NON TECHNICAL SUMMARY

JOHN'S RIVER (WATERFORD CITY) DRAINAGE SCHEME ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1

FEBRUARY 2002

RPS Environmental Sciences Ltd
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This report has been prepared by RPS Environmental Sciences Ltd

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STATUS OF REPORT:	**Revision 2**
DATE OF REPORT:	**11 February 2002**
PROJECT MANAGER:	**John Nelson**

NON-TECHNICAL SUMMARY

INTRODUCTION

This is a non-technical summary of the Environmental Impact Statement (EIS), for the proposed John's River (Waterford City) Drainage Scheme, Volume 2. It draws attention to the most important issues and provides information on other significant topics. Any topic which causes concern can be followed in greater detail in the main EIS (Volume 2).

The Minister for Finance must approve the project, with modifications if necessary, following consideration of the EIS and any comments received (in accordance with the relevant legislation) following public consultation. If you wish to comment on the proposal you should write to:
Project Management Services
The Office of Public Works
51 St. Stephen's Green
Dublin 2
Your comments should be received not later than **thirty days from the first day** of public exhibition of the scheme.

ENVIRONMENTAL IMPACT ASSESSMENT

The proposed flood relief scheme requires an Environmental Impact Statement (EIS) to be prepared. This is in keeping with the requirements of the European Communities, Environmental Impact Assessment (EIA) (Amendment) Regulations, 1999 (S.I. no. 93 of 1999). This section provides a summary account of the proposed works, the potential impact on the environment and proposed mitigation and enhancement measures as and where appropriate. The main issues addressed during the course of the Environmental Impact Assessment included:

- Human Environment
- Ecology (including Fisheries)
- Landscape
- Water Quality
- Geology / Hydrology
- Cultural Heritage
- Material Assets

PROJECT DESCRIPTION

The Study Area

The study area for the proposed scheme encompasses the River Suir from Rice Bridge to Newtown Road, and John's River (a tributary of the River Suir that flows in a north-easterly direction through the heart of Waterford City) from Tramore Road to its confluence with the River Suir (refer to Figure 1).

The Quays of the River Suir have been prone to tidal flooding for centuries. The proposed scheme will generate flood relief along the River Suir from the Rice Bridge to Newtown Road and the Sewage Treatment Plant. The lower reaches of John's River (including People's Park, Canada Street, William Street, Scotch Quay and Georges Quay) are also prone to tidal flooding. The upper reaches of the river along the Tramore Road are prone to inundation by fluvial floodwaters. Hydraulic Modelling of the John's River was undertaken by HR Wallingford to determine the joint effects of fluvial and tidal flooding. The method of flood prevention proposed for the scheme is based upon the findings of the hydraulic modelling.

The proposed flood relief scheme will rely upon floodwalls and embankments in along the Quays fronting the River Suir and along John's River from its confluence with the River Suir to the Tramore Road. In addition the scheme involves raising the level of the Tramore Road, which in turn, will require some stream realignment of John's River. The parapets of several bridges crossing John's River will require to be raised, and a stone cill will be removed from the bed of John's River.

The Need For The Scheme

A flood relief scheme is required to alleviate flooding in Waterford City which causes significant social and economic disruption. Flooding has historically been a problem in Waterford over the centuries The flooding can be a result of high tidal conditions, fluvial flood waters from the John's River and Lisduggan Stream catchment areas or a combination of both.

The following is a synopsis of the "John's River (Waterford City) Drainage Scheme, Preliminary Report, April 2001" report prepared by M.C. O'Sullivans. The report highlights the areas liable to flooding. The place names are illustrated on Figure 1.

Park Road/Newtown Road *(including The People's Park, Canada Street, William Street, Scotch Quay and George's Quay).*
Extreme tides in John's River and the River Suir overtopped quay walls and emerged through road gullies. Since the commissioning of a new pumping station at Waterpark, in December 1995, the frequency of surface flooding has reduced considerably. However, the area is still liable to flooding as the highest tides can overtop some of the existing quay areas.

The Quays *(Extending from the John's River confluence to Rice Bridge).*
This area has been subject to tidal flooding for centuries. The problem was aggravated when surface water in the combined system backed up during such flood events. The Corporation have embarked on a program to alleviate flooding in this area by adopting the following measures:-

(a) Construction of a wall on the existing quayside to a level of 2.8 mOD.
(b) The elimination of outfalls and the diversion of low lying surface water gullies into an Interceptor Sewer, which was due for construction during 1999.

Poleberry
This is a terraced, residential area and is subject to regular inundation. The report points out that at least once a year flood waters from John's River enter the back gardens of houses between Ballytruckle and Lower Grange.

Tramore Road
Several locations along the Tramore Road were identified as being prone to regular inundation. Inquiries by MCOS indicate that this road is closed to traffic for a number of days each year, due to flooding. During such occasions, traffic is forced to use the old Tramore Road with consequent delays for commuters.

Alternatives Considered
Five principal methods of flood alleviation were considered for Waterford:

1) Constructing flood defence walls and embankments to a height sufficient to contain floodwaters within the channel.

2) Increasing the river channels' capacity by deepening and /or widening, to accept flood flows.

3) Constructing a tidal control structure, which would prevent extreme tides from backing up the river channel from the River Suir.

4) Constructing a bypass channel to divert peak flood flows away from the urban areas.

5) Constructing a flood storage reservoir to retain floodwaters until the risk of flooding has passed.

Combinations of the five options given above can also be adopted.

