



The Coal
Authority

Junkies Level

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Introduction

This report has been put together in order to gain a greater understanding of the mining and connections in regards to Junkies Level. The hope is to better understand Junkies level and the connection from both shallow and deep workings and therefore potential pathways for mine water to better enable decisions about the treatment of the water to be made. There have been several reports on the area in regards to the mining and mine water, this report has reviewed these findings and looked in more detail into the area and associated mining.

The aim of this was to understand Junkies Level and associated mining well enough to enable the environment team to ascertain the most strategic placement of a pumping wetwell on the adit. This will enable the capture and treatment of current (associated with shallow workings) and potential (associated with the deep workings) mine water.

The required outcomes are to produce:

- Comprehensive review of mining data associated with Junkies Level
- Plan showing location of line of adit
- Section through adit – showing depth of adit along length and also relationship of deep mining to location of adit.
- Information on any known shaft intersecting adit - are any of them open, and could possibly be used for pumping?
- Interpretation of where workings are connected into the level
- Assessment at what distance along length of adit that shallow mine water and/or deep mine water enters the adit.
- Any other information found during investigation that could be relevant.

Terminology

Below is some terminology that may aid the understanding and interpreting some of the phrases used in the report.

Adit, an inclined underground roadway with one end open to the surface, usually used to service a mine. The adit mouth is the area where an adit opens to the surface. The adit in this report is Old Fordell. A day level is an adit that is used for drainage and a drift mine is a roadway driven into solid ground from the surface to a coal seam, or a roadway in solid ground, but not in coal. The day level in this report is Junkies Day level which is referred to as both Junkies Day Level, Junkies level or just level. They all refer to the same level running from the working to the surface at Old Fordell.

Along the line of Junkies day level are several shafts that are known as air pits. These are shafts used especially for ventilation. The report also refers to level pits which connect different levels of workings within a mine.

Background

The area of investigation is approximately 10km South of Edinburgh and is part of the Midlothian coalfield. The local area known as the Bilston Glen coalfield area has been heavily mined for both deep and shallow coal up until the late 20th century. The area is dominated by a NE trending syncline with both the steeply dipping west limb and shallower eastern limb being worked. The geology of the area relating to the worked coal is from the Carboniferous period and comprises of 3 units; the upper limestone formation, limestone coal formation and the lower limestone formation.

During mining the seams will have been dewatered by pumping. Pumping of the shallower worked seams will have depressed the natural water table where as pumping of deeper units will have dewatered the units within the mined block. At the end of mining operations the workings will gradually flood and rebound through old drainage channels and workings. The aim of this report is to identify these channels and predict where the water will flow before it reaches the surface.



Figure 1: Simplified log showing key coal seam worked in the Bilston Glen area (not to scale)

Literature Review

Report on Bilston Glen Colliery Rising Minewater July 1998 by IMC

This review of the Bilston Glen Coalfield area comprehensively splits the area into three sections depending on their location within the syncline. The eastern limb section is made up of the Arniston, Lingerwood and Easthouse Collieries which are thought to be connected at shallow depths. The western limb comprises the Ramsay, Burghlee and Roslin Collieries and the centre of the syncline being worked by Polton and Whitehill collieries. Junkies Day Level is associated with the eastern part of the syncline.

The report highlighted that workings in the Eastern limb were worked from outcrop and are laterally extensive. The shallow workings from the different collieries are connected by a large number of shafts which in turn are connected by in-seam drainage levels and day levels (Junkies Day Level). These shaft connections which connect the workings below the levels occur at Eastwood Pumping Pit which connects the Parrot Seam, at the base of the shaft, to the Great seam from Easthouse. The Parrot seam is in turn connected to Lingerwood workings.

Eastwood Great seam is also connected to Lady Victoria Splint and Parrot seams by two steep drifts which have been dammed shown on abandonment plans S675.

The Bilston Glen colliery which was located to the West of the syncline but worked the deeper coal seams is connected to the Easthouse Colliery at the Great seam (8350 AOD) presumably for water drainage purposes. There is no record of this connection being dammed.

Summary of information for the eastern limb:

- Day levels and drainage levels connect shallow workings.

- Below the levels, shafts connect the shallow workings, especially Easthouse Pumping Pit.
- Easthouse Pumping Pit connects the Parrot and Great seams worked by Easthouse
- The Parrot seam is also connected to the Lingerwood workings.
- Easthouse Colliery Great seam is connected to Lady Victoria Splint seam by two steep drifts called Newbattle Dooks. These connections are shown to be dammed
- Bilston Glen and Easthouse Colliery is connected.

Bilston Glen Treatment Location Options Feasibility Report by AECOM, 2015

This report highlights the same connections above but has looked into them in more detail.

Easthouse colliery worked the Great seam from outcrop to deep. The workings were accessed from 5 inclined shafts. Three of them (C, D, E) accessed the extensive deep workings but A and B were only shallow connections and may be critical in terms of mine water drainage pathways.

Easthouse colliery was connected to Bilston Glen by roadways across the Bilston Glen barrier. There is no record that these connections were dammed.

Easthouse is also connected to Lady Victoria and Lingerwood which was identified by the report above. These connections are between the Easthouse Great seam and the Lady Victoria Splint seam however these connections are thought to have been dammed.

Lady Victoria and Lingerwood worked extensively the Parrot seam which provides a hydraulic connection with Easthouse. They are connected at the Easthouse pumping pit and also at the Easthouse E incline. This worked Parrot seam also extends north to Junkies Day Level as does the Great seam both crossing Junkies Level although no direct connection has been identified.

It is also thought that Easthouse incline C could be the connection from the shallow to deep workings. This incline is the lowest recorded connection to the Great seam.

This report has identified deep connections between Bilston Glen, Easthouses, Lady Victoria and Lingerwood at Easthouse incline C and possibly at Byrans pit.

It has also identified shallow drainage pathways that could result in the discharge from Junkies Day Level as being levels from Easthouse to Shaws Pit or a level in the parrot seam.

Mine/ Mine water Body	Level	Decant Location	Shallow Mine Drainage pathway	Discharge Location
Bilston Glen, Easthouses, Lady Victoria and Lingerwood	Deep Connections	Easthouse Incline C		
	Shallow	Easthouse Incline C	Via level from Easthouses to Shaw's Pit and Junkies Day Level	Junkies Level
	Shallow		Parrot Seam workings to Junkies Day Level	Junkies Level

Table 1: Highlighting key findings and pathways identified by AECOM

Review of mining data

This report has looked at several mine abandonment plans associated with this area. The aim of looking into these plans was to understand the general mining of the area and identify key connections between workings. More specifically the aim was to identify Junkies Day Level, any key connection to workings joining the level and to identify connection at deeper levels. All plans that

have been looked at have been georeferenced in ArcGIS and overlaid with mine entries in order to better identify locations and connections. All georeferenced plans are included in the Appendix.

