

# Yukon Intelligent Transportation Systems ITS Alaska Conference Anchorage, AK

Amanda Price, Transportation Analyst

Transportation Engineering Branch, Highways and Public Works

September 11, 2017

# Presentation Overview:

- Background: Yukon
- Background: ITS in Yukon Government
- Main ITS Studies Completed
- Current Projects
- ITS Partnerships
- Future Direction

# Background: Yukon

- Population: 37,642 (0.1% of the Canadian population)
- 4,800 kms of highway
- 1 city (Whitehorse), 7 towns and 5 local advisory areas
- Traffic Stats:
  - AADT Whitehorse North 4,695
  - AADT Whitehorse South 1,887
  - 28,500 commercial vehicles/ yr.
  - 15% have an Alaska destination



# Background: ITS in Yukon Government

- 2005 Initial ITS study completed (IBI group),
  - 511 Yukon was launched in 2006.
- 2014 Transportation Division went to tender for a revised ITS strategy,
  - Completed in January 2015,
  - Identified key business areas; “components”.

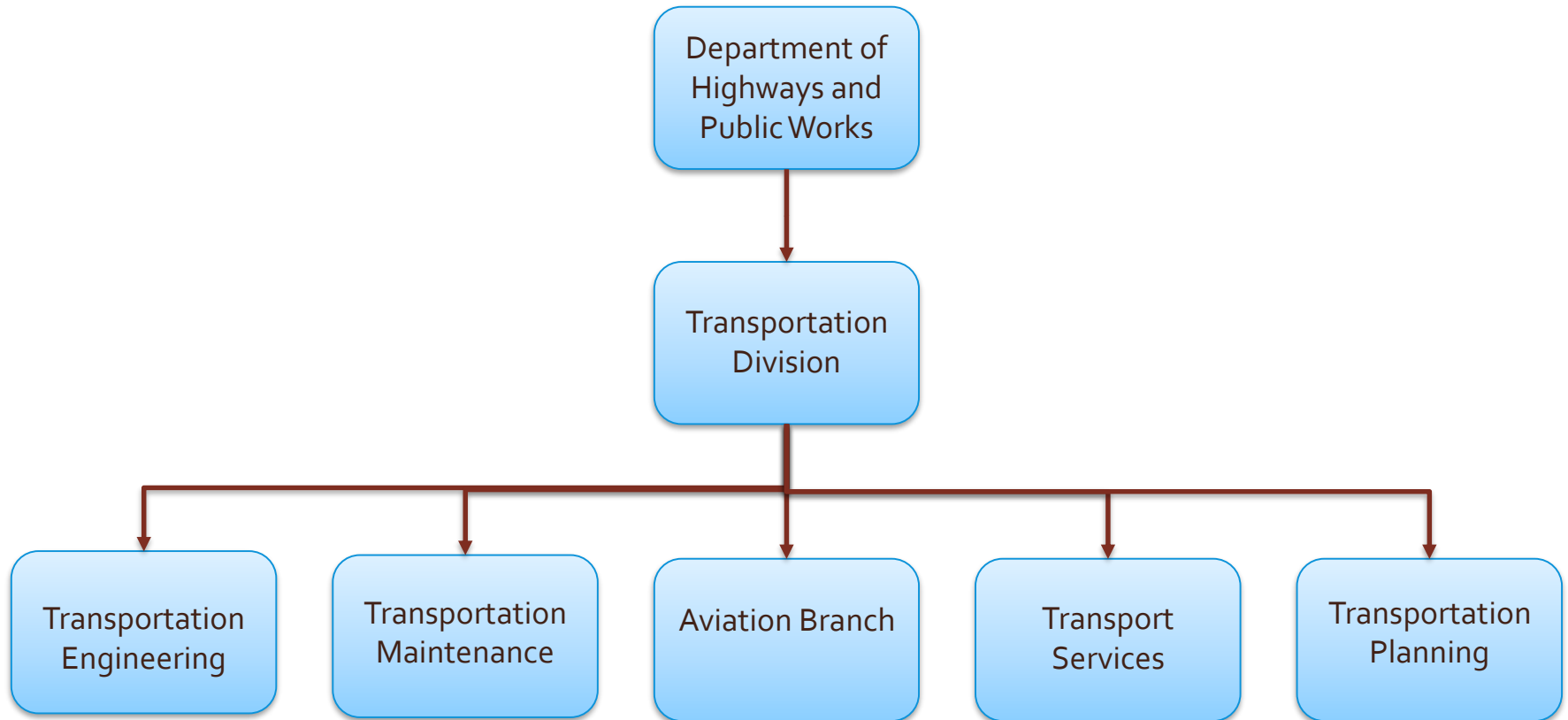
## Component Studies Completed:

- Traffic Monitoring,
- Frost Depth Monitoring,
- Commercial Vehicle Operations,
- Variable Message Boards,
- Speed Radar Boards, and
- RWIS.

# Jurisdictional Role: Highways and Public Works

- Vision:
  - Building Foundations, Inspiring Innovation, and Exceeding Expectations.
- Mission:
  - Builds and maintains transportation infrastructure, systems and programs to ensure safety for travelers and support economic growth within the territory.

