



ENVIRONMENT AGENCY
NORTH EAST REGION

SECTION 105 - C30/92 SURVEYS

REACH ONE RIVER TYNE (RIGHT BANK)

JUNE 1998

Revision	Date	Prepared	Checked	Approved	Status
0	March 1997	T B Ellingham	S Ballm	S E Magenis	Draft for Approval
1	October 1997	T B Ellingham	T J Summers	S E Magenis	2nd Draft
2	March 1998	T B Ellingham	K Argent	S E Magenis	Final
3	June 1998	T B Ellingham 	T J Summers 	S E Magenis TJS "	Final

Document No. C1395/FPM/01/010

Prepared by:

Posford Duvivier
Rightwell House
Bretton
Peterborough
PE3 8DW

For:

Environment Agency
North East Region
Tyneside House
Skinnerburn Road
Newcastle Business Park
Newcastle upon Tyne
NE4 7AR

ENVIRONMENT AGENCY



136316

**THE ENVIRONMENT AGENCY, NORTH EAST REGION, NORTHUMBRIA AREA
SECTION 105, CIRCULAR 30/92 FLOOD PLAIN MAPS
SUMMARY
REACH ONE RIVER TYNE (RIGHT BANK)**

June 1998

This summary is to be read in conjunction with map reference:

- C1395/FPM/01/010
- C1395/FPM/01/011
- C1395/FPM/01/012

Study Reach

The study includes a 15.3km reach of the right bank of the River Tyne between Tyne Bridge at NGR NZ253 638 and the mouth of the River Tyne, South Shields at NGR NZ365 683.

Existing and Predicted Problems

Areas that are predicted to flood during a 100 year event are as follows:

- | | |
|-----------------|--|
| • South Shields | Property between the waterfront and Wapping Street |
| • High Shields | Buildings and car park at West and Middle Dock |
| • Tyne Bridge | Waterfront property and land at Smiths Print Group |

The existing flooding problems on this reach are covered in the "Report on Survey of Flooding Problems Volume 1 March 1997", Posford Duvivier.

CONTENTS

- 1.0 INTRODUCTION
 - 1.1 Section 105 Surveys Circular 30/92 Surveys
 - 1.2 Scope of this Study
 - 1.3 Purpose of this Report
- 2.0 DATA COLLECTION
 - 2.1 Environment Agency Area Offices
 - 2.2 Other Available Data
 - 2.3 Tyne and Wear Development Corporation.
 - 2.4 Site Visits
 - 2.5 Surveying Requirements
- 3.0 INDICATIVE FLOOD PLAIN MAPPING (Brief 3.1)
 - 3.1 Tidal Flooding Mechanism
 - 3.2 Flood Level Estimation
 - 3.3 Limit of Flood Plain
 - 3.3.1 General
 - 3.3.2 South Shields (map C1395/FPM/O1/010)
 - 3.3.3 High Shields (map C1395/FPM/O1/010)
 - 3.3.4 Jarrow (map C1395/FPM/O1/011)
 - 3.3.5 Downstream of Tyne Bridge (map C1395/FPM/O1/012)
- 4.0 SURVEY OF FLOODING PROBLEMS (Brief 3.2)
 - 4.1 Tyne Dock Hotel (map C1395/FPM/O1/010)
 - 4.2 Other Problem Areas
- 5.0 CATCHMENT DRAINAGE STUDIES (Brief 3.3)
 - 5.1 Development and Surface Water Disposal
 - 5.2 Proposed Engineering Works
 - 5.3 Detail Survey
 - 5.4 Flood Warning Recommendations
- 6.0 RESULTS AND CONCLUSION
 - 6.1 Discussion of Results
 - 6.2 Level of Confidence
 - 6.3 Recommendations for further works

Figure 1.1

Figure 3.1

APPENDIX A PHOTOTGRAPHS

APPENDIX B TYNE AND WEAR DEVELOPMENT CORPORATION PLAN

1.0 INTRODUCTION

1.1 Section 105 Surveys Circular 30/92 Surveys

Section 105 – C30/92 surveys will be the Environment Agency's main input to the preparation of the Local Planning Authority (LPA) development plans. The surveys have been instigated by the Department of the Environment Circular 30/92 and are carried out by the Agency under powers granted by section 105(2) of the Water Resources Act 1991.

Surveys within the Agency's NorthEast Region encompass three elements:

- Indicative flood plain mapping.
- Surveys of flooding problems.
- Catchment drainage studies.

1.2 Scope of this Study

The Section 105 – C30/92 Surveys reported here covers one reach within the Northumbria Area, namely the River Tyne right bank from Tyne Bridge (NGR NZ253638) downstream to the mouth of the river at South Shields (NGR NZ365683). A location plan is given as Figure 1.1. The reach is classified as main river and has a length of 15.27 Km.

1.3 Purpose of this Report

This report describes the work carried out for the Flood Plain Mapping and Catchment Drainage Studies. It provides the details required by the Agency's Survey Brief. It should be read in conjunction with the Report on Survey of Flooding Problems Volume 1, March 1997 and the following 1:10,000 scale Indicative Flood Plain Maps.

- C1395/FPM/01/010
- C1395/FPM/01/011
- C1395/FPM/01/012

2.0 DATA COLLECTION

It was anticipated at the outset of the project that the Agency would hold substantial data on the reach in question. The brief confirmed the availability of data and the project was entered into on this understanding. However, investigation over a protected time frame concluded that there was very little relevant data. In fact, no survey data was available as expected, neither were there any details of previous flood defence schemes.

