February 7, 2003
URS Project 16529706

Lakewood Business Park
209 Juniper
Lee's Summit, Missouri 64064

Attention: John W. Ivey

Re: Lee's Summit, Missouri Mine Evaluation

Dear Mr. Ivey:

This letter presents our evaluation of the mine (formerly known as Union Quaries) located north of I-470 and west of Highway 50 in Lee's Summit, Missouri, and our opinions for future use and potential development, both surface and underground. The area of concern is 119 acres located along the southern portion of the mined-out area including a portion south of I-470. Four tunnels perpendicular to I-470 provide access to the southern portion of the mine.

The scope of work included a review of existing data provided to us, review of topographic maps, site reconnaissance, and a general rock mechanics evaluation. The work was completed in general accordance with our proposal numbered 03005024 and authorized by signature of the contract dated December 19, 2002.

SITE LOCATION

The site is located north and south of I-470, west of Highway 50, and south of Bannister Road in Lee's Summit, Missouri. Quarry Park Road is located over the mine. A Site Location Map is presented as Figure 1. The portion of the mine included in this evaluation is located in the NE ¼ of Section 34 and the NW ¼ of Section 35, Township 48 North, Range 32 West, and is owned by John Ivey (47 acres), Harold Mitts (44 acres), and Diane Markman (28 acres). Other owners of the remainder of the mine include Ash Grove Cement Company and Superior/Bowen Asphalt Company. We note that this evaluation does not include property owned by Ash Grove Cement or Superior/Bowen Asphalt. Figure 2, Mine Map, provides the approximate property boundaries and total mined area. Figure 3, Undermined Area at I-470, prepared by the Planning & Development Department of the City of Lee's Summit, dated October 2, 2002 provides an arial view of the surface features related to the underground mined area.

MINING HISTORY

Mining began in 1959 and ceased in 1981. The main entrance to the mine is located on the north side, and mining progressed toward the south and then toward the east and west. Advancement under I-470 began in 1973 with the west set of tunnels. The west tunnel of

the east set was also completed in 1973 with the east tunnel completed in 1974. At the completion of mining activities, the mine face extended approximately 1,400 feet south of I-470.

This mine was constructed by the "room and pillar" method of mining wherein drilling and blasting was conducted to remove the limestone bedrock. Pillars of limestone were left in place to support the mine roof. The pillars were constructed in a random orientation (as opposed to the present mining method, which leaves pillars on a grid system). The pillars were typically constructed circular in shape, and with dimensions of about 25+ feet diameter. Edge to edge spacing of pillars was on the order of 35 feet.

DATA REVIEW

The information provided to us included the following:

1. Cross section and boring log of subsurface units based on core drilling on the centerline of I-470 by Missouri Department of Transportation (MoDOT).
2. Copies of City of Lee's Summit Ordinance Nos. 1402, 1305, 1226, and 893.
3. Copy of meeting minutes from Regular Session No. 14 of the Board of Alderman, dated August 19, 1980.
4. Copy of Complaint Order No. 02626 against Harold Mitts (5-Star Mining Company).
5. Mining extent map by Tuttle Ayers Woodward.
6. Topographic and aerial photo map.
7. Undermined Area at I-470, by the Planning & Development Department of the City of Lee's Summit, dated October 2, 2002.

In addition, various files, reports and other geologic & mining literature retained by URS were reviewed and utilized in preparation of this report.

GEOLOGIC CHARACTERIZATION

The rock units present within and above the subject site include alternating limestone and shale units assigned to the Kansas City Group of Pennsylvanian Age Bedrock. Specifically, the mined unit is the Bethany Falls Limestone Member of the Swope Formation. Rock units overlying the mined zone include the Galesburg Shale, Stark Shale, Winterset Limestone, Block Limestone, Fontana Shale, and Wea Shale. A composite of rock units occurring in the Kansas City area is presented on Figure 4.

A brief description of each of the units follows:

BETHANY FALLS LIMESTONE – This is the rock unit that has been mined extensively in the Kansas City area. The Bethany Falls is typically a 20 to 25+ foot thick limestone unit that is quite thick bedded in the majority of the lower portion of the unit. The lower 12 +/- feet of this unit is typically mined. The location that normally forms the roof of the mine consists of a thin shale parting that is easy for the drillers to identify. The limestone above this shale seam is often a relatively thick (4 to 6 feet) zone of massive limestone that forms a solid "roof beam" for the mine. The upper 2 to 5 feet of the Bethany Falls consists of a nodular limestone in a greenish gray shale matrix. This zone, called "peanut rock" by the local miners is a relatively weak zone.

