APPENDIX H: Financial Realities, Development Costs

CONCEPTUAL DEVELOPMENT PARAMETERS
DOWL Engineers, Bill Hamm, Dec 15, 2004

1. Engineering evaluation of proposed development areas

Initial selection of possible development areas was based on evaluation of existing data sources, such as topographic maps, geologic maps, land use plans, and vegetation coverage. The initially identified areas were then further studied to refine their characteristics and boundaries. Most of the proposed development areas were evaluated on the ground by the planning team. During this stage, the team was joined by Bill Hamm, a senior civil design engineer with DOWL Engineers. His involvement in this planning project brings an element of practical experience with the engineering challenges of infrastructure development in the Girdwood valley.

The conditions present in the project area will present a number of challenges to development. While daunting, these conditions are not insurmountable, as evidenced by other successful development in the Girdwood valley. The first of these challenges is steep terrain. Houses and other buildings can be designed and constructed on almost any terrain, as evidenced by the upper tram terminal above the Alyeska Prince Hotel. Economical year-round access is the most significant constraint in residential areas. The development areas need to be served by a road system with maximum grades of 10% on the runs and no more that 4 or 5 % through the intersections. Driveways should not be any steeper than 15%.

The prevalence of shallow bedrock in the development areas will add to the cost of development but otherwise is believed to be manageable. A detailed geotechnical investigation to determine rock soundness and hardness will be necessary to make a final determination. For purposes of this study, it is assumed that the rock will be similar to that found on the south side of the valley, where development has already taken place in rocky areas.

2. Suggested trail and road sections

In general, the proposed roads and trails are expected to conform to the current MOA standards. Due to some unique requirements of this area, certain variations to the standards are proposed.

In an effort to preserve as much as possible of the existing natural forested areas and to allow generous access to a more secluded setting, it is proposed that most of the trails be located along or near the back lot lines of the lots and development areas. Flexibility must be allowed in the choosing of alignment and grades for the trail system to make them as compatible as possible with existing vegetation and geologic features. This would mean that in some areas, the MOA standards for curvature, grades, widths, and surfacing would be relaxed. The community would decide whether to maintain snow removal of trails during the winter or groom them for cross-country skiing. With a trail system generally in back of the lots, there would be little need for sidewalks adjacent to the streets.

Streets should be paved with rolled curb and gutter on both sides. The residential streets should be 28 ft wide from back of curb to back of curb. This is the narrowest allowed by MOA standards.

Street grades should be generally lower than adjacent lots to allow positive drainage of the lots into the street. An extensive storm drain system should be incorporated to promote good in-street drainage. This scheme will result in a narrower overall improvement section, thus minimizing impact on adjacent natural vegetation.

Snow removal and storage is a major factor in the design of residential subdivisions in Girdwood. Hauling snow is very expensive so adequate space must be provided on each side of the street for stacking of snow plowed off the street. Current Municipal standards call for 7 ft on each side of the road. In Girdwood, due to a generally heavier snowfall, a storage width of 12 ft should be considered. This indicates a minimum Right-of-way width of 52 ft. The Municipality will likely require their minimum standard width of 60 ft. When the parcels are subdivided, and subdivision agreements are negotiated, the developer should request a waiver to allow existing natural vegetation to remain in the snow storage areas to the maximum extent possible. The minimum clear width on each side of the road will likely be 7 ft. The use of near-vertical cut slopes in rock and gabion walls in fill sections will help keep the roadway improvements within a narrower impact zone.

3. Utility location and construction methods

These residential areas will need to be served with a full compliment of utilities. To minimize impact to naturally forested areas, it is proposed that, to the fullest extent possible, all utilities be placed within the Rights-of-way. The standard configuration would include a storm drain down the middle, with water and sewer lines 10 ft on either side. Gas would go behind the curb on one side and all wire utilities behind the curb on the other side. Street light circuits would be included with the other wire utilities.

