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Bray to Greystones Cliff Walk Assessment
North Beach Greystone – Recent storm damage and risk to path
February 2026

Contents

- North Beach Greystone ground conditions
- Cliff slope failure survey (recent failures)
  - Survey divided into discrete zones along chainage (ch)
- Summary of cliff slope failures
- Cliff slope failures and risk to path
- Progress

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North Beach Greystone – Ground Conditions

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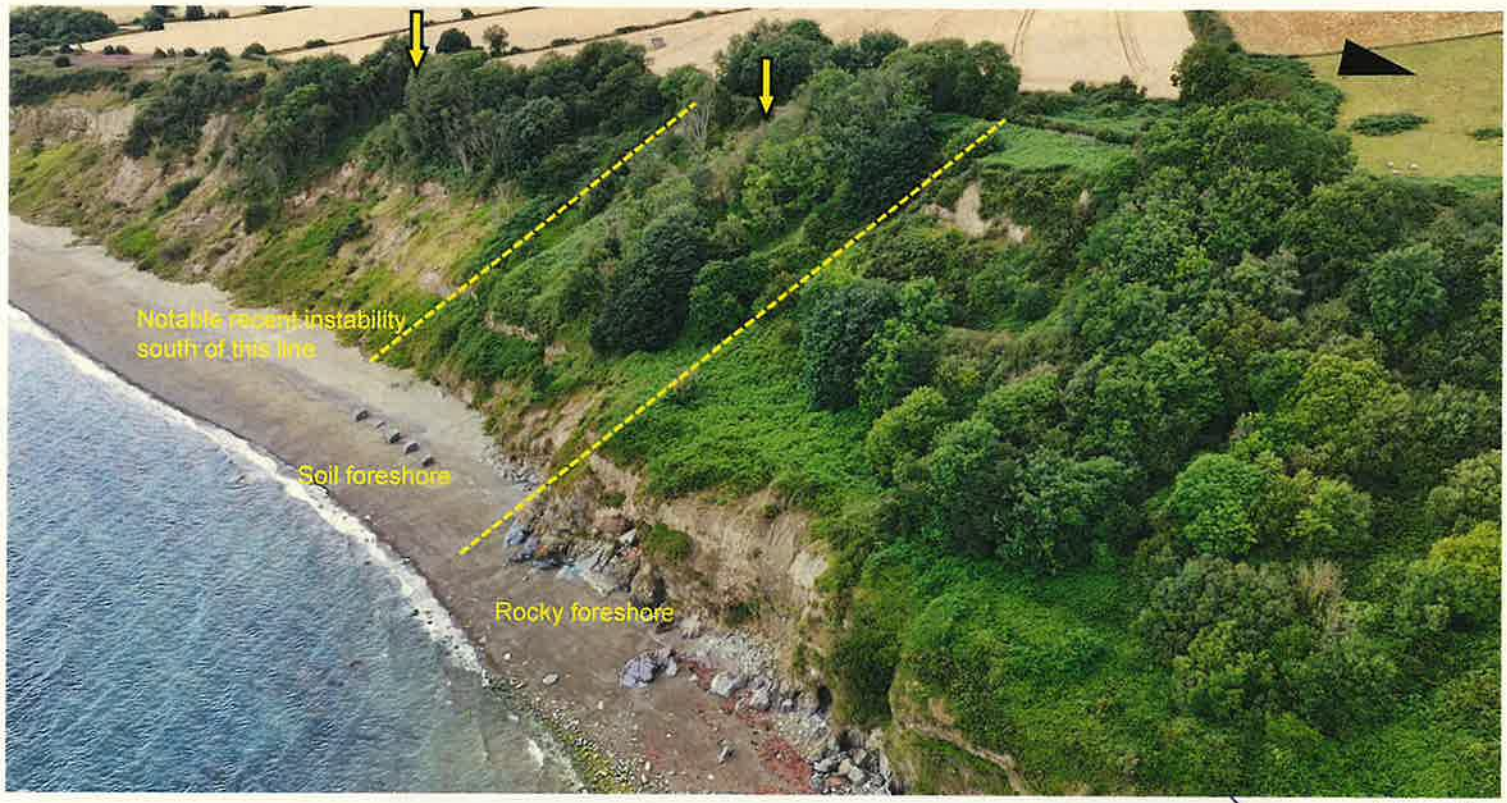
Northern end – ch 3700 rock to soil



July 2025

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Ch 3800

February 2026

July 2025

Observations

- Marks northern boundary of notable recent instability
- Minor slippage / erosion of existing scarp
- Toe erosion and exposure of masonry at toe

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Ch 3800 to 3850

February 2026

July 2025

Observations

- Slippage along existing scarp in upper slope
- Multiple slumping at toe
- Debris flow onto beach
- Estimated failed volume 50L x 4D x 30H = 6,000m^3

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Ch 3850 to 3900

February 2026

July 2025

Observations

- Site of existing landslide scar almost reaching path
- Slumping along existing scarp in upper slope
- Debris flow onto beach
- Estimated failed volume 50L x 4D x 40H = 8,000m^3

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Ch 3850 to 3900 continued

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Observations

- Cracking in path on 22
- Path is undermined ar
- Failure will cause colla

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Ch 3900 to 3970

February 2026

July 2025

Observations

- Slumping along existing scarp in upper/middle slope
- Debris flow and slumping onto beach
- Estimated failed volume 70L x 4D x 40H = 11,200m^3

