TRUCKEE TAHOE AIRPORT DISTRICT
BOARD OF DIRECTORS AGENDA ITEM SUMMARY

Topic:	Facilities Maintenance Plan			
Purpose	Information:	Guidance:	Decision:	X
Recommendation	Approve the September 2013 Facilities Maintenance Plan			
Last Action	Presentation at August 2013 Meeting			

Discussion

Tower Inspections:
Since the July 2013 meeting, three District towers (Alder Hill, Airport and Dry Lake) were inspected by Day Wireless, West Coast Coating Consultants and SA Engineering. As expected, the Alder Hill tower was identified as requiring the most corrective actions with a focus on both the power and communications infrastructure. Given that facility has been the topic of past and present Closed Sessions, the magnitude and responsibility for the Airport to make those corrections (as compared to being shared with other tower users) may not be fully established; a modest amount of money is budgeted to correct the most serious discrepancies. The inspections also revealed the need to replace damaged structural elements at all the towers and at some point in the next 5-10 years the Alder Hill and Dry Lake towers should be recoated.

Facility Plan Recommendations:
The recommendations, schedule and budget proposed in the Plan are based on a goal of extending the life of the airport's structures by 30+ years with the expectation that most, if not all of the work, will be done by licensed contractors selected through a competitive bid basis and paid at Prevailing Wage rates. While the suggested budget (~ $3 million) is a significant sum to spend on primarily non-occupied buildings (i.e. hangars) the justification(s) for the level of effort include:

- The need for **structural stability** is without question; both in terms of protecting the contents of the hangars and the safe operation of the bi-fold doors. The Structural Engineer identified a number of columns that require stiffening for proper operation of the doors and strongly suggested addressing damage to the building walls and resulting horizontal loads caused by snow sliding snow from roofs.
- **Protection** of the structures (structural members, roofs and the exterior walls) from corrosion caused by roof leaks and exposure to a harsh climate (wind, snow, rain, ultraviolet rays) were identified by both the structural engineer and coatings consultant. Replacement or coating of roofs on 11

structures is recommended by the Gabbart&Woods. The coating materials and methods proposed by West Coast Coating Consultants for walls and exposed structural components are industrial grade products specifically formulated for this type of application and climate; the suggested contractor qualifications, application methodology and quality control measures ensure the coatings will afford the desired long-term results.

- The **mechanical** system review and suggested replacement program highlighted the age, expected reliability and typically low energy efficiency of the components installed in many of the occupied buildings. Replacement will correct those deficiencies in a proactive manner rather than reactive as happens when a heating unit fails during the winter affecting the tenants' ability to operate.
- Compliance with the **Americans with Disabilities Act** (ADA) is required by law. An understanding of the **uses/occupancy** by the Warehouse tenants provides the District (as the landlord) with a basis for ensuring a safe work place.
- **Electrical** corrections have been prioritized with the most significant hazards to be addressed this fall. While most of the deficiencies have been in place for a significant period of time with no reported injuries or damage, compliance with the National Electric Code should be considered mandatory as a hazard can occur at any time with typically no advance warning. As discussed, many of the electrical installations at the airport require specialized materials and construction knowledge/experience.
- Assuming an average **replacement cost** of $125/sf (based primarily on non-occupied buildings) and a combined floor area of approaching 400,000 square feet for all the structures, yields a replacement cost of at least $50 million dollars; the $3 million dollar maintenance budget is about six percent of the value.

Fiscal Impact	Total expenditure of approximately $3 million dollars starting in FY 2014 continuing through FY 2023.
Communication Strategy	none
Attachments	Facilities Maintenance Plan dated September 2013

Facilities Maintenance Plan

Truckee Tahoe Airport District

September 2013

Contributors

Acumen Engineering

Holdrege&Kull Geotechnical Engineers

Ward-Young Architects

Gabbart& Woods Structural Engineers

West Coast Coating Consultants

Prosser Building & Development

SA Engineering

Day Wireless

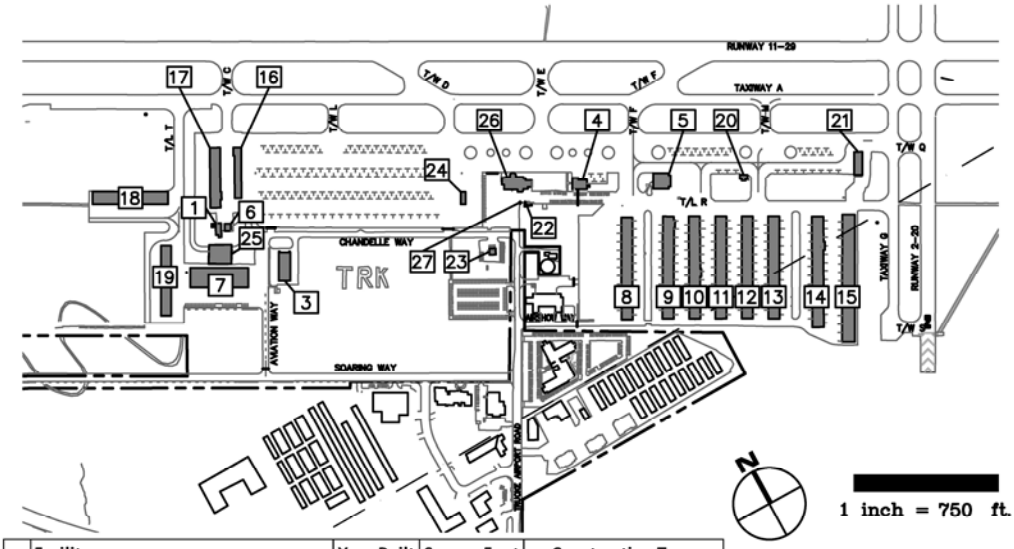
Executive Summary

At the request of the Truckee Tahoe Airport District, a review of 25 buildings and three beacon towers was completed during the summer and fall of 2013 to determine the condition of each building and develop a long-term maintenance plan for the structures. Inspections and analysis were performed by geotechnical, structural, mechanical and electrical engineers, a coating system specialist, a firm that specializes in the construction and maintenance of communications towers and an architect knowledgeable of Americans with Disabilities Act (ADA) compliance. The review found that many of the buildings' roofs have reached the end of their useful life and replacement or a significant rehabilitation is required within the next five years. Most of the buildings/structures require the application of a surface coating (paint) in the next ten years to protect the underlying structure from corrosion and degradation. Mechanical systems require on-going maintenance and replacement of most heating appliances will be required. Every facility had non-code compliant electrical installation(s) of varying degrees with the highest priority corrections being in high hazard areas such as around fuel tanks and recently constructed hangars. Four buildings do not meet ADA compliance requirements. Finally, the uses of the warehouse building require further occupancy analysis to determine if the existing lessees are in compliance with the terms of their lease.

The estimated cost of correcting the identified deficiencies and extending the life of the structures by another 30-40 years is slightly less than $3.0 million dollars. The Plan recommends expenditures of approximately $500,000 for each of the next six fiscal years.

Introduction

The Truckee Tahoe Airport has been in its current location in the early 1960's. Hangar 1 was constructed in 1963 with Hangar 2 following three years later. The warehouse, car rental building and Hangar Rows B, C and J were constructed in the 1970's. In the 1980's Hangar Rows A, D, E, F, G, K and the Phoenix (Civil Air Patrol) Hangar were erected. The maintenance and fueling facilities (tank farm and self-serve) were constructed the following decade while Hangar Rows L and M were built in mid-2000. The Administration Building was completed in 2012. The majority of the buildings are steel framed/sided with exceptions being the modular building occupied by CareFlight, the car rental structure, the EAA building and the Administration Facility. All told 25 different structures with a total floor area approaching 400,000 square feet are owned and maintained by the District. The Dry Lake and Alder Hill Beacon Towers were reportedly constructed in about 1929 while the Airport Beacon Tower was likely constructed in the 1960's. The age of the buildings, combined with exposure to harsh environmental conditions, has resulted in the need for a significant investment in heavy maintenance/repair in order to keep the buildings functional and structurally sound for another 30-40 years.



	Facility	Year Built	Square Feet	Construction Type
1	West Side Modular	1991 ±	1,728	Wood Frame
2	Accounting Modular (not reviewed)	2003	400	Wood Frame
3	Maintenance Building	1998	9,352	Metal
4	Hangar 2	1966 ±	3,126	Metal
5	Hangar 1	1963 ±	7,500	Metal
6	Garage	1991	1,140	Metal
7	Warehouse	1974	30,000	Metal
8	Hangar Row A	1984	29,680	Metal
9	Hangar Row B	1977	29,680	Metal
10	Hangar Row C	1976	29,680	Metal
11	Hangar Row D	1981	29,680	Metal
12	Hangar Row E	1981	29,680	Metal
13	Hangar Row F	1987	29,680	Metal
14	Hangar Row G	1988	32,200	Metal
15	Hangar Row H	1991	42,250	Metal
16	Hangar Row J	1970	8,840	Metal
17	Hangar Row K	1981	16,740	Metal
18	Hangar Row L	2005	24,304	Metal
19	Hangar Row M	2005	18,514	Metal
20	Phoenix Hangar	1985?	1,000	Metal
21	EAA	1963?	5,043	Metal & wood
22	Generator Building	1990	260	Metal
23	Auto Rental Building	1978?	570	Wood Frame
24	Self Serve Tank	1999		Steel tank
25	Fuel Farm	1996		Steel tanks & canopy
26	Admin Building	2012	11,556	Steel, wood, concrete
27	Airport Beacon	1960±		
28	Alder Hill Beacon Tower	1929		
29	Dry Lake Beacon Tower	1929		

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TRUCKEE TAHOE
AIRPORT DISTRICT

AIRPORT FACILITIES

17 JULY 2013

The District contracted with Acumen Engineering to prepare a Facilities Maintenances Plan to identify building deficiencies, develop maintenance strategies and quantify the required work both in terms of cost and timing. The areas of investigation and consultant performing the analysis included:

- Geotechnical/Soils/Foundations: *Holdrege & Kull Consulting Engineers*
- Warehouse Code Compliance and ADA information: *Ward-Young Architects*
- Structural Engineering and metal building conditions: *Gabbart & Woods Structural Engineers*
- Paint and coatings: *West Coast Coating Consultants*
- Mechanical systems: *Prosser Building and Development*
- Electrical systems: *S.A. Engineering*
- Tower Inspections: *Day Wireless*

In the spring of 2013 the team met with District Staff to review the list of facilities, discuss the scope of the investigation and identify any known maintenance or operational issues for each building. Each of the investigators subsequently examined the interior and exterior of each structure, reviewed existing reports/plans, further interviewed staff and prepared a written draft report. Those draft reports were reviewed with staff and comments/questions/corrections from that initial review were incorporated into the consultants' reports provided in the following sections of the Facilities Maintenance Plan.

