

An aerial photograph showing a large-scale flooding event. The water is a murky brown color and has inundated a significant portion of the landscape, including green fields and residential areas. In the center, a large industrial or commercial building with a dark roof is partially surrounded by water. The surrounding area includes roads, smaller buildings, and patches of greenery. The overall scene depicts a major flood event.

# Bridge of Allan Flood Alleviation Scheme

15<sup>th</sup> May 2018



Existing Flood Protection in Poor Condition  
Must be Replaced

# October 2007 damage risk assessment.



- 85 Properties at risk in a 50 yr event.
- Embankment in poor condition

Showing existing scheme showing 100, 50, 20yr Flood extents.



Notes  
This map is produced from based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Stirling Council 100020780 (2009).

- Legend**
- 20yr Flood Extent
  - 50yr Flood Extent
  - 100yr Flood Extent

Indicative flood map, based on Lidar elevation (c) data supplied by Stirling Council and information available from other detailed flood risk assessments. The flood extent should be checked with detailed topographical survey information if used as part of a detailed flood risk assessment.

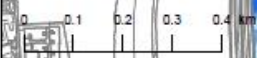


Project  
Bridge of Allan  
Damage Assessment

Figure  
Flood Extents  
20yr, 50yr and 100 yr Events

Drawn by: JT	Date: Nov 09
Checked by: JT	Date: Nov 09
Approved by: JMD	Date: Nov 09

Figure no. Figure A-2	Revision /
Drawing scale: 1:10,000	Size: A3



If there was no FPS.

A few slides showing properties  
damaged as the flood events  
become larger.

Properties damaged in 5yr flood event.

31 Properties damaged

Total Cost £302k

Cost per property £10k

Note:  
This map is produced from based upon Ordnance Survey (referred to as Ordnance Survey) data with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Stirling Council 100000760 (2009).

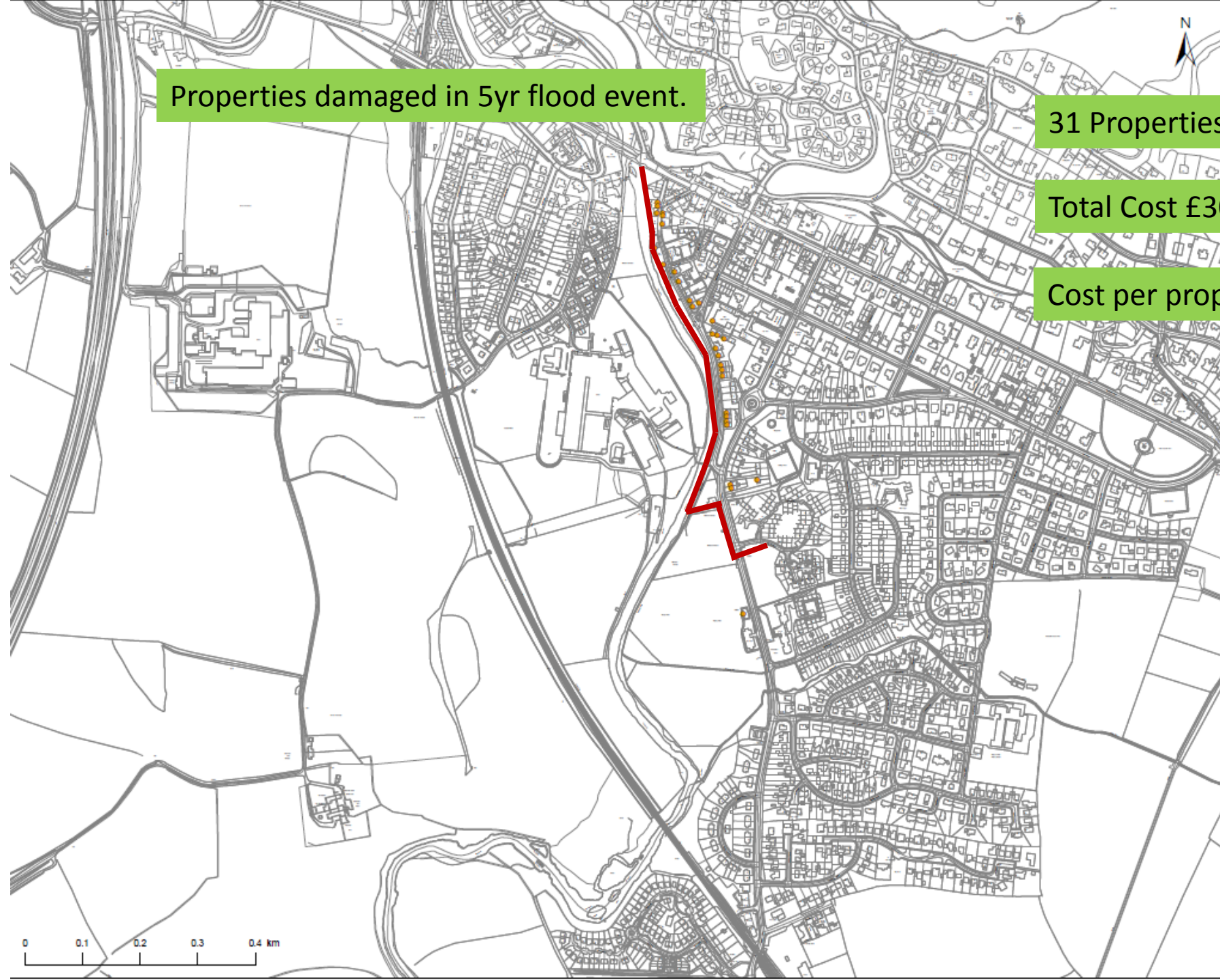
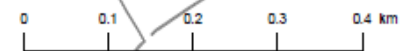
Legend  
● Properties Accruing Damages - 5yr Event

