STANDARD PROFESSIONAL SERVICES
SPECIFICATION – MANAGEMENT OF STATE HIGHWAY BRIDGES AND OTHER SIGNIFICANT HIGHWAY STRUCTURES

This standard specification comprises all standard components of the management of state highway bridges and other highway structures. However, only those components specifically requested in the contract scope section are to be undertaken by the Consultant.

1. INTRODUCTION

Essentially, the contract comprises the management of bridges, large culverts and other significant highway structures within the state highway corridors in the contract area. The principal functions include:

• regular inspections of the structures
• structural maintenance activities
• emergency services
• liaison with Network Outcomes Contractors
• managing the posting and rating evaluation of bridges
• liaison with capital projects teams on structure proposals
• maintenance and updating of inventory records
• structure lifecycle management planning.

For the purposes of this specification, “bridges” are structures (including culverts or multiple culverts with a waterway area greater than 3.4m², Bailey bridges, pedestrian subways and stock underpasses) directly supporting state highway traffic. Adjacent embankment protection structures and any bridge approach side protection shall be included as being part of the bridge structure, unless otherwise defined in the schedule.

“Other significant highway structures” shall include structures within the state highway corridor not directly supporting state highway traffic meeting any of the following criteria:

• structures where public safety or critical network function is likely to be significantly affected in the event of failure, irrespective of ownership
• structures of high value
• structures requiring specialised engineering inspection.

Other significant highway structures may include retaining walls, tunnels, gantries, river and coastal protection works, redundant structures, pedestrian structures and risk critical small culverts.

Appendix A includes a flowchart showing various activities and related interactions between the Consultant, the Network Outcomes Contractor and the Principal for defect identification (inspections), maintenance management and maintenance physical works.

2. STRUCTURE INSPECTIONS

The Consultant shall be responsible for the inspection of all specified structures.

Detailed programming of the inspections is the Consultant’s responsibility. However, all inspections shall be completed in accordance with the contract documents.
2.1 Bridge inspection policy

All inspections shall be carried out in accordance with specification NZTA S6: 2017 *Bridges and other significant highway structures inspection policy* and the Transport Agency’s *Bridge inspection and maintenance manual* (2001).

2.2 Schedule of bridges and other highway structures

The Principal will supply a schedule of all bridges and other significant highway structures within the contract area to the Consultant. The type and frequency of inspections for each structure will be specified in the contract Scope of Services.

2.3 Inspections

**2.3.1 Routine surveillance bridge inspections**

Routine surveillance bridge inspections (refer NZTA S6: 2017), will be undertaken by the Network Outcomes Contractor, and are not included in this contract. The Consultant shall however liaise with the Network Outcomes Contractor to agree the timing of these inspections.

By agreement between the Principal, the Network Outcomes Contractor and the Consultant a programme of routine surveillance inspections should be implemented such that the intent that every structure is inspected annually is achieved. The Network Outcomes Contractor is expected to provide the Consultant with inspection results at least monthly or as they become available, to ensure any potential risks are known.

**2.3.2 General bridge inspections**

General bridge inspections are defined in NZTA S6: 2017. The programme for general inspections is included in the Scope of Services. It should be noted that a general inspection includes verification of the descriptive data recorded for each structure in the Transport Agency’s structures database system (refer Section 8.2).

If during a general inspection, structural defects are noted which may affect the load capacity of the bridge or its safety, the Consultant shall request from the Principal approval to undertake a principal inspection or special inspection if this is deemed necessary. The Consultant may also request approval for the inspection to be up-rated to a special inspection at the next inspection cycle.

If during an inspection, it is noted that urgent repair or maintenance is required to a structure, this shall be immediately reported to the Principal and approval sought to proceed with the remedial work.

**2.3.3 Principal bridge inspections**

Principal bridge inspections are defined in NZTA S6: 2017. The programme for principal inspections is included in the Scope of Services.

Some bridges may be identified as having specific access requirements or features requiring unusual or specific inspection. This includes bridges where predominant river flows preclude pedestrian access from the riverbed for detailed inspections, bridges where the superstructure is too far above the bed to allow detailed inspection from the bed, or other access difficulties where specialist access equipment will be required. The traffic management associated with such specialist access equipment shall be specifically included in the Consultant’s site safety plan.

