

From: John Rowe [<mailto:jrowe@buellconsulting.com>]
Sent: Wednesday, July 09, 2014 1:30 AM
To: Fisher Vicki
Cc: Lacock Fletcher

Subject: Coverage graphs from 2 existing towers vs. the graph from the proposed location.

Coverage graphs were developed from two existing tower locations about two miles to the south of the proposed location. The first tower was a 500' broadcasting tower owned by Haugo Broadcasting tower located at Latitude: 44-01-19 N, Longitude: 103-15-37 W (Alt#1). The second was a 180' self-support tower located at a City Fire Station & occupied by AT&T at Latitude: 44-01-34.9 N, Longitude: 103-15-06.7 W.

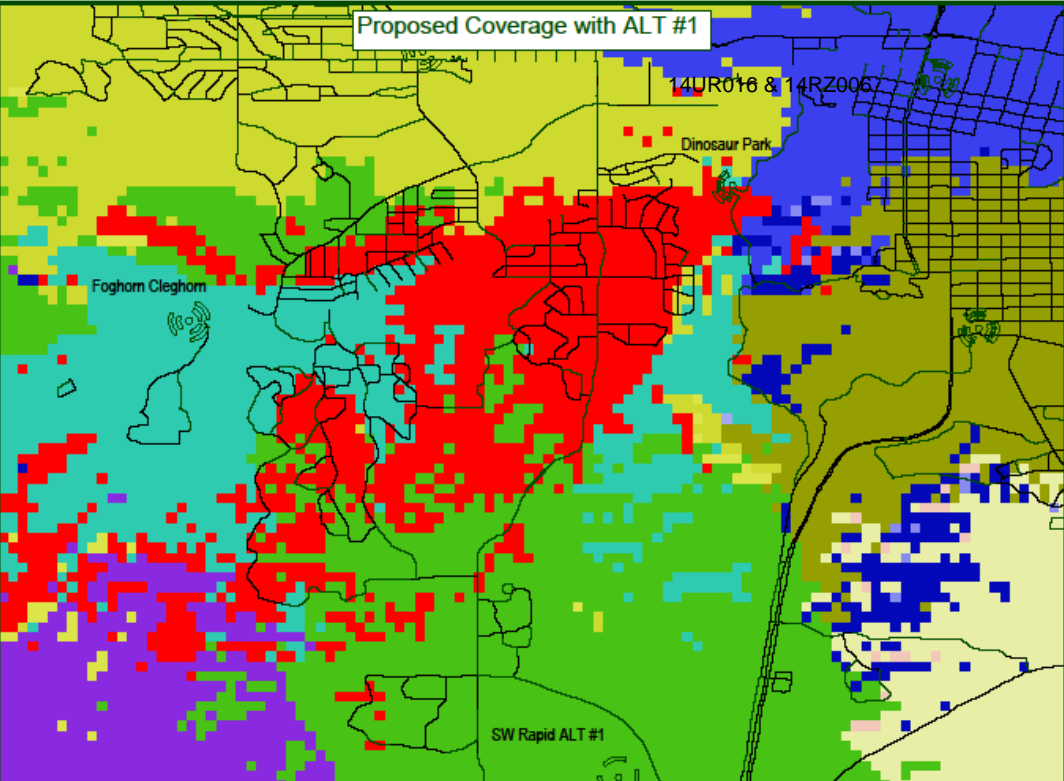
The attached plots for Alt #1 & Alt #2 demonstrate that neither of these sites are a viable option to properly offload traffic from the existing Dinosaur Park site, as they do not provide the offsetting coverage to the neighborhoods that Verizon Wireless needs to cover in the vicinity of the proposed site.

As the number of users on the Verizon Wireless 4G LTE system increases and are downloading increasing volumes of data, the need for capacity offload of existing sites will remain and those sites will remain overloaded, reducing speeds of data transfer below commercially acceptable levels.

Meanwhile, the graph of the proposed new site demonstrates effective offload of the Dinosaur Park site.

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Proposed Coverage with ALT #1



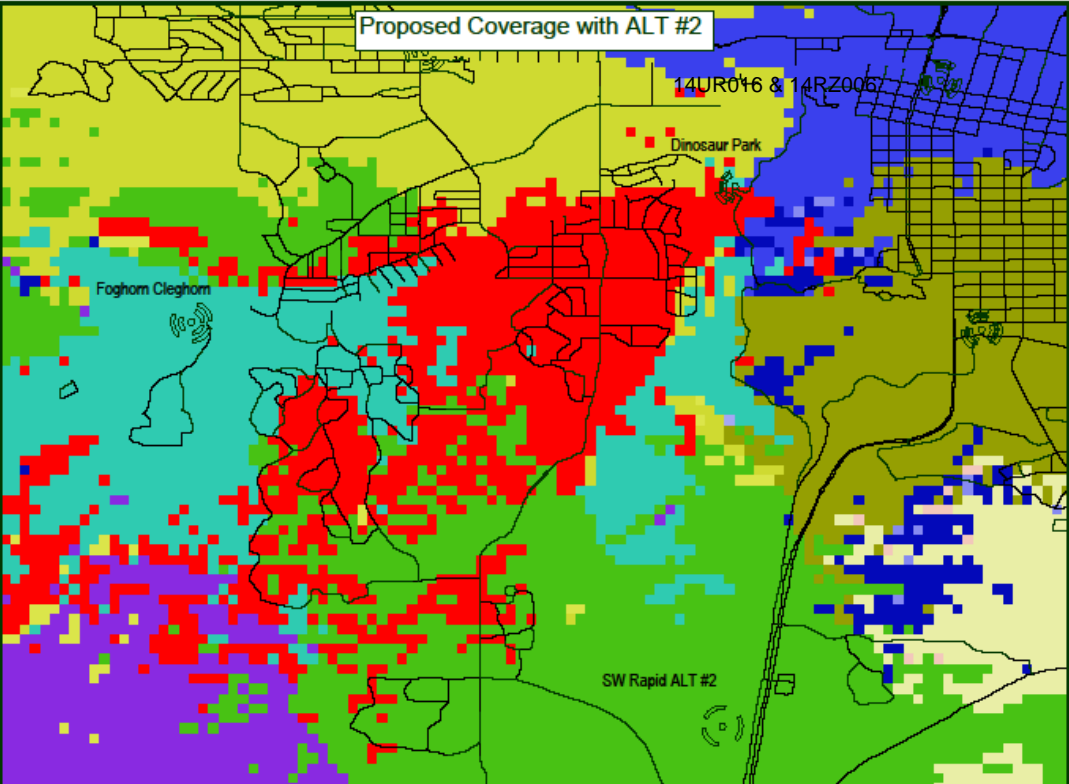
14UR016 & 14RZ006

Dinosaur Park

Foghorn Cleghorn

SW Rapid ALT #1

Proposed Coverage with ALT #2



14UR016 & 14RZ006

Dinosaur Park

Foghorn Cleghorn

SW Rapid ALT #2

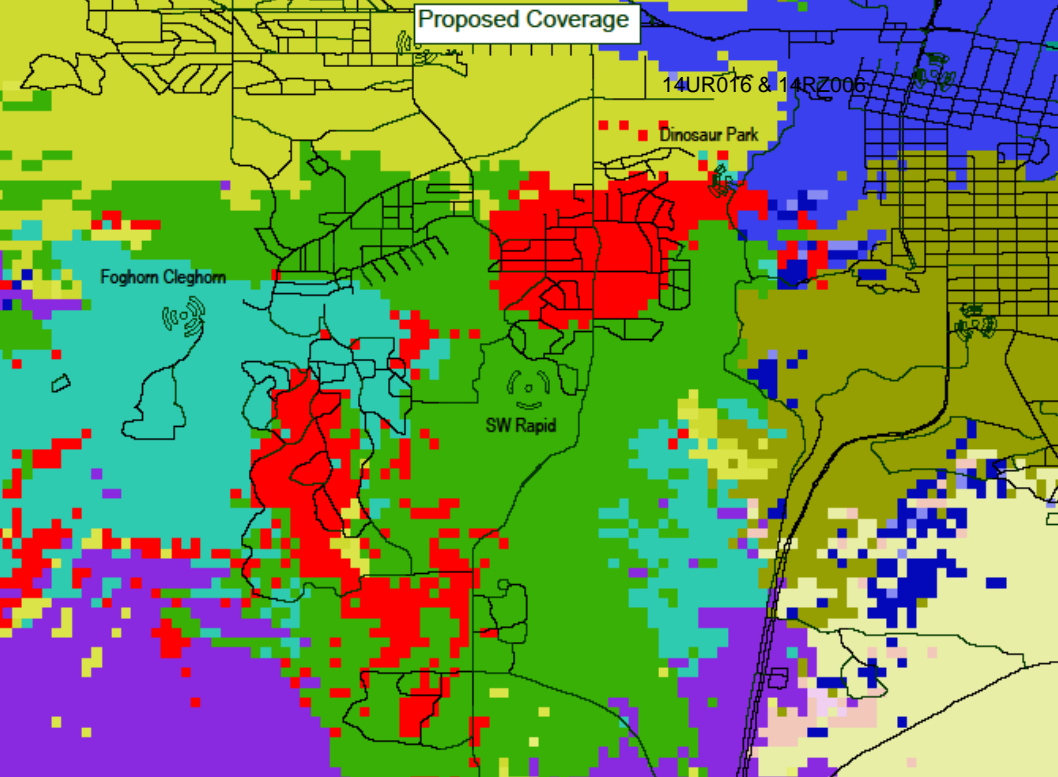
Proposed Coverage

14UR016 & 14RZ006

Dinosaur Park

Foghorn Cleghorn

SW Rapid



From: John Rowe [<mailto:jrowe@buellconsulting.com>]
Sent: Wednesday, July 09, 2014 1:11 AM
To: Fisher Vicki
Cc: Lacock Fletcher
Subject: RE: Verizon Wireless- More RF Data concerning Demand on the Dinosaur Park site

Verizon Wireless has seen an explosive increase in demand for 4G LTE services since the initial launch of the service. This increase has put a strain on the existing macro cellular network. The attached graphics demonstrate the increased demand, first, across South Dakota, then on the Dinosaur Park site.