Flood defence walls and embankments are widely used for urban flood alleviation. They can however, adversely impact on a town's visual landscape and for this reason, flood defences greater than 1.1 – 1.2 m are generally not recommended. Disposal of storm-water runoff from behind the defences is also a major consideration for this option.

Channel improvement is a simple means of flood relief, which is appropriate in certain locations. This option can be very difficult to implement however, in an urban setting with severe space restrictions.

Tidal control structures are viable options to alleviate tidal flooding in many situations. To be effective, there must be sufficient volume in the channel upstream of the control to prevent the stored fluvial flow from reaching excessive levels before the high tidal level passes and free discharge is again allowed through the control structure.

The construction of a bypass channel for Waterford is not feasible due to the general topography of the area. The only possible route for a bypass is from the John's River, south of Ballytruckle to discharge to the Suir, 1.5 km southeast of the confluence. This bypass would be approximately 3 km long and constructed in a tunnel. The cost implications for this option are huge and it can therefore be ruled out on cost grounds.

The ideal location for a flood storage impoundment for this project would be in the low-lying area between Ballytruckle and Ballindud . The major disadvantage with this option is that it would entail flooding the Tramore Road. Another possible disadvantage is that part of this area includes the Kilbarry Bog, which is a proposed Natural Heritage Area. If this area were used as an impoundment, it would have negative environmental impacts for its flora and fauna.

In summary, therefore, the potential methods for flood alleviation at Waterford reduce to: -

(1) Flood defence walls and embankments.
(2) Channel improvements.
(3) Tidal control structure.
(4) Combinations of above options.

Nine combinations of options were considered based on the above recommendations as shown in the table below.

Flood Relief Options/Combinations

OPTION	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Walls	X	X	X	X	X	X	X	X	X
Dredging Option A		X							
Dredging Option B			X						
Wyse's Bridge Works						X			
Removal of Stone Cill				X	X	X			
Footbridge					X	X			
Funderland Bridge							X		X
Dredging of Lisduggan Stream								X	X

The Proposed Scheme

The nine combinations, shown in Table 2.3.3 above, were considered feasible solutions. The decision on which combination of defences should be implemented was decided on the grounds of costs and environmental constraints. **Option 5** was recommended as the preferred option (refer to Figures 2.1 – 2.3)

River Suir: The construction of low quay walls and embankments from Grattan Quay to the Sports Centre downstream of Waterpark Pumping Station to provide a Q_{100} year level of protection.

John's River: The realignment of the Tramore Road to provide a Q_{20} level of protection with 300mm freeboard. The proposed works will involve substantial embankment construction with local channel realignment and culvert works.

Downstream of Waterford Regional Sports Centre the construction of flood defence walls and embankments are designed to provide a Q_{100} level of protection.

Lisduggan Stream: The construction of flood defence walls and embankments are designed to provide a Q_{100} level of protection.

Flood Walls

Floodwalls will have a maximum desirable wall height of 1.2 m above the ground level. In places it may be necessary to raise ground levels inside the walls to achieve this. The walls will be masonry faced, where appropriate. Ramps can be provided in suitable locations to provide access over the walls to the riverbank.

Embankments
It is generally proposed that embankments be constructed at 1/5-1/10 side slopes for ease of maintenance, but steeper slopes may be necessary where space is limited. Side slopes of 1/20 can be used locally to allow the elderly and disabled to cross the proposed embankments safely.

Storm water Drainage
Urban drainage works are an integral part of any flood defence scheme that is based fully or partially on flood containment. These works entail installing flap valves in any outfalls that may allow floodwaters penetrate the defences.

PLANNING CONTEXT

Waterford City Development Plan, 1994
The overall objective of the Waterford City Development Plan is to maintain and enhance Waterford's position as the capital of the South East Region. The policies and objectives contained within the plan with regard to the development of Waterford Port, the development of tourism and general development of the city are all designed with this overall objective in mind.

Flood Prevention Policies
It is an objective of the Corporation to carry out works which will lessen flooding from John's River and Lisduggan Stream. However it is still the policy that new developments should have a minimum floor level of 19' O.D. (Poolbeg LH) or 3.0 m.O.D. (Malin Head). Where possible and appropriate road and pavement levels will also be raised.

Recreation, Open Space and Amenity
The Development Plan identifies that Public Open Space / Amenity Areas are in demand and will continue to be required to cater for the projected growth in the County Borough population.

It is the intention of Waterford Corporation that in the more densely developed residential and inner city areas, where it is not feasible or sometimes not possible to create large recreational open spaces, small paved spaces for intensive use with provision for seating and planting will be developed where funds are available.

It is the policy of Waterford Corporation to ensure that trees, which are of special amenity value or interest, should be preserved. There are tree preservation orders on the riverside trees in the Courthouse Grounds and the People's Park that will need to be observed during flood relief works.

The Ballynakill marsh is the southern extension of Kilbarry Bog. It has been identified as an area of scientific interest, due to ecological interest and is covered in greater detail in Section 5 of the EIS.

HUMAN ENVIRONMENT

Context

This section describes the existing human environment of the study area with particular reference to the social and economic functions of the town, the land use characteristics, the impacts of flooding and the amenity value of the river corridors.

The city is the market, administrative and services centre for a large agricultural hinterland, and growth of the tourism industry has been a major factor in the expansion of the service sector in the recent years. Waterford is a Regional centre for third level education. Waterford Institute of Technology is one of the largest in the Country with over 3,000 full-time students.

