Chapter 13 Simplified procedures

13.1 Overview

In this chapter

This chapter contains the following topics:

Freight transport services

The simplified procedure may be used for evaluation of for all freight transport proposals. However, for proposals with a present value of the funding gap greater than $1 million, and for proposals where the procedures do not accurately represent the costs and benefits, the analyst should provide additional or more appropriate information. If in doubt, the analyst should contact Land Transport NZ before proceeding.

The procedures assume that the primary benefits are road maintenance and improvement cost savings to local and central government. Accident reduction benefits are also taken into account, but transport services user and other road user benefits are excluded as being negligible or zero.

The calculation of the do minimum adopts the simplified procedure for road infrastructure projects from volume 1. The net road maintenance cost savings is calculated by estimating the total annual amount of freight traffic, measured in terms of 'equivalent design axles' (EDA), removed from the network.

For projects with a funding gap up to $1 million, only the worksheets for the chosen option need be submitted. For projects with a funding gap over $1 million, worksheets for all options should be provided.

13.1 Overview, continued

New passenger transport services

The simplified procedure may be used for evaluation of all new passenger transport services. However, for proposals with a present value of the funding gap greater than $1 million, and for proposals where the procedures do not accurately represent the costs and benefits, the analyst should provide additional or more appropriate information. If in doubt, the analyst should contact Land Transport NZ before proceeding.

The procedure assumes that new services will be implemented during the peak period, that the majority of traffic removed will be light vehicles and that there are negligible road maintenance cost savings. Road user benefits are calculated incrementally, as a change from the do minimum. Thus, only a description of the do minimum is required for the evaluation.

The procedure simplifies the calculation of transport services user benefits and road user benefits (including travel time, vehicle operating cost, and accident cost savings and environmental benefits) by utilising the benefits and values per passenger boarding devised for Land Transport NZ's patronage funding rate scheme.

The road user benefit values are based on the assumption that the road corridor in question has at least one point (bottleneck or 'ruling' intersection) that operates at least 80 percent capacity during the peak period. If this is not the case, then the marginal changes in travel time will be negligible and road user benefits should not be included.

For projects with a funding gap of less than $1 million, only the worksheets for the chosen option need be submitted. For projects over $1 million, worksheets for all options should be provided.

13.1 Overview, continued

Existing transport services

The simplified procedure may be used for evaluation of all existing passenger transport services. However, for proposals with a present value of the funding gap greater than $1 million, and for proposals where the procedures do not accurately represent the costs and benefits, the analyst should provide additional or more appropriate information. If in doubt, the analyst should contact Land Transport NZ before proceeding.

The simplified procedure for improving existing passenger transport services assumes that the improvements to services will be implemented in the peak period and that the majority of traffic removed from the road network will be light vehicles. Hence, road maintenance cost saving is excluded from the analysis. All benefits and costs are calculated incrementally as a change from the do minimum. Therefore, only a description of the do minimum is required for the evaluation.

This procedure simplifies the calculation of transport services user benefits and road user benefits (including travel time, vehicle operating cost, and accident cost savings and environmental benefits) by utilising the benefits and values per passenger boarding devised from Land Transport NZ's patronage funding scheme. Thus, there are values for road users, and additional transport service users for the main urban centres of Auckland, Wellington, Christchurch, while other centres will have different values.

The benefit values assume that each trip on the improved service is an 'average' length for the urban centre. Thus, for trips shorter than the average, the benefit may be overestimated. Likewise, for trips longer than the average, the benefit may be underestimated, and the analyst should consider whether this is likely to be significant.

The peak benefit values are based on the assumption that the road corridor in question has at least one point (bottleneck or 'ruling' intersection) that operates at least 80 percent capacity during the peak period. If this is not the case, then the off peak benefits should be used.

The additional transport service user benefits are based on the benefits that accrue to both existing and new users as a result of service improvements.

For projects with a funding gap of less than $1 million, only the worksheets for the chosen option need be submitted. For projects over $1 million, worksheets for all options should be provided.

13.1 Overview, continued

Walking and cycling projects	The simplified procedure for walking and cycling projects may be used where the undiscounted cost of the project is up to $500,000. Projects with a capital cost greater than $500,000 need to be evaluated in greater detail on a case-by-case basis. The procedure is not applicable to signalised crossings over roads.
Travel behaviour change (TBhC) projects	The simplified procedure for travel behaviour change projects may be used for all cost/size TBhC projects. Where a package is proposed combining TBhC components/projects and non-TBhC components/projects, such as walking, cycling, or road-related infrastructure or passenger transport service improvements, and the cost of the non-TBhC components is greater than $150,000, a composite evaluation is required. The Land Transport New Zealand/EECA *Travel behaviour change guidance handbook* (2004) provides guidelines on composite evaluation of such packages. There is also the option, should the analyst wish, of undertaking a composite evaluation for a package involving TBhC projects where the cost of non-TBhC components is less than $150,000.

SP8 Freight transport services

Introduction

These procedures provide a simplified method for evaluating the costs and benefits of freight transport services with or without capital infrastructure.

The calculation of the benefit cost ratio (BCR) in this simplified procedure assumes that:

1. Cost savings from reduced road maintenance and road infrastructure improvements are the primary reasons for undertaking the project.
2. The users of the freight service are indifferent to the mode used to transport the freight. Hence, no freight user benefits are included in this simplified procedure. If, however, the proposal will generate significant freight user benefits (primarily travel time savings or improved service quality), then these benefits should be included in the BCR calculation.
3. The road network affected by the proposal is largely rural. If, however, the freight traffic spends a significant time traversing urban areas, the evaluator should use the procedures described in appendix A14 of this volume to evaluate accident cost savings.
4. Other forms of benefits are usually not significant. The evaluator can indicate on worksheet 1 whether other benefits are important. If they are, then these other benefits should either be included in the BCR or described on a separate sheet and attached to the evaluation.
5. Freight transport proposals that are approved for funding will be established/ constructed in the first year and will operate by the start of Year 2.
6. A 10 percent discount rate and 25 year evaluation period are used.
7. A 12 percent rate of return is used for analysis of the funding gap.
8. All costs are exclusive of GST.

Note: In cases where the above assumptions are not appropriate, either the simplified procedure should be modified or full procedures used.

SP8 Freight transport services, continued

Introduction, continued

The simplified procedure is designed to consider one option at a time. Where it is logical to do so, the analyst should consider other suitable options in order to select the optimal solution. In some cases (eg where pavements are weak), it may be necessary to compare the freight transport option with a pavement rehabilitation option for the affected road network. If there is more than one option, the evaluation will involve incremental analysis of the costs and benefits of the different options.

For projects with a funding gap up to $1 million, only the worksheets for the chosen option need be submitted. For projects with a funding gap over $1 million, worksheets for all options should be provided.

Worksheet	Description
1	Summary of analysis of chosen option
2	Proposal map
3	Funding gap analysis
4	Do minimum
5	Net cost savings to government
6	Accident costs savings
7	Benefit cost ratio and incremental analysis

SP8 Freight transport services, continued

Summary of analysis of chosen option **Worksheet 1**

Worksheet 1 provides a summary of the economic and project data for the preferred option. Provide a brief description of the problem that the proposal is intended to address. For the do minimum, describe the existing road network affected by the proposal, referring to worksheet 2. Other information on the worksheet is filled in based on the calculations in worksheets 3 through 7.

Proposal name: _____

Date entered into **LTP online**: _____ Your reference (as entered in **LTP online**): _____

Location: _____ Base date: 1 July 20 _____

Time zero: 1 July 20 _____

Date evaluation completed: _____ Evaluation completed by: _____

Office/organisation: _____ Checked by: _____

1. **Description of the problem** _____

2. **Do minimum - description** **Cost $** _____ **A**

3. **Freight transport preferred option - description** **Cost $** _____

4. **Programming information**

   Earliest start date _____

   Construction/establishment period _____ months

   Other statutory/regulatory requirements _____

   Period of analysis (service life of proposal – maximum 25 years) _____ years

5. **Roading characteristics**

   Length affected by use of freight transport _____ kilometres

   Freight volume transferred from road network _____ tonnes/year

SP8 Freight transport services, continued

Summary of analysis of chosen option, continued **Worksheet 1**

6. **Funding gap** (from worksheet 3)

PV of service provider costs $ _____

PV of funding gap $ _____

$ _____ per annum

7. **Economic appraisal data** (from worksheets 5 and 6)

PV accident cost savings $ _____

PV other benefits (if any) $ _____

PV net cost savings to government $ _____

8. **Preferred option** (from worksheet 7)

$$BCR_{National} = \frac{\text{present value}_{\text{(accident cost savings + other benefits)}}}{\text{present value}_{\text{(service provider costs – road capital and maintenance cost savings)}}} =$$

$$BCR_{Government} = \frac{\text{present value}_{\text{(accident cost savings + other benefits)}}}{\text{present value}_{\text{(funding gap – net cost savings to government)}}} =$$

9. **Non-monetised impacts:** yes / no (if yes, provide description on separate page)

10. **Network impacts:** describe the upstream and downstream impacts.

_____

_____

_____

_____

11. **Action recommended by analyst:** proceed with proposal/put on hold/abandon proposal

12. **Action recommended by controlling authority:** approved/modified _____

Date: _____

SP8 Freight transport services, continued

Proposal map **Worksheet 2**

On a separate page supply a map that clearly identifies the roads currently used for the freight transport as well as the proposed freight transport route and mode.

SP8 Freight transport services, continued

Explanation sheet for worksheet 3 **Funding gap analysis**

The service provider costs are compared to the projected revenue stream using a net present value (NPV) calculation to determine whether or not the proposal is commercially viable. The NPV is the discounted value of the net cash flow.

Funding gap

1. The deficit between the total revenue (for a new service) or the change in revenue (for an existing service) and the service provider costs is the 'funding gap.' The funding gap is the amount that needs to be funded by local and central government if the proposal is to proceed.
2. Where the funding gap is zero or negative, the proposal is commercially viable and no financial assistance is required from government.

Service provider costs

3. Service provider costs may be calculated either from industry standard unit costs or based on cost estimates from the service providers. The proposal costs include capital costs (for physical infrastructure and/or vehicles, vessels or rolling-stock costs), disruption costs during construction, operating and maintenance costs, and costs of decommissioning. In some cases, costs may be offset by the salvage value of capital assets. Indicative quotes may be considered when the project proposal costs cannot be calculated.

