ASSESSMENT REPORT FOR:

FRED C. UNDERHILL ELEMENTARY

HOOKSETT, NEW HAMPSHIRE

Prepared By:

THE H.L. TURNER GROUP INC.
27 LOCKE ROAD
CONCORD, NH 03301
PHONE: (603) 228-1122

TURNER BUILDING SCIENCE & DESIGN, LLC
HARRISON, MAINE 04040
PHONE: (207) 583-4571

BLW ENGINEERS, INC
P.O. BOX 1551, 311 GREAT ROAD
LITTLETON, MA 01460
PHONE: (978) 486-4301

TTG PROJECT No: 4297

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27 Locke Road Concord, NH 03301 t: 603.228.1122 hlturner.com

On Thursday August 10, 2017, The H.L. Turner Group Inc. (TTG) visited the Fred C. Underhill School at 2 Sherwood Drive in Hooksett, NH, to conduct a site assessment of the property to identify areas of concern, deficiencies, or hazards. This report provides a summary of those findings, our opinions regarding the urgency of correcting deficient conditions, and an opinion of the associated costs to do so. For this report, the location of the main entrance is considered the east side of the building.

Overview

The Underhill School serves students in preschool through second grade and is located at 2 Sherwood Drive in the Town of Hooksett, NH, identified on Tax Map 33 Lot 66. It sits on an 11-acre parcel, of which approximately half of which is undeveloped and densely wooded. According to the National Resources Conservation Service (NRCS) the site is underlain by Windsor soils, a loamy sand classified in the 'A' hydrologic soil group that infiltrates stormwater very effectively.

The school is a single story masonry, that was originally constructed in the 1950's, with additions constructed in 1990, including renovations to the site parking and circulation. A portable classroom sits at the northeast corner of the school, connected to the main building by a covered asphalt walkway. Placement of this structure required sacrificing 13 parking spaces.

The site provides 116 parking spaces, four of which are designated as handicapped accessible spaces. 22 of the spaces are reserved for staff parking and the remainder are for visitors, volunteers, and other employees. A dedicated bus lane provides an area for students to enter and exit school buses separate from parent, visitor, and staff traffic.

The developed portion of the parcel is level, but the property slopes from south to north toward Martin's Ferry Road, and west toward the abutting property owned by Southern New Hampshire University. The runoff flowing to the west is intercepted by Messer Brook which flows to the Merrimack River, while the runoff that runs north is captured in the closed drainage system along Martin's Ferry Road where also discharges into the Merrimack River.

The school is connected to municipal water and sewer service, natural gas, and it also uses propane.

In conversations with school faculty there were no reported concerns with drainage, circulation, parking, or any other site elements.

Drainage

Overview

Stormwater appears to be managed primarily by onsite infiltration. The sandy soils on this site infiltrate runoff very well and there are no apparent significant drainage problems. There are few drainage structures on this site, and those that are installed appear to rely primarily on infiltration. Along the south side of the developed portion, parallel to the entrance driveway and visitor parking lot, a stone-lined swale intercepts runoff flowing toward the school site from the wooded slope at the south end of the parcel, and channels the runoff into an infiltration basin adjacent to the driveway entrance from Sherwood Drive. The runoff from the visitor parking lot also appears to flow toward this swale.

South Side

The asphalt visitor parking lot slopes gradually from the school toward the stone-lined swale along that parallels the driveway. The grass-covered terrain that abuts the southern edge of the asphalt is overgrown with tall weeds and dense vegetation, and the ground is somewhat higher than the asphalt surface, which prevents runoff from flowing freely into the swale. At the southwest corner of this lot there is evidence of stormwater ponding because if its inability to reach the swale.

Runoff from the gymnasium roof flows through two roof drains mounted to the exterior wall of the building and discharges onto the ground next to the school foundation. It appears the original intent was to allow this runoff to flow across the visitor parking lot toward the swale, but the location where these drains daylight has settled, and is lower than the edge of pavement. Roof runoff does not flow across the lot until it ponds to a depth of a few inches and until that happens it infiltrates into the ground adjacent to the gymnasium foundation. It is desirable to transport runoff away from building foundations, even if there is no basement present. Allowing roof runoff to flow across parking areas can lead to hazardous icing conditions during freeze/thaw seasons. According to the 1990 construction plans provided to TTG it appears the original intent was to have a landscaped area along the south face of the exterior gymnasium wall, but in the current condition it is paved almost to the face of the concrete foundation.

The stone-lined swale is overgrown with tall grass, small trees, shrubs, and other woody vegetation. The construction plans from 1990 indicate the tree line was cut back approximately 50-feet from the swale and the remaining slope was loamed and planted with grass. This encroaching vegetation minimizes the capacity of this swale to manage all of the runoff it is designed to accommodate. There is a perforated pipe underneath the swale designed to transport runoff to the infiltration basin. The roots of these plants can clog the pipe and the pores of the stone surrounding it, which can ultimately lead to the failure of this system.

The infiltration structure adjacent to the entrance to the site has a large above-grade opening: It appears the original inlet opening was smaller but some of the concrete has broken and created a larger entrance to the structure. This opening is large enough for a child or animal to crawl through, which presents a hazard because the interior of the structure is over 6-feet deep and is designed to fill with water while slowly releasing it during rain events.

West Side

This side of the school is covered primarily with pervious surfaces. The playground is located in this area and the only impervious cover is the fire lane, pedestrian sidewalks, and the hardscaped portion of the playground. The terrain slopes westward, away from the building and toward the property line and dense woods outside of the school's chain link fence. There is a single catch basin at the corner of the hardscaped play area but it appears most runoff flows off the edge of the pavement and does not really flow into the structure. The ground along the edge of the pavement is eroding and there is a well-defined channel through the mulch surface adjacent to the swing set where the runoff is concentrated during rain events. Around one of the sandboxes there is a channel eroded through the sand as well. The soils at this site infiltrate water very well but they are also erosive and without vegetation to stabilize them they are susceptible to erosion during rain events.

North Side

At a corner of the driveway near the portable classroom, a precast catch basin collects runoff from the staff parking lot and from a portion of the fire lane driveway, and directs it through a culvert out toward Sherwood Drive where it is captured in the Town's municipal drainage system. This structure appears to be in good condition and functioning as designed.

East Side

There is a narrow exterior corridor to the mechanical space on this side of the facility with a catch basin to capture and remove rainfall and snowmelt accumulating in this area. The outlet culvert daylights through a headwall at the toe of the slope leading down to Sherwood Drive, and a paved sluice at the side of the street channels the runoff to a municipal catch basin further down Sherwood. This structure and pipe appear to be functioning adequately however it appeared paint brushes may have been rinsed out into the catch basin near the electrical room: The water in the sump of this basin was white, the asphalt sluice at the pipe outlet was stained white, and the municipal catch basins downstream of the outlet had white liquid in their sumps. The drainage system eventually discharges direct to the Merrimack River so paints, turpentine, oils, and other potential contaminants should not be flushed into the storm drain system because of the potential impacts to aquatic life downstream.

There is a catch basin adjacent to the main entrance intended to prevent runoff and snowmelt from ponding in front of the doorway, because the asphalt sidewalk slopes gradually toward the structure. It appears this is an infiltration catch basin because it is very shallow (12-24" deep) and there was no visible outlet pipe. The shallow depth may be due to an accumulation of sand, mulch, grass clippings, and other debris in the sump, which reduces the design capacity of the basin. The structure appears to have heaved vertically approximately 1-inch, creating a collar that prevents water from completely draining to the inlet.

The grass-covered area in the middle of the bus loop is designed to capture runoff and direct it toward a concrete culvert that is tied into the infiltration basin described earlier (in the 'South Side' Drainage section), located adjacent to the driveway entrance to the site. Some of the surrounding soil has fallen into the inlet, reducing its available capacity, and there is some undermining at the pipe inlet.

