Crail Coastal Path- Erosion Protection

Inspection Survey Report

September 2024

FAIRHURST

CONTROL SHEET

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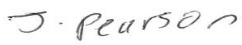
	Prepared by	Joshua Pearson		20/09/2024
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1. Background

Fairhurst have been appointed by the Crail Community Council to carry out an assessment of a 320m stretch of the coastal path at Crail, which has been experienced significant erosion, resulting in access to this section being restricted. Fairhurst were also requested to provide a high level costing for possible remediation options in support of an application for funding by the Crail Community Council.

The path under assessment is located on the Fife coast, approximately 14 km south east from St Andrews, and 6km north east from Anstruther. Several locations considered Sites of Special Scientific Interest are located on coastal area between Crail and St Andrews. Further, the coastal area under assessment is a designated Ramsar site. At present, the 320m long section of the path and associated seawall has become severely eroded, with some areas eroding completely.

2. Scope of Work

The agreed scope of service included:

- Desk top review
- Site walkover and condition assessment of the path/wall
- Preparation of a report with a schedule or locations and possible repair types
- High level costs from published sources (e.g. Spons).

3. Limitations

The recommendations and associated high level costs for repair works provided within the letter report are based solely on a visual and tactile assessment of the existing path, during the site walkover. No intrusive investigation works have been undertaken to provide information in relation to the condition or residual strength of the stonework or retaining wall foundations, the engineering properties of the retained soils behind the retaining wall, or groundwater levels. Therefore, any recommendations provided in this letter report should be regarded as preliminary and will be subject to review following intrusive investigation and detailed design.

Fairhurst have based the conclusions and recommendations within this report upon information supplied by the Client, and third parties. It is assumed that this information can be relied upon. Fairhurst accepts no duty or responsibility (including negligence) to any party other than the stated Client and disclaims all liability of any nature whatsoever to any such party in respect of this Report.

4. Site Location

The site comprises a 320m section of coastal path and seawall, on the adjacent area east of Crail, centred at approximate National Grid Reference NO 61536 07631.

5. Ground Conditions

An assessment of the ground conditions and sea levels at the site was made from publicly available sources of information. The sources of information are referenced below.

- British Geological Survey. 2024. Onshore GeoIndex. [Online]. [Accessed 12th September 2024]. Available from: http://mapapps2.bgs.ac.uk/geoindex/home.html
- The Coal Authority, 2023. The Coal Authority Map Viewer. [Online]. [Accessed 12th September 2024]. Available from: The Coal Authority Map Viewer (arcgis.com)
- The Meteorological Office, 2009, UK Climate Predictions. [Online]. [Accessed 12th September 2024]. Available from: UK Climate Projections (UKCP) - Met Office
- The University of Liverpool. No date. National Tidal and Sea Level Facility. [Online]. [Accessed 12th September 2024]. Available from: Tides | National Tidal and Sea Level Facility (ntslf.org)

The findings of the review are summarised in the following sections.

5.1 Superficial Deposits

The geological maps indicate a significant portion of the foreshore area directly in front of the path has bedrock either at or very close to the surface. Beneath the path and immediately inland, to the west, the superficial deposits comprise Raised Marine Deposits, comprising clay silt sand and gravel of Devensian age. Further inland, the Raised Marine Deposits are replaced by Glacial Till.

5.2 Bedrock Geology

The majority of the site is underlain by cyclical sequences of sedimentary rock belonging to the Anstruther Formation. At the south western edge of the site a small area is underlain by sedimentary rock cycles belonging to the Pittenweem Formation.

The bedrock belonging to the Anstruther Formation comprises cycles of mudstone, siltstone, and sandstone, with thinly bedded limestone, dolomite and seams of coal.

The Pittenweem Formation comprises mudstone and siltstone with thin beds of limestone and dolomite.

A north west to south east trending fault line passes immediately adjacent to the south western edge of the site, down throwing towards the north east. A second geological fault is present approximately 300m to the north east of the site, running from north west to south east, and down throwing towards the North East. A third geological fault line runs from west to east through the middle of the site. The fault down throws towards the North.

A limestone seam is recorded at the surface along the foreshore area in front of the site, and passes beneath the site, approximately from the northern site boundary. The limestone seam is underlain by a thin coal seam.

5.3 Historic Exploratory Hole Records

Limited borehole information was available for the site. The available borehole information did confirm bedrock comprises a sequence of siltstone, mudstone and sandstone, with seams of limestone and thin bands of coal.

The borehole sunk at the nearshore area infront of the site recorded the limestone seam at surface the on the geological map sheets was 0.35m thick and within a shale band. Coaly seat clay was recorded approximately 0.45m thick, approximately 2m below the limestone seam.

The borehole also recorded massive sandstone layers up to 15m thick separating layers of coal, shale and limestone.

5.4 Mining

The Coal Authority Interactive Viewer notes the site is not within a coal mining reporting area. In addition, no mine entries or evidence of past or probable shallow mine workings are recorded at the site or within influence of the site (The Coal Authority, 2023).

5.5 Sea Level

Sea levels for the harbours nearest to the site were referenced to investigate the changes in sea levels in relation to existing ground level at the site. Reference was made to tidal information and sea levels at both Aberdeen and Leith Harbours. These are summarised in Table 1 and Table 2 below.

