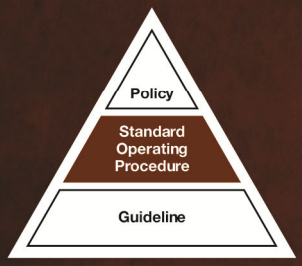

Hut Inspection

Item 1

Standard Operating Procedure – VC 1583

This SOP was last reviewed in June 2016

SOP coordinator: Brian Dobbie, Technical Advisor Systems Improvement

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I. Purpose

This standard operating procedure covers the requirements for inspecting all backcountry huts and associated buildings (toilets, wood sheds etc) managed by the Department, including all wardens quarters, visitor huts and biodiversity huts. The inspection process involves assessing the condition of the buildings, assessing the hut against the Hut Service Standards (for a visitor hut), assessing natural hazards affecting the hut site and managing and updating the data on the hut in AMIS.

The SOP also describes the process for managing information on huts post-inspection and between inspections in AMIS.

Objectives

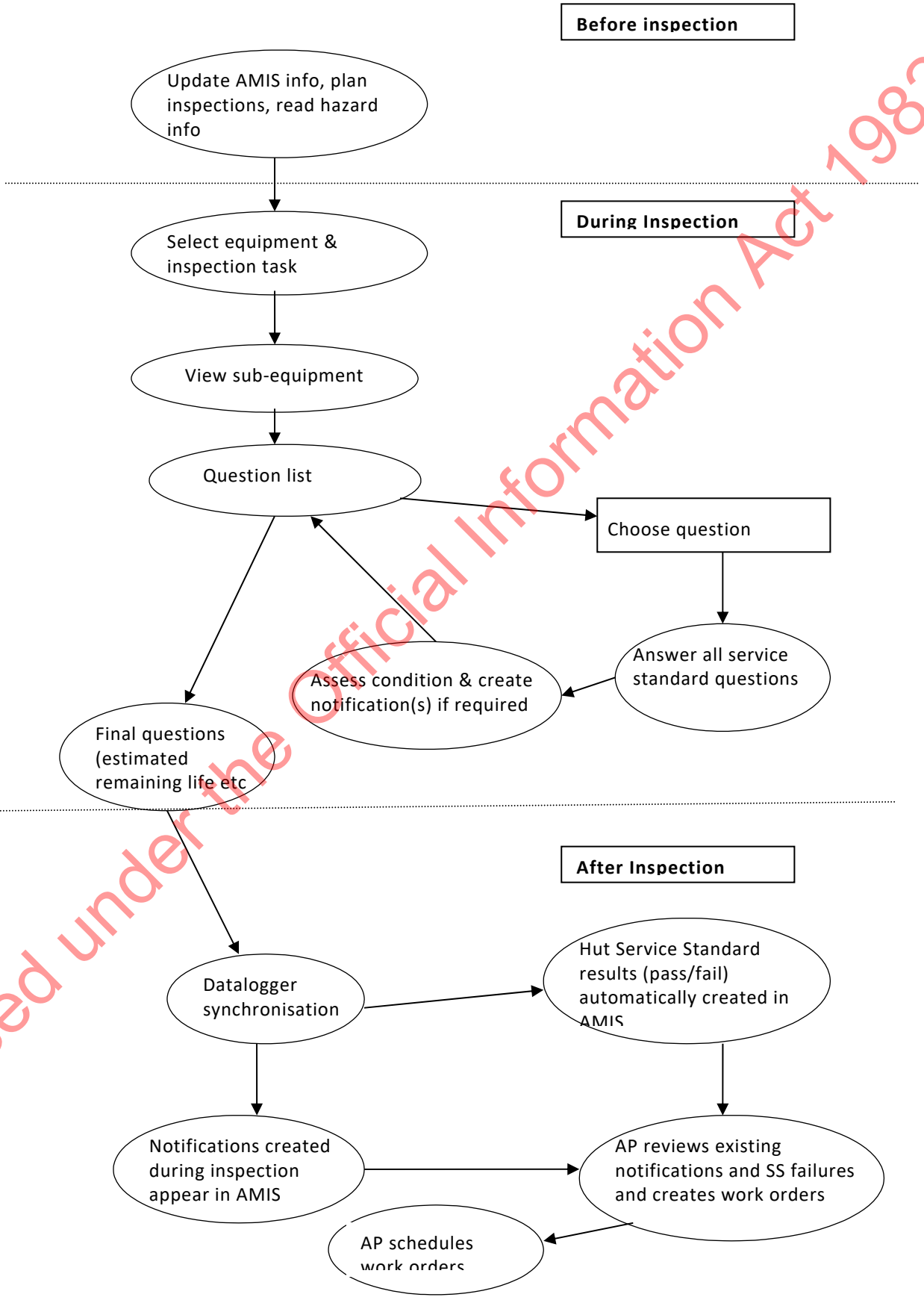
- All backcountry huts to be inspected at the required frequencies and to the requirements set out in this SOP
- All data on backcountry huts in AMIS to be kept up to date and accurate following the requirements of this SOP.

Outcomes

- Backcountry huts managed by the Department that are safe and healthy for users and meet their expectations
- Accurate and up to date data on huts in AMIS
- A regularly updated programme of hut maintenance and replacement informed by the regular inspections

II. Process

Hut Inspection Process



III. Requirements table

Tier 4 or higher managers are authorised to approve variations from SOP requirements and are accountable for those decisions. They are required to use their professional judgement and seek advice or escalate when in doubt. All decisions should be documented. It is expected that variations from requirements will be the exception rather than the norm, and that legal and health and safety requirements are effectively compulsory. Common sense should prevail in the case of exceptional or emergency field situations.

Requirements	Who is accountable for carrying out the requirement	Why?/ Consequence	Links	Completed / comments
Ensure that the following hut types and their sub-equipment are inspected: • Open or closed visitor huts (Except those with "remove (and not replace)" decisions. • Visitor huts with "owned and maintained by community" and with "seeking community maintenance" decisions on them. • Separate wardens huts and wardens quarters that are part of the visitor hut. • Backcountry biodiversity huts • Actively managed historic huts used by visitors for overnight accommodation.	Regional Planning Manager	These facilities need to be inspected regularly to determine whether they are safe and healthy (ie meet the requirements of the Building Act), in good condition and meet the Hut Service Standards. Inspections update data for asset management and this information is linked to the financial system.	1.2 Huts covered by this SOP 1.7 Huts Maintained by Community. 1.6 Biodiversity Huts 1.9 Actively Managed Historic Huts	
Undertake the following inspections for huts	Regional Planning	Each type of inspection	1.4 Types of Inspection	

and their sub-equipment: • Baseline inspection by Engineer • Ongoing inspections by DOC • Update attributes in office • Re-inspection by Engineer	Manager	requires different expertise. If any of these inspections is not carried out, the hut will eventually be considered "not to standard" in the performance report		
Inspect huts and their sub-equipment at the frequencies set out in this SOP	Regional Planning Manager	Ensures all health, safety or other risks are identified within reasonable timeframes. Huts inspected less frequently will be "not to standard" in the performance report.	1.5 Frequency of Inspection	
Inspect huts and their sub-equipment using the process set out in this SOP.	Regional Planning Manager	This SOP describes the process to be used; no other process will work in AMIS	3.0 Hut Inspection Process	
Assign each notification created during the inspection a risk/urgency priority: • Critical • Serious • Routine	Inspector/Engineer	Prioritises work to ensure visitor safety and health issues are addressed within appropriate timeframes. If this is not done and an incident occurs exposes the Inspector/Engineer/ department to considerable risk.	3.4 Notification priority - Critical, Serious, Routine.	
Action Critical/Serious notifications	Operations Manager	Ensures that risks associated with critical and serious issues are mitigated and that this work is planned ahead of routine work. A hut is "not to standard" if	3.4 Notification priority - Critical, Serious, Routine	

		it has any outstanding critical or serious notifications		
Undertake post inspection actions.	Inspector/ Operations Manager	These actions ensure an inspection is "completed" correctly in AMIS	4.0 Post Inspection Actions	
Ensure that Inspectors are trained and approved by a Visitor and Historic Assets Programme trainer.	Director – Operations Planning/ Regional Planning Manager	These are technical roles that manage a significant area of risk and Inspectors require specialist training (e.g. inspecting LPG and fire safety equipment).	7.0 Training/Inspector Requirements	
Keep information on huts and associated assets up to date in AMIS: • Checking existing information • Managing sub-equipment information • Building a new hut • Updating attributes after an inspection • Ongoing data management	Operations Manager	These actions are necessary to keep AMIS up to date, inform performance reporting and ensure accurate information is used in inspections	2.1 Checking information in AMIS 2.3 Managing Sub-equipment Information in AMIS2.4 Managing AMIS information when building a new hut. 5.0 Update Attributes - Office Task 6.0 Ongoing Management of Data	

IV. About this document

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Approved for use

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Amendments

Amendment date	Amendment details	DOCDM version	Amended by	Amendment approved by
August 2006	Version 1	Olddm-726788		
December 2008	Frequency of inspections changed for Standard and Biodiversity huts	359558	Brian Dobbie	
February 2009	Whole SOP revised to incorporate change from VAMS to AMIS	359558	Brian Dobbie	
March 2015	Accountability roles updated to align with organisation structure. Change to frequency of inspection of basic huts (from 2 to 4 years) and to re-inspection by engineer (from 4 to 6 years)	DOC2201029	Brian Dobbie and Tinaka Mearns	Gavin Walker, Acting Director Partnership, Historic & Visitor
June 2016	Accountability roles updated to align with the revised organisation structure		Brian Dobbie	

1. Hut Inspection - General

This section defines the types of inspection to be used for huts, the frequency of inspections and inspections of sub-equipment. It then describes specific requirements for inspections of biodiversity huts, huts maintained by the community, minimal maintenance huts and actively managed historic huts.

1.1 RELATIONSHIP TO OTHER RELEVANT DOCUMENTS

Visitor Strategy ▼	Defines the Visitor Groups
Hut Service Standards ▼	Specifies the level of service (facilities) to be provided for the user at visitor huts.
Hut Inspection SOP	Standard Operating Procedure for the inspection of huts

Also relevant and referred to in this SOP are:

- The Hut Procurement Manual for building backcountry huts – VC 1414
- LPG Use and Installations – HS 1225
- Storage of Flammable Liquids in Backcountry Accommodation – VC 1473
- Hut mattress national contract - Intranet
- 6 to 10 bunk hut fire evacuation scheme exemption conditions – docdm-144483
- DOC's standard candleholder designs – olddm-728618 and Intranet
- Working at Heights – HS 1467

1.2 HUTS COVERED BY THIS SOP

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Ensure that the following hut types and their sub-equipment are inspected	Regional Planning Manager	These facilities need to be inspected regularly to determine whether they are safe and healthy (i.e. meet the requirements of the Building Act), in good condition and meet the Hut Service Standards.

The following huts **must** be inspected under this SOP:

- All open or closed visitor huts (Great Walk, Serviced-Alpine, Serviced, Standard and Basic), **except** those with decisions to "remove (and not replace)"
- All visitor huts with "owned and maintained by community" and with "seeking community maintenance" decisions on them
- Separate warden's huts and warden's quarters that are part of the visitor hut (both are in AMIS with the object type "staff accommodation" and the characteristic "Hut wardens quarters")
- All backcountry biodiversity huts (these are backcountry huts used by staff/volunteers for non-visitor work and not generally available to the public). These include flyable huts and bivvies that may only be located temporarily (a few months or years) in one place before being flown to another

The relevant inspection tasks will be automatically generated in AMIS for these assets.

The following huts **must not** be inspected under this SOP:

- All visitor huts with decisions "remove (and not replace)".

The following types of buildings **should** also be inspected using the procedure described in this SOP, but this is not mandatory. These buildings do not yet have inspection processes developed for them and this inspection process may be used to assess condition and create maintenance tasks until such time as such standards and a specific inspection process are in place.

- Visitor accommodation (in AMIS with the characteristic booked accommodation, education lodge or campground accommodation)
- Staff accommodation (in AMIS with the object type and the characteristic "staff accommodation").
- Toilets (all types) on campsites and amenity areas

No inspection task will be automatically generated in AMIS for these buildings. To set up an inspection task for any of them, the Asset Planner creates ad hoc inspections for them and schedules them.

Note: when buildings with mains electricity are inspected the electrical inspection must not be undertaken by staff; a separate inspection by a specialist is required.

1.3 SUB-EQUIPMENT TO BE INSPECTED

All buildings that are associated with a hut (ie sub-equipment of the hut) will also be inspected at the same time and at the same frequency as the hut. The most common of these assets are:

- Toilets (all types)
- Sheds (usually these are woodsheds or hazardous goods stores)
- Bunkrooms
- Amenity unit/blocks (usually used for a larger toilet building with hand basins)

Sub-equipment may also be;

- Generator/power sheds
- Garages
- Boatsheds

1.4 TYPES OF INSPECTIONS

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Undertake the following inspections for huts and their sub-equipment	Regional Planning Manager/ Senior Engineer	Each type of inspection requires different expertise. If any of these inspections is not carried out, the hut will eventually be considered "not to standard" in the performance report

There are four main inspection task types that make up the hut (and sub-equipment) inspection process:

- Baseline inspection by Engineer
- Ongoing inspection by DOC
- Update attributes in office
- Re - inspection by Engineer

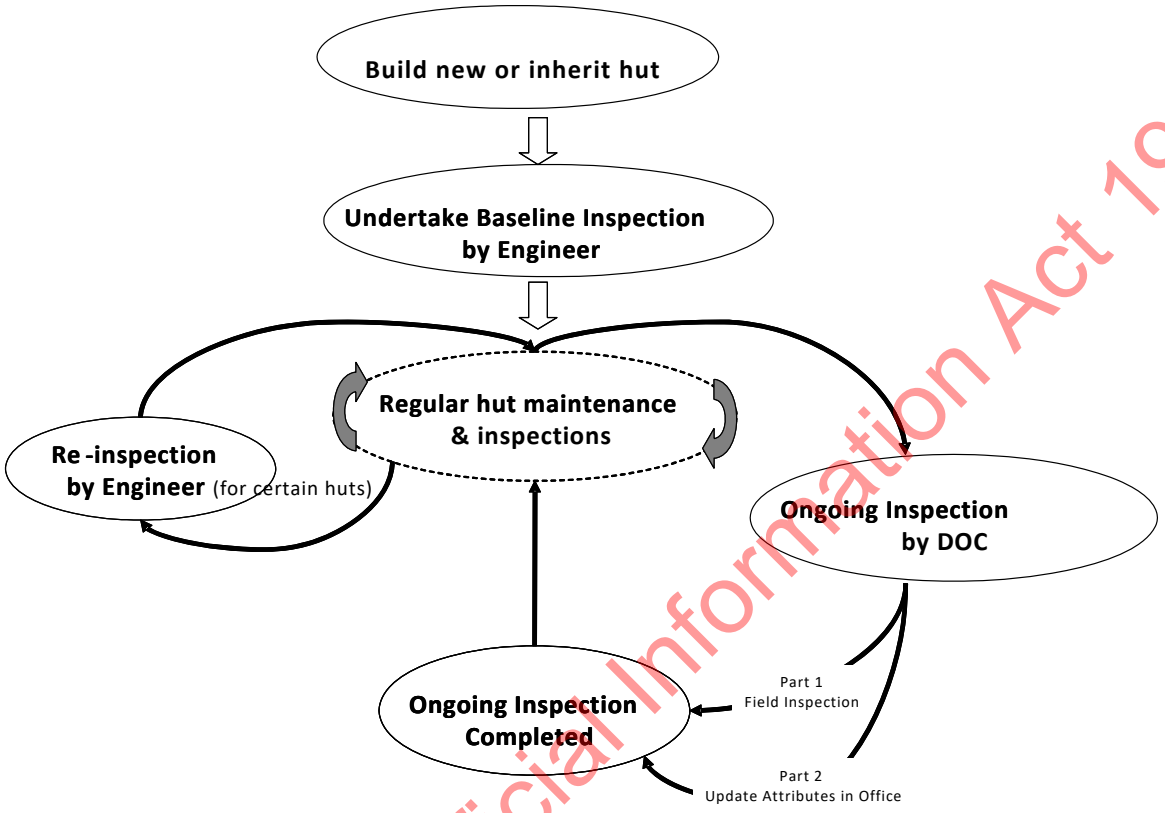
Of special note is the ongoing inspection by DOC task. For biodiversity huts, this only involves a field inspection. For visitor huts, this consists of two parts:

The field inspection – ongoing inspection by DOC

The office based "inspection" – update attributes in office

Although each of these inspections is separate, only when both parts are completed is the inspection considered to be done. This is reflected in performance reporting (section 6).

Hut inspection types flow chart:



Note: The baseline inspection, re-inspection and ongoing inspections use the same set of datalogger questions and all four types of inspection tasks are automatically generated in AMIS.

The inspection types are defined below.

Baseline Inspection by Engineer

For inherited huts and huts yet to have a baseline inspection. This is a one-off inspection by a DOC Engineer to determine and record the condition of the hut and sub-equipment at that point in time. The inspection records the remedial work required arising out of structural condition, design or construction, environmental influences and deferred maintenance. A set of baseline photos and plans and a retirement date (derived from estimating the remaining life of the building) are part of the inspection.

Note: The baseline inspection of a newly constructed hut is a greatly simplified one that consists of an office based exercise by a DOC Engineer to check that the required construction documentation (code compliance certificate, as built drawings, photos etc) have been obtained, entered into Piction and linked to the hut in AMIS.

Ongoing Inspection by DOC

This is the regular inspection of the hut and associated buildings by approved DOC staff ("Inspectors") to assess its condition, identify defects, assess natural hazards and, for visitor huts, check compliance with the service standards. This inspection will only be generated in AMIS after the Baseline Inspection by Engineer task is completed.

Associated with each ongoing inspection of a visitor hut is the **Update Attributes in Office** task, an office based task that is described in section 5.

Re-Inspection by Engineer

Higher risk huts (Great Walk and Serviced-Alpine huts, large Serviced huts and higher altitude huts) and their sub-equipment are to be inspected by an Engineer every 6 years for their general condition, structural condition and exposure to hazards. This inspection is in addition to the ongoing inspection by DOC staff. DOC staff can have additional huts given a re-inspection by Engineer by agreement with an Engineer and by getting the Asset Planner to create an ad hoc inspection for them and scheduling them.

Inspection by Specialist (LPG Check/inspection) – This is an automatically generated task in AMIS set up for all huts that have LPG (cookers and/or heaters). It is a separate task from the ongoing inspection as it requires specialist skills that DOC staff are not expected to have. It is required under the LPG Installations Reference Manual – HS 1225.

Two additional inspection notifications may be generated by the Inspector in the field (using the datalogger) or the Asset Planner in the office (in AMIS). These are:

Special Inspection by Engineer

This notification is created when, during the ongoing inspection, the Inspector comes across a structural defect or defects that he/she is uncertain about that may be serious and believes that an Engineer should assess it.

Inspection by Specialist

This notification is created when, during the ongoing inspection, the Inspector finds a potentially serious issue or hazard, (eg landslide) which may pose a threat to the hut, associated buildings or people at the hut site. A specialist (eg avalanche or geological hazard expert or arborist) will then need to be engaged to conduct this inspection.

There is no datalogger programme or process covered in this SOP for such inspections but the Engineer (in the case of the former) and the Regional Planning Manager (for a specialist inspection) must ensure that the inspection report, together with any drawings and photographs, are linked to AMIS before the inspection work order can be completed. If it is decided to carry out the remedial work recommended by the specialist, the Asset Planner should create a work order, assign the appropriate priority and schedule it.

The table below sets out the main differences between each of the different types of inspection:

	Baseline Inspection by Engineer	Ongoing Inspection by DOC	Update Attributes in Office	Re-Inspection by Engineer	LPG Check/ Inspection
Purpose	Record hut details and assess condition	Assess Service standard, hazards & condition	Record any changes in key data that cannot be assessed in the field	Assess structural condition & hazards	Check that LPG meets the required standards
Who Does it?	Engineer	DOC staff	Asset Planner	Engineer	LPG Specialist
Floor and cross section plans	Yes	No	No	Yes (where changed since Baseline Inspection)	No
Photos	Yes – complete set, including defects	Yes – of defects	No	Yes – of defects	No
One –off/ ongoing	One-off	Ongoing	Ongoing	Ongoing for selected huts	Every two years for huts with LPG

1.5 FREQUENCY OF INSPECTION

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Inspect huts and their sub-equipment at the frequencies set out in this SOP	Regional Planning Manager	Ensures all health, safety or other risks are identified within reasonable timeframes. Huts inspected less frequently will be "not to standard" in the performance report.

Huts, and all their sub-equipment, shall be inspected at the frequencies set out in the table below. Inspections must not be undertaken less frequently than the period specified. AMIS will automatically generate the next inspection task, at the correct frequency, after an inspection is completed on the datalogger and a synchronisation into AMIS has taken place.

Inspection Type	Assets included	Frequency

Baseline Inspection by Engineer	All huts (and all equipment associated with these huts)	A one-off task generated when the equipment is created in AMIS
Ongoing Inspection by DOC *	Great Walk, Serviced-Alpine and Serviced huts, Warden's huts and complex Biodiversity huts (and all their sub-equipment)	Annual
Ongoing Inspection by DOC *	Standard huts and basic Biodiversity huts (and all their sub-equipment)	Every 2 years
Ongoing Inspection by DOC *	Basic huts (and all their sub-equipment)	Every 4 years
Re-inspection by Engineer	Great Walk huts and Serviced-Alpine huts. Serviced huts with total sleeping capacity > 25. All other huts where altitude is > 1100 metres (and all their sub-equipment) where engineers determine that they should inspect them	Every 6 years
Inspection by Specialist (LPG Check)	All huts with cookers or with gas heaters	Every 2 years

* Associated with each ongoing inspection, for all huts except biodiversity and wardens huts, is an **Update Attributes in Office** task that shall be completed at the same frequency as the ongoing inspection.

1.6 BIODIVERSITY HUTS

Biodiversity huts and their sub-equipment shall:

- Be inventoried in the field and set up in AMIS
- Have a baseline inspection by Engineer
- Have an ongoing inspection by DOC and, if identified as a higher risk hut (see section 1.5 above), a re-inspection by Engineer every four years
- Comply with SOPs that apply to visitor huts, namely "LPG Use and Installations", "Storage of Flammable Liquids in Backcountry Accommodation" and relevant fire safety requirements, including mattress standards
- Have work, identified through the inspections above, that has to be done to address health and safety of hut users, completed as a priority in the field and in AMIS

The Hut Service Standards are not mandatory for biodiversity huts (ie those used primarily by DOC staff, contractors and volunteers as a base from which to carry out non-visitor work), however, they are largely relevant to all huts and are used to set up the questions for these huts.

The inspections for these huts will follow exactly the same format as those for visitor huts. This means that the datalogger questions that determine whether the hut meets the service standards will need to be answered, but they will not influence determining whether the hut is to standard. See section 6 for the MOR report that is applied to biodiversity huts.

There is a mix of biodiversity huts; most are simple, small buildings very similar to a Basic visitor hut and a few are larger and more complex, have gas cookers, and are more akin to a Serviced hut. Basic biodiversity huts require an ongoing inspection every two years, while the "complex" ones should have an ongoing inspection annually. All biodiversity huts came across from VAMS to AMIS in 2008 as "simple" huts. Changing a hut to "complex", to put it on an annual inspection plan requires making a change to the Type of accommodation for the hut equipment in AMIS.

1.7 HUTS MAINTAINED BY COMMUNITY

All backcountry huts that are open to the public and owned or maintained by clubs and other organisations on land managed by the Department shall be inspected under this SOP. Inspection of backcountry huts owned and maintained by concessionaires is not covered by this SOP.

Prior to any inspection of a community maintained hut, the Regional Planning Manager should contact the club or organisation to inform them of the coming inspection and seek information on any issue concerning the hut's condition or maintenance programme that would inform the inspection. It may be appropriate for a person from the club or organisation to join the Inspector on the inspection, not to do the inspection but to provide information and see first-hand the work that will be required following the inspection.

After the inspection, the Regional Planning Manager should send a summary of the work required, together with any photos taken during the inspection, to the representative of the club or organisation. This shall be done within a month of the inspection task being completed. The club should be asked to complete the tasks within the same timeframes that would be required if DOC was doing the work.

1.8 MINIMAL MAINTENANCE HUTS

Huts were placed on “minimal maintenance” as a result of decisions made in the recreation opportunities review in late 2004. A minimal maintenance hut is defined as one that is not part of the core hut network, is not essential in the long-term and will not be replaced at the end of its life. It will be retained as long as it remains weatherproof, sanitary and not dangerous. It must also meet the service standards for a Basic hut. These things are determined by the ongoing inspection.

Minimal maintenance huts and their sub-equipment are inspected on the basis that any maintenance on the hut is carried out as part of the ongoing inspection. The Inspector will travel with basic tools and equipment and only minor maintenance that can be carried out during the inspection will be undertaken.

Minimal maintenance huts may be inspected more frequently than every four years if the area is advised of significant health or safety issues at the hut by hut users (or staff) in the period between inspections. In these cases, the principle of carrying out the inspection and only minor maintenance in a single trip still applies. No special trip to undertake maintenance shall be carried out, unless it is to close the hut because of health or safety concerns.

Ongoing inspections of minimal maintenance huts shall concentrate on:

- Identifying whether the hut is dangerous, insanitary or no longer weatherproof
- Identifying defects and work required to fix those and fixing those defects that can be fixed using the basic tools and equipment taken on the inspection
- Cleaning the hut and toilet and, if necessary, clearing vegetation round the hut
- Checking for compliance with the service standards for Basic huts

The following is a checklist of “minimal” or “minor” maintenance that fits the principles above. These are the sorts of things that can reasonably be expected to be undertaken as part of the ongoing inspection trip:

- Vegetation clearance around the hut
- Spring cleaning the hut and toilet
- Identifying tree-fall and natural hazards (or where specialist advice may be required)
- “Hammer and nails” repair of external cladding, roof, floor, decking (not significant replacement)
- Replacing broken windows with plastic
- Basic fixing of water supply (broken taps etc)
- Digging a hole and shifting a pit toilet if the existing hole is full
- Very basic repair of internal linings
- Fixing doors, and basic repair of internal fixtures and heating
- Taking an old wood burner out or boarding up a fireplace if beyond repair
- Replacing hut signs, intentions book and other minor items if required by the service standard

The following are examples of actions that are not regarded as minimal or minor maintenance and that DOC staff should not be doing:

- Painting of the hut (a hut that is regularly painted cannot be regarded as being minimally maintained)
- Replacement of major items (e.g. wood-burner, tables, bunks, water tank, toilet, mattresses)
- Replacement or partial replacement of internal or external cladding, framing, floor, windows, benches, skylights, doors, sub-floor or foundations/piles
- Replacement of loose or rusty tie-downs
- Repairing a fireplace where adjacent timbers are charring or where lining has deteriorated

1.9 ACTIVELY CONSERVED HISTORIC HUTS

There are around 60 actively conserved historic huts available for use by visitors. These are huts that are:

- On a visitor site
- Have a visitor hut object type
- Are open and available for overnight use by visitors
- Are actively conserved historic buildings

These huts will be given the same inspections at the same frequency as all others of their category. The difference will be that before the ongoing inspection the Regional Planning Manager will invite an historic specialist to join the Inspector on the inspection.

The historic specialist will have input into describing the work required to remedy defects so that historic management objectives can be met. The key such objective is described in the Hut Service Standards as “providing an authentic historic hut for visitors to use”. Hut users’ expectations of authenticity are generally met when they are aware that the hut has had its original fabric, design and character retained, and the look and feel of the hut, both inside and out, have not substantially changed since it was built.

The historic specialist and the Inspector will work together to describe the defects and, where possible, the solutions that meet both visitor and historic objectives. If an historic conservation plan has been adopted for the hut any solutions would need to be consistent with it.

Photographs shall be taken, as for all ongoing inspections (see section 2.6), but for these historic huts it is important to have good, clear photographs of significant defects, especially where the solution may be contentious or uncertain. All photographs from the inspection are to be linked to AMIS.

Actively conserved historic huts with the object type “Building – Residential” are not inspected under this SOP. These are buildings that:

- Are not used or able to be used by visitors
- Are not considered to be part of the visitor (or staff) hut network

2. Before the Inspection/Planning

This section covers the actions required before field inspections can get underway.

2.1 CHECKING INFORMATION ON HUTS IN AMIS

Requirement	Who is accountable for carrying it out	Why?/Consequence
Keep information on huts and sub-equipment up to date in AMIS	Operations Manager	These actions are necessary to keep AMIS up to date, inform performance reporting and ensure accurate information is used in inspections

The Operations Manager is *accountable* for keeping the information on all huts in their area up to date in the period between ongoing inspections (but the work may be carried out by the Asset Planner). This ensures that the hut information is complete, aids performance reporting, provides accurate information to visitors and ensures that the ongoing inspection is based on the latest information.

Set out in the table below are the fields in AMIS that must be kept up to date for all huts.