The objective for the proposed site in SW Rapid City is 2-fold; to offload traffic from Dinosaur Park & the Foghorn Cleghorn site and then to provide needed capacity to handle the growth of demand on the system for the SW Rapid City area. Placing the new 3 sector site in the middle of the valley will provide needed capacity to serve customer growth and growth in usage more effectively than the existing single sector can off the Dinosaur Park site or any other single sector could from another direction.

Figure 1 demonstrates the increase in volume of data downloaded since the 1st of the year thru June 30th. There has been more than a 50% increase in downloaded data over the last six months. No current models suggest this trend will slow down or reverse in the foreseeable future.

Figure 2 graphs the growth of the peak number of connected users in South Dakota during the same time frame. The trend is similar, increasing almost 50% in six months.

More people are using wireless services and per user they downloading more data than in the past.

Figure 3 demonstrates the increase in volume of data downloaded since the 1st of the year thru June 30th just from the Dinosaur Park site. The increase in downloaded data over the same time period is 75%, 50% more than the State average.

Figure 4, like Figure 2, graphs the peak number of connected users, however just for the Dinosaur Park site. Again, the trend indicates the number of users connecting to the site at Dinosaur Park is growing twice as fast as the state-wide trend, since the peak number of users doubled in less than six months.

Page 5 is a coverage plot of existing Verizon Wireless cell sites that geographically displays what areas are covered by certain sites in the network system. The proposed site location is identified but its impact displayed on the next page. Please note that the proposed site is intended not only to relieve Dinosaur Park's coverage (in red) but the area covered by the Foghorn Cleghorn site (in teal), as well.

Page 6 demonstrates how the coverage to be provided by the SW Rapid City site (in green) takes over areas now being served by Dinosaur Park. This is the main objective of the site being proposed. Though it is not as substantial, the proposed site will have a similar affect

to relieve existing demanded capacity on the Foghorn Cleghorn site. This offloading improves the customers' experience, where throughput speeds are struggling to keep up with customer satisfaction requirements.