Service provider revenue

4. Where the proposed freight service generates revenue (generally through a user charge for the freight services), the financial analysis must take this into account.
5. The proposed user charge should be based on the 'willingness to pay' of the potential users of the freight service. The maximum user charge may be determined in discussion with the company and should take into account the current user charges for transporting the freight by road. It is generally expected that the user charge will be on a 'per tonne' basis, though other bases for setting the charge are acceptable.
6. In the case of an expansion of, or improvement to, an existing freight service, the increase or change in revenue shall be included in the calculation of the funding gap. In this case the funding request to Land Transport NZ will be to facilitate an improved service rather than funding for an existing service.

Service provider required rate of return

7. The weighted average cost of capital (WACC) can be used to estimate the service provider's required rate of return. The WACC is the weighted average of the required return on equity and the (interest) cost of any debt financing.
8. It is generally expected that the required rate of return will reflect the industry norm of 12 percent. If an alternative rate of return is used, then this needs to be explained and justified.

Calculating the funding gap

9. The use of a computer spreadsheet function, such as the 'Goal Seek' function in the Excel programme, is the simplest method of assessing the financial viability of a proposal and determining the value of the funding gap. Refer to chapter 6 of this volume.

SP8 Freight transport services, continued

Funding gap analysis **Worksheet 3**

1. **Service provider costs**

Type of cost	Year(s) incurred	Cost
Capital cost of proposal	Year 0	
Capital cost of proposal	Year 1	
Operating and maintenance costs of service - if these vary by year, provide information on a separate sheet - $ per year	Years 2 – 25	
Decommissioning costs (zero if none)	Year 25	

2. **Service provider revenue for new service**

(a)	Tonnes of freight moved per year (Year 2 - 25)*	
(b)	Proposed user charge (per tonne)	
(c)	Annual revenue = (a) × (b)*	

*If the rate will vary from year to year, attach separate sheet indicating volumes and revenue for each year.

3. **Service provider revenue for improvements to existing service**

(d)	Current tonnes of freight moved per year	
(e)	Additional tonnes of freight moved after improvement to service - per year (Year 2 - 25)*	
(f)	Proposed user charge (per tonne)	
(g)	Annual revenue = (e) × (f)*	

*If the rate will vary from year to year, attach separate sheet indicating volumes and revenue for each year.

4. **Service provider required rate of return** = 12% per annum.

   If a different rate is to be used, a full explanation and justification must be provided.

5. **Funding gap**

   Using information on the required rate of return, service provider costs and revenues, calculate the annual funding gap. Where operating costs or revenue flows vary on an annual basis, the funding gap will also vary. Refer to section 6.5 of this volume for an example.

   Attach the documentation of the funding gap analysis. If the funding gap is positive, the proposal is not commercial and financial assistance is required to make it viable.

   Funding gap $ _____ per year from year 0 to year 25.

6. **Present value of the funding gap**

   The calculation of the present value of the funding gap assumes that the funding gap occurs uniformly from year 0 through year 25. If this is not the case, use the appropriate procedures outlined in section 6.5 of this volume.

   Present value = funding gap × 9.52 = $ _____

   Enter the present value of the funding gap on the appropriate lines in worksheets 1 and 7.

SP8 Freight transport services, continued

Explanation sheet for worksheet 4 **Do minimum**

The do minimum is the minimum level of expenditure necessary to keep road(s) open that are used to transport the freight in question. The do minimum generally consists of maintenance costs, although in a few instances, it may include future planned road construction.

Note: Where costs are common to both the do minimum and the option under consideration, they do not need to be included in the analysis.

1. The annual (a) and periodic (b) maintenance costs should be obtained from maintenance and resealing records.
2. The sum of (a) plus (b) is the present value of annual and periodic maintenance costs. It is important that these costs are accurate.
3. In exceptional cases the do minimum may involve capital expenditure such as planned road construction. In such cases the costs will include investigation, design and construction, in order to be consistent with the costs of the option. These costs should then be discounted to present value by multiplying by the single payment present worth factor (SPPWF) for year 1 = 0.91.
4. Present worth factors — for 10 percent discount rate

Year	SPPWF	Year	SPPWF
1	0.91	14	0.26
2	0.83	15	0.24
3	0.75	16	0.22
4	0.68	17	0.20
5	0.62	18	0.18
6	0.56	19	0.16
7	0.51	20	0.15
8	0.47	21	0.14
9	0.42	22	0.12
10	0.39	23	0.11
11	0.35	24	0.10
12	0.32	25	0.09
13	0.29		

SP8 Freight transport services, continued

Do minimum **Worksheet 4**

1. **Annual maintenance costs**

   Total = $ _____ × 9.52 = $ _____ (h)

2. **Periodic maintenance costs**

   Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount	SPPWF	Present value
			Total $		(i)

3. **Future planned roading costs avoided** (include investigation, design and construction)

   Description of project avoided

   _____

   _____

   _____

   Present value of planned project costs avoided = _____ × 0.91 = _____ (j)

4. **Present value of the do minimum** = (h) + (i) + (j) = _____

   Enter the present value of the do minimum in position A on worksheet 1

SP8 Freight transport services, continued

Explanation sheet for worksheet 5 **Net costs savings to government**

Worksheet 5 is used for calculating the net government cost savings (road maintenance and improvement savings) associated with the freight transport service proposal. The net government cost savings are calculated by estimating the total annual amount of freight traffic, measured in terms of 'equivalent design axles' (EDA), removed from the road network.

Use worksheet 5 to describe the road sections affected by implementing the freight transport proposal and calculate the road maintenance cost savings per road section. Tables 1 and 2 below provide information on EDA and $/EDA/km for completing the table.

The road user charges (RUC) foregone are estimated, so that the net savings to government can be calculated. This assumes that cost savings begin in year 2, when the service is implemented.

If the amount of freight traffic removed from the road network will vary from year to year, separate calculations are required for each year.

Table 1 Heavy vehicle types and EDA equivalents

Vehicle type	Equivalent design axles (EDAs)		
	Laden trip	Unladen	Return trip
HCV-IIa – up to 18 tonnes payload, 6 wheel truck, 3 axle trailer	1.38	0.2	1.58
HCV-IIb – over 18 and up to 23 tonnes payload, 8 wheel truck, 2 axle trailer	1.94	0.2	2.14
HCV-IIc – over 23 and up to 28 tonnes payload, (forestry)	3.3	0.5	3.8

If the HCV traffic moves freight from its origin (freight source) to destination (distribution point) and returns empty to the origin, then use the return trip EDA. If the HCV traffic carries a load on its return trip and the freight transport proposal will also carry the return load, then double the laden trip value.

Table 2 Value of EDA per km by road type

Road type	$/EDA/km
Local road, designed pavement (LD)	0.60
Local road, undesigned pavement (LU)*	0.60 – 1.00
State highway (SH)	0.35

* Local road undesigned pavement refers to roads that were previously unsealed and were sealed by simply adding more aggregate and then a seal coat. The value of the $/EDA/km for local road undesigned requires judgement on the part of the local authority and evaluator to assess the EDA value.

Caveat on using the above data.

Where the values in tables 1 and 2 above do not accurately represent local conditions, the analyst should provide additional information that shows what values have been used and whether these have been calibrated to local conditions.

SP8 Freight transport services, continued

Calculation of net cost savings to government **Worksheet 5**

Name of road section	Type of road*	$/EDA/km (table 2) (k)	Length (km) (l)	Type of HCV (table 1)**	EDA of HCV (table 1)** (m)	No of HCV/yr (n)	Total EDA/km (o) = (m) × (n)	Maintenance cost saving per section (k) × (l) × (o)
(p) Total road maintenance/improvement cost savings per year								

* (LD = local designed pavements; LU = local undesigned pavements; SH = state highway)

** If there is more than one type of HCV, then record each type on a separate line. Continue on a separate page if necessary.

Road user charges foregone:

Average licensed weight of HCVs used _____

(q) Road user charge $_____ per 1000 km. Note: the evaluator will need to assess the appropriate RUC for the vehicles in question.

(r) Total vehicle kilometres removed from the road per annum = change in number of road trips per annum × km per trip = _____ km

(s) Road user charges foregone = (q) × (r) / 1000 = $_____ per annum

Present value of net savings to government:

(t) Total = (annual maintenance/improvement savings (p) – road user charges foregone (s)) × PWF (from year 2 to year 25)

Total = ((p) – (s)) × 7.70 = $_____ (t)

Enter the present value of the net cost savings to government (t) on the appropriate line in worksheets 1 and 7.

If freight traffic volumes removed from the road vary by year, the maintenance cost savings, RUC foregone, and the PV of net road maintenance cost savings must be calculated for each year.

SP8 Freight transport services, continued

Explanation sheet for worksheet 6 **Accident costs savings**

The calculation of accident cost savings for the freight transport service is based on accident rate analysis. The analysis assumes that the road network affected by the freight transport service proposal is primarily rural, with a minimal number of intersections. If the freight traffic would spend a significant amount of time traversing urban areas, the evaluator should use the procedures described in section 7.3 of this volume.

The accident cost savings are assumed to start from the beginning of year 2, when the freight transport service proposal is implemented.

Table 3 provides the equation coefficients by terrain type for rural mid-block sections. These coefficients only include truck crash rates (Transit vehicle classes III to XIV).

Table 3 Rural mid-block equation coefficients (b_0) for heavy vehicle crashes

Annual average daily traffic (AADT)	Coefficients b_0 by terrain type		
	Level terrain (0 to 3%)	Rolling terrain (3 to 6%)	Mountainous terrain (> 6%)
Up to 4,000	20	42	52
Greater than 4,000	20	20	43

The terrain type can be selected by route gradient. The gradient ranges shown should generally be maintained throughout the mid-blocks. Sections of road that are less steep can occur in rolling or mountainous sections for short lengths. Provided that the lower gradient length is followed by another rolling or mountainous gradient, then the entire section can be classified as rolling or mountainous.

Table 4 below gives the costs per reported injury accident for rural areas.

Table 4 Costs per reported injury accident (July 2002)

Speed Limit and Location	Cost per accident
100 km/h near rural	$590,000
100 km/h remote rural	$890,000

100 km/h remote rural roads are defined as carrying less than 1,000 vehicles/day and being more than 20 km from a town of 3,000 population or more.

Caveat on using the above data.

Where the values in tables 3 and 4 above do not accurately represent local conditions, the analyst should provide additional information that shows what values have been used and whether these have been calibrated to local conditions.