# Organizational Structure



# Why is ITS Important in Yukon:



Dempster Highway



Alaska Highway

# Current Projects:

## System Development and Enhancements:

- Data Warehouse
- 511 System
- Ferry Application

## Program Areas:

- Traffic Monitoring:
- Frost Depth Monitoring:
- Commercial Vehicle Operations:
- Variable Message Boards and Speed Radar Boards:
- RWIS:

# Data Warehouse

## Site Registration

[+ Add Site](#)

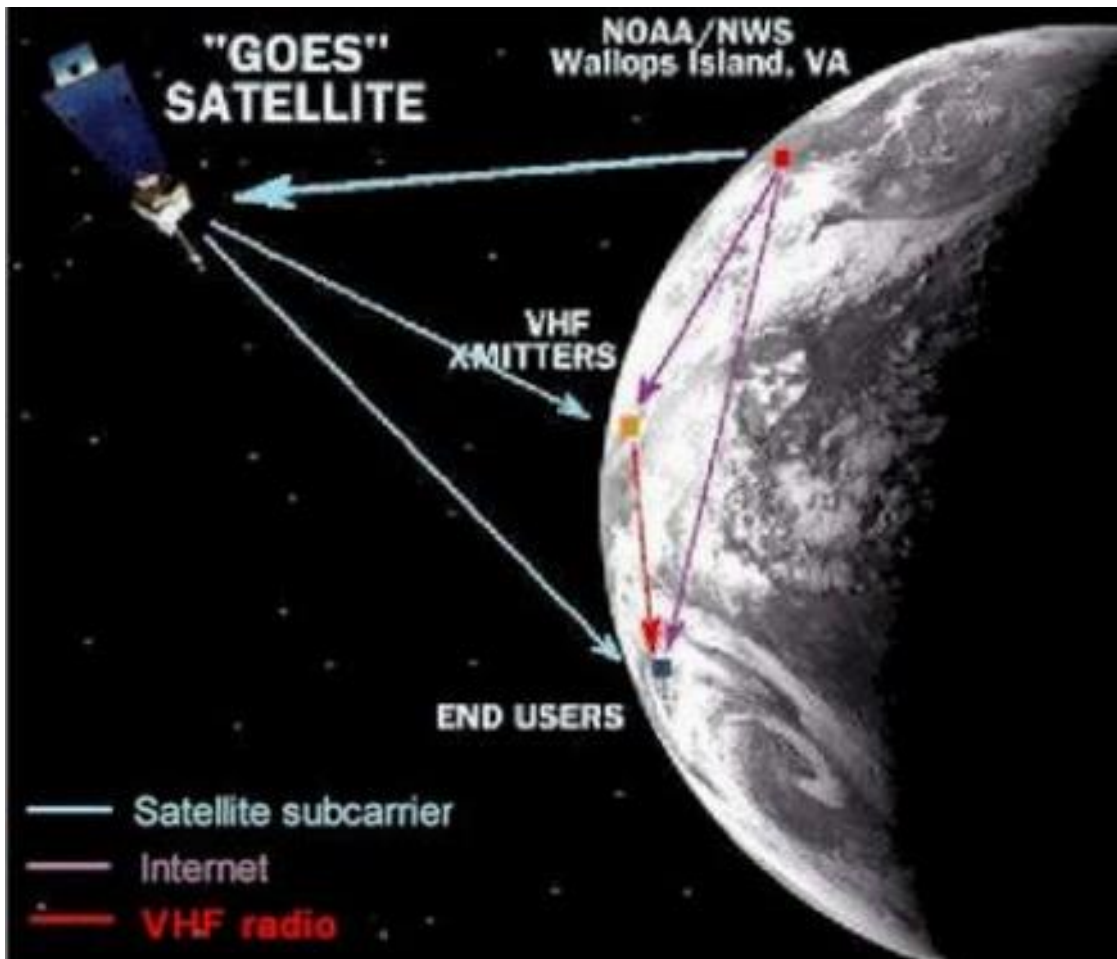
Abbreviation	Name	Zone	DCP Address	Latitude	Longitude	Active
BCT	Beaver Creek Town	Zone 4	2C61913A	62.37965	-140.878217	Yes
BRT	Braeburn Traffic	Zone 2	2C64F31C	61.28717	-135.46616	Yes
CAT	Canada Traffic	Zone 3	2C64F31C	61.28717	-135.46616	Yes

## Beaver Creek Town

[Edit Details](#)[Site Details](#)[Thermistors](#)[Sensors](#)[History](#)[Save Sort](#)[+ Add Sensor](#)

Code	Descr	Type	Thermister	Depth	Traffic Type	Traffic Chainage	Traffic Direction	Latitud	Longitud	Active	Sort Order	Sort	Edit
TA1	Air Temp	WEATHER								Yes	1	↑ ↓	
RH1	Relative Humidity	WEATHER								Yes	2	↑ ↓	
US1	Speed	WEATHER								Yes	3	↑ ↓	
UD1	Direction	WEATHER								Yes	4	↑ ↓	
PCP1	PCP	WEATHER								Yes	5	↑ ↓	
UG1	Gust	WEATHER								Yes	6	↑ ↓	
TMAX1	T Max	WEATHER								Yes	7	↑ ↓	
TMIN1	T Min	WEATHER								Yes	8	↑ ↓	
RHMAX1	RH Max	WEATHER								Yes	9	↑ ↓	
RHMIN1	RH Min	WEATHER								Yes	10	↑ ↓	
VB1	Battery	BATTERY								Yes	11	↑ ↓	
VB2	Battery	BATTERY								Yes	12	↑ ↓	
THERM0	TS1-1	THERMISTOR	BCT_THERM1 ROAD	0.3						Yes	13	↑ ↓	
THERM1	TS1-2	THERMISTOR	BCT_THERM1 ROAD	0.5						Yes	14	↑ ↓	
THERM2	TS1-3	THERMISTOR	BCT_THERM1 ROAD	0.7						Yes	15	↑ ↓	

# *Satellite Communications*



Geostationary  
Operational  
Environmental Satellite  
(GOES) Data  
Transmission:

# System Health

## Health

Name	Abbreviation	Last Measurement	Error Message	Header	Last Successful Measurement
AK Hwy km 1457.4	TKT	2017-09-10 22:00:00		2C64039817254051932G44+0NN042WUB00228	2017-09-10 22:00:00
AK Hwy km 1715.4 (DBAY)	DBT	2017-09-10 22:00:00		2C63F12817254051921G40+0NN042WUB00221	2017-09-10 22:00:00
Beaver Creek Town	BCT	2017-09-10 22:00:00		2C61913A17254051741G44+0NN042WUB00179	2017-09-10 22:00:00
Braeburn Traffic	BRT	2017-09-10 22:00:00		2C64F31C17254052117G35+0NN042WUB00075	2017-09-10 22:00:00
Carcross Traffic	CCT	2017-09-10 22:00:00		2C63D7C417254051904G42+0NN042WUB00113	2017-09-10 22:00:00
Carmacks Traffic	CAT	2017-09-10 22:00:00		2C64667E17254052032G39+0NN042WUB00068	2017-09-10 22:00:00
CEE CEE Traffic	CCT2	2017-09-10 22:00:00		2C64750817254052038G43+0NN042WUB00025	2017-09-10 22:00:00
Champagne	CH	2017-09-10 22:00:00		2C6080B617254050921G43+1NN042WUB00125	2017-09-10 22:00:00
Dempster Cutoff	DEMC	2017-09-10 22:00:00		2C63E25E17254051911G42+0NN042WUB00077	2017-09-10 22:00:00
Dempster km 124	DEM1	2017-09-10 22:00:00		2C61A4A017254051752G43+0NN042WUB00277	2017-09-10 22:00:00
Dempster km 421	DEM2	2017-09-10 22:00:00		2C61B7D617254051803G47+0NN042WUB00214	2017-09-10 22:00:00
Dome Road	DOME	2017-09-10 22:00:00		2C6410EE17254051941G42+1NN042WUB00113	2017-09-10 22:00:00
Drury Creek	DRU	2017-09-10 22:00:00		2C60C3BC17254051531G40+0NN042WUB00197	2017-09-10 22:00:00
Haines Junction Bridge/Airport	HJB	2017-09-10 22:00:00		2C64257417254051951G41+1NN042WUB00097	2017-09-10 22:00:00
Haines Junction-N. AK	HJAK	2017-09-10 21:00:00		2C64858C17254042041G40+0NN042WUB00022	2017-09-10 21:00:00
Jakes Corner	JAK	2017-09-10 22:00:00		2C61542417254051701G43+0NN042WUB00287	2017-09-10 22:00:00
Jct 37	JCT37	2017-09-10 22:00:00		2C64360217254052004G41+0NN042WUB00095	2017-09-10 22:00:00
Klondike Camp	KLOT	2017-09-10 22:00:00		2C6496FA17254052046G40+0NN042WUB00054	2017-09-10 22:00:00
Mayo Airport	MAT	2017-09-10 22:00:00		2C63C4B217254051851G45+1HN042WUB00228	2017-09-10 22:00:00
N. Klondike/AK Hwy Jct	NKAK	2017-05-02 00:00:00			2017-05-02 00:00:00
S. Klondike/AK Hwy Jct	SKAK	2017-09-10 22:00:00		2C64409217254052011G45+0HP042WUB00086	2017-09-10 22:00:00
Stewart Traffic	STWT	2017-09-10 22:00:00		2C6453E417254052021G40+1NN042WUB00110	2017-09-10 22:00:00
Swift River	SWI	2017-09-10 22:00:00		2C6122B417254051631G42+1NN042WUB00197	2017-09-10 22:00:00
Takhini Hot Springs Road	THS	2017-09-10 22:00:00		2C64A36017254052051G44+0NN042WUB00022	2017-09-10 22:00:00