Bridges requiring specialised access machinery or having unusual features to be inspected are identified on the provided schedules together with the relevant details.
2.3.4 Special bridge inspections

Special bridge inspections are defined in NZTA S6: 2017. The programme for special inspections is included in the Scope of Services.

During the contract period, additional bridges to those initially specified or programmed may be identified as requiring special inspections. These shall be agreed between the Principal and Consultant.

Bailey bridge foundations, substructure and decking shall be inspected in accordance with Section 5.5.

2.3.5 Other significant highway structure inspections

The other significant highway structure inspections are defined in NZTA S6: 2017. The programme for other significant highway structure inspections is included in the Scope of Services.

2.4 Inspection reporting

Inspection reports and photographs shall be prepared in accordance with Section 8.1.

The Transport Agency maintains a photographic inventory of all bridges (waterways, approaches, general structural view, and structure details). If since the last inspection, significant changes have occurred at the bridge site, photographs shall be taken (e.g., changes could be replacement guardrails or new river protection works). Copies of the photographs shall be forwarded to the Principal to update Transport Agency records.

3. ROUTINE MAINTENANCE SERVICES

3.1 General

As a result of undertaking inspections, the Consultant shall identify any routine maintenance required.

Routine maintenance definition: All routine work necessary to maintain the condition and appearance of structures. These works are “routine” in the sense that they do not require design input.

Activities include:

- keeping all components clean
- maintaining protective coated surfaces of components above deck level in good condition
- removing detritus from decks, drainage systems, deck joints, etc
- repairing damaged guardrails and handrails
- maintaining waterway and clearing debris from structure
- maintaining drainage systems, deck joints, bearings, linkages etc, and timber decks in serviceable condition
- removing graffiti
- signs, markers, lighting and deck surfacing.

Unless requested by the Principal, routine maintenance implementation does not form part of this contract, and is undertaken by others.

The Consultant shall forward to the Principal and the Network Outcomes Contractor quarterly, a schedule of routine maintenance identified by the Consultant, grouped by network area (as advised by the Principal), including:

- bridge or structure name
• state highway and location reference
• description of maintenance work required
• priority (high, medium, low)
• any specific comments.

Where previous reports have identified that routine maintenance of structures is required, the verification that such maintenance has been completed shall be made at the time of inspection. At the same time that notification of newly identified routine maintenance items occurs, the Principal shall be notified of any previously identified maintenance that has not been undertaken or completed.

Where requested by the Principal, the Consultant shall prepare an Offer of Service for contract preparation and management for routine maintenance projects.

The Offer of Service shall outline:
• description of problem
• estimated cost
• completion date.

Following the Principal's approval of the Offer of Service, the Consultant shall undertake the contract preparation and management in accordance with the Transport Agency’s standard professional services specifications, as agreed with the Principal.

3.2 Liaison meetings

Meetings shall be held on a six monthly basis (unless otherwise agreed with the Principal) with the Network Outcomes Contractor and the Maintenance Contract Manager (for the purposes of this clause and the flowchart in appendix A referred to jointly with the Principal) to discuss the management of bridges and other significant highway structures and in particular routine maintenance. The following issues shall be addressed at the meeting:

• roles and responsibilities
• routine bridge maintenance
  o the Network Outcomes Contractor shall provide a draft schedule of routine maintenance items they have identified. This shall include a prioritised work programme and identify whether the items are included in the NOC lump sum or are outside the lump sum. The Network Outcomes Contractor shall provide prices for proposed routine maintenance items not included under the lump sum
  o the Consultant shall provide details of additional routine maintenance items identified during general and principal inspections
  o the Consultant, Network Outcomes Contractor and the Principal shall discuss routine maintenance requirements and agree on the schedule of work
  o the Consultant, Network Outcomes Contractor and the Principal shall discuss any routine maintenance work that is outside the scope of the Network Outcomes contract that the Network Outcomes Contractor will be asked to undertake as a variation to their Network Outcomes Contract
  o the Consultant, Network Outcomes Contractor and the Principal shall discuss unusual or significant work items and work progress
• structural bridge maintenance
  o the Consultant and the Network Outcomes Contractor shall discuss any structural defects identified by the Network Outcomes Contractor
  o the Consultant shall outline the proposed work programme, noting any work that the Network Outcomes Contractor will be asked to undertake as a variation to their Network Outcomes Contract
4. STRUCTURAL MAINTENANCE SERVICES

As a result of undertaking inspections, the Consultant shall identify, schedule and prioritise all structural maintenance required. Any structural maintenance requirements identified by the Network Outcomes Contractor (from routine surveillance inspections), will be advised to the Consultant.

