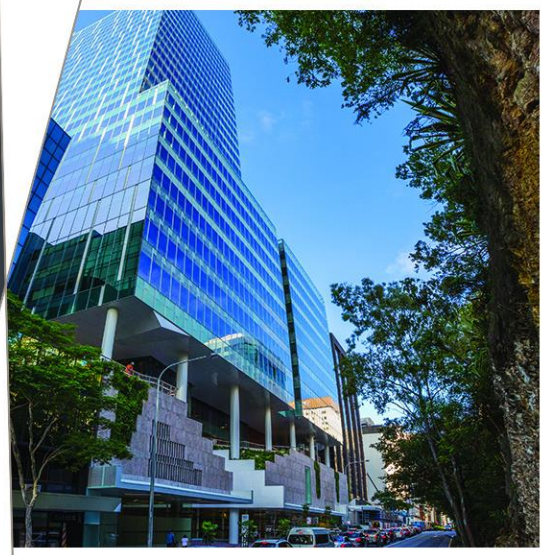
Draft Benchmarking Items and Costing Methodology

Benchmark Costs for Local Infrastructure

360900



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1 Introduction

This report has been prepared to outline the findings of the review and updating of the list of items for benchmarking, and the development and maintenance of benchmark efficient costings for local infrastructure to be used by contributions plans.

This report should be considered as a draft with further development planned in response to stakeholder feedback. Work is still continuing to develop the inputs such as cost analysis for reference prices.

2 Background

The Environmental Planning and Assessment Act, 1979 (EP&A Act) establishes the infrastructure contributions system in NSW. It allows planning authorities to levy contributions to fund delivery of infrastructure (public amenities and services) to support development, through development conditions. Local infrastructure contributions (s7.11 and 7.12) fund the land, works and council administration costs associated with providing development-contingent transport, stormwater management and open space infrastructure.

Infrastructure contributions are an efficient mechanism to fund local infrastructure, aligned with the 'impactor pays' principle and are the primary funding mechanism to deliver the infrastructure requirements of new development.

Since 2012 IPART has had an ongoing role under a terms of reference issued by the Premier, to assess each "Reviewable Contributions Plan". These are plans prepared by Councils that propose contributions above:

- $30,000 per lot/dwelling in a greenfield area
- $20,000 per lot/dwelling in infill areas

or any other plan referred to IPART by the Minister. IPART's assessment considers whether the plan meets the criteria set out in a Practice Note issued by the Department of Planning, Industry and Environment.

The NSW Government is seeking to reform the Infrastructure Contributions System in line with the recommendations of the NSW Productivity Commission to deliver a system that is more certain, efficient, simple, transparent and consistent.

The Productivity Commission made 29 interlinked recommendations in its review of the infrastructure contributions system in NSW, which the Government has accepted. The Government intends to commence the reformed contributions system from 1 July 2022.

To simplify the infrastructure contributions system in NSW the Productivity Commission recommended that IPART's role in relation to reviews of section 7.11 contributions plans should be by exception, only when there is an 'unresolved material issue'. Further, IPART would not be required to review an entire plan but only disputed parts of a plan.

In order to facilitate this change, the NSW Government has referred to IPART two of the Productivity Commission's recommendations to

- develop and maintain benchmark efficient costings for local infrastructure to be used by contributions plans and
- review the Essential Works List, improve and provide advice on the approach to considering efficient infrastructure design and application of nexus,

Based on IPART's recommendations the Department of Planning Industry and Environment (DPIE) will develop new guidance and digital tools for councils to prepare and apply contributions plans.

2.1 Previous report

In September 2013, the Government asked IPART to advise about benchmark costs for infrastructure and how councils can establish the efficient costs of local infrastructure. IPART published "Local Infrastructure Benchmark Costs: Costing infrastructure in Local Infrastructure Plans (2014)". This document was designed to be used to inform how contributions should be calculated to support new development. The report included a list of Essential Work Items and associated benchmark costs for those items.

In line with recommendations from the Productivity Commission, the Government has requested that IPART revisit the essential work list and benchmark costs to improve the contribution process currently in place. This report has referred to sections of the 2014 report where appropriate. It is also noted that the 2014 benchmark costs are out of date and are no longer being used in the CP process.

3 Purpose of this report

To assist IPART in implementing the Productivity Commission's recommendations it requires advice on:

- developing definitions of efficiently designed, development contingent, base level infrastructure
- developing cost benchmarks for stormwater, transport and open space infrastructure, and advice on how these benchmarks vary by location
- Advising on how the benchmark costs could be constructed to take into account variations in project specific conditions or project complexity, for example, difficult terrain
- Advising on how often it is necessary to review benchmarks and how they should be updated in between reviews
- Preparing a costing methodology that councils could use to estimate the costs of infrastructure items for which benchmarks are not available or suitable.

This report contributes this advice through:

- Listing a set of development contingent items, suitable for benchmarking, that Councils are likely to require
- Documenting a typical scope for each infrastructure item to develop 'typical inclusions' for each item on which the benchmark cost will be based
- Providing base unit rates for items and sub-items and factors that should be applied to take into account factors that materially impact on cost such as congestion, location etc
- Listing the allowances that benchmarked items should include for design, project management and contingency
- Identifying any factors or considerations which may make it difficult to determine a suitable benchmark for any particular items
- Outlining a methodology for developing and maintaining benchmarks for efficiently designed, development contingent infrastructure.

4 Development infrastructure items

A list of infrastructure items and sub-items are listed in Appendix A. These items are based on:

- A list originally prepared by IPART based on common items reviews of section 7.11 contributions plans
- A review of the items and sub-items listed in the report Local Infrastructure Benchmark Costs, Costing infrastructure in Local Infrastructure Plans, IPART, 2014
- Cardno's experience in reviews of section 7.11 contributions plans.

This listing will be reviewed and amended following stakeholder consultation.

5 Typical scope of infrastructure items

Definitions for each infrastructure item is included in the Tables within Appendix B.

The format for the datasheet for each item is shown below. Where appropriate, a datasheet will have an accompanying standard drawing. All descriptions will have a plain English description and only use industry jargon where necessary.

Table 5-1 Item datasheet

Item Definition	
Item Name	Name of the infrastructure item included under one of the categories on the Essential Infrastructure List.
Item No.	The unique number assigned to each infrastructure item.
Functional Description	A description of the most fundamental requirements for the infrastructure item.
Inclusions	Describes the significant components of the final delivered asset, included in the base cost.
Key scope of work inclusions	The key activities assumed to be undertaken to construct or install the infrastructure item.
Exclusions (may be reasonably required)	Required but covered elsewhere – cross referenced to an appropriate item or sub-item
Exclusions – exceed minimum requirements	Assets which may sometimes be included but often considered over-engineered or gold plated.
Key identified risks	Examples of the most significant risks contemplated in delivering the infrastructure item.
Sub-item details	The scope of the infrastructure item specific to a particular sub item
Applicable standards	Refers to industry accepted design standards or guidance relevant to an infrastructure item / sub item.

