To: *05 May16*

Faith Murray
Department of Natural Resources
2984 Shawano Ave
Green Bay WI 54313

From:
Richard Dvorak (board member)
Archibald Lake Association
1693 W. Main Circle, Unit #6
DePere, WI. 54115

Faith,

I believe I have attached all the documentation that is needed for the Rapid Response Eurasian Water Milfoil grant (AIRR-161-14) reimbursement. This summary includes expenses starting January 2015 and continuing through to the last invoice dated 2/27/16 for the 2015 season.

This document contains the following:

- *WDNR Grant Payment Request form 8700-001*
- *WDNR Grant Payment Worksheet form 8700-002*
- *Summary of a spreadsheet for Donated Labor*
- *Invoices, and receipts from our expenses.*
- *Includes a report from Onterra.*
- *Includes a summary from me.*

Please note that the Onterra report does contain a paragraph on Phragmites and Flowering Rush.

Please let me know if you have any questions regarding this information or if you need anything in addition.

Please send the check to Gary Miller, Treasurer at the addresses below.

Gary Miller
3590 N. Division Street
Appleton, WI. 54911

I can be reached most at 920-680-0952 (cell phone) or 920-491-6334 (desk at work) or by email at rnedvorak@sbcglobal.net (home) or (richard.dvorak@pcmc.com) if you should have any questions or need any additional information.

Sincerely

Richard Dvorak

INTRODUCTION

Photo 1. Archibald Lake, Oconto County.

Archibald Lake (Oconto County) is a two-basin, 392-acre, oligotrophic seepage lake with a 50 ft max depth. The lake is listed as an Area of Special Natural Resource Interest (ASNRI) outstanding/exceptional resource water under NR 102. The Chequamegon-Nicolet National Forest (CNNF) borders much of the lake's east basin, in the form of the Cathedral Pines State Natural Area. This stand of pines covers 1,874 acres and is "some of the finest old growth pine-hemlock stands on the CNNF" (WDNR website, Cathedral Pines No. 496). A connected wetland within the CNNF has a Sensitive Area Designation.

The Archibald Lake Association (ALA), formed in 1958, have been among the most ambitious and diligent lake associations in the state of Wisconsin, initiating several grant-funded projects and overseeing a flowering rush monitoring and control program on their own. Volunteers participate in an Adopt A Shoreline invasive species monitoring program, Clean Boats Clean Waters (CBCW), and the Citizens Lake Monitoring Network (CLMN).

EURASIAN WATER MILFOIL

Eurasian water milfoil (*Myriophyllum spicatum*; EWM) was first discovered in Archibald Lake in 2009. The ALA has been very pro-active in managing the EWM within Archibald Lake since its initial discovery in 2009. A combination of spot herbicide treatments and manual removal of EWM has kept the EWM population to manageable levels while being monitored largely by volunteers from 2009 to present.

In 2014, the ALA received their second AIS-EDR grant and contracted with Onterra, LLC to monitor the EWM population in Archibald Lake. This report will discuss the EWM control and monitoring activities conducted in 2015.

Two EWM mapping surveys were used within this project to coordinate and qualitatively monitor the EWM control efforts. The first monitoring event was the Early Season Aquatic Invasive Species (ESAIS) Survey. This late-spring/early-summer survey provides an early look at the lake to help guide the EWM hand-harvesting to occur on the system. The second survey was the Late-Summer EWM Peak-Biomass Survey, the results of which serves as a post-treatment assessment of the EWM control activities and is used to develop and guide active management in the subsequent year.

