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*Client*

Stephen G Dalton & Son

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*Project*

Mixed-use Residential  
Development, Salamander Street.

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*Title*

Flood Risk Assessment

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*Date*

November 2023

*Issue*

P00

ET I VE

CONSULTING ENGINEERS

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Revision	Description	Issued by	Date	Checked
P00	Planning	MNU	08/11/2023	JPC

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Report Reference: 23042-ETV-52-XX-C-RP-0002

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## 1.0 Introduction

### 1.1 Purpose of Report

This Flood Risk Assessment is prepared on behalf of Stephen G Dalton & Son ('the Applicant') who is seeking detailed planning permission for the following description of development: "*Demolition of the existing building, and the erection of mixed use development including: residential development (build to rent) and purpose-built student accommodation development with commercial/retail floorspace (Class 1A) at street level with associated amenity space, landscaping and cycle parking at 52-66 Salamander Street, Leith, Edinburgh EH6 7LA*" ('the Application').

This Flood Risk Assessment is part of a suite of documents submitted with the Application, as outlined below. These supporting documents are in addition to the formal application documents comprising the accompanying plans, sections, and elevations.

- Planning Statement
- Pre-application Consultation Report
- Design and Access Statement (Inc. Waste Management Plan, Building Adaptability and Amenity Breakdown)
- Landscape Statement
- Noise Impact Assessment
- Air Quality Impact Assessment
- Transport Statement
- **Flood Risk Assessment**
- Surface Water Management Plan
- Geo-environmental Report
- Sunlight and Daylight Assessment
- Ecological Assessment
- Statement of Energy
- Archaeological Assessment

This document should specifically be read in conjunction with document 23042-ETV-52-XX-C-RP-0001 Surface Water Management Plan (SWMP).

The purpose of this this FRA is to identify and assesses the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling.

## 1.2 Reference documents

The report has been prepared referencing the following statutory literature and guidance documentation:

- CIRIA (2004). Interim Code of Practice for Sustainable Drainage Systems, National SUDS Working Group
- CIRIA (2015). C753 The SuDS Manual, CIRIA, Department for Environment, Food & Rural Affairs
- City of Edinburgh Council (2019), Guidance on Flood Risk Assessment and Surface Water Management Plans
- Vision for Water Management in the City of Edinburgh (CEC, 2020)
- City of Edinburgh Council Sustainable Rainwater Management Guidance (CEC, 2021)
- City of Edinburgh Council (April 2023). Development Control – Flood Risk and Surface Water Management Plan Requirements
- National Planning Framework 4 (NPF4) February 2023.
- Scottish Water (2018) Sewers for Scotland 4<sup>th</sup> Edition
- Scottish Water (2017), *Standard Advice note and process guidance: Surface Water Policy*

## 1.3 Limitations of the report

The report does not consider flooding from potable water supply network such as water mains, and associated infrastructure. However, a high-level review of existing infrastructure plans indicate that water supply pipes are located below the Craighall Ave and Craighall Road, Edinburgh.

This report does not include hydraulic modelling. This assessment has been carried out based on the information made available at the time of writing. Where significant alterations to development proposals occur, this report requires to be reviewed and updated accordingly.

## 2.0 Regulatory Frameworks

### 2.1 Scottish Planning Policy (superseded)

Prior to adoption of National Planning Framework 4 (NPF4) in February 2023, Scottish Government planning policy on flooding and drainage was provided by Scottish Planning Policy (SPP) paragraphs 254–268 (Scottish Government, 2014). This policy was based on the following principles:

- Developers and planning authorities must consider the possibility of flooding from all sources.
- New development should be free from significant flood risk from any sources.
- In areas characterised as “medium to high” flood risk for watercourses and coastal flooding new development should be focused on built up areas and all development must be safeguarded from the risk of flooding.
- The storage capacity of functional flood plains should be safeguarded from further development.
- The functional flood plains comprise areas generally subject to an annual probability of flooding greater than 0.5% (1 in 200 year).
- Drainage is a material consideration and the means of draining a development should be assessed. Any drainage measures proposed should have a neutral or better effect on the risk of flooding both on and off the site.
- Sustainable Drainage Systems (SuDS) are required to avoid increased surface water flooding.

SPP specified a risk framework, to be used to guide development, which classified coastal and watercourse flood risk based on the following categories:

- Little or no risk area (annual probability of flooding less than 0.1%; 1:1000 years). No constraints to development due to flood risk.
- Low to medium risk area (annual probability of flooding between 0.1% and 0.5%; 1:1000 to 1:200 years). Suitable for most developments, excepting civil infrastructure (unless existing civil infrastructure within a low to medium risk area is being extended, or else if civil infrastructure must be placed within this risk area for operational reasons),
- Medium to high-risk area (annual probability of flooding greater than 0.5%; 1:200 years). Suitable for residential, institutional, commercial, and industrial development within built-up areas (provided adequate flood protection is planned or already exists). Generally, not suitable for civil infrastructure or most vulnerable uses (such as schools and care homes) or for general development in undeveloped or sparsely developed areas (unless essential for operational reasons and alternative locations at lower flood risk are not viable).

With respect to surface water flood risk, SPP specified that infrastructure and buildings should generally be designed to be free from surface water flooding in rainfall events when the annual probability of occurrence is greater than 0.5% (1:200 years). Furthermore, surface water drainage measures should provide a neutral or better effect on the risk of flooding both on and off site, accounting for both rain falling on the site as well as run-off from adjacent areas.

## 2.2 National Planning Framework 4 (NPF4)

NPF4 was adopted by Scottish Ministers on 13 February 2023, replacing SPP (2014). In relation to flood risk and water management, the intent of NPF4 is:

*“To strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding.”*

Where development cannot avoid areas of flood risk, proposals will only be supported if they are for:

- i. essential infrastructure where the location is required for operational reasons.
- ii. water compatible uses.
- iii. redevelopment of an existing building or site for an equal or less vulnerable use; or.
- iv. redevelopment of previously used sites in built up areas where the Local Development

Plan (LDP) has identified a need to bring these into positive use and where proposals demonstrate that long-term safety and resilience can be secured in accordance with relevant SEPA advice.

In relation to surface water flood risk, development proposals will:

- i. not increase the risk of surface water flooding to others, or itself be at risk.
- ii. manage all rain and surface water through sustainable drainage systems (SuDS), which should form part of and integrate with proposed and existing blue-green infrastructure. All proposals should presume no surface water connection to the combined sewer.
- iii. seek to minimise the area of impermeable surface.

For planning purposes, “at risk of flooding” and “in a flood risk area” means land or built form with an annual probability of being flooded of greater than 0.5% which must include an appropriate allowance for future climate change.

SEPA and local authority guidance is yet to be updated to reflect interpretation and application of NPF4 at the date of issue of this FRA, with all existing guidance therefore being based upon SPP (2014).

The FRA will seek to be compliant with NPF4 in relation to defining flood risk and with existing SEPA and local authority guidance in all other aspects.