The bus loop slopes very gradually toward this grassy area and the mulch placed at the edge of the landscaped area, adjacent to the interior edge of the bus loop pavement, creates a dam that may prevent runoff from flowing off the pavement and into this detention area.

Recommendations

- Remove trees, shrubs, and woody vegetation from the stone-lined swale along the edge of pavement on the south side of the school, and perform regular maintenance to ensure the swale remains clear. Mow the grass between this swale and the visitor's parking lot to ensure runoff can flow freely into the swale. Inspect the swale regularly for trash, debris, and sediment and remove any of these items that may be discovered.
- Install a stone drip edge (min. 4' wide and 12" deep) along the face of the foundation along the south side of the gym. Place a perforated pipe, sloped to drain, at the bottom of the stone and run it to an infiltration basin located at least 10-feet away from the building. The purpose of the drip edge is to capture roof runoff and prevent it from seeping into the ground against the foundation.

- Install a new cover on the infiltration basin adjacent to the main driveway entrance to the site. The opening should have grating or consist of multiple smaller openings to prevent accidental access.
- Install a bituminous curb along the western edge of the hardscaped playground to direct runoff to the catch basin and prevent further erosion of the playground.
- The hardscaped playground and the paved fire lane are ideal locations for porous asphalt. As the school district budgets for the eventual replacement of these surfaces, TTG strongly encourages them to consider using porous asphalt.
- Remove sediment from the catch basin structure adjacent to the main entrance to the school building. If there is an outlet pipe buried beneath the debris, flush it out to ensure it flows freely. Reset the structure on a bed of crushed stone, 18" to 24" thick, to establish a smooth path for runoff to reach the inlet.
- Ensure runoff flows freely from the bus loop to the grassy central area. Create openings in the mulch or regrade the shoulder so water is not trapped at the edge of pavement.
- Remove soil from the inlet of the concrete culvert from the landscaped area at the bus loop to the infiltration basin. Stabilize the material at the inlet of the culvert to ensure it does not become undermined.
- Establish a dedicated area for rinsing paint brushes and other potential contaminants that are hazardous to natural environments. Educate employees to ensure items are not flushed into the storm drain system that should not enter it.
- Develop a stormwater inspection and maintenance plan that details regular required inspections and maintenance items to ensure the continuing functionality of the stormwater system on this site. The plan should include such items as parking lot sweeping, catch basin cleaning and inspection, swale maintenance, and debris/trash removal.

Pavement and Parking

Overview

The pavement across the entire site is in fair condition. There is some stress cracking but no more than what one would expect for its age. Evidence of preventive maintenance measures (crack sealing) are evident but the work is not recent.

Most of the sidewalks are separated from the driveways by bituminous curbing. The exception to this is the sloped granite curbing along the outer perimeter of the bus loop. The vertical separation between sidewalk and driveway at both kinds of curbing is minimal, 3-inches or less, and is not a deterrent to traffic, if that is the intent.

Much of the sloped granite curbing at the bus loop is broken and displaced. It should be extended the full length of the bus loop, to the radius at the intersection with the driveway to the visitor parking lot. There is no need for a sidewalk tip down at this intersection because there is no pedestrian route across the driveway here.

Where the sidewalks tip down to the driveway to accommodate a wheelchair, the school should install concrete tip downs with detectable warning plates.

The accessible parking spaces do not comply with Americans with Disabilities Act (ADA) regulations. The single space at the staff parking area does not have an adjacent access aisle, and the access aisles in the visitor's parking lot are too small to comply. Additionally, the signage is mounted too low and none of the spaces are indicated as van accessible (where at least one needs to be).

Recommendations

- Develop a pavement maintenance program. Clean and seal all existing cracks and sealcoat the entire site. Perform these actions on a regular basis.
- Place and compact bank run gravel (NHDOT 304.2) at the edges of pavement where the shoulders are eroding, to prevent undermining of the asphalt.
- Reset the sloped granite curbing along the bus loop. Ensure there is a minimum of 4-inch of vertical separation between the vehicle and pedestrian surfaces. Paint a 4-inch wide white or yellow stripe along the top edge of the curbing so it is more visible.
- Replace bituminous curbing when the sidewalks are repaved. There should be at least 4-inches of vertical separation between the vehicle and pedestrian surfaces and paint a 4-inch white or yellow stripe at the top edge of the curb.
- Construct concrete tip downs at those locations where the sidewalk meets the driveway. Include detectable warning plates.
- ADA specifies that an accessible parking space shall be no less than 8-feet wide and shall have an adjacent aisle with a minimum width of 5-feet (8-feet for a van accessible space). The accessible space in the staff parking lot has no adjacent aisle. The district should stripe create a compliant accessible space at the location of the existing space. The three accessible spaces in the visitor lot sit adjacent to a 2-foot and a 4-foot aisle. The parking spaces are approximately 9.5-feet wide, so by restriping the area the district can create 8-foot wide spaces with 5-foot access aisles. The van space can be accommodated by utilizing the area that is already striped for pedestrians where the sidewalk meets the parking lot. Alternatively, the other four spaces adjacent to these three accessible spaces are wider than the standard 9-foot width, so if they are restriped at the same time there is adequate space to establish full compliance with the ADA regulations.
- Elevate the ADA signage. The bottom of the signs should be a minimum of 5-feet above the finished grade.
- The sidewalk at door A15 is only 36-inches wide and it is adjacent to a steep slope at the back corner of the portable classroom. The ground beneath it is undermined from erosion. The sidewalk should be made wider to match the remainder of the sidewalk (5-foot width), a guardrail should be installed to prevent accidental falls at the slope,, and additional gravel or stone should be placed at the sidewalk where it is undermined.
- Extend the sloped granite curb at the bus loop toward the stop sign.

Accessibility

Overview

The site and the exterior approaches to the building appear to be nearly fully compliant with ADA regulations. In addition to the parking related issues discussed above, TTG noted the following items:

The landings at the exit doors from the gym to the visitor's parking lot are steep (13% and 9%, where 10% is typically the absolute maximum). The challenge at this school is the close proximity of the parking lot to the doorway and the desire to eliminate a step down to the pavement. The school would likely have to construct a ramp parallel to the face of the exterior wall to achieve full compliance with ADA. In this instance, providing an egress route that does not require a step is a high priority, which has been accomplished, and it is clear the school has made the attempt to be as fully compliant as possible given the existing conditions.

The steps to the portable classroom spaces are steeper than is permitted. The risers are between 7.5- and 8-inches tall, where 7-inches is the maximum permitted. Further, the handrails do not comply with ADA regulations.

Recommendations

- Replace wooden stairs and railings leading to the portable classroom.

Landscaping

Overview

In general, the landscaping at the Underhill School is in good condition and well maintained. A few areas require additional attention:

The grass cover on the west side of the building is generally sparse, both in the playground and in the landscaped areas adjacent to the building. The sandy soils and lack of irrigation make it difficult to establish dense vegetated cover. Additional grass can help prevent some of the erosion occurring at the playground.

In a few locations, there are some trees or woody vegetation growing against the exterior walls of the school. At the corner of the fenced-in courtyard on the west side of the school there is a tree that is overgrown and obscures windows and an air conditioning unit.

There are several plants against the foundation in this same area. In addition, at the flower garden nestled in the northwest corner of the school there are some shrubs growing up against the exterior walls.

In the landscaped beds adjacent to the foundation, in several locations the mulch is mounded over the lowest courses of masonry, which can prevent water from being able to drain out of the interior wall cavity.

As noted in the 'Drainage' section, the stone-lined swale on the south side of the school is overgrown with excessive vegetation.

Recommendations

- Place 6- 8-inches of loam across the landscaped areas on the west side of the building and seed it with a dense-growing grass. Maintain the grass with regular mowing and reseeding bare areas when they begin to develop.
- Prune or remove vegetation that is overgrown, particularly trees and shrubs growing directly against the exterior walls of the building.
- Rake out mulch to expose the weep holes in the lowest masonry courses.
- Refer to the recommendations in the 'Drainage' section to address overgrowth in the stone swale.

