MSA Memo

To: Village of Cambridge

From: MSA Professional Services

Subject: Vineyards Pond Inspections and Maintenance Recommendations

Date: November 11th, 2024

INTRODUCTION

On September 17th, 2024, MSA Professional Services performed visual inspections of four stormwater ponds in the Village of Cambridge, Dane County, WI. The purpose of the inspections was to address Village and resident concerns regarding performance, visual observations, modifications made by the previous developer and sump backup issues. Inspections included visual checks of detention basins, infiltration basins, inlet and outfall structures, bank erosion, berms, erosion control such as rip rap and erosion fabrics, as well as checking pond footprints to construction plans. Observations and recommended maintenance are included in this memo to maintain pond function in the Vineyards Development.

MAPPING

Figure 1 in the attachments of this memo detail the locations of the four inspected ponds and the approximate watershed boundaries of each pond. Figures 2 through 4 overlay construction plans for the ponds over aerial imagery to compare plans to existing conditions.

INSPECTION NOTES

North Vineyards Ponds

As shown in Figure 2, the North Vineyards Ponds consist of two wet detention basins and an infiltration basin located north of Kenseth Way. The following observations were identified as a result of MSA's inspection

North Vineyards Ponds – West:

1. The infiltration basin located adjacent to the west pond has been filled in and is no longer functioning as designed. Rip rap has been installed between the infiltration basin and the detention basin that is not included in the original design.
2. The infiltration basin is lacking bio-retention vegetation called out in design plan.
3. The erosion socks located in the filled-in infiltration basin are insufficient for a permanent solution of directing water to the pond.
4. Excessive vegetation is present throughout the western inlet structure and rip rap.
5. Trash was observed at the southern inlet rip rap.

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6. Large cattails are present within the majority of the wet detention basin and extend into the designed permanent pool, which is indicative of insufficient depth of permanent pool.
7. The permanent pool appears to be smaller than in the design plans.
8. Woody overgrowth is present on the northern edge of the pond.
9. Outlet structures from the pond to the wetland are overgrown.

North Vineyards Ponds - East:

1. The banks of the pond are fully overgrown.
2. Large cattails are present within the majority of the wet detention basin and extended into the designed permanent pool which is indicative of insufficient depth of permanent pool.
3. The SE inlet structures are overgrown with woody vegetation.

South Vineyards Pond

As shown in Figure 3, the South Vineyards Pond consists of a wet detention basin and infiltration area located south of Vineyard Drive. The following observations were identified as a result of MSA's inspection.

1. There are large trees and vegetation on the pond banks and berm separating the infiltration and detention basins.
2. Erosion fabric has been exposed on the dividing berm.
3. The inlet structure is overgrown.
4. There is a small amount of standing water in the infiltration basin.
5. Both the infiltration and detention basins are full of cattails which indicates insufficient depth of the permanent pool; Infiltration basin design plans indicate no vegetation within basin.
6. The pipe to the outlet structure is overgrown.
7. The outlet structure is full of lawn clippings.

North Winery Pond

As shown in Figure 4, the North Winery Pond consists of an infiltration basin located south of the Dancing Goat Distillery. The following observations were identified as a result of MSA's inspection.

1. The banks of the pond are overgrown.
2. A small tree is present on the northern bank of the pond.
3. The outlet structure is overgrown.
4. Cattails are present at the northeast edge of the pond.

South Winery Pond

As shown in Figure 4, the South Winery Pond consists of a wet detention basin located north of vineyards drive and south of the North Winery Pond. The following observations were identified as a result of MSA's inspection.

1. Cattails are filling much of permanent pool, indicating insufficient depth.
2. There is overgrowth and woody vegetation present on the pond's banks.
3. Dense woody vegetation is obstructing the outlet pipe. The standpipe is overgrown with grass.
4. There is woody vegetation along the east edge of the pond obstructing the inlet structures.

CONCLUSION

The intention of the visual inspections was to identify needed maintenance of the ponds as it relates to pond function. Notwithstanding, sump issues reported by homeowners are likely related to substantial rain events earlier in the year, and proximity to wetlands leading to high groundwater table. Pond maintenance will improve the function of the ponds, but is not intended to address sump discharge issues.

Several observations from the visual inspection of the ponds indicate the ponds may not be functioning as efficiently as designed. The presence of cattails in the detention ponds likely means the water depth may not be at the designed depth for portions of the detention ponds. The standard depth for the permanent pool of a detention pond is five feet. Cattails will grow in water that is up to three or four feet deep. Therefore, the cattails in these ponds indicate the permanent pools may not be at the designed five-foot depth. Additionally, the infiltration basin of the North Vineyards Ponds that has been filled in will no longer function at all, as water has been diverted away from the basin.

