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Aurora, Nevada
Summary

Introduction and History

Aurora, a historic bonanza gold district in Nevada (see also Figure 1.), offers several attractive opportunities for modern-day bonanza gold discoveries. Aurora began as a high-grade, underground district that in the middle 1800's and early 1900's produced over a million ounces of gold. By contrast, the modern, low-grade open pit operations, peripheral to the earlier mined outcropping bonanzas, have produced only about 300,000 ounces of gold. In all its history, the district has produced entirely from outcropping orebodies, and the district has seen no exploration for non-outcropping orebodies. Applying modern epithermal-vein concepts to the available data, RDM has recently identified several promising bonanza exploration targets.

Aurora's mining history began in 1860 when a party of three hunters discovered gold and silver on Silver Hill. A rush to the area began and the town of Aurora sprang up. Through the colorful accounts by its most famous resident, Samuel Clemens, the town quickly gained special notoriety as a rough and tumble western mining camp. The rich near-surface orebodies were soon depleted, and by 1869 the boom was over.

Aurora enjoyed a brief resurgence during the 1870s owing to the excitement surrounding rich discoveries made then at Bodie, California, 16 kilometers west. This flurry soon died down, and Aurora was virtually abandoned until the period 1910-1918, during which several underground operations supplied ore to a 450-tonne-per-day stamp mill. Activity declined again after this mill shut down, and by the early 1920's Aurora had become a ghost town.

Significant open pit mining began in 1987 with Consolidated Nevada Goldfield's construction of a 200 tpd cyanide mill to process ore from the Prospectus vein. In 1993 the mill was expanded to its present 350 tpd capacity. More recent production has come primarily from the Chesco-Juniata and Ann open-pits. CNGC's total production from Aurora for the period December 1987 through December 1997 was 125,702 ounces of gold, and in its last full year of production, 1997, the mine produced 37,327 ounces of gold. By March of 1998 low gold prices had prompted the mine to go on standby.

Another company, The Aurora Partnership, began heap-leaching open-pit ore mined from the Humboldt pit, adjacent to CNGC's property, in 1987. Up to the end of mining in August 1994, Electra produced 13,284 ounces of gold. CNGC, now Real del Monte Mining Corporation, has since purchased Electra's interest in the Humboldt deposit.

Total historic production from the Aurora district is difficult to determine owing to the lack of complete records. Various reports place the value of production during the early boom years at 0.8 to 1.4 million ounces of gold. Production realized during the present century has totaled around 500,000 ounces, so the total production from Aurora is estimated at between 1.3 and 1.9 million ounces of gold. The principal area of historical production centered near the Wide West vein located on Last Chance Hill.

Regional Geology

The Aurora District is one of a number of major ore deposits lying within the northwest-striking Walker Lane structural belt. Basement rocks near Aurora consist of Paleozoic to Early Mesozoic sedimentary rocks uplifted and intruded by granitic masses during the Jurassic as well as the Cretaceous. Subsequent Tertiary volcanism laid down thick deposits ranging from andesitic to rhyolitic in composition, and at Aurora these rocks host a swarm of gold- and silver-bearing epithermal quartz-adularia veins approximately 10-11 million years in age (see also Figure 2.). The northeasterly strike of the Aurora veins parallels a mineral belt that includes the quartz-adularia Bodie (7.1-8.0 m.a.) and acid-sulfate Borealis deposit (11.6-17.6 m.a).

District Geology

Ore at Aurora is hosted by a Miocene pile of andesitic to dacitic extrusive rocks topped by a rhyolitic tuff and intruded by a porphyritic andesite stock (see also Figure 3.). Younger rhyolitic tuffs and basalt flows overlie the mineralized rocks, and all mining carried out to date has been confined to erosional windows exposing the underlying mineralized rocks. The main Aurora District occupies an erosional window in the western portion of the district, and the Ann Pit area sits in another erosional window to the east.

Ore occurs in a relatively simple structural setting. Mineralization exposed in both the main Aurora District and the Ann Pit area consists of a northeasterly swarm of veins ranging up to 12 meters in width. In the main Aurora District, a barren system of north-south fractures cross and apparently offset the veins. A few of these NS fractures are mineralized, and the highest-grade mineralization found on the NE veins has always been found near intersection with members of the NS set. These relationships indicate that at least some of the NS fractures existed during mineralization and emphasize the important ore control exerted by the NS set of faults. The highest-grade ore shoots, mined in the last century, were found near these NE-NS intersections. Modern open pit mining has followed lower grade mineralization along NE veins extending away from the earlier mined high-grade areas.

