Technical advisers on environmental issues

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY IN RESPECT OF THE GRS ROADSTONE LIMITED AGGREGATES RAILHEAD AT NEILSON RAIL SIDINGS, WELLINGBOROUGH

PLANNING APPLICATION TO IMPORT IBAA INTO THE EXISTING WELLINGBOUGH RAILHEAD REGULATED UNDER PLANNING CONSENT 09/00009/MIN DATED 7 APRIL 2009 AND BLEND THE SAME WITH RAW AGGREGATE TO DERVIE A SECONDARY/RECYCLED CONSTRUCTION MATERIAL

Report reference: GRS/WE/KW/20082/01
August 2023

Baddesley Colliery Offices, Main Road, Baxterley, Atherstone, Warwickshire, CV9 2LE

Tel. (01827) 717891 Fax. (01827) 718507

CONTENTS

FIGURES

APPENDICES

1. Introduction

1.1 MJCA is commissioned by GRS Roadstone Limited to undertake a site specific flood risk assessment (FRA) with respect to the proposed importation of Incinerator Bottom Ash Aggregates (IBAA) and blending of the IBAA with primary aggregate at Neilson Rail Sidings, Wellingborough.

1.2 The FRA has been carried out in support of a planning application in relation to the proposed activities. The FRA has been undertaken consistent with the National Planning Policy Framework (NPPF) (reference 1) and the associated Planning Practice Guidance (PPG) (reference 2).

1.3 It is understood that the application area has the benefit of an existing Planning Permission reference WP/2009/0047 dated 7 April 2009 relevant to the operation of a rail aggregates depot. The site location and layout are shown on Figure 1. The area of the current Planning Permission and additional site details are shown on the plan presented at Appendix A.

1.4 The application area comprises part of the Wellingborough Railhead (the railhead site) operated by GRS Roadstone Limited. The railhead site includes the existing railhead with ancillary facilities including areas of hardstanding yard space and stocking bays together with areas of open storage, miscellaneous plant and material stores together with a wheel wash, weighbridge and site offices. The railhead site comprises part of the Neilson Rail Sidings site where aggregates are imported by rail, stored and loaded for onward distribution by road. Based on historical Ordnance Survey (OS) mapping there have been railway sidings in the vicinity of the application area since at least 1899 and the extent of the area of sidings and associated activity has changed over time. The site is located in a predominately industrial area on the north eastern outskirts of Wellingborough, Northamptonshire.

1.5 As shown on Figure 1 the application area comprises two main parts: an area of hardstanding in the north and an existing site access road in the south. It is understood that the majority of the railhead site comprises porous hardstanding including the hardstanding area to be associated with the proposed IBAA handling activities in the north of the application area shown on Figure 1. There are ancillary

facilities such as site offices, weighbridge and car parking in the south of the application area associated with the site access road.

Proposed development

1.6 It is understood that it is proposed to import IBAA and subject the imported materials to a simple blending process to generate a non-waste recycled aggregate/construction material product. The proposed blending process will necessitate the construction of three bays for the IBAA storage and blending operations in the northern part of the site which comprises an area of hardstanding.

1.7 The IBAA blending operations will be carried out using loading shovels and the placement in the bays of alternate layers of IBAA and aggregate. Each IBAA storage and blending bay will be constructed using precast concrete Legioblocks® and each bay will be approximately 30m long, 12.5m wide and 4m high.

1.8 The IBAA storage and blending bays will be established on the existing hardstanding on the current railhead subject to some slight re-grading to facilitate the containment of drainage in the storage bays. The IBAA storage and blending bays will incorporate impermeable surfaces with sealed drainage systems. Surface runoff from the IBAA storage and blending bays will be collected and contained in suitable storage tanks before being removed from the site for off site disposal.

1.9 It is understood that no new processing plant or equipment is required and no changes to materials handing methods are required. It is understood that that the existing facilities such as site offices, weighbridge and car parking in the south of the application area associated with the site access road will be unchanged. It is understood that the railhead and site management facilities already are consented and do not need developing further in support of the planning application.

1.10 Access to the site as regulated through the consent is to and from Meadow Close to the east of the site. However, since late 2019 the operations at the site have benefited from a new and enhanced access off Roundhouse Way to the south. This access was instated by Network Rail under their own permitted development powers to service access to their interests (including the site) at the Neilson Sidings. This

application seeks consent to continue the use of this new access both for the proposed development and the ongoing use of the site as an aggregates railhead.

2. Geological and hydrological setting

Site Setting

2.1 The application area is centred approximately on National Grid Reference (NGR) SP 90457 69639 and is located approximately 1.5km north east of the centre of Wellingborough and 2.3km south west of the centre of the village of Finedon. The Harrowden Brook is located approximately 30m east of the northern part of the application area at its closest point.

2.2 The railhead site of which the application area comprises a part includes the existing aggregate stocking and handling yard with ancillary facilities including areas of hardstanding, yard space and stocking bays together with areas of open storage, miscellaneous plant and material stores. The application area is located in a predominantly industrial area. There are areas of undeveloped land including scrub and woodland located to the east and north of the northern part of the application area.

2.3 The northern part of the application area has dimensions of approximately 50m by 100m which is understood to comprise porous hardstanding. The site access road and associated facilities comprise the southern part of the application area. The site access road is approximately 550m in length. The site access road and the adjacent railway cross over the Harrowden Brook approximately 180m south of the northern part of the application area and cross under the Finedon Road approximately 415m south of the northern part of the application area. The application area is accessed from the south off Roundhouse Way. As shown on the site layout plan presented at Appendix A there is an existing car park, weighbridge and a site office building in vicinity of the site entrance approximately 315m south of the northern part of the application area.

2.4 Based on an Environment Agency (EA) 2022 LIDAR Digital Terrain Model (DTM) the northern part of the application area and the wider hardstanding area of which it comprises a part is at an elevation of between approximately 49.5m above Ordnance Datum (mAOD) and 50.5mAOD. At the edge of the hardstanding area approximately 15m east of the northern part of the application area the ground falls away steeply to

the east towards Harrowden Brook which is at an elevation of approximately 43mAOD to 44mAOD. On the east bank of the Harrowden Brook ground levels are between approximately 45mAOD and 46mAOD.

Geology

2.5 Based on British Geological Survey (BGS) web map service (WMS) 1:50,000 scale geological mapping the bedrock underlying the application area comprises mudstone of the Whitby Mudstone Formation which comprises part of the Jurassic Lias Group.

2.6 The application area is recorded by the BGS as being underlain by artificial ground comprising undivided Made Ground. The Made Ground extends eastwards to Harrowden Brook and westwards to the railway line located approximately 100m west of the northern part of the application area.

2.7 Based on the BGS mapping there are no superficial deposits recorded at the site. Quaternary Alluvium comprising clay and silt is recorded to the east of Harrowden Brook.

Hydrogeology

2.8 The Whitby Mudstone Formation bedrock underlying the site is classified as an unproductive aquifer. The Alluvium is classified as a Secondary A aquifer. Secondary A aquifers comprise permeable layers that can support local water supplies and may form a component of baseflow. There are no groundwater Source Protection Zones (SPZs) located in vicinity of the site.

Hydrology

2.9 The Harrowden Brook is a west bank tributary of the River Ise. The confluence of Harrowden Brook and the River Ise is located approximately 150m north east of the northern part of the application area. The River Ise is located east of the application area and flows generally north to south. The River Ise has a confluence with the River Nene approximately 2km south of the site.

2.10 Based on OS mapping it is considered that the Harrowden Brook runs in a culvert under the railway and site access road approximately 180m south of the northern part

of the application area. There is an additional crossing of Harrowden Brook approximately 85m north east of the northern part of the application area. It is understood that the additional crossing is associated with an alternative site access route to the railhead which is located off Meadow Close on the eastern bank of Harrowden Brook.

2.11 Based on the Environmental Agency Flood Map for Planning the application area generally is located in Flood Zone 1 with the exception of an approximately 15m wide strip in the east of the northern part of the application area which is located in Flood Zone 2. Based on the Flood Map part of the existing site access road in the vicinity of the crossing of Harrowden Brook is also located in Flood Zone 2. Based on the Flood Map a small area of ground immediately adjacent to Harrowden Brook (but outwith the application site) is located in Flood Zone 3. Flood Zone 1 is defined in the PPG to the NPPF (reference 2) as land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%). Flood Zone 2 is defined as land assessed as having between a 1 and 1000 and a 1 in 100 annual probability of river or sea flooding (between 0.1% and 1%). Flood Zone 3 is defined as land assessed as having greater a 1 and 100 annual probability of river or sea flooding (>1%).

2.12 The location of the flood zones at and in the vicinity of the site are shown at Appendix B which comprises flood risk information requested from the EA. The information presented at Appendix B is described in detail in Section 4 of this report.

3. Strategic flood risk assessment

3.1 A Level 1 Strategic Flood Risk Assessment (SFRA) was produced in February 2011 by Royal Haskoning for the Borough Council of Wellingborough (BCW) and Kettering Borough Council (KBC). BCW commissioned Northamptonshire County Council (NCC) in September 2016 to prepare an updated Level 1 SFRA (reference 3) (the 2017 SFRA Update).

3.2 Based on the 2017 SFRA Update the section of Harrowden Brook in the vicinity of the site has been modelled using 1D hydrodynamic (ISIS) hydraulic models and it is reported that the EA should be contacted for further details of the modelling carried out. Flood risk information requested from the EA to facilitate preparation of this FRA is presented at Appendix B.

3.3 The 2017 SFRA Update includes flood maps which record that there are areas with a high risk of fluvial flooding (Flood Zone 3a) located on Harrowden Brook upstream of the application area to the west of the crossing of the railway over Harrowden Brook in the vicinity of the site access road. The application area and the reach of Harrowden Brook downstream of the railway crossing over the Harrowden Brook and upstream of its confluence with the River Ise is not recorded as being located in Flood Zone 3a. There are substantial areas shown in Flood Zone 3a on the east bank of the River Ise.

3.4 Based on 2017 SFRA Update the application area is not recorded in Flood Zone 3b (the Functional Floodplain) which comprises land where water has to flow or be stored in times of flood. There are substantial areas of Functional Floodplain on the east bank of the River Ise.

3.5 Based on the surface water flooding maps in the 2017 SFRA Update there is part of Neilson Rail Sidings west of the northern part of the application area which may have a medium to high risk of surface water flooding. A high risk area is defined as an area with greater than or equal to a 1 in 30 chance in any given year of surface water flooding. An area of medium risk is defined as having less than a 1 in 30 but greater than a 1 in 100 chance in any given year of surface water flooding.

3.6 Based on the 2017 SFRA Update the application area is assessed as having a negligible risk of groundwater flooding and reservoir flooding.

3.7 Detailed information is not provided in the 2017 SFRA Update on the risk of sewer flooding. It is stated that sewers are typically designed to cater for a storm period from 1 in 50 annual probability (2%) up to the 1 in 30 annual probability (3.33%) storm event.

4. Assessment of the risk of flooding at the site

4.1 Detailed flood risk mapping information obtained from the EA is presented at Appendix B. The information requested from the EA comprises the Product 4 package of information. Product 4 comprises a Detailed Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations, historic flood event outlines and more detailed information from EA computer river models (including model extent, information on one or more specific points, flood levels, flood flows).

4.2 Based on the Historic Flood Map presented at Appendix B Harrowden Brook in the vicinity of the site flooded in March 1947. In the 2017 SFRA Update it is reported that in March 1947 a combination of heavy rain on a frozen catchment followed by rapid snowmelt resulted in substantial flooding on the River Nene between Northampton and Wellingborough and flooding on Harrowden Brook.

4.3 The western boundary of the March 1947 flood event shown on the Historic Flood Map coincides with the western boundary of Flood Zone 2 on the Flood Map for Planning. On this basis there is part of the east of the northern part of the application area and part of the site access road shown as being within the March 1947 flood extent.

4.4 The information presented at Appendix B includes information derived from EA hydraulic river models. Modelled flood levels for storm events with a range of return periods are provided for three modelled node points each on Harrowden Brook and a further three node points on the River Ise. The predicted flood levels for the modelled node points on the River Ise are lower than for the modelled flood nodes on the Harrowden Brook adjacent to the site hence are not considered in detail here.

4.5 A map provided at Appendix B shows modelled flood extents for Harrowden Brook. It would appear that the modelled flood extents are applicable to the modelled node points upstream of the application area (node points Ha661 and Ha448). This area is upstream of the culverted section of Harrowden Brook under the railway line and site access road.

4.6 Flood extents do not seem to have been provided for modelled flood node Ha59U located on Harrowden Brook in the vicinity of the site. As shown on Figure 1 node Ha59U is located at the additional crossing point over Harrowden Brook located north east of the northern part of the application area. For modelled flood note Ha59U the modelled 1 in 100 year plus 20% climate change flood level and the modelled 1 in 1000 year plus 20% climate change flood levels are 44.97mAOD and 45.51mAOD respectively. For comparison the northern part of the application area is at an elevation of between approximately 49.5mAOD and 50.5mAOD based on the EA 2022 LIDAR DTM. For illustrative purposes the areas upstream of node Ha59U which are at an elevation lower than the 1 in 100 year and 1 in 1000 year modelled flood levels are shown on Figure 1. Consistent with Figure 1 the whole application area is significantly higher in elevation than either the 1 in 100 year or the 1 in 1000 year modelled flood levels for node Ha59U.

4.7 As the western boundary of the March 1947 flood event coincides with the western boundary of Flood Zone 2 shown on the EA Flood Map for Planning it is considered that the extent of Flood Zone 2 is designated on the Flood Map local to the application area based on the March 1947 flood outline rather than the EA flood modelling described above. As the BGS geological mapping records artificial ground comprising Made Ground at the site it is considered that in the course of the historical use of the side as rail sidings ground levels are likely to have increased significantly compared with the ground levels prior to the development of the rail sidings. Whilst it may be conservative to assume that the 1947 flood outline comprises the western extent of Flood Zone 2 it is considered that this approach does not take into account that ground levels are likely to have changed significantly in the more than 76 years since the 1947 historic flood event and on this basis may be unrealistic. It is considered that the flood modelling results and current ground elevations comprise a more realistic basis for assessing the risk of fluvial flooding than the 1947 historical flood extent.

4.8 For the western part of the site to be located in the floodplain would necessitate a flood level of approximately 49.5mAOD or approximately 4m higher than the modelled 1 in 1000 year plus 20% climate change flood level of 45.51mAOD for

modelled flood node Ha59U. A flood level of 49.5mAOD would cause inundation of a substantially greater area of land than the extent of the 1947 historic flood event.

4.9 Based on the information reviewed it is considered that the northern part of the application area generally is not located in the fluvial floodplain and lies approximately 4m higher than the predicted flood levels for the 1 in 1000 year plus 20% climate change fluvial flood event. Consistent with Figure 1 it is considered that neither the northern part of the application area or the site access road are located in the floodplain. On this basis it is considered that the risk of fluvial flooding to the application area is negligible.

4.10 Detailed information is not provided in the 2017 SFRA Update on the risk of sewer flooding. A plan showing sewers at and in the vicinity of the application area is presented at Appendix C. A 300mm diameter foul sewer crosses the site access road south of Harrowden Brook. Based on the information presented at Appendix C there are no other sewers located in proximity to the application area and it is considered that the risk of sewer flooding generally is low.

4.11 Consistent with the 2017 SFRA Update it is considered that there are no significant risks to the application area associated with surface water flooding, reservoir flooding or groundwater flooding.

5. Flood risk Sequential Test

5.1 The NPPF (reference 1) sets out planning policy for England. The NPPF includes national policy for development and flood risk which must be taken into account in the preparation of local plans and is a material consideration in planning decisions. It is stated in the NPPF that strategic policies should be informed by a strategic flood risk assessment (SFRA) and that a sequential, risk-based approach should be applied to the location of development taking into account the current and future impacts of climate change.

5.2 Based on the allocated housing sites and sustainable urban development extensions maps in the 2017 SFRA Update the application area is in an area which is allocated as suitable for Sustainable Urban Extension. It is reported in the 2017 SFRA Update that the site specific allocation process including the Sequential Test has been informed by the available evidence base on flood and water management.

5.3 Notwithstanding that the application area comprises part of an area which it is understood is allocated for Sustainable Urban Extension, for the purpose of preparing the FRA a sequential, risk-based approach has been followed to assess the proposed development consistent with the NPPF, the 'flood risk and coastal change' section of the PPG and EA guidance on Flood Risk Assessment (FRA). Other sources of information on flood risk including the 2017 SFRA Update have also been reviewed.

5.4 The NPPF sets out the basis for the flood risk Sequential Test, the aim of which is to steer new development to areas with the lowest risk of flooding. Consistent with the NPPF, development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. An Exception Test is defined in the NPPF with reference to the potential vulnerability of the site to flooding and the nature of the development proposed for application in circumstances where it is not possible for development to be located in zones with a lower risk of flooding. It is stated that for the Exception Test to be passed it should be demonstrated that:

> *"…a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and*

> *b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall…"*

5.5 Based on the NPPF the acceptability or otherwise of a development in an area at risk of flooding should be assessed on a site specific basis taking into account the Sequential Test and the Exception Test where applicable and whether (among other criteria) the most vulnerable development within the site is located in areas of lowest flood risk, the development is appropriately flood resistant and resilient, incorporates sustainable drainage systems, and whether any residual flood risk can be managed safely. Based on the NPPF, developments which increase flood risk elsewhere should not be permitted.

