543750N
543500N
543250N
378250E
378500E
378750E
379000E

NENTHEAD

A689

NENTHEAD MINE CAR PARK

PROPOSED LOCATION OF PUMP

LOCATION OF EXISTING RAMPGILL ADIT

LOCATION OF EXISTING CAPLECLEUGH ADIT

FIGURE 2

TREATED MINE WATER TO DISCHARGE INTO RIVER NENT (EXACT LOCATION TO BE CONFIRMED)

EXISTING ACCESS TRACK

NENTHEAD MINES

POTENTIAL AREA OF AEROBIC REEDBEDS

PROPOSED AEROBIC REEDBEDS (SIZE TO BE DETERMINED)

PROPOSED TREATMENT POND 1

PROPOSED TREATMENT POND 2

EXISTING RESERVOIR

FIGURE 3

NOTES

1. PROPOSED PUMPING ROUTE IS SHOWN FOR INDICATIVE PURPOSES ONLY.

KEY

PROPOSED MINE WATER TRANSFER ROUTE (GRAVITY)

PROPOSED MINE WATER TRANSFER ROUTE (PUMPED)

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FIGURE 1 - SITE WIDE LOCATION PLAN

KEY

PROPOSED MINE WATER PUMPING ROUTE

PROPOSED ON SITE BUILDINGS

PROPOSED PIPEWORK

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POTENTIAL FOR MINE WATER TO DISCHARGE TO RIVER NENT IN OVERFLOW EVENTS

TO NENTHEAD MINES CAR PARK

RIVER NENT

EXISTING FOOTBRIDGE CROSSING TO BE IMPROVED

WORKS TO BE UNDERTAKEN TO CAPTURE MINE WATER DISCHARGE

TO DRAIN VIA GRAVITY FROM RAMPGILL ADIT

EXISTING ADIT LOCATION (RAMPGILL (PHOTOGRAPH 2))

PROPOSED MINE WATER TRANSFER ROUTE TO TREATMENT PONDS

TO DRAIN VIA GRAVITY FROM CAPLECLEUGH ADIT

WORKS TO BE UNDERTAKEN TO CAPTURE MINE WATER DISCHARGE

EXISTING ADIT LOCATION (CAPLECLEUGH (PHOTOGRAPH 1))

EXISTING WOODEN OPEN CHANNEL (HISTORIC FEATURE)

EXISTING TRACK

PHOTOGRAPH 1 - CAPLECLEUGH ADIT DISCHARGE

PHOTOGRAPH 2 - RAMPGILL ADIT DISCHARGE

FIGURE 2 - MINE WATER ADIT CAPTURE/PUMPING STATION LOCATION

KEY

- PROPOSED ACCESS TRACKS
- PROPOSED ON SITE BUILDINGS
- PROPOSED MINE WATER PUMPING ROUTE
- TREATED MINE WATER PIPEWORK
- EXTENT OF EARTHWORKS

MINE WATER TRANSFER ROUTE FROM PUMPING STATION

PROPOSED SITE ACCESS POINT TO REEDBED

PROPOSED SITE ACCESS POINT TO TREATMENT PONDS

TREATED MINE WATER RETURN GRAVITY PIPEWORK

EXISTING WATER FEATURES

AEROBIC REEDBEDS (SIZE TO BE DETERMINED)