SP8 Freight transport services, continued

Accident costs savings **Worksheet 6**

Name of road section	AADT	Terrain type (L, R or M)	Coefficient (b_0)	No of HCV removed/yr (t)	Length (km) (u)	Exposure (100 million vehicle km/yr) X = t × u/108	Reported injury accidents/yr $A_T = b_0 \times X$
(v) Total reported injury accidents per year for affected corridor (sum of AT values for each section)							
(w) Cost per reported injury accident (table 4)							
(y) Accident cost savings per year (= v × w)							

Present value of total accident cost savings:

The calculation of the present value of the accident cost savings assumes that the accident cost savings occur uniformly from year 2 through year 25. If this is not the case, please use the appropriate procedure as outlined in section 5.7 of this volume.

Present value of accident cost savings = accident cost savings per year (y) × 7.70 = $ _____(z)

Enter the present value of the accident cost savings (z) on the appropriate line in worksheet 7.

SP8 Freight transport services, continued

Explanation sheet for worksheet 7 **Benefit cost ratio and incremental analysis**

Benefit-cost analysis

1. Under benefits, enter the discounted values for the accident cost savings and any other benefits, for each option.
2. Under costs, enter the discounted value of the funding gap and the discounted value for the net government cost savings for each option. Subtract the net government cost savings from the funding gap to obtain the total cost to government for each option.
3. Calculate the BCR for each option by dividing the total benefits by the total cost to government.

Incremental analysis

1. Rank the options in order of increasing cost to government.
2. Compare the lowest cost option with the next higher cost option to calculate the incremental BCR.
3. If the incremental BCR is less than the target incremental BCR specified in appendix A12 of volume 1, discard the second (higher cost) option in favour of the first. Compare the first option with the next higher cost option.
4. If the incremental BCR is greater than the target incremental BCR, the second (higher cost) option becomes the basis for comparison against the next higher cost option.
5. Repeat the procedure until no higher cost options are available that have an incremental BCR greater than the target incremental BCR.

Note: If a pavement rehabilitation option is being considered in the analysis, the analyst should consult Land Transport NZ on how to evaluate the choice of the preferred option.

SP8 Freight transport services, continued

Benefit cost ratio and incremental analysis **Worksheet 7**

Proposal _____ Time zero _____ Base date _____

BCR calculations	Do minimum	Option	Option	Option	Option
Benefits					
Present value accident cost savings (z)					
Present value other benefits (if applicable)					
Present value total benefits					
Total cost to government					
Present value capital and operating costs (do minimum)					
Present value funding gap (options)					
Present value net government cost savings (options)					
Present value total cost to government (funding gap – net government cost savings)					
BCR					

Base option for comparison			Next higher cost option			Incremental analysis		
Option	**Total costs** (1)	**Total benefits** (2)	**Option**	**Total costs** (3)	**Total benefits** (4)	**Incremental costs** (5) = (3)-(1)	**Incremental benefits** (6) = (4)-(2)	**Incremental BCR** (7) = (6)/(5)

SP9 New passenger transport services

Introduction

These procedures provide a simplified method for appraising the costs and benefits of new passenger transport (PT) proposals that are passenger transport services and/or capital infrastructure.

The calculation of the benefit cost ratio (BCR) in this simplified procedure assumes that:

1. New PT services are provided in the peak period so that commuters change modes from cars to bus or rail. The peak period is defined by the project proposer and justification must be provided.
2. Benefits of providing peak period services accrue to both the PT user and road user.
3. The primary benefits are: travel time savings (including congestion relief), vehicle operating cost savings, accident cost savings, and CO_2 reductions.
4. The proposal will not generate road maintenance cost savings, as the majority of traffic removed from the road network will be light vehicles. There will also be no road capital cost savings.
5. Other benefits (positive or negative) are generally not significant. However, allowance can be made for other benefits in these procedures.
6. The calculation of benefits and costs are based on incremental changes from the do minimum to the option, the benefits and costs of the do minimum are not calculated separately.
7. Proposals adopted will be established or constructed in the first year and will be operating by the start of year 2.
8. A 10 percent discount rate and 25 year evaluation period are used.
9. A 12 percent rate of return is used for analysis of the funding gap.
10. All costs are exclusive of GST.

Note: In cases where the above assumptions are not appropriate, either the simplified procedure should be modified or full procedures used.

SP9 New passenger transport services, continued

Introduction, continued

The simplified procedure is designed to consider one option at a time. Where it is logical to do so, the analyst should consider other options in order to select the optimal solution. If there is more than one option, the evaluation will involve incremental analysis of the costs and benefits of the different options.

For projects with a funding gap of less than $1 million, only the worksheets for the chosen option need be submitted. For projects over $1 million, worksheets for all options should be provided.

Worksheet	Description
1	Summary of analysis of chosen option
2	Proposal map
3	Funding gap analysis
4	PT user benefits
5	Road user benefits
6	Benefit cost ratio and incremental analysis

SP9 New passenger transport services, continued

Summary of analysis of chosen option **Worksheet 1**

Worksheet 1 provides a summary of the economic and project data for the preferred option. Provide a brief description of the problem that the proposal is intended to address. For the do minimum, describe the existing road network affected by the new PT proposal, referring to worksheet 2

Proposal name: _____

Date entered into **LTP online**: _____ Your reference (as entered in **LTP online**): _____

Location: _____ Base date: 1 July 20 _____

Time zero: 1 July 20 _____

Date evaluation completed: _____ Evaluation completed by: _____

Office/organisation: _____ Checked by: _____

1. **Description of the problem** _____

_____

2. **Do minimum - description** _____

_____

_____

3. **Preferred option - description** _____

_____

_____

4. **Programming information**

Earliest start date _____

Construction/establishment period _____ months

Other statutory/regulatory requirements _____

Period of analysis (service life of proposal – maximum 25 years) _____ years

5. **Roading characteristics**

Length affected by use of PT _____ kilometres

Peak period traffic flow* _____ vehicle/hour

Estimated traffic growth _____ %/annum

*If peak period traffic flow cannot be expressed as a single figure, a range should be shown.

SP9 New passenger transport services, continued

Summary of analysis of chosen option, continued **Worksheet 1**

6. **Funding gap** (from worksheet 3)

   PV of service provider costs $ _____

   PV of funding gap $ _____

   $ _____ per annum

7. **Economic appraisal data** (from worksheets 4 and 5)

   PV PT benefits $ _____

   PV road user benefits $ _____

8. **Preferred option** (from worksheet 6)

$$BCR_{National} = \frac{\text{present value}_{(\text{PT user benefits + road user benefits})}}{\text{present value}_{(\text{service provider costs})}} =$$

$$BCR_{Government} = \frac{\text{present value}_{(\text{PT user benefits + road user benefits})}}{\text{present value}_{(\text{funding gap})}} =$$

9. **Non-monetised impacts:** yes / no (if yes, provide description on separate page)

10. **Network impacts:** describe the upstream and downstream impacts.

    _____

    _____

    _____

11. **Transport disadvantaged:** Describe how the proposal considers the needs of the transport disadvantaged

    _____

    _____

    _____

12. **Action recommended by analyst:** proceed with proposal/put on hold/abandon proposal

13. **Action recommended by controlling authority:** approved/modified _____

    Date: _____

SP9 New passenger transport services, continued

Proposal map **Worksheet 2**

On a separate page supply a map that clearly identifies the roads that will be affected by implementing the proposed service, as well as the route of the proposed service

SP9 New passenger transport services, continued

Explanation sheet for worksheet 3 **Funding gap analysis**

The service provider costs are compared to the projected revenue stream using a net present value (NPV) calculation to determine whether or not the proposal is commercially viable. The NPV is the discounted value of the net cash flow.

Funding gap

1. The deficit between the total revenue (for a new service) or the change in revenue (for an existing service) and the service provider costs is the 'funding gap.' The funding gap is the amount that needs to be funded by local and central government if the proposal is to proceed.

2. Where the funding gap is zero or negative, the proposal is commercially viable and no financial assistance is required from government.

Service provider costs

3. Service provider costs may be calculated either from industry standard unit costs or based on cost estimates from the service providers. The proposal costs include capital costs (for physical infrastructure and/or vehicles, vessels or rolling-stock costs), disruption costs during construction, operating and maintenance costs, and costs of decommissioning. In some cases, costs may be offset by the salvage value of capital assets. Indicative quotes may be considered when the project proposal costs cannot be calculated.

Service provider revenue

4. The future demand for the PT service may be estimated by one of several methods, as outlined in chapter 4 of this volume. The proposed service will be expected to generate revenue through a user charge or fare. The financial analysis must take this into account.

5. The proposed user charge should be based on the 'willingness to pay' of the potential users of the PT service. The maximum user charge may be determined in discussion with the local authorities and service provider, and should take into account current charges for similar services.

Service provider required rate of return

6. The weighted average cost of capital (WACC) can be used to estimate the service provider's required rate of return. The WACC is the weighted average of the required return on equity and the (interest) cost of any debt financing.

7. It is generally expected that the required rate of return will reflect the industry norm of 12 percent. If an alternative rate of return is used, then this needs to be explained and justified.

Calculating the funding gap

8. The use of a computer spreadsheet function, such as the 'Goal Seek' function in the Excel programme, is the simplest method of assessing the financial viability of a proposal and determining the value of the funding gap. Refer to chapter 6 of this volume.

SP9 New passenger transport services, continued

Funding gap analysis **Worksheet 3**

1. **Service provider costs**

Type of cost	Year(s) incurred	Cost
Capital cost of proposal	Year 0	
Capital cost of proposal	Year 1	
Operating and maintenance costs of service - if these vary by year, provide information on a separate sheet - $ per year	Years 2 – 25	
Decommissioning costs (zero if none)	Year 25	

2. **Service provider revenue – forecast of demand for service**

Explain the basis and methodology for the demand forecast and any underlying assumptions, particularly those related to traffic growth rates, on a separate sheet.

(a)	Proposed user charge ($ per boarding)	
(b)	New PT users in year 2	
(c)	Estimated percent growth rate (per annum)	

Annual revenue for new PT service

- Where there is no annual growth in passenger numbers: (a) × (b) = $ _____ per year
- Where passenger numbers are expected to grow each year: attach a separate spreadsheet indicating passenger volumes and expected service provider revenue for each year.

3. **Service provider required rate of return** = 12% per annum.

If a different rate is to be used, a full explanation and justification must be provided.

4. **Funding gap**

Using information on the required rate of return, service provider costs and revenues, calculate the annual funding gap. Where operating costs or revenue flows vary on an annual basis, the funding gap will also vary. Refer to chapter 6 of this volume for an example.