5.6 The NPPF is supported by the PPG which provides guidance on how relevant policy in the NPPF should be implemented. The PPG defines flood risk zones (Flood Zones) and sets out a vulnerability classification for different types of proposed development in relation to flood risk. It is stated in the NPPF (reference 1) that:

> *"The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding."*

5.7 The Flood Zones refer to the probability of river and sea flooding ignoring the presence of defences and do not take into account the potential future impacts of climate change.

5.8 Based on the EA Flood Map for Planning the majority of the site is located in Flood Zone 1 and part of the east of the site is located in Flood Zone 2. Based on the review of the detailed flood modelling information presented at Appendix B and described in Section 4 it is considered that the application area is not located in the fluvial floodplain and that on this basis all of the application area is located in Flood Zone 1.

5.9 Flood risk vulnerability classifications are presented at Annex 3 to the NPPF (reference 2). The proposed development comprises an IBAA storage and

processing facility. "Waste treatment (except landfill and hazardous waste facilities)" and "mineral working and processing (except sand and gravel)" land uses are assigned a "less vulnerable" vulnerability classification and on this basis it is considered that the application area comprises a "less vulnerable" development.

5.10 Based on Table 2 of the PPG to the NPPF a development use classified as less vulnerable is an appropriate land use in all flood zones except Flood Zone 3b and it is not necessary to undertake the Exception Test for such development. On this basis it is considered that the proposed development is consistent with the requirements of the flood risk Sequential Test hence is located appropriately with respect to minimising flood risk.

6. Assessment of the potential for flooding in the future at the proposed development

6.1 As explained in Section 2 it is understood that the existing facilities such as site offices, the weighbridge and car parking in the south of the application area associated with the site access road will be unchanged under the development proposals. It is understood that the railhead and site management facilities already are consented and do not need developing further in support of this planning application. On this basis the only aspects of the proposed development which will change from the existing situation relate to the northern part of the application area in which the three bays for the IBAA storage and blending operations will be constructed.

6.2 As explained in Section 4 the approximate extent in the vicinity of the application area of ground with an elevation lower than the 1 in 1000 year plus climate change modelled flood level for flood node Ha59U on the Harrowden Brook is shown on Figure 1. Consistent with Figure 1, it is considered that both the northern and southern parts of the application area are at elevations which are significantly higher than the 1 in 1000 year plus climate change modelled flood level and on this basis no parts of the application area are located in the fluvial floodplain. As the northern part of the application area is not located in the floodplain the construction of the three IBAA storage and blending bays will have no effect on fluvial flood flows or levels or on storage of flood water in the floodplain.

6.3 With regard to access and egress during flood events it is considered that as the southern part of the application area is at an elevation higher than the 1 in 1000 year plus climate change modelled flood level there would be no adverse effect on access and egress during an extreme flood event.

6.4 Details of the proposed surface water management in the northern part of the application area are presented in Section 7. Consistent with the information presented in respect of the proposed surface water management there will be no increase in rates of surface water runoff from the application area and on this basis there will be no increase in flood risk at or in the vicinity of the site as a result of the proposed development.

7. Surface water management

7.1 The purpose of this section of the FRA is to set out the principles of the management of surface water at the application area following development. Consideration is given to the quantity of surface water runoff that it may be necessary to manage during storm events.

7.2 The northern part of the application area has dimensions of approximately 50m by 100m and comprises porous hardstanding. Three bays for the IBAA storage and blending operations are proposed to be constructed on the hardstanding. The IBAA storage and blending bays will incorporate impermeable surfaces with sealed drainage systems.

7.3 Surface runoff from the IBAA storage and blending bays will be collected and contained in suitable storage tanks before being removed from the site for off site disposal. For the purpose of the calculations it is assumed that there would be no discharge from the drainage system during a storm event.

7.4 Each IBAA storage and blending bay will be approximately 30m long and 12.5m wide and have an area of approximately 375m^2 (0.0375 ha). In areas external to the IBAA storage and blending bays rainfall will continue to drain to ground consistent with the current situation.

7.5 Preliminary calculations of the proposed surface water management system are presented at Appendix D. The calculations are based on the Rational Method presented in the SuDS Manual (reference 4) and on design rainfall intensity data from the Flood Estimation Handbook (FEH) web service.

7.6 The calculations include an allowance for future climate change. Climate change allowances for individual catchment areas are presented on the gov.uk website[1]. The central climate change allowance for the Nene Management Catchment for the 1% annual exceedance rainfall event and developments with a lifetime between 2061 and 2125 is 25%.

[1] https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall?mgmtcatid=3059

7.7 The calculations presented at Appendix D are based on the following assumptions:

- The assessment is based on runoff for a 24 hour duration 1 in 100 year rainfall event incorporating a 25% allowance for increased rainfall intensity as a result of future climate change.
- The area of each IBAA bay is 0.0375ha which comprises a sealed drainage system. As the drainage system will be sealed a rate of discharge from the drainage system of 0m^3/day is assumed.
- Taking into account the generally granular texture of IBAA and aggregates the calculations are based on an estimated runoff coefficient of 0.46. Further details of the runoff coefficient estimation method are provided at Appendix D.

7.8 Based on the calculations presented at Appendix D it is estimated that a 24 hour 1 in 100 year plus climate change storm event would generate approximately 20m^3 of runoff from each of the three IBAA storage and blending bays. On this basis it is considered that the storage capacity needed to contain runoff from the sealed drainage system associated with the three IBAA bays is 60m^3 in total. This storage capacity will be provided by tank(s) of suitable specification and capacity. The sealed drainage system including the storage tanks will be subject to routine maintenance and monitoring the principles of which are set out below:

- Regular inspection of the sealed drainage system and tanks will be undertaken. The purpose of the inspections will be to confirm the adequate performance of the drainage system and tanks, to identify operational problems and to facilitate planning of maintenance actions as necessary.
- Insofar as it is practicable inspections of the sealed drainage system will be carried out in a range of weather conditions including during rainfall events.
- Maintenance actions will be planned and implemented as necessary to facilitate the proper functioning of the sealed drainage system and tanks.

Specific maintenance and management actions are likely to include but may not be limited to:

- Removal of debris such as leaves or litter identified within the tanks or conduits comprising the sealed drainage system as part of the regular inspections.

- Removal of silt or debris identified during emptying of the tanks. The silt or debris will be removed as part of the tank emptying operations and taken to a suitably permitted facility for treatment.

- Repair of defects or damage to the conduits or tanks of the sealed drainage system identified as part of the regular inspections. Should immediate repair not be feasible a suitably experienced contractor will be engaged to repair or replace any defective or damaged conduits or tanks.

7.9 The tank(s) will provide storage capacity to enable the recycling re-use of the collected water for use in dust suppression on the IBAA storage and blending bays in drier parts of the year. Any excess water will be tankered off site and disposed of at a suitably permitted facility facilitating inspection of the tanks and any necessary maintenance of the sealed drainage system as outlined above.

7.10 The northern part of the application area in which the IBAA storage and blending bays will be located will have an area of approximately 4,420m^2. Of this area approximately 1,125m^2 or about 25% of the total area will comprise a sealed drainage system following development. Runoff will continue to drain to ground consistent with the current situation in the approximately 75% of the northern part of the application area which will not comprise part of a sealed drainage system. On this basis it is estimated that following development the runoff generated from the northern part of the application area will be approximately 25% less than the current situation for storm events which generate runoff volumes less than the 24 hour duration 1 in 100 year plus 25% climate change storm event. On this basis it is estimated that the proposed development will result in a significant reduction in runoff rates during storm extreme storm events.

8. Conclusions

8.1 Based on the information reviewed it is considered that the northern part of the application area is not located in the fluvial floodplain and lies approximately 4m higher than the predicted flood levels for the 1 in 1000 year plus 20% climate change fluvial flood event. It is considered that neither the northern part of the application area or the site access road are located in the fluvial floodplain. On this basis it is considered that the risk of fluvial flooding to the application area is negligible.

8.2 It is considered that there are no significant risks to the application area associated with surface water flooding, reservoir flooding or groundwater flooding.

8.3 It is considered that the proposed development is consistent with the requirements of the flood risk Sequential Test hence is located appropriately with respect to minimising flood risk.

8.4 Based on the surface water runoff calculations undertaken the proposed development will result in a significant reduction in runoff rates from the application area during storm events. An outline drainage design is presented to specially accommodate the sealed drainage requirements under the environmental permitting regime in relation to the proposed IBAA area. Outline maintenance and monitoring procedures in respect of the sealed drainage system are proposed.

9. References

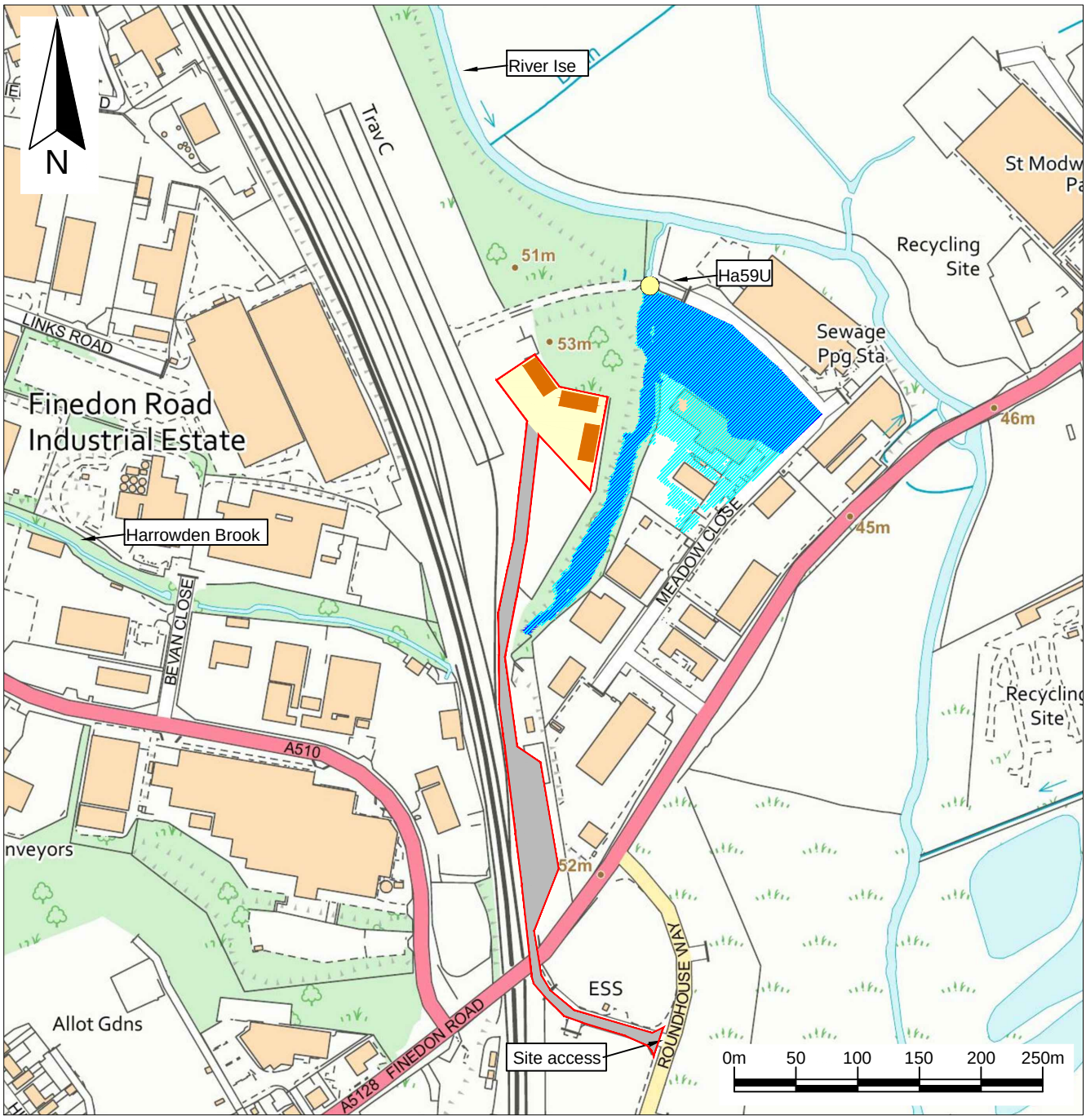
1. Ministry of Housing, Communities & Local Government, 2021. National Planning Policy Framework. https://www.gov.uk/government/publications/national-planning-policy-framework–2. Accessed on 28 July 2023.

2. Ministry of Housing, Communities & Local Government, 2021. National Planning Policy Framework Guidance. Flood Risk and coastal change. https://www.gov.uk/guidance/flood-risk-and-coastal-change. Accessed on 28 July 2023.

3. Northampton County Council (on behalf of the Borough Council of Wellingborough). 2017. Level 1 Strategic Flood Risk Assessment Update. February 2017.

4. Woods Ballard, B., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. 2015. The SuDS Manual. CIRIA, London.

FIGURES



Key / Notes

- Application area
- Storage area for imported and blended IBAA
- Existing hardstanding area
- Site access road
- Approximate location of flood model node Ha59U
- Approximate extent of the area upstream of model node Ha59U for which ground levels are lower than the 1 in 100 year plus 20% climate change flood level of 44.97mAOD.
- Approximate extent of the area upstream of model node Ha59U for which ground levels are lower than the 1 in 1000 year plus 20% climate change flood level of 45.51mAOD.

Note:
Ground levels are based on the Environment Agency 2022 1m LIDAR Digital Terrain Model.

Rev	Status	Drn	App	Chk	Date
	Final	TL	CJC	JRC	16/08/23

Site: WELLINGBOROUGH

Client: GRS Roadstone Limited

Title: Site location and layout

Figure 1

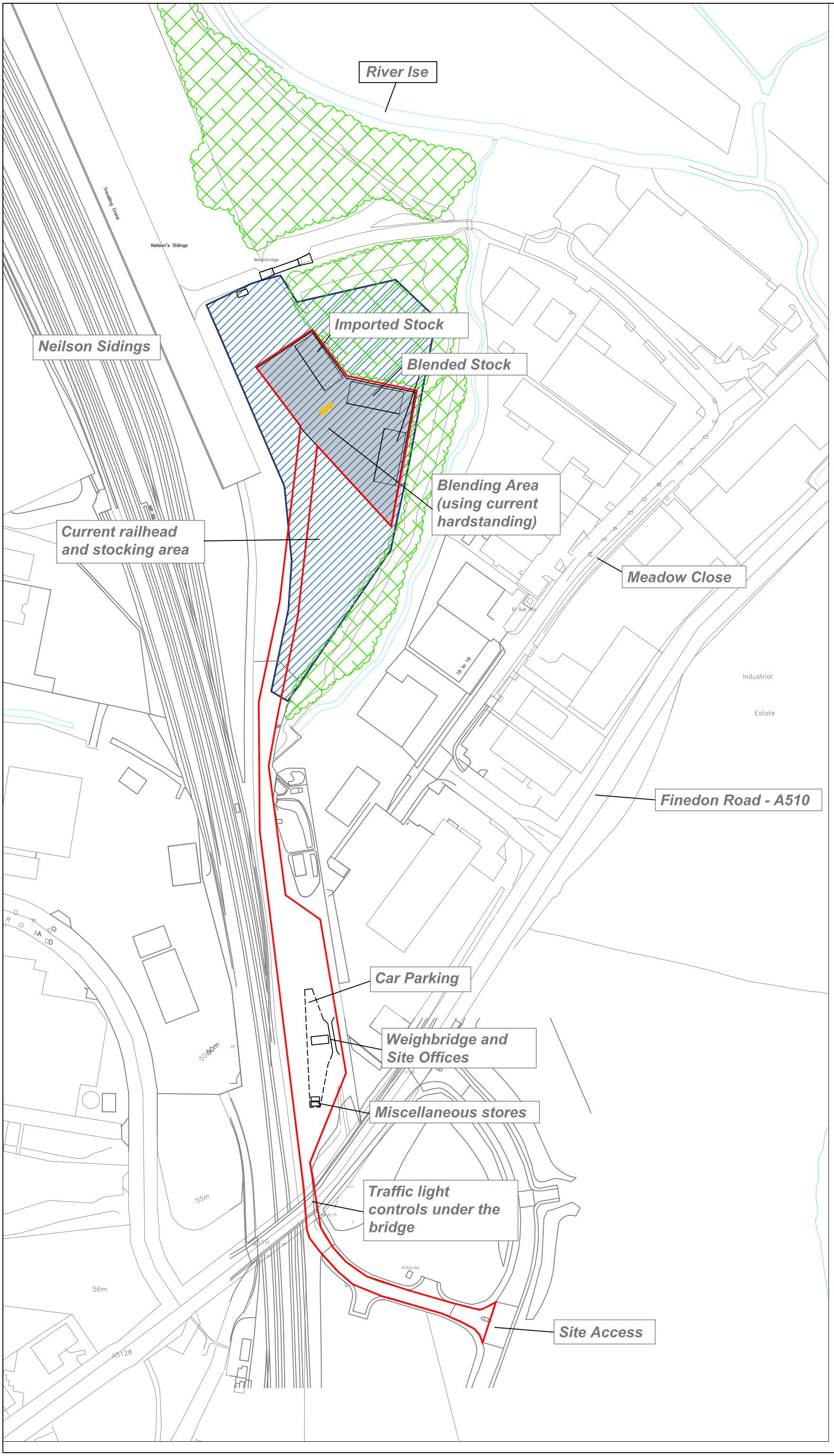
Scale: 1:5,000@A4

Drawing Ref: GRS/WE/08-23/23860

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE.
Telephone : 01827 717891
Fax : 01827 718507

APPENDIX A

DAVID L WALKER LIMITED PLAN ENTITLED "IBAA IMPORT – LAYOUT PLAN" REFERENCE W78/PL3/03 DATED JULY 2023



GRID NORTH

Application Area

Current Permitted Area

Perimeter Vegetation

Revision No.	Date.		Revision By.

