Digital IA
Enhanced environmentally integrated design enabled by digital advances

6th July 2023
Who are Atkins

• Design, engineering and project management consultancy
• Serving the infrastructure, transportation and energy sectors
• Atkins was founded in 1938 in London, acquired by SNC-Lavalin Group in 2017
• 50,000 employees worldwide, with offices in over 50 countries & operations in over 160 countries
• Environment Business has c.650 people in the UK & India, Global Environment Practice of c.1,700

Better outcomes for communities & environment by putting them at the heart of decision making
Presenting today

Paul Morgalla
Associate Director
UK Environment Digital lead

Dan Parsons
Associate Director
Environment Practice

Pietro Rescia
Associate Director
Environment Practice
Using digital to integrate the environment into the Asset Delivery Lifecycle

Environmental Integrated Design → Data Driven Impact Assessment → Digital Environmental Compliance

- Strategic Planning
- Feasibility / Optioneering
- Planning / Design
- Construction and Operation
Environmental Integrated Design
Paul Morgalla
The challenge

- 1.2 mi people killed
- 7,000+ disasters
- $3 trillion economic damage (UNDRR)

Under pressure to deliver more
- Climate resilient
- Low carbon
- People positive
- Nature positive

Demanding environmental requirements
- Regulatory challenges
- Reputational damage
People, Data, Technology

Digital is more than just a label. It’s fundamental to our way of working. It has the power to transform outcomes, when combined with every element of the process: our people, our data insights and our technology

Adoption of digital is as much about adopting a digital mindset, as it is about data and technology
Adopting a digital mindset

- Adopting a digital mindset is just as (if not more) important than the technology
- Much can be achieved using readily available open data tools (e.g. QGIS)
- Global, regional and national open data increasing available
- Upskill your team’s digital and data capabilities
Our Environmental integrated design approach

• Better outcomes through earlier engagement
• Data-driven & digitally enhanced assessment
• Influence design decision making earlier
• Avoid & reduce environmental impacts and effects earlier
• Look for opportunities

Proactive engagement in design development
Left-shift in how the environment is considered in the design process

**Traditional:** reactive to design / brief

- Design development first
- Mitigate the worst environmental impacts
- Caught in a loop of late identification of issues & revisions

**Environment Integrated Design:** proactive, outcome-based approach

- Set environmental principles early
- Identify environmental opportunities & avoid the worst
- Reduce the effects
- Improve overall project outcomes

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Environmental Integrated Design Example

- Environmental Outcomes defined from the onset
- Rapid collation of environmental data, stored in our spatial Common Data Environment
- Establish environmental baseline
Environmental Integrated Design Example

- Development of early route corridors

Environmental Outcomes

- Biodiversity
- Cultural Heritage
- Landscape
- Air Quality
- Community
- Geology & Soils
- Water Resources
- Flood Risk
Environmental Integrated Design Example

Environmental Outcomes
- Biodiversity
- Cultural Heritage
- Landscape
- Air Quality
- Community
- Geology & Soils
- Water Resources
- Flood Risk

- Identify what we want to avoid

As environmental specialists, we typically refer to the mitigation hierarchy when carrying out assessments:

- AVOID
- MINIMISE
- RESTORE
- REDUCE
- OFFSET
Environmental Integrated Design Example

- Quantify potential level of mitigation
- Focus on early sight of constraints & opportunities

<table>
<thead>
<tr>
<th>Environmental Outcomes</th>
<th>High Sensitivity</th>
<th>Medium Sensitivity</th>
<th>Low Sensitivity</th>
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<tbody>
<tr>
<td>Biodiversity</td>
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<tr>
<td>Cultural Heritage</td>
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<td>Geology &amp; Soils</td>
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<td>Water Resources</td>
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Environmental Integrated Design Example

- Objective assessment against original outcomes
- Move the conversation on from the least worst option
- Unlock Opportunities

Assessment Scale

<table>
<thead>
<tr>
<th>Major Adverse</th>
<th>Moderate Adverse</th>
<th>Minor Adverse</th>
<th>Neutral / Nil</th>
<th>Minor Positive</th>
<th>Moderate Positive</th>
<th>Major Positive</th>
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Construction Score

<table>
<thead>
<tr>
<th>Subsections</th>
<th>1: Biodiversity</th>
<th>2: Cultural Heritage</th>
<th>3: Landscape</th>
<th>4: Air Quality</th>
<th>5: Community</th>
<th>6: Geology and soils</th>
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Operation and Maintenance Score

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Unlocking Opportunities

Our role is no longer to just mitigate the worst

Elevate our vision by working with nature and supporting communities to deliver opportunities and resilient infrastructure

‘art of the possible’ + business case benefits
Summary

Environmental integrated design
- Better outcomes through earlier engagement - realize business case benefits earlier than traditional approach permits
- Data-driven & digitally enhanced environmental assessment hub

Proactive engagement in design development
- Influence design decision making earlier
- Avoid & reduce environmental impacts and effects early - lower mitigation costs
- Look to unlock opportunities - enhance the environment and community
- Carry through into the Planning / Design / Construction - robust approach
Data Driven Impact Assessment
Dan Parsons
Using digital to integrate the environment into the Asset Delivery Lifecycle

Environmental Integrated Design

Data Driven Impact Assessment

Digital Environmental Compliance

Strategic Planning → Feasibility / Optioneering → Planning / Design → Construction and Operation
Why should we digitize EIA?