Excess vegetation around the banks of the ponds is not the planned design, and several ponds have dense woody vegetation in several places indicating longer term growth. The South Vineyards Pond has large trees growing from its banks, as well as the berm that separates the infiltration and detention basins. Most of the inlet and outlet structures of each pond are also overgrown, with some having dense woody vegetation obstructing the pipes and endwalls.

To begin remedying these issues, MSA recommends the following actions:

1. Clear the inlet and outlet structures of growth and debris for all ponds.
2. Remove vegetation and trees from the banks of all ponds.
3. Cut or remove cattails located in the South Vineyards Pond infiltration basin south of the berm.
4. Infiltration basin for the North Vineyards Ponds – West to be excavated back to design depth and plant appropriate bioretention vegetation.
5. Replenish rock supply to dividing berm in Vineyards South Pond.
6. After maintenance items 1-5 are completed, re-inspect ponds within one year to evaluate effects of maintenance on basins and potential functionality improvements. Additionally, re-inspect for evaluation of condition and expanse of permanent pools.

Sincerely,
MSA Professional Services, Inc.

Bill Pinnow, PE
Principal Engineer

David Hodel
Graduate Engineer

FUTURE MAINTENANCE AND BEST MANAGEMENT PRACTICES

The following information details general best management practices for wet ponds, should the Village wish to reference it:

INSPECTION AND MAINTENANCE

All components of the stormwater management system shall be inspected at least semiannually in early spring and early autumn or more frequently as described below. Repairs will be made whenever the performance of the system is compromised as described below.

- Vegetation
  - Turf along the side slopes and top of containment berms for the detention pond shall be watered as needed during first growing season.
  - Woody vegetation (trees and shrubs) shall not be allowed to grow within the detention pond and shall be removed when discovered.
  - After initial establishment of vegetation, any area in excess of 1 square foot where vegetation has died or is missing shall be revegetated.

- Earthworks
  - Side slope areas of the detention pond shall be inspected for occurrences of erosion and slumping of bank material. Evidence of failure will require regrading and stabilization.

- Inlet and outlet structures.
  - These types of structures shall be inspected monthly for obstructions that may reduce their hydraulic capacity. Structure openings should immediately be cleared of any accumulated debris. Debris should be properly disposed of outside of stormwater storage areas. Evidence of structural or foundation material failure should be repaired immediately.

- Trash and Debris
  - The stormwater pond shall be inspected monthly for trash and debris. Trash and debris shall be properly disposed of outside of stormwater storage areas

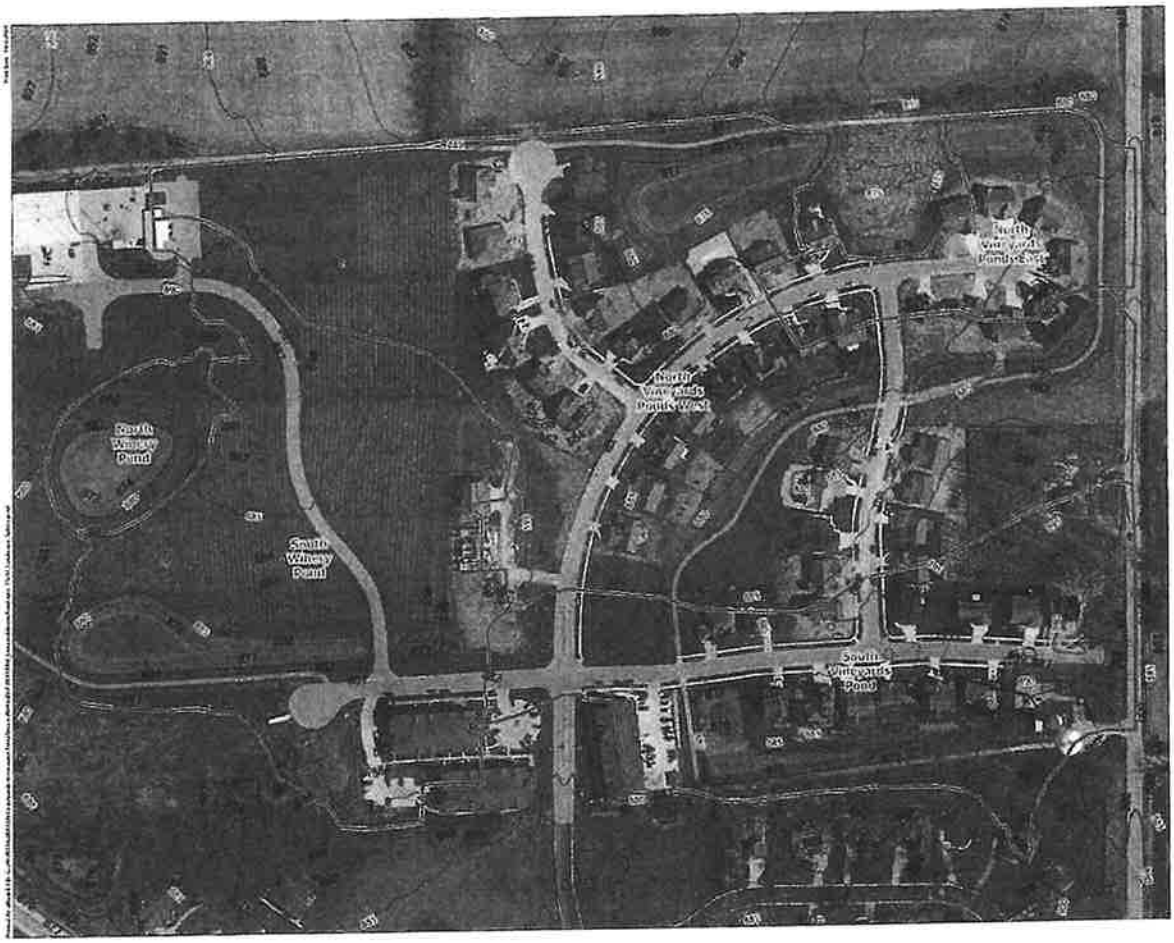
- Pond Storage Volume
  - The owner shall complete an 'as-built' survey of the pond at the time that the site is substantially stabilized. The survey shall be sufficient to determine the as-built volume of the pond permanent pool and live storage areas. Additionally, the survey shall identify the pond average bottom elevation and at least two full depth cross-sections. If the pond does not substantially conform to the approved design the pond shall be modified until it conforms to the approved plan and meets the approval of the Village engineer.