Location

Wellingborough Railhead

Title

IBAA Import - Layout Plan

Drg.No.	Scale	Date
W78/PL3/03	1:2000@A3	07/23

David L Walker Limited
Albion House 89 Station Road
Eckington Sheffield S21 4FW
Tel: 01246 431 749 Fax: 01246 431 863
Email: headoffice@dlwalker.net

APPENDIX B

INFORMATION ON FLOOD RISK REQUESTED FROM THE EA COMPRISING THE PRODUCT 4 PACKAGE OF INFORMATION

Keith Wright
keithwright@mjca.co.uk

Our ref: CCN-2023-315791

Date: 17/07/2023

Dear Keith,

Provision of Flood Risk Information for Burrow's Bush, Wellingborough.

Thank you for your request for our flood risk information for the above site. The information is set out below and attached. It is important you read any contextual notes on the maps provided.

If you are preparing a Flood Risk Assessment (FRA) for this site, please note this information may not be sufficient by itself to produce an adequate FRA to demonstrate the development is safe over its lifetime. Additional information may be required to carry out an appropriate assessment of all risk, such as consequence of a breach in defences.

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

Please read the letter in full as the information covered has been updated in **June 2023.**

1. Flood Map for Planning

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

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

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

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

2. Recorded Flood Outlines

The area was previously known to have flooded in March 1947 and April 1998.

A copy of the Recorded Flood Outlines Map showing the extent of previous recorded flooding in your area is attached. This only covers information we hold and it is possible recent flooding may have occurred which we are currently investigating, therefore this information may be subject to change. It is possible other flooding may have occurred which other organisations, such as the Lead Local Flood Authority (ie top tier council), Local Authority or Internal Drainage Board (where they exist), may have records.

3. Schemes in the area

There are no ongoing capital projects to reduce or sustain the current flood risk to this site.

4. Fluvial Flood Risk Information

This site is considered to be at risk of flooding from main rivers.

The site may also be at risk from local ordinary watercourses for which other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist) have responsibility.

4.1 Fluvial Defence Information

There are no formal flood defences reducing the risk of flooding to this site.

4.2 Fluvial Modelled Levels and Flows

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

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

Our models may not have the most up to date climate change allowances. In time we will update our models for the latest allowances. You should refer to 'Flood risk assessments: climate change allowances' to check if the allowances modelled are appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

4.3 Fluvial Modelled Flood Extents

Please find attached a map showing available modelled flood extents, taking into account flood defences, for your area. This data is taken from the model named on the map, which is the most up-to-date model currently available.

In some cases the flood extents shown may not be from main river, but may be from other sources such as IDB lowland drainage networks.

4.4 Fluvial Hazard Mapping

For certain locations we have carried out modelling to map the maximum values of flood depth, velocity and hazard rating (danger to people) resulting from overtopping and / or breaching of defences at specific locations for a number of scenarios.

At present this information is available for fluvial flood risk in Northampton, Lincoln, Wainfleet and some isolated rural locations.

The number of locations we have this information for is expected to increase in time.

At present this site is not covered by any fluvial hazard mapping.

5. Tidal Flood Risk Information

This site is not considered to be at risk from tidal flooding.

6. Development Planning

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

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

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

Climate change will increase flood risk due to overtopping of defences. Please note, unless specified otherwise, the climate change data included has an allowance for 20% increase in flow. Updated guidance on how climate change could affect flood risk to new development - 'Flood risk assessments: climate change allowances' was published on GOV.UK in **July 2021**. The appropriate updated climate change allowance should be applied in a Flood Risk Assessment.

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

7. Data Licence and Other Supporting Information

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

This information is provided in accordance with the Open Government Licence which can be found here: http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

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

8. Other Flood Risk Management Authorities

The information provided with this letter relates to flood risk from main river or the sea. The Flood Map for Surface Water can be viewed at https://www.gov.uk/check-long-term-flood-risk

Additional information may be available from other risk management authorities, such as the Lead Local Flood Authority (ie top tier council) or Internal Drainage Board (where they exist).

I hope we have correctly interpreted your request. If you have any queries or would like to discuss the content of this letter further please contact Annabelle Webster using the email address below and quoting our CCN reference number above.

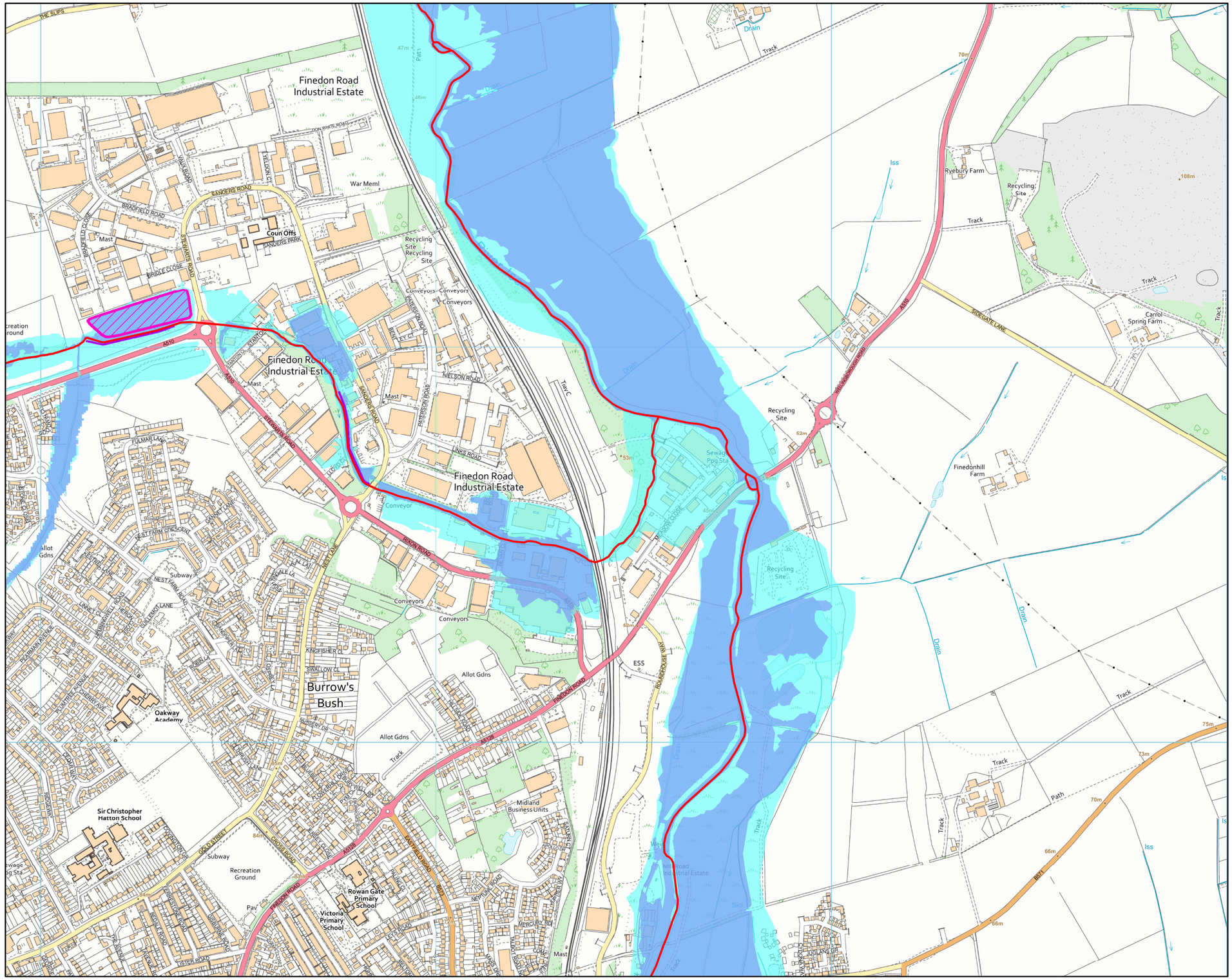
Yours sincerely,

020 302 53535

for Alastair Windler
Welland and Nene Partnerships and Strategic Overview Team Leader
e-mail PSOWN@environment-agency.gov.uk

Enc.
Flood Map for Planning
Recorded Flood Event Outlines Map
Modelled Node Points Map
Modelled Fluvial Levels and Flows Data Sheet
Modelled Flood Extent Maps

Flood Map centred on SP 90457 69639 - created July 2023 [Ref: CCN-2023-315791]



Environment Agency

Scale 1:10,000

N

Legend

- Main Rivers
- Raised Defences
- Flood Storage Areas
- Areas at Risk of Flooding from Rivers or the Sea
- Extreme Flood Outline

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

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

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

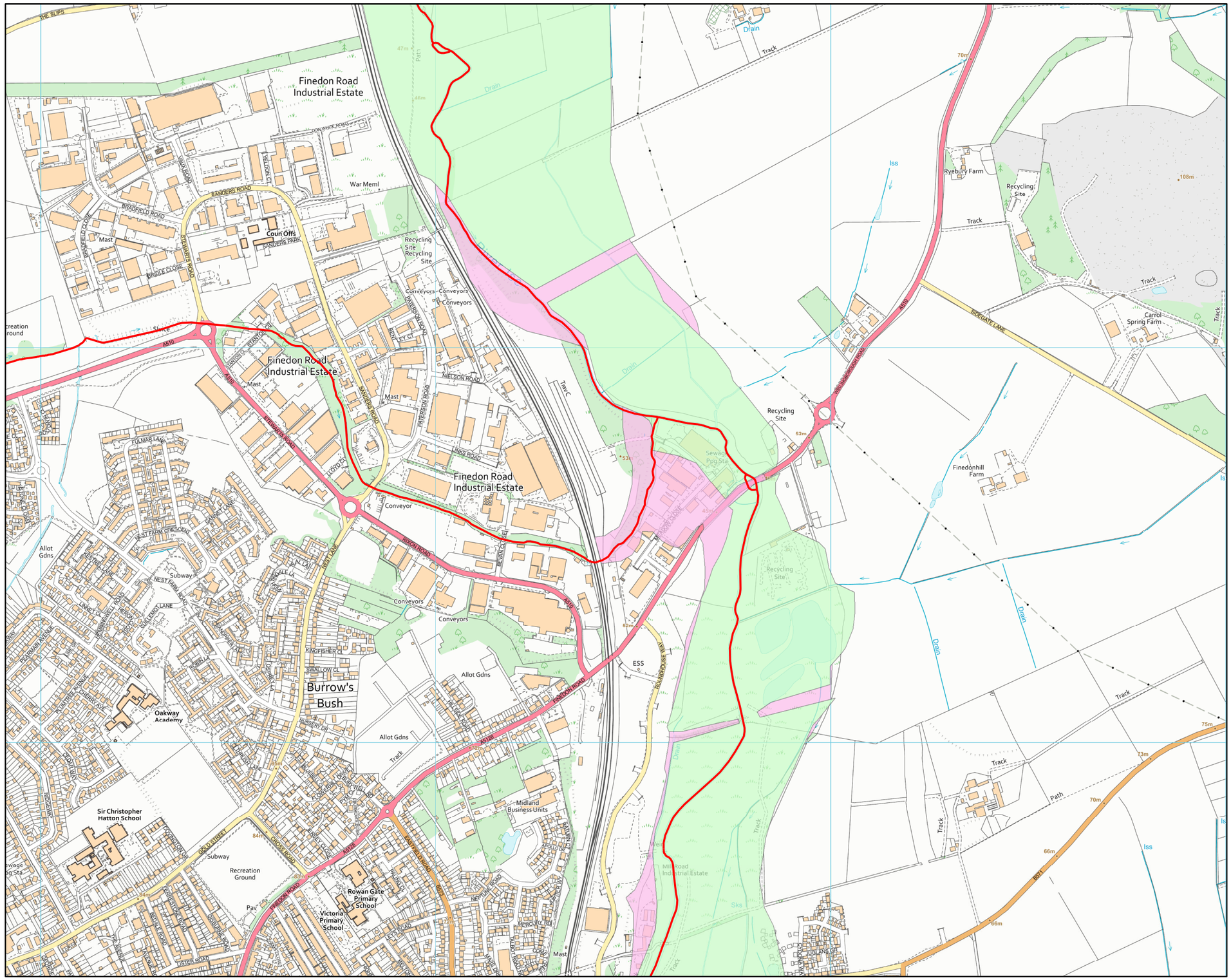
Light blue shows the extent of the Extreme Flood Outline, which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater.

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

Created by the Partnerships and Strategic Overview Team, Kettering

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

Historic Flood Map centred on SP 90457 69639 - created July 2023 [Ref: CCN-2023-315791]



Environment Agency

Scale 1:10,000

N

Legend

Main Rivers

Event name

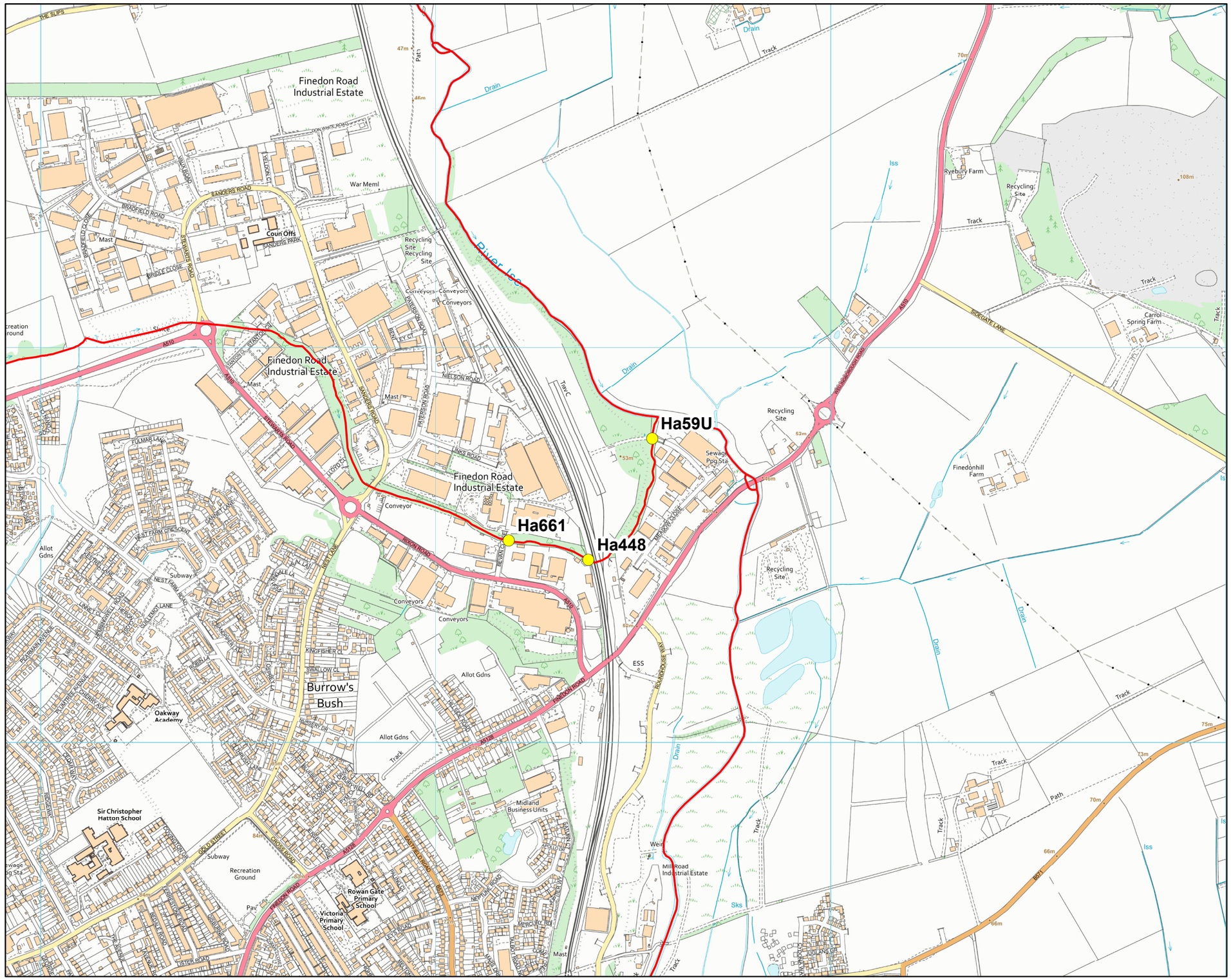
LNA_1947_March_River Nene_d/s Northampton

LNA_1998_April_River Ise

Created by the Partnerships and Strategic Overview Team, Kettering

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

Harrowden Brook Modelled Node Points Map centred on SP 90457 69639 - created July 2023 [Ref: CCN-2023-315791]