2.1 Environment Agency Area Offices

Visits were made to the Newcastle office of the Agency to gain tide level data that would assist in determining flooded areas. The Agency's Liaison Officer, Mr David Bassett, gave guidance during the visits as to where useful data could be found. The Flood Warning Dissemination Plan produced by the Environment Agency in August 1996 was available and consulted. The Plan covers the Tyne Estuary and includes land within the administrative boundaries of North Tyneside Metropolitan Borough Council, South Tyneside MBC, Gateshead MBC and City of Newcastle Council.

2.2 Other Available Data

Four earlier reports produced by Posford Duvivier for the Environment Agency were also of use in defining river levels. They were:

- 1) Humber Estuary Tidal Defences Data Collection and Analysis Report, February 1991.
- 2) Humber Estuary Tidal Defences Data Collection and Analysis, supplement to Final Report May 1991.
- 3) Extending Tidal Warning - Crimdon Park to Berwick upon Tweed Report. September 1995.
- 4) St. Abb's Head to the River Tyne Shoreline Management Plan – January 1998.

2.3 Tyne and Wear Development Corporation.

The Tyne and Wear Development Corporation were approached with the intention of obtaining any records of flooding or details of any development works that they had carried out. No historical flooding records or details of areas identified for development were available. However, Tyne and Wear Development Corporation were able to produce a plan (Appendix B) identifying four locations but not the dates where they had carried out work along the study reach. The lengths of waterfront developed are listed in *Table 2.1*

2.1 Environment Agency Area Offices

Visits were made to the Newcastle office of the Agency to gain tide level data that would assist in determining flooded areas. The Agency's Liaison Officer, Mr David Bassett, gave guidance during the visits as to where useful data could be found. The Flood Warning Dissemination Plan produced by the Environment Agency in August 1996 was available and consulted. The Plan covers the Tyne Estuary and includes land within the administrative boundaries of North Tyneside Metropolitan Borough Council, South Tyneside MBC, Gateshead MBC and City of Newcastle Council.

2.2 Other Available Data

Four earlier reports produced by Posford Duvivier for the Environment Agency were also of use in defining river levels. They were:

- 1) Humber Estuary Tidal Defences Data Collection and Analysis Report, February 1991.
- 2) Humber Estuary Tidal Defences Data Collection and Analysis, supplement to Final Report May 1991.
- 3) Extending Tidal Warning - Crindon Park to Berwick upon Tweed Report. September 1995.
- 4) St. Abb's Head to the River Tyne Shoreline Management Plan – January 1998.

2.3 Tyne and Wear Development Corporation.

The Tyne and Wear Development Corporation were approached with the intention of obtaining any records of flooding or details of any development works that they had carried out. No historical flooding records or details of areas identified for development were available. However, Tyne and Wear Development Corporation were able to produce a plan (Appendix B) identifying four locations but not the dates where they had carried out work along the study reach. The lengths of waterfront developed are listed in *Table 2.1*

Table 2.1

Tyne & Wear Development Corporation construction works.

Location	Length m	Top Level m A O D	Description
Littlehaven	225	5.0	Sheet pile wall with capping beam
Market Dock	480	4.4	Revetment with precast concrete upstand.
Mill Dam	65	3.58*	Sheet pile wall with capping beam
Viking Industrial Park	520	4.0	Revetment.

* Reference to *Table 3.2* indicates this defence to be too low

2.4 Site Visits

Site visits to the right bank of the River Tyne were made with the aim of achieving the following:

- Confirm whether or not areas identified as being at risk in the Flood Warning Dissemination Plan are still at risk
- To visit the locations where Tyne & Wear Development Corporation had undertaken works.
- To inspect low-lying areas of waterfront which are believed to be at risk from flooding.

Information obtained during the site visits is referred to within the relevant sections of this report.

2.5 Surveying Requirements

Within the Agency Brief for the Works section 3.1.11 indicates the possible requirement to undertake a topographic survey. However, it was agreed that no topographic or property threshold survey should be undertaken for the Tyne reach due to budgetary constraints.

3.0 INDICATIVE FLOOD PLAIN MAPPING (Brief 3.1)

3.1 Tidal Flooding Mechanism

On the right bank of the River Tyne the predominant flooding mechanism is tidal still water level. Increased river flows will raise low water levels but, in the areas susceptible to tidal flooding, high water levels will not be significantly raised. Waves generated within the estuary by local winds will sometimes increase the extent of flooding but only slightly. In essence the dominant cause of flooding will be from tidal action and in view of this it is

appropriate to show only the 1 in 200-year tidal flood plain on the maps.

3.2 Flood Level Estimation

It was agreed at an early stage with the Agency that the production of a hydraulic model of the reach of the Tyne being considered was inappropriate. Water level scenarios would be determined from historical data and previous studies.

The highest flood level recorded by the Port of Tyne Authority is 3.77m AOD, which occurred both in 1921 and 1943 at Swing Bridge (just upstream of Tyne Bridge). There have been ten other years this century when the highest recorded flood level at Swing Bridge has exceeded 3.50m AOD.

Reference to table B10 within "The St. Abb's Head to the River Tyne Shoreline Management Plan" indicates that the 1996, 1 in 200 year level at North Shields is calculated to be 3.69m AOD. The extreme water level predictions for North Shields taken from that document are shown in *Figure 3.1*.

The report, "Extending Tidal Warning - Crimdon Park to Berwick upon Tweed" contains the prediction for high tide level relative to the anticipated high tide level at North Shields at three locations on the study reach. The predicted increase in level at each location is listed in *Table 3.1*.