Miscellaneous

Overview

The chain link fencing throughout the site is in fair condition but in a few locations, the components have slipped out of their connections and fittings, and some lengths of fence are out of plumb.

The dumpster located at the southwest corner of the building sets on an asphalt surface and it is not surrounded by an enclosure to contain trash that may spill out of it and to provide visual screening.

The sewer manhole covers at the grease interceptor on the west side of the school set slightly lower than the surrounding ground and it appears water ponds around one of the covers. This is a potential opportunity for rainwater to infiltrate into the sewer system.

The rain gutter over the northernmost stair landing at the portable classroom is missing.

The three stop signs are mounted too low and should be raised.

Site lighting relies on floodlights mounted to utility poles, distributed across the south and east sides of the site at the perimeter of the parking areas. This lighting is supplemented by wall-mounted units that illuminate the areas adjacent to the building. The district may wish to engage the services of a lighting consultant to provide a lighting layout design that utilizes energy efficient LED fixtures, can provide an exacting level of control over the system, and will be more appealing visually.

The school should consider placing bollards to protect the propane regulator valve at the exterior wall of the school, and at the propane tank risers. Although some boulders provide some protection for the risers there is a gap between the fire lane and the shed. Additional boulders or concrete filled steel bollards will provide additional protection from vehicles.

At the egress door leading to the portable classrooms, the concrete door pad has a large broken section and should be repaired to prevent further damage.

There is an exposed water line running aboveground in the exterior corridor near the electrical and mechanical rooms. This is at risk of damage if water in the line freezes. The school should consider reinstalling this line underground to the building (6-feet below grade) and provide an exterior sill cock for a hose connection.

<u>Recommendations</u>

- Repair and reset the chain link fence as needed.
- Install an 8-inch thick (minimum) dumpster pad with a concrete approach apron to support the weight of a garbage truck when it elevates the dumpster to empty it. Install an enclosure fence (wood stockade or chain link with privacy slats) around the dumpster to provide visual screening and containment for trash.
- Elevate the grease interceptor manhole covers so they are 1-2-inches above the surrounding terrain, to ensure rainwater and snowmelt does not seep into the sewer system.
- Replace the rain gutter at the entrance to the portable classroom.
- Remount the stop signs so the bottoms of the signs are at least 6-feet above grade.
- Work with a lighting consultant to design a new system of exterior lighting for the school property. This will enhance safety and security and improve the electrical efficiency.
- Install concrete-filled steel bollards or similar impact protection at propane regulator and tank risers.
- Repair broken concrete door pad at pathway from school building to portable classrooms.

Drainage

Overgrown vegetation between parking lot and swale along south side.

Sediment in southwest corner of parking lot indicating area where runoff ponds.

Roof leader along south face of gym.

Excessive vegetation in drainage swale.

Inlet to infiltration basin adjacent to main driveway entrance to site.

Erosion through playground mulch- note catch basin inlet at corner of asphalt.

Erosion through playground mulch.

Erosion through sandy playground soil.

Catch basin in corridor outside of electrical room.

Culvert outlet from catch basin at electrical room..

Catch basin adjacent to main building entrance.

Culvert inlet at center of bus loop.

Pavement and Parking

Undermining at edge of pavement. Add crushed gravel to stabilize edge and direct runoff away.

Displaced sloped granite curb at bus loop.

Sidewalk tip down- install a concrete accessible tip down compliant with ADA regulations.

Bituminous curb with minimal reveal. Place stripe along top edge of curb. Note cracks in sidewalk and driveway.

Crack in driveway pavement (typical example).

Sidewalk crack. Note evidence of previous repair.

Noncompliant accessible spaces: Aisles are too narrow and signage is mounted too low. No indication of van accessibility.

Noncompliant accessible space- no adjacent access aisle and sign is mounted too low.

Narrow (36”+/-) sidewalk in front of door A36. Note undermining where curved portion sits atop slope.

Extend sloped granite curb around corner of intersection. Sidewalk tip down not required because there is no pedestrian crossing. Note low mounting height of stop sign.

Accessibility

Reconstruct stairs (both sets) to the portable classrooms to be in compliance with ADA regulations. In their current configuration the risers are too tall and the railings are noncompliant.

Repair broken baluster (per the previous note, the entire stair case should be replaced to comply with ADA regulations).

Landscaping

Sparse vegetation on west side (typical)

Sparse vegetation in playground (typical)

Overgrowth in courtyard.

Overgrowth at flower garden.

Overgrowth along foundation (typical of multiple locations)

Landscape bed obstructing masonry weep holes at lowest courses.

Miscellaneous

Example of chain link fence section to be repaired (this location is at the southwest corner of the visitor parking lot).

Displaced fence.

Displaced fence.

Install concrete dumpster pad & approach apron, plus an opaque enclosure.

Grease interceptor manhole covers. Note staining around cover in foreground, indicative of puddling water.

Missing rain gutter at portable classroom entrance.

Stop sign mounted too low (typical for 3).

Typical site light fixture.

Unprotected propane regulator valve.

Provide additional protection for propane tank risers to the right of the boulder in the foreground.

Broken concrete at door pad near portable classrooms.

Exposed exterior water line.

PROJECT NO. 4571 ~ FRED C. UNDERHILL SCHOOL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
DRAINAGE						
Stone-lined swale along south side of driveway and visitor parking lot.	Swale is overgrown with trees and woody vegetation. Grass slope leading to the swale is overgrown with long weeds and terrain at edge of pavement prevents runoff from flowing freely into swale.	Remove trees, shrubs, woody vegetation, and trim tall grass to a 3-4" height. Regrade slope so runoff can flow from visitor parking lot to swale.	<3 years	$8,000		
Roof leaders on south wall of gymnasium.	Leaders discharge direct to the ground with the intention of allowing runoff to flow across parking lot to swale.	Install a stone drip edge along the gym foundation to contain runoff and prevent it from flowing across the parking lot. Include a perforated pipe to carry the runoff away from the foundation to an infiltration structure or to daylight away from the building.	3-5 years		$15,000	
Precast infiltration basin adjacent to driveway entrance to site.	Opening is larger than necessary and poses a hazard to children who could crawl into the structure.	Replace the basin inlet to allow runoff to enter the structure while preventing unauthorized access to its interior.	<3 years	$3,500		

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CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Hardscaped playground	Runoff flows off the edge of pavement and causes erosion across the playground. There is an existing drainage structure at the corner of the paved area but most of the runoff flows off the pavement prior to reaching the inlet.	Install a bituminous curb along the west edge of the hardscaped playground area to direct runoff to the existing catch basin inlet.	3-5 years		$3,000	
Asphalt playground, fire lane loop, and sidewalks on west side of building.	The low-traffic loads this area sees and the sandy soils on this site make these paved surfaces excellent candidates for the installation of porous asphalt.	As the district makes preparations to replace the asphalt in these areas noted, plan on installing porous asphalt to reduce runoff from the site, recharge groundwater, and treat the stormwater.	>5 years			$30,000
Catch basin adjacent to the main building entrance.	This basin is very shallow, with the sediment only 12-24" below the inlet. No outlet pipe is visible. The structure has heaved, creating a barrier to runoff being able to flow freely into it.	A) Clean out sediment from the sump. If there is an outlet pipe, flush it to ensure it drains freely. B) Reset the basin flush with grade so runoff at the entrance can drain into it completely.	A) <3 years B) 3-5 years	A) $1,500	B) $3,000	
Stormwater detention area at bus loop island.	Shallow bus loop cross-slope and mulch placement along interior edge of pavement pose barriers to stormwater flowing off of this driveway to the inlet.	Rake out mulch to allow runoff to flow from bus loop pavement to grassy detention area.	<3 years	$500		

