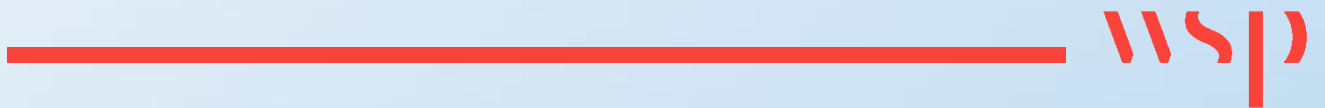


Appendix C

OPTION DETAILS PROFORMAS



Option No/s.	Assumed design and costing details																
1a	<table border="1"> <tr> <td data-bbox="229 311 453 344">Date</td><td data-bbox="453 311 1230 344">10/03/2021</td></tr> <tr> <td data-bbox="229 344 453 378">Design By</td><td data-bbox="453 344 1230 378">JM</td></tr> <tr> <td data-bbox="229 378 453 412">Cost calculation by</td><td data-bbox="453 378 1230 412">DW</td></tr> <tr> <td data-bbox="229 412 453 445">Checked By</td><td data-bbox="453 412 1230 445">AF</td></tr> <tr> <td data-bbox="229 445 453 479">Site</td><td data-bbox="453 445 1230 479">Langthwaite - Arkle Beck</td></tr> <tr> <td data-bbox="229 479 453 512">Description</td><td data-bbox="453 479 1230 512">Flood wall</td></tr> <tr> <td data-bbox="229 512 453 1151">Design Details</td><td data-bbox="453 512 1230 1151"> <p>Flood wall along the left bank of Arkle Beck constructed in 2 sections. Current retaining wall to be replaced. 35m length of Section 1 wall constructed in residential gardens.</p> <p>Defence details:</p> <p>Section 1 Length = 145.0m Height = 10m Sheet Pile Depth = 3m</p> <p>Section 2 Length = 76.0m Height = 10m Sheet Pile Depth = 3m</p> <p>Backdrainage required</p> </td></tr> <tr> <td data-bbox="229 1151 453 1671">Design Assumptions</td><td data-bbox="453 1151 1230 1671"> <ul style="list-style-type: none"> - Flood depths are unknown, therefore the height of the flood wall is indicative only and may be subject to change following further investigation. - Backdrainage has not been designed. The included cost is provided as an indicative value. - Total pile depth has been assumed to be 1/4 above ground and 3/4 below ground. This is intended as a conservative estimate and does not account for seepage. Ground investigation would be needed to confirm pile depth. - It is assumed that the wall can be tied into existing areas of high ground and Langthwaite Bridge to provide continuous defence. Detailed topographic survey would be required to confirm design details. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location. </td></tr> </table>	Date	10/03/2021	Design By	JM	Cost calculation by	DW	Checked By	AF	Site	Langthwaite - Arkle Beck	Description	Flood wall	Design Details	<p>Flood wall along the left bank of Arkle Beck constructed in 2 sections. Current retaining wall to be replaced. 35m length of Section 1 wall constructed in residential gardens.</p> <p>Defence details:</p> <p>Section 1 Length = 145.0m Height = 10m Sheet Pile Depth = 3m</p> <p>Section 2 Length = 76.0m Height = 10m Sheet Pile Depth = 3m</p> <p>Backdrainage required</p>	Design Assumptions	<ul style="list-style-type: none"> - Flood depths are unknown, therefore the height of the flood wall is indicative only and may be subject to change following further investigation. - Backdrainage has not been designed. The included cost is provided as an indicative value. - Total pile depth has been assumed to be 1/4 above ground and 3/4 below ground. This is intended as a conservative estimate and does not account for seepage. Ground investigation would be needed to confirm pile depth. - It is assumed that the wall can be tied into existing areas of high ground and Langthwaite Bridge to provide continuous defence. Detailed topographic survey would be required to confirm design details. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location.
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Cost calculation by	DW																
Checked By	AF																
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Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.1	ha	£20,000.00	£1,326.00
Take down retaining wall and dispose off site - allow 50% of length	110.5	m	£150.00	£16,575.00
Backdrainage	221	m	£75.00	£16,575.00
Set up for sheet piling	1	item	£10,000.00	£10,000.00
Sheet piling	2,210	m2	£200.00	£442,000.00
Sheet piling reinforced concrete capping beam including handrail	221	m	£350.00	£77,350.00
Option 1a Construction Cost Estimate Measured Works Sub-Total				£563,826.00
Allow for:				
Environment and ecological mitigation	1.00%			£5,638.26
Landscaping and accommodation works	3.00%			£16,914.78
Archaeology	0.50%			£2,819.13
Contractors work for statutory undertakers	2.00%			£11,276.52
Option 1a Construction Cost Estimate Total				£600,474.69
Land and Compensation				
Allow for compensation	1.00	item	£20,000.00	£20,000.00