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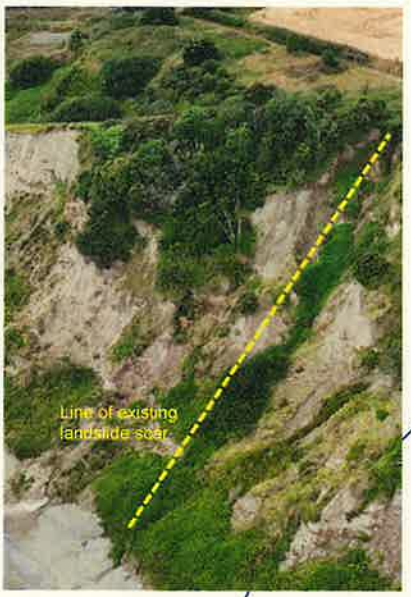
Ch 3970 to 4000

February 2026

July 2025



Observations

- Site of existing landslide scar extending inland
- Slumping within landslide scar
- Debris flow /slumping onto beach
- Estimated failed volume 30L x 4D x 50H = 6000m^3

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Ch 4000 to 4040

February 2026

July 2025

Observations

- Slumping along existing scarp in upper/middle slope
- Debris flow and slumping onto beach
- Estimated failed volume 40L x 5D x 30H = 6,000m^3

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Ch 4040 to 4070

February 2026

July 2025

Observations

- Slumping along existing scarp in upper slope
- Debris flow onto beach
- Estimated failed volume 30L x 4D x 30H = 3,600m^3

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Ch 4100 to 4140

February 2026

July 2025

Observations

- Slumping along existing scarp in upper slope
- Debris flow / slumping onto beach
- Estimated failed volume 40L x 4D x 30H = 4,800m^3

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Ch 4140 to 4235

February 2026

July 2025

Observations

- Slumping along existing landslide scarp and along existing scarp
- Debris flow / slumping onto beach
- Estimated failed volume 95L x 3D x 30H = 8,550m^3

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Ch 4235

February 2026

July 2025

Observations

- Slumping within existing valley
- Debris flow onto beach
- Estimated failed volume 20L x 2D x 30H = 1,200m^3

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Ch 4235 to 4550

February 2026 (Ch 4500)

July 2025 (Ch 4500)

Observations

- Minor shallow slumping along parts of lower slope in places
- Occasional slumping onto beach
- Estimated failed volume 315L x 1D x 6H = 1,890m^3

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Ch 4550 to 4820

February 2026 (Ch 4750)

July 2025 (Ch 4750)

Observations

- Minor shallow slumping along parts of lower slope in places
- Occasional slumping / flow onto beach
- Estimated failed volume 270L x 1D x 6H = 1,620m^3

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Ch 4820 to 5032

February 2026 (Ch 4750)

July 2025 (Ch 4750)

Observations

- Minor localised shallow slumping along parts of lower slope in places
- Occasional slumping onto beach
- Estimated failed volume 212L x 0.75D x 5H = 795m^3

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Ch 5032 to 5342 - below Marina Park

February 2026

July 2025

Observations

- Collapse of some of made ground within cliff
- Minor localised shallow slumping along parts of lower slope in places
- Notably greater failure volume near ramp to beach
- Occasional slumping onto beach
- Estimated failed volume 310L x 0.75D x 5H = 1,170m^3

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Southern end – ramp to beach

February 2026

July 2025

Observations

- Lower end of ramp eroded (say 3 to 5m)
- Estimated locally 2m of cliff eroded
- Wave action has eroded ramp fill behind armour
- Beach lowered at toe of rock armour
- Cliff in area comprises gravelly sand – readily erodible

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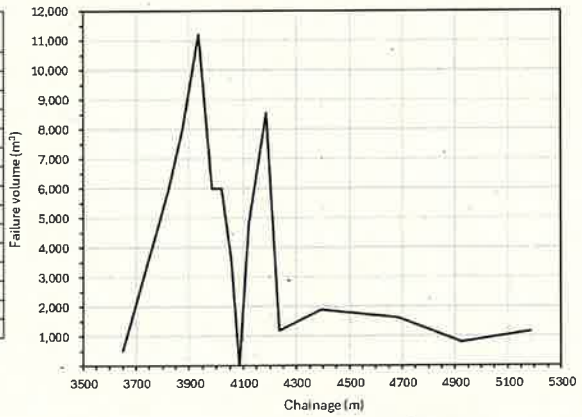
Summary of cliff slope failures

- Recent slope failure volumes determined based on signs of recent failure
- Comparison of recent failures in February 2026 with July 2025
- Northern cliff slopes below the path have the largest failures:
  - Ground conditions controlling to a great degree the extent of the failure
  - Interbedded sand layers / more permeable layers carry groundwater into slope
  - Marine till (IST) essentially impermeable and acts as an aquitard
- Failure volumes become more localised and minor in nature southward
- Note that an amount of the recent failure volume is re-mobilised previous failed material

Chainage		Length (m)	Depth (m)	Height (m)	Volume (m^3)	Comments
Start	End					
3500	3800	-	-	-	500	Estimate
3800	3850	50	4	30	6,000	Extensive slumping on face
3850	3900	50	4	40	8,000	Failure in existing landslide scar extending to path
3900	3970	70	4	40	11,200	Extensive slumping on face
3970	4000	30	4	50	6,000	Failure in existing landslide scar
4000	4040	40	5	30	6,000	Extensive slumping on face
4040	4070	30	4	30	3,600	Slumping on face
4070	4100	-	-	-	-	Erosion of toe
4100	4140	40	4	30	4,800	Failure within stream valley
4140	4235	95	3	30	8,550	Extensive slumping on face
4235	4235	20	2	30	1,200	Failure within stream valley
4235	4550	315	1	6	1,890	Minor failures
4550	4820	270	1	6	1,620	Minor failures
4820	5032	212	0.75	5	795	Localised minor failures
5032	5342	310	0.75	5	1,170	Localised minor failures
				Total	60,825	



