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December 8, 2014

Mr. Ray Holberger
Environmental Planner
City of New Bedford
133 William Drive
New Bedford, MA 02740

**Subject: Fall 2014 Cap Inspection
Keith Middle School
New Bedford, Massachusetts**

Dear Mr. Holberger:

At the request of the City of New Bedford (City), TRC performed the seventeenth inspection of the protective cap installed at the Keith Middle School Site located at 225 Hathaway Boulevard in New Bedford, Massachusetts. In August 2012, TRC submitted a Revised Long-Term Monitoring and Maintenance Implementation Plan (LTMMIP) which was subsequently approved. The inspection was performed in accordance with the revised LTMMIP which requires two inspections per year to confirm that the cap is being properly maintained to prevent exposure to the impacted fill beneath.

The cap inspection was performed on October 11th 2014. The elevator vaults were inspected during the annual elevator inspection later in December 2013 and no cracks were noted in the concrete vault floors at that time.

SUMMARY OF RESULTS

The following issues were noted during the October 2014 inspection, and require repair by the next scheduled inspection:

- Animal burrows were observed in the northern slopes. Reportedly, six gophers were captured during 2013, but the burrows need to be filled in.
- Potentially deep-rooted vegetation was observed on the western and southern slopes and should be cut down.

Although not necessarily required by the LTMMIP, TRC recommends addressing the following items to prevent potential cap issues in the future, or to otherwise maintain the integrity of school property:

- Vegetation was observed penetrating pavement surfaces, particularly in the areas adjacent to curbs and catch basins. Although the cracking/gaps in these areas are minor, potential expansion could occur if this situation is left untreated. These areas should continue to be monitored.
- Areas of caulking between the building walls and exterior walkways are continuing to deteriorate. These areas will likely need to be repaired in the future.
- The cap slope is sloughing in an area adjacent to the wetland west of the school, and is undermining the concrete fence support. A crack was observed in the concrete fence support.
- A minor crack was observed in the eastern driveway pavement. Although less than ¼-inch at this time, this area should continue to be monitored and/or repaired to prevent potential further deterioration.
- Two clean-out drains located in the bathroom near room 148, the school store and the boiler room appeared to be deteriorating, please see photograph 10, though no cracks greater than ¼-inch were observed at this time. These areas should be monitored and/or repaired to prevent future deterioration.

DESCRIPTION OF INSPECTION

The October 2014 cap inspection consisted of a walking traverse of the entire Site with visual observations of the cap, including the first floor concrete slab of the building (where visible), the courtyard within the building footprint, and the concrete, asphalt and landscaped surfaces outside the building. Access to most locked rooms within the building was provided by the facility engineer, Gary Gomes. Elevator vaults were not accessible and were not inspected. The inspection was documented in a log book, and areas where important features were discovered are depicted in Figure 1. Copies of the log book pages are presented as Attachment 1. The findings of the inspection are documented on the site-specific Cap Inspection Form (Attachment 2) provided in the LTMMIP. Photographs taken during the inspection are presented as Attachment 3.

Based on TRC's inspection, the concrete floor within the footprint of the building is currently acting to prevent exposure to the impacted fill beneath. Four minor cracks were previously noted in the boiler room floor and still do not present a cap integrity issue at this time. Three very minor cracks were also observed in storage room 44, and also do not require repairs at this time. Several hair line cracks were observed in the southern hallway (approximately seven) and one hair line crack was observed in the electric closet. Each of the cracks noted above appears in a general east-to-west orientation.

Several curbed areas along the exterior of the middle school had small tufts grass penetrating through the concrete and asphalt. This issue has been monitored and treated following previous inspection reports, and the results have been positive. Although these cracks through which vegetation is penetrating were not greater than ¼-inch, they do pose potential future problems as weathering could increase crack size. The minor crack (less than ¼-inch) in the pavement which was observed during the previous inspection on the eastern driveway has not changed in size, and is not considered a cap integrity issue at this time.