Environment Agency

Scale 1:10,000

N

Legend

- Model Nodes - Levels & Flows
- Main Rivers

Created by the Partnerships and Strategic Overview Team, Kettering

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

Fluvial Flood Levels (mODN)

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

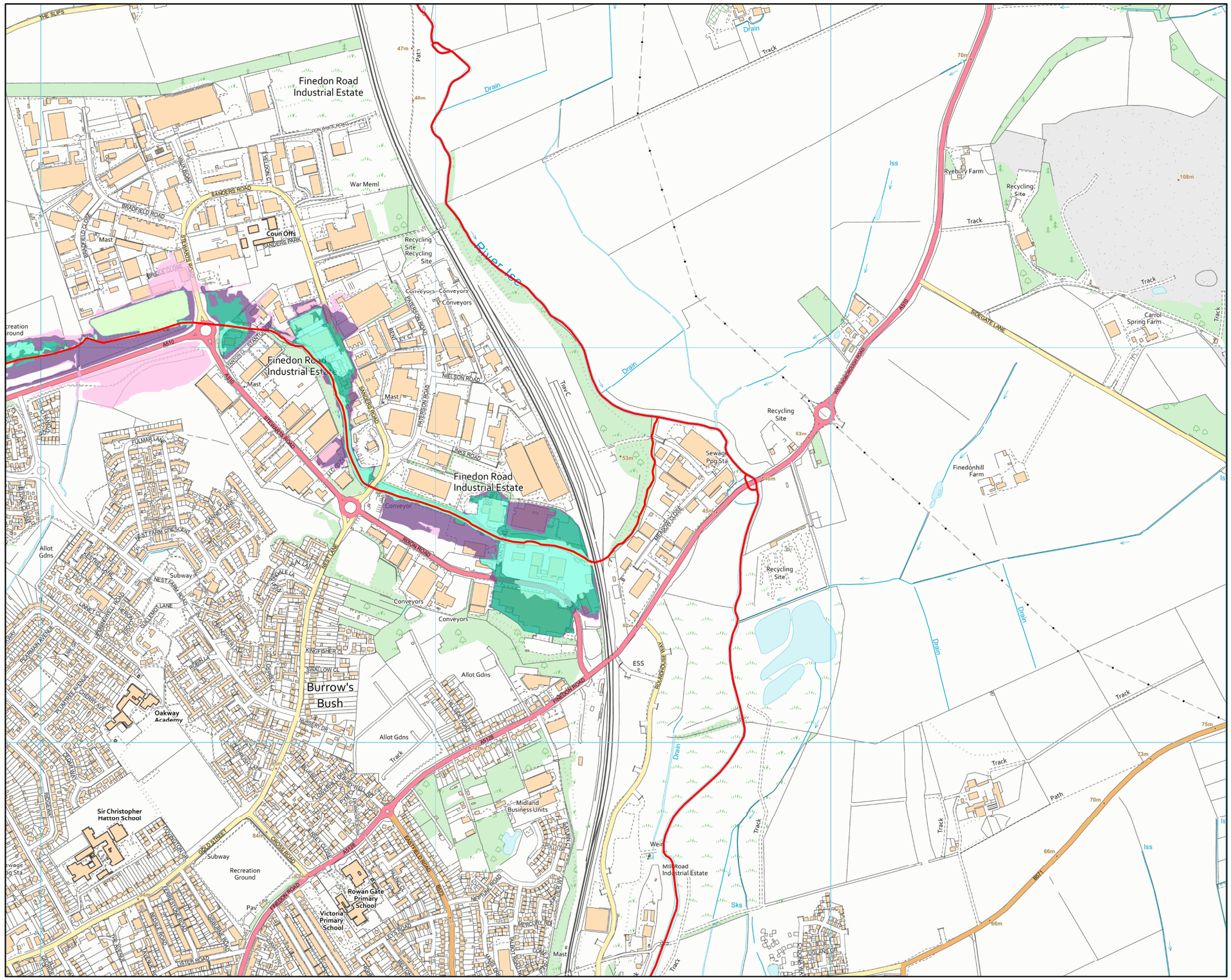
			Annual Exceedance Probability - Maximum Water Levels (mODN)													
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**4% (1 in 25)**	**4% (1 in 25) inc 20% Climate Change**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.5% (1 in 200) inc 20% Climate Change**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
Ha448	490387	269463	45.63	45.93	46.09	46.33	47.00	0.00	48.32	48.82	49.11	49.68	49.74	0.00	49.91	49.95
Ha59U	490548	269769	44.03	44.17	44.30	44.43	44.51	0.00	44.70	44.78	44.84	44.97	44.98	0.00	45.33	45.51
Ha661	490185	269511	45.96	46.13	46.25	46.44	47.03	0.00	48.32	48.82	49.11	49.68	49.74	0.00	49.92	49.95

Fluvial Flood Flows (m^3/s)

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

			Annual Exceedance Probability - Maximum Flows (m^3/s)													
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**4% (1 in 25)**	**4% (1 in 25) inc 20% Climate Change**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.5% (1 in 200) inc 20% Climate Change**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
Ha448	490387	269463	4.90	5.58	5.91	6.39	7.67	0.00	9.83	10.56	10.96	12.01	14.02	0.00	30.65	35.49
Ha59U	490548	269769	4.90	5.58	5.91	6.39	7.66	0.00	9.83	10.56	10.96	12.01	14.03	0.00	26.05	26.96
Ha661	490185	269511	4.92	5.62	5.94	6.50	8.14	0.00	10.61	12.08	13.31	17.91	18.98	0.00	30.73	35.54

Modelled Flood Extents (with defences) Model: Harrowden Brook (2012) centred on SP 90457 69639 - created July 2023 [Ref: CCN-2023-315791]



Environment Agency

Scale 1:10,000

N

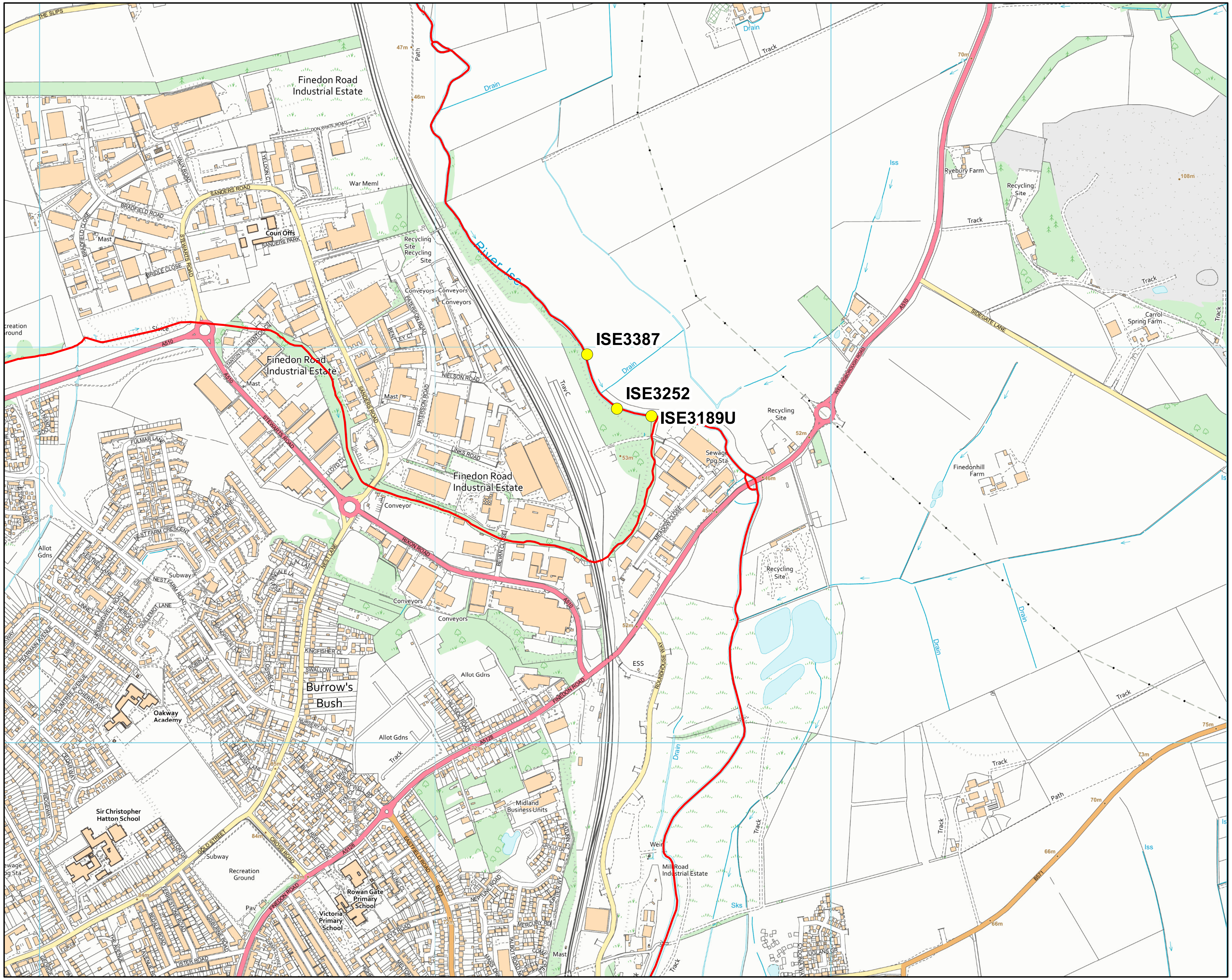
Legend

- Main Rivers
- 5% (1 in 20) fluvial event
- 1% (1 in 100) fluvial event
- 1% (1 in 100) inc 20% climate change fluvial event
- 0.1% (1 in 1000) fluvial event
- 0.1% (1 in 1000) inc 20% climate change fluvial event

Created by the Partnerships and Strategic Overview Team, Kettering

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

Middle Nene Modelled Node Points Map centred on SP 90457 69639 - created July 2023 [Ref: CCN-2023-315791]



Environment Agency

Scale 1:10,000

N

Legend

- Model Nodes - Levels & Flows
- Main Rivers

Created by the Partnerships and Strategic Overview Team, Kettering

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

Fluvial Flood Levels (mODN)

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

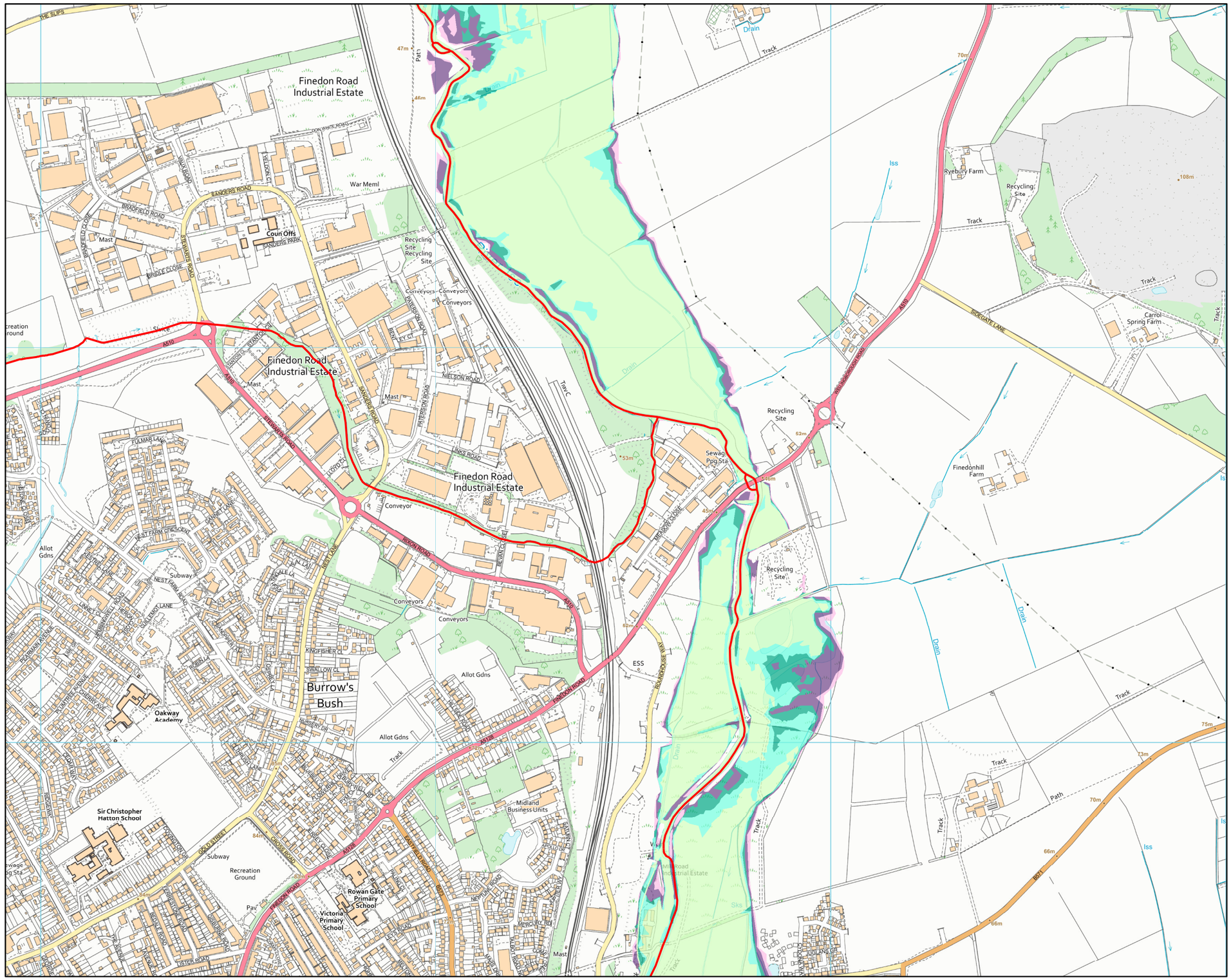
			Annual Exceedance Probability - Maximum Water Levels (mODN)												
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**4% (1 in 25)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.5% (1 in 200) inc 20% Climate Change**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
ISE3387	490384	269981	43.98	44.15	44.24	44.30	44.33	44.42	44.43	44.43	44.52	44.53	44.63	44.71	44.81
ISE3252	490459	269844	43.83	44.04	44.15	44.23	44.26	44.37	44.38	44.38	44.48	44.48	44.59	44.67	44.78
ISE3189U	490547	269825	43.80	44.02	44.14	44.22	44.25	44.35	44.36	44.36	44.46	44.47	44.57	44.66	44.76

Fluvial Flood Flows (m^3/s)

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

			Annual Exceedance Probability - Maximum Flows (m^3/s)												
Node Label	**Easting**	**Northing**	**50% (1 in 2)**	**20% (1 in 5)**	**10% (1 in 10)**	**5% (1 in 20)**	**4% (1 in 25)**	**2% (1 in 50)**	**1.33% (1 in 75)**	**1% (1 in 100)**	**1% (1 in 100) inc 20% Climate Change**	**0.5% (1 in 200)**	**0.5% (1 in 200) inc 20% Climate Change**	**0.1% (1 in 1000)**	**0.1% (1 in 1000) inc 20% Climate Change**
ISE3387	490384	269981	17.37	21.87	23.50	24.86	25.39	26.77	26.94	26.95	28.33	28.37	29.63	29.90	29.93
ISE3252	490459	269844	12.18	13.31	13.74	14.08	14.36	15.53	15.69	15.70	17.26	17.32	19.15	20.50	22.63
ISE3189U	490547	269825	10.73	11.14	11.55	12.24	12.58	13.95	14.11	14.12	15.62	15.67	17.45	18.75	20.23

Modelled Flood Extents (with defences) Model: Middle Nene (2013) centred on SP 90457 69639 - created July 2023 [Ref: CCN-2023-315791]



