



**Ricardo**  
**Energy & Environment**

## **Habitats Regulations Assessment of Air Quality Impacts**

IAPSC, 4<sup>th</sup> December 2019

Dr Tom Adams

- Context: When and why is an HRA needed?
- Recent updates: Implications from recent case law
- Methodology: Some guidelines for carrying out a robust HRA study
- Case study: What happens during Stage 2 (appropriate assessment)

### The Conservation of Habitats and Species Regulations 2017

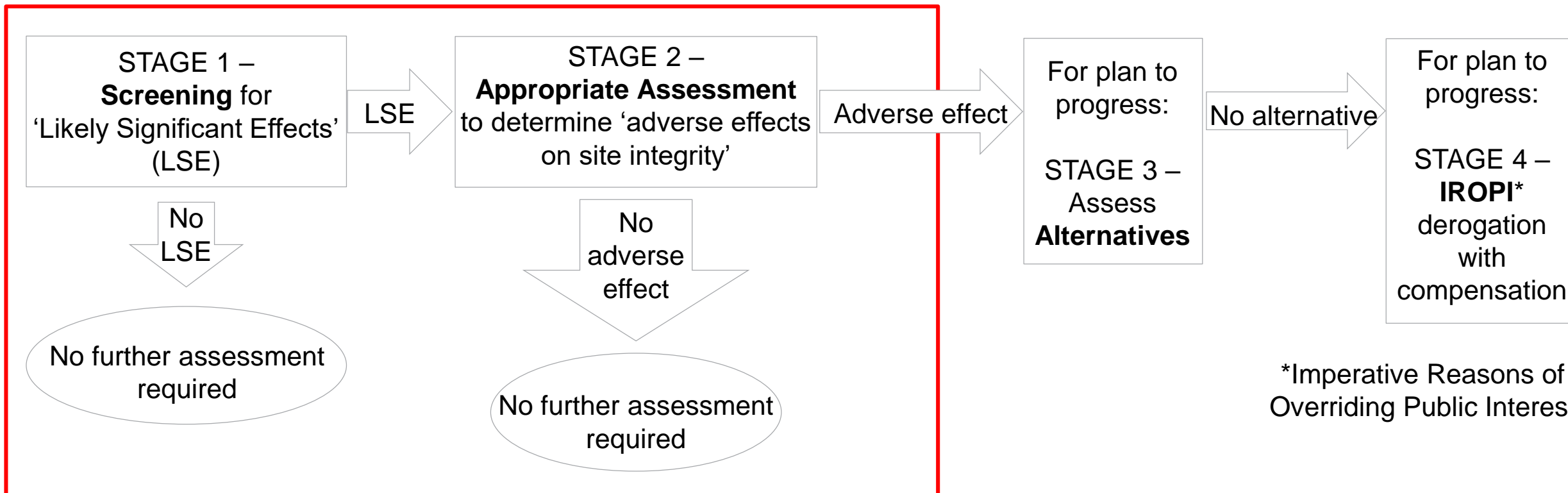
- In England and Wales, the Regulations transpose:
  - Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (**EC Habitats Directive**) into national law.
  - Elements of the **EU Wild Birds Directive**.

Note that **Ramsar Convention** derived sites (internationally important wetlands) are treated the same way in HRA under Government policy, even though they do not form part of this legislation.

- The regulations apply to projects and plans, acting alone or in combination with others, that may affect the following types of designated sites:
  - Special Areas of Conservation (SACs) and possible SACs – for habitats and species
  - Special Protection Areas (SPAs) and potential SPAs – for birds
  - Ramsar sites and proposed Ramsar sites – for wetland habitats and species



In practice, there are up to four stages of HRA:





## HRA Stage 1 – Screening:

- Aim is to screen for '**Likely Significant Effects**' (LSE), alone or in combination, based on **objective** information.
- For most ecological impacts, this is NOT a very detailed assessment. Purpose is simply to check if Appropriate Assessment (Stage 2) is required. It essentially asks 'Should we bother to check?'
- However, to screen for air quality effects, often using quantitative thresholds, some modelling (traffic and emission dispersion) is normally required, which can make Stage 1 more involved for this topic.



### HRA Stage 1 Screening – terminology:

- **‘Likely’** in HRA means a risk or possibility (rather than being probable). However, it should be a credible, real risk; not just hypothetical. Thus, the threshold for moving to Stage 2 is very low.
- **‘Significant’** effect means one that will undermine the site’s conservation objectives.
- **‘Objective’** means based on clear, verifiable facts rather than subjective opinion.



## HRA Stage 1 Screening – Thresholds

- We commonly rely on generic thresholds for Stage 1 screening of air quality effects:
  - Annual average daily traffic (AADT) flow increase of less than **1,000 cars per day** or **200 heavy goods vehicles (HGVs) per day** (ref. Design Manual for Roads and Bridges)
  - Increase less than **1% of critical load/level** (site specific)



### HRA Stage 2 – Appropriate Assessment:

- Required where Stage 1 has found LSE alone or in combination.
- Intended to determine any **adverse effect** on site **integrity**.





### HRA Stage 2 – Appropriate Assessment terminology:

- **‘Adverse’** means that it undermines the site’s conservation objectives.
- **‘Site integrity’** means *‘ecological structure and function across the whole site can sustain its constituent qualifying habitats and/or species populations’*.
- **‘No reasonable scientific doubt’** should remain regarding adverse effect on integrity.
  - Based on best scientific knowledge – i.e. a higher burden of proof required.



Three cases that are particularly pertinent to HRA of air quality impacts within plans:

- **Wealden** District Council vs Secretary of State for Communities and Local Government (SSCLG), Lewes District Council and South Downs National Park Authority (NPA).
- **People Over Wind** and Sweetman ('Sweetman II') vs Coillte Teoranta, Case C-323/17.
- Preliminary ruling of Advocate-General **Kokott**, Joined Cases C 293/17 and C 294/17.



- **Following Wealden:**

- In-combination impacts must be considered at the screening stage (HRA Stage 1).
- Potential opportunity for collaboration with neighbouring authorities – pooling resources & knowledge at various stages of HRA, from transport modelling through to developing joint strategies and implementing mitigation measures.