TREATMENT POND 1

TREATMENT POND 2

EXISTING RESERVOIR

EXISTING ACCESS TRACK

EXISTING MINING SHAFT

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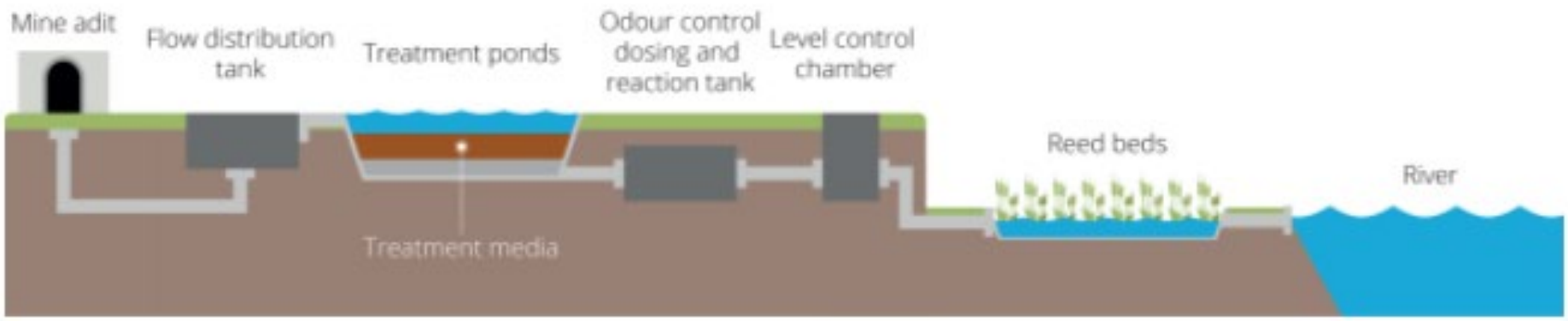
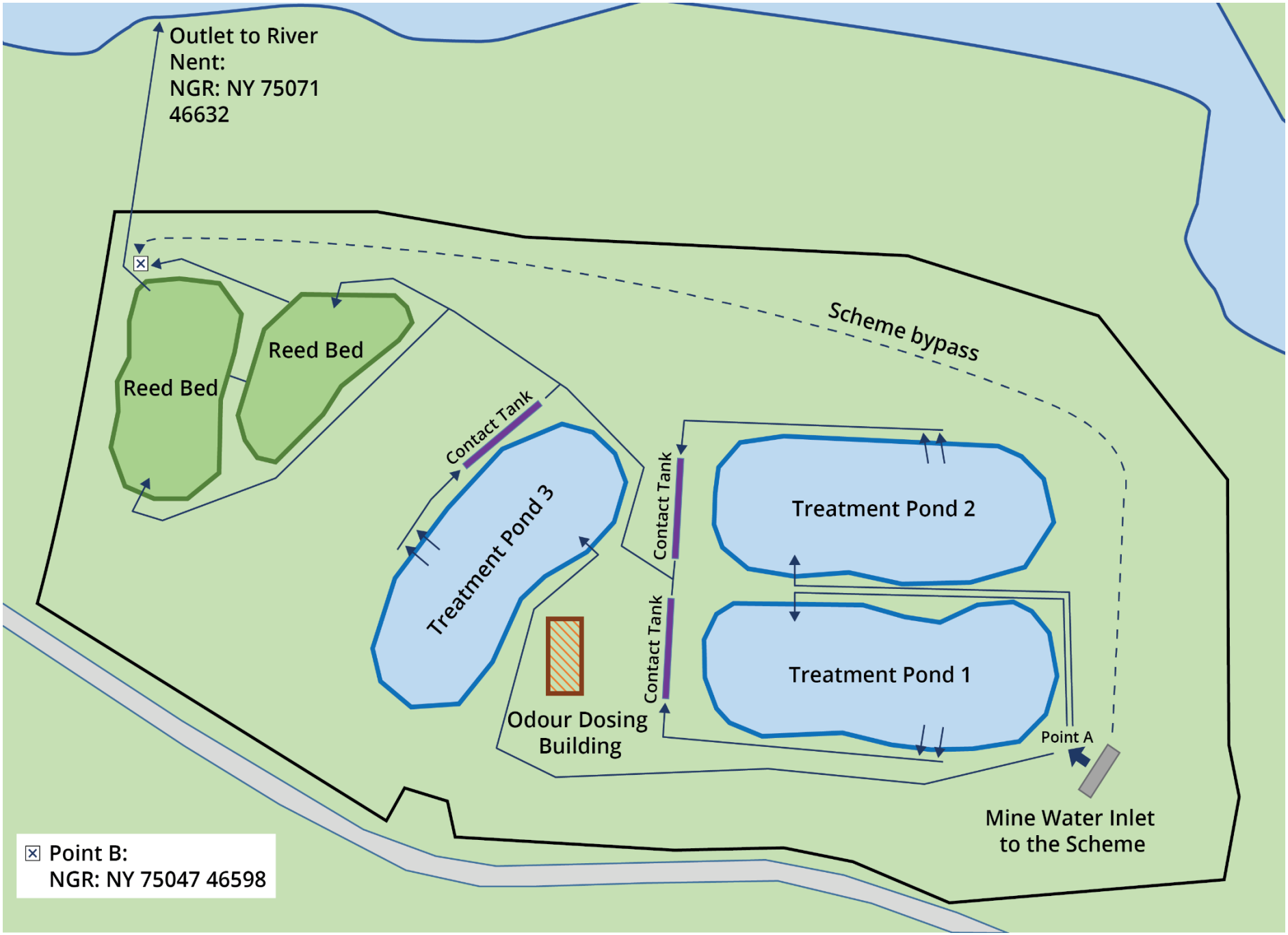
FIGURE 3 - MINE WATER TREATMENT SITE


Mine adit
Flow distribution tank
Treatment ponds
Odour control dosing and reaction tank
Level control chamber
Reed beds
River
Treatment media


Outlet to River Nent:
NGR: NY 75071 46632
Scheme bypass
Reed Bed
Reed Bed
Contact Tank
Treatment Pond 3
Contact Tank
Treatment Pond 2
Contact Tank
Treatment Pond 1
Odour Dosing Building
Point A
Mine Water Inlet to the Scheme
Point B:
NGR: NY 75047 46598

Project Timeline

Scoping

Monitor mine water discharge – chemistry and flow.

Concept studies.

Feasibility

Assess treatment options and site selection.

Design

Current phase. Develop design at selected site. Conduct detailed assessments, surveys and investigations.

2022

Environmental Impact Assessment

Assess impact of treatment scheme and

Planning

Submission of planning application. Public and institutional stakeholders provide views and input on planned development.

