

“The Value of Good Geotechnical Data  
Management”

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Keynetix

1. What is geotechnical data management?
2. What are the financial implications?
  1. On site
  2. In the laboratory
  3. At the offices
  4. National Archive
3. How can you increase data value?

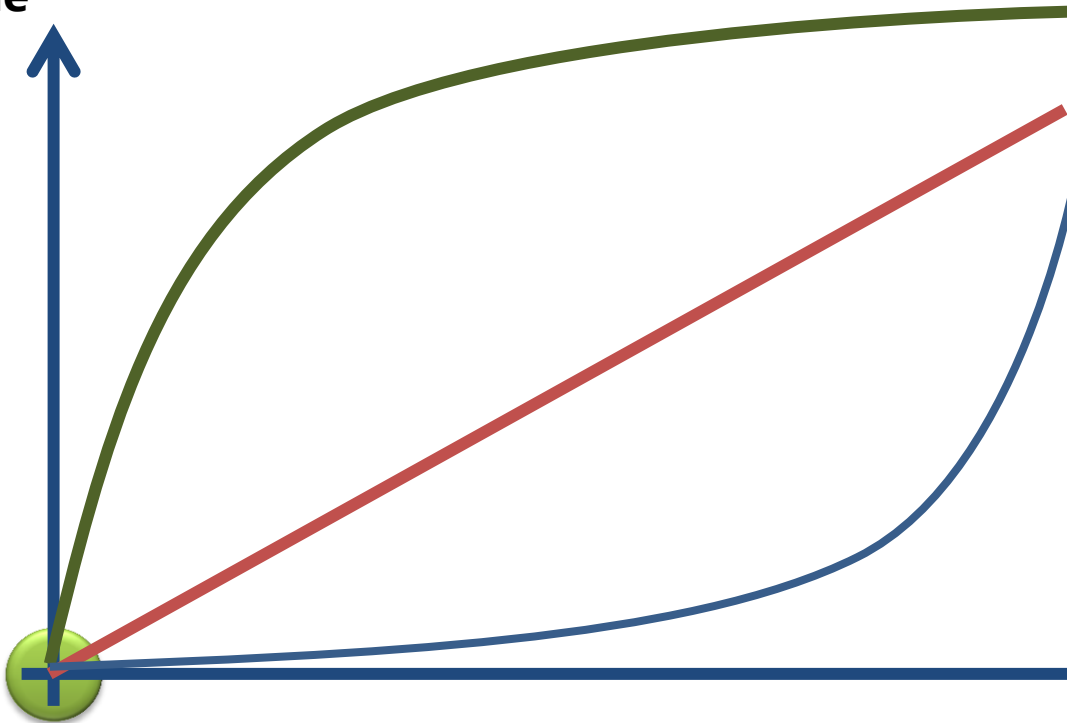
# How do you measure the value of data?



Value



Use



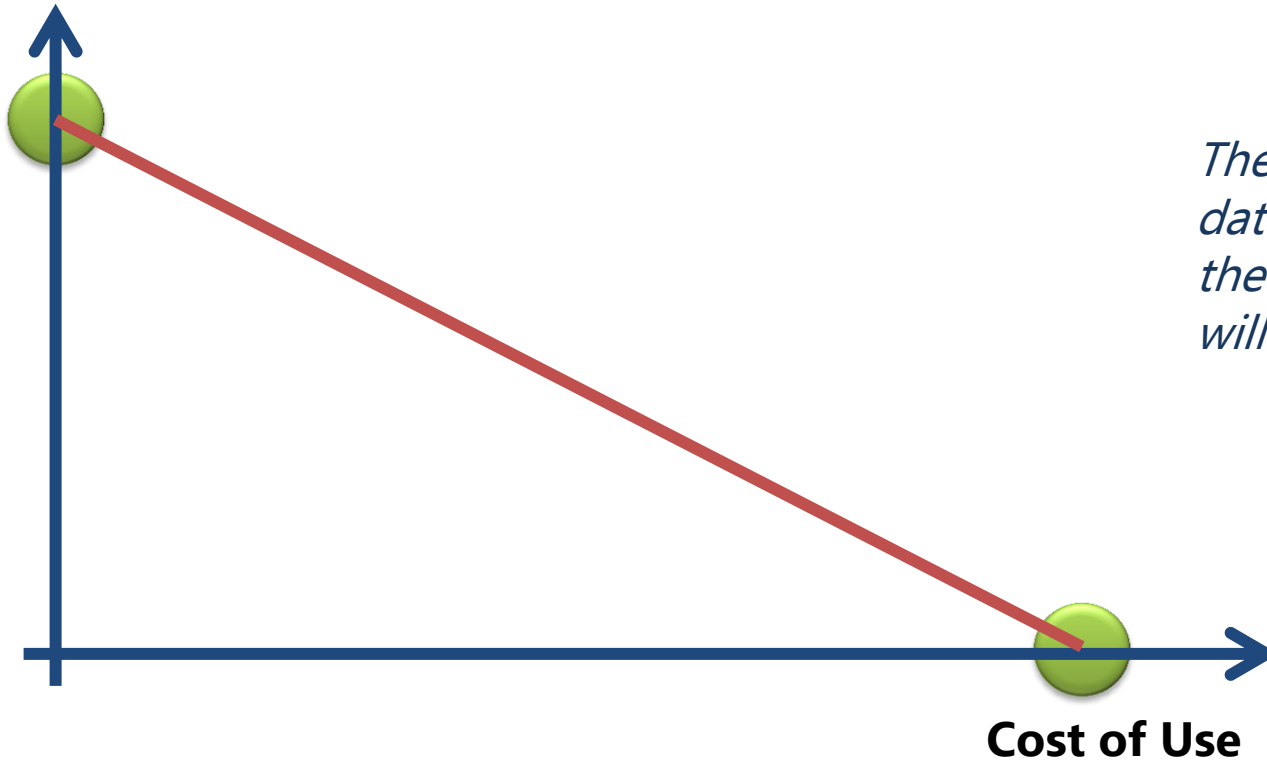
*The more you use the data the more valuable it is*