- **Following People Over Wind:**

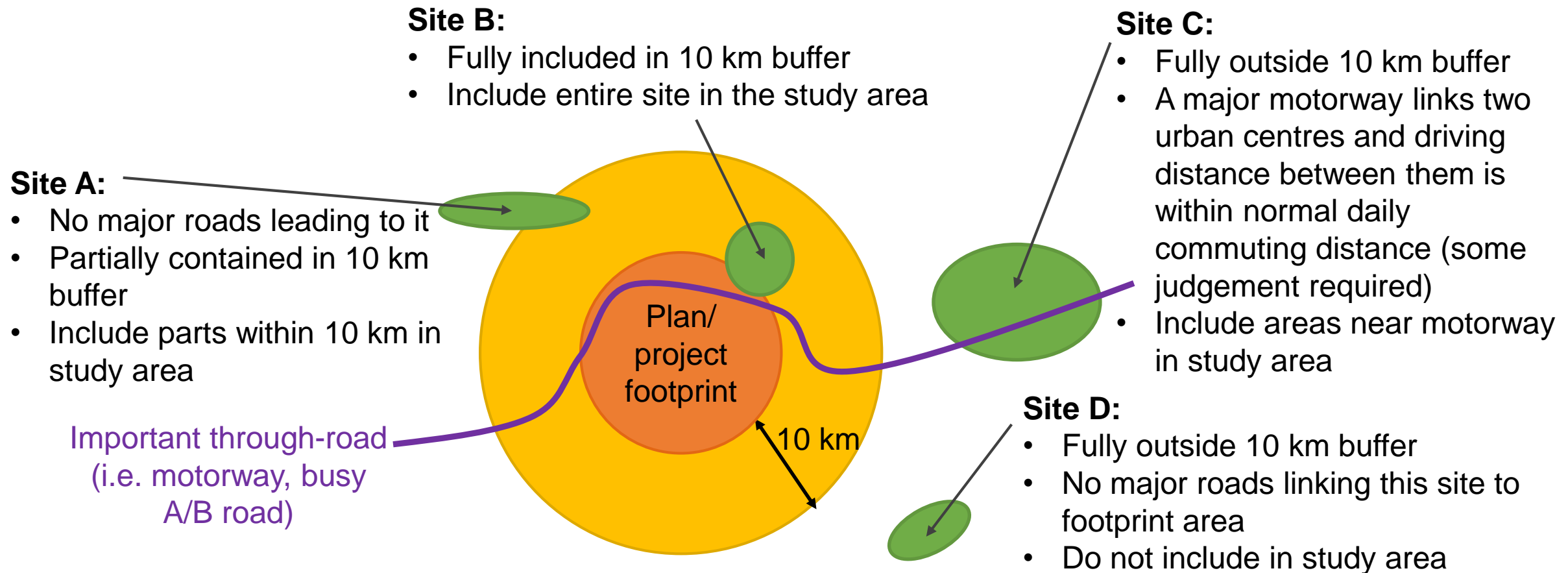
- Mitigation measures cannot be considered at HRA Stage 1.
- Potential opportunity to justify inclusion and funding of mitigation measures that would offer other co-benefits for air pollution, human health, etc.

- **Following Kokott:**

- Consider the limitations of the information upon which the assessment relies; how certain are forecast improvements?
- Potential for new techniques and approaches for the development of more robust evidence bases.

### Exceptional impact pathways:

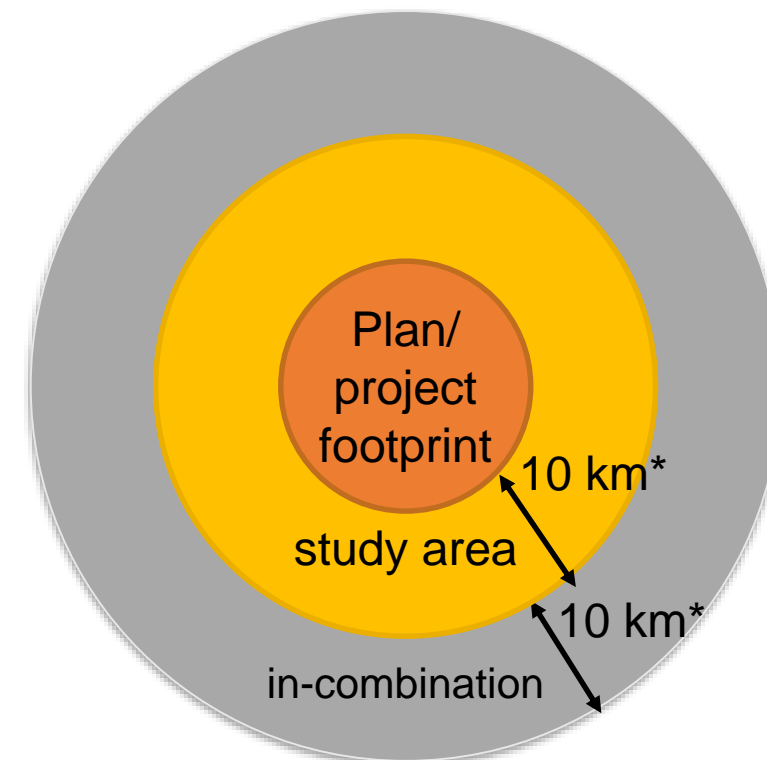
- Is there a pathway for the plan to significantly affect a designated site located more than 10 km away?



- All designated sites within the 'study area' boundary should be fully assessed for impacts, from your plan in isolation as well as in combination with other plans and projects.

### How far to look for in-combination plans and projects:

- In theory, if your plan could reasonably have a significant impact on designated sites up to 10 km away (within the 'study area' boundary), then plans or projects up to 10 km beyond that study area (within the 'in-combination' boundary) could also have a significant impact on the sites within the study area.
- In practice, information tends to be limited.
- It's important to agree a list of potential plans and projects to include in the in-combination assessment, and to be aware of information gaps and limitations of existing studies.





- **The precautionary principle:** the assessment should be precautionary, but not so precautionary as to produce results that are unrealistic.
- The precautionary principle should be reflected in the scenarios that are modelled.
- For a local plan / for modelling road sources: It makes sense to include some transport measures aimed at mitigating traffic impacts, but only those that are committed or otherwise very likely to happen; transport measures that are aspirational rather than likely should not be included in the modelled scenario used in the HRA.

### Three transport scenarios required for an HRA:

1. A reference year (in the recent past): to verify the model
2. A future scenario without the development
3. A future scenario with the development

The difference between scenario 2 and 3 provides the *process contribution (PC)*, which is assessed in the HRA.



## Tips for modelling road sources: Pollutants to model

- We routinely include 4 pollutants in our HRA studies for local plans: airborne oxides of nitrogen (NO<sub>x</sub>), airborne ammonia (NH<sub>3</sub>), nutrient nitrogen deposition and acid deposition.
- Although the majority of UK NH<sub>3</sub> emissions are from agriculture, NH<sub>3</sub> emissions from vehicles are *not* negligible. Technology introduced to reduce NO<sub>x</sub> emissions from vehicles (three-way catalysts, selective catalytic reduction (SCR) systems) can have the unintended consequence of increasing NH<sub>3</sub> emissions.



Airborne NH<sub>3</sub> also contributes to nitrogen and acid deposition; if you do not include NH<sub>3</sub>, you are not fully considering 3 of these 4 pollutants.