1b

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Langthwaite - Arkle Beck
Description	Flood wall
Design Details	<p>Flood wall to the north of village</p> <p>Defence details:</p> <p>Section 1</p> <p>Length = 90.0m</p> <p>Height = 1.0m</p> <p>Sheet Pile Depth = 3m</p>
Design Assumptions	<ul style="list-style-type: none"> - Flood depths are unknown, therefore the height of the flood wall is indicative only and may be subject to change following further investigation. - Total pile depth has been assumed to be 1/4 above ground and 3/4 below ground. This is intended as a conservative estimate and does not account for seepage. Ground investigation would be needed to confirm pile depth. - It is assumed that the wall can be tied into existing areas of high ground to provide continuous defence. Detailed topographic survey would be required to confirm design details. - The ground conditions are unknown. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.03	ha	£20,000.00	£540.00
Set up for sheet piling	1	item	£10,000.00	£10,000.00
Sheet piling	270	m2	£200.00	£54,000.00
Sheet piling reinforced concrete capping beam including handrail	90	m	£350.00	£31,500.00
Option 1b Construction Cost Estimate Measured Works Sub-Total				£96,040.00
Allow for:				
Environment and ecological mitigation	1.00%			£960.40
Landscaping and accommodation works	3.00%			£2,881.20
Archaeology	0.50%			£480.20
Contractors work for statutory undertakers	2.00%			£1,920.80
Option 1b Construction Cost Estimate Total				£102,282.60
Land and Compensation				
Allow for compensation	1.00	item	£10,000.00	£10,000.00

1c

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Langthwaite - Arkle Beck
Description	Flood embankment
Design Details	<p>Flood embankment to the north of village</p> <p>Defence details:</p> <p>Length = 90.0m Height = 1.0m Crest width = 0.5m Slope = 1:2 Emabankment volume = 225m³</p>
Design Assumptions	<ul style="list-style-type: none"> - Flood depths are unknown, therefore the height of the flood wall is indicative only and may be subject to change following further investigation. - It is assumed that the embankment would provide a barrier to divert overland flow towards Arkle Beck to the south-west. It is assumed that no impermeable core is required for the emabankment as the structure would not be impounding water. - It is assumed that the embankment can be tied into existing areas of high ground to provide continuous defence. Detailed topographic survey would be required to confirm design details. - The ground conditions are unknown. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location. - No allowance has been made at this stage for access points to fields to the north.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.09	ha	£20,000.00	£1,710.00
Take down stone wall and dispose off site	20	m	£50.00	£1,000.00
Topsoil strip and preparation for embankment	214	m3	£8.00	£1,710.00
Excavate locally and deposit in embankment	225	m3	£15.00	£3,375.00
Trim crest and side slopes, relay topsoil and seed	214	m3	£6.00	£1,282.50
Make good excavation area and seed	225	m3	£2.00	£450.00
Option 1c Construction Cost Estimate Measured Works Sub-Total				£9,527.50
Allow for:				
Environment and ecological mitigation	1.00%			£95.28
Landscaping and accommodation works	3.00%			£285.83
Archaeology	0.50%			£47.64
Contractors work for statutory undertakers	2.00%			£190.55
Option 1c Construction Cost Estimate Total				£10,146.79
Land and Compensation				
Land acquisition for embankment - agricultural	0.09	ha	£45,000.00	£3,847.50
Allow for compensation	1.00	item	£10,000.00	£10,000.00