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Figure 1

14UR016 & 14RZ006

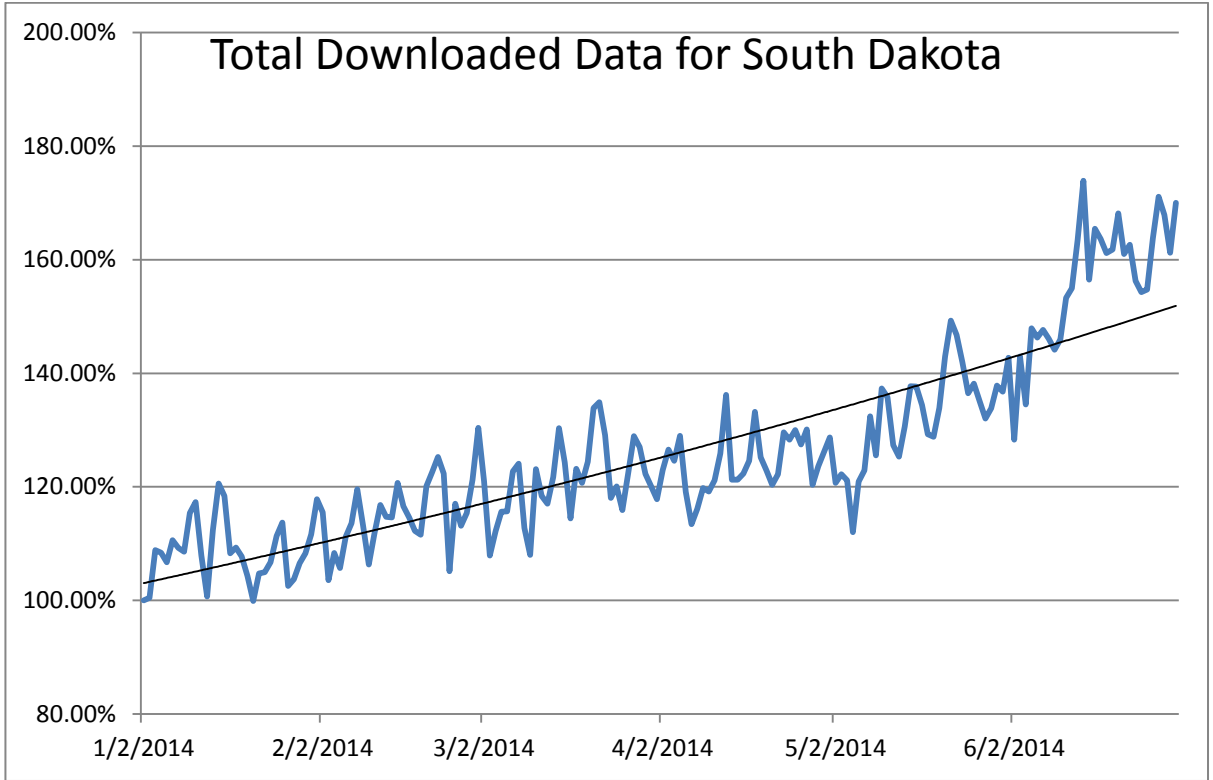


Figure 2

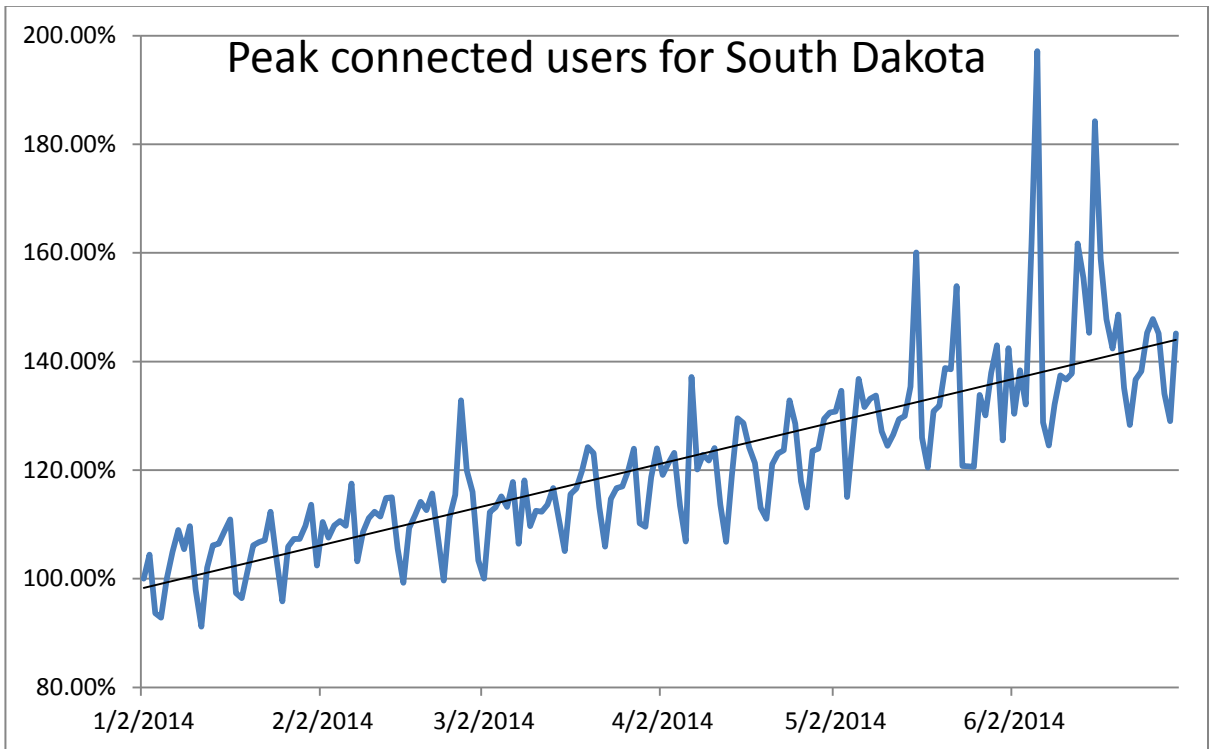


Figure 3

14UR016 & 14RZ006

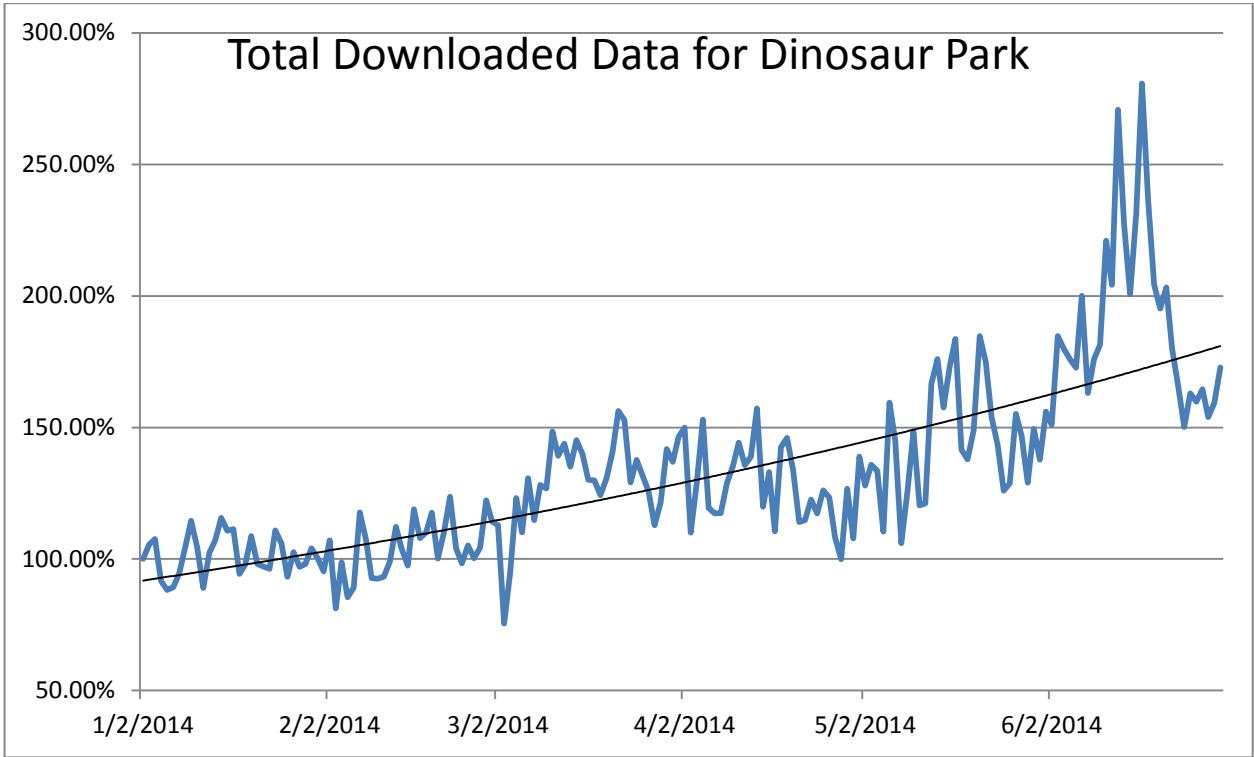
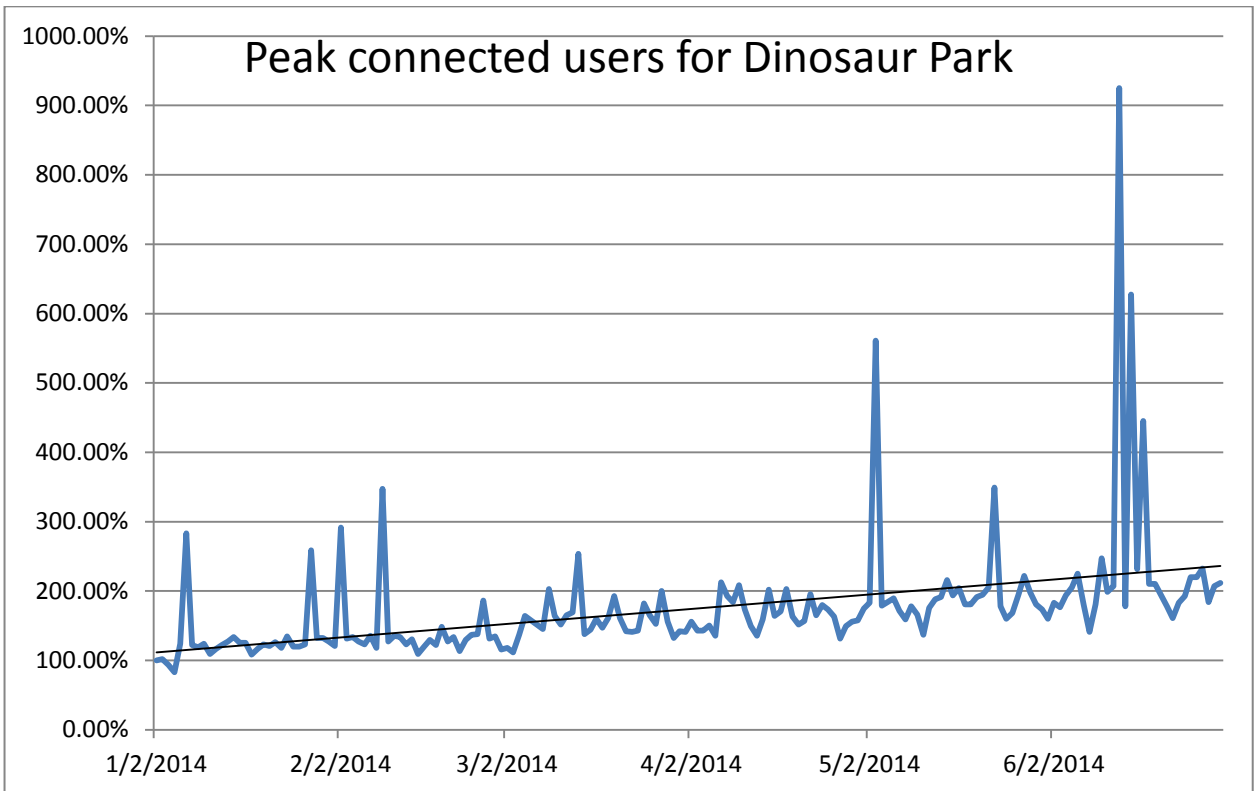