Shaft (CA ref)	Name	Depth	Source Plans	Treated	Other information	Information from mine entry inspection	Location of mine entry
333667-001	Old Fordell Adit	0	S5108		Out flowing water	Nothing visible	Bank above river, vacant land.
333666-001	Air pit	21.6m	S4375	Yes Capped	Water at 17.1m from permit 6625. Depth of shaft at 21.6m from CCTV survey of shaft in 2015	Nothing visible	Boundary of rear paved area/ trees & shrubs
334666-006	Air pit			Concrete raft		Nothing visible	In middle of tarred roadway
334666-007	Air pit		S675/2 Work plan Easthouses			Nothing visible	Mature wooded area, uneven ground
334666-008	Air pit		S4375 S779		Raised mound, 10m diameter, 1.2m to 1.5m high		Mature wooded area, uneven ground
334666-009	Air pit		S675/2 Work plan Easthouses			Nothing visible	Mature wooded area, uneven ground
334666-010	Air pit		S3856 S4375 S779	Concrete raft	Rectangular depression, 2m x 2m, 0.6m deep		Mature wooded area, uneven ground
334666-011	Air pit		Work plan Easthouses S675/2			Nothing visible	Mature wooded area, uneven ground
334666-012	Air pit		S3856 S4375 S779	Concrete raft		Nothing visible	Mature wooded area, uneven ground
334666-013	Air pit		ASR			Nothing visible	Ploughed Field
334666-017	Air pit	27.4m (15 fathoms)	S3856 S4375 S779	Concrete raft		Nothing visible	Edge of ploughed field
334666-004	Shaws pit		S675 S3856 S3488 S4375			Nothing visible	In low area at old tip. Old brick rubble and rubbish noted.
334665-011	Easthouse pumping pit		S3820 S3488 S657	Reinforced Cap		Unable to inspect	Located in rear of property

Table 2: showing any known or found information about the shafts relating to Junkies Day Level. Information in last two columns from mine entry inspections in 2009.

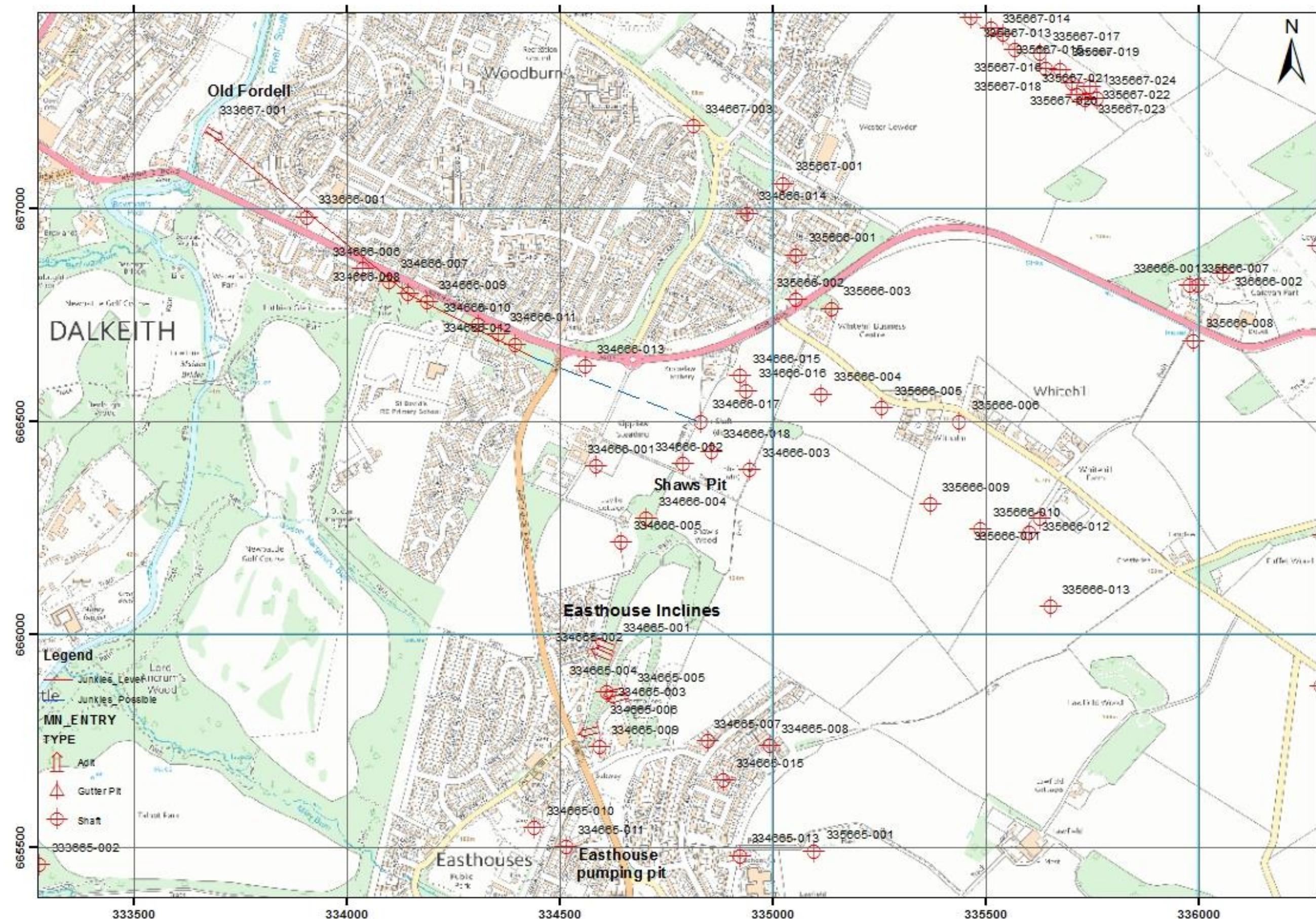


Figure 2: Map showing the location of mine entries mentioned in this report and the assumed line of junkies level taken from abandonment plans

S5108 – shaft area plan



Figure 3: Plan S5108 showing location of Old Fordell adit and Junkies Day level. Plan shown with CA mine entries confirming position to highlight positions and relationship of day level and air pits.

This is the only plan that has the location of the adit, Old Fordell, marked in relation to the surface. The plan also shows the inferred location of Junkies Day level. On the plan it is labelled as a day level and connects the line of mine entries along it. The day level is inferred to rotate and bend at shaft 334666-008 and the line of the day level is extended in pencil to shaft 334666-017, although this shaft is further away than the spacing of the other shafts it does lie along the same line. The shaft is also given a depth on this plan which gives us an idea of the depth and gradient of the day level. This inferred connection to shaft 334666-017 could be a potential connection to the shallow workings, however the OS background maps show shaft 334666-017 to be an air pit.
The inferred line of the day level from this plan has been copied so that it can be placed onto other georeferenced plans in order to be better able to confirm connections and orientate plans.

S4375

This plan shows the location of shafts 333667-001, 334666-008, 010, 012 and 017, they are all shown as level pits on the plan.

