



# 2011 DIRT Report

Damage Information Reporting Tool Analysis & Recommendations for the Province of British Columbia







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#### INTRODUCTION



#### I. BC Common Ground Alliance

The BC Common Ground Alliance (BCCGA) is a non-profit organization established to lead development of consistent practices and coordination of activities to ensure the highest possible standards of worker safety, public safety and damage prevention in connection with underground infrastructure.

The BCCGA is a unique consensus-driven organization with a direct conduit to regulatory innovation. It is open to any individual or organization with an interest in safety and underground infrastructure. The BC Common Ground Alliance considers that all involved with underground infrastructure or disturbance are responsible and accountable for the safety of their own procedures. It acknowledges, however, that it is in everyone's best interest to work together to develop safe and consistent practices.

The BCCGA has over 400 members and reaches a network of over 2,500 excavators throughout the province.

The BCCGA works to offer practical tools and to foster an environment in which anyone resident or doing business in British Columbia is aware of and compliant with best practices in regard to underground infrastructure or disturbance in order to ensure the safest possible environment for the workers and citizens of the province.

For more information please visit our website at: www.commongroundbc.ca

#### II. Damage Information Reporting Tool

Prior to this report, quantifying hits to underground infrastructure in BC has been uneven at best. In some cases, statistics have not been maintained. As a result, stakeholders have not been able to effectively determine how many damage events occur each year, the causes of these events or the circumstances surrounding, causing or preventing these events. Gathering information for this report begins the process of generating a high-level picture of safety and damage prevention in relation to excavation practice and the protection of underground infrastructure. This, in turn, should help all involved improve worker safety, public safety and protect underground infrastructure in BC.

This report is built on the Common Ground Alliance USA's (CGA) Damage Information Reporting Tool (DIRT). Since 2003, DIRT has been the North American standard for data collection and reporting of underground damage information. It is a secure web application that allows users to remain anonymous and submit damage/ near miss reports, browse files by the user's organization, and submit feedback and questions. Anyone involved in underground facilities can contribute to and generate information from the DIRT tool.

In 2011, the BCCGA purchased Virtual Private DIRT. This has allowed the Alliance to provide a data collection tool that is tailored to the needs of British Columbia. Any company or excavator doing business in BC can submit data by registering at www.cga-dirt.com and selecting the British Columbia Virtual Private DIRT.

The primary purpose in collecting underground facility damage data is to analyze data, learn why events occur and determine what actions by industry can prevent them in the future, thereby ensuring the safety and protection of people and infrastructure. The use of BC Virtual Private DIRT will allow the BCCGA to identify root causes, analyze trends, and ultimately help educate all stakeholders so that damages can be reduced through more effective practices and procedures.

This report is a summary of the BC Virtual Private DIRT data (currently available) regarding events that have occurred in 2011. It is the hope of the BCCGA that this report will be a useful tool for stakeholders in improving safety procedures, communications and training. Findings are analysed in the categories of facilities affected, excavation practices used and the cause of the damage or near miss event. Future BC DIRT reports will analyze trends in damage events over multiple years. Increased stakeholder reporting will create a more complete picture of circumstances surrounding damage events, allowing future reports to better serve all stakeholders.



The BCCGA encourages all interested parties to help us in our efforts by submitting their damage reports to the BC Virtual Private DIRT. To participate, simply go to www.cga-dirt.com and register as a user. Once your registration is confirmed, you can begin submitting damage information or generate reports on the existing data.

#### III. Limitations

In presenting this report, it is important to note its limitations:

- While every effort has been made to ensure we have collected the most up to date information for this report, due to the voluntary nature of participation and aspect of confidential self-reporting, this report does not include all of the events that occurred in British Columbia in 2011.
- From anecdotal feedback, it is clear that not all stakeholders are aware of the benefits of using DIRT to report hits and near misses. However, with proper education it is the hope of the BCCGA that each year will see increased industry participation.
- The self-reporting nature of DIRT means that the information reported can be coloured by the interests of the reporting stakeholders. Again, with education, these biases can be overcome through increased stakeholder participation representing diverse viewpoints.
- As the BC Virtual Private DIRT has been adopted only recently, some of the entered data has been
  converted from internal databases maintained by independent operators. As a result, it appears some
  operators did not collect information pertaining to certain prescribed DIRT fields. In a number of cases
  some fields were not been completed. The BCCGA hopes to improve the quality of data by educating users
  on what information is most valuable to collect.

