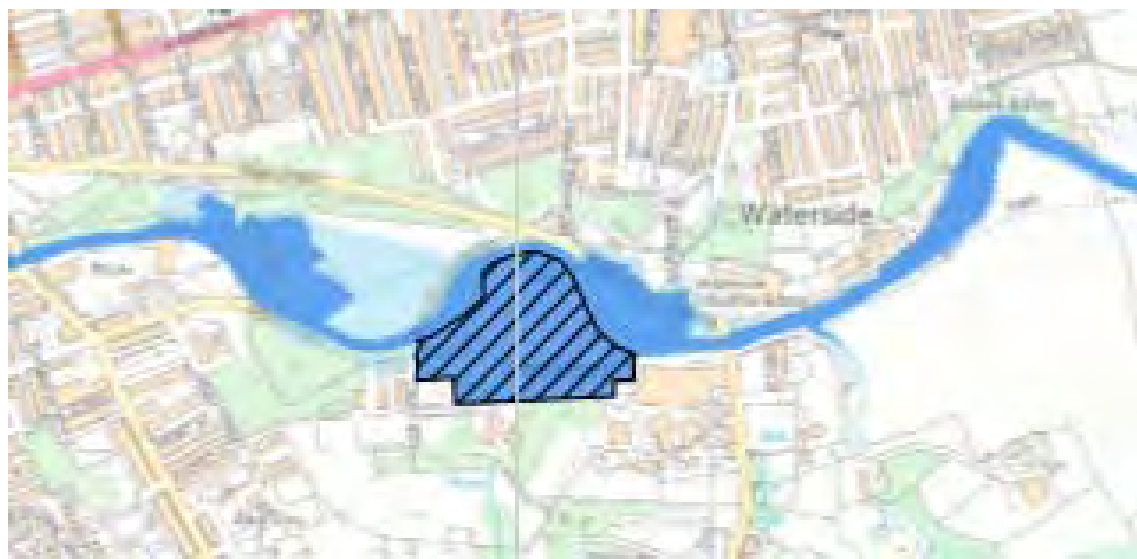
Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A




2.1.4 Flood Mapping (Fluvial)

Figure 2.1: The Environment Agency Flood Map



Source: www.environment-agency.gov.uk

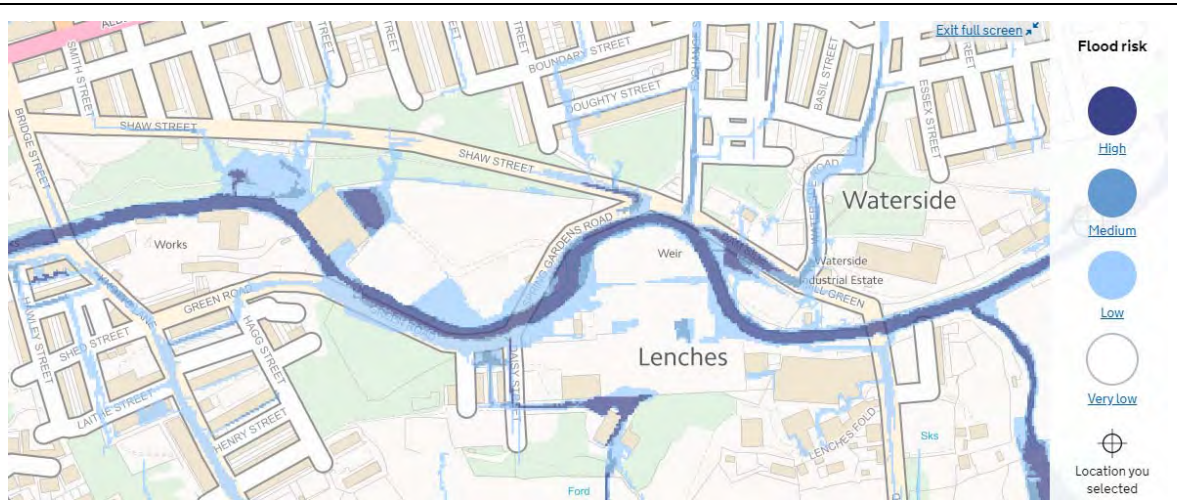
Key

	Flood Zone 2
	Flood Zone 3
	Area benefitting from flood defences

Source: Colne Water

2.1.5 Flood Mapping (Pluvial)

Figure 2.2: Surface Water Flood Map



Source: <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Source: Rainwater runoff; ponding and some out of bank flooding associated with Colne Water.

2.1.6 Climate Change

The National Planning Policy Framework (NPPF) sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. Table 1 shows anticipated changes in extreme rainfall intensity in small and urban catchments.

For flood risk assessments and strategic flood risk assessments, assess both the central and upper end allowances to understand the range of impact.

Residential development is usually designed with a lifetime approximating 100 years; and therefore 20% and 40% must be applied to peak rainfall intensities (see table 2).

Table 1: Peak Rainfall Intensity Allowances¹

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2069	Total potential change anticipated for 2070 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

The town of Colne is situated within the North-West River Basin.

For peak river flow allowances the Environment Agency guidance recommends a number of allowances based on the vulnerability of the site and the river basin it located within. Allowances for climate change within the appropriate river basin are shown within Table 2 below.

Table 2: North-West River Basin Peak River Flow Allowances²

River Basin District	Allowance Category	Total potential change anticipated for 2015 to 2039	Total potential change anticipated for 2040 to 2069	Total potential change anticipated for 2070 to 2115
North West	Upper End	20%	35%	70%
	Higher Central	20%	30%	35%
	Central	15%	25%	30%

When applying peak river flow allowances for flood risk assessments the flood zone and appropriate flood risk vulnerability classification should be consulted to decide which allowances applies to the development.

For more vulnerable development within Flood Zone 3a the higher central and upper end should be used to assess a range of allowances. As such 35% and 70% should be added to peak river flows to assess the impact of climate change at the development site.

¹ Extracted from Table 2 Guidance Flood Risk Assessments; climate change allowances (Available from: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)

² Extracted from Table 1 Guidance Flood Risk Assessments; climate change allowances (Available from: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

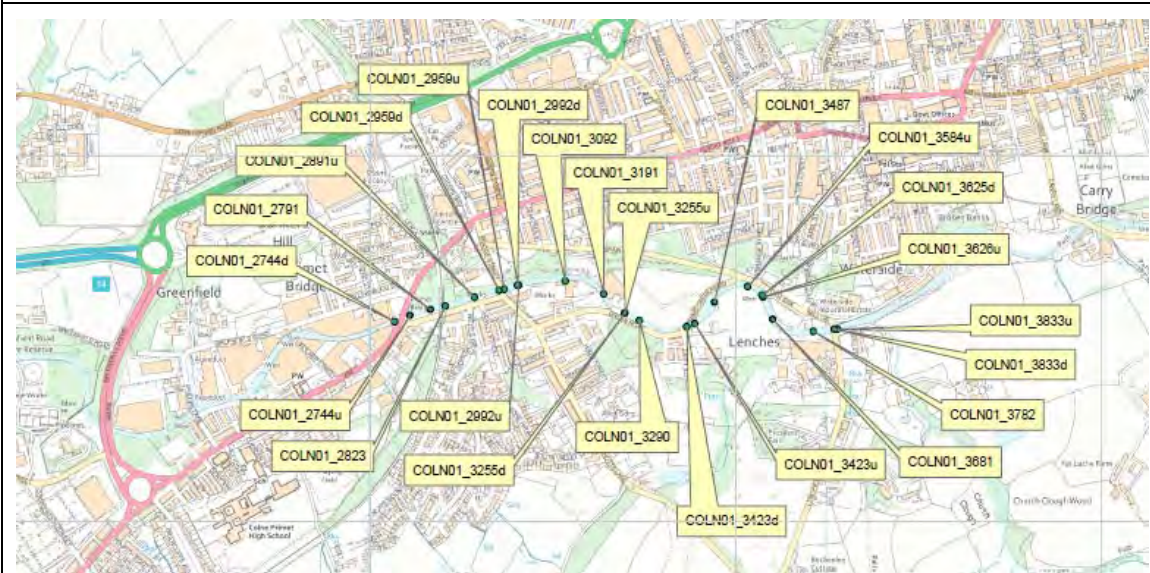
Report No: 2019-113 Revision A

2.2 Environment Agency Data

Data regarding modelled flood levels has within Colne Water has been received from the Environment Agency.

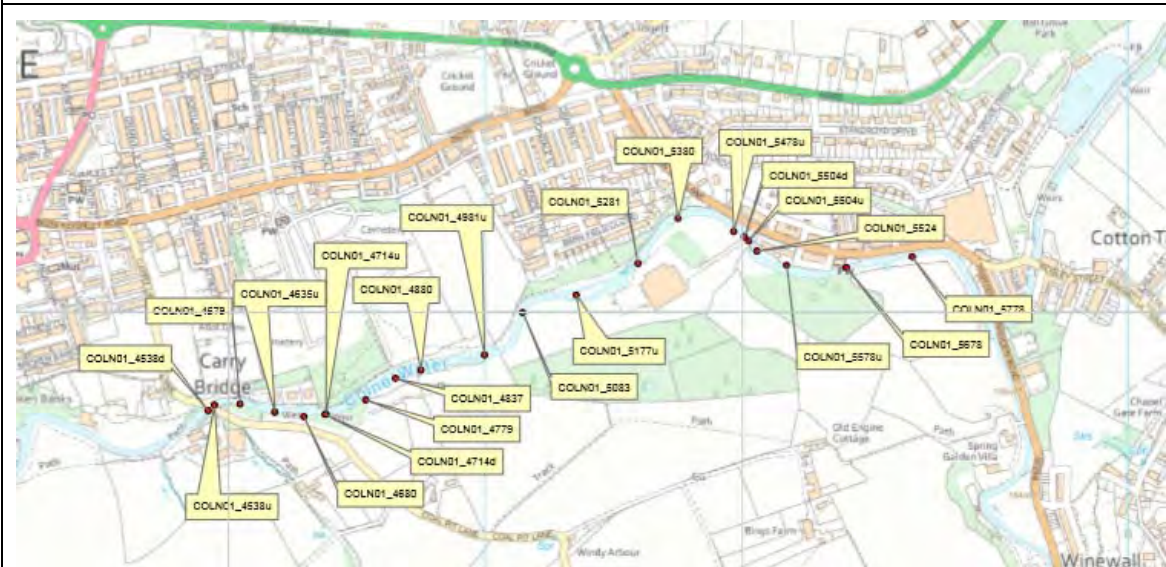
The data provided is extracted from the 2010 1D Colne Water Model; and provides flows and water levels for a range of return periods along the watercourse adjacent to the study sites.

Figure 2.3: EA Model Node Plan 1



Source: Environment Agency

Figure 2.4: EA Model Node Plan 2



Source: Environment Agency

The model data has been used to assess the flood risk at each of the sites; in order to apply the Exceptions Test.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.3 Site CNDP6/2 Land East of Waterside Road

2.3.1 Existing Use

Public open space; comprising small wooded area; and domestic garages to the rear of terraced housing on Essex Street, within the north half of the site; and commercial development currently occupied by a business named NP Structures; a polytunnel and PVC coated fabric building manufacturer and supplier; and the Lord Raglan public house.

The site is located to the north of Colne Water.

2.3.2 Recent Planning History

- **17/0655/FUL** - Northern Polytunnels, Mill Green, Colne (South)
 - Erection of an outbuilding to store HGV vehicles 12m x 20m and engineering operations to extend the service yard (part retrospective)
 - Approved with Conditions (March 2018)
- **18/0361/FUL** - Garage Site To The Rear Of 10 To 24 Essex Street (North)
 - Erection of 15 residential units including 9 dwelling houses and 6 apartments with 29 car parking spaces
 - Planning refused (October 2018)
- **18/0718/FUL** - Garage Site To The Rear Of 10 To 24 Essex Street (North)
 - Erection of 15 residential units including 9 dwelling houses and 6 apartments with 26 car parking spaces (resubmission).
 - Approved with Conditions (January 2019)

Figure 2.5: Aerial Photograph Site CNDP6/2 (1.42 Hectares)



Source: Google Earth

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.3.3 Initial Evaluation of Flood Risk

Table 3: CNDP6/2 Possible Flood Mechanisms

Source/Pathway	Significant?	Comment/Reason
Fluvial	Yes	Colne Water
Canal	No	No canals in the vicinity of the development site
Tidal/Coastal	No	Site is considered to be remote from tidal influence
Reservoir	No	EA Map shows that the site is within an area which could flood in the event of reservoir failure; however, the likelihood of occurrence is considered to be low.
Pluvial: Management of Surface Water Runoff	Yes	Site area exceeds 0.5Ha and therefore the sustainable management of surface water runoff is a major consideration.
Pluvial: Surface Water Flooding; Overland Flows & Ponding	Yes	EA Surface Water Flood Maps indicates the site is at low risk of surface water flooding; however, there is some flood risk from this source within Waterside Road; Dam Side and Mill Green which will require some consideration
Groundwater	No	SFRA indicates the risk from groundwater flooding overall within the Borough is low.
Infrastructure Failure	Yes	Stone arch bridge at Mill Green – blockage could increase flood risk associated with Colne Water

2.3.4 Topography

Site-specific survey is not available; and therefore, LiDAR data extracted from the DEFRA Data Services Platform has been used to understand ground levels across the site.

The Ground generally falls steeply southwards across the site; with a level approximating 167.00mAOD at the north corner and 139.37mAOD in the south west corner of the NP Structures site, adjacent to the highway; and 139.25mAOD at the south-west corner of the public house site.

Within the area which accommodates existing commercial development, the building footprint appears to be located on a plateau, with a yard level approximating 141.50mAOD. In contrast the pub is located at street level, i.e. 139.250mAOD.

The highway at the junction of Mill Street, Waterside Road and Dam Side is 138.670mAOD, rising along Waterside Road to the access into NP Structures which is at a level of 139.720mAOD. The highway continues to rise and achieves a level of 157.080mAOD at the junction with Zion Street and the south end of Colne Lane, which in turn rises to a level approximating 163.94mAOD at the junction with Bold Street.

The aerial photograph provided overleaf (Figure 2.6) provides a 'birds eye' view of the site, viewed to the west, and illustrating the general topography across the site.

2.3.5 Fluvial Flood Risk

Flood Source: Colne Water

The general flood map (Figure 2.1) illustrates that only the south west corner of the site; along with the highway at Mill Green and Dam Side likely to be impacted by flooding associated with Colne Water.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Modelled Flood Levels:

- Nearest Flood Node: COLN01_3782
- Worst-case model scenario: defended
- 1 in 5-year flood level: 139.2mAOD
- 1 in 10-year flood level: 139.26mAOD
- 1 in 25-year flood level: 139.61mAOD
- 1 in 50-year flood level: 139.75mAOD
- 1 in 100-year flood level: 139.88mAOD
- 1 in 100-year + 20% climate change flood level: 140.04mAOD
- 1 in 1000-year flood level: 140.42mAOD

Latest climate change allowances are for an increase in fluvial flow of 35% & 70% for the north-west river basin. Assuming linear relationship between flow and water level for assessment purposes, the flood levels for the climate change scenarios are estimated to be:

- 1 in 100-year + 35% climate change: 140.089mAOD
- 1 in 100-year + 70% climate change: 140.299mAOD

Figure 2.6: Aerial Photograph Viewed West of Site CNDP6/2



Source: Bing Maps

Flood Defences: No formal flood defences noted at this location.

Flood Mechanism: Overtopping

Undertaking a direct comparison of levels, it is noted that the Lowest LiDAR level at the site is 139.25mAOD (south-west corner of the Lord Raglan Public House); which is lower than the predicted 1 in 10-year flood level within the River Colne at this location.

The development plateau within the NP Structures site is considered to be elevated above the extreme 1 in 1000-year flood event; and therefore, is considered to have a low flood risk.

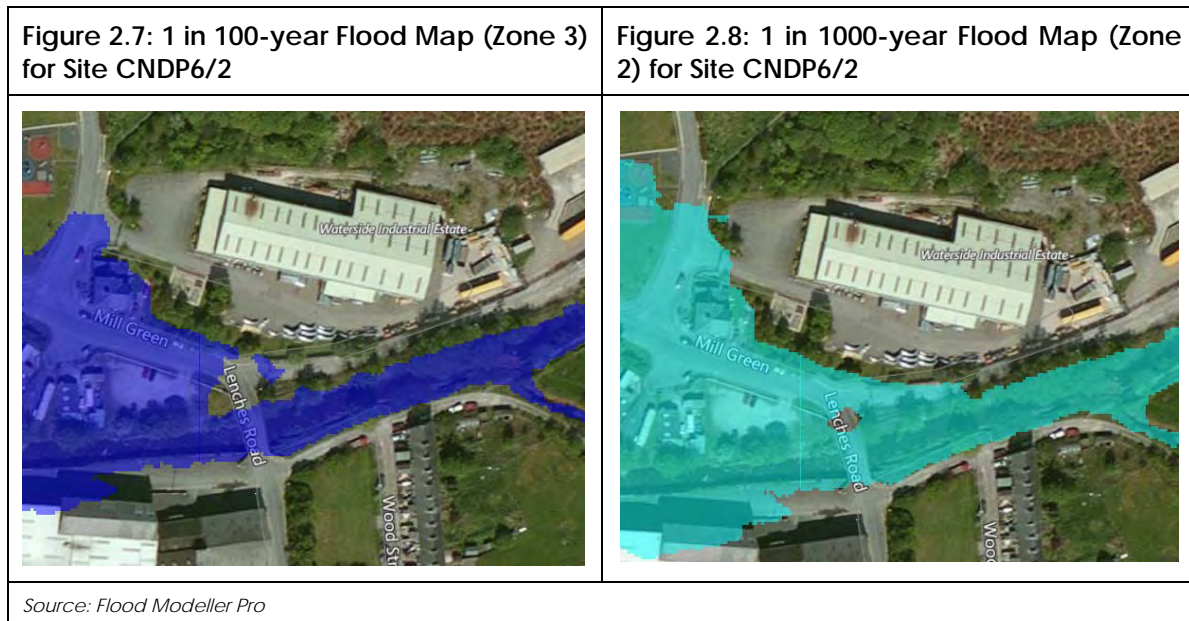
The existing site access within the south part of the allocation site, onto Waterside Street is shown to be potentially impacted by flooding.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Flood risk across site CNDP6/2 is considered to be predominantly low for much of the site; with the exception of the exiting site access onto Waterside Road; and the Lord Raglan Pub Site.



Infrastructure Failure: A blockage at the stone arch bridge across Colne Water is likely to have the impact of raising water levels on the upstream side of the bridge. Given the topography of the area surrounding the bridge crossing; it is considered that any increase to flood risk will be local as there is scope for water to return to the watercourse channel on the downstream side of the bridge.

The detrimental impact to the site, resulting from infrastructure failure is therefore considered to be low.

2.3.6 Pluvial: Management of Surface Water Runoff

Application of the management hierarchy prescribed within the NPPF; Building Regulations Approved Document H; Sustainable Drainage Systems: Non-Statutory Technical Standards; and CIRIA C753 The SUDS Manual; must be applied, where surface water runoff from development is discharged to the following (in order of preference):

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Feasibility for Infiltration:

The ground typically within the area containing the site is comprised of Devensian Till over Sandstone at shallow depths; and therefore the infiltration capability of the ground under the site is likely to be limited.

In conjunction with a relatively steeply sloping site; it is considered that using infiltration methods alone to manage surface water runoff, will be difficult to achieve.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

It is recommended that percolation testing is undertaken at the site in accordance with BRE Digest 365 in order to inform the suitability of infiltration methods to provide partial infiltration of runoff from any new development proposed at the site. This should be undertaken by prospective Developer's at the planning stage.

Infiltration will be subject to identification of any contamination issues on-site.

Discharge to Watercourse:

Colne Water is located close to the south boundary of the site; and therefore, it is considered that a large proportion of surface water runoff from development at this site should be directed to watercourse; utilizing existing outfalls where possible.

Design Constraints:

- Discharge to a watercourse must be restricted to the estimated mean Greenfield runoff rate (QBAR) by means of a controlled outflow (or restricted to provide a betterment to existing runoff rates for brownfield sites).
- Existing runoff rates (greenfield or brownfield) can be derived from a variety of recognised modelling/calculation methods, which can be completed through software or more traditional methods.
- Any design for on-site attenuation of surface water runoff are preferred to be in an 'open' form such as ponds, rather than underground tanks in order to facilitate a sustainable approach to surface water management; however careful design must ensure that displacement of floodwater does not increase flood risk for others.
- Attenuation must be provided, and calculated for the restricted runoff, for flood events up to and including the 1 in 100 year (+ 40% allowance for climate change) critical storm.
- Considering only impermeable areas can mean that runoff from permeable areas when the ground is saturated, particularly on steeply graded sites, can cause a system to have insufficient capacity; therefore, consideration should be given to the site as a whole.

2.3.7 Pluvial: Surface Water Flooding; Overland Flows; and Ponding

Pluvial flooding refers to flooding events that are caused by extreme rainfall.

Such floods occur when the ground cannot absorb rainwater effectively or urban drainage systems are overwhelmed by excessive water flow.

Pluvial flooding also occurs when the ground is saturated by melting snow and consequent low permeability.

Floods caused by extreme rain events are an increasing problem for cities worldwide. Dense urban developments, as well as a fast-changing climate are stress factors which intensify the issue of pluvial flooding.

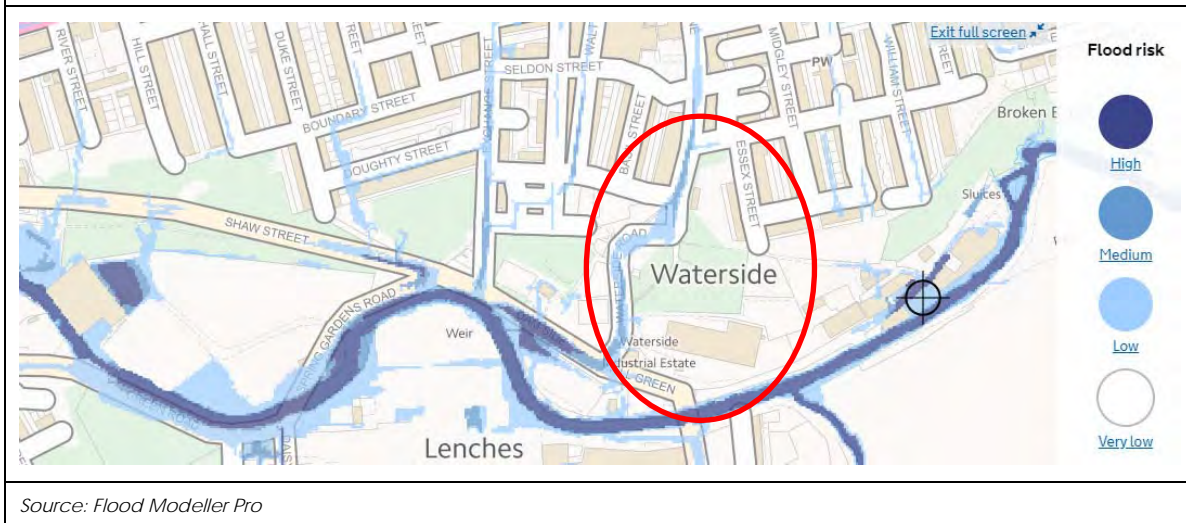
For site CNDP6/2; surface water flood mapping indicates that there is a high risk of surface water flooding at Dam Side, which is in close proximity; however, the land within the site boundary is considered overall to have a low risk of flooding from this source.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Figure 2.9: Surface Water Flood Map for Site CNDP6/2



2.3.8 Mitigation Measures

- Development proposals should be prepared using a Sequential approach with 'more vulnerable' housing located within the areas of the site with the lowest flood risk i.e. within Flood Zone 1.
- 'Less vulnerable' or 'water compatible' site uses such as public open space should be considered to placement within the areas of the site here flood risk is considered to be highest.
- Finished Floor Levels for habitable accommodation should be set at a minimum of 0.6m above the 1 in 100-year + 70% climate change flood level within Colne Water i.e. a minimum level of 140.899mAOD.
- Alternative or emergency access/egress route, which is considered to remain safe and dry at all times should be provided to Essex Street.

