

SILVERTON FIRE EVALUATION OF ODOT RADIO SYSTEM

November 27, 2017

Testing conducted the week of September 25th 2017 through October 15, 2017
None of the radio test results obtained while the parts of the state system were not active are included in his report.

Over the course of several weeks the Fire District tested the ODOT radios for reliability of communications. The locations selected for testing were selected for the following reason; edge of our primary response area, frequency of calls, areas of high density population and values at risk. The list contained 191 specific locations to test (see appendix 1). To ensure that we were able to get the most accurate results, for the type of usage we would see while responding on calls for service, we wanted to get off the road and into buildings as much as possible.

Site specific testing results, on road

Driving the District there was approximately 81% reliability of being able to connect to the tower. The ability to receive and understand the transmission on another radio was approximately 67%, and the reliability connectivity inside a structure was 33%.

While driving the District many simple tests were conducted. The tests consisted of; vehicle-to-vehicle, vehicle-to-stationary person and radio-to-radio within the same vehicle. While the last test was not ideal it did however show the ability for one radio to call/connect to a tower and show the ability for another radio to connect/monitor within the vicinity.

Overview of Findings

For the most part West of Cascade Hwy/OR-HWY 213 the connectivity was found to be good-excellent. The exception to this was in the Southern area West of Cascade Hwy where some minor connectivity problems were discovered. These problems were mostly the inability to understand the transmission. The radios made connection to the towers but the transmission was very broken (digitized). The major problems began to develop once we crossed to the eastside. This is evident by the map, see appendix 2.

Two separate tests were conducted on Silver Falls Hwy above the Silverton Reservoir. On both occasions the connectivity to the towers was lost between the entrance to the reservoir and Amber Ct. On both occasions the radios did not reconnect until just below Forest Ridge Rd. This area is particular concern to the District due to the frequency of calls in this area. While in the area we also checked the reservoir entrance road and parking lot, and found that the entrance road had no connectivity. When testing the parking lot at the day use area at the reservoir we were able to connect only once and it was digitized and unreadable. The other attempts in the parking lot and down by the docks were unsuccessful. Testing with North 7 was not conducted at this location due to past known connections on long duration calls. (North 7 does work in the parking lot, rope swing, boat launch, boat docks and the entrance road.)

Continuing up Silver Falls Highway we located areas of excellent reception. Those areas had good line-of-sight with the valley. Once you dropped out of the line-of-sight, the signal strength and quality of the signal decreased.

When testing the Abiqua Canyon, the connectivity was very spotty at best. On Abiqua Rd NE once you passed McKillop Rd signal was lost. South Abiqua Rd has bad to no connectivity. One specific area of

concern was S Abiqua and Towne Dr where it had no service. This is a concern due to this being one of only 2 hydrants on S Abiqua Rd.

In the City of Scotts Mills 22 locations were tested. It was found that there were large portions of the city that had no connectivity. From the intersection of 6th and C St to approximately 771 Grandview Heights there is no connectivity at all. The lower half of the city north of 3rd street had good coverage. Scotts Mills County Park had good coverage with the exception of the entrance where we did have some digitized signal.

On Butte Creek Rd, the signal was lost approximately $\frac{3}{4}$ of a mile from S. Maplegrove Rd. To confirm the validity of the test I continued on Butte Creek to the Boy Scout Camp, and found that the radios had no connectivity.

Crooked Finger out of Scotts Mills we found that if you were in clear line-of-sight with the valley there was good signal. Once you dropped down on either side of Crooked Finger, the signal progressively got worse. When testing Hazelnut Ridge Rd between Crooked Finger Rd and Ettliln Loop, it was found that the majority of that section had no coverage.