2023

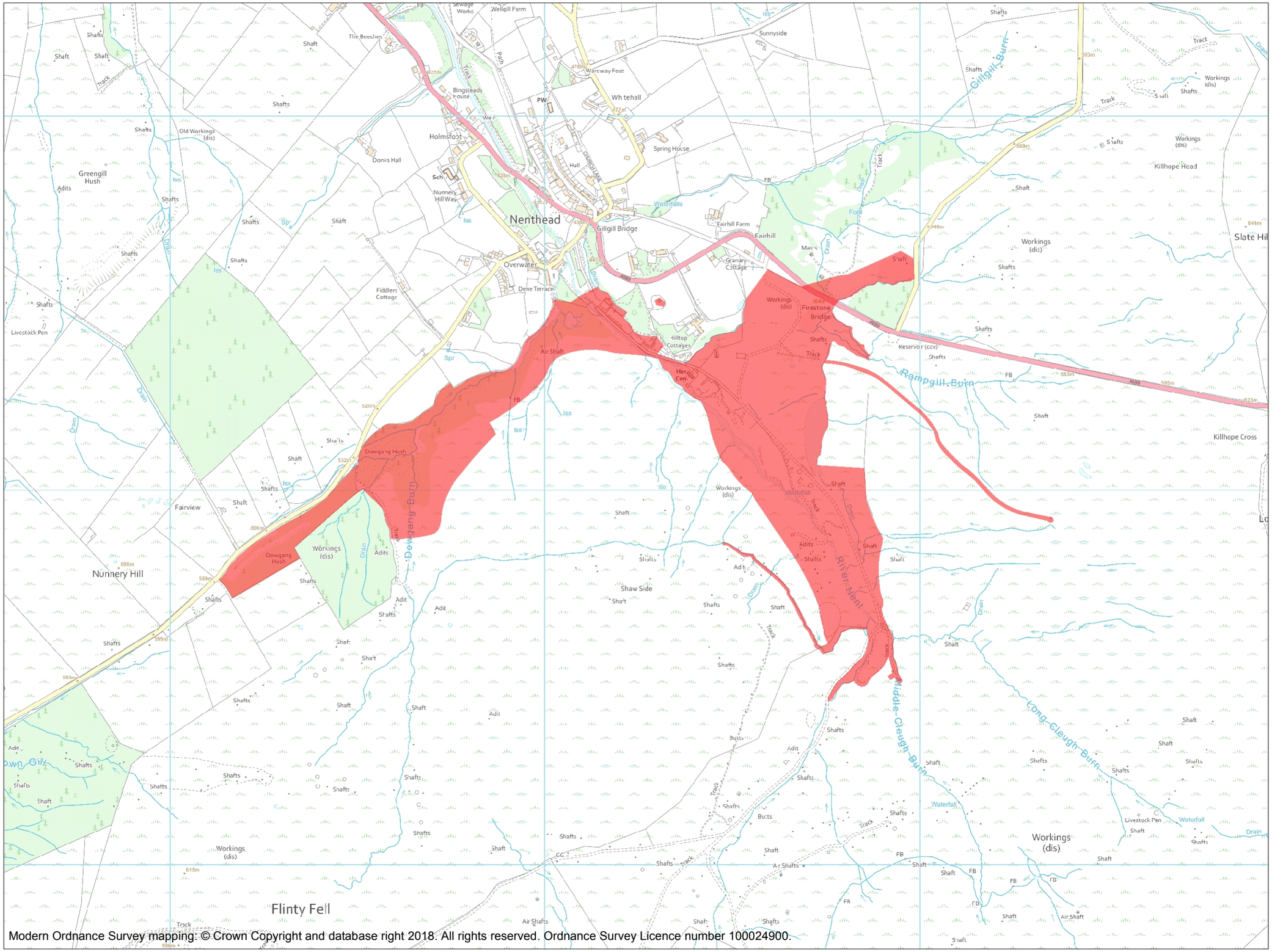
Design Refinement

Incorporate feedback and any planning conditions in final design.

2024

Construction

Appoint construction contractor for build.



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Heritage Category: Scheduling

List Entry No: 1015858

County: Cumbria

District: Eden

Parish: Alston Moor

Each official record of a scheduled monument contains a map. New entries on the schedule from 1988 onwards include a digitally created map which forms part of the official record. For entries created in the years up to and including 1987 a hand-drawn map forms part of the official record. The map here has been translated from the official map and that process may have introduced inaccuracies. Copies of maps that form part of the official record can be obtained from Historic England.

This map was delivered electronically and when printed may not be to scale and may be subject to distortions. All maps and grid references are for identification purposes only and must be read in conjunction with other information in the record.

List Entry NGR: NY 78244 43392

Map Scale: 1:10000

Print Date: 15 October 2021

This is an A3 sized map and should be printed full size at A3 with no page scaling set

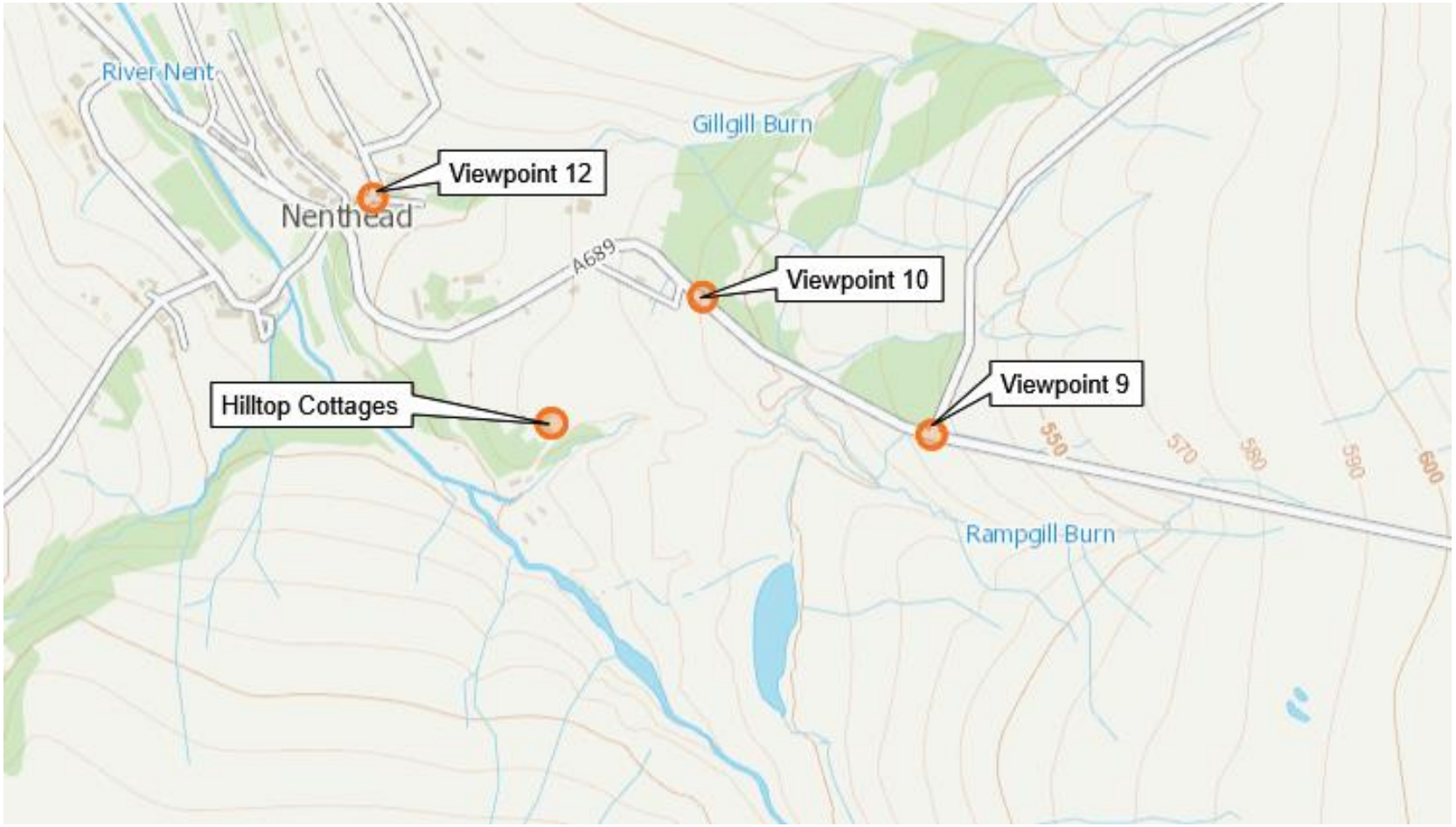
Name: Lead mines, ore works and smeltmill at Nenthead