Early season AIS Survey Results

On June 5, 2015, Onterra ecologists conducted the ESAIS Survey on Archibald Lake. The entire littoral area of the lake was surveyed and the EWM population was mapped using sub-meter GPS technology by using either 1) point-based or 2) area-based methodologies. Large colonies >40 feet in

diameter are mapped using polygons (areas) and were qualitatively attributed a density rating based upon a five-tiered scale from *Highly Scattered* to *Surface Matting*. Point-based techniques were applied to EWM locations that were considered as *Small Plant Colonies* (<40 feet in diameter), *Clumps of Plants*, or *Single or Few Plants*. The surveyors noted favorable weather conditions for the survey and clear water. A submersible camera was used to supplement the survey in some deeper water areas of the lake. Only one *single or few plants* occurrence of EWM was observed during this survey (Map 1). Following the survey, the GPS location of the lone EWM occurrence was provided to the ALA to aid in the volunteer-based monitoring and hand-harvesting efforts.

EWM Control Activities

Volunteers from the ALA conducted monitoring and hand-removal efforts over the course of the 2015 growing season. During the volunteer based monitoring, suspected EWM occurrences were marked with a GPS and attempted to be removed. The volunteer GPS data was provided to Onterra prior to the Late-summer Peak Bio-mass Survey for evaluation.

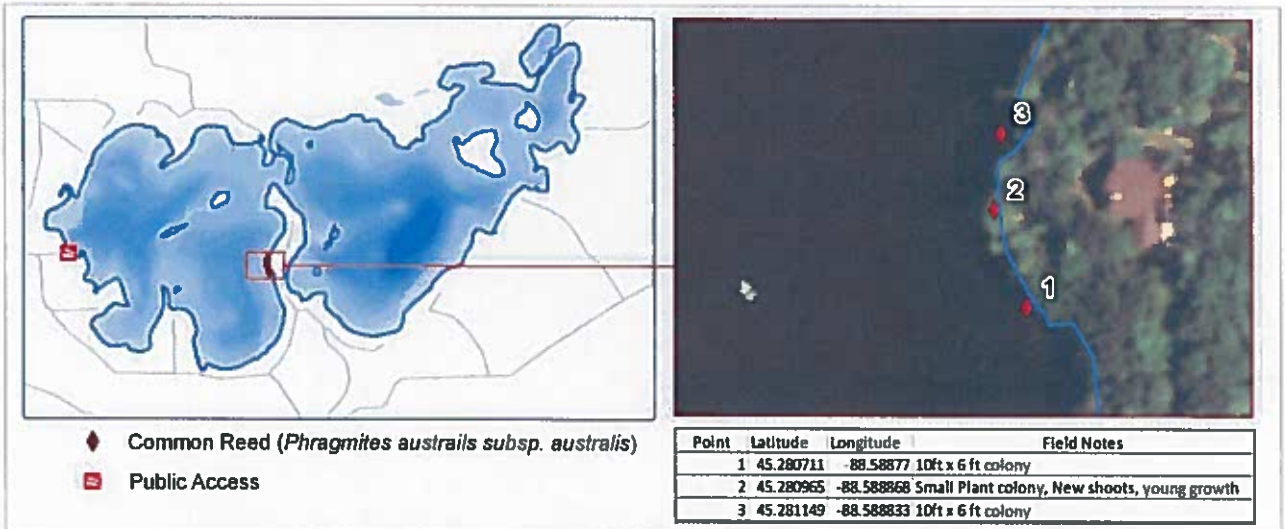
Late-Summer EWM Peak-Biomass Survey Results

The Late-Summer EWM Peak-Biomass Survey was conducted on September 11, 2015 to qualitatively assess the control efforts as well as to understand the peak growth (peak-biomass) of the EWM population throughout the lake. During the meander survey, the entire littoral zone of the lake was surveyed. Onterra integrated the spatial data of suspected EWM occurrences collected on a GPS by ALA volunteers onto the onboard computers for evaluation during the survey. At one of the volunteer points, a small single EWM plant was confirmed and partially removed with a rake. At the other volunteer point, EWM was not located following an extensive search with a submersed camera and only the native northern water milfoil (*Myriophyllum sibiricum*) was found at the site (Map 2). It is likely that the EWM was successfully removed from the second volunteer GPS point by ALA volunteers. One *clump of plants* EWM point was located in the eastern basin of the lake during the survey (Map 2). This clump of EWM was described as a large bushy clump about five feet in diameter and surrounded by a much larger colony of northern water milfoil. The spatial data relating to the EWM occurrences located during this survey were provided to the ALA in the event that additional late-season removal efforts were undertaken; however, these efforts have been postponed until 2016.

