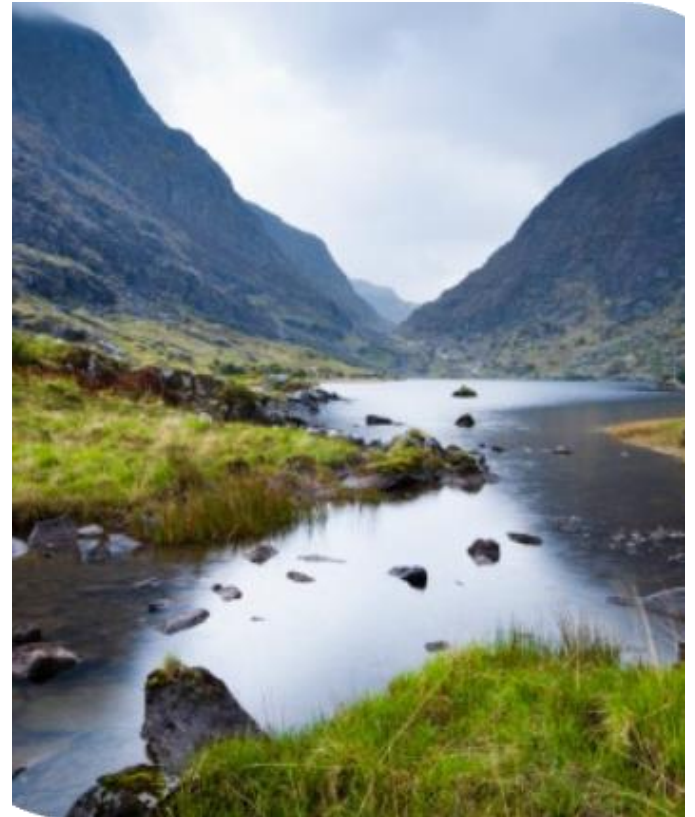


Making Mitigation Work **Measurable Mitigation** – *from project conception to delivery*

Kate Harrington (IW)
Daireann McDonnell (Independent Ecologist)