In several areas around the exterior of the school building, a bead of caulking has been installed in the joint between the foot of the brick building walls and the concrete walkways. The caulking prevents weather elements (i.e., rain, snow, and ice) from entering the joint space. As noted in previous reports, the caulking appeared deteriorated in several areas. The caulking used to repair cracks in the walkways also appears to be deteriorating. Although conditions were not indicative of a potential for soil exposures, TRC recommends continuous observation and repair/replacement of the caulking, as necessary. Continued infiltration of weather elements into the joint could eventually separate and deteriorate the walkway.

The landscaped areas around the exterior of the building were acceptable with the exception of the following:

- Several small holes were observed along the northern edges of the cap, which may have been burrowed by small animals. As previously stated in this report, six gophers were previously removed. It was recommended in that in April 2014 inspection that these borrows be filled prior to the next cap inspection, currently these holes remain unfilled.
- Sloughing riprap is undermining the concrete fence support at the top of the slope, and filling the outlet of the storm water drainage culvert on the west side of the Site. Areas of soil erosion were observed along the upper slope, as well as a crack in the concrete fence support. The area appears relatively stable at this time, but the condition is likely due to an increase in slope steepness. The crack in the concrete fence support is not identified as a cap integrity issue, nor is the riprap accumulating in the culvert outlet, but these issues should be addressed to maintain the integrity of the fence and the function of the culvert.
- Potentially deep-rooted vegetation observed on the slopes south and west of the school and should be cut down.

CONCLUSIONS

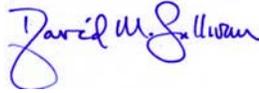
The black separation fabric that demarcates the underlying contaminated fill from the clean imported fill is not visible within the cap area, and exposures to the impacted fill beneath the cap are being prevented. However, the issues identified in this report should be addressed in order to prevent further cap damage or erosion that could eventually expose the separation fabric.

Please refer to the attached Cap Inspection Form and photographs for additional details concerning the conditions described above. If you have any questions, please contact either of the undersigned at 978-970-5600.