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CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Culvert inlet from bus loop island	Soil has partially obscured the intake to this inlet and there is some undermining of the concrete apron.	Remove soil from culvert intake and place compacted gravel to repair the undermined portion. Stabilize the earth on either side of the inlet with loam and seed.	<3 years	$1,500		
Stormwater inspection and maintenance plan	A plan such as this provides guidance to the school faculty about regular inspection schedules and maintenance items that will help ensure the longevity of the stormwater management system, and will ensure the stormwater runoff is treated to the greatest extend possible.	If the school does not have such a plan, develop one and follow its recommendations. Such a plan typically specifies schedules for inspection stormwater inlets and swales, maintenance items such as pavement sweeping and catch basin cleaning, and steps to take to verify the system is functioning correctly.	<3 years	$1,000		

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COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
PAVEMENT & PARKING						
Pavement maintenance program.	Planning for regular maintenance and replacement can help the district budget for pavement repairs and help prevent an expensive site wide pavement replacement project.	The school should develop a guidance document for ongoing pavement maintenance, specifying funds to be put in reserve for this purpose and developing a strategic plan for addressing repairs and replacements. This plan should also include the eventual replacement of asphalt on this site.	<3 years	$1,000		
Edge of driveway pavement.	In multiple locations runoff flowing off the edge of the pavement is undermining the gravels beneath the asphalt, particularly on the west side of the school.	Place compacted crushed gravel at the edge of driveway pavement to bring the shoulder flush to the pavement surface. Slope the shoulder to drain away from the asphalt surface (5%+/-).	<3 years	$2,500		
Sloped granite curbing	This curbing is broken and displaced in many locations. There is minimal vertical reveal (<3”).	Remove and reset sloped granite curbing. Ensure it is set true to line and grade and with at least 4” of vertical reveal. Extend curbing at bus loop to the intersection with the driveway leading to the visitor parking lot.	>5 years			$15,000

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COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Bituminous curbing.	Some of the curbing is cracked and broken and there is minimal vertical reveal (<3"). There is no visual indicator along the top of the curb to delineate its presence.	Replace bituminous curbing. It makes sense for the district to combine this effort with a sidewalk replacement program. New curbing should have a minimum vertical reveal of 4" and the district should paint a 4" wide yellow or white line along the top of the curb. (*Note: The district may opt to paint a stripe now as a short term measure to provide delineation)..*	>5 years			$15,000
Sidewalk tip downs.	Existing tip downs are asphalt and difficult to see. Change in sidewalk elevation blends in with existing sidewalk.	Install concrete sidewalk tip downs where wheelchair access to the sidewalk is required. Include detectable warning plates.	>5 years			$8,000
Accessible parking spaces.	The handicapped accessible parking spaces do not comply with ADA standards. Each space should be adjacent to an access aisle a minimum of 5-feet wide (8-feet for a van accessible space).	Restripe parking areas so accessible spaces comply with ADA standards. There should be a van accessible space at both locations where the school provides accessible parking.	<3 years	$5,000		
Accessible parking signage	There should be a minimum of 5-feet between the bottom of the signage and the ground.	Replace the sign posts and mount the accessible signage in accordance with ADA standards. Include 'Van Accessible' signs at the appropriate spaces.	<3 years	$2,500		

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COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Sidewalk at door A15.	The sidewalk is no more than 36" wide in front of this door because of the proximity of the slope down to the portable classroom. There is a 3-4 foot drop between this sidewalk and the ground on which the portable sets.	Reconstruct the sidewalk to have a consistent 48" minimum width. This will require the placement of additional fill or the installation of a small retaining wall. Also provide a guardrail to protect people from accidentally falling off the edge of the sidewalk.	3-5 years		$12,000	

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COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
ACCESSIBILITY						
Wooden stairs and railings at the portable classroom building.	The stairs and the railings on the east side of the portable classroom do not comply with ADA standards.	Reconstruct the stairs and railings in compliance with ADA regulations.	3-5 years		$7,500	

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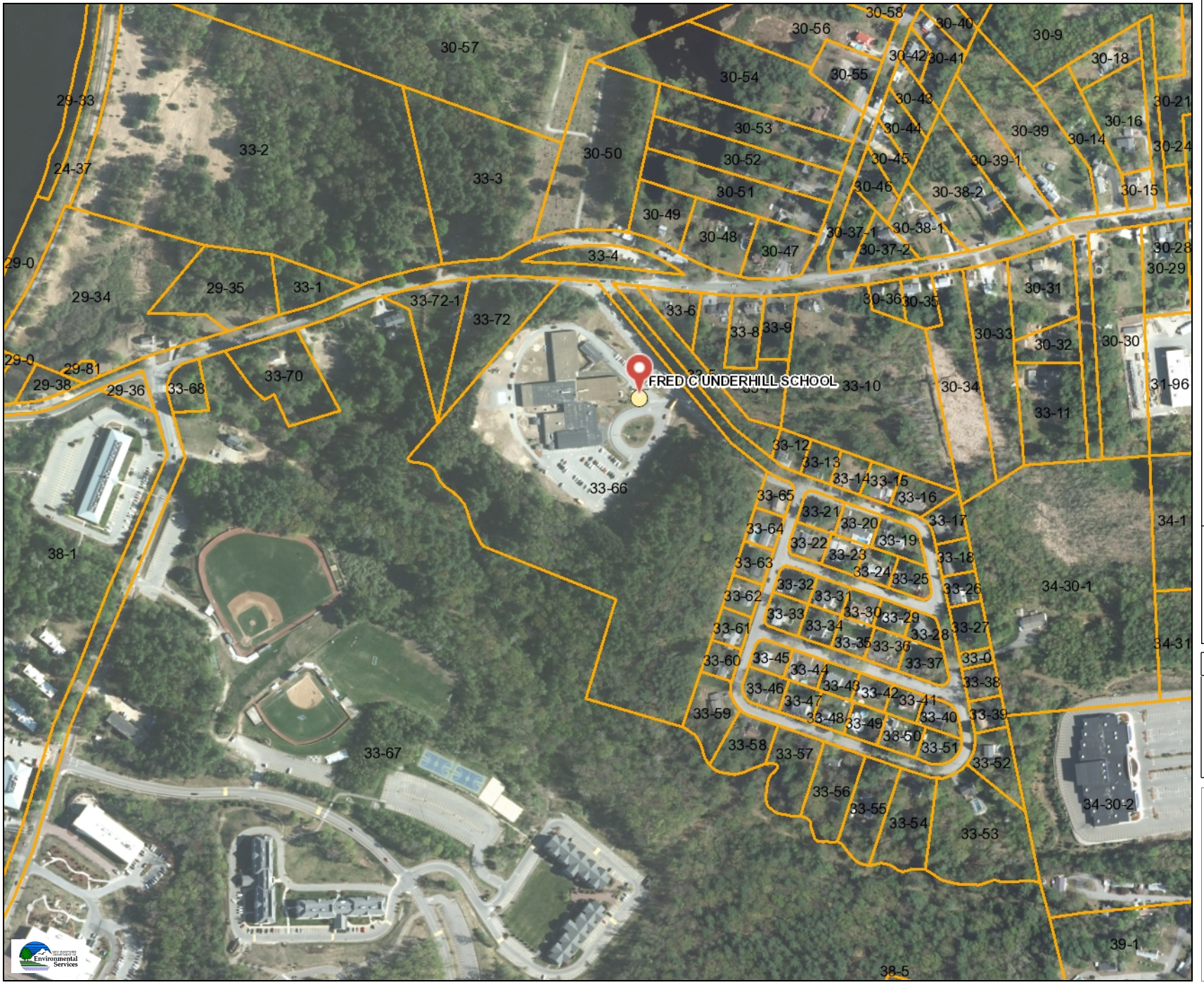
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
LANDSCAPING						
Grass cover on the west side of the school.	The vegetative cover is sparse on the west side of the building, due in large part to the sandy soils.	Spread 6" of loam across the grass surfaces and place grass seed.	>5 years			$10,000
Overgrown vegetation against the exterior face of building.	Trees and shrubs left unmanaged can obscure light, air, and views from windows, clog air intakes, and compromise masonry joints between concrete blocks.	Prune trees, shrubs, and overgrown weeds along exterior of building.	<3 years	$500		
Landscape beds	Mulch is piled over the lowest courses of masonry in many locations, obscuring drainage weep holes.	Rake out the mulch in the landscaping beds away from the building masonry courses	<3 years	$200		