Measuring the value of data

# How many times will you use the data?



Number  
of uses



*The easier the  
data is to use  
the more you  
will use it*

Measuring the value of data

# Ease of use affects the value of the data



**Ease of use**



**Uses**



**Value**

Measuring the value of data



# WHAT IS GEOTECHNICAL DATA?

Knowledge



Information



Data

### Knowledge

- Better design
- Control of risk
- Cost effective

### Information

- Borehole logs
- Sections
- Site plans
- Charts

### Site Investigation data

- Field observations
- Lab data
- Monitoring Data
- Environmental data

What is data?

- Data is the building block for everything we do.

Step 1 - Create data

Step 2 - Create information from data

~~Step 3 - Ignore data~~

Data is what we do






- Is this Data or Information?
  - Can you process it into one or more forms of information without re-entering it or having a PhD in cutting and pasting technology?
    - Yes = Data
    - No = Information

Do I have data or information?



Warning

# AUDIENCE PARTICIPATION ALERT

		Keynetix Ltd Systems House Redditch B98 5PA Tel: 01527 68888		Borehole No <b>BH127</b> Sheet 1 of 2				
Project Name Quinley Gasworks Rev 4		Project No. DLR23099	Co-ords: 399888E - 301131N		Hole Type Cable			
Location: Quinley Embankment		Level: 13.45 m AOD		Scale 1:50				
Client: Key County Unitaries		Dates: 29/09/1991		Logged By MWJ				
Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00	J					TOPSOIL (FILL)
		0.50	D					
		0.50	U		0.75	12.70		Sandy grey brown soil with many fragments of glass and plastic. MADE GROUND (FILL)
		1.45-1.50	D		1.10	12.95		Dense grey-brown SAND with medium poorly graded gravel of mudstone, SANDY STUFF (GLACIAL TILL)
		1.80	D					
		2.00	SPT	N=16 (2,3/ 4,4,4,4)				
		2.00-2.45	D					
		2.45-2.80	B		2.70	10.75		Firm brown very sandy CLAY with a little subangular to subrounded medium gravel subrounded medium gravel, subrounded medium gravel subrounded medium... gravel subrounded medium gravel, GRAVELS (BOULDER CLAY)
		2.80-3.00	D					
		3.00-3.45	U					
		3.50-3.70	D					
		3.80-4.00	D					
		4.00	SPT	50 (25 for 50mm/ 50 for 30mm)				
		4.00-4.45	D					
		4.45-4.80	B					
		4.80-5.00	D					
		5.00-5.45	U					
		5.45-5.90	D					
		6.00-6.50	D					
		6.50	SPT	N=33 (5,8/ 6,10,8,9)				
		6.50-6.95	D					
		6.95-7.50	B					
		7.50	D					
		8.00-8.45	U					
		8.45-8.90	D					
		9.00-9.50	D		9.20	4.25		Brown CLAY with a little well rounded medium cobbles. (BOULDER CLAY)
		9.50	SPT	N=57 (2,5/ 7,11,9,10)				
		9.50-9.95	D					
		9.95-10.00	B					
Remarks: Borehole relocated due to obstruction								Continued next sheet



# A Borehole Log



Data

or



Information

Data or Information



# An Excel File

	A	B	C
1	Date	Location ID	Water Depth
2	02/05/2012	BH 1	24.185
3	03/05/2012	BH 1	23.82
4	04/05/2012	BH 1	23.455
5	08/05/2012	BH 1	22.37
6	09/05/2012	BH 1	21.84
7	10/05/2012	BH 1	21.885
8	11/05/2012	BH 1	21.805
9	14/05/2012	BH 1	21.5
10	15/05/2012	BH 1	21.26
11	16/05/2012	BH 1	20.5
12	17/05/2012	BH 1	20.805
13	18/05/2012	BH 1	20
14	21/05/2012	BH 1	20.115
15	22/05/2012	BH 1	20.555
16	23/05/2012	BH 1	20.465
17	24/05/2012	BH 1	20.375
18	25/05/2012	BH 1	20.21
19	28/05/2012	BH 1	20.295
20	29/05/2012	BH 1	20.42
21	30/05/2012	BH 1	20.4
22	31/05/2012	BH 1	19.9
23	01/06/2012	BH 1	19.795