2.4 CNDP6/8: Dam Side

2.4.1 Existing Use

Public open space located between Exchange Street and Waterside Road; with a small wooded area located in the northern part of the site; and open grass area comprising a children's play area; Youth Hub; and basketball court.

The site is located to the north of Colne Water.

2.4.2 Recent Planning History

No planning history at the site within the last 5 years.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Figure 2.10: Aerial Photograph Site CNDP6/8 (1.42 Hectares)



Source: Google Earth

2.4.3 Initial Evaluation of Flood Risk

Table 4: CNDP6/8 Possible Flood Mechanisms

Source/Pathway	Significant?	Comment/Reason
Fluvial	Yes	Colne Water
Canal	No	No canals in the vicinity of the development site
Tidal/Coastal	No	Site is considered to be remote from tidal influence
Reservoir	No	EA Map shows that the site is within an area which could flood in the event of reservoir failure; however, the likelihood of occurrence is considered to be low.
Pluvial: Management of Surface Water Runoff	Yes	Site area exceeds 0.5Ha and therefore the sustainable management of surface water runoff is a major consideration.
Pluvial: Surface Water Flooding; Overland Flows & Ponding	Yes	EA Surface Water Flood Maps indicates the site is at low risk of surface water flooding; however, there is some flood risk from this source within Waterside Road; Dam Side and Exchange Street which will require some consideration
Groundwater	No	SFRA indicates the risk from groundwater flooding overall within the Borough is low.
Infrastructure Failure	No	No infrastructure such as bridges or culverts in close proximity to the site.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.4.4 Topography

Site-specific survey is not available; and therefore, LiDAR data extracted from the DEFRA Data Services Platform has been used to understand ground levels across the site.

The ground level along the north boundary of the site rises from 146.83m AOD in the north-west corner at the junction of Fountain Street with Exchange Street; to 148.78m AOD at the north-east corner.

Land falls steeply southwards through the small wooded area; with an approximate level of 140.25m AOD at the basketball court; and 140.120m AOD at the children's play area, respectively located within the west and east parts of the site.

The south boundary adjacent to Dam Side ranges between 139.15m AOD (west) and 139.16m AOD (east); with a low point approximating 138.48m AOD near to the centre of the south boundary.

The aerial photograph provided below (Figure 2.11) provides a 'birds eye' view of the site, illustrating the general topography across the site.

Figure 2.11: Aerial Photograph Viewed East of Site CNDP6/8



Source: Bing Maps

2.4.5 Fluvial Flood Risk

Flood Source: Colne Water

The general flood map illustrates that only the south west corner of the site; along with the highway at Mill Green and Dam Side likely to be impacted by flooding associated with Colne Water.

Modelled Flood Levels:

- Nearest Flood Node: COLN01_3681
- Worst-case model scenario: defended
- 1 in 5-year flood level: 138.68m AOD

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- 1 in 10-year flood level: 138.86mAOD
- 1 in 25-year flood level: 139.12mAOD
- 1 in 50-year flood level: 139.33mAOD
- 1 in 100-year flood level: 139.54mAOD
- 1 in 100-year + 20% climate change flood level: 139.75mAOD
- 1 in 1000-year flood level: 140.17mAOD

Latest climate change allowances are for an increase in fluvial flow of 35% & 70% for the north-west river basin. Assuming linear relationship between flow and water level for assessment purposes, the flood levels for the climate change scenarios are estimated to be:

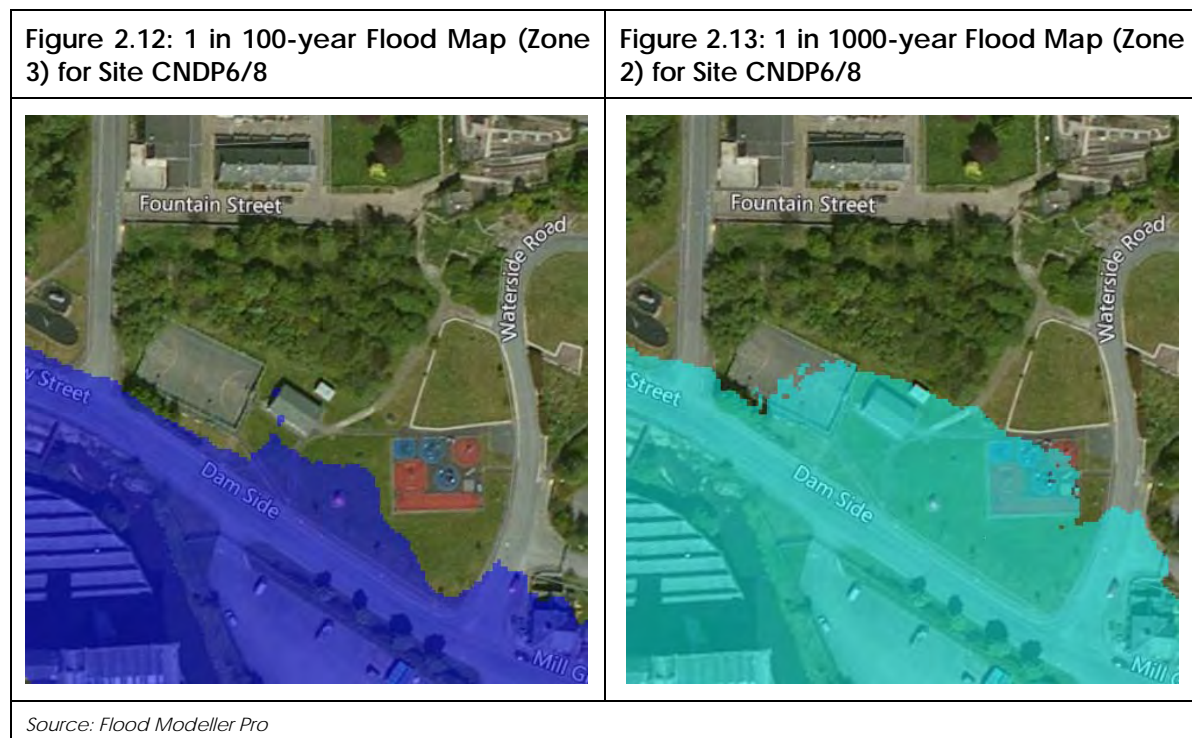
- 1 in 100-year + 35% climate change: 139.832mAOD
- 1 in 100-year + 70% climate change: 140.123mAOD

Flood Defences: No formal flood defences noted at this location.

Flood Mechanism: Overtopping

Undertaking a direct comparison of levels, it is noted that the Lowest LiDAR level at the site is 138.48mAOD, along the south site boundary, where flood water is liable to encroach during the 1 in 5-year flood event.

It is considered that the basketball court and playground areas are elevated above the flood extent achievable during the 1 in 1000-year event.



2.4.6 Pluvial: Management of Surface Water Runoff

Application of the management hierarchy prescribed within the NPPF; Building Regulations Approved Document H; Sustainable Drainage Systems: Non-Statutory Technical Standards; and CIRIA C753 The SUDS Manual; must be applied, where surface water runoff from development is discharged to the following (in order of preference):

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Feasibility for Infiltration:

The ground typically within the area containing the site is comprised of Devensian Till over Sandstone at shallow depths; and therefore the infiltration capability of the ground under the site is likely to be limited.

It is recommended that percolation testing is undertaken at the site in accordance with BRE Digest 365 in order to inform the suitability of infiltration methods to provide partial infiltration of runoff from any new development proposed at the site. This should be undertaken by prospective Developer's at the planning stage.

Infiltration will be subject to identification of any contamination issues on-site.

Discharge to Watercourse:

Colne Water is located close to the south boundary of the site; and therefore, it is considered that a large proportion of surface water runoff from development at this site should be directed to watercourse; re-utilizing existing outfalls where possible.

Design Constraints:

- Discharge to a watercourse must be restricted to the estimated mean Greenfield runoff rate (QBAR) by means of a controlled outflow (or restricted to provide a betterment of existing runoff rates for brownfield sites).
- This can be derived from a variety of recognised modelling/calculation methods, which can be completed through software or more traditional methods.
- Any design for on-site attenuation of surface water runoff are preferred to be in an 'open' form such as ponds, rather than underground tanks in order to facilitate a sustainable approach to surface water management; however careful design must ensure that displacement of floodwater does not increase flood risk for others.
- Attenuation must be provided, and calculated for the restricted runoff, for flood events up to and including the 1 in 100 year (+ 40% allowance for climate change) critical storm.
- Considering only impermeable areas can mean that runoff from permeable areas when the ground is saturated can cause a system to have insufficient capacity.

2.4.7 Pluvial: Surface Water Flooding; Overland Flows; and Ponding

Pluvial flooding refers to flooding events that are caused by extreme rainfall.

Such floods occur when the ground cannot absorb rainwater effectively or urban drainage systems are overwhelmed by excessive water flow.

Pluvial flooding also occurs when the ground is saturated by melting snow and consequent low permeability.

Floods caused by extreme rain events are an increasing problem for cities worldwide. Dense urban developments, as well as a fast-changing climate are stress factors which intensify the issue of pluvial flooding.

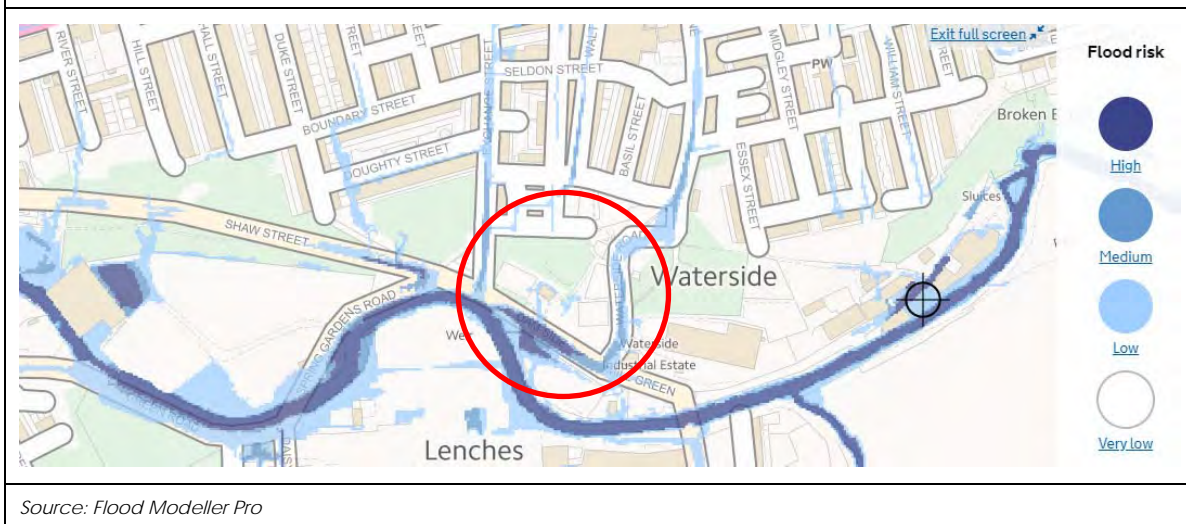
Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

For site CNDP6/8; surface water flood mapping indicates that there is a high risk of surface water flooding at Dam Side, along the south boundary of the site; however, the land within the site boundary is considered overall to have a low risk of flooding from this source.

Figure 2.14: Surface Water Flood Map for Site CNDP6/8



2.4.8 Mitigation Measures

- Development proposals should be prepared using a Sequential approach with 'more vulnerable' housing located within the areas of the site with the lowest flood risk i.e. within Flood Zone 1.
- 'Less vulnerable' or 'water compatible' site uses such as public open space should be considered to placement within the areas of the site here flood risk is considered to be highest.
- Finished Floor Levels for habitable accommodation should be set at a minimum of 0.6m above the 1 in 100-year + 70% climate change flood level within Colne Water i.e. 140.77mAOD.
- Alternative or emergency access/egress route, which is considered to remain safe and dry at all times should be provided to either Waterside Road or Exchange Street, outside of Flood Zone 3.

2.5 Site CNDP6/9 Walk Mill, Green Road

2.5.1 Existing Use

Existing commercial space, accommodated by NP Structures LTD, and comprises a large warehouse type building located within the west part of the site and open storage covering the central and east areas of the site. Gated access is available from Spring Gardens Road on the east boundary; and also, at the south-west corner from Green Road. A number of trees provide a buffer between the site and Shaw street to the north.

The site is located to the north side of Colne Water.

2.5.2 Recent Planning History

- **19/.539/FUL** - Land to The West of Spring Gardens Road Colne Lancashire

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- o Full: Erection of steel and fabric storage building (874 SQMs), laying of concrete roadway and loading area and formation of open yard storage. |
- o Approved with Conditions (December 2018)

Figure 2.15: Aerial Photograph Site CNDP6/9 (2.99 Hectares)



Source: Google Earth

2.5.3 Initial Evaluation of Flood Risk

Table 5: CNDP6/9 Possible Flood Mechanisms

Source/Pathway	Significant?	Comment/Reason
Fluvial	Yes	Colne Water
Canal	No	No canals in the vicinity of the development site
Tidal/Coastal	No	Site is considered to be remote from tidal influence
Reservoir	No	EA Map shows that the site is within an area which could flood in the event of reservoir failure; however, the likelihood of occurrence is considered to be low.
Pluvial: Management of Surface Water Runoff	Yes	Site area exceeds 0.5Ha and therefore the sustainable management of surface water runoff is a major consideration.
Pluvial: Surface Water Flooding; Overland Flows & Ponding	Yes	EA Surface Water Flood Maps indicates the site overall is at low risk of surface water flooding; however, there is some flood risk from this source with a flow route from north of Shaw Street, creating ponding on-site.
Groundwater	No	SFRA indicates the risk from groundwater flooding overall within the Borough is low.
Infrastructure Failure	Yes	Bridge at Spring Gardens Road & site access to NP Structures site at Green Road

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.5.4 Topography

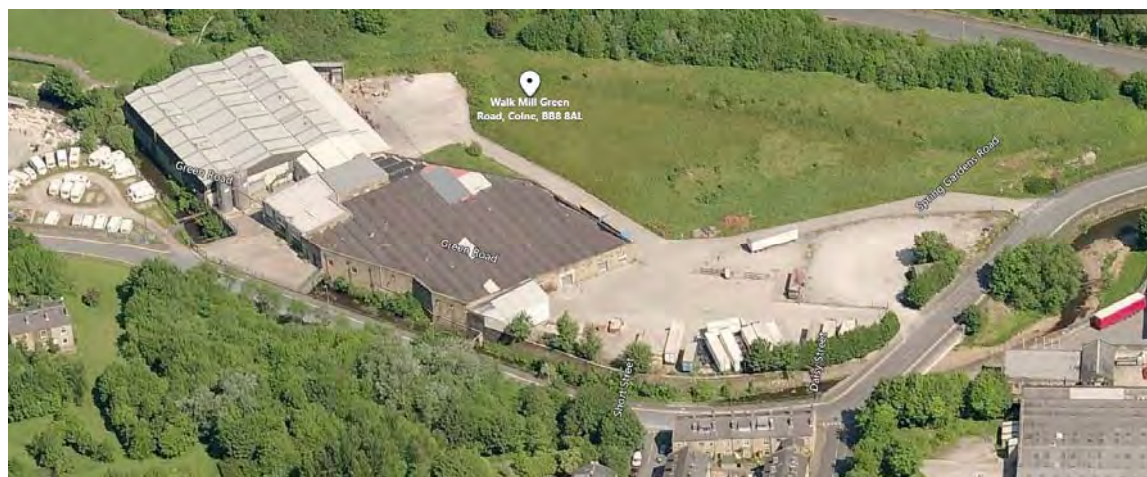
A site-specific survey was undertaken to inform the recent planning application at the site; and checked against LiDAR data, which has been used to inform the assessment.

The site is relatively flat in nature, with higher ground located within the north-east and along the north boundary of the site.

Relevant ground levels across the site are listed below for reference:

- North-east corner - 139.00mAOD
- Existing site access (north) on Spring Gardens Road – 137.40mAOD
- Existing site access (south) on Spring Gardens Road – 136.5mAOD
- South-east boundary (river bank) – 136.70mAOD
- South-west boundary (river bank upstream of culvert) – 136.80mAOD
- South-west boundary (river bank upstream of culvert) – 134.63mAOD
- North-west corner – 133.60mAOD

Figure 2.16: Aerial Photograph Viewed West of Site CNDP6/9



Source: Bing Maps

2.5.5 Fluvial Flood Risk

Flood Source: Colne Water

The general flood map illustrates that the west part of the site is liable to flooding during the 1 in 100-year flood event; with most of the site impacted during the 1 in 1000-year flood event.

Modelled Flood Levels:

The south and east boundaries of the site are in close proximity with Colne Water; and as a consequence, there are a number of modelled nodes adjacent to the site.

For ease of reference, the flood levels associated with each of these nodes is tabulated below.

Latest climate change allowances are for an increase in fluvial flow of 35% & 70% for the north-west river basin. Assuming linear relationship between flow and water level for assessment

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

purposes, the flood levels for the climate change scenarios have been estimated and included within the table overleaf.

Table 6: CNDP6/9 Modelled Flood Levels

Node Ref	COLN01_3487	COLN01_3290	COLN01_3255u	COLN01_3255d	COLN01_3191
Return Period					
1 in 5-year	134.84	133.98	133.83	133.82	133.35
1 in 10-year	135.12	134.18	134.04	134.04	133.51
1 in 25-year	135.66	134.49	134.40	134.31	133.72
1 in 50-year	136.29	134.87	134.84	134.53	133.91
1 in 100-year	136.88	135.49	135.50	134.78	134.14
1 in 100-year + 20% CC	137.15	136.33	136.35	135.09	134.41
1 in 100-year + 35% CC	137.74	136.85	136.86	135.43	134.79
1 in 100-year + 70% CC	138.32	137.37	137.37	135.77	135.16
1 in 1000-year	138.15	137.71	137.71	135.99	135.40

Flood Defences: No formal flood defences noted at this location.

Flood Mechanism: Overtopping

COLN01_3487: Access into the site off Spring Gardens Road approximates 137.40mAOD; which is elevated above the 1 in 100-year + 20% climate change flood event within Colne Water; however is lower than the predicted food levels for the 1 in 100-year + 35% and 70% climate change events; and also the extreme 1 in 1000-year event. This confirms that the east part of the site is located outside of Flood Zone 3; but within Flood Zone 2; and concurs with current flood mapping.

COLN01_3290: Top of bank level adjacent to this river model node is 136.95mAOD; which is elevated above the predicted water levels for Colne Water up to and including the 1 in 100-year + 35% climate change flood event. Overtopping of the bank is anticipated to occur however for the 1 in 100-year + 70% climate change and extreme 1 in 1000-year flood events. This again matches expectations from the latest flood maps.

COLN01_3255u: Modelled flood water levels are provided both upstream and downstream of the bridge crossing, which provides access into the NP Structures site from Spring Gardens/Green Road at the south west boundary. The bank top level at upstream side of the bridge is 136.80mAOD; and sufficiently raised to prevent overtopping occurring for flood events up to and including the 1 in 100-year + 20% climate change event. Inundation however is considered to be likely for the 1 in 100-year + 35% and 70% climate change; and 1 in 1000-year events; rendering the site at this location to be located within Flood Zone 2; and outside of Flood Zone 3.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Figure 2.17: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/9



Source: Flood Modeller Pro

Figure 2.18: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/9



Source: Flood Modeller Pro

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

COLN01_3255d: Downstream of the bridge, the river wall has a crest level of 136.59mAOD, with ground to the rear a level of 134.63mAOD. The wall is not a flood defence; and therefore, flooding of the site is anticipated for the 1 in 100-year to 1 in 1000-year events. This places the west part of the site; including the existing building within Flood Zone 3; and is therefore considered to have a high risk from fluvial flood sources.

COLN01_3191: The south-west face of an existing commercial building forms the river wall at the location of this river model node. It is understood that the threshold level; and hence the finished floor level of the existing building approximates 133.85mAOD; which is lower than the 1 in 50-year flood level. The ground level on the river bank at the rear of the building is 133.82mAOD; and therefore, overtopping is considered to be likely; and again, places the west part of the site within Flood Zone 3; and confirms current flood mapping.

It is identified that there is also the risk of flooding at the existing site via breach through the building wall.

Infrastructure Failure: There are 2 no in-channel structures, which could, if blocked, impede flow within the watercourse channel and increase flooding at the site. Both are single span structures; with wide openings but low heights; and accumulation of debris within the channel could result in a blockage at either structure. This is likely to have the impact of raising water levels within the channel upstream of the blockage location; increasing the risk of flooding at the site; however the risk is likely to be localised to the areas of the structures, as there is opportunity for flood water to re-enter the channel on the downstream side of each bridge.

2.5.6 Pluvial: Management of Surface Water Runoff

Application of the management hierarchy prescribed within the NPPF; Building Regulations Approved Document H; Sustainable Drainage Systems: Non-Statutory Technical Standards; and CIRIA C753 The SUDS Manual; must be applied, where surface water runoff from development is discharged to the following (in order of preference):

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Feasibility for Infiltration:

The ground typically within the area containing the site is comprised of Alluvium over Sandstone at shallow depths; and therefore, the infiltration capability of the ground under the site is likely to be limited.

Similar to other site along Colne Water it is considered that using infiltration methods alone to manage surface water runoff, will be difficult to achieve.

It is recommended that percolation testing is undertaken at the site in accordance with BRE Digest 365 in order to inform the suitability of infiltration methods to provide partial infiltration of runoff from any new development proposed at the site. This should be undertaken by prospective Developer's at the planning stage.