Figure 4



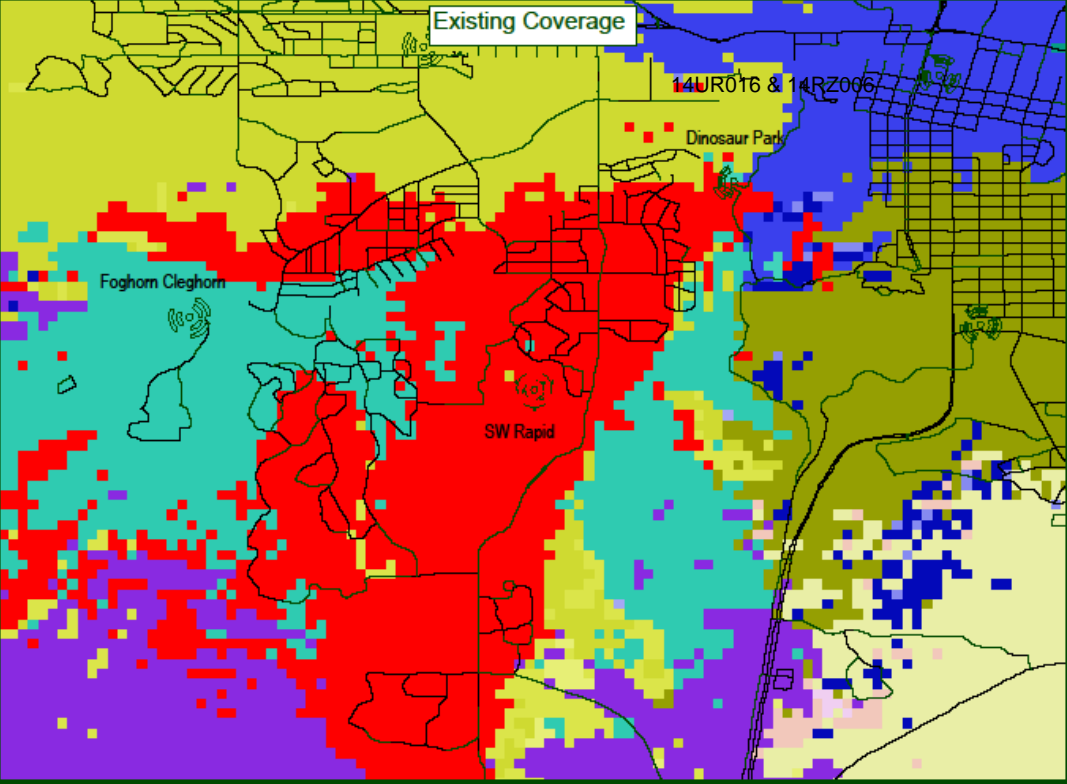
Existing Coverage

14UR016 & 14RZ006

Dinosaur Park

Foghorn Cleghorn

SW Rapid



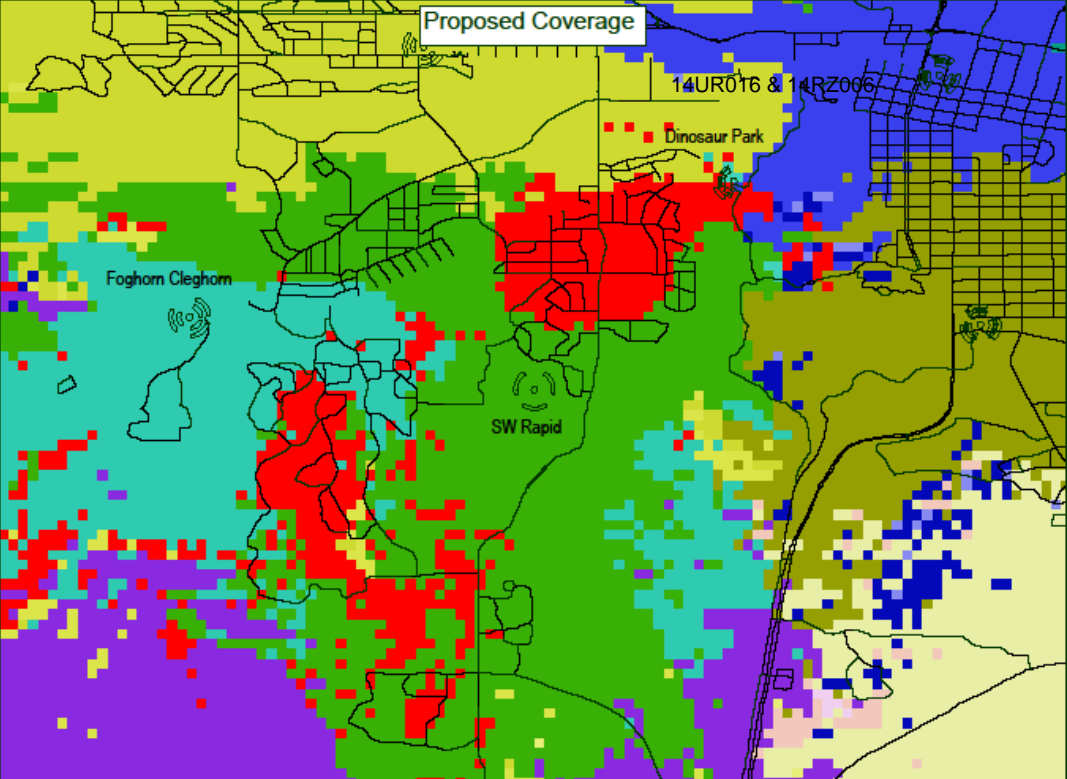
Proposed Coverage

14UR016 & 14RZ066

Dinosaur Park

Foghorn Cleghorn