GALESBURG / STARK SHALES – The Galesburg Shale transitions from the "peanut rock" and is often difficult to determine the exact location of this contact. This unit ranges from approximately 3 to 5 feet thick and is often a gray to dark gray clayey material. The overlying Stark Shale is typically a black, platy (fissile) shale that ranges from about 2 to 4 feet in thickness. This unit can transmit water horizontally and where fractured, or penetrated by rock bolts drilled into the roof of the mine, can also transmit water vertically. Both the upper and lower contact of this rock unit is quite apparent, due to the unique bedding characteristics.

WINTERSET LIMESTONE – This unit is one of the thicker limestone units in the Kansas City area. Average thickness ranges from approximately 25 to 35+ feet. The unit consists of two limestone beds, separated by a 1 to 3 foot thick dark gray shale seam, which is located near the central portion. Both upper and lower limestone can contain nodules and seams of blue gray chert.

FONTANA SHALE – The Fontana Shale is a thin, dark gray clayey unit that ranges in thickness from approximately 1 to 10+ feet. It may have a black zone near the middle and in some locations may be quite calcareous.

BLOCK LIMESTONE – The Block Limestone is a thin (1 to 7+/- feet thick) limestone which may have a very thin shale seam. This unit may consist of a lower consistent limestone overlain by a variable thickness upper zone. We note that the boring log, discussed below, did not identify this limestone as being present.

WEA SHALE – This relatively thick shale was the highest unit identified at the subject site. The Wea can vary from approximately 15 to greater than 30 feet in thickness in the Kansas City area. This shale can vary in color from a light gray to very dark gray to greenish gray with an occasional maroon zone in the middle portion.

OVERBURDEN - A thin veneer of residual clay soils overlies the bedrock units. The thickness of the soils is unknown but expected to be relatively thin (5 to 15 feet).

The only boring that was made available to us was drilled by/for the Missouri Department of Transportation (MoDOT). The date of this drilling is unknown. The boring was located on I-470 right-of-way, between station 372 and 373. It is believed that this is the approximate location of the tunnels under I-470. According to the core hole log, the following rock units were present at this location:

Bethany Falls Limestone	Base Elevation 884.7	Thickness 20.5 feet
Stark/Galesburg Shale	Base Elevation 905.2	Thickness 6.2 feet
Winterset Limestone	Base Elevation 911.4	Thickness 36.1 feet
Wea / Fontana Shale	Base Elevation 947.5	Thickness 8.7 feet
Soil Overburden	Base Elevation 956.2	Thickness 10.1 feet

The bedrock units in the Kansas City area are relatively flat lying. On a regional basis, the bedrock units dip downward about ½ degree to the northwest (away from the Ozark Uplift to the southeast of Kansas City and toward the Forest City Basin, located to the northeast of Kansas City). Local variations are known to exist. For instance, the water ponded on the floor of this mine is generally located in the southeastern portion. This would infer that the local dip is downward to the southeast.

A series of fractures (joints) are present in all of the rock units encountered in this area. These fractures are typically near vertical and oriented in a northeast-southwest direction with a secondary system oriented perpendicular to this set (northwest-southeast). These joints or fractures are typically quite tight when overlain by a substantial thickness of soil and rock units. When near the ground surface, or not overlain by other rock units, they can become very weathered and may be open conduits for downward water movement. The intersection of these two joint systems may also be locations of roof instability in underground facilities/mines.

A series of near surface faults are known to be present in this area. The exact locations of these faults are not precisely known. It is believed they are located somewhere south of the old AT&T facilities, extending northwest, crossing I-470 near Raytown Road, and continue northwestward to near 95th Street & I-435. There have been no observations within this mine that these faults are present in the underground space. However the relatively close proximity is noted.

Significant groundwater is not known to be present in the rock units identified at this location. However, the near surface bedrock units were observed to contain many open fractures and joints (some with considerable plant roots extending into the mine space). Some areas of the mine had a considerable quantity of water on the floor of the mine. It is assumed that this water entered the mine through open joints, locations where the mine

has collapsed to the ground surface, or through the existing portals. Fluctuation of this water should be expected to vary with local precipitation.