The andesitic stock marks an important center of production. The Prospectus vein and Humboldt vein systems occur in well-indurated andesitic conglomerate along the northern margin of the stock and those veins dip 60 to 70 degrees north. The Juniata, Chesco and Martinez vein systems, which occur within the stock and along its southern margin, dip to the south, as do most other vein systems within the district. All recent metal production in the main district has come from vein systems located around the periphery of the andesite stock.

Gold occurs as electrum, and silver is present as acanthite and silver sulfosalt minerals. Gold-to-silver ratios average about 1:5 and reportedly decrease with depth on individual veins. Pyrite is present in the veins, but usually in concentrations well below 1 percent. Very fine-grained sphalerite and galena, when present, occur in trace amounts. The ore minerals are very fine-grained and, as disseminated concentrations, create dark bands within the quartz.

Remaining ore reserves at Aurora occur primarily in the Juniata/Chesco and Humboldt orebodies. Both of these orebodies consist of closely spaced groups of veins and stockwork that in aggregate achieve ore-grade widths exceeding several tens of meters.

Ore grades within any vein are restricted to a narrow vertical range extending over as much as several hundred meters. This is the ore horizon, so typical of epithermal deposits, and although its presence means that erosion may have removed ore in some areas, it also opens the attractive possibility that other, less deeply eroded, areas harbor unexposed ore. Locating this unexposed ore entails modeling the ore horizon and then projecting it into unexplored areas.

When taken in the context of the ore horizon concept, observations of vein characteristics found exposed in different parts of the district can be used to build an ore deposit model for Aurora (see also Figure 4.). Ore exposed in the southern portion of the district on Silver Hill, although very high-grade at the surface, extends only a few meters beneath shallow surface workings. The veins on Silver Hill are numerous, up to several tens of meters in width, and composed primarily of medium- to coarse-grained white quartz. Propylitic alteration dominates in the host rocks. These outcrops on Silver Hill certainly represent the ore horizon bottom.

Veins located farther north and toward the northern edge of the district, such as the Prospectus, Juniata-Chesco, and the Humboldt, exhibit ore grades extending over the entire range of the ore horizon. Gold occurs within fine- to medium-grained white to gray quartz veinlets characteristically including adularia. The veinlets themselves form conformable and cross-cutting bands within an otherwise barren vein of generally coarser-grained white quartz. Ore on these veins vanishes upward into generally finer-grained quartz.

The top of the Humboldt vein system disappears to the east beneath apparently barren rhyolitic rocks exhibiting numerous chalcedonic veins and veinlets only weakly anomalous in gold. Some of this chalcedony outcrops above drill-hole intercepts of typical quartz veins in the underlying andesite. These relationships indicate that veins extending above ore and approaching the surface exhibit a complete transition from quartz to chalcedony.

The host-rock alteration observed in this central and northern portion of the district is generally propylitic in the lower portion of the ore horizon and increasingly argillic toward the top – a typical epithermal feature. The location of the older rhyolitic tuff coincides fairly closely in stratigraphic elevation with the top of economic mineralization on the Humboldt and Prospectus veins, and along the tuff's lower contact at those locations it has been altered extensively to clays and pyrite. Argillic alteration weakens and generally disappears above the rhyolite-andesite contact, somewhat at variance with standard epithermal models.

Viewed in cross section (Figure 5.), these observations show that the ore horizon dips moderately to the north, where it disappears beneath the weakly mineralized rhyolitic tuffs and post-mineralization cover. It is not yet clear whether the rhyolitic tuffs simply mark the approximate top of the ore horizon or if, owing to physical differences with the underlying andesites, the rhyolitic tuffs formed a cap that to some extent controlled the top of mineralization. At any rate, the distribution of open pit outlines and vein outcrops demonstrates that the ore horizon dips northerly at an angle approximating that of the dip of the rhyolitic tuffs. This situation opens a very attractive exploration perspective.

Exploration

The first step in RDM's effort is a compilation of the available data for the district. That compilation is approaching completion and includes an electronic assay and geologic database for the nearly 2,000 exploration and development holes drilled on the property. Significantly, all but a few of these drill holes targeted known mineralization during short-range development programs. Most of the district remains unexplored (see also Figure 6).