Table 1: Highest and lowest predicted tides at Leith and Aberdeen between 2006 and 2026 relative to ordnance datum (The University of Liverpool).

Tidal Range	*Leith*	*Aberdeen*
Highest astronomical tide (m)	3.34	2.60
Mean high water springs (m)	2.71	2.07
Mean high water neaps (m)	1.60	1.21
Mean low water neaps (m)	-0.8	-0.55
Mean low water springs (m)	-2.18	-1.55
Lowest astronomical tide (m)	-2.83	-2.20

The tidal range at Leith is greater than in Aberdeen, varying between 3.34m and -2.83m. By contrast, the tidal range in Aberdeen varies between -2.2m and 2.6m. The lowest astronomical tide is lowest at Leith (-2.83), which also has the greatest highest astronomical tide (3.34m). Given Crail lies between Aberdeen and Leith ports, it is reasonable to suggest that the tidal range for Crail is somewhere within the range of values reported at the two ports.

Skew surges describe the difference between the maximum observed sea level and the predicted maximum tidal level, regardless of the time within the tidal cycle. The residual

between the maximum tidal value observed and value predicted is controlled by local atmospheric pressure and wind stresses. Table 2 shows the ten most significant skew surges at Leith between 1981 and 2012.

Table 2: Ten largest skew surges at the port of Leith between 1981 and 2012.

Ten largest skew surges at Leith	
Date	***Surge (m)***
08:15 16/01/1993	1.025
16:15 25/02/1997	0.904
12:00 01/01/1992	0.894
22:00 19/02/1990	0.880
08:00 01/03/2008	0.850
19:45 11/01/2006	0.750
12:15 11/01/2006	0.735
01:30 09/12/2011	0.723
00:30 26/10/2008	0.712
18:30 19/12/1993	0.709

The largest skew surges vary between 0.709m and 1.025m. Although data was collected in the years between 1981 and 2012, the ten largest skew surges all took place between 1993 and 2011.

5.6 Anticipated Sea Level Rises

Sea levels on the mainland of Scotland are anticipated to rise by approximately 0.35m between 2024 and 2095. Designs for a new coastal wall should accommodate these increases.

6. Walkover Survey Observations

A site walkover was undertaken by representatives of the Fairhurst geotechnical team on the 5th September 2024. The site walkover aimed to locate the most damaged stretches of the path/seawall, assess possible explanations for their damage, and survey for high level costed remedial works. Observations were taken from the southernmost point of the site, and worked north. The qualitative criteria used to assess damage to the wall and path are presented in Table 3.

6.1 Assessment Criteria

Table 3: Damage assessment criteria used to assess the path and wall.

Degree of damage	*Sample damage description for wall*	*Sample damage description for path Surface*
1. No damage	Wall intact, negligible mortar or masonry damage.	Surface material intact. No evidence of surface cracking, or settlement
2. Minor damage	Mortar is weathered, largely intact. Locally some blocks are weathered.	Some cracking evident on surface.
3. Moderate Damage	Mortar is weathered and largely absent from the section. Locally blocks are missing/displaced and weathered.	Cracking up to 5mm wide evident, or clusters of cracks of more than 10 per metre. Depressions greater than 5mm present. Surfacing eroded from areas less than 50mm wide.
4. Severe damage	Mortar absent. Blocks missing in areas of the structure, and undercutting to the foundations coastal wall.	Cracking greater than 5mm wide Loose surfacing with areas of absent surfacing less than 500mm wide, exposing subgrade. Depressions greater than 20mm present.
5. Failure	Wall absent.	Surfacing >500mm wide missing, subgrade materials exposed.

6.2 Observations

The following provides a summary of the observations made during the site walkover. Reference should be made to the notes and photographs appended to this report for more detailed observations from the site walkover.

In general, the existing retaining wall is in a poor condition. Approximately 119m (26%) of the wall has been washed away, and is absent between Ch68-75, Ch85-122, Ch143-149, and Ch170-239. Where the wall is absent the exposed soils comprise reddish brown and grey, clayey gravelly SAND with abundant cobbles of sedimentary rock. Gravel is fine to coarse, sub angular to sub-rounded, of sandstone. The soil slope gradients along the collapsed sections of the wall are typically 45°, however around the edges of the collapsed areas, adjacent to intact sections of the wall, the soil slopes are steeper, ranging from 60-80°.

Further north, the exposed slopes are steeper and rockhead appears to be shallower. The soils are described as grey brown clayey gravelly SAND, overlying orange brown clasts of subrounded to subangular COBBLES and BOULDERS in a matrix of orange brown sandy GRAVEL. At these locations the slopes ranged from 60° to almost vertical. Washout of the orange brown sandy GRAVEL matrix was evident.

No evidence of groundwater was noted along the soil slopes at the collapsed sections of the wall

Where present, the existing wall is a gravity type retaining wall comprising angular to sub angular blocks of sedimentary rock with concrete pointing. The wall ranges from 0.60m to 1.20m thick and varies in height from 1.50m to 3.50m.

The existing wall appeared to be founded directly on the bedrock across the near shore area.