Attach the documentation of the funding gap analysis. If the funding gap is positive, the proposal is not commercial and financial assistance is required to make it viable.

Funding gap $ _____ per year from year 0 to year 25.

5. **Present value of the funding gap**

The calculation of the present value of the funding gap assumes that the funding gap occurs uniformly from year 0 through year 25. If this is not the case, use the appropriate procedures outlined in chapter 7 of this volume.

Present value = funding gap × 9.52 = $ _____

Enter the annual amount and the present value of the funding gap on the appropriate lines in worksheets 1 and 6.

SP9 New passenger transport services, continued

PT user benefits **Worksheet 4**

The calculation of the PT user benefits for a new service is based on the willingness to pay of the users for the new service in the peak period, usually expressed as the maximum user charge (fare) they are willing to pay. The proposed user charge is subtracted from the maximum user charge to find the net PT user benefit.

For a new PT service the evaluator may draw on information from existing services to derive a willingness-to-pay value for the new service. All assumptions must be clearly stated.

Note that the 'rule of a half' applies to the calculation of new PT user benefits.

Calculating PT user benefits for a new service

(a)	New PT users in year 2	
(b)	Estimated growth rate (per annum)	
(c)	Proposed user charge (per boarding)	
(d)	Maximum amount users (user charge) are willing to pay for new service	
(e)	PT user benefit for new service (per boarding) = (d) – (c)	
(f)	Net PT user benefit in year 2 = (a) × (e) × 0.5	

Present value PT user benefits

This calculation is based on a 25-year analysis period and assumes that the service is operating from years 2 to 25. If a different period is used, the evaluator should refer to section 7.8 of this volume.

PV = (f) × DF (from table 1 below) = $_____

Transfer this amount to the appropriate line on worksheets 1 and 6.

Table 1 Discount factors (DF) for different growth rates for years 2 to 25 inclusive

Passenger growth rate	0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
Discount factor (DF)	8.57	8.95	9.32	9.70	10.07	10.45	10.83	11.20	11.58

SP9 New passenger transport services, continued

Road user benefits **Worksheet 5**

Table 2 provides diversion rates for users diverting from vehicles to the new PT service. Table 2 also provides a combined value for travel time savings, vehicle operating cost savings, accident reduction and CO_2 savings for one vehicle-kilometre removed from a road corridor in Auckland, Wellington and Christchurch. Smaller urban centres may use the values for Christchurch. The values provided are averages. If there are known to be significant variations by corridor, then a fuller analysis should be used for road user benefits.

The calculation of the combined benefits in table 2 assumes that there are congested traffic conditions, where the 'ruling' intersection or bottleneck operates at least 80 percent capacity during the peak one hour period, and includes a factor for the induced traffic effect. If there is no point in the corridor where the traffic volume reaches at least 80 percent capacity during the one hour peak, the marginal changes in travel time experienced will be negligible and road user benefits should not be included.

Table 2 Diversion rates and road user benefit values for major urban corridors (July 2002)

Urban area	Diversion rate (vehicle km removed from road per new PT passenger km)	Road user benefit per vehicle km removed from corridor
Auckland	0.712 (71.2%)	$1.26
Wellington	0.788 (78.8%)	$0.80
Christchurch/other	0.675 (67.5%)	$0.20

Calculating road user benefits

Method 1 (using values from table 2 above)

(a) New passengers on service in year 2 = _____

(b) Average vehicle trip replaced by transport service = _____ km

(c) Road user benefits = (a) × diversion rate × (b) × benefit/vehicle km = $ _____ per yr

Method 2 (using a recognised transport model)

(d) Total vehicle-km removed from road corridor affected by PT service in year 2 = _____ km

(e) Road user benefits = (d) × benefit/vehicle km (from table 2) = _____ per yr

Present value road user benefits

It is assumed the new service is operating from years 2 to 25. If any other period is used, the evaluator should refer to chapter 7 of this volume for the appropriate method.

Traffic growth rate in road corridor _____%

PV = (c) or (e) × DF (from table 1) = $ _____

Transfer this amount to the line for PV road user benefits on worksheets 1 and 6.

SP9 New passenger transport services, continued

Explanation sheet for worksheet 6 **Benefit cost ratio and incremental analysis**

Benefit-cost analysis

1. Under benefits, enter the discounted values for the PT user benefits and the road user benefits for each option. Add together the benefits to obtain the total benefits for each option.
2. Under costs, enter the discounted value of the funding gap for each option.
3. Calculate the benefit cost ratio for each option by dividing the total benefits by the funding gap.

Incremental analysis

4. Rank the options in order of increasing cost to government.
5. Compare the lowest cost option with the next higher cost option to calculate the incremental BCR.
6. If the incremental BCR is less than the target incremental BCR specified in appendix A12 of volume 1, discard the second (higher cost) option in favour of the first. Compare the first option with the next higher cost option.
7. If the incremental BCR is greater than the target incremental BCR, the second (higher cost) option becomes the basis for comparison against the next higher cost option.
8. Repeat the procedure until no higher cost options are available that have an incremental BCR greater than the target incremental BCR.

SP9 New passenger transport services, continued

Benefit cost ratio and incremental analysis **Worksheet 6**

Proposal _____ Time zero _____ Base date _____

BCR calculations	Do minimum	Option	Option	Option	Option
Benefits					
Present value PT user benefits					
Present value road user benefits					
Present value total benefits					
Total cost to government					
Present value funding gap (options)					
BCR					

Base option for comparison			Next higher cost option			Incremental analysis		
Option	Total costs (1)	Total benefits (2)	Option	Total costs (3)	Total benefits (4)	Incremental costs (5) = (3)-(1)	Incremental benefits (6) = (4)-(2)	Incremental BCR (7) = (6)/(5)

SP 10 Existing passenger transport services

Introduction

These procedures provide a simplified method for appraising the costs and benefits of proposals to improve an existing passenger transport service through the provision of capital infrastructure and/or service improvements.

The calculation of the benefit cost ratio (BCR) in this simplified procedure assumes that:

1. Service improvements primarily concern existing peak period services and as a result of improvements commuters change modes from cars to bus or rail.
2. The primary benefits are travel time, vehicle operating cost and accident cost savings.
3. The proposal will not generate road maintenance cost savings, as the majority of traffic removed from the road network will be light vehicles. There will also be no road capital cost savings.
4. Other benefits (positive or negative) are generally not significant. However, allowance can be made for other benefits in these procedures.
5. Proposals adopted will be established or constructed in the first year and will be operating by the start of year 2.
6. A 10 percent discount rate and 25 year evaluation period are used.
7. A 12 percent rate of return is used for analysis of the funding gap.
8. All costs are exclusive of GST.

Note: In cases where the above assumptions are not appropriate, either the simplified procedure should be modified or full procedures used.

The simplified procedure is designed to consider one option at a time. Where it is logical to do so, the analyst should consider other options in order to select the optimal solution. If there is more than one option, the evaluation will involve incremental analysis of the costs and benefits of the different options.

For projects with a funding gap of less than $1 million, only the worksheets for the chosen option need be submitted. For projects over $1 million, worksheets for all options should be provided.

Worksheet	Description
1	Summary of analysis of chosen option
2	Proposal map
3	Funding gap analysis
4	Road user and PT user benefits
5	Benefit cost ratio and incremental analysis

SP 10 Existing passenger transport services, continued

Summary of analysis of chosen option **Worksheet 1**

Worksheet 1 provides a summary of the economic and project data for the preferred option. Provide a brief description of the problem that the proposal is intended to address. For the do minimum, describe the existing road network affected by the new PT proposal, referring to worksheet 2.

Proposal name: _____

Date entered into **LTP online**: _____ Your reference (as entered in **LTP online**): _____

Location: _____ Base date: 1 July 20 _____

Time zero: 1 July 20 _____

Date evaluation completed: _____ Evaluation completed by: _____

Office/organisation: _____ Checked by: _____

1. **Description of the problem** _____

_____

2. **Do minimum - description** _____

_____

Road characteristics

Length affected by use of PT _____ kilometres

Peak period traffic flow* _____ vehicles/hour

Estimated traffic growth _____ %/annum

*If peak period traffic flow cannot be expressed as a single figure, a range should be shown.

Existing PT service

Peak period: _____am to _____am, and _____pm to _____pm

Existing peak period passenger numbers _____in 20 _____

Growth rate in passenger numbers over last 5 years _____% per annum

Operating cost $ _____per annum

3. **Preferred option - description** **Cost $** _____

_____

_____

4. **Programming information**

Earliest start date _____

Construction/establishment period _____ months

Other statutory/regulatory requirements _____

Period of analysis (service life of proposal – maximum 25 years) _____ years

SP 10 Existing passenger transport services, continued

Summary of analysis of chosen option, continued **Worksheet 1**

5. **Proposed PT service**

   Peak period: _____ am to _____ am, and _____ pm to _____ pm

   Number of new PT passengers _____ in year 2

   Diversion rate from car drivers to PT passengers _____ %

   Estimated rate of growth of passengers using service _____ % per annum

6. **Proposed user charge for PT service** _____ $ per passenger

7. **Funding gap** (from worksheet 3)

   $ _____ per annum PV of funding gap $ _____

8. **Economic appraisal data** (from worksheet 4)

   PV of net benefits $ _____

9. **Preferred option** (from worksheet 5)

$$BCR_{National} = \frac{\text{present value}_{(\text{PT user benefits + road user benefits})}}{\text{present value}_{(\text{service provider costs})}} =$$

$$BCR_{Government} = \frac{\text{present value}_{(\text{PT user benefits + road user benefits})}}{\text{present value}_{(\text{funding gap})}} =$$

10. **Non-monetised impacts:** yes / no (if yes, provide description on separate page)

11. **Network impacts:** describe the upstream and downstream impacts.

12. **Transport disadvantaged:** Describe how the proposal considers the needs of the transport disadvantaged

13. **Action recommended by analyst:** proceed with proposal/put on hold/abandon proposal

14. **Action recommended by controlling authority:** approved/modified _____

    Date: _____

SP 10 Existing passenger transport services, continued

Proposal map **Worksheet 2**

On a separate page supply a map that clearly identifies the roads that will be affected by implementing the proposed PT service, the route of the existing service, and the route of the proposed service.

SP 10 Existing passenger transport services, continued

Explanation sheet for worksheet 3 **Funding gap analysis**

The service provider costs are compared to the projected revenue stream using a net present value (NPV) calculation to determine whether or not the proposal is commercially viable. The NPV is the discounted value of the net cash flow.

