A GUIDE TO COLLECTING, PROCESSING, AND MANAGING ROADWAY ASSET INVENTORY DATA

NCHRP Project 20–07/Task 357

Prepared for the 11th National Conference on Transportation Asset Management

Presented by:

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applied pavement
TECHNOLOGY

providing engineering solutions to improve pavement performance

Outline

- Research objective
- Summary of practice
- Methodology selection guidelines
- Data collection guidelines
- Data processing and management guidelines
- Future directions

Research Objective

- To develop practical guidelines that can be used by practitioners to collect, process and manage roadway asset inventory data

Project Team

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Summary of Practice

- Most agencies are collecting roadway asset inventory and condition data manually

- Some agencies are using automated and semi-automated techniques to build and manage their inventories

  - Photogrammetry

  - LiDAR

- For further details refer to the report of NCHRP synthesis 45-13

Guidelines for Developing or Updating a Roadway Asset Inventory

1. Getting Ready to Select a Methodology

- **Select assets :** Determine which assets will be included in the inventory

- **Determine constraints :** Identify the agency's constraints on budget, available personnel, etc.

- **Identify users :** Identify the users of the data and encourage higher participation

- **Develop data dictionary :** Identify and document which attributes are of interest to the agency

Guidelines for Developing or Updating a Roadway Asset Inventory

2. Selecting a Methodology

- Determine asset visibility : Identify whether the assets are visible from the roadway surface

- Identify accuracy requirements : Set desired accuracy range for the asset inventory

- Determine agency maturity : Identify the ability of the agency to fully utilize the data provided

2. Selecting a Methodology

- **Consider safety standards:** Evaluate whether methodology is influenced by agency safety standards

- **Evaluate resources :** Determine if work will be done in-house or by contractors

- **Identify other data collection efforts :** Evaluate opportunities for combining data collection efforts and using legacy software

Do We Have A Clear Winner?

	Manual	Photogrammetry	Mobile LiDAR
Equipment	No specialized equipment	ROW cameras	Dedicated equipment, software and training
Type of assets inventoried	All, including drainage structures	Only assets visible from roadway	Only assets visible from roadway, within range
Accuracy	± 5-10 ft.	± 1-3 ft.	± 3-5 in.
QA and adding new elements	Requires re-survey	Images can be reused	Spatial data can be reused
Collection speed	Slow	Traffic speeds	Traffic speeds
Safety	High exposure	Low exposure	Low exposure
File size		Manageable	Large files