Summary of Findings by Discipline

Holdrege and Kull conducted a review of available literature and 11 previous site investigations done at the airport over the years. In most instances the investigations were for or adjacent to one of the 25 buildings under study. The previous studies all had similar findings with respect to the underlying soil materials and suitability for foundation support. Holdrege & Kull's opinion is that remedial foundation repairs are not necessary but careful attention should be paid to drainage in and around the buildings to reduce the occurrence of frost heaving and the resulting differential elevations between the building floor/slab and surrounding asphalt.

Ward-Young Architects was tasked with reviewing the Warehouse building for conformance with Building Code requirements for the types of uses (occupancy) by the lessees. The classification of the uses of the building is difficult because of the types of use, methods of product storage and materials used by the various businesses. The architect's initial analysis is that the building is classified as "Storage" and thus the existing exiting and other building features marginally meet Code requirements for egress distance. However, Ward-Young recommends the District retain a specialist in commodity classification (fire protection consultant) to analyze the "hazard risk"; a changed classification to "Hazard" occupancy would

necessitate the need for the installation of fire protection systems (sprinklers, alarms, increased access and similar components). At the minimum, a review of the tenant leases with respect to compliance with Building Codes should be completed to determine if the potential hazards can be mitigated through a change in the business' operation(s).

Ward-Young also reviewed the Warehouse with respect to conformance to Americans with Disabilities Act (ADA) requirements; as expected the building does not meet ADA standards and the architect identified the necessary modifications to bring the building into compliance. While not investigated by Ward-Young, three other buildings (Hangar 1, Hangar 2 and Automobile Rental) also don't meet the ADA. The section of the Act that applies to Title II Buildings (owned and operated by state and local governments) has been in place since 1992. At the time, the District was required to develop a "transition plan" *to ensure that each service, program or activity must be operated so that, when viewed in its entirety, it is readily available to and usable by individuals with disabilities unless it would result in a fundamental alteration in the nature of a service, program or activity.* Structural changes to existing buildings to meet the program accessibility requirement were required by January 26, 1995. Title II does allow for alternatives in lieu of making changes to buildings; Ward-Young suggested the District retain the services of a CASp (Certified Access Specialist program) consultant to review the warehouse, and by inference the other three structures, and discuss best practices for government entities, transition plans and other options for intermediate and long-term compliance with ADA.

Gabbart &Woods found that the buildings' structural elements (columns, beams, purlins) did not indicate failure or the need for remedial repairs with the exception of relatively modest (¼ to -1-inch) bending of 46 columns supporting the bi-fold doors in ten of the older hangars. They did observe wide-spread and significant issues with the metal roofs of many of the buildings; complete reattachment is necessary at four of the hangars, seven require the application of a coating over the entire roof and four hangars need new roofs within the next five years. The majority of the buildings have roof leaks due to pipe penetrations or poor flashing installations, some have significant damage from ice or snow plow activity and in some cases previously completed repairs were done incorrectly and require attention.

West Coating Consultants reviewed the condition of the different surfaces (metal, wood, concrete) for chalking, visible rust, coating adhesion and thickness at each building. The result is a number of facilities that require recoating in the near (1-2 years) and mid-term (2-5years) due to loss of the existing surface protection. Wood structures generally faired more poorly than metal with regard to coating condition but the Consultant identified a number of the older hangars that require recoating of the metal siding in the next two to five years. He also found

that the fuel farm as a whole (structures, piping, tanks, ladders, etc.) requires significant attention within the next five years with the roof and supporting members being the highest priority.

Prosser Building and Development reviewed/tested 84 mechanical units located throughout the 25 buildings. Many are proposed for replacement over the next 10 years due to age, operational inefficiency, and lack of repair parts or reliability. The consultant also found a large number of units that were not seismically braced and represent a potential hazard to users of the facilities.

S.A. Engineering's review of the electrical components/installation in each of the buildings identified National Electric Code deficiencies in every location. There are many common issues such as lack of labeling, incorrect breakers in panels, unsupported conduits (raceways), improper grounding, openings in panels that allow water intrusion and insufficient clearances in front of panels. The most significant discrepancies are related to the fuel farm, the self-serve fuel island and Hangars L and M. In these areas, the presence of jet fuel and aviation gasoline necessitate the use of explosion proof fixtures, conduit terminations and similar specialized equipment/techniques, much of which is either missing or improperly installed.

Day Wireless found that all three towers had missing or damaged structural members or connectors. The electrical systems at the Dry Lake and Airport Towers required relatively minor upgrades/corrections; however the inspector declined to climb the Alder Hill Tower because of concern regarding the condition of the electrical and communications equipment on the structure. All towers require the installation of new or upgraded climbing safety equipment and proper signage. The coating condition of the Airport Tower is excellent but the two remote structures (Alder Hill and Dry Lake) require coating in the relatively near term as confirmed by West Coast Coating Consultants.

Suggested Timing and Budget Implications

With the exception of S.A. Engineering, each of the consultants provided input on maintenance priorities, recommended timing and unit prices for the various repairs assuming all work is done by Contractor(s) paid at prevailing wage rates. The magnitude of the electrical corrections and uniqueness of each facility's required repairs precluded that type of approach to cost estimating, instead values were assigned to each building based on S.A. Engineering's 35+ years of experience in commercial electrical design and construction. In most locations the priority electrical repairs would occur in year one followed by the correction of less hazardous items in the following year. A spreadsheet was prepared for each building and the sum of the suggested maintenance by year is shown on the following page. The schedule as currently developed

proposes expenditures averaging $425,000 per year through Fiscal Year 2019 with a gradual tapering of costs through Fiscal Year 2023.

Truckee Tahoe Airport District

Recommended Facility Maintenance Budget By Year of Expenditure

Facility Name	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Beyond	Facility Total
West Side Modular	$1,250	$5,418	$6,060	$0	$7,602	$0	$0	$0	$0	$0	$0	$20,330
Maintenance Building	$8,050	$1,400	$1,000	$1,000	$8,000	$1,000	$40,585	$3,000	$1,000	$1,000	$0	$66,035
Hangar 2	$22,060	$3,088	$6,000	$0	$0	$0	$13,397	$0	$0	$0	$7,410	$51,955
Hangar 1	$33,050	$22,500	$0	$43,200	$0	$26,060	$31,200	$0	$0	$0	$0	$156,010
Garage	$0	$2,000	$3,300	$0	$0	$0	$0	$8,817	$0	$0	$4,500	$18,617
Warehouse	$51,500	$11,400	$75,300	$0	$0	$0	$38,500	$0	$0	$9,000	$18,000	$203,700
Hangar Row A	$2,000	$70,500	$75,400	$0	$0	$0	$0	$0	$0	$0	$0	$147,900
Hangar Row B	$67,580	$86,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$153,580
Hangar Row C	$3,000	$4,500	$79,500	$0	$0	$0	$66,080	$0	$0	$0	$0	$153,080
Hangar Row D	$80,000	$7,500	$0	$0	$66,080	$0	$0	$0	$0	$0	$0	$153,580
Hangar Row E	$9,500	$8,500	$0	$190,800	$0	$66,080	$0	$0	$0	$0	$0	$274,880
Hangar Row F	$1,500	$21,425	$0	$0	$64,750	$0	$0	$0	$0	$0	$0	$87,675
Hangar Row G	$4,000	$7,500	$12,825	$0	$0	$68,500	$0	$0	$0	$0	$0	$92,825
Hangar Row H	$11,000	$15,000	$0	$214,500	$0	$107,000	$0	$0	$0	$0	$0	$347,500
Hangar Row J	$3,000	$4,500	$0	$0	$35,500	$64,064	$0	$0	$0	$0	$0	$107,064
Hangar Row K	$5,000	$3,000	$0	$0	$41,580	$34,209	$0	$0	$0	$0	$0	$83,789
Hangar Row L	$1,000	$37,000	$0	$0	$9,550	$0	$0	$79,625	$0	$0	$0	$127,175
Hangar Row M	$100,100	$5,000	$0	$0	$51,940	$0	$0	$0	$0	$0	$0	$157,040
Phoenix Hangar	$7,500	$0	$6,423	$0	$0	$0	$0	$0	$0	$0	$0	$13,923
EAA Building	$21,293	$0	$22,113	$0	$0	$0	$0	$0	$0	$0	$6,300	$49,706
Generator Building	$1,750	$1,000	$3,821	$0	$0	$0	$0	$0	$0	$0	$0	$6,571
Auto Rental Building	$24,500	$2,500	$3,850	$0	$0	$0	$0	$0	$0	$6,000	$0	$36,850
Self-Serve Fuel Tank	$35,000	$3,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$38,500
Fuel Farm	$30,000	$74,700	$0	$30,000	$0	$0	$0	$0	$0	$0	$0	$134,700
Administration Building	$3,000	$3,000	$3,000	$0	$0	$0	$0	$0	$0	$0	$0	$9,000
Airport Beacon Tower	$2,500	$1,000	$0	$0	$0	$0	$0	$0	$4,000	$0	$0	$7,500
Alder Hill Beacon Tower	$3,000	$4,500	$0	$0	$0	$0	$7,000	$0	$0	$0	$0	$14,500
Dry Lake Beacon Tower	$2,500	$2,500	$0	$0	$0	$0	$6,000	$0	$0	$0	$0	$11,000
Design/Construction Admin @ 7.5%	$40,097	$30,670	$22,394	$35,963	$21,375	$27,518	$15,207	$6,858	$375	$1,200	$2,716	$204,374
TOTAL	**$574,730**	**$439,600**	**$320,986**	**$515,463**	**$306,377**	**$394,431**	**$217,969**	**$98,300**	**$5,375**	**$17,200**	**$38,926**	**$2,929,357**