CITY MINING REQUIREMENTS

The first Lee's Summit Missouri Ordinance (#893), dated September 21, 1965 provided a series of requirements for mining in this area. This Ordinance was good for 3 years with one, one-year extension. Additional Lee's Summit City Ordinances (# 1305 and 1402) for other properties also outlined the details of the mining requirements and were issued to various properties and the mining company. Of particular importance is the inclusion of a minimum pillar diameter (25 feet), a maximum pillar spacing (55 feet center to center), and a maximum clear span between pillars (35 feet). The Ordinances also required a minimum 10-foot thick roof of Bethany Falls Limestone, 4 feet of shale, 10 feet of unweathered Winterset Limestone, and 40 feet of additional soil overburden. In addition, a city inspector, or a Registered Engineer paid for by the mining company, was required to visit the mine a minimum of 3 times per year at the owner's expense. Each approved City Ordinance was good for 10 years with the last Ordinance expiring in 1981. Other City Ordinances may have been issued but were not made available to us for this report.

The meeting minutes from Regular Session No.14 of the Lee's Summit, Missouri Board of Aldermen, dated August 19, 1980, include a summary of a public hearing for a special class permit for mining by Union Quarries, Inc. After lengthy discussion, the request for the Special Class Permit was denied for a new mining permit. Thus, underground mining operations ceased in 1981 after the expiration of their most recent mining permit.

A complaint order (# 02626), dated June 3, 1974, was filed against Harold Mitts (5-Star Mining Company). The Order cited a violation of Ordinance No. 1095 related to the overburden not meeting the minimum requirements which resulted in "cave ins". This is the only complaint provided to us for this study. Others may have been issued.

MINE RECONNAISSANCE

In early December 2002, Mr. P. Denny Retter and Richard Moberly visited the site with Mr. Don Woodward. The purpose of this site visit was to gain sufficient information to prepare a scope of work to evaluate this property. Access to the underground space was through a small portal on private property on the north side of Quarry Park Road.

Mr. Richard Moberly and Ms. Jamie Martens of URS conducted a mine reconnaissance on January 28, 2003. Others present included Mr. Don Woodward and Mr. John Ivey. A 4-WD vehicle was used to traverse the mine and several stops were made to observe and measure pertinent features of the mine. In addition, areas of roof collapse, standing

water, visible daylight, and root penetration were noted. See Figure 5, Mine Reconnaissance Map, for more information regarding the locations and observations.

Stop 1 is located in the west-center portion of the mine. The clear span between pillars was measured at 34.6 feet with a floor to ceiling height of 11.75 feet. The circumference of the pillar measured was 91 feet (29 feet diameter). A dominant joint pattern was noted and runs northeast-southwest (N60E). Stop 2 is near the southern mine face where roots are visible through joints in the ceiling. Stop 3 is also located near the southern mine face. Roots are visible through joints in the ceiling with a similar northeast-southwest trend. Span length between pillars was measured to be 34.9 feet with pillar widths of 22 and 28 feet. Stop 4 is at the southern extent of the west set of tunnels under I-470. The width of the tunnels ranged from 29 to 31 feet with a mine height of 12.3 feet at the opening of the tunnel and 12.7 to 13 feet within the tunnel.

In addition to the stops, other features were noted during the reconnaissance. Water was present at the south mine face, near the east set of tunnels under I-470, and also on the eastern part of the mine south of I-470. Several roof collapses are present both north and south of I-470. The largest collapse located near the center of the mine extended for 3 rooms (approximately 180 feet). In addition, infilling of wash material from the surface is present to the east of the main entrance.

On February 3, 2003, URS received a phone message from Mr. John Ivy indicating that additional ground subsidence may have occurred over the previous weekend. A brief site visit was made by Mr. Richard Moberly during the afternoon of February 3rd. It appeared that additional sluffing or possible expansion of the existing surface collapse had occurred in the open field between I-470 and Quarry Park Road, on property owned by Harold Mitts.

ROCK MECHANICS

Rock mechanics analyses were performed to evaluate potential pillar and roof stresses. Potential modes of failure associated with mine geometry include overstressing of pillars as a consequence of high overburden stresses and exceeding the tensile strength of the roof beam in the unsupported span between the pillars.

Pillar stresses were calculated using the tributary area method. The overburden thickness was assumed to range between 30 and 70 feet with an average unit weight of 150 pcf (soil and rock). The calculated extraction ratio of the mine based on 25-foot diameter pillars with 35-foot clear span is 83 percent. Pillar stresses were evaluated for extraction ratios of 80 and 85 percent to account for variation throughout the mine. Calculated pillar stresses range from 160 to 590 psi. Applying a factor of safety of 2.0, the pillar

strength must be greater than 1,180 psi. Typical compressive strength of the Bethany Falls Limestone is greater than 10,000 psi.