After taking into account the northerly dipping ore horizon, it becomes apparent that the main Aurora District most likely continues to the north in the form of blind orebodies. Adding to this attraction is the northerly projection of what history has proven to be a major, district-scale ore control, the NS fault system, and the northeasterly projection of a demonstrated gold-bearing structure, the Sawtooth vein. The projected intersection of these two structures beneath postmineral cover provides one concrete example of a buried high-grade target north of the main District. Additional work will doubtless identify additional, more subtle targets. In keeping with the rather subtle surface expressions typical of the higher levels of epithermal vein systems, premineral rhyolitic tuffs located in this area expose abundant chalcedonic to quartz veinlets moderately to weakly anomalous in gold. This target area requires some finalizing fieldwork to locate specific indications of underlying structures, followed by drilling. Intriguingly, virtually no drilling has been carried out in this area.

A similar situation exists in the Ann Pit area. Ore in the Ann Pit is located on northeasterly fractures similar to those of the main Aurora District, but post-mineralization alluvium and basalt obscure the surrounding area. The projected pre-mineralization andesite and rhyolitic tuff contact offset (see also Figure 3) suggests that the post-ore cover west of the Ann Pit hides another NS fracture system. If the existence of this structure proves true, it would complete a structural pattern at Ann similar to the ore-controlling NE-NS pattern of the main Aurora district. It follows from this interpretation that the Ann Pit veins, projected to their intersection with the covered NS structure, provide an another attractive target for blind, high-grade mineralization.

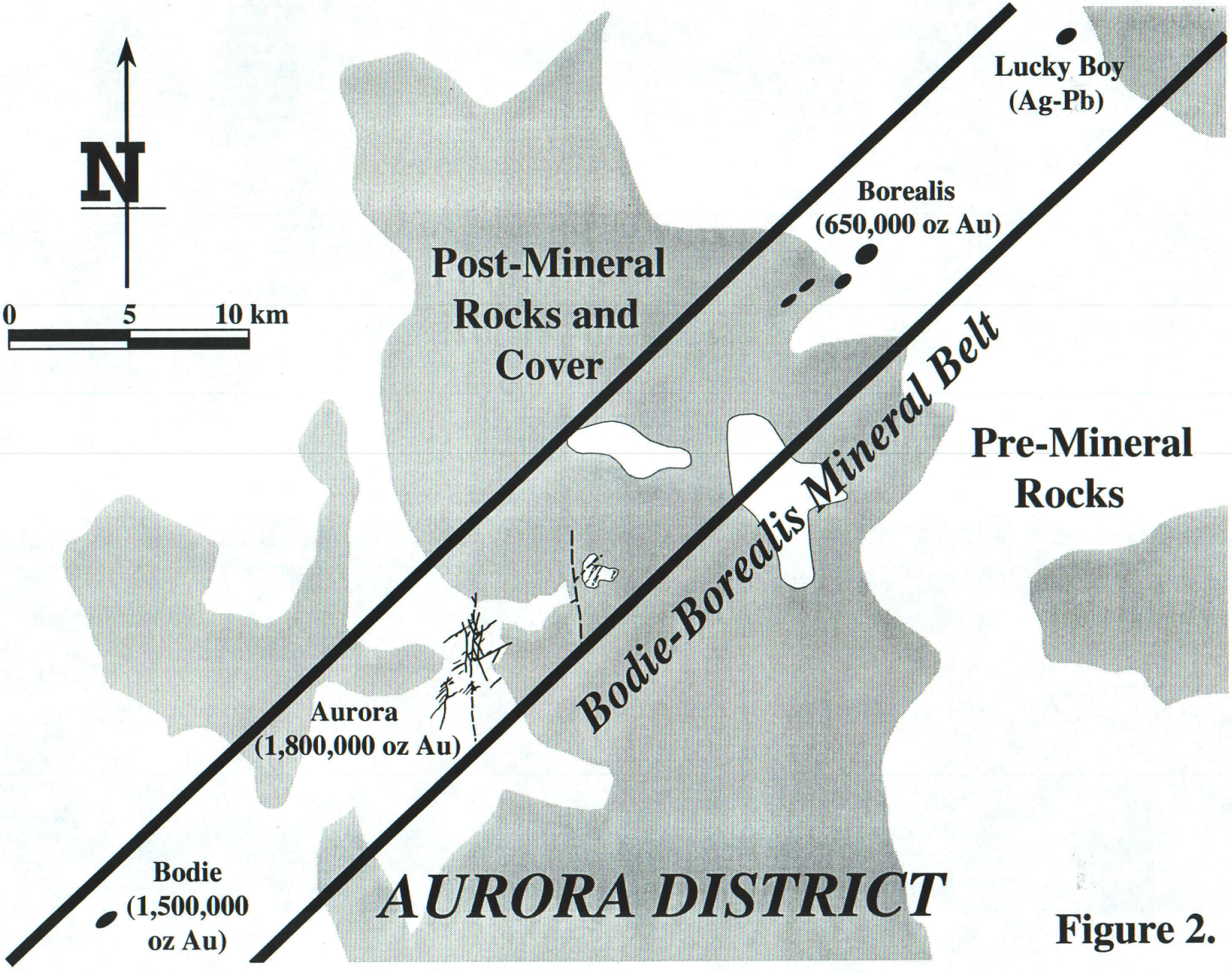
Projected similarly, the Hilda veins offer another blind target a short distance north of the Ann Pit. Restricted outcrops of the pre-mineralization rhyolitic tuff at the Hilda prospect expose chalcedonic to quartz veining that has produced sample assays running up to 12 g/t Au. Although several barren holes have been drilled on these outcrops, there has been no drilling to the west, near the possible buried NS structure. More work needs to be carried out to test this exciting area.