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Cliff slope failures and risk to path

Path running beside Marina Park has numerous slope failures (PATH CLOSED)

Northern section of path has numerous slope failures (PATH CLOSED)

It is likely that other areas of instability are present within the cliff slope that cannot be readily identified and that could represent a risk to the path

Path is actively being undermined in the northern section, particularly at ch 3880 where:

- THE PATH IS UNDERMINED WITH A 4 TO 5m VERTICAL FACE BELOW
- THERE IS PROGESSIVE CRACKS OPENING UP IN PATH
- THIS REPRESENTS AN IMMINENT RISK TO PERSONS ON THE PATH

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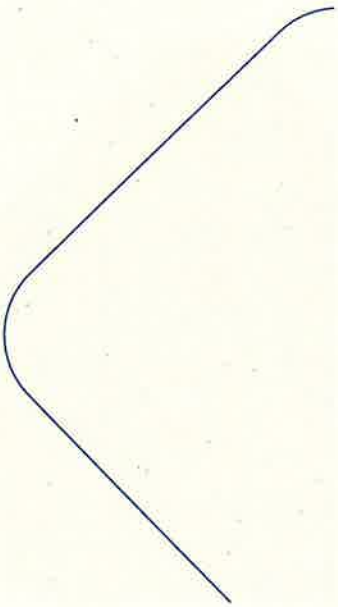
Progress

Bray side

- Engagement with rope access contractors (underway)
- Ecological site assessment to identify any key ecological constraints for rope access (pending)
- Site walk-over with potential contractor to assess anchor / access points (pending – date TBC)

Greystones side

- Inspection of recent cliff slope failures and risk to path
- Possible drone survey with LiDAR to provide survey data (availability TBC)



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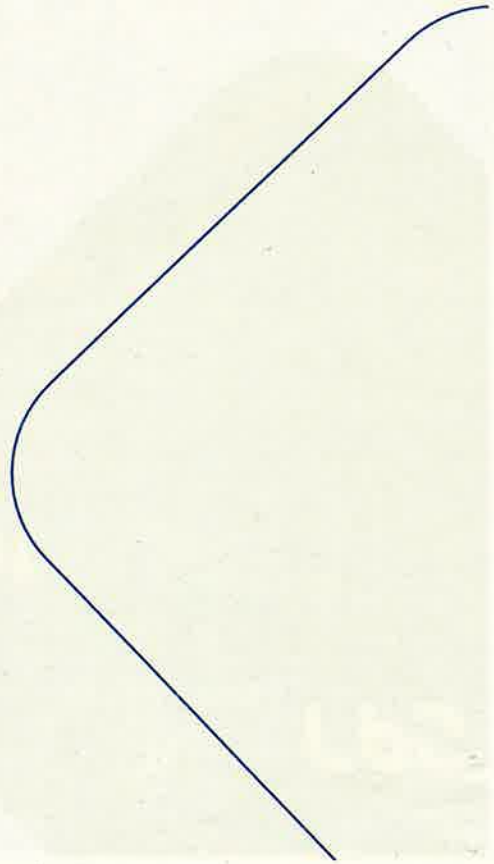
Bray to Greystones Cliff Walk Assessment
Project Progression

January 2026

Contents

- Introduction
- Findings and summary of report
- Slope movement (instability) types
- Examples of instability encountered along walk
- Findings
  - Slope instability risk
  - Slope remedial options
- Proposed next steps
- Potential environmental screening requirements
- Planning consent route
- Typical project main stages – going forward
- Estimated project timelines for each stage
- Challenges and constraints



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Introduction

- RPS appointed by Wicklow County Council (WCC) in June 2025
- Appointment to address potential hazards to the Bray to Greystones Cliff Walk particularly related to the stability of surrounding slopes
- Slope stability for the north and south sections of the Cliff Walk are distinctly different: with rock instability in the north and coastal landslides in the south
- Report produced that assesses slope instability and identifies remedial options. Report includes:
  - Findings of site inspections of slopes surrounding the Cliff Walk
  - Assessment of risk of slope instability
  - Identification of slope remedial options

Methodology

- The Cliff Walk was divided into 30 nos. slopes sections and an inspection with LiDAR and video survey carried out
- An accompanying data sheet produced for each slope
- A risk assessment methodology was used to give each slope a risk score / category. Risk score ranged from 1 (lowest risk) to 25 (highest risk).
- The risk assessment shows there are 9 nos. slopes that require further detailed inspection with potential remedial works and 7 nos. slopes that require actual remedial works
- Results are not unsurprising as it is readily clear that a number of rock slopes in the northern part of the Cliff Walk have rock stability issues, and that the southern soil slopes are impacted by coastal landslides