- Every 10 years after the pond's initial construction, and any time ownership of the property where the pond is located is sold, the pond shall be surveyed in accordance with the previous paragraph. This survey shall be provided to the Village engineer. If accumulated sediment has resulted in any portion of the 'sediment storage area' (those areas beyond any safety shelf) to be within three (3) feet of the normal pool elevation the pond shall be dredged to restore the original planned sediment storage volume. The Village engineer shall be notified at least two weeks in advance of any scheduled dredging and shall be notified again on the day that dredging is to occur. Record of the dredging including documentation of sediment volumes removed shall be provided to the Village engineer within one month of completion of dredging.
- The City engineer may adjust the required time interval (longer or shorter) between scheduled surveys depending upon the observed rate of sediment accumulation within the pond.

The owner shall maintain records of the dates and findings of inspections of the stormwater management system and the cleaning and replacement of system components. The owner shall provide copies of all records to the Village upon request.

Applications of fertilizers are prohibited for areas below the top of slope of the wet pond.

ATTACHMENTS



Drainage Map

Figure 1: Watersheds for storm ponds in the Vineyards

Village of Cambridge
Dane County, WI

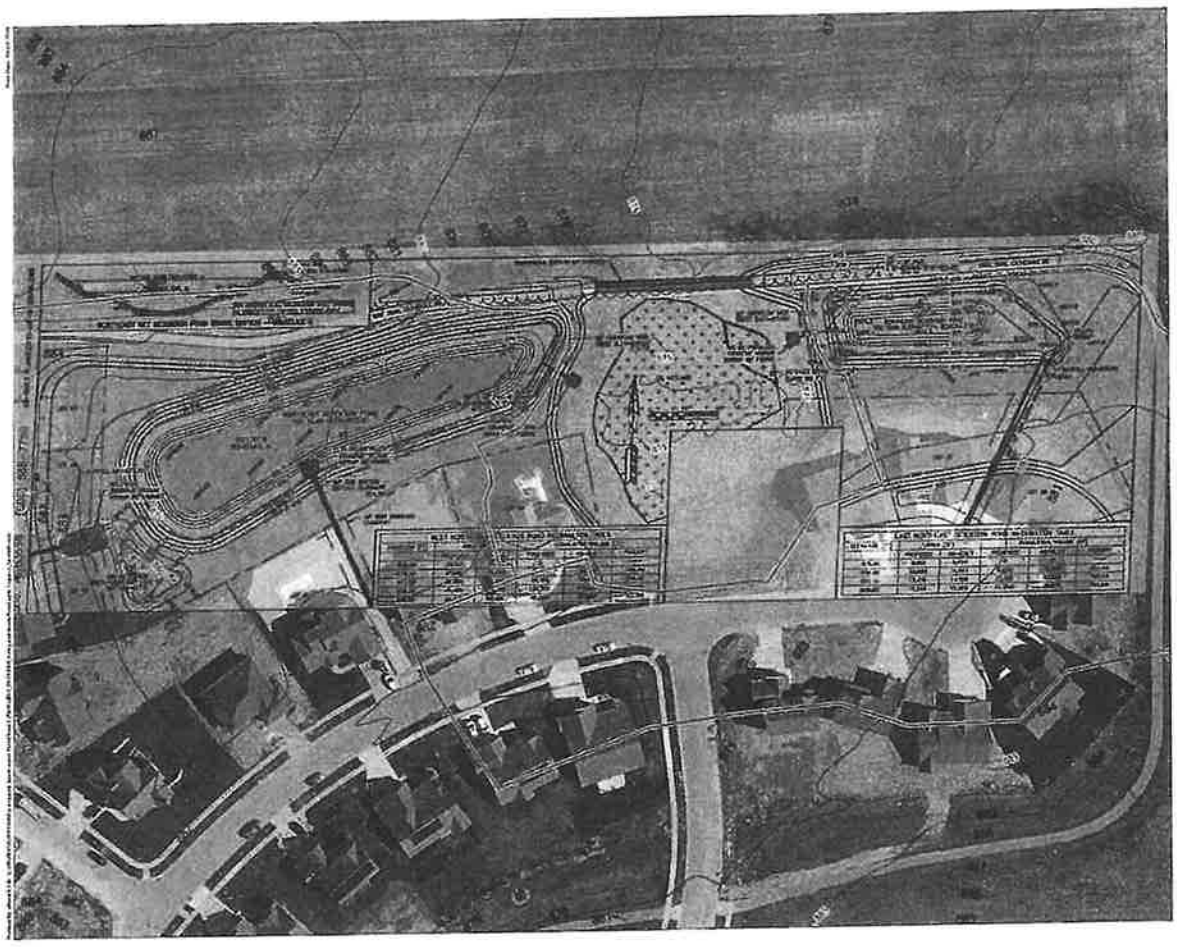
Pond Footprints
Pond Watersheds
Dane County Contours
Index
1
2
5
10

