E-ACRS MANUAL

Extended Asset Condition Reporting System Inspections

ISC

Indigenous Services Canada

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Section 1

Introduction

The Asset Condition Reporting System (ACRS) inspections was developed in response to the Treasury Board request for a better method of determining asset recapitalization requirements, i.e., based on actual asset condition. ACRS involves an inspection of all on-reserve non-residential, O&M funded assets. It was implemented nationally during 1990 and 1991.

In June 1997, the Assistant Deputy Minister, Corporate Services of INAC issued an interim directive on "Compliance Guideline for the Operation and Maintenance of First Nations Assets". The guideline articulated INAC's vision with respect to the operation and maintenance (O&M) of on-reserve, departmentally funded assets. The key focus of the guideline is to ensure that community assets are operated and maintained to provide necessary services and prevent premature recapitalization. The focus led to a new requirement for the assessment of O&M Effort as part of the ACRS inspections.

In 2014, the department introduced new criteria related to the evaluation of Public Access Buildings. The criteria includes a more detailed assessment for buildings classified as "Public Access Buildings". Building considered as Public Access Buildings (PAB) are outlined in the PAB section of this manual.

In July 2017, the Minister of Indigenous Services Canada called for a review of the O&M Policy Framework. In December 2017, the Assembly of First Nations (AFN) passed a resolution to support the joint review of the framework. In 2019, the AFN engaged on the department's O&M Policy Framework including considerations for Extended-Asset Condition Reporting System (E-ACRS) inspections.

ISC piloted E-ACRS inspections in fiscal 2021-2022, receiving positive feedback, and in fiscal-year 2022-2023 the department commenced implementation of the E-ACRS inspection program.

Section 2

Scope of Work

For certainty, inspectors under contract to complete an E-ACRS inspection should refer to "the scope of work requirements", provided in the Term of Reference (TOR) that accompanied the specific Request for Funding Proposals (RFP).

This section is provided for readers of this manual, to allow for an understanding of the general scope of work requirements and information to be gathered during an E-ACRS Inspection.

2.1 Requirements

- The recipient shall use the National Request for Proposals template and other National documentation to engage consulting firms to submit proposals for inspections to be completed under the E-ACRS program.

- The Consultant shall be licensed to practice as a professional engineer and/or architect in the province where the inspections are to be completed.

- The Program Administrator, appointed by the recipient (First Nation or Tribal Council), will be responsible for ensuring that all work is carried out in accordance with quality, time, and budget requirements.

- The recipient shall prepare and submit for the Department's approval, a project proposal detailing the management regime, the approach, the budget, and schedule pertaining to the work covered under this arrangement

- The Consultant shall provide all information obtained from the inspection of assets on the forms outlined in the TOR and included in the E-ACRS manual. The documentation requirements include, but are not limited to, the ICMS Export/Import Excel Workbooks consisting of the Compact Inspection, Fire Protection Questionnaire and Asset Replacement Tool (ARV Tool) that generates the 35-year Chart and draft and final reports

    - Note: It is critical to **never add, delete, or modify any rows, columns, headers, or cell fields** in any way. Doing so can compromise the accuracy and functionality of the data.

- Unless otherwise specified, all meetings will be held at the location chosen by the First Nation or Tribal Council

- The Consultant shall apply his or her professional stamp or seal and signature, to the cover-page of the final report and to the Executive Summary, to identify his or her professional responsibility for the information contained in the inspection forms, excel workbooks and final reports.

- A list of assets, from ICMS, for each site to be inspected in the fiscal year will be provided with the request for proposals (RFP)

2.2 Objectives

The objectives of the E-ACRS Inspections are to:

- Assist First Nations' to understand the role of operations and maintenance as part of good asset management practices

- Obtain condition ratings of all on-reserve assets that receive ongoing funding from the department

- Identify maintenance needs required to protect the health and safety of the users of the assets and to prolong the service life of the assets.

- Improve financial forecasting of asset recapitalization costs.

- Review First Nations' Maintenance Management Plans (MMP) and practices as well as overall O&M performance.

- Provide information that will support the development of Asset Management Plans by providing a 35-year forecast (the ARV Tool generates the forecast) for each asset's component lifecycle needs, related to recapitalization, not O&M, needs.

- Collect relevant data to measure progress against key performance indicators under the department's Capital Facilities and Maintenance Program (CFMP) by completing all relevant data fields in the ICMS Export/Import Excel Workbooks.

2.3 Program Administrator

The contract to carry-out inspections for the E-ACRS will be between the Consultant and the First Nation (FN) or Tribal Council (TC). The Program Administrator is the individual assigned by the FN or TC to manage the E-ACRS project.

2.4 Scope of Work

The scope of work pertains to work to be conducted on all First Nation's departmentally funded assets as provided in the ICMS List of Funded Assets.

Deliverables

- An E-ACRS Final Report with an Executive Summary prepared/organized as outlined in appendix T of the E-ACRS Manual, to be provided to the First Nation and the department.

- On-site Inspection of all departmentally funded assets as provided in the ICMS Asset List with guidance provided in the Scope of Work and the E-ACRS Manual.

    - Note: see Appendix S for full list of departmentally funded assets

- Data to be captured for submission in the ICMS Export/Import Excel Workbooks and the Inspection Forms, one form to be completed for each asset, outlined in the table below. The forms can be completed from the Excel or the Word version of the templates.

Appendices	List of Forms	E-ACRS Manual
A	General Inspection Form	Section 2
B	Building Inspection Form	Section 2
C	Public Access Building Inspection Form	Section 2 & 4
D	Roads Inspection Form	Section 2 & 5
E	Bridge Inspection Form	Section 2 & 6
F	Linear Asset Inspection Form	Section 2
G	Water & Wastewater Systems Protocol Inspection Form	Section 2 & 7
H	Fire Protection Questionnaire Inspection Form	Section 2 & 8
I	O&M Action Plan Inspection Form	Section 2
J	Asset Groups Description Inspection Form	Section 2
K	Maps Inspection Form	Section 2
L	Floor Plan Inspection Form	Section 2
M	Excel Version of Word Inspection Forms	Section 2, 4, 5, 6, 7 & 8
N	ICMS Database Asset Change Form (include: change in use, new assets, decommissioned assets)	Section 2

V	**ICMS Import/Export Workbooks : Compact Inspection, Asset Replacement Valuation Tool (including generating the 35-year Chart from the ARV Tool) and Fire Protection.**	**To be exported from ICMS and provided to inspectors**

Upon Award of the Contract

- **Initiation Meeting and Data Collection**

Upon award of contract, a project initiation meeting with the Program Administrator is required. Additional information will be provided at this meeting.
This information, when available, will includes:

a) Record drawings

b) Previous ACRS and/or E-ACRS reports

c) First Nation contact information

d) E-ACRS inspection forms

e) Three Integrated Capital Management System (ICMS) upload spreadsheets, more specifically; the Compact Inspection, Fire Protection Questionnaire and the ARV Tool, that generates the 35-year Chart

In the case of water and wastewater asset, the following additional information will also be provided, if available:

f) ISC Water and Wastewater system numbers

g) the most recent Water and Wastewater Assessments (API report)

h) Circuit Rider contact information – Water Operators

Information supplied to the inspectors/consultants is confidential and is NOT to be used for purposes other than the E-ACRS Inspection Program.

- **Schedule Inspections**

  - Contact the First Nation to schedule an acceptable date of inspection (may need to work directly with the Program Administrator to coordinate scheduling). Request for the First Nation Administration, First Nation Public Works Manager, and/or Maintenance Supervisor to briefly meet with you to provide background information on the assets being inspected before commencing the inspection.

  - Follow up by faxing/emailing an “introduction letter” (template letters are provided in Appendix U of the E-ACRS Manual). This letter provides the First Nation with additional information on the E-ACRS program, informs them of how to prepare for the meeting, and confirms your scheduled date of inspection.

Whenever possible, site visits should be kept to a minimum time and be as non-disruptive as possible to the First Nation Community.

Inspection Preparation

The inspector should prepare for the inspection by performing the following tasks for each First Nation visit:

- Review the ICMS List of Funded Assets to be inspected, should include all assets funded under ISC's Capital Facilities & Maintenance Program and Health Facilities Program

- Review the Deficiencies/Project List for outstanding projects from prior inspections

- Review all applicable sections of the E-ACRS Manual for inspector's guidance on each asset group included in the ICMS Asset List and the related inspection forms to become familiar with the inspection requirements and the data requirements for completing the Final Report and ICMS workbook submissions to the department.

- Review the data requirements in the ICMS Export/Import Workbooks: Compact Inspection, Fire Protection Questionnaire and the ARV Tool, to ensure inspectors are aware of all the necessary information for completion of the spreadsheets before completing the field work. Components for each asset are identified in Appendix Q of the manual and require specific attention during the site visit.

- Become familiar with the facilities and/or systems to be inspected by reviewing available record drawings and previous ACRS or E-ACRS reports.

- For the inspection of water and wastewater assets, contact the Circuit Rider assigned to the First Nation (contact information will be provided if applicable).

- The Circuit Rider Training Program is a long-standing training program offered to First Nations' water and wastewater operators.

- Circuit Riders are experienced and certified operators that are contracted to provide hands-on training to water and wastewater operators. It is advisable to contact the Circuit Rider assigned to the First Nation prior to the site inspection. Circuit Riders are knowledgeable about the First Nation's water and wastewater systems and can often provide an overview of the O&M function in the community and specific problems pertinent to the water and/or wastewater systems.

Interview with First Nation

Meet with First Nation (FN) Administration, FN Public Works Manager and/or Maintenance Supervisor/Personnel to:

- Provide a general overview of the E-ACRS inspection process.
- Review ICMS Asset List and confirm with the FN that the list is correct/complete.

- Update Asset List to be inspected, if required, and confirm the addition or deletion of the assets with the regional contact officer.

- Identification of **Solid Waste (SW) and Health Facilities (HF)** assets not included on the Asset List provided for inspection by ISC. ISC updated asset codes in ICMS for **SW and HF** asset categories. To ensure all funded assets are included in ICMS, it will be important to work with the community to determine any assets not included on the Asset List provided and to add the assets in the form titled**: "ICMS Database Asset Change Form" (Appendix N)** so updated can be made in ICMS.

- Review the Existing Deficiencies/Project List with the First Nation representatives and determine the status of projects during the meeting (if known) and by visual inspection of the asset.

- Review existing Maintenance Management Plans and Emergency Response Plans.

- Discuss any concerns of the First Nation regarding O&M and their assets in general and make note of the concerns for further assessment during the inspection.

- Review the **Fire Protection Questionnaire** with the First Nation to collect responses to the questions outlined in the questionnaire- answering these questions will require input from a First Nation representative. When the First Nation has a fire-hall the inspector should meet with the Fire Chief/Fire Marshal to complete the questionnaire.

- At the end of the inspection, meet again, for a brief exiting interview to convey general information on the findings of the inspection and timing of providing a draft and/or final report. This will also inform the First Nation of the inspector(s) leaving the site

Inspection Process

Carry out an inspection/assessment of all funded assets listed in the ICMS export/import Workbooks and summarized in the ICMS Asset List. Inspection requirements and guidance are provided, by asset group and by components in the E-ACRS manual. Reference to the appropriate sections of the manual, the ICMS Workbooks including the ARV Tool and the

inspection forms for each asset type should provide inspectors with a good overview of the requirements.

For new funded assets not included in the ICMS Asset List that are identified during the interview with the First Nation or on the ground inspection **only complete the ICMS Database Asset Change Form (Appendix N)** and provide technical drawings where available using Appendix L. Submit the ICMS Database Asset Change Form to the ISC regional office within two weeks of the inspection. The regional office will confirm the approach for completing ICMS Excel Workbooks (Appendix V):

1. Only complete the ICMS Database Asset Change Form (Appendix N) and do not include assets in the ICMS Excel Workbooks (Appendix V)
2. New ICMS Excel Workbooks (Appendix V) will be provided including the new assets identified. Only mandatory fields in the compact inspection are required to be completed, the ARV Tool is not required to be completed.

Inspections of the School Facilities, when possible, **should** be performed while the schools are in session, preferably in April to mid-June (timing may vary by region – check with the Program Administrator)

Draft inspection reports should be completed and transmitted to each First Nation within two-weeks following the inspection (extension may be available in some circumstances, please confirm with the Program Administrator or the ISC Regional Contact Officer). Timelines may vary by region check with the Program Administrator.

ICMS Data Quality Verification

The ICMS Compact Inspection Workbook contains tombstone data about the assets. To ensure the asset information is accurate and current, four (4) ICMS data elements are to be verified by the inspector during the inspection:

- **Location/GPS & Description**
  The location of assets recorded in the ICMS Compact Inspection Workbook should be checked against a map, and/or visually confirmed while on-site. GIS coordinates should be as precise as possible (ie; at the front door or center of the facility). Coordinates must also be a minimum of 5 decimal characters.

- **Actual Usage of the Asset** (Asset Code)
  The asset code recorded in the ICMS Compact Inspection Workbook should be checked against the current actual usage of the asset, not the original purpose for which the asset was designed. If a change in use is identified, please refer to the instructions in the E-ACRS Manual for validating and recording a change in use. Complete the **"Asset Inventory Change Inspection Form"** for submission to ISC for manual updates to ICMS.

- **New or Decommissioned Assets**
  Complete the **"Asset Inventory Change Inspection Form"** for submission to ISC for manual updates to ICMS. Discuss the newly identified or decommissioned asset with the First Nation, if the First Nation agrees with the addition of the asset, add it to the form. Discuss the decommissioned asset with the First Nation to determine if plan is to replace or if asset is permanently closed, include this information in the form.