Historic England

HistoricEngland.org.uk

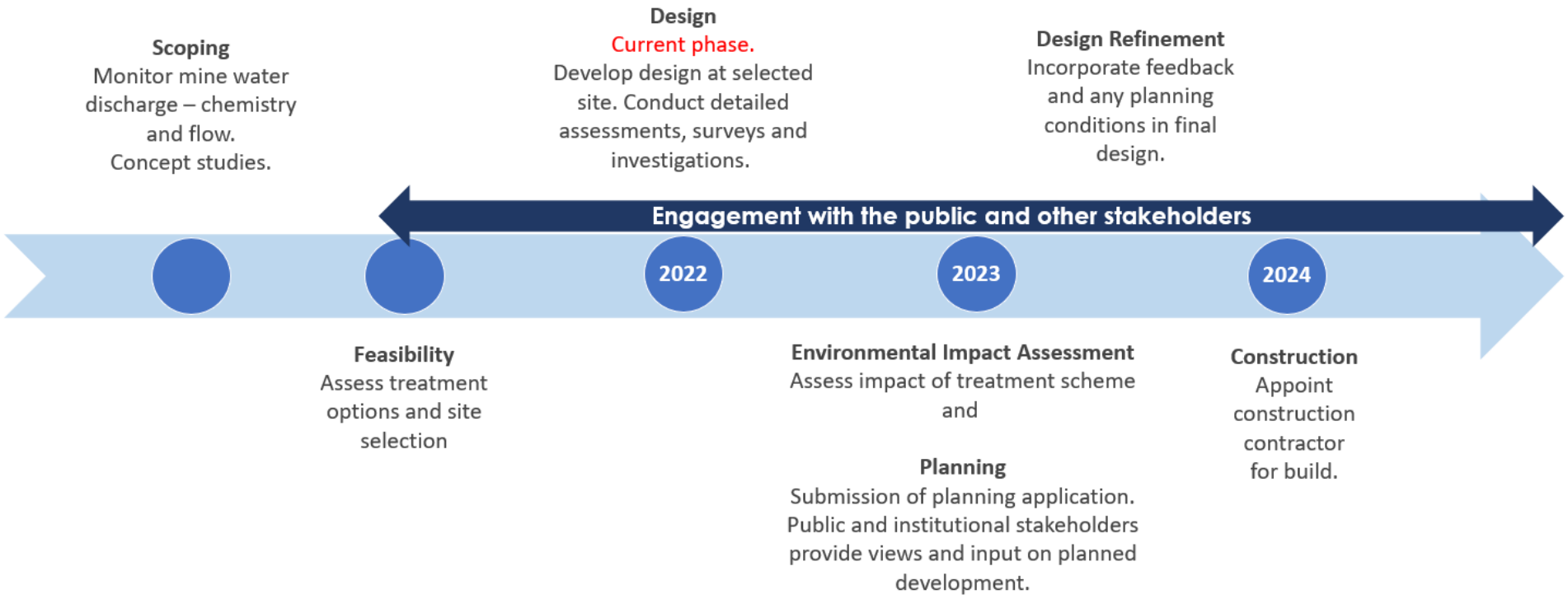
Visualisation Viewpoints

Location Map



Indicative Project Timeline

subject to budget and permissions



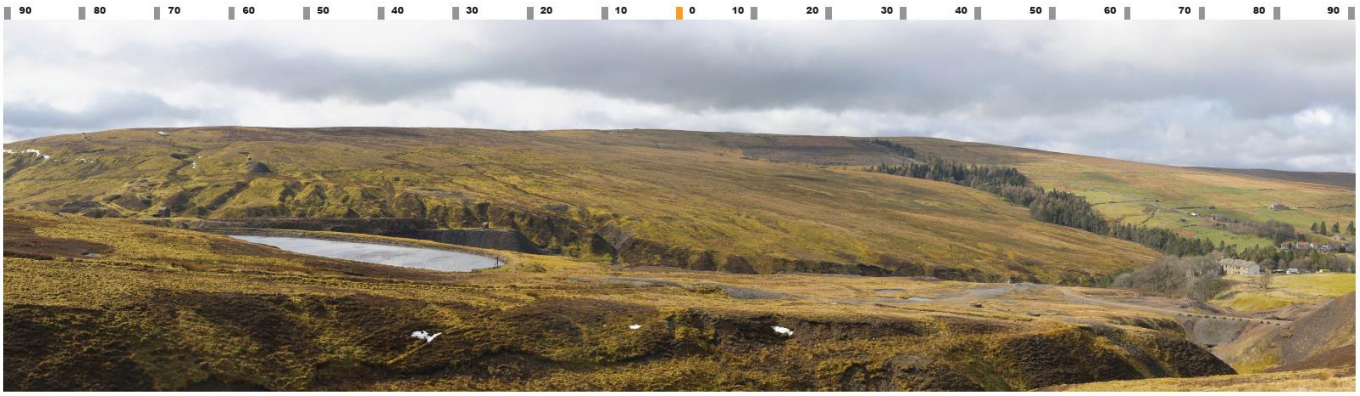
Proposed location for the treatment ponds