Structural maintenance definition: All work necessary to maintain the condition and appearance of structures, or to extend the remaining life of structures, where such work requires design input.

Activities include:

- painting of main structural steel components
- repair or replacement of damaged or deteriorated components such as beams, bearings, deck joints, linkages, decks, etc
• underpinning of foundations
• waterway modifications and protection works.

For other than large projects, and as agreed by the Principal, the Consultant shall prepare an Offer of Service for investigation, design and/or contract preparation and management for structural maintenance projects.

The Offer of Service shall outline:
• description of problem
• nature and extent of investigation and/or design proposed
• estimated cost
• completion date.

Following the Principal's approval of the Offer of Service, the Consultant shall undertake the investigation, and/or design, and/or contract preparation and management in accordance with Transport Agency standard professional services specifications, and current relevant investigation and design standards as agreed with the Principal.

Where the Principal requires such work to be tendered (eg for large projects), the Consultant shall provide all the available information to allow preparation by the Principal, of contract documents for professional service contracts.

5. EMERGENCY SERVICES

5.1 Inspection

The Principal will advise the Consultant whenever an emergency inspection is required to be undertaken. In some situations, this request may be received directly from the Network Outcomes Contractor, in which case the Principal must be advised as soon as possible.

The Consultant shall undertake the inspection as soon as it can be arranged. Any assistance required (eg traffic control), shall be arranged with the Network Outcomes Contractor, via the Principal.

5.2 Emergency action

If the results of any inspection show that emergency action is required to temporarily strengthen a structure or to close a bridge or part or all of a road, or to perform any other work, the Consultant shall communicate immediately with the Network Outcomes Contractor via the Principal, to implement such action.

5.3 Emergency reporting

Immediately following the inspection, the Consultant shall notify the Principal of the action the Consultant recommends.

The Consultant shall forward a written report outlining the results of the inspection and recommendations for any further investigations, strengthening, repair or other actions required, and the timing of such work.

5.4 Investigations and design

Where further investigations, design or other professional services are required urgently, the Principal will brief the Consultant to undertake such work.
5.5 Bailey bridges

As part of Transport Agency’s contingency plans in case of emergency state highway closures, temporary Bailey bridges will be utilised wherever necessary to expedite the re-opening of the highway to traffic. The Transport Agency has in place a Bailey bridging services contract, which includes the design, erection, inspection, maintenance and dismantling of Bailey bridge superstructures and bearings.

The Network Outcomes Contractor is responsible for the managing and overseeing of all emergency works in relation to the re-opening of a state highway after closure. Where the closure is due to a bridge failure or other failure, and a Bailey bridge is indicated as an appropriate action, the Network Outcomes Contractor is required to immediately advise the Consultant.

In this situation, the Consultant's responsibilities are as follows:

- To respond immediately, at any time of the day or night.
- To make the emergency work a top priority for as long as it takes to re-open the highway.
- To liaise at all times with the Network Outcomes Contractor and report regularly on progress.
- To immediately visit the site and determine from the conditions and geotechnical information available, the appropriate course of action, ie whether or not to proceed with a Bailey bridge construction.
- If a Bailey bridge is deemed appropriate, notify the Bailey bridging services contractor accordingly.
- To arrange for any site information required.
- To determine the overall bridge location, alignment and span arrangement.
- To liaise with the Bailey bridging services contractor to confirm the proposed bridge layout and obtain relevant Bailey bridge information.
- To be responsible for the design of the Bailey bridge foundations and sub-structures.
- To supervise foundation and sub-structure construction if requested by the Network Outcomes Contractor.
- To arrange and implement an ongoing maintenance and monitoring programme for the bridge foundations, sub-structures and timber decking.