CIEEM Irish Conference, April 2018



Measurable Mitigation From Project Conception to Delivery



Introduction

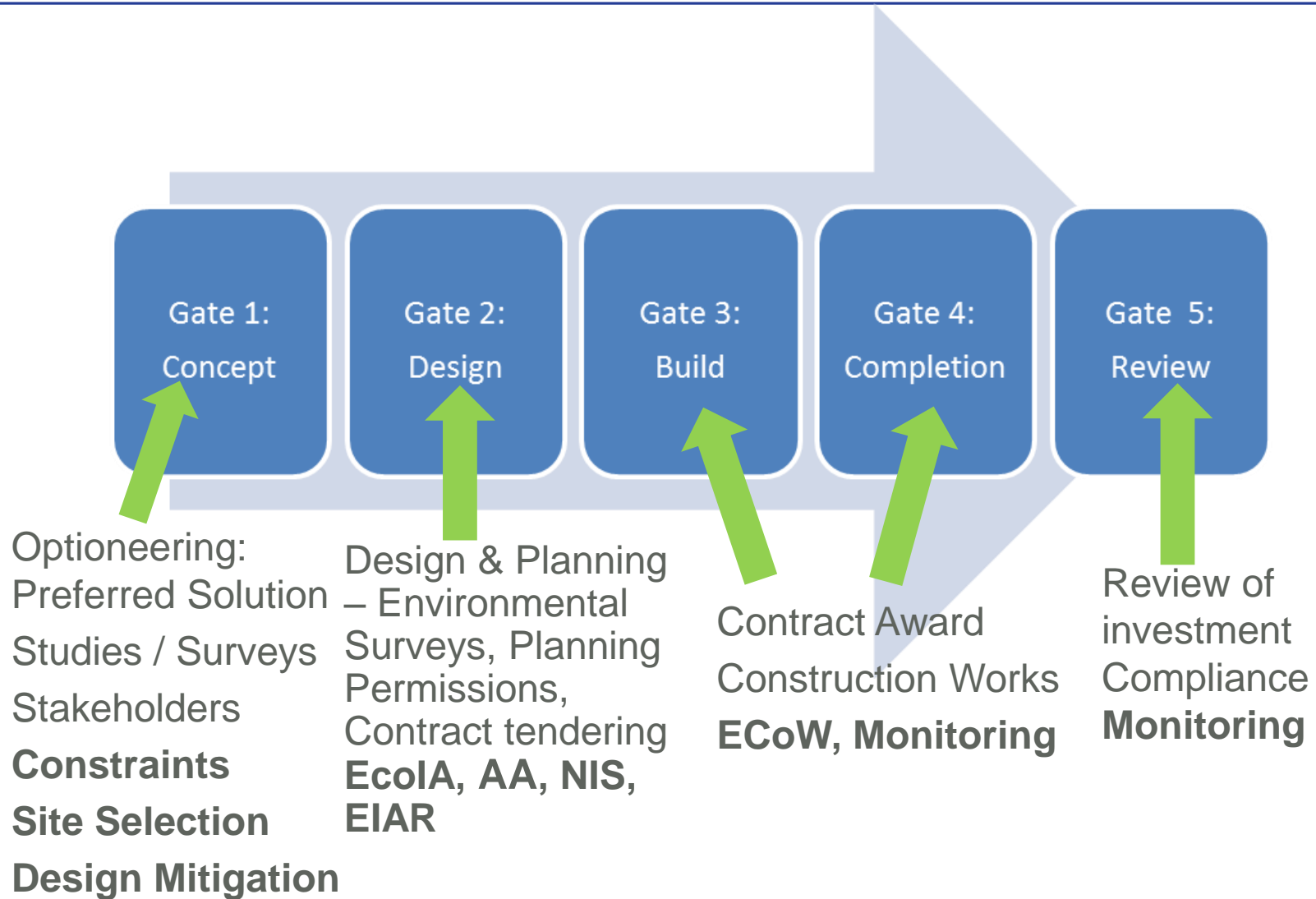
Kate Harrington: Irish Water

Daireann McDonnell: Ecologist

Irish Water Projects



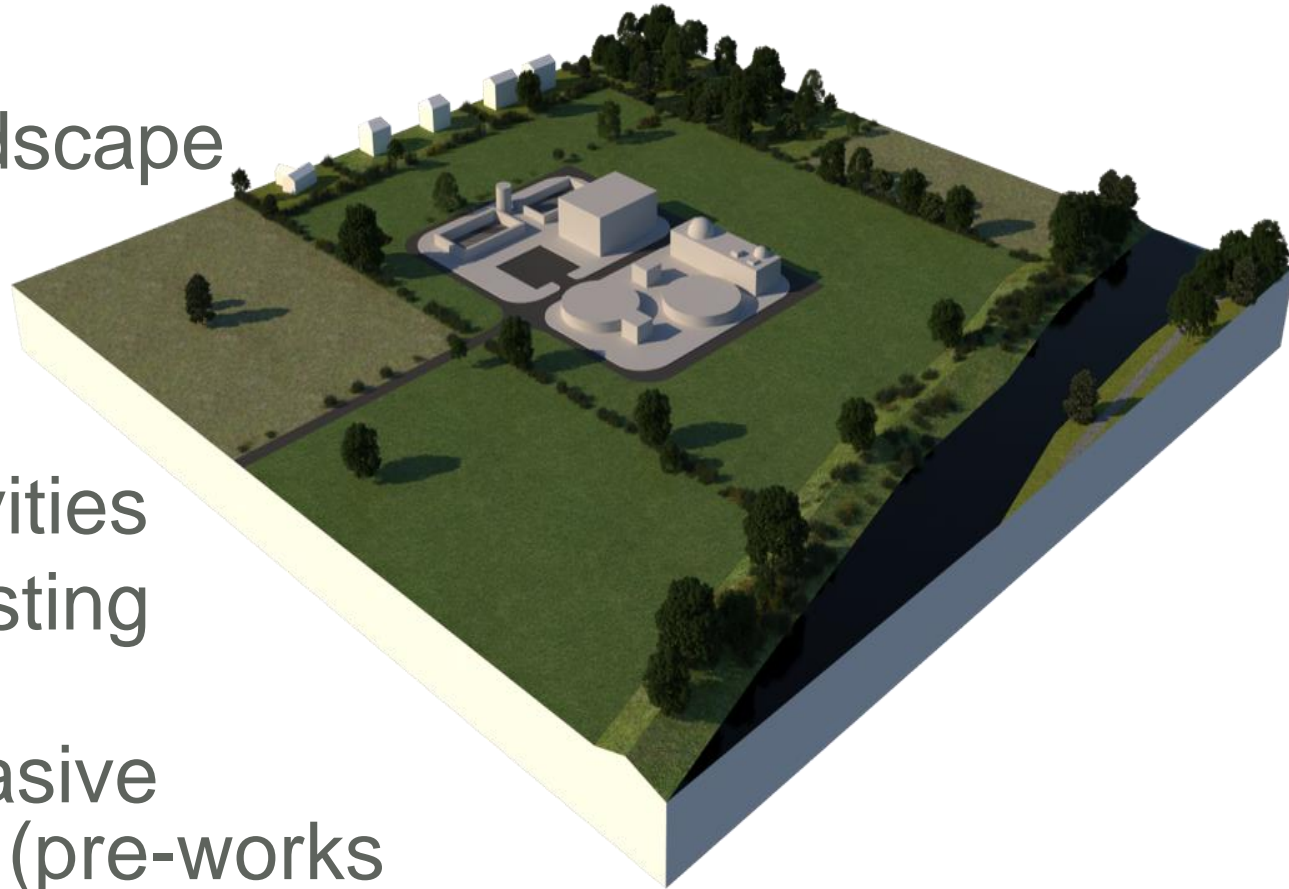
Project Lifecycle



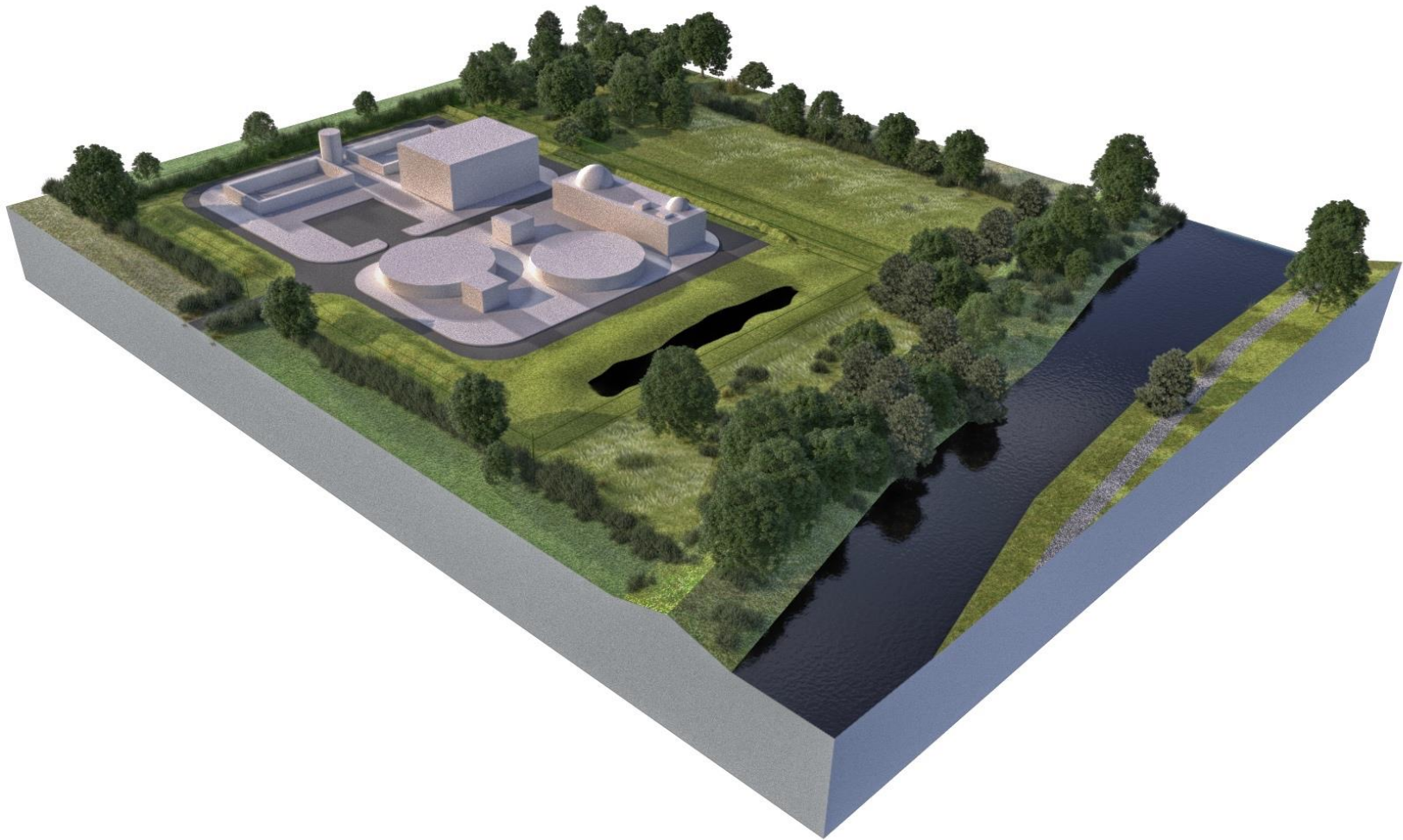
1. Project Siting and Design

Opportunities?

- Consider landscape setting
- Connectivity
- SUDS
- Avoid sensitivities
- Retaining existing features
- Deal with invasive species early (pre-works contract)