A test on Ettliln Loop between the Holy Rosary Cemetery and Station 9 was conducted. During the tests 12 locations were used: Holy Rosary Cemetery, at the creek crossing, top of hill just past creek crossing, intersection of Diane Rose and Ettliln Loop, in front of each house on Ettliln Loop, Intersection of Casper Lane and Ettliln Loop, In front of and behind Holly Rosary Mission and at the front of Station 9. About $\frac{1}{3}$ of the transmissions were digitized an additional $\frac{1}{3}$ still had no coverage.

Continuing up Crooked Finger to the Abiqua Falls Trailhead and Butte Creek Falls Trailhead as soon as you leave the Crooked Finger Mainline the signal drops off and there is no coverage from the mainline to the trailheads. On a side note North 7 and North 1 are both spotty in those areas as well but we still are able to get out.

Site specific testing results, in structure

Silverton Fire District Stations

The Scotts Mills Fire Station was the only station that had coverage inside the building. The rest of the stations had no coverage or extremely spotty coverage, nothing that would resemble being reliable.

Silverton Hospital; <25% reliability

The testing at the hospital involved using 2 people. One person stayed outside the hospital in front of the Family Birthing Center. The other walked through the hospital in public areas only. The areas checked were; foyer of the Birthing Center, Patient lounge, outside of the sprinkler valve control room and outside of the emergency department. Prior to entering the building a verification of operation was done which indicated that both radios were sending and receiving. The first two test areas the transmissions were scratchy but readable. The other two tests were not received by the radio outside the building. Multiple attempts were made by the tester inside the building.

On a second date, the test was repeated testing additional locations within the building. During this test we found less connectivity within the building. Sites tested included 3 locations outside the Emergency Department, entrance to ICU, back corridor that is used to move patients from the ED to the landing pad. During this test we found that fewer locations had connectivity.

Oregon Garden Resort

The Oregon Garden Resort involved using 2 people. One stayed outside the building in the covered area by the front door. The other walked through the building in public areas only. The areas checked were; by the check in desk, outside the restaurant, by the spa, upstairs by the admin offices, and inside the lounge. Prior to entering the building a verification of operation was done. Both radios were sending and receiving. The test at the front desk was successful however the other locations within the building were not successful. Multiple attempts were made by the tester inside the building. Once back outside, a re-verification was made and both radios were working properly.

We returned to the Gardens a two weeks later and re-tested the above locations plus additional locations on the property. The testing that took place within the Resort did not change. In addition to the Resort we tested at 3 of the cottages and the Pavilion. The test conducted at the Pavilion was an interior to exterior test. This test was successful.

Silverton High School Main Building

On multiple occasions tests were conducted at the Silverton High School. These tests were combination interior to exterior and interior to interior. During the tests approximately 30 locations were tested in the building. These locations included; inside classrooms, hallways, restrooms, offices, locker rooms, tech center, library, commons and gyms. While testing the ODOT radios we also tested North 7. We found that the ODOT radios did not work at all 27% of the time. We also found that 46% of the time the transmissions made it through but were too digitized to understand. The other 27% had static on the transmission but were readable. It should be noted all of these tests were conducted while being stationary and not moving.

As stated above we also tested North 7 and found that all but 2 of the sites were readable by METCOM as well as the other tester inside the building. (See Appendix 2 for detailed findings)

Conclusion

The ODOT system, as it stands today, does not meet the needs of the Silverton Fire District. The results of the test show that 1/3 of the total District has unreliable coverage and 70% of the in-structure testing resulted in little to no coverage. For the safety of our members and mutual-aid companies, the Silverton Fire District cannot support the transition to this network unless significant improvements are made to extend coverage in buildings and make current coverage more reliable. The extensive testing that was completed has convinced us that they are too unreliable for safe communications.