2C63C4B217254051851G45+1HN042WUB00228	2017-09-10 22:00:00
	2017-05-02 00:00:00

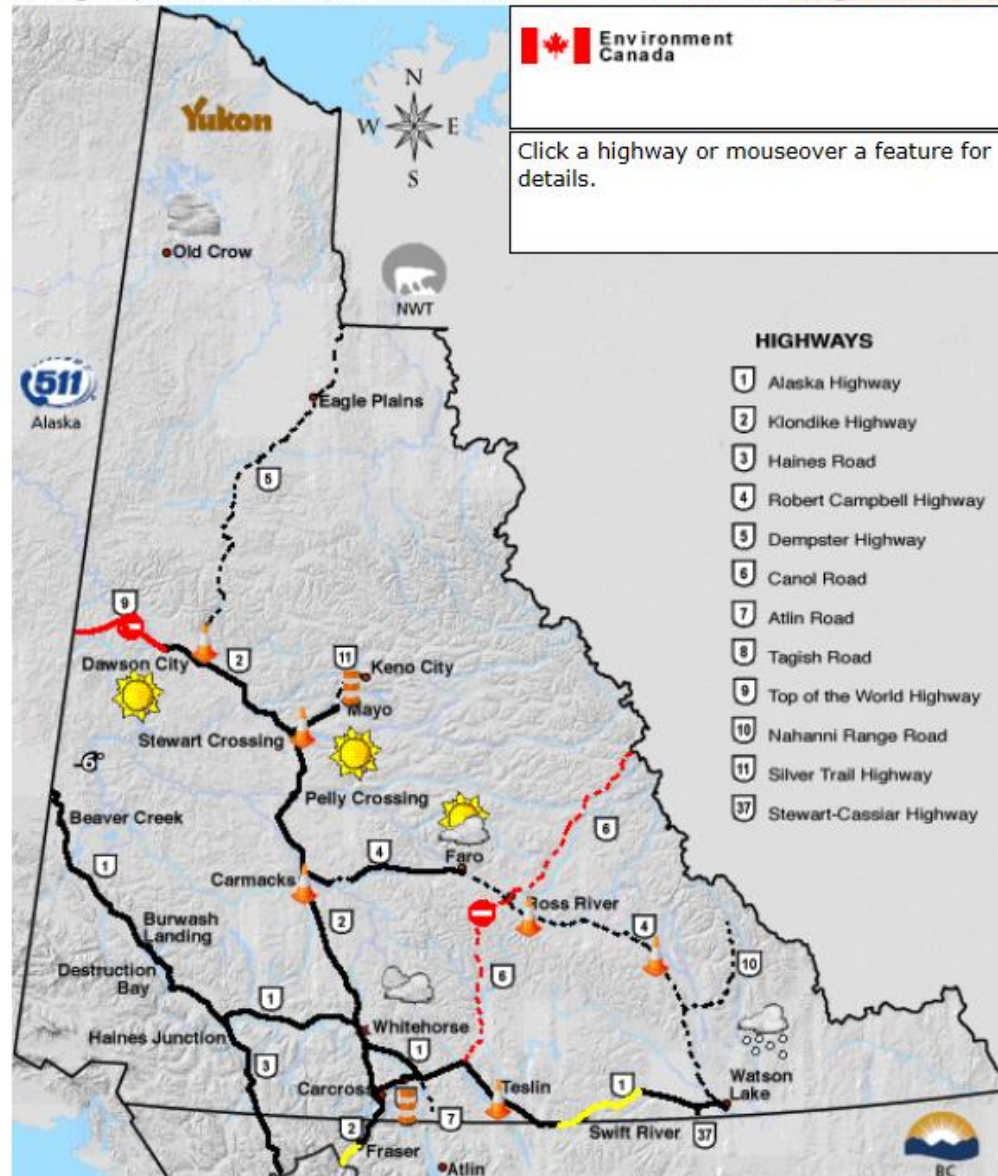
# 511

Emergency Road Closures and Advisories

 [Twitter](#)

 [RSS](#)

[Weight Restrictions](#)



**i Legend**

- Bare  
 ■ Partly Covered  
 □ Covered  
 ■ Closed  
 ■ No Reports Available  
 — Paved Road  
 ..... Gravel Road  
 - - - Paved and Gravel Road