Client  
STIRLING COUNCIL

Project  
**Halcrow**  
Bridge of Allan  
Damage Assessment

Figure  
Properties accruing flood damages  
5 year return period event

Drawn by: JT	Date: Nov 09
Checked by: JT	Date: Nov 09
Approved by: JMD	Date: Nov 09
Figure no: Figure D-2	Revision /
Drawing scale: 1:6,000	Size: A3



Properties damaged in 20yr flood event.

59 Properties damaged

Total Cost £1.5M

Cost per property £26k

Notes  
This map is produced from based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. Crown Copyright. Unauthorised reproduction infringe Crown copyright and may lead to prosecution or civil proceedings. Stirling Council 100000750 (2009).

Legend  
● Properties Accruing Damages - 20yr Event

Client  
STIRLING COUNCIL

**Halcrow**

Project  
Bridge of Allan  
Damage Assessment

Figure  
Properties accruing flood damages  
20 year return period event

Drawn by: IT Date: Nov 09  
Checked by: IT Date: Nov 09  
Approved by: JMD Date: Nov 09

Figure No.  
Figure D-4  
Revision  
/

Drawing scale: 1:5,000 Size: A3

0 0.1 0.2 0.3 0.4 km

Properties damaged in 50yr flood event.

84 Properties damaged

Total Cost £3.1M

Cost per property £30k

Legend  
● Properties Accruing Damages - 50yr Event

Client  
STIRLING COUNCIL



Halcrow

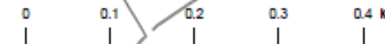
Project  
Bridge of Allan  
Damage Assessment

Figure  
Properties accruing flood damages  
50 year return period event

Drawn by: JT Date: Nov 08  
Checked by: JT Date: Nov 08  
Approved by: JMD Date: Nov 08

Figure no. Revision  
Figure D-5 /

Drawing scale: 1:6,000 Size: A3



Note:  
This map is produced from based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office. Crown Copyright. Unauthorized reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Stirling Council 100000700 (2009).



# Proposed Scheme

Estimated Cost £4.4M



# Indicative New Scheme Details

Still some distance from outline design.

Fire Station Wall

Allotments;  
new 1m wall & road raised.