Waterford has a strategic location at a transportation node between Cork and Dublin. The pattern of roads in Waterford is that of national primary routes, the N25 to Cork and Rosslare, the N24 to Limerick and the N9 to Dublin. Of particular significance is Waterford City's location on the designated Euroroute (E30) linking Cork to Rosslare and thence through the U.K. on to mainland Europe.

Impacts of the Flood Alleviation Scheme

The proposed scheme will afford flood protection to a large area of Waterford City currently at risk from flooding. Most of this land is already developed, but the reduced flood risk may encourage redevelopment/renovation of properties.

The proposed scheme is designed to protect Waterford City from flooding up to the *100-year flood* level. This will have a significant positive impact on the human environment through reducing or eliminating:

- economic damage to residential and commercial properties vulnerable to flooding.
- stress and anxiety experienced by residents and property owners as a result of the threat from future flooding events.
- economic loss to traders in vulnerable properties during flood events.
- social disruption to the local community.
- disruption and delays to traffic in the town.

ECOLOGY

Context

John's River drains a low-lying area south of Waterford City, more or less centred on the Tramore Road and drains into the River Suir approximately 250m downstream of Rice Bridge. The northern section of the study area is mainly urban, being within the city of Waterford. The area in the south is predominantly rural, with an extensive area of reedbed. Within the study area there is a section of the Lower River Suir, which is a candidate Special Area of Conservation and also Kilbarry Bog, which is a proposed Natural Heritage Area.

As part of a desktop review of published sources, key ecological features in the study area were identified and, where possible, a broad evaluation of their importance was provided on the following scale:

- international importance
- national importance
- county importance
- local importance.

The River Suir, which is tidal for part of it's length, is a proposed candidate Special Area of Conservation (cSAC) (Site Code 00399) under the Habitats Directive (92/43/EEC). The area proposed for designation as a cSAC extends upstream as far as Carrick-on-Suir and includes the entire stretch of channel within the study corridor up to the spring high-tide line, and semi-natural wetland areas immediately adjoining the river channel.

Kilbarry Bog, a proposed Natural Heritage Area (pNHA) (Site Code 01700), comprises a 45 ha area of reedswamp located in the floodplain of the John's River, between the Tramore Road roundabout and the Ballindud Road junction. The area is listed in *Irish Fen Inventory* (Crushell 2000) as an area of valley fen.

There are no known records of protected plant species within the study area. Surveys were carried out for vegetation, macroinvertebrates, molluscs, fish, birds, Otters and bats.

Impacts on Designated Sites

River Suir (cSAC)

As a large amount of the section of the Suir within the study area has modified banks and quays then the designated area will not extend beyond the water edge at high tide. There is the possibility that work to the existing walls and quays may impact fish habitat, as holes in the walls that may be used by fish for shelter are filled in or re-grouted.

The area saltmarsh is slightly degraded as debris, both organic and inorganic, is deposited here during high tides. The embankment in this section will impact directly on only a small area of saltmarsh that is not of high quality and it will not result in the fragmentation of any of the saltmarsh areas.

There is also potential for indirect impacts on the river channel of the Suir during construction but with suitable mitigation and strict adherence to best practice these potential impacts can be minimised.

Kilbarry Bog pNHA

The scheme will impact on the Kilbarry Bog pNHA through the direct loss of semi-natural habitats within the pNHA. These include areas of *Phragmites* reedswamp, hedgerows, areas of willow and Alder wet woodland and individual trees. The existing hydrological regime of the surface water within Kilbarry Bog pNHA will be retained so the impacts on the overall hydrology of the area should be minimal.

The total area of direct habitat loss from within the pNHA is approximately 2 hectares. The total size of the pNHA is 45 hectares. The majority of the habitat loss will be *Phragmites* reedswamp, with the section of embankment opposite the sports ground impacting an area of Alder carr. This will be a slight impact on a local level. Removal of reedswamp from the area will also affect the flood attenuation ability of the marsh.

Impacts of the Flood Defences on the Fauna and Flora of the River Systems

The replacement of river walls could cause slight impacts to fish populations, by filling in cavities in the banks that provide habitat for these fauna. If the foundations are required to extend much below the normal water level, some further impacts to fish habitats are likely

Embankments which coincide with the river bank itself could cause damage to the existing vegetation were spoil to be placed on the latter or the latter were to be removed prior to laying an embankment.

Macroinvertebrates
There were no rare or notable macroinvertebrates recorded and the impact of the proposed scheme on macroinvertebrates is expected to be minimal.

Molluscs
There were no rare or notable mollusc species recorded and the impact of the proposed scheme on molluscs is expected to be minimal.

Fish
The Flood Relief Proposals have the potential to impact on the current fisheries status of the channel. Close liaison between the Southern Fisheries Board and the flood relief scheme co-ordinators must be maintained to ensure that any impacts to the fish stocks in the channel be minimised.

Birds
Some birds may be directly impacted through the direct loss of habitat. The impact of this is dependent on the time of year at which works are carried out with the greatest potential impacts occurring during the breeding season.

Otters
The proposed works should not have a significant impact on Otter populations.

Bats
Only one roost was identified within the study area, this roost is not immediately altered by the proposed flood relief scheme. Therefore this is not relevant.

Mitigation

Timing of works

Consideration should be given to timing of the proposed works to minimise potential impacts to key species. These are summarised in Table 1.

TABLE 1 Preferred timing of proposed works to minimise impacts to vulnerable fauna

	Aspect of scheme	Preferred timing
Spawning fish	Widening of watercourse	late autumn and winter
Nesting birds	Removal of trees	September-February
Bats	Removal of trees	September-October April-May

Macroinvertebrates

No mitigation is recommended in relation to macroinvertebrates.