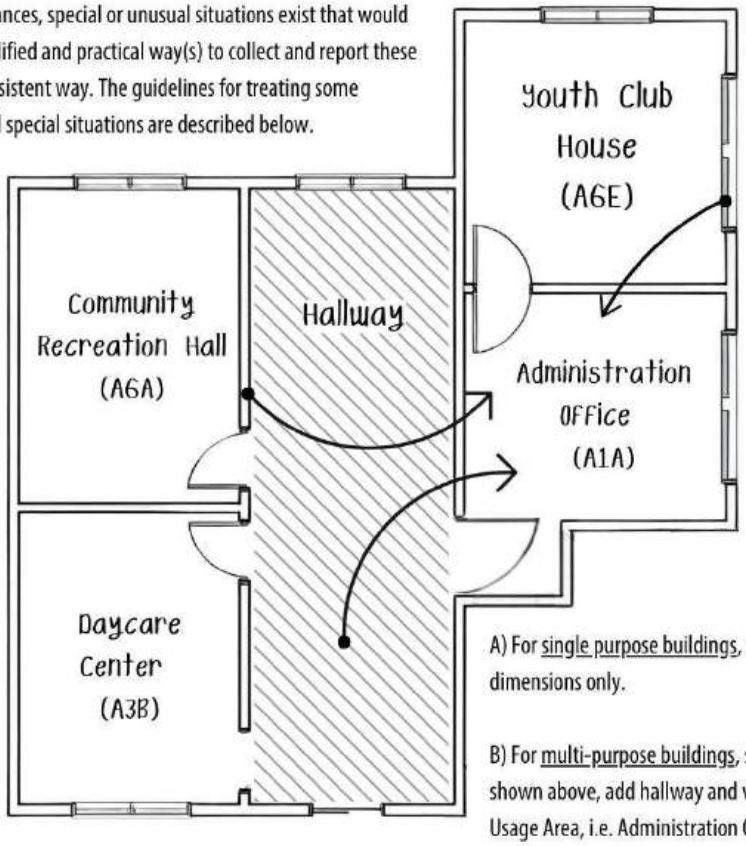
  Note: Do not attempt to update the asset codes in the ICMS Workbooks this will have to be completed by the department after the inspection data is imported, manual system updates are required.

- **Asset Quantity**
  In each E-ACRS inspection year and for each Site, the following assets are to be **physically measured or counted**, as a minimum:

  - ✓ **Buildings,** two (2) assets are to be measured preferably the school and the community centre. *If these two asset types are not in the ICMS Compact Inspection Workbook the inspector must selection two buildings for the ICMS Compact Inspection Workbook to be measured.*
    - ❖ If one building contains multiple asset codes, please refer to the drawing below for accurate space measurement guidance and complete the floor plan inspection form (Appendix L).

Simplified approach to special situations

In some instances, special or unusual situations exist that would require simplified and practical way(s) to collect and report these data in a consistent way. The guidelines for treating some common and special situations are described below.



A) For single purpose buildings, measure outside dimensions only.

B) For multi-purpose buildings, such as the one shown above, add hallway and wall areas to Prime Usage Area, i.e. Administration Office. Example arrows indicate areas to be included in Prime Usage Area.

- ✓ **Utilities,** one (1) asset from the Water Supply Mains or Wastewater Mains.
- ✓ **Transportation,** counted - All vehicles for each sub-class included in the ICMS Compact Inspection Workbook.
- ✓ **Roads**, all roads are to be measured while driving during inspections.
    - ❖ Note: To ensure clarity during inspections, a checkbox has been added to the inspection forms for marking assets as "Re-Measured" or "Not Re-Measured." Inspectors should check "Re-Measured" if the asset's measurements were validated during the inspection and "Not Re-Measured" if the validation was not completed.

The selection of an asset for quantity verification shall be based on the inspector's observation and judgment on the likelihood of the asset quantity deviating from that recorded in the ICMS Compact Inspection Workbook. If the observed quantity, in the inspector's judgment, is not equal to the ICMS quantity, the asset is to be physically measured (i.e. schools) or counted (i.e. vehicles).

For assets buried underground, use as-built drawings for verification. Where no asset quantity is observed as potentially deviating from the quantity recorded in the ICMS Compact Inspection Workbook, the inspector will randomly select the assets to be verified from the three asset categories mentioned above: buildings; utilities and transportation.

Note that the quantity verification should not be repeated on the same asset(s) in subsequent years unless there have been additions or modifications to the asset since the last verification. Select alternative assets from the three categories noted above for validation.

- **Year of Construction** of the asset is accurate. Where the year of construction is unknown, estimate to the nearest five years

For all categories verified above, where discrepancies are identified, make a note of the discrepancy on the inspection form in the Needs Identification comment section.

Asset Identification

Using information contained in the ICMS Compact Inspection Workbook, populate all the relevant asset identification information in the header of the Inspection Form templates, one form is required for each asset. This includes the Band No., Band Name, Site No., Site Name, Asset Code, Asset No., Extension, and Asset Name.

A separate Inspection Form is required for each asset inspected. It is imperative that all header data be entered correctly to ensure the inspection information can be conveyed to the proper asset. See Inspection Template Forms in the appendices of the E-ACRS Manual.

Reminder: all data MUST match between the form and Compact Inspection/ARV tool. For example, changes to the GIS coordinates on the form must also be updated in the compact sheet.

Data Collection Requirements

Asset condition should be inspected with consideration to its performance, operability, and compliance with applicable standards and regulations. Assets must be inspected with reference to the main and major components as defined in Appendix Q to the E-ACRS Manual and in the Excel ARV Tool.

- **Location Description**

Specify the location of the asset (i.e.: street name, intersection, subdivision, proximity to a building). The location should be specific enough that it can be easily located by others. The location should also be clearly identified on the map that is required in the inspection reports.

- **GIS Latitude and GIS Longitude**

The specific location of the asset by GPS.

- **Estimated Remaining Life (ERL)**

Inspector's must estimate the remaining life of the asset to the nearest five (5) years, assuming continuation of the current state of O&M with maintenance projects completed. The estimated remaining life is based on knowledge of the year of construction, the average life span of the asset, records of any major maintenance work that extends the life of the facility, the First Nations O&M practices, and the overall condition of the asset.

Note: *Where the estimated remaining life is <10 years, a more accurate value should be provided (to the nearest year).*

The estimated remaining life of all existing assets must also be updated on the Asset Condition tab of the ICMS Compact Inspection Workbook and in the ARV Tool for each component.

- **Asset Description**

The Asset Description will include the original construction description plus any major updates (e.g., when a reservoir was cleaned up, when a pump was replaced, etc.). If the original description is very brief, inspector's can add more context in terms of construction characteristics.

- **General Condition Rating (GCR)**

The General Condition Rating for a facility or service is based on an overall assessment of all components of the facility. It is especially important that each component of an asset be accurately assessed before determining the overall GENERAL CONDITION RATING (GCR) of the asset.

Based on information gathered during the inspection and the assessment of all components of the facility, the general condition of the asset should be assessed on a scale of 0-10, where 0 would indicate that an asset is closed and 10 would equate to a new asset. The rating assigned should reflect the general integrity of the facility at the time of the inspection and the level of service being provided by that facility.

If the condition of an asset is identified as closed (0 score), please confirm and specify whether the closure is temporary due to health and safety regulations or if the asset has

been permanently retired. **If permanently retired** the asset should be included in the ICMS Database Asset Change Form (Appendix N) as retired.

The general condition of an asset should first be rated as good, fair, or poor. When the asset falls within one of these ranges then a numerical rating in a range will be assigned. Within each of these ratings the actual scale would be determined in terms of the maintenance needs identified and their cost and timing. An asset having more projects, including greater costs, and planned for earlier starts, would rate a lower score than one having fewer projects involving relatively less cost and planned for later starts.

GCR	GCR DESCRIPTION	GCR EVALUATION CRITERIA
0	Replaced or Closed to the public	The infrastructure is unfit for sustained service. The infrastructure is in unacceptable condition with widespread signs of advanced deterioration. Many components of the infrastructure exhibit signs of imminent failure which is affecting service.
1 – 3	Poor Condition	The infrastructure is at risk and mostly below standard with many components approaching the end of their service life. A large portion of the infrastructure exhibits significant deterioration.
4 – 6	Fair Condition	The infrastructure requires attention and is showing general signs of deterioration. Some components of the infrastructure exhibit significant deficiencies.
7 – 9	Good Condition	The infrastructure is adequate for now. Some components of the infrastructure show general signs of deterioration that require attention. A few components of the infrastructure exhibit significant deficiencies.
10	New or Rebuilt	The infrastructure is fit for the future. The infrastructure is generally in very good condition, typically new or recently rehabilitated. A few components of the infrastructure show general signs of deterioration that require attention.

For example, as a rule, an asset with a GCR of 3 or less is providing a less than acceptable level of service and requires capital replacement/reconstruction in the near future and should have a project identified to do so.

The general condition of all existing assets must be updated on the Asset Condition tab of the ICMS Compact Inspection Workbook provided.

- **Inspector's Remarks**

Record any comments, details, or general information regarding the asset that is not captured in other areas of the report. The inspector should also note any items of an

environmental concern or any conditions that pose a safety hazard but are not related to defective equipment. **The inspector must,**

- provide a rationale for any change in the General Condition Rating and/or Estimated Remaining Life and,

- update the status of previous maintenance projects.

This information should also be captured in the O&M Action Plan (Appendix I of the E-ACRS Manual) and in the Inspector's Remarks on the Asset Condition tab of the ICMS Compact Inspection Workbook provided.

Existing Project/Deficiency Status

Report on the status of all existing projects as listed in the Deficiencies/Project List ***(Deficiencies tab in the ICMS Compact Inspection Workbook provided upon award of contract*)** as either 0-incomplete (re-identified), 1-complete, or 2-cancelled. If an existing project is noted as incomplete do not duplicate the project with new deficiencies need (project). If an existing project title or description has been truncated to the point that the original meaning of the project cannot be understood, cancel the project (explain basis briefly in Inspector's Remarks area); or, if the original meaning is clear, elaborate and clarify the details.

Provide the deficiencies/project list complete with all status updates as part of the E-ACRS Final Report. On the inspection forms, in the Need Identification section, list the outstanding existing projects *(provided after award of the contract)* and indicate the status at the time of your inspection.

The status of all existing deficiencies/projects must also be updated on the Deficiencies tab of the ICMS Compact Inspection Workbook provided.

Needs Assessment – Deficiencies/Projects

In carrying out inspections, inspectors are to identify the asset's needs to restore the functional integrity and the original levels of service of the facility and/or service.

During the inspection process an assets needs will be assessed. The need assessments require organization by **group, category and type** for E-ACRS updates and decision making. The process to accurately record the needs identified is further explained below and in the E-ACRS Manual.

Estimates for repair or replacement of components, sub-components or facilities should be at the class "D" level. The inspection should identify problems which are visually apparent. If, during

the inspection process, conditions indicate the need for a more comprehensive evaluation, a study and associated study costs would be recorded as a deficiency to be address.

Identify needs (projects/deficiencies) to be addressed to protect the health and safety of the asset users, prolong the life, satisfy current code requirements, and maintain or restore the functional integrity and the original levels of service of the facility or service. The inspection should identify problems that are visually apparent and relevant to the asset group being inspected. Maintenance personnel should accompany the inspector to provide background information on the operation and maintenance of the facilities being inspected.

A **Needs Identification** section is included in all inspection forms and shall be considered for all assets, the deficiencies/needs should also be updated in the ICMS Compact Inspection Workbook.

For each project/need/deficiency identified, provide the Component code, Project Description, Project Remarks, Group, Category, Type, Urgency, and Amount ***(cost estimate).***
Where an existing Group 1 or Group 2 project/deficiency is identified as being incomplete and still required, but the scope of work has likely expanded create a new project that incrementally defines that specific new need. Existing Group 2 and Group 3 projects should not be reclassified.

- Determine the appropriate **deficiency code *(Appendix Q)*** for each project/need/deficiency identified.

- The **"Project Description"** column in the Needs Identification section identified as **"Description"** field in the ICMS Deficiencies tab should be worded to assert an action and be very brief (limited to a maximum of 100 characters).

- The **"Project Remarks and Recommendations"** column in the Needs Identification section of the forms identified as **"Remarks and Recommendations"** field on the Deficiencies tab of the ICMS Compact Inspection Workbook are used to elaborate/better explain the project or provide more specific details *(maximum 4,000 characters).* Where more space is required, use the Inspector's Remarks field that should be identified with the Inspector's Remarks field *(4000 characters' maximum)* on the **Asset Condition tab of the ICMS Compact Inspection Workbook provided.**

- The wording in the **"Project Remarks and Recommendations**" field should address the following questions: **why** is the project necessary *(describe the current situation),* **what** are the advantages of implementing the project, **how** it should be completed, **how** often a task should be performed and, if applicable, **what** specific measures should be taken to complete the project *(up to 4000 characters).*

Specific coding is applied to organize deficiencies into **group, categories, type,** and **urgency.** The codes and their definitions are outlined in the tables, below.

E-ACRS deficiencies are classified into **three Groups:**

Group Code	Group Title	Funding Stream	Competence	Category Code	Category Title
1	O&M	**O&M Budget** O&M Subsidies + O&M Nation's Contributions	Public Works and Contractors	1	O&M **and** Minor Repairs
2	Major Repairs	**Minor Capital** Band Based Capital	Specialized Contractors and Public Works	2	Major Repairs
				3	Component Replacement/Reconstruction
3	Other	**Major Capital** Typically Capital Projects	Engineered solutions	4	Study
				5	Asset Replacement/Reconstruction
				6	Upgrade

The three groups are designated into six **Categories**:

Each Group can only be matched with their associated Categories (see table above). If, during the inspection process, conditions indicate the need for a more comprehensive evaluation, a study and associated study costs should be identified.

Cat. Code	Category	Category Description
1	O&M **and** Minor Repairs	Categorizes annual, regular activities compiled in a Maintenance Management Plan, and minor repairs such as cascading tasks (replacement of light bulbs, repairs/replacement of a tap or a toilet, repairs to fencing, repairs to building envelope, repairs/replacement of valves in pumphouses, controls, etc.).
2	Major Repairs	Categorizes **expected major repairs of a component** within the life span of an asset. This may include large roof patching, replacement of corroded piping in a Lift Station, etc.). The scope is to keep a certain component to the original design and function. No upgrades, no changes in type of materials used, no change in capacity or fuel, etc.
3	Component Replacement/ Reconstruction	Categorizes **expected component replacement** during the lifespan of an asset. This will include replacement of a furnace (once or twice per a building life span); replacement of main valves (most likely once during the life span on a watermain); replacement of major pumps; replacement of all or several windows due to condensation; roads' re-graveling (every 10 to 12 years); repaving (every 30 years); etc. The scope is to keep a certain component to the original design and function. No upgrades, no changes in type of materials used, no change in capacity or fuel, etc.
4	Study	Defines the need for an in-depth review to generate a technical solution to a problem that cannot be readily assessed in the E-ACRS inspection. The review may require destructive assessment, I&I, or to assess if a larger asset is required to better serve the community.