It also shows the possible line of Junkies Level running east west crossing a roadway in the Great seam which has an open off-shoot labelled Day Level, due to the location this is almost definitely Junkies Day Level. This shows the day level is connected to the Great, Diamond, Coronation and Parrot seams with levels connecting them in Bryans Splint, Stone and Siller Willie seams. All these workings are around 1860's.

The day level carried on to the east passing under a labelled level pit (017) connecting it to the Parrot seam worked in 1862, however there is no evidence that shaft 017 is connected to the day level.

S675/2

This shows the workings from the Easthouse Colliery in the Great seam. The plan doesn't show the location of Junkies Day Level, however the projected line of the level does cross the working but there is no evidence of any connections to them. The plan does show shafts 334666-007, 009 and 011 as level pits but again does not allude to any connections of the workings with the shafts. When looking at the levels on the plan around the shafts it shows the Great seam workings to be around 400m depth so there is no chance of the workings and adit being connected.

The plan also shows the Day Level Line crossing the workings further to the east at the edge of the plan. These workings head north east off the plan and could be possible connections to more northern workings.

The plan clearly shows the Easthouse colliery inclines which have been highlighted in earlier reports as being key connections to deep workings. The inclines are plugged near the surface (max 15 m into the inclines) and backfilled, however they will still be open at depth thus the workings are still connected.

Inclines A and B are shorter than the others and head north west connecting to the Great seams. These workings to the north connect to the Coronation, Siller Willie, Splint and Mavis seams. These connections also pass by Shaws Pit (334666-004). Inclines C and D incline further and connect the Great seam with the deeper Siller Willie.

The inclines connect the deeper seams to the shallower Great seam then water from these deeper workings will be channelled north via Shaw's Pit.

S3820

This plan circa 1905 shows the Easthouse inclines connected to the Great seam workings. It shows them potentially connecting to the Parrot and Splint seam at depth, although due to the age of the plan it is hard to confirm these connections.

The plan does show the Newbattle Dooks which are defined as inclined planes to the deep, these "dooks" connect the Lady Victoria and Lingerwood collieries with Easthouse via the Great seam. Previous reports state that these dooks have been dammed.

The plan also highlights the Easthouse pumping pit as shaft 334665-011. If this pit is untreated then as it is connected to incline E it could be used to monitor water. However it implies that it is treated on S675.

S3856

Plan shows a "Newhills day level" following the line of the probable location of Junkies Level, confirming the location of the level and also an alternative name. The plan shows the name of the level and an arrow indicating that the entrance to the level is to the west tying in with the location of the adit at the surface. The plan shows that this level connecting to the Mavis coal and fireclay workings which are known to be shallow workings. These workings are then connected to the Coronation seam via a level in the Splint seam passing by Shaws Pit. The day level also implies it carries on to shaft 017 level pit and branches off to the Mavis Coal.

Plan S675 shows the Mavis coal connecting into the levels by Shaws Pit and connecting into the Great seam workings. Unfortunately there are no levels on the plans to help gauge the depths of these workings.

S779

This plan shows workings in the Parrot seam by Lady Victoria, the plan was highlighted by an earlier report to potentially show the connection between workings and Junkies Day level. Having

georeferenced the plan, it shows that the line Junkies Level does cross some of the levels but there is nothing to indicate there is a connection to Junkies Level like in the older plans mentioned above. The plan does show shaft 017 (level pit) and Shaws pit. Shaws pit connects the Parrot seam workings via the Coronation and Splint seam to Shaws pit which is further connected to more northern workings via a level in the Great seam. This Great seam level has an off shoot to shaft 017 which connects the Siller Willie, Smithy, Splint, Kaleblades and Parrot workings into this level implying that Junkies level is connected to the deeper seams here at shaft 017 as well as at incline C. It could also connect Lady Victoria and Lingerwood collieries with Easthouse here as well as at Newbattle Dooks to the south.

The level in the Great seam also carries on north implying this level could connect working further north to Junkies level.

S1042

This plan shows the line of shafts along the line of Junkies Level. Shaft 333667-001 has two shaft symbols by it with one labelled as pump which could imply that the level may have been used for pumping in the past in which case we can assume an open and connected adit . Under the shaft is an annotation of Newhills which shows this shaft is connected to the Newhills/ Junkies level beneath.

The plan shows workings in the Great seam to the North of the line of Junkies Level. The workings stop before the line of Junkies Level however the workings themselves have a level coming off them to the South which crosses the line of Junkies Level. Although this doesn't directly show a connection, when laid over several other plans it ties in with connections in the Great seams which are proven to connect with Junkies Level. These overlays highlighting the connections are shown in the Appendix.

S3825-1

This plan shows a pencil line with the annotations stating "newhills or Junkies adit". The line of this ties in with the possible position of Junkies level. The pencil line also follows the line of level pits. It shows Junkies level connecting to a level which connects to shaft 017. This connection also connects with the Siller Willie(also shown on plan s779), Parrot, Splint, Great and Mavis seams.

S3825-2

Shows a level along the possible position of Junkies Level . This level connects to shaft 017 and on to "Old Parrot Waste" workings. It also shows a possible connection, by a dashed line to the Mavis coal which in turn connects to Shaws Pit and Coronation and Siller Willies workings.

Summary of mining data

The line of Junkies Level has been confirmed to run from the adit, Old Fordell right up to shaft 334666-017. The adit line was confirmed on several older plans with annotations and drawn pencil lines (s5108, s1042, s3825). The majority of these plans are dated 1800-1890 highlighting the age of Junkies Level and that the older plans and workings are more likely to be connected to the level than more modern workings.

It has been identified that the shallowest seam connecting into Junkies Level is the Mavis seam (s3856,s3825). Due to the age of the workings associated with the Mavis there are no levels on any of the plans so it is hard to know at what depth the workings are and at what depth they connect into Junkies Level. It has also been shown that the Mavis seam is connected via many levels to

almost all the seams worked in this area. Plan S4375 show Junkies Day Level connecting to the Great seam however this connection is further downstream, to the east of the Mavis seam. Therefore the Mavis seam workings are the first workings to enter Junkies day Level as you go down the level from the adit at surface level.

Junkies Level has been shown to connect to shaft 334666-017 (s3825). This appears to be the furthest horizontal extent of Junkies Level. This shaft appears to be key in connecting almost all the seams worked in this area via levels passing by this shaft. It is shown to connect to the Mavis seam via Junkies level and also to the deepest worked Parrot seam and several seams above this via levels.

The levels that connect Junkies Level to several seams also head north and potentially connect the level to workings to the north (s675/2, s779, s1042). Although there is no plan that shows definite connections there are several that tie in and have connections that line up. This shows solid evidence that levels connect Junkies Level to northern workings especially in the Great seam.

It has also been highlighted that deeper connections could be of key importance and previous literature has stated that the Easthouse inclines are where these deep connections are. Having looked at the plans it confirms that the Easthouse inclines do connect to deeper workings however it has also been noted that levels associated with shaft 017 and Shaws pit have several connections to deeper seams. As these connections are closer to Junkies level this maybe a key discharge point for water in deeper workings.