Table 3.1
Increase in High Tide Levels Relative to North Shields

Location	Increase in High Tide Level above High Tide Level at North Shields
High Shields	0.07m
Jarrow	0.20m
Tyne Bridge	0.33m

The increase in water level along the reach during an extreme event has been estimated to be the same as during high tide. This decision was made following comparison of high tide levels for a neap tide and a spring tide. The increase in water level along the reach was the same for both these tides so it was thought that the same water profile would exist for the extreme tide.

The estimated flood levels therefore, for a 200-year return period tidal event, used to estimate the flooded area, are shown in *Table 3.2*. These levels relate to 1996, with no allowance being made for relative sea level rise after that time.

Extreme Water Level Predictions (1996)

RIVER TYNE

Figure 3.1

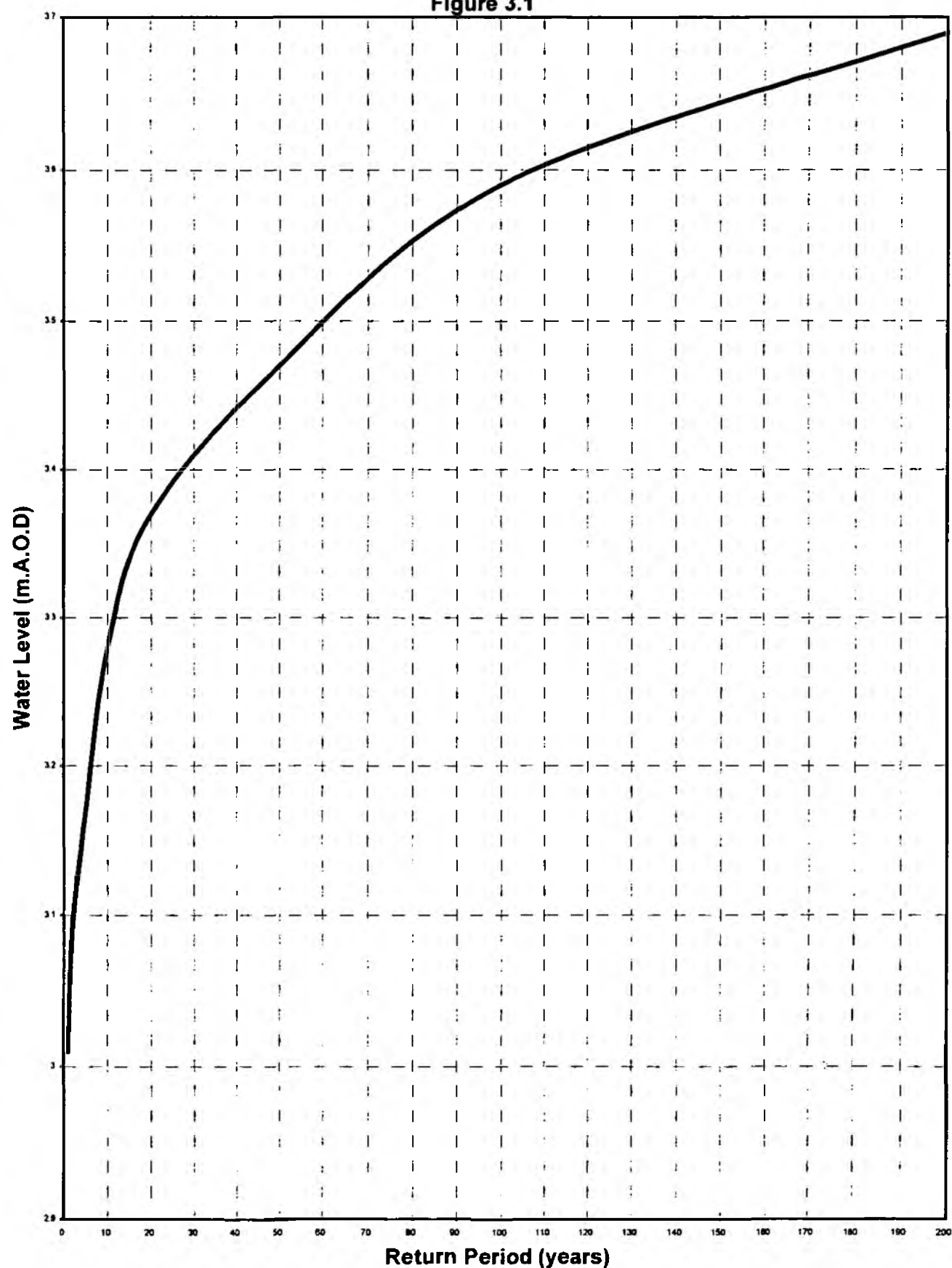


Table 3.2
Predicted 1 in 200 year flood levels for the River Tyne (1996)

Location	Estimated Flood Level
North Shields	3.69m A.O.D
High Shields	3.76m A.O.D
Jarrow	3.89m A.O.D
Tyne Bridge	4.02m A.O.D

The highest known flood had a water level of 3.77m A.O.D. at Swing Bridge, which is lower than the predicted 1 in 200 year flood level. For this reason the extent of the highest known flood is not shown on the Indicative Flood Plain Maps.

3.3 Limit of Flood Plain

3.3.1 General

Areas susceptible to tidal flooding on the Tyne are, generally, low lying waterfront areas. There are also some low lying areas back from the waterfront that are protected by higher waterfront levels (or defences); these areas may become susceptible to indirect flooding due to tidal water backing up through drains. Only areas at risk of direct flooding (tidal) are shown on the Indicative Flood Plain Maps.

The means whereby the indicative flood plain has been established at each flood risk location are described below

3.3.2 South Shields (map C1395/FPM/O1/010)

The area of land, between the waterfront and Wapping Street in South Shields is susceptible to tidal flooding. The report "Extending Tidal Warning - September 1995" identified that some of this area is as low as 3.3m A.O.D with the land rising to 3.9m A.O.D and above. A site visit identified that no works to reduce the flood risk have taken place in recent years so it is considered that the properties in this area remain susceptible to flooding.