The induced tensile stress in the roof beam results from self-weight sag between pillars and transfer of a portion of the overburden stress to the main roof beam. The significance of the latter component depends upon the strength and stiffness of the overburden and the occurrence of horizontal bedding which allows for separation and transfer of stress into the roof beam.

Roof stresses were evaluated using conventional beam theory and various roof beam thickness and span length. Tensile strength of the Bethany Falls Limestone is estimated to be 1,200 psi (172,800 pcf). The minimum required thickness of the Bethany Falls Limestone according to the Ordinance is 10 feet with a maximum span of 35 feet. In the analysis, the roof beam ranged between 2 and 10 feet thick, the overburden thickness ranged from 56 to 64 feet (to account for the varied roof beam thickness), and the span ranged between 25 and 45 feet long. A factor of safety greater than 1.5 is desirable. See Table 1 for the results of the roof beam analysis.

In reality, the factors of safety obtained from the analysis may be higher as this simplified approach does not account for the potential tensile strength provided by the overlying Winterset Limestone. The presence of an overlying limestone layer will aid in dissipating a portion of the stress in the roof beam.

The rock mechanics analysis aids in the evaluation of the potential modes of failure of the mine. Based on the limited thickness of the overburden and the high compressive strength of the Bethany Falls Limestone, failure due to overstressing of the pillars is highly unlikely. The roof beam analysis indicates that if the minimum roof beam thickness of 10 feet is maintained, even with 64 feet of soil and rock overburden, and no additional rock support from overlying layers, the roof should be stable. Factors that can dramatically affect roof stability include overburden stresses, presence of overlying rock layers to dissipate the overburden stresses, and unfavorable joint orientation. Several roof failures were noted during the mine reconnaissance and occur where the overburden thickness is the greatest. Potential causes of the roof failures may be an increased span length, decreased roof beam thickness, or minimal rock support from overlying shale and limestone layers. Another cause may be unfavorable bedding planes present in the Bethany Falls Limestone that lead to dome-outs and cause progressive failures from the roof upward. In addition, an increase in the thickness of the "peanut rock", characteristic of the upper portion of the Bethany Falls, would decrease the available tensile strength of the roof beam.

EVALUATION

Based on the review of existing data and our brief field reconnaissance of existing surface and subsurface conditions, we offer the following observations and opinions:

1. The mine was originally constructed using typical mine geometry used during that period of time, and in general meets the Lee's Summit Missouri Ordinances in place at the time of mining. A few observed pillar dimensions did not meet the Ordinance requirements, but these appear to be isolated occurrences.

2. Pillars are arranged in a "random" pattern, which is generally thought to be unfavorable for subsurface development.

3. Floor to roof dimensions are typically on the order of 12 feet with some small variations noted. We note that for secondary utilization, an increased dimension is often required for truck access and loading dock construction.

4. Overburden thickness is minimal in most areas and did not meet the Lee's Summit Missouri Ordinances in place at the time of mining. Overburden thickness ranges from approximately 10 to 70 feet. A minimum of 64 feet of total overburden (both soil and rock) was required. At least one complaint order was filed by the City of Lee's Summit related to lack of overburden thickness and resulting in surface "cave-in's". Several areas of the mine have so little overburden that plant roots can be seen growing in the fractures/joints within the mine roof.

5. An overburden thickness (isopac) map was prepared using the available information. We note that accurate elevation control was not available. Verbal information provided by Mr. Don Woodward indicates an approximate floor elevation of the mine of 895 feet with the ceiling at approximate elevation 907 feet. This information was used to determine the overburden thickness over the undermined area. The Overburden Thickness Map is presented as Figure 6.

6. Only one test boring was available to evaluate the soil and rock materials over the mine. Additional borings may have been drilled in the past. Gross estimates were required to evaluate the occurrence and thickness of overburden materials.

7. At least two areas within the mine have failed, resulting in surface subsidence. One area appears to be active and continuing to fail. These areas are at locations where substantial overburden materials are present and at locations relatively near (and on both sides) of the existing Quarry Park Road.