**Data**

**or**



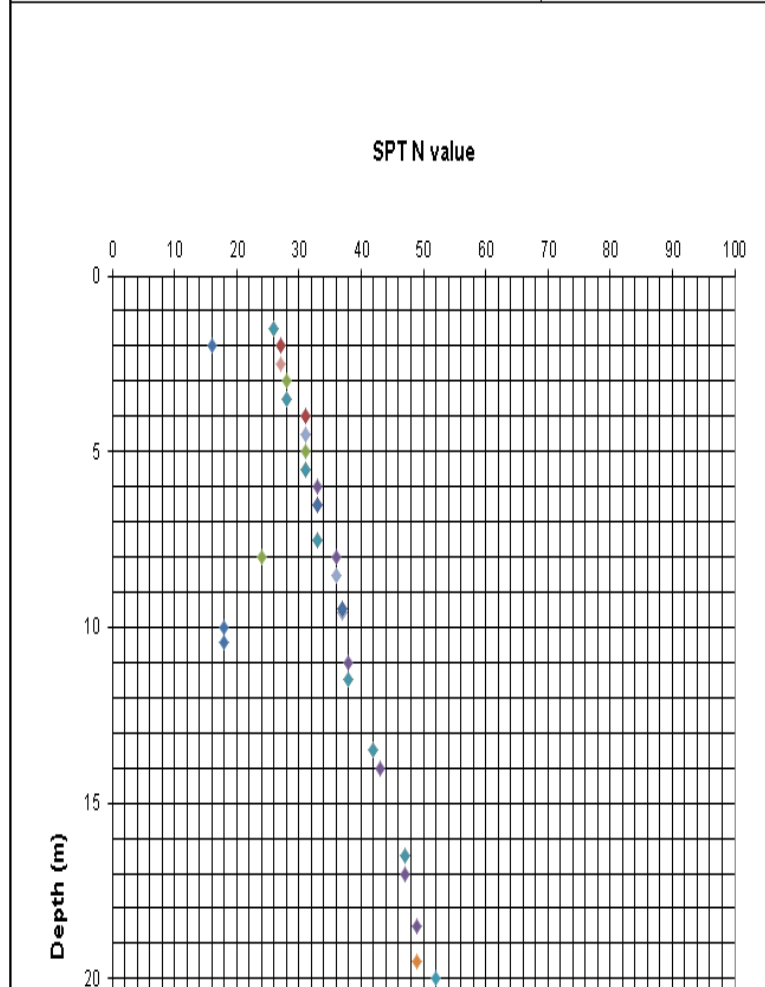
**Information**

Data or Information

# Depth Plot



<b>SPT Vs Depth</b>		Sheet	1 of 1
Client	Key County Unitaries	Job No.	DLR23099
Site	Quinley Gasworks Rev 4	Date Drawn	06/11/2012



**Data**

**or**



**Information**

Data or Information



# Laboratory Management System



**Data**

**or**



**Information**

Data or Information



# Excel Lab Report

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX ( ASTM D4318-10, Multipoint test )				Job Ref	testing1
				Borehole/Pit No.	BH1
Site Name	Sheet testing project			Sample No.	2
Soil Description				Depth	2
Specimen Reference	1	Specimen Depth	1.20 m	Sample Type	D
Specimen Description	description			KeyLAB ID	KNY_201209071
Test Method	ASTM D4318-10, Multipoint test			Date started	
<b>Sample preparation:</b>					
Tested ..... <input type="radio"/> in natural condition <input type="radio"/> after >425um removed by hand <input type="radio"/> after washing to remove >425um					
Total mass of sample	500	g	Percentage retained 425µm	50	%
Mass, greater than 425µm sieve, removed	250	g	Percentage passing 425µm	50	%
<b>Liquid Limit</b>					
	25 - 35	25 - 30	15 - 25		
No. of blows, N	12				
Container No				LL Device No.	
Mass of container	g			Mechanical or manual	
Mass of wet soil and container	g			Grooving tool No.	
Mass of dry soil and container (1)	g			Plastic or Metal	
Mass of dry soil and container (2)	g			Oven No.	
Water Content	%			Oven temperature	°C
<b>Plastic Limit</b>					
Container No				Performed by hand	
Mass of container	g			Rolling device No.	
Mass of wet soil and container	g			Oven No.	
Mass of dry soil and container (1)	g			Oven temperature	°C
Mass of dry soil and container (2)	g				
Water Content	%			Average PL	