Infiltration will be subject to identification of any contamination issues on-site.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Discharge to Watercourse:

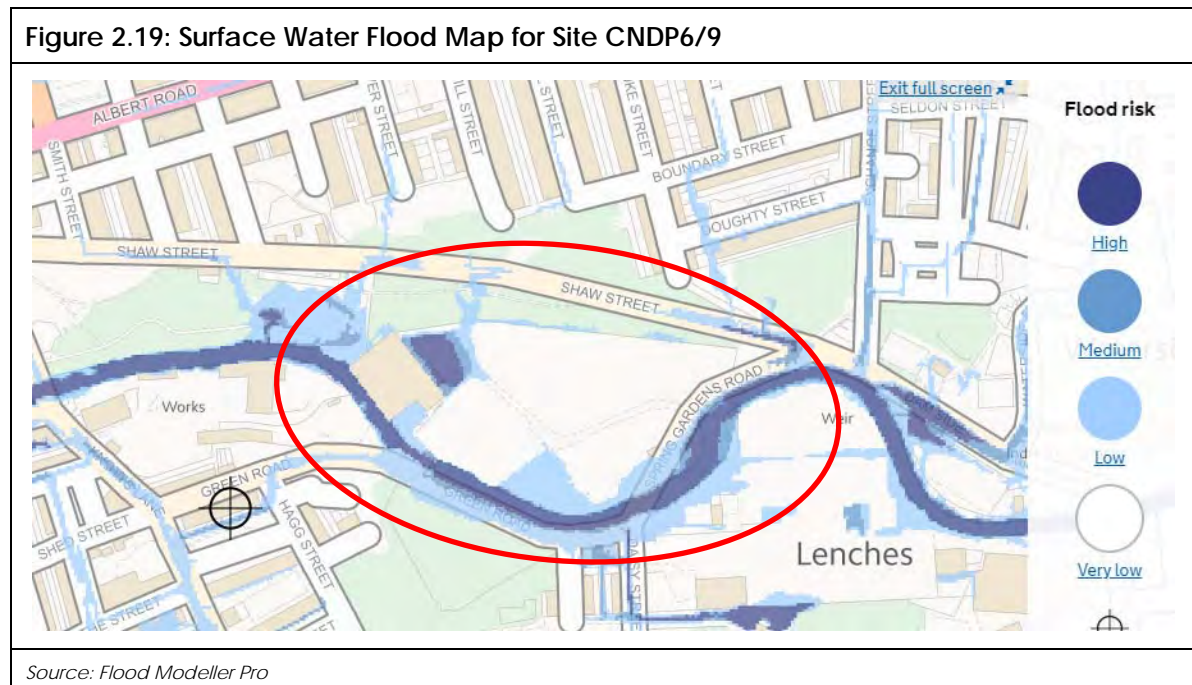
Colne Water is located close to the south boundary of the site; and therefore, it is considered that a large proportion of surface water runoff from development at this site should be directed to watercourse; reutilizing existing outfalls where possible.

Design Constraints:

- Discharge to a watercourse must be restricted to the estimated mean Greenfield runoff rate (QBAR) by means of a controlled outflow (or restricted to provide a betterment of existing runoff rates for brownfield sites).
- This can be derived from a variety of recognised modelling/calculation methods, which can be completed through software or more traditional methods.
- Any design for on-site attenuation of surface water runoff are preferred to be in an 'open' form such as ponds, rather than underground tanks in order to facilitate a sustainable approach to surface water management; however careful design must ensure that displacement of floodwater does not increase flood risk for others.
- Attenuation must be provided, and calculated for the restricted runoff, for flood events up to and including the 1 in 100 year (+ 40% allowance for climate change) critical storm.
- Considering only impermeable areas can mean that runoff from permeable areas when the ground is saturated can cause a system to have insufficient capacity.

2.5.7 Pluvial: Surface Water Flooding; Overland Flows; and Ponding

Pluvial flooding refers to flooding events that are caused by extreme rainfall.



Such floods occur when the ground cannot absorb rainwater effectively or urban drainage systems are overwhelmed by excessive water flow.

Pluvial flooding also occurs when the ground is saturated by melting snow and consequent low permeability.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Floods caused by extreme rain events are an increasing problem for cities worldwide. Dense urban developments, as well as a fast-changing climate are stress factors which intensify the issue of pluvial flooding.

For site CNDP6/9; surface water flood mapping indicates that there is a high risk of surface water flooding on the north-east side of the existing commercial building, which is considered to be from ponding within an area which is characterised by low-lying ground. The flow routes creating the ponded area appear to originate to the north of Shaw Street; and therefore, any re-development works at the site to provide housing, will need to accommodate the flow route.

2.5.8 Mitigation Measures

- Development proposals should be prepared using a Sequential approach with 'more vulnerable' housing located within the areas of the site with the lowest flood risk i.e. within Flood Zone 1.
- Minimum easement of 8m from the river bank should be provided.
- 'Less vulnerable' or 'water compatible' site uses such as public open space should be considered to placement within the areas of the site here flood risk is considered to be highest.
- Finished Floor Levels for habitable accommodation should be set at a minimum of 0.6m above the 1 in 100-year + 70% climate change flood levels within Colne Water.
- Development should be designed to ensure that surface water flood routes are accommodated and flow is not impeded; which could increase flood risk at the site or for others elsewhere.
- Dry access and egress from the site cannot be guaranteed at all times; and a safe route should be made available for people to Shaw Street, which is located within Flood Zone 1.

2.6 Site CNDP6/11 Bridge Street Stoneyard

2.6.1 Existing Use

Commercial/Industrial use, site is occupied by Venchem, a company that manufactures chemicals; and Bridge St Stone, a business that imports and sells stone and building products.

There are a number of commercial buildings across the site and large areas of open storage.

Access into the Venchem area of the site is available at the south-east corner from Green Road; and access into the Bridge St Stone site is from Bridge Street along the east boundary of the site.

The site is located immediately adjacent to the south river bank associated with Colne Water; and the bank is formed by a river wall, which extends above ground levels within the site. It is noted that the wall is not considered to be a formal flood defence structure.

2.6.2 Recent Planning History

- 19/0649/FUL- Venchem Ltd Green Road Colne Lancashire
 - Full: Erection of B1 Industrial Unit (225 sq.m)
 - Approved with Conditions (November 2019)

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Figure 2.20: Aerial Photograph Site CNDP6/11 (1.20 Hectares)



Source: Google Earth

2.6.3 Initial Evaluation of Flood Risk

Table 7: CNDP6/11 Possible Flood Mechanisms

Source/Pathway	Significant?	Comment/Reason
Fluvial	Yes	Colne Water
Canal	No	No canals in the vicinity of the development site
Tidal/Coastal	No	Site is considered to be remote from tidal influence
Reservoir	No	EA Map shows that the site is within an area which could flood in the event of reservoir failure; however, the likelihood of occurrence is considered to be low.
Pluvial: Management of Surface Water Runoff	Yes	Site area exceeds 0.5Ha and therefore the sustainable management of surface water runoff is a major consideration.
Pluvial: Surface Water Flooding; Overland Flows & Ponding	Yes	EA Surface Water Flood Maps indicates the site is at low risk of surface water flooding; however, there is some flood risk from this source within Green Street & Knotts Lane which will require some consideration
Groundwater	No	SFRA indicates the risk from groundwater flooding overall within the Borough is low.
Infrastructure Failure	Yes	Stone arch bridge at Bridge Street – blockage could increase flood risk associated with Colne Water

2.6.4 Topography

Site-specific survey is not available; and therefore, LiDAR data extracted from the DEFRA Data Services Platform has been used to understand ground levels across the site.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

The site in general is considered to have a split-level arrangement, with the level of the informal access route through the site indicated as 135.2mAOD in the north half of the site, rising to 138.5mAOD on the access route in the south part of the site.

Access in to the Venchem site at the south-east corner has a level approximating 137.00mAOD; and is 137.90mAOD at the access leading from Bridge Street/Knotts Lane.

Ground levels at the north-west corner of the site are found to be 136.4mAOD; and similar levels are found at the north-east corner i.e. 136.02mAOD. Levels are shown to rise moving southwards, with a high point of 139.06mAOD identified to be at the south-west corner.

The aerial photograph provided overleaf (Figure 2.21) provides a 'birds eye' view of the site, illustrating the general topography across the site.

Figure 2.21: Aerial Photograph Viewed South of Site CNDP6/11



Source: Bing Maps

2.6.5 Fluvial Flood Risk

Flood Source: Colne Water

The general flood map illustrates that flooding is only likely to encroach marginally within the site; with a large proportion located within Flood Zone 1; and therefore, has a low risk of flooding from fluvial sources i.e. Colne Water.

Modelled Flood Levels:

The north boundary of the site is in close proximity with Colne Water; and as a consequence, there are a number of modelled nodes adjacent to the site.

For ease of reference, the flood levels associated with each of these nodes is tabulated below.

Latest climate change allowances are for an increase in fluvial flow of 35% & 70% for the north-west river basin. Assuming linear relationship between flow and water level for assessment purposes, the flood levels for the climate change scenarios have been estimated and included within the table overleaf.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Table 8: CNDP6/11 Modelled Flood Levels

Node Ref	COLN01_3191	COLN01_3092	COLN01_2992u	COLN01_2992d
Return Period				
1 in 5-year	133.35	132.71	132.24	132.09
1 in 10-year	133.51	132.94	132.40	132.25
1 in 25-year	133.72	133.16	132.62	132.47
1 in 50-year	133.91	133.35	132.80	132.66
1 in 100-year	134.13	133.56	133.01	132.87
1 in 100-year + 20% CC	134.41	133.84	133.26	133.13
1 in 100-year + 35% CC	134.61	134.42	133.40	133.27
1 in 100-year + 70% CC	135.09	134.80	133.79	133.67
1 in 1000-year	135.40	134.76	134.04	133.93

Flood Defences: No formal flood defences noted at this location; however, the river walls are shown to be raised above ground levels within the site.

Flood Mechanism: Overtopping

COLN01_3191: Ground levels adjacent to the modelled flood node within the Venchem site approximate 135.90mAOD; and it is therefore considered that this area of the site is elevated at least 0.5m above the extreme 1 in 1000-year flood level for Colne Water.

COLN01_3092: The gable end of an existing commercial building is located on the river bank adjacent to this model node. LiDAR data indicates that river bank levels at this location are 133.1mAOD; however, the building level approximates 135.30mAOD; and is therefore considered to be elevated above the 1 in 1000-year flood level.

COLN01_2992u: Located upstream of a substantial pipe crossing, which causes an obstruction to flow within the watercourse, upstream of Bridge Street. River bank level of 133.3mAOD rises to a site level of 136.2mAOD; which is elevated significantly above the 1 in 1000-year flood level.

COLN01_2992d: Located downstream of the same pipe crossing, upstream of Bridge Street. River bank level of 133.3mAOD rises to a site level of 136.2mAOD; which is elevated significantly above the 1 in 1000-year flood level.

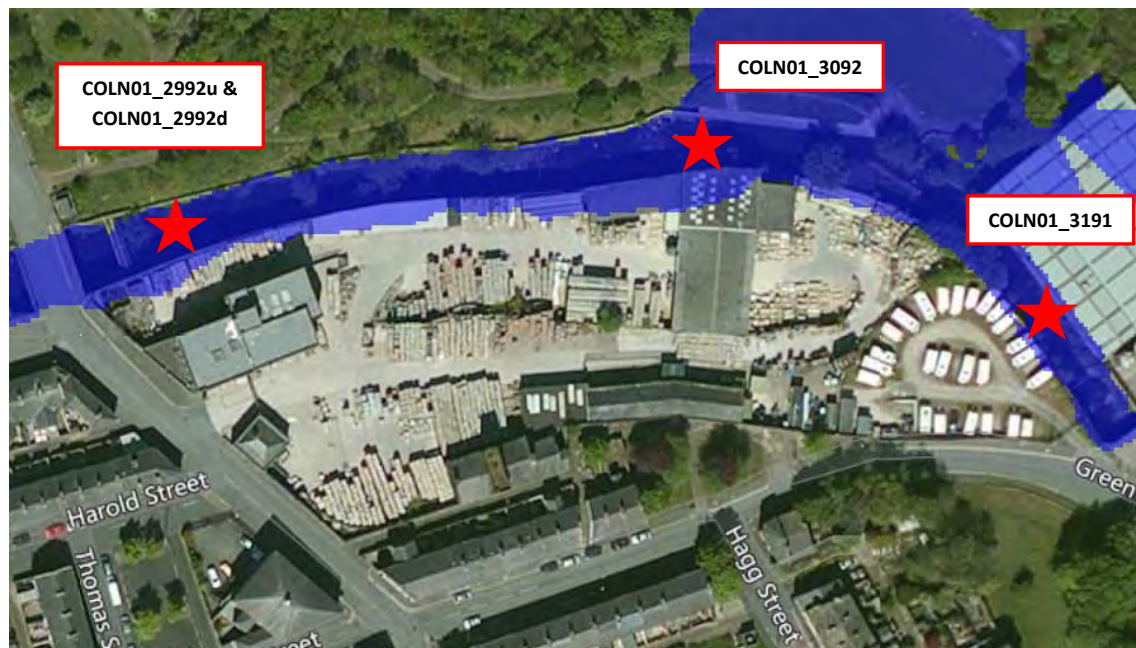
Infrastructure Failure: There are 2no in-channel structures, which could, if blocked, impede flow within the watercourse channel and increase flooding at the site. The first is formed by a pipe crossing, which spans the width of the watercourse. The second is the stone arch bridge under Bridge Street. Accumulation of debris within the channel could result in a blockage at either structure, particularly during flood events. This is likely to have the impact of raising water levels within the channel upstream of the blockage location; increasing the risk of flooding at the site; however the risk is likely to be localised to the area near to the bridge, as there is a flood route available for flood water to re-enter the channel on the downstream side of the bridge.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

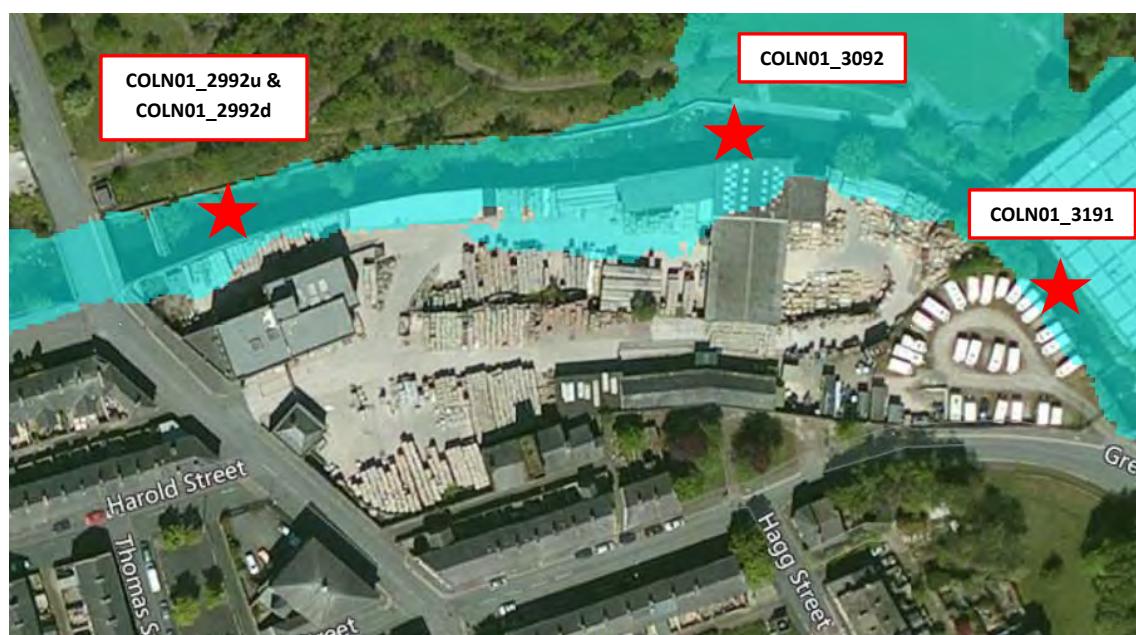
Report No: 2019-113 Revision A

Figure 2.22: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/11



Source: Flood Modeller Pro

Figure 2.23: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/11



Source: Flood Modeller Pro

2.6.6 Pluvial: Management of Surface Water Runoff

Application of the management hierarchy prescribed within the NPPF; Building Regulations Approved Document H; Sustainable Drainage Systems: Non-Statutory Technical Standards; and CIRIA C753 The SUDS Manual; must be applied, where surface water runoff from development is discharged to the following (in order of preference):

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Feasibility for Infiltration:

Similar to other sites along the banks of Colne Water, geology associated with the Stoneyard site is shown to comprise of Devensian Till over Sandstone at shallow depths; and therefore the infiltration capability of the ground under the site is likely to be limited.

It is recommended that percolation testing is undertaken at the site in accordance with BRE Digest 365 in order to inform the suitability of infiltration methods to provide partial infiltration of runoff from any new development proposed at the site. This should be undertaken by prospective Developer's at the planning stage.

Infiltration will be subject to identification of any contamination issues on-site.

Discharge to Watercourse:

Colne Water is located close to the south boundary of the site; and therefore, it is considered that a large proportion of surface water runoff from development at this site should be directed to watercourse; reutilising existing outfalls, wherever possible.

Design Constraints:

- Discharge to a watercourse must be restricted to the estimated mean Greenfield runoff rate (QBAR) by means of a controlled outflow (or restricted to a betterment of existing runoff rates for brownfield sites).
- This can be derived from a variety of recognised modelling/calculation methods, which can be completed through software or more traditional methods.
- Any design for on-site attenuation of surface water runoff are preferred to be in an 'open' form such as ponds, rather than underground tanks in order to facilitate a sustainable approach to surface water management; however careful design must ensure that displacement of floodwater does not increase flood risk for others.
- Attenuation must be provided, and calculated for the restricted runoff, for flood events up to and including the 1 in 100 year (+ 40% allowance for climate change) critical storm.
- Considering only impermeable areas can mean that runoff from permeable areas when the ground is saturated can cause a system to have insufficient capacity.

2.6.7 Pluvial: Surface Water Flooding; Overland Flows; and Ponding

Pluvial flooding refers to flooding events that are caused by extreme rainfall.

Such floods occur when the ground cannot absorb rainwater effectively or urban drainage systems are overwhelmed by excessive water flow.

Pluvial flooding also occurs when the ground is saturated by melting snow and consequent low permeability.

Floods caused by extreme rain events are an increasing problem for cities worldwide. Dense urban developments, as well as a fast-changing climate are stress factors which intensify the issue of pluvial flooding.

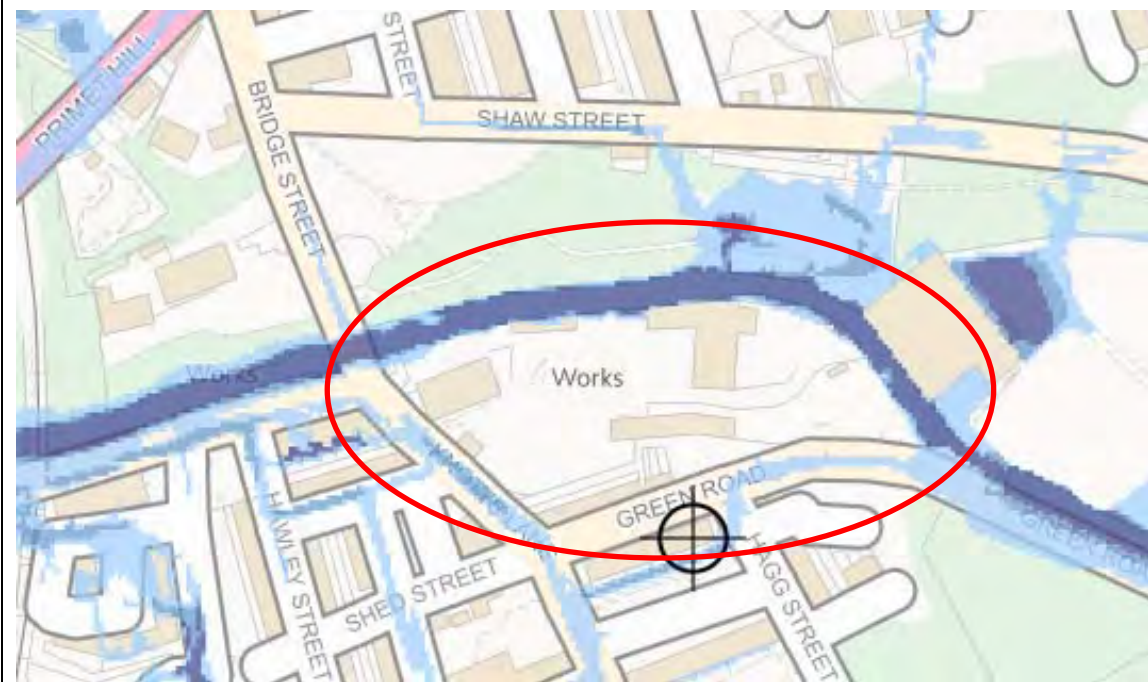
Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

For site CNDP6/1; surface water flood mapping indicates the land within the site boundary is considered overall to have a low risk of flooding from this source; however there are surface water flood routes within Green Road and also Knotts Lane, which will need to be considered within a site-specific flood risk assessment to support a planning application at the site.

Figure 2.24: Surface Water Flood Map for Site CNDP6/1



Source: Flood Modeller Pro

2.6.8 Mitigation Measures

- Development proposals should be prepared using a Sequential approach with 'more vulnerable' housing located within the areas of the site with the lowest flood risk i.e. within Flood Zone 1.
- Minimum easement of 8m from the river bank should be provided
- 'Less vulnerable' or 'water compatible' site uses such as public open space should be considered to placement within the areas of the site here flood risk is considered to be highest.
- Finished Floor Levels for habitable accommodation should be set at a minimum of 0.6m above the 1 in 100-year + 70% climate change flood level within Colne Water.

2.7 Site CNDP6/16 Spring Gardens Mill

2.7.1 Existing Use

Partially derelict site previously occupied by Spring Gardens Mill; also Calder Mill located within the east part of the site, which accommodates a number of businesses; and an existing commercial site located within the south west corner of the development area.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.7.2 Recent Planning History

No planning history at the site within the last 5 years.

Figure 2.25: Aerial Photograph Site CNDP6/16 (3.11 Hectares)



Source: Google Earth

2.7.3 Initial Evaluation of Flood Risk

Table 9: CNDP6/16 Possible Flood Mechanisms

Source/Pathway	Significant?	Comment/Reason
Fluvial	Yes	Colne Water
Canal	No	No canals in the vicinity of the development site
Tidal/Coastal	No	Site is considered to be remote from tidal influence
Reservoir	No	EA Map shows that the site is within an area which could flood in the event of reservoir failure; however, the likelihood of occurrence is considered to be low.
Pluvial: Management of Surface Water Runoff	Yes	Site area exceeds 0.5Ha and therefore the sustainable management of surface water runoff is a major consideration.
Pluvial: Surface Water Flooding; Overland Flows & Ponding	Yes	EA Surface Water Flood Maps indicates there are flood routes within the site which will require consideration
Groundwater	No	SFRA indicates the risk from groundwater flooding overall within the Borough is low.
Infrastructure Failure	Yes	Bridge at Spring Gardens Road

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

2.7.4 Topography

Site-specific survey is not available; and therefore, LiDAR data extracted from the DEFRA Data Services Platform has been used to understand ground levels across the site.