Table 5-2 Cost datasheet

Cost information	
Methodology	Refers to the general approach used in estimating the base cost.
Base unit rate	The unit rate for efficiently delivering the infrastructure item in a greenfield environment
Banding	Quantity bands that reflect unit rate cost sensitivity to the quantity of work performed
Minimum quantity	The minimum quantity that has been assumed for the purpose of estimating the base cost

6 Our approach to the development of cost estimate

The development of the cost assessments relies on both bottom up (first principles) and top-down approaches (reference pricing). Several inputs are being used to determine the costs including contract data, valuation data and first principles component data. The costs presented in this report for a sample of assets are base unit rates that have been adjusted to be 2021 values. Adjustment factors (which have also been provided in this report) are then applied to the base rate to account for specific site considerations. The adjustment factors used in this report include:

- remote locations
- poor ground conditions
- congested development areas

6.1 Reference pricing

The reference pricing method involves taking the known total cost of a similar item delivered at a specific place and time (a 'project'), and making relevant adjustments to take account of the different circumstances in which it is to be delivered. This is a less detailed approach to estimating. As an example, to estimate the cost of a pedestrian bridge by reference pricing, the cost of a similar pedestrian bridge built by the council or a nearby council a year ago would be adjusted to account for the differences in site conditions and cost escalations. Reference pricing is less time intensive than first principles, but requires reliable source data (which is not always available). Reference pricing can be used where only a functional description of an item is available, with little or no design information.

A large number of contracts for projects Cardno has worked on are being reviewed to understand the indicative costs of the items on the list of items for benchmarking. Additionally, Cardno is seeking advice from various suppliers to determine costs of various work items and ancillary works required to support the installation of those items (i.e. open space embellishments such as barbecues).

Contribution plans are being reviewed from the previous six years. The review of contribution plans is limited as the scope, specifications and installation conditions associated with the infrastructure items was not always clearly detailed in the contribution plans. The review of contribution plans has highlighted which items have the most cost variability and which items have the most consistent costs. For those items having a large variation in cost we are attempting to determine what factors may contribute to this variation and how those factors can be accounted for going forward.

Contract data can provide real-world data points that indicate actual costs. The risk of using contract data is the uncertainty in knowing the exact specification for the works completed and the possibility that costs for complex works have not been accurately documented. This can occur when a project involves constructing a wide range of infrastructure categories such as a roadworks with adjacent stormwater works. In this instance earthworks would be required for both the roadworks and stormwater works but from an accounting perspective may be allocated to only one of the infrastructure categories such as the roadworks. Multiple contracts are being evaluated to best understand appropriate cost allocations, and large outliers are interrogated to ensure costs are appropriately allocated in unique situations and do not contribute high or low costs.

We are finding that sufficient information is available to derive reference pricing for the majority of the items and sub-items.

6.2 First principles

The first principles method involves building up an estimate for an item using its most basic resources - the costs of plant, labour and materials. It is a highly detailed approach to estimating. Productivity assumptions are applied to labour and plant costs. Estimates may be supported by quotations from suppliers/contractors for all or part of an activity (but it remains a first principles approach). Some items may be more suitable to a bottom up cost estimate where a detailed cost is built up based on the elements of the item such as plant, labour and materials.

A first principles approach requires many assumptions and may overlook some tasks which would have associated costs items. This approach is useful in sense checking contract data and determining costs where no contract data is available. This approach may be used for items with simple installation such as open space embellishments.

6.3 Confirmation of consistent design assumptions

As the benchmark costs reflect a combination of bottom-up and top-down costing evaluations; consistent design comparisons are critical. The evaluated costs are being used to inform the drawings of the essential work items. Once the drawings are developed an iterative process is undertaken to ensure the costs that were used to inform the benchmark costs are consistent with the item definitions and the benchmark design drawings. In cases where the evaluated costs are not consistent they are adjusted accordingly.

6.4 Infill costs

It is proposed that, where appropriate, infill (sometimes referred to as brownfield) cost banding will be developed by reviewing existing contract data and calculating adjustment factors that could be applied to greenfield installation costs. These adjustment factors reflect the following items that can increase the cost of infrastructure works at infill sites

- increased costs for traffic management and night works
- remediation works
- demolition
- utility relocation

It has already been identified that infill sites present a large number of additional costs that are not necessarily comparable between sites. It is our intent to determine the range of additional costs incurred by the above list and any other obstacles regularly encountered at infill sites. We will document the assumptions and the allowable limits. Where a council considers that an infill project cost significantly exceeds the assumptions and the documented limits they would be required to provide evidence to support their estimate (refer to Section 8).

7 Components of a cost estimate

A cost estimate includes multiple components. These components can briefly be summarised as follows and are covered in the following sections:

- Construction costs
  - labour and materials associated with the infrastructure
  - adjustment factors
- On costs
  - e.g. project management and design
- Contingency

7.1 Definition of an efficient cost

Cost assessments need to be developed in an efficient manner to ensure the value to the community. IPART defines an efficient capital expenditure as “the best and most cost-effective way of delivering services to customers”. Projects are typically deemed efficient if they have been developed through a series of steps that have considered:

- Options to provide the service
- Lifecycle costs for the project
- Compliance with industry accepted standards, codes and guidelines (construction/lifespan)
- The level of service being provided
- Delivery of infrastructure using competitive procurement practices.

Existing levels of service can be updated if they reflect industry standards, NSW or Australian government standards such as requirements around accessibility, environmental management, sustainability, climate change mitigation, resiliency and amenity. An updating of existing standards imposed by a council should be justified on a case-by-case basis.

7.2 Project cost

The total project cost can be separated into the components detailed in Table 7-1.

Table 7-1 Components of project cost

Cost Component	Description
Construction Cost	Base unit rate
	Site constraint factor (generally applies to infill development)
	Regional / raw material sourcing factor
	Ground condition factor
On-Costs	Detailed planning
	Survey
	Geotechnical investigations
	Design
	Project management and contract documentation
	Environmental investigations
	Program management
	Cultural heritage investigations (where appropriate)
Contingency	Allowance to account for residual risk associated with a project. This is applied to the construction cost

7.3 Construction cost

This component is the cost that the contractor charges the client for undertaking a construction project. It is expressed as $ per relevant unit (e.g. metre, m^2 or item) in December 2021 dollars (mid-point of 2021/22 financial year).

As detailed in Table 7-1, the construction cost consists of multiple components and is calculated using the following formulas.

- Construction cost = Base unit rate (indexed to the appropriate year) + Site constraint adjustment + Regional/ raw material sourcing adjustment + Ground condition adjustment
- Site constraint adjustment = Base unit rate x site constraint factor (i.e. $100/unit*0.25 = $25/unit)
- Regional/ raw material sourcing adjustment = Base unit rate x location factor (i.e. $100/unit x 0.05 = $5/unit)
- Ground condition adjustment = Base unit rate x ground condition factor (i.e. $100/unit x 0.00 = $0/unit)

We are currently reviewing material disposal costs which take into account transport over long distances. Councils will be encouraged to make every effort to consider all feasible options for material re-use/ recycling.

The base unit rates are applicable to all asset types and are presented in the datasheets in Appendix B.

7.3.1 Development of base unit rates

Each benchmark item has a datasheet that documents the base unit rate (and other relevant information including the scope of the item). The datasheets for the benchmark items are listed in Appendix B. Sample datasheets and associated drawings are included in this version of the report.