Appendix 1

Key for the map

Green = No interference, good connectivity

Orange = Some interference, but still understandable transmission

Red = Major interference, digitized signal, transmission unreadable

Black = No connectivity at all

Locations that had no connectivity at all

Locations that had no connectivity	In building
Silverton High School 30 locations within the building	y
Silverton Main Station	y
Silverton Drill Tower	y
Rite Aid	y
Station 2 inside	y
Citizens Bank	y
City hall basement	y
Oregon Garden Resort Bar	y
Oregon Garden Resort Resraurant	y
Oregon Garden Resort Admin offices	y
Silverton Legacy Health 5 locations inside	y
Reservoir Driveway	n
Reservoir parking lot	n
Silver Falls Dr from reservoir to Forest Ridge	n
Haven Acres rd	n
Station 3	y
S Abiqua @ Towne Dr	n
Abiqua @ McKillop	n
Abiqua @ Briar Knob	n
Abiqua @ El Romar	n
Abiqua @ Steel Bridge	n
Abiqua @ Concrete Bridge	n
Station 9	y
Abiqua Falls Primary LZ	n
Abiqua Falls Trailhead	n
Abiqua Falls Secondary Staging	n
Abiqua Falls Primary (ATV) Staging	n
Butte Creek Falls Trailhead	n
Butte Creek Boy Scout Ranch Lower Parking area	n
13462 S Butte Creek Rd	n
Butte Creek Rd 1 mile in	n
771 Grandview Heights	n
6th @ C st, scotts mills	n
Hazelnut Ridge Rd 15 locations	n
Grandview Heights between C st and water tower	n
S Abiqua @ Milk Ranch	n
5th @ Scotts Ave Scotts Mills	n

Locations with major interference, digitized signal, transmission unreadable

Major interference, digitized signal, unreadable Tx	in building
Kaufman @ Finlay	N
Canyonview by horse barn	N
Victor Point @ Fox Rd	N
Oregon Garden Resort Building Q by riser room	Y
Silverton Reservoir entrance	N
Wesley @ S Water	N
Citizens bank foyer	Y
Columbia Bank	Y
S Abiqua @ Timber Trail	N
Abiqua NE @ S Abiqua	N
S Abiqua @ Indian Bluff	N
S Abiqua @ Davis Creek	N
Station 3 outside	N
Abiqua @ Hazelnut Ridge	N
Scotts Mills County Park Entrance	N
Butte Creek Rd 1/2 mile in	N
10058 S Wildcat Rd	N
37596 Blair Rd	N
Maple Grove Rd @ Bridge	N
Ettlin Loop Between Cemetary and Station 9	N
Crooked Finger @ Shooting area	N
Crooked Finger @ Butte Creek Falls turn off	N
Ettlin @ Casper Lane	N
Ettlin @ Diane Rose Ln	N
Station 9 outside	N
inside 511 Chester St	Y
Creekside Grill	Y

Locations with some interference, but still understandable transmission

Locations that had minor interference	In Building
Maple Grove rd at edge of district	N
12803 S Maple Grove Rd	N
Maple Grove @ Blair	N
Blair Rd @ Groshong	N
36956 S Blair Rd	N
Wildcat @ Blair	N
Scotts Mills-Mt Angel @ Teeny's Dairy	N

Scotts Mills-Mt Angel @ Heinz	N
1st @ C St Scotts Mills	N
Grandview @ 3rd	N
Grandview @ 6th	N
County Park above falls	N
Butte Creek Rd @ Maple Grove	N
20601 Hazelnut Ridge Rd	N
Crooked Finger @ Jakes Ln	N
Crooked Finger @ Camp Dakota	N
Crooked Finger @ Cattle Guard	N
Crooked Finger @ ATV turn-off	N
Butte Creek Falls Rd @ repeater location	N
Powers Creek @ Timber Trail	N
Hwy 214 @ Powers Creek Loop	N
Timber Trail @ Calinda	N
5800 Davis Creek Rd NE	N
Davis Creek @ Quarry	N
Evans Valley @ Valley View	N
Silver Falls Seed Company	N
Forest Ridge @ Quall	N
Madrona Heights @ Quall	N
S Water@ Mt. View	N
Sun Valley @ Frontier	N
Sun Valley @ Lakeview	N
Eastview @ Entrance to water tower	N
Eastview @ Skookum	N
Steelhammer @ Evans Valley	N
Cowing @ Barger	N
Porter @ Hicks	N
Pool Parking Lot	N
Inside Pool foyer	Y
Main @ 1st	N
Roths Market Inside	Y
Seven Brides inside near entrance door.	Y
SFD drill grounds 25% of the time	N
Oregon Gardens Building P by Riser Room	Y
Oregon Gardens Building H by riser room	Y
Edison @ Woodland	N
Edison @ Finlay	N
Drift Creek @ Victor Point	N
Finlay @ Victor Point	N

