Appendix D

Guidance Note – Infrastructure Sustainability Base Case Framework

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# Purpose

The purpose of this guidance note is to provide guidance for Consultants and Project Managers on how to prepare a Base Case Proposal and calculated Base Case for assessment as part of a project’s Infrastructure Sustainability (IS) Design and/or As Built rating (infrastructure sustainability assessment). The Base Case is to include ‘business as usual’ (BAU) technologies, processes, components and methodologies. This guidance outlines what materials, designs and methodologies the Department of Transport and Main Roads regards as BAU.

However, projects are cautioned not to rely on this Framework as an IS rating evidence document, and any assumptions taken from this document must be reviewed, confirmed, and evidenced at a project level. This document does not provide any guarantees or warranties and the department accepts no liability in using this guidance to inform project pricing or tendering.

# Background

The Queensland Government requires all government infrastructure projects over $100 million to have a sustainability assessment completed. The Infrastructure Sustainability Council (ISC) IS Rating Scheme is an approved method to achieve this objective.

The IS Rating Scheme requires a “Base Case” assessment for the project. The Base Case is a business-as-usual footprint for energy and carbon (Ene-1), material use (Rso-6), and water use (Wat-1), where footprint means the quantified impact of a certain issue across the infrastructure lifecycle. Development of the Base Case involves two key steps:

1. Develop and submit a Base Case Proposal to ISC for verification prior to the Round 1 Design submission. The Base Case Proposal is a qualitative description of assumptions, initiatives and approach for the Base Case, which will be compared to the Actual Case (final design).
2. Calculate the Base Case as part of the Design submission for the Ene-1, Wat-1 and Rso-6 credits.

Both Step 1 and Step 2 may need to be repeated for the As Built submission if additional sustainability initiatives are identified and/or the project footprint changes after the initial submissions. This document is intended to help projects with completing Step 1 and provides some guidance to support Step 2.

There are two ISC-approved methodologies for the calculated Base Case (refer the IS Technical Manual v2.1 and the IS Rulings for full detailed requirements and guidance):

1. Traditional Calculation Methodology: This is based on a suitable early design accepted by key stakeholders as being representative of the original concept for the infrastructure development. For example, this may be the design from Business Case. The submission must be accompanied by a set of BAU assumptions regarding technologies, materials sourcing, and composition.
2. Reverse Calculated Base Case (also known as the “back-casting method”): Projects utilise their Actual Case as the basis/starting point from which the calculated Base Case is determined. This enables projects to use a more accurate starting point from which they can calculate and quantify resource savings, resulting in more accurate verification outcomes. Note: This is the Department’s preferred Base Case methodology. If the project wishes to pursue the Traditional Calculation Methodology, this should be discussed and agreed with the Principal.

ISC have published various resources on how to prepare the Base Case Proposal, including in the IS Technical Manual v2.1, IS Rulings and various guidance documents. In addition to those resources, this document provides the department’s “business as usual” assumptions and standards for the Base Case. These assumptions and standards have been developed based on:

1. Legislation
2. Transport and Main Roads Technical Specifications
3. Standards, and
4. Various resources published by ISC.

# Base Case function (product or service provided)

The project’s primary objective is set by the Strategic Assessment of Service Requirement (SASR) Report, at Gate 1 of the Queensland Government's Project Assessment Framework (PAF). The objectives for the Base Case must be consistent with those specified for the project.

# Base Case boundary

The scope of the resource use assessment boundary is limited to the construction and operation of infrastructure projects in Queensland that are seeking IS ratings. It covers resource demand for energy, water and materials.

A summary of typical resource use anticipated on an infrastructure project includes the following. A detailed list with assumptions, guidance, data sources and quantities can be found in Table 4.3.1.