5	Asset Replacement/ Reconstruction	Categorizes assets with a General Condition Rating of 3 or less and an Estimated Remaining Life of 5 years or less shall be identified for asset replacement/reconstruction to their original design or capacity. In estimating the cost (Class D Estimate) of replacement, no other factors such as growth* and increased levels of service are to be considered.
6	Upgrade	Defines the need for improving the effectiveness and/or efficiency of the existing **asset** including operation. This does not include growth*. It could include upgrading/redesigning the building envelope if original failed; replacing roof covering material; abandoning/replacing a large portion of a watermain; etc.
* Growth is defined as any additional or increased demand on the facility or service beyond the original intended design of the asset.		

E-ACRS needs are also classified into **five types**.

The intent of identifying the **Type** is to provide justification for the needs.

Type Code	Type Title	Type Description
1	Health and Safety	Classifies activities required to eliminate "imminent" risk to patrons, to operations personnel. This includes punctual changes for code conformance (handrails/guardrails for a stair; handicap accessibility; etc.). Health and Safety needs should be rectified as soon as possible and can be associated only to Urgency of "0" (immediate).
2	Restoration of Utility	Classifies activities required to put the facility or service back into operation to meet the normal service demands.
3	Arrest Deterioration	Classifies activities that currently do not visibly affect the ongoing use of the service or facility but that, if not attended to, will result in continued deterioration, and could lead to a complete breakdown of the facility. For example, staining exterior siding; periodic physical testing of moisture in walls; fixing pannels/boards pulling off the building envelope as they occur; fixing holes in vinyl siding as they occur; greasing moving parts; etc.
4	Operational	Classifies activities required to maintain both the appearance and the utility of the service or facility within the scope of the Maintenance Management Plan.
5	Conform to Code	Classifies activities required to ensure that an **asset** needs to be brought up to conforms to current codes.

All E-ACRS needs should be scheduled depending on **Urgency** using the following codes:

Urgency Code	Urgency Title/Description
0	Immediate; work scheduled for completion during the current fiscal year
1	Current Fiscal Year + 1 Year
2	Current Fiscal Year + 2 Years
3	Current Fiscal Year + 3 Years
4	Current Fiscal Year + 4 Years

Projects associated with Water, Wastewater, Schools or Fire Equipment should only have urgencies codes of 2 or less.

- **Amount** - Provide a Class "D" estimated cost for each project identified. The amount should be identified in current dollars *(i.e. dollars tied to the fiscal year in which the inspection is completed).* This overall cost estimate may be derived from lump sum or unit costs for a similar project.

- **Existing Project No.** - Reference the existing ISC project number in the Existing Project No. column for all outstanding *(status 0)* projects identified in previous inspections. **Do not enter any project number** in this column when assigning new projects; numbers will be assigned by ISC in the proper sequence.

E-ACRS Definitions

The following definitions are provided to give the inspector a clear understanding of the terminology used in carrying out E-ACRS inspections. These definitions shall apply to the inspection of all assets.

- **E-ACRS Needs Identification – Deficiencies**
  Any deficiencies related to: O&M/Minor Repairs Major Repairs Component Replacement/Reconstruction Study Asset Replacement/Reconstruction Upgrade. These deficiency projects are intended to protect the health and safety of the asset users, and prolong the life, or maintain the operation of the assets. They are not formal project proposals at this stage.

- **Asset Replacement/Reconstruction**:
  This deficiency/project is defined as the replacement/reconstruction of an asset to the original design or capacity and respect the requirement to meet new or updated codes. In estimating the cost (Class “D”) for asset replacement/reconstruction, no other factors such as “growth”, increased levels of service or other additional uses are to be considered.

- **A class "D" estimate**
  Defined as a preliminary estimate, which due to little site information indicates the approximate magnitude of the cost of the proposed project. This overall cost estimate may be derived from lump sum or unit costs for a similar project. Needs costs are to be identified in current ($) dollars, i.e. dollars tied to the fiscal year in which the inspection is complete.

- **Conform to Code**
  Any need required to ensure an asset conforms to current codes.

- **Growth**
  Growth is defined as any additional or increased demand on the facility or service beyond the original intended design of the asset. Not to be considered in estimates provided in the inspection process.

- **Maintenance Project**
  An approved proposal intended to restore the functional integrity and established levels of service of the asset in respect of the requirement to meet new or updated codes, which includes major repairs and component replacement/reconstruction. No other factors such as “growth”, increased levels of service or other additional uses are to be included. This approved proposal will be carried out as a formal maintenance project.

- **Operation and Maintenance (O&M)**
  To provide for operating expenses, labour costs, equipment, material, routine and preventative maintenance, and minor repairs required to operate an asset at its original level of service.

- **Study**
  A detailed review of a problem or problems to generate a technical solution with a "Class D" cost estimate. These studies are to be carried out on problems that cannot be readily assessed by on-site visual inspection.

  Some examples where studies may be required are:

  - ✓ ***Building****: water leaking into interior space during rainstorms.*
  - ✓ ***Electrical****: the electrical circuit is experiencing a power surge during electrical storms.*
  - ✓ ***Bridges:*** *A structural problem may require an in-depth review of drawings, load calculations, etc.*
  - ✓ ***Roads:*** *A road section in poor condition requires a soil analysis.*
  - ✓ ***Municipal:*** *A video inspection of a sewer line upgrade*

- ✓ *A need which will improve the effectiveness and/or efficiency of the existing asset and its operation. This need may be associated with "Conform to Code" but does not include growth.*

Data Requirements for the Asset Replacement & Valuation (ARV) Tool

Data is captured in the "Asset Replacement and Valuation" section of the inspection forms, and is populated in the ARV Tool to generate the 35-year Chart for each First Nation Community.

The 35-year Chart (CHART) generated from the data in the ARV Tool will describe the expected time-frame and cost to retrofit and replace assets and their components over a 35-year horizon starting in the year of the inspection.

Inspectors will need the following additional data, for each asset, to complete the ARV Tool and to populate the Inspection Forms:

- **List of Components for each asset**
  A list of components, by asset, is provided in **Appendix Q** of the E-ACRS Manual and included as a dropdown menu selection in ARV Tool for ease of reference. Only components included in the drop-down list can be included be sure to select all that apply for each asset.

  Note:
  The ARV Tool requires that all assets include the component titled: **Decommissioning,** to allow the ARV Tool to calculate the asset's replacement cost at end of life, this component will be automatically included in the ARV Tool when assets are added.

- **Component Description**
  Provide additional details when necessary and indicate technical characteristics of the component, for example, 200mm PVC pipe or type of filter media in a Filtration process that could be sand, ion filters, etc.

- **The General Life Expectancy** (GLE) **of each component**
  A range of General Life Expectancy (GLE) for each component is provided in Appendix R to the E-ACRS Manual and represents the GLE when the component is new and is provided for reference only.

- **Assessment of the Estimated Remaining Life (ERL) of each component**
  ERL is determined by qualified inspectors using their professional judgement. When establishing the **"Estimated Remaining Life"** (ERL) for each Component, take into consideration all the major repairs undergone to date for each component and regular maintenance practices.

- **Cost**
  The cost to preplace each component should be included in current dollar values by unit of measure (example: cost to replace mains would be in dollars per meter). Inspectors may rely on a combination of professional experience in the local area and tools, such as RS Means.

- **Unit of Measure for <u>each component</u>**
  The unit of measure is pre-established for components (see Appendix P in the E-ACRS Manual) and includes; square meters, each, etc.

- **Quantity**
  The quantity relates to the unit of measure, for example; a structure that is 5,000 SQM would be recorded with a: Quantity of 5,000**.**

Note: *Estimated costs for <u>Components</u> or <u>Deficiencies</u> should not include growth projections, possible upgrades or changes in demand as a consideration for the purposes of the E-ACRS Inspection. Costs will be updated during the tri-annual inspection process and, where applicable, actual costs will be determined by contractors when a project proposal is submitted for approval.*

Lifecycle Investment Milestones - periodic replacement of major components
The milestones are based on "Estimated Remaining Life" for each component and should not consider growth, updates or change in demand. All costs are in current year dollars. Once completed, the subtotals sorted by asset show a quick summary of capital investment milestones (lifecycle needs) for each asset inspected. The completed CHART is generated from the ARV Tool and is integrated in the digital section of the First Nation's E-ACRS final report, a required deliverable, from each E-ACRS Inspection.

Other Relationships (Linkages)
Component/Asset replacements that are generate from the completion of the ARV Tool and that will occur within 4 years of the inspection should be added to the ICMS Compact Inspection Workbook deficiencies tab and the Inspection form under: Needs Identification.

The CHART when generated from the ARV Tool is designed to have Excel functionalities to enable adjustments to support the community's capital works planning activities including providing information to support the development of a Community's Asset Management Plan.

<u>Assets Not Located or Not Available for Inspection</u>

If an asset cannot be located, include a comment/note in the Inspection Form and ICMS Compact Inspection Workbook that the asset cannot be located and identify a Group 1 project

to locate the asset. The estimated remaining life and GCR can be left blank in this case as it was not inspected.

When an asset cannot be located **or it is not available for inspection**, in the "Inspector's Remarks" section of the **"Needs Identification"** section of the form, and in the equivalent field "Inspector's Remarks" in the ICMS Compact Inspection Workbook indicate the reason for not inspecting the asset.

Assets No Longer in Use/Operation

If an asset is no longer in use or operation, provide details, in the Inspector's Remarks section of the form, as to why the asset is not in use. Clearly state if the asset has been demolished or removed. The Estimated Remaining Life and GCR will be "0". These assets should also be included in form titled: **"Asset Inventory Change Inspection Form" to** facilitate ISC's manual updating of the ICMS database.

Water and Wastewater Assets – Protocol Form

In addition to completing the General Inspection Forms for Water & Wastewater Assets the Water and Wastewater Systems Protocol Form must be completed, one for **each** applicable **asset group,** if assets from that particular asset group are present in the inventory of the First Nation.
Information needed to complete the Protocol Form:

- DOES THIS SERVICE COVER MORE THAN ONE RESERVE?
  If the answer is yes, provide a list of the communities that are serviced, including Reserve Number and Reserve Name.
- The level of O&M Performance is best rated as:
  1-NON-EXISTENT, 2- SUB-STANDARD, 3-ACCEPTABLE, 4-EXEMPLARY
- Is there a developed Maintenance Management Plan?
- Are maintenance activities planned and scheduled?
- Is there a dedicated person to do maintenance for this asset group?
- Is the Maintenance Management Plan successfully implemented?
- Does the First Nation have an up-to-date Emergency Response Plan with a current emergency contact list available in a central location that can be referred to in the event of an emergency?

Public-Access Buildings (PAB)

The overall GCR, O&M Performance and Maintenance Management Plans ratings for Public-Access building assets are established by evaluating each component using the Public-Access Building Inspection Form and should be updated in the ICMS Compact Inspection Workbook and ARV Tool. There are 16 building assets that require the use of the specialized PAB Inspection form:

CLASSIFIED AS PUBLIC ACCESS BUILDINGS	
ASSET CODES	**Building Description**
A1A	Offices
A3A	Schools
A3B	Day Care Centers
A3H	Fire Stations
A4I	Student Residences
A4L	Teachrages
A6A	Community/ Recreation /Hall / Cultural Centers
A6B	Arena
A6C	Gymnasium
A6D	Indoor Swimming Pool
A6E	Youth/Senior Citizen Centers and Drop In
A3L	FNIHB - Health facility
A3M	FNIHB - Aboriginal Head Start On-Reserve (AHSOR)
A3N	FNIHB – Health Professional Residence / Accommodation
A3O	FNIHB - Substance use / Addictions Treatment Centre
A3P	FNIHB - Dental Office
A3Q	FNIHB - Other Health Infrastructure
A3R	FNIHB – Support Infrastructure

- Each Public-Access Building to be inspected, as per the **Asset List,** is identified on a dedicated tab in the ICMS Compact Inspection Workbook. The general information tab, in the ICMS Compact Inspection Workbook, contains the questions to be answered as does the E-ACRS Manual. There is also a unique PAB inspection form, to be completed, titled: Public Access Building Inspection Form.

- The Public-Access Building Inspection Form requires the evaluation of the GCR and O&M Performance of the Life Safety and Fire Protection features as well as questions related to the main building. Components are described as; grounds, building exterior, roof, building interior, mechanical – heating and ventilation, mechanical – air conditioning, mechanical – plumbing, electrical systems, structure, substructure, vertical movement, and specialty rooms

- The aspects to consider when conducting a Public-Access Building inspection are specified for each component as well as for the Life Safety and Fire Protection as outlined in the Public Access Building Inspection Form and the dedicated tab in the ICMS Compact Inspection Workbook.

- An inspector hired to perform the inspection of Public-Access Building assets should have knowledge of the appropriate national/provincial/territorial Building Code and Fire Code, and that his/her qualifications enable him/her to develop:

- Recommendations and plans to address physical deficiencies related to the integrity of the asset; and

- Recommendations and plans to address a combination of management, operational, and performance deficiencies related to the operation of the facility or system.

The Inspection Forms, as well as the digital documentation, will include a brief summary (see Appendix C of E-ACRS Manual) of the GCR, O&M Performance and MMP ratings for each Public-Access Building included in the **ICMS Compact Inspection Workbook/Asset List.**

Community Fire Protection Questionnaire

This questionnaire should be completed for all First Nations, regardless of the whether the community as fire-related assets to be inspected.

The **"Fire Protection Questionnaire**" form requires information about:

- Section A: "Fire Losses in the Last Three Fiscal Years (a fiscal year is Apr 1 to Mar 31);
- Section B: "Community Fire Prevention Practices";
- Section C: "Community Fire Suppression Services"; and,
- Section D: "Comments".

IMPORTANT NOTE:

Sections A, B and question 1, 2 & 3 of Section C
Apply to all First Nations, with or without a fire-hall or fire related assets.

Section C, questions 4 to 9,
Apply only for First Nations with Fire Departments (those communities that own Fire Apparatus and Fire Halls) or a combination of own Fire Department and Municipal Type Service Agreement (MTSA).

Section A: Fire Losses
This section provides information on community fires over a three-year period. Provide a short description of each fire incident that has occurred over the past three years, as well as any comments on the associated fire losses (e.g., number of deaths, injuries, what caught fire, what caused the fire, etc.). If investigations were conducted for any of these incidents/fire losses, please append the fire loss report if it is available. If the report cannot be attached, please indicate where the report can be reviewed.

Section B: Community Fire Prevention Practices
Collect the necessary data to populate this section of the form and add any additional comments that are relevant to the community's fire protection practices.

Section C: Community Fire Suppression Services
Collect the requested data and complete the section related to fire protection services.

Section D – Comments
Please provide any comments or observations that were not captured elsewhere in this form.