Project Siting and Design



2. Development of Mitigation Measures

Key Issues:

- Level of detail – Is it deliverable? Will it work?
- EcolA and requirements of Wildlife Act/Protected species frequently forgotten about.

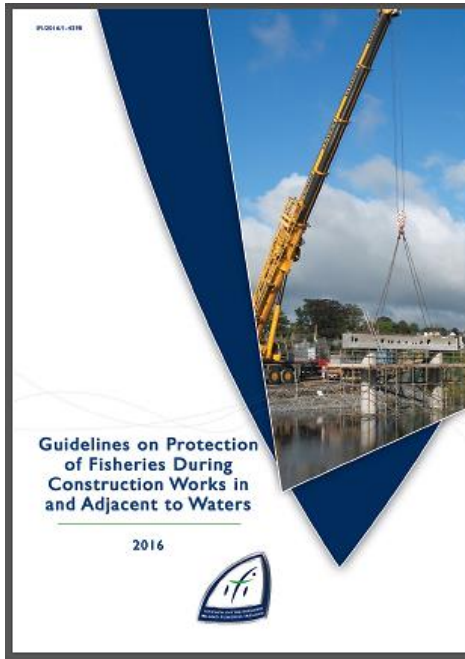


- Invasive species surveys and management plans - constraints and timing of works.
- Expertise of consultants – assessments and consequent mitigation measures often lean on or emphasise the expertise of the authoring team.

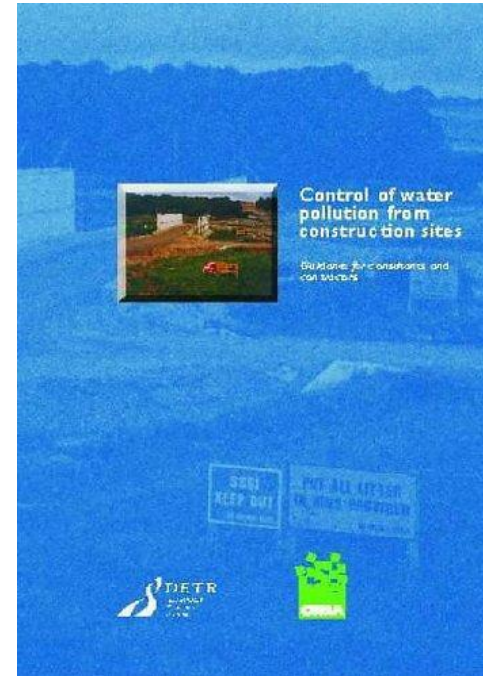
NIS Mitigation:

- Are all measures required to avoid or reduce impacts clearly detailed in the NIS? (must be standalone)
- Could the mitigation measure affect other ecological sensitivities on site?
- Have you made assumptions regarding the ecological expertise available to the contractor?
- Are you confident in results of other specialist reports (e.g. hydrogeology?)
- Monitoring Requirements? – Could this point to an incomplete assessment?

Surface Water Management



“The contractor will follow XX guidance and prevent surface water pollution...”