AMIS Tab	Field	Updating Required	Reason/Comment
Object information	Long text - Location	This is an essential field to record the specific location of the hut (e.g. TR Whakatane River on a low flat terrace beside Bloggs Stm). Include the track it is on, if a well known one, (e.g. Dusky Track)	Used to update the hut list on DOC's website
	Long text - Comment	Use this same field to record major changes or events affecting the hut like change in status, new significant hazards, changes in management or significant upgrades	This field is highly visible for those using AMIS and should be used for significant issues. If it is something the Inspector should see on the datalogger, create an advisory note

Structure	Sub-equipment	See section 2.3 below	
Links	Certificates	Record details of all certificates, consents, producer statements etc issued for the hut as they are obtained. Create a certificate notification and scan the documents into the relevant category in Piction for the hut (Asset Maintenance or Upgrade or Asset As Built Details). Note: When a fire evacuation scheme exemption has been received, scan the exemption/scheme details and include here.	Evidence on AMIS of these certificates is critical for documenting evidence of compliance with the relevant statutory requirements
	Category – Asset As Built Details	Use this category to store photos and plans, certificates and consents following major hut extensions (i.e. significant work that alters the floor plan of the hut), or for a new hut	This provides an up to date record of the hut and is required by the Hut Procurement Manual. Photos and plans of new toilets and sheds should be stored against the toilet or shed equipment, not the hut.
	Category – Asset Condition Inspection Report	All photos taken during the ongoing inspection or re-inspection should be stored in this category	Photos and plans of toilets and sheds should be stored against the toilet or shed equipment, not the hut.
	Category – Asset Maintenance or Upgrade	All photos taken and plans drawn following upgrade or maintenance work should be stored in this category	Photos and plans of toilets and sheds should be stored against the toilet or shed equipment, not the hut.
Equipment life	Known built date	Keep this accurate as information comes to hand	Critical for working out age of the building
	Replacement date	Record the preferred replacement date of hut, toilet or shed based on finance and work planning considerations. Does not	A planning tool to assist in developing a replacement programme for the hut and its associated

		affect the actual retirement date and the depreciation finance (see section 6 of this SOP)	buildings.
Management	Historic actively conserved	See section 1.9. This should be applied to huts that have been assessed as actively managed (not just those that are "old")	Actively conserved historic huts are managed and maintained in a different way to others
	Third party ownership type and name	If DOC is not the owner use the pick-list and text field and record the "owner" here – this is usually the organisation that built it and/or now considers it to be theirs	Hut ownership is important as it assists in determining who is responsible for its replacement
	Third party management type and name	This is the organisation that completes the relevant documentation, administers any charging system, plans and carries out maintenance and determines strategic importance	Accurate information here will assist in determining what role DOC should play in managing the hut
	Restricted use	This is used to indicate where a hut is available to DOC staff only or is available to visitors on a seasonal basis only. For all others record "Not restricted"	
	Decision - equipment	These should be altered only if the agreed Recreation Opportunities Review decision has changed (e.g. from "seeking community maintenance" to "minimal maintenance")	The decisions on huts have been approved through the ROR process. The decision field is used in the ongoing inspection and financial processes
Access	All	This is used to provide information on access for anyone who doesn't know how to get there. It should be completed for all huts and kept current.	Used for work planning for ongoing inspections and to assist search and rescue. Walking access times can be used in visitor info.

	Grid Ref	Updating is done in the field during ongoing inspection – see section 3.24	Provides an accurate location of the hut and sub-equipment
Equipment	Altitude	Make sure this is measured and recorded to the nearest 10m	It is used as one of the criteria for re-inspections by Engineer
	Area (m2)	This is the floor area of the inside of the building plus the area of decking covered by a roof or verandah (but excludes areas of open deck)	It is important as it is used in a number of queries to indicate size or scale of the building
	Design – forest service 6 bunker	This should be kept accurate by adding a description of any modifications to the standard SF 70 design here	This data is valuable for historic research and management of these huts
	Sleeping capacity	Updating is done in the field during ongoing inspection. This should also be updated in AMIS if sleeping capacity is altered between inspections	Sleeping capacity is used to determine a number of service standard requirements, fire assessment and evacuation requirements
Hazard Assessment	All	This was completed some years ago for all huts where the Programme Manager believed the hut was subject to potential geological and/or avalanche hazards. It needs to be completed for all huts. The data must then be manually updated whenever any of the hazard information or conditions affecting the hut changes either following or between inspections.	This data must be read by the Inspectors prior to undertaking the OGI field inspection to inform their hazard assessment. It will also inform decisions on building a replacement hut on that site.
Visitor Impacts/ Information	Estimated bednights (adults and youth)	Update this data as soon as the latest bed night figures are available from the ongoing inspection, wardens or other sources. The bed night figures from the ongoing inspection can be used to update this field,	Bed night data is important for a whole range of planning, visitor information and other reasons

		but will need to be inflated to take account of people not filling in the intentions book.	
Attributes	All remaining tabs	While this data is kept current following sychronisation of the datalogger after an ongoing inspection, it must be updated as work is done between inspections.	Updating attributes is essential for determining whether the hut meets the service standards. See sections 5 and 6

2.2 WHO CAN UNDERTAKE INSPECTIONS

Baseline Inspection by Engineer – DOC Engineers

Re-inspection by Engineer – DOC Engineers

Ongoing Inspection by DOC - approved Inspectors working in the Operations Planning Unit. These people are referred to throughout as "Inspectors".

Update Attributes in Office –Asset Planner

Inspection by Specialist (LPG) – specialist contractors

2.3 MANAGING SUB-EQUIPMENT INFORMATION IN AMIS

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Keep information on huts and sub-equipment up to date in AMIS	Operations Manager	These actions are necessary to keep AMIS up to date, inform performance reporting and ensure accurate information is used in inspections

Management of sub-equipment information in AMIS is important if ongoing inspections and re-inspections of huts in the field are going to be managed efficiently. Sub-equipment is used to show the relationship between the hut (the "primary equipment") and all other assets to be inspected (the "sub-equipment"). Inspections will be easier if the toilets, woodsheds etc are correctly associated before the inspection begins.

Operations Managers must ensure that the sub-equipment are as accurately associated with the primary equipment (the hut) in AMIS as possible before inspections take place in the field.

Paper forms will be available **(use docdm-390490)** and may be used instead of the datalogger for sub-equipment that do not have an inspection task loaded against them (because they were not associated in AMIS before the inspection). They may also be useful where the huts are on remote islands. The data from the paper forms must be entered onto a datalogger upon return to the office and then downloaded into AMIS.

2.4 MANAGING AMIS INFORMATION WHEN BUILDING A NEW HUT

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Keep information on huts and sub-equipment up to date in AMIS	Operations Manager	These actions are necessary to keep AMIS up to date, inform performance reporting and ensure accurate information is used in inspections

The process of managing information in AMIS when building a new hut has to be carefully handled as it has significant implications for future allocations of funds. The Operations Manager is accountable for managing AMIS data on new huts (but may ask for an Asset Planner to actually do the work in AMIS). The following is required.

When a new hut (to replace an existing one) has been given approval in principle, and detailed planning for it is about to begin, notifications for a proposed new equipment are created for the hut and for any proposed associated buildings.

When a new hut (where one has never been before) has been given approval in principle, and detailed planning for it is about to begin, find the notifications for the proposed hut, and its associated buildings in AMIS (these should have come through from VAMS).

Create the new equipment in AMIS and assign asset tags (technical ID numbers) to the notification. Then assign the relevant capex WBS to the notification. Finally turn the notification into a work order.

As the hut building project proceeds relevant documents should be added to the Asset As Built Details category for the hut equipment, either as a document reference or scanned in. These will include consents, site information and site plans. As soon as the hut is completed and open for use asset tags must be attached to the hut and its new sub-equipment and the following must be recorded in AMIS

- the status of the equipment is changed to Open
- uncompleted fields for the hut and each sub-equipment are completed where this can be determined from the office (see section 2.1). Particularly critical is the Attributes information, which will determine whether the new hut meets the hut service standards
- the old hut has its status changed to “removed” once it has gone

The Hut Procurement Manual requires the following photographs to be taken and added to the Asset "As Built Details" category for the hut in AMIS. The Operations Manager is responsible for this.

- aerial view of hut and the site
- ground perspective view of front of hut
- each elevation
- two opposing internal views of the living area
- one internal view of any separate room
- where there are wardens quarters, two opposing internal views (note: wardens quarters (even when part of the visitor hut) is a separate equipment and will require a separate asset tag and a separate equipment set up in AMIS)
- where there are associated buildings, one external photo of each

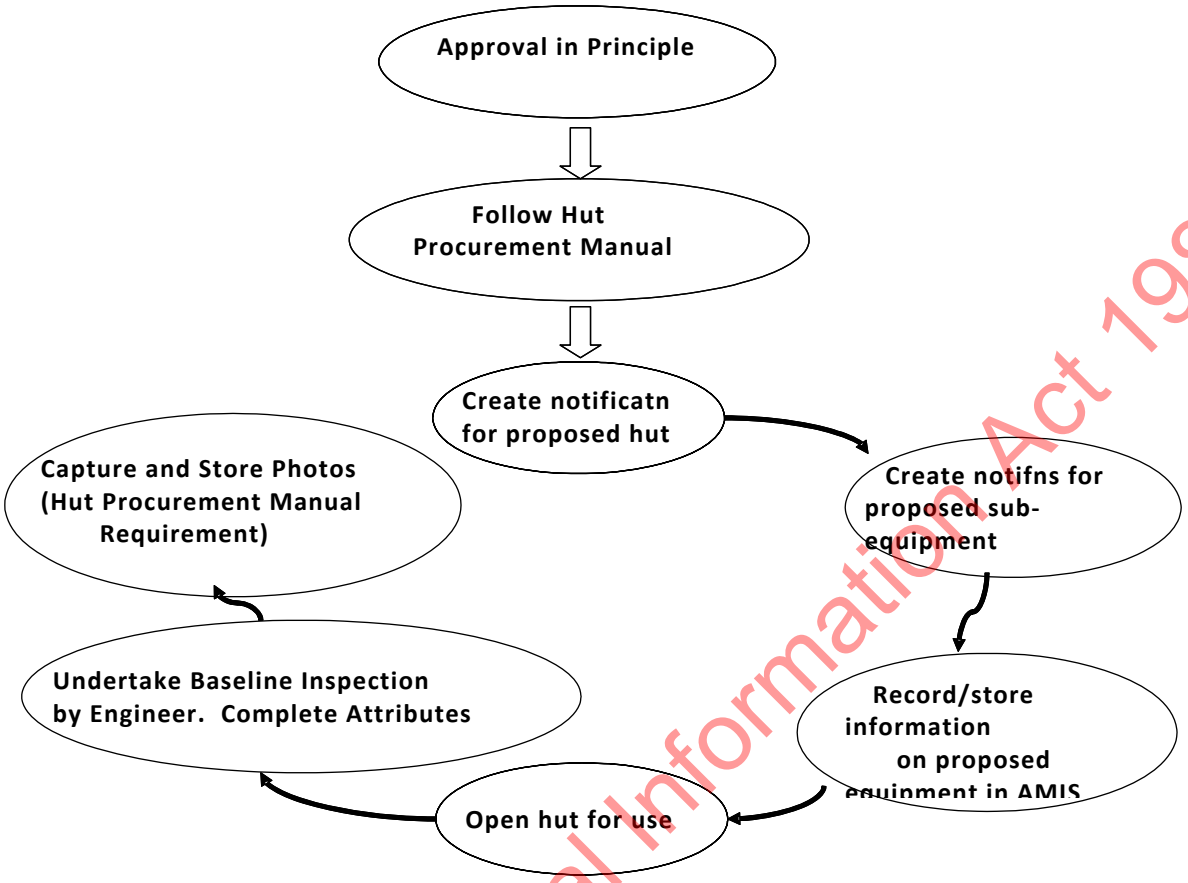
The following must also be obtained by the Operations Manager and added or scanned into the Asset As Built Details category for the hut in AMIS:

- building consent and any other consents
- code compliance certificate
- the most important plans and documents from the construction issue set, particularly site plan, floor plan, elevations, cross-sections
- copies of practical completion and maintenance certificates
- contractor guarantees and producer statement

The building consent and other consents, plus the code compliance certificate, must also be added into AMIS for the hut and associated buildings by creating the relevant notification. The Operations Manager is accountable for doing this.

Both the photographs and the documents above must be linked to the hut equipment in AMIS as soon as possible after the hut is opened. The Baseline Inspection by Engineer task will be automatically generated for the hut once its status is changed to Open.

The following flow chart summarises the steps required for managing AMIS information for a new hut:



Important Note: Under the Building Act 2004, a Code of Compliance Certificate is required before the building can be opened for use by the public.

2.5 PLANNING HUT INSPECTIONS

The due date for all hut inspections is calculated automatically by AMIS. Inspection times can be flexible within the required period but all inspections must be completed by the due date.

The time that hut inspections can be expected to take in the field will vary greatly depending on the size and complexity of the hut and its associated buildings. It may make sense to combine the hut inspection with carrying out key tasks such as clearing vegetation and spring cleaning. Inspections of other assets on the site (particularly structures and signs) may also logically be carried out on the same trip. As a guide to planning hut inspections, the rough time hut inspections (including associated assets) are expected to take on the ground are:

- Less than 1 hour for a minimal maintenance or Basic bivvy with no toilet
- 1 hour for a small hut
- 2 hours for a minimal maintenance hut with a toilet
- 2 - 3 hours for a moderate size hut
- 3 - 4 hours for a large or a complex hut

In planning inspections some time should be allowed for taking accurate measurements of any replacement parts or materials that may be required, and recording these on the datalogger.

Appendix 1 lists the equipment that should be taken into the field for all hut inspections.

In addition to field equipment, the following information from or linked to AMIS should be read by the Inspector before going on the inspection.

- Natural hazard information from the hazard tab for each hut
- Geological and/or avalanche hazard desk-top assessment (linked to AMIS and located in the "Other Asset Report" category for the hut equipment)
- Geological and/or avalanche hazard reports for the hut if these have been done (linked to AMIS and located in the Other Asset Report category for the hut equipment)
- Fire evacuation scheme or exemption if in place
- Resource consent conditions that may have been applied to the hut or toilets
- Any photographs in AMIS of natural hazards taken from previous inspections and assessments

2.6 TAKING PHOTOS AND DRAWINGS

The purpose of taking photos is to provide a visual record accessible via AMIS of the condition of parts of the building. This may enable the solution to the problem to be determined off-site. The following are the requirements for drawings and taking photos for each type of inspection.

Baseline inspection by Engineer (where existing hut has been inherited)

- Asset site photo
- Ground context photo
- Building cross-section drawing (1:50 scale)
- Floor plan drawing (1:50, but 1:100 can be used if absolutely necessary). Add a building/site description (as was used on the baseline inspection excel reports) to this drawing, or the cross-section drawing.
- Photos of each elevation
- Photos of two opposing internal views of the living area and one internal view of any separate room
- Where there are associated buildings, one external photo of each
- Photos of any part of the hut and associated buildings requiring remedial work to illustrate their condition

Baseline inspection by Engineer (where a new hut has been built)

See section 2.4 above

Ongoing inspection by DOC

- Photos of any part of the hut and associated buildings requiring remedial work to illustrate their condition, but only where a defect cannot be adequately described without photos
- Photos are particularly useful when defects are found in gas appliances, multi-fuel burners, sewerage systems and plumbing (where these are visible)
- Photos of obvious geological and avalanche hazard threats to the hut site

Re-Inspection by Engineer

As for ongoing inspection by DOC.

The Operations Manager must ensure that all photos taken are stored in Piction and linked to AMIS for ongoing inspections and for baseline inspections for new huts. For baseline inspections (for inherited huts) and re-inspections by Engineer it is the Engineer that is responsible for storing the photographs, but the Engineer may ask for an Asset Planner to do so. All photos must be clearly named so that anyone looking at their names knows what it is.

2.7 GRID REFERENCES

GPS should be used to capture any grid references required. Failing that the 1:50,000 scale MZMT Topo maps should be used. Map co-ordinates shall be metric Easting and Northing in terms of the New Zealand Transverse Mercator grid.

2.8 HEALTH AND SAFTEY

All inspection work shall be conducted in accordance with the Department's Health and Safety Policy. Particular care needs to be taken when climbing onto and inspecting roofs. Most roofs should not be accessed unless the Inspector is trained to use "working at heights" equipment. Refer to Working at Heights – HS 1467

3. Hut Inspection Process

This section details the field inspection process from start to finish. Sections 3.5 to 3.26 cover the field inspection process and all the questions to be answered in the order that they appear on the datalogger.

3.1 APPROACH TO HUT INSPECTIONS

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Inspect all huts and their sub-equipment using the process set out in this SOP.	Regional Planning Manager	This SOP describes the process to be used; no other process will work in AMIS

The questions on the datalogger are grouped into the main components of the building. Those components are listed in the Bill of Materials when notifications are created during the inspection. The hut should be inspected first, followed by each of the sub-equipment. The inspections have five main steps:

- Select the equipment and then the relevant inspection task for the building
- Pre-inspection screens, starting with viewing the sub-equipment
- Inspection, in a logical order, answering service standard questions and condition questions and creating notifications if required
- Add additional notifications if required (at any stage)
- Final inspection questions (particularly estimated remaining life)

The questions have been ordered to closely match the way in which an Inspector can efficiently inspect a building. Once the pre-inspection screens have been viewed, and any changes made, the datalogger displays a list of questions. While the Inspector can choose to go into a question *in any order*, the questions are listed in the order that an inspection would logically follow. The first set of questions deals with the hut site or environment, the next five sets cover external parts of the hut, followed by a number of sets of questions inside the hut and ending with a "natural hazards" question. Questions for sub-equipment follow a similar order.

For each set of questions, service standard questions are asked, and the current service standard attribute data appears on the datalogger screen. For example, if AMIS currently shows the number of axes for a hut as two, this figure will show up on the datalogger screen when the question "number of axes" appears. If the number is different, the Inspector goes into the question and enters the correct number.

If there is no data showing for a question, the Inspector must go into that question and enter an answer. "No entry" must NOT be chosen. If there is no data against a service standard question after the inspection is completed, this will result in failure against the service standard in AMIS.

In addition to the service standard questions there will be one or more "condition OK" questions. These require the Inspector to assess the condition of the building component and answer yes or no to the question of whether the condition of the component is OK. If "no" is entered, the Inspector will be prompted to create one or more notifications to describe that work. If no work is required, or when notifications for that component have been created, the datalogger goes back to the questions screen. An inspection cannot be completed until all the condition questions are answered. Additional notifications can be created at any time during the inspection.

Paper forms will be available (use **docdm-390490**) and may be used instead of the datalogger to record hut and sub-equipment inspections. They may be useful where the huts are on remote islands or for sub-equipment that do not have an inspection task loaded against them (because they were not associated in AMIS before the inspection). The data from the paper forms must be entered onto a datalogger upon return to the office and then downloaded into AMIS.

Note: Inspectors are **not** expected to set up notifications to deal with most aspects of the hut service standards. Depending on the response, answers to all service standard questions will automatically generate hut service standard results in AMIS (and either a pass or fail) when the datalogger is downloaded. Inspectors are to concentrate on the condition of each component.

Now that warden's quarters (that are part of a visitor hut) are treated as separate equipment in AMIS, each of these two "huts" has to be inspected separately. To avoid duplication, Inspectors should only identify condition defects to do with the exterior of the hut once – for the visitor hut equipment. For example, if the hut has loose iron on the roof, a notification dealing with the problem should be set up against the visitor hut equipment, but should not be repeated when the warden's quarters is being inspected. Defects in the interior of the building, however, will generally require a notification for the visitor part of the hut (only if it occurs there) or the warden's quarters (but only if it occurs there).

Finally, an important requirement of recording the work required for any building is for careful measurements to be taken of any replacement parts. If accurate measurements and descriptions of replacement materials are not recorded during the inspection, an additional trip into the hut will be necessary later and this is undesirable.

The diagram on page (v) summarises the inspection process.

3.2 COMPONENTS AND DEFECTS

The table below defines the components ("bill of materials") that are used for all huts and the main defects likely to be observed for each. A shortened bill of materials list is used when creating notifications for simpler buildings like woodsheds and toilets.

Component (used in bill of materials)	Defined as	Defects to Look For
Visitor Impacts/environment	The "hut site". This is the area outside the hut and around the toilet (including the track to it) and other associated buildings.	Excrement, toilet paper, ashes, rubbish or food scraps on the site. Vegetation damage caused by firewood gathering. Boggy or bare areas caused by trampling/overuse. Junk or leftover material around or under the hut. Condition of track to toilet.
Waste management/sewerage	The waste system from where water enters disposal system: gully traps, soakage fields, grease traps, grey water plumbing & sewerage system: pit toilet holes, containment/composting tanks, pipes, dispersal fields.	Full tanks and holes, broken, blocked, leaking plumbing etc.
Vegetation	Vegetation around the hut and sub-equipment that has the potential to impact on those assets.	All vegetation conditions that pose a risk to assets or visitors: vegetation encroaching on the building (within 4 metres), weeds, dangerous plants, potential tree-fall and dead/dying trees.
Foundations/sub-floor/tiedowns	Tie-down cables/wires, turnbuckles and their attachment to any building and the ground. Piles, bearers, joists, bracing, fixings and all other structural timbers below the floor or deck. Any other foundation system such as steel	Broken, loose or rusted tie down cables, wires, building attachments or ground/rock anchors. Rot in any such component/system and sagging floors.

	frames, stones etc.	
Exterior claddings (incl roof)	Exterior claddings, incl. roof and all flashings. Includes any transparent plastic sheeting but excludes skylights (joinery).	Broken, rotten or rusted claddings, flaking or blistering paint, damaged or lifting nails, leaks or holes.
Water Supply	The water supply from its source to where users collect it. Spouting/guttering, downpipes, tanks and stands, pipes and intakes. Taps, sinks, showers and other plumbing fixtures.	Blocked, broken, leaking, missing or rusted parts. Pollution of the water supply, including animals in the water tank. Broken, blocked or malfunctioning system parts, water damage around downpipes or wet areas under buildings around gully traps. Rotten tank stands.
Flooring/decking	Interior and exterior flooring, decking and associated handrails and steps.	Look for broken, rotten, lifting or loose floorboards, floor sheets or decking. Slippery decks. Condition of any floor coatings (paint, polyurethane etc). Presence & condition of any barriers/handrails to decks.
Walls/roof/linings - internal	Structural timbers and linings in walls and ceilings, including plastic sheeting.	Broken, rotten or rusted timber/linings in walls/beams. Walls not nailed or bowed, sagging roof or distorted ceiling. Flaking, blistering paint or leaks.
Fixtures/joinery - interior	Doors, windows, stairs, handrails, glass, benches (except cooking benches), bunks, cupboards, skylights, vents.	Look at condition/function of all items, esp. fixing of bunks to walls, ease of closing doors and signs that more passive ventilation is required.
Cooking	Cooking appliances, including fuel, but excluding piped, permanent LPG installations (any size). Cooking benches.	Condition and function of cooking appliances and benches. Consider the quantity and suitability of any fuel. Gas cookers are required to be 200mm away from a vertical surface, unless there is a 600mm high non combustible covering on that surface, and have no

		combustibles within those areas.
Heating	Heating appliances, including fuel and chimney/flue, but excluding piped, permanent LPG installations. Axes, saws, ash buckets. Exclude wood/fuel sheds (separate inspection).	Condition and function of heating appliances, chimney, axes etc, quantity, storage of fuel & suitability of supplied wood. Condition of lintel and areas surrounding an open fire place. For gas heaters, check that they are operational, that the instructions are clear and that they are free from leaks
LPG	Piped, permanent LPG installations (any size), from the bottles to the appliance(s). Includes simple systems with appliances attached directly to bottles. Excludes appliance operation (use cooking or heating).	See section 3.17
Hazardous Substances	Flammable liquids, such as petrol, meths, turps, kerosene, white spirits and solvent borne paint. Toxic substances (solid or liquid)/poisons. Storage of above.	Check that storage meets requirements, including signs, containment, amount stored. See section 3.18
Fire Safety	Fire safety equipment-fire extinguishers, hoses, bucket pumps, smoke alarms. Evacuation routes and exits; signs.	Condition of fire safety equipment and signs – all checked and OK? Fire safety issues: evidence of smoke-damage, location of drying racks, ash disposal, presence of soft furnishings.
Electrical/lighting/radios	Solar, gas and other lighting (other than candles) and candleholders. Non-mains, wired electrical systems, from the power source to the appliance(s). Includes the appliance if it is lighting, radios or fridge.	Condition and function of the power source, supply system, lighting, fridge, batteries, radios. Check clearances for gas fridges and lights.

Furniture/movable items	Mattresses and miscellaneous small items not covered elsewhere such as movable furniture, cleaning equipment, drying facilities, intentions book, first aid kit, ticket box.	The absence of any items where required and their condition.
Visitor Information	Visitor information provided at the hut. Includes all notices and signs inside the hut and any direction signs to toilets.	Look for dated, out-of-season or incorrect information, information in the wrong place or not provided at all. Places where visitor information, if provided, would improve visitors' experience.
Natural hazards	Geological or avalanche hazards potentially affecting the hut and all its sub-equipment (cover tree-fall under vegetation).	Any potential erosion, collapse, rock-fall or evidence of flooding or observable changes in streams, rivers, slopes or slips that might be a potential hazard to the hut, toilet or hut site. See section 3.23

Rot in Timber Components

Obvious visual signs of rot in timber are discolouration (lighter or darker than surrounding good timber) and the growth of mould or moss and other vegetation on the surface of the timber. A screwdriver is a useful tool for gauging the extent of rot in timber components. Any rot (within reason) in non-historic huts should trigger replacement of the rotten component.

Rust in Steel

Rusting of exposed steel components or cladding is usually obvious. Rusting of hidden components (e.g. bolts within timber, rock anchors) may only be obvious by iron oxide staining, if at all. Inspectors should not remove bolts or dismantle components to check for rust. If there is a concern regarding rust to a hidden component the Inspector should call for a Special Inspection by Engineer.

Surface rust is not a dangerous condition but should be a trigger to apply corrosion protection or paint where practical. Rust only becomes a safety concern when deep pitting or flaking has reduced the strength of a component. If the component is part of the main supporting structure (e.g. roof beam/pile connecting bolts) a Special Inspection by Engineer should be called for.

3.3 NOTIFICATION TYPES

There are several types of notification that can be created on the datalogger during an inspection, but the one most likely to be used is Maintenance request. This is used for all work on components of a building. It should be used for replacement of any part of the building (such as wood burners, roof and mattresses) and maintenance work on any component. It should also be used to identify the need for a special inspection (by an Engineer, or by a specialist, such as a geological hazard expert).

3.4 NOTIFICATION PRIORITY - CRITICAL, SERIOUS, ROUTINE

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Assign each notification created during the inspection a risk/urgency priority: • Critical • Serious • Routine	Inspector/Engineer	Critical" notifications identify visitor safety and health issues and require an urgent response; "serious" notifications require a less urgent response
Action Critical/Serious notifications	Operations Manager	Critical and serious notifications must be actioned ahead of routine work. A hut is "not to standard" if it has any outstanding critical or serious notifications

Every notification that is created during the field inspection must be assigned a risk/urgency priority of critical, serious or routine. The Inspector must assess the risk, *if the work is not completed*, to hut users and to the building itself.

Consideration of visitor group should be made when assigning a task risk e.g. users of Great walk and some Serviced huts (Backcountry Comfort Seekers) tend to have lower outdoor skills and therefore lower risk tolerance than users of Standard and Basic huts.

Choose the appropriate level of risk/urgency for each work task - Critical, Serious or Routine - based on the definitions below.

Critical	
Definition	Death or severe injury, building collapse, significant damage or loss imminent.
Application	If you believe that the observed event or condition will result in death or severe injury or the collapse, significant damage or loss of a significant asset

	is imminent, record the risk as **Critical**.
Action to take in the field	See section 3.28
Asset status	Closed
People to notify	Notify the Operations Manager immediately or leave the field immediately to do so. It is the Operations Manager's role to: 1. Notify the Regional Operations Director if appropriate. 2. Approve any further action, including immediate steps to remedy the defect. 3. Confirm that the actions taken in the field were correct and sufficient at the time.
Email notifications	Upon receiving the notification in AMIS an email is sent automatically to the Operations Manager, Asset Planner and Regional Planning Manager immediately. This email details: • Functional location number and name • Equipment number and name • Object type • Notification type and priority • Equipment status and a recommendation of changing the status to Closed if still Open • Notification comment recorded • Inspector name • Date of recording • Advice on how of many days this notification has been in place. The Operations Manager must forward the email to the DOC Engineer if the critical task is a Special Inspection by Engineer one. Note: An email will continue to be sent monthly on the notification anniversary date, and this one is also sent to the Regional Operations Director.

Serious	
Definition	Serious injury, building collapse, damage or loss possible. For huts it is to be used particularly where part of the building is in serious condition (e.g. a faulty wood burner, a section of deck or one of two bunkrooms with a serious

	fault), but the rest of the building is OK.
Application	If you believe that the observed event or condition will result in serious injury, or the collapse, damage or loss of a significant part of the building is possible, record the risk as **Serious**.
Action to take in the field	Where it is safe and practical to do so, undertake emergency repairs or action (e.g. disable the wood burner so it cannot be used, close off (with yellow tape) the faulty section of deck or board up the bunkroom that has the serious fault).
Equipment status	Open
People to notify	Notify the Operations Manager immediately, or on return from the field. It is the Operations Manager's role to: 1. Notify the Regional Operations Director if appropriate 2. Approve any further action, including immediate steps to remedy the defect 3. Confirm that the actions taken in the field were correct and sufficient at the time
Email notifications	Upon receiving the notification in AMIS an email is sent automatically to the Operations Manager, Asset Planner and Regional Planning Manager immediately. This email details: • Functional location number and name • Equipment number and name • Object type • Notification type and priority • Equipment status and a recommendation of changing the status to Closed if still Open • Notification comment recorded • Inspector name • Date of recording • Advice on how of many days this notification has been in place. The Operations Manager must forward the email to the DOC Engineer if the serious task is a Special Inspection by engineer one. Note: An email will continue to be sent six-monthly on the notification anniversary

	date, and this one is also sent to the Regional Operations Director.