8. Other areas, especially where overburden is very thin, may be susceptible to future failures.

9. Water is present in some portions of the subsurface (see Figure 5).

10. The two western tunnels below I-470 appear to be in good condition. We note that the eastern two tunnels were "flooded" and not accessible at the time of our inspection.

11. The precise locations of the easement for I-470, as well as other roads above the mine, could not be determined within the subsurface area.

12. At least one gas well casing extends through the mine opening. It is unknown if this well is active or if it has been "plugged". If not properly abandoned, future release of gas into the mine space could occur.

13. Preliminary rock mechanics analysis indicated that pillars and roof beams are adequate for support of the subsurface openings. This assumes that the thickness of the Bethany Falls Limestone above the mine roof meets the Ordinances requirements (minimum of 10 feet). It is possible, and more likely probable, that these thickness conditions are not present over the entire mine.

SUBSURFACE / SURFACE DEVELOPMENT

We understand that you wish to explore the possibility of both surface and subsurface development. Based on our review of the existing data, the mine visit, and rock mechanics evaluation, we offer the following comments.

Subsurface Development

Extensive geologic and engineering studies may be required to investigate the feasibility of converting the subsurface space for secondary utilization. With the information and observations to date, subsurface development does not appear to be feasible. Several large roof collapses were noted during the mine reconnaissance, and repair of these areas alone could be intensive and costly. At a minimum, preparation of the underground for commercial use would include the following:

1. Paving of the roadways to minimize dust and promote vehicle traffic.
2. Surface treatment of the pillars and roof to prevent spalling and degradation.
3. Improved entry including a minimum of two access/ergress points.

4. Possible removal of the floor to gain additional floor to ceiling clearance for tractor-trailer trucks and loading docks.
5. Protection of the exposed shale where the existing mine floor is lowered.
6. Installation of a sump pump system to keep the mine dry.
7. Installation of utilities.
8. Installation of rock/roof bolts in high traffic areas.

Surface Development

We understand that the probable surface development would consist of commercial and industrial development. This would most likely include single and multi-story buildings and parking lots. Surface development would require significant subsurface improvements to be safe. Several roof collapses have previously occurred and additional loading of the surface would detrimentally affect roof stability. Controlled backfilling of significant portions of the mine and/or the installation of false pillars may be required to maintain roof stability in the areas of specific structures within the proposed development areas. In addition, grading of the surface would be required that would alter the loading on the mine, potentially causing overstressing of the roof in other locations or unearthing of the mine where the overburden thickness is thin.

An alternative would be to intentionally collapse selected portion of the mine, utilizing the overburden materials for sale or use in other portions of the future development. Examples exist in the Kansas City area where this is being done.

RECOMMENDATIONS

The following recommendations are divided into several categories, ranging from short to long term and are dependent on your future plans for this property.

Short Term

1. The unstable areas where surface subsidence has occurred be "fenced" so that access is denied for people and livestock.
2. Existing openings to the underground space be secured so that access is denied to non-authorized personnel.
3. The locations of the existing surface facilities (roads, utilities, residential structures) be identified underground to assess the stability of these areas.
4. The underground surveying that has been completed in the past be updated and additional control points established so that more accurate locations of various features can be determined and evaluated.

Long Term

Depending on the potential future use of this property, some or all of the following recommendations may be required.

1. A detailed survey made of the entire underground space to establish more accurate locations throughout the mine. This would be an expansion of the survey that was established during the time of mining. Elevations at selected points within the mine should be included.
2. A detailed and comprehensive geologic and engineering study be made of the entire underground space to delineate potential area of instability and potential areas of future problems.
3. A series of test borings drilled at strategic locations across the site. These borings should be planned to evaluate the presence, thickness and quality of the overburden materials as well as mine pillars. Accurate survey control will be required so that the borings would be drilled through existing pillars.

We have appreciated the opportunity to work with you on this interesting project. As your plans continue to develop for this property, we would like to continue to assist you in any way possible. Please contact the undersigned if you have any questions.