- How does Contractor select appropriate measures to address ecological sensitivities?
- Ecologists completing assessments should be prescribing the appropriate measures for a particular site.

Detail most frequently lacking:

- Location of silt fences/ponds/curtains.
- Impact of installing these features.
- Evidence that there is adequate space/area available.
- Consideration of planning implications e.g. temp works areas.
- Mitigation for HDD risks.



Measures are low cost in context of scheme!

3. Implementation of Mitigation Measures

Contracts are used to control and allocate risk



‘Design Build Operate’ Projects

- Detailed design post-planning – flexibility for contractor.
- More risk goes to contractor.

Difficulties from EcolA/AA perspective:

- Avoid getting bullied into completing vague assessments.
- Ecologists must specify the required constraints.
- Assess worst case scenario, or assess impacts within a range of potential effects scales

‘Employers Requirements’

CEMP: ‘Construction’ or ‘Contractors’ Environmental Management Plan

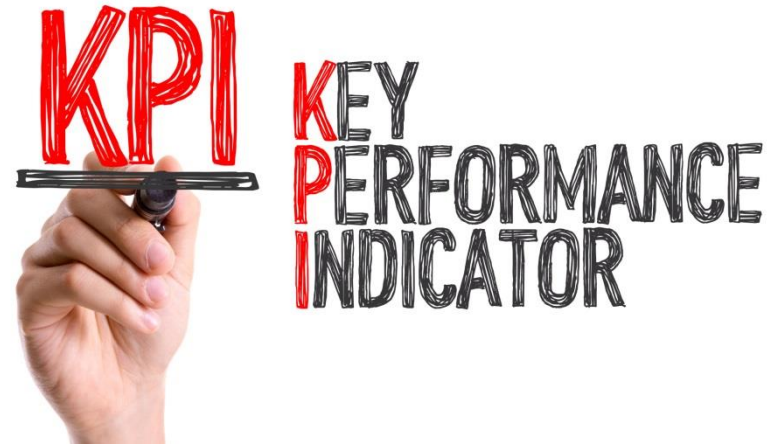
- Key planning requirement & strengthens NIS
- Outline/Preliminary - Specifies parameters / boundaries for compliance (measurable criteria/thresholds)
- Stimulates Project Team discussions prior to planning
- Finalised CEMP includes
 - *Schedule of Environmental Commitments*
 - *Planning Conditions,*
 - *Approved by ECoW / Client*

Employers Requirements'

- 'Schedule of Mitigation Measures and Environmental Commitments'
- Monitoring Plans
- Surface water management plans
- Construction erosion and sediment control plans
- Task-specific method statements for specific construction activities

Key Performance Indicators – KPI's

- Mechanism utilised to incentivise improved performance
- Carrot or Stick
- E.g. H&S, programme, ecological!
- Financial penalty for pollution incident
- Within framework structure contractors can be scored on past performance



Role of an ECoW

- Scope of ECoW role in NIS / Ecological Reporting written into Contract Documents.
 - *ECoW supervision for whole project or only elements?*
 - *What risks / elements need supervision?*
 - *Will the ECoW be as experienced as the Ecologist writing the assessment?*
- Best employed by Employer's Representative – not directly by Contractor.
- Specific expertise / qualifications applicable to the Project
 - *Will a Contractor listen to a graduate?*
 - *Who will evaluate the CV of the proposed individual*



- Consider the project design
- Is Mitigation detailed enough and will it work in practicality?
- Specify how mitigation measures will get incorporated into contracts
- Specify the role of the ECoW
- Irish Water ecologists available for ecological support/advice –
 - *Kate Harrington* kharring@water.ie
 - *Brian Deegan* brdeegan@water.ie

Oughterard WWTP Upgrade: Project History

Outline of Ecological Input
and Acknowledgement of
Involvement:



Evelyn Moorkens
& Associates



Oughterard WWTP : Measurable Mitigation On Site

Part 1: Implementation of Effective Mitigation Measures

- Delivery of mitigation on site and ECoW Role
- Effective mitigation - certainty from reporting to site.