Click on highway segment of choice on the map for additional information

## ✓ Activities

-  Construction
-  Incident
-  Closed
-  Multiple Items
-  Winter Roads

## ■ Border Crossings

-  Active Station

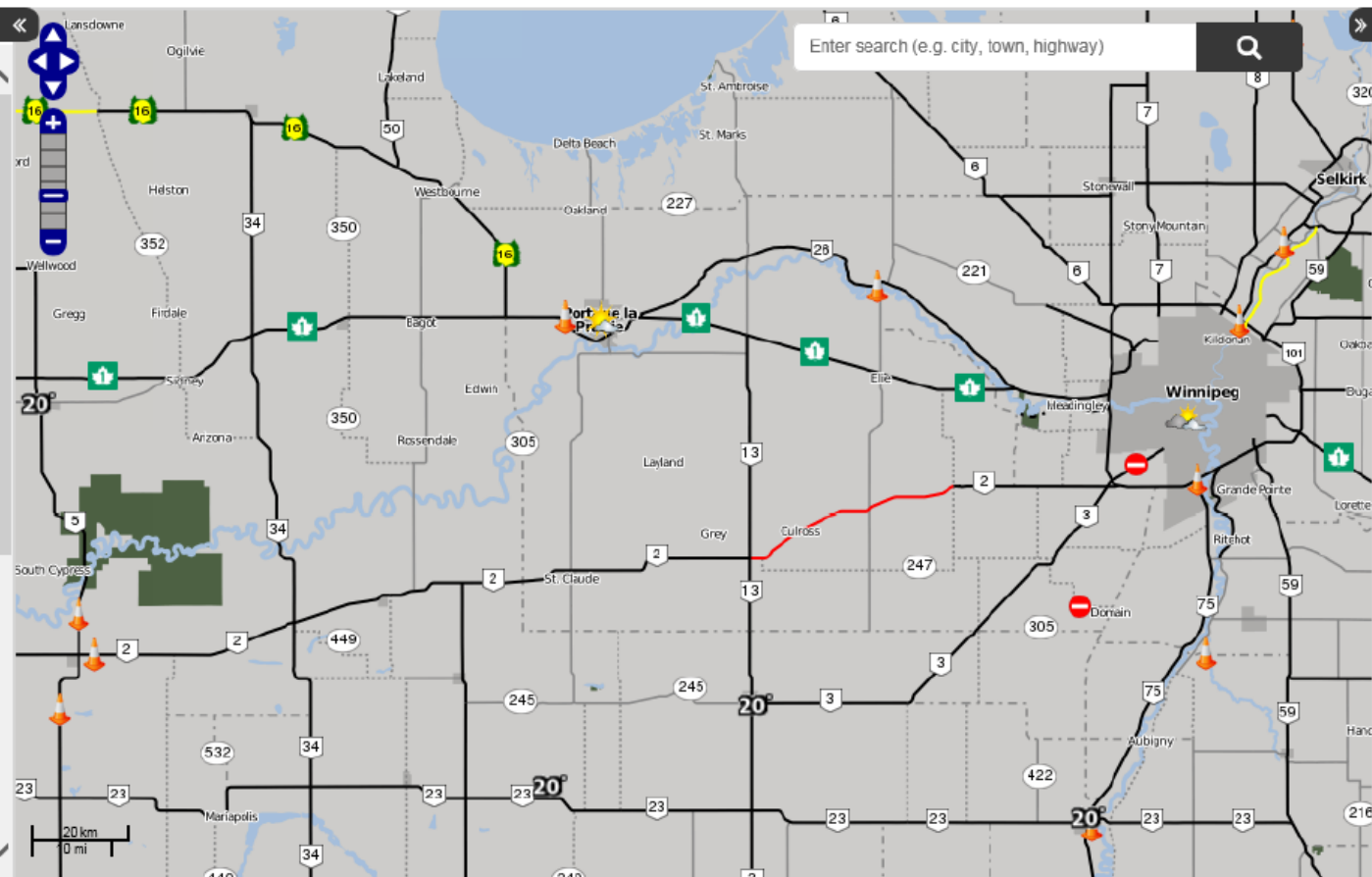
## ■ Parks

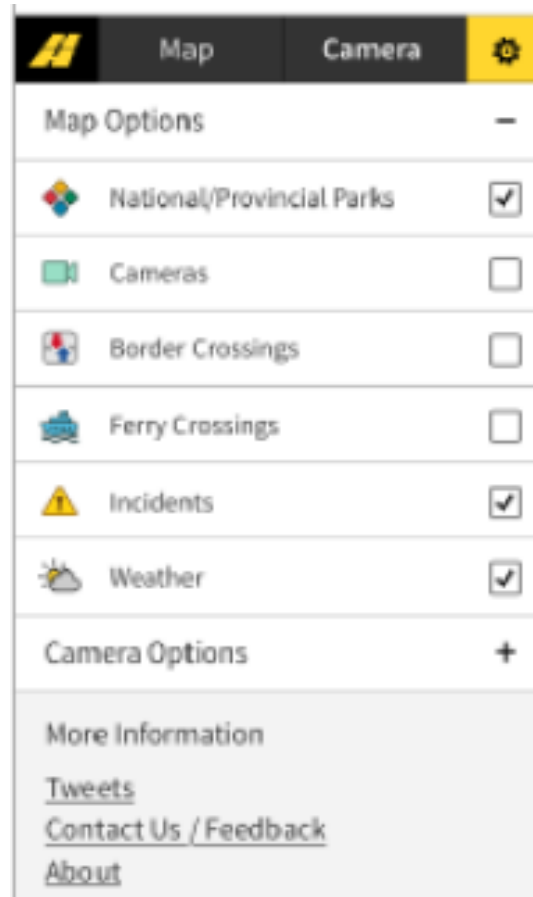
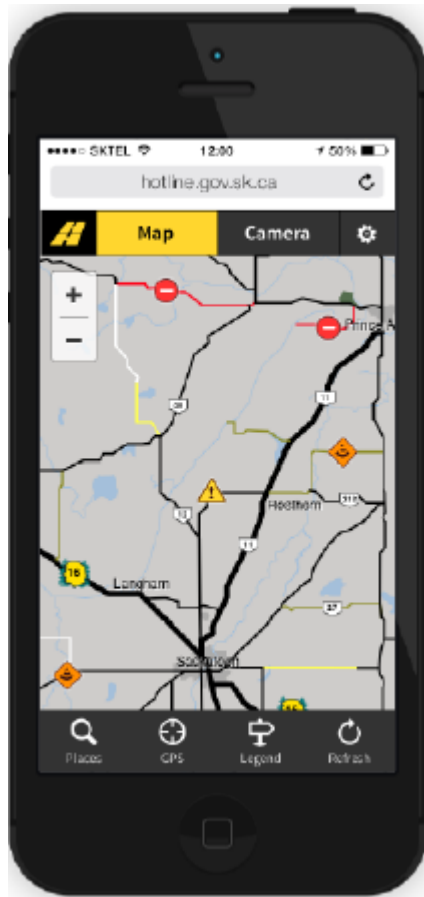
- Provincial Park  
National Park