Environment Agency

Scale 1:10,000

N

Legend

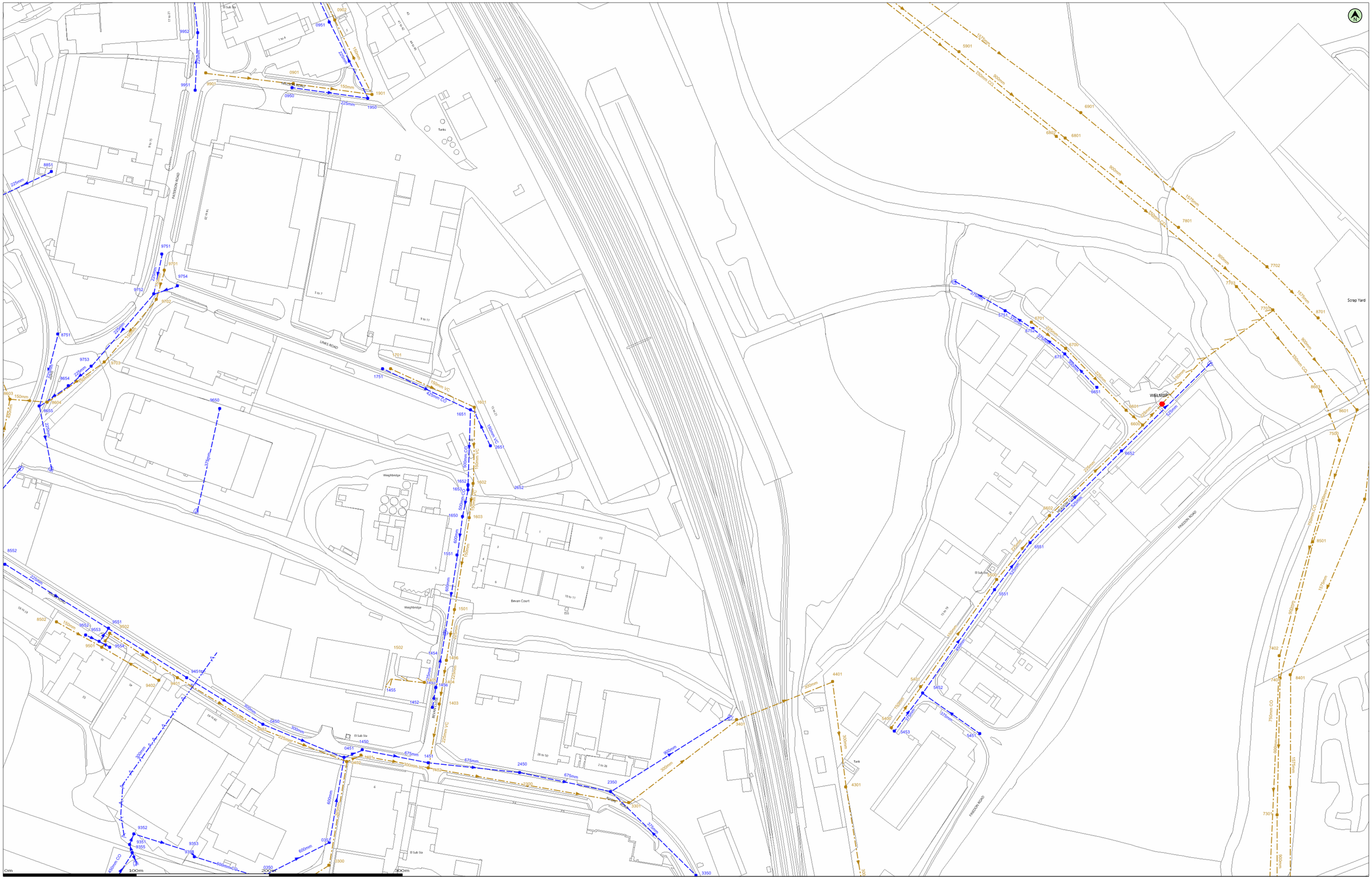
- Main Rivers
- 5% (1 in 20) fluvial event
- 1% (1 in 100) fluvial event
- 1% (1 in 100) inc 20% climate change fluvial event
- 0.1% (1 in 1000) fluvial event
- 0.1% (1 in 1000) inc 20% climate change fluvial event

Created by the Partnerships and Strategic Overview Team, Kettering

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

APPENDIX C

ANGLIAN WATER SEWER PLAN



Date: 03/07/23 | Scale: 1:1250 | Map Centre: 490351,269659 | Data updated: 31/05/23 | Our Ref: 1215449 - 1 | Wastewater Plan A1

Foul Sewer	Outfall*	Sewage Treatment Works	
Surface Sewer			
Combined Sewer			
Final Effluent	Inlet*	Public Pumping Station	
Rising Main*			
Private Sewer*	Manhole*	Decommissioned Pumping Station	
Decommissioned Sewer*		*(Colour denotes effluent type)	

dan.walker@dlwalker.net
Wellingborough RH

love every drop anglianwater

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
0300	490083	269339	F	53.29	51.64	1.65
0401	490033	269441	F	51.29	48.06	3.23
0402	490096	269417	F	50.686	47.74	2.946
0901	490056	269926	F	56.111	54.231	1.88
0902	490087	269974	F	54.726	-	-
1401	490107	269422	F	49.26	47.71	1.55
1402	490157	269412	F	49.72	47.32	2.4
1403	490166	269460	F	49.26	47.71	1.55
1404	490168	269475	F	-	-	-
1405	490154	269476	F	-	-	-
1406	490171	269493	F	-	-	-
1501	490177	269531	F	49.67	48.42	1.25
1601	490192	269683	F	54.77	52.84	1.93
1602	490191	269626	F	53.48	49.57	3.91
1603	490188	269600	F	50.29	48.8	1.49
1701	490129	269712	F	56.89	53.57	3.32
1901	490115	269918	F	54.773	53.093	1.68
2300	490232	269399	F	-	-	-
3301	490308	269386	F	48.45	46.83	1.62
3401	490389	269448	F	-	-	-
4301	490471	269398	F	-	-	-
4401	490461	269477	F	47.06	45.86	1.2
5400	490505	269442	F	-	-	-
5401	490527	269473	F	-	-	-
5500	490584	269554	F	-	-	-
5901	490556	269950	F	-	-	-
6600	490694	269670	F	44.723	42.253	2.47
6601	490682	269681	F	44.725	42.332	2.393
6602	490624	269602	F	-	-	-
6700	490636	269727	F	44.6	42.653	1.947
6701	490610	269747	F	44.605	43.314	1.291
6801	490636	269885	F	-	-	-
6802	490629	269886	F	-	-	-
6901	490648	269904	F	44.82	40.437	4.383
7301	490795	269377	F	-	-	-
7401	490797	269479	F	-	-	-
7402	490797	269497	F	-	-	-
7500	490842	269658	F	-	-	-
7701	490792	269756	F	-	-	-
7702	490787	269789	F	45.23	40.08	5.15
7703	490765	269774	F	-	-	-
7801	490721	269818	F	44.19	41.49	2.7
8401	490805	269482	F	44.24	39.89	4.35
8501	490822	269582	F	-	-	-
8502	489878	269522	F	-	-	-
8601	490855	269681	F	-	-	-
8602	490861	269614	F	45.58	40.032	5.548
8603	489843	269689	F	-	-	-
8603	490828	269695	F	-	-	-
8604	489871	269687	F	-	-	-
8701	490826	269750	F	46.38	40.18	6.2
9401	489969	269480	F	-	-	-
9402	489955	269478	F	-	-	-
9501	489912	269503	F	-	-	-
9502	489918	269513	F	-	-	-
9701	489959	269786	F	-	-	-
9702	489953	269764	F	-	-	-
9703	489914	269717	F	-	-	-
9901	489990	269934	F	-	57.487	-
0350	490035	269332	S	-	-	-
0351	490083	269356	S	-	-	-
0450	490033	269445	S	-	-	-
0451	490094	269420	S	-	-	-
0950	490055	269923	S	56.089	54.009	2.08
0951	490083	269972	S	54.776	-	-
1450	490108	269426	S	-	-	-
1451	490157	269416	S	-	-	-
1452	490160	269458	S	-	-	-
1456	490163	269473	S	-	-	-
1551	490179	269572	S	49.86	47.43	2.43
1650	490183	269601	S	-	47.75	-
1651	490189	269681	S	54.67	51.81	2.86
1652	490187	269625	S	53.42	48.81	4.61
1653	490187	269621	S	53.4	48.63	4.77
1751	490123	269712	S	56.77	52.766	4.004
1950	490112	269915	S	54.672	-	-
2350	490294	269394	S	-	-	-
2450	490226	269409	S	-	-	-
2651	490204	269654	S	54.25	53.26	0.99
3350	490358	269332	S	-	-	-
5451	490572	269438	S	-	-	-
5452	490529	269468	S	-	-	-
5453	490507	269440	S	-	-	-
5551	490583	269546	S	-	-	-
5751	490591	269755	S	44.784	42.634	2.15
6551	490609	269581	S	-	-	-
6651	490660	269698	S	45.007	43.055	1.952
6652	490678	269650	S	-	-	-
6751	490636	269723	S	44.809	42.819	1.99
6752	490612	269742	S	44.773	42.736	2.037
8552	489839	269565	S	-	-	-
8654	489887	269699	S	-	-	-
8655	489865	269684	S	-	-	-
8751	489879	269738	S	-	-	-
8851	489874	269860	S	-	-	-
9351	489933	269355	S	54.38	52.58	1.8
9352	489936	269363	S	53.87	52.32	1.55
9353	489979	269349	S	53.5	51.9	1.6
9354	489982	269345	S	53.57	51.86	1.71
9355	489935	269349	S	-	-	-
9451	489976	269480	S	-	-	-
9551	489917	269517	S	-	-	-
9552	489900	269512	S	-	-	-

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
9553	489910	269507	S	-	-	-
9554	489918	269503	S	-	-	-
9650	490001	269682	S	-	-	-
9751	489957	269798	S	-	-	-
9752	489951	269768	S	-	-	-
9753	489904	269714	S	-	-	-
9754	489969	269774	S	-	-	-
9951	489982	269921	S	57.955	56.595	1.36
9952	489984	269964	S	57.048	55.678	1.37

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

APPENDIX D

SURFACE RUNOFF CALCULATIONS

Calculation of attentuation storage during a 1 in 100 year storm event plus an allowance for climate change for the site using the Rational Method (reference 1)

Parameter	Value	Units	Reference
Catchment area	0.0375	ha	Approximate area of each IBAA storage and blending bay.
Net discharge rate	0	m^3/day	The site will comprise a sealed drainage system. For the purpose of the calculations it is assumed that there would be no discharge from the drainage system during a storm event.
Runoff coefficient	0.46	unitless	The runoff coefficent has been estimated using a calculation method derived consistent with the nomogram presented on Figure 3 of reference 1. A vegetation type of bare earth is assumed and a soil type of sand and gravel is assumed. A stockpile gradient of 1v:2h is assumed.
Climate change factor	25%	unitless	The recommended precautionary increase in peak rainfall intensity to allow for climate change during the period 2061 to 2125 (reference 3).

Storm Duration (hr)	Rainfall for the site derived from reference 2 (mm)	Rainfall Intensity corrected for climate change (mm/hr)	Volume of rainfall run off in time period (m^3)	Outflow in time period (m^3)	Storage necessary in time period (m^3)
0.25	28.87	144.35	6.23	0.00	6
0.5	37.5	93.75	8.09	0.00	8
0.75	42.73	71.22	9.21	0.00	9
1	46.59	58.24	10.05	0.00	10
1.25	49.76	49.76	10.73	0.00	11
1.5	52.46	43.72	11.31	0.00	11
1.75	54.81	39.15	11.82	0.00	12
2	56.9	35.56	12.27	0.00	12
2.25	58.83	32.68	12.69	0.00	13
2.5	60.58	30.29	13.06	0.00	13
2.75	62.17	28.26	13.41	0.00	13
3	63.63	26.51	13.72	0.00	14
3.25	64.98	24.99	14.01	0.00	14
3.5	66.23	23.65	14.28	0.00	14
3.75	67.39	22.46	14.53	0.00	15
4	68.48	21.40	14.77	0.00	15
4.25	69.47	20.43	14.98	0.00	15
4.5	70.4	19.56	15.18	0.00	15
4.75	71.27	18.76	15.37	0.00	15
5	72.09	18.02	15.54	0.00	16
5.25	72.86	17.35	15.71	0.00	16
5.5	73.59	16.73	15.87	0.00	16
5.75	74.28	16.15	16.02	0.00	16
6	74.93	15.61	16.16	0.00	16
12	84.31	8.78	18.18	0.00	18
24	91.43	4.76	19.71	0.00	20

References

Reference 1. National Coal Board, 1982. Technical Management of Water in the Coal Mining Industry.

Reference 2. Flood Estimation Handbook web service https://fehweb.ceh.ac.uk/

Reference 3. https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall?mgmtcatid=3059