Looking north towards Nenthead from above the Handsome Mea reservoir

Visualisation Viewpoint 9

From junction between A689 and Carrshield road

Now



BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	532.2m AOD	Note:	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	137m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		Viewpoint 9
Paper Size:	A1	Direction of View:	SW				
Date / Time:	19/03/2019 11:40	Location:	E378923, N543417				

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1 year after construction is complete

PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	532.2m AOD	Note:	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	137m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		Viewpoint 9
Paper Size:	A1	Direction of View:	SW				
Date / Time:	19/03/2019 11:40	Location:	E378923, N543417				

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3 years after construction is complete

PROPOSED YEAR 3 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	532.2m AOD	Note:	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	137m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		Viewpoint 9
Paper Size:	A1	Direction of View:	SW				
Date / Time:	19/03/2019 11:40	Location:	E378923, N543417				

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Visualisation Viewpoint 12

From above Nenthead

Now

BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	437.9m AOD	**Note:**	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	347m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.8m		Viewpoint 12
Paper Size:	A1	Direction of View:	SE				
Date / Time:	19/03/2019 12:39	Location:	E378284, N543840				

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1 year after construction is complete

PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	437.9m AOD	**Note:**	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	347m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.8m		Viewpoint 12
Paper Size:	A1	Direction of View:	SE				
Date / Time:	19/03/2019 12:39	Location:	E378284, N543840				

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3 years after construction is complete

PROPOSED YEAR 3 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	437.9m AOD	**Note:**	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	347m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.8m		Viewpoint 12
Paper Size:	A1	Direction of View:	SE				
Date / Time:	19/03/2019 12:39	Location:	E378284, N543840				

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Visualisation Viewpoint 10

From quarry track at A689

Now

BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	503.3m AOD	**Note:**	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	317m	Images to be viewed at a comfortable arm's length.	Viewpoint 10
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	S				
Date / Time:	19/03/2019 11:54	Location:	E378635, N543589				

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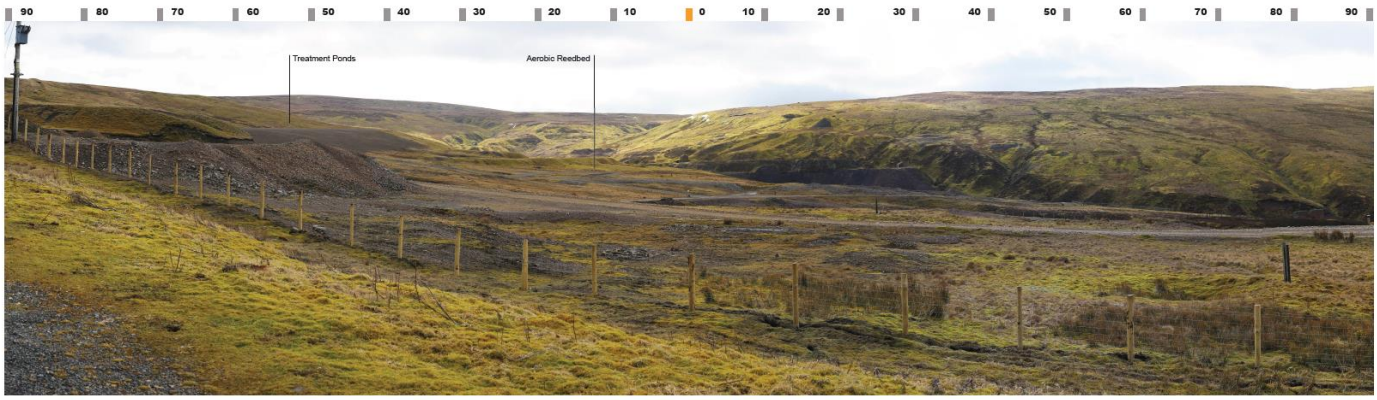
1 year after construction is complete



PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	503.3m AOD	**Note:**	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	317m	Images to be viewed at a comfortable arm's length.	Viewpoint 10
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	S				
Date / Time:	19/03/2019 11:54	Location:	E378635, N543589				