Data Sources:
Village of Cambridge GIS
Dane County GIS
MSA Professional Services

MSA

0 50 100 Feet

N



North Vineyards Ponds

Figure 2: Aerial Footprint Comparison for North Vineyards Ponds

Village of Cambridge
Dane County, WI

Pond Watersheds

Dane County Contours

Index

1

2

5

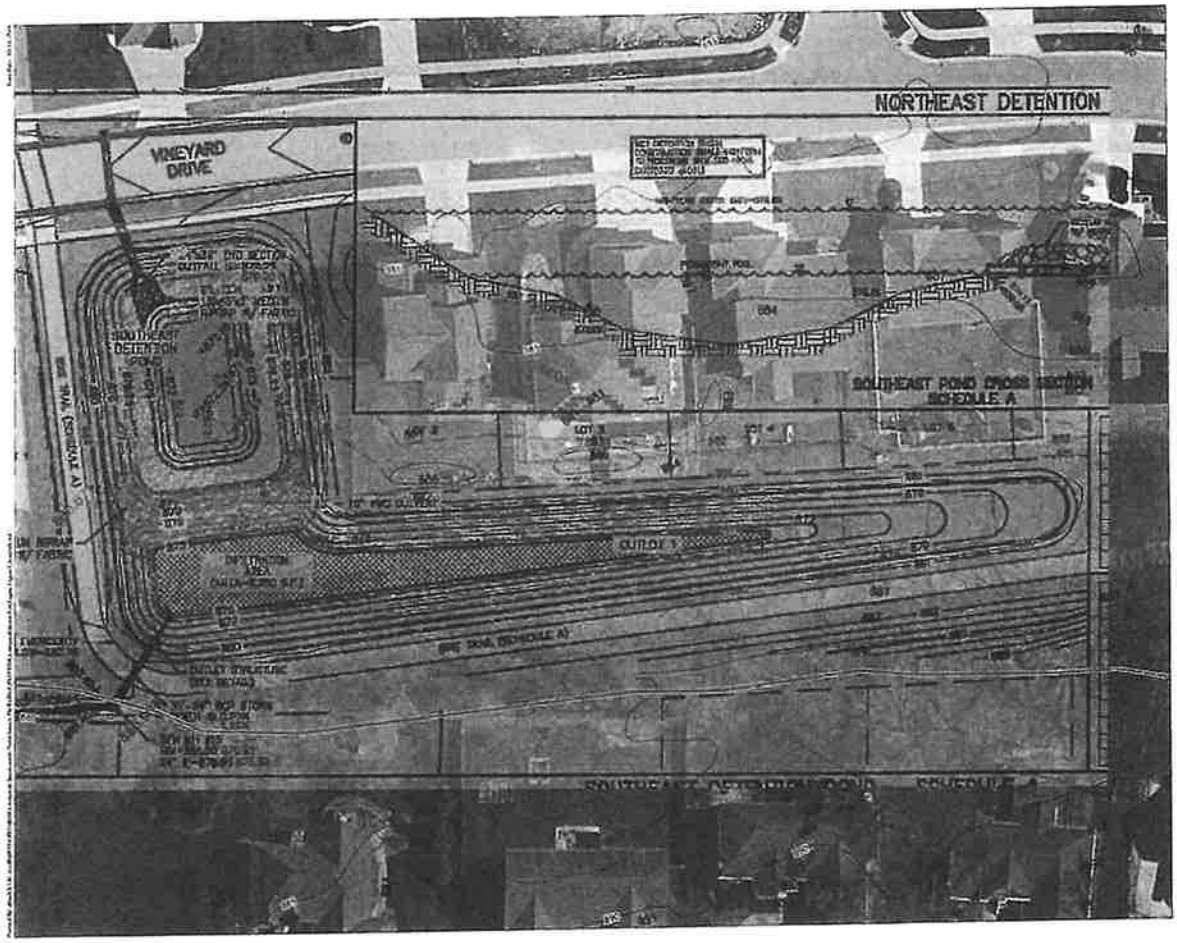
10

Data Sources
Plans provided by Quam Engineering
MSA Professional Services