Routine	
Definition	Minor injury, minor component failure, deterioration or loss is likely to occur with time
Application	If you believe that the observed event or condition is likely to result in minor injury or the failure, deterioration or loss of a minor component over time, record the risk as **Routine**.
Action to take in the field	None
Equipment status	Open
People to notify	Ensure the work task is recorded in AMIS.
Email notifications	None

Definitions:

- Severe injury- loss of limb, likely to require hospitalisation over 24 hours.
- Serious injury - medical assistance or up to 24 hours hospitalization required.
- Imminent- in the very near future, a matter of days.
- Possible- in the near future, a matter of months.
- Over time – over months, years.

3.5 "PRE-INSPECTION" INFORMATION

The "pre-inspection" information is viewed and changed (if necessary) after opening the inspection task.

Sub-equipment

(Huts only)

The first screen, for the inspection of the hut, will list all the equipment currently associated with the hut in AMIS. The Inspector will check that each of the sub-equipment listed is on the right site (functional location). Sheds and toilets that have been built and do not appear on the list of sub-equipment, and those that have not been associated and should be, should be recorded as "Not found" in the datalogger. They are to be inspected using the paper form. Sheds and toilets that are no longer on this functional location and that are still showing as sub-equipment should also be recorded as "Not found" in the datalogger. The corrections to sub-equipment must be made in AMIS upon return to the office.

Retag number

(All equipment)

If the hut or sub-equipment has lost its orange asset number tag, install a new one (inside, above the main entrance door) and enter the new tag number (by overwriting the old one).

Equipment status

(All equipment)

Leave reviewing the status until the end of the inspection.

Equipment name

(Toilets and Sheds)

The equipment name will appear next and, for sheds, toilets and amenity blocks, if this name is wrong, or blank, it should be correctly filled in. Do NOT change the hut name. All sheds and toilets must have a name (no more than 30 characters long) that clearly identifies it as belonging to the hut and that includes word(s) describing what it is. Examples are "Mintaro hut toilet no. 1", "Mintaro hut toilet no. 2", "Powell hut gas shed", "Greenstone hut winter toilet", "Bark Bay hut toilet block".

Advisory note

(All equipment)

Any existing advisory note from a previous inspection or that has been created for the equipment can be viewed at this stage. There is an opportunity to add comments or to create a new advisory at the end of the inspection.

3.6 INSPECTION - COMPONENT BY COMPONENT

Note: The questions with "(SS)" after them below are hut service standard questions (although the "SS" does not appear on the datalogger). The Inspector does not need to create notifications for most of these questions.

3.7 VISITOR IMPACTS/ENVIRONMENT

Appendices 2 to 5 list all the datalogger questions, in order, for huts, toilets, sheds and bunkrooms.

This component covers the area outside the hut and around the toilet and other associated buildings.

Rubbish management meets std (SS)

(Huts only)

The rubbish policy in the service standards is "take in-take out". If the hut has a rubbish hole or rubbish receptacles record "No". A designated place to put dead ashes is acceptable and should be regarded as meeting the rubbish policy standard.

Wasps present around hut/toilet (SS)

(Huts only)

The Service Standards require wasp control (where necessary) at Great Walk and Serviced huts. Although wasp control is only to be carried out at Standard and Basic huts in certain circumstances, this question is to be answered for all huts. Record "Yes" only if wasps are (or have been in the past season) a significant problem around the hut site. A scan through the intentions book may provide comment on wasps if the inspection is carried out in the off-season.

Meat safes/dog kennels too close to hut (SS)

(Huts only)

Meat safes and dog kennels are not assets, simply part of the hut environment. This question is about the distance a meat safe or dog kennel is from a hut and its toilet. Meat safes and dog kennels must be 50m or more from Serviced and Great Walk huts/toilets, 20m or more from Standard huts/toilets and 10m or more from Basic huts. If there are no meat safes and no dog kennels record Not applicable.

Hut on or below bushline or scrubline (SS)

Reliable supply of dead wood (SS)

Risk that live vegetation will be cut (SS)

(Huts only)

Answers to these questions determine whether heating and/or fuel should be provided at Serviced, Standard and Basic huts. For Basic huts, determine whether there is a reliable supply of dead fire-wood within 250m of the hut. For all other huts, the reliable supply of dead wood must be within 200m of the hut. Make a call based on what you can easily see; a detailed "search" isn't necessary.

Determine whether there is significant evidence of live vegetation being cut for firewood to the point where it is having an unacceptable environmental impact. Do this by considering any evidence you can see, your knowledge of the amount of use, type of user and availability of dead wood.

Building environment-condition OK

(Huts, Toilets and Bunkrooms)

Record "No" if the area surrounding the hut contains rubbish, vegetation damage, is significantly bare or muddy or there is junk or leftover material around or under the hut. Record "No" if work is required on repairing meat safes or dog kennels. If "No" is recorded, the Inspector creates one or more notifications.

Sink needed to protect water bodies from pollution (SS)

(Huts only)

The answer to this question helps determine whether a hand washing sink should be provided to meet the service standards for Standard and Basic huts. It should be answered for all huts whether or not there are sinks. If the hut has a water tank, and hands are almost always going to be washed at the tank and not in a nearby lake, tarn or stream, answer "No". If there is no water tank, or the water tank may not always be used to wash hands, determine whether water bodies, particularly those used for water supply, are likely to be polluted by people washing in them.

Toilets provided

(Huts only)

Answer Yes or No

Toilets – distance from hut (m) (SS)

(Huts only)

Pace this to get an approximate distance and to either confirm or change the current distance. If there are no toilets provided enter 0 m. If more than one toilet, choose the closest one.

Track to toilet(s) - condition OK

(Huts only)

The track to the toilet at most huts has not been included as part of the track to the hut and may not, therefore, be included in the ongoing inspections of such tracks. The service standards require the track to the toilets at Great Walk and BCC Serviced huts to be even and not wet/muddy. Vegetation should be clear of the track at all huts. If work is required on the track to the toilet to meet this standard record "No" and set up a notification.

Evidence of toilet waste around site (SS)

No toilet – potential water pollution (SS)

(Huts only)

These questions help determine whether a Basic hut without a toilet needs to have one to comply with the service standards. Potential for water supply pollution is possible when the water supply is a stream, tarn or lake and the numbers of users is relatively high, but a judgement call needs to be made on a case by case basis. A search of the surrounding area is required to look for evidence of toilet waste.

Answer this question for all huts.

Record “Not applicable” where the hut has a toilet.

Pit toilet-distance to water body (m)

(Toilets only)

Information from this question will be useful when determining whether toilets meet requirements of regional council plans, many of which require toilets to be more than a certain distance from a water body. If toilet is a pit toilet, estimate distance from toilet to nearest water body (river, stream, lake or tarn); if there is more than one pit toilet, choose the one closest to a water body.

3.8 WASTE MANAGEMENT/SEWERAGE

This component covers the waste system from where water enters a disposal system to where it discharges and includes gully traps, soakage fields, grease traps, grey water plumbing and the sewerage system (pit toilet holes, containment/composting tanks, pipes, dispersal fields).

Questions on the toilets (number of pans, vents, smell, seat, door and lid) are asked against the hut and not the toilet. This is because these are all service standard issues and have to be asked against the hut equipment to determine whether the hut is to standard. The condition of the sewerage system (holes, tanks, dispersal fields etc) is recorded during the toilet inspection.

Toilets smell OK

(Huts only)

The toilet may smell OK on the day of inspection but to answer the question the hut log book should be scanned for any reference to the toilet smelling in the last year. The service standard for Basic huts requires pit or containment toilets to be vented if the ongoing inspection concludes that it has an offensive smell. This question is to be answered for all huts; all toilets should “smell OK”. Choose “Not applicable” if there is no toilet. If “No” is chosen, determine a solution and create a notification when undertaking the toilet inspection.

Number of toilet pans (SS)

(Huts only)

A “pan” means an individual toilet cubicle (there may be more than one pan in a toilet building). Do not count any separate urinal as a pan. Include all the toilets in the vicinity of the hut (summer and winter) and inside the hut.

Toilets all have seats & lids (SS)

(Huts only)

If there are no toilets, choose “Not applicable”. If a toilet does not have a seat and lid, select “No”. Some toilet designs require no lid to assist in ventilation, however, and in this case, if the toilet has a seat select “Yes”.

All toilets have a door (SS)

(Huts only)

If there are no toilets, choose “Not applicable”. If the answer is "No" create a notification for installing a door when inspecting the toilet.

Pit or vault toilets vented (SS)

(Huts only)

The service standard requires all pit and containment toilets to be vented, and for Basic huts requires them to be vented if the ongoing inspection concludes that they have an offensive smell. If there is no pit or vault toilet, choose “Not applicable”.

Grease traps – number

(Huts only)

Record the number of grease traps provided.

Waste water management-condition OK

(Huts only)

Record “No” when work is required on any part of the waste water system for the hut (but exclude the sewerage system associated with the toilet). This includes gully traps, soakage fields, grey water plumbing, grease traps & pipes. Look for full, broken, blocked parts and pollution. Do not record work required on toilet vents, doors, seats and lids (cover under Fixtures/joinery-interior for the toilet).

Tank/hole/pipes-condition OK

(Toilets only)

This is recorded for toilet/amenity block equipment only. Record “No” if work is required on pit toilet holes, containment/composting tanks, septic tanks and pipes. Look for a pit toilet hole or tank that is full or close to being full and look for broken, blocked parts and pollution.

Sewerage dispersal field-condition OK

(Toilets only)

This is recorded for toilet/amenity block equipment only. If the toilet is not a septic or similar system and has no dispersal field record Yes”. For a toilet with a waste water dispersal system, the Inspector will need to know where there is and look for broken, blocked parts and signs of leaking or pollution.

3.9 VEGETATION

This component covers vegetation around the hut and sub-equipment which has the potential to impact on those buildings.

Vegetation clearance – condition OK

(Huts and bunkrooms)

The service standard requires vegetation to be cleared approximately 4 metres from the hut. This is to ensure there is sufficient light and air right around the building to avoid degradation of building materials due to dampness, mould and mildew. Vegetation clearance also maintains views from the hut, reduces tree fall hazards and ensures that vegetation does not impede means of escape from the building. However, large trees and big branches are to be cleared 4 metres from the hut only where these restrict air flow, impede means of access or views or may be a hazard.

The service standard also requires vegetation clearance to be undertaken in a way that minimises any negative effects on the environment surrounding the hut, with cut vegetation removed from view. If work is required on the vegetation to meet the standard record "No" and create a notification.

For toilets, although the service standard doesn't require vegetation clearance, create a notification in the toilet inspection if vegetation needs to be cleared around the toilet.

Tree fall hazard - condition OK

(Huts, toilets and bunkrooms)

The question asks "are there trees/branches that potentially threaten the hut/building or its immediate environment where people linger"? To answer it, the starting point should be to recall the tree fall hazard data from the Hazard screen in AMIS for the hut. This should record up to date history/knowledge of tree fall and whether the hut is vulnerable to tree fall.

To determine the potential tree fall hazard the Inspector will need to consider the following

- The likelihood of any tree or branch falling on the hut/building or immediate environment
- the consequences of any such tree fall (i.e. what damage or injury it could cause)

The former is not easy to determine and if there is in any doubt about the likelihood of a tree or branch falling onto a building or its environment, choose "No" and set up a notification (maintenance request type – "special inspection required") for an arborist to inspect the trees.

3.10 FOUNDATIONS/SUB-FLOOR/TIE-DOWNS

This component consists of tie-down cables/wires, turnbuckles and their attachment to any building and the ground, piles, bearers, joists, bracing, fixings and all other structural timbers below the floor or deck. It also includes any other foundation system such as steel frames and stones.

Tie-downs or anchors present

(Huts, toilets and bunkrooms)

This question simply records whether the hut has tie-downs or anchors, as this is important structural information. Tie downs are usually wires from the top corners to anchors in the ground. Anchors hold the hut to the ground at near ground level.

Foundations/tie-downs-condition OK

(All equipment)

The foundations/sub-floor is a critical or "core" component of the hut or building. If there are significant problems then the structural integrity of the whole building may be under threat. The following is a guide to what to do.

- Stand back and look at the building in its entirety before considering the details
- Look for any sign of deflection or movement in the foundations and floor
- Probe a selection of piles with a long screwdriver to look for rot
- Consider the quality of ventilation available to the sub-floor system. The bottom of the wall cladding and sub-floor members should not generally be in contact with the ground.
- Overall, look for broken, loose or rusted components, rot and sagging floors.

Tie-downs are vital for the stability and integrity of the building. Check for

- rust in the brackets, threads or waratahs
- looseness at ground level
- slack in the wires
- any change that might have occurred since the last inspection (such as a water channel by a waratah)
- rot where the wires are attached to the building
- gaps between the fixing bracket and the building
- the building being out of alignment along the length of any of the eaves.

If the Inspector is unsure about the condition of the tie-downs, foundations or sub-floor framing, but has some concerns about the building's structural integrity "No" should be recorded and a notification (maintenance request type – "special inspection required") created for a special inspection by an Engineer.

3.11 EXTERIOR CLADDING (INCLUDING ROOF)

This component is the exterior claddings on the walls and roof and all flashings. It includes any transparent plastic sheeting but excludes skylights (covered under fixtures/joinery-interior) and chimney cladding (covered under heating).

Exterior claddings – condition OK

(All equipment)

"Exterior claddings" includes the roof. Look for broken, rotten or rusted claddings, flaking or blistering paint, damaged or lifting nails, leaks or holes. Determine whether the building needs to be painted, or given a partial paint.

The roof should be viewed from the ground and access on to it only considered if specific defects are suspected. The Inspector should not get up onto the roof to inspect it if the roof is more than 3 metres off the ground, unless this can be done safely without risking a fall and the Inspector has fall protection training and gear. A frosty or icy roof should not be walked on. Refer to Working at Heights – HS 1467.

3.12 WATER SUPPLY

This covers the water supply from its source to where users collect it and includes spouting/guttering, down-pipes, tanks and stands, pipes and intakes, taps, sinks, showers and other plumbing fixtures. It does not include the waste water system.

Showers provided (SS)

(Huts only)

Record "Yes" if showers (hot or cold) are provided either inside or outside the hut. Note that the service standard states that showers will not be provided to visitors.

Personal washing areas provided (SS)

(Huts only)

A personal washing area is a screened area, usually outside the hut, where a person can use water from a bucket or container to wash themselves.

Water supply-source (SS)

(Huts only)

For the hut, if water is supplied from rainwater off the roof into a tank choose "Roof into tank". If water is piped from a water body to a tank/taps choose "Piped from water body". If users collect water from a river/lake etc choose "Water body near hut". If there is more than one water source choose the main one used. If there is no water supply or water body near the hut, choose "Not applicable".

Water supply source (excluding hut)

(Toilets only)

For a toilet/amenity block if the toilet or amenity block has no separate water supply (ie the water supplied to it is supplied from the hut or it has no water) choose "Not applicable". If it has a separate water supply, pick from the list as above.

Water body type

(Huts only)

If water supply is "Roof into tank" choose "Not applicable".

Water supply-water clean (SS)

(Huts only)

The service standard requires the water supplied at a hut to be clean (ie generally does not contain particles, sediment and other foreign matter); it does not state that it has to be potable. Choose "Yes" if the water is generally free of sediment, suspended particles and other foreign matter. Where the water is naturally a dark colour, but is otherwise clean, choose "Yes". If there is no water supply or water body near the hut, choose “Not applicable”.

Water body – distance from hut (SS)

(Huts only)

This question is asked to determine the distance (in metres) users must walk to fetch water where the water supply is a water body. If the water supply is from a tank off the roof or is piped to the hut, enter 0 metres.

Water warning sign provided (SS)

(Huts only)

This sign states that the water is not treated and that users may wish to boil or treat it. The service standard requires this sign for all huts, including those where users collect their own water from a water body near the hut. It should ideally be placed near taps or sinks in huts with a tank or piped supply but if the hut has the new (2008) standard hut notice, enter “Yes”.

Sinks - dishwashing (number) (SS)

(Huts only)

In visitor huts, record the number of sinks visitors can use to (mainly) wash dishes and prepare/wash food (as opposed to washing hands). In wardens quarters, record the number of sinks available to wardens only for (mainly) washing dishes and preparing/washing food. Dish washing sinks may be located either inside or outside the hut.

Note: no sink should be recorded as both a dish washing sink and hand washing sink; it must be recorded as one or the other.

Sinks - handwashing (number) (SS)

(Huts only)

In visitor huts, record the number of sinks that visitors would use mainly to wash hands/clean teeth (as opposed to washing dishes and preparing food). In wardens quarters, record the number of sinks available to wardens only for washing hands/cleaning teeth (as opposed to washing dishes and preparing food). If these sinks are located by or in a separate toilet building, count the sinks here against the hut equipment (this question is not asked for toilets/amenity blocks).

Hand washing sinks will be located outside the hut.

Water supply-condition OK

(Huts and toilets)

Record "No" and create notifications if there is any maintenance or replacement work required on any part of the water supply system, including guttering, down-pipes, water tank and stand, sinks and taps. Look for blocked, broken, leaking, missing or rusted parts and pollution, dirty water, water damage or wet areas.

If there is no water supply, record "Yes".

3.13 FLOORING/DECKING

This component consists of interior and exterior flooring, decking, associated handrails and steps.

Verandah and/or deck present (SS)

(Huts and bunkrooms)

The service standard allows or encourages verandahs and decks depending on the category of hut. A small covered porch (the sort that is found by the door of many SF70 6 bunk huts) should not be recorded as a verandah/deck. If any length of deck, and/or verandah (other than a porch) is present, record "Yes".

Floor/decking-condition OK

(All equipment)

Record "No"

if there are broken, rotten, lifting or loose floorboards, floor sheets or decking. Check decks for slipperiness and check condition of any floor coatings (paint, polyurethane etc). Check the condition of any handrails to decks. A one person "shove" is a sufficient test of its strength. A weak handrail is one that the Inspector considers may break if a person falls against it. Consider also whether the handrail is likely to be used to sit on and test its stability for that.

3.14 WALLS/ROOF/LININGS - INTERNAL

This component is structural timbers, framing and linings in walls and ceilings, including plastic sheeting, but excluding skylights.

Hut/building weatherproof

(Huts, toilets and bunkrooms)

The service standard requires huts to be weatherproof. This question aims to provide an answer to the question of the building's weatherproofness. Answer "Yes" if from the evidence you can see that no water is penetrating or accumulating inside the hut through doors, windows, floor, roof or walls and surface water isn't entering the hut or building. Although this is a service standard question for huts, if "no" is chosen determine a solution and create a notification or notifications under the appropriate components.

Walls/linings-condition OK

(All equipment)

The wall structure (part of what is sometimes called "superstructure") is a critical or "core" component of the hut or building. If there are significant problems here, as with the foundations, then the structural integrity of the whole building may be under threat. The following is a guide to what to do.

- Stand back and look at the building in its entirety before considering the details
- Look for any sign of deflection or movement, twisting or distortion, in the walls
- Carefully examine all internal linings to look for leaks and rot, but do not pull any cladding off unless it is in very poor condition and it is essential to see the extent of damage to the framing underneath
- Overall, look for broken, loose or rusted bits, walls not nailed or bowed. Also look for flaking or blistered paint and determine whether the inside is due to be painted.

If the Inspector is unsure about the condition of the wall structure, but has some concerns about the building's structural integrity "No" should be recorded and a notification (maintenance request type – "special inspection required") created for a special inspection by an Engineer.

Vermin infestation

(Huts and bunkrooms)

The service standard requires huts to be in a condition that would prevent infestations of pests and vermin inside the building. "Vermin" is commonly rats and mice, but may include fleas, bed bugs and other insects. An infestation is where hut users' experience is badly impacted because of such pests. Reading the log book may provide some clues, otherwise look for obvious evidence. Although this is a service standard question for huts, if "yes" is chosen determine a solution and create a notification or notifications under the appropriate components.

Roof structure/ceiling-condition OK

(All equipment)

As with the walls, the roof structure is a critical or "core" component of the hut or building. If there are significant problems with it then the structural integrity of the whole building may be under threat. The following is a guide to what to do.

- Stand back and look at the roof in its entirety before considering the details
- Look for any sign of deflection or movement, including sagging, twisting or distortion in the ceiling
- Carefully examine the ceiling to look for leaks and rot, but do not pull any cladding off unless it is in very poor condition and it is essential to see the extent of damage to the framing underneath
- Overall, look for broken, loose or rusted bits, sagging roof or distorted ceiling. Also look for flaking or blistered paint.

If the Inspector is unsure about the condition of the roof structure, but has some concerns about the building's structural integrity "No" should be recorded and a notification (maintenance request type – "special inspection required") created for a special inspection by an Engineer.

3.15 FIXTURES/JOINERY - INTERIOR

This component covers doors, windows, stairs (including handrails), glass, benches (except cooking benches), bunks (but not mattresses), cupboards, skylights, and vents. For toilets, this component also covers vents and toilet fixtures (seat, bowl, lid etc).

Flyscreens on window(s)

(Huts and bunkrooms)

For Great Walk and Serviced huts flyscreens are required where biting insects are a problem and they should also be provided at Standard huts where biting insects are a problem. Record "Yes" where one or more windows has a flyscreen.

Safety barriers on bunks required (SS)

(Huts only)

Where the most likely sleeping position is alongside the edge of a bunk or sleeping platform and there is a real danger of falling more than a metre, a barrier is required. The barrier must be high enough and long enough to prevent a fall, but should not impede access onto or off the platform or bunk.

Safety barriers on bunks provided (SS)

(Huts only)

If a safety barrier is needed, and there isn't one, record "No". If safety barriers are not needed and none are provided record "Not applicable".

Bunks require mattresses (SS)

(Huts only)

In Basic huts, the service standard states that mattresses shall only be provided where the design of the bunks requires mattresses to enable the bunks to be used (e.g. large gaps between slats). If the bunks can be used with reasonable comfort using a carry mat, without mattresses, record "No". Answer this for all huts.

Sleeping capacity

(Huts only)

If warden's quarters are part of the hut, count sleeping capacity for visitors and wardens separately. Record the sleeping capacity of any sleeping space (platform, bench or floor area with mattresses) as 0.75m width per person. Use a tape measure. Always round down – e.g. a 3.6m wide platform sleeps 4.

Ventilation – condition OK

(Huts and bunkrooms)

Consider the quality of ventilation available to the inside of the hut/building and whether more passive ventilation (e.g. fixed open vents) is required. Create a notification if more is required.

Fixtures/joinery-condition OK

(All equipment)

Look at the condition and function of all items, especially fixing of bunks to walls, ease of closing doors and windows, broken latches and handles and condition of skylights and flyscreens. For toilets, look at the condition and adequacy of the vent, and the condition of the toilet fixtures.

3.16 COOKING

This is cooking appliances, if supplied, including fuel, but excluding piped, permanent LPG installations (any size) and includes cooking benches.

Cookers provided - type (SS)

(Huts only)

Wood/multi-burners and open fireplaces are primarily for heating. Do not record these as cookers. For visitor huts, record type of cookers provided for use of visitors. For warden's quarters, record type of cookers provided for the use of wardens only. Treat cookers that are provided for part of the year only as cookers provided.

Length of cooking bench (m) (SS)

(Huts only)

The service standard has a desirable (but not mandatory) length of cooking bench space per person which varies from category to category. Cooking bench space excludes tables and sinks, but includes space taken up by cookers provided for visitors in the peak season or all year round. If there is no cooking bench, record "0". Record length of cooking bench in any warden's quarters against the warden's quarters. Record to the nearest centimetre (0.01m).

Cookers/cooking bench-condition OK

(Huts only)

Look at the condition and function of cooking appliances and benches. Cooking benches are required to be made of fire resistant materials and hygienic. Consider the quantity and suitability of any fuel. Gas cookers in all huts, including biodiversity huts, are required to be 200mm away from a vertical surface, unless there is a 600mm high non combustible covering on that surface, and have no combustibles within those areas. The cookers must sit on a non combustible surface, which must extend 50mm from the appliance.

It is recognised that many DOC cookers are of a temporary or almost portable nature. To ensure that the legal requirements are met the cooking unit footprint shall be "fixed" in some manner on the bench (for example a plinth in which the unit sits, or rebates for legs, may have to be a permanent fixture together with instructions on how to fit the cooker in place).

If there is no cooking bench or cookers, record "Yes".

3.17 HEATING

Heating consists of heating appliances and open fireplaces, axes, saws and ash buckets, including fuel and any flue or chimney, but excluding piped, permanent LPG installations. It does not include stand-alone wood/fuel sheds (they are separate equipment and require a separate inspection).

Heating provided by type (number) (SS)

(Huts only)

Record the number of each type of heating provided. Record "0" where no heating of that type is provided. If heating is provided separately for wardens only, record the number of each type of heating provided against the warden's quarters. If the heating provided is not an open fire, coal/wood burner or gas heater, record the number of "other heating" provided".

Heating fuel for visitors by type (SS)

(Huts only)

This question records whether heating fuel is supplied, for the whole year or for part of the year, and is recorded for the fuel provided for visitors only. Heating fuel provided for wardens only is not recorded. The service standard requires heating fuel to be provided at Great Walk huts and at Serviced huts during the peak season and in the “off-season” if certain criteria are met.

If fuel other than gas, diesel, electricity, coal or wood is supplied for visitors to use choose "Yes" to “Heating fuel (visitors) - other”.

For a warden’s hut choose “Not applicable” for each type of fuel.

DOC wood cut to right length (SS)

(Huts only)

If wood is not supplied (by DOC or the club/organisation that maintains the hut), choose “Not applicable”. The “right length” fits into the wood burner or fireplace.

Wood collected by visitors (SS)

(Huts only)

Wood collected by visitors usually consists of uncut, dead branches from the surrounding forest/scrub (compared with DOC-supplied wood which is cut to length to fit into the wood burner/fireplace).

Wood stored in a dry area outside (SS)

(Huts only)

"A dry area outside" should be a separate or attached wood shed or enclosed porch, but should not be on a deck or inside the hut.

Heating - number of axes (SS)

Heating – number of saws (SS)

Heating – number of metal ash buckets (SS)

(Huts only)

Record the number of axes, saws and metal ash buckets available for visitors to use at the hut. Although not required by the service standards, metal ash buckets should ideally be labelled with the words “cold ash only”. This is to discourage users from putting hot ash into it and emptying hot ash into places that may potentially flare up into a fire.

Heating-condition OK

(Huts only)

Consider the condition and function of heating appliances (including flues), axes etc, quantity, quality and storage of fuel. For wood/coal burners, check that all moving parts are working correctly. For gas heaters, check that they are operational, that the instructions are clear and that they are free from leaks. A simple test for leaks in gas heaters (eg using soap) should be carried out around joints.

Open fire places are the most likely cause of out of control fires in huts. For open fire places, look carefully at the lintel above and around the fireplace, the hearth below and at the chimney both inside and out, and look for any signs of rust or heat damage. In particular:

- Carefully inspect any combustible material within 200mm of the fireplace to check for any significant charring
- Check the flame/fire barriers inside the chimney for signs of damage, holes or rust (holes in the chimney may allow sparks to ignite vegetation outside)
- Attempt to check the state of the timber underneath the fireplace/hearth area
- Note that sheet metal over timber will probably protect the timber underneath from charring and possible ignition.

If there is no heating, record "Yes".

3.18 LPG

This is piped, permanent LPG installations (any size), from the bottles to the appliance(s). It also includes simple systems with appliances attached directly to bottles. It excludes the appliance operation (cover under cooking or heating or electrical/lighting/radios).

This component and its questions appear only for the hut equipment. Storage sheds do not have a LPG installations component, even though some dangerous goods sheds contain the LPG installations for the hut. It is done this way because the LPG is really part of (a component of) the hut and not the storage shed.

Capacity of LPG at hut (kg)

(Huts only)

Look at every LPG gas bottle at the hut and sum their capacity (quantity of gas the bottle can take assuming the bottle is full). Where there is a separate warden's hut near the visitor hut do not add the bottles there to those at the hut.

Location test certificate OK (not expired)

(Huts only)

A test certificate at a "hazardous substance location" may be required when LPG is stored and is issued under the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001. A location test certificate is required if there is the capacity to store a total of 100 kg or more of LPG at the hut. The certificate is displayed adjacent to the bottles. Check the expiry date and record "Yes" if the licence has not expired. If the hut does not have LPG, or the total storage capacity is less than 100 kg, record "Not applicable".

If the hut requires a certificate and there isn't one, choose "There is no certificate". If this or "No" is chosen, the Inspector needs to create a notification.

LPG - condition OK

(Huts only)

If there is no LPG, record “Yes”.

All huts with LPG cookers and /or heaters will have their permanent LPG installations inspected by a specialist every two years. That inspection will ensure that the LPG installations meet the requirements of the relevant legislation. The ongoing inspection by DOC and re-inspection by Engineer will look for any obvious faults and defects in the way the LPG is stored, the pipes and ventilation in the period between the specialist inspections. Check the expiry date (particularly the small bottles) to confirm that no LPG cylinder has expired.

In the storage building, check whether the gas cylinders are upright and secure and that ventilation is clear. Look at the pipes and check that the valves are operational and free from leaks. Check that the ventilation in the hut around the gas is clear. If there are any faults, record “No” and create a notification.

3.19 HAZARDOUS SUBSTANCES

Hazardous substances include flammable liquids, such as petrol, meths, turps, kerosene and white spirits, solvent borne paint, toxic substances (solid or liquid), sprays, explosives and poisons. It includes the storage of these substances.