7.4 Site constraint factor

This factor takes into account the variability of cost associated with the construction of infrastructure in constrained areas. For example, it is easier to construct infrastructure in a greenfield environment than in a more constrained environment which requires greater allowances for service location, restoration works and traffic management.

Infrastructure projects in suburban business districts and heavily built up areas typically involve additional site constraint costs due to:

- Difficulties in accessing the site and other site constraints
- The need to work around existing utilities and infrastructure
- Increased night works
- Greater double-handling and spoilage of materials
- The need for additional safety barriers and temporary works
- Increased traffic management.
- Relocation of utilities
- Reinstatement of existing items after development

Three categorisations of site constrained have been proposed; highly constrained, moderately constrained and minimally constrained and are detailed in Table 7-2.

Table 7-2 Site constraint categories

Constraint level	Description
Highly constrained	Areas categorised as highly constrained have high quality footpaths and road pavement, high-to-heavy traffic density and heavily congested services. Construction would involve significant reinstatement costs and disruption to traffic. Town and city centres would usually be considered as highly constrained, however highly constrained corridors can be found in other areas as well.
Moderately constrained	Areas categorised as moderately constrained include residential, industrial or retail areas containing medium-to-high traffic density and services. Construction would involve some reinstatement of road pavement and driveways. The rate of construction would be slower due to the need to locate and relocate some services etc. Traffic control would also be required.
Minimally constrained	Construction within areas categorised as minimally constrained have little or no restoration costs, as there is generally an absence of permanent infrastructure (e.g. driveways, kerb and channelling) which would need restoration at the end of the project. In addition, there would be few services to relocate and very limited traffic control would be required. Greenfield areas would usually be considered as minimally constrained, however this can be dependent on the proposed alignment.

Site constraint factors are included in Table 7-3. These figures are preliminary and further analysis is being undertaken. Stakeholder feedback, with supporting contract data, on infill cost impacts is welcomed.

Table 7-3 Recommended site constraint factors for roads and stormwater infrastructure

Minimally constrained	Moderately constrained	Highly constrained
0%	20% - 30%	30% - 40%

The site constraint factors listed in Table 7-3 can be used as a guide for estimating the upper limit values (except for the Sydney CBD). The additional costs associated with providing local infrastructure in moderately and highly constrained areas are often time-dependent costs that are not related to the quantity of work to be undertaken. Accordingly, the percentage increase over the benchmark costs is influenced by the number of infrastructure items being undertaken simultaneously in a single location. Where the additional costs are able to be spread over more than one infrastructure item, the increase in percentage terms would be expected to be lower than the values in Table 7-3. Therefore, when considering the additional costs associated with construction in developed areas council must indicate which constraints are present (i.e. congestion, service relocations, and reinstatement of existing services) and to what magnitude they impact the overall construction costs.

In defining these scenarios, the previous report excluded the Sydney CBD as it considered it more appropriate to treat this area as a special case. To adjust the base costs of roads and stormwater items within this area, the council would need to estimate the additional site constraint costs.

We propose to quantify site constraint factors through analysing project costs for a sample of infill infrastructure categories and comparing these costs with equivalent greenfield costs. The factors will be presented as a range with a listing of circumstances/ reasons for the lower bound and higher bound factors.

Where data for the infill infrastructure categories are not available or insufficient we have developed site constraint factors using infrastructure costing models. As it relates to the benchmark costs in this report, these models would be those associated with forecasting stormwater infrastructure costs. The models have been developed using first principles and calibrated against actual contract data. The cost for various scenarios can be compared to develop adjustment factors.

The development of these factors would also be improved if Council were to provide what factors they currently use and sample projects that have been undertaken in constrained areas. The additional data would improve the confidence in the proposed factors and it will also assist in the appreciation of the various obstacles encountered during development in constrained areas.

7.4.2 Regional and raw material sourcing factor

The unit rates cost presented in this report are base costs and do not account for location or distance from raw materials. Regional factors are used for estimating increased costs associated with construction that occurs at a distance from metropolitan centres where sourcing some materials and labour requires additional costs. Additionally, when constructing roads at a distance from a quarry and other raw materials construction costs increase. Haulage costs of raw materials affect the cost of providing road infrastructure across regions more than materials and labour costs. These costs vary according to the infrastructure's distance from the raw material supply sources. Those located further away from these sources typically face higher transportation and logistics costs.

Rawlinsons Australian Construction Handbook provides guidance for regional adjustment factors and the provides a raw material adjustment factor. It is not appropriate to apply both a material and regional adjustment factor unless specific local knowledge can justify such an application.

When determining the location factor for open space embellishment and stormwater, the index for the closest regional centre taken from the Regional Building Indices section of the latest Rawlinsons Australian Construction Handbook should be used. The regional cost indices in Rawlinsons are relative to costs in Sydney (i.e. Sydney = 100), and are updated annually. In the 2021 edition of this handbook, these indices range from 101 (for Newcastle and Wollongong) to 134 (for Cobar). This indicates that costs in Newcastle and Wollongong are typically 1% higher than those in Sydney, while those in Cobar are typically 34% higher.

For roads infrastructure where the distance to raw materials becomes the key criteria in determining construction costs the percentage adjustment based on distance thresholds from the source of raw materials, as set out in Table 7-4, is appropriate.

Table 7-4 Recommended distance adjustment factors for road infrastructure raw materials

<25 km from raw material source	25-75km from raw material source	>75km from raw material source
0%	5%	10%

These factors indicate (for example) that the base cost of providing roads typically increases by 5% if the council is between 25km and 75km from the raw material source, and by 10% if it is more than 75km from the raw material source.

Either a regional or raw material factor should be applied, not both.

7.5 Ground conditions

Ground conditions impact development costs. These can include topography, load bearing capacity, environmental and contamination complexities. Some of these considerations will require specialist and independent investigations to quantify the cost implications. This section covers the cost implications of constructing works over soil with low weight bearing capacity (typically roads). For the construction of roads over substandard soils (i.e.California Bearing Ratio (CBR)<3) some adjustments have been developed to account for the additional works required to deliver fit for purpose roads.

The adjustment factors have been developed by comparing the cost and design requirements of a typical road and those for various CBR conditions under 3. These are shown in Table 7-5.

Table 7-5 Adjustments as a function of CBR

CBR ≥3	CBR (2-3)	CBR (1-2)
1.0	1.15	1.44

These factors should only be applied to those sections of the road where substandard road conditions exist not the entire length.

7.6 Council on-cost

Council on-cost includes the cost of internal and external resources involved in activities such as:

- Detailed planning
- Survey
- Geotechnical investigations
- Design
- Project management & contract documentation
- Environmental investigations
- Program management
- Cultural Heritage investigations (where applicable).

Council on-cost have been defined as costs incurred by the council to deliver the benchmark item, which may include:

- internal staff costs (for project oversight, project planning and definition, contract preparation, tendering and contract administration)
- professional fees (such as legal advice, specialist investigations and any outsourced project management)
- regulatory compliance costs (such as gaining environmental approval)
- levies and other government charges
- insurance costs taken out on behalf of the project owner
- design costs.

On-costs are usually proportional to the size of the project, and so are estimated as a percentage of the total construction cost.

The recommended council on-costs as a percentage of the total cost to the contractor are set out in Table 7-6.