6. CAPITAL PROJECTS

6.1 Capital project involvement

The Consultant shall provide input to capital projects that include structures to ensure that planning, design and construction of those projects produce the best outcomes for the network. The Consultant will be required to assist the Principal by providing inputs leading to sound asset management decisions, such as operations and maintenance considerations, whole-of-life issues and value-for-money outcomes.

The focus of the Consultant’s involvement is to provide recommendations during the pre-design/design phases and in particular for the concept design. The extent of the Consultant’s involvement shall be agreed with the Project Manager on a project-by-project basis. This may include liaison with the Network Outcomes Contractor to get the best outcomes for the Transport Agency.

Specifically, the Consultant shall consider:

- conceptual design issues
• “fitness for purpose”
• “whole-of-life” cost effectiveness
• “value-for-money”
• consistency in asset components
• inspection, maintenance and operating issues.

In addition, the Consultant shall be responsible for ensuring all structures data is provided for inclusion in the Transport Agency’s structures database and is of appropriate quality.

6.2 **Projects requiring input**

The Project Manager will advise the Consultant where input is needed to capital projects.

Where the Consultant is aware that a capital project that includes structures is proposed or underway, and that independent review could be beneficial to the Transport Agency, the Project Manager shall be advised.

7. **BRIDGE POSTING EVALUATION**

The procedures for the posting evaluation of bridges shall comply with the Transport Agency’s *Bridge manual* and the following clauses:

7.1 **Bridges requiring evaluation for Class 1 loading**

The Consultant shall report to the Principal and recommend as appropriate, a posting evaluation for any bridge where:

• inspection indicates that structural deterioration has occurred
• distress is evident
• the capacity of the bridge to carry normal highway loading is in doubt
• the bridge operates at a stress level or load factor other than the standard values specified in the Bridge Manual
• it is proposed to modify a bridge (e.g., apply an overlay or undertake repairs) and where the modification may affect the load carrying capacity of the bridge
• for any reason the capacity of the bridge to carry normal highway loads requires review.

Where the Principal is aware that modifications or maintenance to any bridge is proposed (e.g., resurfacing, addition of services) and is being undertaken by others, and may affect the bridge load carrying capacity, the Consultant will be advised.

The Consultant shall obtain the agreement of the Principal before undertaking any evaluation.

7.2 **Posting reports for Class 1 loading**

The results of the evaluation shall be forwarded to the Principal. Where a posting (decreased allowable load limit) is recommended, or where the bridge does not comply with the requirements of the *Bridge manual*, the report shall include:

• an engineer’s certificate
• the recommended posting (gross weight, axle weight and speed limit)
• the number of vehicles per day affected by the restriction
• the availability of alternative routes
• the level of stress used
• the predicted mode of failure
• justification for a more rigorous analysis, where this may produce an increased bridge capacity
• recommended action (eg replacement, strengthening, or leave as-is), and timing of such action
• the method and rough order cost estimate of strengthening (if applicable).

7.3 Annual notification of load and speed restrictions on bridges

The Heavy Motor Vehicle Regulations 1974 require the Transport Agency to publish bridge load and speed restrictions annually. The Consultant shall advertise any state highway bridge load and speed restrictions in accordance with the regulations, and forward a copy of the advertisements with a summary table, to the Principal. The annual notification of restrictions shall be advertised prior to 1 October every year.

7.4 Posting evaluations for high productivity motor vehicles (HPMVs)

The Principal shall advise the consultant of any bridges requiring posting evaluations for high productivity motor vehicles (HPMVs).

8. REPORT FORMATS AND INVENTORY MAINTENANCE

8.1 Structure inspection reports

Inspection reports shall be prepared for each structure in accordance with NZTA S6: 2017. Any component requiring specific maintenance shall be photographed for the inspection report.

The inspection report is the primary means of communicating the condition of each structure, and all key issues associated with the structure. The Consultant shall ensure that the inspection report is updated as required, to reflect changes in the structure condition, recommendations for future action, or any other issues that need to be communicated to the Principal or other consultants. This must include all recommendations relating to the future monitoring, maintenance, repair, or replacement of the structure.