Hazardous substances - condition OK

(Huts only)

Check that storage meets requirements of the “Standards for Storage and Disposal of Hazardous Substances” and the SOP – “Storage of Class 3(A) and 3(B) Flammable Liquids in Backcountry Accommodation”, including the presence of the required signs, containment and that the correct amount is stored and in the right place (e.g. not under bunks).

If the Inspector has any concerns about hazardous substances, record “No” and set up a notification for a special inspection, which in this case will be a hazardous goods Inspector. If there is significant concern, the Inspector could move the hazardous substances outside the hut as well as creating a notification

3.20 FIRE SAFETY

This is fire safety equipment, including fire extinguishers, hoses, bucket pumps and smoke alarms. It also includes the presence of soft furnishings, evacuation routes and exits and fire safety signs.

Fire extinguishers – number (SS)

Bucket pumps – number (SS)

Smoke detectors – number (SS)

(Huts only)

These questions are only asked for the hut. If there is a separate bunkroom with fire extinguishers etc record these against the hut equipment. Where there are warden's quarters as part of the hut, record fire safety equipment there against the warden's quarters equipment.

Fire extinguishers OK - not expired (SS)

(Huts only)

All fire extinguishers must have a service label with a date last checked. Fire extinguishers must be checked annually. Record "No" if any fire extinguisher is not OK. Record "Not applicable" if the hut does not have a fire extinguisher.

A fire extinguisher is OK when:

- the annual check has been done (ie. the fire extinguisher has not "expired"),
- the tamper proof trigger seal is unbroken,
- the charge pressure dial is in the green zone,
- the cylinder itself is within 5 years of the date stamp on the day of inspection and
- it is dry powder types A B C or A B E.

Should an extinguisher not measure up on any of these points, it is not OK and should be replaced. You should also note that the minimum extinguisher size generally to be used is 4.5kg, except for smaller huts and staff huts.

Ideally, two sets of fire extinguishers should be held with new fire extinguishers brought in with the Inspector, and the old ones taken out to be checked.

Fire alarm system provided

(Huts only)

Does the hut have a fire alarm system (to warn users that there is a fire) other than smoke detectors.

Means of escape from fire – number

(Huts and bunkrooms)

An accepted means of escape from fire for a hut or a separate bunkroom is a door to the outside or a window. Windows may require steps or platforms on the interior and exterior to assist egress.

Fire Engineer's advice to the Department is that the windows may not always be to the sizes specified in the Building Code. Where possible, an egress window should be at least 950mm high by 750mm wide, but for existing huts, they may be a minimum of 800mm high by 600mm wide. The window is to be designed to stay open without the assistance of the occupants. The bottom of the window is to be no more than 900mm above the floor inside. A maximum height of 1500mm above the ground is permitted on the exterior without a landing and stairs.

Record the numbers of doors and windows in the building that meet these specifications.

Where a warden's quarters is part of the visitor hut building, with no internal door between the two, or an internal door that can be locked, record the means of escape for each "hut" separately.

Fire evacuation notice provided

(Huts and bunkrooms)

This is a notice setting out fire safety advice and the evacuation procedure in the event of a fire. This question is asked for huts and for separate bunkrooms. It is not required for huts with a sleeping capacity less than six, or for warden's huts but answer for all huts.

Soft furnishings provided (SS)

Soft furnishings - fire retardant (SS)

(Huts only)

"Soft furnishings" are curtains, cloth, or vinyl-covered furniture, foam cushions etc. Exclude mattresses.

"Fire retardant" materials are those that would be very slow to light and burn in the event of a fire. If there are no soft furnishings, record "No soft furnishings in hut".

Fire exit signs – number

(Huts and bunkrooms)

Record the number of fire exit signs inside the hut. For huts that include a warden's quarters, count only the fire exit signs within the visitor hut when inspecting the visitor hut, and only those within the warden's hut when inspecting the warden's hut. The Department requires a fire exit sign for every door and window that is an acceptable means of escape.

Fire safety issues/equipment - condition OK

(Huts and bunkrooms)

Check all fire safety equipment - hoses, bucket pumps, smoke alarms, fire alarm system and fire extinguishers. Determine whether they are all OK. Choose "No" if the location of any drying rack may pose a fire risk from items catching alight (i.e. if it is located directly over a heater/wood burner). Choose "No" if ash disposal may cause a fire. Consider also whether windows acting as means of escape from fire are functioning as required.

3.21 ELECTRICAL/LIGHTING/RADIOS

This component covers solar, gas and other lighting (other than candles) and candleholders. It includes non-mains, wired electrical systems, from the power source (e.g. solar panels) to the appliance(s). It includes the appliance if it is lighting, radios or a fridge (including a gas fridge).

Are candleholders provided (SS)

(Huts only)

Candleholders are metal holders for candles. Tin cans and wine bottles are not to be counted as candle holders.

Enough candleholders provided

(Huts only)

The service standard states that where lighting is not provided “adequate” numbers of candleholders shall be supplied. “Enough” candleholders will be a matter of judgement but will be around three for a six to eight bunk hut and around six for a twenty bunk hut. Tin cans and wine bottles are not to be counted as candle holders. As a rule of thumb there should be enough candleholders that hut users are not tempted to place candles on a wooden surface instead. If the answer is “No”, create a notification stating the number of candleholders required. Choose “Not applicable” if no candleholders are provided.

Candleholders meet required standard (SS)

(Huts only)

The "required standard" is one of the three approved designs (fixed or detachable base wall mounted) or other "formal" candleholder (one that keeps the candle flame away from material that burns). Tin cans and wine bottles do not meet the required standard. Choose “Not applicable” if no candleholders are provided.

Lighting provided – type (SS)

(Huts only)

If no lighting is provided (candle holders/candles don't count) choose "None".

Electrical/lighting - condition OK

(Huts only)

Determine the condition of the electrical power source, supply system, lighting itself and fridge. Test to see each is working and check the log book to see if comments have been made about systems not working properly. Check clearances; gas lights are required to have a 450mm clearance above and 125mm all round and gas fridges are required to be 50mm from the wall and have a 300mm clearance above them.

If no electrical system or lighting is provided, record “Not applicable”.

Radios – condition OK

(Huts only)

The question on whether radios are provided for visitors is an office based one (because it is a policy issue). If radios are provided check the condition of non-mains, wired electrical systems, from the power source (eg solar panel or batteries) to the radios. The solar panels need to be clean to function properly. Check the condition of aerials, batteries and the radios themselves. A radio call back to the office is a simple way of checking that the radio is working at the time of the inspection.

If no radios are provided, record “Not applicable”.

3.22 FURNITURE/MOVABLE ITEMS

This component consists of mattresses and miscellaneous small items not covered elsewhere such as movable tables, chairs and benches, cleaning equipment, drying facilities, intentions book, first aid kit and ticket box.

Drying facilities adequate (SS)

(Huts only)

Drying facilities include hooks, nails, drying racks and lines. "Adequate" is where there is enough space for each occupant of the hut to hang up at least a wet parka if the hut is at capacity. Ideally there should also be space to hang some wet clothes inside the hut on hooks or a drying rack.

Sleeping spaces with mattresses (SS)

(Huts only)

This figure is used to determine whether the hut meets the service standard requirements for mattresses. Calculate the number by adding together the number of individual bunks with mattresses and the standard 0.75m per person platform space with mattresses. Count all mattresses regardless of their condition. Do not include bunks and mattresses in warden’s quarters when counting mattresses in the visitor hut.

Number of mattresses meeting fire safety requirements (SS)

A mattress meets the fire safety requirements when it is a fire retardant one that meets the Department's mattress standards. The cover must not be ripped (if it is the mattress does not meet fire safety requirements). Count the number of mattresses meeting fire safety requirements-. Do not include bunks and mattresses in warden’s quarters when counting mattresses in the visitor hut.

Intentions book provided (SS)

(Huts only)

A pen or pencil should be provided also.

Hut ticket box provided

(Huts only)

Hut ticket boxes are required at all Serviced and Standard huts and at any Great Walk hut that becomes a Serviced or Standard hut in the off-season. Answer for all huts.

First aid kit provided (SS)

The service standard for Great Walk and Serviced huts states that first aid kits shall be provided (as a service to visitors) in wardened huts only and are for the warden only to use. They are not to be provided in Standard and Basic huts. Answer this question for all huts.

Broom provided (SS)

Brush and pan provided (SS)

(Hut only)

If one of the brush or pan is absent, record both as being absent.

Cleaning fluids provided (SS)

Cloths provided (SS)

(Huts only)

The service standard requirements for these vary depending on the hut category. If cleaning fluids and cloths are provided in the peak season only record "Yes".

Tables -number of people catered for (SS)

(Huts only)

The service standard for all except Basic huts has guidelines on the capacity of tables inside the hut. Consider inside tables only and, for visitor huts, do not include warden's tables. Do not count cooking benches as tables. Assume 400mm length of table per person and measure the length of each table (in mm). For example, for a hut with one table 1,300mm long take the length of each side and divide by 400. Round down (in this example, the answer for each side is 3.25, which is rounded down to 3). Sum the capacity for the two sides and record this figure (in this example, 6).

If a table has a width of 1,200mm or more, add one more for each side to the capacity for that table. For example, a table 2,400mm long and 1,300mm wide has a capacity of 6 for each of the long sides plus one for each of the short sides; a total of 14. If a table has a width of less than 1,200mm do not count any additional capacity.

Seating (inside) – number catered for (SS)

(Huts only)

The service standard for all except Basic huts has guidelines on the capacity of seating inside the hut. Consider inside seating only and, for visitor huts, do not include warden's seating. Do not treat bottom bunks or bottom sleeping platforms as seating (even though they can be used as such) as they are not furniture.

Assume 400mm per person for forms and fixed benches and count each chair and stool. For forms and fixed bench seating measure the length (in mm) of each to determine capacity and round down to the nearest 400mm. For example a form 1300mm long has a capacity of three. So, a hut with two forms 1300mm long, plus two chairs, has a total seating capacity of 8 (three for each of the forms plus two for the chairs). Record this figure (eg 8).

Furniture/movable items - condition OK

(Huts and toilets)

Consider the condition of furniture, mattresses, drying facilities, intentions book, first aid kit, hut ticket box and cleaning equipment. In particular, look at the condition of the mattresses. For toilets/amenity blocks, consider the condition of any toilet cleaning equipment.

3.23 VISITOR INFORMATION

Visitor information is information provided at the hut for visitors. It includes all notices and most signs inside the hut and any direction signs to toilets. Water warning signs are covered under “Water supply” and fire evacuation notices are covered under “Fire safety”. Cover any sign provided in a toilet/amenity block or bunkroom under the hut equipment.

Direction sign to toilet required (SS)

(Huts only)

Record “Yes” where the toilet may be difficult to find without a direction sign. Record “No” where the toilet can easily be found by someone who has never been to the hut before. Record “Not applicable” only where there is no toilet.

Direction sign to toilet provided (SS)

(Huts only)

Record “Not applicable” only where there is no toilet.

Standard hut notice provided (SS)

(Huts only)

The "standard hut notice" is the old national hut user information notice that covers information on health, safety, sharing huts, environmental care and rubbish or the newer (2008) notice that covers a hut users’ code, “looking after yourself” etc.

Local hut notice provided (SS)

(Huts only)

The "local hut notice" is a hut user information notice that covers local information on the hut and the local area. It may include a map, but does not include interpretation signs.

Carbon monoxide warning sign (SS)

(Huts only)

The service standard requires a sign warning hut users of the dangers of the build up of carbon monoxide when using cookers to be installed in the hut. It should ideally be located above the cooking bench. The new (2008) standard hut notice includes this warning but a separate carbon monoxide warning notice above the cooking bench or in another prominent location **must also** be provided (to reinforce the message).

"No smoking" sign provided (SS)

(Huts only)

A "no smoking" sign is required in Great Walk and Serviced huts and may be provided in Standard huts but not Basic huts. The "No smoking" message is included in the new (2008) standard hut notice. If the hut has one of these notices enter "Yes".

Interpretation signs provided (SS)

(Huts only)

This will usually be one or more panels or signs and may be inside or outside the hut. "Interpretation" aims to educate and explain to users relevant history or biodiversity features of the hut or surrounding area.

Hut name provided on outside (SS)

(Huts only)

This is a sign on the outside of the hut or on the hut door with the hut name on it. The service standard requires it for Great Walk, Serviced and Standard huts, and it should also be provided at Basic huts.

Bednights for last full year

(Huts only)

Read the hut intentions book (if it covers at least the last full year) and record the total bednights for that year from today. Do not include DOC staff using the warden's quarters, but count them if they are using the visitor part of the hut. Do not adjust the figure to take account of people not using the intentions book.

If bednight data is collected in some other way, for example through wardens or by intentions book analysis back in the office, do not record a number or change the number. Do not record or change the number if the hut book covers less than a full year. Instead move to the next question.

The reason for collecting bednights data is that for some huts the ongoing inspection represents the best opportunity to collect such data in the field. Note: The figure collected here will be stored in the Measuring points field for the hut in AMIS.

Visitor information - condition OK

(Huts and toilets)

Look at the accuracy, adequacy and condition of visitor information provided at the hut/toilet. Look for dated, out-of-season or incorrect information plus information in the wrong place. Also look at where visitor information, if provided, would improve the visitors' experience.

3.24 NATURAL HAZARDS

"Natural hazards" are defined as geological or avalanche hazards potentially affecting the hut, the hut site used by people and the hut's associated buildings. Cover tree-fall, weeds and dangerous plants under "Vegetation". Cover natural hazards potentially affecting any of the hut's associated buildings under the hut equipment.

Natural hazards – condition OK

(Huts only)

The service standard states that the hut and toilet should be sited in a location where there is a "very low probability" (for Great Walk and Serviced huts) or a "low probability" (for Standard and Basic huts) of it sustaining serious damage or being destroyed due to natural hazards such as slips, rock fall, avalanche and flooding.

Inspectors are not expected to be experts in natural hazard assessments. The main objective in this part of the inspection is to try and determine whether there have been any obvious changes since the last inspection that may have increased the potential risk to the hut, toilet or hut site from natural hazards. The Inspector (or Engineer for a re-inspection by Engineer) will be looking for any evidence of, or greater potential for, erosion, collapse, rock fall, avalanche or flooding. In particular, the Inspector must look for changes in streams, rivers, slopes or slips that might be a potential hazard to the hut, toilet or hut site.

The starting point in the inspection of natural hazards is back in the office reading the existing natural hazards information for the hut in AMIS (i.e. the data from the Hazard assessment screen, the geological hazard desk-top assessment, the avalanche hazard desk-top assessment for some huts, any completed geological or avalanche hazard report and any photographs in AMIS of hazards taken from previous inspections and assessments). The Inspector should read these before the inspection to determine the key things to look for. The other source of potential information is the hut intentions book. The Inspector should scan it to look for any comments referring to natural events in the period since the last inspection.

The Inspector should carry out a brief visual inspection of the area that could potentially impact on the hut site, concentrating on the key factors identified in the current hazards information above. The following is a guide to what to look for:

- Erosion/collapse below or near hut/building – look for signs of cracking or slumping on steep slopes below or near the site and the proximity of the hut and toilets to the edge
- Landslide/slip above and onto the site – look for signs of cracking, slumping or slipping above the site and on a path that would take any larger slip onto the site
- Rock fall onto the site – look for evidence of recent rock fall onto or close to the site
- Debris flow or flooding – look for signs of recent flooding at or near the site (branches and other water borne debris and high water marks). Look also at any damming or blockage of potentially flashy side streams and rivers above the site or upstream.
- Seich hazard (potential for flooding due to rock fall or landslide into a lake beside the hut) – look for signs of recent rock fall or slips
- Avalanche – look for evidence of recent avalanches above or close to the site that, if larger, may threaten the site. In particular, look for rock and vegetation debris and vegetation damage.

If there are any signs of increasing threat to the hut, toilet or hut site from natural hazards, and the Inspector believes further advice is required, record "No" and create a notification to get the relevant hazard expert to inspect it. If there is any evidence of change in the "condition" of natural hazards, either from intentions book comments or evidence from the site inspection, the Inspector should record "No" and create a notification to monitor or note the changes observed. The Inspector should describe the changes observed on the datalogger for that notification and assign it the relevant notification priority. Photographs should be taken to illustrate the things that have been observed. The Operations Manager (or Asset Planner) must update the Hazard assessment screen for the hut whenever any tasks on Natural Hazards arise from an inspection.

FINAL INSPECTION QUESTIONS

3.25 BUILT PERIOD/BUILT DATE

Estimated built period/Known built date

(Sheds only)

For sheds, if "known built date" is not highlighted, estimate from the pick list provided the likely period during which the shed was built based on its condition. If you know the date the shed was built record that in "known built date".

3.26 ESTIMATED REMAINING LIFE

The estimated remaining life is an estimate of how long the hut, shed, bunkroom, toilet or amenity block will last before it becomes uneconomic to maintain it in a weatherproof state and in a reasonable state of repair. It is used to calculate the retirement date for the building in AMIS. It may also be used to calculate the depreciated value of the building in order to ensure that funding will be available at the time of replacement.

Calculating estimated remaining life

The estimated remaining life for huts and associated buildings is calculated as a percentage of life remaining in the building. The same process is used for structures.

The estimated remaining life cannot be updated in the AMIS database, but only on the datalogger through the field inspection.

Who can change estimated remaining life

Only Engineers can change estimated remaining life for the huts (and their associated buildings) that are inspected in a "Re-inspection by Engineer" inspection. These are: all Great Walk huts, Serviced-Alpine huts, Serviced huts with total sleeping capacity >25 and all huts with an altitude >1100m. These huts are regarded as "high risk" huts. The estimated remaining life question appears on the datalogger when DOC staff inspect these huts, and should be answered, but any change they make does not override the Engineer's assessment when the datalogger is synchronised. Inspectors (DOC staff) are required to update estimated remaining life for all huts (and their associated buildings) during the ongoing inspection.

If the last inspection was a year before, then it is generally unlikely that there would be much change in the remaining life unless there had been significant maintenance done on it in that period. If the last inspection was four years before, or the hut had been subject to a significant natural event, major maintenance or serious vandalism since the last inspection, then a change in the remaining life is more likely.

Economic Lives

The standard economic lives of the buildings to be inspected are:

- Huts (all categories) – 50 years
- Bunkrooms – 50 years
- Toilets – 20 years
- Amenity units/blocks – 35 years
- Sheds (all sorts) – 35 years

Guidelines for estimating remaining life

When determining the estimated remaining life for a hut or associated building, Inspectors should consider the following:

- The events and length of time since the last inspection
- The estimated remaining life *shall* be based on a visual and "hands-on" assessment of the condition of the building at the time of inspection.
- The estimated remaining life *shall* be based on the assumption that undertaking normal repairs and maintenance and compliance with service standard requirements will not affect its remaining life.
- The condition of the *core* and *secondary* components.

The built date and age of the hut, and of any major upgrade work, and whether it is an actively managed historic hut, while of some relevance, should not greatly influence determining remaining life. This is because the focus should be on the building's condition.

Using the building components to estimate remaining life

The condition of the building's *"core components"* generally determines its remaining life. These components tend to be difficult (and therefore costly) to replace or upgrade without rebuilding or replacing the whole building.

The building's *"secondary components"* are those that can be replaced or partially replaced during the normal life of a hut, toilet or shed. If the condition of many of the building's secondary components such as internal and external cladding and floor are in poor condition, it may be more cost efficient to replace the whole building even though the core components are sound.

The core components for buildings, those that are critical to its structural stability are:

- Foundations and sub-floor framing (i.e. the "sub-structure")
- Walls and roof framing (i.e. the "super-structure")

In addition, for toilets:

- The underground sewerage system (containment tanks, pipes and dispersal fields)

The secondary components for buildings are:

- Tie-downs and anchors
- Exterior claddings, including roof cladding
- Internal linings
- Flooring, decks, steps
- Doors, windows, stairs, bunks and other fixtures

Selecting estimated remaining life

	Equivalent in Years		
Components Condition - % of remaining life	Indicative remaining life for toilets based on a 20 year life span from today	Indicative remaining life for amenity blocks and sheds based on a 35 year life span from today	Indicative remaining life for huts and bunkrooms based on a 50 year life span from today
Replace now – 0% remaining life	0 years	0 years	0 years
Very poor condition – 2% remaining life	0.4 years	0.7 years	1 year
Poor condition – 10% remaining life	2 years	3.5 years	5 years
Deteriorating – 20% remaining life	4 years	7 years	10 years

Reasonable condition – 40% remaining life	8 years	14 years	20 years
Good condition – 70% remaining life	14 years	24.5 years	35 years
New condition – 100% remaining life	20 years	35 years	50 years

Use the following statements as a guide to estimate the remaining life for buildings.

Replace now – 0% remaining life

The building is dilapidated and beyond repair and should be closed and removed.

Very poor condition – 2% remaining life

The building materials are extremely weathered due to exposure to the environment, use and a lack of reasonable maintenance over the latter years and could be considered in a very poor condition. The building will not be weatherproof any more and the core components will be clearly affected by this. The building should be removed.

Poor condition – 10% remaining life

The building materials are very weathered due to exposure to the environment and use and could be considered in a "poor" condition. The building will generally not be very weatherproof any more and the core components will be affected by this. In addition:

- Evidence of previous repairs and modifications can be seen and will be increasingly to a temporary standard.
- The roofing is dented and misshapen from being walked on over the years, particularly at the lower ends, and roof fixings either lifted or missing. Roof flashings (barge and ridge capping) are also dented and nails lifting where attached to barge boards and roofing.
- Guttering on the shady side of building is stained with black mould, sagging in places or falling off.
- Exterior claddings are dented or "popped out" and rusty if made of metal. Unpainted timbers are greying and have a scoured appearance (exposure to sun), timber joins and "mitre" cuts have opened up and are splitting at the ends or loose. Lower edge of cladding is rusting and has holes in it or if timber has green/blackish mould on it and is rotting.
- The foundation piles also have blackish mould on them, are water leached and soft in places if poked with a screwdriver. Under the building may have a musty smell to it indicating a build up of ground moisture.
- Window and door latches are loose, rattle, may have temporary repairs done or are missing. The lower window jambs clearly display, or are wet through condensation and are rotting on the outside. The lower door jamb has eroded through use over the years and may even be missing.
- Interior walls and ceilings are in poor condition, and may be buckling, and previous paint jobs and smoke discolouration over the years can be seen. Evidence of moisture getting in can be clearly seen in either the ceilings or wall linings through swelling.

- Cuts, dents and graffiti may be either carved in or burnt on and can be seen on bunks and other fixtures.
- Fixings (nails, bolts and brackets) are very weathered, rusty, discoloured or simply missing.

Deteriorating – 20% remaining life

The building materials are clearly weathered due to exposure to the environment and use although could still be considered in an "OK" condition. In addition:

- Evidence of previous repairs and modifications can be seen and are possibly not "finished" to a reasonable standard.
- The roofing is dented and misshapen from being walked on over the years, particularly at the lower ends. Roof flashings (barge and ridge capping) are also dented and nails lifting where attached to barge boards and roofing.
- Guttering on the shady side of building may be stained with black mould, sagging in places and needs repairs.
- Exterior claddings are dented or "popped out" if made of metal, unpainted timbers are greying and have a scoured appearance (exposure to sun), timber joins and "mitre" cuts have opened up and may be splitting at the ends. Lower edge of cladding is clearly rusting or if timber has green/blackish mould on it and is getting soft.
- The foundation piles also have blackish mould on them, have evidence of water leaching and may also be getting soft if poked with a screwdriver. Under the building may have a musty smell to it indicating a build up of ground moisture.
- Window and door latches may be loose, rattle and have temporary repairs done. The lower window jambs clearly display, or are wet through condensation. The lower door jamb is eroding through use over the years and may leave a gap under the door.
- Interior walls and ceilings are in an "OK" condition although previous paint jobs and smoke discolouration over the years can be clearly seen and there may be some evidence of moisture getting in.
- Cuts, dents and graffiti may be either carved in or burnt on and can be seen on bunks and other fixtures.
- Fixings (nails, bolts and brackets) are weathered and have rust and discolouration on them.

Reasonable condition – 40% remaining life

The building materials are generally looking weathered due to exposure to the environment and use although could still be considered in a "sound" condition. In addition:

- Evidence of previous repairs and modifications can generally be seen.
- The roofing is dented and has a slightly misshapen appearance from being walked on over the years. Roof flashings (barge and ridge capping) may be dented and nails may be lifting where attached to barge board.
- Guttering on the shady side of building may be stained with black mould and sagging in places.

- Exterior claddings may be dented or "popped out" if made of metal, unpainted timbers greying (exposure to sun), timber joins and "mitre" cuts may be opening up. Lower edge of cladding starting to rust or if timber has green/blackish mould on it.
- The foundation piles also have blackish mould on them and signs of water leaching. Under the building may have a slightly "musty" smell to it indicating a slight build up of ground moisture.
- Window and door latches may be loose and rattle. The lower window jambs display signs of being wet through condensation. The lower door jamb has some eroding through use over the years.
- Interior walls and ceilings are still in reasonable condition although previous paint jobs and smoke discolouration over the years can be clearly seen. There is little sign of moisture getting in.
- Cuts, dents and possibly graffiti may be either carved in or burnt on and may be seen on bunks and other fixtures.
- Fixings (nails, bolts and brackets) will be slightly weathered and discoloured.

Good condition – 70% remaining life

The whole building no longer looks new but is still in a very sound condition. In addition:

- There is little or no evidence of repairs or modifications.
- Roofing and flashings still retain their original shape and are well secured (eg. no fixings lifting).
- Guttering on the shady side has only some black mould on it and is not sagging.
- Exterior claddings retain their original shape and timber joins and "mitre" cuts are still tight. The lower edge of cladding and foundation piles may show some signs of green/blackish mould.
- Under the building has a "fresh" smell to it indicating little sign of ground moisture building up.
- Window and door latches are tight and do not rattle.
- Interior walls and ceilings are still in good condition and though there may be some smoke discolouration, there is no sign of moisture getting in.
- Bunks and other fixtures may have some cuts, dents and possibly graffiti.
- Fixings (nails, bolts and brackets) are still their original colour.

New condition – 100% remaining life

All of the components are new or in “near new” condition.

3.27 EQUIPMENT STATUS AND GRID REFERENCE

Grid Reference

A correct grid reference is essential for a hut and all its sub-equipment. The Inspector must use a GPS and either:

- Confirm and accept the grid reference displayed (if there is one); or
- Record a GPS grid reference (if there isn't one); or
- Enter a six digit manual grid reference from a 1:50,000 topo map if a GPS reading is not possible

Equipment Status

The status of a hut, toilet, bunkroom or shed must be confirmed or changed at the end of the inspection.

The status assigned to a hut or its sub-equipment represents its condition and usability at the completion of the field inspection. The key to determining whether the building status should be open or closed is the priority associated with any notifications created or existing at the end of the inspection (see section 3.4).

Inspectors should give the building an **Open** status when;

- there are no defects found or only *routine* work is required on it
- a *serious* notification or notifications have been created but the Inspector believes that the risks to visitors or the building can be better managed by keeping the building (or most of it) open than by closing it

Inspectors should give the building a **Closed** status when:

- a *critical* notification has been created
- work requiring a building consent has commenced, is not yet completed and no code compliance certificate has been issued

Examples of situations where Closed status should be considered are;

- You find large cracks between the walls and ceiling that indicate the superstructure could collapse
- You find a large tree has leaned over and is now threatening the building or part of it
- You find a recent flood has undermined the foundations and the hut could subside or collapse

Closed status is a temporary status. A hut or associated building should not be closed for more than the time necessary to get an inspection undertaken by a specialist or Engineer (if required) and the problem fixed or a permanent solution found. A permanent solution will generally be:

- Remove the building
- Shift the building
- Fix the building
- Remove the hazard (e.g. tree)

To change the status, escape out of the inspection, change the status, save the change, then start the inspection again.

3.28 INSPECTION END ADVISORY/CONFIRM COMPLETION

When the inspection is completed, a final screen will appear, "Inspection end (advisory)". Any comments from an advisory at the start of the inspection can be viewed or added to here. Add any comments to an existing advisory, or create a new advisory, to record any major changes or events affecting the hut like significant hazards that need monitoring or anything else that has not been covered in a notification but is important enough to highlight.

Finally, after completing the last sub-equipment inspection, choose "Confirm complete" to complete the work order for the inspection and record the time the inspection has taken (excluding transport) to the nearest hour. **If the Update in Office task appears in the "Confirm Order" screen, it is important that this task is "un-ticked" so that the ongoing inspection task only is confirmed as complete.**

3.29 CLOSING A HUT IN THE FIELD

If the Inspector determines that a notification on a hut or associated building is critical and the building should be closed, the Inspector must take the following actions before leaving the site to ensure that the public knows that the building is closed and why:

- Attach "structure closed" tape to as much of the building as possible at eye level, ensuring that all doors are covered
- Make up a temporary sign from the most durable material available (e.g. detach a sign from inside the hut and use the back) with a dated brief explanation for the hut being closed and attach to the main door. Examples are: "Hut inspection on 12 September 2005 has found several large cracks in walls and ceiling. Hut closed until Engineer can inspect". "Hut foundations severely undermined and building could collapse. Closed until further notice - DOC - 12 September 2005".
- Do not attempt to prevent entry to the building by boarding up windows or nailing boards across the door. It is not possible to physically stop people getting into a closed hut in a remote location and in some cases (eg severe weather) the risk to visitors staying in the hut may be less than them being exposed to the weather without shelter.