Truckee Tahoe Airport District
Recommended Facility Maintenance Budget by Facility

Facility Name	ADA Compliance	Roofing Siding	Structural Repairs	Coatings	Electrical	Mechanical Systems	Facility Total
West Side Modular		$5,418		$8,352	$500	$6,060	$20,330
Maintenance Building		$6,500		$39,985	$1,500	$18,050	$66,035
Hangar 2	$15,000	$10,498		$13,397	$1,000	$12,060	$51,955
Hangar 1	$20,000	$54,000	$20,000	$32,950	$3,000	$26,060	$156,010
Garage		$4,800		$8,817	$500	$4,500	$18,617
Warehouse	$35,000	$75,300		$44,900	$10,000	$38,500	$203,700
Hangar Row A		$76,900	$1,500	$67,500	$2,000		$147,900
Hangar Row B		$80,500	$5,000	$66,080	$2,000		$153,580
Hangar Row C		$82,000	$3,000	$66,080	$2,000		$153,080
Hangar Row D		$79,500	$6,000	$66,080	$2,000		$153,580
Hangar Row E		$196,800	$7,000	$69,080	$2,000		$274,880
Hangar Row F		$12,925	$8,000	$64,750	$2,000		$87,675
Hangar Row G		$13,825	$6,000	$71,000	$2,000		$92,825
Hangar Row H		$222,500	$13,500	$109,500	$2,000		$347,500
Hangar Row J		$65,064	$3,000	$37,000	$2,000		$107,064
Hangar Row K		$44,080	$1,500	$36,209	$2,000		$83,789
Hangar Row L		$41,550		$79,625	$6,000		$127,175
Hangar Row M		$99,100		$51,940	$6,000		$157,040
Phoenix Hangar		$7,000		$6,423	$500		$13,923
EAA Building		$22,113		$13,743	$2,500	$11,350	$49,706
Generator Building		$875		$3,696	$2,000		$6,571
Auto Rental Building	$20,000		$2,500	$5,350	$1,000	$8,000	$36,850
Self-Serve Fuel Tank				$3,500	$35,000		$38,500
Fuel Farm				$94,700	$40,000		$134,700
Administration Building						$9,000	$9,000
Airport Beacon Tower			$1,500	$4,000	$1,000	$1,000	$7,500
Alder Hill Beacon Tower			$1,000	$7,000	$5,500	$1,000	$14,500
Dry Lake Beacon Tower			$1,500	$6,000	$2,500	$1,000	$11,000
Design/Construction Admin @ 7.5%	$6,750	$90,094	$6,075	$80,824	$10,388	$10,244	$204,374
TOTAL	**$96,750**	**$1,291,341**	**$87,075**	**$1,158,480**	**$148,888**	**$146,824**	**$2,929,357**

Building Name	West Side Modular #1
Construction Type	Wood Frame
Year Constructed	1991
Floor Area	1,728
Roof Surface Area	2,167
Wall Surface Area	2,534

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
replace all roof screws		$5,418									
paint hand rails	$750										
paint siding, trim and decking					$7,602						
replace furnace			$4,060								
replace air-conditioning			$2,000								
electrical system repairs	$500										
	$1,250	**$5,418**	**$6,060**	**$0**	**$7,602**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Maintenance Building #3
Construction Type	Metal
Year Constructed	1998
Floor Area	9,352
Roof Surface Area	9,000
Wall Surface Area	11,310

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
repair roof penetrations	$6,500										
paint personnel doors		$400									
paint siding and roll-up doors							$39,585				
water heater					$1,000						
furnace					$6,000						
radiant heaters			$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	
ceiling fans								$2,000			
exhaust fan	$1,050										
electrical system repairs	$500	$1,000									
	$8,050	**$1,400**	**$1,000**	**$1,000**	**$8,000**	**$1,000**	**$40,585**	**$3,000**	**$1,000**	**$1,000**	**$0**

Building Name	Hangar 2 #4
Construction Type	Metal
Year Constructed	1996
Floor Area	3,126
Roof Surface Area	2,470
Wall Surface Area	3,142

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
ADA Compliance	$15,000										
replace screws on lower roof		$3,088									
paint siding and doors							$10,997				
paint wood deck and stairs							$2,400				
coat roofing panels											$7,410
heater			$6,000								
furnace	$5,060										
furnace	$1,000										
electrical system repairs	$1,000										
	$22,060	**$3,088**	**$6,000**	**$0**	**$0**	**$0**	**$13,397**	**$0**	**$0**	**$0**	**$7,410**

Building Name	Hangar 1 #5
Construction Type	Metal
Year Constructed	1963
Floor Area	7,500
Roof Surface Area	7,200
Wall Surface Area	7,940

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
ADA Compliance	$20,000										
replace all roof panels				$43,200							
replace damaged wall panels	$4,800										
add protective plates north side of building	$6,000										
paint plywood siding and rafters	$1,000										
paint porch and support posts	$750										
paint siding and trim							$25,200				
paint steel doors							$6,000				
heaters						$18,000					
furnace						8060					
insulate hangar		$20,000									
electrical system repairs	$500	$2,500									
	$33,050	**$22,500**	**$0**	**$43,200**	**$0**	**$26,060**	**$31,200**	**$0**	**$0**	**$0**	**$0**

Building Name	Garage #6
Construction Type	Metal
Year Constructed	1991
Floor Area	1,140
Roof Surface Area	1,320
Wall Surface Area	2,519

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
replace all roof screws			$3,300								
replace damaged wall panels		$1,500									
paint metal siding								$8,817			
heater											$4,500
electrical system repairs		$500									
	$0	**$2,000**	**$3,300**	**$0**	**$0**	**$0**	**$0**	**$8,817**	**$0**	**$0**	**$4,500**

Building Name	Warehouse #7
Construction Type	Metal
Year Constructed	1974
Floor Area	30,000
Roof Surface Area	30,120
Wall Surface Area	12,500

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Future**
ADA Compliance	$30,000										
code analysis re: occupancy	$5,000										
replace all roof screws			$75,300								
paint doors and frames		$3,600									
paint siding on end of building		$2,800									
paint original siding							$38,500				
Unit A heater											$4,500
Unit B heater										$9,000	
Unit C heater											$9,000
Unit D heater	$7,500										
Unit E2 heater											$4,500
Unit E2 smoke alarm	$4,000										
electrical system repairs	$5,000	$5,000									
	$51,500	**$11,400**	**$75,300**	**$0**	**$0**	**$0**	**$38,500**	**$0**	**$0**	**$9,000**	**$18,000**

Building Name	Hangar Row A #8
Construction Type	Metal
Year Constructed	1984
Floor Area	29,680
Roof Surface Area	30,160
Wall Surface Area	19,557

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
replace all roof screws			$75,400								
seal light pole penetrations	$1,500										
straighten and strengthen column flanges (1)		$1,500									
paint metal siding		$63,000									
paint wood siding		$2,500									
paint man doors		$2,000									
electrical system repairs	$500	$1,500									
	$2,000	**$70,500**	**$75,400**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row B #9
Construction Type	Metal
Year Constructed	1977
Floor Area	29,680
Roof Surface Area	31,800
Wall Surface Area	18,880

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
coat entire roof with coating system		$79,500									
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (5)		$5,000									
paint metal and wood siding	$66,080										
paint man doors											
electrical system repairs	$500	$1,500									
	$67,580	**$86,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row C #10
Construction Type	Metal
Year Constructed	1976
Floor Area	29,680
Roof Surface Area	31,800
Wall Surface Area	18,880

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
coat entire roof with coating system			$79,500								
rework panel laps and/or repair areas	$1,500										
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (2)		$3,000									
paint siding and man doors							$66,080				
electrical system repairs	$500	$1,500									
	$3,000	**$4,500**	**$79,500**	**$0**	**$0**	**$0**	**$66,080**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row D #11
Construction Type	Metal
Year Constructed	1981
Floor Area	29,680
Roof Surface Area	31,800
Wall Surface Area	18,880

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
coat entire roof with coating system	$79,500										
straighten and strengthen column flanges (4)		$6,000									
paint siding and man doors					$66,080						
electrical system repairs	$500	$1,500									
	$80,000	**$7,500**	**$0**	**$0**	**$66,080**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row E #12
Construction Type	Metal
Year Constructed	1981
Floor Area	29,680
Roof Surface Area	31,800
Wall Surface Area	18,880

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
replace entire roof				$190,800							
rework panel laps and/or repair areas	$5,000										
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (7)		$7,000									
paint metal siding and man doors						$66,080					
paint wood siding	$3,000										
electrical system repairs	$500	$1,500									
	$9,500	**$8,500**	**$0**	**$190,800**	**$0**	**$66,080**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row F #13
Construction Type	Metal
Year Constructed	1987
Floor Area	29,680
Roof Surface Area	31,800
Wall Surface Area	18,880

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
Tighten and/or replace 15% of roof screws		$11,925									
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (8)		$8,000									
paint siding and doors					$63,000						
paint man doors					$1,750						
electrical system repairs	$500	$1,500									
	$1,500	$21,425	$0	$0	$64,750	$0	$0	$0	$0	$0	$0

Building Name	Hangar Row G #14
Construction Type	Metal
Year Constructed	1988
Floor Area	32,200
Roof Surface Area	34,200
Wall Surface Area	20,160

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
Tighten and/or replace 15% of roof screws			$12,825								
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (6)		$6,000									
paint plywood	$2,500										
paint siding and doors						$66,500					
paint man doors						$2,000					
electrical system repairs	$500	$1,500									
	$4,000	**$7,500**	**$12,825**	**$0**	**$0**	**$68,500**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row H #15
Construction Type	Metal
Year Constructed	1991
Floor Area	42,250
Roof Surface Area	42,900
Wall Surface Area	31,900