## ■ Cameras

- ## Cameras























### Additional Information



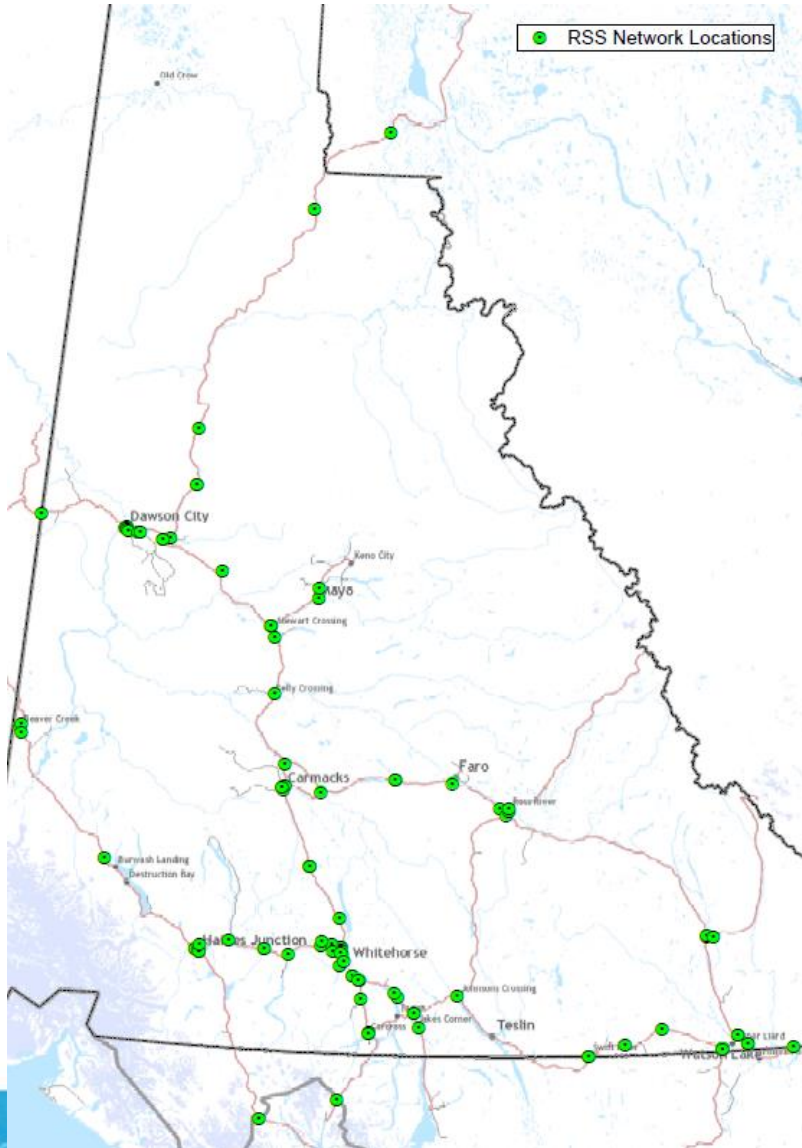


# Ferry Application

Ferry Manifest System - Development Environment T. DAWSON Logout

 Cars		<input type="text" value="0"/>	
 Trucks		<input type="text" value="1"/>	
 Fuel Truck		<input type="text" value="0"/>	
 Motorcycles		<input type="text" value="1"/>	
 Buses		<input type="text" value="1"/>	
 People		<input type="text" value="0"/>	
 Crew		<input type="text" value="1"/>	
Direction	<input type="text" value="To Dawson City"/> 		
Save Manifest		Clear	

# Traffic Monitoring Program



## Remote Sensing Technologies:

- Weigh Stations,
- Traffic Counters,
- Thermistors,
- Border Counts, and
- RWIS Stations



## Expansion of Traffic Count Network:









# Raw Data

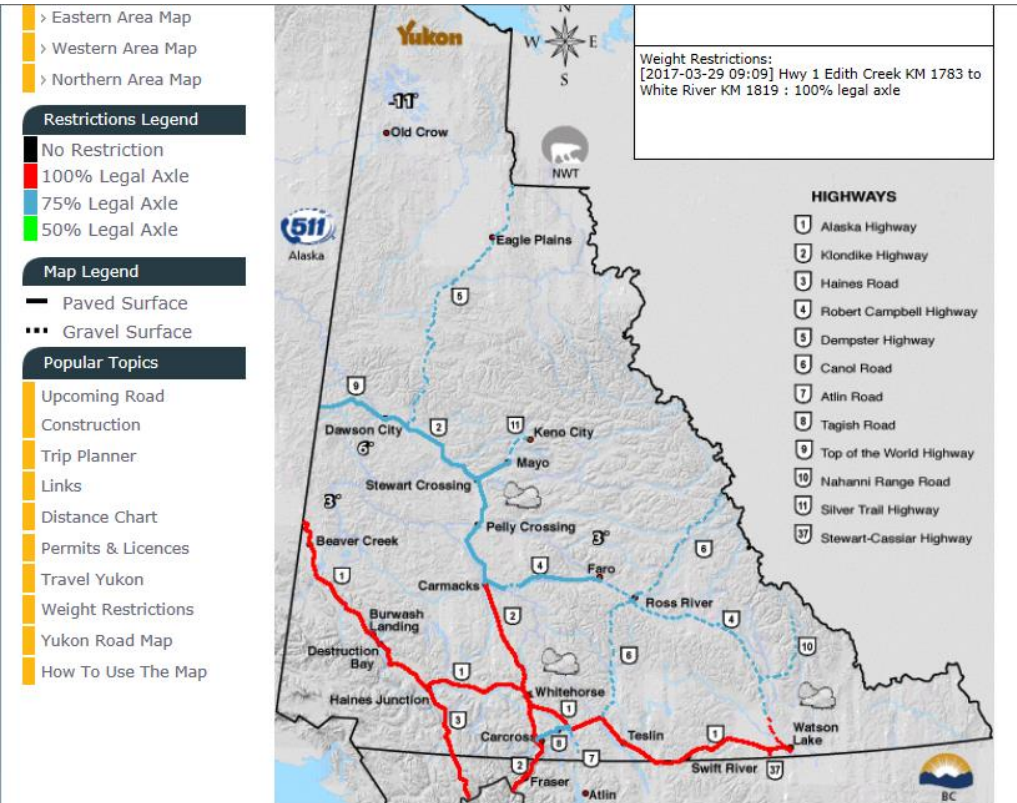
Site \* Start Date \* End Date \* Include Blanks \*

- Braeburn Traffic (BRT)
- CEE CEE Traffic (CCT2)
- Carcross Traffic (CCT)
- Carmacks Traffic (CAT)
- Champagne (CH)
- Dempster Cutoff (DEMC)
- Dome Road (DOME)
- Drury Creek (DRU)
- Haines Junction Bridge/Airport (HJB)
- Haines Junction-N. AK (HJAK)
- Jakes Corner (JAK)
- Jct 37 (JCT37)
- Klondike Camp (KLOT)
- N. Klondike/AK Hwy Jct (NKAK)
- S. Klondike/AK Hwy Jct (SKAK)
- Stewart Traffic (STWT)
- Swift River (SWI)
- Takhini Hot Springs Road (THS)
- Tuchitua (TUC)**
- WL Airport (WLAT)

# *Data Validation*

Start Range	End Range	Tolerance (%)	Standard Deviation	Max Value	Edit
0	10	200	5	30	
11	50	75	10	100	
51	200	40	40	400	
201	1,000	25	50	1,500	
1,001	5,000	20	100	10,000	
5,001	20,000	15	200	15,000	