The concrete mortar bedding is missing from between the sandstone blocks across the majority of the wall. In addition, evidence of blocks being washed out of the wall was recorded locally, as was evidence of wash out from beneath the wall foundation.

Evidence of repairs to the wall were also noted locally and included replacement concrete mortar between the sandstone blocks, replacement concrete foundation along the toe of the wall and thin concrete facing along the surface of the wall.

Behind the wall, the path is most severely damaged in the southern half of the site, and coincides with where the wall is absent. The original surface cover of the path is concrete, which between 236m and the end of the trail, is in a moderately damaged state. There are localised sections of the path where the prevailing surface cover is gravel, but widths of the original concrete surface cover are still present.

Cracking is generally present throughout the concrete surface where still present. A large depression was noted at Ch299 where the concrete surfacing was missing, leaving the underlying granular subgrade exposed.

Between 272m and 295m there is a large section of raised eroded sediment to the west of the path. It is assumed the erosional damage caused is due to the overtopping of waves.

Table 4 provides a summary of the condition survey of the existing wall and path. Reference should be made to the notes and photographs appended to this report, which provide a more detailed summary of the condition of the wall and path

Table 4: *Damage assessment of the coastal wall and associated path from point ch000-ch445. Observations were taken from the south of the beach and worked north.*

Chainage		***Wall Condition***	***Path Condition***
Start	***End***		
Ch000	Ch23.5		
Ch23.5	Ch65.0		
Ch65.0	Ch68.0		
Ch68.0	Ch75.0		
Ch75.0	Ch85.0		
Ch85.0	Ch122.0		
Ch122.0	Ch143.0		

Chainage		Wall Condition	Path Condition
Start	End		
Ch143.0	Ch149.0		
Ch149.0	Ch170.0		
Ch170.0	Ch236.0		
Ch236.0	Ch239.0		
Ch239.0	Ch272.0		
Ch272.0	Ch276.0		
Ch272.0	Ch284.0		
Ch284.0	Ch295.0		
Ch295.0	Ch358.0		
Ch358.0	Ch381.8		
Ch381.8	Ch384.0		
Ch384.0	Ch414.0		
Ch414.0	Ch416.2		
Ch416.2	Ch445.0		

7. Discussion

Overall, the entire length of the wall supporting the path appears to have been subject to erosion, most likely due to a combination of weathering and wave action from the sea. While the wall is still standing in places, wave action appears to have eroded the mortar between the sandstone blocks resulting in some blocks being washed away. In addition, the wall foundations appear to have been undermined, likely through a combination of the wash out of the concrete at formation level and erosion of the sedimentary rock, coal and limestone, upon which the wall foundations appear to be bearing.

The areas where the wall has collapsed coincide with lower lying areas of ground on the foreshore area (Figures 35, 36 and 37). The lower areas of ground are surrounded by higher beds of sandstone bedrock. The effect of this topography appears to have created channels where wave energy is locally focussed on damaged sections of the wall. The result is greater rates of erosion and a tendency towards failure.

The path behind the wall is generally in a poor condition, where it has not been washed away with the wall. The existing path will have been subject to weathering due to people walking along it. The weathering may have been exacerbated by the overtopping of waves, over the

existing wall, evidence for this was recorded as erosional damage to the slopes west of the path between ch284-295.

The available sea level information and skew surge information suggest the sea levels may be quite high at this location. Rising sea levels may also increase the risk of overtopping in the future.

8. Recommendations

The repair of the existing seawall and path will include the following works:

- Replacement of collapsed sections of the wall with similar stone and lime/concrete mortar pointing
- Repointing of existing sections of the wall with lime/concrete mortar
- Replacement of missing individual blocks in the wall
- Underpinning of existing wall foundations with concrete
- Patching and resurfacing of existing costal path surface
- Localised landscaping

The observations made during the site walkover, and information referenced during the desk-based assessment of the site indicated that parts of the wall may have been subjected to stronger wave forces than others due to the nearshore topography and geology directing the waves. In addition, evidence of erosion beyond the top of the wall was noted, which suggests waves have been crashing over the top of the wall. Furthermore, sea levels are anticipated to rise in the order of 0.35m by 2095 due to climate change.

Based on the observations noted above, consideration should be given to further investigation of the wall to assess its future resilience, and inform any additional works that may be required.

It is also recommended that an inspection and maintenance programme is established for the path, which includes regular inspections, particularly after storm events.

9. Cost Estimates

A high-level cost estimate for the repair of the existing seawall and path is expected to be in the order of £600,000 to £650,000, excluding VAT.

The costs relate to a like for like reinstatement of the existing wall, where it has collapsed, repointing of the mortar, replacement of missing blocks and locally reinstating concrete foundations where erosion has occurred.

The cost excludes any additional works, design, investigation or assessments associated with improving the resilience of the wall or adapting the wall to account for climate change impacts.

We trust this meets with your current requirements, however should you wish to discuss any of the details contained within this report please do not hesitate to contact us.