Table 7-6 Recommended Council on-cost percentages

On-Cost	Small Program $250,000 to $1M Construction Cost	Small/Medium Program $1M-2M Construction Cost	Medium Program $2M to $5M Construction Cost	Large Program >$5M Construction Cost
Description	**Amount (%)**	**Amount (%)**	**Amount (%)**	**Amount (%)**
TOTAL	**22%**	**17%**	**15.0%**	**12.0%**
Cultural Heritage (where applicable)	10.0%	5.0%	3.0%	2.0%

The on-costs percentage is to be applied at the project level and not at the asset/ component level.

7.7 Contingencies

Contingencies are a cost allowance in the project cost estimate to account for residual risk associated with a project. The amount of a contingency is reassessed at project review points to reflect current knowledge and level of uncertainty of the project. As more knowledge about a project is determined over time, uncertainty is also reduced, allowing for a lower contingency rate to be applied.

Contingencies typically include allowance for:

- Uncertainty in estimating data and assumptions
- "Known unknowns" which the estimator is aware of from past experience
- Level of scope development (this would decrease as the project progresses through each phase)
- Foreseeable risks.

Contingencies shall typically not include:

- Allowance for significant scope changes – changes in end product specification, changes in capacity associated with changes in project objectives, asset location or project, major policy changes
- Extraordinary events (for example, natural disasters)
- Cost escalation
- Human error in cost estimating.

As the project develops, the estimator's confidence in the definition of the work scope increases; more of the unknown elements of the project become known and the contingency provision for these unknown elements can be decreased.

Table 7-7 Recommended contingency allowances for benchmark items

Project stage	Open space embellishment	Roads	Stormwater
Planning	20%	20%	20%
Design	15%	15%	15%

Contingencies are an appropriate way for managing project risks associated with costs but are still inadequate for high risk projects such as:

- Not all of the scope items have been well defined
- The works are on infill sites - as they usually have greater risks and may require complex integration with existing infrastructure and operations during both construction and commissioning
- High complexities – including service relocations
- High level of known unknowns – such as geotechnical risks and limitations to scope development.

There is an expectation that planning is developed to a level where factors such as soil conditions are identified. It should be noted that an adjustment factor for soil condition is already included and cannot be double counted through an increased contingency.

When costing projects that have an increased level of certainty as a result of more detailed design reducing contingency is appropriate. It is also critical that the original contingency amount is removed from the project. Additional contingency should not be added as the project advances (i.e. if 20% contingency was included during the planning phase an additional 15% contingency cannot be added during the design phase. The 15% represents a reduction in contingency).

The contingency percentage shall only be applied to the construction cost.

7.8 Worked example

A worked example is shown in Table 7-8. This is for a 3.5 km collector road. It is located in Newcastle and 22 km from raw materials so the raw material factor is not used as the source is less than 25km away. There are local conditions that would indicate a minimally constrained construction environment. A small portion of the road will go through poor soils and the costs have been adjusted accordingly.

Table 7-8 Worked example

New collector road				Reference
Unit Rate		$2,550/m		Appendix B
Minimum size		1000 m		
Quantity of infrastructure		3.5 km		
Adjustment Factors		Description	Factor (note that these are examples only and will be updated following further analysis)	
▪ Regional		-	1.01	Section 7.4.2
▪ Raw Materials		22km from source	1.00	Table 7-4
▪ Constraints consideration		Minimally constrained	1.00	Table 7-3
▪ Soil condition		95% >CBR3 5% CBR2-CBR3	1.0 1.15	Table 7-5
▪ Indexation		Year 2022	1.02	Table 9-1
Base Cost		3.5 km x 1000m/km x $2,550/m = $8,925,000		
Adjustments	Indexation	$8,925,000 x (0.02)	$178,500	Table 9-1
	Site constraint	$8,925,000 x (0%)	$0	Table 7-3
	Soil	$8,925,000 x (5%*(1.15-1.00))	$66,938	Table 7-5
	Regional or raw material source	$8,925,000 x (1.01-1.00)	$89,250	Section 7.4.2
Construction Cost			$9,259,688	
On Cost			12% (project> $5 million) 0% cultural heritage (investigations suggests this is unlikely)	Table 7-6
On Cost			$9,259,688 x 0.12 = $1,111,163	
Contingency			20%	Table 7-7
Contingency			$9,259,688 x 0.2 = $1,785,000	
Total			**$12,155,850**	
Estimated installed unit rate			$3,473.10	

8 Approach where benchmark rates are not available/inappropriate

Council, in undertaking its planning will determine service demands, identify, scope and analyse the options available to deliver the service, and select the most appropriate option based on the lowest lifecycle cost. In its analysis Council will access relevant information and/or undertake specific investigations to inform its decision making. In undertaking this planning Council may conclude that the scope of works for the selected option is incompatible with that described under the relevant item datasheet because, for example:

- The works required are significantly different from those listed in 'key scope of work inclusions' due to factors such as poor ground conditions, contaminated land, higher concentration or scope of service relocations etc
- Where infrastructure or the site circumstances are unique or more complex than the scope in the benchmarks
- Additional items are considered necessary for the project. These may be listed under 'exclusions (may be reasonably required)' in the data sheets but no benchmark costs have been provided for the level of site preparation activities such as demolition and site clearance.

Council will be required to justify the basis for the scope variance. Documented evidence such as, for example, the options analysis undertaken, supporting investigation reports, and/or spatial datasets that address factors such as acid sulphate soil, mining subsidence etc. is required. Anecdotal evidence is not acceptable.

As a result of the above scope change or other factors (e.g. the infrastructure is below the minimum quantity), Council may consider that the resulting construction cost (including the base cost, site constraint factor, regional/raw material sourcing factor and soil condition factor) may be inconsistent with construction cost derived from the benchmark unit rates. In these instances, Council will be required to provide evidence that the estimate has been reviewed (if initially prepared internally), or prepared by, a proficient independent third party (e.g. consulting engineer, estimator/ quantity surveyor).

The estimate should be based on either:

- Analysis of similar projects undertaken by Council (reference costs) or
- First principles estimate.

The on-costs and contingencies applied should be consistent with the figures listed in Table X and Table Y.

It is critical that the calculation of contribution charges is transparent. Developers will be able to understand and be more likely to accept the adopted contribution charges when adequate data-based evidence is provided to support the charge.

9 Methodology for developing and maintaining benchmark costs

The item list and benchmark unit rates will need to be updated regularly and treated as a living document. The following list of actions are proposed to keep the data updated and relevant. The item list reflects the likely infrastructure to be included in a contribution plan but should be revisited to ensure its relevancy. The costs assigned to the essential work list reflect costs as of 2021 and should be indexed annually to account for inflation and recalculated every four years. The following list reflects our proposed recommendation to maintaining the item list and benchmark costs:

- Proposing that IPART update and publish the benchmark base costs each year, rather than councils doing this, to make it simpler and more consistent
- Review of local infrastructure benchmark unit rates by reviewed by IPART every four years. These reviews could be brought forward where significant variances (higher/ lower) are consistently found for individual items and justified by councils. As the process matures the frequency of reviews may be extended.
- Re-evaluating the local infrastructure benchmarking list periodically to determine if new items should be included
- Regular review of submitted contribution plans to:
  - Evaluate the effectiveness of selected essential work items
  - Potentially remove or add items
  - Consider the appropriateness of the base unit rates and other factors.