COMMON REED (PHRAGMITES)

During the July 2014 ESAIS Survey, Onterra ecologists documented the presence of another non-native species commonly found in Wisconsin; common reed (Photo 2 & Figure 1). Common reed (*Phragmites australis* subsp. *australis*) is a tall, perennial grass that was introduced to the United States from Europe. A native strain (*P. australis* subsp. *americanus*) of this species also exists in Wisconsin and the plant material collected from Archibald Lake in 2014 was initially inconclusive to whether it was the native or non-native strain. Suspected to be the non-native strain, Onterra sent voucher specimens of the plant to the UWSP herbarium where it was later confirmed to be of the non-native variety. This species can form towering, dense colonies that overtake native vegetation and replace it with a monoculture that provides inadequate sources of food and habitat for wildlife.

Photo 2. Common Reed observed in Archibald Lake during a July 10, 2014 survey.



Point	Latitude	Longitude	Field Notes
1	45.280711	-88.58877	10ft x 6 ft colony
2	45.280965	-88.588868	Small Plant colony, New shoots, young growth
3	45.281149	-88.588833	10ft x 6 ft colony

Figure 1. Common Reed locations located during a July 2014 survey in Archibald Lake.

Because this species has the capacity to displace the valuable wetland plants along the exposed shorelines, it was recommended that these plants be removed by cutting and bagging the seed heads and applying herbicide to the cut ends. Common reed control has been most effective utilizing a foliar application of an enzyme-specific herbicide (imazapyr or glyphosate) applied to the plants during the late summer as the plants are actively transporting sugars and nutrients from their leaves to their rhizomes in preparation for over wintering. This will ensure translocation of the herbicide to the

rhizomes where the entire plant can be controlled. A permit issued by the WDNR is required to place herbicide on plants that are located within the water.