Drift Creek @ Haven Acres	N
Victor Point @ Goode Ln	N
Victor Point @ Riches Rd	N
Drift Creek @ Fox Rd	N
Victor Point @ Doerfler	N
Cascade Hwy @ State	N
State @ 119th	N
Cascade Hwy @ Beaver Creek	N
Sunnyview @ Hibbard	N
Cascade @ Eagan	N
Hibbard @ Beaver Creek	N
Kaufman @ 105th	N

Locations with no interference, good connectivity

Locations where no interference was found	In Building
Library	Y
Smith @ Barger	N
Smith @ S Water	N
S Water @ Enstad	N
S Water @ Ike Mooney	N
Ike Mooney @ S Curve	N
Madrona Heights @ Evans Valley	N
Evans Valley @ Forest Ridge	N
213 @ Valley View	N
Briar Knob @ Mckillop	N
McKillop @ Crooked Finger	N
Crooked Finger @ Lower Ettlin Loop	N
Diane Rose @ white gate	N
Crooked Finger @ Moss Ln	N
Moss Ln @ End of road	N
Station 8 inside	Y
Station 8 Outside	N
7000 block Crooked Finger	N
Crooked Finger @ Hazelnut	N
11039 S Wildcat	N
Marquam	N
213 @ Marquam circle	N
Marquam circle @ District boundry	N
213 @ Jacks Bridge	N
213 @ Scotts Mills-Mt Angel rd	N

5799 Davis Creek Rd	N
Davis Creek @ Porter	N
Porter @ Powers Creek Loop	N
214 @ Porter	N
St Pauls church	N
400 Schemmel	N
Pine @ Old Mt Angel Hwy	N
Hazelgreen @ Brush Creek	N
Mallory's Dairy	N
Hazelgreen @ Torvend	N
Hazelgreen @ Howell Prairie	N
Silverton Rd @ Howell Prairie	N
Silverton Rd @ 81st	N
Hazelgreen @ 75th	N
Howell Prairie @ Kaufman	N
Kaufman @ Desart	N
Desart @ Selah Springs	N
Kaufman @ Hibbard	N
Sunnyview @ 117th	N
11th @ Kuenzi way	N
Doerfler @ Jakes Hill	N
Victor Point @ Waldo Hills	N
Station 2 outside	N
Edison @ Eureka	N
Main @ Eureka	N
Main @ Oregon Garden	N
Oregon Garden Pavilion	Y
Outside Oregon Garden resort building	N
D @ 1st	N
214 @ Downs	N
Mt Angel Fire Station	Y
E Charles @ N Garfield	N
In front of Pauls small motors	N
Gallon House Bridge	N
Hobart @ Gallon House	N
214 @ Hobart	N
Oak @ Steelhammer	N
End of Kloche Ct	N
Shelokum @ Chikamin	N
Main @ Ames	N

Overall Percentages

District Wide	
Signal Strength	% Coverage
Black	19.6%
Red	14.3%
Orange	31.7%
Green	34.4%

In Building	
Signal Strength	% Coverage
Black	48%
Red	19%
Orange	19%
Green	14%

Silverton High School	
Signal Strength	% Coverage
Black	27%
Red	46%
Orange	27%
Green	0%