SW Rapid





Verizon - Cell Tower

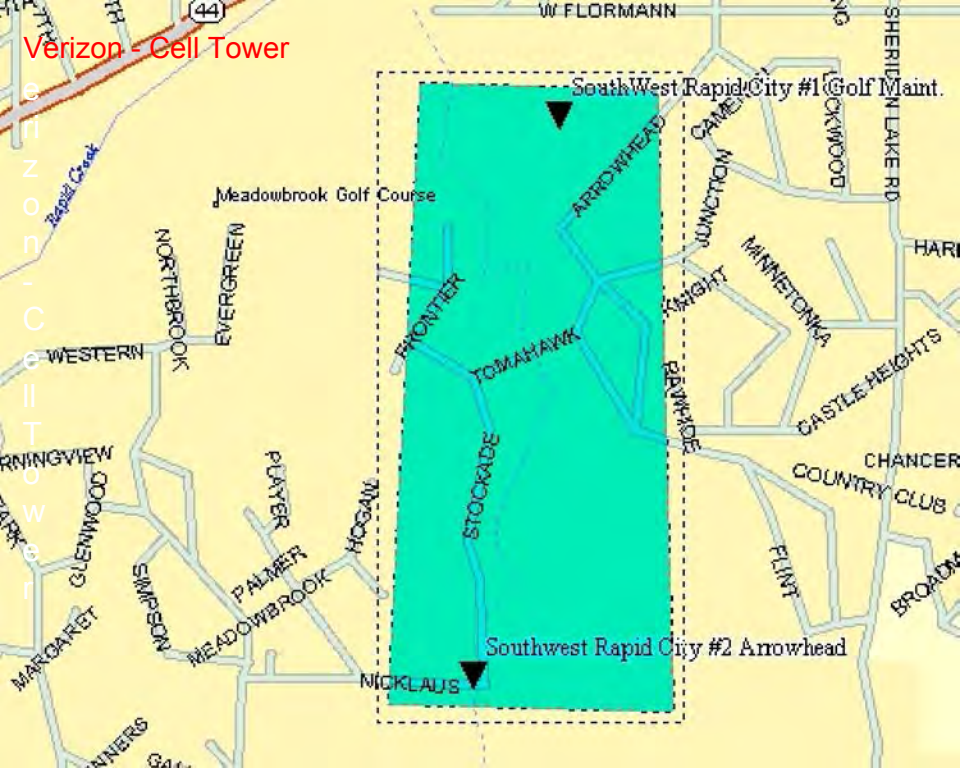


Figure 3 Verizon Cell Tower

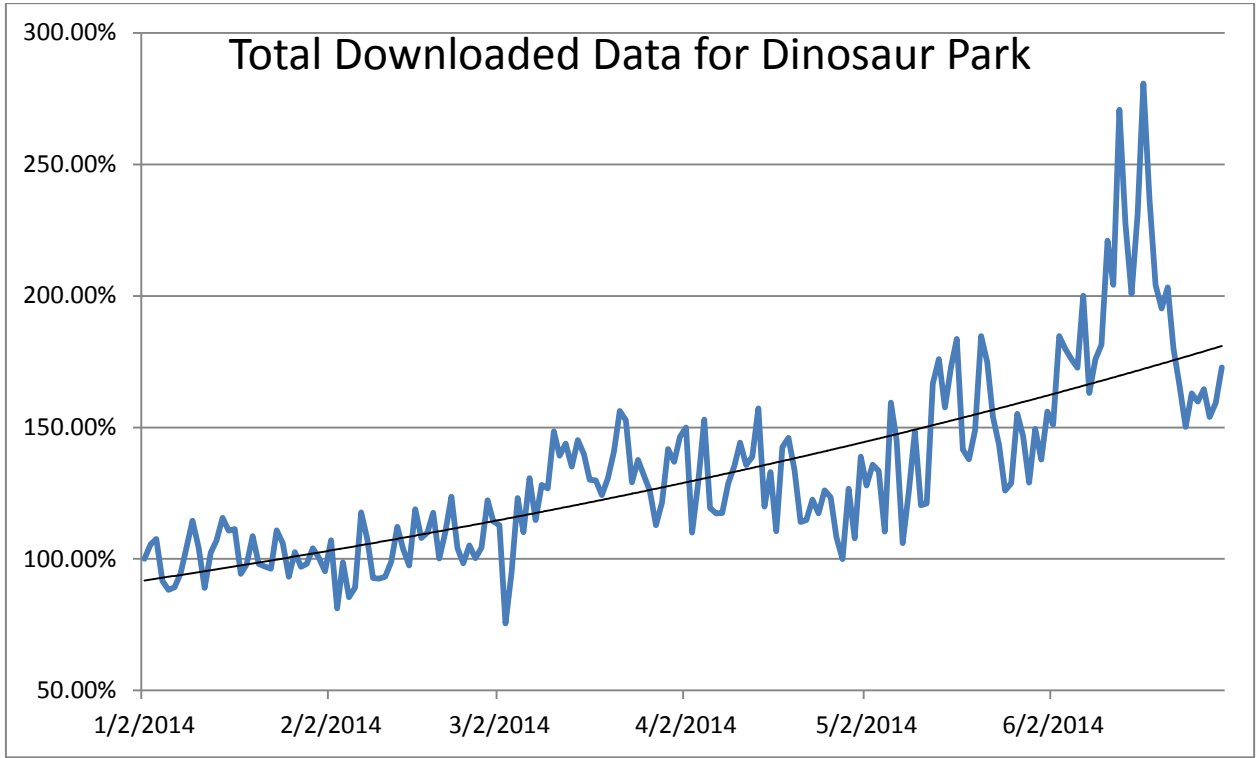
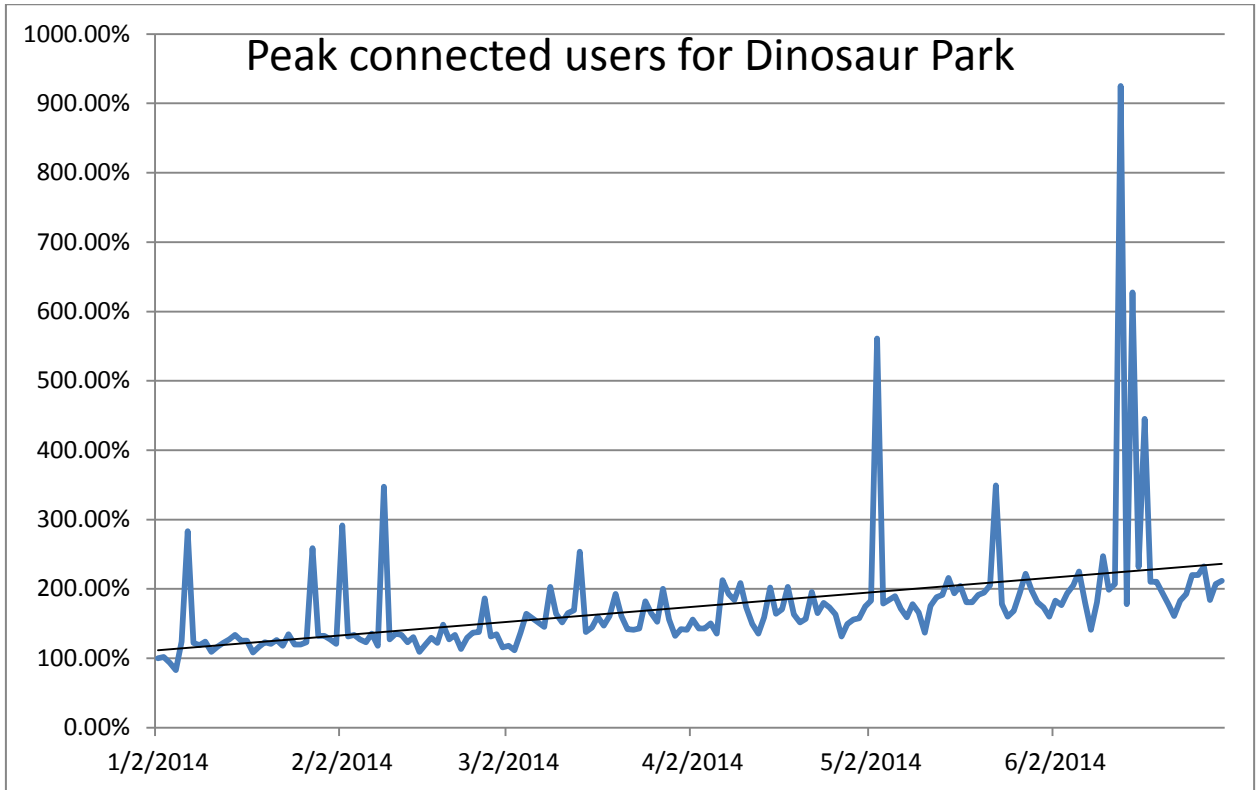
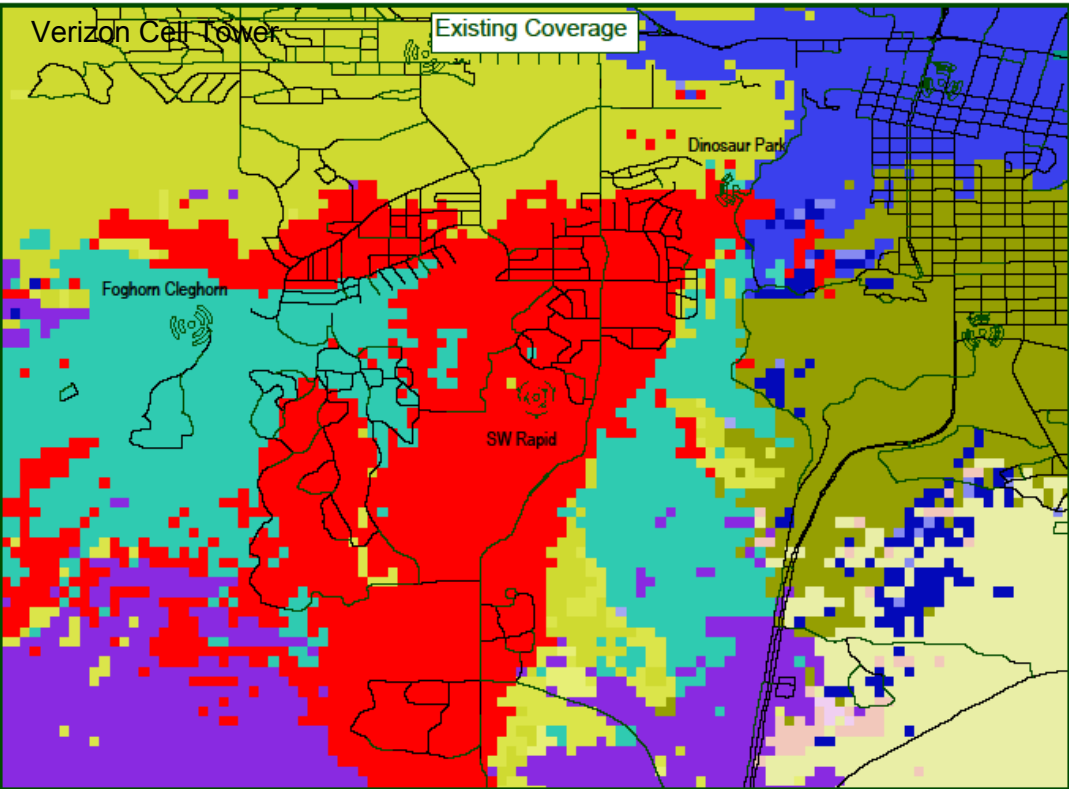