Very truly yours,
URS Corporation

Jamie Martens, E.I.T.
Senior Staff Engineer

Richard L. Moberly, R.G.
Vice President and Sr. Consulting Geologist

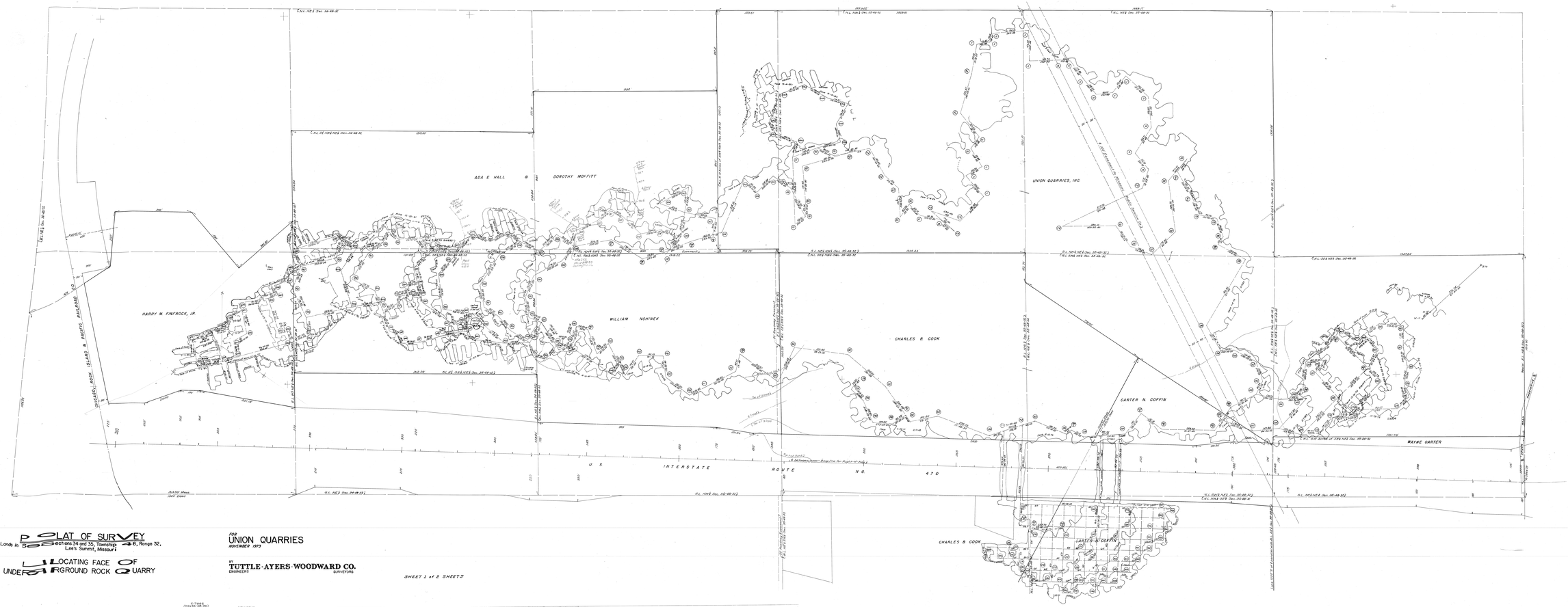
Two copies

Attachments:

Table 1	Roof Beam Analysis
Figure 1	Site Location Map
Figure 2	Mine Map
Figure 3	Undermined area at I-470
Figure 4	Geologic Rock Units in Kansas City
Figure 5	Mine Reconnaissance Map
Figure 6	Overburden Thickness Map

Table 1
Roof Beam Analysis
Lee's Summit Mine
16529706.00001

Thickness (ft)	Span Length (ft)	Tensile Stress (psf)	Tensile Strength (psf)	Factor of Safety
2	25	678,906	172,800	0.25
	30	977,625		0.18
	35	1,330,656		0.13
	40	1,738,000		0.10
	45	2,199,656		0.08
4	25	181,250	172,800	0.95
	30	261,000		0.66
	35	355,250		0.49
	40	464,000		0.37
	45	587,250		0.29
6	25	85,677	172,800	2.02
	30	123,375		1.40
	35	167,927		1.03
	40	219,333		0.79
	45	277,594		0.62
8	25	51,074	172,800	3.38
	30	73,547		2.35
	35	100,105		1.73
	40	130,750		1.32
	45	165,480		1.04
10	25	34,531	172,800	5.00
	30	49,725		3.48
	35	67,681		2.55
	40	88,400		1.95
	45	111,881		1.54



PLAT OF SURVEY

Lands in Sections 34 and 35, Township 48, Range 32, Lee's Summit, Missouri

LOCATING FACE OF UNDERGROUND ROCK QUARRY

FOR UNION QUARRIES
NOVEMBER 1973

BY TUTTLE-AYERS-WOODWARD CO.
ENGINEERS SURVEYORS

SHEET 1 of 2 SHEETS