Funding gap

1. The deficit between the change in revenue (for an existing service) and the service provider costs is the 'funding gap.' The funding gap is the amount that needs to be funded by local and central government if the proposal is to proceed.
2. Where the funding gap is zero or negative, the proposal is commercially viable and no financial assistance is required from government.

Service provider costs

3. Service provider costs may be calculated either from industry standard unit costs or based on cost estimates from the service providers. The proposal costs include capital (for physical infrastructure and/or vehicles, vessels or rolling-stock), disruption during construction, operating, maintenance, and decommissioning. In some cases, costs may be offset by the salvage value of capital assets. Indicative quotes may be considered when the project proposal costs cannot be calculated.
4. In the case of an expansion of, or improvement to, an existing PT service, the increase or change in service provider costs shall be calculated and used in the funding gap, as the funding request will be to facilitate the improved service rather than to fund the existing service.

Service provider revenue

5. The future demand estimate of the proposed service extension may be estimated by one of several different methods, as indicated in chapter 4 of this volume. It is expected that the proposed service will generate revenue (generally through a user charge or fare for use of the PT service). The financial analysis must take this into account.
6. The proposed user charge should be based on the 'willingness to pay' of the potential users of the PT service. The maximum user charge may be determined in discussion with the local authorities and service provider, and should take into account current charges for similar services.
7. In the case of an expansion of, or improvement to, an existing PT service, the increase or change in revenue shall be calculated and used in the funding gap, as the funding request will be to facilitate the improved service rather than to fund the existing service.

Service provider required rate of return

8. The weighted average cost of capital (WACC) can be used to estimate the service provider's required rate of return. The WACC is the weighted average of the required return on equity and the (interest) cost of any debt financing.
9. It is generally expected that the required rate of return will reflect the industry norm of 12 percent. If an alternative rate of return is used, then this needs to be explained and justified.

Calculating the funding gap

10. The use of a computer spreadsheet function, such as the 'Goal Seek' function in the Excel programme, is the simplest method of assessing the financial viability of a proposal and determining the value of the funding gap. Refer to chapter 6 of this volume.

SP 10 Existing passenger transport services, continued

Funding gap analysis **Worksheet 3**

1. **Service provider costs**

   Note that service provider costs are the additional costs incurred through implementation and operation of improved PT service.

Type of cost	Year(s) incurred	Cost
Capital cost of proposal	Year 0	
Capital cost of proposal	Year 1	
Operating and maintenance costs of service - if these vary by year, provide information on a separate sheet - $ per year	Years 2 – 25	
Decommissioning costs (zero if none)	Year 25	

2. **Service provider revenue – forecast of demand for service**

   Explain the basis and methodology for the demand forecast and any underlying assumptions, particularly those related to traffic growth rates, on a separate sheet.

(a)	Proposed user charge ($ per boarding)	
(b)	Existing passengers in year 0	
(c)	Existing percentage passenger growth rate (over past 5 years)	
(d)	Additional PT users in year 2	
(e)	Estimated percentage growth rate (per annum)*	

*Exclude existing growth rate over past 5 years.

Annual revenue generated for improved PT service

- Where there is no annual growth in passenger numbers: (a) × (d) = $ _____ per year
- Where passenger numbers are expected to grow each year: attach a separate spreadsheet indicating passenger volumes and expected service provider revenue for each year.

3. **Service provider required rate of return** = 12% per annum.

   If a different rate is to be used, a full explanation and justification must be provided.

4. **Funding gap**

   Using information on the required rate of return, service provider costs and revenues, calculate the annual funding gap. Where operating costs or revenue flows vary on an annual basis, the funding gap will also vary. Refer to chapter 6 of this volume for an example.

   Attach the documentation of the funding gap analysis. If the funding gap is positive, the proposal is not commercial and financial assistance is required to make it viable.

   Funding gap $ _____ per year from year 0 to year 25.

5. **Present value of the funding gap**

   The calculation of the present value of the funding gap assumes that the funding gap occurs uniformly from year 0 through year 25. If this is not the case, use the appropriate procedures outlined in section 6.5 of this volume.

   Present value = funding gap × 9.52 = $ _____

   Enter the annual amount and the present value of the funding gap on the appropriate lines in worksheets 1 and 5.

SP 10 Existing passenger transport services, continued

Explanation sheet for worksheet 4 **Road user and PT user benefits**

For improvements to an existing PT service, road user benefits and additional PT user benefits are based on the benefit formulation used by Land Transport NZ for its patronage funding growth payment rates. The benefit value incorporates road user travel time, accident and vehicle operating cost savings, and environmental benefits, as well as the benefits of the improved PT services for existing and additional PT users.

The calculation of the travel time savings value assumes that during peak periods there are congested traffic conditions (where the 'ruling' intersection or bottleneck operate at least 80 percent capacity during the peak one hour period) and includes a factor for induced traffic effect. If there is no point in the corridor where the traffic volume reaches at least 80 percent capacity during the peak then use the off peak rates.

Table 1 Benefits per additional passenger boarding (July 2002)

Urban area	Mode	Road user benefits		PT user benefits	
		Peak	Off peak	Peak	Off peak
Auckland	All	6.71	0.68	6.27	4.18
	Rail	10.82	1.27	10.23	6.82
	Bus/ferry	6.46	0.64	6.02	4.02
Wellington	All	7.35	0.92	8.24	5.50
	Rail	9.13	1.71	14.06	9.38
	Bus/ferry	7.56	0.48	4.97	3.32
Christchurch	All	1.43	0.91	6.41	4.24
Other	All	1.06	0.90	7.01	4.67

Caveat on using the above data:

The above values are based on passenger transport trips of average length for each urban area or mode. Where the values in table 1 above do not accurately represent local conditions, the analyst should provide additional information that shows what values have been used and whether these have been calibrated to local conditions.

Table 2 Discount factors (DF) for different growth rates for years 2 to 25 inclusive

Passenger growth rate	0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
Discount factor (DF)	8.57	8.95	9.32	9.70	10.07	10.45	10.83	11.20	11.58

SP 10 Existing passenger transport services, continued

Road user and PT user benefits **Worksheet 4**

Base information to calculate service benefits

(f)	Existing passengers in year 0	
(g)	Existing percentage passenger growth rate (over past 5 years)	
(h)	Additional PT users in year 2	
(i)	Estimated percentage* growth rate (per annum)	

*Exclude existing growth rate over past 5 years.

(j)	Road user benefits in year 2 (h) × $ road user benefit (table 1)	= $	
(k)	Additional PT user benefits in year 2 (h) × $ new PT user benefit (from table 1)	= $	
(l)	Total benefits in year 2 (j + k)	= $	
(m)	Calculate the present value of the benefits Total benefits (l) × DF (from table 2)	= $	

Enter the amount (m) in the line for PV of PT and road user benefits on worksheets 1 and 5.

SP 10 Existing passenger transport services, continued

Explanation sheet for worksheet 5 **Benefit cost ratio and incremental analysis**

Benefit-cost analysis

- Under benefits, enter the discounted value for the benefits for each option.
- Under costs, enter the PV of the operating and maintenance costs for the existing service (before improvements), for the do minimum and the discounted value of the funding gap for each option.
- Calculate the benefit cost ratio for each option by dividing the total benefits by the funding gap.

Incremental analysis

- Rank the options, including the do minimum, in order of increasing cost to government.
- Compare the lowest cost option (usually the do minimum) with the next higher cost option to calculate the incremental BCR.
- If the incremental BCR is less than the target incremental BCR specified in appendix A12 of volume 1, discard the second (higher cost) option in favour of the first. Compare the first option with the next higher cost option.
- If the incremental BCR is greater than the target incremental BCR, the second (higher cost) option becomes the basis for comparison against the next higher cost option.
- Repeat the procedure until no higher cost options are available that have an incremental BCR greater than the target incremental BCR.

SP 10 Existing passenger transport services, continued

Benefit cost ratio and incremental analysis **Worksheet 5**

Proposal _____ Time zero _____ Base date _____

BCR calculations	Do minimum	Option	Option	Option	Option
Benefits					
Present value net benefits					
Total cost to government					
PV operating & maintenance costs of existing service (for do minimum)					
Present value funding gap (options)					
BCR					

Base option for comparison			Next higher cost option			Incremental analysis		
Option	**Total costs** (1)	**Total benefits** (2)	**Option**	**Total costs** (3)	**Total benefits** (4)	**Incremental costs** (5) = (3)-(1)	**Incremental benefits** (6) = (4)-(2)	**Incremental BCR** (7) = (6)/(5)

SP 11 Walking and cycling projects

Introduction

These procedures provide a method of evaluating the economic efficiency of walking and cycling projects, with the exception of signalised crossings over roads.

Note: All walking and cycling projects will potentially be subject to a safety audit to help ensure that safety is improved as a result of the project.

The calculation of the benefit cost ratio (BCR) in this simplified procedure assumes that:

1. A 10 percent discount rate and 25 year evaluation period are used.
2. The worksheets assume that projects adopted will be completed in the first year and will be in service by the start of year 2.
3. All costs are exclusive of GST.

Note: In cases where the above assumptions are not appropriate, either the simplified procedure should be modified or full procedures used.

The simplified procedure is designed to consider one option at a time. Where it is logical to do so, the analyst should consider other suitable options in order to select the optimal solution. If there is more than one option, the evaluation will involve incremental analysis of the costs and benefits of the different options. In particular, where a separate dedicated cycleway is proposed the alternative option of providing wider sealed shoulders or cycle lanes on the carriageway must be considered. The preferred option shall have a minimum incremental BCR of 1.0 and shall be sensitivity tested using a target incremental BCR that is 1.0 higher than the ratio used for choosing the preferred option (refer to appendix A12 of volume 1).

For walking and cycling projects, the worksheets for all the options need be submitted together with a summary of the incremental analysis.

To use the worksheets, it is necessary to determine both the current numbers, and growth rate of cycle/pedestrian traffic for the project. These must be based on local counts and realistic projections.

Worksheet	Description
1	Summary of analysis of chosen option
2	Proposal map
3	Costs of the option
4	Project benefits for walking projects
5	Project benefits for cycling projects
6	Benefit cost ratio and incremental analysis

SP 11 Walking and cycling projects, continued

Explanation sheet for worksheet 1 **Summary of analysis of chosen option**

Worksheet 1 provides a summary of the economic and general data of the preferred option.

Enter the general data at the top of the sheet, ie the project name, location, etc.