Sincerely,



Rishabh V. Iyer
Staff Engineer

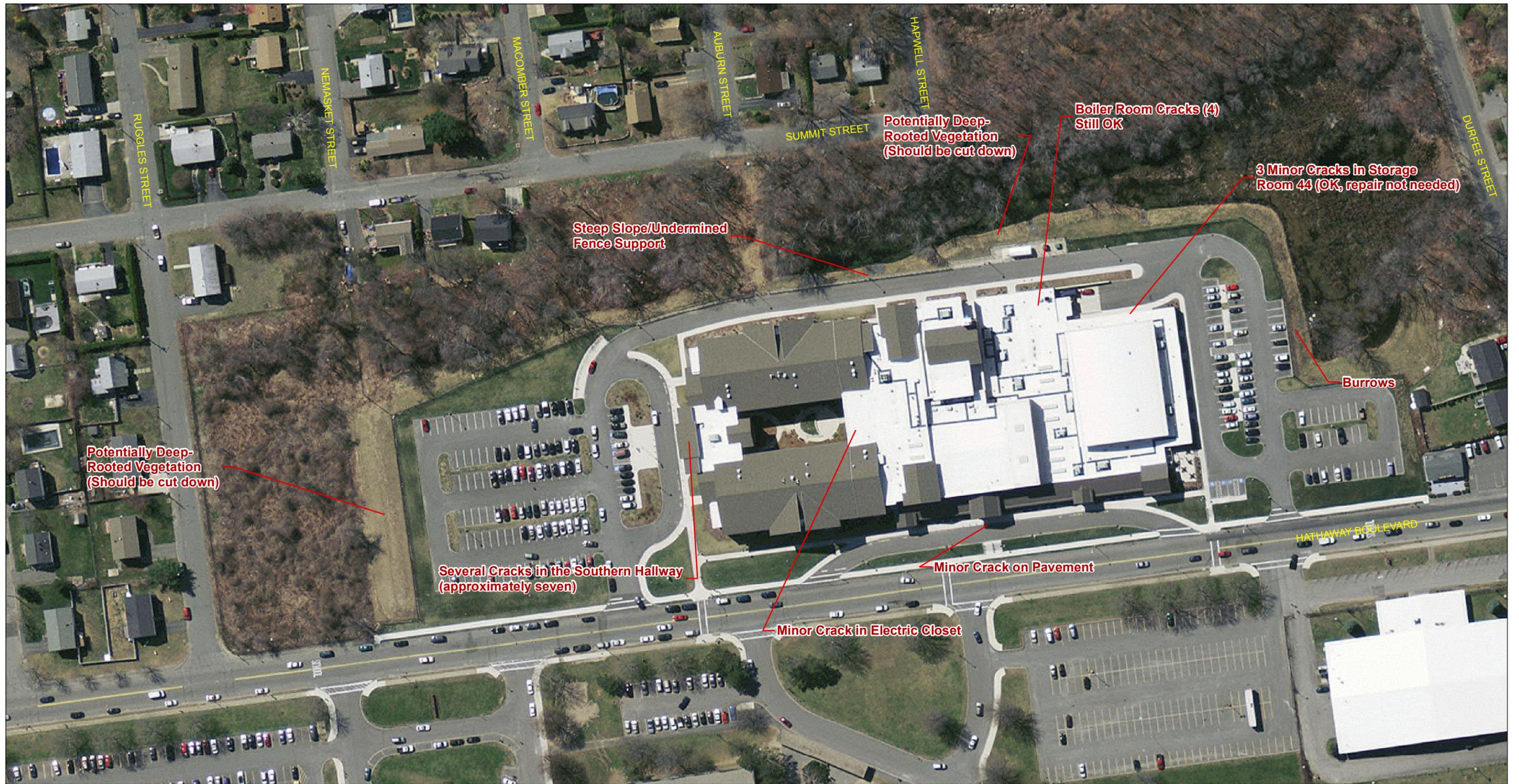


David M. Sullivan, LSP
Senior Project Manager

Attachments

Figure 1

Site Map



Potentially Deep-Rooted Vegetation (Should be cut down)

Steep Slope/Undermined Fence Support

Several Cracks in the Southern Hallway (approximately seven)

Minor Crack in Electric Closet

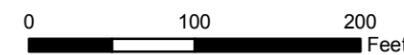
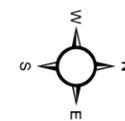
Potentially Deep-Rooted Vegetation (Should be cut down)

Boiler Room Cracks (4) Still OK

3 Minor Cracks in Storage Room 44 (OK, repair not needed)

Burrows

Minor Crack on Pavement



MASSACHUSETTS



SITE LOCATION



Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

SITE MAP
KEITH MIDDLE SCHOOL
NEW BEDFORD, MA

Attachment 1

Log Book

10/11/14 KMS CAI Inspection

1100 RI arrive onsite, weather is rainy & 65°F, RI meets with Gary Gomes plant engineer, to get master set of keys

1105 Clean out drain in boiler room next to custodial office badly deteriorated

1110 2 cracks observed in the outdoor storage room

1125 Could not go in the faculty dining community room, people having a meeting in there

1130 Approximately seven ^{minor RI 10/11/14} major cracks observed in the large hallway is the southern section of KMS

1145 Vault in Science room 129 ^{RI RI 10/11/14} looks good

1150 Vault in Science room 174 looks good

1230 Clean out drain in room 153 looks very deteriorated

1300 RI completes inspection inside of the school, no cracks $\geq 1/4"$ observed, Gary Gomes out for lunch

1300 RI begins inspection on the outside perimeter of middle school
→ in general as noted in previous

10/11/14

KMS CAP Inspection

there are small tufts of grass growing through open spaces in the curbing.

Weather is cloudy outside and continuous down pour

1310 Deep rooted vegetation observed in the western slope, animals burrows observed on the northern section of property → similar to the last visit.

