Who are we?

- Merging of the NRA Strategic Planning Unit and RPA Transport Planning Department
- Transport Planners & Engineers supported by consultancy framework
Hierarchy of Project Appraisal Guidance?

Public Spending Code, DPER (September 2013)
**Rules** for appraisal of all capital and current public expenditure

Common Appraisal Framework for Transport Project & Programmes, DTTaS (March 2016)
**Guidance** document

Project Appraisal Guidelines, NRA (2011)
**Guidance** document for all NRA projects
Update due Oct 2016
Public Spending Code

• Best Practice across all sectors

• Basic Need for appraisal
  – Doing the right thing
  – Doing it right

• Requires Sanctioning Authority to draw up their own procedures for management and appraisal of programmes and projects

• Sets central parameters for all appraisals
  - Discount Rate: 5%
  - Shadow Price of Public Funds: 130%
  - Shadow Price of Labour: 80-100%
  - Shadow Price of Carbon: €6.58/tCO₂
Common Appraisal Framework

What’s in the Updated CAF Guidance?

1. New approval processes
   - Adherence to PSC
   - New governance roles

2. Updating of existing parameters
   - Value of Time, Vehicle Operating Costs, Emission Values, Collision Costs

3. New areas of appraisal
   - Active Travel Parameters
   - Fleet Forecasting (VOCs/emissions)

*Source: DTTAS EFEU Presentation*
## CAF Appraisal Thresholds

All schemes regardless of value require appraisal – level to be proportionate to value

<table>
<thead>
<tr>
<th>Estimated Project Cost</th>
<th>Scale of Appraisal Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below €0.5 million</td>
<td>Simple assessment</td>
</tr>
<tr>
<td>Between €0.5 million and €5 million</td>
<td>Single appraisal incorporating elements of a preliminary and detailed appraisal</td>
</tr>
<tr>
<td>Between €5 million and €20 million</td>
<td>At a minimum, a Multi Criteria Analysis (MCA)</td>
</tr>
<tr>
<td>Over €20 million</td>
<td>Detailed Economic Appraisal - Cost Benefit Analysis (CBA) (or Cost Effectiveness Analysis (CEA))</td>
</tr>
<tr>
<td>Current expenditure (with an annual spend of at least €5m)</td>
<td>Detailed Economic Appraisal - Cost Benefit Analysis (CBA) (or Cost Effectiveness Analysis (CEA))</td>
</tr>
<tr>
<td>Capital Grant Schemes with an annual value in excess of €30 million and of 5 years or more duration</td>
<td>Detailed Economic Appraisal prior and at mid-point of each 5 year cycle or as may be agreed with the Department of Public Expenditure &amp; Reform</td>
</tr>
</tbody>
</table>

*Source: Table 1 CAF*
<table>
<thead>
<tr>
<th>Estimated Project Cost</th>
<th>Pre Appraisal</th>
<th>Detailed Appraisal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below €0.5 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between €0.5 million and €5 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between €5 million and €20 million</td>
<td>Consult with DTTAS EFEU</td>
<td></td>
</tr>
<tr>
<td>Over €20 million</td>
<td>Consult with DTTAS EFEU</td>
<td>Submit appraisals to DTTAS / DPER for review (CBA, MCA, Financial Appraisal)</td>
</tr>
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<td>Submit appraisals to DTTAS / DPER for review (CBA, MCA, Financial Appraisal)</td>
</tr>
</tbody>
</table>
CAF - Pre- Appraisal Discussions

• What do EFEU require?

- Majority of information produced in Project Appraisal Plan and / or Project Brief
- TII have agreed the principles of PAG to reduce need for pre-appraisal
- TII have agreed protocol for interface with EFEU
CAF Preliminary Appraisal - New Concept??

• Covers Phase 0, 1 & Phase 2
• Problem focus not project focus
• Alternatives & options
• Alternatives must cover all ways to solve the problem
  - Incremental Options
  - Management Vs Investment
  - Options falling outside the agency remit
• EFEU require CBA of alternatives

Q: When does a roads project become a roads project?
Annex 1 of CAF provides a full set of parameters
• Price base year 2011
• Not necessary to discount all costs and benefits to 2011
• Appraisal period is construction period plus 30 years of operation

Value of Time (market prices)

<table>
<thead>
<tr>
<th>Trip purpose</th>
<th>2009 CAF €/hr</th>
<th>2016 CAF €/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-work</td>
<td>€26.50</td>
<td>€34.33</td>
</tr>
<tr>
<td>Leisure</td>
<td>€7.30</td>
<td>€12.75</td>
</tr>
<tr>
<td>Commuting</td>
<td>€8.10</td>
<td>€14.03</td>
</tr>
</tbody>
</table>

• DTTaS have committed to undertaking further research on methodology for VOT
What is PAG?