Molluscs

No mitigation is recommended in relation to molluscs.

Fish

During works on the banks of the John's River a channel should be maintained with a minimum water depth of 0.5m to maintain fish passage through the affected section of the river.

Aquatic Molluscs

No mitigation is recommended in relation to aquatic molluscs.

Birds

Trees and hedgerows that are to be removed should be checked prior to work being carried out to avoid impacts on nesting bird species with any work impacting on trees or hedges being carried out outside of the breeding season.

Otters

Mitigation can be implemented which should reduce the amount of Otter casualties along the Tramore Road through Kilbarry Bog pNHA.

Bats

Trees should be examined at the time of removal to ensure that bats are not present. Erection of bat boxes and/or creation of artificial roosts (e.g. by the provision of cavities and hollows in damaged or dead trees) will create alternative roosting cavities for bats that may be displaced by the proposed works. Where possible, vegetation should not be removed. To encourage a level of return to the undisturbed state, the native flora should be given priority in any planting. Tree planting with native species will provide shelter and roosts when mature.

LANDSCAPE

Context

The Landscape Assessment identified the quality and sensitivity of the existing landscape and urban character types of the Study Area. This provided the basis for an objective impact assessment of the scheme on the existing character of the landscape and also the visual impact assessment of the proposed works on the views and prospects observed by visitors, workers and inhabitants of the area.

In general Waterford City Centre is focused towards the River Suir estuary, John's River is not regarded as an attribute, and has little influence on the streetscape of the city. For the most part buildings back onto the river, the banks are overgrown and neglected and the few existing riverside walks are in poor repair.

Five different Landscape Character types were identified within the study area ranging from the rural fringes to the city centre. The Landscape Character Types were identified as:

1. Marginal Wetlands
2. Urban Fringe
3. Industrial / Commercial Character
4. Residential Urban Core
5. Civic / Commercial Urban Core

The scheme proposes alterations to the river channel character with the main visual impacts arising where new floodwalls are to extend the height of the river channels. In general terms the impacts can be categorised as follows:-

1. Loss or removal of landscape features within the river corridor of visual merit.
2. Intrusion of new features incongruous to the landscape character.
3. Exposure of visual detractors and eyesores.
4. Changes to recreational amenities, e.g. public open space, footpaths.
5. Changes to public vantage points.
6. Changes to landscape character in scenic view points.
7. Visual obstruction, intrusion, overlooking and physical removal of residential amenity.
8. Alterations to certain roads and paths, located on the riverbanks will also be necessary.

During the construction period there would be, in general, an appreciable detrimental impact on the visual quality and character within the study area.

Landscape Impacts

The loss of wetland scrub and reed beds will result in only slight landscape character impacts. The loss of mature and semi-mature trees would result in greater impacts and all precautions should be taken during construction works to limit the extent of tree loss to those in the immediate vicinity of the works.

Sheet piled walls will be largely out of view and cause no change to the character. The embankments can be integrated into the open spaces without causing a significant impact. Development of the masonry faced walls and upgrading the river side footpaths will be a positive impact.

The proposed masonry fronted finish to the walls on the River Suir Quays should reflect the historic character of the quays. Hand railings and a walkway will allow access to the water's edge, and allow boat users to use the quay and the marina in the same manner as they currently do. Seating and urban landscape improvements would create an area suitable for pedestrian use improving the amenity value of the Quays.

Visual Impacts

Visual Impacts will arise where the flood defence walls and embankments infringe upon or cause the loss of existing views. The sheet-piled walls are generally not in view and will cause **no significant visual impact**. The embankments will be visible, but careful integration into the existing landscape, by earth shaping and planting will reduce the potential visual impacts to **slight negative**. The masonry faced walls are proposed for public areas where the scheme will be highly visible. A **negative impact** will result from the loss of views.

It is proposed as part of the mitigation measures that the visible floodwalls will be masonry faced. Where required footpaths will be replaced or upgraded, in key locations planting, lighting and seating will be incorporated into the scheme. In general once the works are completed they would have a **positive impact** upon the town core. The improvements should provide the opportunity for local amenity areas to benefit from the natural aesthetic values of the rivers.

WATER

Context

The existing water quality in the affected stretches of John's River is generally slightly to moderately polluted

The proposed flood relief works require the protection walls and embankments to be constructed either on top of existing structures or back from them, causing minimal interference with the existing riverine habitats. In the Kilbarry Bog where the ecology of the surrounding area could be adversely impacted by flood walls the Tramore Road will be raised and the current hydrological regime will be retained.

The greatest interference with the current watercourses will take place along the John's River between the Tramore Road Roundabout and Wyse's Bridge, where the channel will be widened in three places by excavating the right bank. A small section of the Lisduggan Stream will also be widened upstream of the confluence with the John's River. A short riffle section of the John's River will also be removed.

Impacts

None of the habitats earmarked for removal are locally scarce and so their removal will not constitute an important negative impact.

There is potential for indirect impacts on the river channel of the Suir during construction but with suitable mitigation and strict adherence to best practice these potential impacts can be minimised.