## 2.3 SEPA Guidance

SEPA has issued guidance in relation to preparing FRAs (“Technical Flood Risk Guidance for Stakeholders”, v13, (SEPA, 2022a). Technical requirements for FRAs depend on the complexity of the site with more complex or high-risk sites requiring detailed assessments. SEPA has also published a report checklist which must be submitted with a FRA as part of a planning application. In summary,

- FRAs must include the following:
  - Background site data, including suitable plans and/or photographs.
  - Historic flood information.
  - Description of methodologies used.
  - Identification of relevant flood sources.
  - In case of river flooding: assessment of river flows, flood levels, depths, extents, displaced flood storage volumes, etc.
  - Assessment of culverts, sewers or other structures affecting flood risk.
  - Consideration of climate change impacts.
  - Details of required flood mitigation measures; and
  - Conclusions on flood risk related to relevant national and local policies.

In addition to reporting requirements, the document also provides technical guidance on Flood Estimation Handbook (FEH) (CEH, 2008) methodologies and on land raising and compensatory storage.

SEPA also provide Flood Risk and Land Use Vulnerability Guidance (SEPA, 2018), which gives further guidance regarding the interpretation and application of SPP, which currently is considered to apply to NPF4, in relation to the suitability of specific land use types within each flood risk category. This guidance differentiates between new development and redevelopment proposals, noting that vulnerable land uses are generally not suitable within areas of medium to high flood risk in the case of new development, but may be suitable within such areas in the case of redevelopment, provided the proposed land use is equal or less vulnerable than the existing land use.

SEPA further require completion of a standard FRA checklist to accompany all FRAs, which is included as Appendix B.

## 3.0 Sources of Information

### 3.1 Scottish Environment Protection Agency (SEPA)

SEPA have strategic overview role for all forms of flooding and coastal erosion. They also have direct responsibility for the prevention, mitigation, and remediation of flood damage for main rivers and coastal areas.

SEPA is the statutory consultee with regards to flood risk and planning. Information regarding the current flood risk at the application site, local flood defences and flood risk has been obtained from current SEPA online maps.

In addition, the SEPA future flood maps have been reviewed. These maps predict the effect of flooding from river and coastal sources by the year 2080.

### 3.2 City of Edinburgh Council

City of Edinburgh Council is the LPA and has responsibilities for 'local flood risk', which includes surface runoff, groundwater, and ordinary watercourses. Planning guidance written by the Council regarding flood risk was consulted to assess the mitigation policies in place.

The flood risk team within the Council have been consulted through the Pre-application consultation process. Within the meeting it was discussed that current flood model held by the council, relevant to the site, were out of date and would require updating. Therefore, these have been discounted from assessment within this report.



## 4.0 Site Context

### 4.1 Location and Description of Site

The site is in the Leith area of Edinburgh, approximately centred on Ordnance Survey National Grid Reference NT 276 762 and covers an area of approximately 0.49-hectares.

The existing brownfield site comprises of an active scrap yard, with a building to the south-east corner. The site is bounded by Salamander Street to the north, by Salamander Place to the west and by commercial and residential buildings to the south and east respectively. A location plan is provided in Figure 1.0.

The site is located within the Edinburgh Waterfront allocation for regeneration. The Edinburgh Local Development Plan (ELDP 2016) sets out a key aim and strategy is to direct growth to this area as one of the key strategic development areas. The ELDP sets out opportunity for mixed use regeneration on the largest scale. More specifically the site is covered by allocation EW 1c for Housing-led regeneration on former industrial land.

The emerging City Plan 2030 further sets out the intent for significant development at the Edinburgh Waterfront. One of its key Aims sets out how development should be directed to brownfield land to deliver new communities at the Waterfront. The site is specifically identified as one for redevelopment. It is recognised that City Plan 2030 is yet to be found sound and adopted.”



Figure 1.0: Site Location plan Ordnance Survey,2023)

### 4.2 Topography

A topographical survey of the site and surrounding areas was undertaken by GL Surveys in September 2023. A full copy of provided in Appendix A.

The survey depicts the levels of the site to generally fall in a north to south direction from 4.30m AOD in the south to 4.15m AOD to the North. The carriageway of Salamander Street, which follows the northern boundary of the site, falls in the west to east direction from 4.04m AOD to 3.88m AOD.

### 4.3 Existing Drainage

Public sewer records have been procured from, the Scottish Water GISD database. These records show that the site and surrounding development is predominantly serviced by a combined sewer network, the exception being the dwellings of Sailmaker Road which have dedicated surface and foul water sewers. However, there ultimately discharge into the combined sewer system below Salamander Place.

A 600mm diameter concrete combined sewer is located below Salamander Street, this sewer flows in a westerly direction along Salamander Street towards Baltic Street. A 480mm brick build sewer flows in a northerly direction below Salamander Place, to the immediate west of the site, and into the main 600mm sewer, noted above, running below Salamander Place.

In addition to a search of public sewer records, and review of the City of Edinburgh Council archives has been undertaken. Drainage records for the current scrap yard on the site have been obtained. These records note that the existing buildings and hardstandings of the scrap yard are serviced by two dedicated combined (collecting both foul and surface water) sewers. Site buildings and gullies collecting runoff from the entrance and parking area of the site are collected and conveyed to the public combined sewer below Salamander Street, through a disconnecting manhole located within the entrance road bellmouth into the site.

A second combined sewer line services the main area of the site used to store scrap. This area collecting runoff from the scrap area as well as an existing vehicle wash facilities. Flows from these areas and passed through a petrol interceptor prior to discharge off site through a 150mm diameter pipe connection into the local sewer network.

A copy of the Scottish Water records and archive drainage records are provided in Appendix B.

### 4.4 Water Courses and Water Features

The Leith Docks are located 270m to the north of the site with the Firth for 870m north of the site.

The Waters of Leith are located 640m west of the site.

### 4.5 Geology and Ground Conditions

Johnson Poole & Bloomer (JPB) have undertaken a Stage 1 Geoenvironmental Investigation Report for the site (document reference XG240-02\MAK).

Based on their assessment of the available geological information, made ground is anticipated across the site associated with the former developments and iron works on the site. The underlying superficial deposits are noted to comprise marine deposits, clays, sands, and gravels. These are considered to be underlain by silts and clays of marine origin.

JPB consider the underlying rock strata to be the Gullane Formation, typically comprising of mainly interbedded sandstones with siltstones and mudstones.

The report examines historical records for mining and mine entries and no evidence of underground mining within the vicinity of the site was noted.

## 4.6 Development Proposals

The proposed development is for the erection of mixed-use development including residential development (build to rent) and purpose-built student accommodation development with commercial/retail floorspace (Class 1A) at street level with associated amenity space, landscaping and cycle parking at 52-66 Salamander Street, Leith, Edinburgh.

A full copy of the proposed site layout is provided in Appendix A.



Figure 2.0: Proposed Site Layout Plan (Rankin Fraser, 2023)

Proposed site levels have been shared by the Landscape Architects which depict a ground flood level of 4.20m AOD. The ground floor consisting of bike and bin stores in addition to amenity space and allowance for commercial/ retail space.

Residential space for the development has been proposed at 1<sup>st</sup> floor building level with a finished floor level of 5.40m AOD.