The ground across the central part of the site is shown to be relatively flat falls with elevated ground noted along the south boundary.

A few relative levels have been extracted from the LiDAR data and are presented for reference below:

- Site access at Daisy Street/Spring Gardens road – 136.35m AOD
- South-west corner – 143.219m AOD
- South-east access from Lenches Road – 141.000m AOD
- River bank centre north boundary – 138.3m AOD
- Site centre – 139.10m AOD
- Central south boundary – 144.7m AOD
- Land adjacent to the south boundary – 144.92 – 150.00m AOD.

The photograph provided below (Figure 2.26) provides a view of the site, illustrating the general topography across the area.

Figure 2.26: Existing site Viewed South from Spring Gardens Road CNDP6/16



Source: Google Maps

2.7.5 Fluvial Flood Risk

Flood Source: Colne Water

The general flood map illustrates that the northern part of the site adjacent to Colne Water is located within Flood Zone 2; with the flood risk reducing the Flood Zone 1 in the area adjacent to the south site boundary.

Modelled Flood Levels:

The north boundary of the site is in close proximity with Colne Water; and as a consequence, there are a number of modelled nodes adjacent to the site.

For ease of reference, the flood levels associated with each of these nodes is tabulated below.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Latest climate change allowances are for an increase in fluvial flow of 35% & 70% for the north-west river basin. Assuming linear relationship between flow and water level for assessment purposes, the flood levels for the climate change scenarios have been estimated and included within the table overleaf.

Table 10: CNDP6/16 Modelled Flood Levels

Node Ref	COLN01_3782	COLN01_3681	COLN01_3626u	COLN01_3625d	COLN01_3584u	COLN01_3487
Return Period						
1 in 5-year	139.20	138.68	137.39	137.39	136.74	134.84
1 in 10-year	139.26	138.86	138.38	137.51	136.87	135.12
1 in 25-year	139.61	139.12	137.69	137.69	137.06	135.66
1 in 50-year	139.75	139.33	137.84	137.84	137.24	136.29
1 in 100-year	139.88	139.54	138.03	138.03	137.47	136.88
1 in 100-year + 20% CC	140.04	139.75	138.22	138.22	137.66	137.15
1 in 100-year + 35% CC	140.09	139.83	138.42	138.42	137.92	137.62
1 in 100-year + 70% CC	140.30	140.12	138.80	138.80	138.37	138.37
1 in 1000-year	140.42	140.17	138.69	138.69	138.24	138.15

Flood Defences: No formal flood defences noted at this location.

Flood Mechanism: Overtopping

COLN01_3782: Ground levels adjacent to the modelled flood node approximate 139.75mAOD; and it is therefore considered that this area of the site will become flooded in the 1 in 100-year return period event.

COLN01_3681: Ground level on the south bank of the watercourse at this node location is estimated to be 139.24mAOD; and as such it is anticipated that overtopping of the bank will occur during the 1 in 50-year event.

COLN01_3626u: Located on the upstream side of an in-channel weir; ground levels approximate 137.8mAOD; and as such it is anticipated that overtopping of the bank will occur in the 1 in 50-year event.

COLN01_3625d: Located on the downstream side of the in-channel weir; ground levels approximate 137.8mAOD; and as therefore flooding within the site is likely to occur during the 1 in 50-year flood event within Colne Water.

COLN01_3584u: Ground level on-site adjacent to this flood model node is 137.8mAOD; and again, it is anticipated that flooding during the 1 in 50-year event will occur.

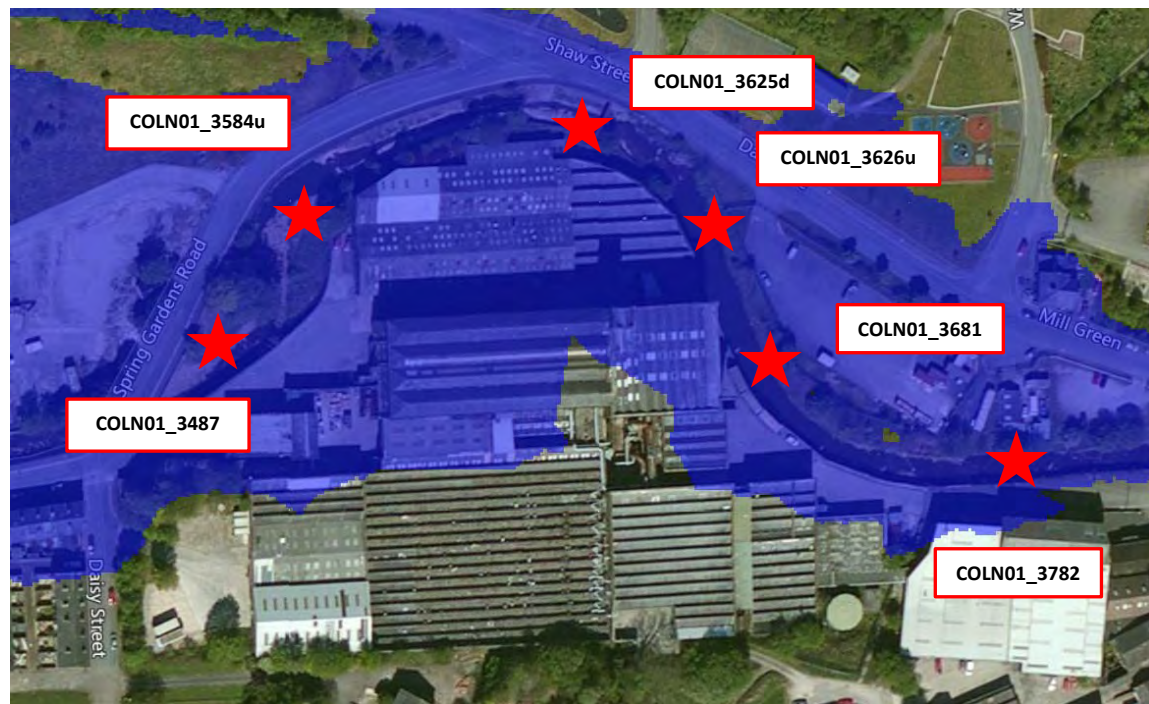
COLN01_3487: Located at the downstream end of the site (west); the river bank level is identified from the LiDAR data as 136.6mAOD; and as such inundation by overtopping is considered to be possible during the 1 in 100-year event.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

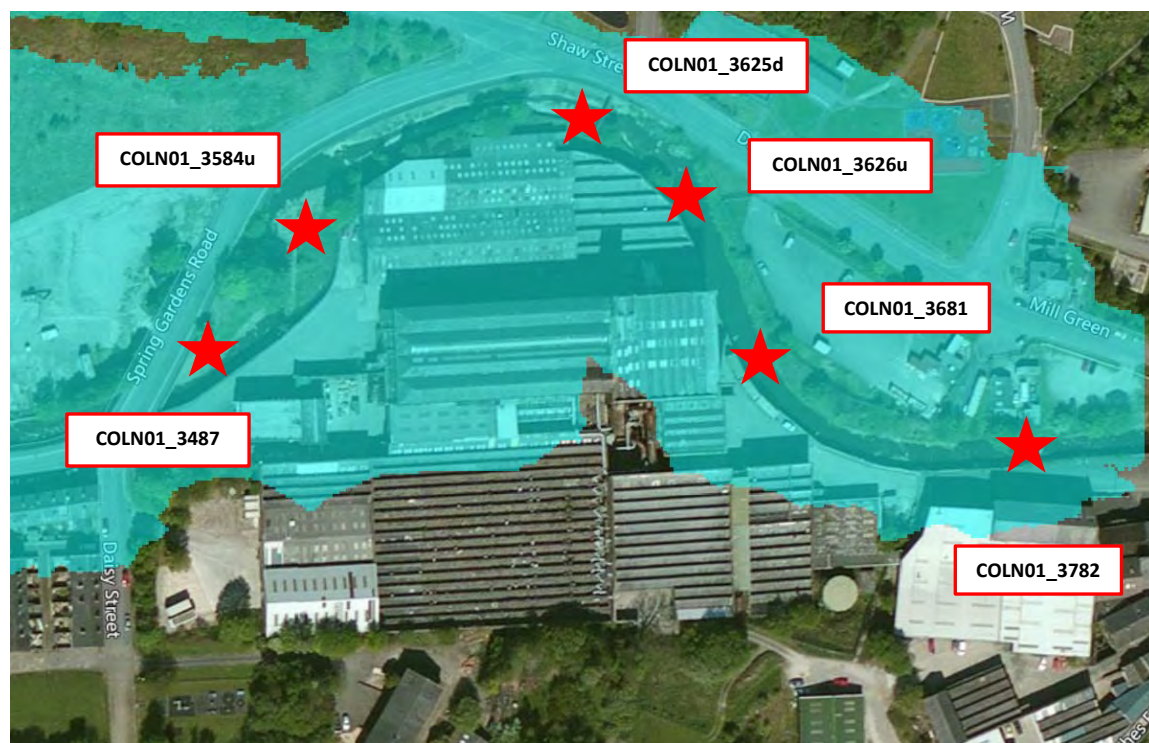
Report No: 2019-113 Revision A

Figure 2.27: 1 in 100-year Flood Map (Zone 3) for Site CNDP6/16



Source: Flood Modeller Pro

Figure 2.28: 1 in 1000-year Flood Map (Zone 2) for Site CNDP6/16



Source: Flood Modeller Pro

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Infrastructure Failure: There is a single in-channel structure, which could, if blocked, impede flow within the watercourse channel and increase flooding at the site. The single span road bridge, which taken Spring Gardens Road across the watercourse has a wide opening however low height; and it is considered that a blockage at the bridge could have the impact of raising water levels upstream, increasing flood risk at the site. It is noted however, that the increased flood risk is likely to be localised to the area of the structure, as there is opportunity for flood water to re-enter the channel on the downstream side of the bridge.

2.7.6 Pluvial: Management of Surface Water Runoff

Application of the management hierarchy prescribed within the NPPF; Building Regulations Approved Document H; Sustainable Drainage Systems: Non-Statutory Technical Standards; and CIRIA C753 The SUDS Manual; must be applied, where surface water runoff from development is discharged to the following (in order of preference):

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Feasibility for Infiltration:

The ground typically within the area containing the site is comprised of Alluvium and Devensian Till over Sandstone at shallow depths; and therefore the infiltration capability of the ground under the site is likely to be limited; and it is considered that using infiltration methods alone to manage surface water runoff, will be difficult to achieve.

It is recommended that percolation testing is undertaken at the site in accordance with BRE Digest 365 in order to inform the suitability of infiltration methods to provide partial infiltration of runoff from any new development proposed at the site.

Infiltration will be subject to identification of any contamination issues on-site.

Discharge to Watercourse:

Colne Water is located close to the south boundary of the site; and therefore, it is considered that a large proportion of surface water runoff from development at this site should be directed to watercourse; utilising existing outfalls where possible.

Design Constraints:

- Discharge to a watercourse must be restricted to the estimated mean Greenfield runoff rate (QBAR) by means of a controlled outflow (or restricted to a betterment of existing runoff rates for brownfield sites).
- This can be derived from a variety of recognised modelling/calculation methods, which can be completed through software or more traditional methods.
- Any design for on-site attenuation of surface water runoff are preferred to be in an 'open' form such as ponds, rather than underground tanks in order to facilitate a sustainable approach to surface water management; however careful design must ensure that displacement of floodwater does not increase flood risk for others.
- Attenuation must be provided, and calculated for the restricted runoff, for flood events up to and including the 1 in 100 year (+ 40% allowance for climate change) critical storm.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- Considering only impermeable areas can mean that runoff from permeable areas when the ground is saturated can cause a system to have insufficient capacity.

2.7.7 Pluvial: Surface Water Flooding; Overland Flows; and Ponding

Pluvial flooding refers to flooding events that are caused by extreme rainfall.

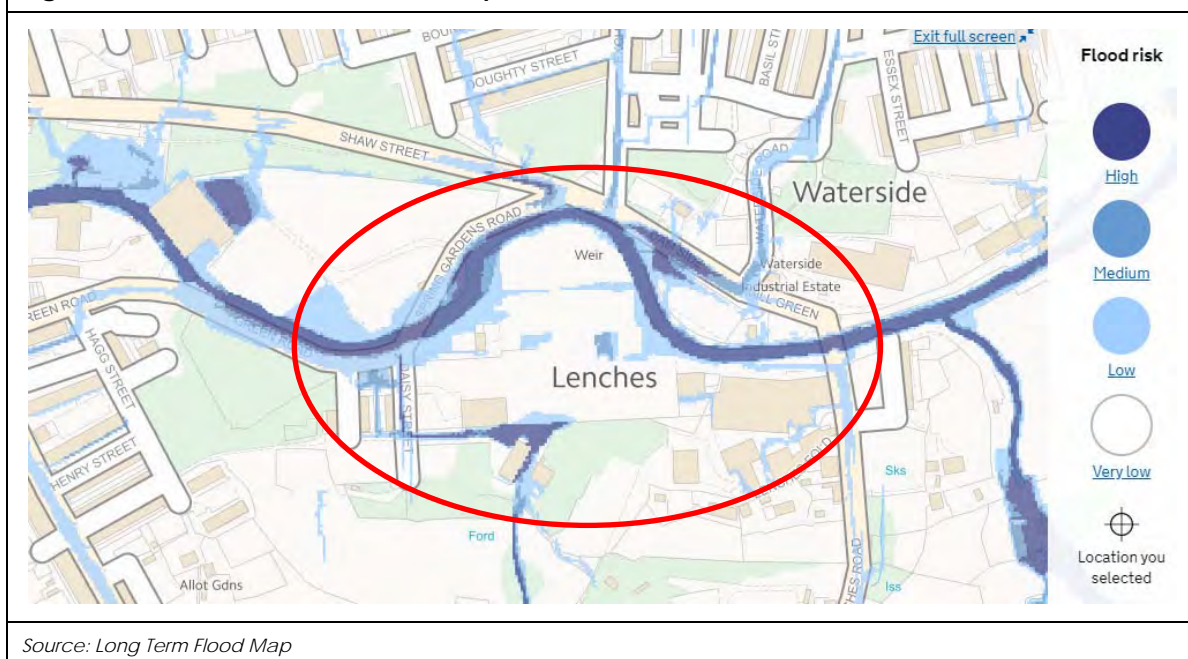
Such floods occur when the ground cannot absorb rainwater effectively or urban drainage systems are overwhelmed by excessive water flow.

Pluvial flooding also occurs when the ground is saturated by melting snow and consequent low permeability.

Floods caused by extreme rain events are an increasing problem for cities worldwide. Dense urban developments, as well as a fast-changing climate are stress factors which intensify the issue of pluvial flooding.

For site CNDP6/16; surface water flood mapping indicates that there is some surface water flood risk associated with Colne Water at the north boundary of the site; however, there is a flow route through the site, which originates from land to the south; and causes ponding along the south boundary, before flowing west and then north along Daisy Street towards Colne water. Some consideration will need to be given to accommodate this source of flooding within the site.

Figure 2.29: Surface Water Flood Map for Site CNDP6/16



2.7.8 Mitigation Measures

- Development proposals should be prepared using a Sequential approach with 'more vulnerable' housing located within the areas of the site with the lowest flood risk i.e. within Flood Zone 1.
- Minimum easement of 8m from the river bank should be provided.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- 'Less vulnerable' or 'water compatible' site uses such as public open space should be considered to placement within the areas of the site here flood risk is considered to be highest.
- Finished Floor Levels for habitable accommodation should be set at a minimum of 0.6m above the 1 in 100-year + 70% climate change flood levels within Colne Water.
- Development should be designed to ensure that surface water flood routes are accommodated and flow is not impeded; which could increase flood risk at the site.
- Dry access and egress from the site cannot be guaranteed at all times; and a safe route should be made available for people towards Knott End, which is located within Flood Zone 1; and provides routes to Colne Town Centre, where emergency and community services can be reached, if required.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

3.0 The Exceptions Test

3.1 National Planning Policy Framework

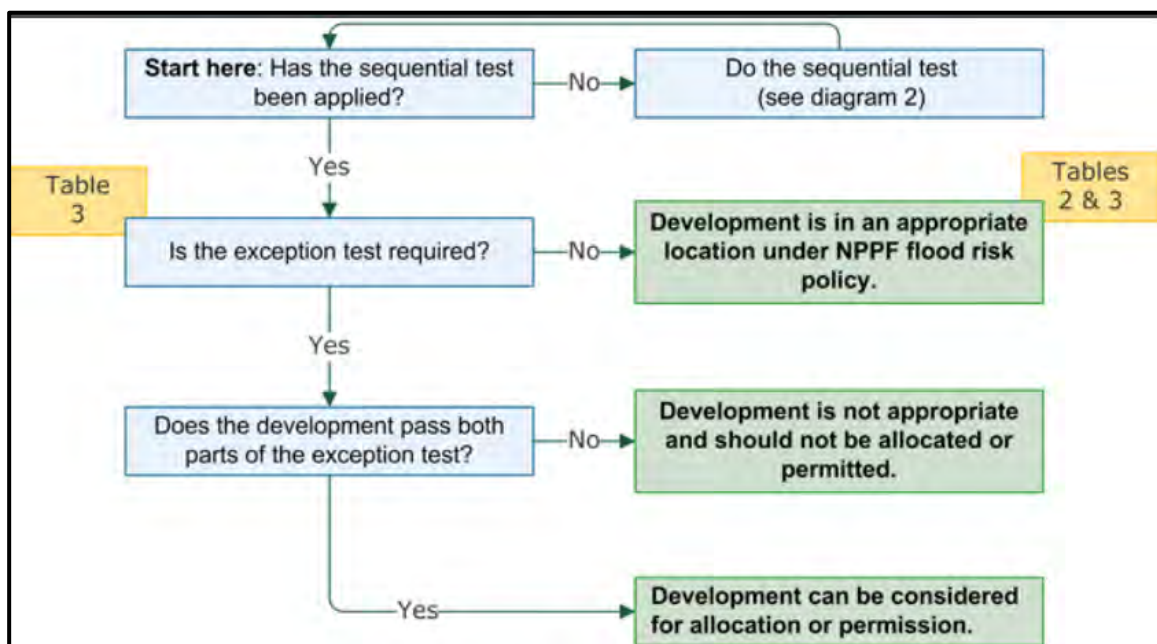
Paragraph 160 of the National Planning Policy Framework (NPPF); and companion document, NPPF Planning Practice Guide, sets out the requirements for application of the Exceptions Test.

The Exceptions Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

There are 2no parts to the Test:

1. How can wider sustainability benefits to the community that outweigh flood risk be demonstrated?
2. What needs to be considered to demonstrate that development will be safe for its lifetime?

The flow chart below extracted from the NPPF Planning Practice Guide sets out the application of the Exceptions Test.



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

To fulfil the first part of the exception test, the sustainability appraisal undertaken by Colne Town Council has been utilised to provide evidence of wider sustainability benefits to the community.

If a potential site allocation fails to score positively against the aims and objectives of the sustainability appraisal, or is not otherwise capable of demonstrating sustainability benefits, it should be considered whether the use of planning conditions and/or planning obligations could make it do so.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Where this is not possible, the exception test is deemed to be not satisfied, and the site should be removed from the list of allocated sites.

In fulfilling the second part of the test the wider safety issues need to be considered. A site-specific flood risk assessment will be required at the planning application stage in order to satisfy this part of the test.

Parts 1 & 2 of the Exceptions Test have been applied across all of the sites; with the conclusions provided within Sections 3.2 and 3.3 below.

3.2 Exceptions Test Part 1 - How can wider sustainability benefits to the community that outweigh flood risk be demonstrated?

The draft Neighbourhood Plan identifies through detailed analysis that Colne Town is perceived to have poor quality housing in some areas, and the selected sites are considered to provide an opportunity to improve quality; and support housing growth targets set by Pendle Borough Council.

In additions there is an opportunity identified to use previously developed land in order to achieve this aim; which provides the added benefit of protecting the rural landscape; and ensuring that only appropriate development is permitted within the open countryside which surrounds the Town.

The historical legacy associated with its status as a Lancashire mill town means that housing stock within Colne Town continues to have a large proportion of terraced housing with fewer demi-detached and very few detached properties. The allocation of the identified sites for housing, aims to address the balance, and increase availability and choice to the community; whilst simultaneously helping to attract and retain economically active residents. This is likely to benefit the employment market.

There is a need for low cost affordable housing in the area. Any residential development larger than 10 units will be required to provide affordable housing.

It is also considered that the development within this area of Colne will help to improve social conditions within area of the Town which have been identified to have high levels of deprivation.

The developments may have a negative impact in regard to the potential increase in traffic; however new development is likely to encourage sustainable modes of transport through the inclusion of pedestrian and cycleway links; and help to improve public transport generally throughout the Colne area.

In conclusion, it is considered that overall, the redevelopment of the identified sites, provides a significant number of wider benefits to the local community, which outweighs flood risk.

3.3 Exceptions Test Part 2 - What needs to be considered to demonstrate that development will be safe for its lifetime?

A number of measures have been identified within Section 2 of the report for each of the identified sites, which should be applied to ensure that development at each location remains safe for its lifetime; and are summarised below.

- Site specific flood risk assessments will be required for each of the sites.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

- Development proposals should be prepared using a Sequential approach with 'more vulnerable' development type i.e. housing, located within the areas of the site with the lowest flood risk i.e. within Flood Zone 1.
- Minimum easement of 8m from the river bank should be provided.
- 'Less vulnerable' or 'water compatible' site uses such as public open space should be considered for placement within the areas of the site where flood risk is considered to be highest.
- Finished Floor Levels for habitable accommodation should be set at a minimum of 0.6m above the 1 in 100-year + 70% climate change flood levels within Colne Water.
- Development should be designed to ensure that surface water flood routes are accommodated and flow is not impeded; which could increase flood risk at the site or elsewhere.
- Personal or community flood warning and evacuation plan/s should be prepared and implemented in order to ensure the safety of residents within the Colne Water valley.
- Dry access and egress from the sites cannot be guaranteed at all times; and a safe route should be provided for people to relocate to Flood Zone 1, where emergency and community services can be reached.
- For public open space placed within areas of high flood risk; suitable warning signs should be provided.
- Displacement of flood storage should be avoided i.e. raising of ground levels within areas designated as Flood Zone 3, in order to prevent the increase of flood risk on for others; through the displacement of flood waters.