# Frost Depth Monitoring



## Daily Max

Date \*

2017-04-03

Run

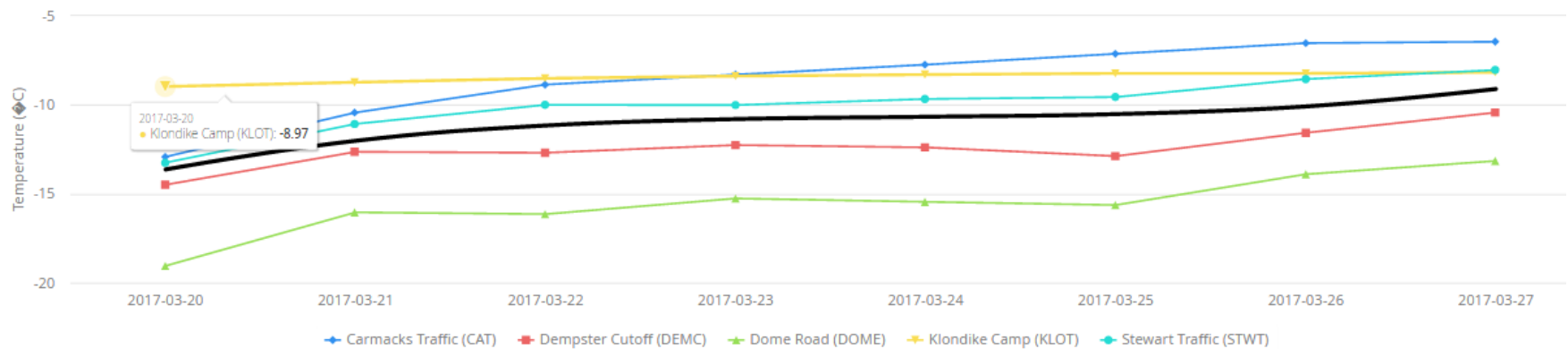
Download to CSV

Site	0.3 m	0.5 m	0.7 m	0.9 m	1.0 m
AK Hwy km 1457.4 (TKT)		-1.35			-3.03
Beaver Creek Town (BCT)	-4.77	-7.12	-8.35	-10.02	
Braeburn Traffic (BRT)	-1.19	-2.28	-3.15	-3.56	
Carcross Traffic (CCT)		-0.24	0.79	-2.12	
Carmacks Traffic (CAT)	-2.15	-3.1	-3.7	-4.44	
Dempster Cutoff (DEMC)	-1.38	-3.75	-4.92	-5.78	
Dome Road (DOME)	-5.76	-1.69	-3.32	-4.94	
Drury Creek (DRU)	-0.94	-2.66	-2.88	-3.9	
Haines Junction Bridge/Air	-2.01	-4.1	-4.44	-4.07	
Jakes Corner (JAK)	-0.64	-4.5	-2.36	-2.97	
Jct 37 (JCT37)	-2.62	-3.8	-4.6	-5.13	
Klondike Camp (KLOT)	-3.44	-4.36	-4.84	-5.21	
S. Klondike/AK Hwy Jct (SK)	-2.15	-3.38	-5.83	-4.52	
Stewart Traffic (STWT)	-1.54	-3.45	-3.77	-3.43	
Swift River (SWI)	2.1	0.33	-1.77	-1.5	
Tuchitua (TUC)	1.6	-2.81	-3.3	-4.73	
WL Weigh Scales (WLWS)		-0.41	-0.76	-1.25	
WLAC (WLAC)	-1.58	-2.53	-3.11	-4.38	

# Daily Max Chart

Sites \*  Depth \*  Start Date \*  End Date \*

Daily Max - ROAD 0.3 m



Date	Carmacks Ti	Dempster C	Dome Road	Klondike Ca	Stewart Traf
2017-03-20	-12.92	-14.49	-19.05	-8.97	-13.25
2017-03-21	-10.43	-12.64	-16.04	-8.73	-11.07
2017-03-22	-8.86	-12.69	-16.14	-8.51	-10
2017-03-23	-8.3	-12.26	-15.26	-8.38	-10.01
2017-03-24	-7.74	-12.39	-15.45	-8.3	-9.67
2017-03-25	-7.13	-12.88	-15.63	-8.23	-9.56
2017-03-26	-6.53	-11.57	-13.9	-8.23	-8.55
2017-03-27	-6.45	-10.43	-13.15	-8.17	-8.04

# Multi Depth Daily Max Chart

Site \*  
 Klondike Camp (KLOT)

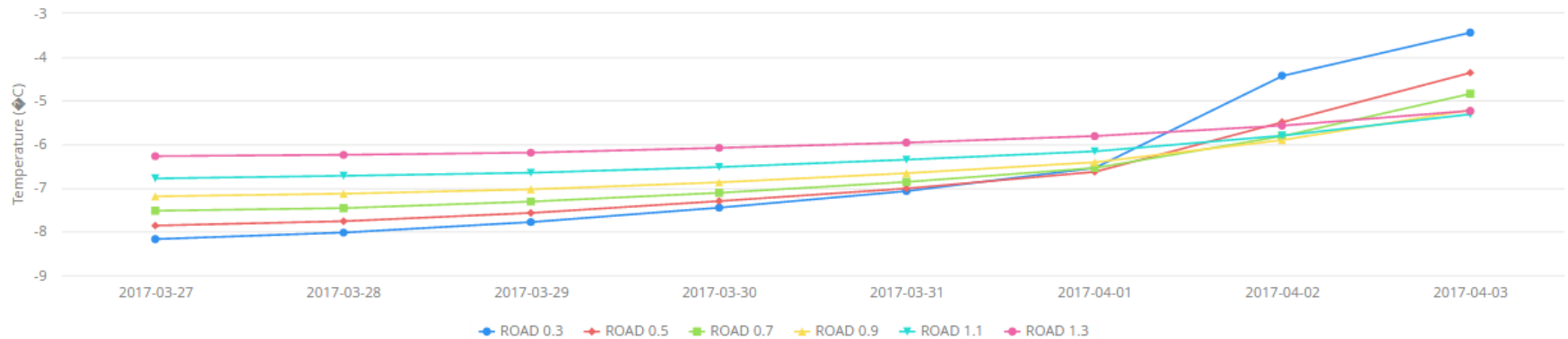
Depth \*  
☒ 0.3 ☒ 0.5 ☒ 0.7  
☒ 0.9 ☒ 1.1 ☒ 1.3