PROJECT NO. 4571 ~ FRED C. UNDERHILL SCHOOL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
MISCELLANEOUS						
Chain link fence	The fence is in decent condition but there are some areas where the connections have come loose and where the sections are out of plumb.	Repair the existing fence as required and reset areas that are not plumb.	3-5 years		$6,000	
Dumpster	The dumpster sits on an asphalt surface, out in the open.	Install a cast-in-place concrete dumpster pad and approach apron to function as a bearing surface for the front tires of a garbage truck when it empties the container. Install a gated enclosure around the dumpster (chain link or cedar stockade) 6-8' tall.	>5 years			$12,000
Grease interceptor access covers	The covers are lower than the surrounding ground and it appears water ponds around them.	Reset the frame and covers so they are 2-3-inches higher than the surrounding grade, and slope the ground to drain away from them.	3-5 years		$7,800	
Northern entrance to portable classroom	The rain gutter over the stair landing is missing.	Replace the gutter.	<3 years.	$100		
Stop signs	These signs are mounted lower than the standard height.	Remount the 3 stop signs on this site so the bottom of the signs is at least 5-feet above the ground below.	<3 years	$2,400		

PROJECT NO. 4571 ~ FRED C. UNDERHILL SCHOOL BUILDING AND SITE ASSESSMENT

CIVIL/SITE			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Site lighting	Exterior parking lot, playground, and driveway lighting is minimal.	Work with a lighting consultant to design a comprehensive lighting plan to increase visibility and security on the site. *(Consultation is typically at minimal cost. This amount reflects a construction cost).*	3-5 years		$30,000	
Propane tank risers and regulator.	The regulator is unprotected from impacts (i.e. a mower) and a vehicle could inadvertently hit the risers.	Place additional boulders, concrete filled steel bollards, or similar measures to provide additional protection for the propane delivery system.	<3 years	$2,500		
Concrete door pad	The concrete at the door landing leading to the portable classroom ramp has a large portion of it that has broken away.	Repair the concrete door pad.	<3 years	$3,500		



Legend

- Underground Storage Tank
- Parcels - polygons

NH 2010/2011 1-foot RGB

Map Scale

1: 5,000

Map Generated: 8/7/2017

Notes

Underhill School

Legend

- State
- County
- City/Town
- Stream Centerlines
  - Perennial Stream
  - Intermittent Stream
- Artificial Paths
- Water Bodies
  - Lake/Pond
  - Reservoir
  - Estuary
  - Swamp/Marsh
- Other Water Features
  - River
  - Spillway
  - Inundation Area
  - Dam/Weir
  - Canal/Ditch
  - Rapids
- Wetlands
  - Estuarine and Marine Deepwater
  - Estuarine and Marine Wetland
  - Freshwater Emergent Wetland
  - Freshwater Forested/Shrub Wetlan
  - Freshwater Pond
  - Lake
  - Other
  - Riverine
- Regional 2010 6-inch RGB I

Map Scale

1: 1,000

Map Generated: 8/11/2017

Notes

27 Locke Road Concord, NH 03301 t: 603.228.1122 hlturner.com

On Thursday August 10, 2017, The H.L. Turner Group Inc. (TTG) visited the Fred C. Underhill School at 2 Sherwood Drive in Hooksett, NH, to conduct a site assessment of the property to identify areas of concern, deficiencies, or hazards. This report provides a summary of those findings, our opinions regarding the urgency of correcting deficient conditions, and an opinion of the associated costs to do so. For this report, the location of the main entrance is considered the east side of the building.

Overview

The Underhill School serves students in preschool through second grade and is located at 2 Sherwood Drive in the Town of Hooksett, NH, identified on Tax Map 33 Lot 66. It sits on an 11-acre parcel, of which approximately half of which is undeveloped and densely wooded. .

The school is a single story masonry that was originally constructed in the 1958, with an addition of the auditorium (gymnasium) and six classrooms in 1966 and a classroom addition constructed in 1990, including renovations to the site parking and circulation. A portable classroom sits at the northeast corner of the school, connected to the main building by a covered asphalt walkway. Placement of this structure required sacrificing 13 parking spaces.

The site provides 116 parking spaces, four of which are designated as handicapped accessible spaces. 22 of the spaces are reserved for staff parking and the remainder are for visitors, volunteers, and other employees. A dedicated bus lane provides an area for students to enter and exit school buses separate from parent, visitor, and staff traffic.

The school building is a single story of 54,000 SF, with the sprinkler system and full perimeter access to the size allowable by state building code. An additional 14,500 SF can be added to the building, before any firewall separations would be necessary.

The school services grades Kindergarten, First and Second grades with a single preschool classroom as well. Classroom sizes are typically 15 to 20 students in First & Second and 15 to 18 in Kindergarten.

TTG was asked to review the possibility of providing additional space to provide seven Kindergarten classrooms, and a second preschool classroom. TTG met the Principal and school staff to review these space and additional needs. Minutes of this meeting are part of this report. Additional concerns were lack of event parking, lack of bus parking, general vehicular circulation issues, smaller building space issues and general security.

Building Condition

Overview

The building is dated and of a minimalist design but it has been well maintained. Areas have fresh paint; interior doors have been replaced recently; there appears to be a ceiling replacement program where ceilings are gradually being replaced throughout the school. The exterior masonry is performing well.

Exterior Walls

The exterior wall construction is of a 4" split face CMU system called Best Stone Facing in an ashlar bond pattern and an 8" CMU back-up wall and show little water damage The exterior walls have minimal insulation with only a Kor-fill or perlite insulation 8" CMU cell, which is a poor preforming system as far as insulation is concerned. Older walls may lack insulation entirely. The wall system R values do not meet present energy codes.

` The majority of the sealant in the joints (both expansion and around openings) have reached the end of their useful life and should be replaced. The expansion joints in the walls should be cleaned out, a backer bar installed prior to the sealant being installed. Care should be exercised when selecting the sealant material to be used. All sealants used for vertical wall joints must conform to ASTM C920 which defines Type, Grade, Class and Use. Sealants are either type S (single component) or type M (multi-component). Grade NS (non-sag) which must be used for vertical wall joints. Sealants are defined by class which defines elongation capabilities. A Class 25 sealant can tolerate 25% expansion and contraction. A Class 100/50 sealant can tolerate 100% expansion and 50% contraction. Sealants are also classified by Use such as M, G, A or O, meaning that they have passed a series of tests demonstrating satisfactory adherence to mortar (M), glass (G), aluminum (A) or other materials (O). A sealant intended for use in an expansion joint between masonry and begin capable of 50% elongation would be specified as Type M, Grade NS, Class 50, Use M. There are three types of joint sealants typically used that can be applied with a sealant gun. Types sealants are;

- **Low-range sealants (caulks)** – Have a very limited elongation, typically no more than 5%. Used for minor cracks and non-moving joints. Cure by the evaporation of water or an organic solvent and shrink substantially as they cure. Not recommended to be used for sealing joints in building exterior wall systems.
- **Medium range sealants** – Typically of butyl rubber or acrylic. Have elongation of 5% to 10%. Typically used in building exterior walls for sealing non-working joints. Cure by evaporation of water or an organic solvent, and undergo limited shrinkage during curing.
- **High range sealants** – Have elongation of 50-100%. Typically contain polysulfides (site mixed from two components to effect a chemical cure), polyurethanes (cure by a two-component reaction or by reacting with moisture vapor from the air) and/or silicones (cure by reacting with moisture vapor from the air). Do not shrink upon curing since they do not rely on the evaporation of water or a solvent. Good adhesion to the sides of joints. Highly resilient and are durable for many years. Recommended for working joints in exterior walls.