**Airborne:**

Oxides of nitrogen (NO<sub>x</sub>)

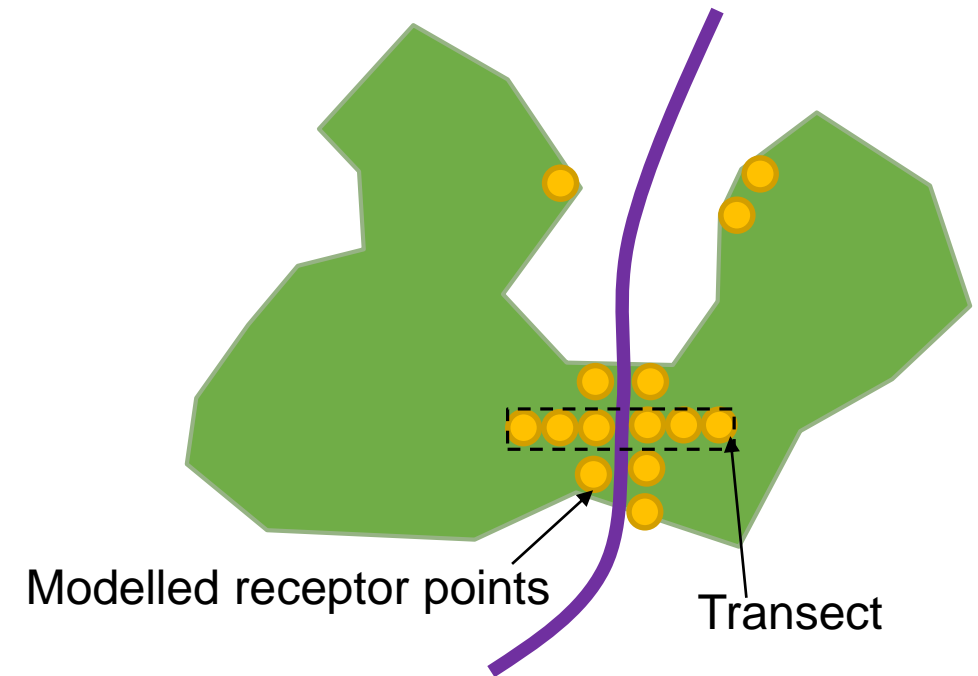
Ammonia (NH<sub>3</sub>)

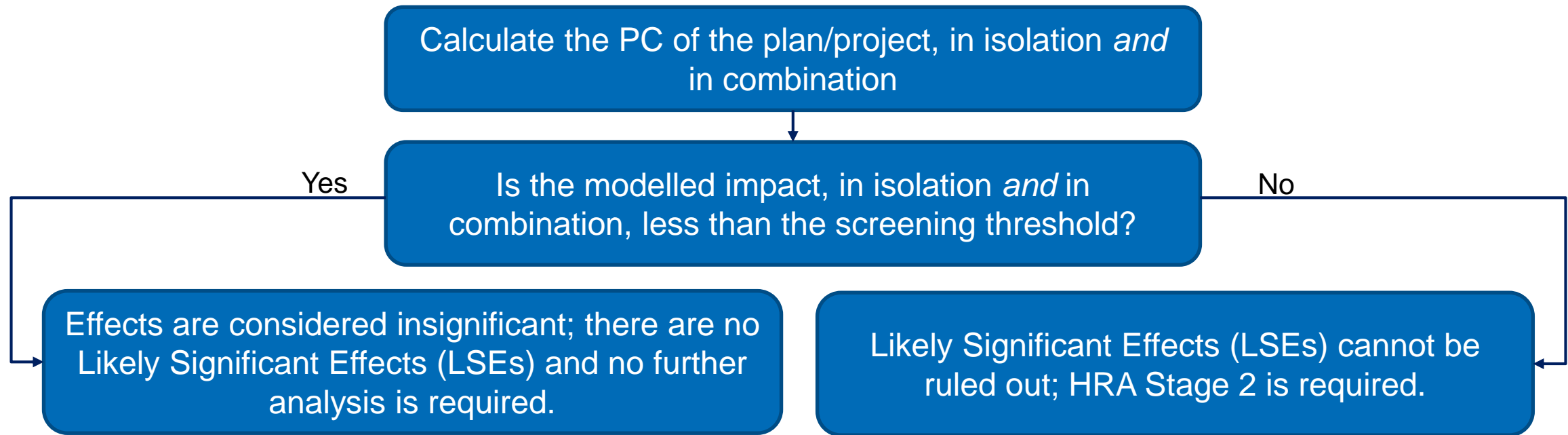
**Deposition:**

Nutrient nitrogen

Acid

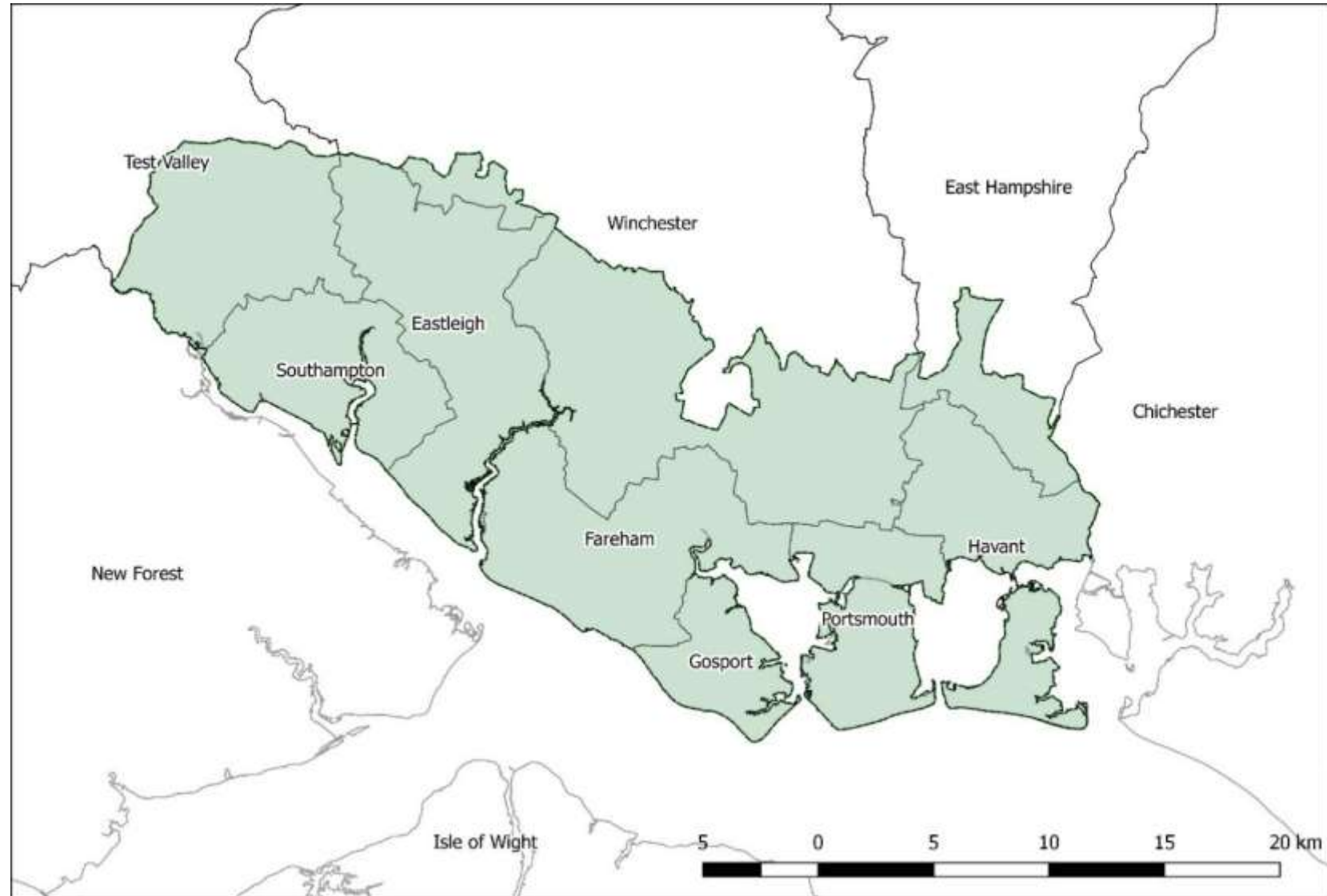
- More than one receptor point should be modelled in each designated site
- Include points spaced regularly along the side of a road where it passes through a designated site
- Include points where a road passes within 200 m of the edge of the site
- Include points along the site boundary and within the site itself, for example by modelling transects
- IAQM recommends that predictions are not made within 2 m from the edge of a road, as predictions at that short distance can be unreliable





