




**Best Practices for Facility Condition Assessments – Planning for Future Needs**  
 Tuesday, November 2, 2021, 11:30 am  
 Michael D. Remington, P.E.

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## Agenda

- Facility Condition Assessments (FCA's)
  - Importance of FCA's
  - Predictive vs. Reactive Maintenance
  - Best Practices/Common Mistakes
  - Examples of FCA's
  - Cost Estimating
  - Questions?




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### Facility Condition Assessments - Definition

A Facility Condition Assessment is “a process of systematically evaluating an organization’s capital assets to project repair, renewal or replacement needs that will preserve their ability to support the mission or activities they are assigned to serve.”<sup>1</sup>

1. Rugless, J. (1993). Condition Assessment Surveys, Facilities Engineering Journal, 21 (3). 11-13.





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### Facility Condition Assessments

Facility condition assessments are performed through visual inspection by experts in specific building systems, such as:

- Architectural
- Structural
- Electrical
- Mechanical
- Others





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### Facility Condition Assessments Typically Include:

- Current condition of facility assets
- Identification of current and future repair and maintenance
- Estimated costs for work identified during the FCA
- Some sort of prioritization system

**Don't** typically identify new opportunities or improvements such as energy conservation, etc.




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### Facility Condition Assessments Importance

**Importance of the Facility Condition Assessment stage in the asset management process is integral to the overall performance of buildings.**

Article Citation: Glenda Mayo and Pauline Karanja (2018) Building Condition Assessments – Methods and Metrics. Journal of Facility Management Education and Research: 2018, Vol. 2, No. 1, pp 1-11.



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## Facility Condition Assessments Importance

- Maintaining a building is essential to keep it performing and functioning throughout its lifecycle.
- Lack of funds and mismanagement are the main reasons for the unsatisfactory performance of building facilities.

Article Citation: Glenda Mayo and Pauline Karanja (2018) Building Condition Assessments – Methods and Metrics. Journal of Facility Management Education and Research: 2018, Vol. 2, No. 1, pp 1-11.



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## Facility Condition Assessments Importance

An instrumental part of managing a facility includes facilitation of a condition assessment and then reporting that information in a concise and usable format.

Article Citation: Glenda Mayo and Pauline Karanja (2018) Building Condition Assessments – Methods and Metrics. Journal of Facility Management Education and Research: 2018, Vol. 2, No. 1, pp 1-11.



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## Facility Condition Assessments Importance

### Facility Condition Assessments (FCA's):

- Provide accurate data vs. based on educated guesses
- Allow facility managers to determine present condition and future costs for each asset type
- Helps prioritize projects
- Provides defensible evidence for funding



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## Advantages of Predictive vs. Reactive Maintenance

- Planning Ability
- Cost Savings
- Downtime/Disruption of Operations
- Extending Service Life



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## Savings from Predictive Maintenance Program

Studies indicate these average savings from a functional predictive maintenance program:

Return on Investment:	10 times
Reduction in Maintenance Costs:	25% to 30%
Elimination of Breakdowns:	70% to 75%
Reduction in Downtime:	35% to 45%
Increase in Production:	20% to 25%

Source: US Department of Energy, Federal Energy Management Program, Release 3.0. Operations & Maintenance Best Practices, A Guide to Achieving Operational Efficiency. August 2010



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## Everyone Benefits from Planned Investments for Facilities



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## Facility Condition Assessments

<p><b>Best Practices</b></p> <ul style="list-style-type: none"> <li>• Determine what FCA will be used for and what information is important</li> <li>• Use experts to perform assessments.</li> </ul>	<p><b>Common Mistakes to Avoid</b></p> <ul style="list-style-type: none"> <li>• Collecting meaningless data/losing sight of purpose of FCA</li> <li>• Using unqualified staff</li> </ul>
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## Facility Condition Assessments – Subjectivity

**One of the greatest obstacles to the development of an efficient condition assessment process is the subjectivity and ensuing lack of accuracy.**

Article Citation: Glenda Mayo and Pauline Karanja (2018) Building Condition Assessments – Methods and Metrics. Journal of Facility Management Education and Research: 2018, Vol. 2, No. 1, pp 1-11.




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## Facility Condition Assessments – Assessors/Inspectors

- Asset management systems incorporate measures to ensure uniformity such as staff training and use of numerically based rating system; however, still highly subjective.
- Accuracy dependent on the experience and training of field inspectors and assessors.