- Provide a brief description of the problem that the works/programme are intended to eliminate or mitigate.
- Briefly describe the preferred option and how it will eliminate or mitigate the problems. The cost of the option is estimated on worksheet 3.
- Enter programming information.
- Enter the pedestrian/cycling data obtained from a local counting programme. AADT refers to pedestrian, cycle and vehicle traffic volumes as appropriate.
- Calculate the project benefits and the BCR using the results from worksheets 3 and 4. To bring the benefits up to the base date use the appropriate update factors.
- Name the cycling/walking strategy document that the work is identified in. To be eligible for funding the work must be identified, either specifically or generically, in a current cycling or walking strategy.
- Action recommended by analyst. Decide whether to proceed, put on hold, or abandon the project option.
- Action recommended by controlling authority. Decide whether to approve or modify the evaluation.

SP 11 Walking and cycling projects, continued

Summary of analysis of chosen option **Worksheet 1**

Worksheet 1 provides a summary of the economic and project data for the preferred option. Provide a brief description of the problem that the proposal is intended to address. For the do minimum, describe the existing road network affected by the proposal, referring to worksheet 2. Other information on the worksheet is filled in based on the calculations in worksheets 3 through 7.

Proposal name: _____

Date entered into **LTP online**: _____ Your reference (as entered in **LTP online**): _____

Location: _____ Base date: 1 July 20 _____

Time zero: 1 July 20 _____

Date evaluation completed: _____ Evaluation completed by: _____

Office/organisation: _____ Checked by: _____

1. **Description of the problem** _____

_____

2. **Option cost - description** **Cost $** _____ **A**

3. **Programming information**

Earliest start date _____

Construction/establishment period _____ months

Land designation required yes / no

Other statutory/regulatory requirements _____

4. **Data** (only fill in the applicable data)

Existing pedestrian/cycling volumes _____ AADT in 20 _____

Estimated new pedestrian/cyclist volume _____ AADT

Estimated motor vehicle volumes _____ AADT

Estimated motor vehicle speed _____ km/h

Pedestrian/cyclist growth rate _____ %

Width available for walking/cycling before _____ m

Width available for walking/cycling after _____ m

Length walked/cycled before works _____ km

Length walked/cycled after works _____ km

Expected reduction in private vehicle travel (if applicable) _____ km per day

SP 11 Walking and cycling projects, continued

Summary of analysis of chosen option, continued **Worksheet 1**

5. **Economic appraisal data**

Benefits

Route improvements: $ _____ **B** × update factor _____ = $_____ **X**

or

Improvements at hazardous sites: $ _____ **C** × update factor _____ = $_____ **Y**

or

Promotion projects: $ _____ **D** × update factor _____ = $_____ **Z**

$$\text{BCR} = \frac{\text{X, Y or Z}}{\text{A}} =$$

6. **Is the proposed work identified in a current strategy?** yes/no

If yes, provide reference _____

7. **Non-monetised impacts:** yes/no (if yes, provide description on separate page)

8. **Network impacts:** describe the upstream and downstream impacts.

_____

_____

_____

_____

9. **Action recommended by analyst:** proceed with proposal/put on hold/abandon proposal

10. **Action recommended by controlling authority:** approved/modified _____

Date: _____

SP 11 Walking and cycling projects, continued

Proposal map **Worksheet 2**

Worksheet 2 is used to briefly describe and illustrate the proposed works. If possible, the alternatives and options should be detailed on the same diagram. If this is not possible, then more than one diagram should be supplied for the options.

Information provided shall include:

- location/route map
- layout plan of the project.

The layout plan shall show:

- start and end points/stations of the work.
- on a road cross-section, the width available for use by cycles, the relationship with roadside parking and whether the cycle space is shared or dedicated, or a cross-section of the footpath/cycleway/other structure (as appropriate)
- topographical data, rivers, bridges, railways, side roads, north direction.

SP 11 Walking and cycling projects, continued

Explanation sheet for worksheet 3 **Costs of the option**

Worksheet 3 is used for calculating the PV cost of the cycling or walking works.

1. Calculate the cost of the option, ie investigation, design, construction etc. Attach the estimate sheet to this worksheet. Multiply the costs by the discount factor 0.91 to get the PV.
2. Estimate the cost of annual maintenance following completion of project based on local experience and knowledge. Multiply by 8.57 to get the PV maintenance/update costs.
3. In part 2.3 of worksheet 3 calculate the PV of any periodic maintenance. Enter the years and the amounts in the table.
4. Sum (a) + (b) + (c) to get total $_____A.

Present worth factors — for 10 percent discount rate

Year	SPPWF	Year	SPPWF
1	0.91	14	0.26
2	0.83	15	0.24
3	0.75	16	0.22
4	0.68	17	0.20
5	0.62	18	0.18
6	0.56	19	0.16
7	0.51	20	0.15
8	0.47	21	0.14
9	0.42	22	0.12
10	0.39	23	0.11
11	0.35	24	0.10
12	0.32	25	0.09
13	0.29		

SP 11 Walking and cycling projects, continued

Costs of the option **Worksheet 3**

1. **Description of the walking or cycling improvements.**

_____

_____

_____

_____

2. **Cost of works/activities**

2.1 Estimated cost of works/activities as per attached estimate sheets

$_____ × 0.91 = $_____ (a)

2.2 Estimated cost of annual maintenance following works

*$_____ × 8.57 = $_____ (b)

* Years 2 to 25 inclusive

2.3 Periodic maintenance costs

Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount	SPPWF	Present value
			Total $	(c)

3. **Present value of the option** = (a) + (b) + (c) = _____ **A**

Enter the present value of the option in position A on item 2 worksheet 1.

SP 11 Walking and cycling projects, continued

Explanation sheet for worksheet 4 **Project benefits for walking projects**

Only one of the following three categories may be used in the evaluation of a project. If a project contains more than one of these categories they must be submitted as separate evaluations. Analysts are required to make realistic estimates of the number of new pedestrians generated by any of these projects.

Projects that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional accident costs these must be accounted for in the project benefits on worksheet 1.

The basis of the composite health, safety and environmental benefits used in worksheet 4 is described in chapter 8.

Discount factors (DF) for different growth rates for years 2 to 25 inclusive

Pedestrian growth rate	0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
Discount factor (DF)	8.57	8.95	9.32	9.70	10.07	10.45	10.83	11.20	11.58

SP 11 Walking and cycling projects, continued

Project benefits for walking projects **Worksheet 4**

1. **Health, safety and environment benefits for footpaths and other pedestrian facilities**

1.1 Benefit = number of new pedestrians/day × length of new facility in km × 365 × $0.50

= $_____ (a)

1.2 The project benefits are: (a) × DF = $_____ (b)

Transfer total (b) to position $_____ **B** on item 5 worksheet 1

2. **Health, safety and environment benefits from improvements at hazardous sites**

(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

2.1 Benefit = number of new pedestrians/day × 365 × $0.5 = $_____ (b)

2.2 The project benefits are: (b) × DF = $_____ (c)

Transfer total (c) to position $_____ **C** on item 5 worksheet 1

3. **Health, safety and environment benefits from walking promotional activities**

3.1 Benefit = number of new regular pedestrians generated by promotion × 250 × $0.50

= $_____ (c)

3.2 The project benefits are: (c) × DF = $_____ (d)

Transfer total (d) to position $_____ **D** on item 5 worksheet 1

SP 11 Walking and cycling projects, continued

Explanation sheet for worksheet 5 **Project benefits for cycling projects**

Only one of the following three categories may be used in the evaluation of a project. If a project contains more than one of these categories they must be submitted as separate evaluations. Analysts are required to make realistic estimates of the number of new cyclists generated by any of these projects.

Projects that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional accident costs these must be accounted for in the project benefits on worksheet 1.

The basis of the composite health, safety and environmental benefits used in worksheet 5 is described in chapter 8.

When evaluating the benefits of cycling promotional activities only the number of **new** cyclists are included in the calculations.

Discount factors (DF) for different growth rates for years 2 to 25 inclusive

Cycle growth rate	0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
Discount factor (DF)	8.57	8.95	9.32	9.70	10.07	10.45	10.83	11.20	11.58

SP 11 Walking and cycling projects, continued

Project benefits for cycling projects **Worksheet 5**

1. **Health, safety and environment benefits for cycle lanes, cycleways or increased road shoulder widths**

1.1 Benefit = number of new and existing cycle trips/day × length of new facility in km × 365 × $0.30

= $_____ (b)

1.2 The project benefits are: (b) × DF = $_____ (B)

Transfer total (B) to position $ _____ **B** on item 5 worksheet 1

2. **Health, safety and environment benefits from improvements at hazardous sites**

(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

2.1 Benefit = number of new and existing cycle trips/day × 365 × $0.90 = $_____ (c)

2.2 The project benefits are: (c) × DF = $_____ (C)

Transfer total (C) to position $ _____ **C** on item 5 worksheet 1

3. **Health, safety and environment benefits from cycling promotional activities**

3.1 Benefit = number of **new** regular commuter cyclists generated by promotion × 250 × $0.90

= $_____ (d)

3.2 The project benefits are: (d) × DF = $_____ (D)

Transfer total (D) to position $ _____ **D** on item 5 worksheet 1

SP 11 Walking and cycling projects, continued

Explanation sheet for worksheet 6 **Benefit cost ratio and incremental analysis**

Benefit-cost analysis

1. Under benefits, enter the discounted values of benefits, for each option.
2. Under costs, enter the discounted value for the road authority's capital and maintenance costs for each option.
3. Calculate the benefit cost ratio for each option by dividing the total benefits by the option costs.

Incremental analysis

1. Rank the options in order of increasing cost.
2. Compare the lowest cost option with the next higher cost option to calculate the incremental BCR.
3. If the incremental BCR is less than the target incremental BCR specified in appendix A12 of volume 1, discard the second (higher cost) option in favour of the first. Compare the first option with the next higher cost option.
4. If the incremental BCR is greater than the target incremental BCR, the second (higher cost) option becomes the basis for comparison against the next higher cost option.
5. Repeat the procedure until no higher cost options are available that have an incremental BCR greater than the target incremental BCR.
6. Undertake a sensitivity test using a target incremental BCR that is 1.0 greater than the ratio used in steps 2 to 5 above. Report the results of this sensitivity test in the project report.