Disclaimer:
Recognizing that E-ACRS Inspectors are not fire professionals, Indigenous Services Canada will not treat the completed "Fire Protection Questionnaire" form as constituting a professional opinion. Indigenous Services Canada only asks that E-ACRS Inspectors provide an informed assessment on the questions asked within the "Fire Protection Questionnaire". Please note that this informed assessment should always include observations and input from the community undergoing the E-ACRS assessment. The "Fire Protection Questionnaire" form should be completed while the inspector is assessing the community's fire-related assets. All fire-related asset assessments and the completion of the "Fire Protection Questionnaire" form must be carried out with the First Nation's Fire Chief or responsible officer, to find out the details of current and past problems.

For communities that do not have fire-related assets the inspector should review the questions that are applicable (see explanation above) with the First Nation representatives during the initial meeting. Data gathered under the "Fire Protection Questionnaire" form will be used solely to assess the quality of a reserve's funded structural fire assets, and to understand the structural fire protection gaps that First Nations are currently facing.

O&M Action Plan Template

Complete an O&M Action Plan form, **provided in Appendix I**, for the asset categories of water, wastewater, schools and fire protection (one for each applicable asset group, if assets from that particular group are present in the inventory for that First Nation), and for which the O&M Performance score is less than Fair.

Review the community's O&M function for overall effectiveness, provide comments and corrective steps to improve maintenance performance where appropriate, addressing the need for a formal MMP. In assessing O&M performance, inspectors should give weight to health and safety related items.

Asset Group Descriptions Template

Include a description of each asset group present per site/reserve you are inspecting on the Asset Group Description form **Appendix J.** The asset codes to be included in each asset category can be found in **Appendix P.** The asset group description, provides space for more technical context that is beyond the Executive Summary, giving a general overview of operation, maintenance, and renovations for the Public Works Manager.

Maps and Photographs (see Inspection Forms)

For all asset a **map** (sketch plan) must accompany the inspection form for the specific asset to clearly relate the geographic locations and extent of assets belonging to the community. When possible, asset locations should be overlaid onto a community roads map. Use available information from previous reports, record drawings, and/or maps from the First Nation to ensure consistency between the sketch maps and locations described on the inspection forms. Maps shall be included in the draft and final reports and supplied separately in digital format in *.jpg format*.

Updated maps are to be provided only for sites that have new assets listed for inspection. GIS files together with technical drawings in .pdf format will be provided for these sites on request after award of work.

Sites that are expected to require map updates will be provided to the inspector. Maps in .jpg format will be provided for all the other sites after award of contract.

- The **MAP** should contain the following information**:**
    - Locations of the assets collected with corresponding annotation that shows the ICMS asset ID and, in the case of roads, the road name
        - Each streetlight should be represented as an individual point on the map for precise identification, but they should all share a single, unified asset code for categorization.
    - Reserve Boundaries
    - Topographic map data that serves to enhance the sketch map by providing context such as water features, roads, contours
    - Cadastral boundaries (i.e. District Lots)
    - North Arrow

- Scale Bar and/or Scale Ratio

- Key Map indicating the extents of the current sketch map within the context of the overall site if using multiple sketch maps within the overall site

- The **PHOTOS**

Include digital **photographs** of each asset (at least one general view), and close-ups as required to better describe the repairs or to illustrate instances where O&M performance has not achieved a **"**Fair**"** rating. Pictures are to be provided in landscape format that matches the layout in the inspection forms

PHOTO IDENTIFICATION REQUIREMENTS **Example: 99908047B1B60200003-BC-REG22-05**		
999	Band Number	A one, two or three digit number that identifies the First Nation
08047	Site Number	Five-digit site/community identifier
B1B	Asset Code	Alpha-numeric 3 digit - sequence – letter, number, letter
602000	Asset Number	Six-digit asset identifier that is specific to the asset in the photo
03	Asset Number Extension	Two-digit sequential identifier that is specific to the asset in the photo
BC	Region	Region in Canada
REG22	Client ID	Five-digit alpha numeric identifier that is unique to each of the proponents (3 letters that identify the consultant) and two numbers that identify the year (2022 = 22)
01	Photo ID	Two-digit sequential number given to each photo - 01,02.03 etc.

Each photograph shall be identified using the following information:

- The combination of Band Number, Site Number, Asset Code, Asset Number and Asset Number Extension is known as the Asset Identifier (this combination of numbers is specific to each asset). Followed by two-digit region code, five-digit client ID and two-digit photo ID.

- Digital photos shall be included in the draft and final reports and supplied separately on a USB drive. **The photos should be no larger than approximately 500 kilobytes each**, preferably in landscape format.

- The most relevant two photographs of each asset will be included in the hard copy version of the E-ACRS report. All photos will be included in the digital

version of the report using the photo section of the Inspection Forms and saved as a .pdf.

Reporting Format Requirements

- The E-ACRS final report shall be organized in a manner that facilitates easy reading. Please refer to **Appendix T of the E-ACRS Manual for the Table of Content requirements.**

- All reports should have a Table of Contents and page numbering as outlined in Appendix T. Reports may include additional information/pages that may be warranted to add value to the report.

- To reduce the size of the reports and to provide the information in a more interactive format each E-ACRS report will have a hard copy and a digital section.

- The Executive Summary has a new format that provides an asset management perspective to First Nations leadership. The information in the report is graphically synthesized and provides perspective on how to better use the data captured in the E-ACRS report.

- **A template of the Executive Summary is presented in Appendix O** together with instructions for consistent results and an example of what a complete Executive Summary. Please use the template formatting to provide a consistent summary of findings to all First Nations. A word version of template is included in the folder with other all the inspection form templates. Titled: “E-ACRS Inspection Forms”.

- The template **transmittal letters for the DRAFT and FINAL reports are included in Appendix U.**

Site Visits

All site visits shall be arranged by contacting the Program Administrator so that the First Nation can be given adequate prior notice and confirm dates as acceptable. Notice will be required for site visits including for proposal preparation purposes, if needed, and to carry-out the inspection after being awarded a contract. On-site inspection of assets is required to fulfill the requirements of an E-ACRS inspection.

Section 3

E-ACRS Policy

3.0 Background

It is the policy of Indigenous Services Canada (ISC) to preserve the capital asset investments on First Nations reserves throughout Canada. ISC's capital budget provides funds for new capital projects and for the operation, maintenance, repair, and recapitalization of department-funded assets as defined in the Capital Facilities and Maintenance Program (CFMP).

The department received direction from Treasury Board that future Multi-Year Operational Plans must contain improved information about its major maintenance projects (both repair and rehabilitation projects). ACRS was developed for this purpose. The Extended Asset Condition Reporting System (E-ACRS) has been developed to forecast future capital needs of departmentally funded assets and provide this information to First Nations in a usable format.

Prior to 1990, there was no formal system to identify the departmentally-funded assets needs. During 1990 and 1991, the ***Asset Condition Reporting System*** (ACRS) was implemented in response to the Treasury Board request for a better method of determining asset recapitalization requirements. The information in the ACRS was used for the first time in 1991 in the preparation of the five-year capital program for submission to Treasury Board. The five-year capital program was prepared based on an assessment of asset condition on reserves including repair and rehabilitation projects identified in ACRS.

Since 1991, information in the ACRS has been used for assessing long term recapitalization needs as well as for updating Multi-Year Operational Plans. The system being used to collect this vital information, namely the ACRS, updated in 2021 to provide additional information related to lifecycle infrastructure needs and renamed the ***Extended Asset Condition Reporting System*** **(E-ACRS).**

3.1 E-ACRS Inspections

Indigenous Services Canada (ISC) shall prepare and have in place a program to carry out formal E-ACRS inspections for all ISC O&M funded non-residential on-reserve assets. Guidelines for inspections of specific asset groups are provided in this manual.

As a minimum, each non-residential on-reserve asset which receives O&M funding shall receive an E-ACRS inspection once every three (3) years. In order to achieve a cyclical inspection, regions will ensure that approximately a third of the non-residential assets, on a geographic basis, are inspected annually.

During the E-ACRS inspection all information will be completely reviewed and updated, including, but not limited to: asset quantity, layout and measurements. If an asset is replaced by another (example: a road closed and new road constructed) the asset is not replaced in ICMS (it is decommissioned) and a new asset should be identified. ICMS updates to information on quantity, measurement, new asset, etc., when applicable, will be completed by regions no later than May 15 of each year.

Section four (4) through eight (8), of this manual, provide specific guidance for inspections by category of asset, as follows: Public Access Buildings, Roads, Bridges, Water & Wastewater Systems and Fire Protection Services.

3.2 Annual Updating

Regions will ensure data remains current in ICMS by uploading annual updates

The annual updates will ensure that:

a) maintenance projects identified in E-ACRS and approved as part of the bands or Tribal Councils annual capital plan, have been completed and that E-ACRS is updated accordingly,

b) any additional urgent maintenance or major maintenance project needs identified from the 3-year cycle inspections are identified and E-ACRS is updated; accordingly,

c) a revised General Condition Rating along with updated cost information is entered into ICMS, and

d) when updated, ICMS will include the 35 year costing data

3.3 Responsibilities

ISC regions will be responsible for:

a) coordinating E-ACRS inspections, preferably through Bands and/or Tribal Councils, and providing advice and assistance as required,

b) providing Bands or Tribal Councils with an annual listing of assets to be inspected, i.e., a third of assets on a geographic basis

c) ensuring the integrity of the information provided by Bands and Tribal Councils and inputting the data into the E-ACRS system, and

d) providing the name of Regional Contact for E-ACRS process support

e) Upon receipt of the inspector's Data Quality Verification Report, Regional staff will scrutinize the corrected data and enter them into the database using the "Reasons" coding provided in the ICMS.

ISC Headquarters will be responsible for:

a) the provision of E-ACRS advice and assistance to regions as required,

b) system development and revisions to meet the client's needs,

c) coordinating the updating of the national system

d) compiling national data providing national asset condition information, as required, and

e) working with regions to implement changes to process and/or activities related to E-ACRS inspections and data collection requirements

3.4 Results Statement

This policy will ensure that high quality information results from the Extended Asset Condition Reporting System inspection process and that ICMS captures the data for multiple uses; including, data for use in identifying infrastructure needs, information for First Nation's to develop Asset Management Plans and forecasting future costs, as well as, providing necessary information for the departmental to meeting its requirement to report on outcomes.

SECTION 4

Public Access Buildings

In addition to the general inspection data collection elements, such as the GCR, Needs Identification and Replacement and Valuation assessments, public access building inspections include, the following elements that must be responded to:

4.1 Maintenance Management Plan (MMP)

- Is there a Maintenance Management Plan (MMP) for the facility that is being properly implemented (defined as maintenance activities being planned, scheduled, and budgeted)?

- Is there a responsible and qualified party implementing the activities of the MMP, and ensuring that the MMP is updated at least annually?

- Is there evidence (preferably written such as logs, work orders, etc., but visual may be acceptable in some circumstances) that most of the MMP activities that were scheduled for the previous year have been successfully implemented?

- Is there an Emergency Response Plan - including a Fire Safety Plan - in place for this facility?

4.2 Performance

Review all areas, noted below and respond to the questions by applying the rating/score table below**. The following information must be populated in the ICMS dedicated tabs and the Public Access Building Questionnaire for building.**

General Condition Ratings (GCR)

Closed	Poor	Fair	Good	New	Not Applicable	Not Inspected
0	1 to 3	4 to 6	7 to 9	10	98	99

Maintenance Management Score (MMP Score)

Not Operational	Poor	Fair	Good	Excellent	Not applicable	Not Inspected
0	1 to 3	4 to 6	7 to 9	10	98	99

4.3 Grounds

Please visually inspect all aspects of the grounds including, but not limited to landscaping; fences/gates/railings; retaining walls; pedestrian surfaces; parking areas; drainage; playground equipment; paved areas; play area surfaces, etc. In addition to assessing the physical condition

of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: dumpsters are located outside travel areas; grounds are free of rubbish; directional and safety signs are clearly visible and in good condition; vegetation does not pose a threat to the substructure or exterior walls; records are kept confirming required inspections are being done (e.g., monthly inspections of play grounds), etc. Note all deficiencies found in the deficiencies section above.

Use your observations to answer the following questions:

- What is the physical General Condition Rating (GCR) of the elements and components of the Grounds of the building? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Grounds? (Mandatory)

4.4 Structure

Please visually inspect all aspects of the structure including, but not limited to: structural members; structural connections; and roof structure. In addition to assessing the physical condition of these components, look for signs of proper care and maintenance.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Structure?

- What is the Operations and Maintenance Management Score of the maintenance activities performed on the Structure?

4.5 Building Exterior

Please visually inspect all aspects of the building exterior including, but not limited to steps; platforms; ramps; super structure; exterior cladding; caulking; chimney and stacks; doors; windows; sidewalks; handicapped access, etc. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: entrances are secured to prevent unauthorized access (while still allowing egress); gutters and down-pipes are clear; sidewalks are clear of tripping hazards, etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Building Exterior? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Building Exterior? (Mandatory)

4.6 Roof

Please visually inspect all aspects of the roof including, but not limited to surface; flashing; drains; skylights; vents; and roof mounted equipment. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Roof of the building? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Roof? (Mandatory)

4.7 Building Interior

Please visually inspect all aspects of the building interior including, but not limited to ceilings; floor coverings; floors; painting; walls; doors; safety signage; handicapped access; lighting, etc. Inspect all interior rooms, including but not limited to halls; offices; cafeteria; library; mechanical rooms; storage areas; shops; labs; washrooms; etc. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: hallways are clear of hazards and clutter; directional and safety signs are clearly visible and in good condition; records are kept confirming required inspections are being done, etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Building Interior? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Building Interior? (Mandatory)

4.8 Mechanical

<u>Mechanical - Heating and Ventilation</u>

Please visually inspect all aspects of the mechanical heating and ventilation system including, but not limited to: heating; ventilation; controls; fuel tanks; propane tanks; ducts , etc. In

addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: the mechanical room is dedicated to its intended purpose and free of clutter; records are kept confirming required inspections are being done and all components have, where appropriate, up to date certification (for components such as exhaust fans, fuel-fired equipment, emergency generators, hydraulic lifting devices, fume hoods, etc.); etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Mechanical heating and ventilation systems of the building?

- What is the Operations and Maintenance Management Score of the maintenance activities performed on the Mechanical heating and ventilation systems?