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## Facility Condition Assessments

<p><b>Best Practices</b></p> <ul style="list-style-type: none"> <li>• Accurately identify future needs</li> <li>• Visual inspections by qualified staff</li> <li>• Determine accurate cost estimates</li> </ul>	<p><b>Common Mistakes to Avoid</b></p> <ul style="list-style-type: none"> <li>• Mistakenly excluding needed future work</li> <li>• Using only typical life cycle information and installation dates</li> <li>• Significantly underestimating or overestimating costs</li> </ul>
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## Facility Condition Assessments

<p><b>Best Practices</b></p> <ul style="list-style-type: none"> <li>• Effective communication and planning throughout the Facility Condition Assessment</li> </ul>	<p><b>Common Mistakes to Avoid</b></p> <ul style="list-style-type: none"> <li>• Poor planning and communication causing disruption to operations and chaos</li> </ul>
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## Main Steps of a Facility Condition Assessment:

- Preliminary Set Up and Preparation
- Data Collection
- Data Analysis
- Report Preparation

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# Examples of Facility Condition Assessments



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# Hennepin County Facility Condition Assessment



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## How Hennepin County Uses the Facility Condition Assessment

- Utilizes a scorecard to systematically measure and report on the condition of the County's facilities.
- Provides Facility Operations Managers (FOM) with an overall understanding of their facilities.
- Helps the County prioritize work in their portfolio of sites.
- Results of the assessment used to identify facilities in excellent, good, adequate, marginal, and poor condition; and identify the level of urgency of identified capital projects.



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## List of Categories/Assets

Hennepin County Facility Condition Assessment  
Potential Assets to Evaluate

CONSTRUCTION
FOUNDATION
SUBSTRUCTURE CONSTRUCTION
BUILDING SHELL
FOUNDATION
ROOF CONSTRUCTION
EXTERIOR VERTICAL ENCLOSURE
EXTERIOR HORIZONTAL ENCLOSURE
INTERIORS
INTERIOR CONSTRUCTION
CONVEYING EQUIPMENT
MECHANICAL SYSTEMS
HEATING SYSTEMS
COOLING SYSTEMS
FIRE PROTECTION
FIRE PROTECTION SYSTEMS
ELECTRICAL
ELECTRICAL SYSTEMS
COMMUNICATIONS
COMMUNICATIONS
ELECTRONIC SYSTEMS
ELECTRONIC SAFETY AND SECURITY
ELECTRONIC ACCESSIBILITY
EQUIPMENT & FURNISHINGS
FURNITURE
FURNISHINGS
OTHER CONSTRUCTION
SPECIAL CONSTRUCTION
SITING
SITE IMPROVEMENTS
CIVIL/MECHANICAL STRUCTURES
LIQUID & GAS SITE UTILITIES
ELECTRICAL UTILITIES
SITE UTILITIES
SITE COMMUNICATIONS
MECHANICAL SITE CONSTRUCTION
MISCELLANEOUS WORK
OTHER IMPROVEMENTS



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## Facility Condition Assessment – Team Members Expertise

### INSPEC

- Substructure
- Substructure Shell
- Interiors
- Equipment & Furnishings
- Other Construction
- Sitework
- Miscellaneous Work

### LERCH-BATES

- Conveying Equipment

### HALLBERG ENGINEERING

- Mechanical Systems – Plumbing, HVAC
- Fire Protection
- Electrical
- Communications
- Electronic Systems
- Sitework – Utilities



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## Scoring System

2019 HENNEPIN COUNTY FACILITY CONDITION ASSESSMENT  
BUILDING ASSESSMENT WORKBOOK

### EXTERIOR HORIZONTAL ENCLOSURE

Building Name: \_\_\_\_\_  
 Building #: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 FOM: \_\_\_\_\_  
 Assessor: \_\_\_\_\_  
 Reported By: \_\_\_\_\_  
 Date of the Visit: \_\_\_\_\_

**WORKBOOK KEY**

Condition Evaluation Rating Key for Appearance and Practicality

1 - Excellent (no visible wear, tear, or damage; no visible deterioration; no visible defects)

2 - Good (minor wear, tear, or damage; minor visible deterioration; minor visible defects)

3 - Adequate (moderate wear, tear, or damage; moderate visible deterioration; moderate visible defects)

4 - Marginal (significant wear, tear, or damage; significant visible deterioration; significant visible defects)

5 - Poor (extensive wear, tear, or damage; extensive visible deterioration; extensive visible defects)

6 - Very Poor (severe wear, tear, or damage; severe visible deterioration; severe visible defects)

7 - Critical (extreme wear, tear, or damage; extreme visible deterioration; extreme visible defects)

8 - Unacceptable (total failure; total visible deterioration; total visible defects)

9 - Not Applicable (N/A)

10 - Not Inspected (N/A)

11 - Not Assessed (N/A)

12 - Not Evaluated (N/A)

13 - Not Rated (N/A)

14 - Not Scored (N/A)

15 - Not Graded (N/A)

16 - Not Measured (N/A)

17 - Not Observed (N/A)

18 - Not Visible (N/A)

19 - Not Accessible (N/A)