Though we plan to improve data collection further in the future, the BCCGA is confident that the information in this report will be useful in improving, targeting and developing safety and awareness programs within the province. The current stakeholders reporting represent the largest stakeholder groups in the province. The current data also represents a geographical distribution that allows us to analyze the entire province.





#### THE DATA



#### 1.A EVENTS BY REGION

The data used in this report comes primarily from hydroelectric, gas transmission and gas distribution stakeholders. In 2011, 1,285 events were submitted to BCCGA through Virtual Private DIRT. This includes damage as well as "near miss" events. Over 90% of reports in 2011 were submitted by natural gas stakeholders, and thus primarily reflect hits on natural gas infrastructure. The natural gas distribution network is the largest underground plant operator in BC and is geographically distributed throughout the province. For these reasons, it is likely that the activity around natural gas infrastructure is reflective of activity around other underground infrastructure in British Columbia.

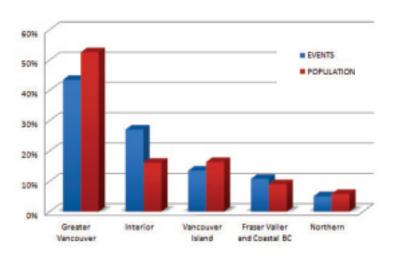
	EVE	NTS	POPULAT	ION 2011
REGIONAL DISTRICT	COUNT	%	COUNT	%
Alberni-Clayoquot	3	0.23	31,664	0.69
Bulkley-Nechako	2	0.16	39,371	0.86
Capital	79	6.15	374,675	8.19
Cariboo	29	2.26	65,847	1.44
Central Coast	0	0	3,182	0.07
Central Kootenay	21	1.63	60,681	1.33
Central Okanagan	97	7.55	187,234	4.09
Columbia-Shuswap	26	2.02	53,748	1.18
Comox-Strathcona	37	2.88	109,303	2.39
Cowichan Valley	21	1.63	83,300	1.82
East Kootenay	21	1.63	60,301	1.32
Fraser-Fort George	33	2.57	96,928	2.12
Fraser Valley	97	7.55	286,981	6.28
Greater Vancouver	559	43.5	2,404,911	52.59
Kitimat-Stikine	0	0	39,702	0.87
Kootenay Boundary	26	2.02	31,851	0.7
Mount Waddington	0	0	12,034	0.26
Nanaimo	34	2.65	150,632	3.29
North Okanagan	45	3.5	83,052	1.82
Northern Rockies	5	0.39	6,324	0.14
Okanagan-Similkameen	34	2.65	82,644	1.81
Peace River	25	1.95	64,280	1.41
Powell River	4	0.31	20,525	0.45
Skeena-Queen Charlotte	0	0	19,482	0.43
Squamish-Lillooet	7	0.54	41,379	0.9
Stikine	0	0	581	0.01
Sunshine Coast	17	1.32	30,357	0.66
Thompson-Nicola	63	4.9	132,352	2.89

The reported events for 2011 roughly reflect population distribution in the province. The largest exception was Greater Vancouver, which contained 52.59% of the population but only 43.5% of the DIRT events. Conversely, Central Okanagan reflected only 4.09% of the population but had 7.55% of reported events.

There are two important trends to note in this data:

- The Greater Vancouver Regional District had the most hits.
- The Central Okanagan Regional District had the second-highest number of hits, and was an unusually high-risk location relative to population.