# Future Proofing for a 1 in 100 upgrade

- **2018: limited to 1 in 50 (1 in 100)**

- 1 in 100 scheme not possible as Benefit / Cost ratio less than 1.
- For proposed scheme SEPA guidelines restrict any increase in water level to only 10mm, very difficult to comply.
- 1 in 100 scheme much more expensive.

- **The Future ?**

- Climate change likely to force upgrade to higher, longer walls.
- Political cost/benefit calculations likely to influence financial cost / benefits.

# Key Areas of Interest

- Foot Bridge
- Raising Roadway Level
- Impact on Allotments
- Surface Water Back Drainage
- Implications of Stirling FPS

# Foot Bridge



- **Options**

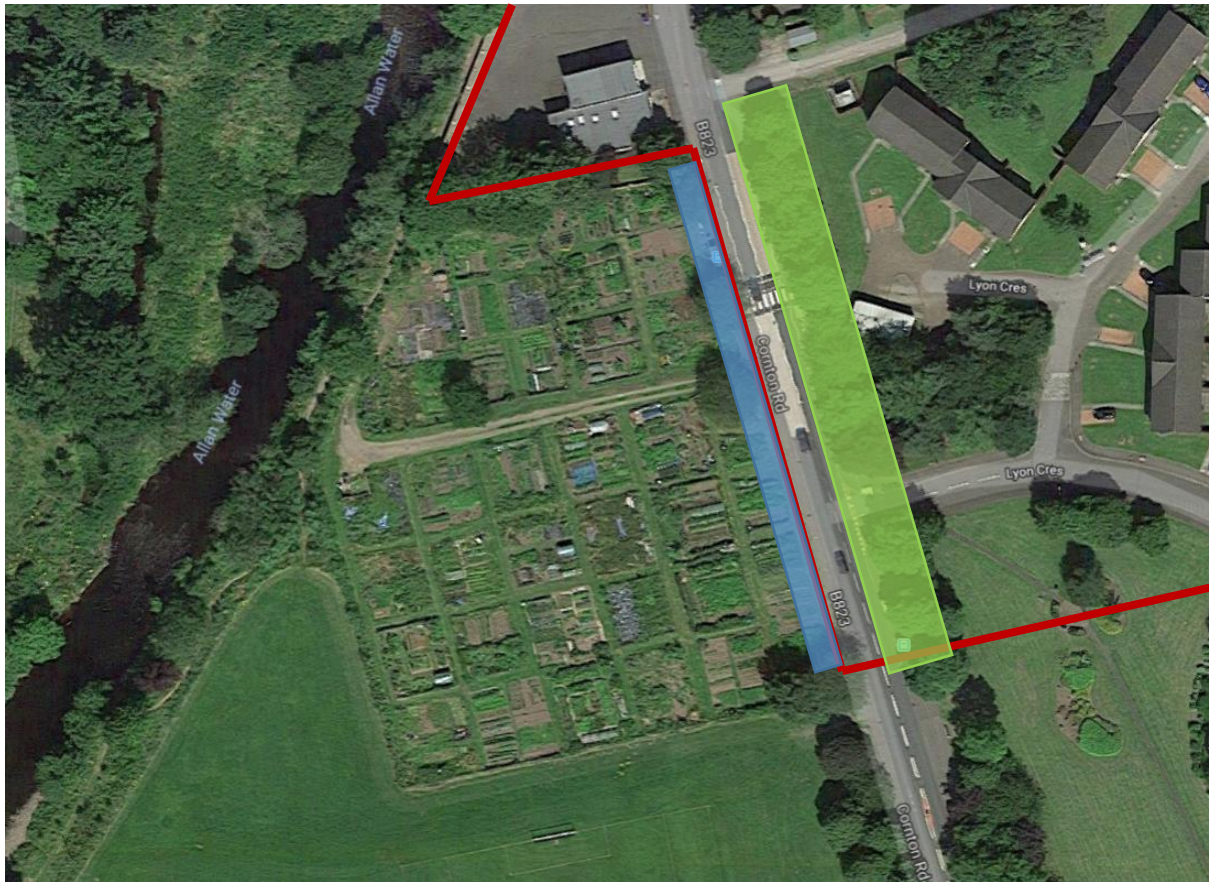
- Raise it 780mm, requiring a long disabled access ramp.
- Remove it to assist future higher FPS.
- Move it upstream out of the way, to a better use location, need to consult community.