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Langthwaite - Booze Road
Description	Road regrade & surface water collection channel
Design Details	<p>Regrade area on Booze Road to route surface water through filed to the south. Water collected by newly excavated collection channel routing water to the south-west, discharging to open field.</p> <p>Road surface regrade: Area = 170m² Fill material = 60m³ Road raised 100-200mm on northern side to encourage surface water to run off in to field to south</p> <p>Collection channel: Length = 75m Top width = 1.3m Base width = 0.3m Depth = 0.5m Bank slope = 1:1 Excavation required = 30m³</p>
Design Assumptions	<ul style="list-style-type: none"> - All dimensions are indicative only. - The channel route has been outlined using 1m LIDAR. Topographic survey will be required to confirm ground levels. - The ground conditions of the land in which the proposed drainage ditch is to be located is unknown. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location. - No hydraulic or hydrological assessment has been undertaken in outlining this option - Areas to be regraded and volume of material required to infill are indicative values for the purposes of providing cost estimates. Changes to the topography should be supported by a more detailed hydrological assessment which considers the impacts of the various flow paths and potential for surface water ponding

Construction Cost Estimate

Description	Quantity	Unit	Rate	
Adjust existing ironwork in carriageway	1	item	£500.00	
Excavation and local deposition	30	m3	£15.00	
Remove existing pavement 100mm thick (assume non-tar bound)	170	m2	£8.00	
Prepare formation for imported fill	170	m2	£2.00	
Import and compact fill	60	m3	£40.00	
Pavement reinstatement 100mm thick	170	m2	£35.00	
Kerb both sides	60	m	£45.00	
Option 3 Construction Cost Estimate Measured Works Sub-Total				
Allow for:				
Environment and ecological mitigation	1.00%			
Landscaping and accommodation works	3.00%			
Archaeology	0.50%			
Contractors work for statutory undertakers	2.00%			
Option 3 Construction Cost Estimate Total				
Land and Compensation				
Land acquisition for channel - agricultural	0.02	ha	£45,000.00	

5

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Lengthwaite - unnamed watercourse
Description	Culvert upgrade
Design Details	<p>Upgrade culvert, currently a 1m x 1.5m stone arch.</p> <p>Replace with 1m x 1.5m precast box culvert (available cover unknown). Length = 30m</p>
Design Assumptions	<ul style="list-style-type: none"> - No assessment of the capacity required has been undertaken, hence the dimensions of the culvert is indicative only. - It is not known if there are any utilities that may limit/ prohibit the implementation and/or scope of upsizing the culvert. - It is assumed there is sufficient cover to accommodate the culvert size indicated - All lengths of culvert to be upsized are under the highway and/or private gardens, not under private residences.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
Remove existing culvert in carriageway / footway and dispose off site	30	m	£80.00	£2,400.00
1m x 1.5m precast box culvert	30	m	£600.00	£18,000.00
Carriageway / footway reinstatement	30	m	£80.00	£2,400.00
Road markings - minimum visit charge	1	item	£1,500.00	£1,500.00
Option 5 Construction Cost Estimate Measured Works Sub-Total				£24,300.00
Allow for:				
Environment and ecological mitigation	1.00%			£243.00
Landscaping and accommodation works	3.00%			£729.00
Archaeology	0.50%			£121.50
Contractors work for statutory undertakers	2.00%			£486.00
Option 5 Construction Cost Estimate Total				£25,879.50
Land and Compensation				
Assume not applicable				

6

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Langthwaite - unnamed watercourse
Description	Culvert maintenance/clearance and trash screen install
Design Details	<p>Parish Council have advised culvert is 50% blocked.</p> <p>Price for culvert clearance and installation of new trash screen, with maintenance platform, at culvert inlet.</p>
Design Assumptions	<ul style="list-style-type: none"> - Current culvert capacity unknown - Assumed no new headwall required