On the basis of these examples, further study of the Ann Pit area promises to produce a number of attractive exploration targets. Again, development of these targets requires some detailed fieldwork to locate specific indications of underlying structures, followed by drilling.

RDM estimates that a program to finalize these targets and carry out approximately 20,000 feet of initial drilling would cost $500,000 or less. Additional exploration would depend on the initial results.

AURORA LOCATION

Figure 1.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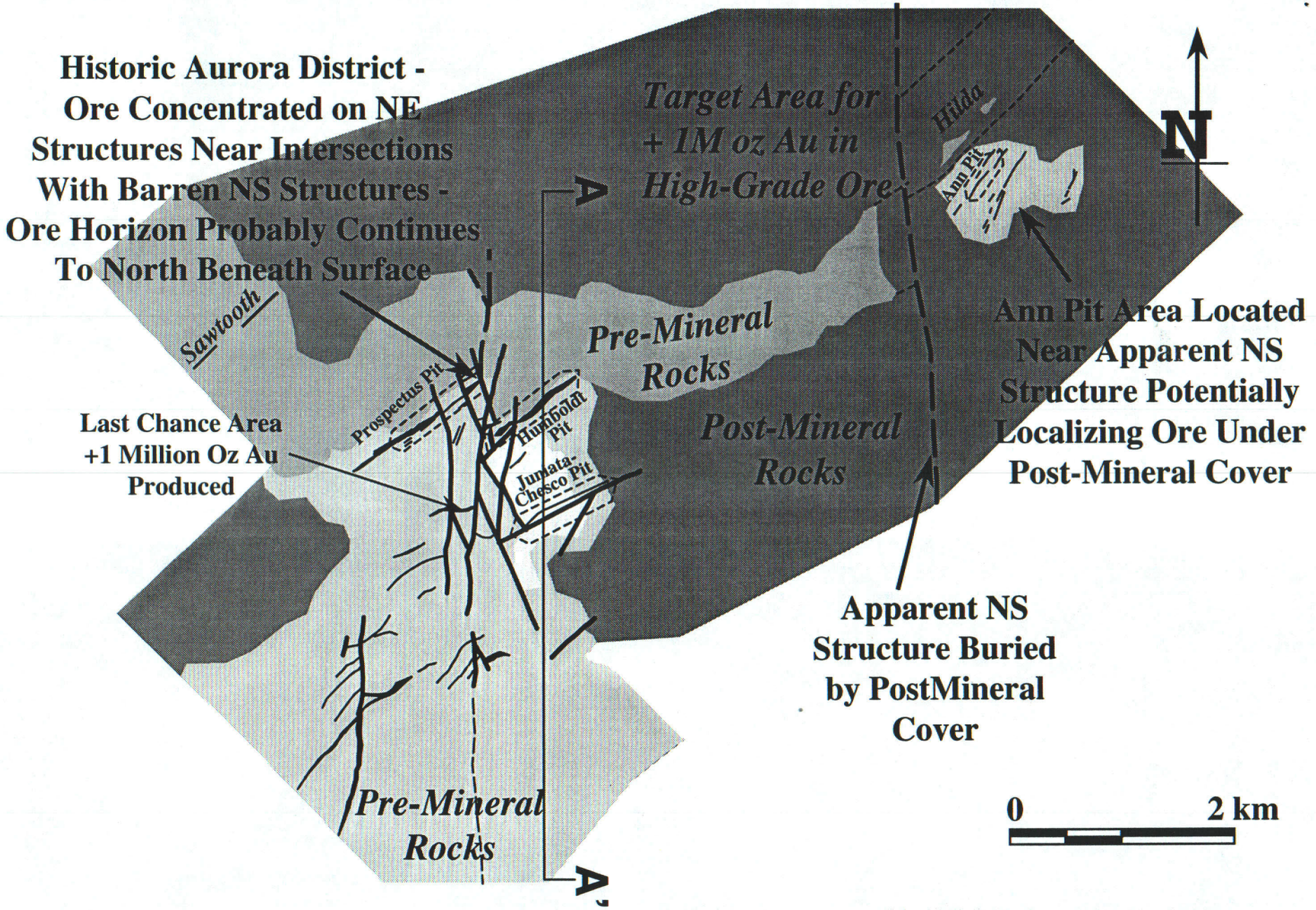
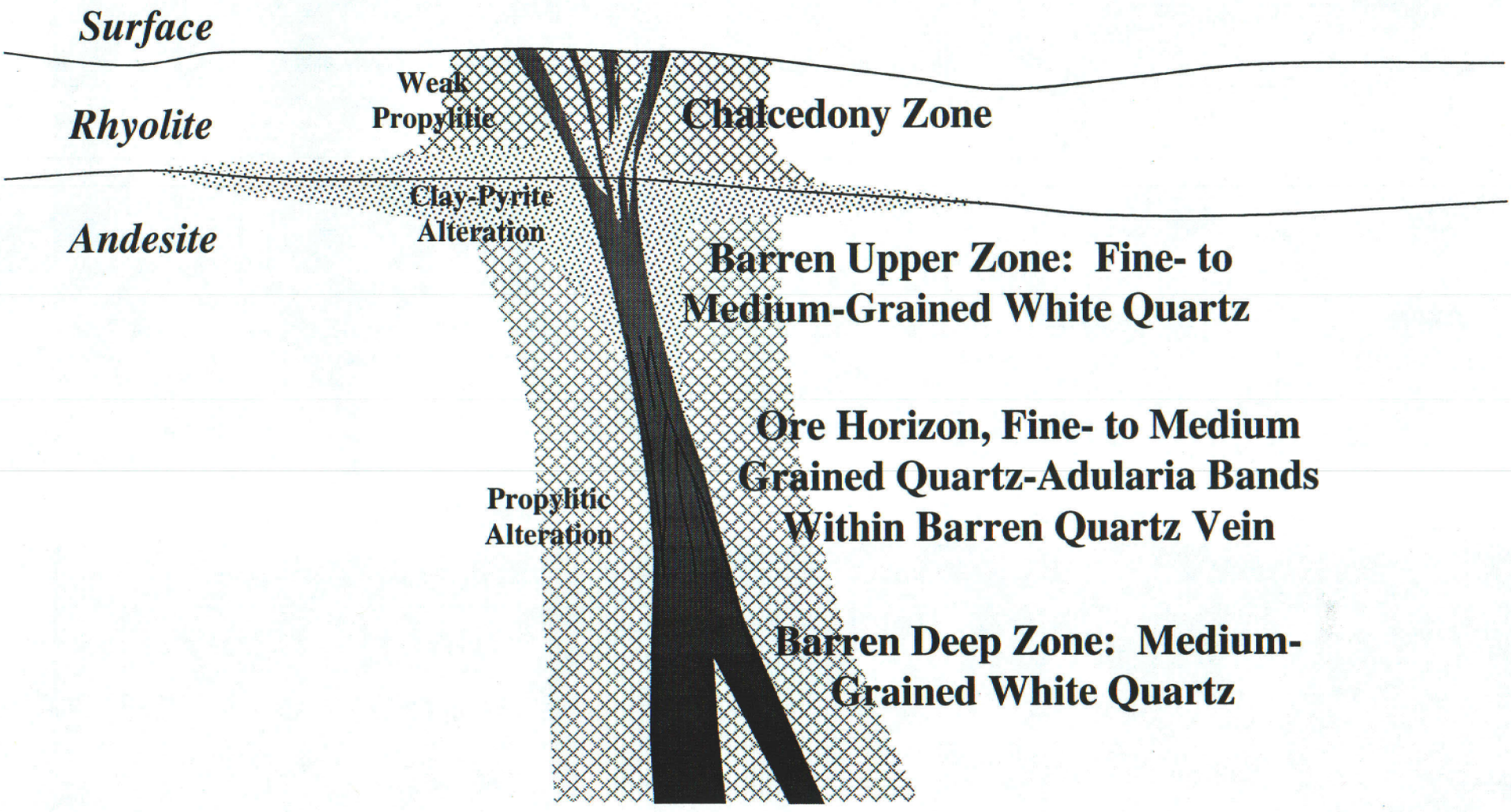
AURORA DISTRICT