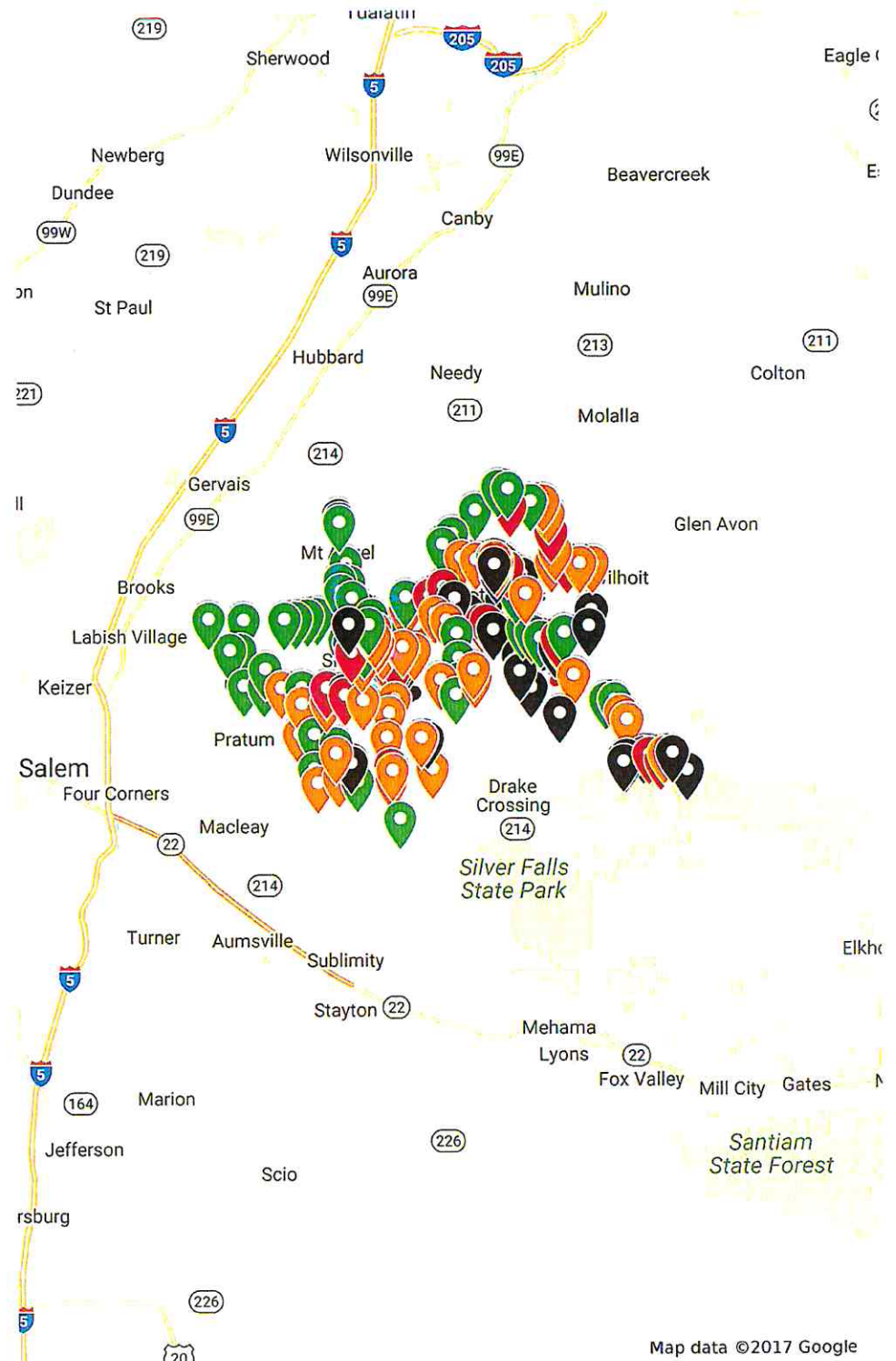
Appendix 2 – Silverton High School specific results