* Energy use:
	+ Scope 1 – stationary and off-road fuel
	+ Scope 2 – purchased electricity
	+ Scope 3 – transport fuel, for delivery of products and materials
* Water use:
	+ Potable
	+ Non-potable
* Material use:
	+ Pavement
	+ Asphalt
	+ Aggregate
	+ Bitumen seals
	+ Unbound pavement
	+ Stabilised pavement
	+ Foamed bitumen
	+ Cement and concrete
	+ Steel
	+ Embankment
	+ Aluminium
	+ Glass
	+ Timber
	+ Pipes
* Land and vegetation clearing
* Waste generated: It is noted that waste generation, while being a project resource impact, is outside the scope of the IS Base Case

A suite of project elements relevant to the Base Case are presented as follows, and should be reviewed in conjunction with relevant Base Case guidance from ISC:

* Road, accesses, pavement for bus stops, parking or other secondary function
* Road furniture including noise walls and road safety barriers
* Structures, including bridges, over / under pass, reinforced walls, and retaining walls.
* Underground works for example, piles and foundations
* Earthworks (cut and fill) and underground works (tunnelling)
* Drainage including kerbing, open drains, stormwater
* Laydown areas, stockpiles
* Temporary works (for example, site office, sidetracks)
* Property works
* Onsite processing
* Early works (for example, preloading)

Not all of these are necessarily required for each project. To take a systems perspective, the resources used are essentially inputs for the construction of multiple structures and works, that are specific to a project's physical scope of works, with resource outputs being the carbon dioxide equivalent greenhouse gas emissions and other environmental impacts (captured as IS Enviropoints) generated from construction and operation of the project components.

## Base Case design life

The department’s requirements for minimum design periods include the following as per Table 4.1.1 below.

Table 4.1.1 - Minimum design life of assets

| Asset | Minimum design life |
| --- | --- |
| * Abutment protection either not subject to scour or subject to scour.
 | 100 years |
| * Bridge drainage systems
 | 50 years |
| * Bridge structures including concrete arches, underpasses, and wildlife underpasses
* Paint coating systems
* Deck wearing surface
* Protective treatment of permanent steel structural members
* Tunnels
* Above carriageway structures
* Sign support structures (including cantilever signs and signs on side of bridges)
* Other roadside furniture
* Drainage pits
* Abutment protection subject to scour
 | Refer to Transport and Main Roads Manual Design Criteria for Bridges and Other Structures and Bridge Scour Manual |
| * Difficult to maintain drainage elements, which must include:
* any culvert (existing or new) within the upgrade road formation, and
* culvert end walls that are difficult to access.
 | 100 years |
| * Expansion joints and rubbers in expansion joints
* Drainage systems (replaceable elements only)
* Steel bridge traffic barrier, safety screens and fencing
* Light poles (including outreach arms) and signs on side of bridge
* Gantries and cantilever structures over any portion of the roadway
* Bridge bearings
* Median slabs
 | Refer to Transport and Main Roads Manual Design Criteria for Bridges and Other Structures, Clause 3.7.1 Design Life – New Bridges. |
| * Sign faces
 | 10 years |
| * Fences, including fence posts, fauna fences (excluding fencing on bridges and noise fences)
 | 20 years |
| * ITS components
 | Refer to respective Transport and Main Roads Technical Specifications |
| * Lighting (including luminaries) and electrical equipment excluding light poles, outreach arms, and foundations
 | 20 years |
| * Outreach arms, light poles, and foundations for light poles
 | 40 years |
| * Retaining walls, including reinforced soil structure walls
 | 100 years |
| * Noise attenuating structures
 | Refer MRTS15 Noise Fences |
| * Earthworks and batter treatments
 | 100 years |
| * Mechanical and electrical equipment
 | 20 years |
| * Traffic management and control systems
 | 20 years |
| * Buildings
 | 50 years |
| * Pavements
 | 20 to 30 yearsRefer to Transport and Main Roads Pavement Design Supplement |
| * Timber furniture for environmental works
 | 40 years |

## Greenhouse gas modelling

For credit Ene-1, projects may refer to the [Transport for New South Wales *Carbon Tool*](https://www.transport.nsw.gov.au/industry/doing-business-transport/sustainability-at-transport) (previously known as the CERT Tool) as a useful supporting tool for modelling and reporting on greenhouse gas emissions.