Start Date \*  
 2017-03-27

End Date \*  
 2017-04-03

[Run](#)
[Download to CSV](#)

Daily Max - Klondike Camp [0.3m, 0.5m, 0.7m, 0.9m, 1.1m, 1.3m]

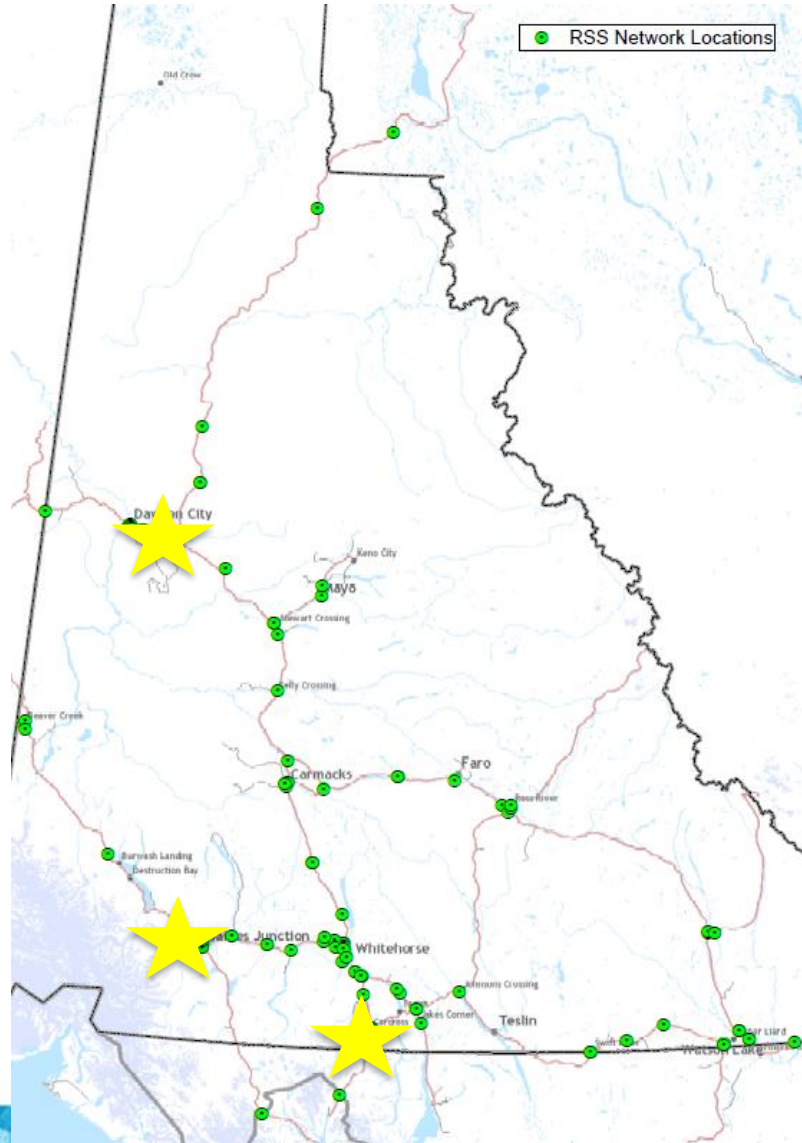


Date	ROAD 0.3	ROAD 0.5	ROAD 0.7	ROAD 0.9	ROAD 1.1	ROAD 1.3
2017-03-27	-8.17	-7.86	-7.52	-7.19	-6.78	-6.27
2017-03-28	-8.02	-7.76	-7.46	-7.13	-6.72	-6.24
2017-03-29	-7.78	-7.57	-7.31	-7.03	-6.65	-6.19
2017-03-30	-7.45	-7.3	-7.11	-6.87	-6.52	-6.08
2017-03-31	-7.07	-7.01	-6.86	-6.66	-6.35	-5.96
2017-04-01	-6.54	-6.63	-6.54	-6.41	-6.16	-5.81
2017-04-02	-4.43	-5.49	-5.81	-5.9	-5.8	-5.57
2017-04-03	-3.44	-4.36	-4.84	-5.21	-5.31	-5.23

# *Commercial Vehicle Operations*



# Variable Message Boards



# *Speed Radar Boards*



## Future Direction:

- Continue developing program areas and integrating data into the DW,
- Continuation of joint projects,
- Connecting/ sharing data with neighbouring jurisdictions (Alaska, BC and NWT),
- Create new partnerships (wildlife collision prevention, international border crossing for commercial vehicles and fleet information management system), and
- Advocacy for Funding – Federal and Territorial.

# ITS Achievements and Lessons Learned:

## ITS Achievements:

- Establishment of ITS program within Transportation Division,
- Data Warehouse (DW) (SQL server with applications for decision making),
- Collection of historical data and integration into DW,
- Enhancements to the Traffic and Geotechnical monitoring programs, and
- Collaboration with partnering organization, government departments and branches.

## ITS Lessons Learned:

- Reliance on contractors to maintain data put Yukon Government at risk,
- Project costs, and
- Utilizing internal resources.

# Thank You!

## ITS Program Manager:

Amanda Price

Transportation Analyst, Transportation Engineering Branch

Highways and Public Works, Yukon Government

[amanda.price@gov.yk.ca](mailto:amanda.price@gov.yk.ca)

(867) 336-0151