3.3.3 High Shields (map C1395/FPM/O1/010)

Tyne Dock Engineering is partly located on relatively low-lying waterfront areas at West and Middle Dock, High Shields. The report "Extending Tidal Warning - September 1995" states that *most of the waterfront area is above 3.9 m A.O.D but there are some areas as low as 3.1m A.O.D. Land and buildings are therefore susceptible to flooding.*

The predicted 1 in 200 year flood level at High Shields is 3.76m A.O.D., which is 180mm above the recently constructed defence at Mill Dam. The parking area and Custom House in this location are therefore susceptible to flooding.

There may be other areas where localised flooding occurs to the north of West and Middle Dock or around Tyne Dock and Iron Ore Quay. However the level of the waterfront in these areas is known to be above 3.6m A.O.D., as these areas are not at risk when a red four-type warning (trigger 3.6m A.O.D.) is issued. These areas have therefore not been included on the 1:10,000 indicative flood plain.

3.3.4 Jarrow (map C1395/FPM/O1/011)

Analysis of Ordnance Survey sheets indicate that the areas of Jarrow Slake and Curlew Dry Dock are at levels less than 5m A.O.D. indeed there is a spot height of 4m A.O.D. near the jetty. However the areas have not been identified in the Flood Warning Dissemination Plan as being at risk from flooding. A site visit confirmed that the dry docks have been in-filled and that the area is generally flat. Access to the site for closer examination was not possible. The precise defence levels at these locations are therefore unconfirmed. However, the 200 year flood level is approximately 3.90m A.O.D, ground level appears to be 4m A.O.D and above and there are no assets at risk therefore these areas have not been included on the 1:10,000 indicative flood plain map.

Rohm and Haas UK Ltd occupy the former Lennig Chemical Works at Jarrow, which the report "Extending Tidal Warning - September 1995" suggests is situated on gently sloping land with levels that rise from 3.3m A.O.D. This report refers to the site as Lennig Chemical Works; however, Rohm and Haas took over the site in the mid sixties and around the same time a revetment was constructed along part of the waterfront. It is known that there have been several changes to the site layout in recent years. It is possible that these land profile and land use changes and the construction of the revetment have reduced the flood risk that once existed.

Discussions with an employee of twenty-five years confirmed that the site has not suffered any river inundation during this period. In view of the fact that no information exists to the contrary we consider that the area should not be included on the 1:10,000 indicative flood plain map.

3.3.5 Downstream of Tyne Bridge (map C1395/FPM/O1/011)

In the area of Tyne Bridge the 200-year return period flood level is estimated to be 4.02m A.O.D., see table 3.2. The Flood Warning Dissemination Plan identifies that there are some isolated small areas on the southside of the river near the Tyne Bridge, which have low ground levels of 3.6m to 3.9m A.O.D. These areas will be flooded during the 200-year event. However, a site visit confirmed that most of these areas are immediately upstream of

Tyne Bridge and therefore beyond the upper boundary of the study area. An exception is the Smith Print Group building which is significantly lower than those properties around it and during an extreme event is likely to be flooded, this area is therefore shown on the 1:10,000 indicative flood plain map.

4.0 SURVEY OF FLOODING PROBLEMS (Brief 3.2)

4.1 Tyne Dock Hotel (map C1395/FPM/O1/010)

It is known from the Flood Warning Dissemination Plan that the Tyne Dock Hotel is at risk from flooding. The Hotel is located at the junction of Temple Town and South Eldon Street, a spot level just to the south of the junction is shown at 3.0m A.O.D.

The Hotel proprietors confirm that there is a risk of periodic flooding especially during periods of heavy rain. Discussions with Hunter Timber Importers, whose yard lies between the Hotel and the River Tyne, confirm that floodwaters do not pass across their land. This would tend to confirm that the flooding problem at the Tyne Dock Hotel is in fact a drainage problem.

4.2 Other Problem Areas

Other flooding problems on this reach not associated with tidal inundation are covered in the "Report on Survey of Flooding Problems Volume 1 March 1997" Posford Duvivier.

5.0 CATCHMENT DRAINAGE STUDIES (Brief 3.3)

5.1 Development and Surface Water Disposal

Because increased river flows, such as from development in the catchment area do not significantly raise extreme water levels in this reach of the River Tyne, the impact of development can be considered insignificant. It was agreed that hydraulic modelling would not serve any useful purpose under this scenario.

5.2 Proposed Engineering Works

The study has identified locations that will potentially flood during the 200-year return period tide. The three areas at risk are a 350m length in South Shields, an 1100m length in High Shields and an area immediately downstream of Tyne Bridge. These areas which typically have levels of 3.6m A.O.D, are all waterfront locations. To reduce the risk of flooding defences constructed to a level equal to the predicted 1 in 200 year tide level with an appropriate free board to allow for predicted sea level rise would be required. There are a number of construction options for undertaking this type of work including:

- Earth embankment

- Clad reinforced concrete wall.
- High level steel sheet piled wall with capping beam
- Stone revetment with precast concrete upstand

In general the first two construction methods would tend to be the cheaper options. However, without the results of a thorough survey, which eventually would yield benefit/cost information, it is difficult to recommend any specific engineering works, their extent nor indeed the most appropriate type of construction to prevent tidal flooding. As a consequence of this no FD100 forms accompany this report.