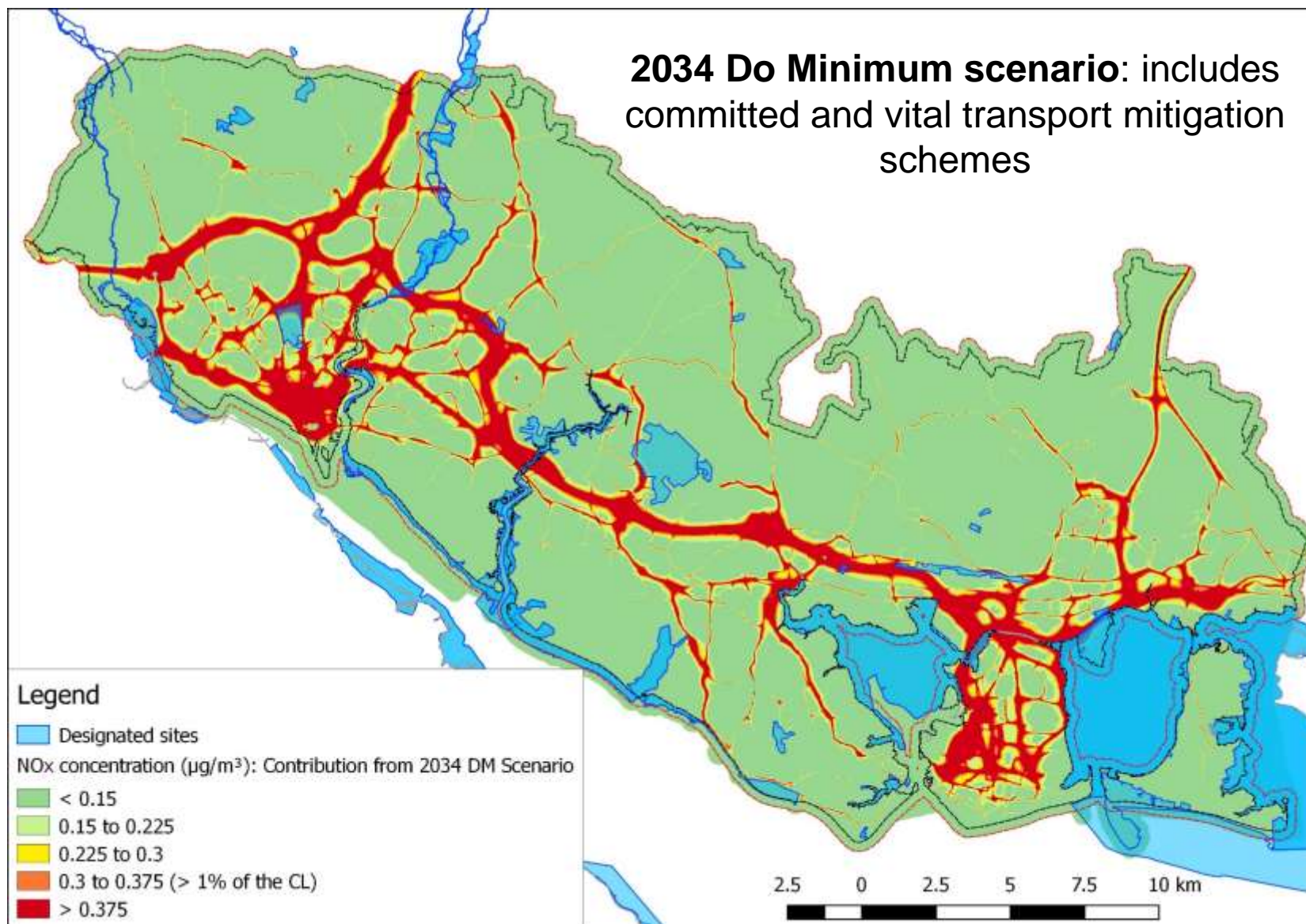
- Screening thresholds can be based on transport modelling (numbers of vehicles); however, the use of dispersion modelling with the latest version of the Emission Factor Toolkit (EFT) is recommended as it provides more detail on the PC impacts.
- If dispersion modelling is used, the screening threshold is set at 1% of the applicable pollutant limit (known as critical level or critical load for pollutants relevant to ecological sites).
- As a result of the need to consider in-combination impacts at the screening stage, the bar to move to HRA Stage 2 has effectively been lowered and Stage 2 is more common.