ENR Latest Leaf Off Aerial Imagery

MSA

0 30 60 Feet

N



South Vineyards Pond

Figure 3: Aerial Footprint Comparison for South Vineyards Pond

Village of Cambridge
Dane County, WI

Pond Watersheds

Dane County Contours

Index

2

5

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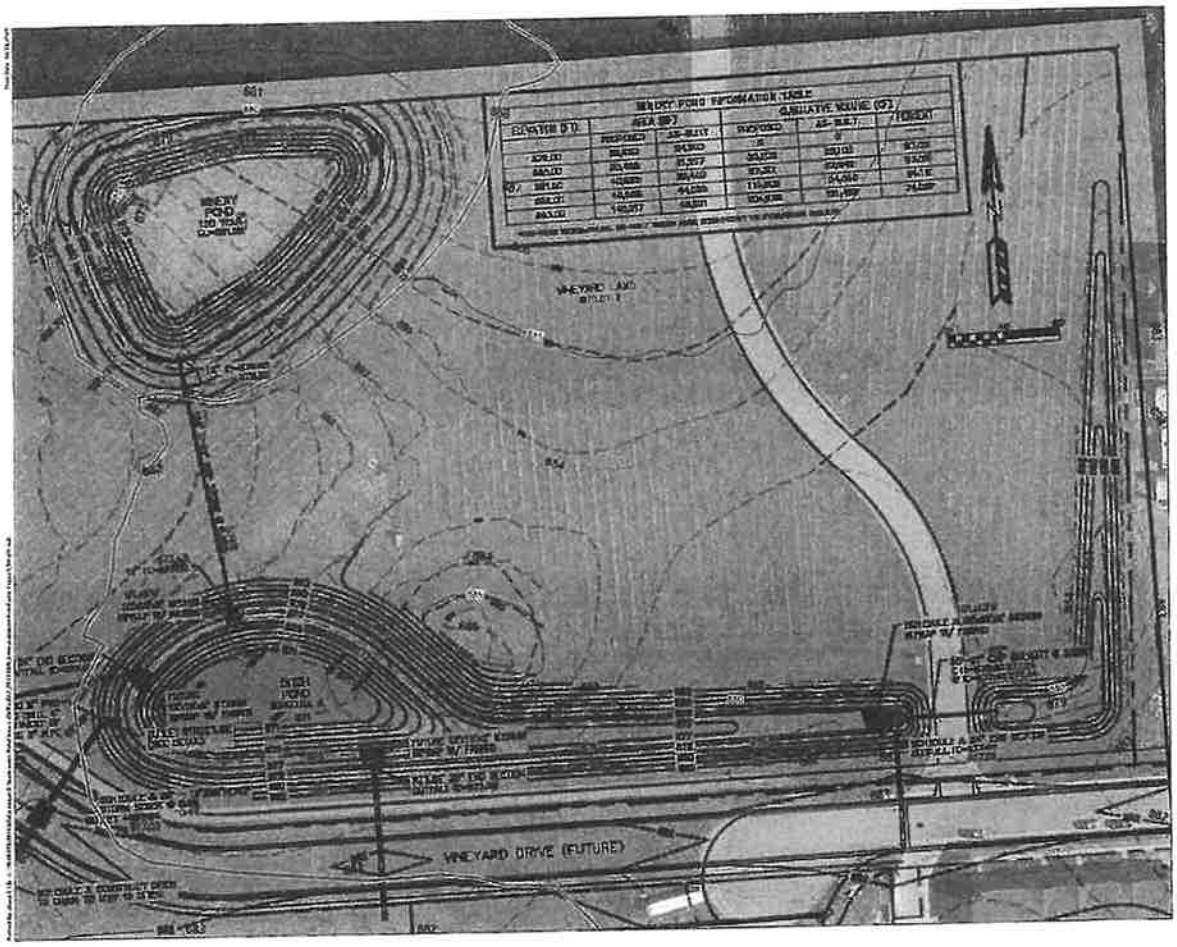
Data Sources:
Plans provided by Quam Engineering
MSA Professional Services
DNR Latest Leaf Off Aerial Imagery