## 5.0 Flood Risk

### 5.1 Sources of Flooding

All sources of flooding have been considered, these are fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

### 5.2 Climate Change

Projections of future climate change in the UK indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. It is recommended that a climate change allowance of +39% be applied to the estimated 1 in 200-year event for the Leith catchment.

### 5.3 Historic Flooding

There are no records of anecdotal information of flooding at the site including within the British Hydrological Society "Chronology of British Hydrological Events".

No other historical records of flooding for the site have been recorded. Therefore, it has been assumed that the site has not flooded within the recent past.

### 5.4 Existing and Planned Flood Defence Measures

It is understood that there are no flood defences in this area specifically protecting the site.

### 5.5 SEPA Flood Maps

A review of the SEPA Flood Maps has been undertaken for all possible flood sources provided.

In addition, a review of the SEPA future flood maps has been undertaken. These maps present flooding from river and coastal sources have been produced based upon predicted climate change data and how the medium likelihood of flooding may present itself by the year 2080.

The presence of potential flooding sources within the vicinity of the site does not necessarily translate into a high risk of flooding. The following table summaries the potential flood sources identified, and the related flood risk posed to the site.

Table 1.0 Flood Risk Assessment Summary

Flood Source or Mechanism	Presence at Site	Assessed Potential risk level.	Description
Fluvial	Yes	Low	The SEPA flood maps show a high flood risk associated with the Water of Leith, however the flood extents appear to extend no further than Constitution Street which is circa 350m to the west of the site propose development site.
Tidal	Yes	Low	The SEPA flood maps show a high risk of coastal flooding to the Albert Dock Basin approximately 190m to the northwest of the site.
Ground Water	No	Low	The SEPA groundwater maps show no indication of the likelihood of groundwater flooding on site.  The area is already developed with buildings and hardstanding areas, so the likelihood of groundwater flooding we would suggest is low.
Sewers	Yes	Low	There are combined sewers within Salamander Street and Salamander Place. On the basis that these sewers are maintained and operated by Scottish Water it is assessed that these sewers are maintained and monitored sufficiently to assume a low risk to the site.
Pluvial (Surface Water)	Yes	Medium	The SEPA flood maps indicate areas of low and medium risk of surface water flooding on Salamander Street, Salamander Place and encroaching into circa 80% of the development site area.
Artificial Sources	No	N/A	No artificial sources have been identified within our initial assessment.

## 5.5 Fluvial Flooding

The nearest source of fluvial flooding is the Water of Leith which lies approximately 600m west of the site.

The SEPA flood maps show areas of low, medium, and high flood risk to the Water of Leith. Medium and High-risk areas appear to be kept within the main banks of the river with low-risk areas extending to the surrounding streets and properties. The furthest extent of low-risk flooding is noted with Constitution Street circa 350m west of the proposed site.

It is understood that previous advice from SEPA on development applications in the local area was that several studies undertaken on the Water of Leith that a 1:200-year event including an allowance for climate change for up to the year 2057 would result in a flood level of 4.04m AOD.

Residential development would therefore have to set a floor levels with a minimum 600mm freeboard above this flood level, i.e., 4.640m AOD.

The proposed residential flood level has been set at 5.40m AOD, in excess of the recommended 4.640m AOD level noted above.

The risk to the site from fluvial sources is therefore considered to be low provided finished floor levels are set at a suitable level above the identified 1:200year +CC level.

## 5.6 Tidal Flooding

The current SEPA maps indicate that the nearest source of tidal flooding is the Albert Dock Basin which lies approximately 220m north of the site and is associated with the Water of Leith, located 350m west of the site, and the Firth of Forth located 570m north of the site.

SEPA flood maps show areas of low, medium, and high flood risk to the Albert Dock Basin, Water of Leith and Firth of Forth coastline. All at risk areas appear to be contained within the Firth of Forth coastline, dock areas and channel banks.

The closest area of High-risk flooding is noted to be at the Albert Dock Basin, circa 215m north of the site.

The risk to this development from tidal flooding is considered low.

## 5.7 Ground Water Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded. Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements, and car parks) underlain by permeable rocks (aquifers).

The susceptibility of the site to groundwater flooding, based on the underlying geological conditions, is moderate. There are no records of groundwater flooding at or near to the site. It can therefore be concluded that the risk of groundwater flooding is not significant.

## 5.8 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled.

Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are existing public sewers within roads adjacent to the site these will inevitably have a limited capacity so in extreme conditions there could be surcharges, which may in turn cause flooding.

Given the design parameters normally used for drainage design and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 30 years.

The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 200 years or less.

Therefore, sewer flooding poses a low flood risk to the site, and it can be concluded that the risk of sewer flooding is of low significance. The risk from the sewer sources will need be managed and mitigated by using several flood mitigation measures to manage and reduce the overall flood risk at the site.



## 5.9 Pluvial (Surface Water) Flooding

Pluvial flooding or flooding overland may occur when intense rainfall exceeds the infiltration capacity of the ground, when it is already saturated, or when it is impermeable or when it is unable to enter drainage systems.

Flood risk to the site may occur if it lies between a catchment and the natural drainage channel. Risk of flooding from overland flows is considerably higher in areas where the surrounding topography results in an accumulation of flows.

The SEPA flood maps depict extensive medium likelihood of flooding from surface water within the road carriageways of Salamander Street and Salamander place. In addition, the medium extent is shown entering the development site.

Assessing the extent of flooding mapped against the topographical survey for the site suggests that medium surface water flooding could reach a level of 4.30m AOD.

Residential development would therefore have to set floor levels with a minimum 600mm free board above this anticipated flood level, i.e., 4.90m AOD.

The proposed residential flood level has been set at 5.40m AOD, in excess of the recommended 4.90m AOD level noted above.

The risk to the site from pluvial sources is therefore considered to be low provided residential finished floor levels are retained at the proposed level. These would provide a freeboard of 1.10m above the predicted surface water level.

## 5.10 Flood Risk from the development

Surface water flows associated with the proposed development should be discharged via an appropriate drainage system.

Increased surface water flows to the local sewer system may contribute to an increased flood risk on site or downstream of the development.

The design of the surface water system for the development is outwith the scope of this report and is discussed further within the surface water management plan (SWMP) for the development. Reference should be made to Etive Consulting document reference 23042-ETV-52-XX-C-RP-0001.

To comply with the National Planning Framework (NPF4, 2023) and the City of Edinburgh Council guidelines (2022), the design of surface water runoff from the site should be attenuated on-site prior to discharge off-site.

Surface water should be attenuated to suitable discharge rate, required by the City of Edinburgh Council to be the equivalent 2-year greenfield runoff rate or 4.5 litres/second/hectare, whichever is the lowest figure. The surface water should be attenuated up to the 1 in 200-year (0.5% AEP) rainfall event, including a 39% allowance for climate change.

Where the lowest figure calculated from the City of Edinburgh guideline falls below 3 l/s, a default minimum 3 l/s discharge rate can be used as it is appreciated that surface water flow rates below this level can lead to inefficiencies and potential blockages in the proposed system.

An appropriate point of discharge for surface water discharge should be explored and considered.