The waterfront defences that protect low-lying areas behind the waterfront would have to be brought up to a similar level of defence in order to protect those areas to a similar standard. Any locations where flooding is caused by tidal water backing up through the surface water drains, or surface water being unable to escape possibly due to high river levels, such as at the Tyne Dock Hotel would have to be reviewed. The use of flap valves might be a solution to the problem of inflow from the river. They may not however, stop surface water flooding which may be due to inadequate capacity within the sewerage system and would require further investigations.

5.3 Detail Survey

In order to improve confidence in defining the areas at risk from flooding at the 1 in 200 year event and to devise engineering works for their protection, a detailed survey of the waterfront would be beneficial. The survey would need to target those areas previously discussed. The existing defence level would be required as well as the extent of any low lying water front areas. A record of the buildings at risk would be made so that an estimate of the assets affected and therefore the benefits for the each location could be completed. Following this detailed survey a better estimate of the protection required could be made.

5.4 Flood Warning Recommendations

The existing Flood Warning Dissemination Plan has been reviewed in the light of the findings of this study. With the exception of Rohm and Haas (UK) Ltd, Jarrow, our conclusions are that the plan is adequate and comprehensive. It is recommended however, that Rohm and Haas (UK) Ltd should remain on the Red Warning - Areas at Risk register until such time that a detailed survey be undertaken.

6.0 RESULTS AND CONCLUSION

6.1 Discussion of Results

The estimated tidal levels and data collected relating to defences have been used to identify flood risk areas. These are shown on the accompanying Indicative Flood Plain Maps and are discussed in Section 3 of the report and summarised in *Table 6.1*. The maps show that the

indicative flood plain encompasses those areas previously identified as being at risk of flooding.

Table 6.1

1 in 200 Year Flood Risk Area

Location	Area at Risk from Flooding
South Shields	Property between the waterfront and Wapping Street.
High Shields	Buildings in the region of West and Middle Dock including the Custom House and car park
Tyne Bridge	Property and land on the waterfront at Smiths Print Group.

6.2 Level of Confidence

The assessment of the indicative flood plain at the 200-year tide level has a medium level of confidence. The reason for this is that the ground levels are generally unconfirmed. However, estimated flood levels taken from "St. Abb's Head to River Tyne Shoreline Management Plan 1998" and the adjustments to flood levels along the reach taken from the report. "Extending Tidal Warning in Crimdon Park to Berwick upon Tweed" are likely to be reliable. No further work is recommended on tidal water level investigation. The predicted locations and the length of frontage at risk from flooding are similar to those identified in the Flood Warning Dissemination Plan. There is uncertainty as to the extent of the area of flooding, as comprehensive topographical details were not available for these areas.

6.3 Recommendations for Further Work

It is therefore suggested that a detailed topographical, or LIDAR survey be undertaken of the locations where flooding may occur. This would assist in clarifying the extent of potential flooding.

The suggested areas are:

- To the north of West and Middle Dock around Harton Low Staithe
- Around Tyne Dock and Iron Ore Quay
- Jarrow Slake
- Curlew Road Dry Docks
- To the waterfront of Rohm & Haas

In addition to these areas, topographical survey of the areas where flooding is known to occur

would increase confidence when predicting the extent of the flooding. These areas are:

- Between the waterfront and Wapping Street in South Shields
- Waterfront areas at West and Middle Dock, High Shields
- To the properties downstream of Tyne bridge in the vicinity of Smiths Print Group.



**APPENDIX A
PHOTOGRAPHS**



Photograph 1: River Tyne – Properties between Wapping Street and Waterfront.



Photograph 2: River Tyne – Mill Dam with Custom House on right of picture, capping beam on left at 3.58m A.O.D.