## PERCENT OF DAMAGE EVENTS AND PERCENT OF POPULATION IN EACH GEOGRAPHIC AREA

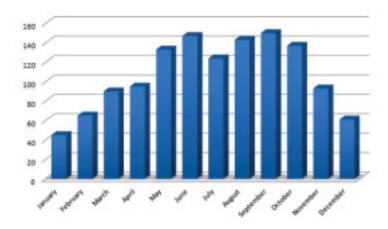


These trends continue when the 28 regional districts are divided into five geographic areas. When divided in this way, it is clear that Greater Vancouver had comparatively fewer events compared to population than other geographic areas. The Interior had comparatively more events based on population than any other geographical area with 16% of the total population but 27% of the DIRT events.

This is an indication that education and awareness programs could have the greatest effect in these two areas. For example, safety education and awareness programs in Greater Vancouver could reach a high number of excavators, and programs in the Interior would be able to reach a population where proportionately more excavators are employing unsafe practices.

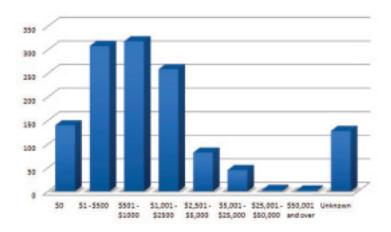


#### 1.B MONTHLY DISTRIBUTION



Construction and excavation activities occur all year in BC because of the mild climate. The data indicates that there is a clear increase in DIRT events in the broader summer months (May — October). This may be a reflection of increased excavation activity that typically occurs during these months

#### 1.C COST OF DAMAGE



DIRT asks stakeholders to report the estimated cost of damages. Of events, 80% had an estimated cost of damage below \$2,500. More specifically, 69% of events had an estimated cost between \$1 and \$2,500. Three events had an estimated cost in the \$25,001-\$50,000 range, and only two were estimated above \$50,000. Though there were very few of these high-cost events, they represent the highest risk to workers and the public and should be monitored closely.

#### 1.D SUMMARY - THE DATA

- Reported events loosely followed population lines within the province, with the Interior and specifically Central Okanagan having more events relative to population than any other geographic area.
- Greater Vancouver had the largest share of damage events.
- Most DIRT events occurred in the broader summer months (May – October).
- 69% of events had an estimated cost of damage between \$1 and \$2,500. It is important to note that a lower estimated cost does not necessarily indicate a lower safety risk. There is a potential for injury with any size event.



#### **FACILITIES AFFECTED**



Of the data received for British Columbia for 2011, the majority was drawn from natural gas stakeholders. As such, over 91% of reports listed "facility operations affected" as natural gas. Electric operations were affected in 8% of reports. The remaining 1% was divided between telecommunications and water.

#### 2.A FACILITIES AFFECTED

FACILITY AFFECTED	<b>EVENTS</b>	%
Distribution	1,157	90
Service/Drop	107	8
Transmission	11	1
Gathering	8	1
Unknown/Other	2	0

Most of the damage events were in the distribution category, with service/drop being the second largest category. The predominance of distribution and service/drop facilities is a reflection of the majority of reports being recorded by natural gas or electric stakeholders.

## 2.C SUMMARY – FACILITIES AFFECTED

- Most events occurred when a distribution facility was affected.
- Most facilities affected were located on a private right of way.
- 99% of reports for 2011 selected natural gas or electric as the facility operation affected.

**EVENTS** 

660

345

167

92

18

3

51 27

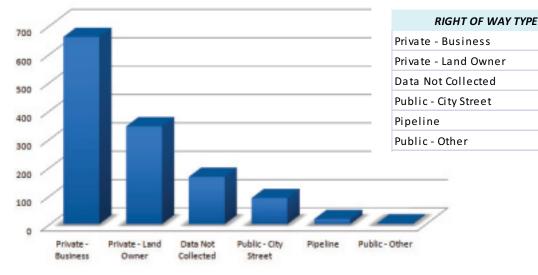
13

7

1

#### 2.B LAND TYPE





There is a DIRT field which asks reporting stakeholders to identify the right of way on which an incident took place. This question establishes the ownership or use of the land effected.