In many of the proposed development areas, bedrock is found at or near the surface. Thus it will be necessary to blast rock to dig the trenches for the deep utilities under the street. This is commonly done in the Girdwood area. Normally water lines are placed 10 ft deep and sewer and storm drain lines are a minimum of 6 ft deep. In particularly difficult areas, the utilities can be put in arctic pipe or otherwise insulated to reduce the required trench depth. After the pipe is placed and bedded, it would be backfilled with rock blasted from the trench, supplemented with imported gravel as required.

4. Conceptual construction cost factors

- **Streets**. For estimating purposes, the proposed street section includes a 24 ft wide pavement with rolled curb and gutter on both sides. The pavement section includes 2 inches of asphalt, 2 inches of leveling course, and 18 inches of classified material. Rock or soil excavation and backfill will occur below that (most areas will be utility trenches). Signs and landscaping are included. The estimated cost range for these improvements, in 2005 dollars, is $200 to $250 per linear foot of roadway in granular soils and $300 to $350 in rocky areas.

- **Trails**. For estimating purposes, the proposed trail section includes an 8 ft wide surface of leveling course underlain by 12 inches of classified material. Rock excavation and backfill will occur as required below that. A nominal amount of signs and landscaping is included. Lighting is not included. The estimated cost range for such improvements, in 2005 dollars, is $20 to $25 per linear foot of trail in granular soil and $30 to $35 in rocky areas.

- **Water line.** For estimating purposes, the typical water line is assumed to be an 8 inch diameter ductile iron pipe at a depth of 10 ft below the road surface. Trench excavation will be in granular soils and backfill will be done with imported classified material. Lot services to the property line will be placed at a nominal spacing of 100 ft and fire hydrants will be placed at a nominal spacing of 300 ft. The estimated cost range for such improvements, in 2005 dollars, is $120 to $145 per linear foot of mainline in granular soils. Where trenching will go through bedrock, the estimated cost range per foot of waterline is $150 to $180 for comparable improvements.

- **Sewer line.** For estimating purposes, the typical sewer line is assumed to be an 8 inch diameter ductile iron pipe at a depth of 8 ft below the road surface. Trench excavation will be in granular soils and backfill will be done with imported classified material. Lot services to the property line will be placed at a nominal spacing of 100 ft and manholes will be placed at a nominal spacing of 300 ft. The estimated cost range for such improvements, in 2005 dollars, is $90 to $115 per linear foot of mainline in granular soils. Where trenching will go through bedrock, the estimated cost range per foot of sewer line is $110 to $135 for comparable improvements.

- **Storm drain.** For estimating purposes, the typical storm drain line is assumed to be an 18 inch diameter corrugated metal pipe at a depth of 6 ft below the road surface. Trench excavation will be in granular soils and backfill will be done with imported classified material. Catch basins will be placed at a nominal spacing of 500 ft and manholes will be placed at a nominal spacing of 300 ft. The estimated cost range for such improvements, in 2005 dollars, is $75 to $120 per linear foot of mainline in granular soils. Where trenching will go through bedrock, the estimated cost range per foot of storm drain line is $95 to $120 for comparable improvements.

- **Trunk assessments.** It is assumed that AWWU will extend a water transmission line through the proposed development area as required to provide the needed service. Their existing tariff provides for assessing the areas served by such transmission lines to pay for the cost of line construction, and other downstream costs. For estimating purposes, the estimated assessment for water service is assumed to be $1.25 per square foot of development area. For assessment purposes, the development area is computed as the front 150 ft of all lots served by water.

AWWU has no current plans to provide a sewer trunk to the Upper Crow Creek area. Service will likely be provided by extending an existing line in lower Crow Creek Road. This existing line is probably not large enough to handle the proposed new development. Either the future developers will need to upsize the existing line or construct another line back to where there is sufficient capacity. An alternative might be to ask AWWU to provide the needed capacity and assess the areas served. Assuming the latter course is followed, the estimated assessment for sewer service is assumed to be $1.00 per square foot of development area.

- **Gas, Telephone and Electric.** Typically these utilities design and install their own lines and include the cost in their rate structure.