The 2014 report recommended producer price indices (Table 9-1) for cost indexations. We recommend maintaining these costs indexations.

Table 9-1 Indices for benchmark cost indexing

Infrastructure Category	Recommended cost index
Roads	ABS PPI Road and Bridge Construction Index for NSW (no. 3101)
Stormwater	ABS PPI Road and Bridge Construction Index for NSW (no. 3101)
Open space	ABS PPI Non-Residential Building Construction Index for NSW (no. 3020)

APPENDIX

A

ITEM AND SUB-ITEM LISTING

1 Transport	
1.01	New local road
1.02	Not used
1.03	New collector road
1.04	New sub-arterial road
1.05	New industrial road
1.06	New rural road
1.07	Upgrade to collector road
1.08	Upgrade to sub-arterial road
1.09	Signalised intersection – single lane
1.10	Signalised intersection – two lane
1.11	Signalised intersection and 1 turning lane
1.12	Signalised intersection and 2 turning lanes
1.13	Priority controlled/ un-signalised intersection
1.14	Roundabout – single lane
1.15	Roundabout – two lane
1.16	Shared pathway 1.5m
1.17	Footpath/path
1.18	Not used
1.19	Road bridge (including over railways, waterways, gradeseparation)
1.20	Cycleway/Pedestrian bridge
1.21	Not used
1.22	Not used
1.23	Bus shelter
1.24	Not used
1.25	Pedestrian crossing
1.26	Signals/traffic signals
1.27	Street lighting
1.28	Road safety
2. Stormwater/ Transport Stormwater	
2.01	Culvert
2.02	Combined basin and raingarden facility
2.03	Single raingarden facility
2.04	Bio-retention basin
2.05	Bio-retention filter
2.06	Bio retention area
2.07	Bio-retention system
2.08	Wetland basin
2.09	Constructed wetland
2.10	Detention basin
2.11	Gross pollutant trap
2.12	Enhanced storage area
2.13	Stormwater pipe
2.14	Stormwater headwall
2.15	Stormwater pit
2.16	Stormwater channel/open channel
2.17	Stormwater channel stabilisation
3. Plan administration	
3.1	Not applicable
4. Open space embellishment	
4.1	Amenities building 400sqm
4.2	BBQ area
4.3	Boundary Fencing
4.4	Car park
4.5	Cricket wicket
4.6	Cycleway/Lm
4.7	Demolition
4.8	Double playing fields
4.9	Double playing lighting 100 Lux
4.10	Electrical works
4.11	Hydraulic works
4.12	Basic landscaping / smq
4.13	Netball courts lighting / court
4.14	Netball courts/ 6no.
4.15	Park lighting
4.16	Pathway /Lm
4.17	Paved area/m2
4.18	Picnic area
4.19	Playground
4.20	Seating area
4.21	Shade sail
4.22	Spectator seat/ea

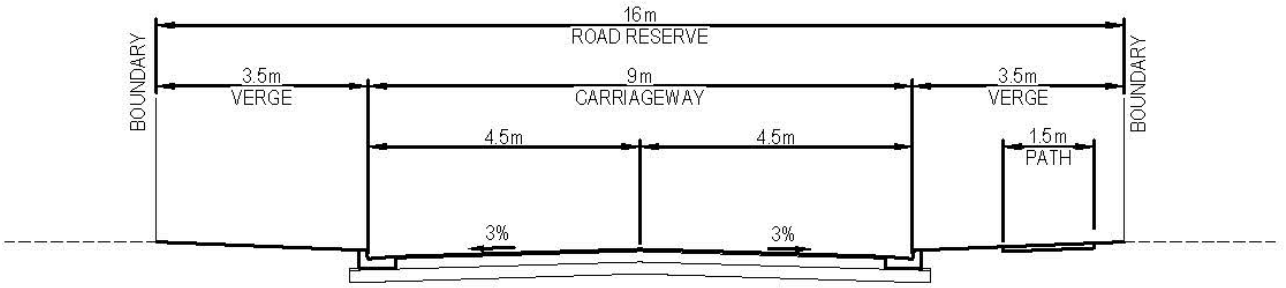
4.23	Tennis court & lighting
4.24	Turfing / smq

APPENDIX

B

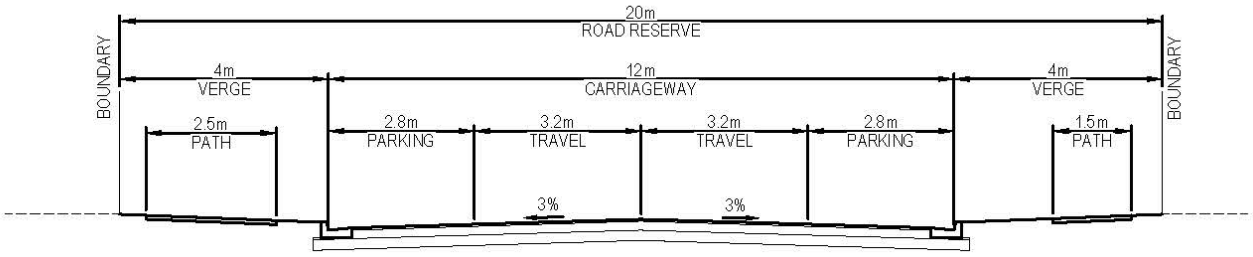
LOCAL INFRSTRUCTURE BENCHMARK DATASHEETS (SAMPLE)

Item Definition				
Item Name	New Local Road			
Item No.	1.01			
Functional Description	New, 2 Lane, flexible pavement local access road			
Inclusions	Pavement structure: 300mm subbase, 150mm base, primer seal, 50mm AC 10 (2 x 25mm layers) Road corridor: 2 x 4.5m lanes, 9m wide carriageway, road reserve 16m Roll-top gutter Stormwater drainage Subsoil drainage - 100mm diameter corrugated perforated plastic pipe with sock, including drainage filter backfill 1 x 1.5m reinforced concrete footpath - 1500mm wide x 125mm thick concrete on 125mm thick DGS20 1 x 3500mm and 1 x 2000m wide turfed grass nature strip			
Key scope of work inclusions	Nominal 500mm cut/fill balance Clearing and grubbing of light to medium vegetation Minor traffic control allowance for construction vehicles/pedestrian and around tie-in point with trafficked road (includes installation and removal of signage and barriers) Installation works			
Exclusions (may be reasonably required)	Guardrails and guide post Street lighting (see item 1.27)			
Exclusions (exceed minimum requirements	Signage Line-marking Guardrails and guide post			
Key identified risks	Relocation and diversion of existing utilities Contaminated materials Surplus excavated material requiring disposal off-site Imported fill required for site levelling			
Sub-item details	N/A			
Specific sub item information	Not applicable for this item			
Applicable standards	Austroads Guide to Traffic Engineering Practice Guide to Asset Management Part 5: Pavement Performance Guide to Pavement Technology Part 2: Pavement Structural Design Guide to Road Design Part 3: Geometric Design Roads and Maritime Services - Road Design Guide Council's relevant work specification - Civil			
Cost information				
Methodology	Reference pricing			
Benchmark base unit rate	#	Item/ sub-item	Unit	$/ Unit
	1.01	New local access road	Lm	$2,275
Banding	Not applicable for this item			
Minimum quantity	80m length			