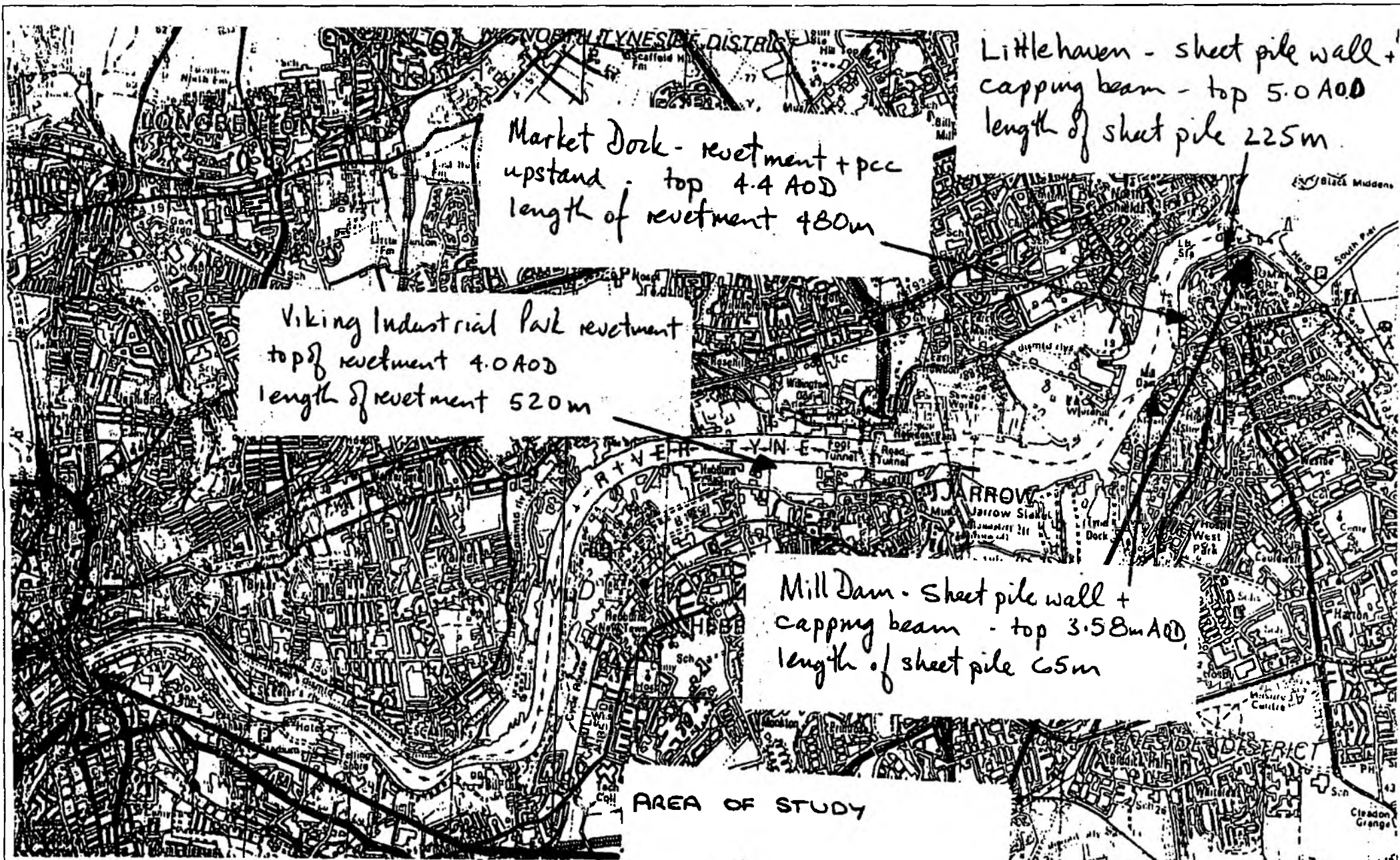


Photograph 3: River Tyne – Revetment at Rohm and Haas



Photograph 4: River Tyne – Smith Print Group waterfront at lower level than surrounding properties.

APPENDIX B
TYNE AND WEAR DEVELOPMENT CORPORATION PLAN



ENVIRONMENT AGENCY

NORTH EAST
REGION

PROJECT

TYNE & WEAR DEVELOPMENT
CORPORATION PLAN

TITLE

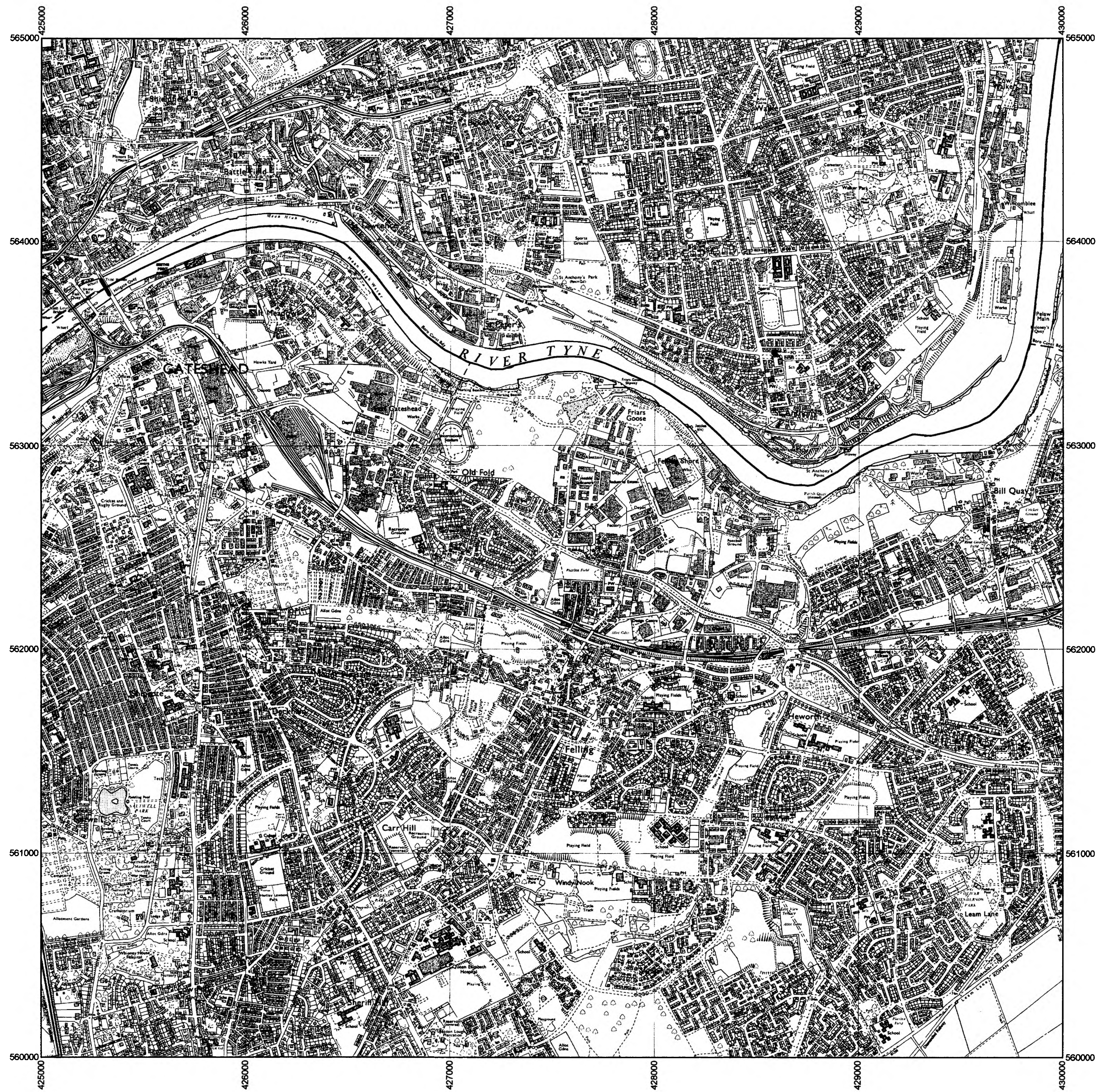
SECTION 105 - C30/92 SURVEYS
RIVER TYNE RIGHT BANK