Mechanical - Air Conditioning

Please visually inspect all aspects of the mechanical air conditioning system including, but not limited to: air conditioning systems and distribution; controls, etc. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: the mechanical room is dedicated to its intended purpose and free of clutter; records are kept confirming required inspections are being done and all components have, where appropriate, up to date certification (for components such as emergency generators, air handling units, hydraulic lifting devices, etc.); etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Mechanical air conditioning systems of the building?

- What is the Operations and Maintenance Management Score of the maintenance activities performed on the Mechanical air conditioning systems?

Mechanical – Plumbing

Please visually inspect all aspects of the mechanical plumbing system including, but not limited to: controls; plumbing; sprinkler system; water supply and distribution systems , etc. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: the mechanical room is dedicated to its intended purpose and free of clutter; records are kept confirming required inspections are being done and all components have, where appropriate, up to date certification (for components such as emergency generators, hydraulic lifting devices, eye wash devices, etc.); etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Mechanical plumbing systems of the building?

- What is the Operations and Maintenance Management Score of the maintenance activities performed on the Mechanical plumbing systems?

4.9 Electrical Systems

Please visually inspect all aspects of the electrical system including, but not limited to: electrical distribution; panels; wiring; emergency power, etc. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: electrical panels are unobstructed and have a 3-foot clearance; no exposed wires creating tripping hazards; no overloaded circuits; records are kept confirming required inspections are being done and all components have, where appropriate, up to date certification (for components such as Ground Fault Circuit Interrupters (GFCI), etc.); etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Electrical systems of the building? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Electrical systems? (Mandatory)

4.10 Substructure

Please visually inspect the substructure of the building, looking for signs of floor slab cracks and other physical deficiencies. In addition to assessing the physical condition of these components, look for signs of proper care and maintenance.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components of the Substructure of the building? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Substructure? (Mandatory)

4.11 Vertical Movement

Please visually inspect all aspects of the vertical movement components within the building including, but not limited to: elevators; stair lifts; stairwells; and ladders. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: are all vertical movement systems and stairwells clear of obstructions and debris; are capacity signs clearly posted for elevators and chair lifts; are maintenance contracts in place for elevators and wheel chair lifts; do the elevators have emergency communication equipment; is there sufficient clearance and access to elevators and wheel chair lifts; are proper safety measures in place (railings for stairs, seat belts and lights for wheel chair lift, etc.); etc..

Use your observations to answer the following questions: [N/A is a valid answer for these questions]

- What is the physical General Condition Rating of the elements and components relating to Vertical Movement systems of the building? (Mandatory)

- What is the Operation and Maintenance Management Score of the maintenance activities performed on the Vertical Movement system? (Mandatory)

4.12 Specialty Rooms

Please visually inspect specialty rooms within the building, such as but not limited to labs; auto shops; trade shops; computer server rooms. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management including, but not limited to: evident of safety measures in place for specialized equipment; WHMIS data sheets are properly posted; rooms are used for intended purpose and free of clutter. Note all Deficiencies found in the Deficiencies Table, above.

Use your observations to answer the following questions: [N/A is a valid answer for these questions]

What is the physical General Condition Rating of the elements and components of the Specialty Rooms of the building?

What is the Operation and Maintenance Management Score of the maintenance activities performed on the Specialty Rooms? (Mandatory)

4.13 Life Safety & Fire Protection

Based on the health and safety requirements of the National Building Code of Canada (NBCC) and the National Fire Code of Canada (NFCC), please visually inspect main aspects of the fire

protection and life safety equipment and features of the building, including but not limited to: fire alarm systems (smoke/fire detectors, pull stations, alarm gongs, CO detectors, annunciator panel, etc.); sprinkler and fire suppression systems; standpipe and hose systems; fire pump; fire separation integrity; emergency exit signs; door releasing hardware; emergency lighting systems; emergency back-up power; and fire extinguishers. In this case, also please take note of what systems or components are required but either missing, insufficient in number, and/or not professionally installed according to the NBCC and NFCC. In addition to assessing the physical condition of these components, look for signs of proper operation, maintenance, and management such as, but not limited to: is there a fire safety plan and are emergency procedure prominently posted on each floor area; is there evidence of fire drills being conducted; all components and systems are being inspected, tested, and maintained as required by the NFCC/NBCC and have appropriate records to confirm it; are the exit paths free of clutter, obstructions, or hazards (e.g., ice), both inside and outside the building; are all doors clear of evidence indicating illegal locking hardware that would prevent egress of the building; are combustible and/or flammable materials properly stored; etc.

Use your observations to answer the following questions:

- What is the physical General Condition Rating of the elements and components related to Life Safety and Fire Protection of the building?

- What is the Operation and Maintenance Management Score of the maintenance activities performed related to Life Safety and Fire Protection? (Mandatory)

4.14 Overall Facility Performance Scores

Based on the performance scores of all the building's main components and elements provided above, determine overall scores for the entire facility

- What is the physical General Condition Rating for the entire facility? (Mandatory)

- What is the Operation and Management Score of the maintenance activities performed for the entire facility? (Mandatory)

- What is the estimated remaining life of the facility? (Conditional)

O&M Action Plan

Complete an O&M Action Plan form, provided in *Appendix I,* for the asset categories of **community buildings, education, fire protection and health** (one for each applicable asset group, if assets from that group are present in the inventory for that First Nation), for which the O&M Performance and Maintenance processes are considered poor (O&M Performance 1-3).

Review the community's O&M function for overall effectiveness, provide comments and corrective steps to improve maintenance performance where appropriate, addressing the need for a formal MMP.

In assessing O&M performance, inspectors should give weight to health and safety related items.

SECTION 5

Roads Assessment

5.1 Introduction

This section is provided to assist E-ACRS inspectors in the visual assessment of the condition of **Public Roads** on First Nation Lands.

Definition: Public roads including service access roads located on reserve for the benefit of the entire community and for the purpose of providing vehicular access to provincial road systems, residential areas and to public facilities such as schools, band offices, sewage treatment plants, landfill sites, etc.

Reserve roads exclude: third-party roads, off-reserve roads, private entrances and access roads to private economic ventures.

Please note, the information is provided as guidance and engineers/qualified inspectors should consider the applicable standards that are aligned with the province where the inspections are being completed!

Prior to starting the E-ACRS road inspection, it is essential to have an up to date, detailed plan of the First Nation's road layout showing First Nation boundaries, road notation, types of construction, and defined limits of responsibilities for Operation & Maintenance (O&M).

This should be cross referenced with the ICMS data and E-ACRS data sheets. The inspector should be fully conversant with road construction and maintenance procedures. All road inspections should be done in conjunction with the First Nation Roads Superintendent/Foreman who will be able to provide both background information on the roads and general assistance.

These instructions should be read in conjunction with the General User Guide (Section 4). The inspector should be familiar with the objectives of the system, the inspection philosophy, the definitions, and the terminology.

Each road segment is driven, and the factors related to the condition are rated using the relevant forms contained in Appendix D. The physical measurements required are the roadway width and length (measure length while driving during inspection). Start and end coordinates should also be recorded, as these fields have been added to the compact inspection.

The railway surface crossing section must be completed, if applicable. The point geographic coordinates of the crossing must be collected within specifications defined in Section 6.3. Photographs of the crossing should provide an indication of the crossing surface.

The methodology is based on the evaluation of:

1. Safety or Design Factors
2. Preservation of the Asset or Inherent Maintenance Factors

5.2 Data Collection

The condition ratings are recorded on the Roads Summary Form in *Appendix D* which is subdivided into component as outlined in the following table.

Repairs identified during the inspections can be captured on the "Needs Identification" section of the form.

The following table provides a summary of the road component assessment requirements. Detailed explanation of the various components follows in this section.

Location & Identification	Locate road assets in the field based on information obtained from record drawings, old ACRS reporting maps, and descriptions from ICMS.
Road Description	
Classification	*Evaluate based on estimated AADT and the appropriate design speed.
Terrain Type, Posted Speed Limit, Surface Type	Visually determine terrain type, posted speed, and surface type
Design Factors	
Average Safe Speed	Drive the section and assess the (maximum) safe speed.
Road Widths	Physically measure the road width.
Vertical & Horizontal Deficiencies	Drive the section and count the deficiencies where the safe speed must be reduced by 10kph.
Cross-Sections	Rate on side slopes, crown, and super elevation
Road Length	Drive the section and measure the road length.
Inherent Maintenance Factors	
Surface Distress	Evaluate on the ability to maintain.
Gravel Supply	Evaluate on actual adequacy of gravel surface.
BSTs and Pavements	Evaluate on surface features
Drainage Condition	Evaluate on actual ability of road section to drain run-off.
Winter Maintenance	Evaluate potential for snow drifting over roadway.
Service Factors	
Access to Dwellings	Count the number of entranceways to dwellings
Access to buildings & public sites	Check off or list the type of facilities the road provides access to
Service Vehicle Route	Determine if the road is a service route
AADT	Determine the AADT
Identify Repairs/Projects	
Most typical improvement include:	
Re-Gravel Surface Widen Cross-Section Alignment Deficiencies	Estimate cost of repairs, rehabilitation, or reconstruction.

Ditches and Culverts Signage Intersections	Where re-construction is not a priority due to low service levels, estimate cost of rehabilitation or spot Intersections-repairs and provide explanation.

Location and Identification

The individual sections (road assets) are to be clearly identified by an air photo-mosaic, other plan of the reserve or by sketch. Where changes in roadway standards, traffic volumes or rural/urban setting occur, the inspector should make a recommendation to the regional office to split road sections into separate rating sections. These sections should be of a reasonable length to warrant a separate section (at least 0.5km).

Distance should be defined as increasing from south to north and from east to west.

For each road section, enter the following information in the appropriate spaces:

- ✓ Record the Region Name, Reserve No./Name, First Nation No./Name, Location, Asset Code, Asset No., Ext. No., and Asset Name.
- ✓ Record the road section length in kilometers.
- ✓ Where a photo-mosaic map, or sketch plan, has been provided for a reserve, label the roads with their asset and extension numbers.

Road Description

Classification
Based on the Average Annual Daily Traffic (AADT), select the appropriate road classification from Table 1, 2, or 3. The ACRS inspection program requires the road be classified as it exists now and not necessarily what it was designed for.

The first question to be answered is whether the road is urban or rural. The terms “urban” an “rural” refer to the predominate characteristics of the adjacent land use and not only to the jurisdictional boundaries or features of the typical cross section. Sometimes this distinction is evident but in some cases on reserve particularly in what can only be describes as a “rural subdivision” the distinction is not that easy.

As a guide the definition used for municipal services could be used.

- ✓ They classify as urban such areas where the provision of piped water and sewer services are reasonable. They feel that the housing density of these services is approximately 7.5 housing unit/hectare or 3/acre.

- ✓ This would seem to be a reasonable definition, although it should be used with some caution. For example, if children are likely to be playing in the street with other children rather than their own yards, the situation is tending towards urban.

Once the distinction is made between urban and rural the next decision is the class of road. This is determined in large part by the traffic volume and the use of the road.

- ✓ Higher traffic volumes are generally associated with some activity along the road other than just residential or if the road serves as a connector to the outside highway network.

Once this classification has been determined the next step is design speed. Every effort should be made to use as high a design speed as practicable to obtain the desired degree of safety, mobility, and efficiency. Only where severe topographic conditions and surrounding development are encountered and where drivers expect to travel at lower speeds, should consideration be given to selecting a lower design speed. Drivers do not adjust their speed to the classification of the road but to the physical limitations and the prevailing traffic conditions.

Short trips (less than 4km for rural settings and 2km for urban and suburban settings) allow for the use of lower design speeds but where possible a constant design speed with relation to adjacent or continuing routes off –reserve should be maintained. For subdivisions, design speeds of less that 40km/hr should only be considered when access is short and limited to only one or two houses.

For rural situation where class R1 or R2 roads have been selected, design speeds below 80km/hr should be considered only in difficult areas where it can be justified on a cost-effective basis.

Geometric Design Standards – Public Type Rural Roads on Reserves

Class	Design Year AADT (vpd)	Design Speed (km/h)	Minimum Curve Radius (m)	Stopping Sight Dist. (m)	Crest K Type 1 ***	Crest K Type 2	SAG K	Maximum Gradient %*	Roadway Width	
									Gravel (m)	Surfaced (m)**
R-I	150-400	90	300	170	70	55	40	7-9	7.8	8.6
		80	230	140	50	35	30	8-10	7.4	8.0
		70	170	110	30	22	25	9-12	7.4	8.0
R-II	100-200	80	230	140	50	35	30	8-10	7.4	8.0
		70	170	110	30	22	25	9-12	7.4	8.0
		60	120	85	18	15	18	10-13	7.0	7.6
		70	170	110	30	22	25	9-12	7.0	8.0
R-III	100	60	120	85	18	15	18	10-13	7.0	7.6
		50	80	65	12	7	12	10-14	6.4	7.2
		40	50	45	5	4	7	11-15	6.4	7.2

* Use lower gradients for rolling terrain, higher gradient for mountainous terrain only. Maximum 10% gradients for roads open to winter traffic.

** Widths do not include rounding. For surfaced roads only, 0.5m for rounding may be added to each side.

*** Type 1 Crest K values are to be used only where there may be an absence of continuous maintenance or regular road inspections.

Geometric Design Standards - Public Type Urban Roads on Reserves

Class	Design Year AADT (vpd)	Design Speed (km/h)	Minimum Curve Radius (m)	Stopping Sight Dist. (m)	K Crest Type 1 ***	K Crest Type 2	K SAG	Maximum Gradient %*	Roadway Width	
									Gravel (m)	Surfaced (m)**
U-I	400-1000	60	130	85	18	15	18	10-13	8.5	8.5
		50	90	65	12	7	12	10-14	8.5	9.5
U-II	100-400	60	130	85	18	15	18	10-13	7.0	7.6
		50	90	65	12	7	12	10-14	6.6	7.2
		40	55	45	5	4	7	11-15	6.6	7.2
U-III	100	50	90	65	12	7	12	10-14	6.4	7.2
		40	55	45	5	4	7	11-15	6.4	7.2
		30	35	30	3	3	4	11-16	6.0	7.0

* Use lower gradients for rolling terrain, higher gradient for mountainous terrain only. Maximum 10% gradient for roads that are open to winter traffic.

** Widths do not include rounding. For surfaced roads only, 0.5m for rounding may be added to each side. An Additional 2.5m may be provided for on street parking, one side only. An additional 5.0m to provide parking on both sides should be considered only in areas of dense commercial or multiple unit residential development.

*** Type 1 Crest K values are to be used only where there may be an absence of continuous maintenance or regular road inspections.