It is important to keep the sealant in good condition to prevent moisture from getting into the building and causing issues.

Recommendations

- Develop a program to reseal existing control joints.
- Develop a program to insulate the exterior walls.

Roofing

The roofing on the original buildings (1958 and 1966) was replaced when the additions were completed in 1990. The original building roof is a 0.045 ethylene propylene diene terpolymer (EPDM) roofing membrane. The roof is a black membrane that is mechanically fastened. The roofing on the additions is the same EPDM roof but is covered with a stone ballast. The stone is added to help the roof to resist wind uplift and the stone protects the membrane from the ultraviolet rays from the sun. The stone was likely not added to the original building due to a concern about the original structure being able to support the additional weight. Stone ballast typically adds 10 -12 pounds per square foot (psf).

The roofing on the original building was noted to be in fair condition, particularly over the gymnasium and kitchen. A number of seams have opened up and a number of roof patches have begun to lift off the roof. On the gymnasium roof and kitchen roof there was a large buldge in the membrane. This would indicate to us that moisture is getting under the membrane and causing the problem. Further study of this issue would be recommended to fully understand the issue. The further study would require involving a roofing to repair the membrane in this area.

The roof membrane on the additions was reviewed in numerous spots by temporarily removing the stone ballast to review the condition of the membrane. The membrane appears to be in good overall condition.

It was noted that there are just two roof drains on the east end of the 1966 addition.

The portable classroom has an asphalt shingle roof. The shingles are curling and overall were noted to be in fair condition.

Recommendations

- Repair the patches and reseal the joints in the EDPM.
- Develop a plan to re-roof the EPDM membranes that do not have ballast.
- If not replaced in the next few years, replace the asphalt shingles on the portable classroom.
- Review number of roof drains and when re-roofing the building, add drains as required.

Interior Walls

The interior walls are a majority of concrete masonry block, and some gypsum wallboard. All have been well maintained and are performing well.

Recommendations

- Continue maintenance

Doors & Hardware

The interior doors have been replaced. Doors have been installed swinging into the corridor directly opposing each other, while this may appear to be an egress issue it is allowable by the current building code as long as doors are able to swing fully back against the wall with only 7” of protrusion into the corridor. The exterior doors are serviceable. Some of the exterior

hollow metal door frames have rotted at the bottom from use of salt at doorways in the winter and should be patched; the remaining door frames should be painted and protected.

The main entrance should be updated to provide increased security to not allow visitors through the inner vestibule doors; this would insure visitors cannot bypass the front office when entering.

There are a few doors with double 2'-6" leaves and 2'-8" in the present building code minimum door leaf size.

Recommendations

- Continue interior door replacement program.
- Install secure vestibule that allows transactions into the main office without providing access to the rest of the school.
- Repair exterior door frames
- Replace (2) 2'-6" doors with 3'-0" & 2'-0" door leafs

Windows

The windows are insulated double pane sliding aluminum windows. The windows are difficult to operate and should be serviced.

Recommendations

- Service windows.
- Schedule window replacement for the future.

Interior Finishes

The existing finishes are minimal, but well maintained. Vinyl composition tile floors, painted walls and 2'x4' acoustical panel ceilings are predominant through the school. Some areas have newer ceilings. To avoid the issue of sag in the ceiling panels a high grade humidity resistant 2'x4' panel should be selected or 2'x2' should be installed. Some tile floors are translating a rough concrete surface below. The gymnasium flooring is showing open joints that should be filled. The restrooms are very dated and an upgrade should be scheduled.

Recommendations

- Continue maintenance.
- Schedule upgrade of all restrooms

Handicapped Accessibility

The school for the most part is accessible. However the accessible parking spaces are not designed to current codes. Drinking fountains in the corridor are not recessed and require an impaired vision cane guard or need to be recessed. Accessible drinking fountains should be provided for adults as well. There is one accessible single restroom; the accessible fixture requirement would require more accessible toilet stalls to meet the population requirements of the school.

There are a few doors with double 2'-6" leaves and 2'-8" in the present building code minimum door leaf size.

Recommendations

- Provide additional handicap restroom facilities
- Repair drinking fountains to make accessible
- Provide accessible drinking fountains for adults
- Revise handicapped parking design
- Replace (2) 2’-6” doors with 3’-0” & 2’-0” door leafs

Space Needs

The desire to have seven kindergarten full-day classrooms can be met with the seven classrooms constructed in the 1990 addition. Each of those classrooms is the required 1,000 SF size. The classrooms have sinks, but share restrooms down the hall which can disrupt teaching with restroom trips for the whole class. The space need is for literacy and Title One support space in order to remove the portable classroom from the site thus increasing security, as well as additional resource space, and an additional preschool classroom. This will open the existing kindergarten classroom spaces for kindergarten. A classroom wing addition to the northwest would provide the space needed.

Recommendations

- While the site appears full, it can be reorganized to accommodate the addition, a larger bus loop, more parking, and a consolidated playground area. This would assist with daily vehicular congestion and large event parking. See design option included in report.

PROJECT NO. 4571 ~ FRED C. UNDERHILL SCHOOL BUILDING AND SITE ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
EXTERIOR						
Exterior walls.	Wall insulation does not meet present energy code	Insulate exterior walls from the interior of the building with spray foam, metal studs and abuse resistant gypsum wall board.			$200,000	
	Bottom piece of masonry veneer is missing at one corner of the building	Replaced missing piece of masonry veneer	1 year	$ 1,200		
Roofing	The patches and seams on the EDPM roof without the ballast need to be repaired	Repair the seams and patches	1 year	$ 4,500		
	EPDM roof membrane without ballast is in need of replacement	Remove and replace the EPDM membrane in areas without ballast	3-5 years		$ 330,000	
Windows.	Windows difficult to open	Service window hardware	<3 years	$2,000		
Sealants	Sealant in expansion joints in masonry walls has failed	Add backer rod and sealant	1 year	$ 6,700		

PROJECT NO. 4571 ~ FRED C. UNDERHILL SCHOOL BUILDING AND SITE ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
	Sealant around openings (louvers , doors and windows) have failed	Add backer rod and sealant	1 year	$ 12,400		
	Step cracking in the masonry is occurring at the corners of some openings	Add sealant at all step crack	1 year	$ 2,600		
Doors & Hardware	Hollow metal door frames rusting.	Patch bottom of door frame.	10 years	$2,000		
INTERIOR	.	.				
Acoustical Panel Ceilings	Un-replaced ceilings are sagging	Continue program to replace ceiling panels and suspension grid	10 years		$5,000/yr	
Vinyl Composition Tile.	Some corridor tiles need replacement due to substrate.	Grind substrate and replace tile	<3 years	$1,000		
Restrooms	Gang restrooms are dated but serviceable. HC stalls needed.	Renovate Restrooms	<10 years		$450,000	

PROJECT NO. 4571 ~ FRED C. UNDERHILL SCHOOL BUILDING AND SITE ASSESSMENT

ARCHITECTURAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
TOTALS				$32,400	$980,000 (plus $5,000/Yr For Ceilings)	

Interior

Drinking Fountain Trip Hazard.

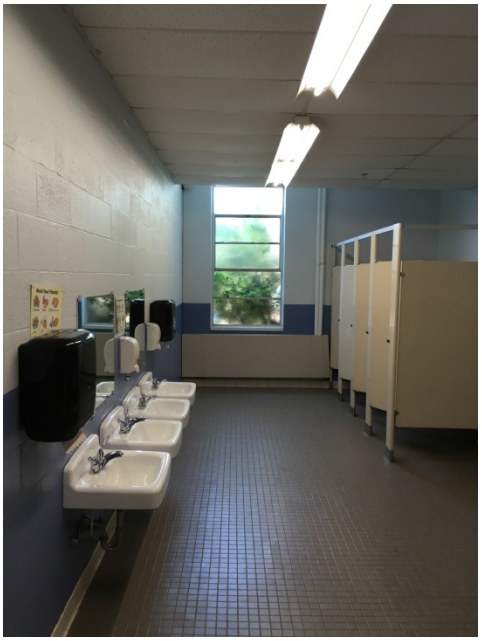
Unsecure Main Office Access

Sagging ceiling tiles.