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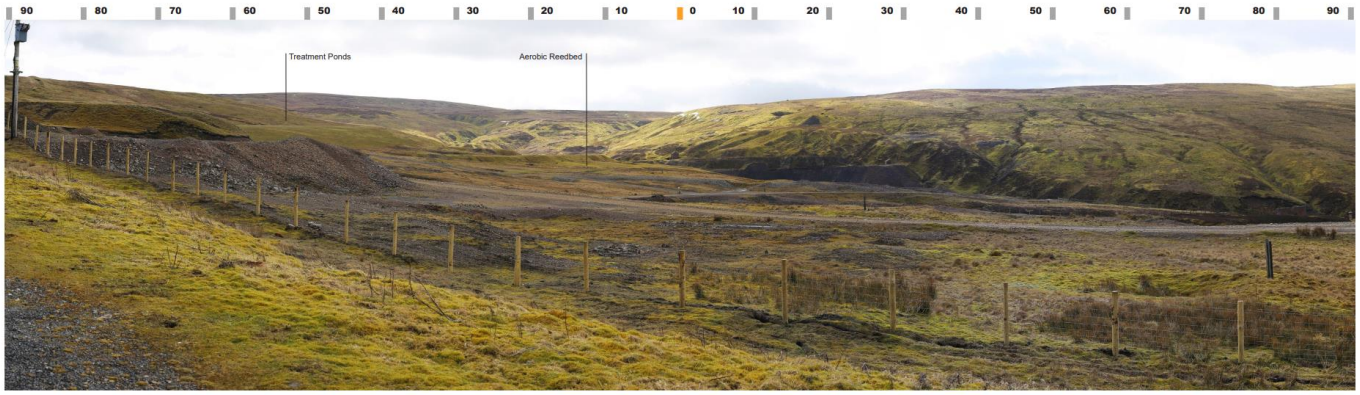
3 years after construction is complete



PROPOSED YEAR 3 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	503.3m AOD	**Note:**	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	317m	Images to be viewed at a comfortable arm's length.	Viewpoint 10
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	S				
Date / Time:	19/03/2019 11:54	Location:	E378635, N543589				

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Keeping In Touch

We are keen to hear your thoughts about the proposals and help you stay up to date with the project.

You can do this by:

Signing up to our email newsletters by leaving your email details with a member of the project team here today.

Checking out our website at - https://consult.environment-agency.gov.uk/north-east/nenthead-mwts/

Asking any questions via nent@coal.gov.uk or calling 0345 762 6848.

We will also continue to post details of key updates relating to the proposed scheme to properties in Nenthead.

The River Nent: fish surveys

Environment Agency monitoring

Between 2017 and 2019, the Environment Agency monitored fish and invertebrate (river fly) populations along the River Nent to provide baseline data for the WAMM project.

Monitoring was undertaken at several locations along the River Nent, as well as from the Deepdale Beck, a tributary of the River Tees, which is similar to the Nent except that it isn't polluted by abandoned metal mines.

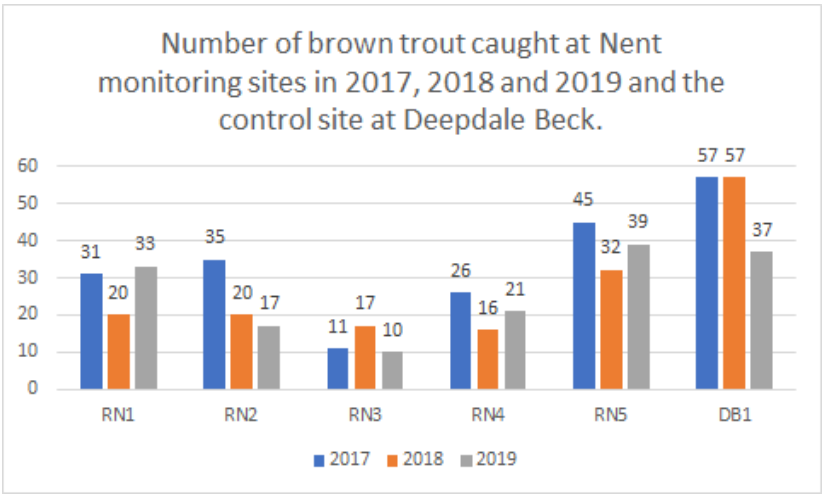
Results

In Deepdale Beck, we found a diverse fish population with Brown Trout, Atlantic Salmon, Grayling, Bullhead, Stoneloach and Minnow recorded, as well as a healthy river-fly population.

Across the 3 years, the only fish found in the River Nent were Brown Trout (migratory fish like salmon are not expected because the Nent Force waterfall is a natural barrier). There were only about half as many trout in the Nent compared to the Deepdale Beck. We found no juvenile fish (less than a year old) in the main River Nent channel and we believe this is because the younger fish live in tributaries where the metal concentrations are lower.

This graph shows the number of fish recorded at the 5 sample sites along the River Nent, and the control site on the Deepdale Beck.

It is likely that these populations have developed some tolerance to the extremely high levels of zinc, cadmium and lead which would normally be acutely toxic to fish.



A similar story was found for river-flies with the surveys recording a lower number and less diverse population. Overall, these results illustrate that aquatic wildlife in the River Nent is heavily impacted by the high metal concentrations and is less resilient and abundant than in similar un-polluted rivers.

BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	494.9m AOD	**Note:**	
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	410m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	E				
Date / Time:	19/03/2019 10:33	Location:	E377732, N543369				

NENTHEAD MINE WATER TREATMENT SCHEME

Viewpoint 7

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PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	494.9m AOD	**Note:** Images to be viewed at a comfortable arm's length.	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	410m		Viewpoint 7
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	E				
Date / Time:	19/03/2019 10:33	Location:	E377732, N543369				

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90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90

PROPOSED YEAR 15 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	494.9m AOD	**Note:** Images to be viewed at a comfortable arm's length.	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	410m		Viewpoint 7
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	E				
Date / Time:	19/03/2019 10:33	Location:	E377732, N543369				

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BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	532.2m AOD	**Note:**	
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	137m	Images to be viewed at a comfortable arm's length.	
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Paper Size:	A1	Direction of View:	SW				
Date / Time:	19/03/2019 11:40	Location:	E378923, N543417				

NENTHEAD MINE WATER TREATMENT SCHEME

Viewpoint 9

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PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	532.2m AOD	**Note:**	
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	137m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	SW				
Date / Time:	19/03/2019 11:40	Location:	E378923, N543417				

NENTHEAD MINE WATER TREATMENT SCHEME

Viewpoint 9

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PROPOSED YEAR 15 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	532.2m AOD	**Note:**	
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	137m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	SW				
Date / Time:	19/03/2019 11:40	Location:	E378923, N543417				