Appendix A:

Site Walkover Observations

Appendix 1*-Detailed observations relating to damage of the wall associated with the Crail coastal Path.*

Wall Section	***Degree of damage***	***Wall height and depth***	***Observations***	***Figures***
0m-23.5m	2	2.4m height, 0.6m depth	Mortar washout between stones. Blocks still intact and no structural support absent.	Figures 1 and 2
23.5m-65m	4	2.4m height, 0.6m depth	Mortar largely absent, undercutting at the base of the wall and stones missing. Where stones are missing, voids vary from 12cm to 50cm wide, and 30cm-60cm deep.	Figures 3 and 4
65m-75m	5	N/A	completely eroded, retained soils and structural members exposed	Figures 5 and 6
75m-85m	3	3.5 m tall section with intact wall 75-85m	30 cm wide void. Mortar damage, so again in areas voids where mortar should be are up to 10cm wide. Mortar better than first 65m.	Figures 7 and 8
85m-122m	5	N/A	completely eroded, retained soils and structural members exposed	Figures 9, 10, 11 and 12
122-143m	4	2m height, 0.6m depth	Complete absence of mortar between blocks. Undercutting to the wall evident.	Figures 12 and 13
143m-149m	5	N/A	completely eroded, retained soils and structural members exposed	Figure 14
149m-170m	1	1.5m height 0.5m depth	Signs of construction of a newer stretch of wall. No blocks absent and mortar present across the length.	Figures 15 and 16
170m-239m	5	N/A	Completely eroded, retained soils and structural members exposed.	Figures 17, 18 and 19
239-276m	3	2.2m-2.3m height, X.X depth	Small footbridge connecting two sections of wall. On the north side under the foot bridge there is a void approximately 1m long and 30cm wide. The mortar is present between stones.	Figures 20 and 21
276-297m	4	2.9m height, 1m depth	General undercutting to the structure. Larger stone at the base of the wall seems displaced. Voids vary between 0.9-1.5m widths. Mortar damage minimal.	Figure 22
297-347m	4	Wall height 3.3m, 0.5m-1.2m deep.	General mortar damage across the length. Voids located at the base of the wall across the length of the section. Voids are between 10cm-0.5m wide. The wider voids are a result of missing stones/blocks.	Figures 23, 24 and 25
347m-396m	4	2.7m height, 0.5-0.9m deep.	General mortar deterioration. Undercutting to the base of the wall. Ten large voids along the length, ranging between 0.5-1.5m wide.	Figures 26, 27, 28, 29 and 30.

Wall Section	***Degree of damage***	***Wall height and depth***	***Observations***	***Figures***
396-445m	4	2.7m-3.3m height, depth up to 1.2m	General continuation of wall damage. Mortar and stones appear weathered. Three large voids at the base of the wall 1m long and 0.2-1.3m wide.	Figures 31 and 32

Appendix 2:- *Detailed observations relating to damage of the Crail coastal Path.*

Path Section	***Degree of damage***	***Surface width***	***Observations***	***Figure***
0m-65m	5	N/A	Complete absence of path, vegetation coverage across the whole width.	Figure 33
65m-68m	2	2.2m	Good condition. Some cracking. Weeds and grass noted in joints	Figure 34
68m-236m	5	N/A	Complete absence of path, vegetation and gravel across width.	Figures 35, 36 and 37
236m-272m	2	2.2m-2.4m	Surface is generally cracked, although these have not significantly affected the structure. Coverage is of a concrete like material.	Figures 38 and 39
272m-276m	3	2.4m	Same surface cover. Surface is cracked extensively.	No Figure
276m-284m	4	Original surface cover 1.5m, gravel 0.9m (2.4m total)	Coverage of the concrete/original surface cover is only 1.5m. there is an additional 0.9m of surface which has been eroded and a red gravely material is exposed assumed to subgrade materials	Figure 40
284m-295m	3	2.4m	Surface is cracked extensively reaching up to 1cm width. No evidence of settlement or depressions. . Large area where there is a void to the western edge of the path. Area also runs parallel to an area where it looks as if waves are over topping.	Figures 41, 42, 43 and 44
295m-341m	4-5	2.1-2.2m	Surface is cracked extensively reaching up to 1cm width. At the western edge of the path subgrade materials/gravel is exposed.	Figure 45
341m-349m	4	2.5m	Gravel is the prevailing surface cover. Although at 85m there is a small area with original surface cover that is cracked (cracks not frequent however >5mm wide).	Figures 46 and 47
349m-358m	4	2.4m	Taper of the gravel into the concrete like material assumed to be original surface cover. Surface width of the concrete ranges from 0.4-2m. where there is original surface cover it is cracked (> 10 per metre, > 5mm in width. No depressions. Surfacing >500mm wide missing.	Figure 48
358m-381.8m	3	2.2m	Surface coverage is the concrete like material which acts as a matrix for small angular clasts. Cracking throughout (<10 per metre, but some <5mm wide), however no depressions or deformity. Vegetation encroaching on paths surface. One area (picture 88), 20cm area of surface missing, subgrade material exposed.	Figure 49

Path Section	***Degree of damage***	***Surface width***	***Observations***	***Figure***
381.8m-384m	2	2.2m	Ramp/slope to lower area of ground. Good condition. Cracking negligible	No photo
384m-414m	4	Original surface cover 1.1m, gravel 1.1m (2.2m total)	Original surface cover is equal to cover by gravel. Surface is not significantly cracked although there are some depressions (>5mm).	Figures 50, 51 and 52
414m-416.2m	3	2.2m	Second of the two ramps/slopes. Much worse condition. Loose surfacing (<500mm wide) and cracked. Some cracks are across the whole width/length of the section.	Figure 53
416.2m-445m	2	2.2m	Some minor cracking, no depressions	No Photo

Appendix B:

Site Walkover Photographs

Figure 1- General condition of the wall between ch000-ch23.5.