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
coat portion of roof				$64,350							
replace portion of roof				$150,150							
rework panel laps and/or repair areas	$2,500										
add protective plates on north side of building	$4,000										
waterproof light pole penetrations	$1,500										
straighten and strengthen column flanges (9)		$13,500									
paint plywood	$2,500										
paint siding and doors						$105,000					
paint man doors						$2,000					
electrical system repairs	$500	$1,500									
	$11,000	**$15,000**	**$0**	**$214,500**	**$0**	**$107,000**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row J #16
Construction Type	Metal
Year Constructed	1970
Floor Area	8,840
Roof Surface Area	9,152
Wall Surface Area	9,198

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
Replace roof						$64,064					
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (2)		$3,000									
paint wood doors	$1,500										
paint metal doors					$18,000						
paint siding					$17,500						
electrical system repairs	$500	$1,500									
	$3,000	**$4,500**	**$0**	**$0**	**$35,500**	**$64,064**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row K #17
Construction Type	Metal
Year Constructed	1981
Floor Area	16,740
Roof Surface Area	16,632
Wall Surface Area	9,774

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
replace all roof screws					$41,580						
Repair corner trim	$1,500										
waterproof light pole penetrations	$1,000										
straighten and strengthen column flanges (1)		$1,500									
paint steel trim	$2,000										
paint siding and doors						$34,209					
electrical system repairs	$500	$1,500									
	$5,000	**$3,000**	**$0**	**$0**	**$41,580**	**$34,209**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Hangar Row L #18
Construction Type	Metal
Year Constructed	2005
Floor Area	24,304
Roof Surface Area	25,467
Wall Surface Area	22,750

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
Tighten and/or replace 15% of roof screws					$9,550						
add protective plates on north side of building		$32,000									
paint siding and man doors								$79,625			
electrical system repairs	$1,000	$5,000									
	$1,000	**$37,000**	**$0**	**$0**	**$9,550**	**$0**	**$0**	**$79,625**	**$0**	**$0**	**$0**

Building Name	Hangar Row M #19
Construction Type	Metal
Year Constructed	2005
Floor Area	18,514
Roof Surface Area	18,540
Wall Surface Area	14,840

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
PVC membrane on existing roof	$92,700										
add protective plates north side of building	$6,400										
paint siding and man doors					$51,940						
electrical system repairs	$1,000	$5,000									
	$100,100	**$5,000**	**$0**	**$0**	**$51,940**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Phoenix Hangar #20
Construction Type	Metal
Year Constructed	1985
Floor Area	1,000
Roof Surface Area	1,000
Wall Surface Area	1,835

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
replace all roof panels	$7,000										
paint siding and man door			$6,423								
electrical system repairs	$500										
	$7,500	**$0**	**$6,423**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	EAA Building #21
Construction Type	Wood
Year Constructed	1963
Floor Area	5,043
Roof Surface Area	4,914
Wall Surface Area	3,498

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
install spray roof coating system			$22,113								
paint wood siding and trim	$12,243										
paint roll-up and man door(s)	$1,500										
exhaust fan	$5,050										
furnace											$6,300
electrical system repairs	$2,500										
	$21,293	**$0**	**$22,113**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$6,300**

Building Name	Generator Building #22	
Construction Type	Wood and Metal	
Year Constructed	1990	
Floor Area	5043	
Roof Surface Area	244	metal
Roof Surface Area	160	wood
Wall Surface Area	672	metal
Wall Surface Area	560	wood

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
tighten or replace 15% of roof screws			$125								
repair metal panels below asphalt grade	$750										
paint siding and doors			$3,696								
electrical system repairs	$1,000	$1,000									
	$1,750	**$1,000**	**$3,821**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Auto Rental Building #23
Construction Type	Wood
Year Constructed	1978
Floor Area	570
Roof Surface Area	1,650
Wall Surface Area	1,056

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
ADA Compliance	$20,000										
repair exposed wood beams	$2,500										
paint eaves, rafter tails and porch railing	$1,500										
paint siding			$3,150								
paint porch			$700								
install airconditioning		$2,000									
furnace										$6,000	
electrical system repairs	$500	$500									
	$24,500	**$2,500**	**$3,850**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$6,000**	**$0**

Building Name Self Serve Fuel Tank #24
Construction Type
Year Constructed 1999/2012
Floor Area
Roof Surface Area
Wall Surface Area

Maintenance Description	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Beyond
spot coat tank and enclosure		$3,500									
electrical system repairs	$35,000										
	$35,000	**$3,500**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Fuel Farm #25
Construction Type	Metal Frame and Canopy
Year Constructed	1994
Steel Tank Surface Area	4,000
Concrete Tank Surface Area	2,000
Roof Surface Area	13,000

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
paint structural members		$58,500									
paint pumping equipment		$1,500									
paint stairs and walkways		$3,500									
paint guard shack		$1,200									
replace coatings on steel fuel tanks				$24,000							
paint concrete fuel tanks				$6,000							
electrical system repairs	$30,000	$10,000									
	$30,000	**$74,700**	**$0**	**$30,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Administration Building #26
Construction Type	Steel, wood, concrete
Year Constructed	2012
Floor Area	11556
Roof Surface Area	
Wall Surface Area	

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
mechanical system optimization	$3,000	$3,000	$3,000								
	$3,000	**$3,000**	**$3,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Building Name	Airport Beacon Tower
Construction Type	Metal
Year Constructed	1960
Height	52

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
repairs to structure	$1,500										
install safety equipment	$1,000										
paint structure									$4,000		
electrical system repairs		$1,000									
	$2,500	**$1,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$4,000**	**$0**	**$0**

Building Name	Alder Hill Beacon Tower
Construction Type	Metal
Year Constructed	1929
Height	75

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
repairs to structure	$1,000										
correction of radio/comm installation		$3,000									
install safety equipment	$1,000										
paint structure							$7,000				
electrical system repairs	$1,000	$1,500									
	$3,000	**$4,500**	**$0**	**$0**	**$0**	**$0**	**$7,000**	**$0**	**$0**	**$0**	**$0**

Building Name	Dry Lake Beacon Tower
Construction Type	Metal
Year Constructed	1929
Height	58

Maintenance Description	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Beyond**
repairs to structure	$1,500										
install safety equipment	$1,000										
paint structure							$6,000				
electrical system repairs		$2,500									
	$2,500	**$2,500**	**$0**	**$0**	**$0**	**$0**	**$6,000**	**$0**	**$0**	**$0**	**$0**

WEST COAST COATING CONSULTANTS

IDUSTRIAL, MARINE
COATING INSPECTION
FAILURE ANALYSIS, COATING SURVEYS

PHONE: 415-244-6429
FAX: 510-528-5416

September 9, 2013
Via email: bquesnel@ltol.com

Mr. Bill Quesnel
Acumen Engineering
10775 Pioneer Trail
Suite 214
Truckee, CA 96161

Subject: <u>Assessment of Light Beacon Towers at the Truckee-Tahoe Airport</u>

Dear Bill:

As you requested, West Coast Coating Consultants (WCCC) prepared an assessment of the coatings applied to three light beacon towers at the Truckee-Tahoe Airport. The assessment was requested so that the appropriate requirements could be included in the airport maintenance painting specifications.

Background Information

The Alder Hill Beacon LED Light Tower (Photo 1) was built in 1929. It is approximately seventy-five feet tall and is of bolted, galvanized steel frame construction. It has four legs constructed of 3” by 3” angles. There are horizontal and diagonal supports which are 2” by 2” angles.

Photo 1 shows a general view of the Alder Hill Beacon Tower. Note the gray areas on the tower where the red paint has delaminated.

The Dry Lake Beacon LED Light Tower (Photo 2), also built in 1929, is approximately fifty-five feet tall and is of bolted, galvanized steel frame construction. It too has four legs constructed of 3" by 3" angles. There are horizontal and diagonal supports which are 2" by 2" angles.

The Airport Beacon LED Light Tower is approximately fifty feet tall and is of bolted, galvanized steel frame construction. This tower was painted August 2012. According to Mike Ketron (Truckee Airport Staff), the maintenance painting included spot repair and over coating. Exposed substrate was power tool cleaned, spot primed and then all surfaces were over coated.

Photo 2 shows a general view of the Dry Lake Beacon Light Tower. Again note the many areas where the red paint has delaminated.

Results of the Field Investigation

Photo 3 shows the a leg where a good portion of the paint has delaminated.

The Alder Hill Beacon LED Light Tower and the Dry Lake Beacon LED Light Tower are in similar condition. Flaking and delaminating coatings were observed scattered over the entire structure. The delaminated areas revealed smooth galvanized steel surfaces. The galvanized steel is in good condition with no evidence of rust (Photo 3).

Coating adhesion tests were conducted in accordance with ASTM D3359, "Measuring Adhesion by Tape Test," Method B. The method involves scribing the coating with a knife in a cross-hatch pattern, applying tape to the incisions and then removing the tape. Adhesion is evaluated on a scale of 0 to 5 based on the amount of paint that is removed. An adhesion value of 0 is poor and 5 is excellent.

The adhesion testing showed moderate/poor coating adhesion. ASTM D3359 – Method B tests resulted in adhesion values of 2B.

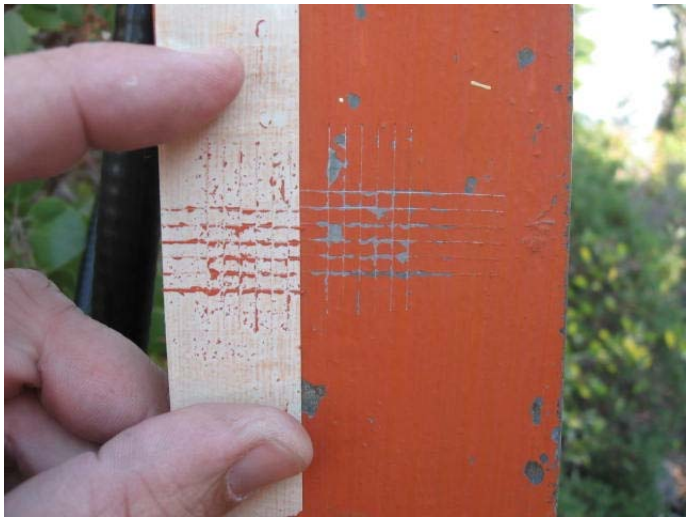


Photo 4 shows an adhesion test performed on one of the legs of the towers. The test represents poor adhesion.