In addition to surface water attenuation, an appropriate method of surface water treatment should be implemented on the site to follow the best practice requirements of Sustainable Drainage System (SuDS) to prevent negative impacts on receiving water quality. Appropriate natural SuDS features, such as bioretention area, raingardens, and green/blue roofs, can help to reduce the volume of surface water discharge offsite.

Provided an appropriate surface water management strategy is developed for the site, flood risk from the development is considered to be low.

### 5.11 Future flood maps.

Future flood maps representing the extent of river flooding by the 2080's indicate that the full extent of the site and surrounding land works be inundated with a medium likelihood of flooding.

Reviewing the extent of the plotted flood map extents suggests the medium likelihood flood level could be in the order of 4.50m AOD.

Similarly, future flood maps representing the extent of coastal flooding notes the site and its surroundings to be inundated. The anticipated level of this inundation, reviewing the plotted flood maps against the topographical survey for the site, would suggest a flood water level of 4.40m AOD.

Residential development would therefore have to set floor levels with a minimum 600mm freeboard above this anticipated flood level, i.e., 5.100m AOD.

The risk to the site from pluvial sources, in the context of residential development, is therefore considered to be low provided residential finished floor levels are retained at the proposed level. These would provide a freeboard of 0.90m above the predicted river flooding level.



## 6.0 Risk Management

In this flood zone, developers should seek opportunities to reduce the overall level of flood risk in the area through the layout, form of the development and the use of flood mitigation measures including SuDS techniques.

### 6.1 Minimum Floor Level

It is recommended that generally that all buildings are located above the adjacent highways by 150mm to enable the full capacity of any secondary flood conveyance to be utilised.

The ground floor level of the proposed development has been set at 4.20m AOD, this level is generally above the adjacent highway channel lines of Salamander Street which range between 4.07 and 3.97m AOD.

Minimum finished flood levels for residential dwellings on the site should be set at a minimum level on 4.640m AOD to provide an appropriate 600mm minimum freeboard above the anticipated 4.04m AOD fluvial flood level.

### 6.2 Access and Egress

The site and surrounding areas are not located within the floodplain therefore a permanently safe and dry access can be maintained.

The site has been identified as being within the extent of potential pluvial flooding, safe access and egress has been provided for this flood extent from the external access corridor to the southwest corner of the development. This proposed route would lead people out to Salamander Place. In times of medium surface water flooding this route could be subject to circa 100mm water depth inundation. This depth is considered acceptable for pedestrians to walk through to a safe muster point outwith the site boundary.

Figure 3.0: Proposed Safe Access/Egress Route



### 6.3 Flood Resilience and Resistance

The development of the layout should always consider that the site is potentially at risk from an extreme event and as such the implementation of flood resilience and resistance methods should be assessed.

Relatively simple measures such as raising utility entry points, using first floor or ceiling down electrical circuits and sloping landscaping away from properties can be easily and economically incorporated into the development of the site.

### 6.4 Flood Consequence

The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable.

In conclusion, the flood risk to the site can be considered to be limited.

## 7.0 Conclusions

This report presents details of the flood risk assessment as prepared in accordance with National Planning Framework 4 (NPF4) and Scottish planning Policy (SPP-superseded), Sewers for Scotland and City of Edinburgh Council's own guidance.

The development site is located a sufficient distance away from the Water of Leith that flood risk from pluvial sources is considered low.

The development site is located far enough away from the Water of Leith, Albert Dock Basin and Forth Estuary that the risk risk from tidal sources is considered low.

A proportion of the existing site is subject to low and medium risk of pluvial flooding; however, the implementation of finished ground levels and appropriate drainage measures will mitigate the risk of surface water flooding on the site.

SEPA's Future flood maps have been reviewed in the context of potential flooding from river and coastal sources and as a result a minimum residential finished flood level of 4.640m AOD has been deemed appropriate.

Proposed residential finished floor levels exceed to recommended level more than 700mm (5.40m AOD).

Surface water flooding potential from adjacent public sewers systems can be mitigated against with suitable designed site levels.

Surface water runoff from the development should be managed in such a manner that runoff off site should be controlled to an equivalent Greenfield runoff rate using appropriate SuDS techniques to attenuate flows and look to reduce the volume of surface leaving the site.

Surface water drainage design should comply with the NPF4 and the City of Edinburgh Council guidelines, the design of surface water runoff from the site should be attenuated on-site prior to discharge off-site.

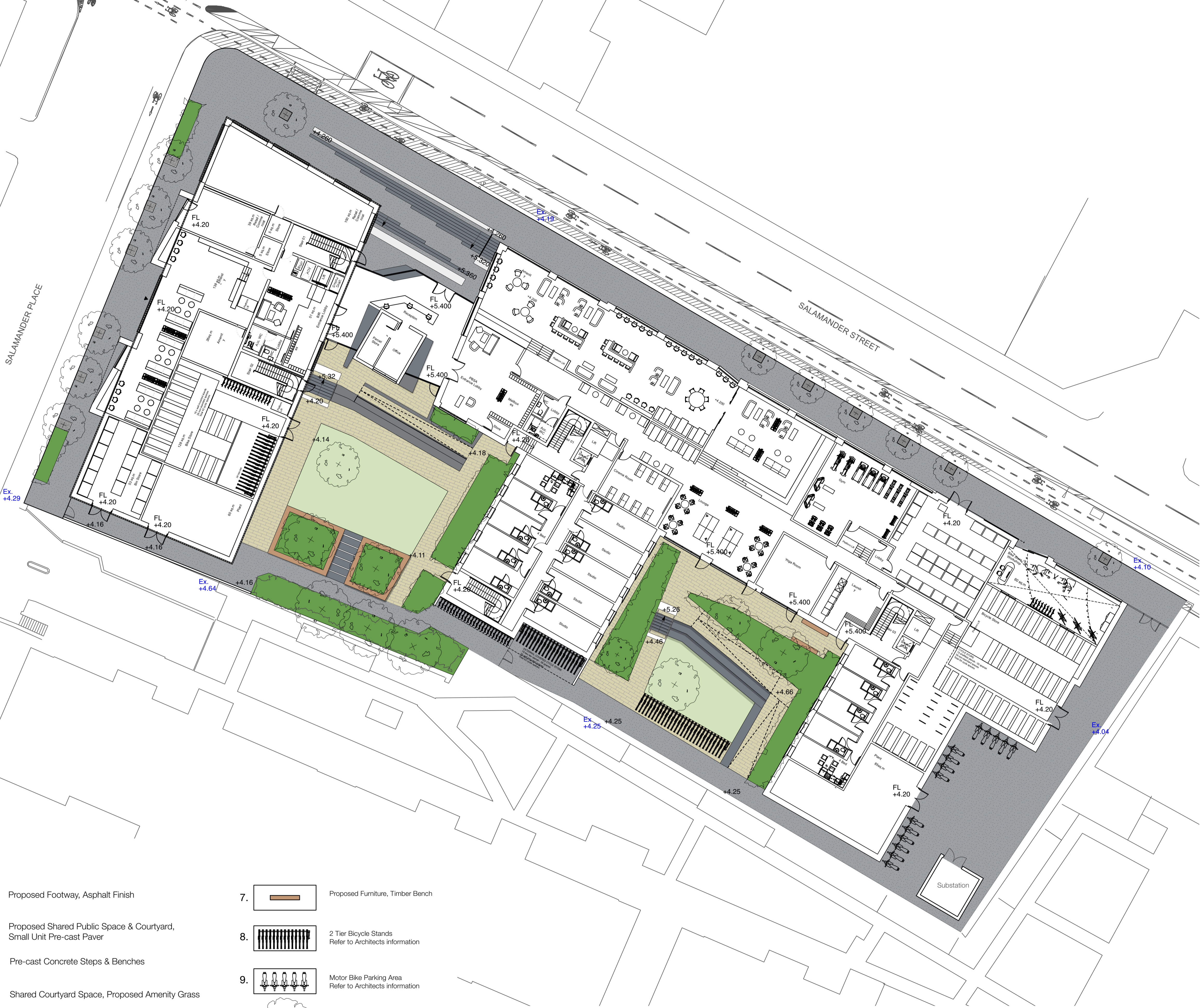
## APPENDIX A – Topographical Survey & Site Plan