SOILS, GEOLOGY AND HYDROGEOLOGY

Geological Context

The study area is underlain by interbedded sediments and volcanics of Ordovician age which have been subsequently folded, faulted and recrystallised. These rocks were deposited in a mainly marine environment. They are now well fractured with cleavage and jointing developed in them. These consolidated rocks are covered by a layer of glacial till of which there are two main types, Volcanic Till with the main rock fragment being volcanic rocks and Sandstone Till with the main rock fragment being sandstone. Underlying the bottom of the John's River Valley there is a buried river channel with, in places, more than 20 m of alluvial material. The upper part of the alluvial material tends to be clay and peats and these overlie gravels and sands which in turn overlie boulder clays and then rock.

Hydro-geological Context

The main aquifer in the area is a Regionally Important Aquifer, which is hosted in the Ordovician rocks. Underlying the valley flat of the John's River is a confined aquifer which is host in the alluvial sands and gravels which are confined by the overlying alluvial clay beds. There is probably some continuity between the two aquifers. The aquifer in the alluvial sands and gravels underlying the John's River Valley is separated from the wetlands by a thick, impervious or low permeability, clay layer, 4 m – 14 m thick. The underlying aquifer, as long as the clay layer remains intact, will not contribute to the water supply to the wetlands.

The main water supply to the wetlands is direct precipitation and surface run-off from the surrounding higher ground. The upper peat layers will act as reservoirs, holding rain and surface water to support plant growth.

Impacts

Any proposed drainage works to the John's River should not, according to the currently available data, impact on the natural occurring wetlands at either side of the river and the Kilbarry bog if the clay layer overlying the gravel aquifer remains intact.

The proposed scheme will reduce water logging of soils in areas protected from flooding. It is not expected to significantly impact on the groundwater or on the hydrology of the river.

CULTURAL HERITAGE

Context

The John's river has played an important part in the development of Waterford as a City. In Viking and medieval times it formed part of the city's defences and in more recent times it was important as a place of anchorage and docking for merchant craft. Its tidal nature has made it very prone to silting. In recent times, this silting has reduced the importance of the river.

Archaeologically the river has varying degrees of archaeological potential. The upper reaches of the river in Ballindud and Ballytruckle are of low potential. The area between the Tramore road roundabout and Wyses Bridge are of very low potential. The area from Wyse's Bridge to the confluence with the Suir is of very high archaeological potential, particularly within the former Medieval City.

Previous development works and flood relief schemes appear to have stripped the interior of the river of much of its archaeological potential. The canalisation of the river and the construction of enclosing walls and the removal of silt in the town reaches would appear to have stripped it of much of its archaeological potential.

Impacts

Kilbarry Bogs

The realignment works of the R675 impact only the margins of the present road and none of the marsh. A field inspection did not record any cultural remains in the vicinity of these proposed works. The Sites and Monuments Record does not record any monuments in this area. As such, the proposed works can be considered to have little impact on the surrounding archaeological and historical landscape. To this regard no mitigation procedures should be required for this component of the project.

Lisduggan Stream

Owing to the large number of recent developments in this area it must be considered that the probability of recovering archaeological remains from this area is very low.

Waterside

The canalisation of the river and the construction of enclosing walls and the removal of silt in the town reaches would appear to have stripped it of much of its archaeological potential. The proposed floodwalls would be set on top of the flagstone capstones on the left bank where there will be no possibility of interference with archaeological materials. On the opposing side the construction of embankments will have little influence on the already much rebuilt walls.

The vicinity of John's Bridge

Considering the importance of the area and its proximity to national monuments, further archaeological investigation of the area should be considered prior to any development.
In addition to this the remnants of St. John's mill can be seen as a stone arch contained in the river wall directly opposing this proposed new floodwall site.

The Courthouse Grounds

The land between Lombard St. and Hardy's bridge is very important both historically and archaeologically as it contains the remains of St. Catherine's Abbey and graveyard and is a National Monument. In light of this and considering the archaeological sensitivity of the

surrounding area, any development will require prior archaeological investigation and the on site supervision of construction works by suitably qualified archaeologists.

Mitigation

Any work with the potential to affect archaeology should be the subject of archaeological test excavation and monitoring. In the event of any archaeological features or objects being identified requirements to consolidate or conserve structures should be identified. If avoidance of the archaeological remains is not possible, detailed recording of the form and extent of the archaeological deposits should be carried out by excavation.

MATERIAL ASSETS

The objective is to ensure the sustainable use of material assets and to ensure that they will be available for future generations.

The kind of material assets to be considered is influenced both by the location and nature of the proposed works:

- land ownership, use and access;
- the existing transportation infrastructure;
- impact on major utilities;
- the use of natural resources; and
- navigation on the River Suir and lower John's River.

Disturbances to public and private properties during the construction of the flood defence walls are likely to cause short term impacts such as access problems, noise impacts and visual impacts. Where possible the construction will be undertaken at times and locations which will cause the minimum impacts. BS5228 includes a number of guidelines and recommendations which are considered appropriate and of good working practice for all construction contracts.