Test locations within the High School	Signal strength
SCANTV HS	Black
inside auditorium HS	Black
outside business comp. lab HS	Black
hallway outside kitchen HS	Black
hallway outside choir room HS	Black
hallway between locker rooms and gyms HS	Black
hallway between auditorium and gym HS	Black
Main gym HS	Red
Small Gym HS	Red
Wrestling Gym HS	Red
Athletic trainers office HS	Red
A wing 1st floor outside wellness center HS	Red
a wing 1st floor inside computer lab HS	Red
A wing 2nd floor south stairs HS	Red
A wing 2nd floor outside computer lab HS	Red
2nd floor B wing outside staff offices HS	Red
2nd floor outside auditorium HS	Red
1st floor outside auditorium HS	Red
inside ASB classroom HS	Red
Main Office HS	Orange
Counseling center HS	Orange
library HS	Orange
Commons HS	Orange
2nd floor above main entrance HS	Orange
1st floor b wing outside TLC room HS	Orange
1st floor B wing behind computer lab HS	Orange

700 Mghz Radio testing

Radio Test Sites









- 📍 Creekside Grill
- 📍 City Hall Foyer
- 📍 Main and 1st
- 📍 Citizens Bank Foyer
- 📍 Citizens Bank Vault
- 📍 Library
- 📍
- Corner of Wesley and S Water
- 📍 Parking lot at Pool
- 📍 Inside pool foyer
- 📍 Porter at Hicks
- 📍 Cowing at Barger
- 📍 Smith at Barger
- 📍 Smith at S Water
- 📍 S Water at Enstad
- 📍 S Water at Ike Mooney
- 📍 S Water at Mtn. View
- 📍 Reservoir Parking lot
- 📍 Reservoir Drive
- 📍 Silver Falls Hwy at Reservoir
- 📍 No coverage
- 📍 Sun Valley and Lakeview
- 📍 Sun Valley At Frontier
- 📍 Ike Mooney S Curve
- 📍
- Madrona Heights ant Evans Valley
- 📍
- Evans Valley @ Forest Ridge Rd
- 📍 Silver Falls Seed Company
- 📍 Evans Valley @ Valley View
- 📍 Hwy 213 @ Valley View
- 📍 S Abiqua @ Davis Creek
- 📍 S Abiqua @ Indian Bluff
- 📍 S Abiqua @ Towne Dr




Testing completed on the radios


-  S Abiqua @ Timber Trail
-  Abiqua Rd NE @ S Abiqua
-  Abiqua Rd @ McKillop
-  Abiqua @ Briar Knob
-  Abiqua At Steel Bridge
-  Abiqua @ El Romar
-  Abiqua @ Concrete Bridge
-  Briar Knob @ McKillop
-  McKillop @ Crooked Finger
- 




Crooked Finger @ Ettlin Loop
Lower

-  Station 9 Outside
-  Station 9 inside
-  Ettlin Loop @ Casper Ln
-  Ettlin @ Diane Rose
-  Diane Rose @ White Gate
-  Crooked Finger @ Jakes Ln
-  Crooked Finger @ Moss Ln
-  Moss Ln At end of road