Figure 2- Closer condition of weathered stones and mortar representative of ch000-ch23.5.

Figure 3- Undercutting of concrete foundations between ch23.5-c65.

Figure 4- General condition between ch23.5-ch65. Mortar erosion and significant undercutting to the concrete foundations.

Figure 5- Collapse of the coastal wall taken at approximately ch65.

Figure 6- Remainder of the collapsed section from approximately ch65-ch75.

Figure 7- Section of wall standing between ch75-ch85. Photo taken from the north side of the damaged section looking south.

Figure 8- Undercutting to the concrete foundations of the wall located between ch75-ch85.

Figure 9- Photo taken between ch85-ch122, wall completely eroded and structural members exposed.

Figure 10- Photo taken between ch85-ch122, wall completely eroded, large mudstone beds visible behind where the previous structure stood.

Figure 11- Photo taken between ch85-ch122, wall completely eroded, large mudstone beds visible behind where the previous structure stood.

Figure 12- Photo taken between ch85-ch122 facing south, wall completely eroded, near vertical slope.

Figure 13- Photo taken between ch122-ch143, wall gradually reappears from the completely eroded state.

Figure 14- Frontal view between ch122-ch143, complete absence of mortar concrete foundations see, okay. Where the wall has been founded on a large sandstone bed there has been undercutting.

Figure 15- Between ch143-ch149, the wall has been completely eroded and structural members exposed.

Figure 16- Between ch149-170 a newer section of wall has been Constructed.

Figure 17- Between ch149-170 a newer section of wall has been constructed.

Figure 18- Between ch170-ch239, the wall has been completely eroded. Photo taking standing from the north looking south.

Figure 19- Between ch170-ch239, the wall has been completely eroded. Dark rock exposed, possible coal.

Figure 20- Photo taken between ch170-ch239, looking north, up the coast.

Figure 21- Footbridge located at ch239. Void visible on the northern side of the coastal wall, under the bridge.

Figure 22- Generally good wall condition between ch239 and ch276.

Figure 23- Generally wall condition is good between ch276-297. Larger stone at the base of the wall possibly displaced. Some undercutting to the structure at the base.

Figure 24- Between ch297 and ch347, mortar and stone condition generally okay. Some stones at the base of the wall possible displaced. Where there is displacement there are voids behind.

Figure 25- Voids located behind the displaced stones in figure 23.

Figure 26- Generalised wall condition for between ch297-ch347. Concrete foundations are much thicker.

Figure 27- Large void located between ch347-ch396.

Figure 28- General wall condition between ch347-ch396. Voids located at varying heights u the wall.

Figure 29- Two areas of undercutting to the wall located between ch347 and ch396.

Figure 30- Further erosional damage between ch347-ch396.

Figure 31- Significant displacement of stones at the base of the wall located at ch393.

Figure 32- General wall condition approximately between ch396-ch458.

Figure 33- General wall condition at ch458.

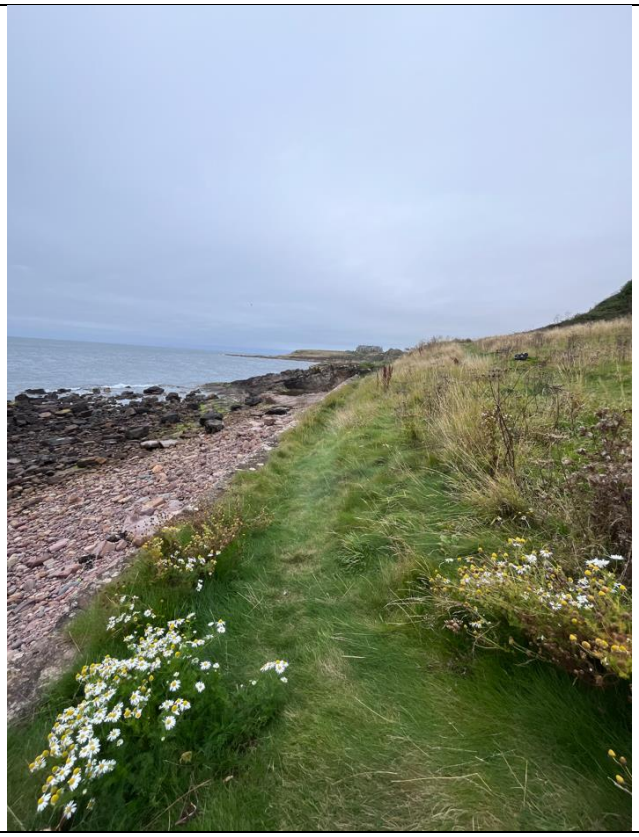


Figure 34- Between ch000-ch65 there is no path/surface cover.