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

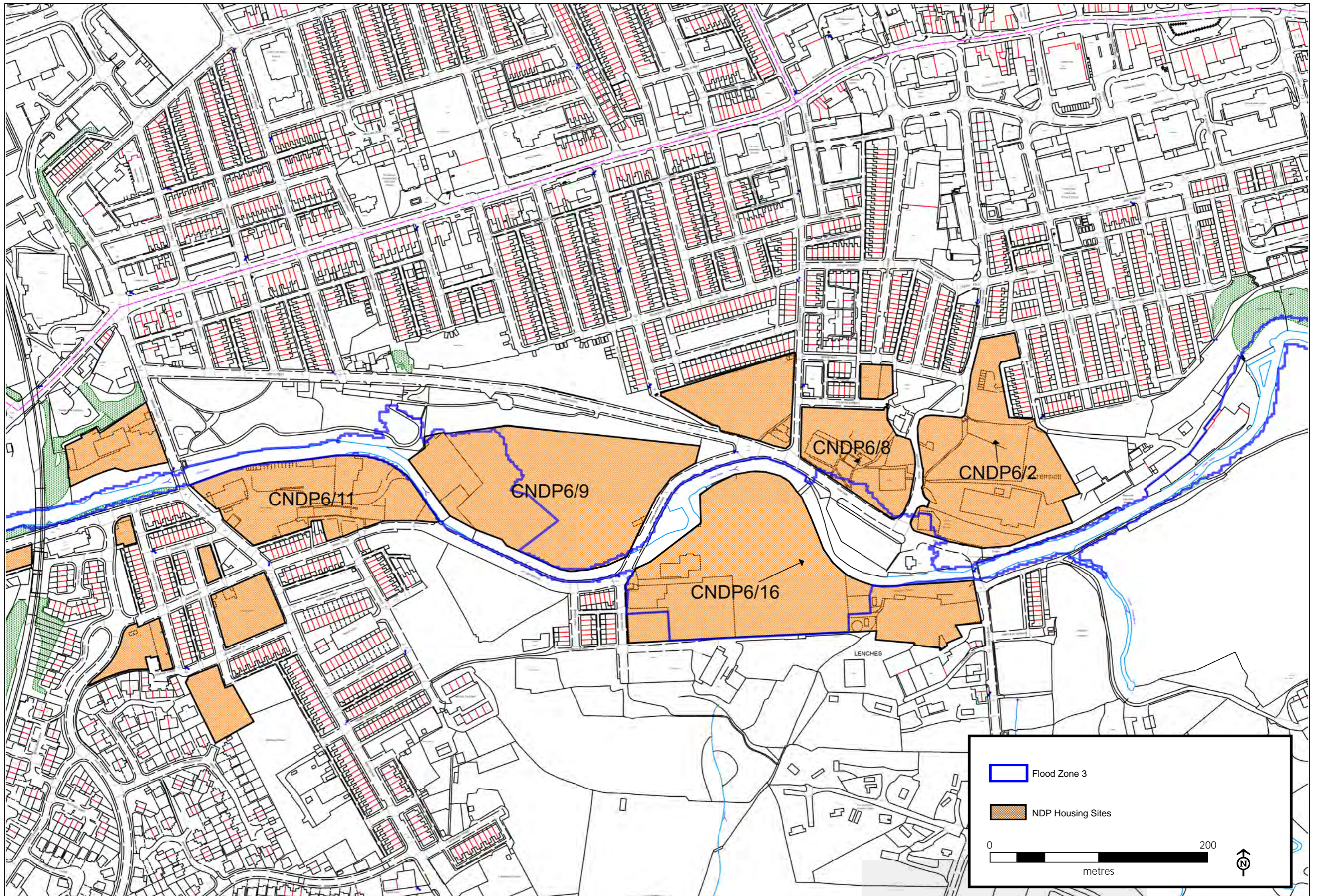
APPENDICES

Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Appendix A: - Site Location Map



Sites Selected for Allocation: Exceptions Test

Colne Town Council Neighbourhood Plan

Report No: 2019-113 Revision A

Appendix B: - Environment Agency Data

Flood Map for Planning: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 22 November 2019
Our Ref: CL148605
NGR: 389,591 439,947

Key



Areas Benefiting from Defences



Flood Zone 3



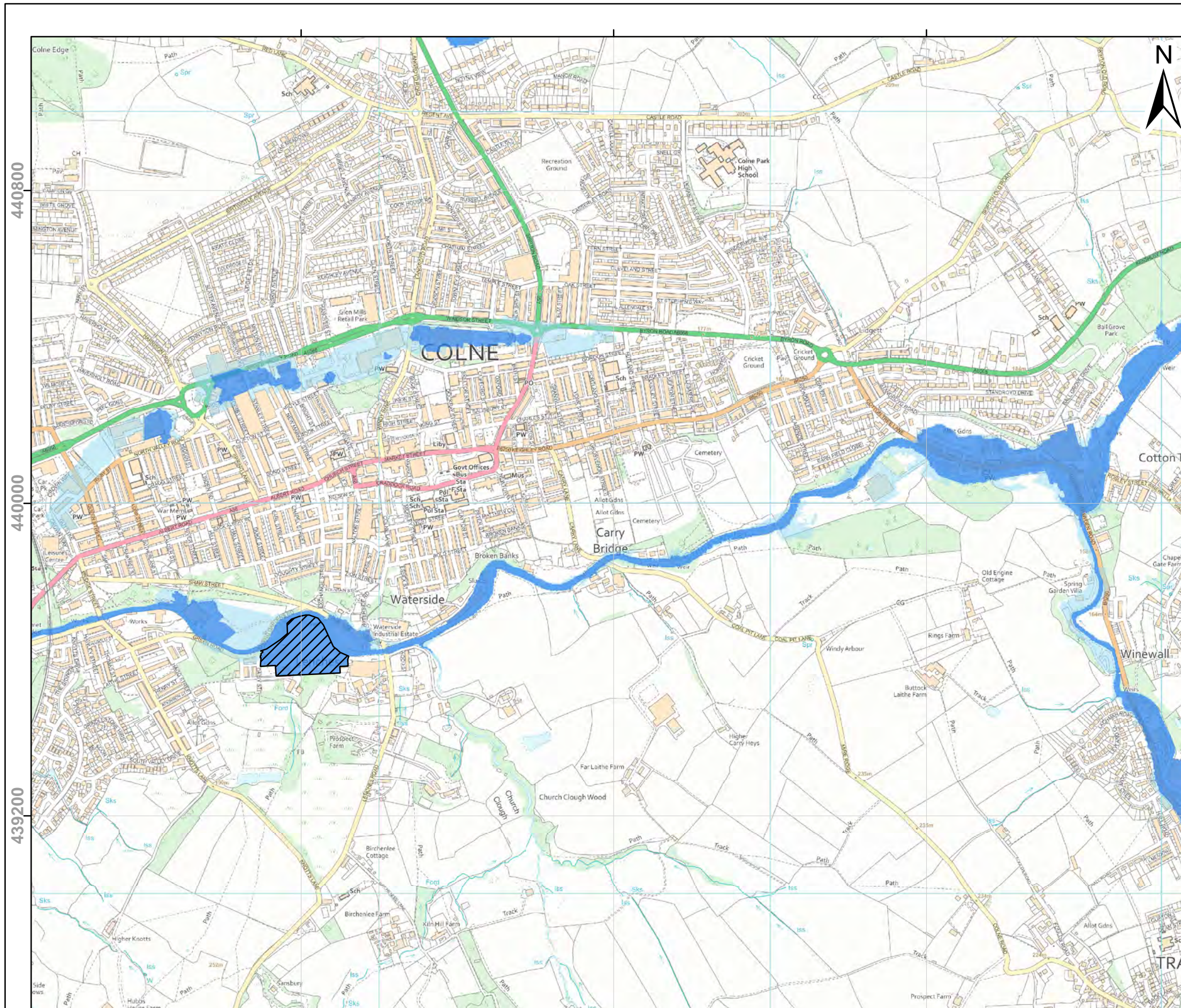
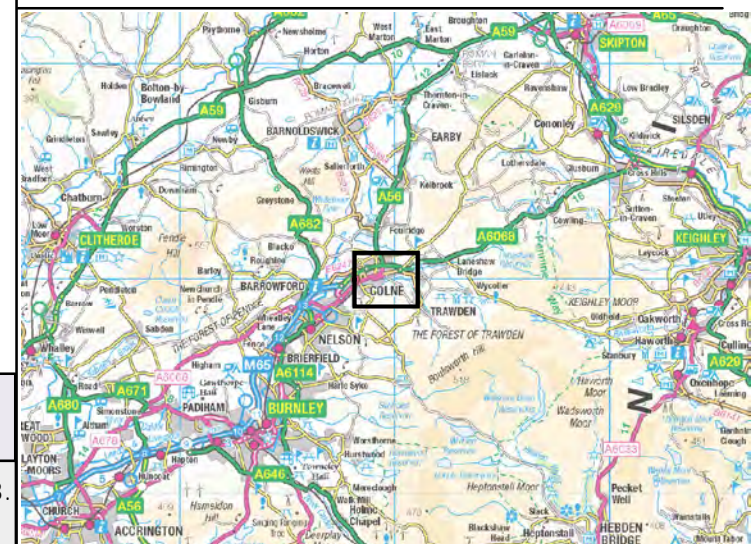
Flood Zone 2

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.



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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 Model Outline Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 18 November 2019
Our Ref: CL148605
NGR: 388,617 439,669

Key

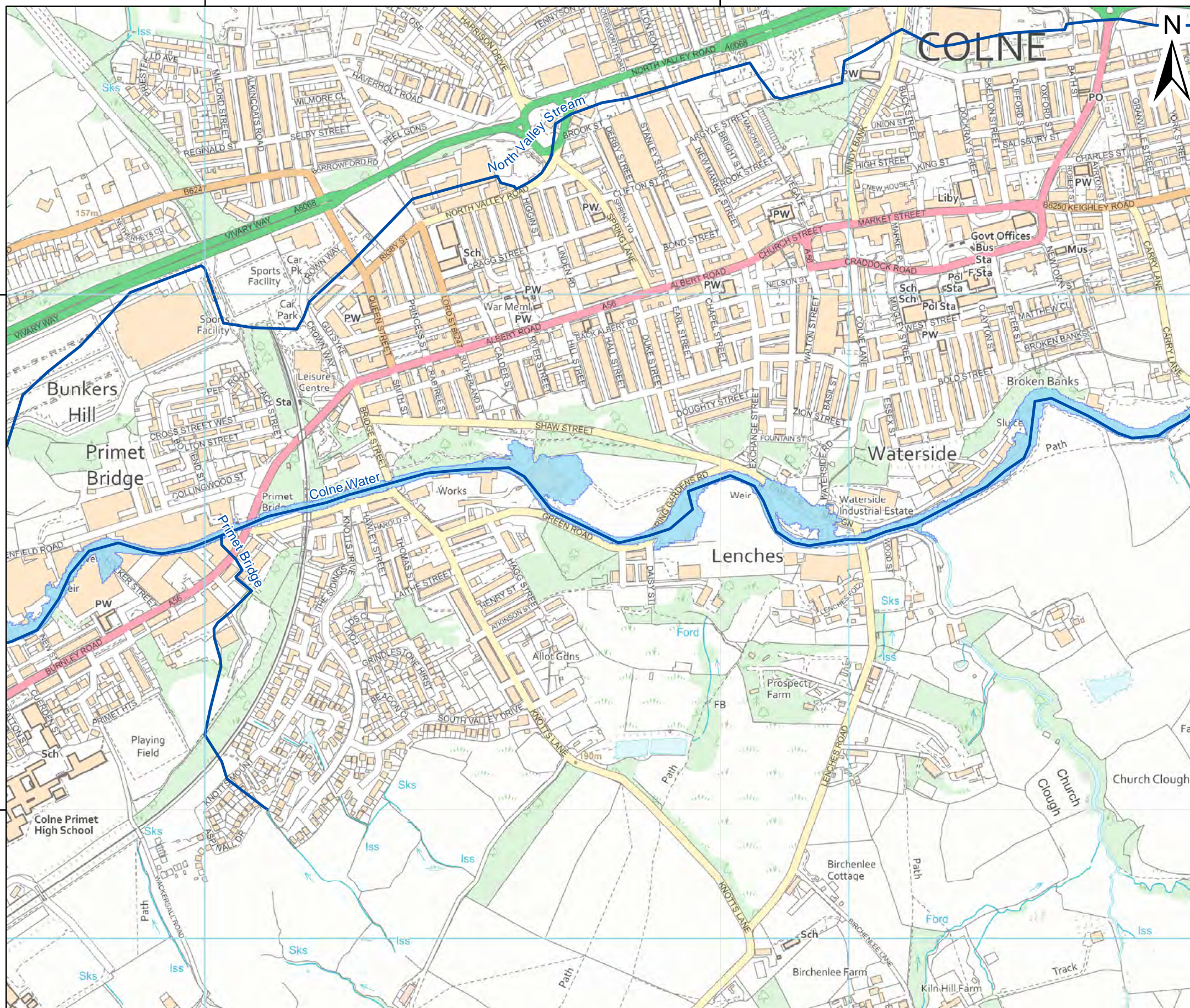
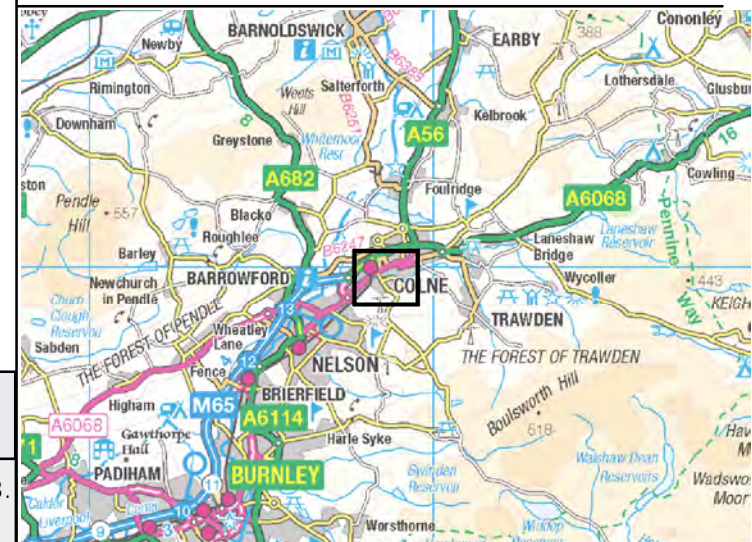
-  Main River
-  1.0% Undefended Model Outline

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

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Fluvial Model Outline Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 18 November 2019
Our Ref: CL148605
NGR: 388,617 439,669

Key

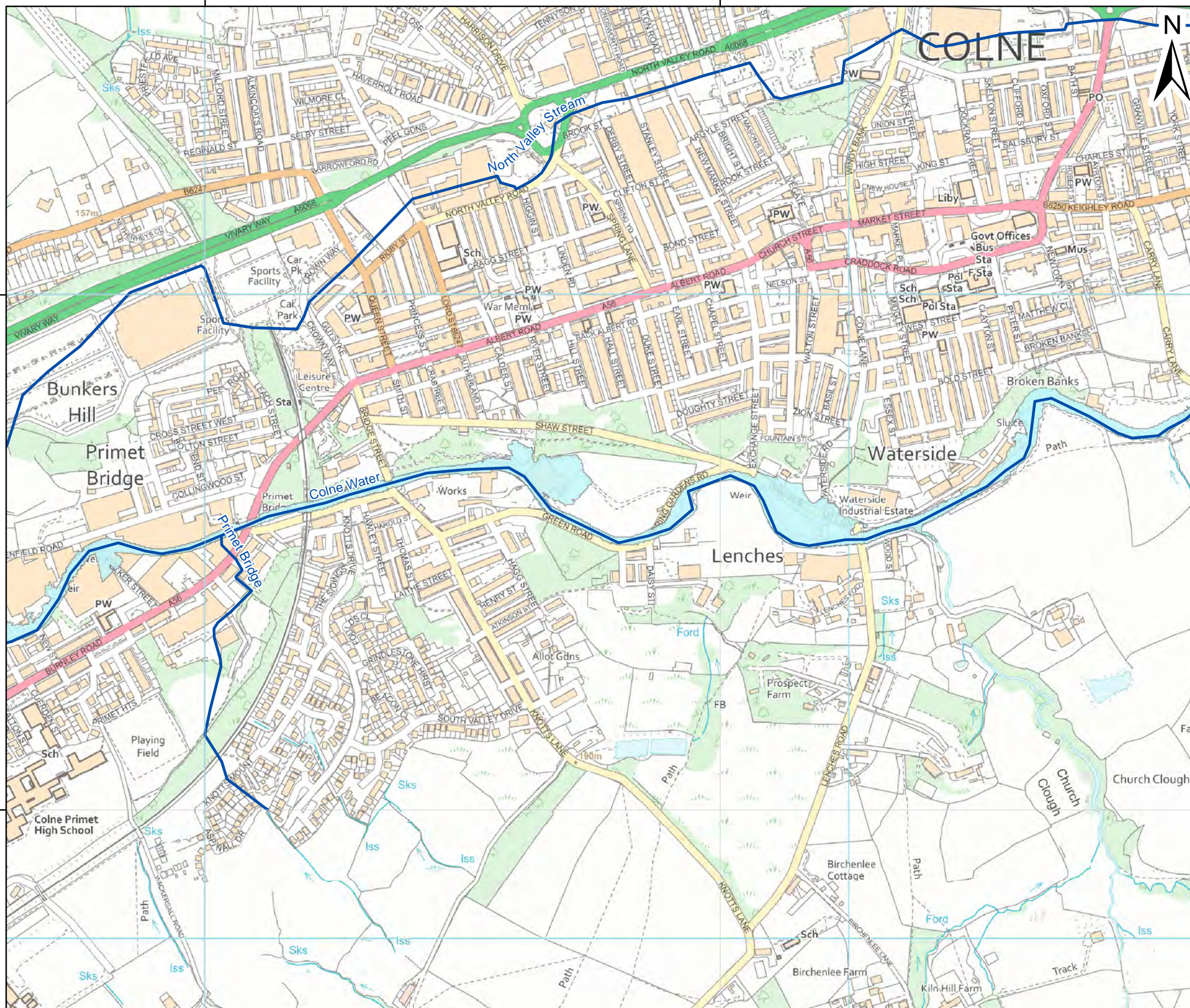
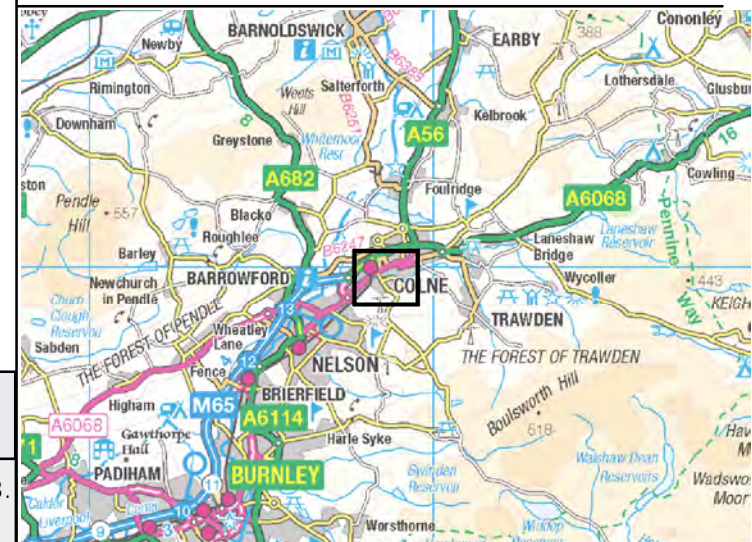
-  Main River
-  1.0% Defended Model Outline

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
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ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.





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Fluvial Model Outline Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 18 November 2019
Our Ref: CL148605
NGR: 388,617 439,669

Key

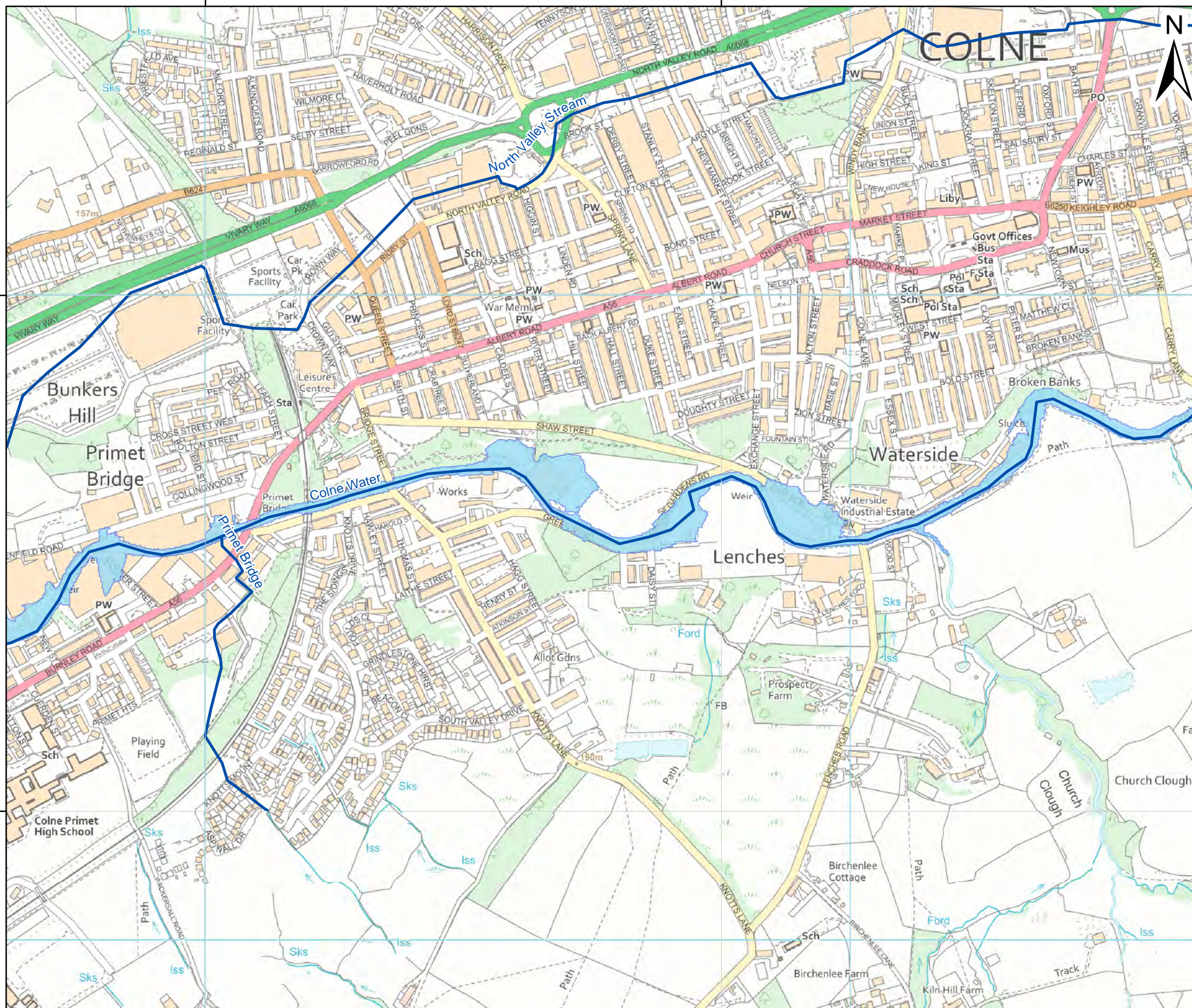
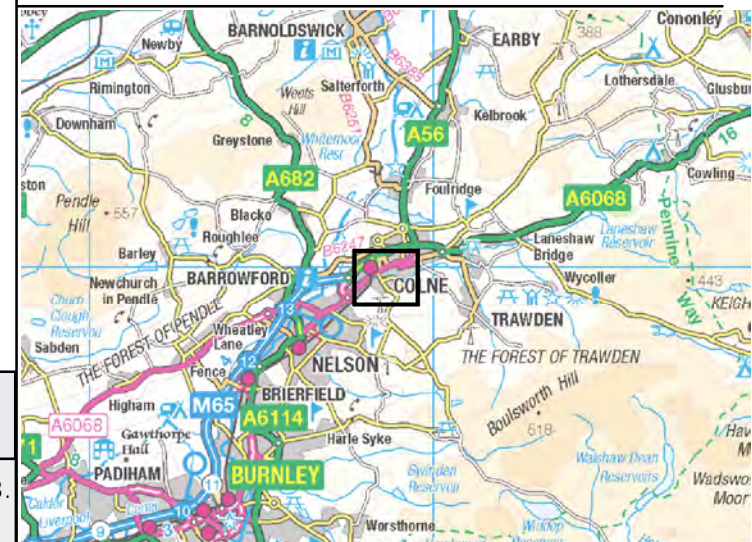
-  Main River
-  1.0% + CC Undefended Model Outline

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.





Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

Fluvial Model Outline Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 18 November 2019
Our Ref: CL148605
NGR: 388,617 439,669

Key

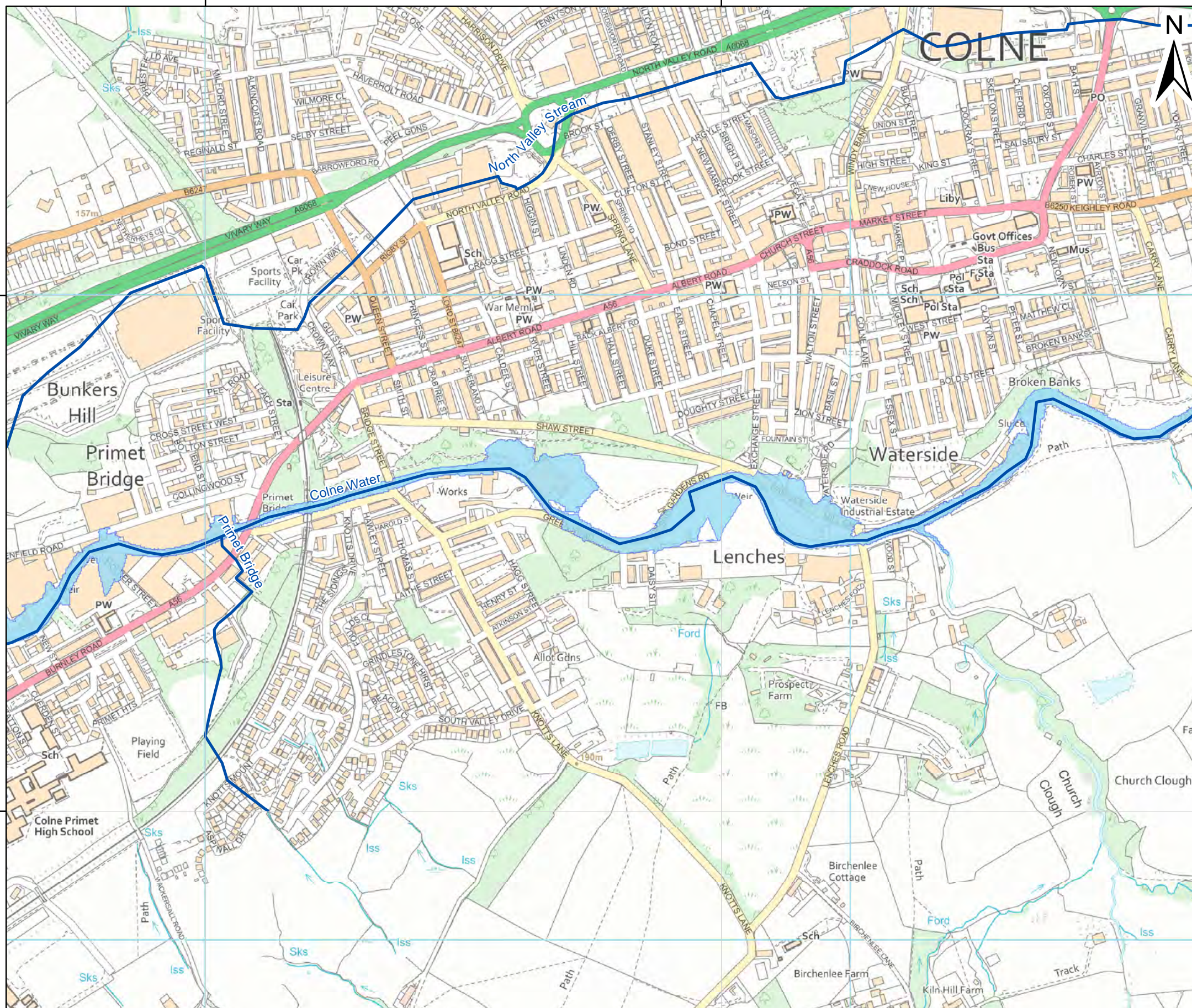
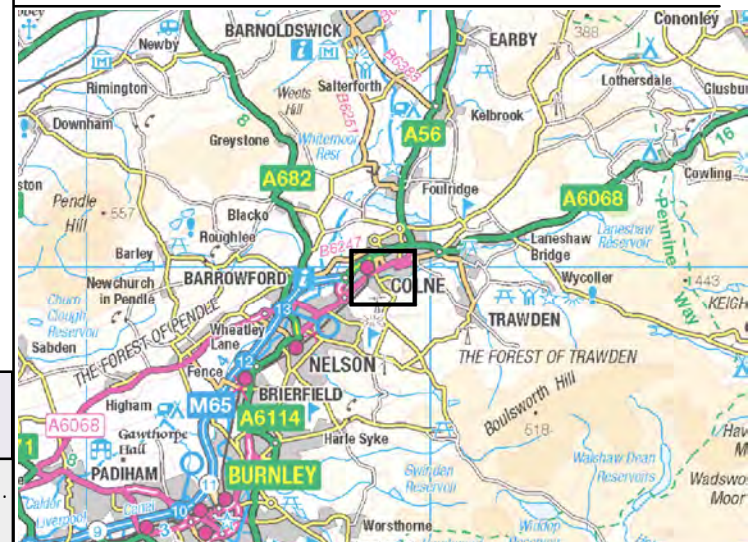
-  Main River
-  1.0% + CC Defended Model Outline

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.




Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

Fluvial Model Outline Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 18 November 2019
Our Ref: CL148605
NGR: 388,617 439,669

Key

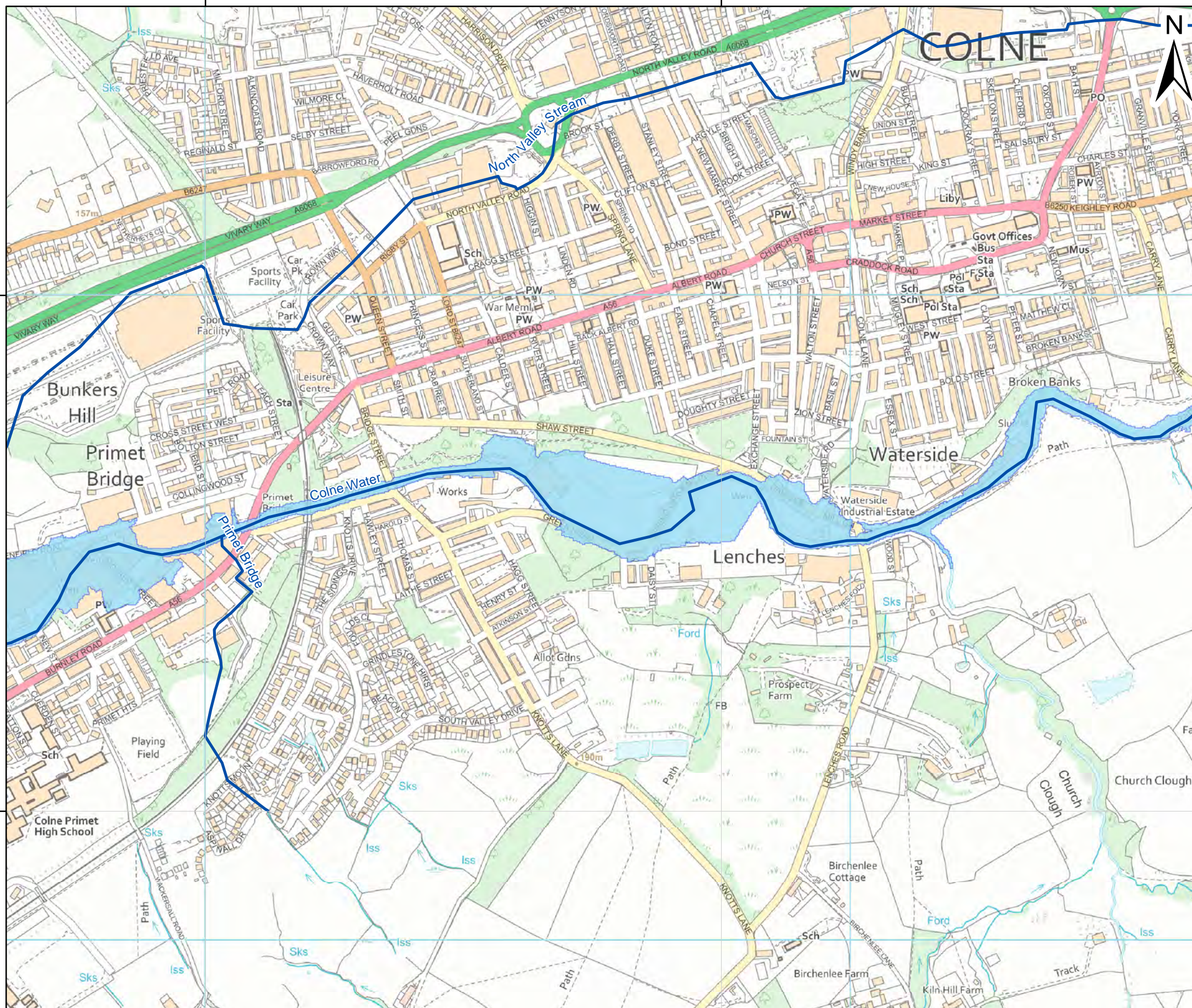
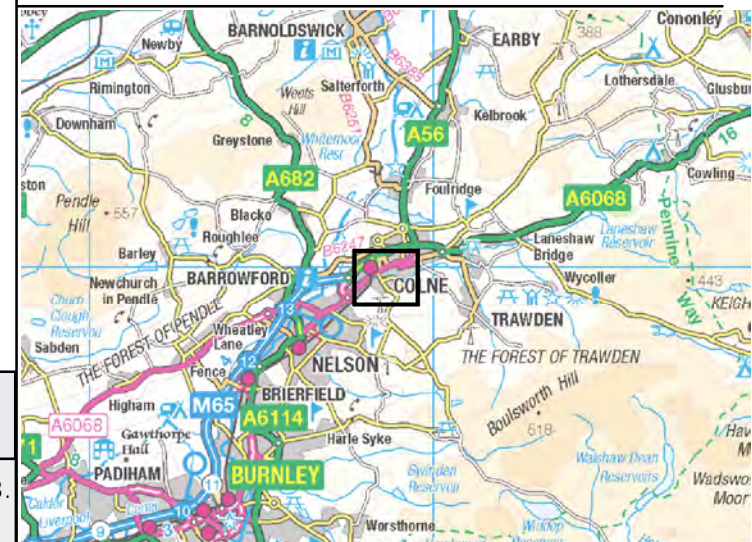
-  Main River
-  0.1% Undefended Model Outline

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.





Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

Fluvial Model Outline Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 18 November 2019
Our Ref: CL148605
NGR: 388,617 439,669

Key

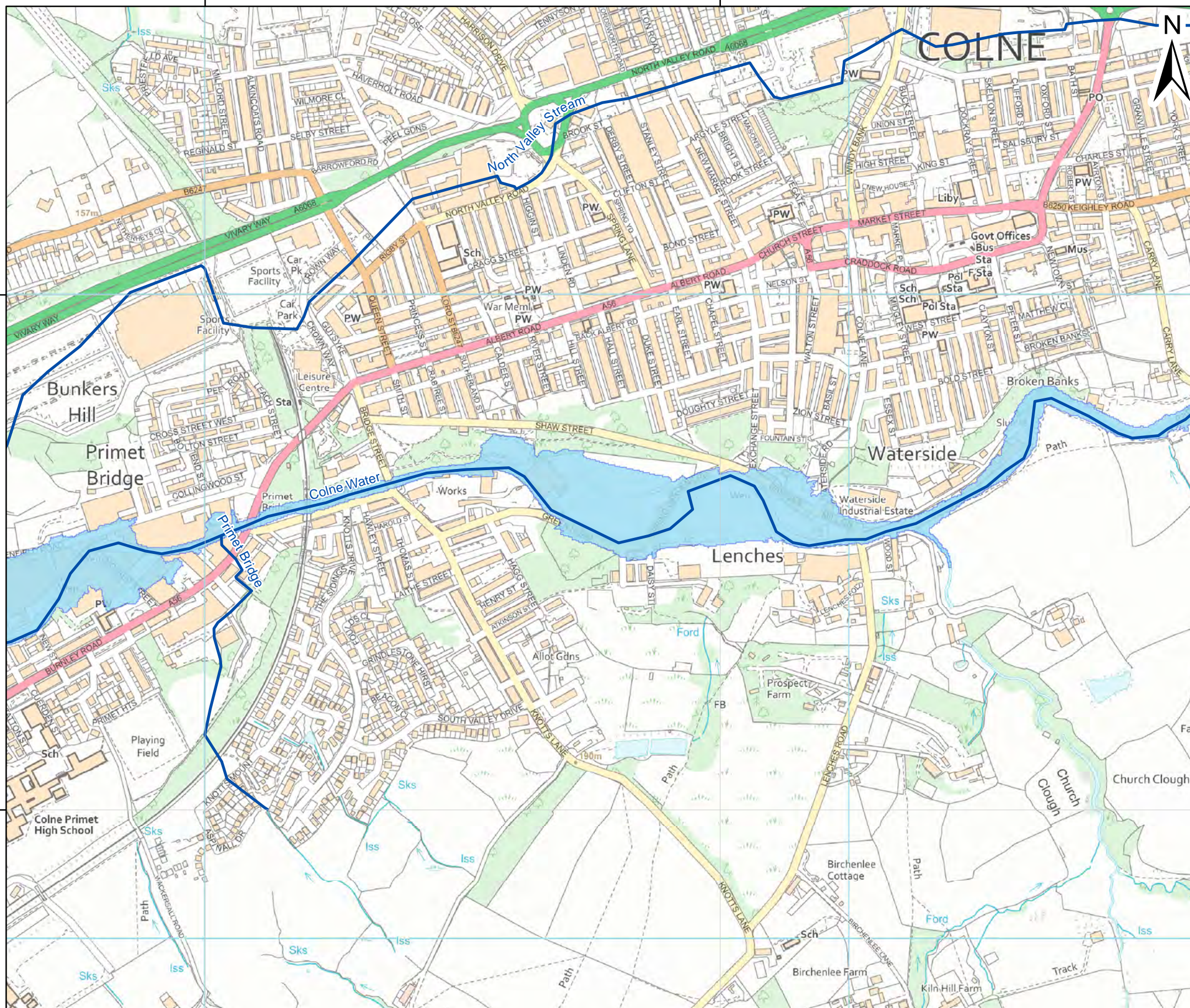
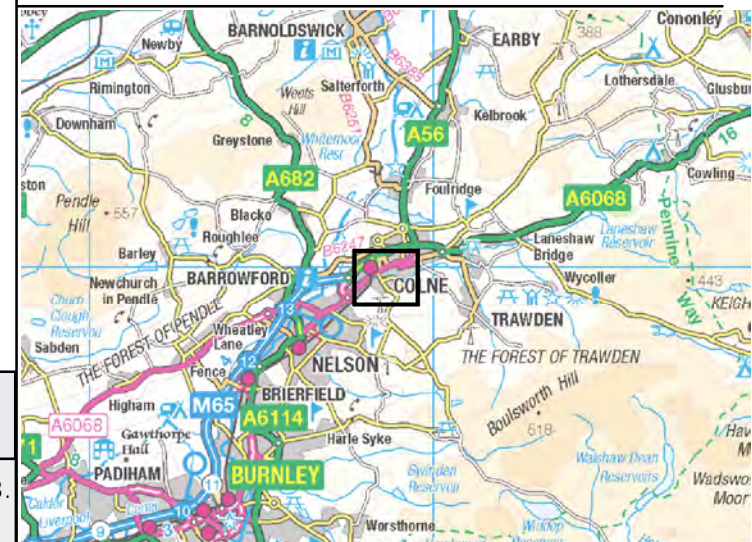
-  Main River
-  0.1% Defended Model Outline

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

Node Point Location Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 20 November 2019

Our Ref: CL148605

NGR: 390,143 439,975

Key

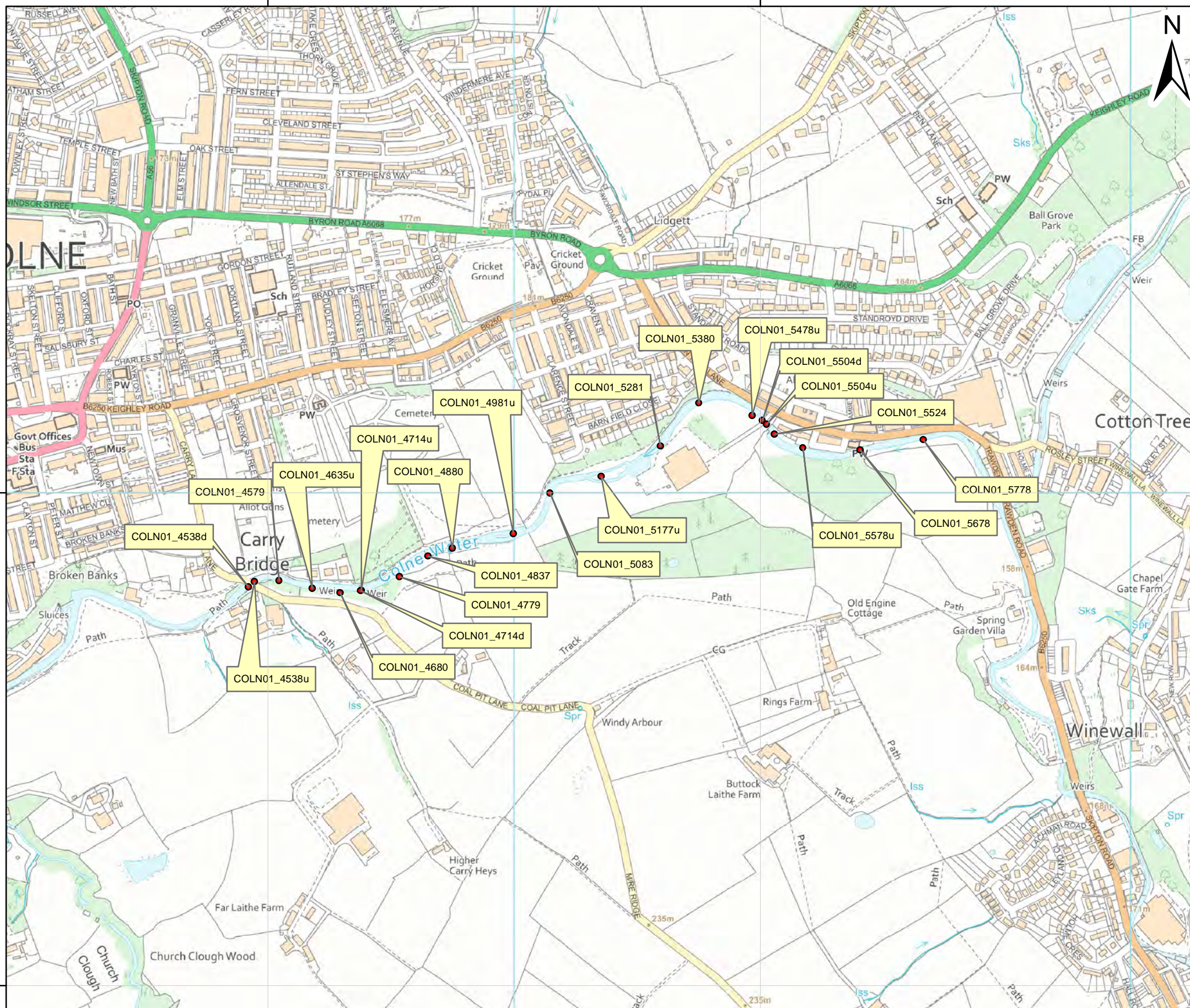
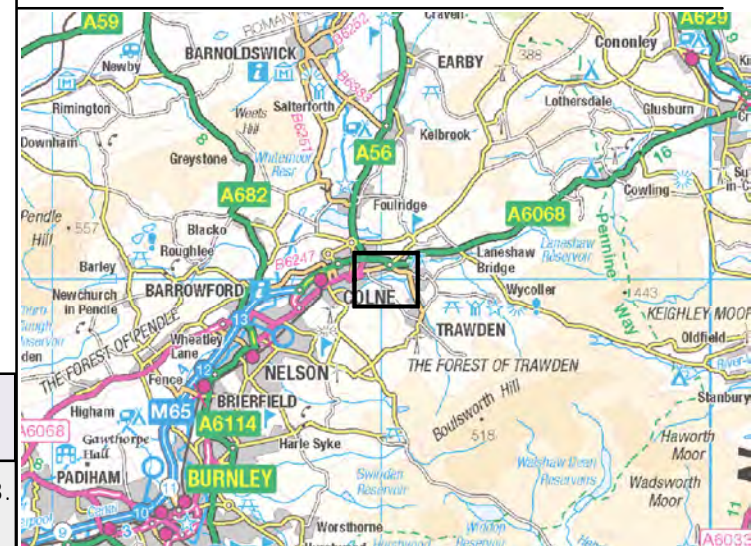
- Modelled Node Point

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

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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