• A set of “how to” appraisal guidelines to ensure consistency of approach across all TII projects

• Includes detailed guidance on transport modelling, economic appraisal and MCA

• Standard parameters for model inputs

• Publication of CAF and user feedback have necessitated an update

Objective of PAG:

To ensure consistent appraisal of all TII projects and compliance with DTTAS and DPER requirements
# Structure & Contents of Updated PAG

<table>
<thead>
<tr>
<th>Unit*</th>
<th>Topics discussed</th>
<th>Detailed Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>Appraisal Deliverables</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>Project Brief</td>
<td>PB Template</td>
</tr>
<tr>
<td>4.0</td>
<td>Consideration of Alternatives</td>
<td></td>
</tr>
</tbody>
</table>
| 5.0   | Transport Modelling | •Construction of Models  
|       |                  | •Data Collection  
|       |                  | •Forecasting  
|       |                  | •Sample TM Report  |
| 6.0   | CBA              | •Scheme Costs  
|       |                  | •TUBA & COBALI  
|       |                  | •Sample CBA  
|       |                  | •Service Areas  
|       |                  | •Wider Impacts  
|       |                  | •Reliability & Quality  
|       |                  | •National Parameter Values  |
| 7.0   | Multi-Criteria Analysis | MCA Guidance  
|       |                  | PABS Template  |
| 8.0   | Business Case    | BC Template & Sample |
| 9.0   | Post Project Review |               |
| 10.0  | Current Expenditure |               |
| 12.0  | Minor Projects (€5m-€20m) | Simple Appraisal Tool |
| 13.0  | Walking & Cycling Facilities |               |
| 14.0  | Minor Projects(€0.5m-€5m) | Minor Project PABS Template |
| 16.0  | Data Analysis Techniques | Estimating AADT  
|       |                  | Expansion Factors for Short Period Counts  |

*Numbering of units subject to change
Linking Project Management & Project Appraisal

• PAG seeks to align appraisal deliverables with project deliverables
• Project Management Guidelines set out hold points for approval of Sanctioning Authority
• Changes to governance in PSC / CAF require update to PMG and hold points
• TII currently undertaking update of PMG
## Major Projects - Current Submissions / Hold Points

<table>
<thead>
<tr>
<th>TII Project Management Guidelines Phase</th>
<th>Department</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 0 / 1: Feasibility Scheme Concept</td>
<td>NDFA</td>
<td>Advice on project financing</td>
</tr>
<tr>
<td></td>
<td>DTTAS - EFEU</td>
<td>Agree inputs and assumptions</td>
</tr>
<tr>
<td>Phase 2: Option Selection</td>
<td>DTTAS</td>
<td>Preliminary Appraisal Report submitted to DTTAS (cost &gt;€5m)</td>
</tr>
<tr>
<td>Phase 3: Planning &amp; Design</td>
<td>DTTAS - EFEU</td>
<td>Review / Audit Draft Business Case</td>
</tr>
<tr>
<td></td>
<td>DPER - CEEU</td>
<td>Review Draft Business Case</td>
</tr>
<tr>
<td></td>
<td>Sanctioning Authority*</td>
<td>Delivers Approval in Principle</td>
</tr>
<tr>
<td></td>
<td>Sanctioning Authority*</td>
<td>Seeks Approval to proceed</td>
</tr>
<tr>
<td>Phase 4: Statutory Processes</td>
<td>Sanctioning Authority*</td>
<td>Seeks Approval to proceed</td>
</tr>
</tbody>
</table>

*For all schemes > €100M government is Sanctioning Authority*
## PAG Deliverables

<table>
<thead>
<tr>
<th>National Roads Project Management Guidelines - Project Phase</th>
<th>PAG Deliverable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAP</td>
</tr>
<tr>
<td>Phase 0: Programme Overview and Requirements Definition</td>
<td>Y</td>
</tr>
<tr>
<td>Phase 1: Scheme Concept &amp; Feasibility Studies</td>
<td></td>
</tr>
<tr>
<td>Phase 2: Option Selection</td>
<td>Y</td>
</tr>
<tr>
<td>Phase 3: Planning &amp; Design</td>
<td>Y</td>
</tr>
<tr>
<td>Phase 4: EIA/EIR and the Statutory Processes</td>
<td>Y**</td>
</tr>
<tr>
<td>Phase 5: Advance Works &amp; Construction Documents Preparation, Tender &amp; Award</td>
<td>Y</td>
</tr>
<tr>
<td>Phase 6: Construction &amp; Implementation</td>
<td>Y</td>
</tr>
<tr>
<td>Phase 7: Handover, Review &amp; Closeout</td>
<td>Y</td>
</tr>
</tbody>
</table>

*Certain projects will require some cost benefit analysis at Phase 1.