4. Post - Inspection Actions

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Undertake post inspection actions.	Inspector/ Operations Manager	These actions ensure an inspection is "completed" correctly in AMIS

When back in the office from a field inspection, the Inspector must complete the following:

- Advise the Operations Manager of any critical or serious notifications identified during the inspection
- Complete a datalogger synchronisation to update the AMIS database
- Arrange for any changes to sub-equipment to be made in AMIS (if required) and once inspection tasks for those buildings have automatically appeared, enter the inspection of those buildings from the paper form into the datalogger. Complete a datalogger synchronisation.
- Process any photos and sketches taken during the inspection and link these to the correct equipment in AMIS. Photos and sketches of sub-equipment should be attached to that equipment (and not the hut). All photos must be given a caption that will clearly identify the subject when viewed in AMIS.

What Happens Next

- Any notifications with priority assessments of critical or serious are automatically emailed by AMIS to the Operations Manager for action. Hut characteristic data for the huts inspected will be updated in AMIS
- Hut service standard results (pass/fail) will appear in the relevant tabs for the hut. The Asset Planner reviews all of the "fails" to determine what work needs to be done to bring the hut to standard.
- All notifications dealing with equipment condition set up during the hut inspections will appear in AMIS. The Asset Planner (with help from the Inspector where interpretation of notifications is required) must review all these notifications, and the service standard results above.
- If work is planned, the Asset Planner creates work orders and schedules the work as resources allow.
- The Operations Manager or Asset Planner updates the hazards data for huts that have been inspected if required.

Club/Community maintained huts

For all huts that are open to the public and owned or maintained by clubs and other organisations, following the inspections and datalogger synchronisation the Operations Manager/ Conservation Partnerships Manager should send a summary of the work required, together with photos taken during the inspection, to the representative of the club or organisation. This should be done within a month of the inspection task being completed.

The club should be asked to complete the tasks within the same timeframes that would be required if DOC was doing the work, and advise the Operations Manager.

5. Update Attributes - Office Task

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Keep information on huts and associated buildings up to date in AMIS	Operations Manager	These actions are necessary to keep AMIS up to date, inform performance reporting and ensure accurate information is used in inspections

5.1 ACCOUNTABILITIES AND RATIONALE

The field inspection cannot determine whether a visitor hut meets all the requirements of the hut service standards. Some requirements can only be reviewed in the office in AMIS. These requirements must be checked at the same frequency as the ongoing inspection in the field (see section 1.5). Operations Managers are accountable for ensuring the Update Attributes – Office task is completed for all visitor huts within the required timeframes (but may ask to have an Asset Planner to actually do the work in AMIS).

AMIS creates a single work order for a hut inspection with two operations: ongoing inspection and "update in office". The inspection plan for the hut will automatically create the next inspection work order only when both of the operations (ongoing inspection and update in office) in the previous work order are confirmed as completed. To confirm completion of the update in office task in AMIS, display the work orders for the hut that are not completed and confirm the update in office task as complete.

Note that this "inspection" is required for visitor huts only. It will not appear in AMIS for warden's quarters or biodiversity huts.

5.2 ATTRIBUTES TO BE UPDATED

The following characteristics (attributes) are to be checked before the due date and updated (if required) for every hut with a work order for update in office. Go to the relevant Attributes screens for the hut and make any changes required there. When finished, confirm completion of the work order.

Hut colour – meets standard (SS)

The service standard describes “appropriate" as bright coloured walls/roof when the hut needs to be seen in marginal conditions; if it does not need to be seen from afar, a colour that blends in.

Food sales meets standard

The hut service standards state, “There shall be no sale of food or other products from the hut”. This applies to all visitor huts. The hut meets the standard if there are no such sales from the hut at any time during the year. In this case, record “Yes”.

Crowding – meets standard

The hut service standards state, “During the peak season, if the hut capacity is exceeded by 10% or more over 10% of the season, management shall take action to prevent this happening the next season.” This applies to all visitor huts. If the hut’s visitor sleeping capacity is exceeded by 10% or more over 10% of the peak season, the hut does not meet the service standard at that point in time and “No” should be recorded. If capacity is not exceeded, the hut meets the standard and “Yes” should be recorded.

Wardens provided

The hut service standards require wardens to be provided at Great Walk huts during the peak season and at Serviced huts during the peak season (but only where revenue exceeds costs). Wardens are not to be provided at Standard and Basic huts. If the hut has had a warden (which includes staff carrying out warden’s duties) at any stage during the year record “Yes”.

Wardens – meets standard

A *Great Walk* hut will meet the standard when a warden is provided during the peak season at one or more huts on the Great Walk. If this is the case, record “Yes”.

A *Serviced* hut will meet the standard when a warden is provided during the peak season at one or more huts on the track, but only where the revenue gained from increased fee compliance is greater than the full cost of providing the warden and running any warden’s quarters. To determine whether a Serviced hut meets this standard you will need revenue and cost figures for the last financial year for the hut or network of huts on the track. The hut’s share of revenue and cost is calculated from those figures.

If wardens are not provided at a Serviced hut, or if wardens are provided and revenue exceeds cost, record “Yes”. If wardens are provided and revenue does not exceed cost, record “No”.

A *Serviced-Alpine* hut with wardens provided will meet the standard (the service standard states that wardens should not be provided for these huts, but “not having wardens” is not mandatory).

A *Standard* or *Basic* hut will meet the standard only if wardens are not provided.

Cleaning (hut/toilets) - meets standard

A *Great Walk* hut will meet the service standards when the hut and toilets are cleaned daily by wardens or staff during the peak season. If this is the case, record "Yes".

A *Serviced* hut (on a Backcountry Comfort Seeker site) will meet the standard when the hut and toilet have been cleaned during the last peak season in line with the formula. The formula is that cleaning shall be carried out when the number of bednights since the last time they were cleaned totals the hut capacity x five. For example, for a 20 bunk hut, cleaning shall be carried out every 100 bednights.

A *Serviced* hut (on a Backcountry Adventurer site) will meet the standard if the hut and toilets are cleaned at least twice a year.

A *Serviced-Alpine* hut must be cleaned at least once a year.

Standard and *Basic* huts require spring-cleaning only (see below) so for these huts, choose "Not applicable".

Spring cleaning meets standard

The hut service standards require all huts, except Basic huts, to be spring-cleaned once a year. Basic huts are to be spring-cleaned once every two years, except huts on minimal maintenance, which are to be spring-cleaned at least every four years.

Radios provided

The hut service standards allow radios to be provided in some categories of hut. They are to be used by wardens to provide a service to visitors or, where is there is no warden, for visitors to use. Where radios are provided in this way record "Yes". Where radios are provided only for staff or wardens to use but not to provide any service to visitors, record "No".

Radio provision - meets standard

A *Great Walk* hut will meet the service standards when no radios are provided as a service to visitors or when radios are provided for use by wardens to provide visitors with weather forecasts and communication with emergency services. If either situation is the case, record "Yes".

A *Serviced hut* will meet the standard when no radios are provided as a service to visitors or when radios are provided for use by wardens to provide visitors with weather forecasts and communication with emergency services. If either situation is the case, record "Yes". The standard is also met when wardens are not present and radios are provided for visitors to use in an emergency, but only where the criteria set out on page 18 of the hut service standards relating to bednights, serious accidents or location near flood prone rivers are met.

A *Serviced-Alpine* hut will meet the standard if radios are provided as a service to visitors or if no radios are provided. If either situation is the case, record "Yes".

A *Standard* hut will meet the standard if no radios are provided or if radios are provided for hut users to operate and it is a hut in an alpine location and the criteria set out on page 25 of the hut service standards relating to bednights and serious accidents are met. If either situation is the case, record "Yes".

A *Basic* hut will meet the standard only if no radios are provided.

Toilet paper provided

If toilet paper has been provided at the hut at any time during the last year record "Yes".

Fire evacuation scheme or exemption applied for

Applications to the NZ Fire Service for exemptions to the requirement for evacuation schemes for 6 to 10 bunk huts have been made for almost all these huts and may also be required for bigger huts in the future. Large and complex huts may require an approved evacuation scheme. When an application for an exemption is made for a hut, or an application for approval of an evacuation scheme, record the date the application was made here.

Note: When a fire evacuation scheme exemption or scheme approval has been received from the NZ Fire Service, scan the document and create a link in AMIS for the hut and create the relevant certificate notification to record the details.

6. Ongoing Management of Data in AMIS

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Keep information on huts and associated buildings up to date in AMIS	Regional Planning Manager	These actions are necessary to keep AMIS up to date, inform performance reporting and ensure accurate information is used in inspections

Updating hut attributes once work completed

When service standard work is completed on the hut and its associated buildings so that it will meet the hut service standards, and the relevant work order has been confirmed as complete, AMIS will still be indicating that the hut is not to standard (failing). It will remain this way until the hut is inspected again or the attributes are updated in AMIS.

The Asset Planner must go into the Attributes tabs for the hut and update the characteristics (attributes) to reflect the service standard work now done. Only by doing this will the relevant hut service standard results change and the hut be to standard.

For example, if the ongoing inspection found that a water warning sign was not provided, when the datalogger is synchronised the attribute "Water warning sign provided" in AMIS will show "No". When the relevant sign has been put up in the hut, and the work order containing that task completed, the Asset Planner then needs to go to the relevant Attributes tab for the hut and change "Water warning sign provided" to Yes.

Note: An attribute must be changed only when the service standard task has been completed in the field and the work order completed on the datalogger.

Managing replacement dates

The replacement date (on the Equipment life tab for each equipment) should be used to plan and model the replacement of huts and their associated buildings based on their condition, current and expected use and current size. The replacement date should be the year in which the building should ideally be replaced. It has no bearing on the retirement date for the building or on financial information such as depreciation.

Hut upgrades/extensions

Where a major upgrade of a hut is being carried out that involves a change to the floor area and/or a change to the sleeping capacity, information must be recorded in AMIS. The process is similar to that used in an Engineer's baseline inspection, but the responsibility for getting the information into AMIS is the Conservation Service Manager's.

As the hut building project proceeds relevant documents should be added to the Asset As Built Details folder in Docdm and linked to AMIS for the hut, either as a document reference or scanned in. These will include consents and may include site information and site plans.

Once the building work is complete, the sleeping capacity must be changed in AMIS (if it has changed) and the following must be obtained by the Operations Manager and the documents scanned into the Asset As Built Details category for the hut.

- building consent and any other consents
- code compliance certificate
- the most important plans and documents from the construction issue set, particularly site plan, floor plan, elevations, cross-sections
- copies of practical completion and maintenance certificates
- contractor guarantees and producer statement

Out in the field the following photographs must be taken and then added to the Asset As Built Details category in AMIS. The Regional Planning Manager is accountable for this (but may get an Asset Planner to actually do the work in AMIS)

- ground perspective view of front of hut (if changed)
- each elevation (if changed)
- two opposing internal views of the living area (if changed)
- one internal view of any separate room (if changed)

Both the photographs and the documents above must be linked to the hut equipment in AMIS as soon as possible after the hut is re-opened.

AMIS report – huts thirdly report

Information from the inspections of huts and their sub-equipment is used to determine whether the hut is "to standard" at any point in time. The thirdly report in AMIS will determine that a visitor hut is not to standard if it:

- has not had a Baseline Inspection by Engineer; or
- has work arising from the Baseline Inspection by Engineer that is outstanding (ie has a notification that has not been completed); or
- has not had a hut service standard assessment completed (i.e. has a number of hut service standard characteristics (attributes) with no answer, resulting in "fails" in the "key performance maintenance" tab); or

- has the status Closed; or
- has, or any of its sub-equipment has Critical or Serious notifications that are outstanding (ie has a work order that is not complete); or
- has, or any of its sub-equipment has an Ongoing Inspection by DOC, Re-inspection by Engineer, Update Attributes in Office or Inspection by Specialist (for checking LPG) task that is outstanding (beyond the finish date); or
- has a "fail" against one or more service standard results in the "key performance maintenance" tab. It will be failing because the relevant service standard characteristic (attribute) either has no answer, or has an answer that means the service standard isn't being met. It will continue to fail until the work to bring it to the service standard is done, the relevant work order is completed and the characteristic (attribute) changed in AMIS to reflect that.

Note: Around half of the service standard tasks are regarded as "key" aspects of the service standard and must not fail for the hut to be to standard for performance reporting. The remainder, those in the "general maintenance" tab, are required to be done for the hut to be to standard, but are not used in performance reporting. These are:

- minor aspects of the service standards (e.g. cloths and brooms)
- tasks that do not have to be carried out immediately (e.g. replace open fires with woodburners)
- not mandatory for all huts of that category (e.g. provision of axes) or
- derived from "should" or "may" statements in the service standards (e.g. length of cooking bench).

There are clearly a large number of factors that are considered in AMIS to determine whether a hut is to standard for the purposes of performance reporting. Ensuring that all inspections are up to date is critical, as is the completion of hut service standard work. Keeping huts to standard will take careful planning with particular attention needing to be paid to ensuring data is up to date in AMIS.

AMIS report – hut service standard report

This report contains the same information as the thirdly report, but in more detail.

7. Training/Inspector Requirements

Requirement	Who is accountable for carrying it out	Why?/ Consequence
Ensure that Inspectors are trained and approved by a Visitor and Historic Assets Programme trainer.	Director, Operations Planning Planning/ Regional Planning Manager	Hut inspection requires specialist training (eg inspecting LPG and fire safety equipment). Only trained Inspectors can inspect huts.

For full details of the hut inspection training requirements, refer to docdm-376274.

8. Appendices

8.1 FIELD EQUIPMENT LIST

Inspection equipment for all inspections

- Datalogger
- Datalogger pouch
- GPS unit
- Spare batteries for datalogger and GPS
- 1:50,000 maps
- 8 m steel tape measure
- Camera or digital, spare films and batteries
- Replacement asset number tags
- Structure closed tape
- Calculator
- Torch

Tools and materials for all inspections

- Hammer
- Selection of nails and screws
- Screwdrivers (including one long for probing)
- Folding pruning saw
- Adjustable spanner
- Fencing pliers
- Roll of plastic (for broken windows)
- Loppers
- Hut cleaning gear
- Replacement notices (water warning, carbon monoxide, no smoking etc)
- Replacement fire extinguishers (for huts that have them)
- File for sharpening axe (or replacement axe)
- Soapy water spray (for checking LPG leaks)

Extra equipment required for baseline inspections

- Grid paper for drawing floor and cross-section plans and pencils

- 150mm ruler and scale ruler
- Spirit level

8.2 HUT INSPECTION QUESTIONS

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
"Pre-inspection" information	Sub-equipment (view)		
	Retag number (Change existing tag #)		
	Advisory note (view)		
Visitor Impacts /Environment	Rubbish management meets std	Yes	
	Wasps present around hut	Yes	
	Meat safe/dog kennel - too close	Yes	
	On or below bushline/scrubline	Yes	
	Reliable supply of dead wood	Yes	
	Risk live vegetation will be cut	Yes	
	Building environment - condition OK		Yes
	Sink needed to protect water	Yes	
	Toilets provided		
	Toilets-distance from hut	Yes	
	Track to toilet – condition OK		Yes
	Evidence of toilet waste	Yes	
	No toilet – potential water pollution	Yes	
Waste Management /Sewerage	Toilets smell OK		
	Number of toilet pans	Yes	
	Toilets all have seats and lids	Yes	
	All toilets have a door	Yes	
	Pit or vaulted toilets vented	Yes	
	Grease traps – number		
	Waste water management condition OK		Yes
Vegetation	Vegetation clearance - condition OK		Yes
	Tree fall hazard condition OK		Yes
Foundations/sub-floor/tie-downs	Tie-downs or anchors present		
	Foundations/tiedowns – condition OK		Yes
Exterior Claddings (including roof)	Exterior cladding – condition OK		Yes
Water Supply	Showers provided	Yes	
	Personal washing area provided	Yes	
	Water supply - source	Yes	

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
	Water body type		
	Water supply - water clean	Yes	
	Water body - distance from hut	Yes	
	Water warning sign provided	Yes	
	Sinks (dishwashing) - number	Yes	
	Sinks (handwashing) - number	Yes	
	Water supply - condition OK		Yes
Flooring/Decking	Verandah and/or deck present	Yes	
	Flooring/decking - condition OK		Yes
Walls/roof/ linings - Internal	Building weatherproof		
	Walls/linings – condition OK		Yes
	Vermin infestation		
	Roof structure/ceiling - condition OK		Yes
Fixtures/joinery – Interior	Flyscreens on windows		
	Safety barriers on bunks required	Yes	
	Safety barriers on bunks provided	Yes	
	Bunks require mattresses	Yes	
	Sleeping capacity		
	Ventilation – condition OK		Yes
	Fixtures/joinery – condition OK		Yes
Cooking	Cookers provided	Yes	
	Length of cooking bench	Yes	
	Cookers/bench - condition OK		Yes
Heating	Heating provided - type (number)	Yes	
	Heating fuel (visitors) by type	Yes	
	DOC wood cut to right length	Yes	
	Wood collected by visitors	Yes	
	Wood stored - dry place outside	Yes	
	Heating – number of axes	Yes	
	Heating – number of saws	Yes	
	Heating - metal ash buckets	Yes	
	Heating condition OK		Yes
LPG	Capacity of LPG (kg)		
	Location test certificate OK - not expired		
	LPG installations condition OK		Yes
Hazardous Substances	Hazardous substances – condition OK		Yes
Fire Safety	Fire extinguishers - number	Yes	
	Bucket pumps - number	Yes	

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
	Smoke detectors - number	Yes	
	Fire extinguishers OK - not expired	Yes	
	Fire alarm system provided		
	Means of escape from fire - number		
	Fire evacuation notice provided		
	Soft furnishings provided	Yes	
	Soft furnishings – fire retardant	Yes	
	Number of fire exit signs		
	Fire safety - condition OK		Yes

Electrical/ Lighting/Radios	Candleholders provided	Yes	
	Enough candleholders provided		
	Candleholders meet standard	Yes	
	Lighting provided - type	Yes	
	Electrical/lighting – condition OK		Yes
	Radios – condition OK		Yes

Furniture/ Movable Items	Drying facilities adequate	Yes	
	Sleeping spaces with mattresses	Yes	
	Number of mattresses meeting fire safety	Yes	
	Intentions book provided	Yes	
	Hut ticket box provided		
	First aid kit provided	Yes	
	Broom provided	Yes	
	Brush and pan provided	Yes	
	Cleaning fluids provided	Yes	
	Cloths provided	Yes	
	Tables –number of people catered for	Yes	
	Seating inside –number catered for	Yes	
	Furniture/movable items – condition OK		Yes

Visitor Information	Direction sign to toilet required	Yes	
	Direction sign to toilet provided	Yes	
	Standard hut notice provided	Yes	
	Local hut notice provided	Yes	
	Carbon monoxide warning sign	Yes	
	“No smoking” sign provided	Yes	
	Interpretation sign provided	Yes	
	Hut name sign provided outside	Yes	
	Bednights for last full year		
	Visitor information – condition OK		Yes

Natural Hazards	Natural hazards – condition OK		Yes

Final inspection	Estimated remaining life		

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
information			
	Grid reference		
	Equipment status		
	Inspection end advisory		
	Confirm complete and record time taken (after all sub-equipment inspected)		

8.3 TOILET INSPECTION QUESTIONS

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
"Pre-inspection information	Retag number		
	Equipment name		
Visitor Impacts /Environment	Pit - distance to water body (m)		
	Building environment - condition OK		Yes
Waste Management /Sewerage	Tank/hole/pipes - condition OK		Yes
	Sewerage field - condition OK		Yes
Vegetation	Tree fall hazard - condition OK		Yes
Foundations/sub-floor/tie-downs	Tie-downs or anchors present		
	Foundations /tie-downs - condition OK		Yes
Exterior Claddings (including roof)	Exterior claddings - condition OK		Yes
Water Supply	Water supply – source (excluding hut)		
	Water supply - condition OK		Yes
Flooring/Decking	Flooring/decking - condition OK		Yes
Walls/roof /linings - Internal	Building weatherproof		
	Walls/linings - condition OK		Yes
	Roof structure/ceiling - condition OK		Yes
Fixtures/joinery – Interior	Fixtures/joinery - condition OK		Yes
Furniture/Movable Items	Furniture/movable items – condition OK		Yes
Visitor Information	Visitor information – condition OK		Yes
Final inspection information	Estimated remaining life		
	Grid reference		

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
	Equipment status		
	Inspection end advisory		
	Confirm complete and record time taken (if last inspection)		

8.4 SHED INSPECTION QUESTIONS

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question –notification created if answer is No
"Pre-inspection" information	Retag number		
	Equipment name		
Foundations/sub-floor/tie-downs	Foundations/tie-downs - condition OK		Yes
Exterior Claddings (including roof)	Exterior cladding - condition OK		Yes
Flooring/Decking	Flooring/decking - condition OK		Yes
Walls/roof /linings - Internal	Walls/linings - condition OK		Yes
	Roof structure/ceiling - condition OK		Yes
Fixtures/joinery – Interior	Fixtures/joinery - condition OK		Yes
Final inspection information	Estimated built period		
	Known built date		
	Estimated remaining life		
	Grid reference		
	Equipment status		
	Inspection end advisory		
	Confirm complete and record time taken (if last inspection)		

8.5 BUNKROOM INSPECTION QUESTIONS

Component (bill of materials)	Attribute	Service Std question – auto generate pass/fail	Condition question – create notification
"Pre-inspection" information	Retag number		
Visitor Impacts /Environment	Building environment - condition OK		Yes
Vegetation	Tree fall hazard - condition OK		Yes
	Vegetation clearance – condition OK		Yes
Foundations/sub-floor/tie-downs	Tie-downs or anchors present		
	Foundations/tie-downs - condition OK		Yes
Exterior Claddings (including roof)	Exterior cladding – condition OK		Yes
Flooring/Decking	Verandah and/or deck present	Yes	
	Flooring/decking - condition OK		Yes
Walls/roof /linings - Internal	Building weatherproof		
	Walls/linings – condition OK		Yes
	Vermin infestation		
	Roof structure/ceiling - condition OK		Yes
Fixtures/joinery – Interior	Flyscreens on windows		
	Ventilation – condition OK		Yes
	Fixtures/joinery - condition OK		Yes
Fire Safety	Means of escape from fire - number		
	Fire evacuation notice provided		
	Fire exit signs - number		
	Fire safety - condition OK		Yes
Final inspection information	Estimated remaining life		
	Grid reference		
	Equipment status		
	Inspection end advisory		
	Confirm complete and record time taken (if last inspection)		

Cable Structure Load Test Manual

Item 2

QUALITY STATEMENT

PREPARED BY	…….
Brad Williamson	……/…7…/…14…
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	……/……/……
APPROVED FOR ISSUE BY	…….
Brad Williamson	…23…/…8…/…16…

REVISION SCHEDULE

Rev No	Date	Description	Signature Required			
			Prepared By	Checked By	Reviewed By	Approved By
A	Jul14	Internal Issue for Review	BW	TC, TT		
B	21/08/15	Internal Issue for Review	BW			
C	23/08/16	Removed inspection info	BW			

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1. Load Testing Procedure

1.1. Approach

The test loading of cable suspension bridges and swingbridges consists of testing the bridge to the full ultimate (ULS) design capacity of 1.2G+1.5Q. The applied load is equivalent to the design concentrated live load plus the remainder of the dead load (i.e. 0.2G+1.5Q). The load is applied by pumping water into bladder/bag mounted on the bridge. Anchor and main cable deflections are monitored which forms the basis of the performance of the bridge under load. If significant deflections are recorded during the initial load cycle without obvious failure, then a second load cycle can be undertaken to check whether the deflections occurred as a result of tightening of load bearing components.

1.2. Pre-Test Requirements

Prior to proceeding with test loading the following criteria must be checked and satisfied:

- Check existing drawings and information on AMIS
- Confirm baseline inspection complete – verify AMIS information

  NB. Some early baseline tests were carried out based on a higher live load of 1.8kN before this was changed to 1.2kN. As a consequence, some 6 wire bridges were tested for a load of about 920kg instead of 720kg.
- Verify Test load – calculations or previous load test certificate in AMIS
- Determine appropriate test bag size to take to site. Small rectangle bags = 900 kg. Large sausage shape bags = 2500 Litres= 2500 kg
- Arrange travel logistics and DOC Field Centre support personnel for testing.
- Accessibility of each site to get there and for pumping water.
- Ensure time allowed is realistic. Allow about 2 hrs on site for each load test. (ie. 3 tests in 1 day is usually achievable depending on travel times).
- Safety Plan in place & everyone has read it.
- Inspect bridge especially cable hardware terminations on site prior to test.
- Bridges with rope grip terminations – best to check and re-torque the grips BEFORE carrying out the load test. If you haven't got the gear to re-torque the grips a good rule of thumb when checking rope grips visually is the cable under the U bolt (ie the "tail" of the cable) should be compressed by around ¼ of its diameter.
- Set up radios on local simplex station if to be used during testing for communication between river banks and pump operator.

1.3. Deflection Measurement Set-Up

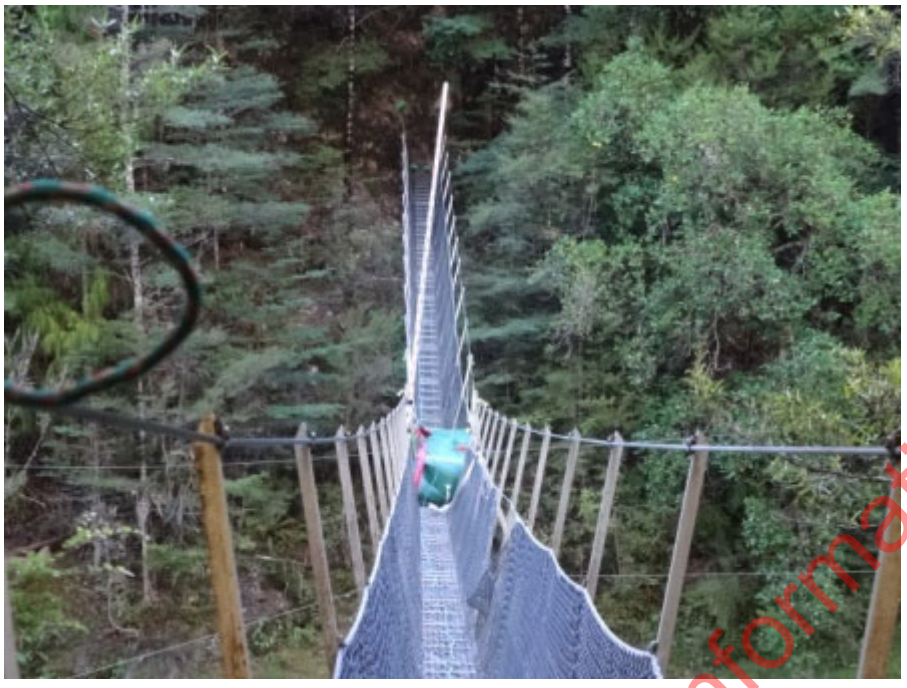


Fig 1: Mid span deflection measurement with staff

1.3.1 Mid-span Cable Sag

Initial position of cable sag is required prior to placing the load test bag on the bridge:

- Set up level on tripod legs. Choose the bank side based on a good view of midspan and that is easy to set up tripod.
- Tie staff at midspan. Either use Duck tape and attach to a hanger – carry a pocket knife for cutting tape OR use some straps that tighten & release easily (rubber crampon straps or ski binding straps work well). Ensure staff is adequately extended so it can still be read with level at maximum sag. NB. Sometimes the staff may need to be set partly below the bridge deck to be in view of the level at the start.
- Take a zero reading with no load (& no bag) on the bridge.
- Then place the bag

Anchors

- For new epoxied rock anchors it is easiest to spray dazzle paint (preferably green or yellow so it doesn't stand out too much) around the anchor so that any pullout or movement can be clearly seen by a break in the paint. You can also spray any adjacent rock fracture lines to check they don't open up. See Fig 2 below.
- Old expansion type rock anchors often protrude a small amount from the rock. Dazzle paint can be used but it is often useful to also place a small amount of blue-tack in the gap so that any pull out can be measured.

Fig 2: Dazzle paint around rock anchor and existing rock fracture line to check movement. (Note blue tack on old anchor to the left of photo)

- To monitor earth anchors a stringline can be used with large steel tent pegs each side. Narrow insulation tape can be used to mark the zero position on the anchors. See Fig 3 below.

Fig 3: Stringlines set up at earth anchors to check movement

Fig 4: Stringline using waratahs

- For soil anchors a maximum movement up to 10mm can be expected, but once the load is released the residual movement should not exceed 2mm.

1.4. Hose & Test Bag Set up

- Standard water bag is 900 kg = 880 litres + 20kg weight.
- The 900 kg bag is designed to fit symmetrically within deck of NZFS swingbridge.
- Place test bag between hangers otherwise a hanger may break.
- Tighten top straps to ensure bag keeps its shape when filled with water, otherwise bag will flop over side of deck especially when there is no infill mesh. See Fig 5 below.
- It is normally better to lay hose along one end of bridge deck but it will also work when placed directly from the side through or over handrail.
- Ensure water release hose mechanism will work. Good quality cord should be used for the release ropes. Tie ropes to end of hoses and carefully lay ropes along bridge ensuring they won't snag when pulled.

Fig 5. Test bag straps not tight enough on hand cables causing bag to flop over side of deck

1.5. Pumping Water & Monitoring Movement

- It is easiest to have one person operating the pump, the Engineer monitoring mid-span cable sag and anchor movement at one end, and another person monitoring the other anchor end. Radios are useful to stay in communication.
- If you have flown in, ensure the helicopter pilot is on the same bank as the helicopter (in case of bridge failure).
- Safety: Ensure the pump operator is not directly underneath the bridge and observers are not directly in front of anchors (in case of failure).
- Safety: Access onto the bridge is prohibited once loading commences.
- Pump operation: It is important to prime the intake hose. Fill the intake hose with water ensuring all air is out. There should be a 1-way valve at the intake end so the hose can be filled up at the pump end without water spilling out.
- Monitoring the flowmeter: Best practice is to set up the flowmeter close to the Engineers end of the bridge for monitoring by the Engineer. Alternatively, the pump operator can be used if they can be trusted to read the meter correctly.