Data

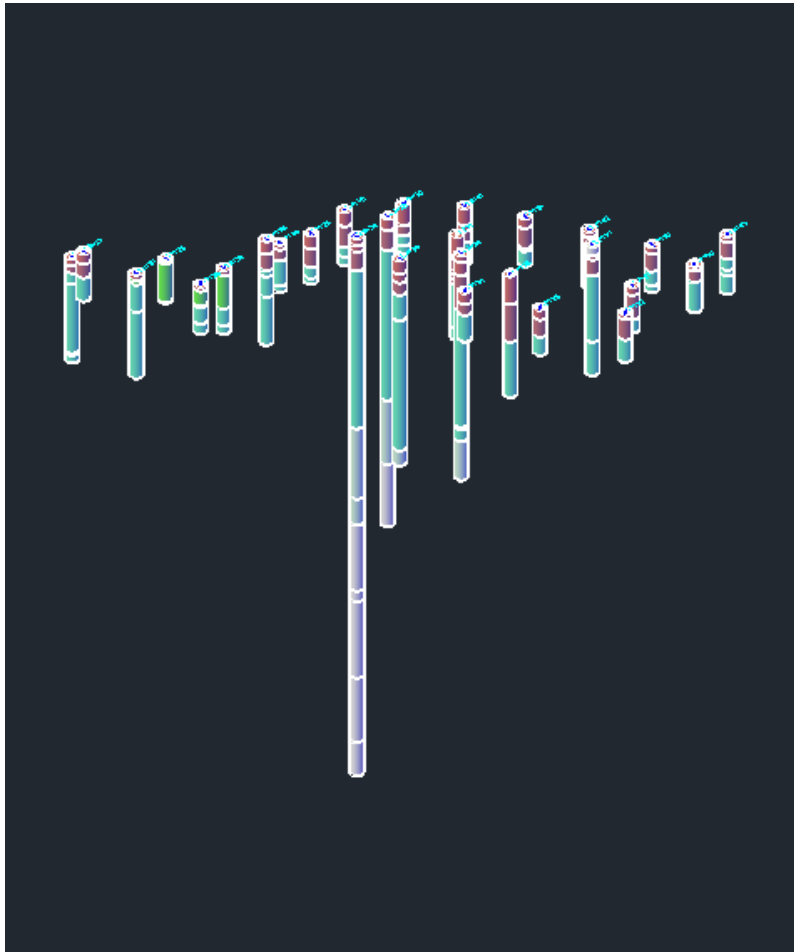
or



Information

Data or Information

# 3D BIM



**Data**

**or**



**Information**

Data or Information



# AGS Data File



```
Quinley.ags - Notepad
File Edit Format View Help
"TP131","4.000","7","D","0","4.000","","0","","","",""
"TP131","4.000","8","B","0","4.000","","0","","","",""
"TP132","0.000","1s","J","0","0.000","","0","","","",""
"TP132","0.300","1","D","0","0.300","","0","","","",""
"TP132","0.300","2","B","0","0.300","","0","","","",""
"TP132","1.500","3","D","0","1.500","","0","","","",""
"TP132","1.500","4","B","0","1.500","","0","","","",""
"TP132","2.500","5","D","0","2.500","","0","","","",""
"TP132","2.500","6","B","0","2.500","","0","","","",""
"TP132","4.000","7","D","0","4.000","","0","","","",""
"TP132","4.000","8","B","0","4.000","","0","","","",""
"TP159","0.000","1s","J","0","0.000","","0","","","",""
"TP159","0.100","1","D","0","0.100","","0","","","",""
"TP159","0.100","2","B","0","0.100","","0","","","",""
"TP159","1.200","3","D","0","1.200","","0","","","",""
"TP159","1.200","4","B","0","1.200","","0","","","",""
"TP159","2.500","5","D","0","2.500","","0","","","",""
"TP159","2.500","6","B","0","2.500","","0","","","",""

***CLASSS
"*HOLE_ID", "*SAMP_TOP", "*SAMP_REF", "*SAMP_TYPE", "*SPEC_REF
"*CLASS_VNPK", "*CLASS_VNRM", "*?CLASS_REM", "*?FILE_FSET"
<UNITS> "m", "m", "m", "%", "%", "%", "Mg/m3", "Mg/m3", "Mc