20 - Not Available (N/A)

21 - Not Determined (N/A)

22 - Not Identified (N/A)

23 - Not Located (N/A)

24 - Not Located (N/A)

25 - Not Located (N/A)

26 - Not Located (N/A)

27 - Not Located (N/A)

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97 - Not Located (N/A)

98 - Not Located (N/A)

99 - Not Located (N/A)

100 - Not Located (N/A)



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## Scoring System

**WORKBOOK KEY**

**Condition Evaluation Rating Key for Appearance and Functionality**

5 = Excellent: No visible defects, new or near new condition, may be still under warranty  
 4 = Good: Good condition, but no longer new, may have some slightly defective or deteriorated component(s) but has not exceeded useful life  
 3 = Adequate: Moderately deteriorated or defective component(s), but has not exceeded useful life  
 2 = Marginal: Defective or deteriorated component(s) in need of replacement, has exceeded useful life  
 1 = Poor: Critical (damaged component(s) or in need of immediate repair, well past useful life. All Life Safety concerns must be rated 1.

**Add'l Inv. Needed**


Check box if question raised that can be answered by staff, or a more thorough investigation is needed.  
 Describe in Additional Comments/Notes or complete Scope of Work Details. (Asset Type, Scope of Work, Repair Timeframe, Photos, Estimated Cost) if applicable.

**Work Required?**

If any asset is in poor/marginal condition (rating of 1 or 2) or needs repair/replacement in 0-5 years, must mark Yes.  
 If Yes, complete Scope of Work Details (Asset Type, Scope of Work, Repair Timeframe, Photos, Estimated Cost)

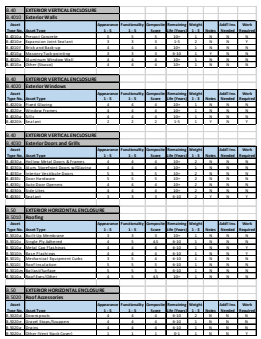

**Estimated Construction Cost**

Provide estimated construction cost if any asset is in poor/marginal condition (rating of 1 or 2) or needs repair/replacement in 0-5 years.  
 Cost should include estimated cost to address the scope of work + consulting fees + GC overhead and profit.



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## Examples of Completed Building Assessment Data

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## Examples of Completed Comments/Notes

Asset No.	Asset Type	Comments
B.4010.g	Exterior Walls - Masonry Task painting	Existing mortar has areas of deterioration, currently has raked mortar joints, concave joints decrease rate of deterioration. Recommend tuckpointing mortar and brick wall areas in 6-10 years, approximately 4,000 square feet, estimated cost \$60,000 - \$70,000. See photos B.3, B.4.
B.4020.h	Exterior Windows - Sealant	Window sealant is cracked and deteriorated and needs to be replaced. Also some gaskets on storefront windows are shrunk and should be replaced.
B.4030.i	Exterior Doors - Sealant	Door perimeter sealant around hollow metal doors on south side of building has signs of deterioration.
C.2020.b	Interior Flooring - Resilient Flooring	Vinyl flooring in back storage/custodial area has significant wear in certain areas; remove and replace or install new resilient flooring over existing.
D.3040.a	Facility HVAC - Distribution Systems - Condenser Fan & Coils (CFC)	Unit needs maintenance on an increased basis over normal; recommend replacement.
E.1020.c	Electrical Service and Distribution - Switchgear & Switchboards	Switchboard is at the end of its life expectancy per ASHRAE standards. The switchboard is good for appearance and functionality but because it's original and over 25 years old, per the ASHRAE standards for equipment and commissioning - the equipment is past its useful life. In regards to electrical equipment, it can last 50 years if maintained but typically parts become an issue if something fails.
K.5010.a	Site Lighting - Parking Lot Lighting	One (1) light pole in parking lot was taken down for maintenance by owner. Pole is removed with pole base and wires remaining.




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## Examples of Completed Work Recommendations