LOCAL ACCESS ROAD - TYPICAL SECTION

Item Definition				
Item Name	**New collector road**			
Item No.	1.03			
Functional Description	Not available			
Inclusions	▪ Pavement structure: 350mm subbase, 200mm base, primer seal, 50mm AC 10 (2 x 25mm layers) ▪ Lime Stabilisation (150mm, 3%). ▪ Road corridor: 12m wide carriageway, road reserve 20m ▪ 150mm high Kerb & Gutter ▪ Stormwater drainage ▪ Subsoil drainage - 100mm diameter corrugated perforated plastic pipe with sock, including drainage filter backfill ▪ 1 x 1.5m reinforced concrete footpath - 1500mm wide x 125mm thick concrete on 125mm thick DGS20 ▪ 1 x 2.5 reinforced concrete shareway – 2500mm wide x 150mm thick concrete on 125mm thick DGS20 ▪ 1 x 1500mm and 1 x 2500m wide turfed grass nature strip			
Key scope of work inclusions	▪ Nominal 500mm cut/fill balance ▪ Clearing and grubbing of light to medium vegetation ▪ Minor traffic control allowance for construction vehicles/pedestrian and around tie-in point with trafficked road (includes installation and removal of signage and barriers) ▪ Installation works			
Exclusions (may be reasonably required)	▪ Signage ▪ Line-marking			
Exclusions (exceed minimum requirements	▪ Guard rail and guide posts			
Key identified risks	▪ Relocation and diversion of existing utilities ▪ Contaminated materials ▪ Surplus excavated material requiring disposal off-site ▪ Imported fill required for site levelling			
Sub-item details	▪ N/A			
Specific sub item information	▪ N/A			
Applicable standards	▪ Austroads > Guide to Traffic Engineering Practice > Guide to Asset Management Part 5: Pavement Performance > Guide to Pavement Technology Part 2: Pavement Structural Design > Guide to Road Design Part 3: Geometric Design > Roads and Maritime Services - Road Design Guide > Council's relevant work specification - Civil			
Cost information				
Methodology	Reference pricing			
Benchmark base unit rate	#	Item/ sub-item	Unit	$/ Unit
	1.03	New Collector Road	Lm	2,550
Banding	▪ N/A			
Minimum quantity	▪ 1,000m			



COLLECTOR ROAD - TYPICAL SECTION

Item Definition				
Item Name	Stormwater pit			
Item No.	2.15			
Functional Description	Precast reinforced concrete gully pit including heavy duty grates			
Inclusions	▪ Precast gully pits type SA1 (trafficable) ▪ Pits to suit pipes up to 600mm in size assumed to be 2.0m in depth ▪ Pits to suit pipes above 600mm in size assumed to be 2.5m in depth ▪ Bedding materials ▪ Type 1 backfill material ▪ Galvanised frame Heavy duty grates			
Key scope of work inclusions	▪ Excavation (minimal) and backfilling (minimal) but excluding reinstatement of any hard surfacing ▪ Imported stabilised fill material ▪ Installation works ▪ Connection into network ▪ 1.8m lintel kerb inlet, up to 2m in depth			
Exclusions (may be reasonably required)	▪ Not applicable for this item			
Exclusions (exceed minimum requirements				
Key identified risks	▪ Removal of excess spoil ▪ Waste levy allowances ▪ Excavated material other than VENM ▪ Encountering rock ▪ Dewatering ▪ Stockpile location located further than 500m from site			
Sub-item details	2.15.1	Precast pit to suit 375mm pipe		
	2.15.2	Precast pit to suit 450mm pipe		
	2.15.3	Precast pit to suit 600mm pipe		
	2.15.4	Precast pit to suit 900mm pipe		
	2.15.5	Precast pit to suit 1050mm pipe		
	2.15.6	Precast pit to suit 1200mm pipe		
Specific sub item information	▪ Not applicable for this item			
Applicable standards	AUS-SPEC NSW Development Design Specification D5 Stormwater Drainage Design			
Cost information				
Methodology	Reference pricing			
Benchmark base unit rate	#	Item/ sub-item	Unit	$/ Unit
	2.15.1	Precast pit to suit 375mm pipe	each	3.850
	2.15.2	Precast pit to suit 450mm pipe	each	3,850
	2.15.3	Precast pit to suit 600mm pipe	each	3,850
	2.15.4	Precast pit to suit 900mm pipe	each	TBC
	2.15.5	Precast pit to suit 1050mm pipe	each	TBC
	2.15.6	Precast pit to suit 1200mm pipe	each	TBC
Banding	▪ Not applicable for this item			
Minimum quantity	▪ Not applicable for this item			
Notes	Typically, precast pits for pipe sizes up to 600mm have the same internal dimensions and therefore approximately the same construction costs. As the pipes get larger and >600mm the internal pit dimensions change to accommodate the larger pipe. We haven't provided a price for the larger pits in			

	this iteration, however we will provide another drawing and prices in the next version

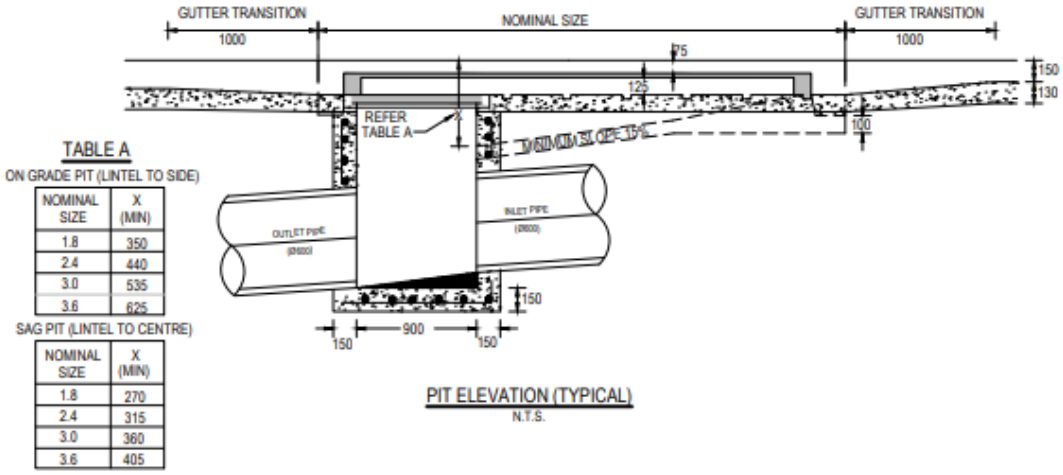


TABLE A

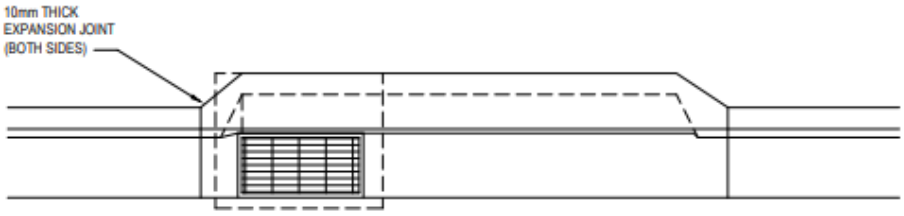
ON GRADE PIT (LINTEL TO SIDE)

NOMINAL SIZE	X (MIN)
1.8	350
2.4	440
3.0	535
3.6	625

SAG PIT (LINTEL TO CENTRE)

NOMINAL SIZE	X (MIN)
1.8	270
2.4	315
3.0	360
3.6	405

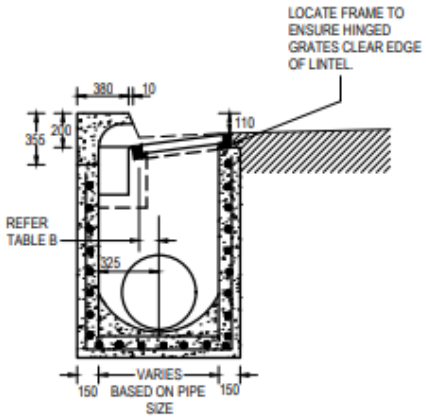
PIT ELEVATION (TYPICAL)
N.T.S.