NodePointName	ModelledFloodGroupCode	ReturnPeriod (Yrs)	LevelValue (Maod)	FlowValue (cumec)
COLN01_4538d	Colne2018_Undefended	5	145.24	44.24
COLN01_4538d	Colne2018_Undefended	10	145.44	52.63
COLN01_4538d	Colne2018_Undefended	25	145.72	64.6
COLN01_4538d	Colne2018_Undefended	50	145.94	75.35
COLN01_4538d	Colne2018_Undefended	100	146.13	88.07
COLN01_4538d	Colne2018_Undefended	100+CC	146.37	105.69
COLN01_4538d	Colne2018_Undefended	1000	147.01	170.01
COLN01_4538d	Colne2018_Defended	5	145.24	44.22
COLN01_4538d	Colne2018_Defended	10	145.44	52.59
COLN01_4538d	Colne2018_Defended	25	145.71	64.52
COLN01_4538d	Colne2018_Defended	50	145.94	75.31
COLN01_4538d	Colne2018_Defended	100	146.13	88.05
COLN01_4538d	Colne2018_Defended	100+CC	146.37	105.64
COLN01_4538d	Colne2018_Defended	1000	147.01	169.69
COLN01_4538u	Colne2018_Undefended	5	145.29	44.24
COLN01_4538u	Colne2018_Undefended	10	145.52	52.63
COLN01_4538u	Colne2018_Undefended	25	145.83	64.6
COLN01_4538u	Colne2018_Undefended	50	146.09	75.35
COLN01_4538u	Colne2018_Undefended	100	146.32	88.07
COLN01_4538u	Colne2018_Undefended	100+CC	146.65	105.69
COLN01_4538u	Colne2018_Undefended	1000	147.72	170.01
COLN01_4538u	Colne2018_Defended	5	145.29	44.22
COLN01_4538u	Colne2018_Defended	10	145.52	52.59
COLN01_4538u	Colne2018_Defended	25	145.83	64.52
COLN01_4538u	Colne2018_Defended	50	146.08	75.31
COLN01_4538u	Colne2018_Defended	100	146.32	88.05
COLN01_4538u	Colne2018_Defended	100+CC	146.65	105.64
COLN01_4538u	Colne2018_Defended	1000	147.72	169.69

COLN01_1579	Colne2018_Undefended	5	145.36	44.24
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COLN01_1579	Colne2018_Undefended	25	145.8	64.6
COLN01_1579	Colne2018_Undefended	50	146.01	75.36
COLN01_1579	Colne2018_Undefended	100	146.31	88.07
COLN01_1579	Colne2018_Undefended	100+CC	146.66	105.69
COLN01_1579	Colne2018_Undefended	1000	147.76	170.09
COLN01_1579	Colne2018_Defended	5	145.36	44.21
COLN01_1579	Colne2018_Defended	10	145.54	52.59
COLN01_1579	Colne2018_Defended	25	145.79	64.53
COLN01_1579	Colne2018_Defended	50	146.01	75.3
COLN01_1579	Colne2018_Defended	100	146.31	88.05
COLN01_1579	Colne2018_Defended	100+CC	146.65	105.65
COLN01_1579	Colne2018_Defended	1000	147.76	169.7
COLN01_4635u	Colne2018_Undefended	5	145.96	44.25
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COLN01_4635u	Colne2018_Undefended	50	146.67	75.36
COLN01_4635u	Colne2018_Undefended	100	146.9	88.11
COLN01_4635u	Colne2018_Undefended	100+CC	147.16	105.68
COLN01_4635u	Colne2018_Undefended	1000	148.09	170.08
COLN01_4635u	Colne2018_Defended	5	145.96	44.21
COLN01_4635u	Colne2018_Defended	10	146.16	52.59
COLN01_4635u	Colne2018_Defended	25	146.43	64.53
COLN01_4635u	Colne2018_Defended	50	146.67	75.28
COLN01_4635u	Colne2018_Defended	100	146.9	88.05
COLN01_4635u	Colne2018_Defended	100+CC	147.16	105.66
COLN01_4635u	Colne2018_Defended	1000	148.09	169.72
COLN01_4680	Colne2018_Undefended	5	146.24	44.21

COLN01_4680	Colne2018_Undefended	10	146.43	52.58
COLN01_4680	Colne2018_Undefended	25	146.7	64.54
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COLN01_4680	Colne2018_Undefended	100	147.13	87.99
COLN01_4680	Colne2018_Undefended	100+CC	147.39	105.58
COLN01_4680	Colne2018_Undefended	1000	148.22	169.92
COLN01_4680	Colne2018_Defended	5	146.23	44.17
COLN01_4680	Colne2018_Defended	10	146.43	52.54
COLN01_4680	Colne2018_Defended	25	146.7	64.46
COLN01_4680	Colne2018_Defended	50	146.92	75.22
COLN01_4680	Colne2018_Defended	100	147.13	87.96
COLN01_4680	Colne2018_Defended	100+CC	147.38	105.55
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COLN01_4714u	Colne2018_Undefended	5	146.63	44.21
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COLN01_4714u	Colne2018_Undefended	25	147.1	64.54
COLN01_4714u	Colne2018_Undefended	50	147.33	75.28
COLN01_4714u	Colne2018_Undefended	100	147.57	87.99
COLN01_4714u	Colne2018_Undefended	100+CC	147.87	105.57
COLN01_4714u	Colne2018_Undefended	1000	148.78	169.93
COLN01_4714u	Colne2018_Defended	5	146.64	44.17
COLN01_4714u	Colne2018_Defended	10	146.83	52.54
COLN01_4714u	Colne2018_Defended	25	147.1	64.46
COLN01_4714u	Colne2018_Defended	50	147.33	75.24
COLN01_4714u	Colne2018_Defended	100	147.57	87.96
COLN01_4714u	Colne2018_Defended	100+CC	147.87	105.56
COLN01_4714u	Colne2018_Defended	1000	148.77	169.57
COLN01_4714d	Colne2018_Undefended	5	146.39	44.21
COLN01_4714d	Colne2018_Undefended	10	146.58	52.57

COLN01_4714d	Colne2018_Undefended	25	146.86	64.54
COLN01_4714d	Colne2018_Undefended	50	147.1	75.28
COLN01_4714d	Colne2018_Undefended	100	147.36	87.99
COLN01_4714d	Colne2018_Undefended	100+CC	147.67	105.57
COLN01_4714d	Colne2018_Undefended	1000	148.63	169.93
COLN01_4714d	Colne2018_Defended	5	146.39	44.17
COLN01_4714d	Colne2018_Defended	10	146.58	52.54
COLN01_4714d	Colne2018_Defended	25	146.86	64.46
COLN01_4714d	Colne2018_Defended	50	147.1	75.24
COLN01_4714d	Colne2018_Defended	100	147.36	87.96
COLN01_4714d	Colne2018_Defended	100+CC	147.67	105.56
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COLN01_4779	Colne2018_Undefended	10	147.1	52.56
COLN01_4779	Colne2018_Undefended	25	147.33	64.53
COLN01_4779	Colne2018_Undefended	50	147.51	75.28
COLN01_4779	Colne2018_Undefended	100	147.71	88
COLN01_4779	Colne2018_Undefended	100+CC	147.95	105.58
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COLN01_4779	Colne2018_Defended	10	147.09	52.54
COLN01_4779	Colne2018_Defended	25	147.33	64.46
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COLN01_4779	Colne2018_Defended	100+CC	147.95	105.58
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COLN01_4837	Colne2018_Undefended	10	147.25	52.56
COLN01_4837	Colne2018_Undefended	25	147.47	64.53

COLN01_4837	Colne2018_Undefended	50	147.65	75.28
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COLN01_4837	Colne2018_Defended	25	147.47	64.46
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COLN01_4837	Colne2018_Defended	100+CC	148.1	105.58
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COLN01_4880	Colne2018_Undefended	10	147.65	52.54
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COLN01_4880	Colne2018_Defended	25	147.88	64.46
COLN01_4880	Colne2018_Defended	50	148.07	75.29
COLN01_4880	Colne2018_Defended	100	148.26	87.97
COLN01_4880	Colne2018_Defended	100+CC	148.51	105.59
COLN01_4880	Colne2018_Defended	1000	149.27	169.58
COLN01_4981u	Colne2018_Undefended	5	148	44.17
COLN01_4981u	Colne2018_Undefended	10	148.15	52.58
COLN01_4981u	Colne2018_Undefended	25	148.36	64.53
COLN01_4981u	Colne2018_Undefended	50	148.53	75.28

COLN01_4981u	Colne2018_Undefended	100	148.72	88.02
COLN01_4981u	Colne2018_Undefended	100+CC	148.97	105.61
COLN01_4981u	Colne2018_Undefended	1000	149.78	170.05
COLN01_4981u	Colne2018_Defended	5	148	44.16
COLN01_4981u	Colne2018_Defended	10	148.15	52.54
COLN01_4981u	Colne2018_Defended	25	148.36	64.46
COLN01_4981u	Colne2018_Defended	50	148.53	75.31
COLN01_4981u	Colne2018_Defended	100	148.72	87.97
COLN01_4981u	Colne2018_Defended	100+CC	148.97	105.6
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COLN01_5083	Colne2018_Undefended	25	148.88	64.53
COLN01_5083	Colne2018_Undefended	50	149.05	75.29
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COLN01_5083	Colne2018_Undefended	100+CC	149.47	105.63
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COLN01_5083	Colne2018_Defended	10	148.7	52.54
COLN01_5083	Colne2018_Defended	25	148.88	64.46
COLN01_5083	Colne2018_Defended	50	149.05	75.32
COLN01_5083	Colne2018_Defended	100	149.24	87.97
COLN01_5083	Colne2018_Defended	100+CC	149.47	105.6
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COLN01_5177u	Colne2018_Undefended	50	149.78	75.28
COLN01_5177u	Colne2018_Undefended	100	149.94	88.02

COLN01_5177u	Colne2018_Undefended	100+CC	150.13	105.64
COLN01_5177u	Colne2018_Undefended	1000	150.73	170.12
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COLN01_5177u	Colne2018_Defended	10	149.46	52.54
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COLN01_5281	Colne2018_Undefended	5	150.32	44.18
COLN01_5281	Colne2018_Undefended	10	150.47	52.58
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COLN01_5281	Colne2018_Undefended	50	150.83	75.28
COLN01_5281	Colne2018_Undefended	100	151.04	88.02
COLN01_5281	Colne2018_Undefended	100+CC	151.24	105.65
COLN01_5281	Colne2018_Undefended	1000	151.77	170.11
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COLN01_5281	Colne2018_Defended	10	150.47	52.54
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COLN01_5281	Colne2018_Defended	50	150.83	75.31
COLN01_5281	Colne2018_Defended	100	151.04	87.95
COLN01_5281	Colne2018_Defended	100+CC	151.24	105.6
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COLN01_5380	Colne2018_Undefended	5	151.23	44.14
COLN01_5380	Colne2018_Undefended	10	151.4	52.52
COLN01_5380	Colne2018_Undefended	25	151.63	64.46
COLN01_5380	Colne2018_Undefended	50	151.81	75.2
COLN01_5380	Colne2018_Undefended	100	151.93	87.93
COLN01_5380	Colne2018_Undefended	100+CC	152.14	105.55

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COLN01_5380	Colne2018_Defended	5	151.23	44.12
COLN01_5380	Colne2018_Defended	10	151.4	52.49
COLN01_5380	Colne2018_Defended	25	151.63	64.39
COLN01_5380	Colne2018_Defended	50	151.81	75.22
COLN01_5380	Colne2018_Defended	100	151.93	87.87
COLN01_5380	Colne2018_Defended	100+CC	152.14	105.48
COLN01_5380	Colne2018_Defended	1000	152.67	169.59
COLN01_5478u	Colne2018_Undefended	5	151.99	44.14
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COLN01_5478u	Colne2018_Undefended	100	152.66	87.92
COLN01_5478u	Colne2018_Undefended	100+CC	152.86	105.55
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COLN01_5478u	Colne2018_Defended	5	151.99	44.12
COLN01_5478u	Colne2018_Defended	10	152.14	52.49
COLN01_5478u	Colne2018_Defended	25	152.34	64.4
COLN01_5478u	Colne2018_Defended	50	152.5	75.21
COLN01_5478u	Colne2018_Defended	100	152.66	87.88
COLN01_5478u	Colne2018_Defended	100+CC	152.86	105.47
COLN01_5478u	Colne2018_Defended	1000	153.42	169.3
COLN01_5540d	Colne2018_Undefended	5	152.22	44.14
COLN01_5540d	Colne2018_Undefended	10	152.35	52.52
COLN01_5540d	Colne2018_Undefended	25	152.52	64.47
COLN01_5540d	Colne2018_Undefended	50	152.66	75.05
COLN01_5540d	Colne2018_Undefended	100	152.85	86.64
COLN01_5540d	Colne2018_Undefended	100+CC	153.11	101.26
COLN01_5540d	Colne2018_Undefended	1000	153.92	144.82

COLN01_5540d	Colne2018_Defended	5	152.22	44.12
COLN01_5540d	Colne2018_Defended	10	152.35	52.49
COLN01_5540d	Colne2018_Defended	25	152.52	64.4
COLN01_5540d	Colne2018_Defended	50	152.66	75.09
COLN01_5540d	Colne2018_Defended	100	152.83	87.6
COLN01_5540d	Colne2018_Defended	100+CC	153.05	104.43
COLN01_5540d	Colne2018_Defended	1000	153.86	152.34
COLN01_5540u	Colne2018_Undefended	5	152.22	44.14
COLN01_5540u	Colne2018_Undefended	10	152.35	52.52
COLN01_5540u	Colne2018_Undefended	25	152.52	64.47
COLN01_5540u	Colne2018_Undefended	50	152.66	75.05
COLN01_5540u	Colne2018_Undefended	100	152.85	86.64
COLN01_5540u	Colne2018_Undefended	100+CC	153.11	101.26
COLN01_5540u	Colne2018_Undefended	1000	154.48	144.82
COLN01_5540u	Colne2018_Defended	5	152.22	44.12
COLN01_5540u	Colne2018_Defended	10	152.35	52.49
COLN01_5540u	Colne2018_Defended	25	152.52	64.4
COLN01_5540u	Colne2018_Defended	50	152.66	75.09
COLN01_5540u	Colne2018_Defended	100	152.83	87.6
COLN01_5540u	Colne2018_Defended	100+CC	153.05	104.43
COLN01_5540u	Colne2018_Defended	1000	154.46	152.34
COLN01_5524	Colne2018_Undefended	5	152.34	44.14
COLN01_5524	Colne2018_Undefended	10	152.5	52.46
COLN01_5524	Colne2018_Undefended	25	152.74	63.32
COLN01_5524	Colne2018_Undefended	50	152.99	71.37
COLN01_5524	Colne2018_Undefended	100	153.3	78.63
COLN01_5524	Colne2018_Undefended	100+CC	153.72	86.33
COLN01_5524	Colne2018_Undefended	1000	154.8	107.98

COLN01_5524	Colne2018_Defended	5	152.34	44.12
COLN01_5524	Colne2018_Defended	10	152.5	52.49
COLN01_5524	Colne2018_Defended	25	152.7	64.4
COLN01_5524	Colne2018_Defended	50	152.87	75.08
COLN01_5524	Colne2018_Defended	100	153.07	87.48
COLN01_5524	Colne2018_Defended	100+CC	153.35	103.31
COLN01_5524	Colne2018_Defended	1000	154.7	133.84
COLN01_5578u	Colne2018_Undefended	5	152.82	42.84
COLN01_5578u	Colne2018_Undefended	10	153.02	47.81
COLN01_5578u	Colne2018_Undefended	25	153.38	49.47
COLN01_5578u	Colne2018_Undefended	50	153.67	49.98
COLN01_5578u	Colne2018_Undefended	100	153.94	50
COLN01_5578u	Colne2018_Undefended	100+CC	154.24	50.71
COLN01_5578u	Colne2018_Undefended	1000	154.94	81.71
COLN01_5578u	Colne2018_Defended	5	152.81	44.12
COLN01_5578u	Colne2018_Defended	10	152.96	52.49
COLN01_5578u	Colne2018_Defended	25	153.17	64.4
COLN01_5578u	Colne2018_Defended	50	153.39	74.26
COLN01_5578u	Colne2018_Defended	100	153.63	84.86
COLN01_5578u	Colne2018_Defended	100+CC	153.92	97.78
COLN01_5578u	Colne2018_Defended	1000	154.74	133.9
COLN01_5678	Colne2018_Undefended	5	153.67	44.13
COLN01_5678	Colne2018_Undefended	10	153.7	52.52
COLN01_5678	Colne2018_Undefended	25	153.76	64.38
COLN01_5678	Colne2018_Undefended	50	153.86	74.81
COLN01_5678	Colne2018_Undefended	100	153.99	87.03
COLN01_5678	Colne2018_Undefended	100+CC	154.17	102.53
COLN01_5678	Colne2018_Undefended	1000	154.87	135.45
COLN01_5678	Colne2018_Defended	5	153.72	44.12

COLN01_5678	Colne2018_Defended	10	153.85	52.49
COLN01_5678	Colne2018_Defended	25	154.01	64.41
COLN01_5678	Colne2018_Defended	50	154.15	74.32
COLN01_5678	Colne2018_Defended	100	154.3	84.9
COLN01_5678	Colne2018_Defended	100+CC	154.5	99.08
COLN01_5678	Colne2018_Defended	1000	155.02	152.4
COLN01_5778	Colne2018_Undefended	5	154.31	44.12
COLN01_5778	Colne2018_Undefended	10	154.45	52.51
COLN01_5778	Colne2018_Undefended	25	154.58	64.38
COLN01_5778	Colne2018_Undefended	50	154.74	74.82
COLN01_5778	Colne2018_Undefended	100	154.91	87.03
COLN01_5778	Colne2018_Undefended	100+CC	155.08	103.68
COLN01_5778	Colne2018_Undefended	1000	155.29	161.87
COLN01_5778	Colne2018_Defended	5	154.31	44.12
COLN01_5778	Colne2018_Defended	10	154.5	52.5
COLN01_5778	Colne2018_Defended	25	154.63	64.42
COLN01_5778	Colne2018_Defended	50	154.78	74.33
COLN01_5778	Colne2018_Defended	100	154.91	84.91
COLN01_5778	Colne2018_Defended	100+CC	155.09	99.09
COLN01_5778	Colne2018_Defended	1000	155.64	152.49

Node Point Location Map: Various Locations, Colne Water, Lancashire, BB8 8EJ

Produced: 04 December 2019
Our Ref: CL148605
NGR: 388,325 439,598

Key

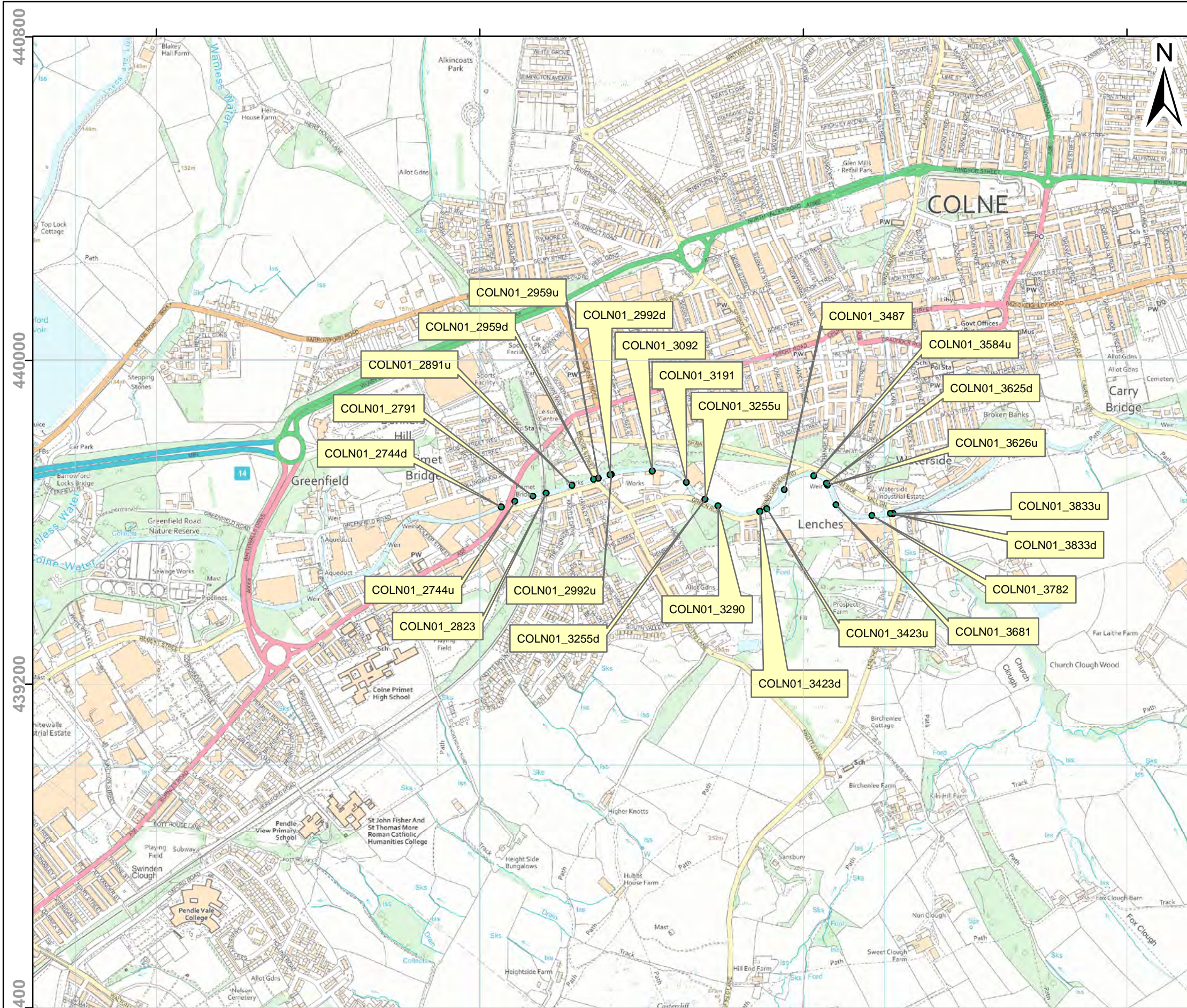
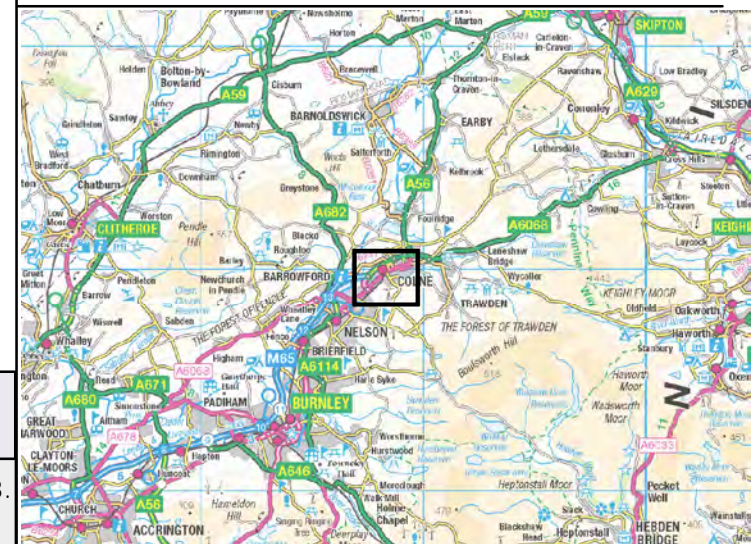
- Modelled Node Point