Figure 35- Short 3 metre section between ch65-ch68 of path which is in an okay condition.

Figure 36- Foreshore area in front of the stretch of wall/coastal path which is largely absent (ch65-ch236).

Figure 37 Foreshore area in front of the stretch of wall/coastal path which is largely absent (ch65-ch236).

Figure 38- Foreshore area in front of the stretch of wall/coastal path which is largely absent (ch65-ch236).

Figure 39- General condition of the path between ch236-ch272. Cracking appears to be over 7.5cm wide, although not altered the structure of the path.

Figure 40- General condition of the path surface between ch236-272.

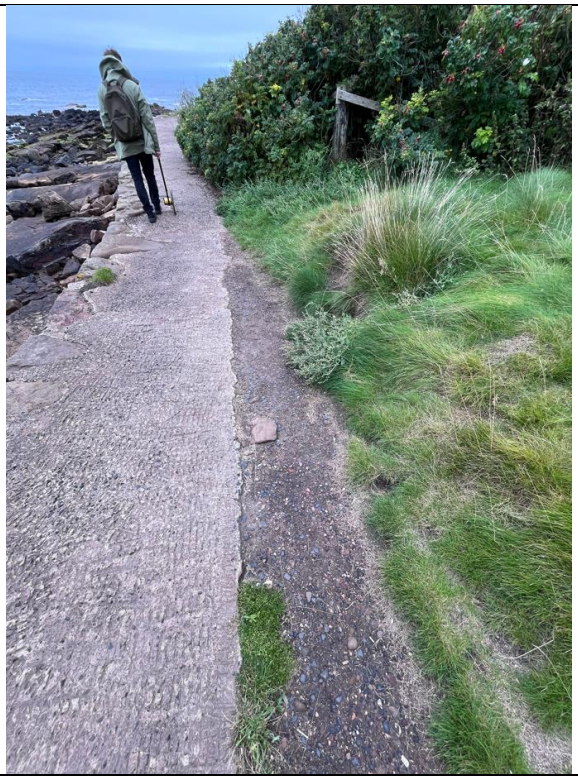


Figure 41- Subgrade materials exposed at the surface of the path between ch272-ch284.

Figure 42- Subgrade materials exposed at the western surface edge, assumed to be subgrade materials. Located between ch284-ch295.

Figure 43- Large void at the western edge of the path located at approximately ch295.

Figure 44- Erosional damage to land west of the path edge, potentially overtopping waves between ch284-ch295).

Figure 45- Erosional damage to land west of the path edge, potentially overtopping waves between ch284-ch295).

Figure 46- Subgrade material coverage, between ch295-ch341.

Figure 47- Subgrade material coverage, between ch341-ch349.

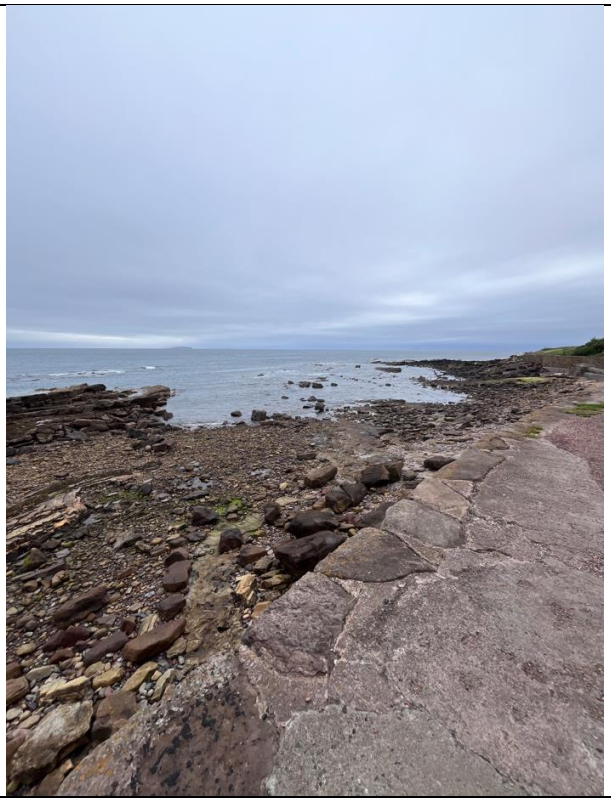


Figure 48-Surface coverage and foreshore materials at ch341-ch349.

Figure 49- Area of surfacing missing between ch349-ch358.

Figure 50- Cracked path surface between ch358-381.8.

Figure 51- Path surface between ch384-ch414.