Objectives Summary

Comprehensive review of mining data

The table below shows a summary of all the plans that have been looked at in relation to the Junkies Level, highlighting the key findings from the plans.

Plan	Detail plan shows:	Key details
S5108	- Line of junkies level	Junkies Day Level
S4375	- Day level connecting into Great seam workings	Connection to Junkies Day Level
S675/2	<ul style="list-style-type: none"> - Great seam workings - Connects Mavis coal to Great seam - Possible connection to workings to north - AB inclines from Great seam to Splint and Shaws Pit - CD inclines – Great seam to Siller Willie 	Deep workings connection Mavis seam connecting to Great seam levels Connection to northern workings
S3820	<ul style="list-style-type: none"> - Easthouse inclines connecting to Great seam and possible Parrot and Splint seams - Newbattle Dooks connection 	Deep connections
S3856	<ul style="list-style-type: none"> - Newhills Day level connecting to Shallow Mavis seam. This then connects to Shaws pit. - Possible connection to 017 	Shallow connection to Mavis Seam
S779	<ul style="list-style-type: none"> - Shaws pit connected to deep Parrot - Also connects to northern workings - 017 level pit connects Siller Willie to Parrot 	Deep connections N workings
S1042	<ul style="list-style-type: none"> - Newhills shafts and pumps - Level of north Great seam 	Open and connected adit which was previously pumped. N workings
S3825/1	- Junkies level connecting to 017 which connects	017 connection – deep

	Mavis to Parrot seams	
S3825-2	<ul style="list-style-type: none"> - Junkies level connection to 017 - Junkies connection to Mavis coal which is in turn connected to Shaws pit - 017 connected to Parrot workings 	<ul style="list-style-type: none"> Shallow connections Deep connections

Table 3: Comprehensive review of mining data showing a summary of what each plan investigated shows and its key findings.

Plan showing location of line of adit

The location of the line of Junkies Level was recorded on several old plans. The line of the adit was copied off plan S5108 and placed over the other georeferenced plans. Figure 2 shows the location of the line of adit and key shafts. Both figure 5 and 6 also show this copied line on an OS background.

Section through adit

Although lots of information was found in regards to the workings and connections to Junkies Day Level, very little information was recorded about the shafts. This is probably due to the fact that they are air pits and not key shafts used to access workings. However from the information available a section has been created to give an idea of Junkies level.

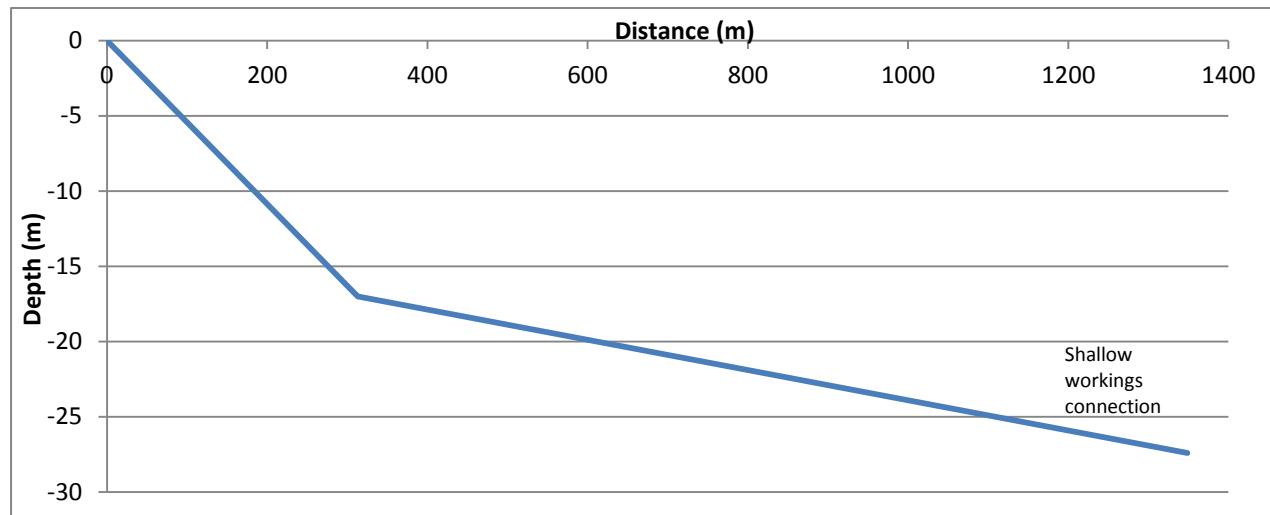


Figure 4: Cross section of Junkies Day Level. Blue Line indicates the level, information taken from air pit depths known to intersect Junkies Level.

Information on any shafts intersecting adit

Table 2 shows any information that was known or found about the mine entries in relation to Junkies level. A large amount of information came from the mine entry inspection team and also a CCTV survey from PSS.

The best locations and shafts to use to monitor or treat Junkies Level would be 334666-007/008/009 as there is no known treatment associated with these shafts and all three are not directly in a built up residential area. All three are located in wooded areas but were not visible during inspection in 2009 so work to locate and uncover these entries maybe needed. Shaft 334666-008 was found to be a 1.5m high mound. This may be part of the shaft itself or may need removing for access purposes to the shafts. They are also all located to the west of the shallow and deep connections with level so will receive all water coming from all workings in Junkies level.