Photo 5 shows an area where the galvanizing layer has lifted and delaminated. A very thin film of tightly adherent rust was observed at the delaminating areas.

The Dry Lake Beacon LED Light Tower had one diagonal that had been damaged. The galvanized layer had lifted at this location but no rust was observed (Photo 5).

There were no coating failures observed on the Airport Beacon LED Light Tower. Adhesion tests were not performed due to the good condition of the coating. Dry film thickness measurements ranged between 6.5 and 7.8 mils.

Discussion and Recommendations

While the coatings applied to the Alder Hill and Dry Lake towers are delaminating and lifting in many areas, the underlying galvanized surfaces are providing good corrosion protection in almost all areas and should continue to provide protection for many years to come. Untopcoated galvanized steel will provide corrosion protection for as much as 20 to 30 years in the Truckee environment. Certainly for aesthetic purposes, the towers could be repainted.

However, with the exception of one area, from a corrosion point of view repainting at this time is not needed.

The area where the galvanizing has delaminated should be painted to protect the underlying steel. This should be accomplished by scraping the galvanizing to remove any loose material. Exposed steel should be power tool cleaned to meet the requirements of SSPC SP-15, Commercial Grade Power Tool Cleaning. The edges of the sound galvanizing should be feathered smooth with grinding wheels attached to power tools. The prepared steel should be spot primed with surface tolerant epoxy and then over coated with a high performance acrylic.

It is important to note that the repainting of these towers is not an easy task if it is to be done safely. The safest way to paint the tower would be from man lifts and bucket trucks. Many times, painters just climb the tower and paint from planks laid over the cross members. When performed in this manner, serious falls have occurred.

When the towers are repainted, all surfaces should be pressure water washed at 5000 psi. Any areas of rust should be power tool cleaned in accordance with SSPC SP-15, Commercial Grade Power Tool Cleaning. Exposed smooth, unweathered galvanizing should be treated with a phosphoric acid based etchant. All surfaces should be primed with a surface tolerant epoxy and over coated with two coats of a high performance acrylic.

Should you have any questions, please do not hesitate to call me at 415-244-6429 or via email at coatingconsultents@yahoo.com.

Sincerely,

Greg Whiting

Greg Whiting

S.A. Engineering

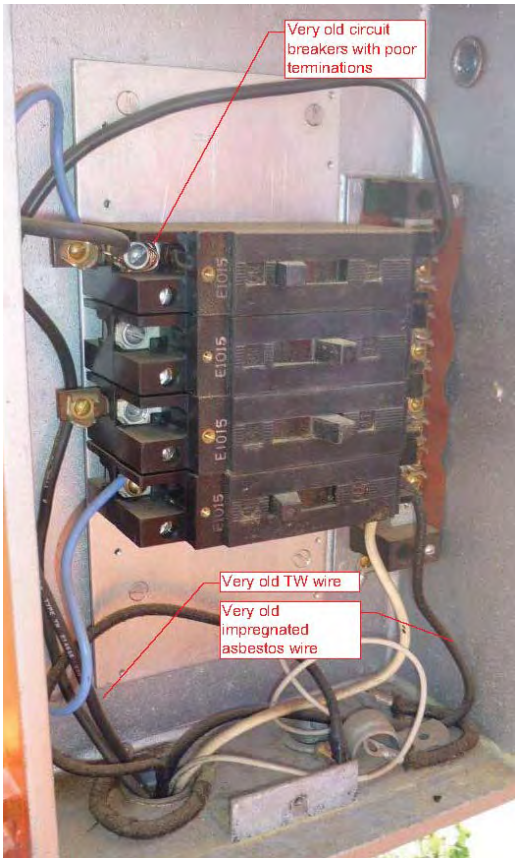
Electrical Engineering ♦ Control Design ♦ SCADA Design ♦ Water & Wastewater Controls

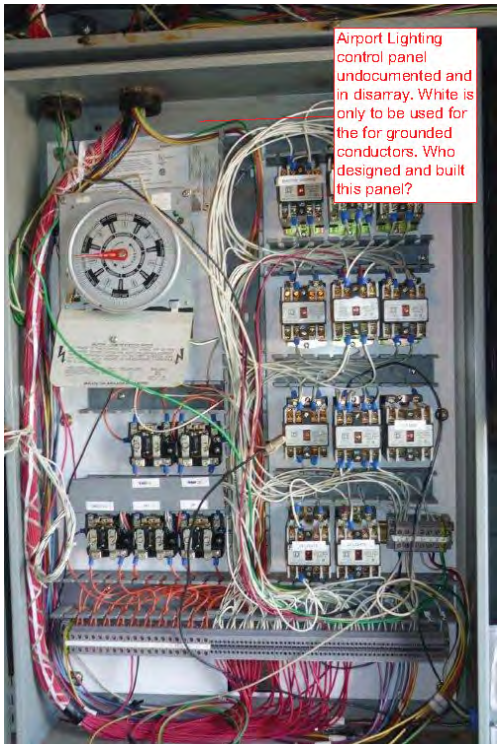
TTAD Airport Beacon Electrical Survey

The three beacon sites were visited. The original wiring appears to be about 50years old. There have been many modifications over the years that have compromised the original job, but were needed to facilitate the addition of new equipment, chiefly radios.

There are many NEC compliance issues that require work to make the beacon sites safe for maintenance employees. Specifics: 1. There are equipment locations that do not meet the working space requirements required by the NEC and OSHA. 2. There are extremely old conductors and apparatus (load centers) still in use that should be replaced. 3. There are installations where maintenance personnel used unlisted products when reconfiguring the electrical distribution wiring - these need to be removed from the system. 4. There are many raceways without required supports. In short, the electrical systems for all three towers should be replaced.

See attached pictures with annotation.





12003 Ski Run Road ♦ Drawer 2469 ♦ Truckee, CA 96160 ♦ 530-587-4725♦ esandel@sa-eng.com

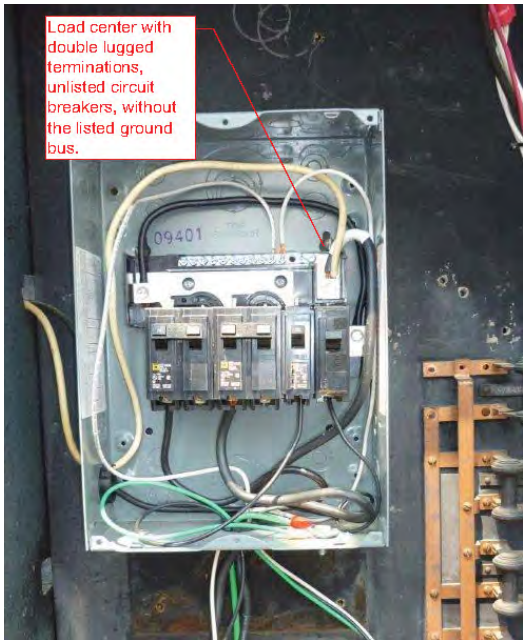
Unused meter socket fed from existing tower
Safety disconnect and load center without required working space

Plumbing fittings are not allowed in electrical installations

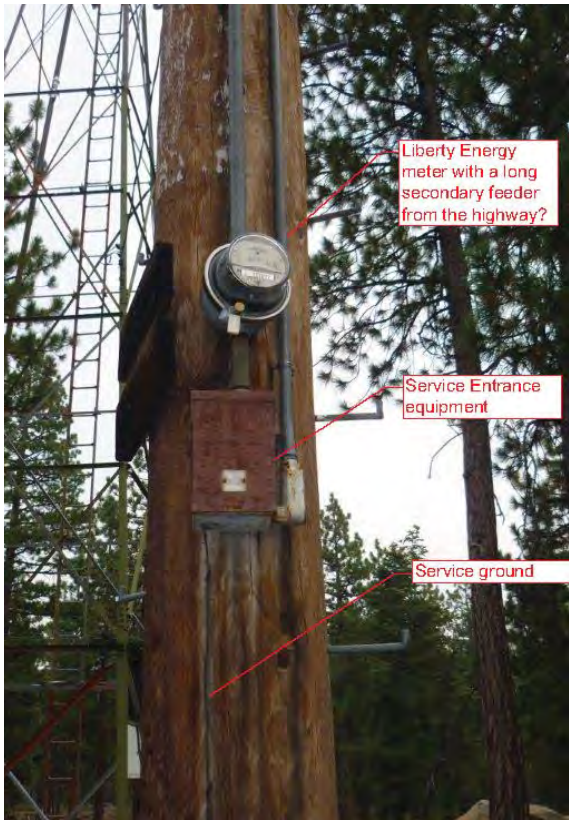
Load center on tower

End of TDPUD feeder with open splice to Load Center feeder
Unused meter socket

Open wiring exiting the enclosure
Open wiring not allowed within this type of enclosure


Load center with double lugged terminations, unlisted circuit breakers, without the listed ground bus.
09401

Raceway supports required


Liberty Energy meter with a long secondary feeder from the highway?
Service Entrance equipment
Service ground

Tower Inspection Report for Truckee/Tahoe Airport

Summary of work completed

The inspection started with the structure condition. We inspected the legs and members of the tower. The east leg was bent as if someone had backed into it. This caused several other members to become bent or twisted. The results of which is the compromising of the structure's integrity and alignment. We recommend that these members are replaced or fixed in the immediate future. There were no loose or missing members. The upper portion of the tower was missing lock washers which were present on the lower half and many of the bolts were facing the wrong direction. We also recommend the climb cable be replaced to a 3/8" aircraft cable which is more in line with today's safety standards.

Next, the lighting was checked. The lens, bulb, etc. were found to be in good condition. There is, however, some cracking and aging of the silicone sealing the light. We have provided pictures and recommend some fresh sealant be applied.

Grounding was found to be insufficient. The lightning rod was grounded but not the tower itself. We recommend that ground lines be cad welded to the legs of the tower to ensure equipment safety.

We were unable to fully inspect the condition of the foundation due to it being covered in asphalt. It does appear, however, that the foundation is intact and there are no concerns.

Lastly, we found the overall condition of the site, including the shack, parking, and accessibility to be in good standing.