SP 11 Walking and cycling projects, continued

Benefit cost ratio and incremental analysis **Worksheet 6**

Proposal _____ Time zero _____ Base date _____

BCR calculations	Do minimum	Option	Option	Option	Option
Benefits					
Route improvements					
Improvements at hazardous sites					
Promotion projects					
Present value total benefits					
Costs					
Present value capital costs					
Present value maintenance costs					
Present value total costs					
BCR					

Base option for comparison			Next higher cost option			Incremental analysis		
Option	Total costs (1)	Total benefits (2)	Option	Total costs (3)	Total benefits (4)	Incremental costs (5) = (3)-(1)	Incremental benefits (6) = (4)-(2)	Incremental BCR (7) = (6)/(5)

SP 12 Travel behaviour change projects

Introduction

These procedures provide a method of evaluating the economic efficiency of travel behaviour change (TBhC) projects. TBhC projects generally employ education, information and marketing based approaches to achieve voluntary changes in the travel behaviour of individuals.

These procedures may be used to evaluate the following types of TBhC projects:

- community based initiatives, eg travel awareness campaigns, ride share
- household-based initiatives, eg personalised marketing, 'living neighbourhoods'
- school travel initiatives (school travel plans)
- workplace based initiatives (workplace travel plans)
- substitutes for travel, eg teleworking.

The procedures do not cover the following types of activity even though they may be included within the definition of travel behaviour change in some countries:

- Travel demand management planning for special events. This is considered to be the responsibility of the sponsoring organisation and local authorities.
- Mobility management centres (European model) are a 'one stop shop' designed to promote and inform the public about environmentally-friendly and safe transport options, selling passenger transport tickets and renting cycles and for individuals seeking advice on their travel options, such as passenger transport, car pooling, car sharing clubs. Essentially, such a centre is a means for delivering components of TBhC programmes rather than a TBhC programme in itself.
- Freight management, logistics or any other possible action to change the travel behaviour of commercial vehicle operators or fleets.

The Land Transport New Zealand/EECA *Travel behaviour change guidance handbook* (2004) provides further information on development, evaluation and monitoring of TBhC proposals.

The calculation of the benefit cost ratio (BCR) in this simplified procedure assumes that:

1. A 10 percent discount rate and 10 year evaluation period are used.
2. The worksheets assume that projects adopted will be completed in the first year and will be in service by the start of year 2.
3. All costs are exclusive of GST.

Note: In cases where the above assumptions are not appropriate, either the simplified procedure should be modified or full procedures used.

Worksheet	Description
1	Summary of analysis of chosen option
2	Project description profile
3	Costs of the option
4	Expected diversion rate
5	Benefits of the project

SP 12 Travel behaviour change projects, continued

Explanation sheet for worksheet 1 **Summary of analysis of chosen option**

Worksheet 1 identifies the TBhC project, provides a link to the proposal information recorded via LTP online, and summarises key economic evaluation inputs and outputs.

1. Enter the general information including project location
2. Enter the reference and date to the project entry in LTP online
3. Enter the present value cost of the project, which is estimated on worksheet 3
4. Enter information about the timing of the project
5. Enter the information used to select the most appropriate default diversion rates and composite benefit values in worksheets 4 and 5
6. Enter the present value benefits from worksheet 5, enter update factor if necessary (from appendix A12 of volume 1), calculate updated present of benefits
7. Divide by the present value of benefits from step 6 by the present value of costs from step 2 above to determine the benefit cost ratio
8. Record other economic evaluation information as appropriate.

SP 12 Travel behaviour change projects, continued

Summary of analysis of chosen option **Worksheet 1**

1. **Project details**

Project name: _____ Evaluator: _____

Location: _____ Checked by: _____

Organisation/office: _____ Date: _____

2. **LTP online**

Reference: _____ Date entered: _____

3. **Costs** (from worksheet 3) Cost $ _____ **A**

Monitoring cost $ _____ **B**

4. **Project information**

Earliest start date: _____ Implementation period: _____

5. **Economic appraisal data:**

Type of TBhC project: (workplace, school, or community) _____

Type of TBhC evaluation: (standard or composite) _____

Geographical location: (Auckland, Wellington, Christchurch, or other) _____

CBD or non-CBD location: (workplace CBD or non-CBD) _____

Diversion rate: (worksheet 4)

(workplace low, medium, or high)

(school primary or secondary/intermediate)

(community low or standard) _____

Public transport service improvements: (workplace yes or no) _____

School type: (primary, intermediate, or secondary) _____

Target population: (worksheet 5) _____ **C**

Composite benefit value: (worksheet 5) _____ **D**

SP 12 Travel behaviour change projects, continued

Summary of analysis of chosen option, continued **Worksheet 1**

6. **Calculations**

Benefits:	(**C** × **D**) × 5.49	**E**
Update factor:	(appendix A12 of volume 1)	**F**
Present value benefits:	(**E** × **F**)	**Y**
Costs:	(**A**) do not include (B)	**Z**

7. **Benefit cost ratio**

$$BCR = \frac{Y}{Z} =$$

8. **Other economic evaluation information**

Net present value: (**Y** - **Z**)

9. **Other impacts** (yes / no)

If yes, provide description on separate page

10. **Is this project identified in a current strategy?** (yes / no)

If yes, provide reference

11. **Network impacts** (describe the upstream and downstream impacts)

12. **Analyst recommendation:** (proceed with proposal / put on hold / abandon proposal)

13. **Controlling authority recommendation:** (approved / modified)

SP 12 Travel behaviour change projects, continued

Explanation sheet for worksheet 2 **Project description profile**

Separate project description profile sheets are provided for different types of TBhC projects as follows:

- Worksheet 2A Workplace travel plans
- Worksheet 2B School travel plans
- Worksheet 2C Household and community based initiatives

Select the form that is relevant for the TBhC project type that is being evaluated and complete this form.

Information recorded in worksheet 2 is used for:

- Determining and confirming the diversion rate profile for the project
- Post-implementation analysis of contributing factors to TBhC project diversion rates and the success or failure of the project

For TBhC project types other than the three for which sheets are provided, select the most applicable project description profile and record the relevant information, or use it as a guide and record corresponding information on a separate sheet.

SP 12 Travel behaviour change projects, continued

Workplace travel plans project description profile **Worksheet 2A**

Characteristic	Proposal description
The workplace	
Address (street and suburb)	
Nature of business activity	
Number of employees on-site (including management – full time/part time, shift work) Indicate percentage working part- time	<100/100–500/500+
'Buy-in' and commitment – briefly describe workplace involvement and commitment to project – eg human resources, financial, ability to revise internal policies or provide trip end facilities, etc.	
Internal communication system (briefly describe – intranet, newsletters, team meetings, etc)	
Indication of organisational 'culture' (eg membership in EnergyWise or other, health and environmental policies, etc)	
Existing transport environment	
Hierarchy designation of roads around workplace	
Current parking situation (where do staff park, who pays, any problems/shortages)	
Is the workplace prepared/able to address any parking issues	Yes/no/uncertain
Local access to services (such as cafes, hairdressers, shops – within walking distance)	Poor/good/excellent
Quality of peak period passenger transport services (frequency, travel time, areas connected to the workplace by existing PT services)	Poor/good/excellent – Please provide some detail
Location of nearest bus stop/train station to workplace	
Walk-ability (safety/distance/infrastructure) in 1 km area surrounding workplace. If 'poor', describe issues and indicate if Council is planning to address through this project	Poor/good/excellent
Cycle-ability (safety/distance/infrastructure) in 3 km area surrounding workplace If 'poor', describe issues and indicate if Council is planning to address through this project	Poor/good/excellent
Council's additional planned / potential infrastructure improvements (within project time frame and area)	
1. Passenger transport information	
2. Passenger transport services	
3. Walking	
4. Cycling	

SP 12 Travel behaviour change projects, continued

School travel plans project description profile **Worksheet 2B**

Characteristic	Proposal description
The school	
Address (street and suburb)	
Type. Feeder primary/full primary/intermediate/secondary	
Decile number	
Student roll	
Number of staff on-site (including management – full time/part time)	
Existing mode share – Private vehicle/cycle/walk	
Buy-in and commitment (briefly describe school's involvement and commitment to project)	
Motivations for school travel work	
Identified safety issues (briefly describe, include number of casualties where possible)	
Identified parking issues (briefly describe)	
Existing transport environment	
Hierarchy designation	
Crossing available If yes, what type? If no, is council prepared to address through this project?	Yes/no
Traffic volume (either vehicles per day or volume in morning peak)	
Average speed of traffic (if available)	
Location of nearest bus stop / train station to school (if secondary)	
Walk-ability (safety/distance/infrastructure) in 1 km area surrounding school - If 'poor', describe issues and indicate if council is planning to address through this project	Poor/good/excellent
Cycle-ability (safety/distance/infrastructure) in 3 km area surrounding school - If 'poor', describe issues and indicate if council is planning to address through this project	Poor/good/excellent
Council's additional planned / potential infrastructure improvements (within project time frame and area)	
1. Passenger transport information	
2. Passenger transport services	
3. Walking	
4. Cycling	

SP 12 Travel behaviour change projects, continued

Household and community based initiatives project description profile **Worksheet 2C**

Characteristic	Proposal description
Population	
Targeted area (give street boundaries or suburb name(s) as appropriate)	
Number of households	
Usually resident population	
Socio-economic characteristics	
Vehicle ownership (average rates per household)	
Existing transport environment	
Local access to services (such as cafes, hairdressers, shops – within walking/cycling distance)	Poor/good/excellent
Quality of passenger transport services – peak (frequency, number of routes, areas served)	
Quality of passenger transport services – off-peak (frequency, number of routes, areas served)	
Is capacity available for new passengers on all services? (If no, proposal will need to indicate how this will be addressed)	Yes/no
Estimated percentage of households having bus stop/train station within 400 m of residence	
Walk-ability (safety/distance/infrastructure) to key locations If 'poor', describe issues and indicate if council is planning to address through this project	Poor/good/excellent
Cycle-ability (safety/distance/infrastructure) to key locations If 'poor', describe issues and indicate if council is planning to address through this project	Poor/good/excellent
Council's additional planned / potential infrastructure improvements (within project time frame and area)	
1. Passenger transport information	
2. Passenger transport services	
3. Walking	
4. Cycling	

SP 12 Travel behaviour change projects, continued

Explanation sheet for worksheet 3 **Costs of the option**

Worksheet 3 is used for calculating the present value cost of a travel behaviour change project.