BH127", "0.500", "1", "D", "1", "0.500", "31.00", "37.00", "0.00"
BH127", "0.500", "2", "U", "1", "0.500", "37.00", "40.00", "34.00"
BH127", "1.450", "3", "D", "1", "1.450", "38.00", "40.00", "28.00"
BH127", "1.800", "4", "D", "1", "1.800", "44.00", "47.00", "35.00"
BH127", "2.000", "5", "D", "1", "2.000", "38.00", "43.00", "32.00"
BH127", "2.450", "6", "B", "1", "2.450", "38.00", "40.00", "35.00"
BH127", "2.800", "7", "D", "1", "2.800", "38.00", "42.00", "34.00"
BH127", "3.000", "8", "U", "1", "3.000", "32.00", "47.00", "29.00"
BH127", "3.500", "9", "D", "1", "3.500", "44.00", "48.00", "33.00"
BH127", "3.800", "10", "D", "1", "3.800", "41.00", "47.00", "33.00"
BH127", "4.000", "11", "D", "1", "4.000", "38.00", "41.00", "35.00"
BH127", "4.450", "12", "B", "1", "4.450", "39.00", "42.00", "35.00"
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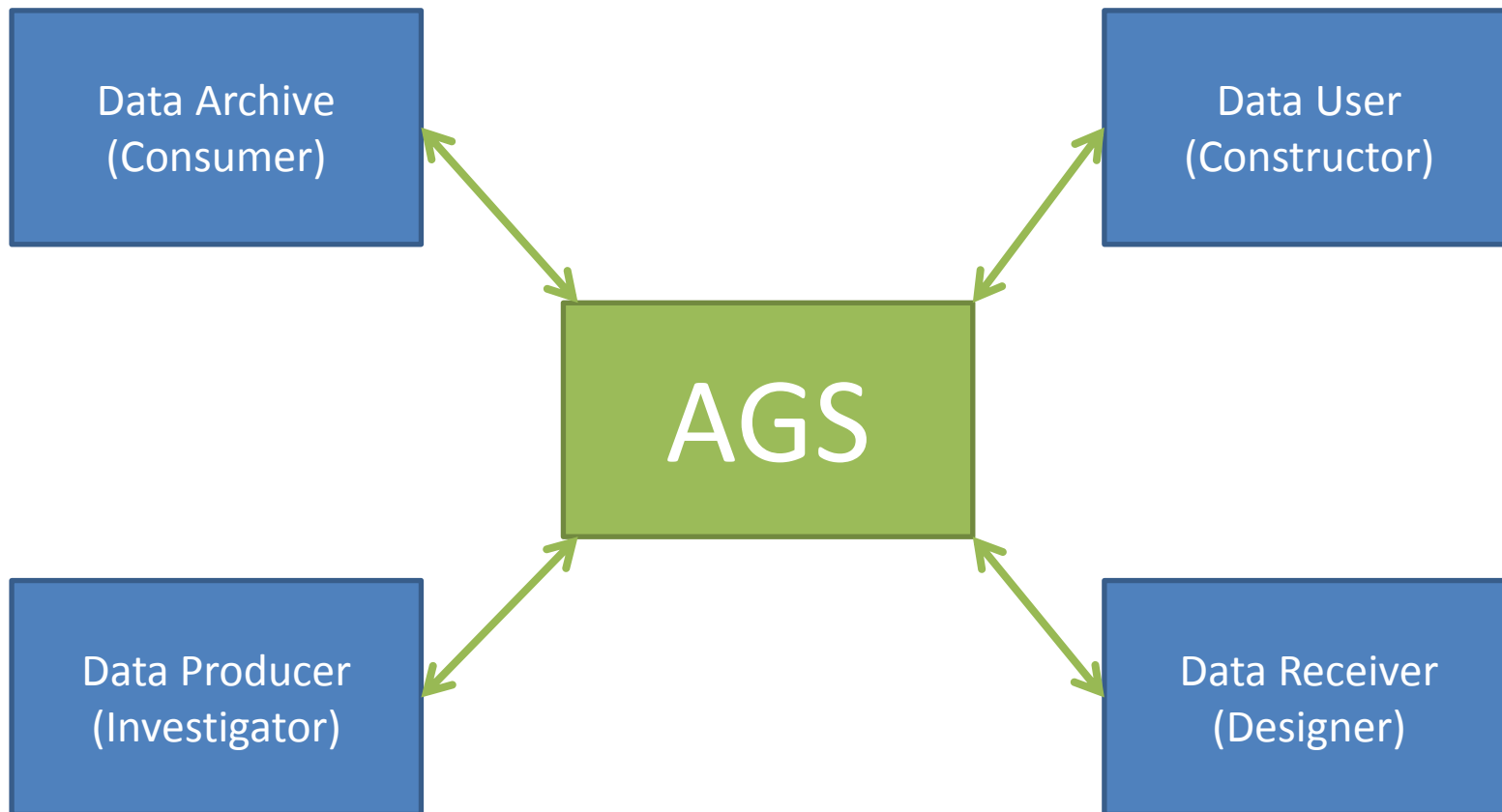
Data

or

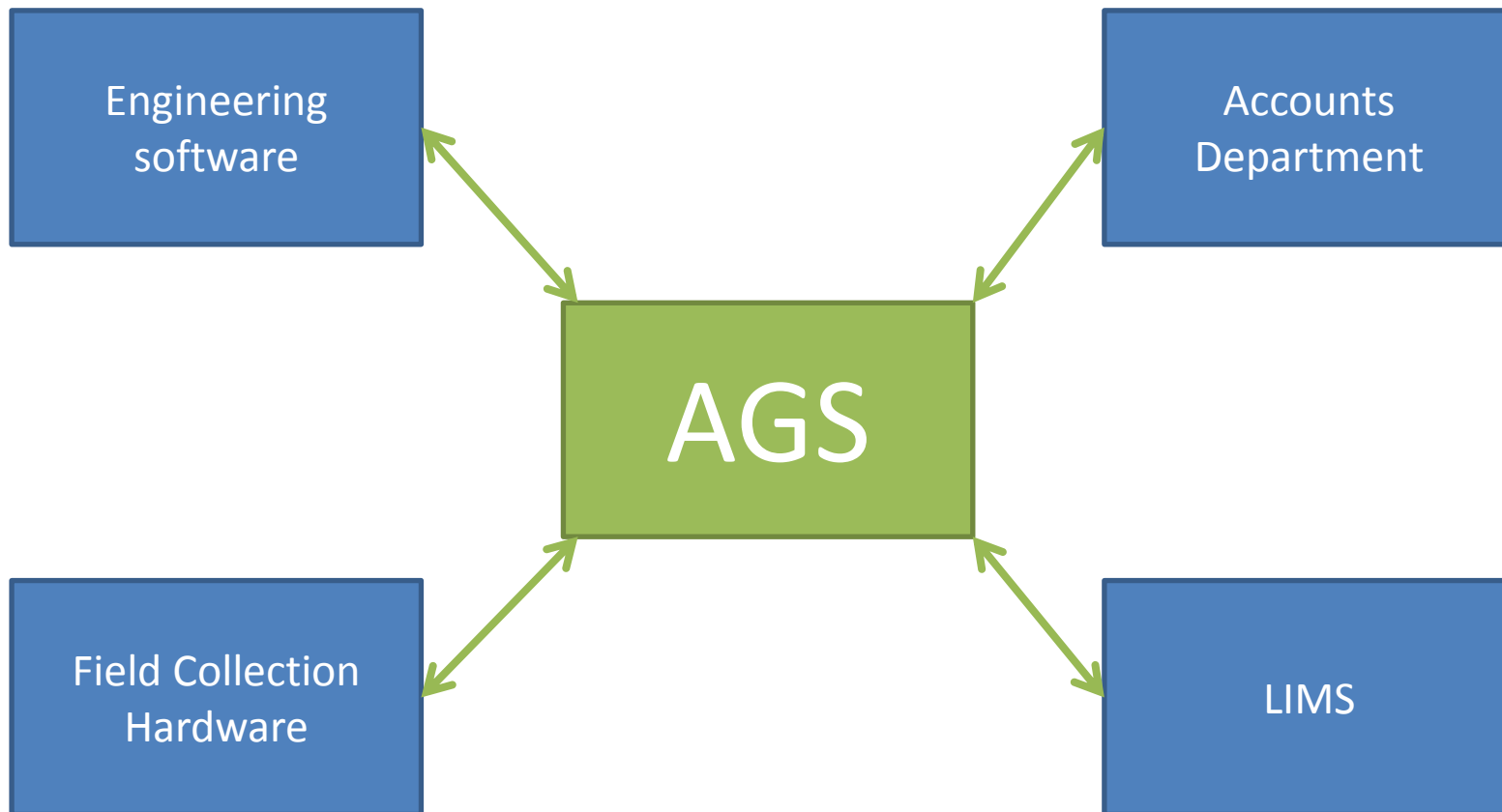


Information

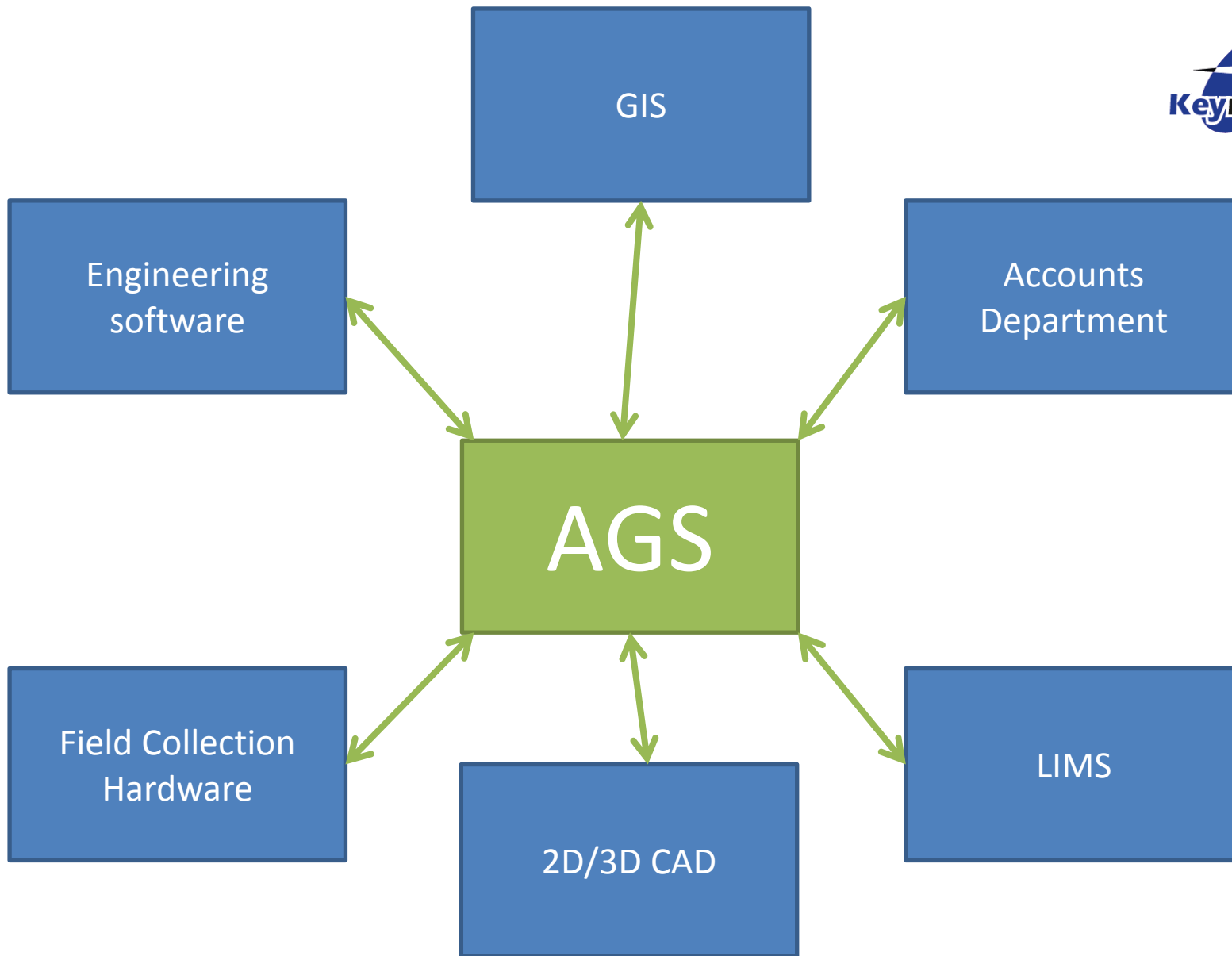
Data or Information



AGS original view – external focus



AGS view – internal focus



AGS view – internal focus



gINT

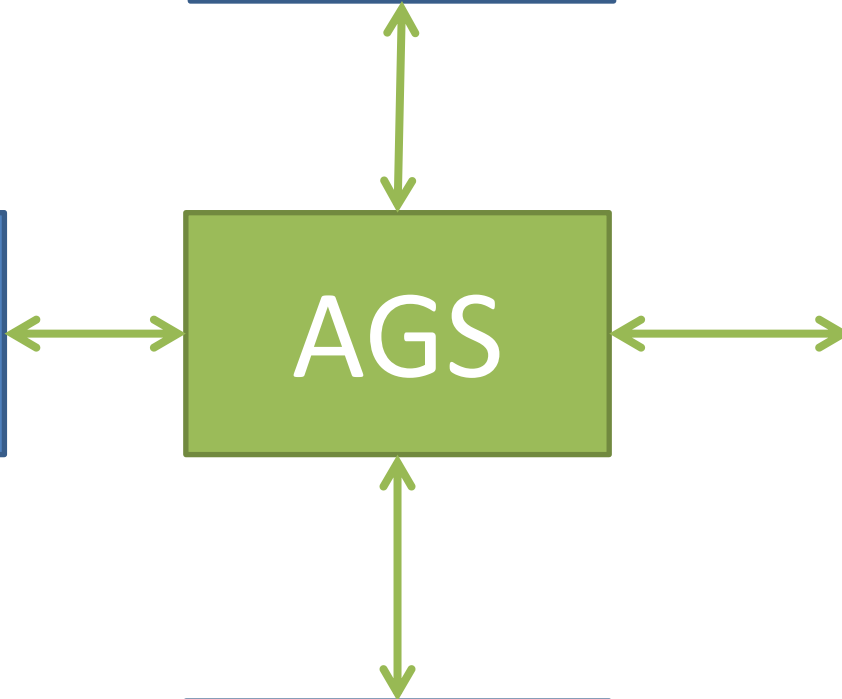
AGS

CPT Pro

AutoCAD

HoleBASE

Data Freedom





Data DATA Data DATA Data Data DATA Data  
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DATA Data

Think “data”



# The Two Golden Rules



# Only Enter Data Once Get Someone Else to do it

(Only enter data you have created)