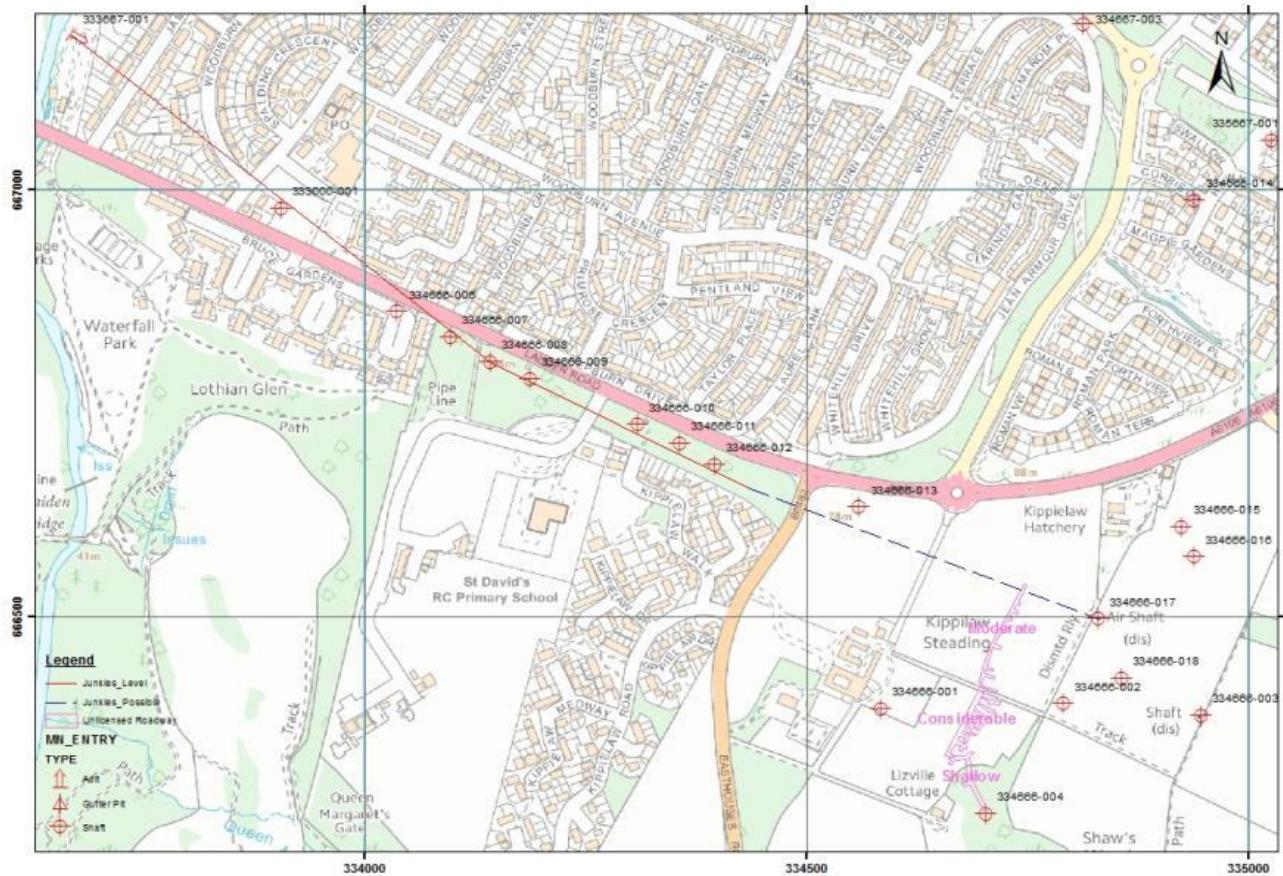


Figure 5: Plan showing location of Junkies level and where the worked Mavis Coal connects into it.

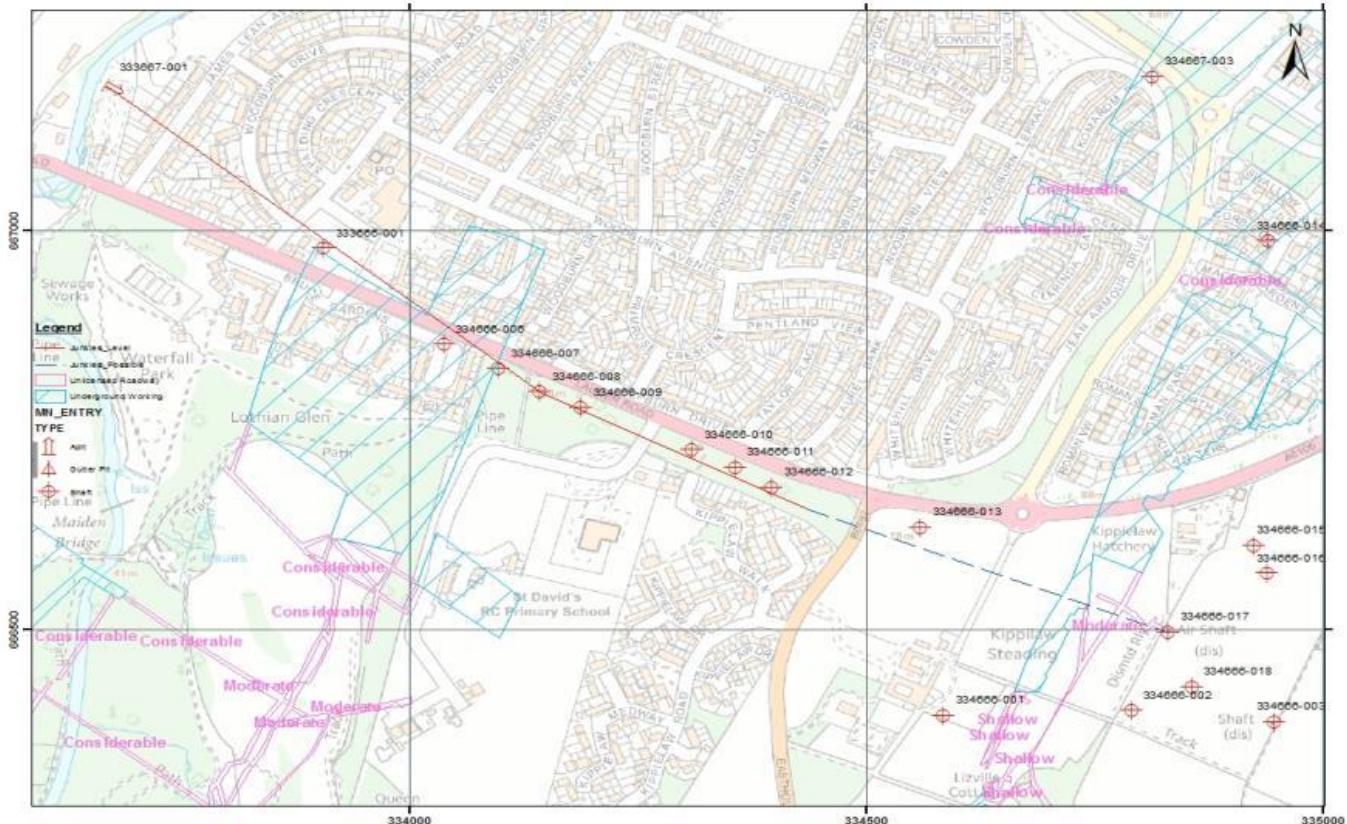


Figure 6: Plan showing the location of the Great Seam levels that connect to Junkies Day Level and workings to the north near shaft 334666-017. Note that Great seam workings to the West are at 400m depth and therefore do not connect to Junkies Day Level.

Interpretation of where workings connect into levels

The shallowest worked coal that intercepts Junkies Day Level is the Mavis coal. A plan highlighting the location of this connection is shown in figure 5. The Great seam, which has been extensively worked in this area also connects into Junkies and connects the level to workings to the north see figure 6. The deeper connections are located at Easthouse inclines and also at Shaws pit via levels.

Conclusion

It has been shown that the Mavis coal is the shallowest worked coal that connects to Junkies Day Level. These workings in turn connect to other seams worked in the area. The majority of workings associated with Junkies Level are dated circa 1800. Deeper workings are shown to connect to Junkies via the Great seam at Easthouse inclines and also at level pit 017. The schematic diagram shows an overview of the key connection and levels in relation to Junkies Day Level.