PIT PLAN (TYPICAL)
N.T.S.

TABLE B

PIPE DIA.	℄ PIPE TO INV. GUTTER
<675	120
675	170
750	230
825	260
900	330
1050	425
1200	500
1350	580
1500	700
1650	775
1800	865



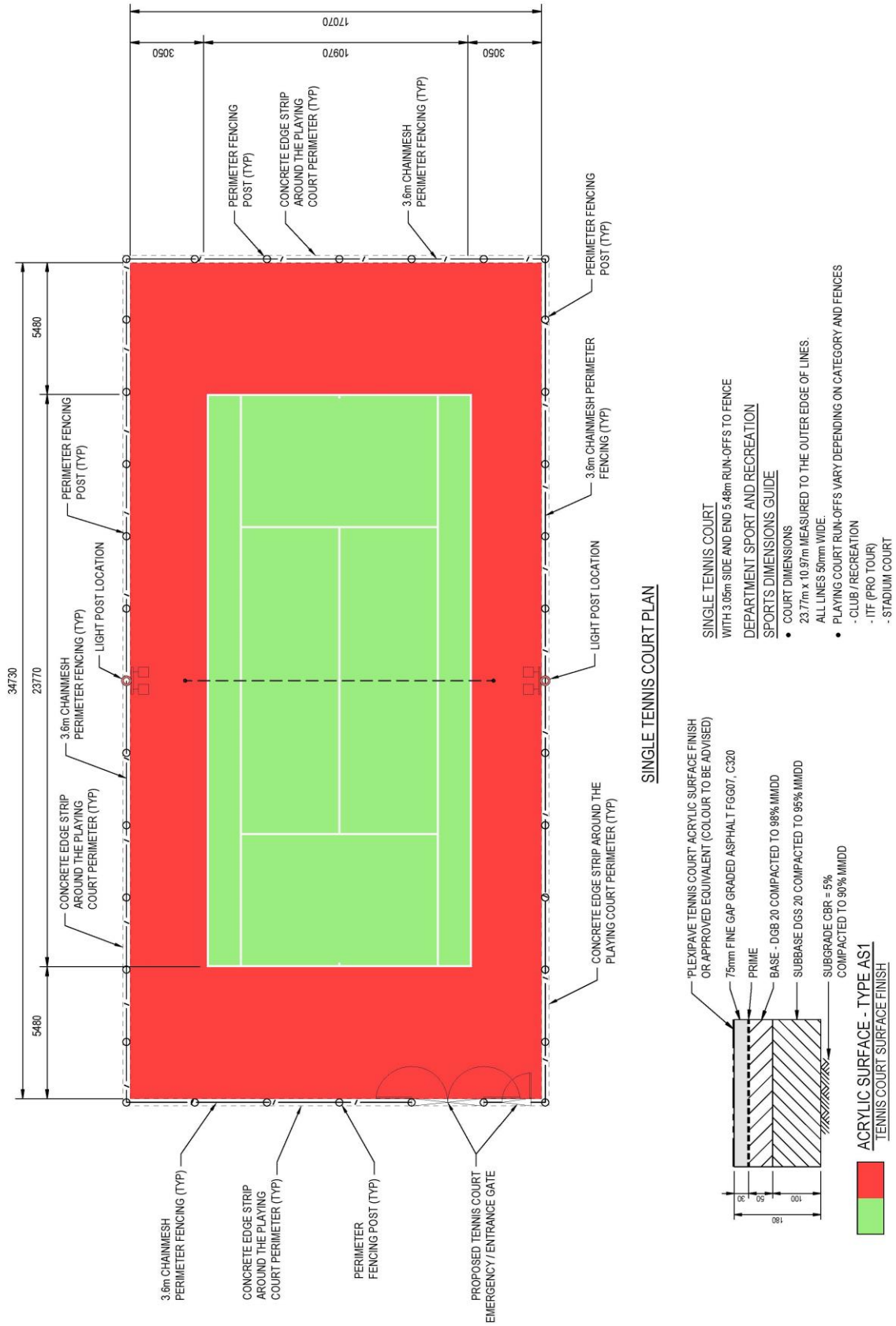
PIT SECTION (TYPICAL)
N.T.S.

Item Definition				
Item Name	**BBQ area**			
Item No.	4.02			
Functional Description	Electric cooker BBQ with surrounds/bench top			
Inclusions	▪ Basic electric cooker BBQ ▪ Stainless steel surrounds/bench top ▪ Concrete base			
Key scope of work inclusions	▪ Nominal excavation for foundations with material retained on-site ▪ Electrical connection (20m run) ▪ Installation works			
Exclusions (may be reasonably required)	▪			
Exclusions (exceed minimum requirements	▪ Sink units			
Key identified risks	▪ Not applicable for this item			
	4.02.1	Single plate; uncovered		
	4.02.2	Double plate; uncovered		
Specific sub item information	▪ Not applicable for this item			
Applicable standards	N/A			
Cost information				
Methodology	▪ Reference pricing			
Benchmark base cost	#	Item/ sub-item	Unit	$/ Unit
	4.02.1	Single plate; uncovered	each	$10,000.00
	4.02.2	Double plate; uncovered	each	$15,000.000
Banding	▪ Not applicable for this item			
Minimum quantity	▪ Not applicable for this item			

Item Definition				
Item Name	**Basic landscaping / smq**			
Item No.	4.12			
Functional Description	**Native trees and shrubs including mulching and edging**			
Inclusions	▪ Native sapling plant, semi mature trees, mature trees and shrubs ▪ Imported topsoil ▪ Mulching allows to cut and mulch trees (semi mature) ▪ Insitu concrete edging, 300mm			
Key scope of work inclusions	▪ Nominal 500mm cut/fill balance			
Exclusions (may be reasonably required)	▪ Planter box (no longer a separate item -may need to include)			
Exclusions (exceed minimum requirements	▪ Drainage system ▪ Tree guard			
Key identified risks	▪ Contaminated materials ▪ Surplus excavated material requiring disposal off-site ▪ Imported fill required for site levelling			
Sub-item details	3.12.1	Planting; sapling		
	3.12.2	Planting; semi mature tree (45ltr)		
	3.12.3	Planting; mature tree (100ltr)		
	3.12.4	Planting; shrubs		
	3.12.5	Mulching		
	3.12.6	Edging		
Specific sub item information	▪ Not applicable for this item			
Applicable standards	N/A			
Cost information				
Methodology	Reference pricing			
Benchmark base cost	#	Item/ sub-item	Unit	$/ Unit
	3.12.1	Planting; sapling	each	$5.00
	3.12.2	Planting; semi mature tree (45ltr) - including top soil	each	$90.00
	3.12.3	Planting; mature tree (100ltr) - including top soil	each	$300.00
	3.12.4	Planting; shrubs, including top soil & 2 plants m2	m2	$ 45.00
	3.12.5	Mulching – Forest Blend	m2	$ 25.00
	3.12.6	Edging 150 x 150	Lm	$ $70.00
Banding	▪ Not applicable for this item			
Minimum quantity	▪ Not applicable for this item			