Methodology – hazard risk score and category

				Likelihood (L)				
			Description	Remote	Unlikely	Possible	Likely	Very likely
	Potential typical impacts		Likelihood (L)	<5%	5 to 19%	20 to 49%	50 to 74%	>75%
	Description	Scale of failure (rock / soil)	Remedial repair works	Scale	1	2	3	4	5
Impact (I)	Very High	Greater than 2m³ rock / 20m³ soil	Significant new, recurring large-scale adverse failure requiring remedy by Specialist Contractor	5	5	10	15	20	25
	High	1m³ to 2m³ rock / 10m³ soil	New, recurring adverse failure or local failure requiring remedy by Specialist Contractor	4	4	8	12	16	20
	Medium	Less than 1m³ rock / 5m³ soil	Unanticipated localised adverse transient failure or localised failure likely requiring remedy by Specialist Contractor.	3	3	6	9	12	15
	Low	Isolated small rock pieces and / or debris	Very localised failure requiring local management response, but readily remediated	2	2	4	6	8	10
	Very Low	None	No failure requiring no remedial works.	1	1	2	3	4	5

L x I = Risk (R)

Score	Description	Risk category
1 to 3	Acceptable	No further action needed. Regular inspection and maintenance required.
4 to 8	Adequate	Currently stable with no history or apparent signs of failure. Regular inspection and maintenance required.
9 to 12	Tolerable	Previous instability and potentially further unstable material on slope. Requires further detailed inspection and potential remedial works.
15 to 25	Unacceptable	Previous recent instability with further unstable material identified on the slope. Remedial works required.

Hazard risk matrix - score

Hazard risk category

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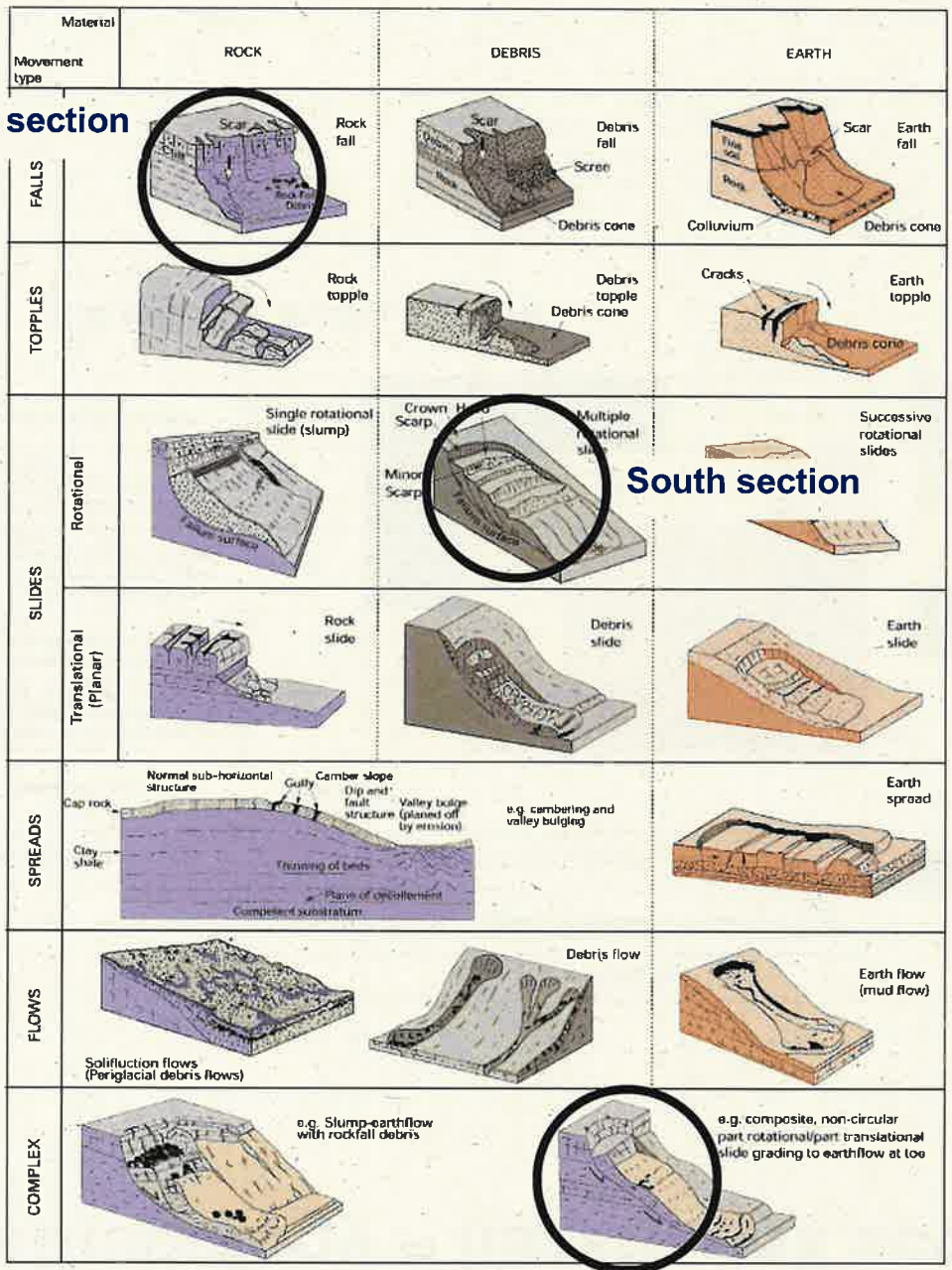
Slope movement (instability) types



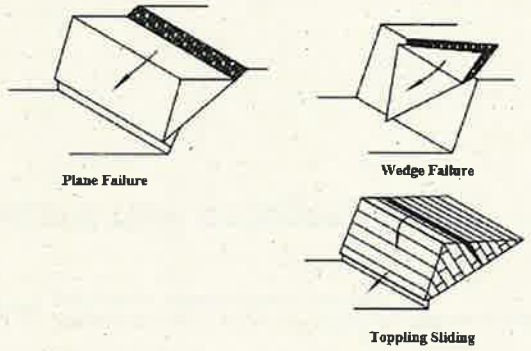
North section

South section

South section

Source: Varnes (1978) and DOE (UK) (1990)