Inspection reports and photographs shall be provided in electronic format in either Word or Excel format. Photographs shall either be embedded in the report or appended at an appropriate place for each structure. The reports and photographs shall be fully indexed.

Photographs shall be taken in high-resolution digital format capable of being printed up to A4 size without loss of resolution. The photos shall be provided in .jpg or .jpeg format.

8.2 Bridge data system (BDS) - descriptive data maintenance

The Transport Agency operates a computerised bridge data system, which includes an inventory of all state highway bridges and large culverts.
During the bridge inspections, any changes required to the descriptive data held in the BDS shall be noted and advised in the monthly reports. The Consultant shall prepare updated BDS detail sheets for this purpose.

BDS detail sheets for new or replacement structures, will in general, be provided by the Consultant separately engaged for design and project documentation (D&PD) for each structure, unless advised otherwise by the Principal.

The Principal shall arrange for completed detail sheets to be forwarded directly to the Consultant for review, prior to input into the system. Where the Consultant is aware that a new or replacement structure is in use and the BDS has not been modified, the Principal shall be immediately advised.

The BDS detail sheets, codes and definitions are described in the Transport Agency’s BDS user guide: part A descriptive guide. For minor amendments to existing data, an annotated copy of the existing BDS detail sheet may be used. All BDS detail sheets shall be reviewed by the Consultant for compliance with the BDS structural guide. The input sheets shall be forwarded to the Principal in a timely manner. Input of the data and management and operation of the system, is not included in this contract.

After processing of data, the Principal will return updated BDS detail sheets for verification by the Consultant.

8.3 As-built drawings

The Consultant is responsible for maintaining complete and accurate structure as-built drawings. The Consultant shall hold the drawings on behalf of the Transport Agency until such time as they can be stored within the Transport Agency’s proposed structures management system.

The Consultant shall maintain in an up-to-date manner the Transport Agency National Office as-built drawing register for their region(s).

During the bridge inspections, any changes required to the as-built drawings or any missing drawings shall be noted and advised in the monthly reports and noted in the drawing register.

As-built drawings for new or replacement structures, will in general, be provided by the consultant separately engaged for design and project documentation (D&PD) for each structure, unless advised otherwise by the Principal. The Principal shall arrange for completed as-built drawings to be forwarded directly to the Consultant for overview, prior to recording in the Consultant’s system. Where the Consultant is aware that a new or replacement structure is in use and the as-built drawings have not been submitted, the Principal shall be immediately advised.

As-built drawings shall be completed in accordance with NZTA PSG/9: 2014 Delivery of as-built documentation.

8.4 Structure records

The Consultant is responsible for maintaining complete records of significant and relevant information pertaining to the operation, maintenance and future management of structures. The Consultant shall hold the records on behalf of the Transport Agency until such time as they can be stored within the Transport Agency’s proposed structures management system. It is not intended that correspondence that is not directly relevant to the future bridge management should be recorded by the Consultant.

Records shall include (but not be limited to) the following:

- Resource Management Act conditions
- heritage listings
- adjacent landowner correspondence
• relevant general correspondence
• agreements
• reports and other documents
• operational limitations/conditions
• technical information such as geotechnical data, hydrological records, loading evaluations, structural capacity outcomes.

The Consultant will either receive information directly, or will be provided with information for recording by the Principal. Where the Consultant is aware that relevant information is available but is not held by the Consultant, the Principal shall be immediately advised.

9. OVERWEIGHT PERMIT SYSTEM

9.1 Bridges requiring overweight rating evaluation

The Consultant shall obtain the agreement of the Principal before any overweight rating evaluation is undertaken. The procedures for the rating evaluation shall comply with the Transport Agency’s Bridge manual.

Any bridge where the capacity to carry overweight loads is considered by the Consultant to require review, shall be identified and reported to the Principal. Where the Principal is aware that modifications or maintenance to any bridge is proposed (eg resurfacing, addition of services) and is being undertaken by others, and may affect the bridge load carrying capacity, the Consultant will be advised.

9.2 Bridge data system (BDS) – structural data maintenance

The Transport Agency operates a computerised permit issuing system for the processing of state highway overweight permit applications. This system uses bridge structural data held in the BDS.