Asset No.	Asset Type	Scope of Work	Repair Timeframe	Photo #	Estimated Cost
B.4010.g	Exterior Walls - Masonry	Repair missing mortar and sealant in masonry expansion joint and grout wall	0-5 years	B.1-B.7	\$8,000 - \$10,000
B.4020.h	Exterior Windows - Sealant	Remove and replace deteriorated window perimeter sealant and the window gaskets	0-2 years	B.5-B.9	\$8,000 - \$10,000
B.4030.i	Exterior Doors - Sealant	Remove and replace existing door perimeter sealant on hollow metal doors on south side of the building	0-5 years	B.7	\$1,000 - \$3,000
C.2020.b	Interior Flooring - Resilient Flooring	Remove old resilient flooring	0-5 years	B.8	\$100
C.2020.b	Interior Flooring - Resilient Flooring	Install new resilient flooring	0-5 years	B.9	\$100
D.3040.a	Facility HVAC - Distribution Systems - Condenser Fan & Coils (CFC)	Apply scheduling system of parts content and test to confirm functional test scheduling system	0 years	B.10	\$400
E.1020.c	Electrical Service and Distribution - Switchgear & Switchboards	Storage/functional area of building, approximately 500 square feet	0-5 years	C.1-C.2	\$15,000 - 20,000
K.5010.a	Site Lighting - Parking Lot	Replace condenser unit (CFC)	1 year	D.1	\$100,000
K.5010.a	Site Lighting - Parking Lot	Crack seal and seal expansion for and down	0-2 years	E.1-E.3	\$2,000
K.5010.a	Site Lighting - Parking Lot	Replace/repair two areas of damaged concrete	0-2 years	E.4	\$1,000
K.5010.a	Site Lighting - Parking Lot	Install new concrete expansion	0-2 years	E.4	\$1,000
K.5010.a	Site Lighting - Parking Lot	Install new concrete expansion	0-2 years	E.4	\$1,000
K.5010.a	Site Lighting - Parking Lot	Replace cracked concrete sidewalk panels by south entrance	0-2 years	E.5	\$8,000
K.5010.a	Site Lighting - Parking Lot	Replace two heaved concrete sidewalk panels near the east edge of the lot	0 years	E.6	\$2,000
K.5010.a	Site Lighting - Parking Lot	Remove obsolete metal sign base from sidewalk near northeast corner of site	0 years	E.7	\$100

Total Site Estimated Cost: \$133,800 - \$183,800



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## Examples of Photos for Recommended Work

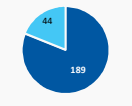



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## Effective FCA Effect on Unplanned Projects


**2017**


81% Planned vs. 19% Unplanned



**2019**


98% Planned vs. 2% Unplanned







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# Other Examples of Facility Condition Assessments



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# Due Diligence Building Assessment Example

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# Due Diligence Building Assessment Example


Scope of Work	Firm
Historical Inspection	
Interior and exterior lighting systems	Hallberg
Electrical distribution	Hallberg
Lifting equipment systems	Hallberg
Identification of common areas	Hallberg
Switch gear and transformers	Hallberg
Emergency power review	Hallberg
Other gasification conditions and maintenance	Hallberg
Life-Safety Fire Protection	Hallberg
Vertical Transportation	Leitch Bates
Code/Compliance Review	Inspeo and BRDM
Accessibility and ADA Compliance	Justice Quares-Peterson
Interior Elements and Finishes	Inspeo
Kitchen Equipment/Mini- Appliances	Inspeo
Security Systems	Hallberg
Low Voltage/Cabling and IT Systems Review	Hallberg
Utility and Service Providers	
Scope review	Hallberg
Contract review	Hallberg
Assessment Review	
Review All-Build Documentation	BRDM
Final Report	Inspeo
Review NCR Resizable Area Calculations	Inspeo
Electronic Architectural and MEP Plans/Books for any work completed in the last 3 years	Inspeo and Hallberg
Corrective Cost Options and Recommendations	ALL



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# Due Diligence Building Assessment Example


Scope of Work	Firm
Historical Inspection	
Interior and exterior lighting systems	Hallberg
Electrical distribution	Hallberg
Lifting equipment systems	Hallberg
Identification of common areas	Hallberg
Switch gear and transformers	Hallberg
Emergency power review	Hallberg
Other gasification conditions and maintenance	Hallberg
Life-Safety Fire Protection	Hallberg
Vertical Transportation	Leitch Bates
Code/Compliance Review	Inspeo and BRDM
Accessibility and ADA Compliance	Justice Quares-Peterson
Interior Elements and Finishes	Inspeo
Kitchen Equipment/Mini- Appliances	Inspeo
Security Systems	Hallberg
Low Voltage/Cabling and IT Systems Review	Hallberg
Utility and Service Providers	
Scope review	Hallberg
Contract review	Hallberg
Assessment Review	
Review All-Build Documentation	BRDM
Final Report	Inspeo
Review NCR Resizable Area Calculations	Inspeo
Electronic Architectural and MEP Plans/Books for any work completed in the last 3 years	Inspeo and Hallberg
Corrective Cost Options and Recommendations	ALL



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# Due Diligence Building Assessment Example