In accordance with the Ene-1 requirements to apply model assumptions associated with the future decarbonisation of the electricity grid, projects may refer to the following guidance:

1. Identify the emissions factor at commencement of the project’s construction phase (i.e., the starting date of the energy model) based on the Queensland Scope 2 and 3 emissions factors for the consumption of purchased electricity from the grid, as reported in the latest National Greenhouse Accounts Factors publication.
2. Identify the most recent policies and commitments from the Queensland government, or other applicable jurisdiction, in relation to grid electricity renewable energy targets. For example, those listed under the Queensland Climate Action website.
3. The grid electricity emissions factor can be assumed to decrease linearly each year between each milestone. An example is provided below in Figure 4.2.1, noting dates and emissions factors will need to be revised based on the project program, latest National Greenhouse Accounts Factors publication and government grid emissions targets.

Figure 4.2.1 - Base Case operational electricity emissions



## Business as usual assumptions and exclusions

Transport and Main Roads business as usual assumptions and guidance for calculating a Base Case are presented in Table 4.3.1. However, it is emphasised that this document is not a standard in itself, nor should it be used or relied upon as Base Case evidence. Not all assumptions will be applicable to each project, and projects should only submit the assumptions that they intend to claim as a point of difference / reduction initiative between their Base and Actual Case.

Generally, it is expected that projects will also have initiatives requiring the submission of additional project specific BAU assumptions. All BAU assumptions submitted to ISC will need to be justified and evidenced using project-specific documents or industry standards.

Contact: sustainability@tmr.qld.gov.au PMD Sustainability Team.