(Log electronically as close to source as possible and use data transfer formats)

Two Golden Rules





# EXAMPLES



	Pen based collection	Electronic collection
Time on site	2 days	
Log production	4 hours	

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In the Field



	Pen based collection	Electronic collection
Time on site	2 days	2 days
Log production	4 hours	10 minutes

**Saving £200 = 1000QR  
PER DAY ON SITE**

In the Field



	Excel based Storage Solution	LIMS
Testing Time	2 days	
AGS data production	2 hours	

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In the Lab



	Excel based Storage Solution	LIMS
Testing Time	2 days	2 days
AGS data production	2 hours	2 minutes

**Saving £100 = 500 QR  
PER DAY OF TESTING**

In the Lab



5 days on site  
10 days of testing

£3,000 – 15,000 QR saving

	With Information	With Data
Section Diagrams	3 hours each	
Parameter Plots	2 hours each	
Detailed analysis of data	2 days	

In the Office



	With Information	With Data
Section Diagrams	3 hours each	10 minutes
Parameter Plots	2 hours each	2 minutes
Detailed analysis of data	2 days	1 hour

In the Office

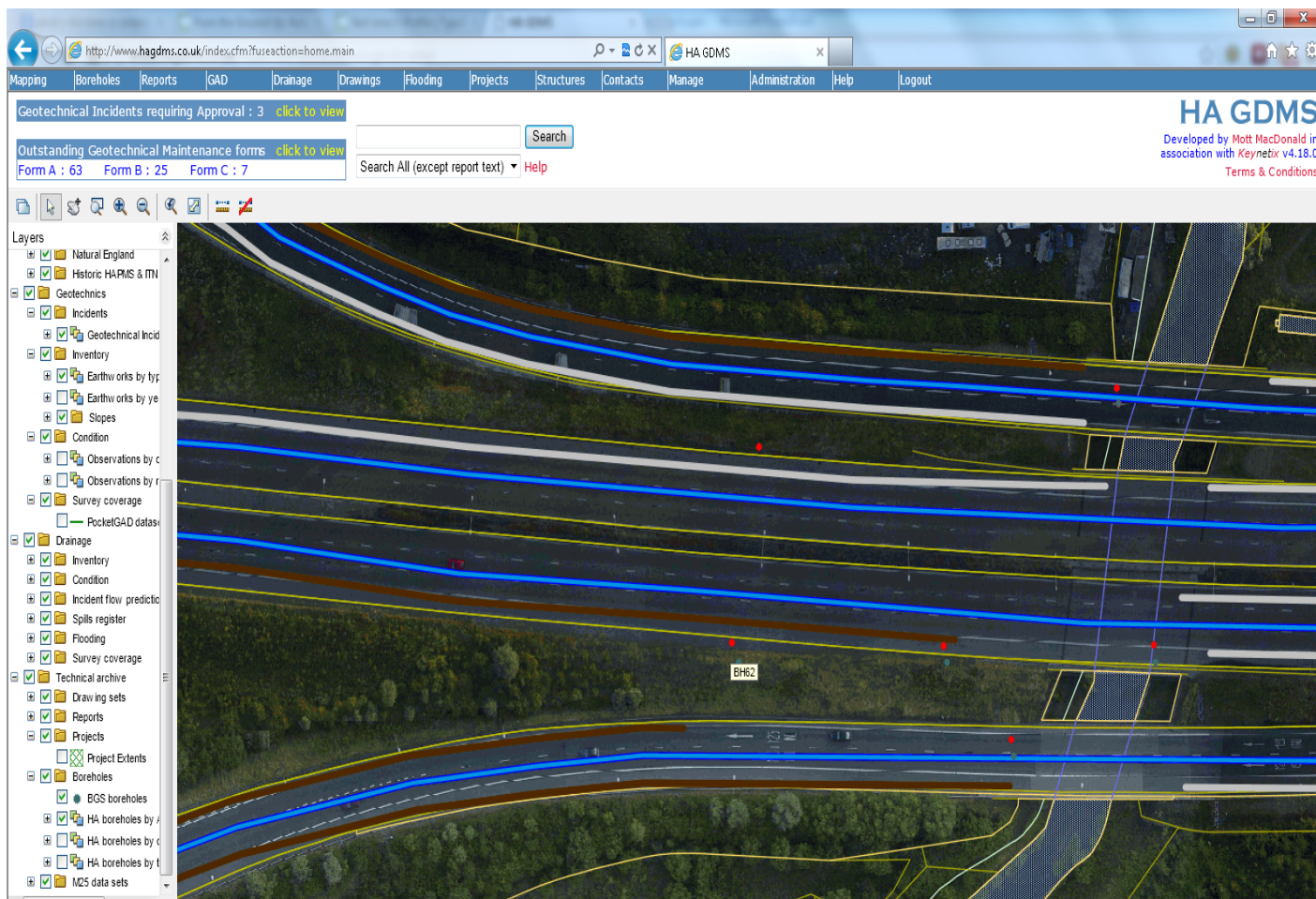




		With Information	With Data
5	Section Diagrams	15 hours	50 minutes
10	Parameter Plots	20 hours	20 minutes
1	Detailed analysis of data	16 hours	1 hour
	Total	51 hours	2.5 hours

**Saving £5,000 = 25,000 QR**

In the Office