INSPEC	Estimated Construction Cost
Replace damaged areas of concrete sidewalk around building	\$38,000 - \$49,000
Replace damaged concrete panels around Day Care Play Area	\$5,000 - \$11,000
Replace areas of damaged or uneven pavers outside main entrance and around courtyard	\$35,000 - \$45,000
Replace missing and unreliable trees around the building and replace damaged grass areas of the Day Care Play Area	\$50,000 - \$55,000
Replace the parking ramp access stairs and metal panels that the doors are set within and replace the weather stripping	\$3,000 - \$5,000
Repair all of the stripping in the parking structure	\$6,000 - \$8,000
Performance maintenance/repair and repaint building deck exterior doors and tracks and rails	\$5,000 - \$8,000
Replace horizontal sections around the building perimeter between the stone wall panels and other stone pieces on concrete walls	\$15,000 - \$20,000
Replace granite base riser joints between metal panel or curtain wall and the granite base of the building, specifically at the main building entrance and the curved elevation facing Harris Plaza	\$5,000 - \$7,000
Replace riser joints at the stone retaining wall along 6 <sup>th</sup> Street	\$20,000 - \$25,000
Replace granite panels that are chipped or broken	\$10,000 - \$15,000
Re-seal exterior gaskets that have regressed out of the joint between the glass and aluminum frame in several locations throughout the building	under \$5,000
Reset rubber gaskets between joints in the metal panels in areas where they have regressed out of the joint	\$10,000 - \$15,000
Replace all weatherstripping and seals on exterior doors	\$2,000 - \$5,000
Paint steel doors and frames, including those to the loading dock and receiving area	\$5,000 - \$7,500
Replace the hollow metal door and frame to the garden storage room	\$2,500
Rebarbed steel grates at the parking ramp openings and at lower openings and add a hand screen to the interior end of the lower opening grates	\$25,000 - \$40,000
Rebarbed metal fence at Deacon Center	\$50,000 - \$50,000



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# Roof Evaluation Example

	Replacement Cost by Year					5 Year Total	
	Repairs	2019	2020	2021	2022		2023
001 Concord Elementary	\$1,158	\$0	\$0	\$0	\$0	\$0	\$1,158
002 Cornwell Elementary School	\$120	\$0	\$0	\$0	\$0	\$0	\$120
003 Countryside Elementary	\$0	\$0	\$0	\$0	\$0	\$0	\$0
004 Creek Valley Elementary	\$1,070	\$0	\$0	\$0	\$0	\$0	\$1,070
005 Edina Community Center	\$398	\$0	\$936,380	\$0	\$0	\$0	\$936,778
006 Edina High School	\$4,474	\$0	\$729,795	\$0	\$474,131	\$0	\$1,208,400
007 Highlands Elementary	\$1,460	\$0	\$0	\$0	\$0	\$0	\$1,460
008 South View Middle School	\$3,247	\$0	\$537,600	\$0	\$0	\$0	\$540,847
009 Valley View Middle School	\$1,186	\$0	\$0	\$478,380	\$0	\$0	\$479,566
010 Transportation Center	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Totals:</b>	<b>\$13,122</b>	<b>\$0</b>	<b>\$2,203,775</b>	<b>\$478,380</b>	<b>\$474,131</b>	<b>\$0</b>	<b>\$3,169,408</b>



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# Roof Evaluation Example

Building	Section	Inspected	Area	Roof Type	ESL <sup>1</sup>	Replaces Yr.	Replaces Cost	
001 Convent Elementary	A	2014	10,254	A-Fly BDR Asphalt	10 yrs			
		2016	8,406	A-Fly BDR Asphalt	10 yrs			
		2016	3,160	A-Fly BDR Asphalt	10 yrs			
		2007	12,088	A-Fly BDR Asphalt	10 yrs			
		2006	11,269	A-Fly BDR Asphalt	9 yrs			
		2000	11,406	A-Fly BDR Asphalt	9 yrs			
		2001	1,059	A-Fly BDR Asphalt	10 yrs			
Totals		7	56,582					
002 Convent Elementary School	A	2016	88,476	A-Fly BDR Asphalt	10 yrs			
		2017	1,800	A-Fly BDR Asphalt	10 yrs			
		2000	5,647	A-Fly BDR Asphalt	9 yrs			
		2014	3,202	A-Fly BDR Asphalt	10 yrs			
Totals		4	100,125					
003 Convent Elementary	A	2016	18,846	A-Fly BDR Asphalt	10 yrs			
		2016	21,200	A-Fly BDR Asphalt	10 yrs			
		2014	10,400	A-Fly BDR Asphalt	10 yrs			
		2016	1,100	A-Fly BDR Asphalt	10 yrs			
		Totals		4	51,546			
004 Convent Elementary	A	2016	10,170	Single Ply PVC	10 yrs			
		2014	695	A-Fly BDR Asphalt	10 yrs			
		2016	1,340	A-Fly BDR Asphalt	10 yrs			
		Totals		3	12,205			
005 Eden Community Center	A	2016	30,140	A-Fly BDR Asphalt	10 yrs			
		2016	5,275	A-Fly BDR Asphalt	10 yrs			
		1990	80,000	A-Fly BDR Asphalt	7.0 yrs	8000	8000,000	
		2000	2,000	Single Ply PVC	10 yrs			
		1990	10,000	Single Ply PVC	10 yrs			
		2000	11,000	Single Ply PVC	9 yrs			
		2014	4,100	A-Fly BDR Asphalt	10 yrs			
		1990	1,000	Single Ply PVC	7.0 yrs	8000	8000,000	
		Totals		10	156,655			16,000,000