Table 4.3.1 - Business as usual assumptions and exclusions

| Ref | Resource Category | Business As Usual (BAU)Assumptions and Data Sources | BAU Guidance | Data Quantities Required |
| --- | --- | --- | --- | --- |
| Energy and Carbon |
| Stationary and Off-road Fuel |
| 1 | Use of generators during construction | * Where generators are used to provide electricity to site offices (e.g., temporary demountable offices) they are operated at full load using 100% mineral diesel 12 hours per working day.
* Generators providing electricity to critical demountable site offices (for example, server sheds) are operated at full load using 100% mineral diesel 24/7.
* Unless otherwise known, the fuel consumption rate will be sourced from the Caterpillar Performance Handbook that is valid at the time of ISC registration.
* Generators may be used for both day and night works as defined by the project.
 | * The operational hours of generators are provided by Transport and Main Roads projects.
* Caterpillar plant and equipment (P&E) are widely used across the construction industry in Queensland. Data published in their performance handbook is based on their own field testing, computer analysis, laboratory research and experience.
 | * Total fuel use (kL)
* Number and capacity of generators.
 |
| 2 | Use of plant and equipment for construction | * Generators providing electricity for plant and equipment are operated at full connected load using 100% mineral diesel fuel 12 hours per working day.
* Unless otherwise known, the fuel consumption rate for plant and equipment will be sourced from the Caterpillar Performance Handbook.
 | * The operational hours of generators are provided by Transport and Main Roads projects.
* Caterpillar P&E are widely used across the construction industry in Queensland.
* Data published in their performance handbook is based on their own field testing, computer analysis, laboratory research and experience.
 | * Number and types of plant and equipment for whole project.
* Total fuel use (kL).
 |
| Transport Fuel |
| 3 | Use of project owned vehicles | * The number of project related vehicles used to transport staff on the project and distance travelled will be estimated by the project proponent.
* Fuel use for vehicles will be unleaded or mineral diesel.
 | * Given that projects will vary in size and scale, the staff and vehicles required will vary. Consultation with the work packages agreed that this estimate should be determined by project proponents.
* Previous projects indicate that project vehicles typically use unleaded or diesel fuel.
 | * Staff numbers for the project.
* Distance travelled (km) in project vehicles.
* Estimate of fuel use in project vehicles for project purposes.
 |
| 4 | Transport of materials and products to site | * The current version of the IS Materials Calculator at the time of developing the Base Case will be used to estimate transport-related carbon emissions from the delivery of materials.
* Materials are imported to site by contractors and may be transported by roads, rail or international freight shipping.
* Delivery trucks use mineral diesel fuel.
* Transport distance of materials to the project site will be estimated by the project team.
 | * The IS Materials Calculator is an approved tool for the Rso-6 credit.
* The largest road transport mode and size from the IS Materials Calculator is BAU as it is assumed that industry will deliver materials in a cost effective and efficient manner (i.e., the least number of trips).
* Distances will vary for each project.
* Projects will need to estimate on a site-specific basis.
 | * Material types.
* Material quantities (t) (see materials category).
* Number and capacity of delivery trucks.
* Distance travelled to site (km).
 |
| 5 | Transport of temporary products to site, for example, temporary site offices, construction fencing | * Products are transported to site using mineral diesel fuelled trucks.
 | * Distances will vary for each project.
* Projects will need to estimate on a site-specific basis.
 | * Types and volume of products to be delivered to site
* Number and capacity of delivery trucks
* Distance travelled to site (km).
 |
| 6 | Transport of water to site | * Water delivery trucks use mineral diesel fuel.
 | * Distances will vary for each project.
* Projects will need to estimate on a site specific basis.
 | * Amount of water (t) to be delivered to site.
* Distance travelled to site (km).
 |
| 7 | Transport of waste from project to disposal or reuse site (optional depending on credits sought by the project) | * Waste is transported off site using a mineral diesel fuelled truck.
* BAU for waste transport distances should generally be determined based on the nearest landfill. Where different / separate disposal facilities are expected to be used for the project (e.g., contaminated waste disposal/treatment facilities), and those locations are known, separate BAU locations may be specified.
 | * The largest road transport mode and size from the IS Materials Calculator is selected as it is assumed that industry will deliver materials in a cost effective and efficient manner (that is, the least number of trips).