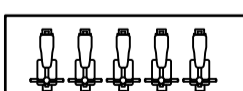
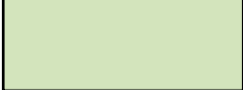


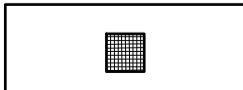


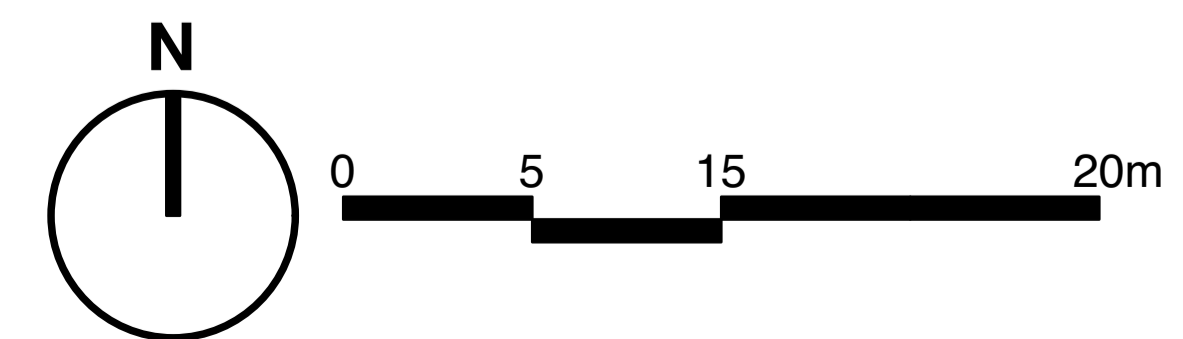
**Note:**  
 Work to written dimensions only.  
 All dimensions to be checked on site.  
 Do not scale from drawing.  
 Any drawing errors or inconsistencies should be brought to the attention of rankinfraser landscape architecture as soon as they become apparent.

Refer to Planting Plan OOO-RFL-XX-XX-DR-L-0001



**KEY**

- |  |   |
|--|---|
| 1.  Proposed Footway, Asphalt Finish                                    | 7.  Proposed Furniture, Timber Bench                           |
| 2.  Proposed Shared Public Space & Courtyard, Small Unit Pre-cast Paver | 8.  2 Tier Bicycle Stands<br>Refer to Architects information   |
| 3.  Pre-cast Concrete Steps & Benches                                   | 9.  Motor Bike Parking Area<br>Refer to Architects information |
| 4.  Shared Courtyard Space, Proposed Amenity Grass                      | 10.  Proposed Trees  |
| 5.  Proposed Planting Area  | 11.  Metal Tree Grille   |



P01 27/10/2023  
 rev date revision notes

rankinfraser  
 landscape architecture

project project nr 2315  
 52-66 Salamander Street  
 client Dalton Metal Recycling Ltd  
 drawing title Landscape Layout Plan  
 drawing nr OOO-RFL-XX-XX-DR-L-0001

date 27/10/2023 rev P01 scale 1:200 @ A1

issue information  
 billing  
 tender  
 construction  
 final construction  
 PLANNING  
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## APPENDIX B – FRA Checklist



# Flood Risk Assessment (FRA) Checklist

(SS-NFR-F-001 - Version 13 - Last updated 15/04/2015)

**This document should be attached within the front cover of any flood risk assessments issued to Local Planning Authorities (LPA) in support of a development proposal which may be at risk of flooding. The document will take only a few minutes to complete and will assist SEPA in reviewing FRAs, when consulted by LPAs. This document should not be a substitute for a FRA.**

Development Proposal	
Site Name	Mixed-use development, Salamader Street, Edinburgh
Grid Reference	Easting: 327692 Northing: 676265
Local Authority	Edinburgh City Council
Planning Reference number (if known)	TBC
Nature of the development	Mixed Use If residential, state type: PBSa and BTR
Size of the development site	0.48 Ha
Identified Flood Risk	Source: Pluvial Source name: surface water from carriageway
Supporting Information	
Have clear maps / plans been provided within the FRA (including topographic and flood inundation plans)	Yes
Has a historic flood search been undertaken?	Yes
Is a formal flood prevention scheme present?	No If known, state the standard of protection offered
Current / historical site use	Scrape metal yard.
Hydrology	
Area of catchment	km <sup>2</sup>
Qmed estimate	m <sup>3</sup> /s Method: Other
Estimate of 200 year design flood flow	m <sup>3</sup> /s
Estimation method(s) used *	Select from List If other (please specify methodology used): Select from List If Pooled analysis have group details been included: Select from List
Hydraulics	
Hydraulic modelling method	Select from List Software used: Select from List
If other please specify	
Modelled reach length	m
Any structures within the modelled length?	Select from List Specify, if combination
Brief summary of sensitivity tests, and range:	
variation on flow (%)	%
variation on channel roughness	%
blockage of structure (range of % blocked)	% <a href="#">Reference CIRIA culvert design guide R168, section 8.4</a>
boundary conditions:	
(1) type	Upstream Downstream
	Flow Select from List
Specify if other	Select from List Specify if other Select from List
(2) does it influence water levels at the site?	Select from List
Has model been calibrated (gauge data / flood records)?	Select from List
Is the hydraulic model available to SEPA?	Select from List
Design flood levels	200 year m AOD 200 year plus climate change m AOD



# Flood Risk Assessment (FRA) Checklist

(SS-NFR-F-001 - Version 13 - Last updated 15/04/2015)