Typical rock slope instability



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Examples - rock slope instability

Planar

Wedge

Topple

Ravelling

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Examples - soil slope instability

Multiple rotational slide

Composite rotational slide grading to earth flow

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Example – slope risk category

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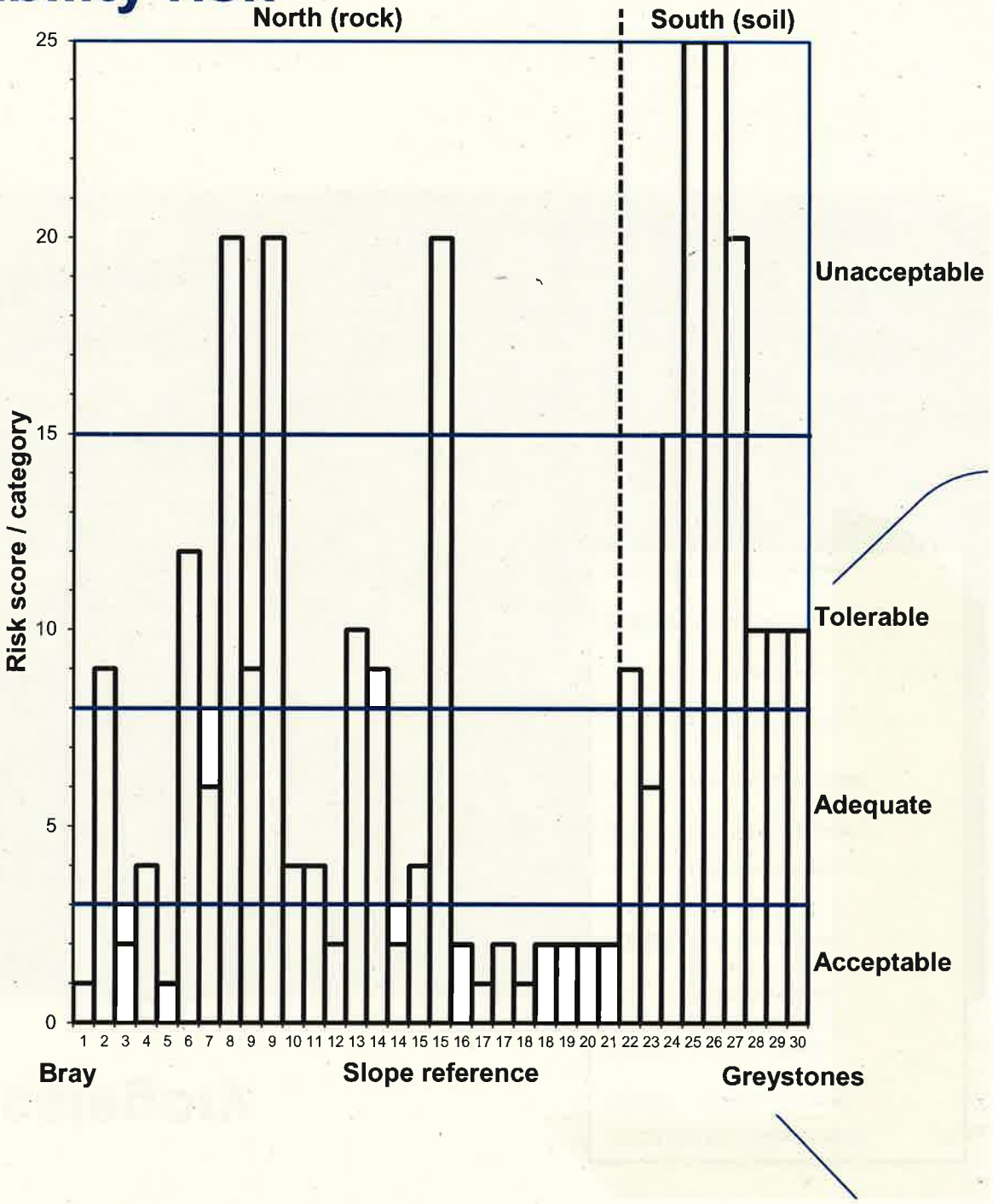
Findings - slope instability risk

Slope Reference	Upslope/ Downslope	Start Chainage (m)	End Chainage (m)	Likelihood (L)	Impact (I)	Risk Category (R)	
1	Upslope	0	275	1	1	1	
2	Upslope	275	800	3	3	9	
3	Upslope	800	900	1	2	2	
4	Upslope	900	1000	2	2	4	
5	Upslope	1000	1100	1	1	1	
6	Upslope	1100	1200	4	3	12	
7	Upslope	1200	1250	2	3	6	
8	Upslope	1250	1350	5	4	20	
9	Upslope	1350	1575	3	3	9	
9	Downslope	1350	1650	5	4	20	
10	Upslope	1575	1700	2	2	4	
11	Upslope	1700	1830	2	2	4	
12	Upslope	1830	2020	1	2	2	
13	Upslope	2020	2150	5	2	10	
14	Upslope	2150	2300	3	3	9	
14	Downslope	2150	2300	1	2	2	
15	Upslope	2300	2800	2	2	4	
15	Downslope	2300	2400	5	4	20	
16	Upslope	2800	2900	2	1	2	
17	Upslope	2900	3000	1	1	1	
17	Downslope	2900	3000	1	2	2	
18	Upslope	3000	3085	1	1	1	
18	Downslope	3000	3085	1	2	2	
19	Upslope	3085	3200	1	2	2	
20	Downslope	3200	3300	2	1	2	
21	Downslope	3300	3400	2	1	2	
22	Downslope	3400	3500	3	3	9	
23	Downslope	3500	3600	3	2	6	
24	Downslope	3600	3700	3	5	15	
25	Downslope	3700	3800	5	5	25	
26	Downslope	3800	3900	5	5	25	
27	Downslope	3900	4000	5	4	20	
28	Downslope	4000	4100	2	5	10	
29	Downslope	4100	4235	2	5	10	
30	Downslope	4235	5032	2	5	10	