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
Culvert clearance	1	item	£2,000.00	£2,000.00
Fixed trash screen and maintenance platform	1	item	£1,500.00	£1,500.00
Option 6 Construction Cost Estimate Measured Works Sub-Total				£3,500.00
Allow for:				
Environment and ecological mitigation				£0.00
Landscaping and accommodation works				£0.00
Archaeology				£0.00
Contractors work for statutory undertakers				£0.00
Option 6 Construction Cost Estimate Total				£3,500.00
Land and Compensation				
Assume not applicable				

8

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Langthwaite - unnamed watercourse
Description	Culvert upgrade
Design Details	<p>Replace culvert under highway.</p> <p>Assumed culvert details: 900mm diameter pipe, 40m length. Laid under road, car park and riparian land.</p>
Design Assumptions	<ul style="list-style-type: none"> - No assessment of the capacity required has been undertaken, hence the dimensions of the culvert is indicative only. - It is not known if there are any utilities that may limit/ prohibit the implementation and/or scope of upsizing the culvert. - It is assumed there is sufficient cover to accommodate the culvert size indicated - All lengths of culvert to be upsized are under the highway and/or private gardens, not under private residences.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.01	ha	£10,000.00	£90.00
Take down stone wall and set aside for re-use	6	m	£75.00	£450.00
Remove existing culvert and dispose off site	40	m	£80.00	£3,200.00
900mm diameter culvert with concrete bed and surround	30	m	£730.00	£21,900.00
900mm diameter culvert	10	m	£330.00	£3,300.00
Headwall	2	no	£2,750.00	£5,500.00
Carriageway / car park reinstatement	30	m	£80.00	£2,400.00
Verge reinstatement	10	m	£50.00	£500.00
Road markings - minimum visit charge	1	item	£1,500.00	£1,500.00
Reconstruct stone wall	6	m	£90.00	£540.00
Option 8 Construction Cost Estimate Measured Works Sub-Total				£39,380.00
Allow for:				
Environment and ecological mitigation	1.00%			£393.80
Landscaping and accommodation works	3.00%			£1,181.40
Archaeology	0.50%			£196.90
Contractors work for statutory undertakers	2.00%			£787.60
Option 8 Construction Cost Estimate Total				£41,939.70
Land and Compensation				
Assume not applicable				

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Whaw - North-east hillside
Description	Hillslope surface water collection channel and overflow
Design Details	<p>Excavate shallow collection channel to the north-east of affected properties.</p> <p>Overflow pipes at either end route surface water to watercourse</p> <p>Collection channel: Length = 100m Top width = 1.3m Base width = 0.3m Depth = 0.5m Bank slope = 1:1 Excavation required = 40m³</p> <p>Overflow pipe 1: 450mm dia., 65m length discharging to watercourse through channel bank (natural)</p> <p>Overflow pipe 2: 450mm dia., 28m length (2 legs) discharging to watercourse through retaining wall</p>
Design Assumptions	<ul style="list-style-type: none"> - No assessment of the capacity required has been undertaken, hence the collection channel dimensions and dia. of the drainage pipes are indicative only. - It is not known if there are any utilities that may limit/ prohibit the implementation and/or scope of upsizing the culvert. - All lengths of pipe to be installed are under the highway or private gardens, not under private residences. - It is assumed the drainage pipes will be able to discharge to Arkle Beck under gravity.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.06	ha	£20,000.00	£1,158.00
Take down stone wall and dispose off site	30	m	£50.00	£1,500.00
450mm diameter culvert	93	m	£175.00	£16,275.00
Headwall	4	no	£1,800.00	£7,200.00
Excavation and offsite disposal	40	m3	£30.00	£1,200.00
Carriageway / footway reinstatement	33	m	£80.00	£2,640.00
Garden / verge reinstatement	60	m	£50.00	£3,000.00
Reconstruct stone wall	15	m	£90.00	£1,350.00
Option 10 Construction Cost Estimate Measured Works Sub-Total				£34,323.00
Allow for:				
Environment and ecological mitigation	1.00%			£343.23
Landscaping and accommodation works	3.00%			£1,029.69
Archaeology	0.50%			£171.62
Contractors work for statutory undertakers	2.00%			£686.46
Option 10 Construction Cost Estimate Total				£36,554.00
Land and Compensation				
Land acquisition for channel - agricultural	0.02	ha	£45,000.00	£900.00