**If the scope of a project is significantly changed then the Business Case may need to be updated.
Summary

• PSC requires the appraisal of all projects and programmes

• TII updating PAG to reflect PSC, CAF and lessons learned

• Stronger focus on problem solving and alternatives

• New parameters and nature of new schemes will need to consider monetising additional benefits

• STP undertaking research in consultation with other agencies into monetisation of additional benefits
Some Issues & Future Work
## Discount Rates – International Comparison

**What is the value of €1M in 30 years?**

<table>
<thead>
<tr>
<th>Country</th>
<th>Discount Rate</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Bank</td>
<td>12.0%</td>
<td>€37,383</td>
</tr>
<tr>
<td>New Zealand</td>
<td>8.0%</td>
<td>€107,328</td>
</tr>
<tr>
<td>Australia</td>
<td>7.0%</td>
<td>€140,563</td>
</tr>
<tr>
<td>USA</td>
<td>7.0%</td>
<td>€140,563</td>
</tr>
<tr>
<td>Ireland</td>
<td>5.0%</td>
<td>€242,946</td>
</tr>
<tr>
<td>Sweden</td>
<td>3.5%</td>
<td>€368,748</td>
</tr>
<tr>
<td>UK</td>
<td>3.5%</td>
<td>€368,748</td>
</tr>
<tr>
<td>Germany</td>
<td>3.0%</td>
<td>€424,346</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2.5%</td>
<td>€488,661</td>
</tr>
</tbody>
</table>
Discount Rates – Alternative for Road Schemes?

TII research on the use of hyperbolic discounting as transport projects have a longer lifecycle

<table>
<thead>
<tr>
<th>M4/M6 Worked Example</th>
<th>Exponential 30 years</th>
<th>Exponential 60 years</th>
<th>Hyperbolic 60 years</th>
<th>Combined 60 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Benefits</td>
<td>1,357</td>
<td>2,846</td>
<td>2,959</td>
<td>3,576</td>
</tr>
<tr>
<td>PV of Capital Costs</td>
<td>1,490</td>
<td>1,490</td>
<td>1,490</td>
<td>1,490</td>
</tr>
<tr>
<td>NPV</td>
<td>-133</td>
<td>1,356</td>
<td>1,469</td>
<td>2,086</td>
</tr>
<tr>
<td>BCR</td>
<td>0.91</td>
<td>1.91</td>
<td>1.99</td>
<td>2.40</td>
</tr>
</tbody>
</table>
Wider Impacts / Wider Economic Benefits

- Future schemes may not have high travel time savings
- Growing need across transport projects to monetise other benefits
- Areas under consideration
  - Accessibility & Agglomeration
  - Revised Value of Time based on Willingness to Pay
  - Health Benefits
  - Reliability
- Key concern - potential double counting
Initial Research – TRIN Note

- Mechanism to measure agglomeration impacts of road investment
- "Effective Density" of employment for zone = measure of economic activity / measure of accessibility
- Based on 2006 Census Data
- Compared accessibility of Road Network 2006 & 2010
- Accessibility score relative to most accessible zone i.e. south Dublin city centre
- Increase productivity potential by 0.35%
- Annual benefit in GDP terms - €525m
- Present Value over 30 years - €9.5bn
- Increased need to measure Wider Economic Impacts as part of project justification
Impact of MIUs

Accessibility Analysis
- Model used to assess the impact of investment in road network on access to employment
- Based on 2011 Census data

Previous Investment 2006-2015
- Major Inter Urban Routes delivered
- Significant improvements in access to employment
- Reduction in ‘peripherality’

Accessibility score

Low

High

2006 Road Network & Employment – as per TRIN

2015 Road Network & 2011 Employment
Impact of Major Projects in Construction

Schemes Included
- N25 New Ross
- N11 Enniscorthy
- M17/M18 Gort Tuam

Accessibility Impacts
- Clear improvements around each scheme
- Large projects linking / improving links to significant urban areas

Accessibility score
- Low
- High

2015 Road Network
Completion of schemes in construction
Impact of Building On Recovery Schemes

**Completion of schemes in construction**

**Completion of all Building on Recovery Schemes**

**Schemes Included**
- N7 Naas Newbridge
- M8/N40/N25 Dunkettle
- N4 Collooney to Castlebaldwin
- N22 Ballyvourney to Macroom
- N5 Westport to Turlough
- N20 Mallow Relief Road
- N2 Slane Bypass
- N6 Galway City Transport Project
- N21/N69 Adare to Foynes
- N28 Cork to Ringaskiddy
- N59 Moycullen Bypass
- N56 Mountcharles to Inver
- N56 Dungloe to Glenties

**Accessibility Impacts**
- Scale of impacts generally not sufficient to change rating category
Impacts on journey time

- Supplementary Analysis
- Using model data catchment areas can be defined
- Visual representation of how geographic areas have been “brought closer together”
What can be done next?

- The approach adopted in this study could be applied to project appraisal
- DTTAS accept the merits of agglomeration impacts
- M20 Cork to Limerick Scheme displays significant potential benefits due to agglomeration
- Impacts along corridor but also extend northwards towards Galway
- Significant journey time benefits
Summary

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• New parameters and nature of new schemes will need to consider monetising additional benefits

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Thank You
Any Questions?