Fig 6: Flowmeter with splitter/divertor

- Work out what the reading will be on the flowmeter when the water load has been reached. The flowmeter has a series of dials in increments of 1 m3 (so 1000 ℓ = 1.0; 100 ℓ = 0.1; 10 ℓ = 0.01; 1 ℓ = 0.001).

Fig 7: Flowmeter dials read 166, 217 litres. If you add 825 ℓ it will then be 167m3 and 0.042

- Allow for water in the hose (1.3 ℓ /m for 41mm dia hose)
- Connect a flow splitter after the pump so that water can be diverted before the flow meter.
- Typical set up is shown in Figs 8 -10 below:

Fig 8: Intake hose section from water to pump

Fig 9: Intake hose connected to pump with flow splitter used to control when water starts flowing to bag (and through flowmeter from zero reading). 2 m hose length from splitter.

- Divert water at splitter when starting pump until water is flowing reliably, then send through flowmeter to bag when ready.

Fig 10: 2m hose connected to Hydroblender and Flowmeter then to 30m – 60m length hose.

- When required volume is reached, stop flow through flowmeter by diverting water at flow splitter.
- Take reading of midspan sag. Check anchors for movement.
- Wait 10 mins.
- Take another reading (T_{10}) of midspan sag and check anchors.
- If residual deflections are excessive and there is doubt about the integrity of the anchors, then further load cycles should be attempted. A continually increasing residual deflection is a sign of eventual failure.
- Release water by pulling release ropes.
- Wait until a substantial amount of water is out of bag before going onto the bridge to release main hose, empty and fold bag and remove from bridge. Leave staff in place!!
- Take final reading of midspan sag to determine any residual sag.

NB. There will be some stretch of the cable due to settlement of the wires in the strands and strands against each other when the bridge is load tested. For a new bridge the expected stretch is about 0.1% in the cable length which will have a big effect on the the midspan sag but we normally get only about 10-30mm residual sag for an existing bridge. Rigging screws may need to be tightened if the residual sag makes a difference to the appearance or performance of the bridge. Sag for a loaded NZFS swingbridge should be 0.3%-0.5% of span length.

- Remove staff and pack up survey level, staff & tripod.
- Re-tighten /check torque on main cable grips with torque wrench. NZFS grips should be 9 Nm. (80 lb-in).
- Clean equipment in field or back at DOC Field Base as required.
- Record any changes to cable hardware if different from Baseline Inspection (this is likely if rock anchors have been replaced).

2. Load Test Equipment Requirements

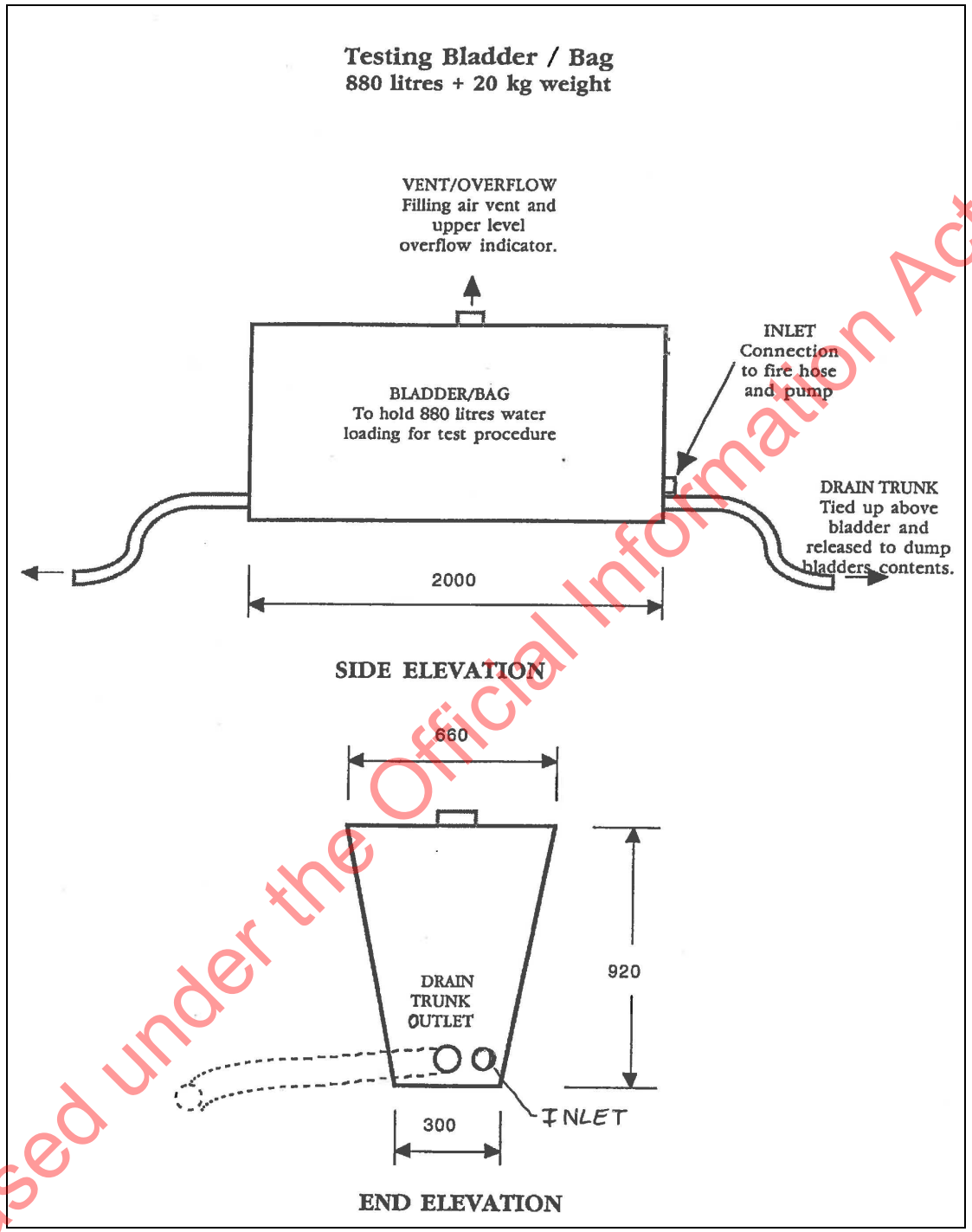


Fig 11: Test bladder/bag

2.1. Test Bags

900 kg bag for 1 Person Limit bridge: Refer to Fig 11 above. Check it has the following:

- Input connection = standard fire hose fitting plastic or metal threaded female end. Usually connected at bottom of bag.

- Drain release hose each end of bag at base. Standard 41mm dia fire hose (approx 1-2m long) connected with hose clamps to plastic male end. Hole at other end for release ropes to tie.
- Fitted hole in top to release air and as backup for input.
- Hanging straps with plastic clips for connection to handrail cables and for maintaining shape of bag.
- Release ropes. Buy good quality 6-8mm double braid polyester or polypropylene marine yachting rope (ultrafine marine or yachtmaster). 2 x 40m to 60m long. Dont get cheap rope. Plastic rope storage holders are useful to avoid tangles.

Fig 12: Drain release hose connection and main inflow hose threaded joint with blank end

Fig 13: Release ropes in plastic storage holders to avoid tangles

2500kg bag for larger bridges: Refer Fig 14 below.

Fig 14: Larger 2500kg test bag for load limit of 2 or more persons

2.2. Pumps & Hoses & Flowmeter

- Intake suction hose with filter (to stop leaves etc) and camlock coupling /clip connection to pump
- Wick pump or similar eg Wick 80-4H or Honda WX15. (A rural fire fighting Wajax pump is too heavy and bulky).
- Spare fuel bottle
- Hose splitter/divertor breeching piece with 1 female end to connect to pump
- Flowmeter
- Various lengths of fire hose made from 41mm rubberised red fireline hose. Standard hose length is 30m.
- Recommend 3x30m + 2x13m + 2x2m sections

  NB. 25mm dia white percolating hose is sometimes used for rugged backcountry fire fighting but this is much slower to use for filling the test bag. It also requires extensive drying.
- Earmuffs for pump operator

2.3. Level, Staff & Tripod

- Automatic level
- Lightweight staff
- Lightweight tripod with dome head
- Rubber straps or tape & knife to tie staff to bridge (rubber crampon straps work well)
- Waterproof notebook/paper and pencils etc

2.4. Anchor Measurement

- Spray dazzle paint can – green or yellow
- Blue-Tac
- 8 x large metal tent pegs or waratah stakes + mallet hammer
- 2 x stringlines

- Thin tape for marking initial stringline position on anchor rod.

2.5. Other Tools

- Tool bag which also carries anchor measurement equipment
- Adjustable spanner
- Small Torque wrench for checking main wire rope grips on NZFS bridges rated 4 or 5 to 40 or 50 Nm. Two brands are Toptul 5 - 50Nm and Norbar Torque Tools Ltd. Slimline 4 - 40Nm model SL10.
- The setting for Fedspec 3/8in rope grips or DIN 10mm grips is 9 N-m or 6.6 ft-lb or 80 lb-in
- Two tube sockets that fit most rope grips used on the NZFS bridges – 19mm fits Fedspec 3/8in rope grips and 5/8in fits some of the old BS grips
- Tube sockets need to fit torque wrench eg. 3/8in (10mm) drive for small wrenches.
- Possibly a larger 150 Nm torque wrench for wire ropes up to 26mm dia. Eg. REPCO RT4120 1/2" drive rated 30 – 160 Nm.
- Areas that have bridges with larger cable sizes should already have the necessary tube sockets. Otherwise you would need both a metric and Imperial set to cover all bases.
- Phillips screwdriver & standard slotted screwdriver
- Pliers/nippers for No 8 wire

2.6. Didymo Cleaning Gear

- Hydroblender soap dispenser (for cleaning hoses) and soap
- OR 2 x large approx 50 litre flexible plastic containers. NB. 45 litre round plastic containers with handles available at Bunnings or other DIY stores.
- Snot Off disinfectant Didymo killer. Comes in 500ml packs. Instructions state mix 50ml to 10 litres water but 50ml to 20 litres is okay.
- 1-2 litre hand spray bottle to spray intake hose/pump, flowmeter, ropes and bag exterior.

2.7. Additional Inspection Gear

Some of the following items are optional depending on the bridge:

- Digital camera
- Mirror pole – for looking at underside of bridge especially hanger bolts
- Steel measuring tape, 5 or 8m.
- Fibreglass measuring tape, 20 – 30m
- Disposable plastic gloves and knife for cutting denso tape

- Hand trowel/ small camp spade, for digging around buried anchors or cable terminations.
- Closure tape
- Communication radios. Use local simplex band during testing
- Structure information and maps etc
- In-Reach tracker and/or PLB for safety
- Personal Safety Gear – ear plugs/muffs, climbing harness, helmet & ropes (where required)
- 1st aid kit including sunscreen, insect repellent, antihistamine (for bee or wasp stings)
- Personal food & liquid refreshments. (Keep well hydrated)

2.8. National Inventory of Load Test Bags

In case you need additional bags, following is a list of bags in each area.

	Engineer	Office	900 kg Bags	2500 kg bags
E100-E01	Jon Calder	Hokitika	1 + 750	2 x 2300
E100-E02	Tim Cross	Invercargill	1	1
E100-E03	Brad Williamson	Christchurch	2	1
E100-E04	Kate Zwartz	Palmerston Nth	2	
E100-E05	Tahu Taylor-Koolen	Hamilton	2	1

3. Back in the Office

- Sign off the load test and Engineering inspection in AMIS.
- Complete a Load Test Certificate and forward to Asset Planner to go into AMIS.
- Send any sketches and photos of new cable hardware to Asset Planner to load into AMIS.

Appendix 1. Cleaning to Stop Spread of Didymo

A1.1 Introduction

There are 2 main practices for cleaning the test equipment to stop the spread of didymo. One uses a hydroblender with hydroblender soap and the other uses Snot Off detergent mixed in a large tub.

Make sure all equipment in contact with water is cleaned and dried after each load testing trip.

When testing several bridges on the same river, start at the most upstream bridge and move downstream as didymo is more likely in the lower reaches of a river. This way you won't need to clean the equipment until you finish at the last downstream bridge. It may be easier to clean the equipment in the yard at the end of the day before going to another catchment.

Find out from your local Regional Council which rivers in your area are known to have didymo, so that extra precautions can be taken where possible.

Avoid known didymo sites until the end of the days testing.

If testing in different catchments on the same day, preferably use the Snot Off in a Tub method of cleaning between catchments.

A1.2 Snot Off in a Tub

Advantage: Effectively kills didymo instantly. Equipment can be used in another catchment immediately after cleaning.

Disadvantage: Disinfected water can not be re-introduced to the river. Takes time to set up. Tub may not fit in helicopter.

Site Clean - Takes about 45mins to 1 hour to complete:

- Remove bag from bridge at end of test and set up on ground away from river so that detergent water will soak into soil rather than drain directly back into river. Stop drain ends.
- Disconnect flowmeter for easier flow.

- Set up 50 litre plastic tub near pump and fill with water using pump and short hose.
- Mix Snot Off at min1:400. So need 125 ml Snot Off in 50 litre tub.
- Hand dip all loose fittings including release ropes, flowmeter and your boots in tub.
- Move pump and place intake into tub and pump through all hoses to the bag.
- Use 2nd tub if required to get enough water in bag to slop around.
- Stop pump, slop remaining detergent water around test bag and then allow detergent water to drain out and soak into ground.
- Dry all equipment back at Field Base workshop.

Workshop Clean – takes about 1 - 1.5 hours depending on help:

Preferably clean gear in workshop with a wash down area with sloping concrete floor leading to a trade waste drain.

Fill bin with 50 litres of water and 250ml Snot Off (1:200 dilution).

Hand dip all fittings, meter, short hoses (including getting some through the hose). Dip all long hoses to coat outside then run out with female end to drain.

Pour 3 litres of solution in far end of EACH hose and allow to run through. Don't rinse.

Rubberised hoses rollup damp with male end in centre. Hang up canvas hoses, roll up when dry so they don't rot.

Pump sucker hose – slide through bin so outside is completely coated with solution. Pour 3 litres inside hose, slosh around and drain.

Pump – Depending on type of pump. Eg. For Tims pump: Screw 40mm cap over inlet. Remove plug on top of impeller housing and pour in solution until full. Slosh around and then remove lower plug to drain.

Bag – Screw 40mm caps onto fittings at each end (2 one end and 1 at other). Pour 10 to 12 litres of solution into bag through large red cap at top, replace cap and slosh around so inside of bag is fully contacted by solution. Drain bag – the workshop may have a hoistable clothesline to hang the bag over and haul it up or just haul up from 1 end. Don't worry about the outside of the bag – should be ok if it is allowed to dry.

Tip rest of solution down drain connected to trade waste.

NB. Bin may not fit inside helicopter very well although might be OK if it is a Squirrel and there is a spare seat. But the gear could be flown in a fadge as an underslung load and get it dropped right at the end of the bridge if at all possible. Note that heavy rigid plastic bins are easily broken though if the pilot lowers the load a bit too fast.

A1.3 Hydroblender with Soap

Limitation: Only effective in killing didymo if left for 32 hrs. Not to be used if testing in different catchments on the same or next day.

Advantage: Easy and quick to set up.

Disadvantage: Soapy water may end up in river.

A. Site Clean during or near end of test:

- Connect with 2m section of hose from pump before flowmeter
- Place soap in dispenser during or near end of test and allow soapy water to run through flowmeter and main hose to bag.
- Intake hose and pump and 2m hose section will also need cleaning which could be done with handspray of Snot Off.

B. Clean after test:

NB. This is most easily done back at the Field Base.

- After test, remove bag from bridge and reconnect to hoses & pump over ground.
- Run pump with soap through dispenser to bag until partially filled.
- Disconnect hose and re-direct into intake hose to get soap into intake, pump and 2m section of hose.
- Stop pump and slosh soapy water around bag, cleans release ropes in soapy water and then allow to run out through release hoses.
- Handspray intake and any other wet items with Snot Off.

NEVER put the gear away until it has been cleaned

Dry all equipment back at the Field Base.

Item 3

DOC Structure Inspection Manual

Prepared by: Jonathan Calder
DOC Engineering Manager

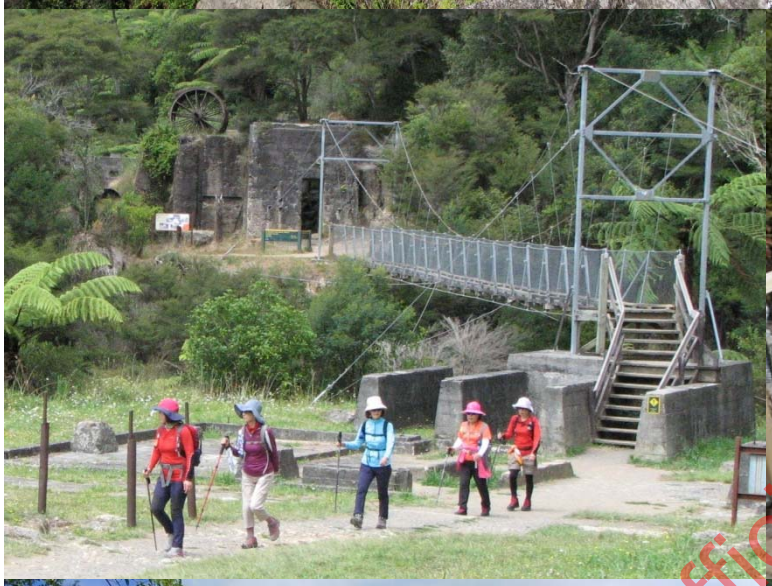
File Ref: DOC-2806404

Date: 2 March 2017

Department of Conservation
Te Papa Atawhai

New Zealand Government





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1 Introduction and Scope

DOC manages 14000 'outdoor visitor structures' (pedestrian and vehicle bridges, viewing platforms, stairs, ladders, boardwalks etc.) that provide access to public conservation land (PCL) for millions of visitors every year.

These structures exist in harsh environments and are subject to material degradation, erosion, impact damage (trees and rocks), vandalism and general wear-and-tear. In rare cases construction, component manufacturing or design defects may become evident during the service life of a structure.

To minimise visitor risk and inform a maintenance and replacement plan, the following inspection regime is in place:

DOC Structure Inspection Regime:

Inspection Type	What	When	By
Baseline	*All structures**	*When structure built, discovered or on land transferred to PCL*	*DOC structure inspector*
Baseline by Engineer	*High Risk structures***	*When structure built, discovered or on land transferred to PCL*	*DOC Engineer*
Ongoing	*All structures**	*Every two years*	*DOC structure inspector*
Ongoing by Engineer	*High Risk structures***	*Every six years*	*DOC Engineer*

* *There are structures not used by visitors (e.g. used by DOC staff) included in this inspection regime.*

** *Refer Appendix B for high risk criteria. In addition, all cable structures are load tested every 12 years (refer to Cable Structure Load Test Manual DOC-2851169).*

This Manual covers structure inspections carried out by **DOC structure inspectors**.

Ongoing Inspections include checking 'inventory' information (length, width, height etc.) and visually checking structure for defects. Defect notifications are entered into DOC's Asset Managment Information system (AMIS).

In addition, **Baseline Inspections** include a photographic record of the structure saved to DOC's Asset Managment Information System (AMIS).

2 Structure Inspector Capability

Structure inspections are carried out only by trained and audited DOC employees regularly engaged in structure inspection work and current with the minimum workload requirments of Section 2.3 Minimum Workload.

2.1 Training

Individual inspector training consists of three components:

1. **On-the-job training** – 100 structures, including 10 cable structures, inspected with an already qualified and current structure inspector. Concurrent with;
2. **Self-directed study** of this Manual followed by a written exam, set and marked by a DOC Engineer and;
3. **Training and Audit by Engineer** - 20 structures, including 5 cable structures, inspected with a DOC engineer. 5 of these, including 2 cable structures, will be conducted as a formal audit.

Group training/audit sessions may be run by a DOC Engineer if numbers demand. Refresher courses will be run on an as-required basis as determined by the DOC Engineering Manager.

2.2 Pre-Requisites

Structure Inspectors need a basic level of computer literacy and familiarity with New Zealand backcountry conditions. Building maintenance/construction experience is desirable but not compulsory. Enough training will be given to ensure an appropriate level of capability.

2.3 Minimum Workload

Structure inspectors must complete a minimum of 100 structure inspections, including 5 cable structures, within each calender year, to remain current. This requirement will be monitored in AMIS.

2.4 Audit

In addition to the post-training audit, ongoing structure inspector audits will be conducted every 4 years. The ongoing audit will include a minimum of 5 structures, including 2 cable structures, inspected with a DOC Engineer.

All audits will be recorded on copies of form DOC-2835468 and referenced in DOCLearn. Audit requirement's will be managed in AMIS.

2.5 Continuing Capability Development

Structure inspectors are encouraged to regularly accompany other structure inspectors and the DOC Engineers on inspection trips and to participate in activities that will extend their knowledge of structures e.g. participation in construction and maintenance projects.

As a guide, structure inspectors should spend at least:

- 2 days in the field with a DOC engineer annually.
- 5 days in the field with another structure inspector annually.

2.6 Inspector's Log

An inspector's log (DOC-1349318) is available to record attendance at training courses, audits and field-trips with other inspectors, construction and maintenance staff and DOC engineers.

3 Inspection Planning Tools

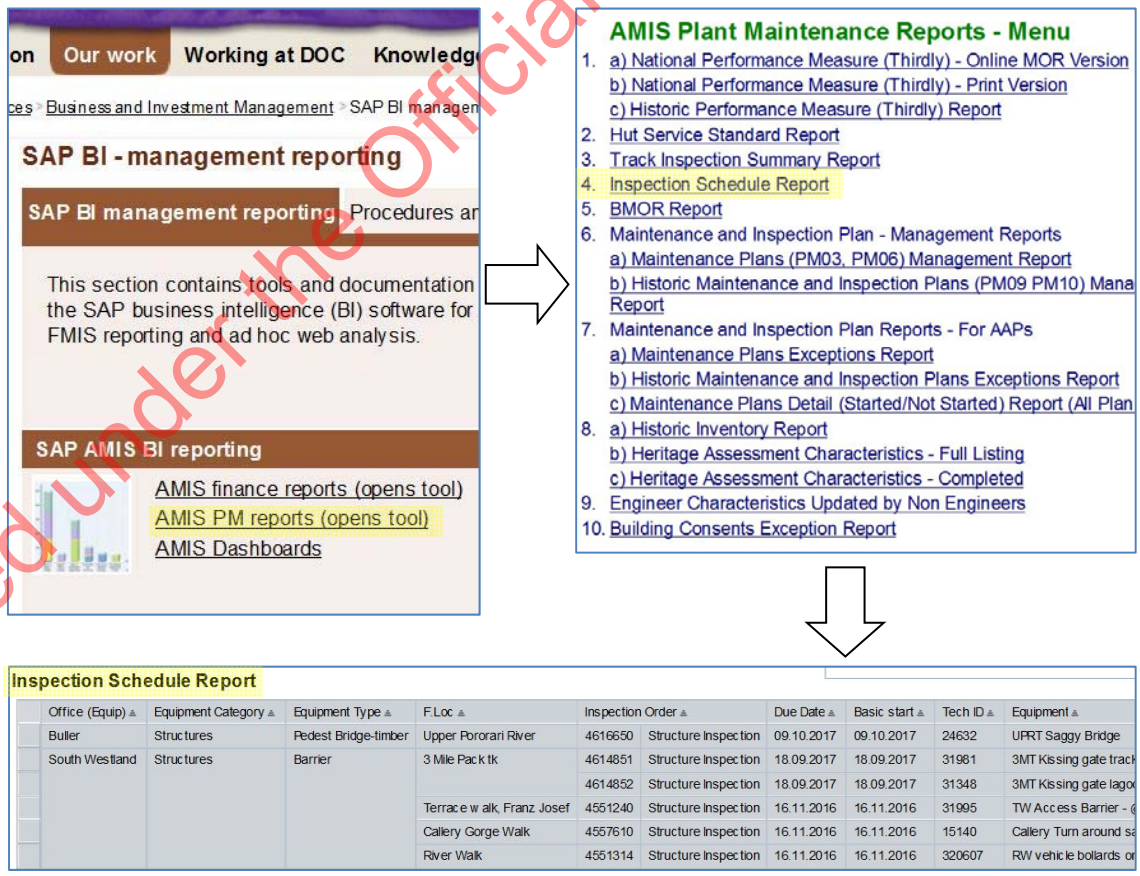
3.1 Key Contacts

- **Asset Planners** for help with DOC's Asset Managment Information System.
- **Senior Rangers** to arrange/share flights and combine inspections with maintenence work.
- **DOC Engineers** to arrange audits and for general advice about structures.
- Other **structure inspectors** to arrange combined inspection trips (capability development/peer review) and for general advice.

3.2 Inspection Schedule

A list of structures allocated to an inspector and due for inspection can be obtained from SAP Asset Managment System Business Intelligence Reporting (SAP AMIS BI) on the DOC intranet.

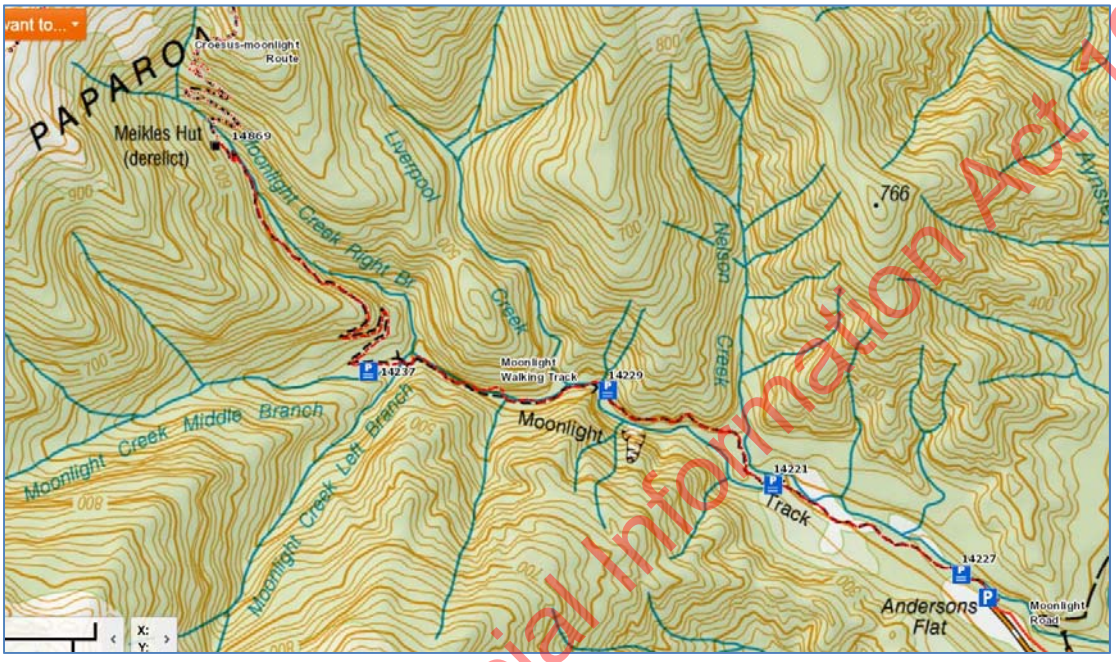
http://wgnhosap3.depcon.internal:50100/irj/servlet/prt/portal/prtroot/pcd!3aportal_content!2fcom.sap.pct!2fplatform_add_ons!2fcom.sap.ip.bi!2fiViews!2fcom.sap.ip.bi.bex?TEMPLATE=ZPM_PMM1



3.3 DOCgis Maps

DOC's Geographic Information System (DOCgis) can produce topographic maps showing the location of structures.

http://intmaps/richmapviewer/?Viewer=DOCgis



4 Inventory Information

Inventory information is stored in AMIS and describes the physical characteristics and location of a structure. It is measured and recorded during the **baseline inspection** of a new structure. For **ongoing inspections** of existing structures, it is adequate to only measure and change existing inventory information if it **looks obviously wrong**.

4.1 Asset Number Tag

Every structure has an orange tag with a unique 6-digit number (the 'Tech ID' in AMIS). This is usually located somewhere on the true-left down-stream side. Some structures e.g. a long boardwalk or a bridge with access stairs, may have been divided up into several structures and have several asset number tags.

4.2 Structure Name

Many structures are known by name e.g. Heaphy River Bridge. This can only be changed in AMIS (not on a datalogger).

4.3 Structure Type

Structures are categorised according to use and primary structural mechanism/material. Refer to **Appendix C** for a complete list of structure type names and definitions.

Figure 4.1 Vehicle Bridge – Steel Truss

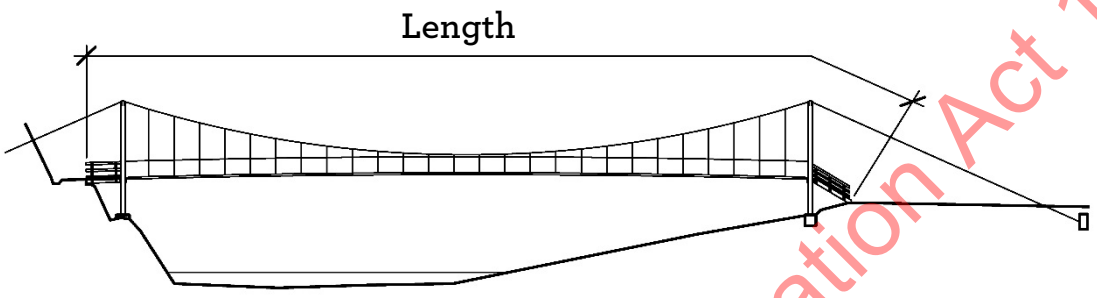
Figure 4.2 Pedestrian Bridge – Steel Beam

4.4 Grid Reference

New Zealand Transverse Mercator (NZTM) Easting and Northing.