Solution to existing problems
• Increasingly complex and impenetrable reports
• Increasingly expensive

Unlocking opportunities
• Integration of the EIA process with other project digital tools
• Earlier engagement with project designers and engineers
• Better environmental outcomes
• Cheaper and more efficient processes
Digital EIA – Efforts to date

- A few examples but no wide spread adoption of digital EIA
- Regulators don’t currently accept digital submissions
Coming at the problem from a different direction

- Digital mindset
- Shifting focus from presentation to process
- EIA coordination becomes data management
Back to basics – Conceptual EIA model

- Desk studies
- Surveys
- Modelling
- Consultation

- Professional judgement
- Modelling
- Consultation

- Standards and guidance
- Professional judgement
- Experience
- Consultation

Environmental Report

Environmental receptor → Impact → Mitigation → Residual effect

Digital EIA model
Building a truly digital EIA

- Data / information management and flows
- Use of common and familiar software e.g. MS Office applications
- Automation to improve quality and efficiency
- Improved collaboration
- Flexibility in reporting
Digital IA model in action

- Exports Environmental Statement in a format that is acceptable to regulators
- Replicates the structure of the Conceptual EIA Model
Digital Environmental Compliance
Pietro Rescia
Environmental Requirements

Minimum Requirements
• Requirements generated by the applicable environmental legislation
• Standards adopted voluntarily by the proponent
• Other standards e.g., required by investors

Specific Requirements
• Control and mitigation measures published in the EIAs and other official documents
• Permit, licence and planning conditions e.g., authorisations, decrees and consent conditions by regulators and public authorities.
• Specific agreements of the Organisation with third parties, including community groups, non-governmental organisations (NGOs).
General Workflow

1. Applicable Legislation
2. Standards Stewardship
3. Other Standards

Environmental Minimum Requirements

Environmental Requirements

ESIAs

Permit Conditions

Other agreements

Environmental Specific Requirements

Requirements from other disciplines

Design Construction Operation Requirements
The challenges of the Specific Requirements

- Many
- Dynamic nature
- Vague terms

- Contractually relevant
- Regulatory links
- Subject to conditions

- Attribution to entities
- Management of interfaces
- Traceability of compliance
Conditions for Applicability

Spatial
- Jurisdictions
- Designations
- Receptors

Temporal
- Seasons
- Day and night
- Project phasing

Technological
- Activities
- Plants and equipment
- Emissions

External
- Wind speed
- Temperature
- Water levels
Workflow for a specific region / subset of activities

Requirements from other disciplines

Design, Construction, Operation Requirements

Environmental Requirements

Minimum Environmental Requirements

Environmental Specific Requirements

Technology Filter

Spatial Filter

Programme Filter
Spatial filter
Spatial Filter

1. Run geoprocessing tool
2. Authenticate with ArcGIS Enterprise as the signed in user
3. Search for feature layers by tags
4. Feature Layers
   - Does the layer have a specific field?
     - Yes: Query each feature layer to find features within the AOI
       - Display features on map
       - Generate downloadable Excel file
     - No: End
# Technology and programme filter

<table>
<thead>
<tr>
<th>Contract Number</th>
<th>Contract Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td>Stage</td>
<td>All</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td></td>
</tr>
<tr>
<td>Start / End Date of Works</td>
<td>01-Jan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question Code</th>
<th>Will Contract Activities Require/Originate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>T001</td>
<td>The use of construction equipment or plants powered by internal combustion engines</td>
</tr>
<tr>
<td>T002</td>
<td>To clear the area where the activities will be carried out from vegetation, shrubs, trees</td>
</tr>
<tr>
<td>T003</td>
<td>The generation of traffic to transport construction materials to the site, dispose of waste, access of personnel</td>
</tr>
<tr>
<td>T004</td>
<td>The use of areas for setting up a construction compound outside the perimeter of the construction site</td>
</tr>
<tr>
<td>T005</td>
<td>The use of areas for storage e.g., of waste, construction materials, parking lots, refuelling of vehicles</td>
</tr>
<tr>
<td>T006</td>
<td>The removal of top soil in agricultural or natural or semi-natural areas</td>
</tr>
<tr>
<td>T007</td>
<td>Excavation of trenches, building of embankments, slopes, remodelling of surface, earth stockpiling earth movements in general</td>
</tr>
<tr>
<td>T008</td>
<td>The production of waste</td>
</tr>
<tr>
<td>T009</td>
<td>The production and discharge of wastewater, excluding liquid waste disposed of in tanks</td>
</tr>
<tr>
<td>T010</td>
<td>Construction of bridges, culverts</td>
</tr>
<tr>
<td>T011</td>
<td>Activities in the vicinity or intersecting waterbodies or their flood plain or embankments</td>
</tr>
<tr>
<td>T012</td>
<td>Maintenance activities during operation</td>
</tr>
</tbody>
</table>

Clear  Submit
Advantages of digital environmental compliance

Managing digitally the Specific Requirements enable to:

• Focus on what is applicable to specific designers, contractors, operators
• Narrow the scope of reviews, audits, and inspections
• Control of risks and liabilities
• Optimise construction phasing
• Improve the quality of the design
Summary

- Digital Impact Assessment can be applied across the asset lifecycle
- Digital mindset – Digital doesn’t necessarily require expensive technology
- Left-shift – use of data to early environmental thinking - make the biggest impact
- Golden thread – data handshake at each stage
- Reduction of risk – ensure benefits are realised – positive environmental outcomes