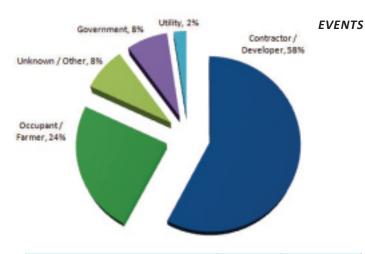
About half of all reports occurred on a private business right of way, meaning that the land effected is owned privately and used for commercial purposes, with another quarter in the private owner category. The vast majority of reported events occurred on privately owned land types. This may be an indication of safer excavation practices being used in public work than in private excavation.



#### THE EXCAVATION



#### 3.A EXCAVATOR TYPE



EXCAVATOR TYPE	<b>EVENTS</b>	%
Contractor / Developer	742	58
Occupant / Farmer	311	24
Unknown / Other	104	8
Government	98	8
Utility	30	2

A strong majority of reported events involved the contractor / developer excavator type. This finding is consistent with the DIRT data in other regions of North America.

**EXCAVATION TYPE** 

3.B

EXCAVATION TYPE	<b>EVENTS</b>	%
Hoe / Trencher	826	91
Hand Tools	71	8
Drilling	11	1
Miscellaneous	1	0

Of reports where data was collected, over 91% of events involved the hoe/trencher group. This is consistent with DIRT reports of other regions and reflects the popularity of hoes and trenchers as primary tools of excavation for large and small projects.

#### 3.D SUMMARY - THE EXCAVATION

- 58% of events had an excavator type in the contractor/developer group.
- 91% of events occurred while using a backhoe, trackhoe or trencher.
- The most-selected work performed group was construction / development, followed by water and landscaping / fencing.

#### 3.C WORK PERFORMED

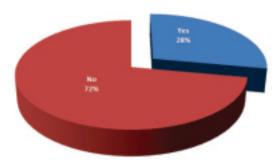
WORK PERFORMED	<b>EVENTS</b>	%
Construction / Development	278	36
Water	199	26
Landscaping / Fencing	127	17
Energy / Telecommunication	82	11
Street	60	8
Agriculture	19	2

Of reports where data was collected, 36% of events fell into the construction / development group. The top three groups, construction / development, water and landscaping / fencing represent 79% of all known work performed in damage events.



#### THE CAUSES

#### 4.A NOTIFICATION



All excavators are required to call before they dig in the province of BC. It is clear from the data that 72% of damage events occurred when BC One Call was not notified. It is likely that many of these events could have been avoided if proper notification was intiaited.

The BC One Call Centre is an important safety resource. BC One Call partners with its member institutions to communicate the location of underground infrastructure. When compared with other provinces and US states, BC clearly underuses this valuable service. In 2011, Alberta One Call serviced over 246,000 calls while BC One Call only saw 100,000 tickets. It is clear that increased awareness and use of BC One Call would be an extremely effective step towards reducing damage to underground in British Columbia.

From any phone in British Columbia, BC One Call can be reached toll-free at 1-800-474-6886 or from Telus or Rogers cellular phones by pressing \*6886. More information can be found at http://www.bconecall.bc.ca.

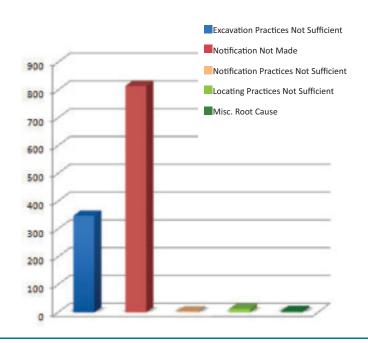
In addition to contacting BC One Call, private marking and locating services can be found throughout the province to help verify facilities.

#### 4.B ROOT CAUSE

- Where a root cause was listed, 68% of the damage events in BC had a root cause of notification not made. This supports the importance of notification in reducing excavation damage.
- The "excavation practices not sufficient" group was also responsible for a large portion of the 2011 events. It is possible that excavators are not aware of the appropriate techniques and practices when working around underground infrastructure. The BCCGA publishes an industry-reviewed Best Practices guide which is available free of charge at www.commongroundbc.ca.