Part 2: Surface Water Management On-site

- Compliance with specified protection measures
- Adaptive solutions to meet requirements

Part 3: Turbidity Monitoring Programme

- Planning conditions and Contract Document specifications
- Tailored solution and site-specific design

Part 1: Implementation of Effective Mitigation

- Effective mitigation should meet the following criteria:
 - **S** *Scientific, evidence-based*
 - **M** *Measurable*
 - **A** *Achievable*
 - **R** *Repeatable*
 - **T** *Timely*
- Protective / avoidance measures should always be specific to the site and its receptors
- Must be appropriate and scaled proportionately to the reduction / avoidance of risk

- Oughterard WWTP Upgrade: Lough Corrib SAC boundary and Freshwater Pearl Mussel (FPM) river
- Planning: Quantified mitigation proposals and advanced monitoring programmes
- Contract Documents: Certainty of delivery

IW Involvement Post-planning:

- Contract Documents incorporating Planning Conditions
- Contract Award and Contractor Appointment
- ECoW Appointment – via Nicholas O'Dwyer
- Review and sign-off of Site-specific Environmental Method Statements in advance of works commencing
- Contractor mobilises to site – ongoing review of EMS and monitoring

ECoW: Supervision on site

- Oversight / advisory role - not risk management
- Appointment of ECoW always best as Client's / Proponents representative.
- Contractor may engage own Ecologist if required.
- ECoW role requires familiarity with site-specific receptors to make strong evaluations of risk
- ECoW must be persuasive in maintaining requirements for or against re. mitigation measures or risk avoidance.

Part 2 – Surface Water Management On Site

- Site-specific threshold criteria for surface water management built into NIS / Planning
- Encompassing Management Plan delivered via Contract Documents
- Contractor's EMP's subject to review and approval on site
- Sub-Plans:
 - *Surface Water Treatment and Retention (Settlement Areas)*
 - *Silt Fencing (site isolation)*
 - *Erosion and Sediment Control Plan*
 - *Surface Water Monitoring Programme*

Owenriff River Channel – Lough Corrib SAC



Part 2 – Surface Water Management On Site



Silt Fencing – Site Isolation

Triple-layer silt fence, dug in and secured as per guidance



Surface water drains isolated with check-dams and silt curtains in series



Part 2 – Surface Water Management On Site



Part 2 – Surface Water Management On Site



Part 2 – Surface Water Management On Site

Sediment control for dewatering



- Constraints and issues encountered on site:
 - *Lands made available*
 - *Retention Time*
 - *Connectivity to local drainage features*
 - *Site Investigation / Geology*
 - *Flood risk*

Part 3: Turbidity Monitoring Programme

Monitoring is necessary to:

- Ensure required mitigation is implemented in full by Contractor – need audit / recorded account
- Demonstrate the proponent is maintaining full control and responsibility
- Demonstrate that the predicted impact thresholds / significance have not been exceeded
- Demonstrate mitigation proposed was effective in achieving objectives
- Confirm that impacts or adverse effects arising are or are not resulting from the works.

Part 3: Turbidity Monitoring Programme

- Conservation Status (C.O.s) for FPM – standard surface water quality criteria for TSS do not afford protection
- Suspended Solids vs. Turbidity monitoring
- **Aspirational value of 25mg/l is not achievable**

Part 3: Turbidity Monitoring Programme

Weather Forecast Trigger Values – Measurable Criteria

- Schedule 1: Very high risk activities
 - *6hour rainfall >3mm / 12hour rainfall >4mm / 24hour rainfall >5mm*
 - *No overland flow or pathway for water movement*
 - *Conditions on the ground match the forecast*
- Schedule 2: High risk activities
 - *6hour rainfall >6mm / 12hour rainfall >8mm / 24hour rainfall >10mm*
 - *Conditions on the ground match the forecast*
- Schedule 3: Intermediate to low risk
 - *Silt fencing manages all risks; work can be undertaken in all weathers but turbidity monitoring triggers remain*

Owenriff River Channel – Lough Corrib SAC



Part 3: Turbidity Monitoring Programme

- Monitoring programme in the Owenriff River (SAC/FPM population)
- 6 no. fixed turbidity monitors at agreed locations. Fully operational prior to works commencing.
- Each monitor takes 5 consecutive readings and outputs an averaged value.
- Readings transmitted to web-based data portal by Sea Below Marine – allows live monitoring.
- Data graph over time for each monitor + rolling / instantaneous averages / data processing.