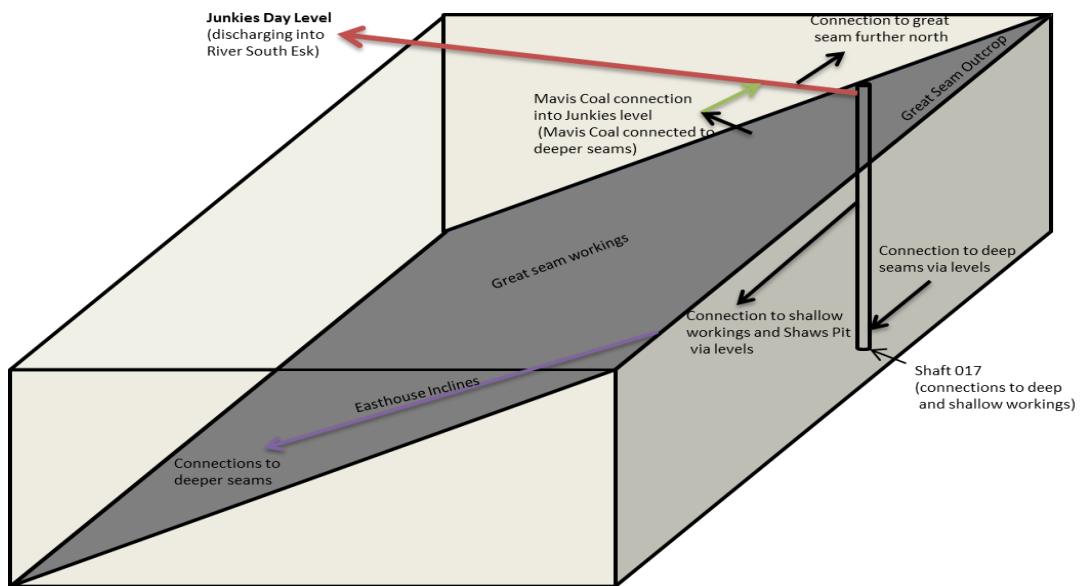
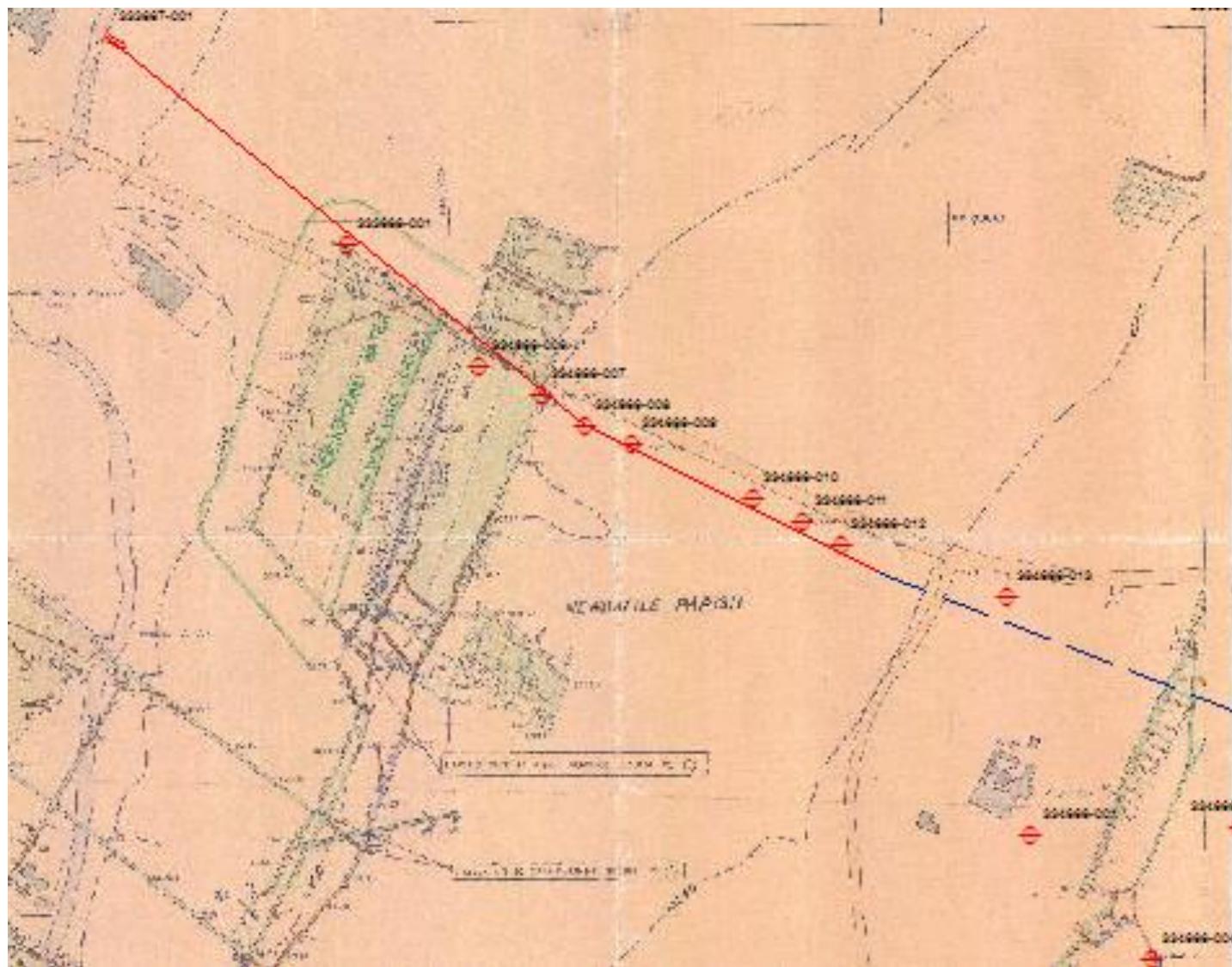


Figure 7: Schematic diagram giving an overview of key connections associated with Junkies Day Level