- PUSH is a partnership of 11 local authorities (9 included in this study)
- PUSH local authorities updating their local plans, looking forward to 2034 & 2036
  - Approximately 530 km<sup>2</sup> study area
  - > 9,000 road links included in the model
  - Estimated 83,000 new homes in study area
  - Increase in road traffic & air emissions





# PUSH: Modelled NOx contribution from the 2034 'do minimum' scenario



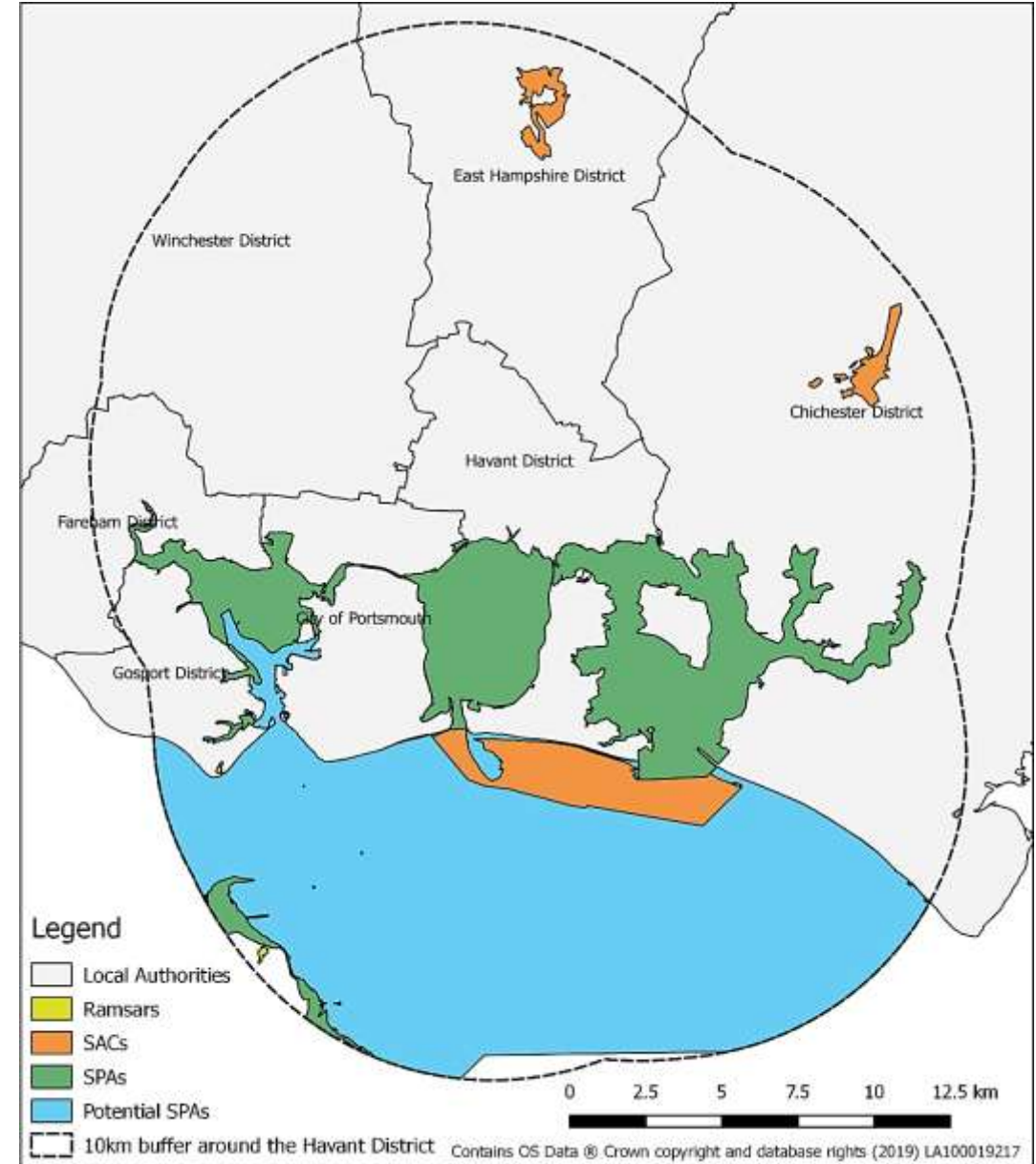
- Havant is one of the PUSH local authorities, updating their local plan to 2036
  - Estimated 9,260 new homes in study area
  - Approximately 55 km<sup>2</sup> study domain

## Key study questions:

- What are the associated impacts on designated sites?
- How can adverse effects be mitigated?

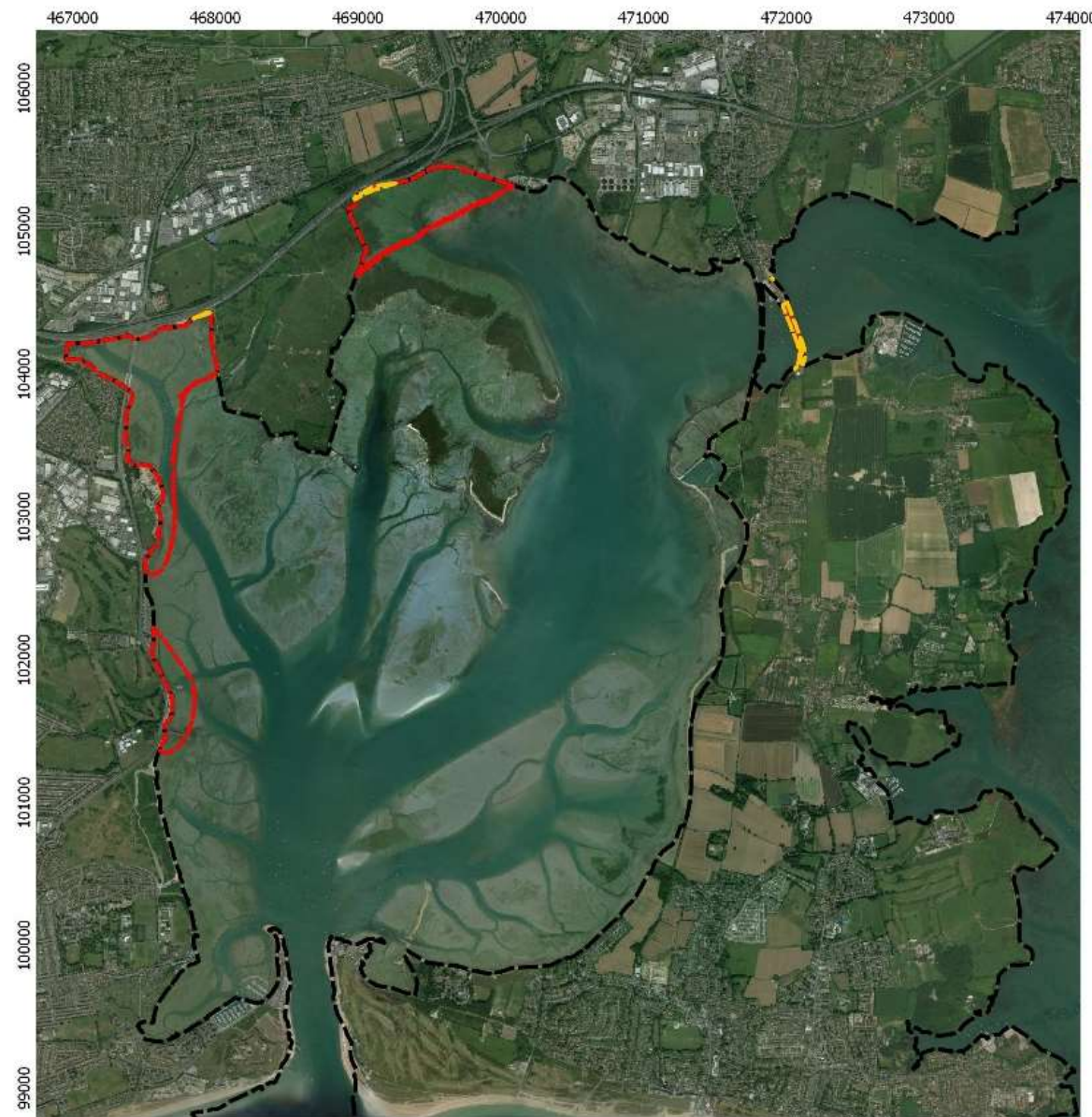
## Assessed:

- Designated sites – airborne NO<sub>x</sub>, airborne NH<sub>3</sub>, acid deposition & nitrogen deposition.





# Solent Maritime SAC: Screening results for nitrogen deposition



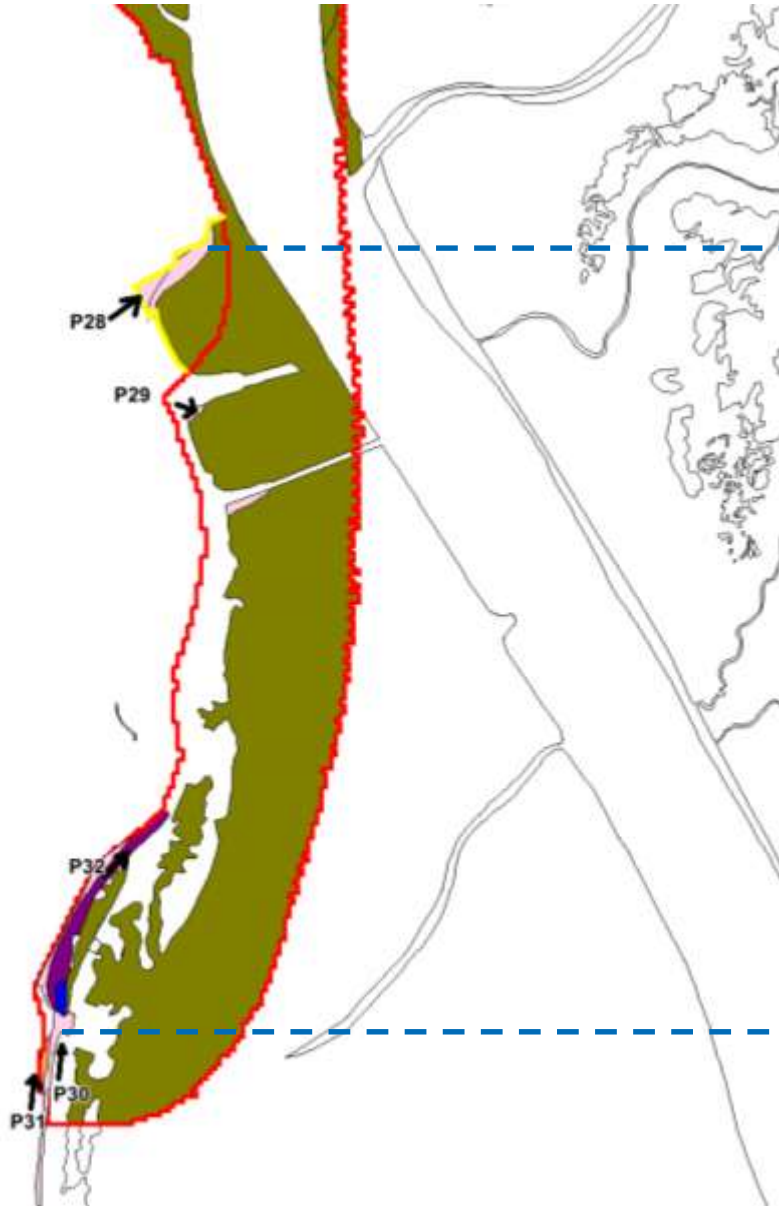
## Legend

- Solent Maritime - SAC
- Area where the PUSH DM contribution > 1% of the CL
- Area where the Havant DM contribution > 1% of the CL

500 0 500 1000 1500 2000 m



Sources: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, GeoEye, USDA FSA, USGS, AeroGrid, IGN, IGP, and the GIS User Community



Photograph 28:  
Narrow strip of sandy shingle behind fence, with rough grassland above.

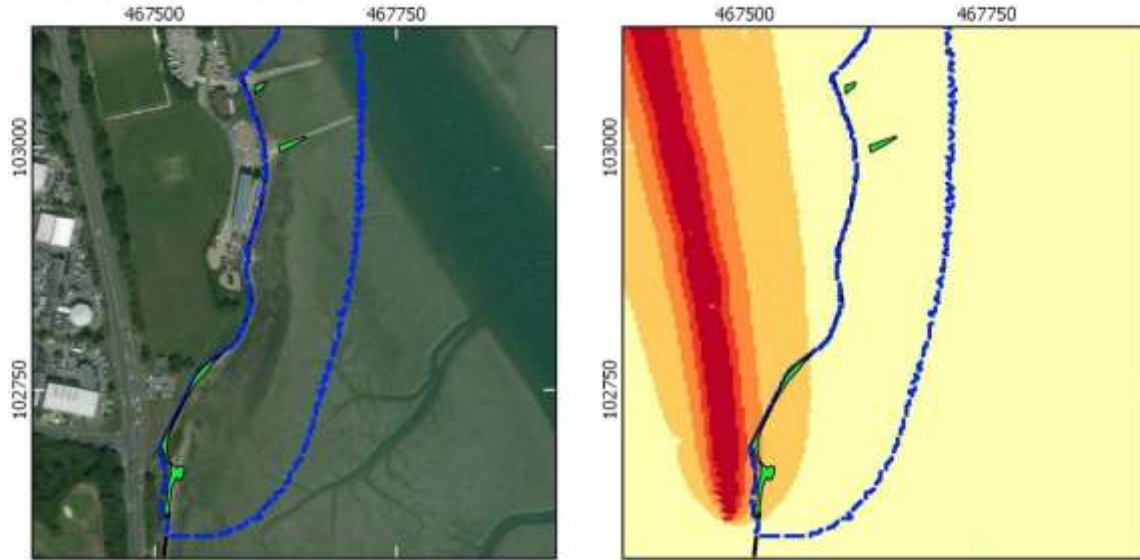


Photograph 30:  
Shingle vegetation, fronting small area of rough grassland in front of sea wall.