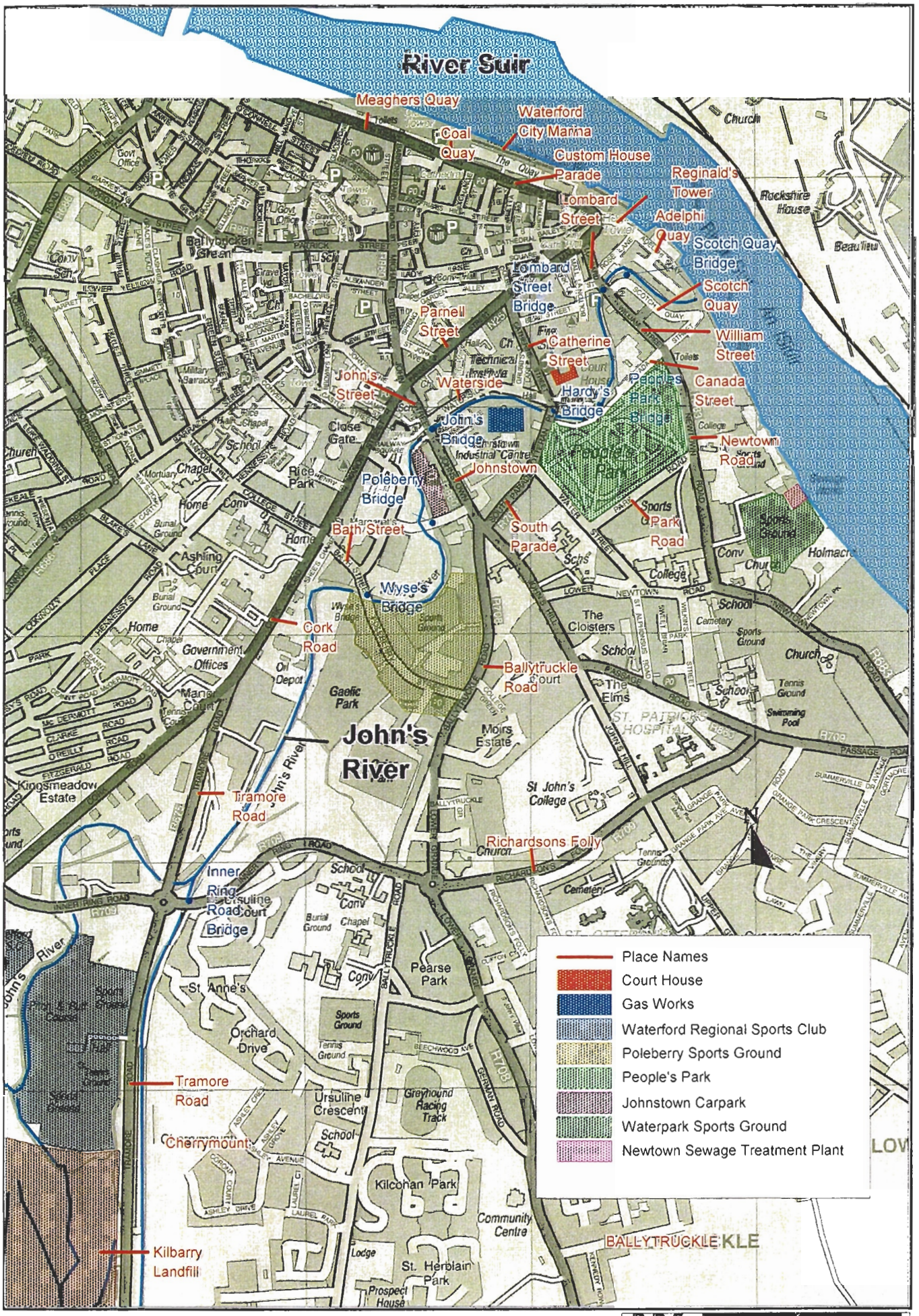
The realignment of the Tramore Road involves raising the existing road surface by approximately 1.5m. The proposed works will involve substantial embankment construction with local channel realignment and culvert works. This will cause temporary negative impact on the traffic using the Tramore road requiring traffic to detour on to a different route. The temporary impact is believed to be outweighed by the long term gains of the flood relief.

Waterside Road and sections of the Quays will be temporarily affected due to the building of the flood defence walls; it is not expected to require closure of the roads for any significant time span. Replacing Wyse's Bridge will result in temporary impacts to the traffic, Wyse's Bridge is not of archaeological or cultural value but replacement of the bridge which is otherwise in good repair would be a loss of assets to city. Incorporating flood walls into the parapets of John's Bridge will need to be carefully executed in order to prevent any impacts upon the historic structures. The proposed works include provision for repair and replacement of walls in suspect condition resulting in a positive impact on the city's assets.

The sewer pipeline that runs parallel to John's River will be monitored closely during construction of the flood defence works. The appropriate precautions will be taken to avoid any damage to the sewer pipeline and avoid any potential impact. The works will also provide a stormwater drainage system that will discharge by gravity through flapped outfalls with 14 small scale pumping stations which will be activated during flood conditions. Resulting in an improved drainage system for Waterford City.

Details of the sourcing of material for embankment construction and road surfacing are up to the discretion of the successful contractor, provided they conform to any relevant statutory requirements.

The overall impacts of the scheme are expected to be positive.