Guidelines for Developing or Updating a Roadway Asset Inventory
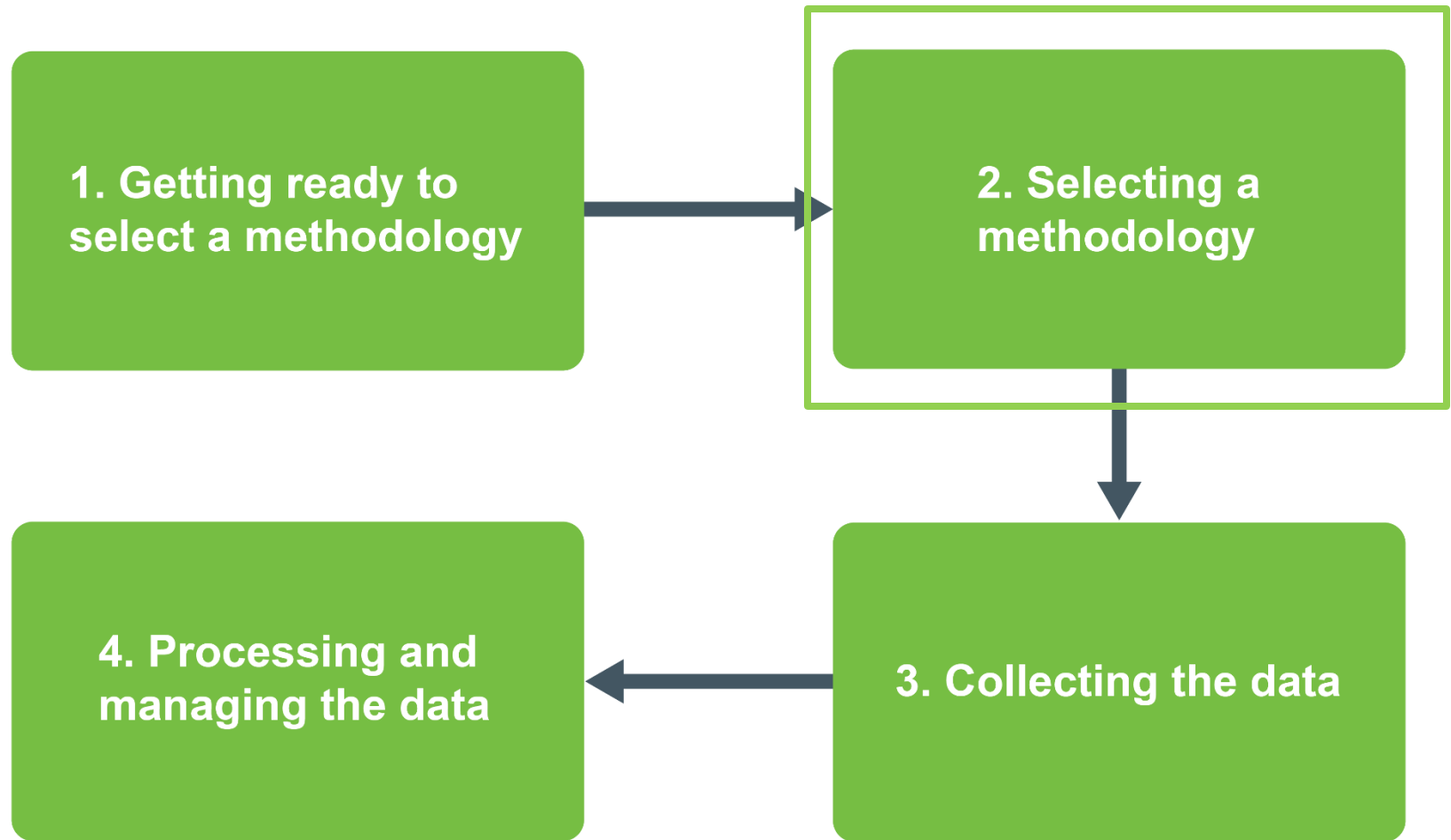
3. Collecting the Data

- Secure equipment/ vendor : Acquire any new equipment, staff, or contractors needed

- Develop data collection protocol: Establish required resolution, accuracy, repeatability, acceptance testing, roles and responsibilities, plans for documentation, etc.

3. Collecting the Data

- Conduct training and calibration: Train data collection personnel to calibrate, operate, and troubleshoot equipment for better quality control

- Conduct acceptance testing: Perform acceptance testing periodically to help identify malfunctioning equipment, anomalies, completeness, and reasonableness of data etc.