Coastal	
Estimate of 200 year design flood level	<input type="text"/> m AOD
Estimation method(s) used	Select from List <input type="text"/> If other (please specify methodology used): <input type="text"/>
Allowance for climate change (m)	<input type="text"/> m
Allowance for wave action etc (m)	<input type="text"/> m
Overall design flood level	<input type="text"/> m AOD
Development	
Is any of the site within the functional floodplain? (refer to SPP para 255)	<input type="text"/> No <input type="text"/> If yes, what is the net loss of storage <input type="text"/> m <sup>3</sup>
Is the site brownfield or greenfield	<input type="text"/> Brownfield
Freeboard on design water level (m)	<input type="text"/> 0.6 m
Is the development for essential civil infrastructure or vulnerable groups?	<input type="text"/> No <input type="text"/> If yes, has consideration been given to 1000 year design flood? <input type="text"/> Select from List
Is safe / dry access and egress available?	<input type="text"/> Vehicular and Pedestrian <input type="text"/> Min access/egress level <input type="text"/> m AOD
If there is no dry access, what return period is dry access available?	<input type="text"/> years
If there is no dry access, what is the impact on the access routes?	Max Flood Depth @ 200 year event: <input type="text"/> m <input type="text"/> Max Flood Velocity: <input type="text"/> m/s
Design levels	Ground level: <input type="text"/> 4.04 m AOD <input type="text"/> Min FFL: <input type="text"/> 4.2 m AOD
Mitigation	
Can development be designed to avoid all areas at risk of flooding?	<input type="text"/> Yes
Is mitigation proposed?	<input type="text"/> Yes
If yes, is compensatory storage necessary?	<input type="text"/> No
Demonstration of compensatory storage on a "like for like" basis?	<input type="text"/> No
Should water resistant materials and forms of construction be used?	<input type="text"/> No
Comments	
Any additional comments:	<input type="text"/>

Approved by: J Chapman  
 Organisation: Etive Consulting Engineers  
 Date:

08/11/2023

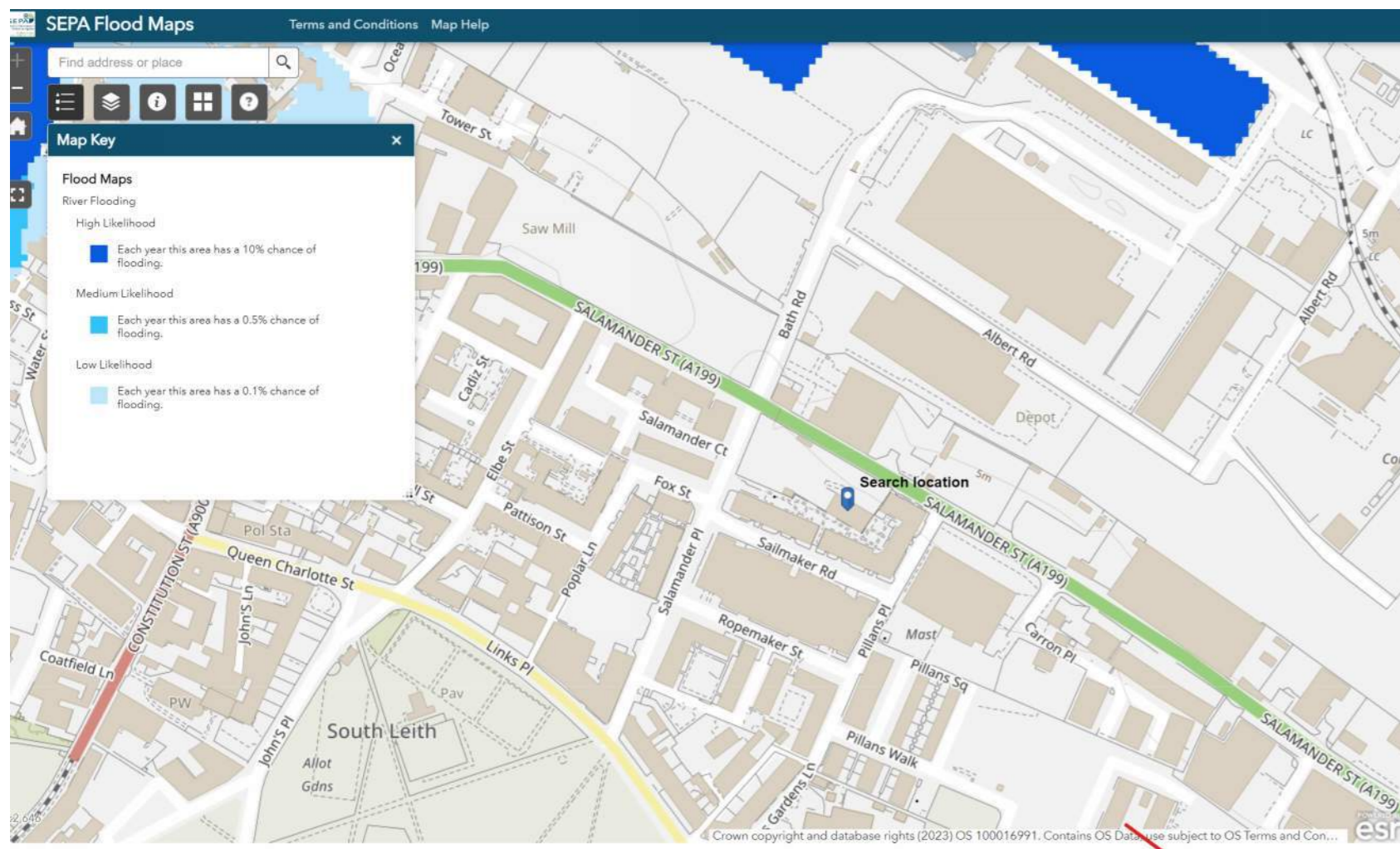
Note: Further details and guidance is provided in 'Technical Flood Risk Guidance for Stakeholders' which can be accessed here:- [CLICK HERE](#)

\* ReFH2 is now accepted by SEPA for flow estimates in Scotland. Any use of this method should be compared with other accepted methods.