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# Roof Evaluation Example

### Roof Corrective Action

**Building:** 008 - South View Middle School  
**Roof Section:** B  
**Last Inspection Year:** 2016

**Roof Type:** A-Fly BDR  
**Roof Area:** 10,000 sq ft  
**Roofing System:** Built-up Asphalt  
**Roofing Material:** 30 Year 1/4" Asphalt  
**Roofing Labor:** 1.0 hrs  
**Roofing Cost:** \$10,000

**Observations/Recommendations**  
 The following defects were observed on this section. Those recommended for repair are indicated within the table below. Medium level base flashing deterioration has been observed and repaired. No apparent water entry.

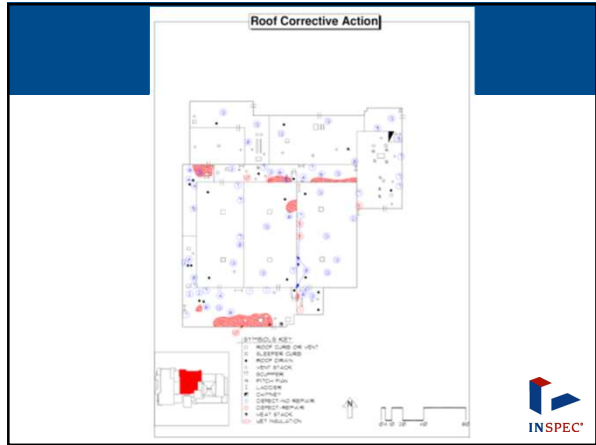
Defect Number	Defect Description	Repair Quantity	Est. Recommended Repair Cost
1	Base Flashing (B) - Medium level base flashing deterioration has been observed and repaired. No apparent water entry.	1	\$7.00
2	Ridges (R) - Ridges are visible and visible. The surfacing is gone and the top bit is exposed.	0	\$0.00
3	Other - See remarks.	0	\$0.00
4	Surface Deterioration (S) - Protective surfacing has been compromised, exposing underlying components. No deterioration present.	0	\$0.00
5	Metal Flashing (M) - Loose or missing fasteners.	1	\$7.00
6	Wall Insulation (W) - Missing or damaged.	0	\$0.00
7	Base Flashing (B) - Slipping, wrinkling, blistering, or pulling of base flashing material.	0	\$0.00
8	Sealant (H) - Failed sealant, allowing water entry.	0	\$0.00
9	Vegetation (V) - Evidence of vegetation, but not penetrating the membrane.	0	\$0.00
10	Other - See remarks.	1	\$1,200.00
11	Metal Flashing (M) - Metal cap or counterflashing is missing or displaced from its original position.	8	\$15.00
12	Metal Flashing (M) - Corrosion holes have occurred through the metal on a vertical surface.	0	\$0.00
13	Ponding (P) - Ponding.	0	\$0.00
2020	Re-roofing recommended.	25,840	\$15,000

**Repair Subtotal:** \$1,327  
**A Subtotal:** \$538,927



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### Roof Corrective Action



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### Roof Corrective Action

#### Cost Summary

008 - South View Middle School

**Section: A**

ID	Year	Description	Qty	Unit Cost	Extended Cost
1		Base Flashing (B) - Medium level base flashing deterioration with surfacing erosion and deteriorated felt. No apparent water entry.	0	\$7.00	\$0
2		Ridges (R) - Ridges are visible and visible. The surfacing is gone and the top bit is exposed.	0	\$0.00	\$0
3		Other - See remarks.	0	\$0.00	\$0
4		Surface Deterioration (S) - Protective surfacing has been compromised, exposing underlying components. No deterioration present.	0	\$0.00	\$0
5	2019	Metal Flashing (M) - Loose or missing fasteners.	1	\$7.00	\$7
6		Wall Insulation (W) - Missing or damaged.	0	\$15.00	\$0
7		Base Flashing (B) - Slipping, wrinkling, blistering, or pulling of base flashing material.	0	\$15.00	\$0
8		Sealant (H) - Failed sealant, allowing water entry.	0	\$10.00	\$0
9		Vegetation (V) - Evidence of vegetation, but not penetrating the membrane.	0	\$8.00	\$0
10	2019	Other - See remarks.	1	\$1,200.00	\$1,200
11	2019	Metal Flashing (M) - Metal cap or counterflashing is missing or displaced from its original position.	8	\$15.00	\$120
12	2019	Metal Flashing (M) - Corrosion holes have occurred through the metal on a vertical surface.	0	\$15.00	\$0
13		Ponding (P) - Ponding.	0	\$0.00	\$0
2020		Re-roofing recommended.	25,840	\$15,000	\$387,600
<b>Repair Subtotal:</b>					\$1,327
<b>A Subtotal:</b>					\$538,927