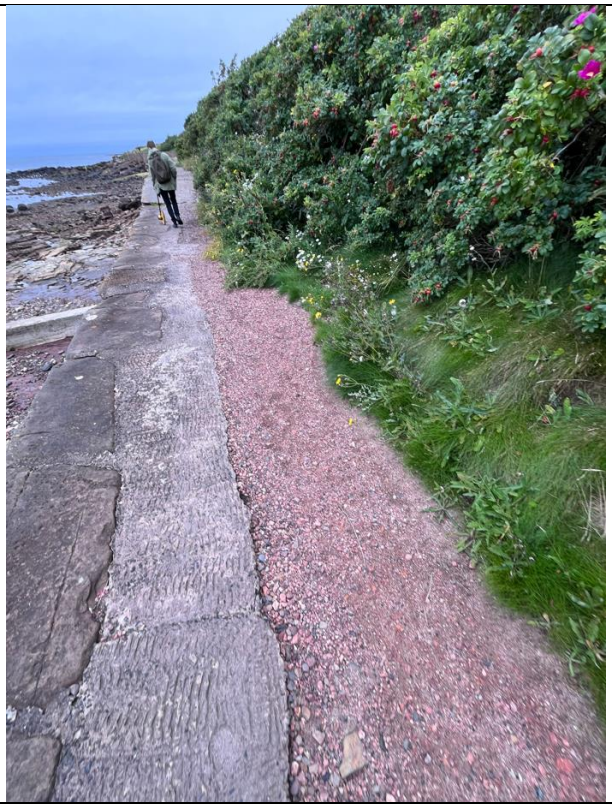


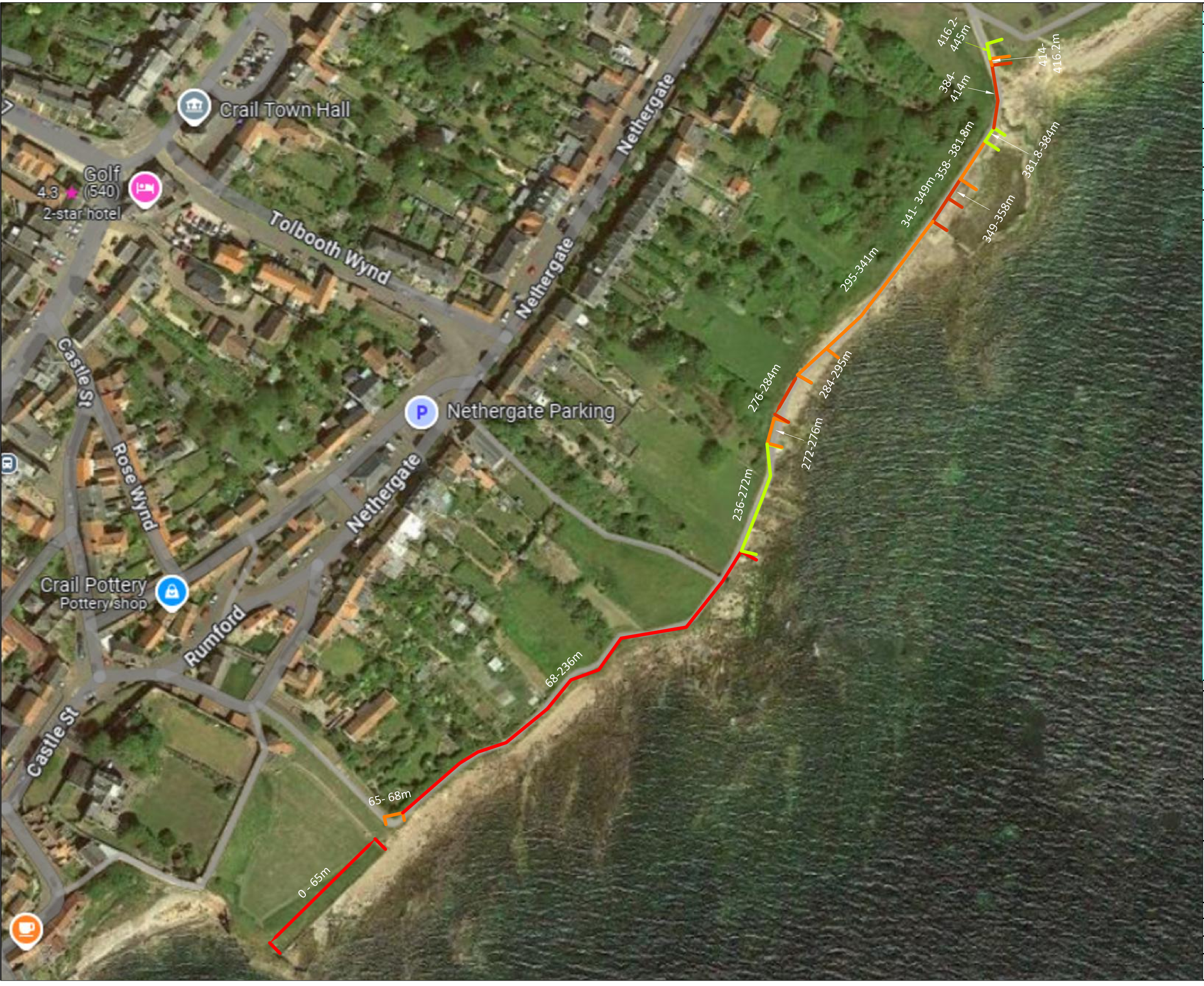
Figure 52- Path surface between ch384-ch414.

Figure 53- Path surface between ch384-ch414.

Figure 54- Damaged ramp/slope to lower area of coastal path located at approximately ch414.

Appendix C:

Drawings



Key:

No Damage	
Minor Damage	
Moderate Damage	
Severe Damage	
Failure	

Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drwn.	Chkd.	Appd.