4.5 Length

The overall length of walking surface including access stairs and ramps. Record in meters to two decimal places e.g. 60.25m



4.6 Width

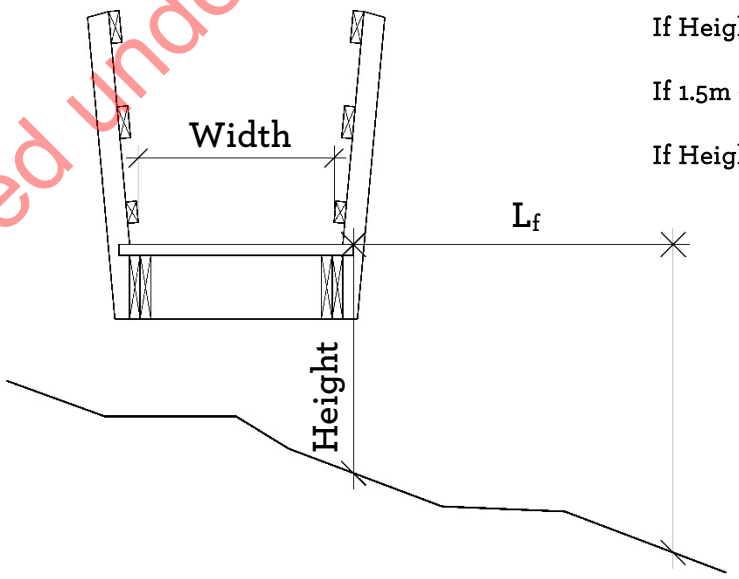
The width of the walking surface/deck at deck level. Record in meters to two decimal places e.g. 1.20m

4.7 Height

The greatest distance from deck to ground measured straight down from the deck edge. Measured in meters to two decimal places e.g. 1.56m

4.8 Fall Height

The vertical distance from deck level to ground level, measured up to a distance L_f out from the edge of the deck, in a place that will give the maximum value for that structure.



If Height ≤ 1.5m then L_f = 1.5m

If 1.5m < Height ≤ 2.0m then L_f = Height

If Height > 2.0m then L_f = 2.0m

For fall height onto water likely to remain 1.0m deep or greater, measure to water surface. For water less than 1.0m deep measure to bed.

Fall Height is recorded in meters to one decimal place e.g. 1.9m, for both sides of a structure.

4.9 Fall Surface

The surface onto which a fall from the structure could occur (where the fall height is measured). Recorded for both sides of a structure, upstream and downstream or uphill and downhill. Fall surface catagories:

Benign	Soft vegetation, swamp, shallow still water deep enough to cushion a fall (approx. 1.0m).
Favourable	Gravel, sand, grass, deep still water with reasonable means of exit.
Unfavourable	Rocks, concrete, flowing/deep water without reasonable means of exit.
Hazardous	Boiling mud or water, extended falls following initial impact due to rolling/sliding down a slope (greater than 35°), swift flowing water.

4.10 Barrier Type

Recorded for both sides of a structure.

None	No barrier
Type A	Infill mesh or vertical palings (maximum gap 100mm)
Type B	Top, middle and bottom horizontal rails (maximum gap 300mm)
Type C	Top and middle horizontal rails (maximum gap 500mm)
Type D	Top rail only
Natural	Dense vegetation, rock face

4.11 Load Restriction

Some pedestrian structures, typically suspension bridges and swingbridges, are designed for a restricted load measured in numbers of people. This restricted load shall be displayed on prominant signs at all approaches to a structure.

4.12 Known Built Date

Date of construction if known.

4.13 Estimated Built Period

An estimate of the period in which the structure was built if an actual date is unknown:

Pre 1971, 1972 – 1981, 1982 – 1991*, 1992 – 1999

* Pre New Zealand Building Act

4.14 Estimated Remaining Life

An estimate of how long a structure will last before it becomes uneconomic to repair. Expressed as a percentage of economic life:

- All components in very poor condition 4%
- Core components in poor condition 12%
- Secondary components in poor condition 20%
- All components in deteriorating condition 40%
- All components in reasonable condition 60%
- Near new 80%
- New (less than 5 years old) 100%

5 Structure Condition Assessment

5.1 Scope

A structure condition assessment is a visual inspection of all safely accessible parts of a structure, checking for material degradation and component damage:

- Primary considerations are visitor safety and structure longevity.
- Structure components shall not be dismantled during an ongoing inspection.
- Care shall be taken not to become exposed to fall hazard during an inspection. DOC asset inspectors are not expected (or trained) to apply rope access techniques.
- If practical, minor repair work can be completed during an inspection.

5.2 General Approach

Many DOC structures are large and complex and require a systematic approach to ensure defects are not missed.

Stage 1 – Initial Overview

An assessment of the structure as a whole. Conducted upon arrival and from one end of the structure before it is crossed. Looking for:

- Main components out-of-level/plumb, unsymmetrical (may be symptomatic of other problems e.g. suspension bridge anchor movment).
- Obvious damage to main components.
- Windfall/rockfall onto structure.
- Foundation erosion.

It may not be safe to proceed beyond stage 1 if serious defects are discovered.

Figure 5.1 Structure condition assessment stage 1 – initial overview

Stage 2 – Detailed inspection of all accessable structure components

A visual inspection of all accessible structure components applying the techniques described in section *5.3 Inspection Technique and Component Sequencing*.

Component Group	Components Included
Barrier System	Barrier posts, rails, in-fill netting, barrier cables, hand-chain
Decking	Anti-slip mesh, deck boards, steel grate, wire mesh
Beams	Beams, trusses, poles, transoms and staircase stringers
Sub-frame	Posts, bearers, bracing and other support systems between the beams and the ground
Foundations	Pads, piles and footings at or below ground level
Fixings	Bolts, screws, nails, nail plates, splice plates, brackets
Cables	Main load bearing cables, wind sway cables, barrier infill cables, deck restraint cables
Cable hardware	Shackles, rigging screws, suspension bridge hangers, Telluric splices, wire rope grips, spelter sockets
Cable anchors	Buried ground anchors/deadman, rock anchors, anchor rods
Cable support towers	Cable saddles, bracing, posts
Vegetation	Vegetation encroaching onto structure, potential windfall
Visitor/environment impacts	Rock-fall onto structure, trip hazards, graffiti, rubbish
Visitor Information	Load restriction signage

Stage 3 – Final Overview/Review

A final walkover to review and ensure that all accessable components (true-right and true-left, upstream and downstream, above and below, all-round) have been inspected and all defects recorded.

5.3 Inspection Technique and Component Sequencing

Structure condition assessments are visual and to a lesser degree, tactile. Inspectors should be 'up-close' and 'hands-on':

- **Clear** soil and vegetation from foundations with a small trowel and use a stiff nylon brush to **clean** leaf litter and debris off rock anchors.
- Use a screw driver to **probe** for rot and scrape rust scale.
- **Grab and shake** barriers, rock anchors etc.
- Endeavor to **view** components **from multiple directions**.
- Take the time to be **systematic** and **thorough**.
- Avoid distractions, **focus** attention on and **be aware** of the name and function of the component being inspected.

The exact order in which components are inspected will vary but it is important that <u>all</u> safely accessible components are inspected systematically.

<u>Example 1</u> - **Suggested suspension bridge component inspection sequence** (Having arrived at true-left end and conducted initial overview)

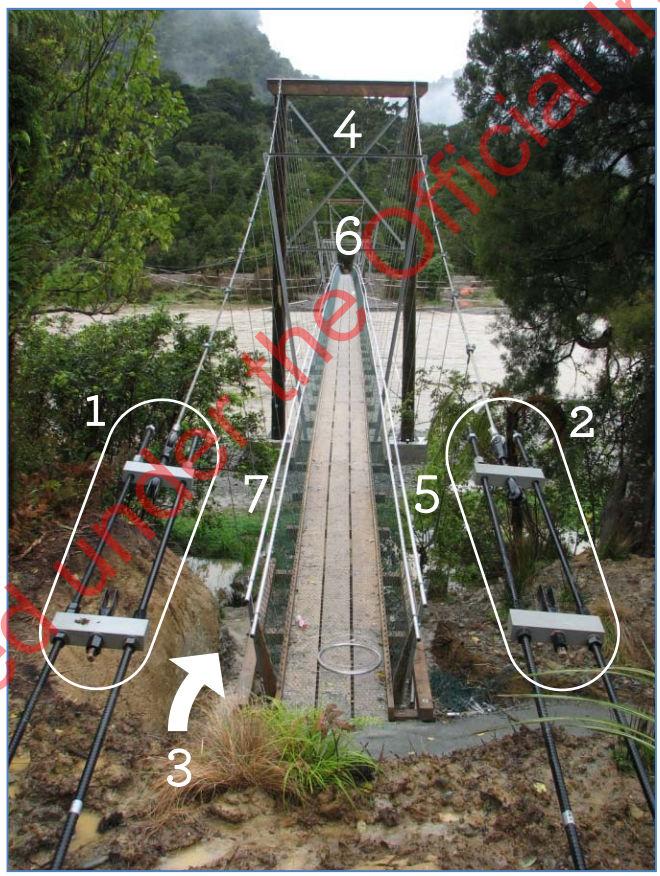


Figure 5.2 Punakaiki River Suspension Bridge

<u>True-Left</u>

1. **Downstream Main Cable Anchor**
   - Anchor rods
   - Adjuster mechanism
   - Main cable termination
2. **Upstream Main Cable Anchor**
   - Anchor rods
   - Adjuster mechanism
   - Main cable termination
3. **Deck soffit**
   - Deck boards
   - Transoms
   - Hanger fixings
4. **Tower**
   - Foundations
   - Posts
   - Bracing
5. **Deck & Upstream Barrier**
   - Anti-slip deck mesh
   - Deck Boards
   - Barrier
   - Transoms
   - Hangers
   - Main Cable
6. <u>True-Right</u>
   Items 1 to 4 on true-right
7. **Downstream Barrier**
   - Barrier
   - Transoms
   - Hangers
   - Main Cable

Example 2 – Suggested NZFS Swingbridge deck dable termination/anchor component inspection sequence:

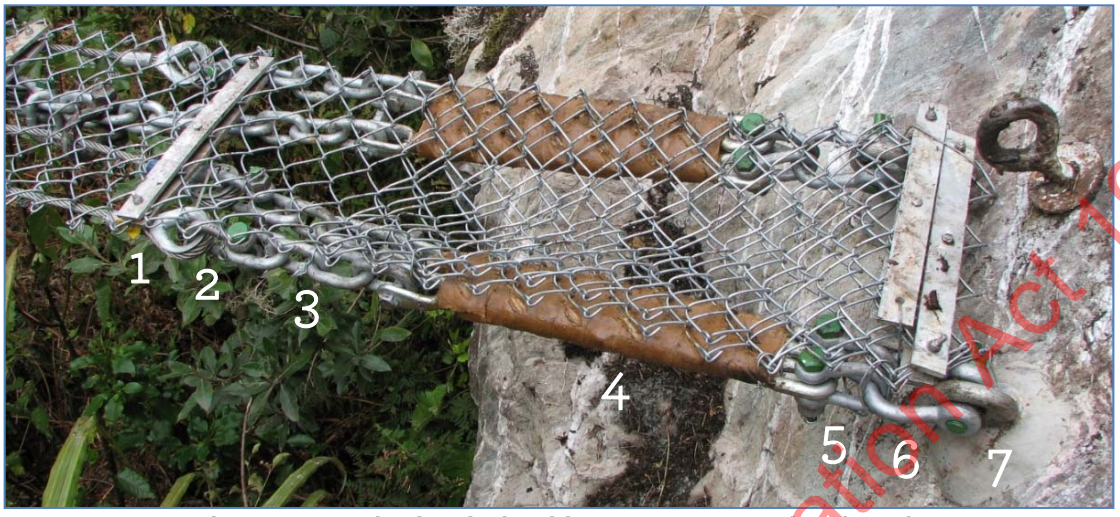


Figure 5.3 Typical NZFS Swingbridge deck cable terminations and rock anchors

When presented with a dense group of components it is important to **mentally isolate each component and inspect individually.**

1. Downstream deck cable termination
2. 16mm shackle
3. Chain links (4 links, inspect each)
4. Rigging screw
5. 16mm shackle
6. 19mm shackle
7. Forged eyebolt (rock anchor)
8. **Repeat for all four deck cables**

Example 3 – Steel truss vehicle bridge

Figure 5.4 Moonlight Bailey Bridge, Greymouth

Break into **parts** of **core components** depending on viewing position e.g. deck soffit, transoms, lateral bracing, bottom chord of trusses, abutments.

5.4 Structure Defects

Structure defects are any **material degradation** or **damage** to a structure or structure component that may pose a hazard to visitor safety and/or cause a loss of structure function.

5.4.1 General Defects

DOC structures of all ages are adversly effected by general wear-and-tear, extreme weather, natural disasters, windfall, rockfall, erosion, and vandalism. **It shouldn't be assumed that because a structure is new, there is nothing wrong with it.**

5.4.1.1 Anti-Slip Deck Mesh

2.0 Level Access Routes

2.1 Slip resistance

2.1.1 Level *access routes* to which the public has access, including level *accessible routes*, shall have a mean coefficient of friction μ, of not less than 0.4 when tested in accordance with AS/NZS 3661.1 (see D1/VM1). Requirements for ramps and *stairways* are given in Paragraphs 3.1.4 and 4.1.4.

Exert from New Zealand Building Code Acceptable Solution D1/AS1. DOC meets this requirement by installing galvanised wire or polymer mesh on timber decks.

Figure 5.5 Worn anti-slip deck mesh is a common defect and can pose a significant trip or slip hazard.

5.4.1.2 Broken or Missing Components

Figure 5.6 Broken/missing barrier rail

Figure 5.7 Missing stair tread, no anti-slip mesh.

Figure 5.8 Failed tread/stringer connection, common on older staircases.

Figure 5.9 Broken sawn timber beam

5.4.1.3 Erosion, Ground Instabiliy, Windfall, Rockfall, and Vandalism

Erosion or scour, the removal by water flow of bed material or ground supporting a foundation, is a common defect. Scour can be exacerbated by windfall debris in the river upstream or downstream of a bridge and by the build-up of flood debris on a bridge pier.

Ground instability may include landslide onto a structure or displacement of the ground a structure is sitting on. There may be associated slumping, tension cracks and exposed slip scarps.

Figure 5.10 Flood debris trapped on a bridge pier can obstruct flow and cause scour – worth removing.

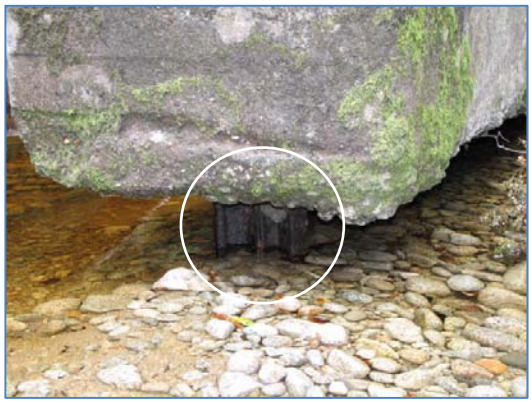


Figure 5.11 There will usually be driven piles under vehicle bridge piers. In this case, because only a short length of the pile is exposed and it's in good condition, no remedial work is required.

Figure 5.12 Loss of support to NZFS Swingbridge tower footing due to scour.

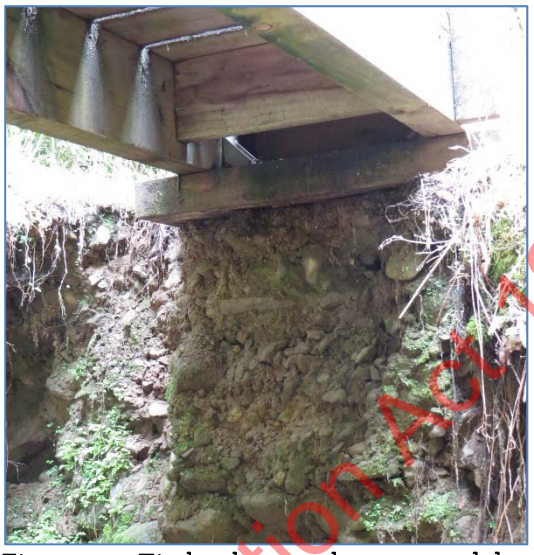


Figure 5.13 Timber bearer plate exposed due to erosion.

Figure 5.14 Broken main cable and deck structure due to large windfall.

Figure 5.15 Riverbank erosion claims a relatively new suspension bridge.

Figure 5.16 Rockfall onto structure. Structure damage less of a concern than the ongoing rockfall hazard to visitors.

Figure 5.17 Graffiti, generally considered preferable to remove promptly before problem grows.

5.4.1.4 Load Restriction Signage

Many vehicle bridges and almost all pedestrian cable structures (suspension bridges, swingbridges, cableways and 3-wire crossings) have been designed to carry a 'restricted load' for economic reasons. It is important that these bridges have prominant signage displaying their load restriction at each approach.

Figure 5.14 The format for vehicle bridge load restriction signage is specified in the NZ Heavy Motor Vehicle Regulations 1974

Figure 5.15 There is currently no standard format for load restriction signs

Figure 5.16 Standard 150x210 load restriction sign. Adequate for one-person backcountry bridges. Too small for most other applications.

Figure 5.17 This busy 10 person road-end bridge needs prominent load restriction signage

5.4.2 Timber Component Defects

5.4.2.1 Rot

The Cellulose in timber is a potential food source for many types of fungi. Without natural resistance (hardwoods) or chemical treatment (CCA – chromated copper arsenate) and given moisture, oxygen and warmth, fungi will break down the rigid cellular structure that gives timber its strength.

Figure 5.18 Hidden rot in bridge beam

Figure 5.19 Rotten pile

Figure 5.20 Rot at base of suspension bridge tower post

Figure 5.21 Exposed untreated core of pile beginning to rot

Figure 5.22 Black mould on timber surface doesn't affect timber strength

5.4.2.2 Shrinkage

Timber shrinks as it drys. This can result in loosening of bolts in new structures. Repeated shrinking and swelling due to fluctuating moisture content can cause nails to work their way out of timber.

Figure 5.23 Severe drying and splitting of timber in an alpine environment

Figure 5.24 New bolted connections can loosen due to timber shrinkage

5.4.2.3 Delamination

Glue laminated timber can delaminate along glue lines under conditions of extreme wetting and drying e.g. on the sunny face of a beam. Extent of delamination has to be quite severe (greater than 70% of beam width) before strength of beam significantly affected.

Figure 5.25 Delamination on sunny face of glue laminated timber beam

Figure 5.26 Beam strength reduced if entire width of glue-line delaminated

5.4.3 Steel Component Defects

5.4.3.1 Rust

Corrosion/oxidation/rust of steel components generally occurs when protective coatings break down and allow the oxygen in air or water to react with the iron in steel to form iron oxide.

Because corrosion involves the conversion of iron (strong) to iron oxide (weak), severe corrosion with 'pitting' and loss of cross-section can significantly reduce the strength of a steel component.

However, iron oxide (rust scale) has seven times the volume of the parent metal so a small amount of corrosion can look worse than it really is.

Figure 5.27 Surface corrosion on main cable and wire rope grip U-bolt (hasn't progressed to pitting and section loss yet)

Figure 5.27 Severely corroded stair stringer bracket, marine environment

Figure 5.29 Severely corroded shackle (deeply pitted, loss of cross-section/strength)

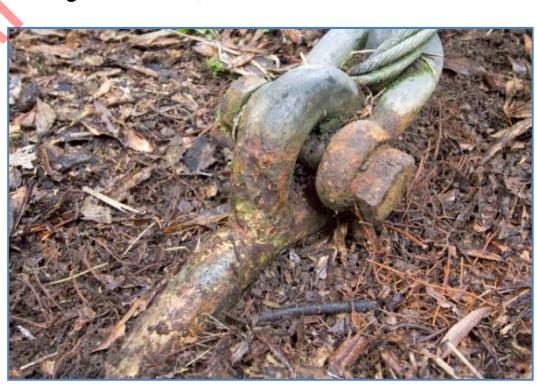


Figure 5.30 Cableway anchor rod & shackle corrosion (acidic soil/leaf-litter/moisture)

Figure 5.31 Galvanised steel vs. stainless steel in a marine environment

Figure 5.32 Corroded top and bottom flange of vehicle bridge beam

5.4.3.2 Fatigue/Embrittlement

Cracks can develope in metal (steel, aluminium, stainless steel etc) components at points of fluctuating stress concentration or where some manufacturing or environmental factor has embrittled the steel. Cracks may propogate from welds, holes, nicks, notches and corrosion pits.

Figure 5.33 Cracked weld, cableway tower

Figure 5.34 Karangarua Cableway

Figure 5.35 Cracked chain link, Hopuruahine Suspension Bridge 2015 (manufacturing defect)

Figure 5.36 Cut in rigging screw eye (possible crack propagator)

Figure 5.37 Swingbridge rock anchor plate – pay attention to welds – check for cracks.

5.4.4 Reinforced Concrete Structure Defects

5.4.4.1 Reinforing Corrosion and Spalling

When reinforcing steel corrodes the increased volume of the corrosion product (iron oxide) forces the cover concrete off ('spalling'). Particularly prevalent in marine environments.

Figures 5.38 & 5.39 Corroded reinforcing steel and spalled cover concrete, historic structures in a marine environment

5.4.4.2 Concrete Erosion

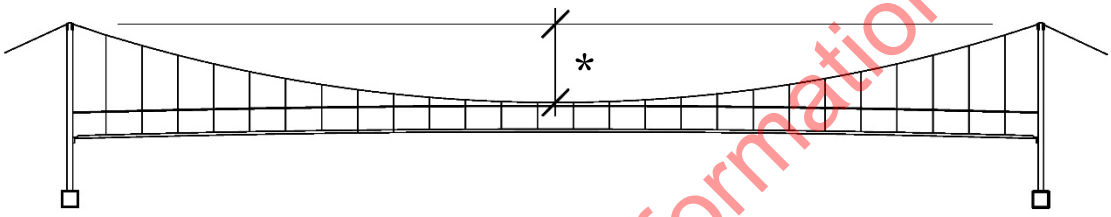
Figure 5.40 Erosion of concrete bridge piers due to impact and abrasion of particles (gravel and rocks) suspended in flood flow.

5.4.5 Cable Structure Defects

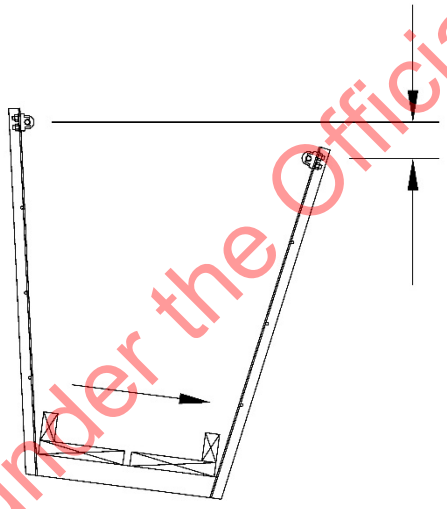
Cable structures are very reliant on the performance of a number of 'safety-critical' components. The failure, for example, of a single shackle or chain-link can result in catastrophic failure of the entire structure. In addition to general issues with timber and steel components (described previousely) the following defects are particular to cable structures (swingbridges, suspension bridges, cableways, 3-wire crossings).

5.4.5.1 Uneven Main Cable Sag

* Main cable sag = distance between a line drawn between cable saddles and the main cable, measured at mid-span. Should be the same for both main cables of a suspension bridge.



Uneven cable sag is most noticable when looking along the deck from one end.

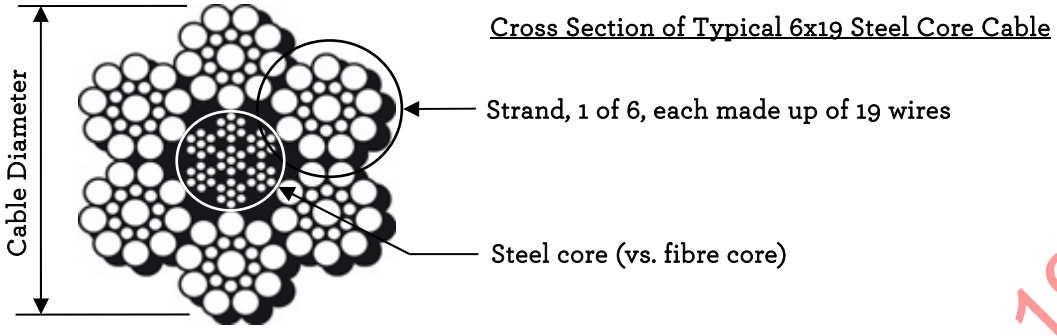


Uneven cable sag – investigate cause:

- Cable anchor movement
- Cable termination (e.g. wire rope grip) slippage
- Tower movement
- Windfall onto sway cable or sway cable failure
- Uneven cable stretch

5.4.5.2 Broken/Cut Cable Wires

Cable or 'wire rope' is made up of **strands** of high-tensile **galvanised wires**, wound together to form a helix. Although very tough, cables can be damaged by impact or long term wear against a hard object.



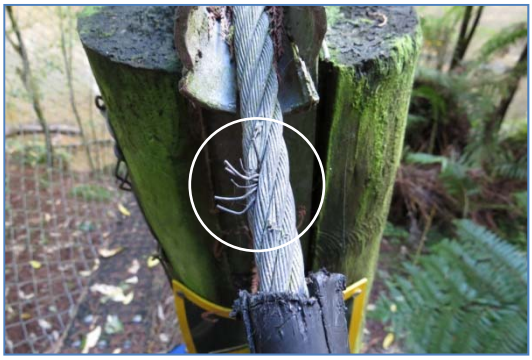


Figure 5.41 Wires cut (windfall impact) near cable saddle

Figure 5.42 Cable wires cut and wire rope grip damaged (scrub bar)

The number of wires cut in the examples do not reduce the cable strength by a dangerous amount but should trigger a request for an inspection by engineer.

If two strands or more are cut the bridge should be closed.

5.4.5.3 Cable In Contact with Ground or Trees

Acidity and trapped moisture can accelerate the corrosion of cables in contact with ground or trees.

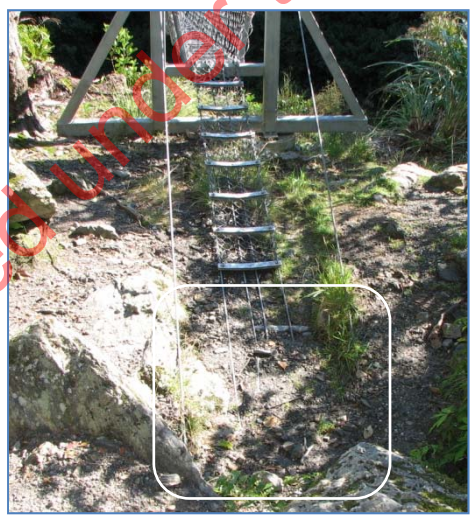


Figure 5.43 Buried NZFS Swingbridge cables and termination hardware

Figure 5.44 3-Wire Crossing hand-cable insufficiently blocked off anchor tree

5.4.5.4 Rigging Screws

Rigging screws are mechanical devices typically installed at the ends of bridge cables to allow adjustment of cable sag. As well as general condition the following points are important to consider during an inspection:

1. Because loaded cables impart an anti-clockwise torque on rigging screws, **locking wire** must be be installed to prevent them unwinding. Various different methods are used but it is important that the wire is threaded through both end-fittings and the barrel of the rigging screw. The wire should be at least 2.0mm diameter and be well tied off. Some rigging screws are supplied with lock-nuts on the end fitting-threads, these do not effectively prevent unwinding.
2. To ensure rigging screw threads remain operable **Denso Tape** (fabric tape only, not covered with PVC overwrap) should be installed to the extent of the end-fitting threads only.
3. There must be a **minimum length of end fitting thread** inside the barrel equal to the swaged length of the barrel. To estimate this assume the length of thread on an end fitting is equal to half the length of the barrel.

Fig. 5.45
Rigging Screw Parts:
1. End-fitting bolt
2. End fitting (fork type)
3. Barrel
4. End-fitting (eye type)
5. Swaged barrel length

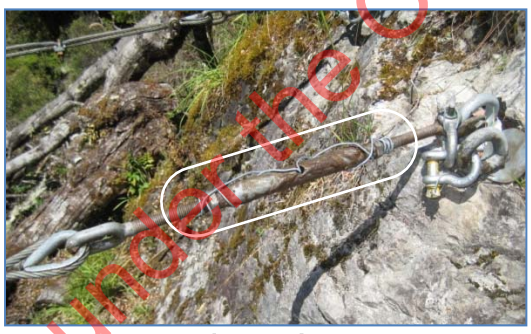


Figure 5.47 No locking wire installed.

Figures 5.46 Poorly wired rigging screw on NZFS Swingbridge (wire not threaded through end-fittings). Enough end-fitting thread in barrel?