The screenshot displays the HA GDMS web application interface. At the top, a navigation menu includes links for Mapping, Boreholes, Reports, GAD, Drainage, Drawings, Flooding, Projects, Structures, Contacts, Manage, Administration, Help, and Logout. The main header area features the text "Geotechnical Incidents requiring Approval : 3" with a "click to view" link, and "Outstanding Geotechnical Maintenance forms" with a "click to view" link. Below this, there are counts for "Form A : 63", "Form B : 25", and "Form C : 7". A search bar is present with a "Search" button and a dropdown menu set to "Search All (except report text)". The "HA GDMS" logo is on the right, with a note: "Developed by Mott MacDonald in association with Keynetix v4.18.0" and a "Terms & Conditions" link.

The central part of the interface is a map showing a road network with various colored overlays. A "Layers" panel on the left lists the following categories and items:

- Natural England
- Historic HAPMS & ITN
- Geotechnics
  - Incidents
    - Geotechnical Incid
  - Inventory
    - Earthworks by typ
    - Earthworks by ye
    - Stops
  - Condition
    - Observations by c
    - Observations by r
  - Survey coverage
  - PocketGAD data
- Drainage
  - Inventory
  - Condition
  - Incident flow predic
  - Spills register
  - Flooding
  - Survey coverage
- Technical archive
  - Drawing sets
  - Reports
  - Projects
    - Project Extents
- Boreholes
  - BGS boreholes
  - HA boreholes by A
  - HA boreholes by c
  - HA boreholes by t
- M25 data sets

The map shows a road with several red dots and a label "BH62". The map is overlaid with blue and brown lines, and yellow dashed lines.

National Archive

	HAGDMS	Inside your company
Collection of historic borehole data	10 minutes	???

- Removal of double entry reduces errors
- Removal of triple entry reduces errors
- Removal of quadruple entry reduces errors
  
- Greater use of geotechnical data leads to a better understanding of the geotechnical problems



# **INCREASING DATA VALUE**



- Embrace AGS data
  - Don't start your learning process at the end of a project!
  - Ensure that all systems are AGS compatible (directly or indirectly)



- Identify areas of data inefficiency
  - Only enter data once
  - Transfer data from one program to another

- Review software requirements
  - Do you need to upgrade any in house software?
  - Do you need to acquire additional modules or packages?





- Geotechnical Data Procedures
  - Don't let your knowledge reside with one person
  - Ensure everyone knows how important data is
  - Document your data management procedures in the same way you do your other procedures

- Good quality geotechnical data management will
  - Increase the use of your data
  - Increase your knowledge of the site
  - Reduce errors
  - Save money

Geotechnical data management only costs money if you don't do it