FAIRHURST
43 George Street
EDINBURGH
EH2 2HT
Tel: 0131 225 6471

Client:

Project Title:

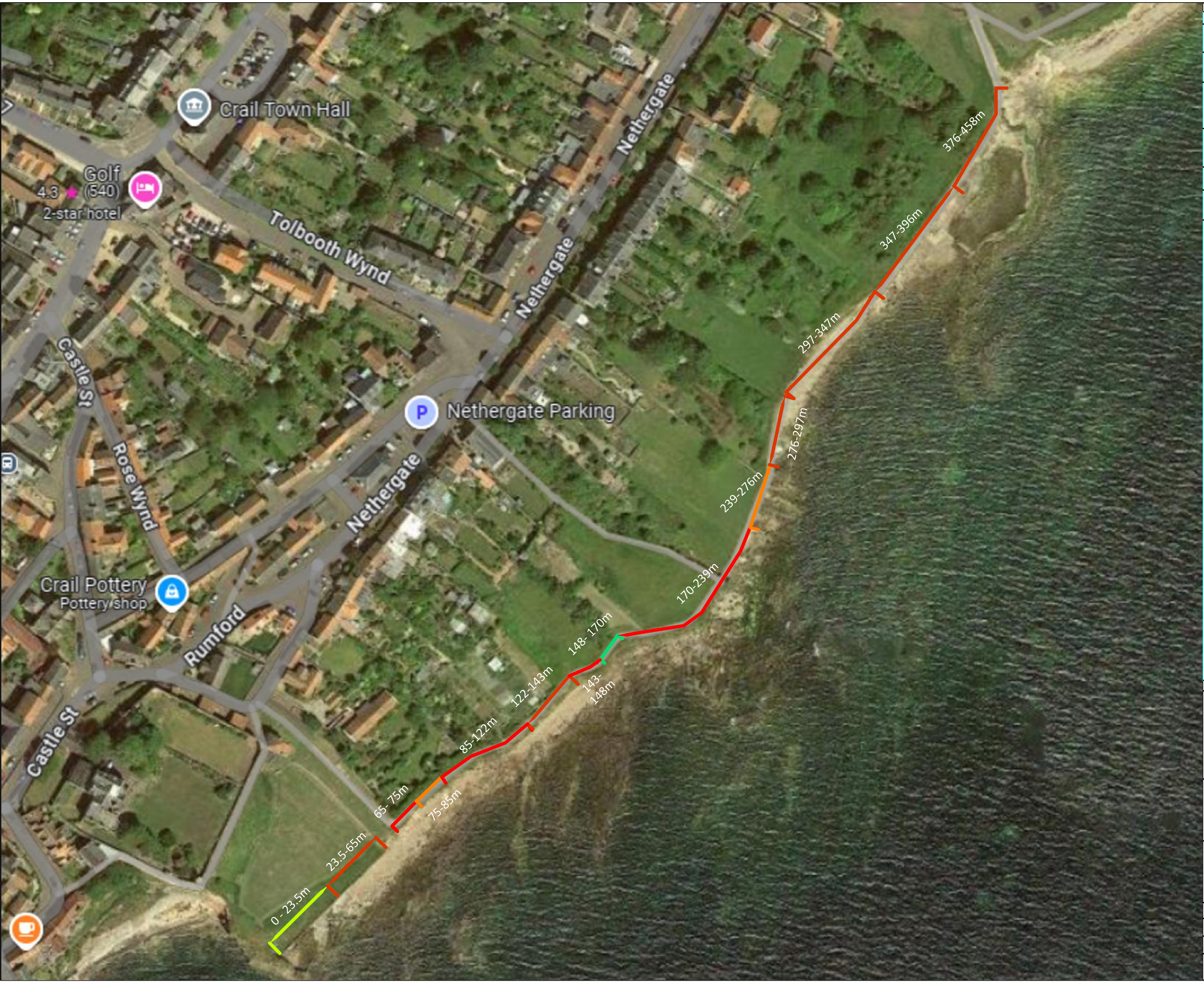
163275
CRAIL COASTAL PATH

Drawing Title:

CRAIL COASTAL PATH
DAMAGE ASSESSMENT – SURFACE

Scale at A1:	Status:	
1:500	DRAFT	
Drawn:	Checked:	Approved:
LC	JP	JL
Date:	Date:	Date:
09/09/2024	09/09/2024	09/09/2024

Drawing No.: FIGURE 1 Revision: P01



Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Key:

No Damage	
Minor Damage	
Moderate Damage	
Severe Damage	
Failure	

Rev.	Date	Description	Drwn.	Chkd.	Appd.

FAIRHURST
43 George Street
EDINBURGH
EH2 2HT
Tel: 0131 225 6471

Client:

Project Title:
163275
CRAIL COASTAL PATH

Drawing Title:
CRAIL COASTAL PATH
DAMAGE ASSESSMENT – WALL

Scale at A1:	Status:	
1:500	DRAFT	
Drawn:	Checked:	Approved:
LC	JP	JL
Date:	Date:	Date:
09/09/2024	09/09/2024	09/09/2024

Drawing No.: FIGURE 2 | Revision: P01

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