Turbidity monitoring gauge installation

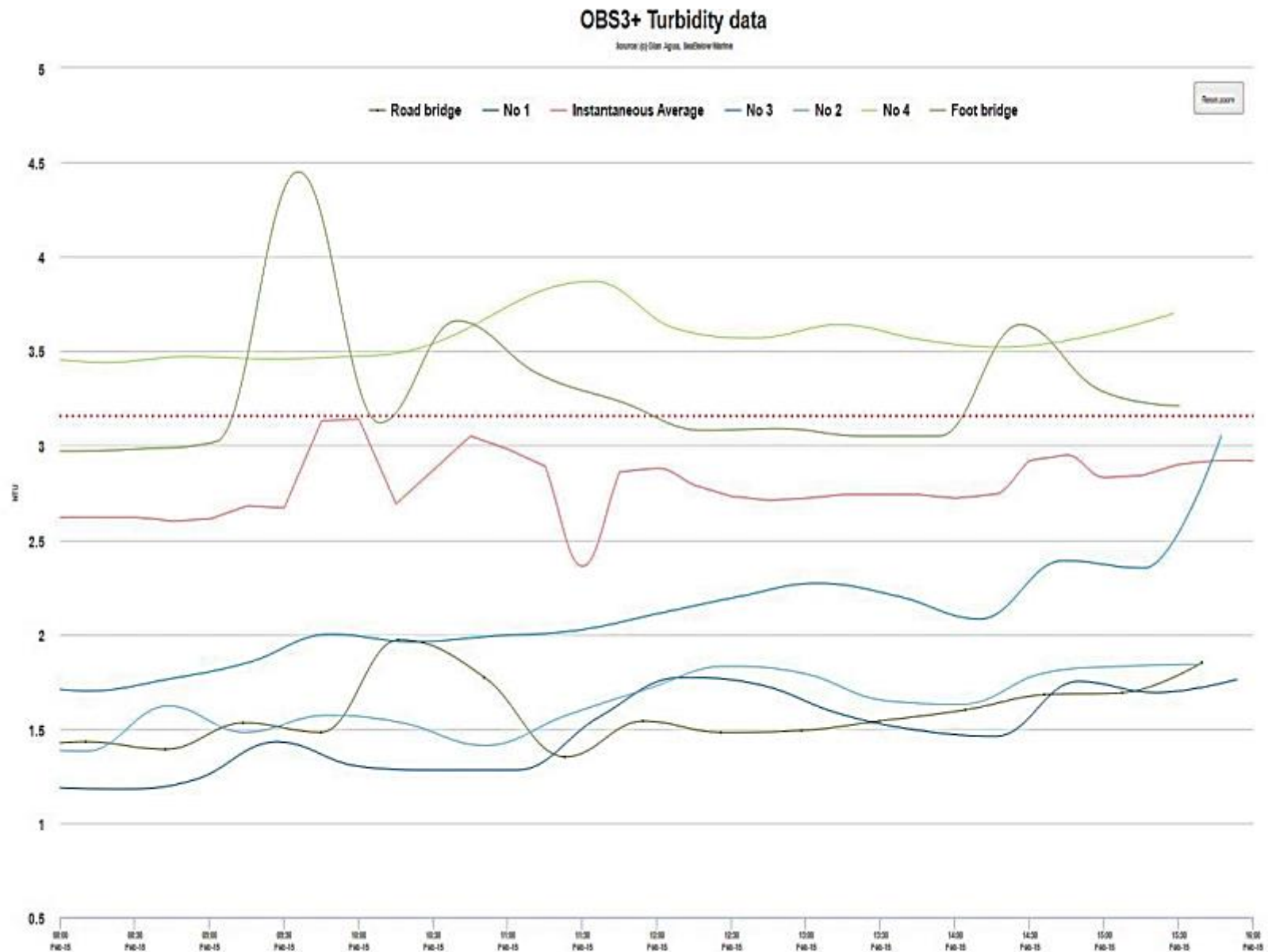


Part 3: Turbidity Monitoring Programme

Measurable Criteria - Turbidity Thresholds / Alerts:

- The following conditions have been considered in establishing the parameters.
 - *Low Flow Level (<1.25m (from OPW)) uses a long term rolling average (of 3 x upstream gauges) based on previous 30 days.*
 - *High Flow Level (>1.25m (from OPW)) uses an instantaneous average (of 3 x upstream gauges) updated every 5 minutes.*
- There are two alert systems for all conditions (high flow / low flow)
 - *Alert 1 is when any of the downstream monitors reaches 80% of the average.*
 - *Alert 2 is when any of the downstream monitors reaches 100% of the average.*