* Distances to disposal locations will need to be estimated on a project specific basis.
* Waste disposal vs reuse opportunities depend heavily on various factors such as project location, cut vs fill balance, and general supply/demand within and beyond the project for various waste streams.
 | * Estimated tonnes of material to be disposed of for each category.
 |
| Electricity |
| 8 | Use of grid electricity for construction | * The emissions factors for all purchased electricity for construction activities is sourced from the Queensland grid using the most recent National Greenhouse Accounts Factors (NGA) publication available at the time of Base Case development.
* The electricity grid is assumed to decarbonise in accordance with Queensland government renewable energy commitments.
* No renewable electricity will be purchased.
* No emissions offsets will be used.
 | * This is the government approved emission factor for calculating Scope 2 GHGs for electricity.
* Renewable energy sources (for example, from the installation of solar panels, or the purchase of GreenPower) or other emissions offsets are rarely adopted in industry due to high cost and the temporary nature of the site sheds.
 | * Estimate of electricity requirements for relevant construction activities (kWh).
 |
| 9 | Use of grid electricity for operation | * The emissions factor for all purchased electricity for operational activities is sourced from the Queensland grid using the most recent NGA publication available at the time of developing the Base Case. The grid is assumed to decarbonise in accordance with Queensland renewable energy commitments.
* The design does not include energy efficiency measures, application of renewable energy sources, or other emissions offsets.
* LED fittings will be used for all new operation lighting installations.
 | * This is the government approved emission factor for calculation of Scope 2 GHGs for electricity.
* Lighting to meet MRTS94 Road Lighting LED fittings are standard for new installations.
* Operational renewable energy and offsets are not yet BAU due to high costs.
* Where real (current or past project data) is unavailable to assist with benchmarking energy use for buildings (e.g., site sheds, stations), projects may refer to minimum energy efficiency requirements in the most recent version of the National Construction Code, Section J.
 | * Estimate of electricity requirements for operation activities (kWh).
 |
| Land use change / clearing |
| 10 | Land / vegetation clearing | * As size and location vary this needs to be determined individually for each project.
* BAU for waste disposal vs reuse of cleared vegetation should be considered with respect to waste transport (Item #7).
 | * The [TAGG Carbon Gauge](https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/environment-and-sustainability-in-our-operations/environmental-technical-areas/climate-change/climate-change-mitigation/carbon-gauge-tool/) GHG Assessment Calculator for Road Projects is an acceptable GHG assessment and reporting tool.
 | * Amount and type of land and vegetation cleared (ha).
 |
| Water |
| 11 | Water demand during construction and operation | * Only water is used for dust suppression.
* 100% potable water is used for construction works in urban areas (for example, compaction and dust suppression).
* Rural projects will assume 75% use of non-potable water for construction.
* Water fixtures in site offices have standard WELS water efficiency ratings.
* There are no operational watering requirements beyond the landscape monitoring period.
 | * Polymer dust suppression is sometimes used but is not always cost-effective / viable and therefore not standard practice.
* It is acknowledged that Transport and Main Roads standards approve the use of non-potable water sources during construction however this is not readily available or used in urban areas.
* The ability to use non potable water will vary depending on the local conditions of each project.
* High efficiency water fixtures are available but not BAU for site offices.
	+ Queensland Development Code QDC 4.1—Sustainable buildings states the minimum WELS rating and requirements for tap ware, toilet cisterns and shower roses for class 1 and class 2 buildings.
* Watering requirements for landscape treatments are defined in MRTS16 Landscape and Revegetation Works.
* Sourcing of non-potable water for construction is defined in MRTS51 Environmental Management.
 | * Estimate of water use (kL/day or for entire project) for construction activities and site office use.
 |
| Materials |
| 12 | All materials listed below | * The current version of the IS Materials Calculator at the time of calculating the base will be used to estimate the carbon emissions from the use of materials for the project.
* Also refer to assumptions for the transportation of materials to site (Item #4).
* For most materials and material applications, BAU is 0% recycled content.
 | * The IS Materials Calculator is an ISC developed and approved tool for benchmarking.
* Transport and Main Roads approves, but generally does not mandate, the use of recycled materials at varying levels depending on the requirements of the project and material available. See Tender Schedule S12 – Waste to Resource Plan which lists recycled content allowances for various materials with references to relevant Transport and Main Roads Technical Specifications.