10/11/14 crack

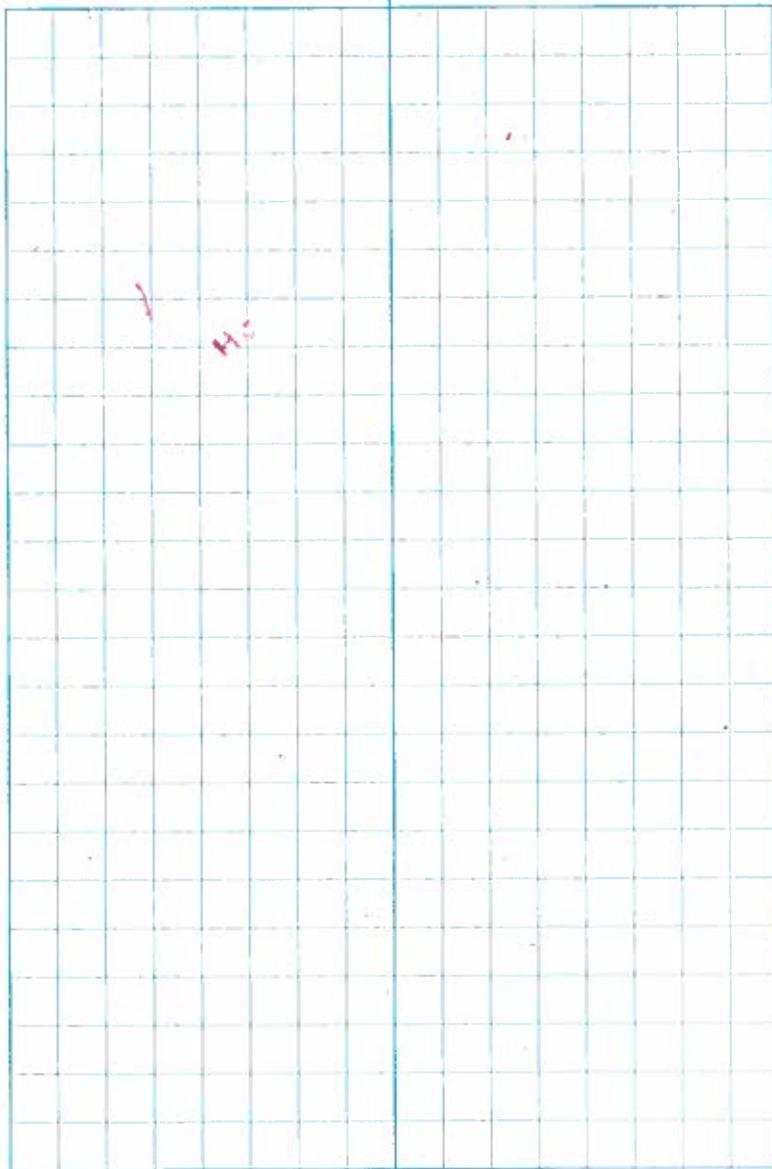
1330 minor cracks observed in the eastern driveway

1340 Deep rooted vegetation observed on the southern slope, similar to the last visit

1350 Deep rooted vegetation in the western slope, sloughing observed on the concrete base of fence. (Similar to previous visit)

1400 RI completes inspection outside, Gary Gomes not back, RI inspects faculty community dining room, no cracks observed

1405 RI calls Gary Gomes, RI packed up and offsite

RLB10/11/14

Rite in the Rain

Attachment 2
Cap Inspection Form

CAP INSPECTION FORM KEITH MIDDLE SCHOOL

Use this inspection form to document cap inspections. If unacceptable conditions are observed, complete an additional form immediately after repairs are completed.

Inspection Date: October 11th 2014

Inspection by: Rishabh Iyer, TRC

A. ASPHALT AND CONCRETE PAVING – observe asphalt and concrete paving for cracking, holes, and asphalt removed during construction, other damage.