NENTHEAD MINE WATER TREATMENT SCHEME

Viewpoint 9

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BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	503.3m AOD	**Note:** Images to be viewed at a comfortable arm's length.	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	317m		Viewpoint 10
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	S				
Date / Time:	19/03/2019 11:54	Location:	E378635, N543589				

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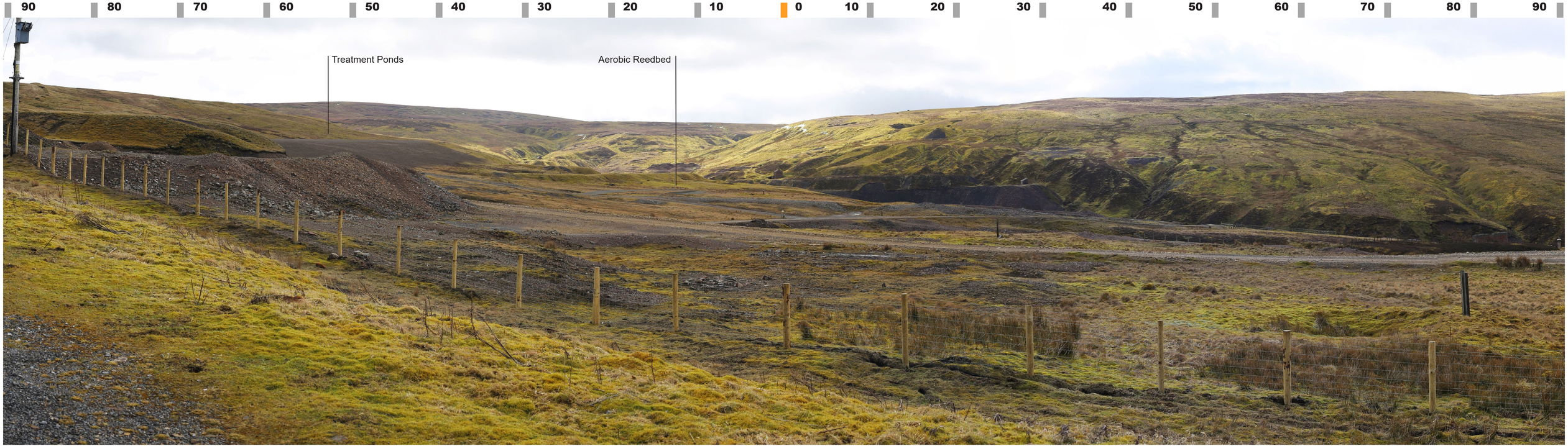

PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	503.3m AOD	**Note:** Images to be viewed at a comfortable arm's length.	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	317m		Viewpoint 10
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	S				
Date / Time:	19/03/2019 11:54	Location:	E378635, N543589				

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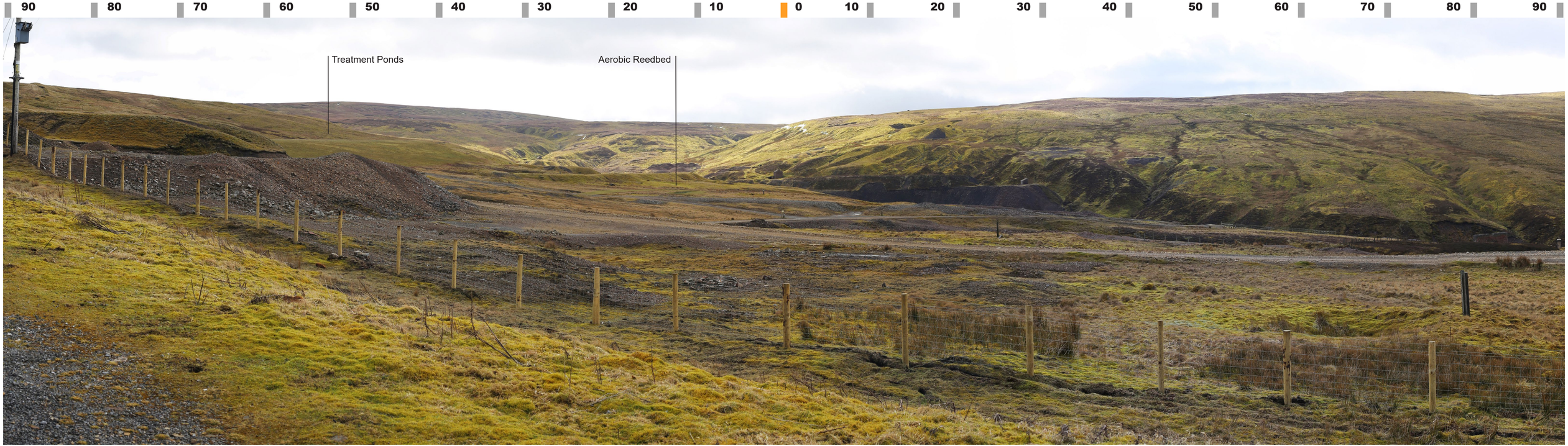

PROPOSED YEAR 15 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	503.3m AOD	**Note:**	
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	317m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	S				
Date / Time:	19/03/2019 11:54	Location:	E378635, N543589				

NENTHEAD MINE WATER TREATMENT SCHEME

Viewpoint 10

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BASELINE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	437.9m AOD	**Note:**	
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	347m	Images to be viewed at a comfortable arm's length.	
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	SE				
Date / Time:	19/03/2019 12:39	Location:	E378284, N543840				

NENTHEAD MINE WATER TREATMENT SCHEME

Viewpoint 12

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90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90