 | * As noted below.
 |
| 13 | Pavement Type | * Heavy Duty Pavements:
	+ Use of Full Depth Asphalt (FDA) pavements.
* Other Pavements:
	+ Lower trafficked – Unbound Granular (UG) pavements.
	+ Moderately trafficked – Lightly Bound (LB) or Foamed Bitumen Stabilised (FBS) pavements.
* Surfacing:
	+ Single/Single (SS) in rural areas over UG/LB/FBS.
* Asphalt in urban roads, intersections and higher trafficked rural roads.
 | * Deep Strength Asphalt (DSA), Flexible Composite (FC), Foamed Bitumen Stabilised (FBS) or Rigid pavements are not BAU. More suitable pavement types exist as BAU for expected traffic loads and construction constraints.
* Transport and Main Roads Pavement Design Supplement – Supplement to ‘Part 2: Pavement Structural Design’ of the Austroads Guide to Pavement Technology.
 | * Total amount (t) and types of pavement used for entire project.
 |
| 14 | Asphalt | * Use of Full Depth Asphalt pavements:
	+ SEQ: Base layers are EME2.
	+ Outside of SEQ: Base layers are AC20.
* Hot Mix Asphalt with bitumen binder.
 | * DSA, FC, FBS or Rigid pavements are not BAU.
* No RAP is used for asphalt.
* Transport and Main Roads has trialled and Type Approved RAP in a number of pavement types however as yet not mandated its use in any projects other than trial projects.
* There is limited data available relating to the total volume and percentage of projects across Queensland that have used RAP in the past 5 years.
* Functional requirements of specific projects and the geographic location are considered to be the two largest constraints in the broader adoption of RAP across Queensland.
* Transport and Main Roads approves the use of recycled materials at varying levels depending on the requirements of the project and material available. See MRTS102 Reclaimed Asphalt Pavement Material.
 | * Total amount (t) and types of asphalt used for entire project.
 |
| 15 | Recycled Asphalt Pavement (RAP) | * Surfacing: 0% RAP.
* Other layers: 0% RAP.
* EME2: 0% RAP.
 | * Transport and Main Roads has trialled and Type Approved RAP in a number of pavement types.
* See Technical Specification MRTS102 Reclaimed Asphalt Pavement Material.
 | * Total amount (t) and types of RAP used for entire project.
 |
| 16 | Unbound Pavement (Gravel) | * BAU is for unbound pavement to contain 0% recycled aggregate.
* All aggregates will be virgin/quarried materials and imported to site.
* No processing of rock will be undertaken on site (e.g., either to enable on-site reuse or to further process quarried materials).
* Also see waste transportation assumptions (Item #7).
 | * While some re use of insitu materials as fill is common, typically this material is not reprocessed into unbound pavement on site.
* Reused insitu material as unbound pavement material may not meet MRTS05 specifications.
* MRTS05 Unbound Pavements.
 | * Amount of unbound pavement used for entire project (t).
 |
| 17 | Bitumen seals | * Bitumen seals are either a single/single reseal or double/double reseal.
* Sprayed bituminous treatments to be either single/single or double/double with either straight bitumen or Polymer Modified Bitumen binders based on design parameters.
* Polymer modified binder.
* Crumb rubber for trafficked seals, where supply is assured.
* Use of cutter in cool weather.
* Use of AMC0 or AMC00 primes.
 | * Refer to MRTS11 Sprayed Bituminous Treatments (Excluding Emulsion) and MRTS12 Sprayed Bituminous Emulsion Surfacing.
 | * Amount of bitumen emulsion seals (m²).
 |
| 18 | Stabilised Pavements | * Granular materials – sourced from quarries.
* Cement:
	+ Use of 75% Cement/25% Fly ash in SEQ.
	+ Use of 60% slag/40% cement in SEQ.
	+ Use of 70% Cement/30% fly ash outside of SEQ.
 | * MRTS07B Insitu Stabilised Pavement.
 | * Amount of stabilised pavement used for entire project (t).
 |
| 19 | Foamed Bitumen | * Bitumen:
	+ Use of C170 bitumen.
* Granular materials:
	+ Sourced from quarries.
* Secondary stabilising agents:
	+ Hydrated lime.
 | * MRTS09 Plant-Mixed Foamed Bitumen Stabilised Pavements.
 | * Amount of foamed bitumen used for entire project (t).
 |
| 20 | Cement and concrete | * All concrete use will be in accordance with relevant Transport and Main Roads Technical Specifications.
* All ready mix and precast concrete contain no recycled aggregate.
* All ready mix and precast concrete contain minimum cement replacement of 25% fly ash only.
* Use of concrete pavements in bus pavements (Translink bus stops and busways).
* Use of supplementary cementitious materials:
	+ 25% fly ash in concrete bases.
	+ 40% fly ash in lean mix concrete sub base.
 | * Consultation with structural and civil engineers.
* Transport and Main Roads standard specifications vary depending on requirements, for example, MRTS24, 25, 26, 39, 40, 65, 70.
* MRTS70 Concrete states a minimum 25% replacement of cementitious material with flyash currently considered viable due to inherent variability of such materials.
* Use of synthetic or recycled concrete aggregates is not BAU.
 | * Amount of concrete used for entire project (all types) (t and/or m³).
 |