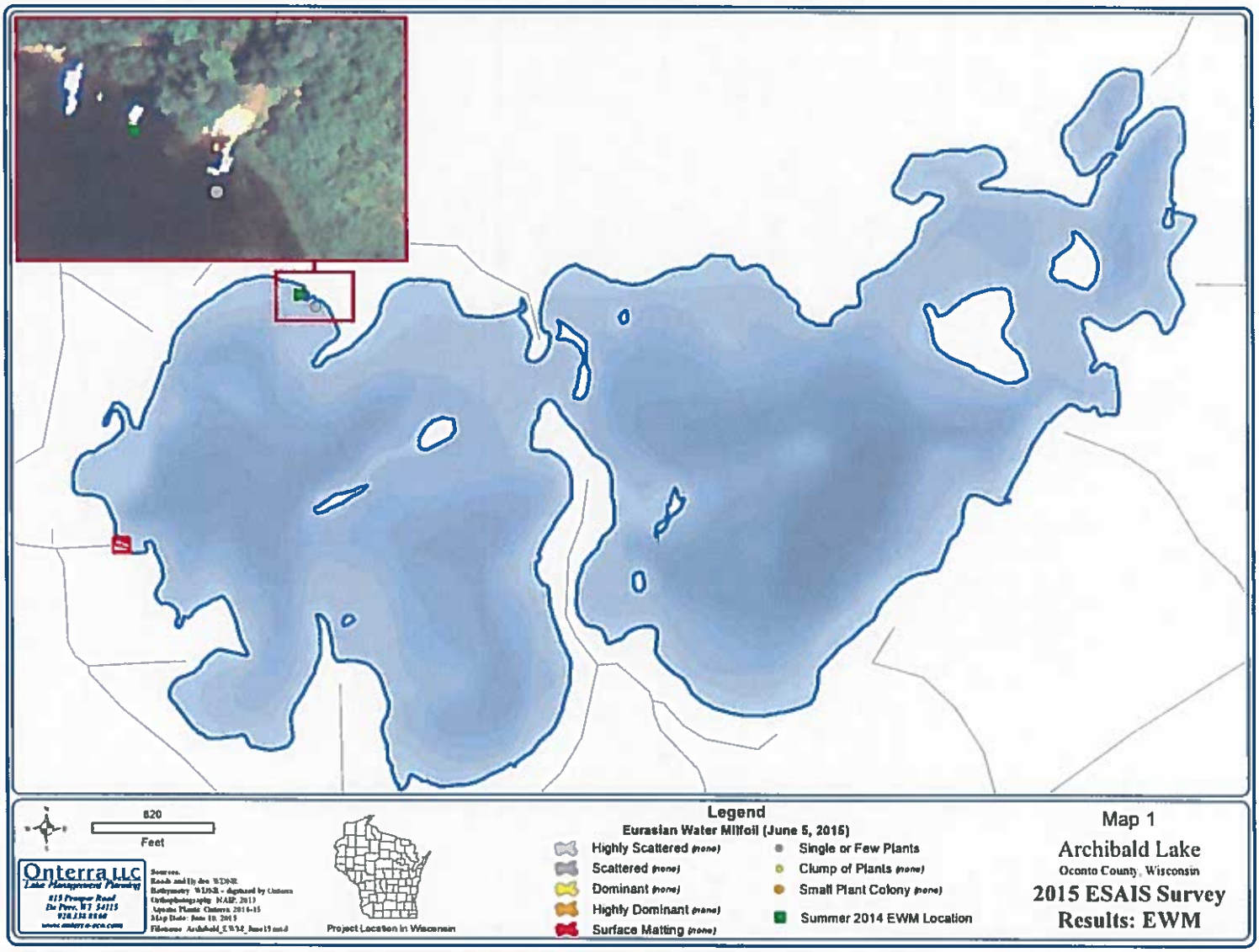
The ALA partnered with the WDNR through a program conducted under a Great Lake Research Initiative (GLRI) grant to help control common reed populations along the Lake Michigan shoreline, which includes Oconto County. Following the appropriate notifications and obtaining landowner permissions, common reed control actions, coordinated by the WDNR (Jason Granberg), were implemented at the three sites on Archibald Lake in 2015. A licensed herbicide applicator (Nature Care Ecological Consulting and Services) treated approximately 145 square feet of common reed populations on September 3, 2015. These sites will be monitored in 2016 to determine if the treatment was successful.