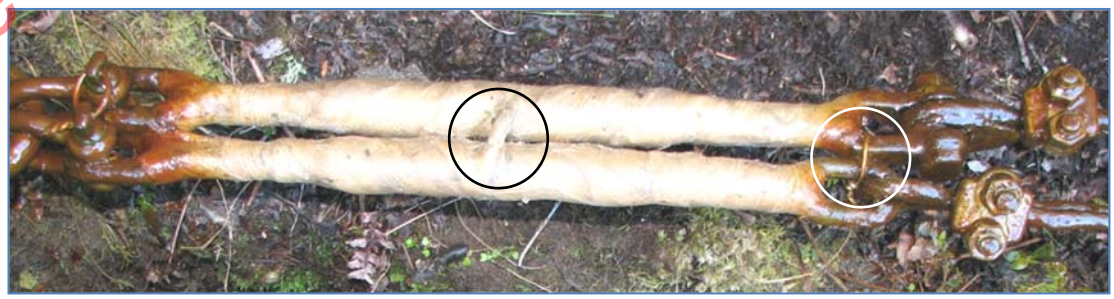


Figure 5.48 Alternative locking wire installation – paired rigging screws wired together. Note installation of Denso Tape for extent of threads only.

5.4.5.5 Denso Tape

Denso Tape is a corrosion protection system designed for buried steel components e.g. suspension bridge ground anchor rods. Generaly, the only other application of Denso Tape on DOC structures should be to rigging screw threads (components 1 and 2 only). **All other cable hardware should be left exposed to allow inspection.**

The full Denso system consists of three components:

1. Primer Paste
2. Fabric tape impreganated with petroleum based corrosion inhibiters
3. PVC self-adhesive overwrap tape

Figure 5.49 Denso Taped cable grips. Should be stripped, torque checked and left exposed.

Figures 5.50 – 5.53 Application of the full Denso system (primer paste, fabric tape, PVC overwrap) to an anchor rod component prior to backfilling.

5.4.5.6 Cable Terminations

Three common methods for terminating or forming an 'eye' at the end of a cable:

1. **Wire Rope Grips** – assembled on site. Correctly tightened grips will cause a noticeable deformation in the tail end of cables 19mm and smaller. Grips out-of-square with cable may indicate termination slippage. Ideally end of tail is covered with heat-shrink sleeve to protect hands from sprags.

2. **Telurit Swage** – factory assembled. Tail end should be visible at end of ferrule.

3. **Spelter Socket** – factory assembled. Socket pin must be secured with a split pin.

Figures 5.54 – 5.56 Cable termination types

5.4.5.7 Shackles

Shackles are used to connect cable structure components together. Shackles have either a 'screw collar' pin that should have locking wire installed, or a 'safety anchor' pin that is supplied with a split-pin.

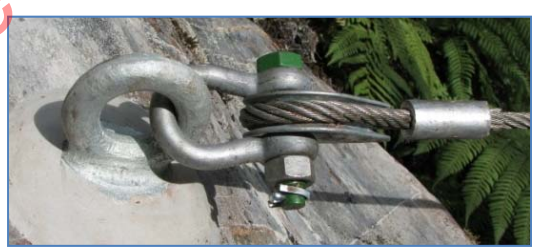


Figure 5.57 Green Pin Standard Bow Shackle with safety bolt

Figure 5.58 Green Pin Standard Bow Shackle

5.4.5.8 Main Cable Anchors

There are two primary types of main cable anchor, rock anchors where steel rods are drilled and grouted into rock, and ground anchors where a timber or concrete 'deadman' is buried in soil.

Figure 5.59 Reinforced concrete deadman under construction for suspension bridge main cable anchor.

Figure 5.60 Timber deadman under construction for swingbridge main cable anchor.

Figure 5.61 Rock Anchor – Check for opening of joint between anchor mortar and rock.

Figure 5.62 Rock Anchor – Check for obvious recent movement of existing cracks around anchor or the development of new cracks.

Figure 5.63 Failed NZFS Type Rock Anchor – These rely on an expansion bolt (prone to corrosion) and friction, they are not grouted into the rock.

Figure 5.64 Reidbar End-Fittings – Check pin locking wire or 'R-Clip' in place. Check end-fitting not un-winding from rod (it should typically be grouted onto rod or be drilled for locking wire).

5.4.6 Special Purpose Structures

5.4.6.1 Helipads

Figure 5.65 Kelman Hut helipad, Aoraki

Figure 5.66 Three Kings Is helipad

Figure 5.67 Lyall Hut helipad (on-ground)

Elevated Helipads are built to provide a level surface for landing and take-off in uneven terrain. Special considerations in addition to material degradation and broken or missing components:

- It is important that the helipad surface is not slippery but it is not generally desirable to install anti-slip mesh due to the risk of snagging a skid. A mould-free rough sawn timber deck is generally considered adequate.
- If anti-slip mesh has been installed it must be well fixed with no holes or raised edges.
- The landing approaches and helipad perimeter must be clear of vegetation. As general guidance, an AS350 Squirrel requires a cleared landing area with a minimum diameter of 30m.
- On-ground helipads are generally a cheaper, lower-risk alternative to elevated helipads. Consider suggesting removal of an elevated helipad if practical to bench or backfill to create an on-ground helipad.
- No consideration of CAA helipad regulations is required.

5.4.6.2 Playground Equipment

Figure 5.68 Piano Flat Slide

Figure 5.69 Momorangi Swings

Special considerations in addition to material degradation and broken or missing components:

- Check moving components of swings and similar items of playground equipment for wear e.g. eyebolt anchors, chains and shackles that make up the hangers of a swing.
- Typically shackles in swing hangers won't have locking wire installed because it could snag childrens hands.
- Impact reducing ground cover around playground equipment should be intact and in good condition.
- Check for sharp protrusions, especially on slides.
- No consideration of the requirements of *NZS5828 Playground Equipment and Surfacing* is required (This should be done by a specialist during a baseline inspection).

Figure 5.70 Typical swing seat, hanger fixings and chain prone to wear

5.4.6.3 Tunnels, Stone Arches , Swimming Pools, Historic Artifacts

Figure 5.71 Historic Brick Kiln, Waiuta

Figure 5.72 Banbury Arch, Denniston

Figure 5.73 Historic swimming pool, Waiuta

Historic structures will be degraded to some degree and are likely to have broken or missing components. This can generally be ignored unless it is obvious that significant recent degradation has occured that threatens the structure or visitors.

- The primary consideration is risk to visitors from, for example, falling bricks.
- The presence of rocks on the floor of a tunnel may indicate a rockfall hazard. Check tunnel roof for loose rocks.
- Check slopes above a tunnel portal for potential rockfall/treefall hazard.
- Unused historic swimming pools should generally be fenced to protect visitors from fall hazard or drowning hazard if there is water in the pool.
- Structure inspectors are not expected to have specialist knowledge of historic structure remediation techniques.

5.4.7 Defect Notifications

Defect notifications are recorded on a datalogger or on paper forms (refer Appendix E) for later entry to AMIS. Full and comprehensive descriptions should be given. Guidelines:

- Enter 'long text' as well as a 'short text' summary into the datalogger.
- Avoid abbreviations, take the time to enter complete words and sentences.
- Write with the person repairing the defect in mind.
- Aim to answer;

  What? Describe the defect and identify the affected component.

  Where? True-left, true-right, up-stream, down-stream, 3.0m from north-end, third hanger in from true-right end on downstream side.

  Why? Describe the cause of the defect if known and if this is useful information.

  How? Describe how to repair, material types and dimensions and any special tools or procedures required.

  When? There may be reason to recommended a timeframe/due date for the repair.

5.4.7.1 Special Inspection (by Engineer)

A notification requesting a **Special Inspection** can be entered if the inspector is unsure about some aspect of a structure defect and/or if engineering design input or advice is required to fix the defect. A full and comprehensive description and quality photos may save a site visit by the engineer.

5.4.7.2 Risk Assessment

Structure defect risk i.e. the level of risk to visitors and the structure, is catagorised according to the **consequence of failure** and **likelihood of occurrence** as follows:

Critical*

Death, severe injury and/or structure collapse imminent.

Serious*

Serious injury and/or structure collapse possible in the near future.

High

Moderate injury and/or damage to structure may occur with time.

Routine

Minor injury and/or damage to a structure component may occur with time.

* When 'critical' and 'serious' notifications are uploaded to AMIS an email is autogenerated and sent to the accountable Senior Ranger, Operations Manager, Operations Director and DOC Engineer. Emails continue to be sent until remedial work has been carried out.

5.4.7.3 Closing Structures

Structure inspectors shall close a structure using 'Danger Tape' if they consider further use is a hazard to visitors.

'Critical' defects should **almost certainly** trigger immediate structure closure.

'Serious' defects **may** trigger immediate structure closure.

Local operations staff shall be notified of the closure as soon as possible. The implications of closing a structure that may, for example, be necessary for safe access across a river must be considered. Further action to manage this risk may be required e.g.:

- Arrange a detour route or close entire track.
- Install signage at huts or road ends notifying visitors of the closure.
- In extreme cases, helicopter evacuation of visitors might be required.

5.4.7.4 Photographing Defects

Good photos of structure defects are extremely useful to the operations staff responsible for organising repair work:

- Set up the camera (not a cell phone!) to take reasonably high resolution photos, jpg file size say 4MB. They can be reduced later if required.
- Use the flash to fill in shadows in bright light and for close-ups in low light.
- Use the macro function for close-ups (typically within 150mm of object).
- Learn about the auto exposure and focus functions of a camera.
- Include a context shot or two that show the whole structure and the component affected as well as a closeup of the defect.

Figure 5.65 Sample photos of damaged swingbridge cable

5.4.7.5 Defect Notification Examples

Example 1

Short Text: *Densotaped Cablegrips*

Long Text: *Strip Densotape from all main cable termination hardware. Check cable grip torques and rigging screw locking wire. Reapply Densotape (fabric tape only) to barrel and threads of rigging screw only.*

Risk: *Routine*

Closed? *No*

Example 2

Short Text: *Broken pulley-gaurd*

Long Text: *One of the cableway carraige pulley-gaurds has been struck and broken by someone using the solo-operator handle. Still semi-intact but replacment required within say 12 months. Sketch and photos saved to AMIS.*

Risk: *High*

Closed? *No*

Example 3

Short Text: *Pier washed out*

Long Text: *Third beam support pier from true-right end has been washed away. Beams still semi-intact but bridge not safe to use. Bridge closed with danger tape but recommend installation of more effective barriers wihin 48 hours. Engineer required to inspect and design solution.*

Risk: *Serious*

Closed? *Yes*

Example 4

Short Text: *Cracked anchor weld*

Long Text: *Crack in weld, true-left up-stream main cable rock-anchor plate. Refer photo saved to AMIS. Bridge closed with danger tape but recommend installation of more effective barriers immediately. Engineer inspection required (Radio'd through to Operations Manager, Franz).*

Risk: *Critical*

Closed? *Yes*

Appendix A – Field Equipment List

Inspection specific equipment. In addition to usual field safety equipment.

Inspection Equipment

- ☐ Data-logger
- ☐ GPS
- ☐ Battery pack
- ☐ 8m measuring tape
- ☐ Vernier callipers (plastic)
- ☐ Digital camera
- ☐ Spare camera batteries
- ☐ Flathead screwdriver (as probe)
- ☐ Head Torch
- ☐ Stiff nylon brush
- ☐ Trowel
- ☐ Replacement asset number tags
- ☐ Structure closed tape
- ☐ Spare load restriction signs (1 & 5 person)

Tools & Materials

- ☐ Folding pruning saw
- ☐ Phillips screwdriver
- ☐ Small adjustable spanner x 2
- ☐ Small pair of pliers
- ☐ Hammer
- ☐ 10/100 x 4.0 mm galv. jolt heads
- ☐ Packet of galvanised staples
- ☐ Stainless steel screws for fixing asset number tags and load restriction signs
- ☐ Role of light stainless steel wire

Paperwork

- ☐ Inspection schedule
- ☐ GIS maps
- ☐ Waterproof note book
- ☐ Pencil

Appendix B – High Risk Structure Criteria

Visitor Group	Structure Type (Structure type number[3] in brackets)	Fall Height (m)	Fall Surface
All	All (1 - 47, 49, 99)	All	Hazardous
All	Vehicle bridges (17-26), cable structures2 (7-12, 44), jetties (35), wharves (36), gantries/galleries (29-30), playground equipment (46), helicopter platforms (45).	All	All
SST, DV, ON	All (1- 47, 49, 99)	≥ 1.5	All
BCC, BCA, RS	Viewing platforms (40-42)	≥ 1.5	All
	Pedestrian bridges (1-6, 13-16) & boardwalks (27), ladders (37), staircases (38), ramps (39)	≥ 2.0	All
	Handrail/guidewire/cable (33), safety fence/barrier (34), historic structures (43), retaining walls (31), stiles (47), other structures (99).	≥ 2.0	All

Notes

1. 'All' includes null entries i.e. if no value for Fall Height or Fall Surface has been entered into AMIS the structure defaults to 'High Risk'.
2. Visitor groups are from *SNZ HB 8630 Tracks and Outdoor Visitor Structures.*
3. Refer p.42 Structure Type Summary List for structure type numbers.

Appendix C – Structure Type Names and Definitions

Pedestrian Bridge

Elevated structure providing pedestrian access. People not likely to congregate to view scenery. Greater than or equal to 2.5m clear span.

Type – Based on main structural component spanning between supports:

- Sawn Timber
- Poles
- Laminated, Glued (Glue laminated timber)
- Laminated, Bolted
- Steel Beam
- Concrete Beam
- Timber Truss
- Steel Truss
- NZFS Swing-bridge
- Other Swing-bridge (deck parallel to main cables)
- Suspension (deck horizontal or cambered)
- 3 Wire Crossing (foot cable and two handrail cables, no decking)
- Cableway (a single suspended cable with a user propelled carriage)

Naming Convention: *'Pedestrian Bridge - Type'* e.g.

'Pedestrian Bridge - Timber poles'

'Pedestrian Bridge - 3 Wire Crossing'

Vehicle Bridge

Elevated structure providing vehicle access.

Types – As for pedestrian bridges (excluding swing bridges, 3 wire crossings and cableways).

Note – old vehicle bridges that are now closed to vehicles and accessible to pedestrians only shall be called 'Pedestrian Bridges – Type'.

Boardwalk

Elevated structure providing pedestrian access. People not likely to congregate to view scenery. Greater than 1m overall length and clear span less than 2.5m.

Boat Ramp

Running surface on ground or elevated for launching boats.

Gantry/Gallery

Elevated walkway traversing a steep slope.

Types

- Cantilevered (supported from below)
- Suspended (suspended from above)

Naming Convention: *'Gantry - Type'* e.g.

'Gantry – Cantilevered'

'Gantry – Suspended'

Retaining Wall

Earth retaining structure ≥ 1.5m high (retaining walls less than 1.5m high do not constitute a structure).

Gabion Basket

Wire mesh basket containing rocks. Used to protect foundations of structures and track formations from river erosion. Usually included as part of the main structure.

Handrail/Guide Wire/Cable

Single rail, chain, rope, wire or cable providing support, guidance, and assistance with movement/balance when negotiating difficult terrain.

Safety Fence/Barrier/Guardrail

Standalone structure placed to protect vehicles or people from fall hazard.

Jetty

An elevated structure extending from land over water and providing access, predominantly for pedestrian and occasional light maintenance vehicles, to boats.

Wharf

An elevated structure extending from land over water and providing access for pedestrians, cargo and vehicles to boats.

Ladder

Steeply sloping (greater than 60 degrees) structure with treads or rungs.

Staircase

Sloping (between 19 and 60 degrees) structure with treads.

Ramp

Sloping (between 5 and 18 degrees) structure with no steps.

Viewing Platforms

Elevated structure where people congregate to view scenery.

Types

- Cantilevered (fixed at one end and cantilevering more than 500mm beyond the last support)
- Raised (structure height 3.0m or less)
- Tower (structure height greater than 3.0m)

Naming Convention: *'Viewing Platform - Type'* e.g.

'Viewing Platform - Raised'

'Viewing Platform - Tower'

Historic Structure

'Actively managed historic structures' e.g. lime kilns, log dams, crushing plants and other old mining equipment.

Flying Fox

A single suspended cable with a gravity propelled carriage.

Helicopter Platform

Elevated platform for helicopter landings.

Playground Equipment

Apparatus constructed for children's recreation.

Stile

Structures which provide pedestrian access across fences.

Swimming Pool

Structures which retain water for the purpose of recreation.

Water Tank Stand

Structures which elevate water supply tanks.

Underground Structure

Types – Adit, Gun Emplacement, Magazine, Shaft, Tunnel, Underpass, Water-Race.

Naming Convention: *'Underground Structure - Type'* e.g.

'Underground Structure – Tunnel'

Other Structure

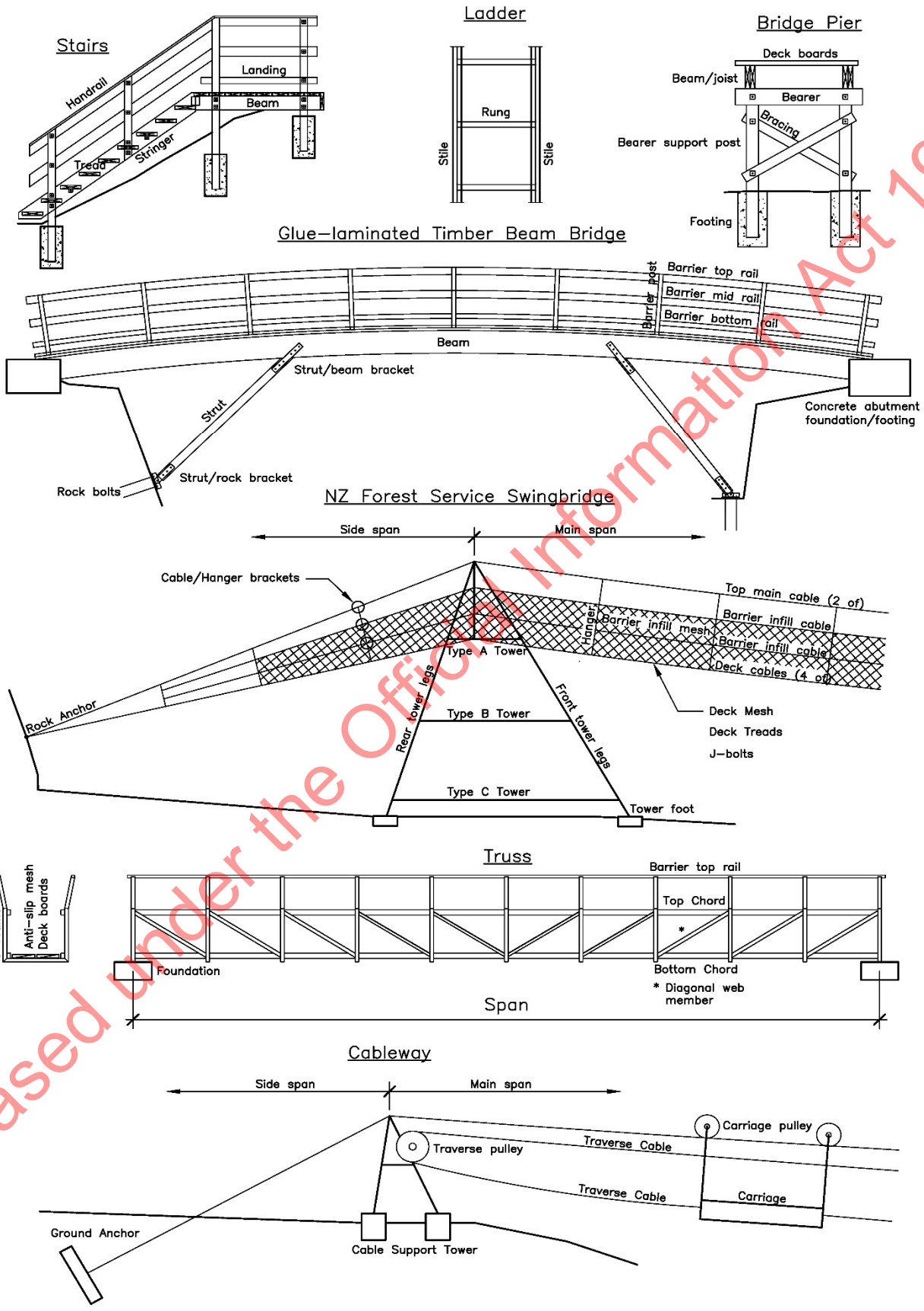
Structure that don't match any of the type definitions above.

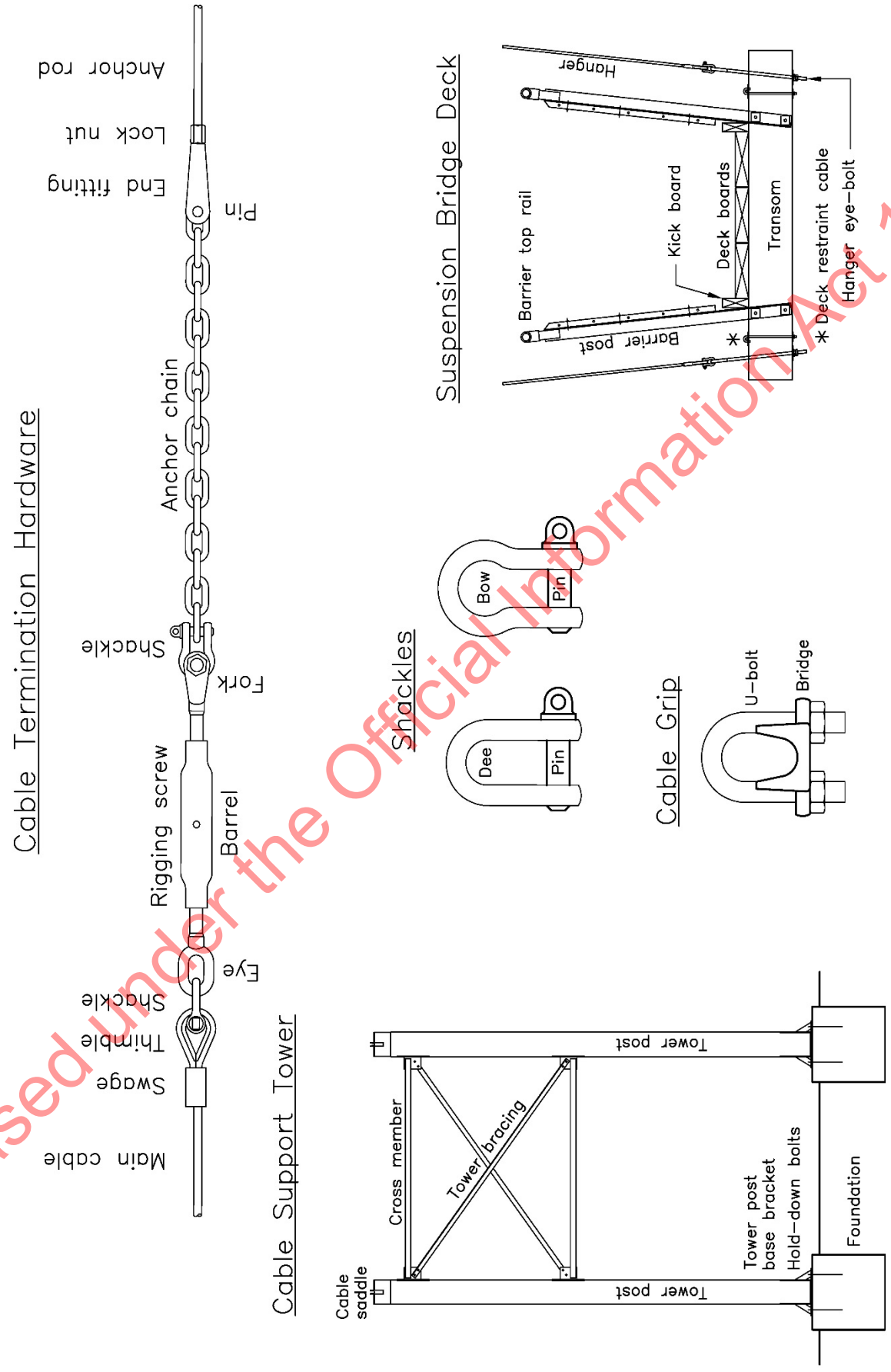
Structure Type Summary List:

No.	Structure Type Name	No.	Structure Type Name
1	Pedestrian Bridge – Sawn Timber	30	Gantry/Gallery – Suspended
2	Pedestrian Bridge – Poles	31	Retaining Wall
3	Pedestrian Bridge – Laminated, glued	32	Gabion Basket
4	Pedestrian Bridge – Laminated, bolted	33	Handrail/Guide-wire/Cable
5	Pedestrian Bridge – Steel Beam	34	Safety Fence/Barrier/Guardrail
6	Pedestrian Bridge – Concrete Beam	35	Jetty
7	Pedestrian Bridge – NZFS Swing-bridge	36	Wharf
8	Pedestrian Bridge – Other Swing-bridge	37	Ladder
9	Pedestrian Bridge – Suspension	38	Staircase
10	Pedestrian Bridge – Cable-way	39	Ramp
11	Pedestrian Bridge – 2 Wire Crossing	40	Viewing Platform – Cantilevered
12	Pedestrian Bridge – 3 Wire Crossing	41	Viewing Platform – Raised
13	Pedestrian Bridge – Timber Truss	42	Viewing Platform – Tower
14	Pedestrian Bridge – Steel Truss	43	Historic Structure
15	Pedestrian Bridge – Combination Truss*	44	Flying Fox
16	Pedestrian Bridge – Other*	45	Helicopter Platform
17	Vehicle Bridge – Sawn Timber	46	Playground Equipment
18	Vehicle Bridge – Poles	47	Stile
19	Vehicle Bridge – Laminated, glued	48	Swimming Pool**
20	Vehicle Bridge – Laminated, bolted	49	Water Tank Stand
21	Vehicle Bridge – Steel Beam	50	Underground Structure – Adit **
22	Vehicle Bridge – Reinforced Concrete	51	Underground Structure - Gun Emplacement**
23	Vehicle Bridge – Suspension		
24	Vehicle Bridge – Timber Truss	52	Underground Structure – Magazine**
25	Vehicle Bridge – Steel Truss	53	Underground Structure – Shaft**
26	Vehicle Bridge – Combination Truss*	54	Underground Structure – Tunnel**
27	Boardwalk	55	Underground Structure – Underpass**
28	Boat Ramp	56	Underground Structure – Water Race**
29	Gantry/Gallery – Cantilevered	99	Other Structure

* These structure types are no longer used

Appendix D – Structure Component Names





Appendix E – Structure Inspection Paper Form 2016

PTO

(Copy structure inspection form onto waterproof paper, double sided)

Department of Conservation
Te Papa Atawhai

DOC Outdoor Visitor Structure Inspection

Date:		**Inspection By:**	
Site Name:		**Tag Number:**	
Structure Name:		**Structure Type:**	
Grid Reference:		**Length (m):**	
Width (m):		**Height (m):**	

Fall Height (m)		**Upstream**	**Downstream**

	Upstream	Downstream
Fall Surface		
Benign	☐	☐
Favourable	☐	☐
Unfavourable	☐	☐
Hazardous	☐	☐
Barrier Type		
None	☐	☐
A – (infill mesh, vertical palings)	☐	☐
B – (top, mid and bottom rails)	☐	☐
C – (top and mid rails)	☐	☐
D – (top rail only)	☐	☐
Natural	☐	☐

Load Restriction:	

Estimated Built Period:		**Known Built Date:**	
Pre -1971	☐		
1972 – 81	☐		
1982 – 91	☐		
1992 – 99	☐		

Est. Remaining Life:	
All components very poor – **4%**	☐
Core components poor – **12%**	☐
Secondary components poor – **20%**	☐
All components deteriorating – **40%**	☐
All components reasonable – **60%**	☐
Near new – **80%**	☐
New (less than 5 years old) – **100%**	☐

Asset Status:	
Open	☐
Closed	☐
Removed	☐
Destroyed	☐

Comments (Not work required, PTO for condition assessment)

Condition Assessment Checklist	
Visual, hands-on, safely accessible components only.	
1. Initial Overview	☐
Plumb, straight and level.	
2. Component Condition	
Broken, bent, loose, cracked, missing, rotten, corroded.	
• ***Barrier System*** *Intact, rigid.*	☐
• ***Decking*** *Anti-slip mesh intact, full-width.*	☐
• ***Beams***	☐
• ***Sub-frame***	☐
• ***Foundations***	☐
• ***Fixings***	☐
• ***Vegetation clearance***	☐
• ***Visitor/environment impacts*** *Graffiti, rockfall, landslide.*	☐
• ***Visitor information*** *Prominent load restriction signage both ends.*	☐
• ***Cables*** *Broken wires/sprags*	☐
• ***Cable hardware*** *Locking wire on rigging screws and shackles, Densotape on rigging screw barrels only, nuts on rigging screw bolts.*	☐
• ***Cable anchors***	☐
• ***Cable support towers***	☐
3. Final Overview	
All the above, true-left, true-right, upstream, downstream, above, below, all-round.	☐

Notification Type/Priority			Short Text	Long Text (**What, Where,** Why, How, When?**)**
1	Maintenance Special Inspection	☐ ☐		
	Routine High Serious Critical	☐ ☐ ☐ ☐		
2	Maintenance Special Inspection	☐ ☐		
	Routine High Serious Critical	☐ ☐ ☐ ☐		
3	Maintenance Special Inspection	☐ ☐		
	Routine High Serious Critical	☐ ☐ ☐ ☐		
4	Maintenance Special Inspection	☐ ☐		
	Routine High Serious Critical	☐ ☐ ☐ ☐		
5	Maintenance Special Inspection	☐ ☐		
	Routine High Serious Critical	☐ ☐ ☐ ☐		