Site Location

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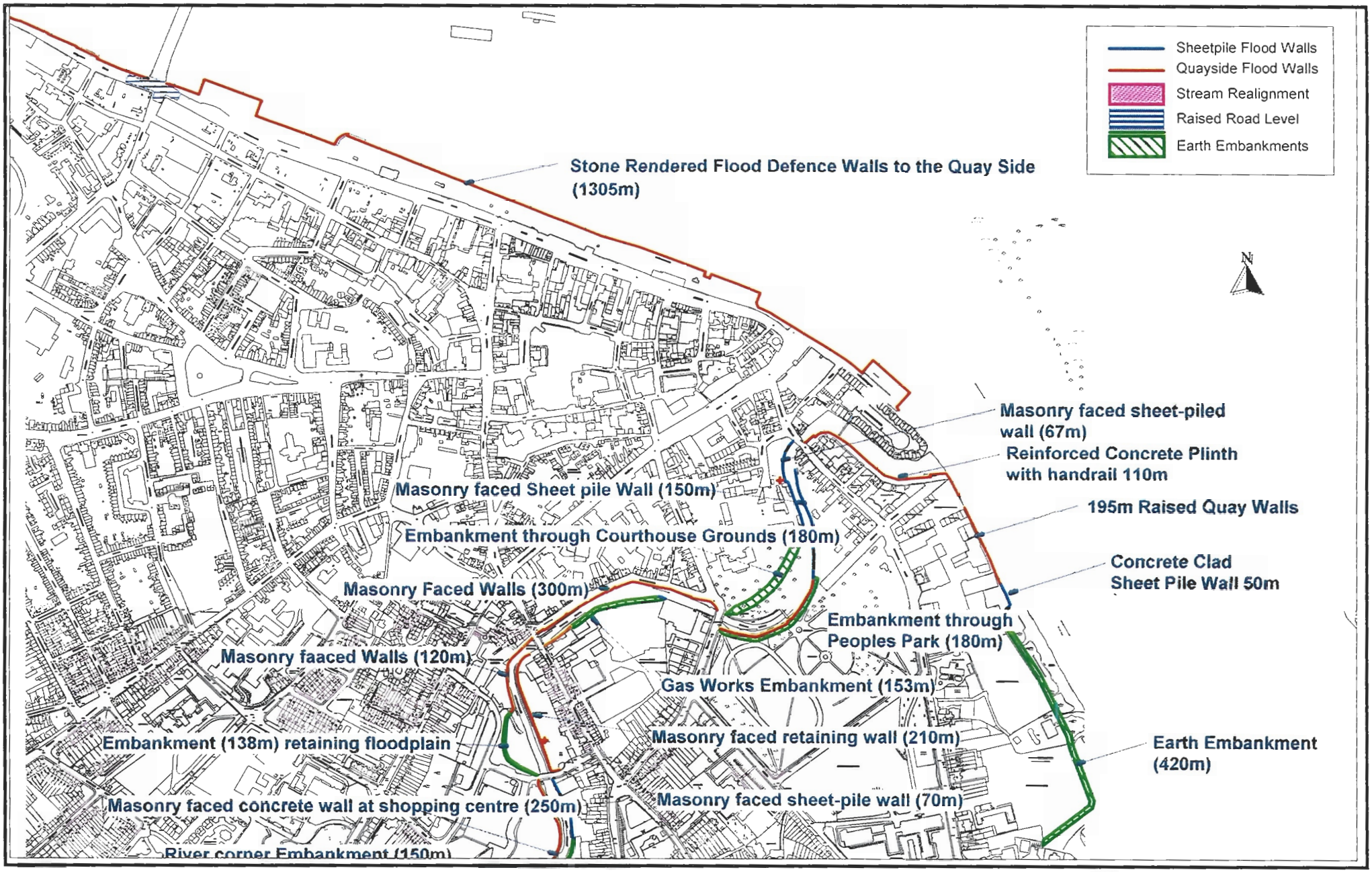
Figure 1



Project Description - Proposed Flood Defence Works

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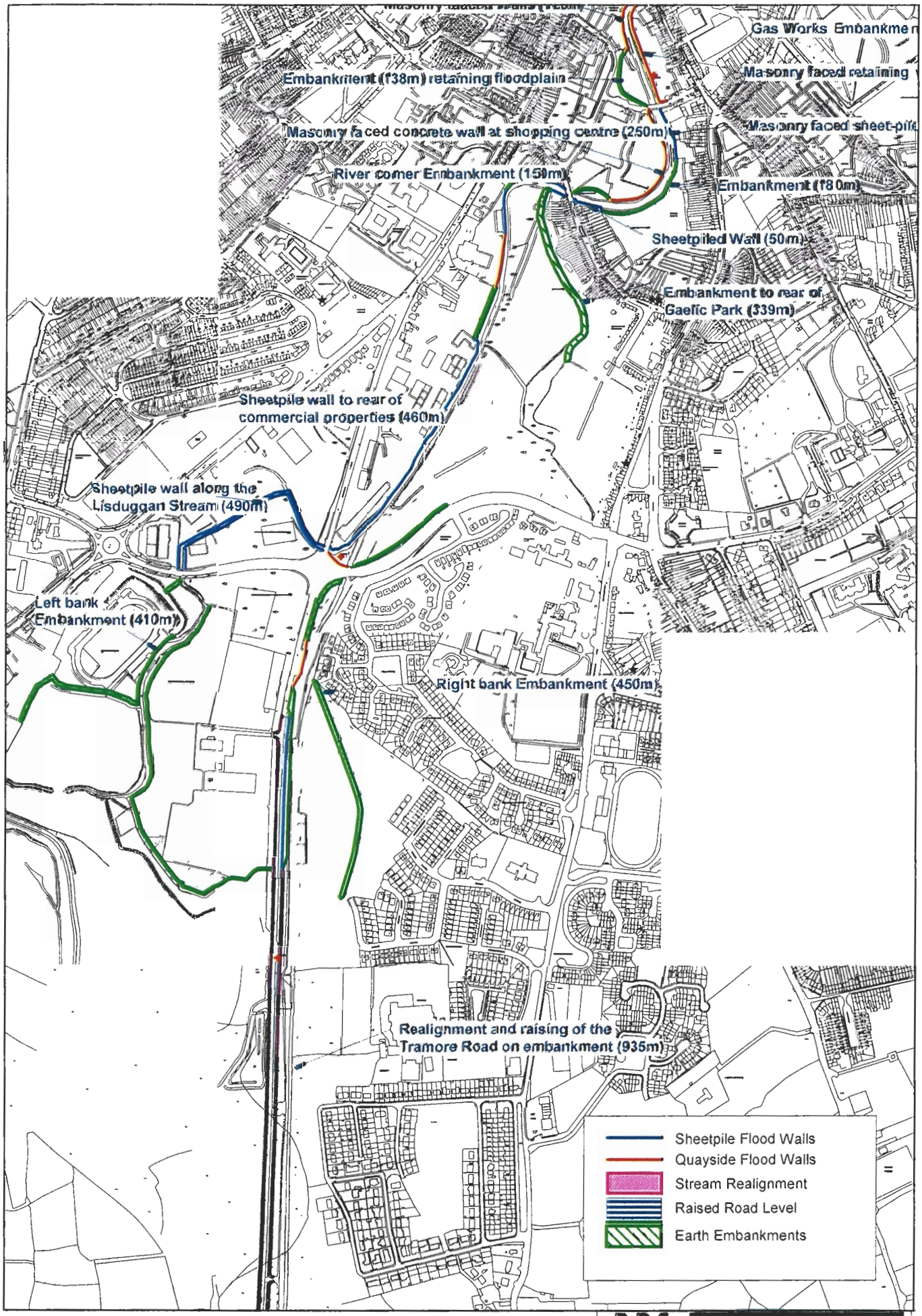
Figure 2.1