FLOWERING RUSH

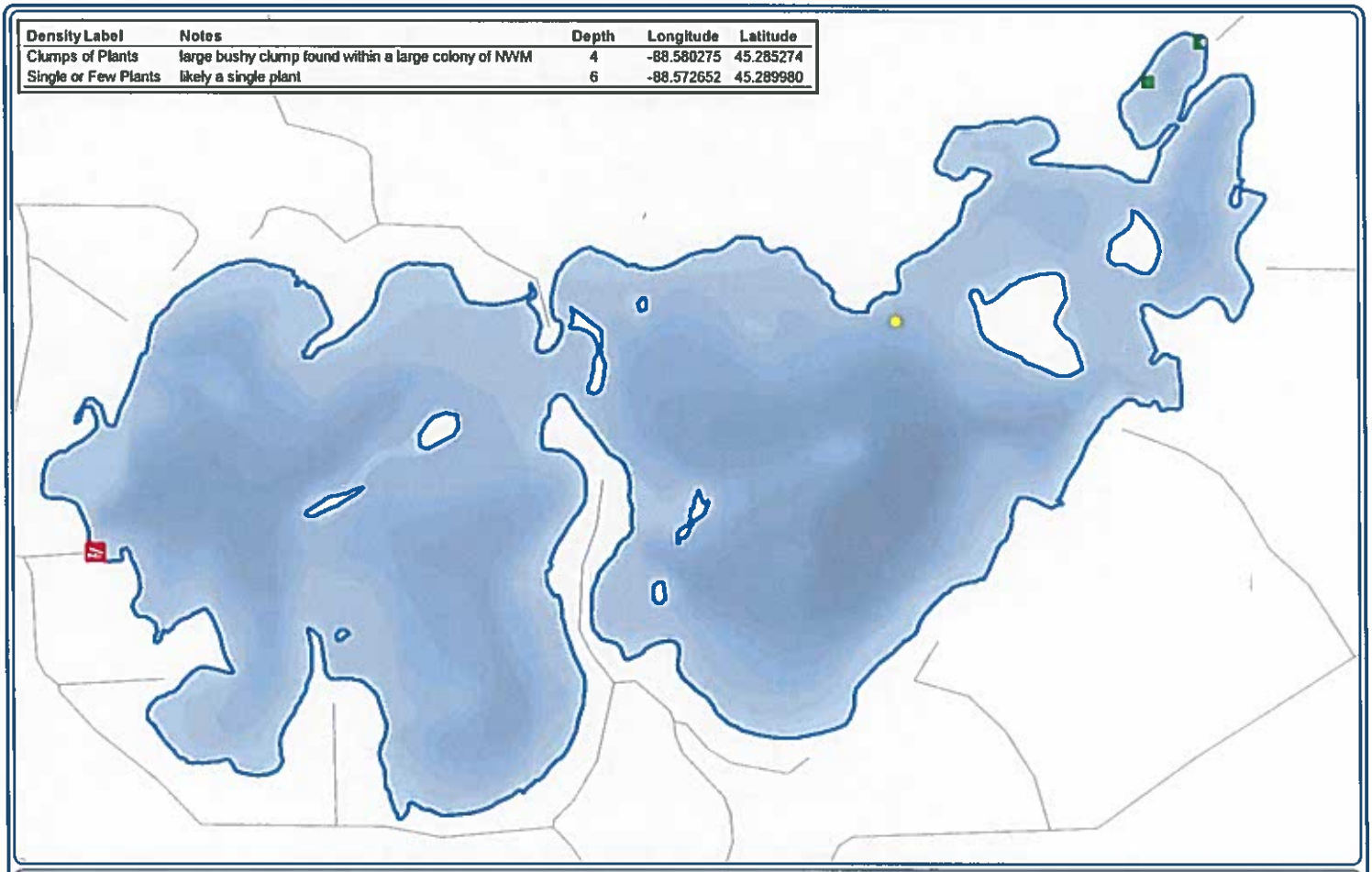
In 1998, flowering rush was first identified from Archibald Lake. In 2010, the ALA successfully applied for a WDNR AIS Established Population Control grant to determine an appropriate control method for flowering rush on Archibald Lake. The project has been highly collaborative, being led by ALA members (Steve Fleming) and involving WDNR staff, herbicide manufacturer scientists, contracted applicators, federal government researchers, and university researchers. This project is coming to an end, with the most recent report being released in February 2016. Using the information from the research project, the next phase is for the ALA to develop a flowering rush management program.

CONCLUSIONS AND DISCUSSION

The 2015 monitoring activities conducted on Archibald Lake indicate the EWM population within the lake is currently low, likely a result of the past management activities on the lake. It is possible that EWM may exist in low densities within other locations of the lake that escaped detection in 2015. Continued monitoring is proposed for 2016, including an early-summer ESAIS survey. If EWM is located during this survey, volunteer- and possibly professional-based hand-harvesting may be enacted as appropriate. The ALA was awarded a WDNR grant funded project submitted in December 2015. This project will ultimately result in an updated Comprehensive Lake Management Plan for Archibald Lake. While the updated Plan would include a strong aquatic plant-related component (EWM, flowering rush, phragmites), it would also include investigations of the system's water quality, watershed, shoreland habitat, stakeholder perceptions, and fisheries that will lead to a holistic management strategy for the ALA.