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Whaw - Arkle Beck
Description	Flood wall
Design Details	<p>Retaining wall along watercourse to be replaced with flood wall. Limited space due to road as shown.</p> <p>Defence details:</p> <p>Length = 140.0m Height = 1.0m Sheet Pile Depth = 3.0m</p> <p>Backdrainage required</p>
Design Assumptions	<ul style="list-style-type: none"> - Flood depths are unknown, therefore the height of the flood wall is indicative only and may be subject to change following further investigation. - Backdrainage has not been designed. The included cost is provided as an indicative value. - Total pile depth has been assumed to be 1/4 above ground and 3/4 below ground. This is intended as a conservative estimate and does not account for seepage. Ground investigation would be needed to confirm pile depth. - It is assumed that the wall can be tied into existing areas of high ground and Whaw Bridge to provide continuous defence. Detailed topographic survey would be required to confirm design details. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.1	ha	£10,000.00	£663.00
Take down retaining wall and dispose off site	140	m	£150.00	£21,000.00
Backdrainage	140	m	£75.00	£10,500.00
Set up for sheet piling	1	item	£10,000.00	£10,000.00
Sheet piling	420	m2	£200.00	£84,000.00
Sheet piling reinforced concrete capping beam including handrail	140	m	£350.00	£49,000.00
Option 11 Construction Cost Estimate Measured Works Sub-Total				£175,163.00
Allow for:				
Environment and ecological mitigation	1.00%			£1,751.63
Landscaping and accommodation works	3.00%			£5,254.89
Archaeology	0.50%			£875.82
Contractors work for statutory undertakers	2.00%			£3,503.26
Option 11 Construction Cost Estimate Total				£186,548.60
Land and Compensation				
Assume not applicable				

Date	10/03/2021
Design By	JM
Cost calculation by	DW
Checked By	AF
Site	Langthwait, Whaw, Reeth & Fremington
Description	Floodplain embankments
Design Details	<p>Implement 2no. embankments in remote floodplain areas north of Whaw. Assume no clay required and material excavated locally.</p> <p>Embankment 1: Length = 40m, in 2 lengths of 20m either side of watercourse Height = 1.5m Crest = 0.5m Slope = 1:2 Volume = 210m³</p> <p>Constructed access from nearby road required, approx 500m on right bank/250m on left bank.</p> <p>Embankment 2: Length = 100m, in 2 lengths of 20m on left bank and 80m on right bank Height = 1.5m Crest = 0.5m Slope = 1:2 Volume = 525m³</p> <p>Access via road to south, approx 80m of access track required</p>
Design Assumptions	<ul style="list-style-type: none"> - The volume of storage required has not been assessed. - The existing floodplain storage volume is unknown. - The length, height and cross section of the embankment are indicative values with the height of the embankment assumed to be constant along its length. - It is not known if there are any utilities that may limit/ prohibit the installation and/or scope of attenuation in this location. - The ground conditions of the land in which the proposed attenuation area is to be located is unknown.

Construction Cost Estimate

Description	Quantity	Unit	Rate	Amount
General site clearance	0.1	ha	£3,000.00	£339.00
Topsoil strip and preparation for embankment	283	m3	£8.00	£2,260.00
Excavate locally and deposit in embankment	735	m3	£15.00	£11,025.00
Trim crest and side slopes, relay topsoil and seed	283	m3	£6.00	£1,695.00
Make good excavation area and seed	735	m3	£2.00	£1,470.00
Access track	4,150	m2	£55.00	£228,250.00
Option 13 Construction Cost Estimate Measured Works Sub-Total				£245,039.00
Allow for:				
Environment and ecological mitigation	1.00%			£2,450.39
Landscaping and accommodation works	3.00%			£7,351.17
Archaeology	0.50%			£1,225.20
Contractors work for statutory undertakers	2.00%			£4,900.78
Option 13 Construction Cost Estimate Total				£260,966.54
Land and Compensation				
Land acquisition for embankments - agricultural	0.03	ha	£45,000.00	£1,260.00