Guidelines for Developing or Updating a Roadway Asset Inventory
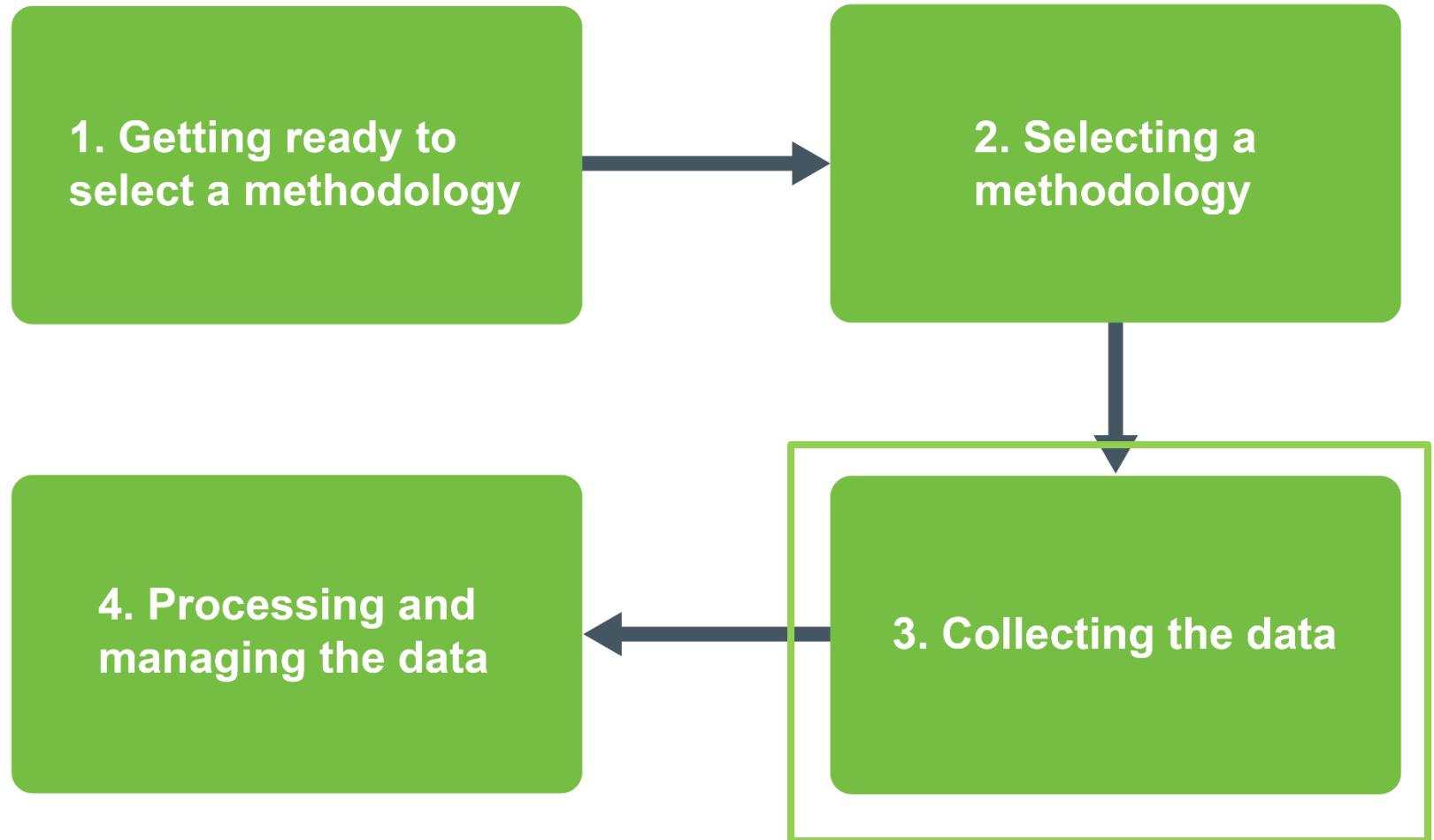
4. Processing and Managing Data

- Develop in-house expertise: Conduct training on data collection and processing if required, train data users to understand capabilities and limitations

- Formulate processing procedure: Limit time at workstations to 2-hour slots, identify raters to check for accuracy

- Provide access to data: Share the data with users in an easily accessible and useable format

4. Processing and Managing Data

- Address organizational issues: Develop business processes that promote the use of the data outside of maintenance or asset management to fully realize the potential benefits

- Implement data governance standards: Identify data attributes to collect and specify data owners and uses

4. Processing and Managing Data

- Plan for inventory updates: Identify responsibilities for updates, verify updates are done, and replace outdate information

- Other factors:
  - Consider IT costs
  - Extract new assets
  - Update inventory vs replace inventory
  - Use LiDAR digital elevation model (DEM) for design

Future Directions

- Developments in data collection processes

- Advancements in data processing techniques

- Emerging technologies: 360 degree cameras, flash LiDAR, Aerial LiDAR etc.

- Future regulatory changes: MAP 21-NPRM, driverless cars etc.

For a Copy of the Report

Go to the AASHTO Subcommittee on Maintenance website

- Select Research
  - Select NCHRP Project 20-7
    - Go to Completed Tasks
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NCHRP Project 20–07/Task 357

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FINAL REPORT

Requested by:

American Association of State Highway
and Transportation Officials (AASHTO)
Standing Committee on Highways
Subcommittee on Maintenance

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