Crooked Finger @ Camp
Dakota



Crooked Finger @ Cattle Guard


Crooked Finger @ ATV turn off


-  ATV Staging
-  Abiqua Falls Primary LZ
- 

Abiqua Falls Secondary
Staging

-  Abiqua Falls Trail Head


Crooked Finger @ Shooting
area


Crooked Finger @ Butte Creek
Falls


Butte Creek Falls rd @repeater
location

-  Butte Creek Falls Trailhead


 Lost Signal



Butte Creek Rd @ Scout
Ranch




Butte Creek Ranch Lower
parking lot

 Lost Signal



Butte Creek Rd @ Maple Grove

 Station 8 Inside bays

 Entrance to County Park

 County park above falls

 7000 block Crooked Finger




Crooked Finger @ Hazelnut
Ridge

 Maple Grove @ Blair




Maple Grove at edge of
District

 Bottom of hill at bridge


 12803 S Maple Grove Rd

 Blair @ Groshong

 37596 Blair Rd

 36956 S Blair Rd

 Wildcat @ Blair

 11039 S Wildcat Rd

 10058 S Wildcat Rd

 Marquam

 Hwy 213 @ Marquam Circle



Marquam Circle at district
boundry

 Hwy 213 @ Jack's Bridge



Hwy 213 @ Scotts Mills-Mt
Angel



Scotts Mills-Mt Angel @
Teeny's Dairy



Scotts Mills-Mt Angel @ Heinz



Abiqua Rd NE @ Hazelnut
Ridge



Station 3 outside



Station 3 Inside



Davis Creek @ Quarry



5800 Davis Creek Rd NE



5799 Davis Creek Rd



Davis Creek @ Porter Rd



Porter @ Powers Creek Loop



Hwy 214 @ Powers Creek
Loop



Hwy 214 @ Porter Rd



Powers Creek @ Timber trail



Timber Trail @ Calinda



Forest Ridge @ Quall Rd



Madrona Heights @ Quall Rd



Silverton High School



Silverton Legacy



SFD offices



SFD Drill tower



SFD Drill grounds



City Hall basement



Columbia Bank



Roths Market



Seven Brides



511 Chester St



St Paul's Church



Waste Water treatment plant
front gate



Pine @ old mt angel hwy



Hazelgreen @ brush creek



Mallory's dairy



Hazelgreen @torvend



Hazelgreen @ Howell Prairie



Silverton Rd @ Howell Prairie



Silverton Rd @ 81st



Hazelgreen @ 75th



Howell Prairie @ Kaufman Rd



Kaufman @ Desart



Desart @ Selah Springs



Kaufman @ 105th



Kaufman @ Hibbard



Sunnyview @ Hibbard



Hibbard @ Beaver Creek



Sunnyview @ 117th



117th@ Kuenzi way



State @ 119th



State @ Cascade Hwy



Doerfler @ Jakes Hill Rd



Doerfler @ Victor Point



Victor Point @ Waldo Hills



Drift Creek @ Fox



Lower Haven Acres



Drift Creek @ Haven Acres



Victor Point @ Drift Creek



Victor Point @ Finlay



Victor Point @ Goode Ln



Victor Point @ Fox Rd



Vicotr Point @ Riches Rd



Station 2 outside



Station 2 inside



Cascade Hwy @ Riches



Cascade Hwy @ Beaver Creek



Cascade @ Eagan



Cascade @ Finlay



Finlay @ Canyonview



Canyonview by horse barn



Finlay @ Edison



Edison @ Woodland



Edison @ Eureka



Main @ Eureka



Main @ Oregon Garden




Oregon Garden Pavilion





Outside Resort




Inside Resort

 Breeze way


 Breeze way


 breeze way


 No service



Butte Creek rd approx half mile in


 6th @ C st


 771 Grandview Hgts


 No Service

 Grandview @ 6th St

 Grandview @ 3rd St

 D @ 1st

 1st @ C St


 Questionable coverage

 20601 Hazelnut Ridge Rd

 214 @ Downs

 Mt Angel Fire Station

 E Charles @ Garfield


 In front of Paul's


 214 @ Abiqua Creek


 Gallon House at Bridge


 Hobart @ Gallon House

 214 @ Hobart

 Oak @ Steelhammer


 Steelhamer @ Evans Valley


 End of Kloche Ct

 Shelokum @ Chikamin



Eastview @ entrance to water tower

 Eastview @ skookum

 Main @ Ames St

 Rite Aid Inside

 S Abiqua @ Milk Ranch



5th @ Scotts Ave Scotts Mills