Item Definition				
Item Name	**Picnic area**			
Item No.	4.18			
Functional Description	**Hard surfacing with foundation layers and drainage**			
Inclusions	▪ Steel frame picnic set ▪ Concrete base ▪ Extra over provided for shade covering			
Key scope of work inclusions	▪ Nominal excavation for foundations with material retained on site ▪ Installation works			
Exclusions (may be reasonably required)	▪ Not applicable for this item			
Exclusions (exceed minimum requirements	▪ Structural Engineering – assumed the street furniture is 'off the shelf' to Australian standards.			
Key identified risks	▪ Not applicable for this item			
Sub-item details	4.18.1	Fixed table; aluminium slats; back supported seats		
	4.18.2	Extra over for shade covering		
Specific sub item information	▪ Not applicable for this item			
Applicable standards	N/A			
Cost information				
Methodology	Reference pricing			
Benchmark base unit rates	#	Item/ sub-item	Unit	$/ Unit
	4.18.1	Fixed table; aluminium slats; back supported seats	each	4,800
	4.18.2	Extra over for shade covering	M2	350
Banding	▪ Not applicable for this item			
Minimum quantity	▪ Not applicable for this item			

Item Definition				
Item Name	**Tennis court & lighting**			
Item No.	4.23			
Functional Description	Single court outdoor tennis court, with 'Plexipave Tennis Court' Acrylic Surface, including court markings and net posts			
Inclusions	▪ Court size of 593m2, inclusive of 5.48m clearance at back of court, 3.05 clearance at side of court. ▪ 100mm thick subbase DGS 20 ▪ 50mm thick Base DGB 20 ▪ 75mm Fine Gap Graded Asphalt ▪ 'Plexipave Tennis Court' Acrylic Surface Finish ▪ Court markings and removable net posts ▪ Perimeter fencing ▪ Floodlighting (typical 250 Lux for social play) ▪ Basic drainage			
Key scope of work inclusions	▪ Site levelling (cut/fill neutral) ▪ Installation works			
Exclusions (may be reasonably required)				
Exclusions (exceed minimum requirements	▪ Spectator seating			
Key identified risks	▪ Relocation and diversion of existing utilities ▪ Contaminated materials ▪ Surplus excavated material requiring disposal off-site ▪ Imported fill required for site levelling			
Sub-item details	▪ N/A			
Specific sub item information	▪ Not applicable for this item			
Applicable standards	▪ Court size: International Tennis Federation Rules of Tennis, adopted by Tennis Australia			
Cost information				
Methodology	Reference pricing			
Benchmark base unit rate	#	Item/ sub-item	Unit	$/ Unit
	4.23	Tennis court & lighting	court	$460,000
Banding	▪ Not applicable for this item			
Minimum quantity	▪ Not applicable for this item			


17070
3050
10970
3050
PERIMETER FENCING POST (TYP)
CONCRETE EDGE STRIP AROUND THE PLAYING COURT PERIMETER (TYP)
3.6m CHAINMESH PERIMETER FENCING (TYP)
PERIMETER FENCING POST (TYP)
34730
23770
5480
5480
PERIMETER FENCING POST (TYP)
3.6m CHAINMESH PERIMETER FENCING (TYP)
LIGHT POST LOCATION
3.6m CHAINMESH PERIMETER FENCING (TYP)
LIGHT POST LOCATION
CONCRETE EDGE STRIP AROUND THE PLAYING COURT PERIMETER (TYP)
CONCRETE EDGE STRIP AROUND THE PLAYING COURT PERIMETER (TYP)
3.6m CHAINMESH PERIMETER FENCING (TYP)
CONCRETE EDGE STRIP AROUND THE PLAYING COURT PERIMETER (TYP)
PERIMETER FENCING POST (TYP)
PROPOSED TENNIS COURT EMERGENCY / ENTRANCE GATE
SINGLE TENNIS COURT PLAN
SINGLE TENNIS COURT
WITH 3.05m SIDE AND END 5.48m RUN-OFFS TO FENCE
DEPARTMENT SPORT AND RECREATION
SPORTS DIMENSIONS GUIDE
• COURT DIMENSIONS
23.77m x 10.97m MEASURED TO THE OUTER EDGE OF LINES.
ALL LINES 50mm WIDE.
• PLAYING COURT RUN-OFFS VARY DEPENDING ON CATEGORY AND FENCES
- CLUB / RECREATION
- ITF (PRO TOUR)
- STADIUM COURT
'PLEXIPAVE TENNIS COURT' ACRYLIC SURFACE FINISH OR APPROVED EQUIVALENT (COLOUR TO BE ADVISED)
75mm FINE GAP GRADED ASPHALT FGG07, C320
PRIME
BASE - DGB 20 COMPACTED TO 98% MMDD
SUBBASE DGS 20 COMPACTED TO 95% MMDD
SUBGRADE CBR = 5%
COMPACTED TO 90% MMDD
30
50
100
180
ACRYLIC SURFACE - TYPE AS1
TENNIS COURT SURFACE FINISH

Item Definition				
Item Name	**Turfing / smg**			
Item No.	4.24			
Functional Description	**Rolled turf on sand bed with irrigation**			
Inclusions	▪ Rolled buffalo turf or hydroseeding on 200mm-400mm sand bed ▪ Water supply piping and tap connections for irrigation ▪ Hose and portable sprinkler accessories – Pop up Sprinkler system			
Key scope of work inclusions	▪ Nominal 500mm cut/fill balance ▪ Re-use of topsoil from local stockpile ▪ Water supply piping maximum run of 50m ▪ Initial fertilisation ▪ Installation works			
Exclusions (may be reasonably required)				
Exclusions (exceed minimum requirements	▪ 6 months maintenance			
Key identified risks	▪ Contaminated materials ▪ Surplus excavated material requiring disposal off-site ▪ Imported fill required for site levelling			
Sub-item details	4.24.1	Rolled turf; buffalo		
	4.24.2	Hydro seeding		
Specific sub item information	▪ Not applicable for this item			
Applicable standards	▪ Landcom: Open Space Design Guidelines (2008)			
Cost information				
Methodology	Reference pricing			
Benchmark base cost	#	Item/ sub-item	Unit	$/ Unit
	4.24.1	Rolled turf; buffalo – includes ground prep and pop up sprinklers No provision for water connection	m2	$40.00
	4.24.2	Hydro seeding – include ground prep	m2	$10.00
Banding	▪ Not applicable for this item			
Minimum quantity	▪ Not applicable for this item			