Input

Output

VERSION	"FEH Web Service (2.0.0.0) "	Version	1.0.0	exported a	12:55:02	GMT	Fri	28-Jul-23							
Parameters															
Rainfall model=	FEH13														
Calculation type=	Design rainfall														
Calculation mode=	For a point														
Calculation location=	Point	GB	490503	269678	SP 90503 69678										
Fixed duration=	no														
Annual maximum=	yes														
Duration hours	Duration days	2 year rain	5 year rain	10 year rai	20 year rai	30 year rai	50 year rai	75 year rai	100 year ra	150 year ra	200 year ra	500 year ra	1000 year	10000 year rainfall (mm)	
0.25	0.010416667	7.5	12.48	16.12	19.76	21.94	24.76	27.12	28.87	31.42	33.33	40.06	45.53	65.65	
0.5	0.020833333	9.52	15.87	20.6	25.41	28.26	32.1	35.22	37.5	40.95	43.53	52.73	60.3	88.25	
0.75	0.03125	10.74	17.96	23.3	28.73	32.01	36.44	40.07	42.73	46.75	49.74	60.37	69.2	101.95	
1	0.041666667	11.7	19.46	25.28	31.21	34.86	39.66	43.64	46.59	50.96	54.25	65.86	75.59	111.67	
1.25	0.052083333	12.91	21.07	27.17	33.41	37.26	42.33	46.59	49.76	54.47	58.02	70.47	80.83	118.5	
1.5	0.0625	14.13	22.58	28.86	35.33	39.32	44.61	49.1	52.46	57.46	61.24	74.38	85.22	123.86	
1.75	0.072916667	15.29	23.96	30.36	37.01	41.11	46.6	51.28	54.81	60.08	64.05	77.78	88.98	128.3	
2	0.083333333	16.36	25.2	31.7	38.49	42.69	48.36	53.23	56.9	62.41	66.55	80.78	92.28	132.09	
2.25	0.09375	17.18	26.21	32.83	39.79	44.11	49.98	55.02	58.83	64.54	68.83	83.49	95.25	135.6	
2.5	0.104166667	17.92	27.11	33.84	40.95	45.39	51.43	56.64	60.58	66.48	70.89	85.93	97.91	138.71	
2.75	0.114583333	18.6	27.92	34.76	42.01	46.55	52.76	58.12	62.17	68.24	72.77	88.14	100.3	141.49	
3	0.125	19.21	28.66	35.6	42.97	47.62	53.98	59.48	63.63	69.85	74.49	90.14	102.46	144	
3.25	0.135416667	19.77	29.34	36.37	43.86	48.6	55.11	60.73	64.98	71.34	76.07	91.98	104.44	146.27	
3.5	0.145833333	20.29	29.97	37.08	44.68	49.51	56.15	61.89	66.23	72.71	77.53	93.66	106.25	148.35	
3.75	0.15625	20.78	30.56	37.74	45.44	50.35	57.12	62.97	67.39	73.99	78.89	95.22	107.92	150.25	
4	0.166666667	21.23	31.1	38.36	46.15	51.14	58.02	63.98	68.48	75.18	80.15	96.66	109.46	152.01	
4.25	0.177083333	21.65	31.6	38.93	46.81	51.87	58.85	64.91	69.47	76.28	81.31	97.98	110.87	153.61	
4.5	0.1875	22.04	32.07	39.47	47.42	52.55	59.63	65.77	70.4	77.3	82.39	99.2	112.18	155.09	
4.75	0.197916667	22.41	32.52	39.97	48	53.19	60.36	66.58	71.27	78.26	83.4	100.34	113.4	156.46	
5	0.208333333	22.76	32.94	40.45	48.55	53.79	61.05	67.34	72.09	79.15	84.34	101.4	114.53	157.74	
5.25	0.21875	23.09	33.33	40.9	49.06	54.36	61.7	68.06	72.86	79.99	85.23	102.4	115.59	158.94	
5.5	0.229166667	23.4	33.7	41.32	49.55	54.9	62.31	68.74	73.59	80.79	86.07	103.33	116.59	160.06	
5.75	0.239583333	23.7	34.06	41.73	50.01	55.41	62.89	69.38	74.28	81.54	86.86	104.21	117.52	161.12	
6	0.25	23.98	34.4	42.11	50.45	55.9	63.44	69.99	74.93	82.25	87.6	105.04	118.4	162.11	
6.25	0.260416667	24.25	34.71	42.47	50.87	56.36	63.96	70.57	75.54	82.91	88.3	105.83	119.23	163.04	
6.5	0.270833333	24.5	35.02	42.81	51.26	56.79	64.45	71.11	76.13	83.55	88.97	106.57	120.01	163.93	
6.75	0.28125	24.74	35.31	43.14	51.64	57.21	64.92	71.63	76.69	84.15	89.59	107.27	120.75	164.76	
7	0.291666667	24.98	35.58	43.45	52	57.61	65.37	72.13	77.22	84.72	90.19	107.93	121.45	165.55	
7.25	0.302083333	25.2	35.85	43.75	52.35	57.99	65.8	72.6	77.72	85.26	90.76	108.56	122.12	166.3	
7.5	0.3125	25.42	36.1	44.04	52.68	58.35	66.21	73.05	78.2	85.78	91.3	109.16	122.75	167.02	
7.75	0.322916667	25.63	36.35	44.32	53	58.7	66.6	73.48	78.66	86.27	91.81	109.74	123.35	167.7	
8	0.333333333	25.83	36.59	44.59	53.31	59.04	66.97	73.9	79.11	86.74	92.31	110.28	123.93	168.35	
8.25	0.34375	26.02	36.82	44.85	53.6	59.36	67.34	74.29	79.53	87.2	92.78	110.81	124.47	168.97	
8.5	0.354166667	26.21	37.04	45.09	53.89	59.67	67.68	74.68	79.93	87.63	93.23	111.31	125	169.56	
8.75	0.364583333	26.39	37.25	45.34	54.16	59.97	68.02	75.04	80.32	88.05	93.66	111.78	125.5	170.13	
9	0.375	26.57	37.46	45.57	54.43	60.26	68.34	75.4	80.7	88.45	94.08	112.24	125.98	170.67	
9.25	0.385416667	26.74	37.66	45.79	54.68	60.54	68.65	75.74	81.06	88.83	94.48	112.68	126.45	171.19	
9.5	0.395833333	26.91	37.86	46.01	54.93	60.81	68.95	76.06	81.41	89.2	94.87	113.11	126.89	171.69	
9.75	0.40625	27.07	38.05	46.22	55.17	61.07	69.24	76.38	81.74	89.56	95.24	113.52	127.32	172.18	
10	0.416666667	27.23	38.23	46.43	55.4	61.32	69.53	76.69	82.07	89.9	95.59	113.91	127.73	172.64	
10.25	0.427083333	27.38	38.41	46.63	55.63	61.57	69.8	76.98	82.38	90.24	95.94	114.29	128.13	173.09	
10.5	0.4375	27.53	38.58	46.82	55.85	61.81	70.06	77.27	82.68	90.56	96.27	114.65	128.51	173.52	
10.75	0.447916667	27.67	38.75	47.01	56.06	62.04	70.32	77.55	82.98	90.87	96.6	115.01	128.88	173.94	
11	0.458333333	27.82	38.92	47.19	56.27	62.26	70.56	77.82	83.26	91.17	96.91	115.35	129.24	174.34	
11.25	0.46875	27.95	39.08	47.37	56.47	62.48	70.8	78.08	83.53	91.46	97.21	115.68	129.58	174.73	
11.5	0.479166667	28.09	39.24	47.54	56.67	62.69	71.04	78.33	83.8	91.74	97.5	116	129.92	175.1	
11.75	0.489583333	28.22	39.39	47.71	56.86	62.9	71.27	78.57	84.06	92.01	97.78	116.31	130.24	175.47	
12	0.5	28.35	39.54	47.88	57.05	63.1	71.49	78.81	84.31	92.28	98.06	116.61	130.55	175.82	
12.25	0.510416667	28.48	39.69	48.04	57.22	63.29	71.7	79.04	84.54	92.53	98.32	116.89	130.85	176.16	
12.5	0.520833333	28.6	39.83	48.19	57.4	63.47	71.9	79.26	84.77	92.78	98.57	117.17	131.14	176.48	
12.75	0.53125	28.72	39.97	48.35	57.57	63.65	72.11	79.48	85	93.02	98.82	117.43	131.42	176.8	
13	0.541666667	28.84	40.11	48.5	57.73	63.83	72.3	79.69	85.22	93.25	99.06	117.69	131.7	177.1	
13.25	0.552083333	28.95	40.24	48.64	57.9	64	72.49	79.89	85.43	93.47	99.3	117.95	131.96	177.4	
13.5	0.5625	29.07	40.38	48.79	58.06	64.17	72.68	80.09	85.64	93.69	99.52	118.19	132.22	177.69	
13.75	0.572916667	29.18	40.51	48.93	58.21	64.34	72.86	80.28	85.84	93.91	99.75	118.43	132.47	177.97	
14	0.583333333	29.29	40.63	49.06	58.36	64.5	73.04	80.47	86.04	94.12	99.96	118.66	132.72	178.25	
14.25	0.59375	29.4	40.76	49.2	58.51	64.66	73.21	80.66	86.23	94.32	100.17	118.89	132.96	178.51	
14.5	0.604166667	29.5	40.88	49.33	58.66	64.81	73.38	80.84	86.42	94.52	100.38	119.11	133.19	178.78	
14.75	0.614583333	29.61	41	49.46	58.8	64.97	73.55	81.02	86.6	94.71	100.58	119.33	133.41	179.03	
15	0.625	29.71	41.12	49.59	58.95	65.12	73.71	81.19	86.78	94.9	100.77	119.54	133.63	179.28	
15.25	0.635416667	29.81	41.24	49.72	59.08	65.26	73.87	81.36	86.95	95.09	100.97	119.75	133.85	179.52	
15.5	0.645833333	29.91	41.35	49.84	59.22	65.4	74.03	81.52	87.12	95.27	101.15	119.95	134.06	179.76	
15.75	0.65625	30.01	41.46	49.96	59.35	65.55	74.18	81.69	87.29	95.45	101.33	120.14	134.27	179.99	
16	0.666666667	30.1	41.58	50.08	59.49	65.68	74.33	81.84	87.46	95.62	101.51	120.34	134.47	180.22	
16.25	0.677083333	30.2	41.69	50.2	59.61	65.82	74.48	82	87.62	95.79	101.69	120.52	134.66	180.44	
16.5	0.6875	30.29	41.79	50.32	59.74	65.95	74.62	82.15	87.77	95.95	101.86	120.71	134.86	180.65	
16.75	0.697916667	30.39	41.9	50.43	59.87	66.08	74.77	82.3	87.93	96.11	102.02	120.89	135.04	180.87	
17	0.708333333	30.48	42	50.54	59.99	66.21	74.91	82.45	88.08	96.27	102.19	121.06	135.23	181.07	
17.25	0.71875	30.57	42.11	50.65	60.11	66.34	75.04	82.59	88.23	96.43	102.35	121.24	135.41	181.28	
17.5	0.729166667	30.66	42.21	50.76	60.23	66.46	75.18	82.73	88.37	96.58	102.5	121.4	135.58	181.48	
17.75	0.739583333	30.74	42.31	50.87	60.35	66.59	75.31	82.87	88.52	96.73	102.66	121.57	135.75	181.67	
18	0.75	30.83	42.41	50.98	60.46	66.71	75.44	83.01	88.66	96.88	102.81	121.73	135.92	181.86	
18.25	0.760416667	30.92	42.51	51.09	60.58	66.83	75.56	83.14	88.79	97.02	102.95	121.89	136.09	182.05	
18.5	0.770833333	31	42.61	51.19	60.69	66.95	75.69	83.27	88.93	97.16	103.09	122.05	136.25	182.23	
18.75	0.78125	31.08	42.7	51.29	60.8	67.06	75.81	83.4	89.06	97.29	103.24	122.2	136.41	182.41	
19	0.791666667	31.17	42.8	51.4	60.91	67.18	75.93	83.52	89.19	97.43	103.37	122.35	136.56	182.59	
19.25	0.802083333	31.25	42.89	51.5	61.02	67.29	76.05	83.65	89.32	97.56	103.51	122.5	136.71	182.76	
19.5	0.8125	31.33	42.98	51.6	61.13	67.4	76.16	83.77	89.45	97.69	103.64	122.64	136.86	182.94	
19.75	0.822916667	31.41	43.08	51.7	61.24	67.51	76.28	83.89	89.57	97.82	103.77	122.79	137.01	183.1	
20	0.833333333	31.49	43.17	51.8	61.34	67.62	76.39	84.01	89.69	97.94	103.9	122.93	137.15	183.27	
20.25	0.84375	31.57	43.26	51.89	61.45	67.73	76.5	84.12	89.81	98.07	104.03	123.06	137.3	183.43	
20.5	0.854166667	31.65	43.35	51.99	61.55	67.83	76.61	84.24	89.93	98.19	104.15	123.2	137.43	183.59	
20.75	0.864583333	31.73	43.44	52.09	61.65	67.94	76.72	84.35	90.05	98.31	104.27	123.33	137.57	183.75	
21	0.875	31.8	43.52	52.18	61.75	68.04	76.83	84.46	90.16	98.43	104.39	123.46	137.71	183.9	
21.25	0.885416667	31.88	43.61	52.27	61.85	68.14	76.93	84.57	90.28	98.54	104.51	123.59	137.84	184.06	
21.5	0.895833333	31.95	43.7	52.37	61.95	68.25	77.04	84.68	90.39	98.66	104.63	123.72	137.97	184.21	
21.75	0.90625	32.03	43.78	52.46	62.05	68.35	77.14	84.79	90.5	98.77	104.74	123.84	138.1	184.35	
22	0.916666667	32.1	43.87	52.55	62.14	68.45	77.24	84.89	90.61	98.88	104.86	123.97	138.23	184.5	
22.25	0.927083333	32.18	43.95	52.64	62.24	68.54	77.34	85	90.71	98.99	104.97	124.09	138.35	184.64	
22.5	0.9375	32.25	44.03	52.73	62.33	68.64	77.44	85.1	90.82	99.1	105.08	124.21	138.47	184.78	
22.75	0.947916667	32.32	44.12	52.82	62.43	68.74	77.54	85.2	90.92	99.21	105.19	124.32	138.59	184.92	

23	0.958333333	32.4	44.2	52.91	62.52	68.83	77.64	85.3	91.03	99.31	105.29	124.44	138.71	185.06
23.25	0.96875	32.47	44.28	52.99	62.61	68.93	77.73	85.4	91.13	99.41	105.4	124.55	138.83	185.2
23.5	0.979166667	32.54	44.36	53.08	62.7	69.02	77.83	85.5	91.23	99.52	105.5	124.67	138.95	185.33
23.75	0.989583333	32.61	44.44	53.17	62.79	69.11	77.92	85.6	91.33	99.62	105.6	124.78	139.06	185.46
24	1	32.68	44.52	53.25	62.88	69.2	78.01	85.69	91.43	99.72	105.7	124.89	139.17	185.59
24.25	1.010416667	32.75	44.6	53.33	62.97	69.29	78.1	85.78	91.52	99.81	105.8	124.99	139.28	185.71
24.5	1.020833333	32.82	44.67	53.42	63.06	69.38	78.19	85.87	91.61	99.9	105.89	125.09	139.38	185.83
24.75	1.03125	32.89	44.75	53.5	63.14	69.46	78.28	85.96	91.7	99.99	105.98	125.18	139.49	185.95
25	1.041666667	32.95	44.83	53.58	63.23	69.55	78.36	86.05	91.79	100.08	106.07	125.28	139.59	186.07
25.25	1.052083333	33.02	44.9	53.66	63.31	69.63	78.45	86.13	91.87	100.16	106.16	125.38	139.69	186.18
25.5	1.0625	33.09	44.98	53.74	63.39	69.72	78.53	86.22	91.96	100.25	106.25	125.47	139.79	186.29
25.75	1.072916667	33.16	45.05	53.82	63.47	69.8	78.62	86.3	92.04	100.34	106.33	125.56	139.89	186.41
26	1.083333333	33.22	45.13	53.9	63.56	69.88	78.7	86.39	92.13	100.42	106.42	125.66	139.99	186.52
26.25	1.09375	33.29	45.2	53.98	63.64	69.96	78.78	86.47	92.21	100.51	106.5	125.75	140.08	186.63
26.5	1.104166667	33.36	45.28	54.06	63.72	70.05	78.86	86.55	92.29	100.59	106.59	125.84	140.18	186.74
26.75	1.114583333	33.42	45.35	54.13	63.8	70.13	78.95	86.63	92.38	100.67	106.67	125.93	140.27	186.84
27	1.125	33.49	45.42	54.21	63.88	70.21	79.03	86.71	92.46	100.75	106.75	126.01	140.37	186.95
27.25	1.135416667	33.55	45.49	54.29	63.96	70.29	79.11	86.79	92.54	100.83	106.84	126.1	140.46	187.05
27.5	1.145833333	33.62	45.57	54.36	64.03	70.36	79.18	86.87	92.62	100.91	106.92	126.19	140.55	187.16
27.75	1.15625	33.68	45.64	54.44	64.11	70.44	79.26	86.95	92.7	100.99	107	126.27	140.64	187.26
28	1.166666667	33.75	45.71	54.52	64.19	70.52	79.34	87.03	92.77	101.07	107.07	126.36	140.73	187.36
28.25	1.177083333	33.81	45.78	54.59	64.27	70.6	79.42	87.1	92.85	101.15	107.15	126.44	140.82	187.46
28.5	1.1875	33.87	45.85	54.67	64.34	70.67	79.49	87.18	92.93	101.23	107.23	126.52	140.9	187.56
28.75	1.197916667	33.94	45.92	54.74	64.42	70.75	79.57	87.26	93	101.3	107.31	126.6	140.99	187.66
29	1.208333333	34	45.99	54.81	64.49	70.83	79.65	87.33	93.08	101.38	107.38	126.68	141.08	187.76
29.25	1.21875	34.06	46.06	54.89	64.57	70.9	79.72	87.41	93.15	101.45	107.46	126.76	141.16	187.86
29.5	1.229166667	34.12	46.13	54.96	64.64	70.98	79.8	87.48	93.23	101.53	107.53	126.84	141.25	187.95
29.75	1.239583333	34.19	46.2	55.03	64.72	71.05	79.87	87.56	93.3	101.6	107.61	126.92	141.33	188.05
30	1.25	34.25	46.27	55.1	64.79	71.13	79.94	87.63	93.37	101.67	107.68	127	141.41	188.14
30.25	1.260416667	34.31	46.33	55.18	64.86	71.2	80.02	87.7	93.45	101.74	107.75	127.08	141.49	188.24
30.5	1.270833333	34.37	46.4	55.25	64.94	71.27	80.09	87.77	93.52	101.82	107.83	127.15	141.57	188.33
30.75	1.28125	34.43	46.47	55.32	65.01	71.34	80.16	87.84	93.59	101.89	107.9	127.23	141.66	188.42
31	1.291666667	34.49	46.54	55.39	65.08	71.42	80.23	87.92	93.66	101.96	107.97	127.3	141.74	188.51
31.25	1.302083333	34.55	46.6	55.46	65.15	71.49	80.3	87.99	93.73	102.03	108.04	127.38	141.81	188.6
31.5	1.3125	34.61	46.67	55.53	65.23	71.56	80.37	88.06	93.8	102.1	108.11	127.45	141.89	188.69
31.75	1.322916667	34.67	46.74	55.6	65.3	71.63	80.44	88.13	93.87	102.17	108.18	127.53	141.97	188.78
32	1.333333333	34.73	46.8	55.67	65.37	71.7	80.51	88.2	93.94	102.24	108.25	127.6	142.05	188.87
32.25	1.34375	34.79	46.87	55.74	65.44	71.77	80.58	88.26	94.01	102.3	108.32	127.67	142.12	188.96
32.5	1.354166667	34.85	46.93	55.81	65.51	71.84	80.65	88.33	94.08	102.37	108.38	127.74	142.2	189.05
32.75	1.364583333	34.91	47	55.88	65.58	71.91	80.72	88.4	94.14	102.44	108.45	127.81	142.27	189.13
33	1.375	34.97	47.06	55.95	65.65	71.98	80.79	88.47	94.21	102.51	108.52	127.88	142.35	189.22
33.25	1.385416667	35.03	47.13	56.01	65.72	72.05	80.86	88.53	94.28	102.57	108.59	127.95	142.42	189.3
33.5	1.395833333	35.09	47.19	56.08	65.78	72.12	80.92	88.6	94.34	102.64	108.65	128.02	142.5	189.39
33.75	1.40625	35.14	47.26	56.15	65.85	72.18	80.99	88.67	94.41	102.7	108.72	128.09	142.57	189.47
34	1.416666667	35.2	47.32	56.22	65.92	72.25	81.06	88.73	94.47	102.77	108.78	128.16	142.64	189.55
34.25	1.427083333	35.26	47.38	56.28	65.99	72.32	81.12	88.8	94.54	102.83	108.85	128.23	142.71	189.64
34.5	1.4375	35.32	47.45	56.35	66.06	72.39	81.19	88.86	94.6	102.9	108.91	128.29	142.79	189.72
34.75	1.447916667	35.38	47.51	56.42	66.12	72.45	81.26	88.93	94.67	102.96	108.97	128.36	142.86	189.8
35	1.458333333	35.43	47.57	56.48	66.19	72.52	81.32	88.99	94.73	103.02	109.04	128.43	142.93	189.88
35.25	1.46875	35.49	47.64	56.55	66.26	72.59	81.39	89.06	94.79	103.09	109.1	128.49	143	189.96
35.5	1.479166667	35.55	47.7	56.62	66.32	72.65	81.45	89.12	94.86	103.15	109.16	128.56	143.07	190.04
35.75	1.489583333	35.6	47.76	56.68	66.39	72.72	81.51	89.18	94.92	103.21	109.22	128.62	143.13	190.12
36	1.5	35.66	47.82	56.75	66.45	72.78	81.58	89.25	94.98	103.27	109.29	128.69	143.2	190.2
36.25	1.510416667	35.72	47.89	56.81	66.52	72.85	81.64	89.31	95.04	103.33	109.35	128.75	143.27	190.27
36.5	1.520833333	35.77	47.95	56.88	66.58	72.91	81.71	89.37	95.11	103.39	109.41	128.81	143.34	190.35
36.75	1.53125	35.83	48.01	56.94	66.65	72.98	81.77	89.43	95.17	103.45	109.47	128.88	143.4	190.43
37	1.541666667	35.88	48.07	57	66.71	73.04	81.83	89.5	95.23	103.51	109.53	128.94	143.47	190.5
37.25	1.552083333	35.94	48.13	57.07	66.78	73.11	81.89	89.56	95.29	103.57	109.59	129	143.54	190.58
37.5	1.5625	35.99	48.19	57.13	66.84	73.17	81.96	89.62	95.35	103.63	109.65	129.06	143.6	190.66
37.75	1.572916667	36.05	48.25	57.2	66.91	73.23	82.02	89.68	95.41	103.69	109.71	129.12	143.67	190.73
38	1.583333333	36.11	48.31	57.26	66.97	73.3	82.08	89.74	95.47	103.75	109.77	129.18	143.73	190.81
38.25	1.59375	36.16	48.37	57.32	67.03	73.36	82.14	89.8	95.53	103.81	109.83	129.24	143.8	190.88
38.5	1.604166667	36.21	48.43	57.39	67.1	73.42	82.2	89.86	95.59	103.87	109.88	129.3	143.86	190.95
38.75	1.614583333	36.27	48.49	57.45	67.16	73.48	82.26	89.92	95.65	103.93	109.94	129.36	143.92	191.03
39	1.625	36.32	48.55	57.51	67.22	73.55	82.32	89.98	95.7	103.98	110	129.42	143.99	191.1
39.25	1.635416667	36.38	48.61	57.57	67.28	73.61	82.38	90.04	95.76	104.04	110.06	129.48	144.05	191.17
39.5	1.645833333	36.43	48.67	57.64	67.35	73.67	82.44	90.09	95.82	104.1	110.11	129.54	144.11	191.24
39.75	1.65625	36.49	48.73	57.7	67.41	73.73	82.5	90.15	95.88	104.16	110.17	129.6	144.18	191.32
40	1.666666667	36.54	48.79	57.76	67.47	73.79	82.56	90.21	95.93	104.21	110.23	129.66	144.24	191.39
40.25	1.677083333	36.59	48.85	57.82	67.53	73.85	82.62	90.27	95.99	104.27	110.28	129.72	144.3	191.46
40.5	1.6875	36.65	48.91	57.88	67.59	73.91	82.68	90.33	96.05	104.32	110.34	129.77	144.36	191.53
40.75	1.697916667	36.7	48.97	57.94	67.66	73.97	82.74	90.38	96.11	104.38	110.39	129.83	144.42	191.6
41	1.708333333	36.75	49.03	58.01	67.72	74.03	82.8	90.44	96.16	104.44	110.45	129.89	144.48	191.67
41.25	1.71875	36.81	49.09	58.07	67.78	74.09	82.86	90.5	96.22	104.49	110.5	129.94	144.54	191.74
41.5	1.729166667	36.86	49.14	58.13	67.84	74.15	82.92	90.56	96.27	104.55	110.56	130	144.6	191.81
41.75	1.739583333	36.91	49.2	58.19	67.9	74.21	82.97	90.61	96.33	104.6	110.61	130.06	144.66	191.87
42	1.75	36.97	49.26	58.25	67.96	74.27	83.03	90.67	96.38	104.65	110.67	130.11	144.72	191.94
42.25	1.760416667	37.02	49.32	58.31	68.02	74.33	83.09	90.72	96.44	104.71	110.72	130.17	144.78	192.01
42.5	1.770833333	37.07	49.37	58.37	68.08	74.39	83.15	90.78	96.49	104.76	110.77	130.22	144.83	192.08
42.75	1.78125	37.12	49.43	58.43	68.14	74.45	83.2	90.84	96.55	104.82	110.83	130.28	144.89	192.14
43	1.791666667	37.18	49.49	58.49	68.2	74.51	83.26	90.89	96.6	104.87	110.88	130.33	144.95	192.21
43.25	1.802083333	37.23	49.55	58.55	68.26	74.57	83.32	90.95	96.66	104.92	110.93	130.38	145.01	192.28
43.5	1.8125	37.28	49.6	58.61	68.32	74.63	83.37	91	96.71	104.98	110.99	130.44	145.06	192.34
43.75	1.822916667	37.33	49.66	58.67	68.38	74.68	83.43	91.06	96.76	105.03	111.04	130.49	145.12	192.41
44	1.833333333	37.39	49.72	58.72	68.43	74.74	83.49	91.11	96.82	105.08	111.09	130.55	145.18	192.48
44.25	1.84375	37.44	49.77	58.78	68.49	74.8	83.54	91.16	96.87	105.13	111.14	130.6	145.23	192.54
44.5	1.854166667	37.49	49.83	58.84	68.55	74.86	83.6	91.22	96.92	105.19	111.2	130.65	145.29	192.6
44.75	1.864583333	37.54	49.89	58.9	68.61	74.92	83.65	91.27	96.98	105.24	111.25	130.7	145.34	192.67
45	1.875	37.59	49.94	58.96	68.67	74.97	83.71	91.33	97.03	105.29	111.3	130.76	145.4	192.73
45.25	1.885416667	37.64	50	59.02	68.73	75.03	83.77	91.38	97.08	105.34	111.35	130.81	145.46	192.8
45.5	1.895833333	37.69	50.05	59.08	68.78	75.09	83.82	91.43	97.13	105.39	111.4	130.86	145.51	192.86
45.75	1.90625	37.74	50.11	59.13	68.84	75.14	83.88	91.49	97.19	105.44	111.45	130.91	145.56	192.92
46	1.916666667	37.8	50.17	59.19	68.9	75.2	83.93	91.54	97.24	105.49	111.5	130.96	145.62	192.99
46.25	1.927083333	37.85	50.22	59.25	68.96	75.26	83.98	91.59	97.29	105.54	111.55	131.01	145.67	193.05
46.5	1.9375	37.9	50.28	59.31	69.01	75.31	84.04	91.64	97.34	105.59	111.6	131.06	145.73	193.11
46.75	1.947916667	37.95	50.33	59.36	69.07	75.37	84.09	91.7	97.39	105.64	111.65	131.11	145.78	193.17
47	1.958333333	38	50.39	59.42	69.13	75.43	84.15	91.75	97.44	105.69	111.7	131.16	145.83	193.24
47.25	1.96875	38.05	50.44	59.48	69.19	75.48	84.2	91.8	97.5	105.74	111.75	131.21	145.89	193.3
47.5	1.979166667	38.1	50.5	59.54	69.24	75.54	84.25	91.85	97.55	105.79	111.8	131.26	145.94	193.36
47.75	1.989583333	38.15	50.55	59.59	69.3	75.59	84.31	91.91	97.6	105.84	111.85	131.31	145.99	193.42