1. Calculate the cost of the option. Attach the estimate sheet to this worksheet. Separately identify the estimated costs for project development (investigation/design) and those for implementation. Multiply the costs by the discount factor 0.91 to get the present value. When conducting initial indicative evaluations for project development funding for workplace and school travel plans obtain a cost estimate from past experience or judgement. The implementation cost estimate will be refined and the evaluation reconfirmed based on the completed plan before implementation funding is approved. Consider whether a composite evaluation may be required. A composite evaluation is required for a package of measures involving travel behaviour change initiatives if the cost of supporting infrastructure components (such as walk/cycle paths or minor road improvements) or passenger transport components are over $150,000. A composite evaluation is optional if the cost of supporting infrastructure or passenger transport improvement components are under $150,000. This supersedes the advice given in the Land Transport New Zealand *Travel behaviour change guidance handbook*.
2. Estimate the cost of annual expenditure required to maintain the benefits of the TBhC project over the remainder of the evaluation period following completion of project based on local experience and knowledge. For household/community based initiatives this is generally zero unless the proposal contains specific plans for follow-up measures. For workplace and school travel plans it is likely that some ongoing maintenance expenditure will be required to maintain benefits over the ten year evaluation period.
3. Calculate the present value of any periodic 'maintenance' expenditures. The dollar amount in future years will need to be weighted by the present worth factors in the table below. Enter the years and the amounts in the table.
4. Sum (a) + (b) + (c) to get total $_____ A and enter in worksheet 1.
5. Estimate monitoring costs and calculate the present value to obtain B and enter in worksheet 1.

Present worth factors — for 10 percent discount rate

Year	1	2	3	4	5	6	7	8	9	10
SPPWF	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.47	0.42	0.39

SP 12 Travel behaviour change projects, continued

Costs of the option **Worksheet 3**

1. Estimated cost of activities, provide details if required

   $_____ investigation and design

   $_____ implementation of travel plan

   $_____ supporting infrastructure or passenger transport service improvements

   Total cost $_____ × 0.91 = $_____ (a)

   Note: This simplified procedure assumes that these costs occur in year one. If costs are incurred outside the first year SPPWF need to be applied to annual budgets. A composite evaluation will be required if supporting infrastructure or passenger transport service improvements are >$150,000

2. Estimated cost of annual maintenance following implementation (years 2 to 10 inclusive)

   Annual cost $_____ × 5.49 = $_____ (b)

3. Periodic maintenance costs

   Periodic maintenance will be required in the following years:

Year	Type of maintenance	Amount	SPPWF	Present value
			Total $	(c)

4. **Present value of the option** = (a) + (b) + (c) = $_____ **A**

   Enter the present value of the option in position A on worksheet 1.

5. Monitoring costs

   Costs of monitoring travel behaviour before and after implementation of the travel plan

Year	Type of maintenance	Amount	SPPWF	Present value
			Total $	**B**

   Enter the present value of the option in position B on worksheet 1.

SP 12 Travel behaviour change projects, continued

Explanation sheet for worksheet 4 **Expected diversion rate**

Worksheet 4 is used for selecting the appropriate default diversion rate.

The tables show the diversion rates between modes that were used to derive the composite benefit values in worksheet 5. These are the most appropriate default diversion rates based on experience to date. They are not used directly when conducting TBhC evaluations as the composite benefit values already take account of these default diversion rates.

If analysts consider they have strong reasons why a different diversion rate is more appropriate for their situation they can interpolate a composite benefit value (based on the values in worksheet 5 and their project situation compared with the default diversion rates shown here) for workplace travel plans, or use a computer spreadsheet programme (available from Land Transport NZ) to forecast a diversion rate and calculate a composite benefit value for any TBhC project.

When conducting initial indicative evaluations for project development funding for workplace and school travel plans the diversion rate should be selected based on the proponent's knowledge of the organisations involved and the area. For the final evaluation for implementation funding the diversion rate will be based on the actual features of the completed plan.

Workplace travel plans

There are several default diversion rate profiles for workplace travel plans. The appropriate profile is identified by determining a score for the project based on the anticipated or proposed measures to be included in the workplace travel plan.

The standard diversion rate values are applicable in most situations where no significant public transport measures are included in the workplace travel plan. The alternative 'with public transport service improvements' diversion rate values are applicable when significant public transport service improvements (including company provided transport), subsidy schemes, or other similar measures (covered by the last two questions in the scoring table) are part of the workplace travel plan.

School travel plans

There are only two default diversion rate profiles for schools, one for primary and another for intermediate and secondary schools.

Household and community based initiatives

The standard diversion rate value is applicable for most projects.

The low diversion rate is applicable in situations where:

- The proposal will implement fewer measures than 'usual' household based programmes, eg a community travel awareness campaign on its own would not achieve the standard diversion rate
- Public transport services and cycling/walking facilities in the area are poor and no significant changes to these are envisaged as part of the TBhC proposal.

SP 12 Travel behaviour change projects, continued

Expected diversion rate **Worksheet 4**

Workplace travel plans

There are two sets of diversion rates for workplace travel plans: standard – where no passenger transport improvements are proposed and alternative – where there are proposed passenger transport improvements. Within these two sets of diversion rates, a scoring system is used to select the appropriate profile for a given workplace travel plan. The score, out of six, is assigned based on the responses to the questions in the table below.

Question	Yes	No
Is car-parking availability constrained at the workplace?	1	0
Does the proposed workplace travel plan include:		
One or more parking management strategies*?	1	0
Improvements to cycling/walking facilities?	1	0
Ridesharing matching service?	1	0
Public transport service improvements or company transport?	1	0
Public transport subsidies?	1	0
Total score (sum of 'yes' column):		

*Strategies for managing parking demand include initiatives such as parking charges, reduced supply of parking spaces, parking 'cash-out' scheme, etc.

Default diversion rates (percentage point change in mode share)						
	Score	Car as driver	Car as passenger	Passenger transport	Cycling	Walking
Standard – without passenger transport measures						
Low	1 or 2	0.0%	0.0%	0.0%	0.0%	0.0%
Medium	3 or 4	-5.0%	1.3%	1.3%	0.6%	1.8%
Alternative – with passenger transport measures or improvements						
Low	1 or 2	0.0%	0.0%	0.0%	0.0%	0.0%
Medium	3 or 4	-5.0%	1.3%	2.6%	0.3%	0.8%
High	5 or 6	-12.9%	3.3%	7.4%	1.0%	1.2%

School travel plans

Select either the primary school or secondary/intermediate diversion rate as appropriate.

Default diversion rates (percentage point change in mode share)					
School type	Car as driver	Car as passenger	Passenger transport	Cycling	Walking
Primary	0.0%	-9.0%	0.0%	1.5%	7.5%
Secondary/intermediate	0.0%	-9.0%	5.0%	0.5%	3.5%

Household and community based initiatives

Select either the standard or the low diversion rate as appropriate. The standard diversion rate should be used in most circumstances. The low diversion rate should be used if the TBhC project is to implement fewer measures than 'usual' household based initiatives or where existing public transport services and/or cycle/walk facilities are poor.

Default diversion rates (percentage point change in mode share)					
	Car as driver	Car as passenger	Passenger transport	Cycling	Walking
Low	-1.0%	-0.2%	0.5%	0.3%	0.4%
Standard	-3.1%	-0.5%	1.4%	0.9%	1.3%

SP 12 Travel behaviour change projects, continued

Explanation sheet for worksheet 5 **Benefit of the project**

Worksheet 5 is used for calculating the present value of benefits for the TBhC project.

Select composite benefit value

The tables on worksheet 5 contain composite benefit values for a range of TBhC project types and situations. This composite benefit value includes benefits to the person changing their travel behaviour as well as benefits to remaining road users and the general community, such as reduced health costs and accident risk, decongestion and environmental benefits. The exact composition depends on the nature of the TBhC project being undertaken. The composite benefits also incorporate the default diversion rate assumptions for each TBhC project type (as shown on worksheet 4) as well as the average trip length for each mode affected by the project.

Select and circle the composite benefit value that is applicable to the proposed TBhC project from the appropriate table. Composite benefit values are the average annual benefit for all people in the workforce, school or community targeted by the TBhC project (and take account of the proportion that do not participate or change their travel behaviour).

Determine target population

The target population is the TOTAL population of the workplace, school, or community in which the TBhC project is being implemented. It includes the people who do not participate in the project and those who participate but do not change their behaviour.

Type of TBhC project	Definition of target population
Workplace	The total workforce (number of employees) at the workplace covered by the travel plan. Make appropriate adjustment if a significant proportion of employees work more or less than the standard five days per week.
School	The total school roll. If this is expected to vary significantly in the next few years use an appropriate average.
Household and community	The total population of the community/suburb/area in which the household or community based initiative is being implemented.

Calculate present value of benefits

1. Multiply the composite benefit by the target population to determine the annual benefit.
2. Multiply the annual benefit by the discount factor for years 2 to 10 to calculate the present value of benefits over the evaluation period.

SP 12 Travel behaviour change projects, continued

Benefit of the project **Worksheet 5**

Travel behaviour change benefits

1. Benefits per annum = _____ x _____ = $_____ (c)
   (composite benefit value, **C**) (target population, **D**)

   Note: Composite benefit value is benefit per annum per person in target population from the appropriate workplace, school or community travel plan benefit ($/annum) tables below.

2. The present value of project benefits is: (c) × 5.49 $_____ **E**

   Transfer total E to position E on worksheet 1

Workplace travel plans benefit per employee ($/annum)

	Workplace	CBD			Non-CBD		
	Diversion	Low	Medium	High	Low	Medium	High
Auckland	Standard	0.00	160.88		0.00	137.88	
	Alternative	0.00	201.17	588.00	0.00	178.17	528.66
Wellington	Standard	0.00	142.31		0.00	119.31	
	Alternative	0.00	178.21	525.78	0.00	155.21	466.44
Christchurch/ other	Standard	0.00	40.84		0.00	40.84	
	Alternative	0.00	47.95	173.12	0.00	47.95	173.12

Based on 100% of changed trips being in peak period

Standard = without passenger transport improvements or subsidies

Alternative = with passenger transport improvements or subsidies

School travel plans benefits per student on school roll ($/annum)

	School type	
	Primary	Secondary/intermediate
Auckland	25.87	106.98
Wellington	23.21	92.42
Christchurch/other	15.34	43.21

Based on 55% of changed trips being in peak period

Household/community based initiatives benefit per head of target population ($/annum)

	Level of diversion	
	Standard	Low
Auckland	85.06	25.46
Wellington	92.84	28.21
Christchurch/other	65.65	18.76

Based on 15% of changed trips being in peak period