# Raising Roadway Level



- Potential removal of roadside trees as raised road and new flood wall will require wider footprint.

# Impact on Allotments & Trees



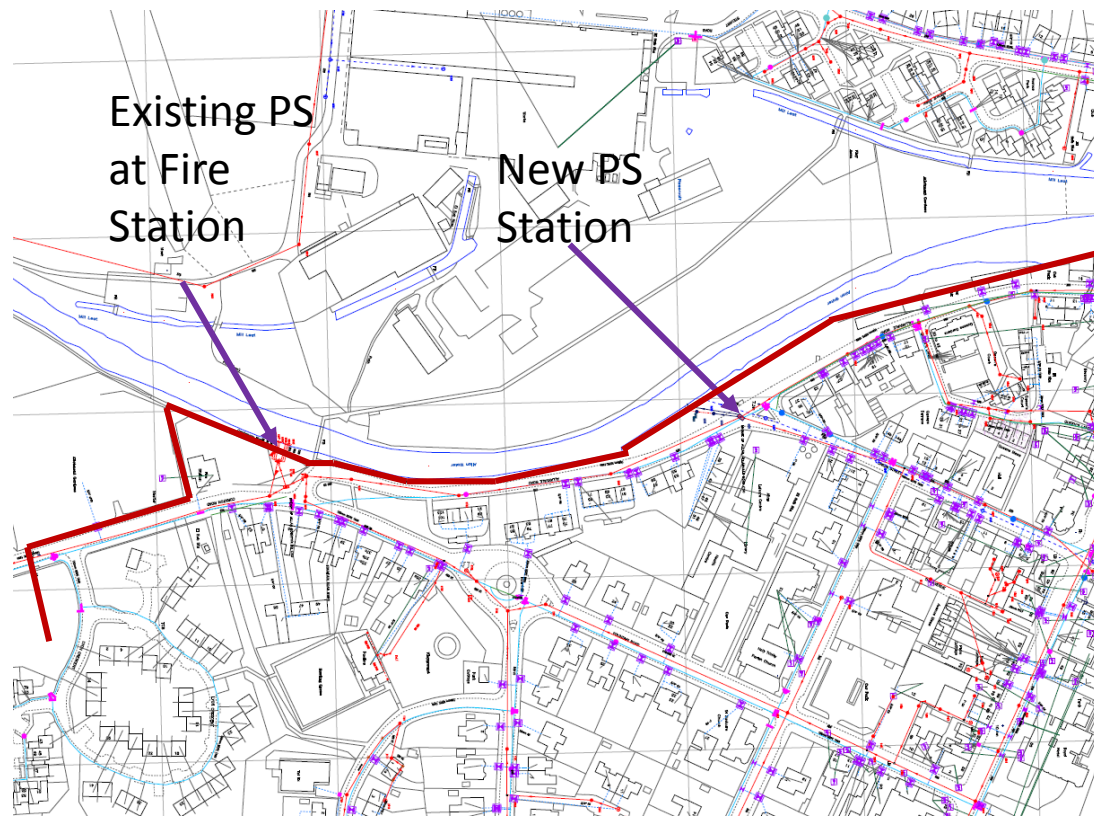
- To raise road level requires a 4m wide construction strip through the allotments. 
- Consultation with plot holders to start soon. Temporary land take required during construction phase only.
- Potential removal of trees. 



4m wide temporary land take from roadside allotments



# Surface Water- back drainage



- If river water levels are high rain water will be trapped on the wrong side of the FPS.
- Need for non-return valves on river outlets
- Upsized Pipe work
- New Pumping station

# Implications of Stirling FPS



- Bridge of Allan is 1km u/s from the River Forth. A Stirling Scheme will increase water levels in both the Forth and Allan.
- To prevent additional flooding the B of A scheme will be constructed before the Stirling Scheme.

Any Questions