Figure 4



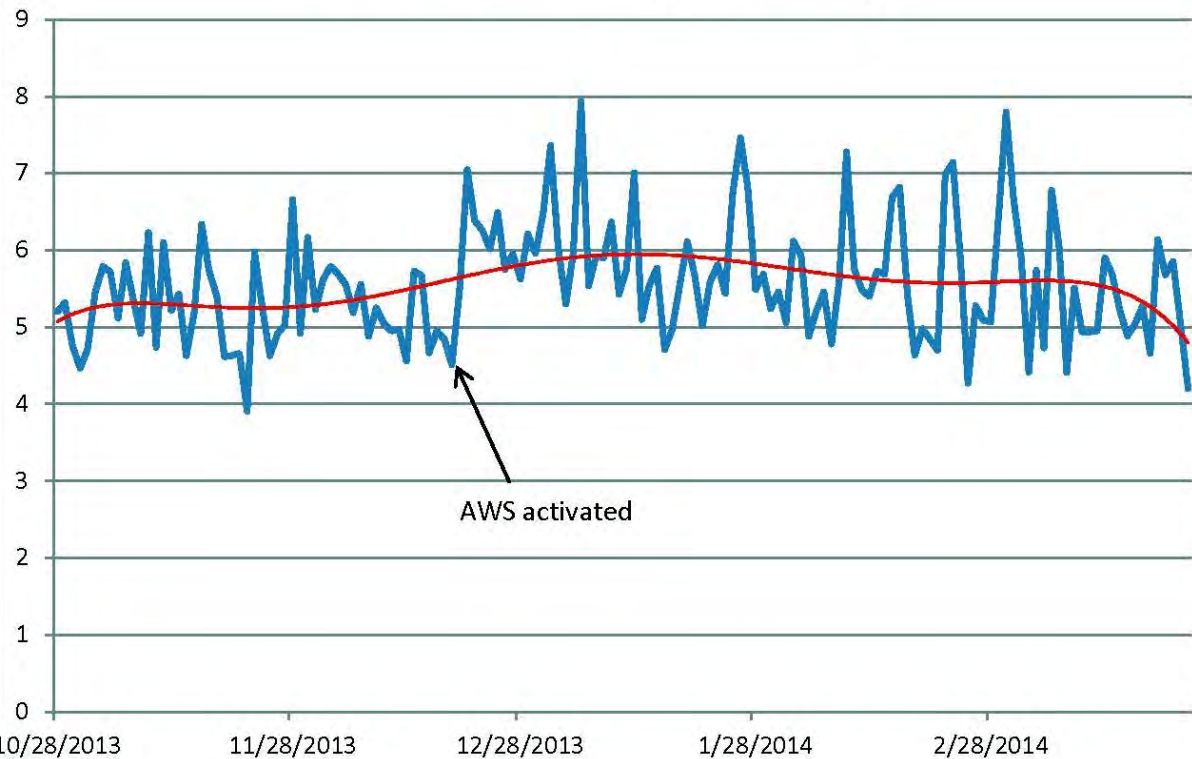
Verizon Cell Tower

Existing Coverage



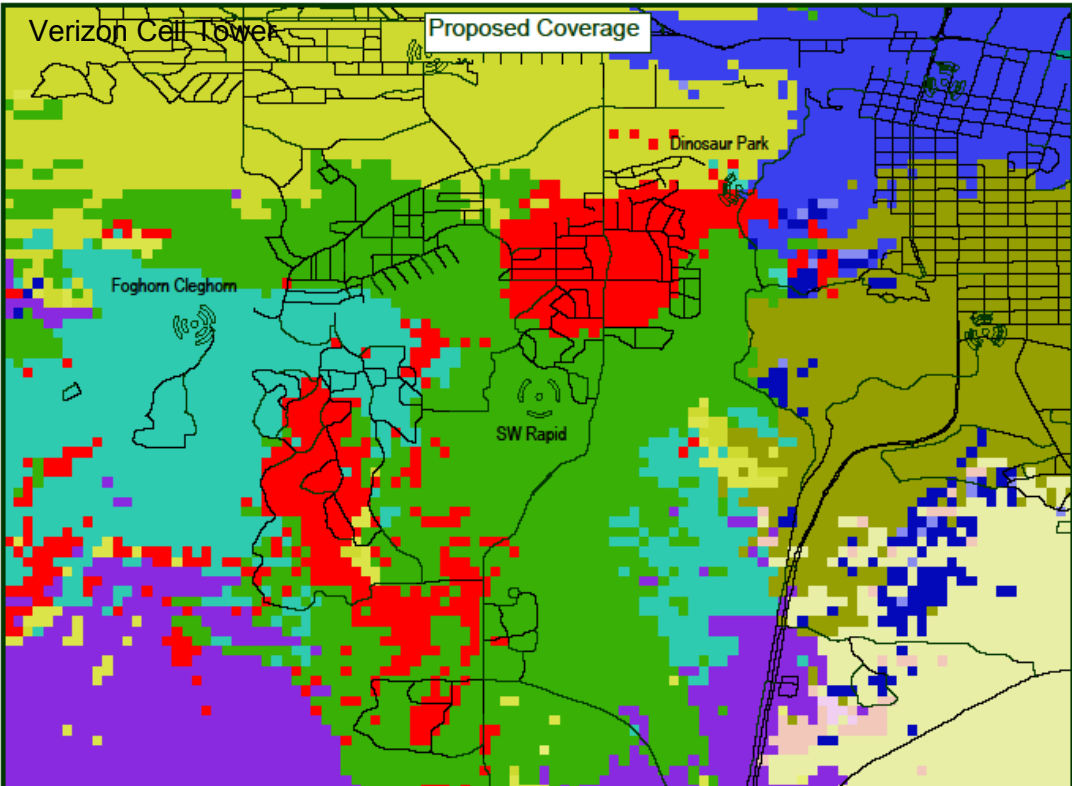
Verizon Cell Tower

Downlink Throughput in Mbps



Verizon Cell Tower

Proposed Coverage

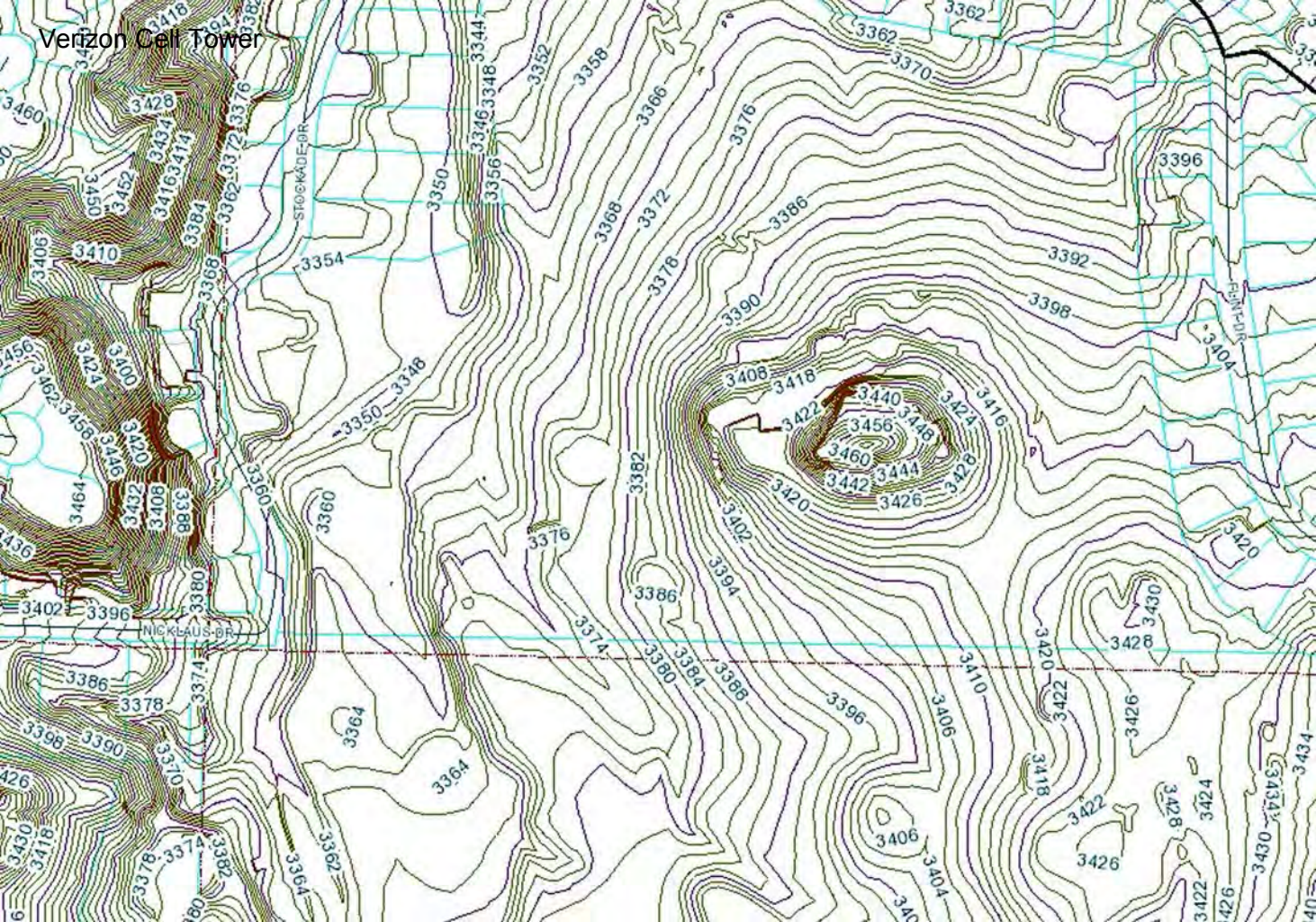


Foghorn Cleghorn

Dinosaur Park

SW Rapid

Verizon Cell Tower



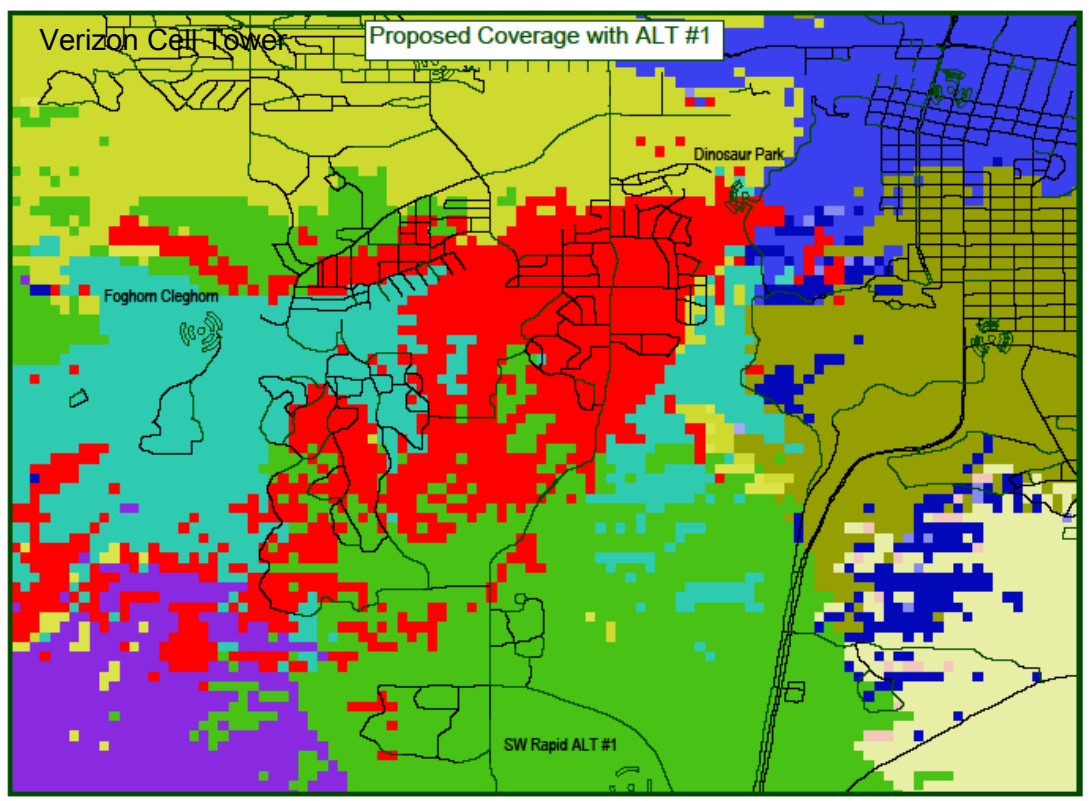
Verizon Cell Tower

Proposed Coverage with ALT #1

Dinosaur Park

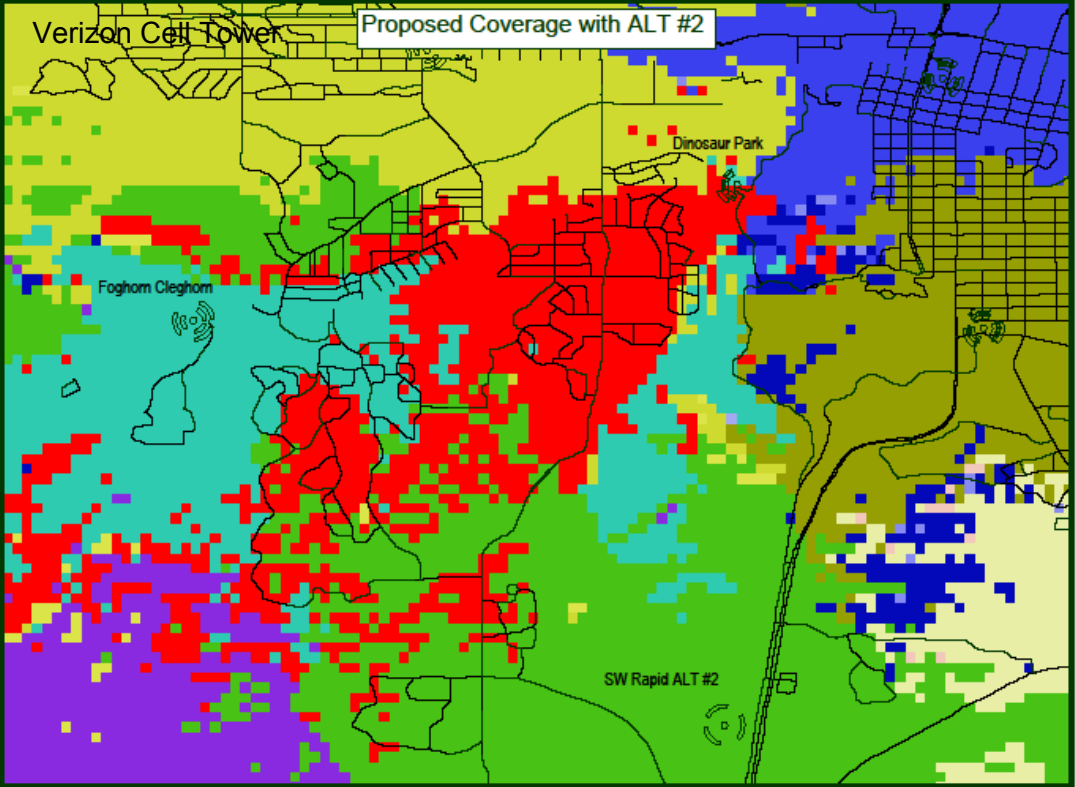
Foghorn Cleghorn

SW Rapid ALT #1



Verizon Cell Tower

Proposed Coverage with ALT #2



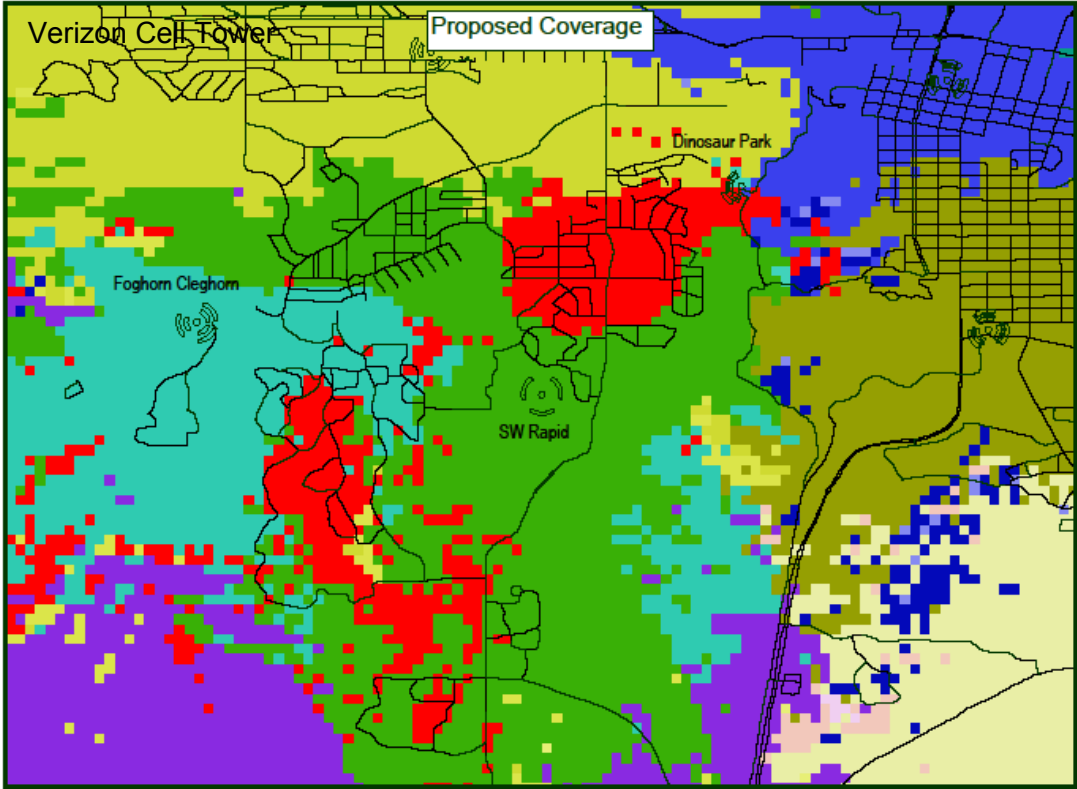
Foghorn Cleghorn

Dinosaur Park


SW Rapid ALT #2

Verizon Cell Tower

Proposed Coverage

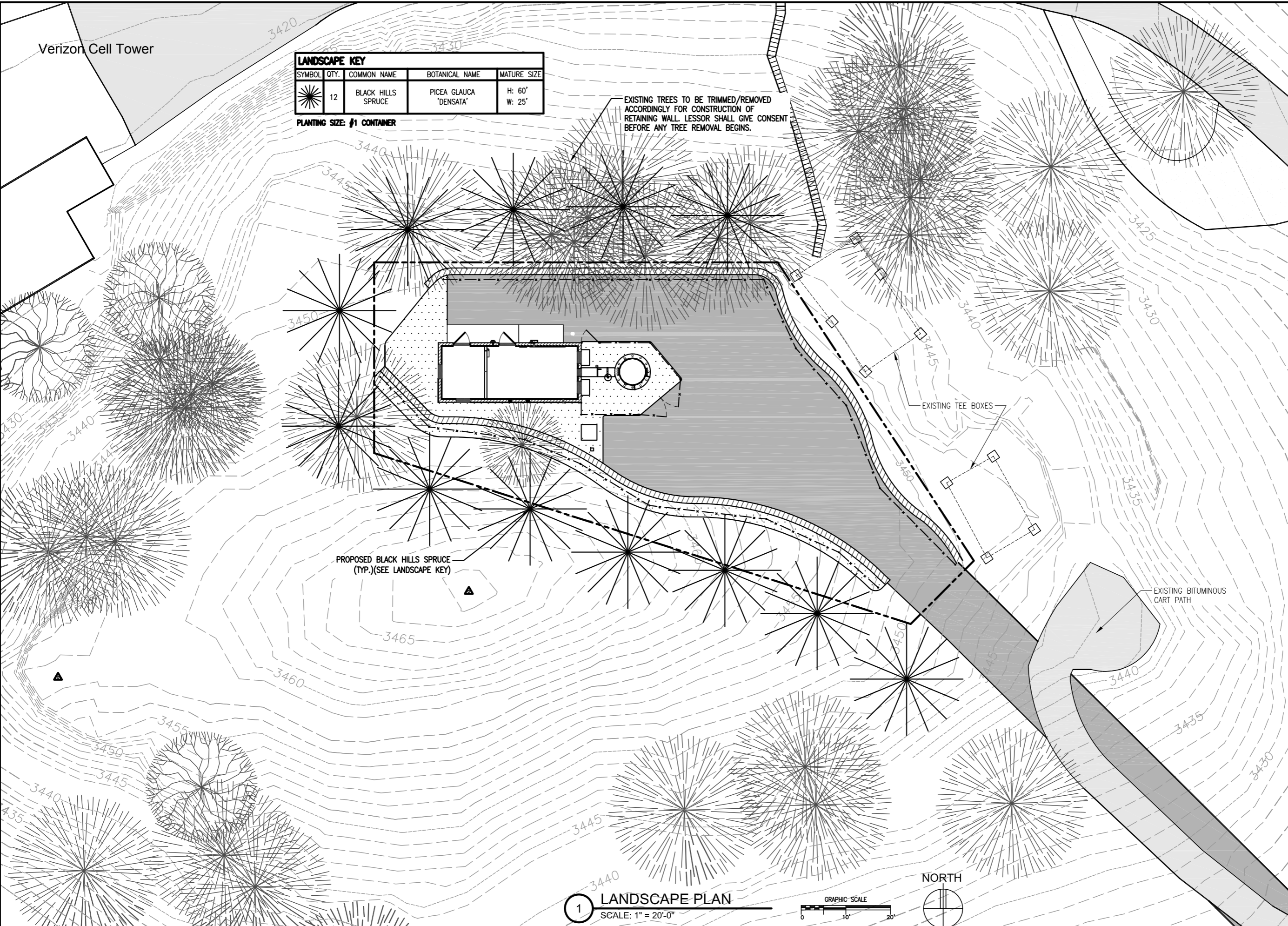


Verizon Cell Tower

LANDSCAPE KEY				
SYMBOL	QTY.	COMMON NAME	BOTANICAL NAME	MATURE SIZE
	12	BLACK HILLS SPRUCE	PICEA GLAUCA 'DENSATA'	H: 60' W: 25'

PLANTING SIZE: #1 CONTAINER

EXISTING TREES TO BE TRIMMED/REMOVED ACCORDINGLY FOR CONSTRUCTION OF RETAINING WALL. LESSOR SHALL GIVE CONSENT BEFORE ANY TREE REMOVAL BEGINS.



NOT FOR CONSTRUCTION

DESIGN

ROBERT J DAVIS, AIA
ARCHITECT
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EDEN PRAIRIE, MN 55344
(952) 903-9299

VERIZON WIRELESS

10801 BUSH LAKE ROAD
BLOOMINGTON, MN 55438
(612) 720 - 0030

PROJECT

2005125051

RCYC
SW RAPID CITY

TOMAHAWK DRIVE
RAPID CITY, SD 57702

SHEET CONTENTS:
LANDSCAPE PLAN

DRAWN BY: A. STANLEY

DATE: 05-06-13

CHECKED BY: TAB/DRT

REV. A 09-13-13

REV. B 11-26-13

REV. C 02-26-14

1 LANDSCAPE PLAN
SCALE: 1" = 20'-0"



NORTH



A-2.1



Disclaimer: This picture is an artist's rendition of the completed construction prior to construction. The completed construction may differ from this image.

View Type: Simulated Photograph - View 1
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking east at proposed location of monopole with flag and ground equipment.



Disclaimer: This picture is an artist's rendition of the completed site layout prior to construction. The completed construction may vary in layout, dimension, and color from the above picture.

View Type: Simulated Photograph - View 2
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking south at proposed location of monopole with flag and ground equipment.

Verizon Cell Tower



View Type: Simulated Photograph - View 3
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking west at proposed location of monopole with flag and ground equipment.

Disclaimer: This picture is an artist's rendition of the completed site layout prior to construction. The completed construction may vary in layout, dimension, and color from the above picture.