Gaps in Gymnasium Flooring.

Non Compliant 2’-6” Door Leaves

Dated Restrooms



Dated Non Accessible Restrooms

Dated Non Accessible Restrooms

Dated Restrooms

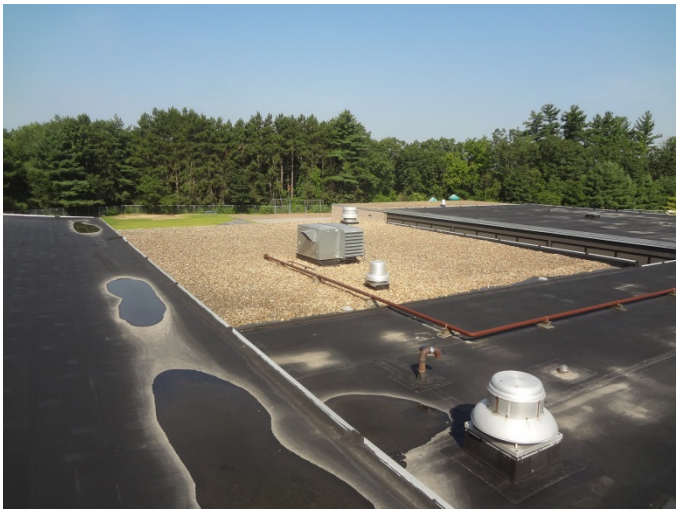
Opposing Corridor Doors are Okay.

Rotted Door Frames & Damaged Tile

Tile Damage Example

Patches on the Gym EPDM Roof

Seam on the Gym EPDM Roof



Ponding Along the Gym Roof Edge

Buldge in Gym Roof

EDPM Membrane – Original Building

Gym Roof Scupper

EPDM Roof - Addition

Rusted Roof Expansion Joint

Buldge in Kitchen Roof Membrane

Cracked Chimney

Sealant at Louver

Expansion Joint in the Masonry Wall

Expansion Joint in Masonry Wall

Expansion Joint in Masonry Wall

Missing Brick at Building Corner

Step Crack at Masonry Veneer

Step Crack in Masonry Veneer

Step Crack in Masonry Veneer

Damaged Roof at East Entry

Portable Roof Shingles

TURNER GROUP

27 Locke Road Concord, NH 03301 t: 603.228.1122 hlturner.com

On Thursday August 10, 2017, The H.L. Turner Group Inc. (TTG) visited the Fred C. Underhill School at 2 Sherwood Drive in Hooksett, NH, to conduct a mechanical assessment of the property to identify areas of concern, deficiencies, or hazards. This report provides a summary of those findings, our opinions regarding the urgency of correcting deficient conditions, and an opinion of the associated costs to do so. For this report, the location of the main entrance is considered the east side of the building.

Overview

The Underhill School serves students in preschool through second grade and is located at 2 Sherwood Drive in the Town of Hooksett, NH, identified on Tax Map 33 Lot 66. It sits on an 11-acre parcel.

The school is a single story masonry, that was originally constructed in the 1950's, with additions constructed in 1990, including renovations to the site parking and circulation. A portable classroom sits at the northeast corner of the school

Heating, Ventilating and Air Conditioning

The heating source for the Underhill Elementary School is two HB Smith Model 28HE SW-06 boilers with PowerFlame burners. The boilers have a rated output of 1,268,000 BTU/hour each. These two boilers are gas fired and were reportedly installed during a renovation project in 2006. Combustion air for the Boiler Room (heating boilers and domestic hot water boiler) is provided through a fan powered Exhaust unit hung from the roof framing. The hot water from the boilers is distributed by two circulating pumps (CP-1 & CP-2, both with variable frequency drives) to duct heating coils, fin tube radiators, unit heaters, and fan coil units.

Central air conditioning is only provided in the Office and Guidance areas of the school. A York rooftop air handling unit with gas-fired heat and direct expansion (DX) cooling is ducted to the individual offices in this area of the building. This rooftop unit was observed to be relatively clean inside with recently changed filters. However, the outside air damper on this air conditioning unit was observed to be closed during normal operation on the day of our site visit.

Several other spaces in the school have through-window air conditioning units for cooling.

Rooftop energy recovery ventilators provide ventilation air to the central classroom wings and the Multi-Purpose Cafeteria space. These units have wheel type heat exchangers that transfer.

heat and moisture from the exhaust air to the incoming air. We noted that the surface of the energy exchange wheels are showing signs of dirt and the seals between the supply and exhaust sides of the units were showing signs of wear. These items should be addressed to improve unit efficiency. Each unit has a duct mounted heating coil to temper the incoming air in winter. Classrooms in these wings are typically heated by fin tube radiators located at the perimeter walls under the windows.

Remaining rooms in the Library/Kindergarten wing and in the area surrounding the Main Office are heated and ventilated by fan coil units located above the suspended ceiling. Each of these fan coil units has a connection to an outdoor air louver and exhaust fan (for economizer operation).

The original Gymnasium/Stage area appears to have a ventilation unit mounted above the ceiling of the Stage. This unit was not accessible during our site visit.

Two ductless split air conditioning systems are located in the building. These air conditioning units appear to serve server/IT spaces that generate heat from switching equipment year-round.

Two types of control systems were observed for mechanical equipment. The fan coil units above the ceilings, rooftop air conditioning unit for the Office, and cabinet unit heaters at entries have local thermostats that control the temperature of the local space with no other centralized control. The energy recovery ventilators (ERVs) and the fin tube radiators in the classrooms served by the ERVs are accessible through a central control system (Pro Controls KMC system) with an interface computer located in the Maintenance Office next to the Boiler Room. The boilers, combustion air, and domestic hot water system were not included on this control system, but rather have their own controls.

Plumbing

The main water service has two primary water meters, with a separate metered branch for irrigation water. Gang bathroom facilities are provided in the newer classroom wing and in the original wing across the hall from the Boiler Room. Fixtures in the original wing remain from the original construction. In other areas fixtures include wall mounted lavatories and urinals, with floor mounted toilets. The remainder of the toilet facilities are single user type in various areas of the building. Roof drains are single connection type. Sinks are provided in each of the Kindergarten classrooms. Domestic hot water is provided by an indirect fired tank fed from a Weil McLain boiler in the Boiler Room. The domestic hot water has a Leonard thermostatic mixing valve and two recirculation pumps, likely serving different vintages of construction.

Fire Protection

Wet fire protection systems are provided throughout. The fire protection system entrance is located in the Boiler Room.

Equipment Condition

Most of the mechanical equipment is within its useful life and should provide several years of continued service. There is a concern about any systems serving the Gymnasium and Stage, which were not accessible. This air handling system is likely original to the construction of the building and should be replaced with a new ventilation and heating system for this space.

The automatic temperature controls have limited coverage and do not provide adequate remote notification and alarm capability for the entire school. New controls would allow the introduction of alarms for equipment malfunction or lack of temperature control that would improve troubleshooting and maintenance operations.

Plumbing

The plumbing piping within the building appears to be in good condition. The original fixtures (sinks, toilets, water fountains) are showing their age and should be replaced in the mid term. Fixture replacement should take into account any ADA (Americans with Disabilities Act) requirements indicated in the Architectural portion of this report.

Recommendations

The primary focus for mechanical equipment replacement should be the Gymnasium air handling system, due to its age and serviceability. We recommend replacement of this unit with a system that would allow for control of ventilation air and ease of service.

Some areas of the building appear to have office type occupancies, but are only provided with exhaust or no ventilation. These areas include the Physical Education office, OT room, and Cafeteria office. These rooms should have ventilation air delivered continuously during occupied hours, similar to other non-storage areas.

Two exhaust fans on or near the Cafeteria are less than 10 feet from the roof edge. Since these pieces of equipment require periodic maintenance, fall protection should be provided per OSHA requirements.