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



Modelled water levels with climate change using +20% flow allowances are not suitable for the majority of planning purposes. New climate change allowances can be checked on the following website; www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

NodePointName	ModelledFloodGroupCode	ReturnPeriod (Yrs)	LevelValue (Maod)	FlowValue (cumec)
COLN01_3833u	Colne2018_Undefended	5	139.13	44.42
COLN01_3833u	Colne2018_Undefended	10	139.2	52.86
COLN01_3833u	Colne2018_Undefended	25	139.32	64.86
COLN01_3833u	Colne2018_Undefended	50	139.41	75.64
COLN01_3833u	Colne2018_Undefended	100	139.54	88.46
COLN01_3833u	Colne2018_Undefended	100+CC	139.69	106.1
COLN01_3833u	Colne2018_Undefended	1000	140.13	170.73
COLN01_3833u	Colne2018_Defended	5	139.57	44.38
COLN01_3833u	Colne2018_Defended	10	139.74	52.8
COLN01_3833u	Colne2018_Defended	25	139.85	64.77
COLN01_3833u	Colne2018_Defended	50	139.97	75.62
COLN01_3833u	Colne2018_Defended	100	140.03	88.43
COLN01_3833u	Colne2018_Defended	100+CC	140.22	106.1
COLN01_3833u	Colne2018_Defended	1000	140.69	170.33
COLN01_3833d	Colne2018_Undefended	5	139.05	44.42
COLN01_3833d	Colne2018_Undefended	10	139.09	52.86
COLN01_3833d	Colne2018_Undefended	25	139.14	64.86
COLN01_3833d	Colne2018_Undefended	50	139.18	75.64
COLN01_3833d	Colne2018_Undefended	100	139.26	88.46
COLN01_3833d	Colne2018_Undefended	100+CC	139.34	106.1
COLN01_3833d	Colne2018_Undefended	1000	139.6	170.73
COLN01_3833d	Colne2018_Defended	5	139.57	44.38
COLN01_3833d	Colne2018_Defended	10	139.74	52.8
COLN01_3833d	Colne2018_Defended	25	139.85	64.77
COLN01_3833d	Colne2018_Defended	50	139.97	75.62
COLN01_3833d	Colne2018_Defended	100	140.03	88.43
COLN01_3833d	Colne2018_Defended	100+CC	140.22	106.1
COLN01_3833d	Colne2018_Defended	1000	140.69	170.33

COLN01_3782	Colne2018_Undefended	5	139	32.72
COLN01_3782	Colne2018_Undefended	10	139.26	52.81
COLN01_3782	Colne2018_Undefended	25	139.21	46.08
COLN01_3782	Colne2018_Undefended	50	139.27	54.18
COLN01_3782	Colne2018_Undefended	100	139.88	88.46
COLN01_3782	Colne2018_Undefended	100+CC	139.62	65.67
COLN01_3782	Colne2018_Undefended	1000	139.97	96.87
COLN01_3782	Colne2018_Defended	5	139.2	44.37
COLN01_3782	Colne2018_Defended	10	139.26	52.81
COLN01_3782	Colne2018_Defended	25	139.61	64.78
COLN01_3782	Colne2018_Defended	50	139.75	75.61
COLN01_3782	Colne2018_Defended	100	139.88	88.46
COLN01_3782	Colne2018_Defended	100+CC	140.04	106.12
COLN01_3782	Colne2018_Defended	1000	140.42	168.17
COLN01_3681	Colne2018_Undefended	5	138.33	32.74
COLN01_3681	Colne2018_Undefended	10	138.86	52.81
COLN01_3681	Colne2018_Undefended	25	138.71	46.08
COLN01_3681	Colne2018_Undefended	50	138.9	54.19
COLN01_3681	Colne2018_Undefended	100	138.97	57.26
COLN01_3681	Colne2018_Undefended	100+CC	139.14	65.63
COLN01_3681	Colne2018_Undefended	1000	139.66	96.84
COLN01_3681	Colne2018_Defended	5	138.68	44.38
COLN01_3681	Colne2018_Defended	10	138.86	52.81
COLN01_3681	Colne2018_Defended	25	139.12	64.79
COLN01_3681	Colne2018_Defended	50	139.33	75.58
COLN01_3681	Colne2018_Defended	100	139.54	88.53
COLN01_3681	Colne2018_Defended	100+CC	139.75	105.63
COLN01_3681	Colne2018_Defended	1000	140.17	155.44
COLN01_3626u	Colne2018_Undefended	5	138.22	32.81

COLN01_3626u	Colne2018_Undefended	10	138.74	52.81
COLN01_3626u	Colne2018_Undefended	25	138.59	46.12
COLN01_3626u	Colne2018_Undefended	50	138.78	54.23
COLN01_3626u	Colne2018_Undefended	100	138.84	57.32
COLN01_3626u	Colne2018_Undefended	100+CC	139	65.67
COLN01_3626u	Colne2018_Undefended	1000	139.49	96.85
COLN01_3626u	Colne2018_Defended	5	137.39	44.41
COLN01_3626u	Colne2018_Defended	10	138.38	38.25
COLN01_3626u	Colne2018_Defended	25	137.69	64.8
COLN01_3626u	Colne2018_Defended	50	137.84	75.59
COLN01_3626u	Colne2018_Defended	100	138.03	88.6
COLN01_3626u	Colne2018_Defended	100+CC	138.22	103.6
COLN01_3626u	Colne2018_Defended	1000	138.69	141.66
COLN01_3625d	Colne2018_Undefended	5	137.19	32.81
COLN01_3625d	Colne2018_Undefended	10	137.51	52.81
COLN01_3625d	Colne2018_Undefended	25	137.41	46.12
COLN01_3625d	Colne2018_Undefended	50	137.52	54.23
COLN01_3625d	Colne2018_Undefended	100	137.58	57.32
COLN01_3625d	Colne2018_Undefended	100+CC	137.73	65.67
COLN01_3625d	Colne2018_Undefended	1000	138.38	96.85
COLN01_3625d	Colne2018_Defended	5	137.39	44.41
COLN01_3625d	Colne2018_Defended	10	137.51	52.81
COLN01_3625d	Colne2018_Defended	25	137.69	64.8
COLN01_3625d	Colne2018_Defended	50	137.84	75.59
COLN01_3625d	Colne2018_Defended	100	138.03	88.6
COLN01_3625d	Colne2018_Defended	100+CC	138.22	103.6
COLN01_3625d	Colne2018_Defended	1000	138.69	141.66
COLN01_3584u	Colne2018_Undefended	5	136.55	32.79
COLN01_3584u	Colne2018_Undefended	10	136.87	52.82

COLN01_3584u	Colne2018_Undefended	25	136.78	46.12
COLN01_3584u	Colne2018_Undefended	50	136.96	54.24
COLN01_3584u	Colne2018_Undefended	100	137.13	57.32
COLN01_3584u	Colne2018_Undefended	100+CC	137.31	65.67
COLN01_3584u	Colne2018_Undefended	1000	138.07	96.84
COLN01_3584u	Colne2018_Defended	5	136.74	44.46
COLN01_3584u	Colne2018_Defended	10	136.87	52.82
COLN01_3584u	Colne2018_Defended	25	137.06	64.83
COLN01_3584u	Colne2018_Defended	50	137.24	75.57
COLN01_3584u	Colne2018_Defended	100	137.47	88.6
COLN01_3584u	Colne2018_Defended	100+CC	137.66	103.6
COLN01_3584u	Colne2018_Defended	1000	138.24	141.65
COLN01_3487	Colne2018_Undefended	5	134.96	32.76
COLN01_3487	Colne2018_Undefended	10	135.12	52.81
COLN01_3487	Colne2018_Undefended	25	135.77	46.06
COLN01_3487	Colne2018_Undefended	50	136.37	54.16
COLN01_3487	Colne2018_Undefended	100	136.96	57.27
COLN01_3487	Colne2018_Undefended	100+CC	137.24	65.66
COLN01_3487	Colne2018_Undefended	1000	138.21	96.76
COLN01_3487	Colne2018_Defended	5	134.84	44.47
COLN01_3487	Colne2018_Defended	10	135.12	52.81
COLN01_3487	Colne2018_Defended	25	135.66	64.8
COLN01_3487	Colne2018_Defended	50	136.29	75.47
COLN01_3487	Colne2018_Defended	100	136.88	88.58
COLN01_3487	Colne2018_Defended	100+CC	137.15	103.54
COLN01_3487	Colne2018_Defended	1000	138.15	141.54
COLN01_3290	Colne2018_Undefended	5	133.98	44.41
COLN01_3290	Colne2018_Undefended	10	134.18	52.87
COLN01_3290	Colne2018_Undefended	25	134.49	64.84

COLN01_3290	Colne2018_Undefended	50	134.88	75.56
COLN01_3290	Colne2018_Undefended	100	135.49	88.55
COLN01_3290	Colne2018_Undefended	100+CC	136.65	106.1
COLN01_3290	Colne2018_Undefended	1000	137.72	170.4
COLN01_3290	Colne2018_Defended	5	133.98	44.43
COLN01_3290	Colne2018_Defended	10	134.18	52.8
COLN01_3290	Colne2018_Defended	25	134.49	64.75
COLN01_3290	Colne2018_Defended	50	134.87	75.36
COLN01_3290	Colne2018_Defended	100	135.49	88.48
COLN01_3290	Colne2018_Defended	100+CC	136.33	105.47
COLN01_3290	Colne2018_Defended	1000	137.71	170.14
COLN01_3255u	Colne2018_Undefended	5	133.83	44.41
COLN01_3255u	Colne2018_Undefended	10	134.04	52.87
COLN01_3255u	Colne2018_Undefended	25	134.4	64.86
COLN01_3255u	Colne2018_Undefended	50	134.84	75.56
COLN01_3255u	Colne2018_Undefended	100	135.5	88.54
COLN01_3255u	Colne2018_Undefended	100+CC	136.38	106.1
COLN01_3255u	Colne2018_Undefended	1000	137.71	170.4
COLN01_3255u	Colne2018_Defended	5	133.83	44.42
COLN01_3255u	Colne2018_Defended	10	134.04	52.8
COLN01_3255u	Colne2018_Defended	25	134.4	64.75
COLN01_3255u	Colne2018_Defended	50	134.84	75.35
COLN01_3255u	Colne2018_Defended	100	135.5	88.48
COLN01_3255u	Colne2018_Defended	100+CC	136.35	105.48
COLN01_3255u	Colne2018_Defended	1000	137.71	170.13
COLN01_3255d	Colne2018_Undefended	5	133.82	44.41
COLN01_3255d	Colne2018_Undefended	10	134.04	52.87
COLN01_3255d	Colne2018_Undefended	25	134.32	64.84
COLN01_3255d	Colne2018_Undefended	50	134.54	75.56

COLN01_3255d	Colne2018_Undefended	100	134.78	88.54
COLN01_3255d	Colne2018_Undefended	100+CC	135.1	106.1
COLN01_3255d	Colne2018_Undefended	1000	136	170.4
COLN01_3255d	Colne2018_Defended	5	133.82	44.42
COLN01_3255d	Colne2018_Defended	10	134.04	52.8
COLN01_3255d	Colne2018_Defended	25	134.31	64.75
COLN01_3255d	Colne2018_Defended	50	134.53	75.35
COLN01_3255d	Colne2018_Defended	100	134.78	88.48
COLN01_3255d	Colne2018_Defended	100+CC	135.09	105.48
COLN01_3255d	Colne2018_Defended	1000	135.99	170.13
COLN01_3191	Colne2018_Undefended	5	133.35	44.42
COLN01_3191	Colne2018_Undefended	10	133.51	52.8
COLN01_3191	Colne2018_Undefended	25	133.72	64.85
COLN01_3191	Colne2018_Undefended	50	133.91	75.56
COLN01_3191	Colne2018_Undefended	100	134.13	88.54
COLN01_3191	Colne2018_Undefended	100+CC	134.42	106.09
COLN01_3191	Colne2018_Undefended	1000	135.4	170.4
COLN01_3191	Colne2018_Defended	5	133.35	44.42
COLN01_3191	Colne2018_Defended	10	133.51	52.8
COLN01_3191	Colne2018_Defended	25	133.72	64.74
COLN01_3191	Colne2018_Defended	50	133.91	75.35
COLN01_3191	Colne2018_Defended	100	134.13	88.48
COLN01_3191	Colne2018_Defended	100+CC	134.41	105.48
COLN01_3191	Colne2018_Defended	1000	135.4	170.13
COLN01_3092	Colne2018_Undefended	5	132.77	44.42
COLN01_3092	Colne2018_Undefended	10	132.94	52.85
COLN01_3092	Colne2018_Undefended	25	133.16	64.85
COLN01_3092	Colne2018_Undefended	50	133.35	75.55
COLN01_3092	Colne2018_Undefended	100	133.56	88.54

COLN01_3092	Colne2018_Undefended	100+CC	133.84	106.09
COLN01_3092	Colne2018_Undefended	1000	134.76	170.38
COLN01_3092	Colne2018_Defended	5	132.77	44.4
COLN01_3092	Colne2018_Defended	10	132.94	52.8
COLN01_3092	Colne2018_Defended	25	133.16	64.74
COLN01_3092	Colne2018_Defended	50	133.35	75.34
COLN01_3092	Colne2018_Defended	100	133.56	88.48
COLN01_3092	Colne2018_Defended	100+CC	133.84	105.48
COLN01_3092	Colne2018_Defended	1000	134.76	170.14
COLN01_2992d	Colne2018_Undefended	5	132.24	44.44
COLN01_2992d	Colne2018_Undefended	10	132.4	52.87
COLN01_2992d	Colne2018_Undefended	25	132.62	64.87
COLN01_2992d	Colne2018_Undefended	50	132.8	75.57
COLN01_2992d	Colne2018_Undefended	100	133.01	88.57
COLN01_2992d	Colne2018_Undefended	100+CC	133.26	106.13
COLN01_2992d	Colne2018_Undefended	1000	134.03	170.43
COLN01_2992d	Colne2018_Defended	5	132.09	44.4
COLN01_2992d	Colne2018_Defended	10	132.25	52.81
COLN01_2992d	Colne2018_Defended	25	132.47	64.75
COLN01_2992d	Colne2018_Defended	50	132.66	75.37
COLN01_2992d	Colne2018_Defended	100	132.87	88.5
COLN01_2992d	Colne2018_Defended	100+CC	133.13	105.51
COLN01_2992d	Colne2018_Defended	1000	133.93	170.21
COLN01_2992u	Colne2018_Undefended	5	132.24	44.44
COLN01_2992u	Colne2018_Undefended	10	132.4	52.87
COLN01_2992u	Colne2018_Undefended	25	132.62	64.87
COLN01_2992u	Colne2018_Undefended	50	132.8	75.57
COLN01_2992u	Colne2018_Undefended	100	133.01	88.57
COLN01_2992u	Colne2018_Undefended	100+CC	133.26	106.13

COLN01_2992u	Colne2018_Undefended	1000	134.04	170.43
COLN01_2992u	Colne2018_Defended	5	132.24	44.4
COLN01_2992u	Colne2018_Defended	10	132.4	52.81
COLN01_2992u	Colne2018_Defended	25	132.62	64.75
COLN01_2992u	Colne2018_Defended	50	132.8	75.37
COLN01_2992u	Colne2018_Defended	100	133.01	88.5
COLN01_2992u	Colne2018_Defended	100+CC	133.26	105.51
COLN01_2992u	Colne2018_Defended	1000	134.04	170.21
COLN01_2959d	Colne2018_Undefended	5		
COLN01_2959d	Colne2018_Undefended	10		
COLN01_2959d	Colne2018_Undefended	25	152.34	64.47
COLN01_2959d	Colne2018_Undefended	50	152.5	75.21
COLN01_2959d	Colne2018_Undefended	100	152.66	87.92
COLN01_2959d	Colne2018_Undefended	100+CC	152.86	105.55
COLN01_2959d	Colne2018_Undefended	1000	153.43	167.75
COLN01_2959d	Colne2018_Defended	5	151.99	44.12
COLN01_2959d	Colne2018_Defended	10	152.14	52.49
COLN01_2959d	Colne2018_Defended	25	152.34	64.4
COLN01_2959d	Colne2018_Defended	50	152.5	75.21
COLN01_2959d	Colne2018_Defended	100	152.66	87.88
COLN01_2959d	Colne2018_Defended	100+CC	152.86	105.47
COLN01_2959d	Colne2018_Defended	1000	153.42	169.3
COLN01_2959u	Colne2018_Undefended	5	152.22	44.14
COLN01_2959u	Colne2018_Undefended	10	152.35	52.52
COLN01_2959u	Colne2018_Undefended	25	152.52	64.47
COLN01_2959u	Colne2018_Undefended	50	152.66	75.05
COLN01_2959u	Colne2018_Undefended	100	152.85	86.64
COLN01_2959u	Colne2018_Undefended	100+CC	153.11	101.26
COLN01_2959u	Colne2018_Undefended	1000	153.92	144.82

COLN01_2959u	Colne2018_Defended	5	152.22	44.12
COLN01_2959u	Colne2018_Defended	10	152.35	52.49
COLN01_2959u	Colne2018_Defended	25	152.52	64.4
COLN01_2959u	Colne2018_Defended	50	152.66	75.09
COLN01_2959u	Colne2018_Defended	100	152.83	87.6
COLN01_2959u	Colne2018_Defended	100+CC	153.05	104.43
COLN01_2959u	Colne2018_Defended	1000	153.86	152.34
COLN01_2891u	Colne2018_Undefended	5	152.22	44.14
COLN01_2891u	Colne2018_Undefended	10	152.35	52.52
COLN01_2891u	Colne2018_Undefended	25	152.52	64.47
COLN01_2891u	Colne2018_Undefended	50	152.66	75.05
COLN01_2891u	Colne2018_Undefended	100	152.85	86.64
COLN01_2891u	Colne2018_Undefended	100+CC	153.11	101.26
COLN01_2891u	Colne2018_Undefended	1000	154.48	144.82
COLN01_2891u	Colne2018_Defended	5	152.22	44.12
COLN01_2891u	Colne2018_Defended	10	152.35	52.49
COLN01_2891u	Colne2018_Defended	25	152.52	64.4
COLN01_2891u	Colne2018_Defended	50	152.66	75.09
COLN01_2891u	Colne2018_Defended	100	152.83	87.6
COLN01_2891u	Colne2018_Defended	100+CC	153.05	104.43
COLN01_2891u	Colne2018_Defended	1000	154.46	152.34
COLN01_2791	Colne2018_Undefended	5	152.34	44.14
COLN01_2791	Colne2018_Undefended	10	152.5	52.46
COLN01_2791	Colne2018_Undefended	25	152.74	63.32
COLN01_2791	Colne2018_Undefended	50	152.99	71.37
COLN01_2791	Colne2018_Undefended	100	153.3	78.63
COLN01_2791	Colne2018_Undefended	100+CC	153.72	86.33
COLN01_2791	Colne2018_Undefended	1000	154.8	107.98

COLN01_2791	Colne2018_Defended	5	152.34	44.12
COLN01_2791	Colne2018_Defended	10	152.5	52.49
COLN01_2791	Colne2018_Defended	25	152.7	64.4
COLN01_2791	Colne2018_Defended	50	152.87	75.08
COLN01_2791	Colne2018_Defended	100	153.07	87.48
COLN01_2791	Colne2018_Defended	100+CC	153.35	103.31
COLN01_2791	Colne2018_Defended	1000	154.7	133.84
COLN01_2823	Colne2018_Undefended	5	131.35	44.44
COLN01_2823	Colne2018_Undefended	10	131.56	52.88
COLN01_2823	Colne2018_Undefended	25	131.83	64.87
COLN01_2823	Colne2018_Undefended	50	132.05	75.56
COLN01_2823	Colne2018_Undefended	100	132.29	88.62
COLN01_2823	Colne2018_Undefended	100+CC	132.55	106.13
COLN01_2823	Colne2018_Undefended	1000	133.34	170.39
COLN01_2823	Colne2018_Defended	5	131.35	44.4
COLN01_2823	Colne2018_Defended	10	131.56	52.8
COLN01_2823	Colne2018_Defended	25	131.83	64.74
COLN01_2823	Colne2018_Defended	50	132.05	75.38
COLN01_2823	Colne2018_Defended	100	132.29	88.48
COLN01_2823	Colne2018_Defended	100+CC	132.54	105.51
COLN01_2823	Colne2018_Defended	1000	133.34	170.22
COLN01_2744u	Colne2018_Undefended	5	130.6	44.44
COLN01_2744u	Colne2018_Undefended	10	130.77	52.88
COLN01_2744u	Colne2018_Undefended	25	131	64.87
COLN01_2744u	Colne2018_Undefended	50	131.2	75.55
COLN01_2744u	Colne2018_Undefended	100	131.43	88.63
COLN01_2744u	Colne2018_Undefended	100+CC	131.72	106.13
COLN01_2744u	Colne2018_Undefended	1000	132.77	170.39
COLN01_2744u	Colne2018_Defended	5	130.6	44.41

COLN01_2744u	Colne2018_Defended	10	130.77	52.8
COLN01_2744u	Colne2018_Defended	25	131	64.74
COLN01_2744u	Colne2018_Defended	50	131.2	75.38
COLN01_2744u	Colne2018_Defended	100	131.43	88.47
COLN01_2744u	Colne2018_Defended	100+CC	131.71	105.51
COLN01_2744u	Colne2018_Defended	1000	132.77	170.21
COLN01_2744d	Colne2018_Undefended	5	130.6	44.44
COLN01_2744d	Colne2018_Undefended	10	130.77	52.88
COLN01_2744d	Colne2018_Undefended	25	131	64.87
COLN01_2744d	Colne2018_Undefended	50	131.19	75.55
COLN01_2744d	Colne2018_Undefended	100	131.4	88.63
COLN01_2744d	Colne2018_Undefended	100+CC	131.66	106.13
COLN01_2744d	Colne2018_Undefended	1000	132.5	170.39
COLN01_2744d	Colne2018_Defended	5	130.6	44.41
COLN01_2744d	Colne2018_Defended	10	130.77	52.8
COLN01_2744d	Colne2018_Defended	25	130.99	64.74
COLN01_2744d	Colne2018_Defended	50	131.18	75.38
COLN01_2744d	Colne2018_Defended	100	131.4	88.47
COLN01_2744d	Colne2018_Defended	100+CC	131.65	105.51
COLN01_2744d	Colne2018_Defended	1000	132.5	170.21