MSA

0 20 40 Feet

N



Winery Ponds

Figure 4: Aerial Footprint Comparison for North and South Winery Ponds

Village of Cambridge
Dane County, WI

Pond Watershed

Dane County Contours

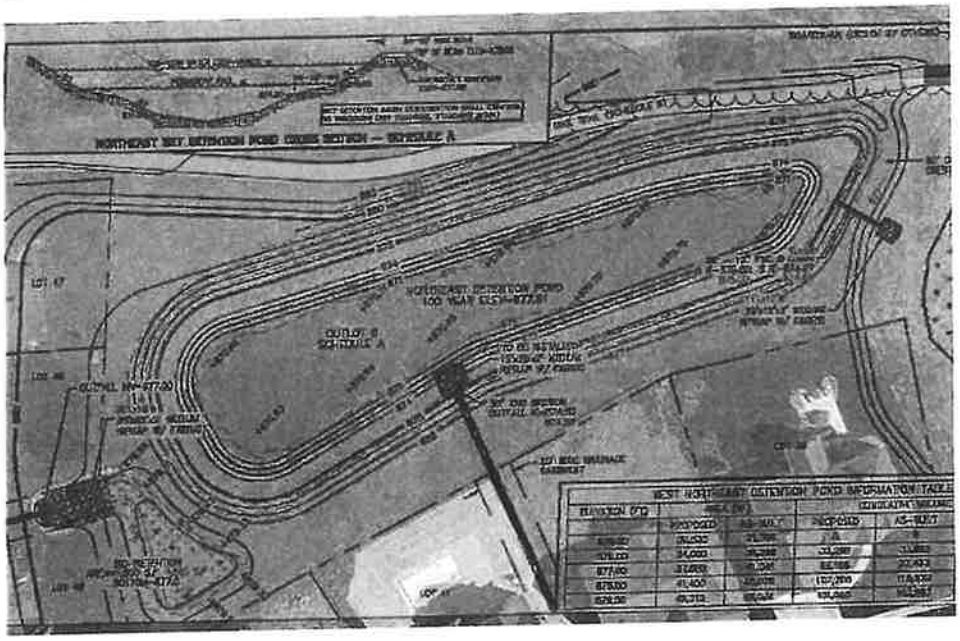
Data Sources:
Data provided by Quam Engineering
MSA Professional Services
Date of most recent aerial imagery

MSA

0 50 100 Feet

N

North Vineyards Ponds - West



North Vineyards Ponds – West: Observations and Recommendations

Observations:

1. The infiltration basin located adjacent to the west pond has been filled in and is no longer functioning as designed.
2. The infiltration basin is lacking bio-retention vegetation called out in design plan.
3. Rip rap has been installed between the infiltration basin and the detention basin that is not included in the original design.
4. The erosion socks located in the filled-in infiltration basin are insufficient for a permanent solution of directing water to the pond.

Recommendations:

1. Excavate infiltration basin back to design depth and plant appropriate bio-retention vegetation.
2. Correct design of inlet structure to flow to infiltration basin, as per design.

North Vineyards Ponds – West: Observations and Recommendations

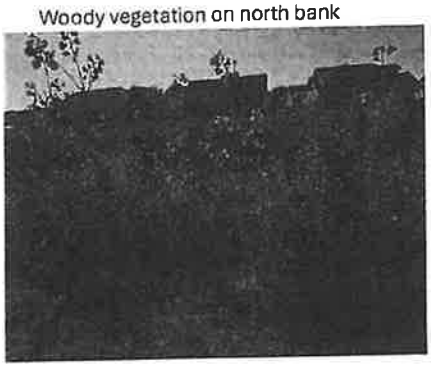
Observation:

1. Excessive vegetation and woody vegetation present on inlet/outlet structures and pond banks.

Recommendation:

1. Clear excess growth from banks and structures.

Woody vegetation on north bank



Overgrown inlet on west side of pond

Overgrown outlet structure to wetland

North Vineyards Ponds – West: Observations and Recommendations

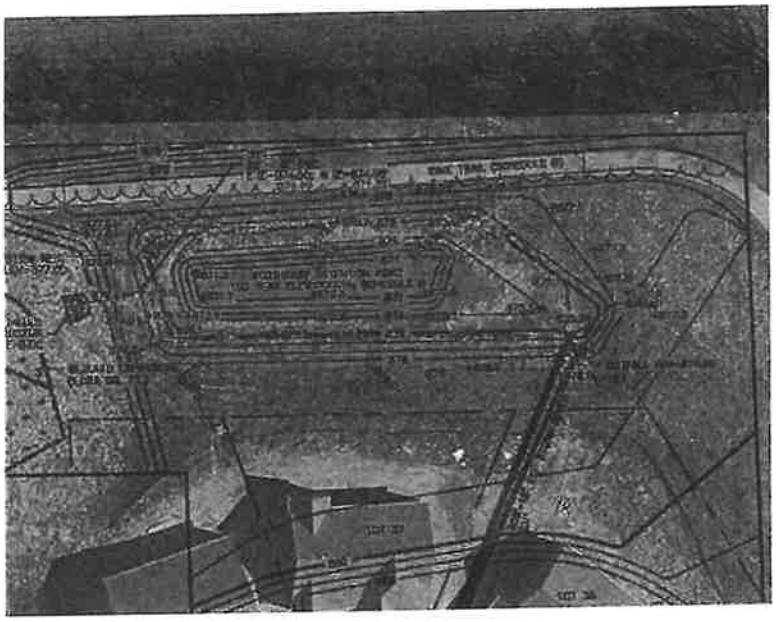
Observations:

1. Large cattails are present within the majority of the wet detention basin and extend into the designed permanent pool, which is indicative of insufficient depth of permanent pool.
2. Trash was observed at the southern inlet rip rap.

Recommendation:

1. Remove trash from rip rap.

North Vineyards Ponds - East



North Vineyards Ponds – East: Observations and Recommendations

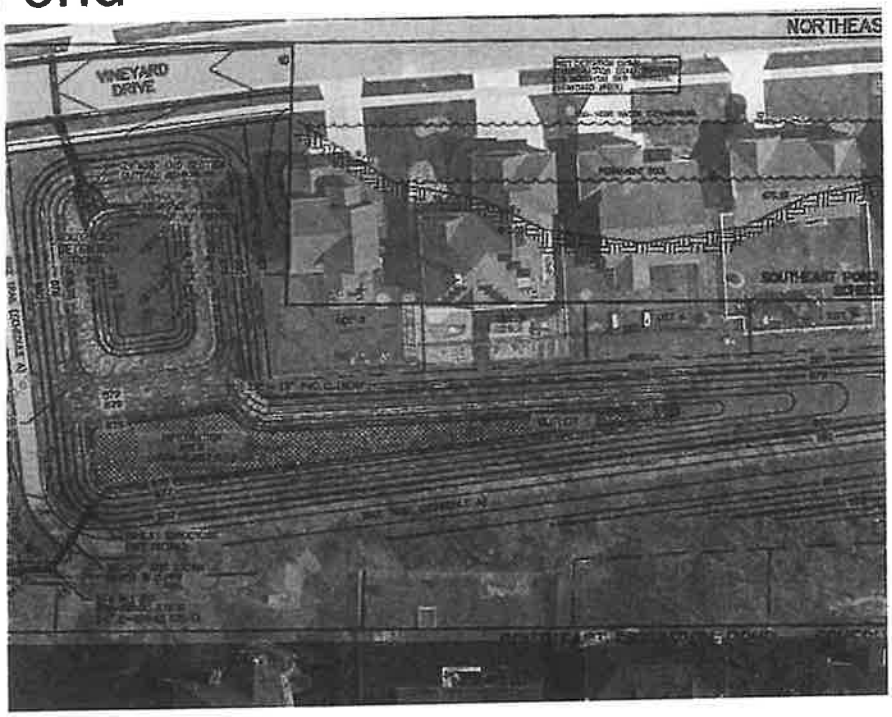
Observations:

1. The banks of the pond are fully overgrown.
2. Large cattails are present within the majority of the wet detention basin and extended into the designed permanent pool which is indicative of insufficient depth of permanent pool.
3. The SE inlet structures are overgrown with woody vegetation.

Recommendation:

1. Clear excess growth from banks and structures.

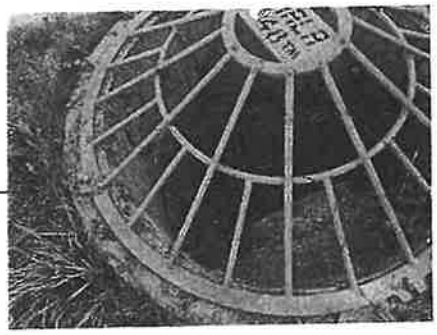
South Vineyards Pond



South Vineyards Pond: Observations and Recommendations

Observations:

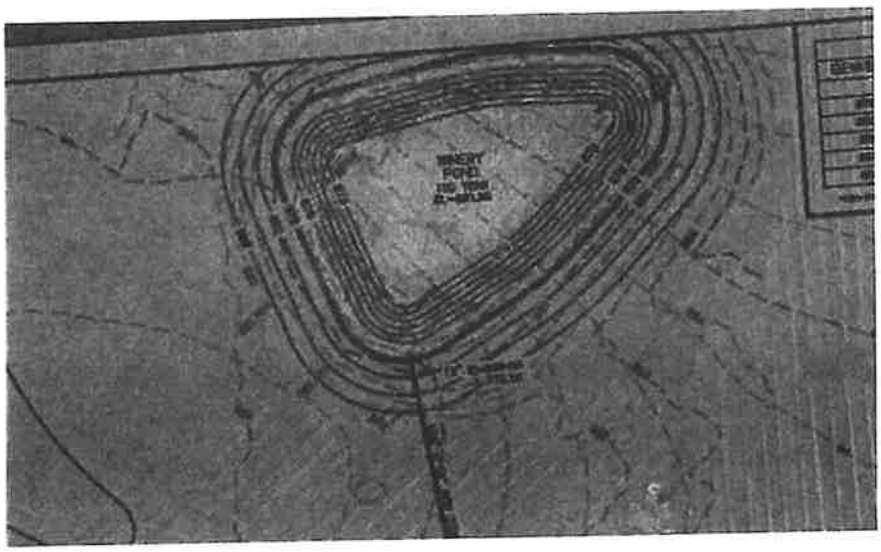
1. There are large trees and vegetation on the pond banks and berm separating the infiltration and detention basins.
2. Erosion fabric is exposed on the dividing berm.
3. The Pond Inlet structure is overgrown.
4. Both the infiltration and detention basins are full of cattails which indicates insufficient depth of the permanent pool
5. The pipe to the outlet structure is overgrown.
6. The outlet structure is full of lawn clippings.



Recommendations:

1. Clear excess growth from banks, the berm, and structures.
2. Replenish rock supply to the berm to cover all fabric.
3. Cut or otherwise remove the cattails from the infiltration basin.
4. Clean the outlet structure.

North Winery Pond



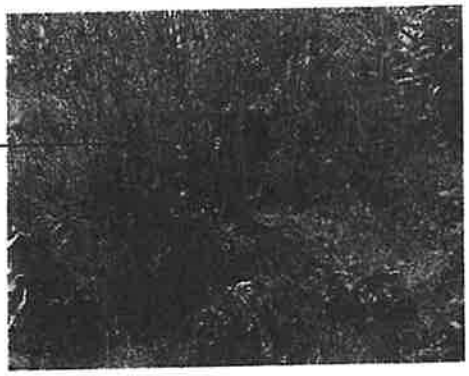
North Winery Pond: Observations and Recommendations

Observations:

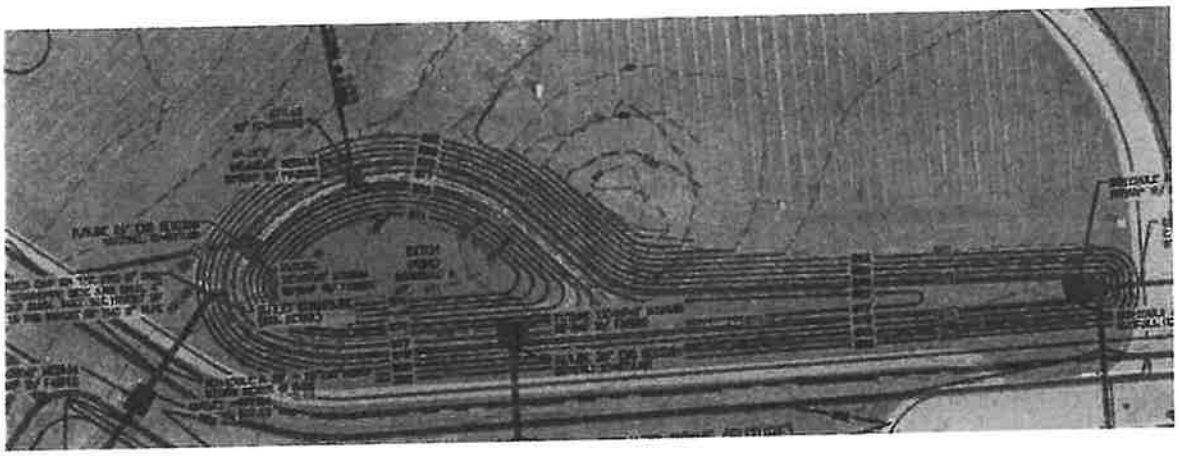
1. The banks of the pond are overgrown.
2. A small tree is present on the northern bank of the pond.
3. The outlet structure is overgrown.
4. Cattails are present at the northeast edge of the pond.

Recommendation:

1. Clear excess growth from the banks and structures.



South Winery Pond



South Winery Pond: Observations and Recommendations

Observations:

1. Cattails are filling much of permanent pool, indicating insufficient depth.
2. There is overgrowth and woody vegetation present on the pond's banks.
3. There is woody vegetation along the east edge of the pond obstructing the inlet structures.
4. Dense woody vegetation is obstructing the outlet pipe. The standpipe is overgrown with grass.

Recommendation:

1. Clear excess growth from the banks and structures.