Geometric Design Standards – Entranceways on Reserves

Class	Design Year AADT (vpd)	Design Speed (km/hr)	Minimum Curve Radius (m)	Stopping Sight Dist. (m)	K Crest Type 2	K SAG	Maximum Gradient %*	Roadway Width	
								Gravel (m)	Surfaced (m)**
E-I	50	40	55	45	5	7	11-15	6.0	6.0
		30	30	30	3	4	11-16	5.6	5.6
E-II	50	40	50	90	9	7	11-15	4.0	4.0
		30	30	60	4	4	11-16	4.0	4.0
E-III	50	30	30	60	4	4	11-16	4.0	4.0

* E-II & E-III Standards are for 2-way -1 lane roads. For reasons of safety 2 way-1 Lane roads should be considered only where the following conditions can be satisfied:

- Operating speeds are 50km/hr or less.
- The road is short in length.
- The road serves a single purpose.
- The road is clearly signed as to its configuration.
- Turnouts for passing are provided.

**Use lower gradients for rolling terrain, higher gradients for mountainous terrain only. Maximum 11% gradients for roads open to winter traffic.

*** Roadway widths do not include rounding

Design Factors

The purpose of this measurement is to obtain an indication of the effect of horizontal and vertical alignment geometrics on safe driving speed. The measurement, therefore, should be made at a time when traffic and surface conditions will not have an appreciable effect on the result. On roads where the surface is poor due to lack of grading, it may be necessary to adjust the measured speed upward to give a more realistic measurement.

Speed on curves should be the maximum that is comfortable for a driver who might like to go faster but is not late for an appointment. Speed reduction for stopping sight distance should be enough to allow an average driver to avoid collision with an object on the road. Deceleration and acceleration should be at normal rates. Grades should be allowed to take their natural effect.

Average Safe Speed (ASS)

When driving a section for the purpose of measuring the average safe speed, the legal speed limit or the design speed should not be exceeded. Enter the safe speed on the form, or, if the entire section can be driven at the posted speed, enter the posted speed as the “average safe speed”.

In no case should the average safe speed exceed the posted speed limit.

Existing Roadway Width (ERW)

For Gravel or Earth Surface Roadways, measure the existing usable roadway width (to the nearest tenth of a metre), including the shoulders.

Existing Pavement Width (EPW)

If the road is paved, measure the existing surface width which is the actual width from edge of pavement to edge of pavement, or curb face to curb face. Measure the shoulder width if applicable.

Horizontal and Vertical Deficiencies

Where the minimum radii of the horizontal curvature or the minimum stopping sight, distances are substandard they should be identified. Where information on stopping sight distance or horizontal curvature is not available from drawings, the following should be used as a guide. If a horizontal curve or restriction in vertical sight distance causes a reduction in the driving speed which is more than 10 km/hr below the average speed, the section should be considered deficient. Identify the efficient sections by the number of occurrences.

Cross-Section

Factors to be considered are adequate side slopes and backslopes, enough crown, and enough super elevation. Rate the cross-section on a scale of 0 (poor) to 5 (good) and record on the form.

Design Factor Rating

Rate the road on a scale of 0 (poor) to 5 (good) for the overall design taking into consideration safe speeds, roadway widths, horizontal and vertical deficiencies, and cross section.

Inherent Maintenance Factors (Surface Conditions)

The roadway surface should be appraised based on its structural condition.

In order to distinguish between reconstruction and rehabilitation projects, it is necessary to do a detailed evaluation of the surface condition depending on surface type. Use only one of the surface classifications below (a,b or c).

A) Earth Road

The extent and severity of the surface distress is recorded on this line. The percentage of the road surface that falls into each class is determined. For example, 70% of the roadway might show no distress, 10% light, 10% moderate, 10% severe stress. Be sure the total is 100%.

Try not to let the actual level of maintenance influence the rating, for example, if it not been bladed for two months. Ask “could it be maintained? Rather than “is it maintained?”

The following can be used as a guideline for evaluating the severity of surface distress:

No distress	The roadway appears structurally sound and can be maintained with normal grader maintenance.
Light distress	This can be identified where the maintenance effort may be above average, but the road could still be maintained at an acceptable level. Loss of gravel, poorly graded gravel, oversize material in the gravel, minor settlements and bumps that can be reworked with a grader are all light distress factors.
Moderate distress	This can be identified where the maintenance effort is well above average. Sandy gravel, or an absence of gravel could be considered as moderate distress if it causes a reduction of speed under certain weather conditions. Distortions, settlements, bumps that are serious enough that drivers either try to drive around them or reduce speed should be considered deficient. These areas would normally require additional equipment to repair.
Severe distress	This occurs when the maintenance effort is high in order to keep the road serviceable in all weather conditions. Poor surface condition (rocks, topsoil, clay, sand) or severe distortions that might damage vehicles at normal highway speeds should be considered severe.

B) Gravel Road

The following should be used as a guideline for assessing the adequacy of gravel surfacing:

0-1	Very Poor	Gravel lacking such that the section can only be driven at speeds less than 10 kph below speed limit.
2-3	Poor	Gravel lacking at many locations such that driving speeds are reduced 10-15 kph even during dry conditions.
4-6	Fair	Gravel missing at intermittent locations such that driving speeds must be reduced by 10-15 kph during wet weather. Oversize gravel on surface.
7-8	Good	Gravel spread evenly across roadway, occasional spot where pit run or under laying subgrade appears on surface, some oversize.
9-10	Very Good	Adequate supply of gravel on roadway surface.

C) Bituminous Surface Treatment (BST) and Pavement Roads

BST and pavement surfaces may be rated using the following guide for limited number of sections. However, more detailed procedures are recommended where there is any appreciable length of paved or BST surfaces. These procedures can be used to estimate remaining service life before a major rehabilitation is required.

0-1	Very Poor	Pavement is in extremely poor condition with extensive severe cracking, alligatoring and dishing. Ride is poor and the surface is very rough and uneven.
2-3	Poor	Pavement is in poor condition with moderate alligatoring and extensive severe cracking and dishing. Ride is poor and the surface is very rough and uneven.
4-6	Fair	Pavement is in fair condition with intermittent moderate and frequent slight cracking, and with intermittent slight or moderate alligatoring and dishing. Ride ability is fair and surface is slightly rough and uneven.
7-8	Good	Pavement is in good condition with slight cracking, slight or very slight dishing and a few areas of slight alligatoring. Ride is good with intermittent rough and uneven sections.
9-10	Very Good	Pavement is in excellent condition with few cracks. Ride is excellent with few areas of slight distortion.

Drainage Condition

Drainage conditions are evaluated on a scale from 0 (very poor) to 10 (very good). Factors that should be considered in assessing drainage are:

For Rural Highways

Very Poor	The road becomes impassable because of flooding and/or there is an excessive maintenance effort required to prevent this.
Poor	Excessive maintenance is required to provide adequate service, or poor drainage conditions which sometimes impede safe traffic movements and/or severe ponding of water in ditches, blocking or collapsed culverts.
Fair	The height of grade line, cross-section elements, culvert or ditch capacity is below the standard that would be provided it the roads were rebuilt, or the maintenance effort is somewhat higher than normal.
Good	The cross-section and drainage are adequate.

For Urban Sections

Very Poor	Local streets are completely flooded on an average on one or more times per year, and/or collectors of arterials are flooded for a greater width than 50% of the width from the edge of pavement to the centre line, on an average of one or more times per year and/or basement flooding occurs on an average of at least once per year because of road drainage problems, or if there are no storm sewer or drainage systems.
Poor	Excessive maintenance is required on a storm sewer section to prevent continual major flooding or major flooding occurs to an extent less than noted below.
Fair	The drainage conditions are such as to cause occasional minor flooding that does not impede the safe movement of traffic.
Good	The storm sewer system is adequate.

Winter Maintenance

Consideration must be given to winter maintenance requirements. Although difficult to assess in the summertime, interviews with band members, school bus operators and maintenance supervisors may indicate locations of snow drifting or avalanches. Be on the lookout for snow fences and areas which are wide open (lakes for example) and with enough fetch to cause drifting.

In the absence of any information, the following Table can be used as a guide to rate winter maintenance problems on a scale of 0 (very poor) to 10 (very good).

Very Poor	As below, but in addition, no storage area in ditches. Conditions indicate potential for considerable drifting.
Poor	Drifting likely a problem, large open areas to windward of prevailing winds, poor storage in ditches or exceptionally low, grade line.
Fair	Low grade line, fair storage ditch.
Good	No apparent snow problem, enough storage ditches, forested area.

Service Factors

Service factors relate to the use of the highway in terms of total traffic as well as class of traffic. For each road section, enter the following information in the appropriate spaces on the form.

Access to Dwellings

Determine the number of access points (entrance ways) to dwellings for the entire road section length.

Access to Commercial Buildings & Public Sites

Determine the number of access roads or entrance ways to commercial buildings or public sites within the road section. Check off the appropriate facilities.

Service Vehicle Route

Determine if the road section is used regularly by a school bus, water delivery truck or sewage disposal truck.

AADT – the Average Annual Traffic

Establish the existing AADT. Some information may be available from the provincial highway departments AADT maps or maps prepared by municipal authorities.

If no AADT is available, try and estimate by inquiring of the residents. Alternatively, use the following as guidelines:

VPD	Description
0-10	This type of road is likely used only for residents and not through traffic. Count the number of residences and multiply by 3 to get the average number of trips/days. Unless you are evaluating this road at the peak hour you should not see more than 2-3 vehicles on the road during your inspection.
10-30	This type of road may be used for local access, or as a collector for local access roads. The AADT may be approximated by counting the residences as above.
30-85	This type or road generally serves as a collector for the other local access roads or has a high residential density along it.
85-105	This type of road generally serves as a collector or arterial for other roads or has a high residential access along it. You should see significant traffic. This type or road normally connects to a provincial highway where traffic counts would be available.

Repair/Project Identification

Report on repair requirements on the inspection form based on your observations. For rehabilitation and reconstruction requirements, provide an estimated cost. All repairs should include a distance location.

Recommendations & Comments

Provide on the inspection forms, any comments, and recommendations regarding appropriate strategies for routine maintenance, major maintenance, or reconstruction. Identify any special problems such as:

- Dangerous intersections.
- Dangerous horizontal or vertical alignment.
- Areas subject to flooding; and
- Areas that pose any safety concerns.

Type Coding

Projects to correct design deficiencies or geometric problems are almost always safety related so use Type “1” code (Health/Safety). Gravelling and repaving projects are to restore utility use Type “2” code 2 (Restore Utility) unless the road has deteriorated to such an extent that it poses a safety problem, in which case use Type “1” code.

Urgency and Amount

These columns require an assessment of the timing and cost of the improvement required. Spot improvements and reconstruction should be recorded as immediate projects. This will result in a backlog of projects in Year 0 but priorities to deal with the backlog are determined by other considerations and most cases this other consideration is traffic.

For gravel surfaced highways, resurfacing is normally required on a 4 to 5-year basis. If the gravel supply was rated as poor or very poor the timing on gravelling should be immediate. If the supply was rated as fair, then the project should be scheduled for year 2 to 3. If the rating was good or very good, then gravelling should be done in 4 to 5 years (in this case a project does not need to be created as ACRS inspections are every 3 yrs.).

For BST’s if the condition was rated as fair or less then the need for resealing should be rated as immediate. If the BST condition was rated at fair or better the need for resealing should be selected as 4 to 5 years (no needs should be created).

For pavements in poor or very poor condition the project should be scheduled immediately, if the pavement is in fair condition the repaving should be rescheduled with in the next 5 years (no needs should be created).

For both BST's and pavements, the detailed evaluation format that has been recommended will give a much better indication of the timing and nature of the required rehabilitations.

The final column is to be used by the department for numbering of maintenance projects.

5.3 Estimated Remaining Life

The remaining life of the roadway is to be estimated and not the remaining life of the gravel or paved surface. The terms of reference of this study were to exclude growth and changes in the level of service which means that if the road needs to be reconstructed then the estimated life is 0 years.

5.4 General Condition Rating

The following is a guide to the field evaluation:

0-2	The section of road needs to be driven with a 4-wheel truck or contains sections that are an immediate danger to the motoring public and the road should be closed
3-4	The section of road should be driven with a pickup and is not recommended for private cars or heavy trucks or the road contains elements that pose a danger to a motorist unfamiliar with the road.
5-7	The section of road if maintained with a higher than normal level of effort could be driven at the posted speed. There are only minor geometric deficiencies.
8-10	The road is in excellent condition with a comfortable ride and no geometric deficiencies.

5.5 Railway Crossing

A railway surface crossing section is provided in the Roads Inspection Form and must be completed, if applicable. The point geographic coordinates (GPS) of the crossing must be collected. Photographs of the crossing should provide an indication of the condition of the crossing surface.

SECTION 6

Bridges Assessment

6.1 Introduction

The E-ACRS program has a well-developed set of procedures and documentation that is directed toward protecting the health & safety of users and to maintaining assets in good operating condition. The purpose of this document, "Bridge Inspection Protocol" is to provide guidance and for the Bridge's asset group.

In some locations, bridges may be inspected by the province (example: when a provincial roadway passes through a First Nation that includes a bridge that is funded by the department). Inspectors should ask if there is a provincial inspection report available for their review, when applicable.

The term **bridge** includes vehicular and pedestrian bridges and boardwalks. Bridge structures are diverse in age, size, design, function, and construction materials. Management of these valued assets is important. A bridge inspection protocol provides consistency which enhances effective management of these assets.

6.2 Standards

A fundamental aspect of this protocol is the establishment of appropriate Health and Safety Standards for managing existing assets. The Canadian Highway Bridge Design Code (CHBDC) and the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads are the primary standards employed for the design of highway[1] and pedestrian bridges. These standards are used for design of new bridges and the rehabilitation of existing bridges. Condition inspection and maintenance is not generally covered in these standards except where it relates to evaluation for load limit restrictions, serviceability, or fatigue loadings. E-ACRS bridge inspectors need to be familiar with CHBDC and TAC standards. These standards can be obtained from: http://www.csagroup.org/global/en/services/codes-and-standards and http://tac-atc.ca/en respectively.

Large asset holders such as the Government of Canada have well established inspection and management policies and standards. The Government of Canada through Public Service & Procurement Canada (PSPC) has produced a Bridge Inspection Manual (BIM). BIM is the primary reference for E-ACRS inspection protocol and copies can be obtained through:

[1] "Highway" refers to all road types including rural roads, urban roads, and major highways.

http://www.tpsgc-pwgsc.gc.ca/biens-property/cn-bn-pp-eng.html

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Public Services & Procurement Canada
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11 Laurier Street
Gatineau, QC K1A 0S5

Additional Government laws, standards and regulations apply to the inspection process and this protocol does not relieve the users from their responsibility to comply with these laws, standards, and regulations.