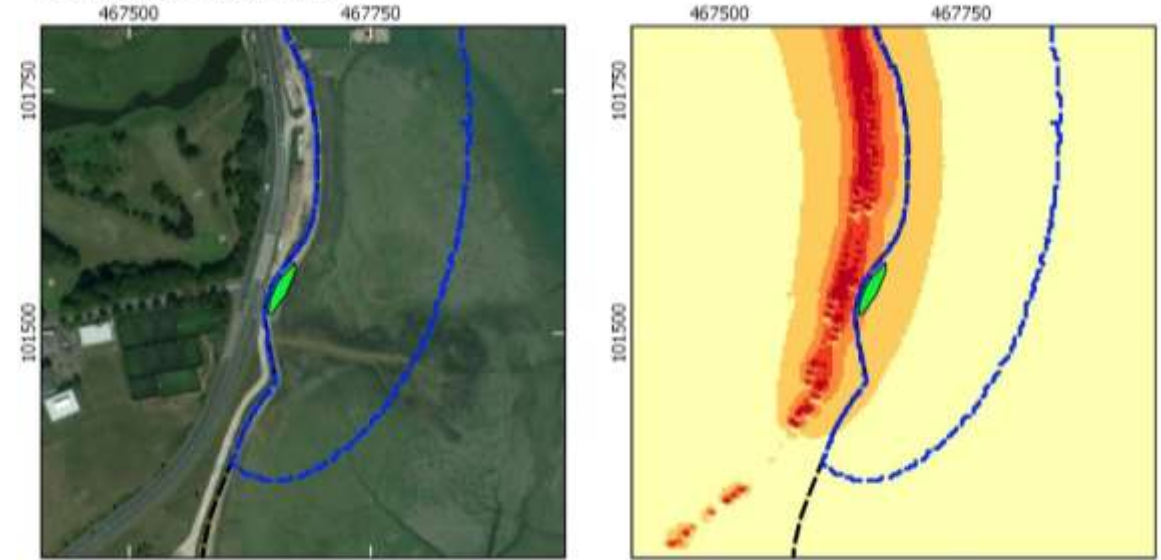


# Solent Maritime SAC: Appropriate assessment for nitrogen deposition

Northern area with PVSB



Southern area with PVSB

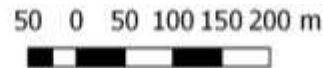


## Legend

- Solent Maritime SAC boundary
- Area where the PUSH DM contribution > 1% of the CL
- Perennial vegetation of stony banks (PVSB)

Modelled contribution of PUSH DM scenario to nitrogen deposition (kgN/ha-year)

- <= 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8



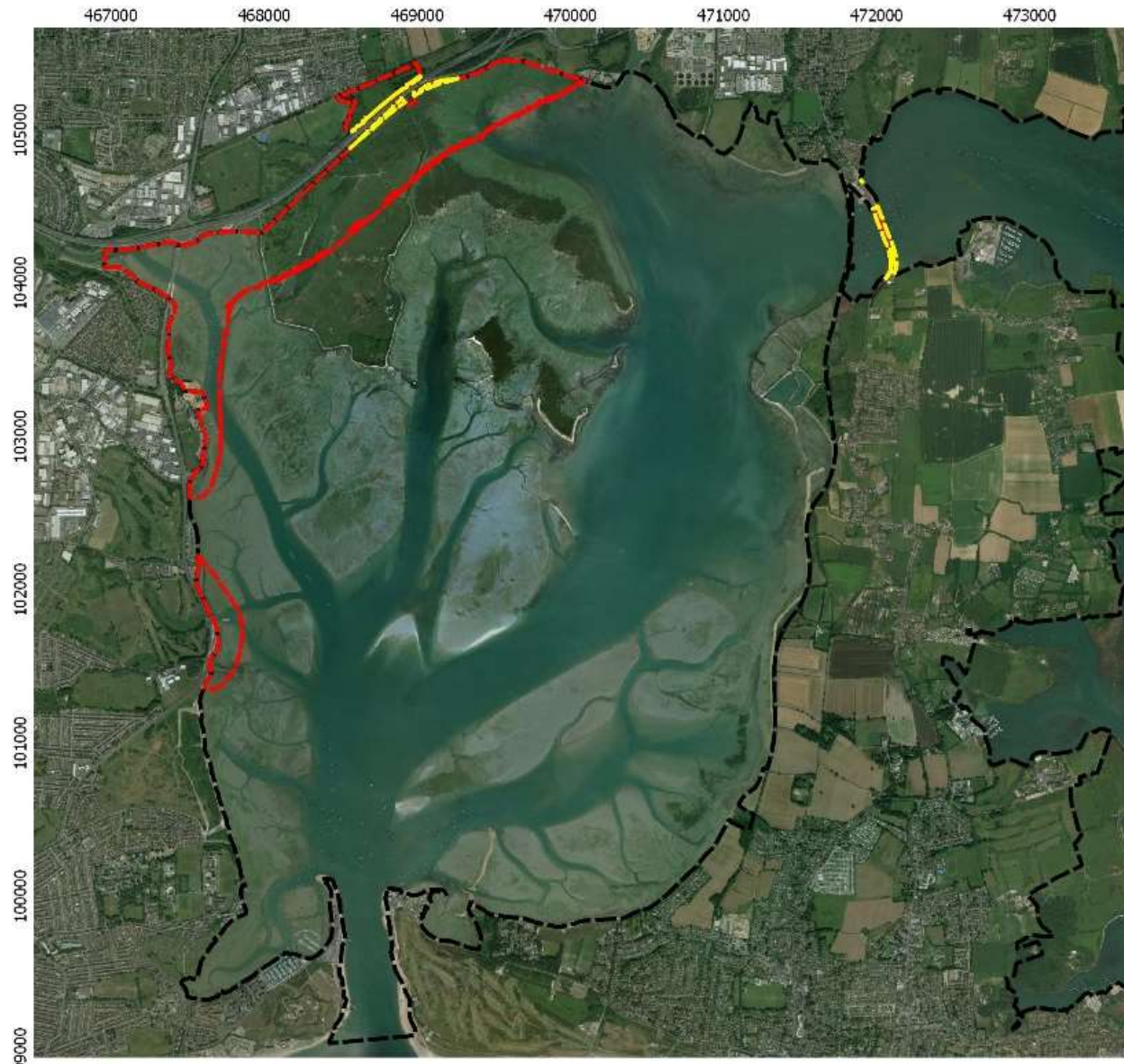
Sources: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, GeoEye, USDA FSA, USGS, AeroGRID, IGN, IGP, and the GIS User Community.

## Recommendations:

In order to address the adverse effect of nitrogen deposition identified at Solent Maritime SAC to perennial vegetation of stony banks (PVSB), it is advocated that a joint Nitrogen Action Plan is developed with Portsmouth City Council under the Duty to Co-Operate.