**POSFORD
DUVIVIER**
CONSULTING ENGINEERS

DATE MARCH 1998 SCALE 1:50,000

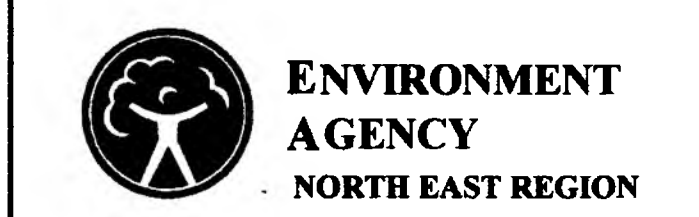
DRAWN MDWP CHKD TE

DRG. Figure 1.1



- Key:**
- Fluvial Floodplain (100yr unless noted otherwise)
 - Tidal Floodplain (200 yr unless noted otherwise)
 - Washland
 - Controlled Washland
 - Limit of reach
 - Floodplain extent (High confidence)
 - Floodplain extent (Medium confidence)
 - Floodplain extent (Low confidence)
 - Known event line with estimated return period eg 150 yr
 - Main river included in survey
 - Ordinary watercourse included in survey
 - Main river excluded from survey
 - Ordinary watercourse excluded from survey
 - Culvert / tunnel
 - Model node Point