North (rock)

South (soil)



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Findings - slope remedial options

- Results shows that of the 30 nos. slopes:
  - 9 nos. slopes require further detailed inspection with potential remedial works
  - 7 nos. slopes require actual remedial works
- A multicriteria analysis used to assess the most desirable remedial options:

Option	North (rock)	South (soil)
1	Netting and / or sprayed concrete applied to rock slope	Embedded cantilevered piles
2	Catch net canopy applied to rock slope	Toe protection
3	Rockfall protection gallery	Filling on to slope
4	Re-route Cliff Walk	Re-route Cliff Walk

- Based on the above the most desirable options are as follows:

Term	North (rock)	South (soil)
Long	Re-route Cliff Walk	Re-route Cliff Walk
Long (alter)	Netting and / or sprayed concrete applied to rock slope	None recommended
Short	Netting and / or sprayed concrete applied to rock slope	Localised re-routing/ Filling on to slope

- Note – short term refers to the longevity of the option not the time to complete
- Published report includes further details and limitations of selected options

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Proposed next steps

- Assessment of potential route options (Greystones - south)
- Detailed engineering assessment of rock slopes (Bray - north)
- Remediation options and design
- Environmental assessment
- Planning application
- Land acquisition
- Tender and construction

Potential Environmental Screening Requirements

Ecological legislative context:

Species, Habitats, and Areas

- Habitats Directive (92/43/EEC)
- Birds Directive (79/409/EEC)
- European Communities (Birds and Natural Habitats) Regulations 2011, as amended
- European Union (Invasive Alien Species) Regulations 2024
- Wildlife Act 1976 and the Wildlife (Amendment) Acts, as amended
- Flora (Protection) Order, 2022

Examples

- Species: bats, badger, plants, birds
- Habitats: estuaries, upland dry heath, ancient woodland, hedgerows.
- Areas: Natural Heritage Area (NHA), Wildfowl Reserve, Special Area of Conservation (SAC), Special Protection Area (SPA), Biosphere reserve.

Processes required to be undertaken

- Compliance with legislation – Ecology report
- Appropriate Assessment: Habitats Directive (92/43/EEC) – screening for Appropriate Assessment and Nature Impact Statement

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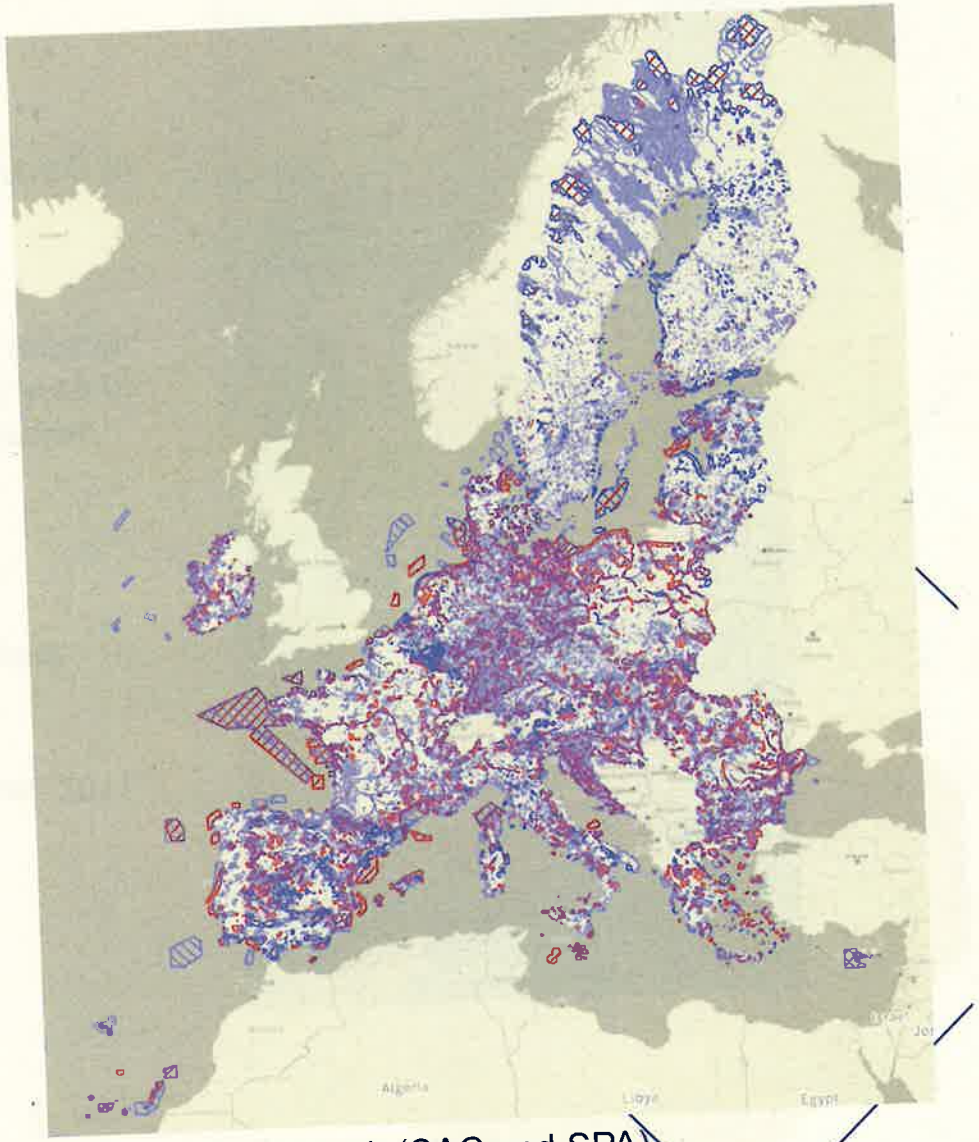
Potential Environmental Screening Requirements