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# Exterior Wall Evaluation Example

**RECOMMENDATIONS**

Based upon the visual observations made above, Inspect has the following recommendations:

- Further investigation of the brick in images 24 and 25 is recommended to find the cause of the movement and if the brick is still moving or not. Once a cause is determined, the condition can be fixed, stabilized, and the re-entrant joint can be sealed.
- Cracked and spalled brick should be replaced. Brick that is cracked or spalled can allow more water to enter the wall system than the system was designed to handle. This can cause additional damage.
- Efflorescence should be cleaned from the wall. Efflorescence is the result of excess water moving through the brick. Once the efflorescence is cleaned, the walls should be monitored for reappearance of the efflorescence in areas where the efflorescence returns, further investigation should take place to determine the cause of the excess moisture.
- Deteriorated mortar joints should be replaced through tuck pointing. Deteriorated joints can cause excess water to enter the wall system resulting in damage. Consideration should be given to adding backspacing some areas in groups. This could make management of the joints easier since the age of any group would then be known. The joints in the groups should then deteriorate at a relatively similar pace.
- Deteriorated sealant joints should be replaced. All water joints should be monitored and replaced upon they have passed their useful life. Consideration should be given to replacing sealants in groups that relate to the age of construction. This can allow the replacement to be managed easier and allow for the age of sealants in any given area to be known.
- Crack penetrations should be fixed via backspacing if they occur in joints of via replacement with a brick or CMU unit. Penetrations that remain can allow for increased water penetration into the wall system which could result in damage or premature degradation.

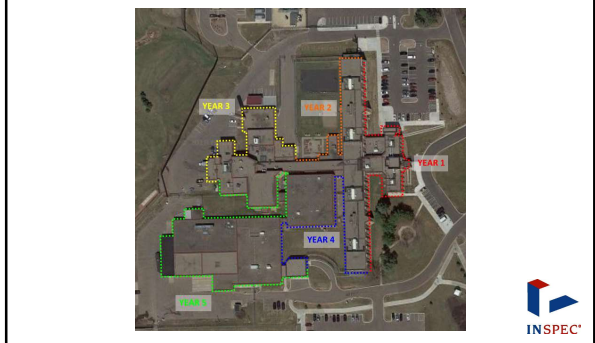
**OPINION OF PROBABLE CONSTRUCTION COSTS**

Brick/CMU Replacement	\$20,000 - \$70,000
Tuckpointing	\$40,000 - \$50,000
Sealant Replacement	\$20,000 - \$30,000
Stone Seal Replacement	\$50,000 - \$100,000
Brick Cleaning	\$20,000 - \$50,000



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# Exterior Wall Evaluation Example



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## Exterior Wall Evaluation Example



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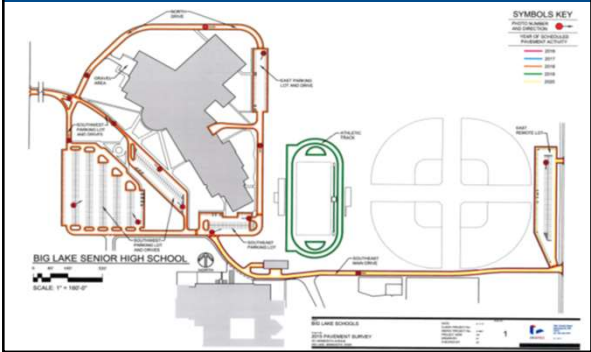
## Pavement Evaluation Example