The Bridge Inspection Protocol introduces a new E-ACRS form, the Bridge Inspection Form (*Appendix E)*. Further information is provided to explain the inspection process to be used and provide guidance for the completion of the new form.

6.3 Types of Bridges

Bridges are generally described by:

Style	girder span, arch, truss span, culvert
Crossing Type	waterway crossing, highway overpass, railway overhead
Traffic Usage	vehicle, rail, pedestrian, utility.

Bridges vary in age, material of construction, and design life. It is often the case that documentation on design is not available.

List of Bridge Types – By Span

The following lists represent the different bridge types currently registered in E-ACRS by span type:

- Concrete Box Beam
- Concrete Slab Beam
- Steel “I” Girder
- Steel Truss
- Timber Stringer
- Timber Glued Laminate
- Log Stringer
- Suspension

These bridges are either single span or multi span with overall lengths from approximately 10.0m to several kilometers (boardwalks) and have timber or concrete decks and timber, concrete, or steel substructures.

List of Bridge Types – By Function

The following lists represent the different bridge types currently registered with E-ACRS by function:

- vehicle traffic predominantly
- vehicle and pedestrian traffic
- pedestrian only
- pedestrian, all-terrain and specialty vehicles
- utility

Vehicle bridges are either single or 2 lane structures. Pedestrian traffic on multi-use bridges can be either be separated from traffic or not separated.

6.4 Inspection

Qualified Professionals

All bridge inspections should be carried out by a qualified professional knowledgeable in bridge design and construction in the region. A qualified professional is a Professional Engineer registered with a professional association or a qualified bridge inspector directly supervised by a Professional Engineer.

Visual Detailed Inspection

The inspection of bridges for the E-ACRS program can best be described as a Visual Detailed Inspection (VDI). However, some non-destructive testing is required where applicable. Prior to on-site inspection, it is important to review all information including previous inspections and drawings, if applicable. This information is valuable in assessing deficiencies and rate of deterioration. Review of drawings and other documents can also assist in determining if the design is appropriate for the current usage or if further study is recommended.

Visual Detailed Inspections shall include (where applicable):

- walking the bridge site and inspecting in detail all components above water level that can be inspected; a short stepladder should available as needed,
- examining the traffic function of the bridge and observing live loads whenever possible,
- hammer sounding of timber and concrete,

- chain dragging a small representative portion of the bridge deck, and
- coring log and sawn timber components.

This type of inspection is not a load evaluation or a seismic assessment. The purpose of a Visual Detailed Inspection is to observe and detect deficiencies in bridge materials and performance, document inspection results and provide recommendations for further actions such as repairs, replacement, upgrades, or further study.

Recommendations for further study, bridge upgrades or replacement to meet current design codes require engineering judgement. Although the VDI is not a load assessment, the inspection should detect obvious deficiencies in original design or condition deterioration that would warrant urgent actions. These actions could include recommendations for load limits or even closure until a detailed assessment can be conducted. Immediately notify the First Nation and ISC should urgent issues be noted.

Inspection Equipment

The minimum recommended equipment for Visual Detailed Inspections is listed below:

TABLE 1: MINIMUM EQUIPMENT REQUIREMENTS	
• Binoculars	• Inspection Mirror
• Calipers	• Level
• Camera	• Measuring Tapes
• Drill, Auger Bits and Treated Plugs	• Personal Safety Equipment
• Field Books, Pencils, Markers	• Plumb Bob
• Flashlight	• Probe
• GPS	• Scraper
• Hammer	• Short Chain

6.5 Inspection Documentation

Bridge inspections like all other E-ACRS inspections needs to be conducted and documented in a manner that provides enough information for completion of all the applicable E-ACRS forms.

6.6 Photographic Records

A photographic record of the inspection is to be completed and the following are the recommended minimum number of photos to be recorded.

TABLE 2: MINIMUM PHOTOGRAPHY REQUIREMENTS	
Min. Number of Photos	**Items**
1 Photo	Bridge Profile.
2 Photos	Looking at bridge from each approach.
2 Photos	Looking upstream and downstream from centre of bridge.
2 Photos	Detail of deck and railings.
2 Photos	Looking up at superstructure from underside of bridge and from deck for through truss bridge.
2 Photos	Looking at each abutment from underside of bridge.
2 Photos	Looking at piers from underside of bridge.
(As Required)	Photos of deficiencies, areas of concern, unique features.
13 Photos	*Minimum number of photos per bridge, typically.*

6.7 Non-Destructive Testing

Although primarily a visual inspection, the following non-destructive testing methods are required (where applicable) to provide a complete E-ACRS inspection of bridge structures.

- Hammer Testing

Hammer sounding of timber and concrete is a standard bridge inspection technique. Hammer sounding of concrete can detect delamination areas as does chain dragging the horizontal concrete deck surface. It should be noted that sounding of timbers requires skill and experience in order to provide meaningful results and to minimize coring.

- Chain Dragging

A complete chain drag of the deck is not a required but dragging representative areas (±10% for large structures to 20% for smaller structures) can indicate the need for further study if considerable delamination is found.

- Coring

Where hammer sounding of timbers indicates suspect material, investigative coring of wood should be employed, taking care to plug all holes with a tight-fitting preservative treated hardwood dowel.

6.8 Component Ratings and General Condition Rating (GCR)

The General Condition Rating is a rating on the bridge as a whole and is to be calculated using individual ratings for its components while taking into consideration the role of the component within the entirety of the structure.

The E-ACRS Bridge Inspection form has a list of components classified as Primary, Secondary, and Auxiliary as listed in the following table.

BRIDGE COMPONENT CLASSIFICATION		
PRIMARY	**SECONDARY**	**AUXILIARY**
• **Abutments** • **Scour Protection** • **Deck** • **Embankments** • **Piers** • **Superstructure (beams, trusses, cables)** • **Towers** • **Pedestrian Underpass**	• Approaches • Bearings • Railing System • Superstructure Diaphragms & Bracing	• Signage • Support for Utilities (electrical, water, sewer)

Not all components listed above are applicable to all structures. The classification of Primary, Secondary, and Auxiliary is useful in establishing the relative importance of components, together with good judgement. As an example, railings are a secondary component, but are important for the users of the asset.

6.9 Bridge Inspection Manual (BIM)

To provide consistency in ratings, inspectors are to reference the latest version of the Bridge Inspection Manual (BIM) published by the Public Works and Government Services Canada. Part 1 and Appendix E of the manual contains technical information on bridge components, deficiencies and rating guidelines for the bridge components and these sections should be followed as closely as possible to maintain consistency. Not all potential circumstance can be covered by a reference document and professional judgement shall be applied. Reference subsection 2.1 & 2.2 of this manual as it pertains to the development of the General Condition Rating from the component ratings. The remaining sections and appendices of the BIM manual are not directly applicable to E-ACRS.

BIM uses a different condition scale than the established E-ACRS scale and Table 4, below, shows a comparison of the two scales and their correlation. The E-ACRS scale shall be used in completing all the inspection documentation.

E-ACRS vs BIM RATINGS						
E-ACRS	Rating	0	1-3	4-6	7-9	10
	Description	Closed	Poor	Fair	Good	New
BIM	Rating	1	2,3	4	5	6
	Description	Critically Inadequate	Inadequate, Poor	Fair	Good	Excellent

Each component that is applicable to the structure shall have a condition rating applied and recorded together with relative comments.

Example Component Condition Rating

A pedestrian timber bridge deck was inspected and found to have top surface wear of up to 20mm of the total plank thickness of 100mm.The 20mm wear was confined to approximately 2% of the deck surface with the remainder of the deck averaging 5mm to 10mm wear. Planks were sounded from above and below where accessible and no fungal deterioration or other deficiencies observed. Considerable live load was observed during the inspection and no unusual deflection or other obvious problems were observed during loading. The deck does not drain well due to design, and dirt is also accumulating on the deck surface.

The loss of section of 20mm at localized areas is the most significant defect with 20% loss of section over 2% of the deck. The remainder of the deck has approximately 7% section loss. Poor drainage and dirt accumulation are other problems. The deck is also rough and may present a minor tripping hazard. Ponding water can freeze during cold temperatures making the surface slippery.

Section A7 of Part 2 of the BIM manual provides rating criteria. The defects in the above example can be examined and rated as either material or performance defects. The condition rating is a combination of the material and performance rating, and judgement is required to produce the condition rating. For the above example a material rating of 4 or 5 with a performance rating of 4 would be appropriate. A condition rating of 4 could therefore be applied to the deck and this would correlate to the E-ACRS rating of 4 to 6. Both BIM and E-ACRS refer to these ratings as fair.
The differences in material rating and performance rating can be much larger, often because of ongoing repairs. Considerable judgement is required to produce a condition rating that reflects

both performance and material defects and explanations in the comment sections are important to convey the situation to the report readers and for review in future inspections.

6.10 Example General Condition Rating

The following is an example of how judgement can be applied to the preparation of the GCR from the component ratings.

Example

A bridge with all components rated 9 except with railing coating rated at 3. This bridge would be best served by a GCR of 8. The condition of the railing paint does not have a significant impact on the condition or performance of the entire bridge.

6.11 Bridge Criticality

Each inspected bridge must be assessed a value for bridge criticality. The criticality depends on whether the bridge provides an emergency service route, the presence/absence of an alternate route, and the usage frequency. The criticality information and score are to be entered in the Bridge Summary Form.

Bridges are to be scored as:

0. Not Critical
1. Low Criticality
2. Moderately Critical, or
3. Critical

A guide to the criticality score is presented in the following table:

BRIDGE CRITICALITY SCORING							
Bridge Located on Emergency Service Route?		**Is There an Alternate Route?**		**Alternate Route Travel Time**		**Usage Frequency**	
Yes/No	Score	Yes/No	Score	Minutes	Score	Frequency	Score
Yes	1	Yes	0	< 5	0.25	Closed	0
				5 to <15	0.5	Seasonal	0.25 to 0.75
No	0	No	1	15 to <30	0.75	Daily Use	1.0
				>30	1		

When using the scoring table, **round all totals to the nearest whole number.** The scoring table is meant to be a guide and scores can be adjusted depending on the inspector's professional judgement to account for other factors not listed in the table. Note: If a bridge scores "0 – Not Critical" due to closure and/or abandonment, a Needs project to deactivate the bridge may be required.

If a bridge is the only access for emergency vehicles to an area of the community, then the bridge is to be considered located on an emergency service route.

6.12 Needs Identification & Bridge Projects

In the E-ACRS process, an asset inspection leads directly into "needs identification" and a separate form is used to capture this information and track past activity. Needs are broken down into groups and categories and a description of this breakdown for bridges is described below. The needs identification form is also used to document the type, urgency, and status of projects. Please note, new projects must be described in language that is clear to non-technical readers of the document.

Group 1 – O&M

- **Category 1 – Operations & Maintenance**

  This group and category include minor repairs such as:

  - approach maintenance
  - brushing (yearly)
  - cleaning (minimum yearly)
  - inspection (every 3 months and after high river flows)
  - debris removal
  - maintenance touch-up painting
  - minor erosion/scour repairs
  - rail maintenance
  - sign maintenance

Example - Operation and Maintenance
Clean dirt accumulation from deck and accessible areas of bridge structure with broom, shovels or hoe. Wash with clean fresh water (no soap) on steel and concrete surfaces that see winter salting. Do not introduce contaminants into waterways while washing, including debris, dirt, and garbage. Regular cleaning will reduce rate of deterioration and help maintain the lifespan of bridge components.

Group 2 – Major Repair

➢ Category 2 – Major Repairs

The group and category include major repairs such as:

- bank protection and scour repairs
- deck repairs
- railing repairs
- recoating railings
- recoating superstructure
- substructure repairs
- superstructure repairs

Example- Major Repair
Repair/replace significantly damaged and deteriorated railings and posts. This is a safety concern. If the railings and posts are not addressed as-soon-as-possible, it will lead to additional and unnecessary repair costs as the deterioration will affect other related components. Band to retain a qualified contractor to complete this work.

➢ Category 3 – Component Replacement/Reconstruction

This group and category include replacement or reconstruction activities including:

- replace complete span superstructure
- replace or reconstruct complete substructure
- replace railing system
- replace/repair complete deck

Example – Component Replacement/Reconstruction
Complete railing system replacement. Existing railing is in very poor condition and needs to be replaced. This is a significant safety concern and should be addressed as soon as possible. Retain a contractor with significant bridge experience to complete these works.

Group 3 – Other

➢ Category 4 – Study

This group and category include studies to provide an assessment of the bridge or of component including (often require more than one discipline):

- comprehensive detailed inspection
- detailed concrete deck condition survey
- geotechnical investigation
- hydro-technical investigation
- load assessment and rating
- seismic vulnerability assessment
- traffic study
- underwater inspection

Example – Study Required
Conduct study to define load rating of bridge. Original intended use of bridge was for light vehicles only and is being used by larger vehicles and equipment. In addition, bridge is old and constructed to an older standard. There is a risk that the loading capacity of the bridge is less than what it is currently being used for. This is a potentially serious safety concern. Retain a professional bridge engineer to conduct a detailed assessment of the bridge in order to determine the safe loading capacity.

- **Category 5 – Asset Replacement/Reconstruction**

  This group and category are for the complete replacement or reconstruction of an asset or a major component of the asset, for example:

  - entire bridge replacement
  - replacement of superstructure and decking

  Note: when replacing a bridge, it is typical for the new bridge to have a larger deck area to meet current standards.

- **Category 6 – Upgrade**

  This group and category are for major upgrades of bridge components including:

  - bank protection where none prior
  - bridge widening
  - load capacity strengthening
  - seismic retrofit
  - sidewalk addition

- railings

Example – Upgrade Needed
The bridge deck was noted to react to significant loads (large trucks). There was more bridge vibration and vertical movement in the stringers (horizontal members under the deck) than would otherwise be considered normal. This is a significant concern that could lead to a catastrophic bridge failure. Bridge strengthening is recommended. Retain a professional bridge engineer to review the bridge, recommend immediate upgrades required, and then retain a qualified contractor to install the recommended bridge improvements.