All asphalt areas look in good condition except for a minor crack observed in the eastern parking lot, which was less than ¼-inch, please view Photograph 1. The two major cracks greater than ¼-inch discovered in the April 2014 inspection was not observed during this inspection. Small tufts of grass were observed penetrating up through the curbed sidewalk in various areas but are less than ¼-inch and deemed acceptable. These areas should be addressed to prevent potential cap issues in the future.

All Asphalt and concrete paving acceptable? YES NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

Condition:

Describe any repairs to asphalt and/or concrete paving conducted since previous inspection:

All repairs adequate YES NO Photograph of repair attached

B. INTERIOR CONCRETE FLOORS – observe concrete for cracking, holes, and concrete removed during construction, other damage.

Four cracks in the boiler room floor are less than ¼-inch wide and have not increased in size, see Photograph 2. Three minor cracks in storage room 44 are also less than ¼-inch wide and have not increased in size, see Photograph 2 and Photograph 3. The clean out drain in the boiler room has become badly deteriorated but no cracks greater than ¼-inch was observed. The majority of interior concrete floors are covered with tiles or other type of flooring material. No cracks were observed in the vaults in the science rooms, see Photograph 4 and 5. Approximately 7 minor cracks were observed along the southern hallway, see Photograph 6. Based on visual inspection and conversations with current employees, there are no breaches or other significant damage or deterioration of the interior surficial flooring materials or, where visible, concrete floors. No construction was occurring within the building at the time of the inspection.

All interior concrete floors acceptable? YES NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

Condition:

Describe any repairs to interior concrete floors conducted since previous inspection:

All repairs adequate YES NO Photograph of repair attached

C. LANDSCAPING – observe landscaping for erosion, animal holes, excavation, erosion control vegetation health.

Landscaping was inspected by Rishabh Iyer to observe unacceptable conditions. Animal borrows were observed along the northern slopes, please see Photograph 7. During the April 2014 inspection, borrows were observed in western portion however due to the thickly vegetated brush, the southern portion of western slope was inaccessible. Deep rooted vegetation was observed on the western and southern slope, please see picture 8 and 9. All vegetation should be mowed in the near future. Sloughing and erosion under the fence to the west of the school appears to be stable and the extent of erosion similar to conditions observed during past inspections.

The structural integrity of this fence may be compromised if the sloughing and erosion continues. The cap soils beneath the riprap may also become exposed and susceptible to erosion. The area appears stable at the moment, but the condition is likely due to an increase in steepness beyond the cap design slope. The extent of erosion seems similar to the conditions observed during several previous inspections.

All landscaped areas acceptable? YES NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

1) The exterior slopes surrounding the school.

Condition:

- 1) Animal burrow holes were observed on the slopes to the north and west of the school, see Photographs 8. Currently these borrow do not look active, TRC will monitor these areas for increased animal activity, i.e., resumed use of borrows and increased quantity of borrows. .
- 2) Potentially deep rooted vegetation was observed on the slope to the south and west of the school and should be cut down.

Describe any repairs to landscaping since previous inspection:

All repairs adequate YES NO Photograph of repair attached

D. Areas Not Inspected:

1) The elevator vaults were not inspected.

Attachment 3

Site Inspection Photographs

SITE PHOTOGRAPHS
October 2014 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



1) Crack in the asphalt less than ¼ -inch, located in eastern driveway



2) Crack in the asphalt less than ¼ - inch in storage room 44.

SITE PHOTOGRAPHS
October 2014 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



3) Crack in the asphalt less than ¼ - inch in storage room 44.



4) Vault in Science room 127

SITE PHOTOGRAPHS
October 2014 Cap Inspection
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5) Vault in Science room 171



6) Cracks along the southern hallway

SITE PHOTOGRAPHS
October 2014 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



7) Animal borrows on the northern slope



8) Potentially deep rooted vegetation on the southern slope

SITE PHOTOGRAPHS
October 2014 Cap Inspection
Keith Middle School
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9) Potentially deep rooted vegetation on the western slope



10) Deteriorated clean out drain in boiler room.