Figure 2.



AURORA DISTRICT GEOLOGY

Figure 3.



AURORA DISTRICT ORE DEPOSIT MODEL

Figure 4.

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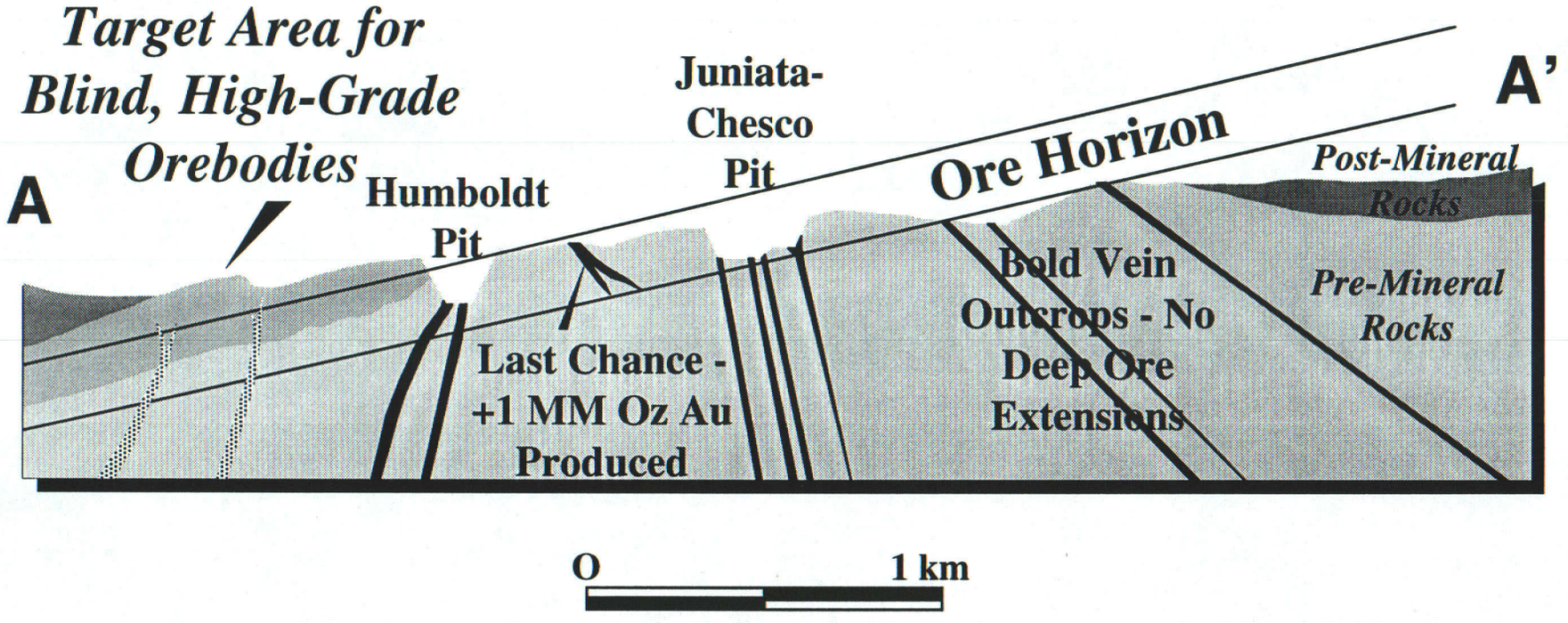
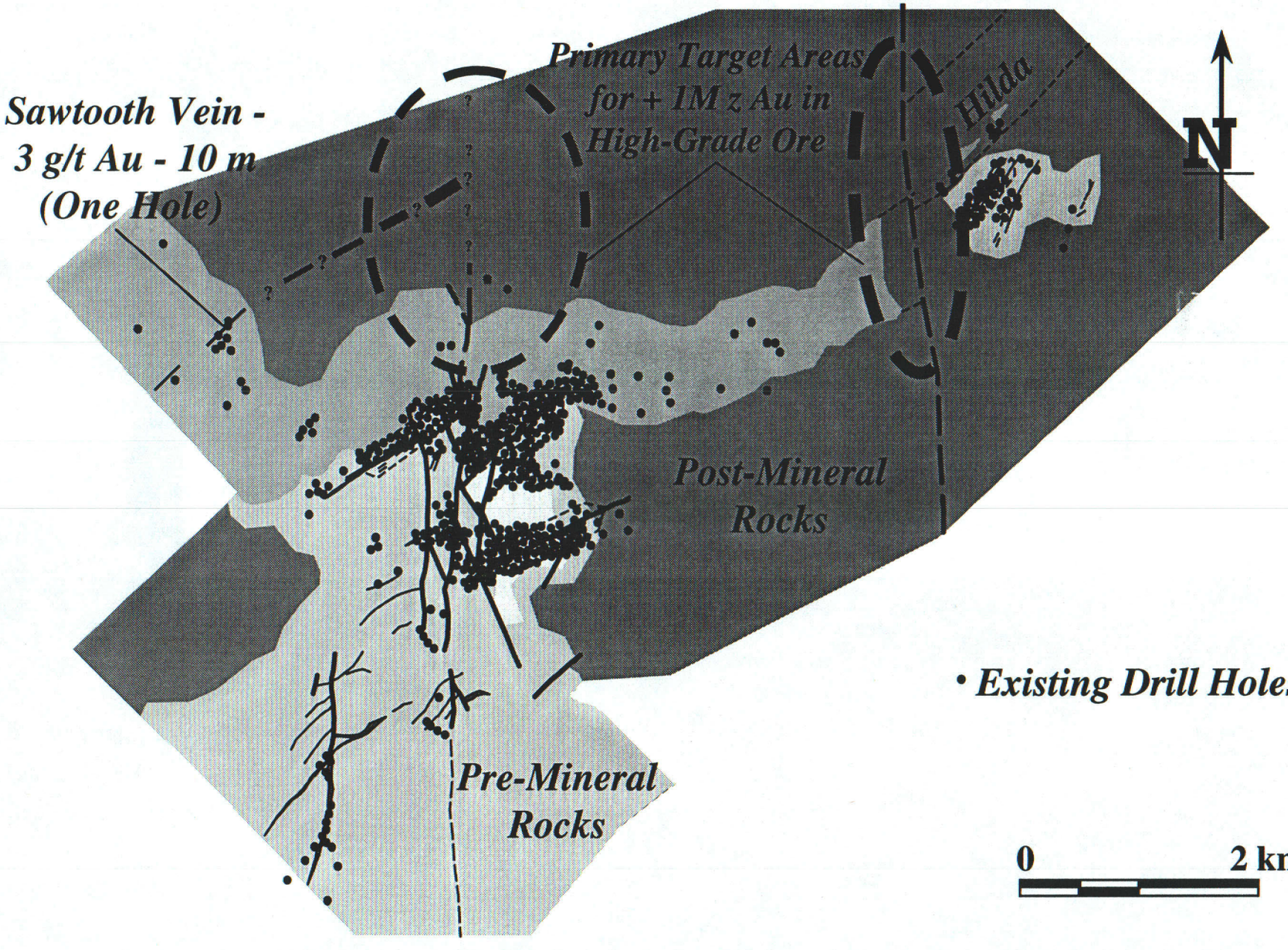


AURORA DISTRICT - ORE HORIZON CONCEPT

Figure 5.



TARGETS AND EXISTING DRILL HOLES

Figure 6.