#### 4.3 SUMMARY - THE CAUSES

- 72% of damage events occurred when the BC One Call Centre had not been notified.
- The majority of events were caused by insufficent notification and location practices.
- Increased notification and use of BC One Call could have a significant impact on the frequency of hits to underground infrastructure in British Columbia.





#### CONCLUSION



Since 2003, DIRT has been used throughout North America to collect data on accidents and near miss events involving underground infrastructure. This data allows province-wide, cross-industry analysis that can be used by the Common Ground Alliance and other groups to design and target safety initiatives in the hope of reducing future incidents.

In its first year, BC Virtual Private DIRT collected 1,285 event reports from stakeholders. While more cross-sectoral industry participation will make a more powerful data set in subsequent reports, a number of important conclusions and recommendations can be drawn. These include:

#### 1. INCREASED REPORTING

#### Conclusion:

Increased stakeholder reporting would greatly improve the depth of content for future DIRT reports.

#### Recommendation:

BCCGA will work with industry and stakeholders to increase reporting of damage and near-miss events. This is in the interest of both worker and public safety.

#### 2. BCONE CALL

#### Conclusion:

The majority of events occurred when notification did not occur. It can be inferred from this that proper notification and location verification could significantly reduce incidents in British Columbia. In fact, increased use of BC One Call may be the most valuable step towards decreasing damage to underground infrastructure in BC.

#### Recommendation:

It is imperative that the excavation community be made aware of the availability and benefits of the BC One Call Centre and the rules and regulations associated with underground infrastructure.

# 3. LOCATION OF EVENTS - GREATER VANCOUVER

#### Conclusion:

The Greater Vancouver Regional District, while having a lower percentage of hits per capita, still has the majority of incidents in the province. This is due to the higher population and thus higher levels of both infrastructure and excavation activity.

#### Recommendation:

Targeting education and awareness activities in Greater Vancouver should reach the largest number of excavators and thus have the greatest effect on the number of damage events in BC.

#### 4. LOCATION OF EVENTS - THE INTERIOR

#### Conclusion:

The Interior region had more events proportionate to population than any other geographic area, while also having the second-largest share of damage events in the province.

#### Recommendation:

Increased safety training in the Interior area could be beneficial to reducing excavation damage. Though these programs would not reach as many excavators as programs in Greater Vancouver, they would reach a population with particularly high risk relative to population.

#### 5. TIMING OF EVENTS

#### Conclusion:

There are increased damage events in the summer months.

#### Recommendation:

In British Columbia, excavation safety and awareness programs should focus on the months of May to October. To avoid disturbing busy work times, programs that require a time commitment, such as safety courses, should ideally be scheduled outside of this busy time. Awareness techniques that require little or no time commitment from the excavator, such as poster campaigns, should take place during the busiest months.

#### 6. CONTRACTOR COMMUNITY

#### Conclusion:

The majority of events occurred when contractors were working on privately owned land.

#### Recommendation:

Safety and awareness programs would be most effective if targeted towards contractors, particularly those that are usually contracted by private businesses and landowners.

To participate in DIRT, simply go to www.cga-dirt.com and register as a user. Once your registration is confirmed, you can begin submitting damage information or generate reports on the existing data.