It is of prime importance to the Transport Agency that the Consultant maintains the BDS structural data in an accurate and up-to-date condition. This shall include, but not be limited to, the preparation or revision of data for all noted inconsistencies and for all modifications (including new structures) carried out within the network area. Input of the data and operation and management of the system is not included in this contract.

BDS structural input sheets for new or replacement structures will in general be provided by a consultant separately engaged for the design and project documentation (D&P) for each structure, unless advised otherwise by the Principal. The Principal will arrange for completed input sheets to be forwarded directly to the Consultant for review, prior to input into the system.

Where the Consultant is aware that a new or replacement structure is in use and the data held in the BDS has not been modified, the Principal shall be immediately advised.

The appropriate BDS structural input sheets shall be completed for each structure in accordance with the Transport Agency’s BDS structural guide.

The data input sheets shall be completed and forwarded to the Principal in a timely manner for input to the inventory. After processing of data, the Principal will return the updated structural inventory data for verification by the Consultant.
9.3 **Overweight permit technical support**

Overweight permit applications are processed by the Principal, using the computerised system.

The Consultant will be required to provide the Principal with technical advice on computer output and approval of overweight applications. Supervision of the movement of overweight vehicles is not included within this contract.

The overweight permit system is also used to process HPMV applications. The consultant will be required to provide the Principal with technical advice on computer output and approvals for some of these HPMV applications.

10. **GENERAL REPORTING**

10.1 **Consultant's monthly report**

Further to the requirements set out in the contract management specification and the contract Scope of Services, the consultant's monthly report will include description of the following items:

- progress of inspections
- routine maintenance items identified
- progress of structural maintenance professional services
- recommended structural maintenance works for urgent consideration
- progress reports on physical works contracts
- posting or rating analyses undertaken
- HPMV analysis outcomes
- bridge data system (BDS) updates (descriptive and structural)
- overweight permit technical support
- emergency works
- any additional information considered pertinent by the Consultant
- any outstanding issues.

This information will be formatted such that the information is separable for individual Transport Agency regions, and where requested by the Principal, for network management areas.

10.2 **Handover report**

The Consultant shall, unless directed otherwise, prepare a handover report on completion of the contract, at the time specified in the contract deliverables. The report will summarise previous reports and unresolved issues, and will include all data and deliverables that may not have been previously forwarded, or which are required by the succeeding consultant.

11. **LIFECYCLE MANAGEMENT PLANNING**

The consultant is generally responsible for developing and implementing regional lifecycle management plans that ensure appropriate structure performance and appropriate condition are maintained at the least whole of life cost. In addition it is the consultant’s responsibility to continuously manage structure risk across the network.
The consultant shall prepare regional lifecycle management plans for all network structures every three years to support the three year funding request. The plan shall be prepared in accordance with the detailed instructions that will be provided at the time. These instructions will include a template that will cover in summary, the inventory, asset condition, asset performance, risk and forecast maintenance and renewals.

Individual structure management plans shall be prepared for significant structures with significant structural or other issues warranting specific investigations, monitoring and management. The development of such plans shall be recommended to the Principal for approval.

12. ANNUAL FUNDING PROGRAMMES

12.1 Preliminary funding request

The Consultant shall forward to the Principal within the time specified in the contract documents, a preliminary funding request for structures maintenance and component replacement activities for the following financial year (1 July - 30 June). The preliminary funding request will be based on known maintenance requirements, whether currently programmed or as a result of current inspections, and an assessment of likely needs based on knowledge of the bridge stock and other structures.

The preliminary funding request will be reviewed by the Principal and will be used to develop the regional state highway funding request. It is recognised that the proposed work programme may change as a result of ongoing inspections, changing priorities and final funding allocation.

The funding request shall be developed in accordance with the State highway annual plan instructions manual (SM018).

12.2 Final funding request

The Consultant shall forward to the Principal within the time specified in the contract documents, a final funding request for the following financial year. The final funding request shall update the preliminary funding request subsequent to the completion of the inspections. This request (once approved), will itemise the maintenance and component replacement work to be carried out in the following financial year.

12.3 Final allocation advice

The Principal will advise the Consultant of:

- the final maintenance and component replacement funding allocation
- the approved works for each region
- the extent of work, if any, the Consultant is required to undertake in the following financial year.