Appropriate Assessment:

- The process is a result of the EU Habitats Directive
- Process is to ensure that all plans and projects do not result in any adverse effects on the integrity of any European site(s)
  - European sites = Special Area of Conservation (SAC) and Special Protection Area (SPA)
- All plans and projects are required to be screened for Appropriate Assessment
- 4 stages of Appropriate Assessment
  - Stage 1 – Screening (likely significant effect)
  - Stage 2 – Appropriate Assessment and Nature Impacts Assessment preparation) (adverse affect)
  - Stage 3 – Assessment of alternatives
  - Stage 4 - Imperative Reasons of Overriding Public Interest – IROPI

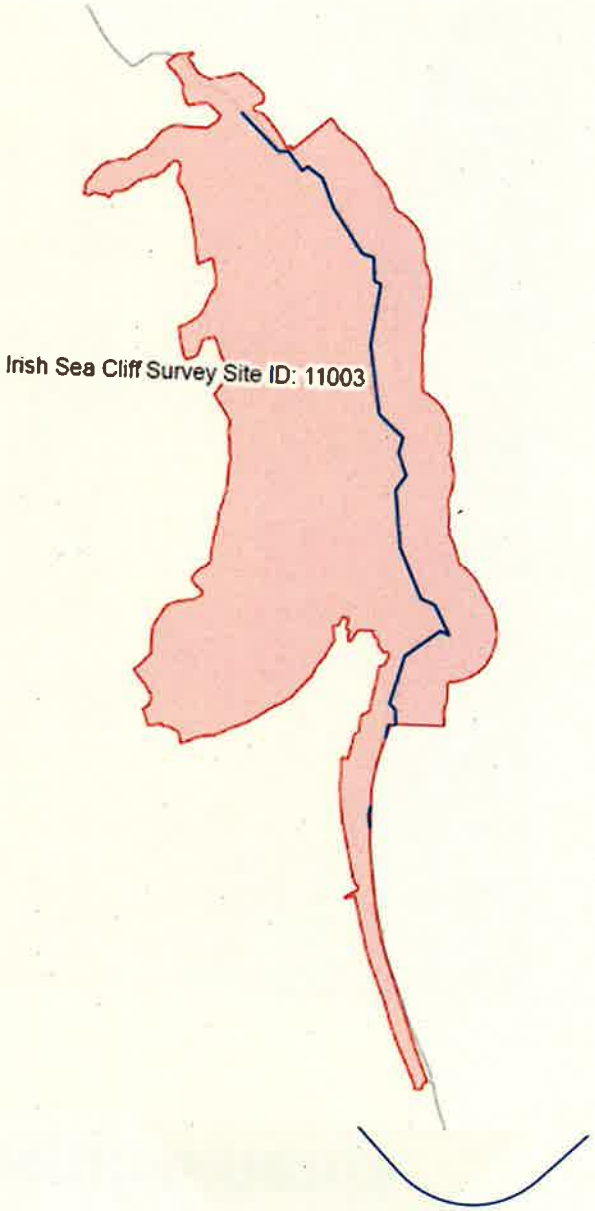


Natura 2000 network (SAC and SPA)

Potential Environmental Screening Requirements

Ecological context:

- Bray head is designated as a Special Area of Conservation (SAC) for the following habitats:
  - Sea cliff
    - Irish sea cliff survey identified linear extent of Annex I sea cliff habitat.
  - Dry heath
    - Dry heaths has not been mapped in detail for Bray Head SAC and thus the total area of the qualifying habitat is unknown. Dry heath is the dominant habitat over much of the SAC (NPWS 2017).
- Bray head is also designated as a proposed Natural Heritage Area (pNHA) for:
  - Sea cliffs and dry heath
  - Greater broomrape
  - Kittiwake and peregrine falcon
- The site is known for sea bird roosting and nesting



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Potential Environmental Screening Requirements

Ecological considerations:

- Two stages of project to consider:
  - Investigation surveys (assessment of rock and ground conditions)
  - Main project (repair and improvement works)
- Bray head is designated as an SAC (sea cliff and dry heath) and pNHA
- Proposed project (investigation surveys and main project) will be completed within the habitats (dry heath and sea cliff) for which the site is designated.
  - Conservation objectives for these habitats state a target of 'no decline' of habitat distribution.
- Likely seasonal constraints for ecological surveys and any proposed works due to roosting and nesting birds
- Removal of invasive alien plant species, if encountered

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Potential Environmental Screening Requirements

Ecological considerations:

- Highly likely that both the investigation surveys and main project will 'screen in' from Appropriate Assessment (stage 1).
  - This has implications for the planning consent route regarding Part VIII (see later slides regarding planning)
  - This will require preparation of a Nature Impact Statement (NIS) for Stage 2 Appropriate Assessment

Estimated timelines:

- Ecological surveys = c.12 months
- Ecology reporting = following survey completion
- Stage 1 Appropriate Assessment Screening = during ecological survey timeframe.
- Stage 2 Natura Impact Statement (NIS) = following survey completion

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Planning consent route

- The default consenting route for Local Authority projects is via Part 8 of the *Planning and Development Regulations 2001,as amended* (the Regulations).