48	2	38.2	50.61	59.65	69.36	75.65	84.36	91.96	97.65	105.89	111.9	131.36	146.04	193.48
48.25	2.010416667	38.25	50.66	59.71	69.41	75.71	84.42	92.01	97.7	105.94	111.95	131.41	146.09	193.54
48.5	2.020833333	38.3	50.72	59.77	69.47	75.76	84.47	92.06	97.75	105.99	112	131.46	146.14	193.6
48.75	2.03125	38.35	50.78	59.82	69.53	75.82	84.52	92.11	97.8	106.04	112.05	131.51	146.2	193.66
49	2.041666667	38.4	50.83	59.88	69.59	75.87	84.58	92.17	97.85	106.09	112.09	131.56	146.25	193.72
49.25	2.052083333	38.46	50.89	59.94	69.64	75.93	84.63	92.22	97.9	106.14	112.14	131.61	146.3	193.78
49.5	2.0625	38.51	50.94	60	69.7	75.99	84.69	92.27	97.95	106.19	112.19	131.65	146.34	193.84
49.75	2.072916667	38.56	51	60.05	69.76	76.04	84.74	92.32	98.01	106.24	112.24	131.7	146.39	193.9
50	2.083333333	38.61	51.05	60.11	69.82	76.1	84.79	92.37	98.06	106.29	112.29	131.75	146.44	193.96
50.25	2.09375	38.66	51.11	60.17	69.87	76.16	84.85	92.43	98.11	106.34	112.34	131.8	146.49	194.02
50.5	2.104166667	38.71	51.17	60.23	69.93	76.21	84.9	92.48	98.16	106.39	112.39	131.84	146.54	194.08
50.75	2.114583333	38.76	51.22	60.28	69.99	76.27	84.95	92.53	98.21	106.44	112.43	131.89	146.59	194.14
51	2.125	38.81	51.28	60.34	70.04	76.32	85.01	92.58	98.26	106.49	112.48	131.94	146.64	194.2
51.25	2.135416667	38.86	51.33	60.4	70.1	76.38	85.06	92.63	98.31	106.54	112.53	131.98	146.69	194.26
51.5	2.145833333	38.91	51.39	60.45	70.16	76.43	85.11	92.68	98.36	106.59	112.58	132.03	146.74	194.32
51.75	2.15625	38.96	51.44	60.51	70.21	76.49	85.16	92.73	98.41	106.63	112.63	132.08	146.78	194.37
52	2.166666667	39.01	51.5	60.57	70.27	76.54	85.22	92.78	98.46	106.68	112.67	132.12	146.83	194.43
52.25	2.177083333	39.06	51.55	60.62	70.33	76.6	85.27	92.83	98.51	106.73	112.72	132.17	146.88	194.49
52.5	2.1875	39.11	51.61	60.68	70.38	76.65	85.32	92.88	98.56	106.78	112.77	132.22	146.93	194.55
52.75	2.197916667	39.16	51.66	60.74	70.44	76.71	85.37	92.93	98.6	106.83	112.81	132.26	146.98	194.6
53	2.208333333	39.21	51.71	60.79	70.49	76.76	85.43	92.98	98.65	106.87	112.86	132.31	147.02	194.66
53.25	2.21875	39.26	51.77	60.85	70.55	76.82	85.48	93.03	98.7	106.92	112.91	132.35	147.07	194.72
53.5	2.229166667	39.31	51.82	60.91	70.61	76.87	85.53	93.08	98.75	106.97	112.96	132.4	147.12	194.78
53.75	2.239583333	39.36	51.88	60.96	70.66	76.93	85.58	93.13	98.8	107.02	113	132.44	147.16	194.83
54	2.25	39.41	51.93	61.02	70.72	76.98	85.63	93.18	98.85	107.06	113.05	132.49	147.21	194.89
54.25	2.260416667	39.46	51.99	61.07	70.77	77.04	85.68	93.23	98.9	107.11	113.1	132.53	147.26	194.94
54.5	2.270833333	39.51	52.04	61.13	70.83	77.09	85.74	93.28	98.95	107.16	113.14	132.58	147.3	195
54.75	2.28125	39.56	52.09	61.18	70.88	77.14	85.79	93.33	99	107.21	113.19	132.62	147.35	195.06
55	2.291666667	39.61	52.15	61.24	70.94	77.2	85.84	93.38	99.04	107.25	113.23	132.67	147.4	195.11
55.25	2.302083333	39.65	52.2	61.3	70.99	77.25	85.89	93.43	99.09	107.3	113.28	132.71	147.44	195.17
55.5	2.3125	39.7	52.25	61.35	71.05	77.3	85.94	93.48	99.14	107.35	113.33	132.76	147.49	195.22
55.75	2.322916667	39.75	52.31	61.41	71.1	77.36	85.99	93.53	99.19	107.39	113.37	132.8	147.54	195.28
56	2.333333333	39.8	52.36	61.46	71.16	77.41	86.04	93.58	99.24	107.44	113.42	132.85	147.58	195.34
56.25	2.34375	39.85	52.42	61.52	71.21	77.47	86.09	93.63	99.28	107.49	113.46	132.89	147.63	195.39
56.5	2.354166667	39.9	52.47	61.57	71.27	77.52	86.14	93.68	99.33	107.53	113.51	132.94	147.67	195.45
56.75	2.364583333	39.95	52.52	61.63	71.32	77.57	86.2	93.73	99.38	107.58	113.55	132.98	147.72	195.5
57	2.375	40	52.58	61.68	71.38	77.63	86.25	93.77	99.43	107.63	113.6	133.02	147.76	195.55
57.25	2.385416667	40.04	52.63	61.74	71.43	77.68	86.3	93.82	99.47	107.67	113.64	133.07	147.81	195.61
57.5	2.395833333	40.09	52.68	61.79	71.49	77.73	86.35	93.87	99.52	107.72	113.69	133.11	147.85	195.66
57.75	2.40625	40.14	52.73	61.84	71.54	77.78	86.4	93.92	99.57	107.76	113.73	133.15	147.9	195.72
58	2.416666667	40.19	52.79	61.9	71.59	77.84	86.45	93.97	99.62	107.81	113.78	133.2	147.94	195.77
58.25	2.427083333	40.24	52.84	61.95	71.65	77.89	86.5	94.02	99.66	107.86	113.82	133.24	147.99	195.83
58.5	2.4375	40.29	52.89	62.01	71.7	77.94	86.55	94.06	99.71	107.9	113.87	133.28	148.03	195.88
58.75	2.447916667	40.33	52.95	62.06	71.76	78	86.6	94.11	99.76	107.95	113.91	133.33	148.08	195.93
59	2.458333333	40.38	53	62.12	71.81	78.05	86.65	94.16	99.8	107.99	113.96	133.37	148.12	195.99
59.25	2.46875	40.43	53.05	62.17	71.86	78.1	86.7	94.21	99.85	108.04	114	133.41	148.17	196.04
59.5	2.479166667	40.48	53.1	62.22	71.92	78.15	86.75	94.26	99.9	108.08	114.05	133.46	148.21	196.09
59.75	2.489583333	40.53	53.16	62.28	71.97	78.21	86.8	94.3	99.94	108.13	114.09	133.5	148.25	196.15
60	2.5	40.57	53.21	62.33	72.02	78.26	86.85	94.35	99.99	108.17	114.13	133.54	148.3	196.2
60.25	2.510416667	40.62	53.26	62.39	72.08	78.31	86.9	94.4	100.04	108.22	114.18	133.58	148.34	196.25
60.5	2.520833333	40.67	53.31	62.44	72.13	78.36	86.95	94.45	100.08	108.26	114.22	133.63	148.39	196.31
60.75	2.53125	40.72	53.36	62.49	72.18	78.41	87	94.49	100.13	108.31	114.27	133.67	148.43	196.36
61	2.541666667	40.77	53.42	62.55	72.24	78.47	87.04	94.54	100.18	108.35	114.31	133.71	148.47	196.41
61.25	2.552083333	40.81	53.47	62.6	72.29	78.52	87.09	94.59	100.22	108.4	114.35	133.75	148.52	196.46
61.5	2.5625	40.86	53.52	62.65	72.34	78.57	87.14	94.64	100.27	108.44	114.4	133.8	148.56	196.52
61.75	2.572916667	40.91	53.57	62.71	72.4	78.62	87.19	94.68	100.31	108.49	114.44	133.84	148.6	196.57
62	2.583333333	40.95	53.62	62.76	72.45	78.67	87.24	94.73	100.36	108.53	114.48	133.88	148.65	196.62
62.25	2.59375	41	53.68	62.81	72.5	78.73	87.29	94.78	100.41	108.57	114.53	133.92	148.69	196.67
62.5	2.604166667	41.05	53.73	62.87	72.56	78.78	87.34	94.82	100.45	108.62	114.57	133.96	148.73	196.72
62.75	2.614583333	41.1	53.78	62.92	72.61	78.83	87.39	94.87	100.5	108.66	114.61	134	148.77	196.78
63	2.625	41.14	53.83	62.97	72.66	78.88	87.44	94.92	100.54	108.71	114.66	134.05	148.82	196.83
63.25	2.635416667	41.19	53.88	63.03	72.71	78.93	87.48	94.96	100.59	108.75	114.7	134.09	148.86	196.88
63.5	2.645833333	41.24	53.93	63.08	72.77	78.98	87.53	95.01	100.63	108.8	114.74	134.13	148.9	196.93
63.75	2.65625	41.29	53.99	63.13	72.82	79.03	87.58	95.06	100.68	108.84	114.79	134.17	148.94	196.98
64	2.666666667	41.33	54.04	63.18	72.87	79.08	87.63	95.1	100.72	108.88	114.83	134.21	148.99	197.03
64.25	2.677083333	41.38	54.09	63.24	72.92	79.14	87.68	95.15	100.77	108.93	114.87	134.25	149.03	197.08
64.5	2.6875	41.43	54.14	63.29	72.98	79.19	87.73	95.2	100.82	108.97	114.91	134.29	149.07	197.13
64.75	2.697916667	41.47	54.19	63.34	73.03	79.24	87.78	95.24	100.86	109.01	114.96	134.33	149.11	197.19
65	2.708333333	41.52	54.24	63.4	73.08	79.29	87.82	95.29	100.91	109.06	115	134.38	149.16	197.24
65.25	2.71875	41.57	54.29	63.45	73.13	79.34	87.87	95.34	100.95	109.1	115.04	134.42	149.2	197.29
65.5	2.729166667	41.61	54.34	63.5	73.19	79.39	87.92	95.38	101	109.15	115.08	134.46	149.24	197.34
65.75	2.739583333	41.66	54.4	63.55	73.24	79.44	87.97	95.43	101.04	109.19	115.13	134.5	149.28	197.39
66	2.75	41.71	54.45	63.6	73.29	79.49	88.02	95.47	101.09	109.23	115.17	134.54	149.32	197.44
66.25	2.760416667	41.75	54.5	63.66	73.34	79.54	88.06	95.52	101.13	109.28	115.21	134.58	149.36	197.49
66.5	2.770833333	41.8	54.55	63.71	73.39	79.59	88.11	95.57	101.17	109.32	115.25	134.62	149.41	197.54
66.75	2.78125	41.85	54.6	63.76	73.44	79.64	88.16	95.61	101.22	109.36	115.3	134.66	149.45	197.59
67	2.791666667	41.89	54.65	63.81	73.5	79.69	88.21	95.66	101.26	109.4	115.34	134.7	149.49	197.64
67.25	2.802083333	41.94	54.7	63.87	73.55	79.74	88.25	95.7	101.31	109.45	115.38	134.74	149.53	197.69
67.5	2.8125	41.98	54.75	63.92	73.6	79.79	88.3	95.75	101.35	109.49	115.42	134.78	149.57	197.74
67.75	2.822916667	42.03	54.8	63.97	73.65	79.84	88.35	95.79	101.4	109.53	115.46	134.82	149.61	197.79
68	2.833333333	42.08	54.85	64.02	73.7	79.89	88.4	95.84	101.44	109.58	115.51	134.86	149.65	197.84
68.25	2.84375	42.12	54.9	64.07	73.75	79.94	88.44	95.88	101.49	109.62	115.55	134.9	149.69	197.89
68.5	2.854166667	42.17	54.95	64.12	73.81	79.99	88.49	95.93	101.53	109.66	115.59	134.94	149.74	197.94
68.75	2.864583333	42.21	55	64.18	73.86	80.04	88.54	95.98	101.57	109.7	115.63	134.98	149.78	197.99
69	2.875	42.26	55.05	64.23	73.91	80.09	88.59	96.02	101.62	109.75	115.67	135.02	149.82	198.03
69.25	2.885416667	42.31	55.1	64.28	73.96	80.14	88.63	96.07	101.66	109.79	115.71	135.06	149.86	198.08
69.5	2.895833333	42.35	55.15	64.33	74.01	80.19	88.68	96.11	101.71	109.83	115.75	135.1	149.9	198.13
69.75	2.90625	42.4	55.2	64.38	74.06	80.24	88.73	96.16	101.75	109.87	115.8	135.14	149.94	198.18
70	2.916666667	42.44	55.25	64.43	74.11	80.29	88.78	96.2	101.79	109.92	115.84	135.18	149.98	198.23
70.25	2.927083333	42.49	55.3	64.49	74.16	80.34	88.82	96.25	101.84	109.96	115.88	135.22	150.02	198.28
70.5	2.9375	42.54	55.35	64.54	74.21	80.39	88.87	96.29	101.88	110	115.92	135.26	150.06	198.33
70.75	2.947916667	42.58	55.4	64.59	74.27	80.44	88.92	96.34	101.92	110.04	115.96	135.3	150.1	198.38
71	2.958333333	42.63	55.45	64.64	74.32	80.49	88.96	96.38	101.97	110.09	116	135.33	150.14	198.42
71.25	2.96875	42.67	55.5	64.69	74.37	80.54	89.01	96.43	102.01	110.13	116.04	135.37	150.18	198.47
71.5	2.979166667	42.72	55.55	64.74	74.42	80.59	89.06	96.47	102.06	110.17	116.08	135.41	150.22	198.52
71.75	2.989583333	42.76	55.6	64.79	74.47	80.64	89.1	96.52	102.1	110.21	116.12	135.45	150.26	198.57
72	3	42.81	55.65	64.84	74.52	80.69	89.15	96.56	102.14	110.25	116.17	135.49	150.3	198.62
72.25	3.010416667	42.85	55.7	64.89	74.57	80.74	89.2	96.6	102.19	110.29	116.21	135.53	150.34	198.67
72.5	3.020833333	42.9	55.75	64.95	74.62	80.79	89.24	96.65	102.23	110.34	116.25	135.57	150.38	198.71
72.75	3.03125	42.95	55.8	65	74.67	80.84	89.29	96.69	102.27	110.38	116.29	135.61	150.42	198.76