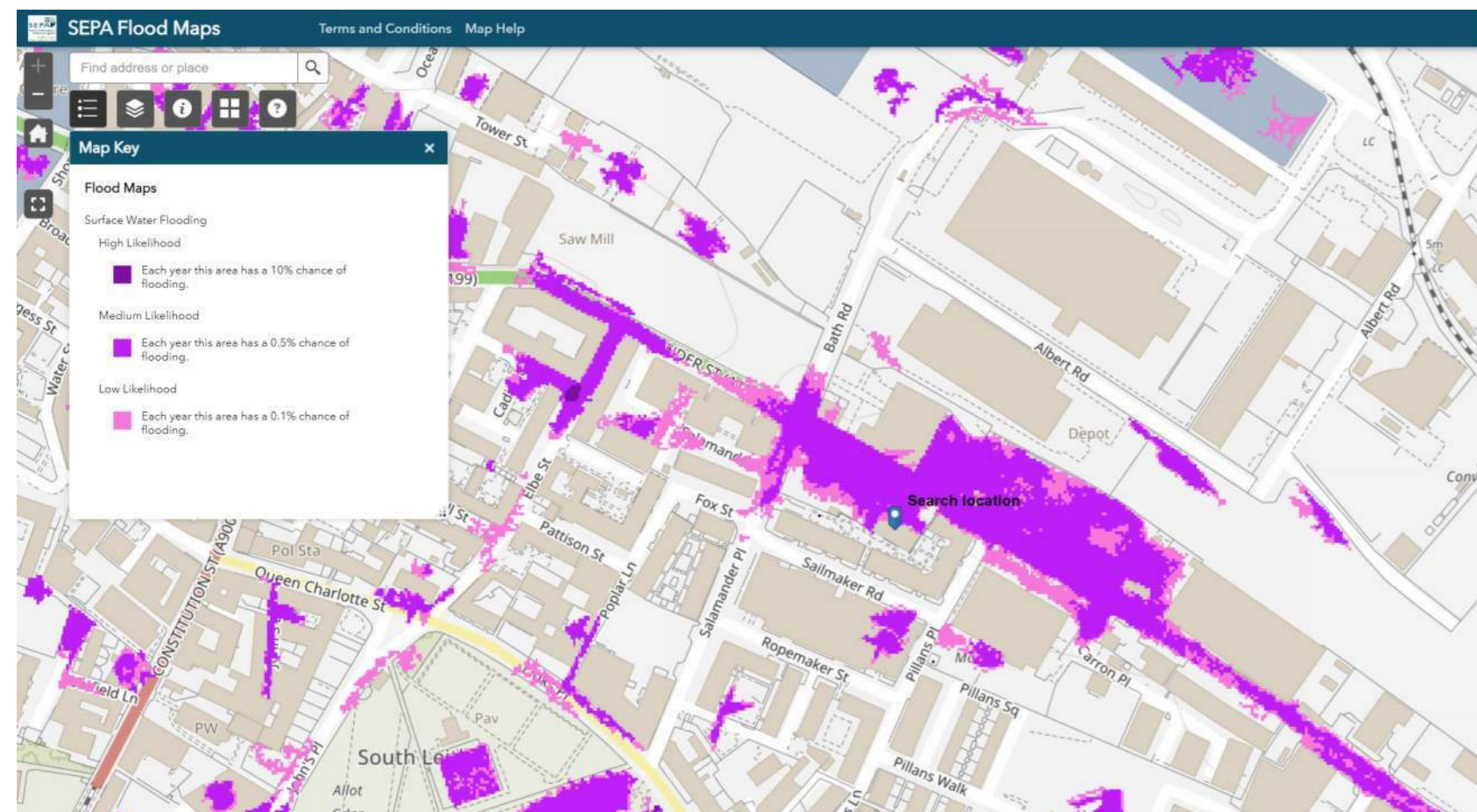
## APPENDIX C – Flood Maps Extracts





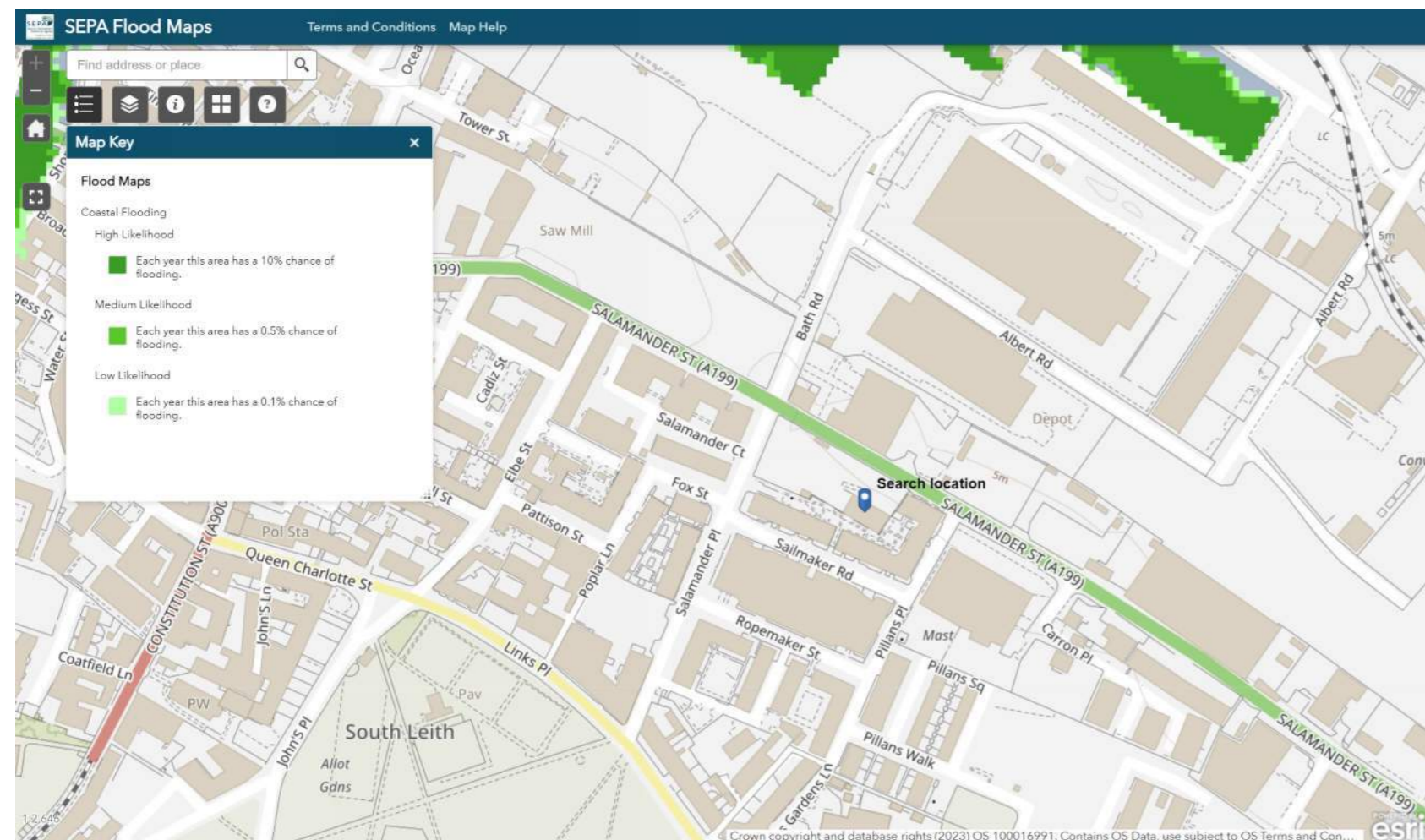
## River Flooding

Review of the SEPA flood maps indicate the site is not at risk from river flooding. The closest river source being the Water of Leith and its associated docs.



## Surface Water (Pluvial) Flooding

Review of the SEPA flood maps indicate the site is at risk of high to medium flooding from surface water sources. The flood maps indicates surface water run-off conveying along Salamander Street and entering the site.



## Coastal Flooding

Review of the SEPA flood maps indicate the site is not at risk from coastal flooding. The closest coastal water being the Port of Leith docks.