## **APPENDIX A - SUMMARY TABLE OF DIRT DATA ELEMENTS**

STAKEHOLDER GROUP S	UBMISSION	4.005
Events With Known Data	1 100	1,285
Natural Gas	1,180	92%
Electric	105	8%
TYPE OF FACILITY OPE	RATION	
Events with Known Data		1,285
Natural Gas	1,175	91.44%
Electric	108	8.40%
Water	1	0.08%
Telecommunications	1	0.08%
2.A - TYPE OF FACILITY	AFFECTED	
Events with Known Data	AFFECIED	1,283
Distribution	1,157	90.18%
Service/Drop	1,137	8.34%
Transmission	11	0.86%
Gathering	8	0.62%
2.B - RIGHT OF WAY	Y TYPE	
Events with Known Data		1,115
Private - Business	660	51.36%
Private - Land Owner	345	26.85%
Public - City Street	92	7.16%
Pipeline	18	1.40%
3.A - EXCAVATOR G	ROUP	
Events with Known Data		1,181
Contractor / Developer	742	62.83%
Occupant / Farmer	311	26.33%
Government	98	8.30%
Utility	30	2.54%
3.B - EXCAVATION EQUIPN	MENT GROUP	000
Events with Known Data	826	909 90.87%
Hoe / Trencher		
Hand Tools	71	7.81%
Drilling Miscellanious	11	1.21% 0.11%
Wiscerramous	1	0.1170
4.B - ROOT CAUSE G	GROUP	
Events with Known Data		1,190
Notification Not Made	815	68.49%
Excavation Practices Not Sufficient	348	29.24%
Locating Practices Not Sufficien	13	1.09%
Other	9	0.76%
	5	0.42%
Misc. Root Cause	3	0.42/0



### **APPENDIX B - GROUPINGS USED IN REPORT**

#### **GEOGRAPHIC AREA**

Group	Administrative Region
Greater Vancouver	Greater Vancouver
Fraser Valley and Coastal BC	Central Kootenay, Fraser Valley, Powell River, Sunshine Coast
Interior	Cariboo, Central Okanagan, Columbia-Shuswap, East Kootenay, Kootenay Boundary, North Okanagan, Okanagan-Similkameen, Squamish-Lillooet, Thompson-Nicola
Northern	Fraser-Fort George, Northern Rockies, Peace River
Vancouver Island	Alberni-Clayquot, Capital, Comox-Strathcona, Cowichan Valley, Nanaimo

#### **EXCAVATOR GROUPING**

Group	Type of Excavator
Contractor / Developer	Contractor, Developer
Occupant / Farmer	Occupant, Farmer
Utility	Utility
Government	Province, Regional District, Municipality
Other	Railroad

#### **EXCAVATION EQUIPMENT GROUPING**

Group	Type of Excavation Equipment
Hoe / Trencher	Backhoe, Trackhoe, Trencher
Hand Tools	Hand Tools, Probe
Drilling	Auger, Bore, Directional Drill, Drill
Other	Grader, Scraper, Road Milling Equipment, Explosives, Vacuum Equipment, Farm Implement

#### **WORK PERFORMED GROUPING**

Group	Type of Work Performed
Water	Sewer, Water
Energy / Telecommunication	Natural Gas, Electric, Steam, Liquid Pipe, Telecom, Cable TV
Construction / Development	Construction, Site Development, Grading, Drainage, Driveway, Demolition, Engineering, Railroad, Waterway
Street	Roadwork, Curb / Sidewalk, Storm Drainage, Milling, Pole, Traffic Signals, Traffic Signs, Streetlight, Public Transit
Landscaping / Fencing	Landscaping, Fencing
Agriculture	Agriculture, Irrigation

#### **ROOT CAUSE GROUPING**

Group	Root Cause
Excavation Practices Not Sufficient	Failure to maintain clearance, Failure to support exposed facilities, Failure to use hand tools where required, Failure to test hole (pot-hole), Improper Backfill
	practices, Failure to maintain marks, excavation practices not sufficient (other)
Notification Not Made	No notification made to one call centre
Locating Practices Not Sufficient	Incorrect facility records / maps, Facility marking or location not sufficient, Facility was not located or marked, Facility could not be found or located
Notification Practices Not Sufficient	Notification of one call centre made but not sufficient, Wrong information provided to one call centre
Misc. Root Cause	Abandoned, One call centre error, Deteriorated, Previous damage



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This Report is based upon data voluntarily submitted by industry stakeholders into DIRT. The data submitted to the BCCGA is neither inclusive of all facility events, nor is it a random sample of facility events that occurred during the year covered by the Report. The Report and the analysis of data reflected in the Report may not be representative of what is actually occurring in any particular geographic area(s) or for any particular industry group(s). For these reasons, the BCCGA cautions you as to the conclusions that may be drawn from the Report.

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