73	3.041666667	42.99	55.85	65.05	74.72	80.89	89.34	96.74	102.32	110.42	116.33	135.65	150.46	198.81
73.25	3.052083333	43.04	55.9	65.1	74.77	80.94	89.38	96.78	102.36	110.46	116.37	135.69	150.5	198.86
73.5	3.0625	43.08	55.95	65.15	74.82	80.98	89.43	96.83	102.4	110.5	116.41	135.72	150.54	198.9
73.75	3.072916667	43.13	56	65.2	74.87	81.03	89.48	96.87	102.44	110.54	116.45	135.76	150.58	198.95
74	3.083333333	43.17	56.05	65.25	74.92	81.08	89.52	96.92	102.49	110.59	116.49	135.8	150.62	199
74.25	3.09375	43.22	56.1	65.3	74.97	81.13	89.57	96.96	102.53	110.63	116.53	135.84	150.66	199.05
74.5	3.104166667	43.26	56.15	65.35	75.02	81.18	89.61	97	102.57	110.67	116.57	135.88	150.7	199.09
74.75	3.114583333	43.31	56.2	65.4	75.07	81.23	89.66	97.05	102.62	110.71	116.61	135.92	150.74	199.14
75	3.125	43.35	56.25	65.45	75.12	81.28	89.71	97.09	102.66	110.75	116.65	135.95	150.77	199.19
75.25	3.135416667	43.4	56.3	65.5	75.17	81.33	89.75	97.14	102.7	110.79	116.69	135.99	150.81	199.24
75.5	3.145833333	43.44	56.35	65.55	75.22	81.38	89.8	97.18	102.75	110.83	116.73	136.03	150.85	199.28
75.75	3.15625	43.49	56.39	65.6	75.27	81.42	89.84	97.22	102.79	110.88	116.77	136.07	150.89	199.33
76	3.166666667	43.53	56.44	65.65	75.32	81.47	89.89	97.27	102.83	110.92	116.81	136.11	150.93	199.38
76.25	3.177083333	43.58	56.49	65.7	75.37	81.52	89.94	97.31	102.87	110.96	116.85	136.15	150.97	199.42
76.5	3.1875	43.62	56.54	65.75	75.42	81.57	89.98	97.36	102.92	111	116.89	136.18	151.01	199.47
76.75	3.197916667	43.67	56.59	65.8	75.47	81.62	90.03	97.4	102.96	111.04	116.93	136.22	151.05	199.52
77	3.208333333	43.71	56.64	65.85	75.52	81.67	90.07	97.44	103	111.08	116.97	136.26	151.09	199.56
77.25	3.21875	43.75	56.69	65.9	75.57	81.72	90.12	97.49	103.04	111.12	117.01	136.3	151.13	199.61
77.5	3.229166667	43.8	56.74	65.95	75.62	81.76	90.17	97.53	103.09	111.16	117.05	136.33	151.16	199.66
77.75	3.239583333	43.84	56.79	66	75.67	81.81	90.21	97.57	103.13	111.2	117.09	136.37	151.2	199.7
78	3.25	43.89	56.83	66.05	75.72	81.86	90.26	97.62	103.17	111.24	117.13	136.41	151.24	199.75
78.25	3.260416667	43.93	56.88	66.1	75.77	81.91	90.3	97.66	103.21	111.28	117.17	136.45	151.28	199.8
78.5	3.270833333	43.98	56.93	66.15	75.82	81.96	90.35	97.71	103.26	111.33	117.21	136.49	151.32	199.84
78.75	3.28125	44.02	56.98	66.2	75.87	82.01	90.39	97.75	103.3	111.37	117.25	136.52	151.36	199.89
79	3.291666667	44.07	57.03	66.25	75.92	82.05	90.44	97.79	103.34	111.41	117.29	136.56	151.39	199.93
79.25	3.302083333	44.11	57.08	66.3	75.97	82.1	90.48	97.84	103.38	111.45	117.33	136.6	151.43	199.98
79.5	3.3125	44.16	57.13	66.35	76.02	82.15	90.53	97.88	103.42	111.49	117.37	136.64	151.47	200.03
79.75	3.322916667	44.2	57.17	66.4	76.07	82.2	90.58	97.92	103.47	111.53	117.41	136.67	151.51	200.07
80	3.333333333	44.24	57.22	66.45	76.12	82.25	90.62	97.97	103.51	111.57	117.45	136.71	151.55	200.12
80.25	3.34375	44.29	57.27	66.5	76.17	82.29	90.67	98.01	103.55	111.61	117.49	136.75	151.59	200.16
80.5	3.354166667	44.33	57.32	66.55	76.21	82.34	90.71	98.05	103.59	111.65	117.53	136.79	151.62	200.21
80.75	3.364583333	44.38	57.37	66.6	76.26	82.39	90.76	98.1	103.63	111.69	117.56	136.82	151.66	200.25
81	3.375	44.42	57.42	66.65	76.31	82.44	90.8	98.14	103.68	111.73	117.6	136.86	151.7	200.3
81.25	3.385416667	44.46	57.46	66.7	76.36	82.49	90.85	98.18	103.72	111.77	117.64	136.9	151.74	200.35
81.5	3.395833333	44.51	57.51	66.75	76.41	82.53	90.89	98.22	103.76	111.81	117.68	136.93	151.78	200.39
81.75	3.40625	44.55	57.56	66.8	76.46	82.58	90.94	98.27	103.8	111.85	117.72	136.97	151.81	200.44
82	3.416666667	44.6	57.61	66.85	76.51	82.63	90.98	98.31	103.84	111.89	117.76	137.01	151.85	200.48
82.25	3.427083333	44.64	57.66	66.9	76.56	82.68	91.03	98.35	103.88	111.93	117.8	137.04	151.89	200.53
82.5	3.4375	44.69	57.71	66.95	76.61	82.72	91.07	98.4	103.93	111.97	117.84	137.08	151.93	200.57
82.75	3.447916667	44.73	57.75	67	76.66	82.77	91.12	98.44	103.97	112.01	117.88	137.12	151.96	200.62
83	3.458333333	44.77	57.8	67.04	76.7	82.82	91.16	98.48	104.01	112.05	117.92	137.16	152	200.66
83.25	3.46875	44.82	57.85	67.09	76.75	82.87	91.21	98.53	104.05	112.09	117.95	137.19	152.04	200.71
83.5	3.479166667	44.86	57.9	67.14	76.8	82.91	91.25	98.57	104.09	112.13	117.99	137.23	152.08	200.75
83.75	3.489583333	44.9	57.95	67.19	76.85	82.96	91.3	98.61	104.13	112.17	118.03	137.27	152.12	200.8
84	3.5	44.95	57.99	67.24	76.9	83.01	91.34	98.65	104.18	112.21	118.07	137.3	152.15	200.84
84.25	3.510416667	44.99	58.04	67.29	76.95	83.06	91.39	98.7	104.22	112.25	118.11	137.34	152.19	200.89
84.5	3.520833333	45.04	58.09	67.34	77	83.1	91.43	98.74	104.26	112.29	118.15	137.38	152.23	200.93
84.75	3.53125	45.08	58.14	67.39	77.05	83.15	91.48	98.78	104.3	112.33	118.19	137.41	152.27	200.98
85	3.541666667	45.12	58.18	67.44	77.09	83.2	91.52	98.82	104.34	112.37	118.23	137.45	152.3	201.02
85.25	3.552083333	45.17	58.23	67.49	77.14	83.25	91.57	98.87	104.38	112.41	118.26	137.49	152.34	201.07
85.5	3.5625	45.21	58.28	67.54	77.19	83.29	91.61	98.91	104.42	112.45	118.3	137.52	152.38	201.11
85.75	3.572916667	45.25	58.33	67.58	77.24	83.34	91.65	98.95	104.47	112.49	118.34	137.56	152.41	201.16
86	3.583333333	45.3	58.38	67.63	77.29	83.39	91.7	99	104.51	112.53	118.38	137.6	152.45	201.2
86.25	3.59375	45.34	58.42	67.68	77.34	83.43	91.74	99.04	104.55	112.57	118.42	137.63	152.49	201.24
86.5	3.604166667	45.38	58.47	67.73	77.39	83.48	91.79	99.08	104.59	112.61	118.46	137.67	152.53	201.29
86.75	3.614583333	45.43	58.52	67.78	77.43	83.53	91.83	99.12	104.63	112.65	118.5	137.71	152.56	201.33
87	3.625	45.47	58.57	67.83	77.48	83.58	91.88	99.17	104.67	112.69	118.53	137.74	152.6	201.38
87.25	3.635416667	45.52	58.61	67.88	77.53	83.62	91.92	99.21	104.71	112.73	118.57	137.78	152.64	201.42
87.5	3.645833333	45.56	58.66	67.92	77.58	83.67	91.97	99.25	104.75	112.77	118.61	137.81	152.67	201.47
87.75	3.65625	45.6	58.71	67.97	77.63	83.72	92.01	99.29	104.8	112.81	118.65	137.85	152.71	201.51
88	3.666666667	45.65	58.76	68.02	77.68	83.76	92.06	99.33	104.84	112.85	118.69	137.89	152.75	201.55
88.25	3.677083333	45.69	58.8	68.07	77.72	83.81	92.1	99.38	104.88	112.89	118.73	137.92	152.78	201.6
88.5	3.6875	45.73	58.85	68.12	77.77	83.86	92.14	99.42	104.92	112.92	118.76	137.96	152.82	201.64
88.75	3.697916667	45.78	58.9	68.17	77.82	83.91	92.19	99.46	104.96	112.96	118.8	138	152.86	201.69
89	3.708333333	45.82	58.95	68.22	77.87	83.95	92.23	99.5	105	113	118.84	138.03	152.9	201.73
89.25	3.71875	45.86	58.99	68.26	77.92	84	92.28	99.55	105.04	113.04	118.88	138.07	152.93	201.77
89.5	3.729166667	45.91	59.04	68.31	77.96	84.05	92.32	99.59	105.08	113.08	118.92	138.1	152.97	201.82
89.75	3.739583333	45.95	59.09	68.36	78.01	84.09	92.37	99.63	105.12	113.12	118.96	138.14	153.01	201.86
90	3.75	45.99	59.13	68.41	78.06	84.14	92.41	99.67	105.16	113.16	118.99	138.18	153.04	201.91
90.25	3.760416667	46.03	59.18	68.46	78.11	84.19	92.45	99.72	105.2	113.2	119.03	138.21	153.08	201.95
90.5	3.770833333	46.08	59.23	68.51	78.16	84.23	92.5	99.76	105.25	113.24	119.07	138.25	153.12	201.99
90.75	3.78125	46.12	59.28	68.55	78.21	84.28	92.54	99.8	105.29	113.28	119.11	138.28	153.15	202.04
91	3.791666667	46.16	59.32	68.6	78.25	84.33	92.59	99.84	105.33	113.32	119.15	138.32	153.19	202.08
91.25	3.802083333	46.21	59.37	68.65	78.3	84.37	92.63	99.88	105.37	113.36	119.18	138.36	153.22	202.12
91.5	3.8125	46.25	59.42	68.7	78.35	84.42	92.68	99.93	105.41	113.4	119.22	138.39	153.26	202.17
91.75	3.822916667	46.29	59.46	68.75	78.4	84.47	92.72	99.97	105.45	113.43	119.26	138.43	153.3	202.21
92	3.833333333	46.34	59.51	68.8	78.44	84.51	92.76	100.01	105.49	113.47	119.3	138.46	153.33	202.25
92.25	3.84375	46.38	59.56	68.84	78.49	84.56	92.81	100.05	105.53	113.51	119.34	138.5	153.37	202.3
92.5	3.854166667	46.42	59.61	68.89	78.54	84.61	92.85	100.09	105.57	113.55	119.37	138.53	153.41	202.34
92.75	3.864583333	46.46	59.65	68.94	78.59	84.65	92.9	100.14	105.61	113.59	119.41	138.57	153.44	202.38
93	3.875	46.51	59.7	68.99	78.64	84.7	92.94	100.18	105.65	113.63	119.45	138.61	153.48	202.43
93.25	3.885416667	46.55	59.75	69.04	78.68	84.75	92.98	100.22	105.69	113.67	119.49	138.64	153.52	202.47
93.5	3.895833333	46.59	59.79	69.08	78.73	84.79	93.03	100.26	105.73	113.71	119.52	138.68	153.55	202.51
93.75	3.90625	46.64	59.84	69.13	78.78	84.84	93.07	100.3	105.77	113.75	119.56	138.71	153.59	202.56
94	3.916666667	46.68	59.89	69.18	78.83	84.89	93.12	100.35	105.81	113.79	119.6	138.75	153.62	202.6
94.25	3.927083333	46.72	59.93	69.23	78.87	84.93	93.16	100.39	105.86	113.82	119.64	138.78	153.66	202.64
94.5	3.9375	46.76	59.98	69.28	78.92	84.98	93.2	100.43	105.9	113.86	119.68	138.82	153.7	202.69
94.75	3.947916667	46.81	60.03	69.32	78.97	85.02	93.25	100.47	105.94	113.9	119.71	138.85	153.73	202.73
95	3.958333333	46.85	60.07	69.37	79.02	85.07	93.29	100.51	105.98	113.94	119.75	138.89	153.77	202.77
95.25	3.96875	46.89	60.12	69.42	79.06	85.12	93.33	100.55	106.02	113.98	119.79	138.93	153.81	202.81
95.5	3.979166667	46.93	60.17	69.47	79.11	85.16	93.38	100.6	106.06	114.02	119.83	138.96	153.84	202.86
95.75	3.989583333	46.98	60.21	69.51	79.16	85.21	93.42	100.64	106.1	114.06	119.86	139	153.88	202.9
96	4	47.02	60.26	69.56	79.21	85.26	93.47	100.68	106.14	114.1	119.9	139.03	153.91	202.94