6.13 Additional Bridges Types

Boardwalks

Boardwalks are an asset in the E-ACRS system that is captured in the bridge inspection protocol. Boardwalks are a special case since they may carry loads that are not specifically addressed in the CHBDC for either pedestrian or vehicle bridges. All-terrain vehicles and specialized maintenance and emergency response vehicles may use the boardwalks alongside pedestrians and cyclists. The inspection of boardwalks must take into consideration these unique considerations and the fact that the original designs may not have accounted for live loads other than pedestrian usage. Boardwalks vary in height above ground and in some cases lead directly to the entrance doorways of buildings. The requirement for railings and guards on boardwalks may include consulting both the National Building Code and the CHBDC. Full pedestrian height guards on low boardwalks (under 600mm above adjacent ground) may not be required, but a low-level wheel guard may be required if wheeled vehicles are utilized. The inspection process must consider all the above considerations. A detailed assessment of the live loading, present and future, of the boardwalks may be advisable and the inspection process can recommend a detailed assessment be conducted.

Inspection

A design review is recommended to ensure that all current live loads have been considered. The determination of condition deficiencies and rating of these deficiencies will remain the same as for any other bridge structure.

Documentation

The boardwalk deck area shall be calculated using an average deck width. Describe the start and end points of a boardwalk along with differences in deck widths and their lengths within the comments section of the Needs report.

Photographs

TABLE 3: BOARDWALK PHOTOGRAPHY REQUIREMENTS	
Min. Number of Photos	**Items**
1 Photo	Boardwalk profile.
2 Photos	Boardwalk from endpoints.
2 Photos	Detail of deck and railings.
4 Photos	Looking at representative piers.
4 Photos	Looking at representative areas of superstructure from below deck.
13 Photos	Minimum number of photos required per boardwalk, typically. Additional photos required for deficiencies, areas of concern, unique features.

Valuation

Valuation calculations shall be calculated in a similar manner to other bridge structures.

Log Structures

Log structure lifespan is short, from 10 to 20 years for most species and up to 40 years and often greater for old growth Western Red Cedar. Dryer and colder climates can extend these lifespans. It is recommended that all log bridges at or beyond their design lifespan have a Comprehensive Detailed Inspection that includes extensive coring at least every 6 years. Log structures do not usually provide adequate condition information from sounding and investigative coring is the primary technique to accurately determine condition. Engineering judgement is required when inspecting these structures and recommendations for further actions should consider the lack of accurate condition information, age of structure, site conditions and structure failure mode.

Older Bridges

Many bridges function adequately today that were built to older standards, but they do not provide all the benefits that the newer standards provide. Crash tested railing systems, approach barriers, wider traffic lanes and shoulders are examples of improvements that have real benefits, but the lack thereof in older designs does not mean the bridge cannot carry current traffic loads. It is not always readily apparent that a bridge does not comply with current codes and design documentation may be incomplete or missing. It is important that the limitations of the Visual Detailed Inspection are clearly understood to allow for effective management of the asset.

Estimate Based on Similar Projects

The bridge construction cost estimates are best obtained from recent similar projects in the same geographic area and research can provide adequate examples. Adjustments for differences between known project construction costs and the estimated new construction cost for the site under consideration will have to be made, as will inflation factors to the current date.

Estimate Based on Deck Area

Bridge valuation for replacement is commonly calculated using a unit cost for complete bridge construction based on the deck area of the bridge. The deck area is the total deck area inclusive of sidewalks and areas under parapets or railings. The construction cost of the bridge includes:

- construction of the new bridge to current standards,
- removal of the existing bridge,
- minor realignment and/or temporary detour structure to maintain traffic if required.

Replacement Considerations

Engineering judgement is required to determine the appropriate style and size of replacement structure. Many of the bridges being assigned a replacement cost are of considerable age and designs for replacement bridges to meet current standards usually incur greater deck areas. Current lane and shoulder width standards are often greater than those in place when the old bridge was constructed. Span length can also be an area of increase to meet current hydraulic and environmental standards. It is also often the case that older bridges with multiple spans have the number of spans reduced for a new crossing to produce the most economical design.

Valuation Comments

Be sure to include a description of the cost estimate assumptions in the comments section of the Asset Replacement & Valuation Form.

For example:

- if comparable projects are referenced: describe the project.
- if a remoteness factor was used: state the factor, and
- if the replacement value has been adjusted based on assumptions for future sizing (i.e. a greater deck width and/or length): indicate the dimensions referenced. Note, the replacement dimensions, if different from the current dimensions, should be also stated in the E-ACRS Bridge Summary Form.

6.14 Bridge Valuation Example

An example cost estimate based on deck area is provided below. The estimate is based on a general value applicable at the time of drafting this document (2015):

BRIDGE COST ESTIMATE EXAMPLE					
Item	**Ex. Quantity**	**Units**	**Upgrade Quantity**	**Unit Price**	**Cost**
Bridge Replacement	200	m^2	-	$4500	$900,000

Note 1: Upgrade Quantity is an estimated deck surface area that may be greater than the existing deck area to meet current standards for deck width and/or an increase in deck length that is required to meet current hydraulic conditions and standards.

Note 2: E-ACRS Valuations need to be broken down to the various components as applicable for each asset.

In this example, the total cost of all bridge components should be equal to the bridge estimate value based on the deck area.
Building on the previous example, a breakdown of the costs needs to be summarized in the ACRS Asset Replacement & Valuation Form.

An example breakdown is presented in the following table:

VALUE OF BRIDGE COMPONENTS					
Item	**Quantity**	**Units**	**Upgrade Quantity**	**Unit Price**	**Cost**
Approaches, including Pavement & Barriers	1	Lump Sum	-	$17,000	$17,000
Abutments	2	Each	-	$130,500	$261,000
Bank Protection	200	m^3	-	$150	$30,000
Piers	2	Each	-	$54,500	$109,000
Superstructure	1	Lump Sum	-	$305,000	$305,000
Deck	200	m^2	-	$760	$152,000
Railings	50	M	-	$520	$26,000
TOTAL					**$900,000**

SECTION 7

Water & Wastewater Protocol

7.1 O&M Performance & Emergency Plan Assessment – W&WW

The Maintenance Management Activities and Emergency Plan for Water and Wastewater assets are evaluated using the "Water and Wastewater Assets PROTOCOL FORM" *(Appendix G).* The assessment is intended for assets that are constructed on-reserve and the First Nation oversees the maintenance. A sample of the filled-up form is attached.

- Check the asset group box to indicate to which asset group this evaluation refers: Water or Wastewater.

- Check the boxes for the on-reserve asset types that are part of the asset group and are the in the scope of First Nation maintenance.

For example: check Treatment and Distribution boxes if the water is supplied by a third party and the treatment and distribution assets are on reserve and maintained by the First Nation.

☒ Water

☐ Supply	☒ Treatment	☒ Distribution

☐ Wastewater

☐ Collection	☐ Disposal	☐ Treatment

When the scope of the assessment covers multiple reserves, check all the asset types that are part of the maintenance process as applicable. In the "Comments on Maintenance Management Activities and Emergency Response Plan" box indicate which asset types are specific for each reserve.

- Indicate the reserves/sites that are the scope of assessed water/wastewater assets.

- Rate the level of O&M Performance: 1=Non-existent, 2= sub-standard, 3=acceptable, 4=exemplary

- Respond by using the Yes/No check boxes for each of the following four questions:

  - Is there a developed Maintenance Management Plan?
  - Are maintenance activities planned and scheduled
  - Is there a dedicated person to do maintenance for this asset group?
  - Is the Maintenance Management Plan successfully implemented?

To answer question 5: An MMP is considered as successfully implemented if the answers to questions 2 to 4 are "YES" AND the level of O&M performance is "3" or greater.

- Respond by using the Yes/No check boxes for the following question:

  - Does the First Nation have an up-to-date **Emergency Response Plan** with a **current emergency contact list** available in a central location that can be referred to in the event of an emergency?

- Provide comments on Maintenance Management Activities and Emergency Response Plan

7.2 O&M Action Plan

- Complete an O&M Action Plan form, provided in *Appendix I,* for the asset categories of **water and wastewater** (one for each applicable asset group, if assets from that group are present in the inventory for that First Nation), for which the O&M Performance and Maintenance processes are considered unreliable (checked 0 or 1 for O&M) if the "NO" box was checked for any of the 4 questions above.

- Review the community's O&M function for overall effectiveness, provide comments and corrective steps to improve maintenance performance where appropriate, addressing the need for a formal MMP.

- In assessing O&M performance, inspectors should give weight to health and safety related items.

7.3 Inspection of water-mains

- Inspector should meet with the water operator to enquire about any general issues they had in the past, is there any indication of water loss, when was the last swabbing/how often the swabbing is done, how often are the hydrants serviced, and if valves are exercised on a regular schedule.

- Following the layout on the water-main, check vegetation above the pipeline, there are no structures above the pipeline, make sure all the valves are easy to find and marked properly, check the hydrants – location (not exposed to traffic damage, not on private property, etc.), if they are visible/easy to access, proper installation (height above ground), vegetation is low around them, paint in good condition, if they numbered/recorded, proper servicing schedule.

- GPS to be recorded in ICMS – only one set of coordinates is required. Define a rule and explain it in the Group Description for how the coordinates have been recorded. For example: the most northern (for those that run N-S) or western starting point for those running E-W; if there is a loop, establish a rule to capture the N,S, E, or W point on the loop.

- For creating maps – GPS readings should be taken for each hydrant, or main valves if no hydrants. Record drawings should be available during and after the readings so the mains can be properly marked.

SECTION 8

Community Fire Protection

8.1 General

Good fire protection is a prerequisite to a safe and healthy environment for communities. ISC recognized this in its funding efforts and is committed to assess the progress made in fire protection for communities.

The Level of Service Standards for fire protection services is determined on a national basis and serves as the standard to which ISC is prepared to financially assist First Nations in providing basic fire protection services for their communities. For community fire protection, the Level of Service Standards outlines a tiered approach that increases support to a community based on its ability to deliver services at each tier. With a focus on fire prevention, First Nations must meet the requirements at each tier to move to the next tier of funding.

- Tier 1 prioritizes investments in fire prevention and fire education programming, with a focus on individual home safety and household fire prevention.

- Tier 2 invests in capacity development, training, and the effective operation and maintenance of fire protection equipment.

- Tier 3 provides capital investments towards fire protection infrastructure or equipment, dependent on clearly identified risks and community requirements. The Level of Service Standards outlined above aims to be comparable to what would be available in off-reserve communities of a similar size and circumstance.

This assessment is to be conducted as part of the regular E-ACRS inspection and the results will be used to provide the First Nation with recommendations identifying steps which should be taken to upgrade Community Fire Protection, and to report on Community Fire Protection.

8.2 Methodology

The “Fire Protection Questionnaire” form should be completed while the inspector is assessing the community’s fire-related assets, if applicable, or with a responsible officer if no fire related assets are present. All fire-related asset assessments and the completion of the “Fire Protection Questionnaire” form must be carried out with the First Nation’s Fire Chief or responsible officer, to gain an understanding of current and past problems.

Indigenous Services Canada will not, in any way, use the Fire Protection data as a basis for the provision or reduction of capital funding through the Capital Facilities and Maintenance

Program. Data gathered under the "Fire Protection Questionnaire" will be used to understand the structural fire protection gaps that First Nations are currently facing.

Recognizing that E-ACRS Inspectors are not fire professionals, Indigenous Services Canada will not treat the completed "Fire Protection Questionnaire" form as constituting a professional opinion. Indigenous Services Canada only asks that E-ACRS Inspectors provide an informed assessment on the questions asked within the "Fire Protection Questionnaire" through discussion with the Fire Chief or responsible officer. Please note that this assessment should always include observations and input from the community.

Some Indigenous Services Canada Regional Offices support communities in accessing professional assessments of a First Nation's Fire Department. If a First Nation is interested in receiving a formal fire department assessment, the community's Chief-and-Council should contact their respective Regional Office.

If the community does not have fire hall the inspector should work with the responsible officer in the community to complete the sections of the form that are applicable for all First Nations, see explanation below (section 8.3)

8.3 Community Fire Protection Questionnaire

This questionnaire should be completed for all inspection, regardless of the extent of fire-related assets in the community.

The four parts form "Community Fire Protection Questionnaire ", see ***Appendix H,*** requires information on:

- **Section A:** "Fire Losses in the Last Three Fiscal Years ***(a fiscal year is Apr 1 to Mar 31)***
- **Section B:** "Community Fire Prevention Practices",
- **Section C**: "Community Fire Suppression Services" and
- **Section D:** "Comments".

Notes:
Sections A, B, and Questions 1, 2, and 3 of Section C apply to all First Nations;

Section C, Questions 4 to 9, applies to First Nations with Fire Departments (i.e., those communities that own Fire Apparatuses and Fire Halls) or a combination of their own Fire Department and a Municipal-Type Service Agreement (MTSA)

It is important to understand that one form is to be completed per site, giving an overall assessment of the fire protection for the whole community on the site identified in the form header. In assessing the community fire protection consideration must be given to the overall protection on the whole community or the whole site.

Items attributable to Health and Safety, impact to the community (e.g. magnitude of service interruption or deficiencies), readiness and efficiency, and potential replacement cost should be weighted with higher significance than minor items such as minor lack of maintenance.

Section A: Fire Losses

This section provides information on community fires over a three-year period. Provide a short description of each fire incident that has occurred over the past three years, as well as any comments on the associated fire losses (e.g., number of deaths, injuries, what caught fire, what caused the fire, etc.). If investigations were conducted for any of these incidents/fire losses, please append the fire loss report if it is available. If the report cannot be attached, please indicate where the report can be reviewed.

Section B: Community Fire Prevention Practices

Collect the necessary data to populate the data in this section and add any additional comments that are relevant to the community's fire protection practices.

Section C: Community Fire Suppression Services

Collect requested data and complete the section related to fire protection services.

For **assessing the operational condition** of the critical fire suppression elements provide a rating for the following:

- Fire Hall and/or garage,
- Fire Vehicles,
- Tools and Equipment, and
- Protective Clothing.

The **rating** is to be established as follow:

- 0 if the elements are non-operational or non-existent

- 1 if the elements are in poor operational condition *(the elements are there but in poor condition or could not be used effectively in case of emergency)*

- 2 if the elements are in a fair operational condition (*all the elements are there and operational, but some improvements should be made to render their use more efficient in case of emergency*)

- 3 if the elements are in good operational condition. *(all elements are there and ready for an efficient use in case of emergency)*

If any elements are rated as 0 or 1, provide in the comments box some indications or reasons for the rating. Where appropriate, provide recommendations/steps which could be taken to upgrade deficient elements to "fair" or "good" level.

Section D – Other

Please provide any comments or observations that were not captured elsewhere in this form.