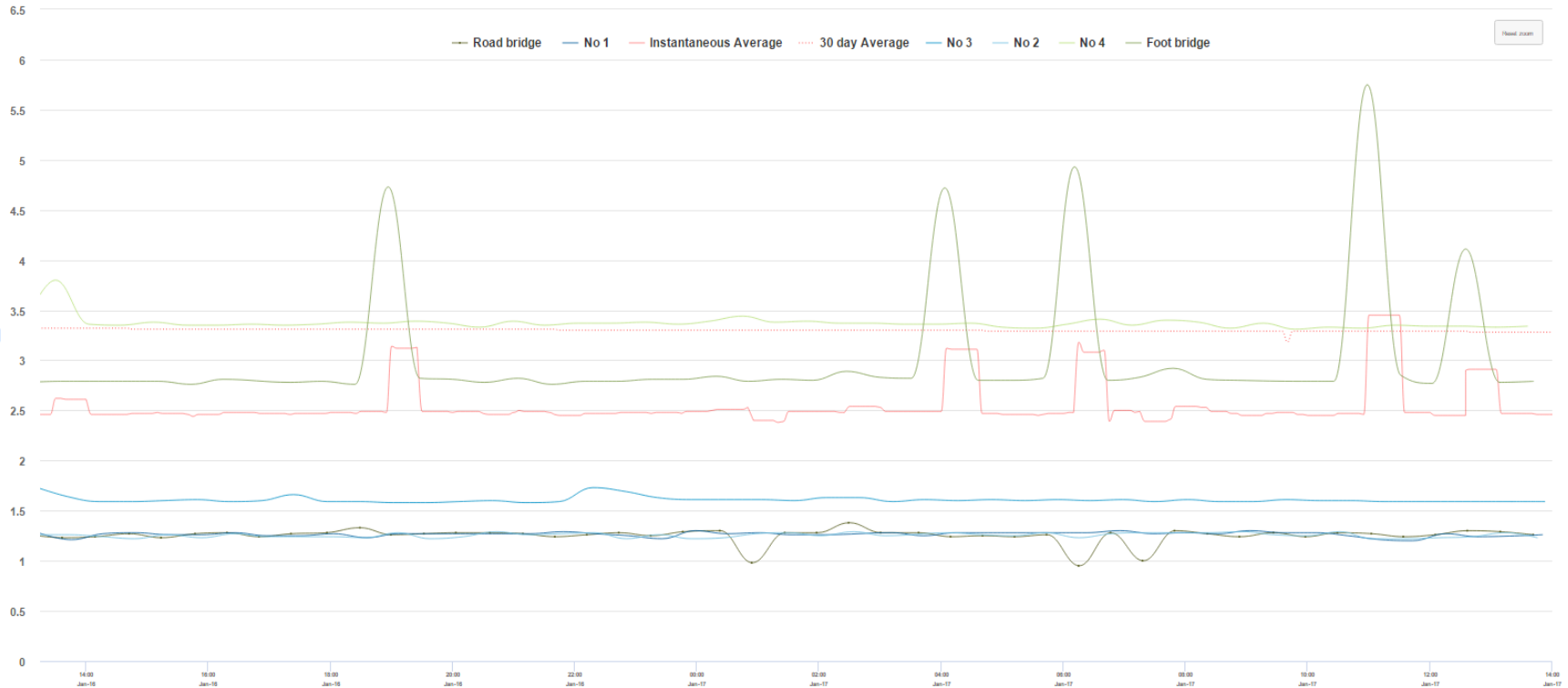
Part 3: Turbidity Monitoring Programme



Part 3: Turbidity Monitoring Programme

OBS3+ Turbidity data

Source: (c) Glen Aqua, Seaboard Marine



- Measurable threshold criteria ensure compliance with mitigation / protection objectives (certainty)
- ECoW – familiarity with site sensitivities
- Use of technology to provide data
- Data allows demonstration of project effects (certainty feedback loop)

- Recognition of Project Inputs
- Many Thanks for Listening
- Open for Questions