- However, under Section 177AE of the *Planning and Development Act 2000, as amended* (the Act) where an Appropriate Assessment (NIS) is required in respect of a Local Authority project, approval for the project must be made by An Coimisiún Pleanála:

> *"177AE (1) Where an appropriate assessment is required in respect of development –*
>
> *(a) by a local authority that is a planning authority, whether in its capacity as a planning authority or in any other capacity* […] the local authority shall prepare, or cause to be prepared, a Natura impact statement in respect thereof.
>
> *(2) Proposed development in respect of which an appropriate assessment is required shall not be carried out unless the Board has approved it with or without modifications".*

- Having regard for the preliminary screening for Appropriate Assessment, it is considered likely that an application under Section 177AE will be required.

Planning consent route

- An 177AE application typically includes *inter alia*:
  - Natura Impact Statement
  - Outline Construction Management Plan
  - Planning Report / Planning and Environmental Considerations Report
  - Suite of engineering drawings and planning particulars

- These are prepared and submitted to ACP and public notices are published for a 5 to 6 week public consultation period.
- ACP can request further information to be submitted and can invite submissions to respond to the further information. ACP may also decide to hold an Oral Hearing.
- The decision process typically takes longer than a Part 8 consent in practice. While ACP have a *target* turn around of 18 weeks, recent 177AE applications have taken >26 weeks (6 months).

- Note: The *Planning and Development Act 2024* has been signed into law and is being rolled out with new regulations anticipated over the next year. It is unknown what implications this legislation might have on the planning consent route / timeline for this project.

Typical project main stages – going forward

- Detailed engineering assessment and design
  - Route option (Greystones – south side) - underway
  - Rock slopes (Bray – north side)
  - Remediation options and design
- Environmental assessment
  - Ecological reporting
  - Ecological site work
  - EIA screening
- Planning application
- Land acquisition
- Planning consent
- Prepare tender documents and tender (drawings, specification, cost estimate, final design, tender/contract documents)
- Construction

Estimated project timelines for each stage

STAGE	ESTIMATED TIME
STAGE 1 DETAILED ENGINEERING ASSESSMENT AND DESIGN Site assessment - south Site assessment - north (includes 8 weeks tendering for rope access) Reporting on findings and remediation options Design Review planning conditions and amend design	25 weeks
STAGE 2 ENVIRONMENTAL ASSESSMENT	
Stage 2a Ecological Reporting Appropriate Assessment Screening Report for project Nature Impact Statement for project Ecological Impact Assessment Activities Requiring Consent application	15 weeks over 12 months
STAGE 2b - Ecological Site Work Site walkover Bird surveys (monthly for 12 months) Annex I habitats Mammals Input to the committee meetings (local authority, community groups, NPWS)	20 weeks over 12 months
STAGE 2c EIA Screening Environmental Impact Assessment Screening Report PHH Air Quality /Climate Noise & vibration Landscape and visual Ecology Soils/Geology Property Material assets Cultural heritage	8 weeks over 12 months
STAGE 3 PREPARATION OF PLANNING APPLICATION Preparation of Planning Report (incl. planning history review) Prepare Planning Particulars incl. wording of Newspaper Notice Review and validation check of planning application drawings Updating planning pack following Client review (assumes 1 wk for CR) Send copy of application and NIS to Prescribed Bodies	6 weeks over 12 months
STAGE 4 LAND ACQUISITION (WCC)	78 weeks (18 months)
STAGE 5 PLANNING CONSENT	26 weeks (min)
STAGE 6 DRAWING, SPECIFICATION, COST ESTIMATE Produce drawings, specification, cost estimate and PHSP Review and update	4 weeks
STAGE 7 REVIEW AND PREPARE FINAL DETAILED DESIGN Update drawings, specification, cost, PHSP as per WCC Comments Issue final detailed design	2 weeks
STAGE 8 PREPARE TENDER AND TENDER PERIOD Client instruction to commence Designer and PSDP duties Prepare tender documents Issue tender documents to WCC WCC tender documentation review Issue tender documents and tender	12 weeks
STAGE 9 TENDER EVALUATION & AWARD Return of tenders Tender assessment Pre-contract award meeting Issue tender assessment report WCC review and approval Letter of Intent Standstill Period Contract Award	4 weeks
STAGE 10 CONSTRUCTION Client instruction to commence Designer and PSDP duties Site mobilisation Construction commencement meeting Supervision & contract administration Issue projected outturn contract cost report Issue final account certificate & report Issue draft health & safety file and maintenance file	26 weeks

Challenges and constraints

- Key stages with respect to duration are:
  - Environmental assessment (12 months)
  - Planning consent (6 months minimum)
  - Construction (6 months)
- Environmental assessment involves seasonal surveys so difficult to reduce duration
- Planning consent duration is only an estimate
- Potential savings in duration:
  - Demonstrate rock slope inspection surveys do not impact ecology
  - Prepare tender documents in advance of planning consent
  - Construction of rock remediation – use same remediation throughout