Following are the pictures and brief descriptions of the aforementioned findings.

Figure 1 Bent Leg

Figure 2 Bent and twisted horizontal member

Figure 3 South leg slightly twisted

Figure 4 Diagonal member bent

Figure 5 Horizontal member warped

Figure 6 Cable climb should be replaced with 3/8"

Figure 7 No lock washers and some bolts facing the wrong way

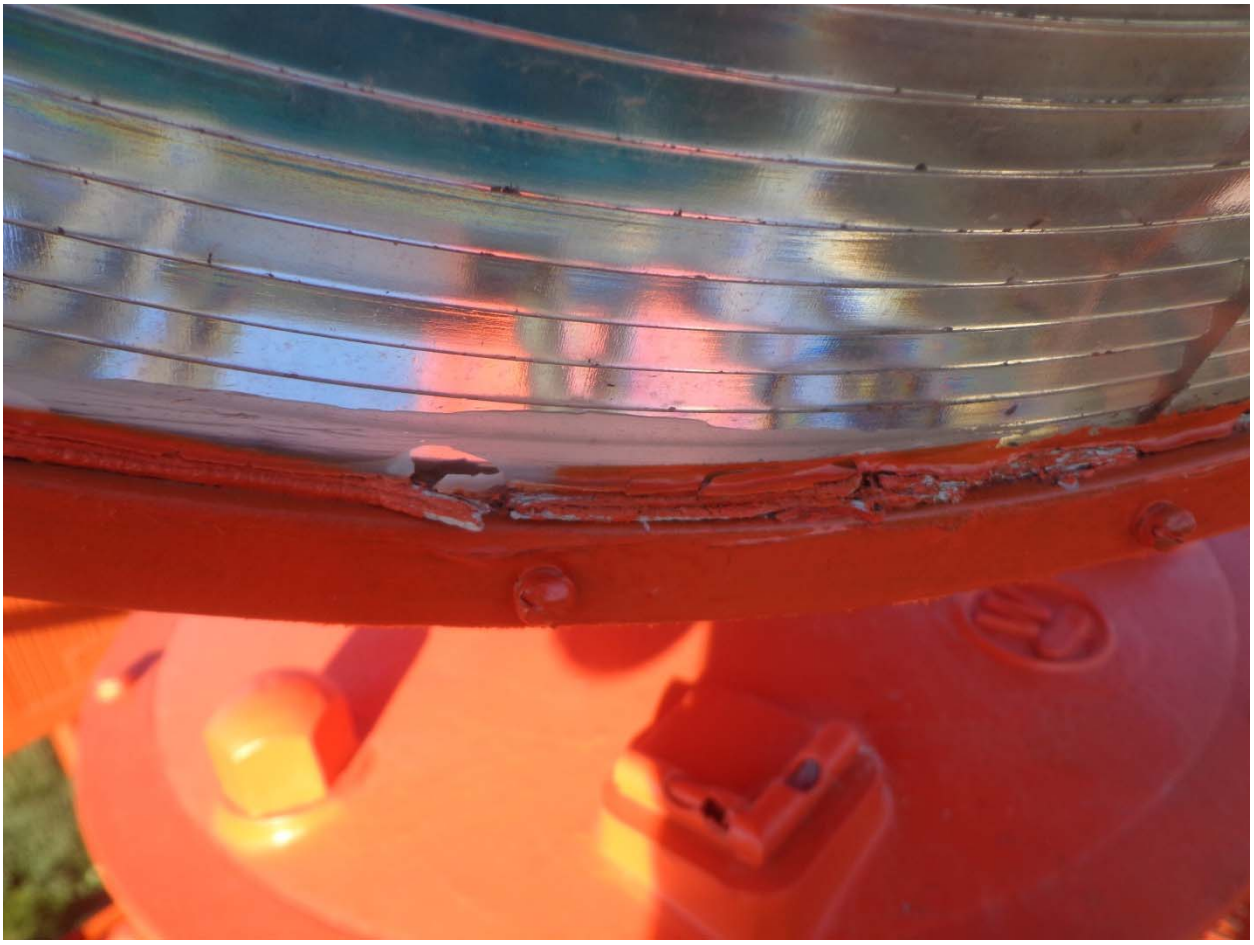


Figure 8 Sealant around light cracking

Figure 9 Height of tower at top rail just under 52'

Figure 10 Paint chipping off on some members

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Tuckee Tahoe Airport

Cody hunter,Rick Buitrago,Dion Little

GPS Co ordinates Lat/Long N 39 19.141 W 120 08.696

Acumen Engineering

	OK? (Y/N/NA)	Deficiencies Found	Suggested Maintenance	Photo number, Located in index
1. Structure Condition				
1.1 Check for damaged members (legs and bracing)	N	North and East tower legs are bent along with several braces	Short trem, angles need to be replaced as soon as possible is compromising strucual integrity	
1.2 Check for loose members	Y			
1.3 Check for missing members	Y			
1.4 Check for climbing facilities, platforms, catwalks – all secure and functional	N	Aircraft cable needs to be up graded to 3/8		
1.5 Check for loose, damaged, corroded and/or missing bolts and/or nut locking devices. Tighten or replace as needed.	Y			
1.6 Check for visible cracks in welded connections	Y			
2. Finish				
2.1 Check overall paint and/or galvanizing condition	Y	Some minor cracks and voids	long term,	
2.2 Check for overall rust and/or corrosion condition including mounts and accessories	Y			
2.3 Check FAA color marking conditions. Rate condition on scale of 1 to 10 in place of Y/N/NA response, where 10 = best case condition, 5 = fair condition and 1 = worst case condition.	N/A			
2.4 Check for water collection in members and remedy (e.g., unplug drain holes, etc.)	Y			
3. Lighting				
3.1 Check conduit, junction boxes, and fasteners (weather tight and secure)	Y			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Tuckee Tahoe Airport

Cody hunter,Rick Buitrago,Dion Little

GPS Co ordinates Lat/Long N 39 19.141 W 120 08.696

3.2 Check drain and vent openings (verify they are unobstructed and clear as needed)	Y			
3.3 Check wiring condition	Y			
3.4 Check light lenses	Y			
3.5 Check bulb condition	Y			
3.6 Check controllers (verify they are functioning)	Y			
3.6.1 Check flasher	Y			
3.6.2 Check photo control	N/A			
3.6.3 Check alarms if available	N/A			
4. Grounding				
4.1 Check connections	N	Tower is not grounded	recommend tower being ground to prevent equipment failure	
4.2 Check for corrosion	N/A			
4.3 Check lightning protection (secured to structure)	Y			
4.4 Check ground integrity and verify attachment to tower base.	N	Is not attached to any leg	same as above	
4.5 Check grounding of guy points.	N/A			
5. Antennas and Feed Lines				
5.1 Check antenna condition	N/A			
5.2 Check mount and/or ice shield condition (bent, loose, and/or missing members)	N/A			
5.3 Check feed line condition (flanges, seals, dents, grounding, etc)	N/A			
5.4 Check hanger condition (snap-ins, bolt on, kellum grips, etc.)	N/A			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Tuckee Tahoe Airport

Cody hunter,Rick Buitrago,Dion Little

GPS Co ordinates Lat/Long N 39 19.141 W 120 08.696

5.5 Verify they are properly secured to structure	N/A			
5.6 Check for proper feed line drip loop on all cables.	N/A			
6. Other Appurtenances (walkways, platforms, sensors, floodlights, etc.)				
6.1 Check condition	Y			
6.2 Verify they are properly secured to structure	Y			
7. Check Insulator Condition				
7.1 Check for cracking and chipping	N/A			
7.2 Check for cleanliness of insulators	N/A			
7.3 Verify spark gaps are set properly	N/A			
7.4 Check isolation transformer condition	N/A			
7.5 Verify bolts and connection are secure	N/A			
8. Guys				
8.1 Check strand condition (corrosion, breaks, nicks, kinks, etc.)	N/A			
8.2 Check guy hardware Conditions	N/A			
8.2.1 Check turnbuckles or equivalent (secure and safety properly applied)	N/A			
8.2.2 Verify cable thimbles are properly in place (if required)	N/A			
8.2.3 Verify service sleeves are properly in place (if required)	N/A			
8.2.4 Check cable connectors (end fittings)	N/A			
8.2.4.1 Verify cable clamps are applied properly and bolts are tight	N/A			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Tuckee Tahoe Airport

Cody hunter,Rick Buitrago,Dion Little

GPS Co ordinates Lat/Long N 39 19.141 W 120 08.696

8.2.4.2 Verify wire serving is properly applied	N/A			
8.2.4.3 Verify there are no signs of slippage or damaged strands	N/A			
8.2.4.4 Check preformed wraps – properly applied, fully wrapped, and sleeve in place	N/A			
8.2.4.5 Verify poured sockets are secure and showing no separation	N/A			
8.2.4.6 Verify shackles, bolts, pins and cotter pins are secure and in good condition	N/A			
8.3 Measure guy tensions. Record in worksheet Record of Guy Wire Tension, included as a separate tab in this file.	N/A			
8.4 Record temperature, wind speed and wind direction Temperature - _____60_____ Deg. F. Wind Velocity - _____No wind_____ MPH Wind Direction - _____N/A_____				
9. Concrete Foundations				
9.1 Ground condition	N/A	Foundation is covered by asphalt	unable to verify ground condition	
9.1.1 Check for settlement, movement or earth cracks	N/A			
9.1.2 Check for erosion	N/A			
9.1.3 Assess site condition (standing water, drainage, trees, etc.)	N/A			
9.2 Anchorage condition	N/A			
9.2.1 Check nuts and/or nut locking device for tightness and acceptable condition	Y			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Tuckee Tahoe Airport