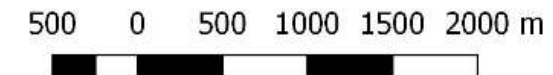


# Chichester and Langstone Harbours (Ramsar & SPA): Screening results for NOx

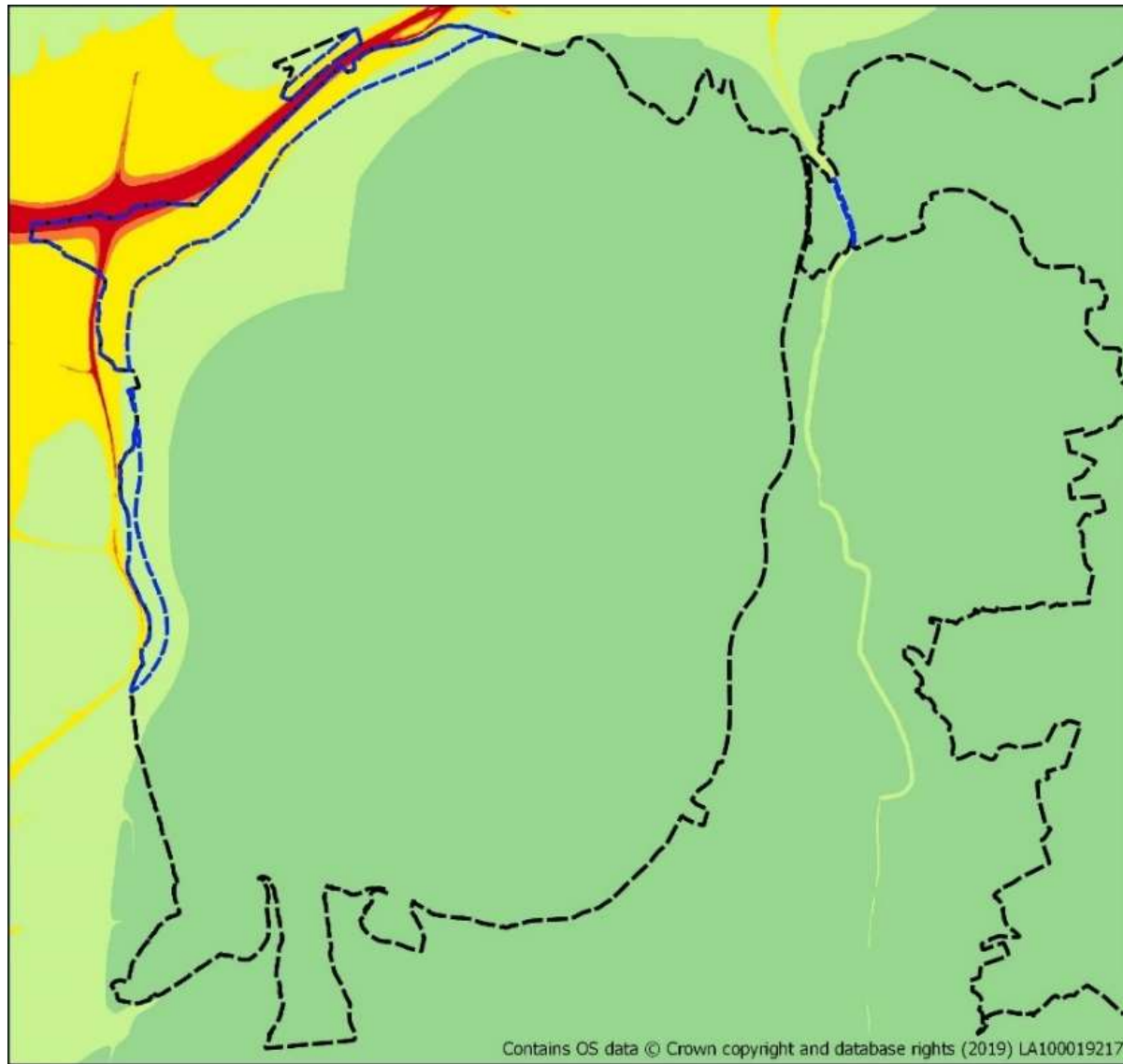


## Legend

- Chichester and Langstone Harbours - SPA
- Area where the PUSH DM contribution > 1% of the CL
- Area where the Havant DM contribution > 1% of the CL



Sources: Esri, DigitalGlobe, Earthstar Geographics, CNES/Airbus DS, GeoEye, USDA FSA, USGS, AeroGrid, IGN, IGP, and the GIS User Community



## Recommendations:

The available evidence includes consideration of **forecast NOx background maps**, which contain a **degree of uncertainty**. It is recommended that Havant and other local authorities **maintain a watching brief** on the Defra forecasts of future trends in airborne NOx. If it appears likely that the expected reductions in NOx will not be achieved, Havant and partner authorities should review this assessment in the light of the updated forecasts and taking into account any other new data, in order to determine whether additional mitigation may be required. **It is recommended that a formal review will take place at least once every three years.**

[...]

Etc.

Etc.

Etc.

Etc.

## Outcome:

- Inclusion of an air quality policy in the Pre-Submission Draft (policy E23).
- The Pre-Submission Local Plan was unanimously approved at Full Council in January 2019.
- Followed by public consultation.

Designated site	HRA Study results	Recommendations
Butser Hill (SAC)	HRA Stage 2: no adverse effects	None
Chichester and Langstone Harbours (Ramsar, SPA)	HRA Stage 2: no adverse effects	Periodically monitor future forecasts for NOx and assess whether mitigation is required
Kingley Vale (SAC)	HRA Stage 1: no likely significant effects	None
Pagham Harbour (Ramsar, SPA)	HRA Stage 1: no likely significant effects	None
Portsmouth Harbour (Ramsar, SPA)	HRA Stage 2: no adverse effects	None
Solent and Dorset Coast (potential SPA)	HRA Stage 2: no adverse effects	None
Solent and Isle of Wight Lagoons (SAC)	HRA Stage 1: no likely significant effects	None
Solent and Southampton Water (Ramsar, SPA)	HRA Stage 1: no likely significant effects	None
Solent Maritime (SAC)	HRA Stage 2: no adverse effects after mitigation	Develop Nitrogen Action Plan with neighbouring local authorities

# Any Questions?



- For any specific questions relating to this presentation:

<p><b>Ricardo UK Ltd</b> – Gemini Building, Fermi Avenue, Harwell, Oxon, OX11 0QR, UK</p>	
<p><b>Dr Tom Adams</b> <b>Consultant – Energy &amp; Environment</b></p>	
<p>Direct Dial: <b>+44 (0)1235 753 517</b> Reception: <b>+44 (0)1235 753 000</b> <a href="mailto:Thomas.Adams@ricardo.com">Thomas.Adams@ricardo.com</a></p>	
	<p><a href="http://www.ricardo.com">www.ricardo.com</a></p>

- Acknowledgements: Dr Jessica Virdo