PROPOSED YEAR 1 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	437.9m AOD	**Note:** Images to be viewed at a comfortable arm's length.	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	347m		Viewpoint 12
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	SE				
Date / Time:	19/03/2019 12:39	Location:	E378284, N543840				

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90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90

PROPOSED YEAR 15 PHOTOMONTAGE

AECOM

Visualisation Type:	4	Camera:	Canon EOS 6D	Ground Level:	437.9m AOD	**Note:** Images to be viewed at a comfortable arm's length.	NENTHEAD MINE WATER TREATMENT SCHEME
Projection:	Cylindrical	Lens:	Canon 50mm	Distance to Site:	347m		Viewpoint 12
Enlargement Factor:	100%	Horizontal Field of View:	90°	Height of Camera:	1.5m		
Paper Size:	A1	Direction of View:	SE				
Date / Time:	19/03/2019 12:39	Location:	E378284, N543840				

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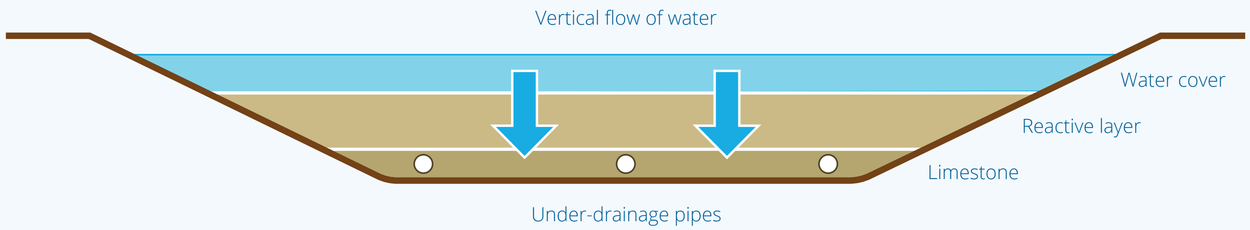
The Coal Authority

Environment Agency

Treatment process

Mine water treatment ponds

The lined ponds contain a layer of material in which natural reactions capture the metals. The cleaned water passes through an aerobic wetland before being put back into the River Nent.



Example of compost-based treatment ponds at Force Crag in the Lake District

Odour management

Hydrogen sulphide (H_2S) is generated by the natural reactions which remove the metals. There is the potential for this to cause an unpleasant odour if it is not controlled. We expect to use hydrogen peroxide to stop the H_2S causing an odour nuisance. However, we are investigating whether other options can be as effective but are cheaper to install and operate.

The Coal Authority

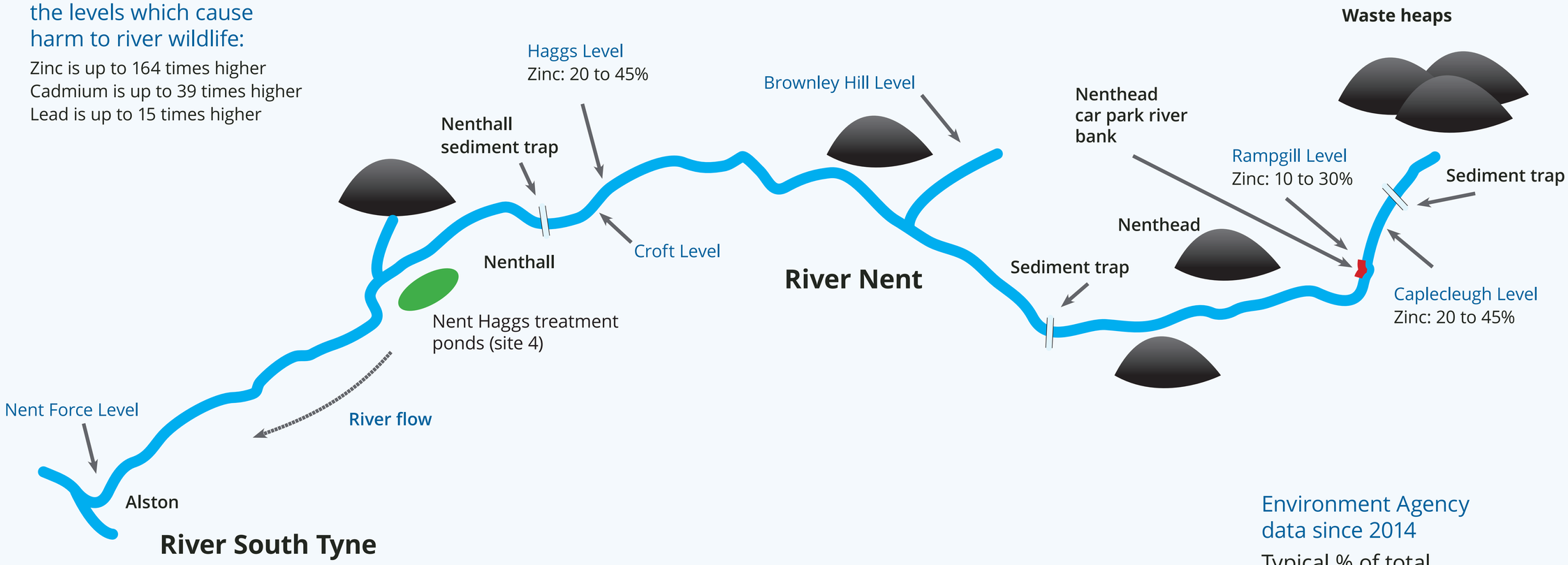
Environment Agency

GROWTH DEALS

Why do we need to clean up the River Nent?

At Alston, metal concentrations in the Nent are many times the levels which cause harm to river wildlife:

Zinc is up to 164 times higher
Cadmium is up to 39 times higher
Lead is up to 15 times higher



Environment Agency data since 2014

Typical % of total pollution at Alston