| 21 | Steel | * All reinforced and structural steel used is new (virgin) for all steel works and in accordance with relevant AS/NZS.
* 0% recycled steel is considered BAU.
* Steel used for rail and pipes is in accordance with relevant Australian Standards, Transport and Main Roads Technical Specifications. Additional standards from other local jurisdictions may apply for specialised applications such as cane rail.
 | * Transport and Main Roads requirements vary based on where the steel will be used. Technical Specifications for Steel Piles (MRTS64, MRTS66), Reinforcing Steel (MRTS71, MRTS71A), Steel Girders (MRTS76), Fabrication of Structural Steelwork (MRTS78).
* Strength and quality testing make recycled components difficult to use.
* While recycling of steel is maximised, the proportion of recycled content in products is not well documented.
 | * Amount of steel used for entire project (t).
 |
| 22 | Aluminium | * All aluminium used for the project will be primary (new) and in accordance with relevant AS/NZS.
 | * MRTS79 Fabrication of Aluminium Components.
* Strength and quality testing make recycled components difficult to use.
 | * Amount of aluminium used for entire project (t).
 |
| 23 | Glass | * All glass for the purpose of buildings and structures will be new and in accordance with relevant AS/NZS.
* Transparent noise barriers built to AS/NZS will be made from new materials.
 | * MRTS15 Noise Barriers
* AS/NZS 2208.
* Strength and quality testing make recycled materials difficult to use.
 | * Amount of glass used for entire project (t).
 |
| 24 | Timber | * All timber is assumed to be made from virgin materials. Type of timber will vary based on application.
 | * MRTS15 Noise Barriers. Posts, panels, planks. Treatment, strength and consistency requirements make recycled materials difficult to use.
* MRTS87 Supply of Timber Bridge Materials and Components. Testing for strength and quality requirements makes recycled timber difficult to use for this purpose.
 | * Amount of timber used for entire project (t or m³).
 |
| 25 | Plastic sheet and film | * No general BAU assumptions apply. If plastic sheet and film are used, project to determine if BAU assumption needs to be specified.
 | * Plastic sheet and film are excluded because they are predominantly used in the packing industry and unlikely to apply to Transport and Main Roads projects in significant quantities.
 | * N/A.
 |
| 26 | Composites | * No general BAU assumptions apply. If composites are used, project to determine if BAU assumption needs to be specified.
 | * Glass fibre reinforced plastic (FRP) is typically used as an insulating material and unlikely to apply to departmental projects in significant quantities.
* Cement fibreboard is typically used for external cladding and unlikely to apply to departmental projects in significant quantities.
 | * N/A.
 |
| 27 | Coatings and finishes | * No general BAU assumptions apply. Paint can be water or solvent-based depending on application, project to determine if BAU assumptions need to be specified.
 | * Coatings and finishes applied to standard (MRTS88 Protective Coating for New Work).
 | * Total amount of tonnes (t) of paint required for the project.
 |
| 28 | Water treatment chemicals | * No general BAU assumptions apply. If water treatment chemicals are used and captured, project to determine if BAU assumption needs to be specified.
 | * Transport and Main Roads projects rarely use water treatment facilities.
 | * N/A.
 |
| 29 | Embankment | * Embankment will be sourced from cut to fill earthworks where available (from both a quality and quantity perspective).
* Where additional embankment material is required, all imported embankment material will be virgin materials and imported to site.
* Also see waste transportation assumptions (Item #7).
 | * Material requirements are generally governed by MRTS04 General Earthworks.
 | * Amount of excavated earthworks and type of cuttings (t).
* Amount of imported embankment material.
 |
| 30 | Aggregates (including gravel, rock, sand, etc) | * All aggregate is virgin material with no recycled glass, crushed concrete or other alternative materials.
 | * Use of virgin aggregates is generally BAU.
* Transport and Main Roads approves the use of crushed glass as aggregate (refer to MRTS05 Unbound Pavements and MRTS30 Asphalt Pavements but its use is not mandated and is not standard practice at this stage).
* Transport and Main Roads approves use of recycled crushed concrete (refer to MRTS05 Unbound Pavements), but this is not standard practice at this stage.
 | * Amount of sand used for entire project (t).
 |
| 31 | Pipes | * Pipe material is generally as per the design material and is typically polyvinyl chloride (PVC), polyethylene (PE), or reinforced concrete depending on application.
* BAU is 0% recycled content.
 | * Transport and Main Roads Technical Specifications indicate that precast reinforced concrete pipes and box culverts are standard practice.
* ISO 1452.2009: Plastic piping systems for water supply and for buried and above ground drainage and sewerage under pressure – Unplasticized poly (vinyl Chloride) (PVC U).
 | * Amount of piping (t) used for entire project (t).
* Transport distance (km).
 |