List of revisions



PROJECT TITLE

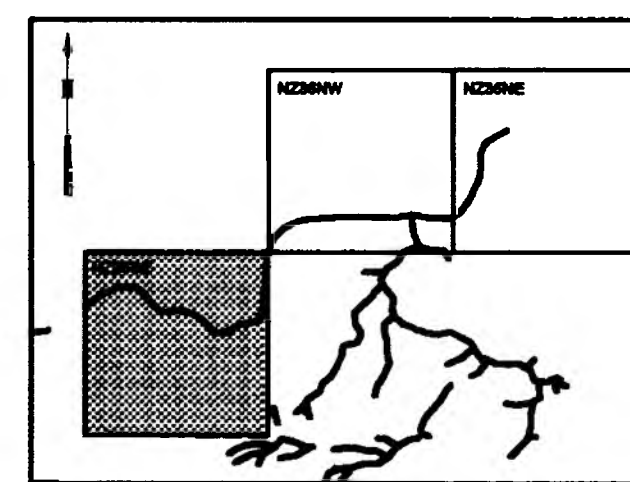
**SECTION 105 - C30/92 SURVEYS
FLOOD PLAIN IDENTIFICATION
1 IN 200 YEAR EVENT**

**NORTHUMBRIA AREA
REACH ONE RIVER TYNE
(RIGHT BANK)
SHEET 3 OF 3**

ORIGINATED BY SPT	DRAWN BY TH-R	CHECKED BY TJS	APPROVED BY
DATE	DATE	DATE	DATE

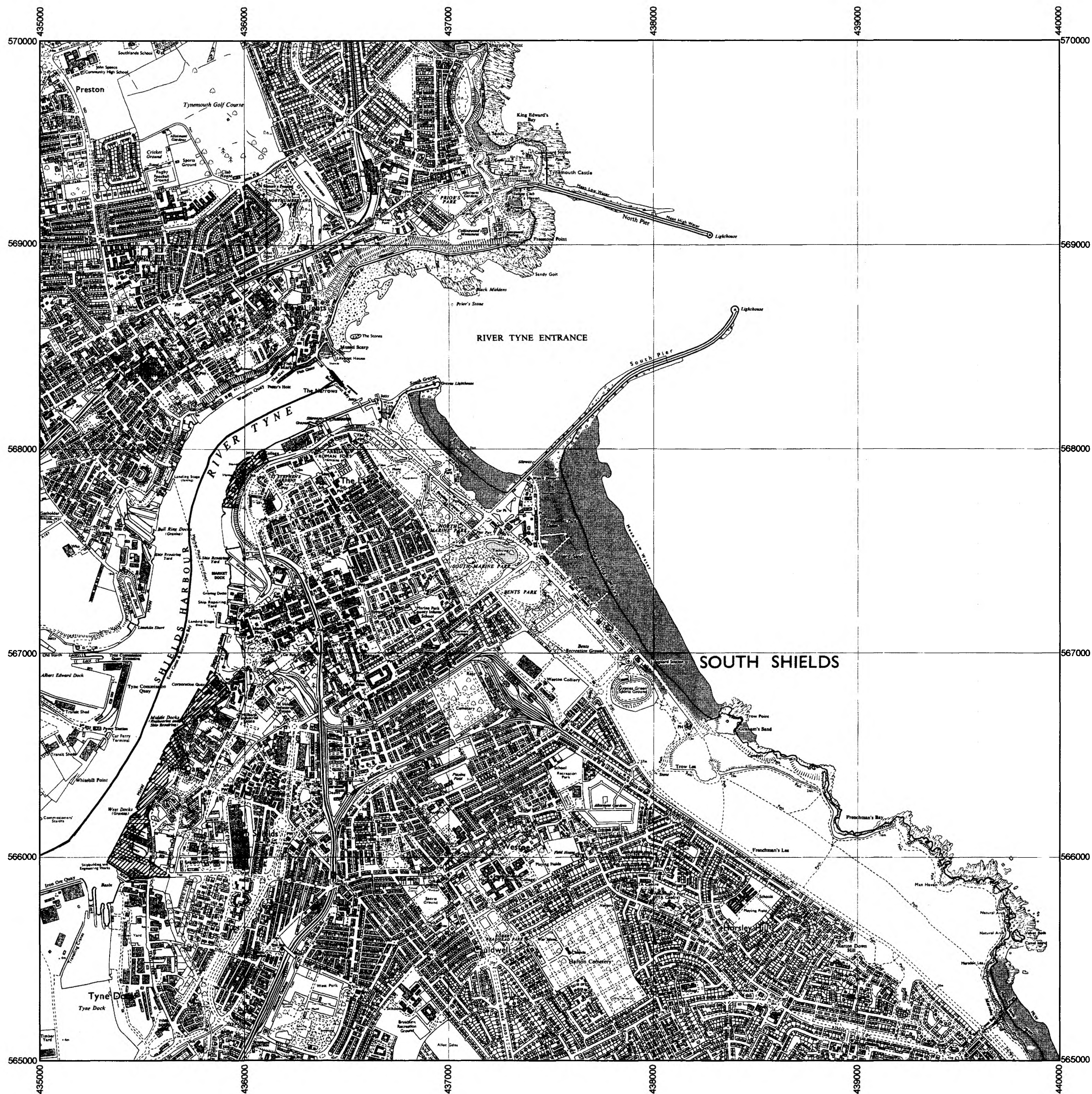
SCALE
1:10,000

PROJECT NO. / DRAWING NO. / REV
C1395/FPM/01/012



Reproduced from Ordnance Survey Maps with the permission of the Controller of Her Majesty's Stationary Office. Crown copyright reserved. Licence no. AL 546037

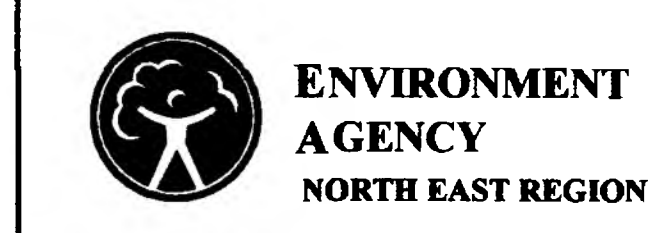
USER NOTE
This plan has been produced with the requirements of Department of the Environment Circular 30/92. Because the information is indicative rather than specific, local planning authorities will nevertheless need to consult the Environment Agency on individual applications. Flood plain extent is based on the information available at the time of survey. Amendments will be required in future to account for information gathered subsequently eg. changes in hydrological river responses or observations following flood events. It should be noted that locations adjacent to rivers not included in this stage of the survey may be at risk of flooding. When in doubt the Environment Agency should be consulted.



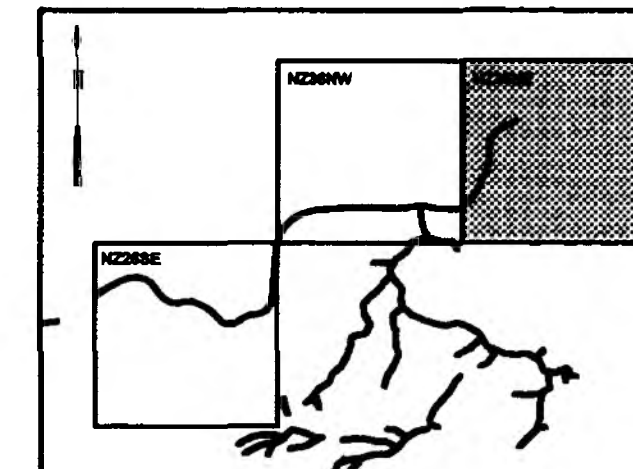
Key:

- Fluvial Floodplain (100yr unless noted otherwise)
- Tidal Floodplain (200 yr unless noted otherwise)
- Washland
- Controlled Washland
- Limit of reach
- Floodplain extent (High confidence)
- Floodplain extent (Medium confidence)
- Floodplain extent (Low confidence)
- Known event line with estimated return period eg 150 yr
- Main river included in survey
- Ordinary watercourse included in survey
- Main river excluded from survey
- Ordinary watercourse excluded from survey
- Culvert / tunnel
- Model node Point

List of revisions



SECTION 105 - C30/92 SURVEYS
FLOOD PLAIN IDENTIFICATION
1 IN 200 YEAR EVENT



**NORTHUMBRIA AREA
REACH ONE RIVER TYNE
(RIGHT BANK)
SHEET 1 OF 3**

Reproduced from Ordnance Survey Maps with the permission of the Controller of HM Stationary Office. Crown copyright reserved. Licence no. AL 546537

USER NOTE
This plan has been produced with the requirements of Department of the Environment Circular 3092. Because the information is indicative rather than specific, local planning authorities will nevertheless need to consult the Environment Agency on individual applications. Flood plain extent is based on the information available at the time of survey. Amendments will be required in future to account for information gathered subsequently eg. changes in hydrological river response or observations following flood events. It should be noted that locations adjacent to rivers not included in this stage of the survey may be at risk of flooding. When in doubt the Environment Agency should be consulted.

ORIGINATED BY	DRAWN BY	CHECKED BY	APPROVED BY
SPT	TH-R	TJS	
DATE	DATE	DATE	DATE

SCALE 1:10,000
PROJECT NO. / DRAWING NO. / REV C1395/FPM/01/010