Cody hunter,Rick Buitrago,Dion Little

GPS Co ordinates Lat/Long N 39 19.141 W 120 08.696

9.2.2 Check grout condition	N/A			
9.2.3 Check anchorages and/or anchor rod condition	N/A			
9.3 Check concrete condition	N/A			
9.3.1 Check for cracking, spalling, or splitting	N/A			
9.3.2 Check for chipped or broken concrete	N/A			
9.3.3 Check for honeycombing	N/A			
9.3.4 Check for low spots to collect moisture	N/A			
10. Guyed Mast Anchors				
10.1 Check for settlement, movement or earth cracks	N/A			
10.2 Check for backfill heaped over concrete for water shedding	N/A			
10.3 Check for anchor rod condition below earth (Maintain required structural capacity of anchor during exploration. Attachment to temporary anchorage may be required)	N/A			
10.4 Check corrosion control measures (galvanizing, coating, concrete encasement, cathodic protection systems, etc.)	N/A			
10.5 Check for anchor heads clear of earth	N/A			
11. Tower Alignment				
11.1 Check tower plumb and twist. Generate report with findings and include with consolidated report. No realignment shall be done without prior approval from ACE-IT.	N	South leg has a twist about half way up.	leg has twist due to the bent legs and angles on the north face	
12. Compound Area				

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Tuckee Tahoe Airport

Cody hunter,Rick Buitrago,Dion Little

GPS Co ordinates Lat/Long N 39 19.141 W 120 08.696

12.1 Check condition of access road and parking area.	Y			
12.2 Check condition of fences and gate(s)	N/A			
12.3 Check compound for excessive underbrush growth, obstructions, debris, etc.	Y			
12.4 Check electrical entrance.	Y			
12.5 Check general site conditions.	Y			
13. Building				
13.1 Check condition of building. (Optional)	Y			
13.2 Check roof of building for damage or deterioration. (Optional)	Y			
13.3 Check security light. (Optional)	N/A			
14. Signage				
14.1 Check for Radiation and ASR signage and notate in additional comments and photograph.	N/A	No RF on tower		

Tower Inspection Report Alder Hill

Summary of work completed

The structural condition of the tower is undetermined since we were unable to climb due to the perceived electrical danger on the tower. However, from the ground level there did not appear to be any structural damage around the base of the tower. As far as the platforms and catwalk, we recommend that they be removed since they are made of wood planks and are in various stages of decay. Removing the decks could also hinder the integrity of the entire structure. From the ground, the entire tower appears to have missing paint and surface rust.

Most of the antennas are incorrectly mounted and without the proper grounding. Some antennas appeared as if they could fall in a good wind or snow storm. These antennas and pipes should be removed immediately as they pose a hazard risk to workers and civilians alike. There are no fences to keep nonessential personnel away from tower. There is no cable management as the lines run are not secured and ran properly down the tower. They are zipped tied together in a huge rat's nest and that makes it difficult to identify one from the next. There are not proper drip loops, allowing water to run down to the shelter. We recommend that all nonessential equipment be identified and removed.

The foliage needs to be removed from underneath and around the tower to about a 25' radius.

There is extensive potential electrical danger with the electricity being run up the tower, around, and down to the shelter. There are exposed splices at two separate locations, where the lines come from the ground to the tower and where the lines leave the tower to the shelter. This has been addressed with Phred Stoner and it is understood that no one will climb the tower until the matter is resolved.

Based on what we have witnessed from the ground and from climbing the other two towers, we believe this tower has reached its lifespan and should be replaced along with the shelter.

Pictures and captions to follow.

Figure 1 Electrical wires from the ground with exposed splices

Figure 2 electrical line runs down to this meter box

Figure 3 Electrical lines with exposed splices leave tower and run down to shelter also the cable mismanagement can be seen

Figure 4 10' section of electrical line spliced between the tower and the shelter

Figure 5 Meter box inside shelter and shelter damage

Figure 6 Antennas and pipes overloading tower

Figure 7 Foliage and undergrowth engulfing tower

Figure 8 View of overall condtion of the grounds and site

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Alder Hill

Inspector Name: Dion Little

GPS Co ordinates Lat/Long N 39deg. 21.141, W 120deg. 11.724

District Owning/Using/Maintaining Tower: Acumen Engineering

	OK? (Y/N/NA)	Deficiencies Found	Preventive Maintenance Performed	Photo number, Located in index
1. Structure Condition				
1.1 Check for damaged members (legs and bracing)	Y	Bottom legs and bracing showed no deficiencies, but do to electrical safety issues we were unable to inspect higher.		
1.2 Check for loose members	N/A	Unable to verify do to electrical issue		
1.3 Check for missing members	Y	From ground level we did not detect any missing members		
1.4 Check for climbing facilities, platforms, catwalks – all secure and functional	N	No safety climb, wood platforms with splits and gaps		
1.5 Check for loose, damaged, corroded and/or missing bolts and/or nut locking devices. Tighten or replace as needed.	N/A	Unable to verify do to electrical issue		
1.6 Check for visible cracks in welded connections	N/A	Unable to verify do to electrical issue		
2. Finish				
2.1 Check overall paint and/or galvanizing condition	N	Paint chipping		
2.2 Check for overall rust and/or corrosion condition including mounts and accessories	N/A	Unable to climb tower to verify condition due to electrical issue.		
2.3 Check FAA color marking conditions. Rate condition on scale of 1 to 10 in place of Y/N/NA response, where 10 = best case condition, 5 = fair condition and 1 = worst case condition.	N/A			
2.4 Check for water collection in members and remedy (e.g., unplug drain holes, etc.)	N/A			
3. Lighting				
3.1 Check conduit, junction boxes, and fasteners (weather tight and secure)	N/A			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Alder Hill

Inspector Name: Dion Little

GPS Co ordinates Lat/Long N 39deg. 21.141, W 120deg. 11.724

3.2 Check drain and vent openings (verify they are unobstructed and clear as needed)	N/A			
3.3 Check wiring condition	N/A			
3.4 Check light lenses	N/A			
3.5 Check bulb condition	N/A			
3.6 Check controllers (verify they are functioning)	N/A			
3.6.1 Check flasher	N/A			
3.6.2 Check photo control	N/A			
3.6.3 Check alarms if available	N/A			
4. Grounding				
4.1 Check connections	N	Ground bolted to tower	We recommend cad welding ground to tower legs	
4.2 Check for corrosion	N	Some corrosion on bolts attaching ground	Same as above	
4.3 Check lightning protection (secured to structure)	N/A	Unable to verify from ground level		
4.4 Check ground integrity and verify attachment to tower base.	N/A	Unable to determine		
4.5 Check grounding of guy points.	N/A			
5. Antennas and Feed Lines				
5.1 Check antenna condition	N/A	Unable to determine from ground level		
5.2 Check mount and/or ice shield condition (bent, loose, and/or missing members)	N/A			
5.3 Check feed line condition (flanges, seals, dents, jacket damage, grounding, etc.)	N /A	Unable to determine from ground level		
5.4 Check hanger condition (snap-ins, bolt on, kellum grips, etc.)	N	Most lines are zip tied to tower leg	Better cable management	

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Alder Hill

Inspector Name: Dion Little

GPS Co ordinates Lat/Long N 39deg. 21.141, W 120deg. 11.724

5.5 Verify they are properly secured to structure	N	The lines are twisted and interspersed, no way to track from origin to destination		
5.6 Check for proper feed line drip loop on all cables.	N	Not all cables have proper drip loops		
6. Other Appurtenances (walkways, platforms, sensors, floodlights, etc.)				
6.1 Check condition	N	From ground platforms appear split with gaps and are made of wood	Replace with metal grating	
6.2 Verify they are properly secured to structure	N/A	Unable to determine from ground		
7. Check Insulator Condition				
7.1 Check for cracking and chipping	Y	Only able to see insulators near data shack		
7.2 Check for cleanliness of insulators	Y			
7.3 Verify spark gaps are set properly	N/A	Unable to determine		
7.4 Check isolation transformer condition	N/A			
7.5 Verify bolts and connection are secure	N/A			
8. Guys				
8.1 Check strand condition (corrosion, breaks, nicks, kinks, etc.)	N/A			
8.2 Check guy hardware Conditions	N/A			
8.2.1 Check turnbuckles or equivalent (secure and safety properly applied)	N/A			
8.2.2 Verify cable thimbles are properly in place (if required)	N/A			
8.2.3 Verify service sleeves are properly in place (if required)	N/A			
8.2.4 Check cable connectors (end fittings)	N/A			
8.2.4.1 Verify cable clamps are applied properly and bolts are tight	N/A			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Alder Hill

Inspector Name: Dion Little

GPS Co ordinates Lat/Long N 39deg. 21.141, W 120deg. 11.724

8.2.4.2 Verify wire serving is properly applied	N/A			
8.2.4.3 Verify there are no signs of slippage or damaged strands	N/A			
8.2.4.4 Check preformed wraps – properly applied, fully wrapped, and sleeve in place	N/A			
8.2.4.5 Verify poured sockets are secure and showing no separation	N/A			
8.2.4.6 Verify shackles, bolts, pins and cotter pins are secure and in good condition	N/A			
8.3 Measure guy tensions. Record in worksheet Record of Guy Wire Tension, included as a separate tab in this file.	N/A			
8.4 Record temperature, wind speed and wind direction Temperature - 65 Deg. F. Wind Velocity - 5 MPH Wind Direction - N/A				
9. Concrete Foundations				
9.1 Ground condition	N/A	Legs anchored into the ground		
9.1.1 Check for settlement, movement or earth cracks	N/A			
9.1.2 Check for erosion	N/A			
9.1.3 Assess site condition (standing water, drainage, trees, etc.)	N	Shrubs growing around and up through the first 8-10 ft of the tower.		
9.2 Anchorage condition	N/A			
9.2.1 Check nuts and/or nut locking device for tightness and acceptable condition	N/A			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Alder Hill

Inspector Name: Dion Little

GPS Co ordinates Lat/Long N 39deg. 21.141, W 120deg. 11.724

9.2.2 Check grout condition	N/A			
9.2.3 Check anchorages and/or anchor rod condition	N/A			
9.3 Check concrete condition	N/A			
9.3.1 Check for cracking, spalling, or splitting	N/A			
9.3.2 Check for chipped or broken concrete	N/A			
9.3.3 Check for honeycombing	N/A			
9.3.4 Check for low spots to collect moisture	N/A			
10. Guyed Mast Anchors				
10.1 Check for settlement, movement or earth cracks	N/A			
10.2 Check for backfill heaped over concrete for water shedding	N/A			
10.3 Check for anchor rod condition below earth (Maintain required structural capacity of anchor during exploration. Attachment to temporary anchorage may be required)	N/A			
10.4 Check corrosion control measures (galvanizing, coating, concrete encasement, cathodic protection systems, etc.)	N/A			
10.5 Check for anchor heads clear of earth	N/A			
11. Tower Alignment				
11.1 Check tower plumb and twist. Generate report with findings and include with consolidated report. No realignment shall be done without prior approval from ACE-IT.	Y	Visually inspected for twists of each leg		
12. Compound Area				