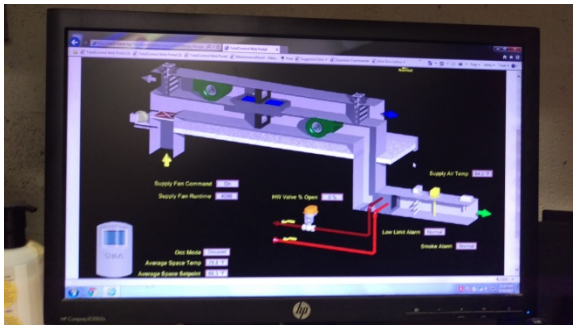
The existing control system should be expanded to include the rooms with fan coil units, the rooftop air conditioning unit, and the boiler plant. The control system should have the ability to be expanded for future equipment changes. The control system should provide remote access to set points and alarms in order to notify maintenance workers of issues as they happen.

The combustion air system should be revised to operate when the domestic hot water boiler operates, as well as when the main boilers operate.

Opinion of Cost

Short Term (2-3 years)	
Gymnasium Air Handling Unit	$ 50,000
Office Ventilation	$ 10,000
Roof Fall Protection	$ 5,000
Combustion Air System	$ 2,000
Mid Term (5-6 years)	
Control System Expansion	$ 50,000
Long Term (10-12 years)	
Rooftop Air Conditioning Unit	$ 35,000
Energy Recovery Units	$ 105,000
Ductless Split Air Conditioners	$ 10,000

Mechanical



Control System Typical.

Dirt on ERU exchange Wheel.

Ductless Split AC System.

Fan Coil Unit Above Ceiling.

ERU gap in seal between Supply & Exhaust.

Main Boilers

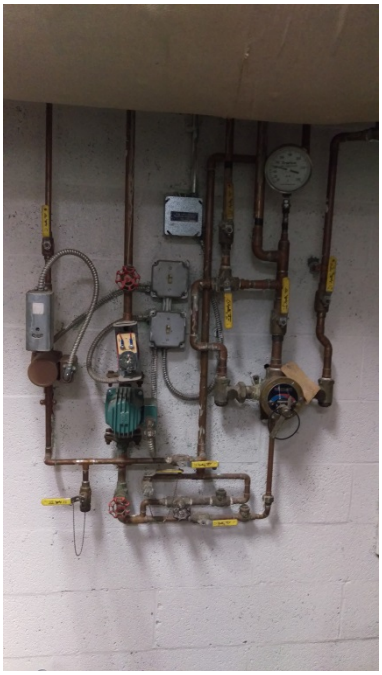
Rooftop Air Conditioning Serving Office

Rooftop Energy Recovery Unit

Two exhaust fans near roof edge

Plumbing

Domestic Hot Water Boiler



Hot water tempering & recirculating

Original Plumbing Fixtures

Sprinkler Pipe Entrance

Sprinkler Service Entrance

PROJECT NO. 4571 ~ UNDERHILL ELEMENTARY SCHOOL - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Gymnasium Air Handling Unit	Original equipment is difficult to access. No distribution through Gymnasium	Replace unit in accessible location to provide better outside air introduction and more ease of operation.	0 years	$50,000		
Office Ventilation	Physical Education Director, OT, and Cafeteria Office do not have ventilation air supply	Add ducting from existing units or install small air exchange units to ventilate spaces.	0 years	$10,000		
Roof Fall Protection	Some exhaust equipment on the roof is less than 10 feet from the edge and requires periodic maintenance.	Provide rails at roof edge to prevent workers from falling.	0 years	$5,000		
Combustion Air System	The combustion air supply system does not operate when the domestic hot water boiler is running.	Change control sequence to include an interlock that operates the combustion air system when DHW boiler fires.	0 years	$2,000		
Control System Expansion	Existing computerized control system covers only about half of the building and systems.	Expand control systems to provide access to remaining equipment throughout the school.	5 years		$50,000	
Plumbing Fixtures	Existing plumbing fixtures will need replacement in the future	Replace existing plumbing fixtures to ensure continued operation	5 years		$40,000	

PROJECT NO. 4571 ~ UNDERHILL ELEMENTARY SCHOOL - FACILITY ASSESSMENT

MECHANICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Rooftop Air Conditioning Unit	This unit will reach the end of its useful life in 10-12 years	Plan for replacement of this equipment	10 years			$35,000
Energy Recovery Units	These rooftop air handling units will reach the end of their useful life in 10-12 years	Plan for replacement of this equipment	10 years			$105,000
Ductless Split Air Conditioners	These units will reach the end of their useful life in 10-12 years	Plan for replacement of this equipment	10 years			$10,000

PROJECT NO. 4571 – FRED C. UNDERHILL ELEMENTARY SCHOOL – FACILITY ASSESSMENT

ELECTRICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Caterpillar Weather-Proof Housed Exterior 200 KW, 208V 3-Phase Diesel Standby Generator/Remote Generator Annunciator	Great condition	Continue to exercise weekly; provide annual maintenance, testing as recommended by manufacturer.	30 years	$1,000/ year maintenance /testing		$50,000 Replacement in 30 years
800 Amp, 208V 4-Pole ASCO Automatic Transfer Switch	Great condition	Continue to exercise weekly; provide annual maintenance, testing as recommended by manufacturer.	30 years	Part of cost listed above		$15,000 Replacement in 30 years.
800 Amp, 208V 3-Phase Main Switchboard Square D	Great condition	Provide testing every 3 years; retorquing of connections; verify proper operation of circuit breakers.	30 years	$1,500 every 3 years		$30,000 replacement in 30 years.
Original Recessed Electrical Panels in Hallways	Approaching the end of their expected useful life.	Replace in the next 3-5 years.	3-5 years		$10,000	
2'x4' Recessed Acrylic Lensed Light Fixtures	In Good Condition; installed in in 2006. Ballasts may begin to fail.	Replace with high-efficiency LED fixtures.	5 years		$8,000	

PROJECT NO. 4571 – FRED C. UNDERHILL ELEMENTARY SCHOOL – FACILITY ASSESSMENT

ELECTRICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
Fluorescent (T5 High Output) Gym Fixtures	In good condition. Not sure on age.	Replace with high-efficiency LED gym lights.	7-10 years		$9,000	
Fluorescent Surface Wrap Around Classroom Fixtures	Have approached their expected life.	Replace with high- efficiency surface wraparounds.	1 year	$84,000		
Emergency Battery Units and Remote Dual-Head Emergency Lights	In good working condition.	Check batteries annually. Replace in 3-5 years.	5 years		$15,000	
Fluorescent Exit Signs	In decent condition; approaching end of life expectancy.	Replace with new self-contained LED edge-lit exit signs.	2-3 years	$5,000		
Simplex Addressable Fire Alarm Control System 4100u	In good condition; installed in 2006.	Test annually; replace devices as needed.	8-9 years	$1,000/year testing		$110,000

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ELECTRICAL			$ Opinion of Cost			
COMPONENT	**OBSERVATION**	**RECOMMENDATION**	***Remaining Useful Life***	**Short-Term**	**Mid-Term**	**Long-Term**
LED Exterior Wall Packs	In good condition	Replace in 15-20 years	15-20 years			$5,000
Bogen Clock System	In bad condition; majority of clocks/speakers missing.	Replace immediately.	0-1 year	$34,000		

SAU 15 - HOOKSETT

UNDERHILL ELEMENTARY SCHOOL STUDY

SITE/ BUILDING OPTION 1

SCALE: N.T.S.

DATE: 08/28/2017

SHEET: A1 PROJECT: 4571

PREPARED BY: HL TURNER GROUP, INC. ■ ARCHITECTS ■ ENGINEERS ■ BUILDING SCIENTISTS ■ 27 LOCKE RD. CONCORD, NH 03301, USA ■ 603.228.1122 ■ 603.228.1124 ■ www.hlturner.com

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