Verizon Cell Tower



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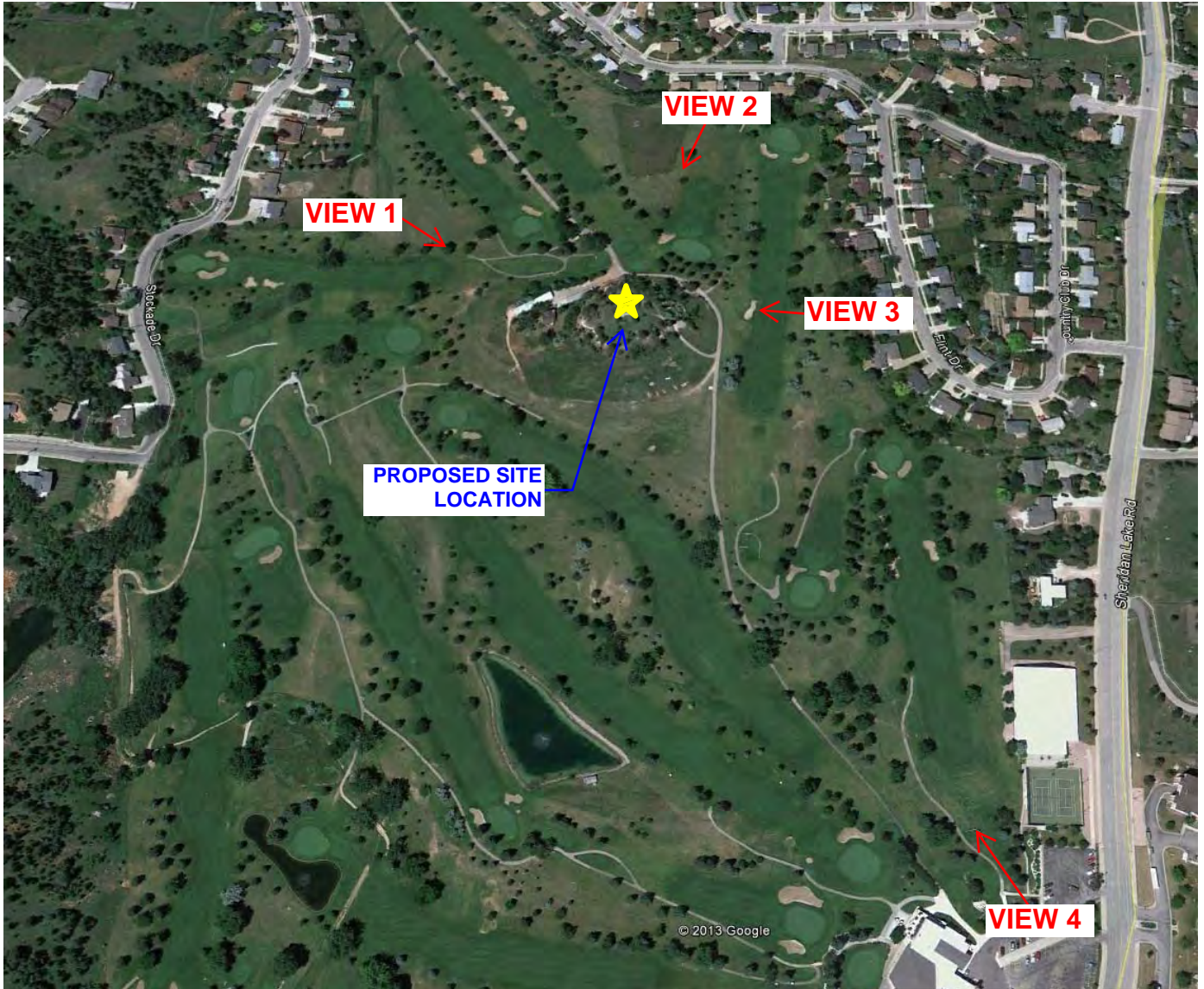
View Type: Simulated Photograph - View 4
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking northwest at proposed location of monopole with flag and ground equipment.



PHOTO SIMULATION

SITE: RCYC SW RAPID CITY CARRIER: VERIZON WIRELESS

SITE ADDRESS: TOMAHAWK DRIVE, RAPID CITY, SD 57702

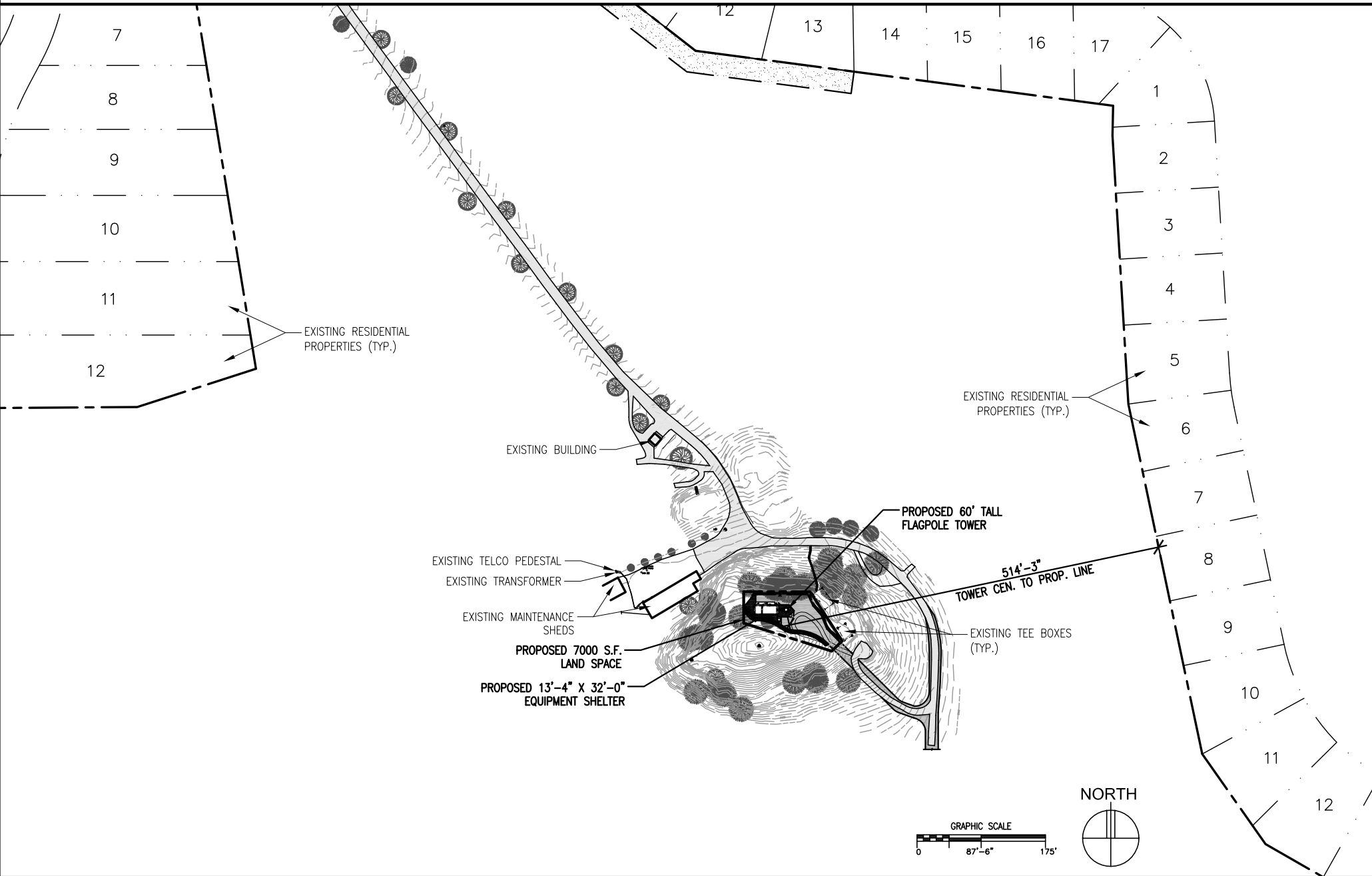


SITE LOCATION MAP

NOT TO SCALE



SITE PLAN



EXISTING RESIDENTIAL PROPERTIES (TYP.)

EXISTING RESIDENTIAL PROPERTIES (TYP.)

EXISTING BUILDING

PROPOSED 60' TALL FLAGPOLE TOWER

EXISTING TELCO PEDESTAL

EXISTING TRANSFORMER

EXISTING MAINTENANCE SHEDS

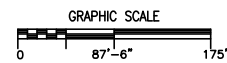
PROPOSED 7000 S.F. LAND SPACE

PROPOSED 13'-4" X 32'-0" EQUIPMENT SHELTER

514'-3"
TOWER CEN. TO PROP. LINE

EXISTING TEE BOXES (TYP.)

NORTH





REV 4 - 07.03.14

View Type: Simulated Photograph - View 1
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking east at proposed location of monopine and ground equipment.

Disclaimer: This picture is an artist's rendition of the completed site layout prior to construction. The completed construction may vary in layout, dimension, and color from the above picture.



REV 4 - 07.03.14

View Type: Simulated Photograph - View 2
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking south at proposed location of monopine and ground equipment.

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REV 4 - 07.03.14

View Type: Simulated Photograph - View 3
Site Address: Tomahawk Drive
City: Rapid City **State:** SD
Site Name: RCYC SW RAPID CITY
View Description: Looking west at proposed location of monopine and ground equipment.

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REV 4 - 07.03.14

View Type: Simulated Photograph - View 4
Site Address: Tomahawk Drive
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View Description: Looking northwest at proposed location of monopine and ground equipment.

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