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Alder Hill

Inspector Name: Dion Little

GPS Co ordinates Lat/Long N 39deg. 21.141, W 120deg. 11.724

12.1 Check condition of access road and parking area.	N/A	Remote access, steep and rocky access to tower		
12.2 Check condition of fences and gate(s)	N/A			
12.3 Check compound for excessive underbrush growth, obstructions, debris, etc.	N	Excessive underbrush obstructs full access to the tower		
12.4 Check electrical entrance.	Y			
12.5 Check general site conditions.	N		Underbrush removal and gravel would make site safer and more accessible	
13. Building				
13.1 Check condition of building. (Optional)	N	Older building could be better insulated from outside conditions.		
13.2 Check roof of building for damage or deterioration. (Optional)	N	Building is a little beat up with dents etc.		
13.3 Check security light. (Optional)	N/A			
14. Signage				
14.1 Check for Radiation and ASR signage and notate in additional comments and photograph.	N	No signage was found for the site	Add some signs	

Tower Inspection Report for Dry Lake

Summary of work completed

Structure condition. Several bent and twisted members all around the tower and one missing horizontal member on the South face. These faults compromise the structural integrity of the tower. We recommend that they are replaced or fixed. Several missing bolts on the North leg about midway up the tower. The overall tower alignment, however, was good. The ladder doesn't have a safety climb, therefore, we recommend installing a 3/8" aircraft cable for climbing safety. There is chipped paint and surface rust on tower. We recommend removing rust and repainting to FAA standards.

Lighting was inspected and it all appeared to be in good condition.

Grounding on tower legs had one ground lug. We recommend replacing with cad weld to better protect the equipment on the tower.

All antenna and feed lines are all properly mounted and secured to the tower with proper drip loops and dressing down the tower.

The Foundation has minor cracks that can be exposed to further damage during the winter months. We recommend sealing with grout to prevent further damage. Other than that it appears to be in good condition.

The proper signs are not posted on the tower. Recommend putting some up.

The power lines are run directly to the tower. We recommend building an A frame and running the power to that so the lines are not run directly to the tower.

Pictures will follow with proper notation.

Figure 1 Bent diagonal member

Figure 2 Horizontal member supporting decking is bent on South side

Figure 3 Bent Horizontal member

Figure 4 Missing horizontal member on South side

Figure 5 Missing bolts on both sides of this leg

Figure 6 Bent member

Figure 7 Recommend Cad weld for grounding tower

Figure 8 Recommend running power to an A frame box so not directly on tower

Figure 9 Fill with grout to prevent further cracking and damage

Figure 10 Tower at upper railing 58'

Figure 11 Dry Lake Tower

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Dry lake

Inspector Name: Cody Hunter, Rick Buitrago, Dion Little

GPS Co ordinates Lat/Long N 39 19.247 W 120 06.232

District Owning/Using/Maintaining Tower: Acumen Engineering

	OK? (Y/N/NA)	Deficiencies Found	Maintenance Required	Photo number, Located in index
1. Structure Condition				
1.1 Check for damaged members (legs and bracing)	N	Several bent/twisted members	Short term, Repalce old members with new ones	
1.2 Check for loose members	Y			
1.3 Check for missing members	N	One missing member	Add new member	
1.4 Check for climbing facilities, platforms, catwalks – all secure and functional	Y			
1.5 Check for loose, damaged, corroded and/or missing bolts and/or nut locking devices. Tighten or replace as needed.	N	2 missing bolts on north leg	Add new bolts	
1.6 Check for visible cracks in welded connections	Y			
2. Finish				
2.1 Check overall paint and/or galvanizing condition	N	Cracked and missing paint	Long term, pai nt when possible	
2.2 Check for overall rust and/or corrosion condition including mounts and accessories	Y	But some minor spots of surface rust	Fix before you paint	
2.3 Check FAA color marking conditions. Rate condition on scale of 1 to 10 in place of Y/N/NA response, where 10 = best case condition, 5 = fair condition and 1 = worst case condition.				
2.4 Check for water collection in members and remedy (e.g., unplug drain holes, etc.)	Y			
3. Lighting				
3.1 Check conduit, junction boxes, and fasteners (weather tight and secure)	Y			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Dry lake

Inspector Name: Cody Hunter, Rick Buitrago, Dion Little

GPS Co ordinates Lat/Long N 39 19.247 W 120 06.232

3.2 Check drain and vent openings (verify they are unobstructed and clear as needed)	Y			
3.3 Check wiring condition	Y			
3.4 Check light lenses	Y			
3.5 Check bulb condition	Y			
3.6 Check controllers (verify they are functioning)	Y			
3.6.1 Check flasher	Y			
3.6.2 Check photo control	N/A			
3.6.3 Check alarms if available	N/A			
4. Grounding				
4.1 Check connections	N	Only one ground lug	Recommend using a caldweld	
4.2 Check for corrosion	Y			
4.3 Check lightning protection (secured to structure)	Y			
4.4 Check ground integrity and verify attachment to tower base.	Y			
4.5 Check grounding of guy points.	N/A			
5. Antennas and Feed Lines				
5.1 Check antenna condition	Y			
5.2 Check mount and/or ice shield condition (bent, loose, and/or missing members)	Y			
5.3 Check feed line condition (flanges, seals, dents, jacket damage, grounding, etc.)	Y			
5.4 Check hanger condition (snap-ins, bolt on, kellum grips, etc.)	Y			

Radio Tower Inspection and Maintenance Checklist

Date(s) of Inspection: 9/4/2013

Inspector Company: Day Wireless Systems

Site Name/Location: Dry lake

Inspector Name: Cody Hunter, Rick Buitrago, Dion Little

GPS Co ordinates Lat/Long N 39 19.247 W 120 06.232

5.5 Verify they are properly secured to structure	Y			
5.6 Check for proper feed line drip loop on all cables.	Y			
6. Other Appurtenances (walkways, platforms, sensors, floodlights, etc.)				
6.1 Check condition	Y			
6.2 Verify they are properly secured to structure	Y			
7. Check Insulator Condition				
7.1 Check for cracking and chipping	N/A			
7.2 Check for cleanliness of insulators	N/A			
7.3 Verify spark gaps are set properly	N/A			
7.4 Check isolation transformer condition	N/A			
7.5 Verify bolts and connection are secure	N/A			
8. Guys				
8.1 Check strand condition (corrosion, breaks, nicks, kinks, etc.)	N/A			
8.2 Check guy hardware Conditions	N/A			
8.2.1 Check turnbuckles or equivalent (secure and safety properly applied)	N/A			
8.2.2 Verify cable thimbles are properly in place (if required)	N/A			
8.2.3 Verify service sleeves are properly in place (if required)	N/A			
8.2.4 Check cable connectors (end fittings)	N/A			
8.2.4.1 Verify cable clamps are applied properly and bolts are tight	N/A			

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8.2.4.2 Verify wire serving is properly applied	N/A			
8.2.4.3 Verify there are no signs of slippage or damaged strands	N/A			
8.2.4.4 Check preformed wraps – properly applied, fully wrapped, and sleeve in place	N/A			
8.2.4.5 Verify poured sockets are secure and showing no separation	N/A			
8.2.4.6 Verify shackles, bolts, pins and cotter pins are secure and in good condition	N/A			
8.3 Measure guy tensions. Record in worksheet Record of Guy Wire Tension, included as a separate tab in this file.	N/A			
8.4 Record temperature, wind speed and wind direction Temperature - ___60_____ Deg. F. Wind Velocity - _____NO WIND_____ MPH Wind Direction - _____N/A_____				
9. Concrete Foundations				
9.1 Ground condition	Y			
9.1.1 Check for settlement, movement or earth cracks	Y			
9.1.2 Check for erosion	Y			
9.1.3 Assess site condition (standing water, drainage, trees, etc.)	Y			
9.2 Anchorage condition	Y			
9.2.1 Check nuts and/or nut locking device for tightness and acceptable condition	N/A			

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9.2.2 Check grout condition	N/A			
9.2.3 Check anchorages and/or anchor rod condition	N/A			
9.3 Check concrete condition	Y			
9.3.1 Check for cracking, spalling, or splitting	Y			
9.3.2 Check for chipped or broken concrete	Y	But some minor cracks	long term, fill when possible	
9.3.3 Check for honeycombing	Y			
9.3.4 Check for low spots to collect moisture	Y			
10. Guyed Mast Anchors				
10.1 Check for settlement, movement or earth cracks	N/A			
10.2 Check for backfill heaped over concrete for water shedding	N/A			
10.3 Check for anchor rod condition below earth (Maintain required structural capacity of anchor during exploration. Attachment to temporary anchorage may be required)	N/A			
10.4 Check corrosion control measures (galvanizing, coating, concrete encasement, cathodic protection systems, etc.)	N/A			
10.5 Check for anchor heads clear of earth	N/A			
11. Tower Alignment				
11.1 Check tower plumb and twist. Generate report with findings and include with consolidated report. No realignment shall be done without prior approval from ACE-IT.	Y			
12. Compound Area				

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12.1 Check condition of access road and parking area.	Y			
12.2 Check condition of fences and gate(s)	N/A			
12.3 Check compound for excessive underbrush growth, obstructions, debris, etc.	Y			
12.4 Check electrical entrance.	Y			
12.5 Check general site conditions.	Y			
13. Building				
13.1 Check condition of building. (Optional)	N/A			
13.2 Check roof of building for damage or deterioration. (Optional)	N/A			
13.3 Check security light. (Optional)	N/A			
14. Signage				
14.1 Check for Radiation and ASR signage and notate in additional comments and photograph.	N	No signage	long term post nessary signs	