Facility	2016		2017		2018		2019		2020	
	Est Cost	Reconstruct	Est Cost	Reconstruct	Est Cost	Reconstruct	Est Cost	Reconstruct	Est Cost	Reconstruct
<b>Big Lake High School</b>										
25,500		\$600,000								
2,000		\$75,000								
4,500		\$80,000								
2,400		\$90,000								
4,800		\$12,000								\$80,000
8,000	\$13,000									\$25,000 (New 1)
6,000										
<b>SubTOTAL</b>	<b>\$39,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$17,000</b>	<b>\$0</b>	<b>\$14,000,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$80,000</b>
<b>Big Lake Middle School</b>										
4,800		\$25,000 (New 1)								\$80,000
3,200		\$17,000 (New 1)								\$60,000
3,500		\$7,000								\$40,000
2,200		\$90,000								\$7,000
4,800										
<b>SubTOTAL</b>	<b>\$48,000</b>	<b>\$60,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$178,000</b>
<b>Clayton Elementary School</b>										
3,500		\$50,000 (New 1)								\$125,000
5,200		\$16,000 (New 2)								\$75,000
3,200		\$5,000								\$25,000
<b>SubTOTAL</b>	<b>\$39,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$125,000</b>
<b>Independence Elementary School</b>										
3,500		\$80,000								\$12,000
8,000		\$750,000								\$18,000
5,500		\$11,000								\$75,000
2,200		\$80,000								\$9,000 (New 2)
300		\$7,000								\$9,000 (New 2)
4,200		\$100,000								\$12,000
<b>SubTOTAL</b>	<b>\$18,000</b>	<b>\$175,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$108,000</b>
<b>TOTAL PER FACILITY</b>	<b>\$141,000</b>	<b>\$200,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$17,000</b>	<b>\$0</b>	<b>\$14,000,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$600,000</b>
<b>ANNUAL CONSTRUCTION COST</b>	<b>\$171,000</b>	<b>\$200,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$17,000</b>	<b>\$0</b>	<b>\$14,000,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$600,000</b>
<b>ENGINEERING - DESIGN</b>	<b>\$14,000</b>	<b>\$18,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$44,000</b>	<b>\$0</b>	<b>\$30,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$37,000</b>
<b>CONSTRUCTION ADMINISTRATION</b>	<b>\$23,000</b>	<b>\$12,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$20,000</b>	<b>\$0</b>	<b>\$24,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$25,000</b>
<b>RECOMMENDED BUDGET</b>	<b>\$178,000</b>	<b>\$230,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$81,000</b>	<b>\$0</b>	<b>\$178,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$702,000</b>

Note 1: Includes approximately 200 square yards of resurfacing.  
 Note 2: Includes approximately 150 square yards of resurfacing.  
 Note 3: Recommended budget includes approximately 10% for contingencies.

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## Pavement Evaluation Example



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## Pavement Evaluation Example



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## Cost Estimating



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## Cost Estimating

It is important to have a clear and accurate forecast of what a project will cost.





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## Cost Estimating

**Failing to prepare a Reliable cost estimate can cause Big Problems.**






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## Low Cost Estimates Too Common


**University of Oxford scholar Bent Flyvbjerg analyzed 258 transportation infrastructure projects from around the world and found that 9 out of 10 exceeded their cost estimates.**




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## Examples of Cost Estimating Disasters

**The International Space Station started off with a \$36.7 billion budget and was completed 6 years late with a final cost of \$105 billion – 186% over budget.**






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## Examples of Cost Estimating Disasters

**Major Projects That Went Catastrophically Over-Budget**  
Selected over-budget construction projects worldwide (billion U.S. dollars)\*

Project	Planned	Current/Final	\$ Over Budget
International Space Station	~37	~105	\$68.25bn
Sochi Olympics	~10	~40	\$39.00bn
The Channel Tunnel	~10	~21	\$21.10bn
Three Gorges Dam	~16	~17	\$16.18bn
Boston's Big Dig	~13	~14	\$13.45bn
London Olympics	~11	~12	\$11.01bn
Athens Olympics	~6	~7	\$6.99bn
Jubilee Line Extension	~4	~8	\$4.11bn
Hubble Space Telescope	~3	~7	\$3.80bn
Denver International Airport	~3	~6	\$3.10bn
Montreal Olympic Stadium	~2	~5	\$2.96bn
Brazil World Cup	~2	~4	\$2.50bn

\* Converted to U.S. dollars and adjusted for inflation. Source: Prolio.com




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## Cost Estimating

**Cost Estimating obviously includes materials and labor, but don't forget to include these other important cost factors:**


- Scale of project
- Location
- Site Conditions
- Schedule/Phasing
- Time of year
- Quality of Plans & Specifications
- Soft Costs
- Contingencies



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## Common Cost Estimating Mistakes to Avoid

- Failure to Factor in Site Conditions
- Overlooking Soft Costs
- Not Checking Numbers
- Not Having Contingencies



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## Facility Condition Assessments – Importance

**Importance of the Facility Condition Assessment stage in the asset management process is integral to the overall performance of buildings.**

Article Citation: Glenda Mayo and Pauline Karanja (2018) Building Condition Assessments – Methods and Metrics. Journal of Facility Management Education and Research: 2018, Vol. 2, No. 1, pp 1-11.



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## Facility Condition Assessments – Importance

**An instrumental part of managing a facility includes facilitation of a condition assessment and then reporting that information in a concise and usable format.**

Article Citation: Glenda Mayo and Pauline Karanja (2018) Building Condition Assessments – Methods and Metrics. Journal of Facility Management Education and Research: 2018, Vol. 2, No. 1, pp 1-11.



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# Questions?



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# Thank You!

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