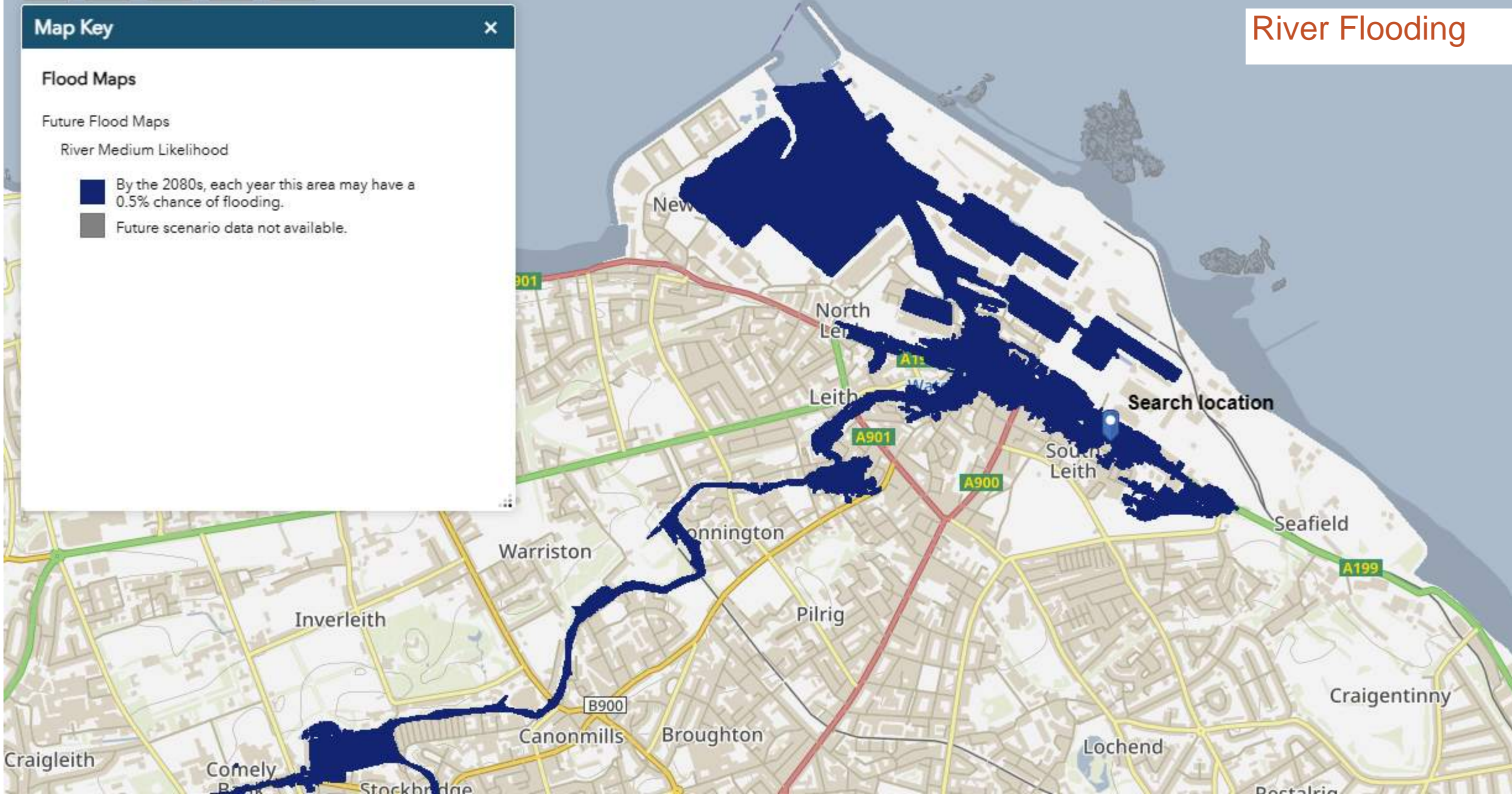
**ETIVE**  
CONSULTING ENGINEERS

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22 Rutland Street  
Edinburgh  
EH1 2AN

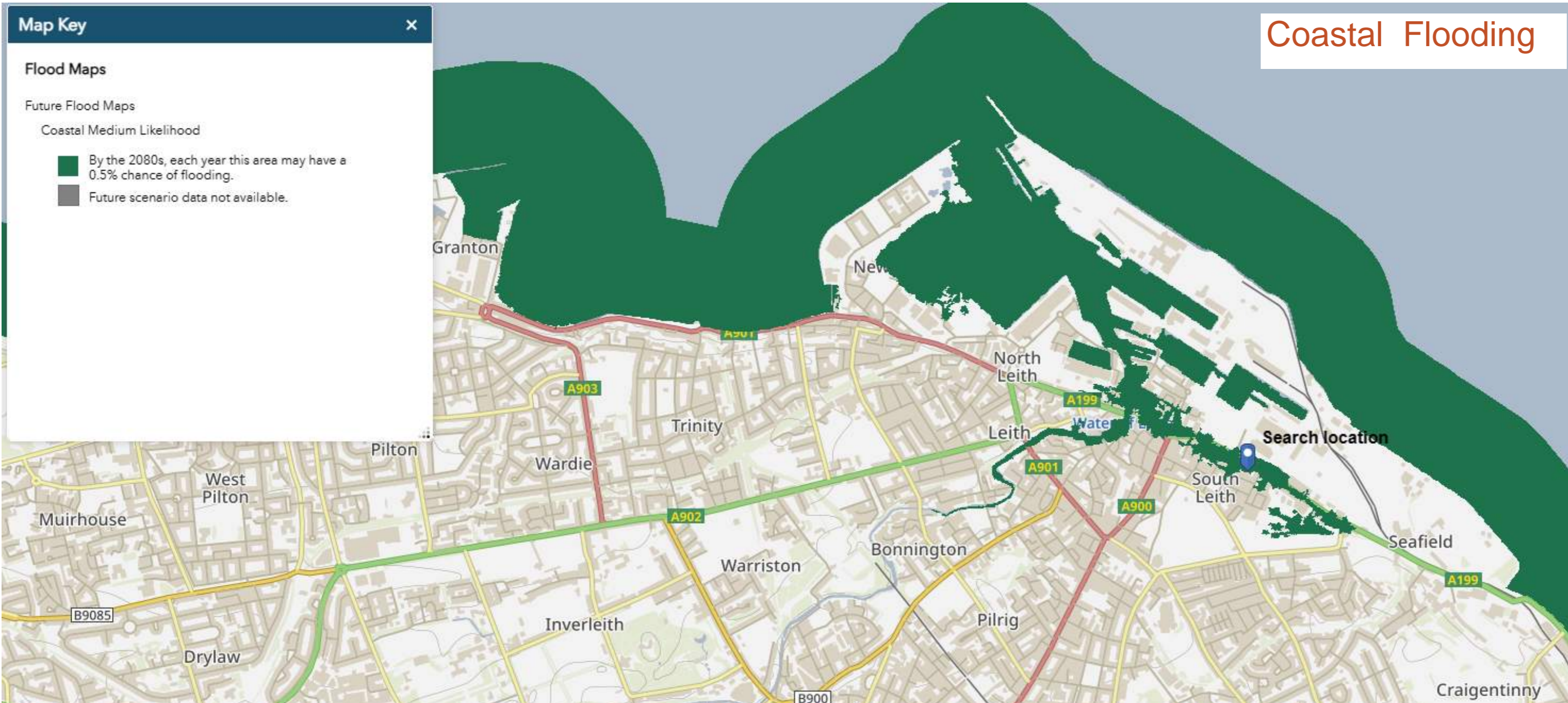
T 0131 226 6746  
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E [info@etiveconsulting.co.uk](mailto:info@etiveconsulting.co.uk)



River Flooding



Coastal Flooding



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