820
Feet
Onterra LLC
Lake Management Planning
Project Location in Wisconsin
Legend
Eurasian Water Milfoil (June 5, 2015)
Highly Scattered (none)
Scattered (none)
Dominant (none)
Highly Dominant (none)
Surface Matting (none)
Single or Few Plants
Clump of Plants (none)
Small Plant Colony (none)
Summer 2014 EWM Location
Map 1
Archibald Lake
Oconto County, Wisconsin
2015 ESAIS Survey
Results: EWM

Density Label	Notes	Depth	Longitude	Latitude
Clumps of Plants	large bushy clump found within a large colony of NWM	4	-88.580275	45.285274
Single or Few Plants	likely a single plant	6	-88.572652	45.289980



800
Feet

Onterra LLC
Lake Management Planning
815 Prospect Road
De Pere, WI 54115
920.338.0860
www.onterra-wi.com

Sources:
Roads and Hydro: WDNR
Bathymetry: WDNR - digitized by Onterra
Orthophotography: NAIP, 2011
Aquatic Plants: Onterra, 2015
Map Date: September 14, 2015
Filename: Archibald_EWM_PB_Sept15.mxd

Project Location in Wisconsin

Legend

Eurasian Water Milfoil (Sept. 11, 2015)

- Highly Scattered (none)
- Scattered (none)
- Dominant (none)
- Highly Dominant (none)
- Surface Matting (none)
- Single or Few Plants
- Clump of Plants
- Small Plant Colony (none)
- Volunteer EWM Location

Map 2
Archibald Lake
Oconto County, Wisconsin
2015 Late-Summer EWM Survey Results

Archibald Lake Association 4/27/16

Eurasian Water Milfoil Progress Report (AIRR-161-14)

Here is our plan moving forward into 2016.
We continue to be very vigilant and determined to not have EWM get the best of our beautiful Archibald Lake. We still feel that there are four critical components that are leading our success against EWM.

- Education, Communications, and Association Support – There are more people getting involved every year. This means more watchful eyes identifying plants. More people are inspecting their own shoreline and their neighbors.
- Adopt-A-Shoreline and Complete Surveys – We are continuing to do our Adopt-A-Shoreline surveys. These provide an early warning system and feed the manual removal process. We will also continue to do consultant lead "targeted point intercept surveys" using the point intercept grind and rake dropping techniques to find colonies that may escape normal observation.
- Manual Removal – The manual removal effort has been very successful. We have completely removed plants in several bays that have completely avoided chemical treatment in those locations. We currently have 6 teams working the manual removal process. Our goal is to find and remove plants early before chemical treatment is needed. This strategy is working. This year we also have scuba diver volunteers that will be doing manual removal where our typical teams can not reach.
- Aggressive Chemical Treatment – We have learned that being aggressive is critical for managing this invasive plant. The expanded treatment areas (buffers) used in 2013 have been very effective in eliminating the plants and we need to continue with this approach only as needed.

The following is a summary of our expenses and donated labor over the duration of the grant. Our 2015 donated labor hours is near double the hours of any of the previous years.

Archibald Lake - WDNR - EWM Grant Summary

	Grant Expenses	Donated Labor $'s	Donated Labor Hours
2009	*All 2009 Expenses rolled into 2010*		
2010	$7,097.06	$2,391.00	199.25
2011	$4,572.93	$1,530.00	127.50
2012	$3,642.04	$1,259.00	104.92
2013	$4,687.97	$1,568.49	130.71
2014	$4,812.50	$1,260.00	105.00
2015	$4,637.50	$4,788.00	399.00
Totals	$29,450.00	$12,796.49	667.37

If there are any questions please let me know.
Richard Dvorak, Archibald Association Board of Directors
Phone: 920-680-0952