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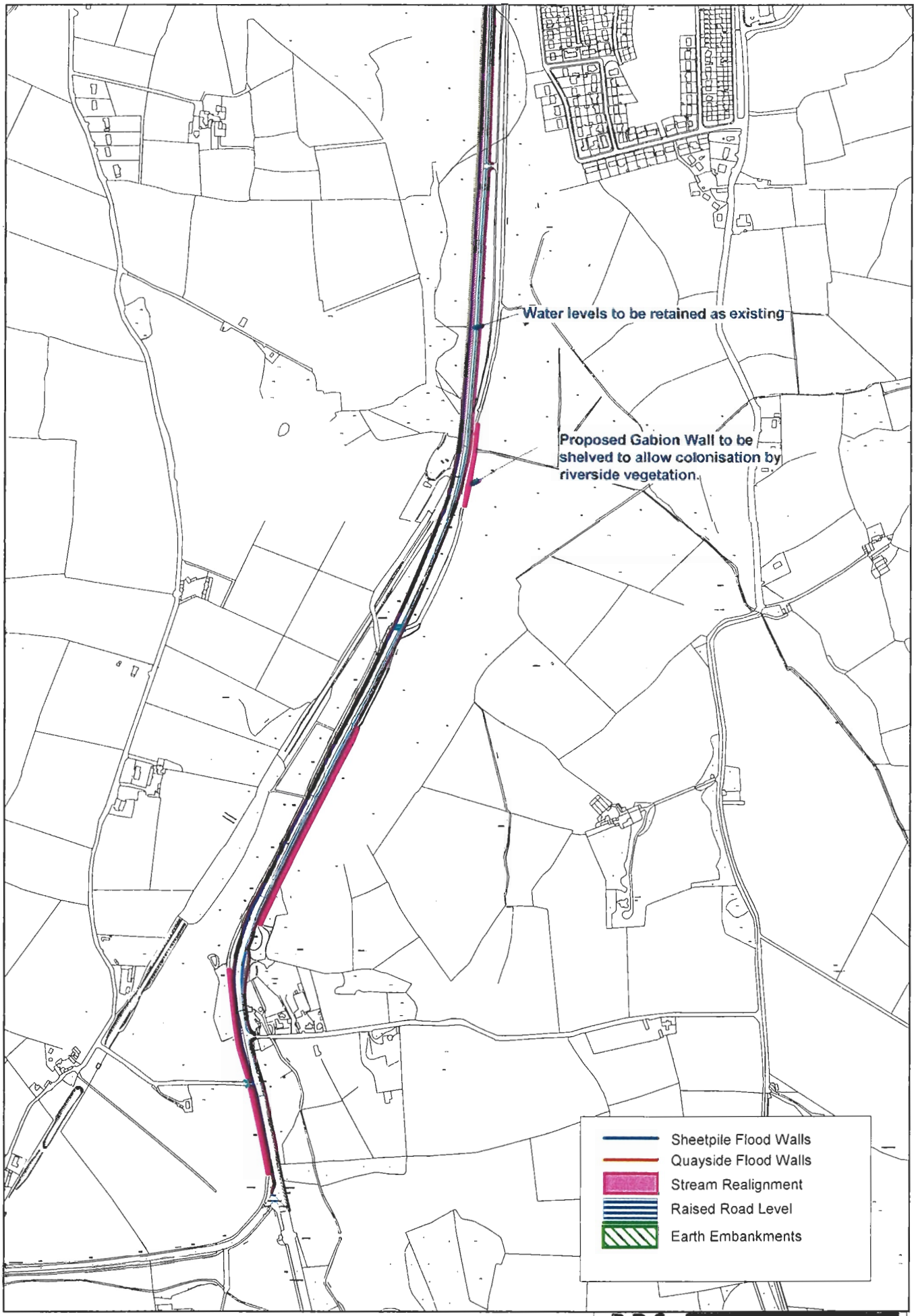
Project Description - Proposed Flood Defence Works

Figure 2.2



Project Description - Proposed Flood Defence Works

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Figure 2.3