APPENDIX

S675/2



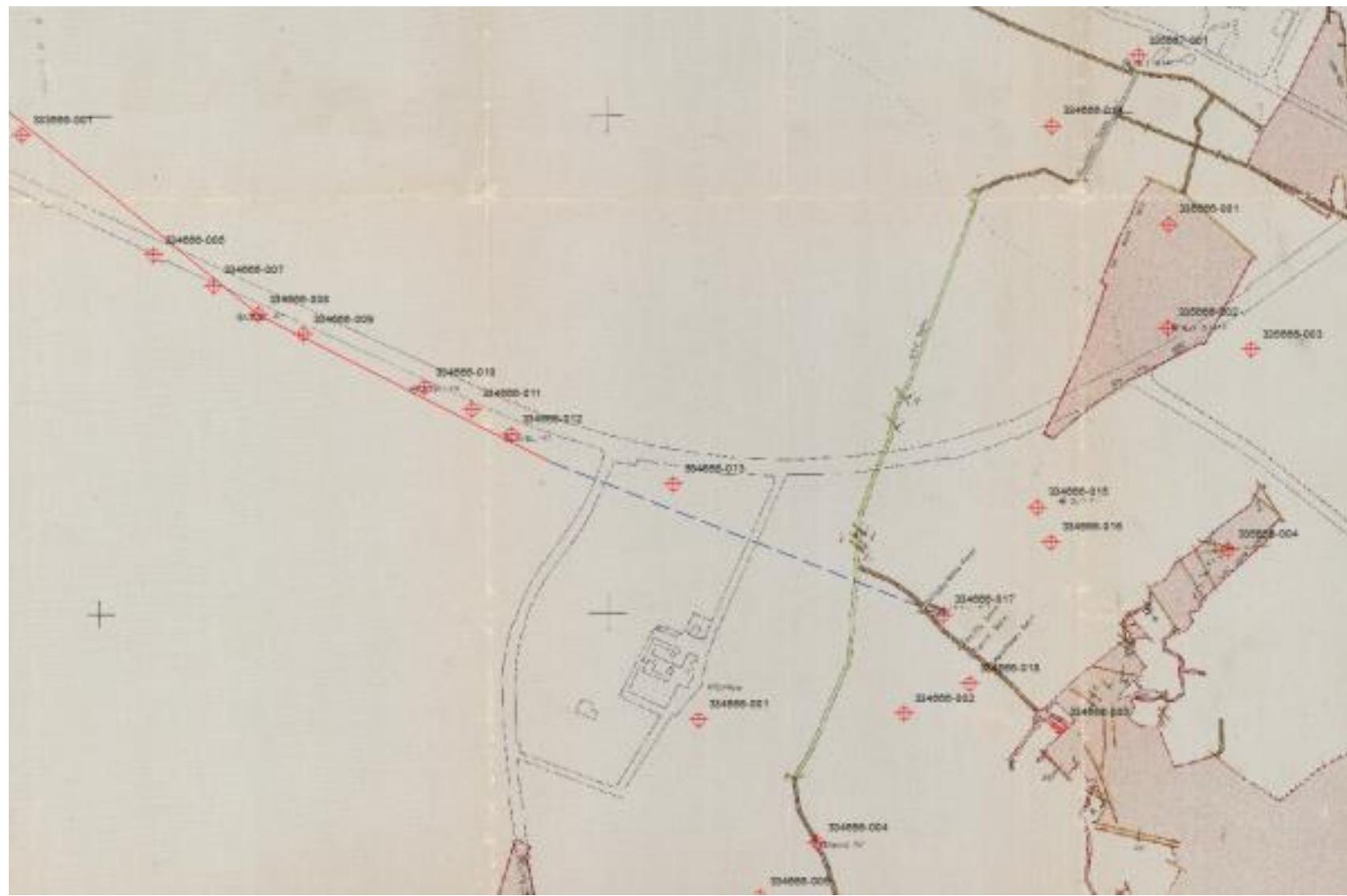
S3820



S3856



S779



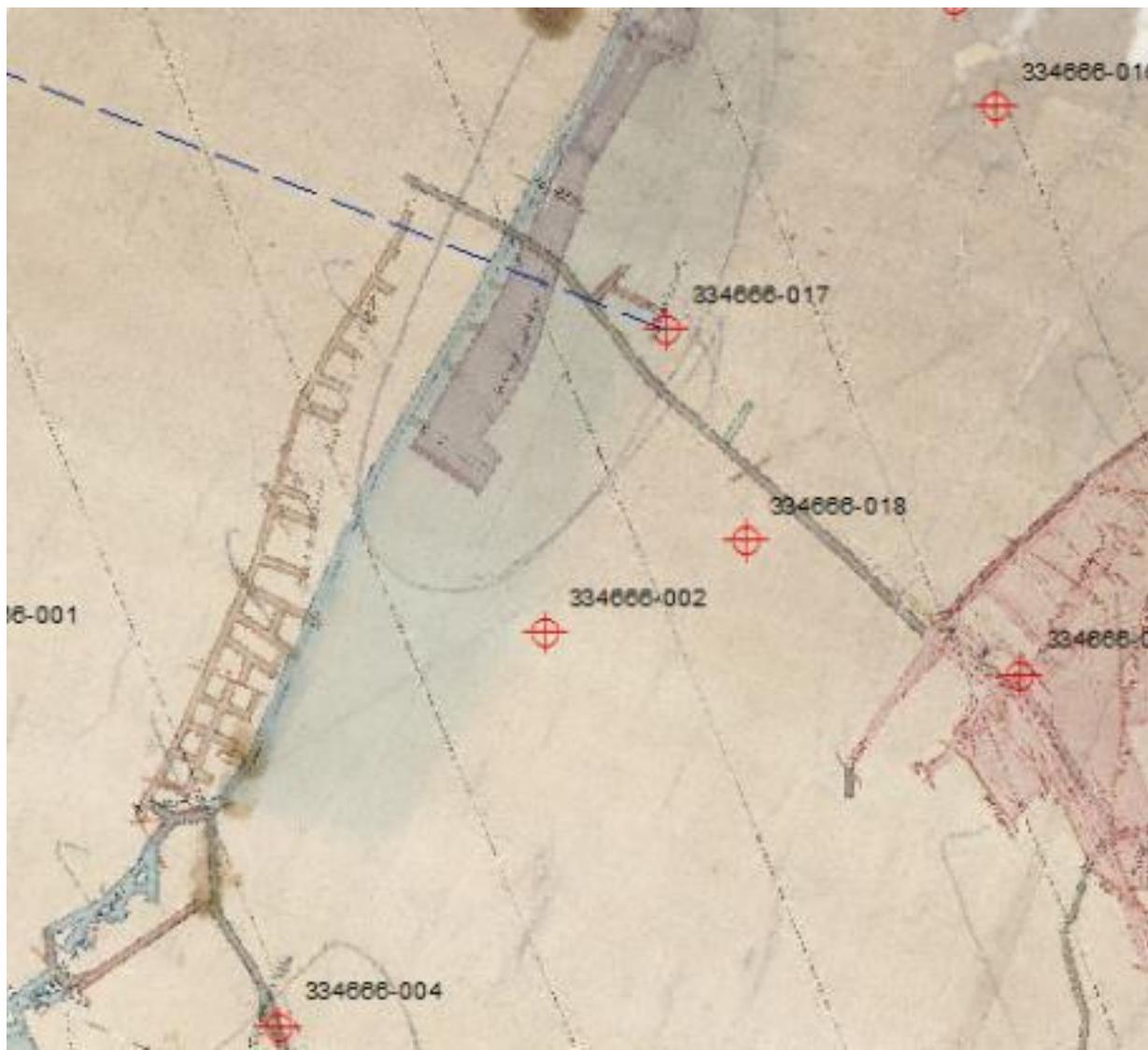
S1042



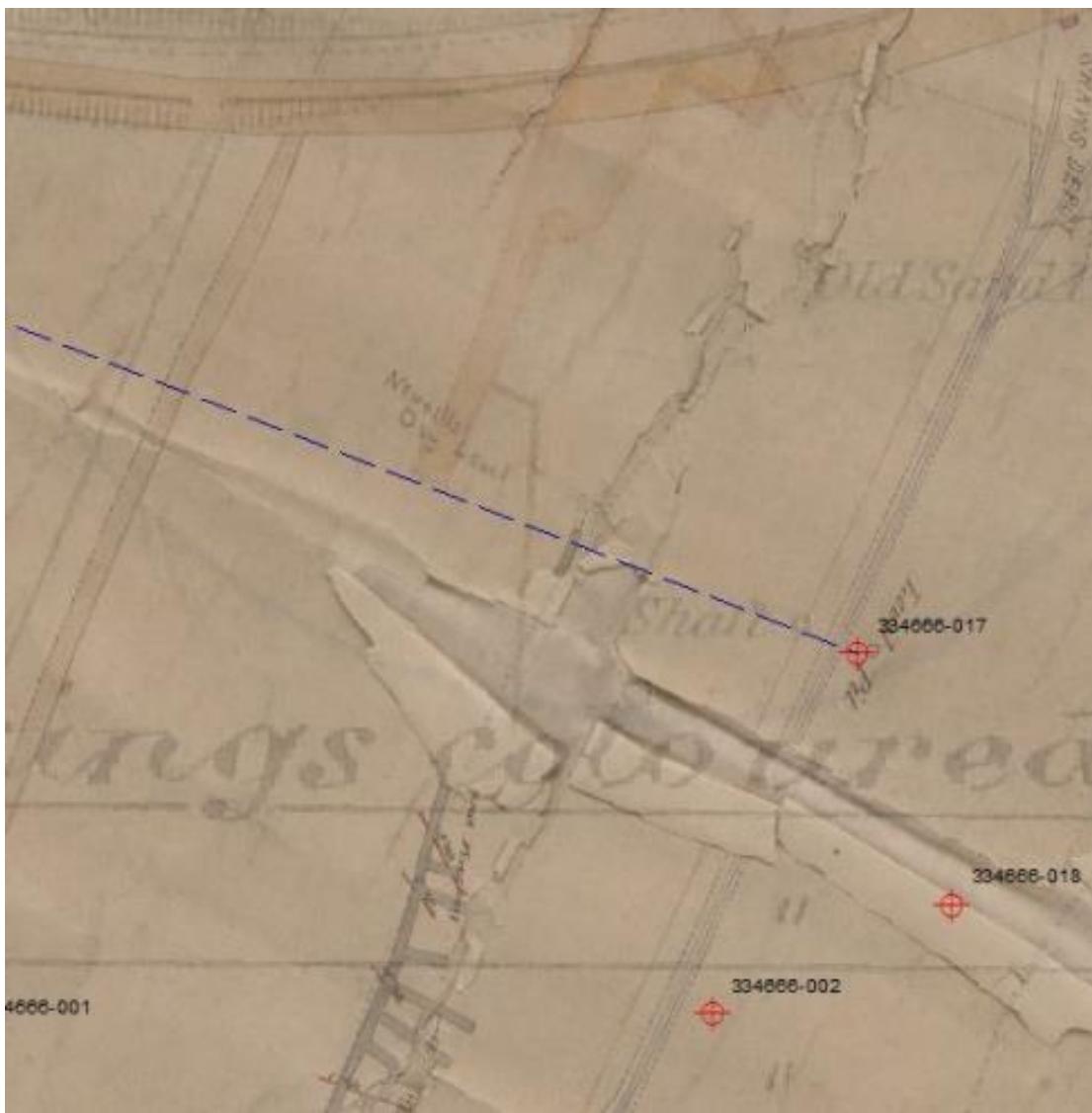
S3825/1

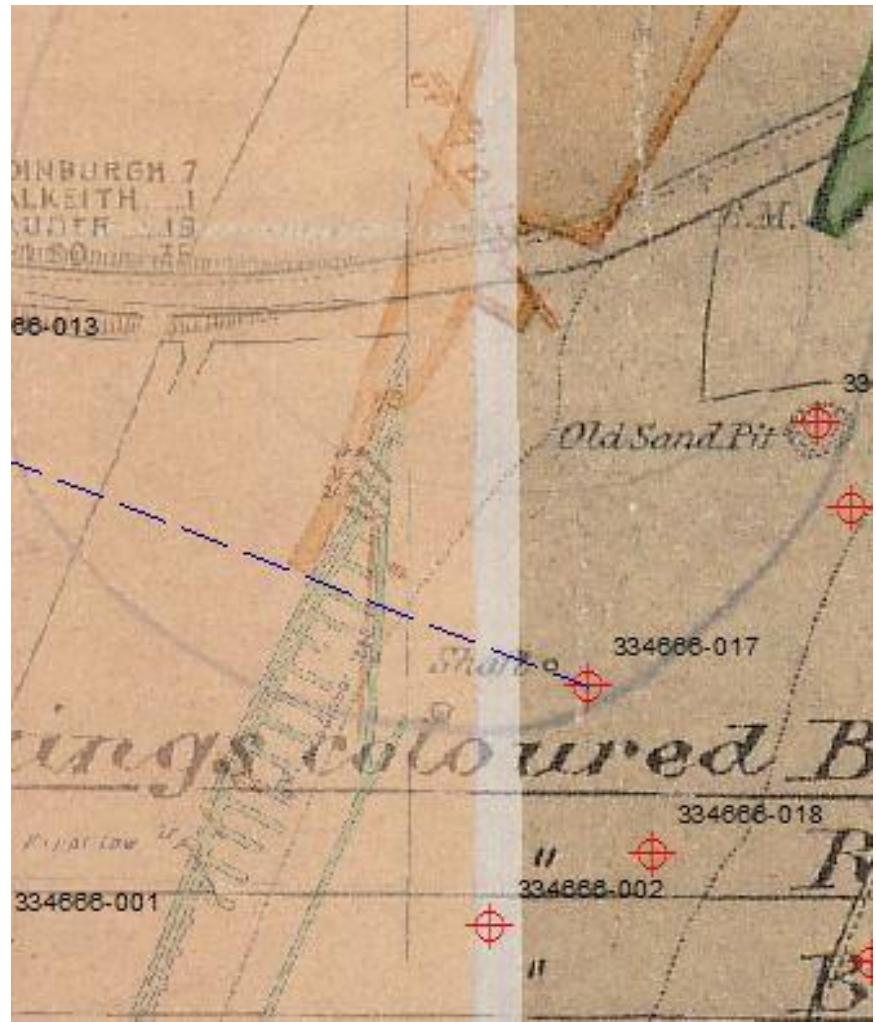


S3825/2



Connections to north workings





Pictures from mine entry inspections

333667-001



333666-001



334666-006



334666-007



334666-008



334666-009



334666-010



334666-011



334666-012



334666-013



334666-017



334666-004

