

Daybreak

South Jordan, Utah

Project Type: **Master-Planned Community**

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PROJECT TYPE

Located in South Jordan, Utah, a suburb of Salt Lake City, Daybreak is the largest master-planned community in the state's history. Developed by Kennecott Land, a subsidiary of mining company Rio Tinto, the project will consist of over 13,500 residential units and 9.1 million square feet (845,418 square meters) of retail and commercial space upon completion in 2017. The developer employed a number of sustainable design features and strategies, such as preserving over one-quarter of the site as open space, retaining 100 percent of the stormwater runoff on site, and requiring that all homes be Energy Star® certified.

LOCATION

Outer Suburb

SITE SIZE

4,126 acres/1,670 hectares

LAND USES

Single-Family Homes, Apartments, Office, Retail, Open Space

KEY FEATURES

- Traditional Neighborhood Development
- Master-Planned Community
- Green Building
- Sustainable Development



- Pedestrian-Friendly Design

WEB SITE

www.daybreakutah.com

ADDRESS

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South Jordan, Utah

DEVELOPER

Kennecott Land Company
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www.kennecottland.com

LAND PLANNER

Calthorpe Associates
Berkeley, California
510-548-6800
www.calthorpe.com



GENERAL DESCRIPTION

Daybreak, at 4,126 acres (1,670 hectares), is the largest master-planned community in Utah history and the state's first large-scale project guided by new urbanist principles. Developed by London-based mining company Rio Tinto through Kennecott Land, its subsidiary, the project is located 20 miles (32 kilometers) south of Salt Lake City. Groundbreaking took place in early 2004. When finished in 2017, Daybreak will comprise a mix of uses, at least 13,500 residential units, and a commercial core (9.1 million square feet/845,418 square meters of retail/commercial space) oriented around transit systems. The development incorporates about 1,250 acres (506 hectares) of open space, which in turn facilitates 100 percent stormwater retention. All homes are Energy Star® certified. Phase I includes an elementary school and a community center that are LEED-Silver certified, deriving their heating and cooling needs from ground-source heat pumps.

THE SITE

In 1989, Rio Tinto, one of the world's largest mining companies, bought Kennecott Utah Copper and took ownership of 93,000 acres (37,636 hectares) on the western side of the Oquirrh Mountains. More than half of the land is in the mountains and is still actively mined for copper. Another 40,000 acres (16,187 hectares) lie in the western foothills in an undeveloped area that for over 100 years has served as a buffer between development and mining operations. In 2001, Kennecott Land was created to manage and develop the nonmining land owned by Rio Tinto.

The 4,126-acre (1,670-hectare) Daybreak site is located on the eastern edge of the buffer area at the foot of the mountains and within the city limits of South Jordan (population 41,000). Historically, much of the site has been used for farming. However, a small portion of the tract (13 percent) sits on the former site of evaporation ponds used in conjunction with mining operations in Bingham Canyon. The ponds were used for evaporation until 1965 and for periodic storage of runoff water until 1987. Studies conducted in the early 1990s concluded that there were

elevated levels of heavy metals in the soil where the holding ponds had been located. Kennecott Copper entered a voluntary cleanup agreement with the U.S. Environmental Protection Agency to remediate the evaporation ponds. Ten years later, Kennecott Land decided to go beyond standard industry practice and spent tens of millions of dollars to remove the remaining pond sediment from the site in order to develop an 85-acre (34-hectare) lake and housing on the east side of Daybreak.

From a sustainability perspective, the Daybreak site has one serious handicap: its location 20 miles (32 kilometers) south of downtown Salt Lake City, the regional employment center, would generate myriad car trips and exacerbate regional air quality problems. These environmental ramifications, however, will be partially mitigated in the longer term as Daybreak attracts local employment generators and by a light-rail extension planned for the area in 2010. The rail system will abut a north-south highway scheduled to bisect Daybreak after 2010. Several parallel arteries providing access to Salt Lake City are already in place: Utah 111 along the development's western border, the Bangor Highway immediately to the east, and Interstate 15 about 2.5 miles (four kilometers) east.

DEVELOPMENT PROCESS

During the early 1990s, Kennecott Utah Copper (KUC), a subsidiary of Rio Tinto, hired the Florida planning firm of Glatting Jackson to select a parcel from its holdings for possible development. Two factors drove the selection of Daybreak. First, roads, water, and sewer system were nearby. Second, Glatting Jackson thought the relatively youthful market in South Jordan might accept a master-planned community based on the principles of traditional neighborhood design.

Meanwhile, Rio Tinto was going through a sea change. After decades of conflict with communities close to its mining units, the corporation had joined the Global Mining Initiative, which subsequently launched the Mining, Minerals, and Sustainable Development Project to shift the industry onto a sustainable trajectory. Rio Tinto also realized that another historical practice—"disposing" of excess lands—was antiquated and misguided. In April 2001, the company split Kennecott Land from KUC and charged the former with transforming 40,000 acres (16,187 hectares) of developable land into a profitable business founded on sustainable principles.

Peter McMahon, previously a financial officer based in Brisbane, Australia, transferred to Utah as president of the new subsidiary. He put an organization together, wrote a business plan, and hired Calthorpe & Associates of Berkeley, California, to produce a master plan with design guidelines. By early 2003, the project was ready to proceed. Rio Tinto had agreed to fund Daybreak. Nearly one-third of the project (1,238 acres/501 hectares) would be set aside as open space. The agreement also established a "planned community" zone for mixed-use development.

Each Daybreak phase is organized around a "village" of 1,000 to 1,200 residential units. Development will progress village by village, moving westward across the Mountain View Corridor, a freeway that will bisect the property in approximately 2010. Construction of a major town center is expected to commence between 2012 and 2014.

SUSTAINABILITY AS A CORE VALUE

When Rio Tinto decided to reorient its global businesses around sustainable practices, it was a long-term imperative. The company wanted to foster better relationships with neighboring communities, which meant focusing on the benefits of investing in sustainability to drive long-term shareholder value. McMahon explains: "We have eight to ten more Daybreaks to go. Our sustainable practices are an investment in the future. Given worldwide trends on sustainability and our desire to have other lands entitled, it's about long-term value creation—a different business model."

Rio Tinto sees that advantage in reduced expenses for litigation and environmental cleanup, greater operational efficiencies, and an optimized chance for securing future entitlements. The company began to institutionalize its green commitment by adopting the Brundtland Commission's definition of sustainability—a project is sustainable "if it meets the needs of the present without compromising the ability of future generations to meet their own

needs”—and then customizing it: Sustainable development should balance a healthy environment, social well-being, and a healthy economy.

Next, Rio Tinto tied management bonuses to sustainability performance and issued mandates to business units to establish sustainable development focal areas along with annual metrics for evaluating progress. Kennecott Land selected air quality, economic development, environmental education, energy/greenhouse gases, open space, transportation, waste generation/recycling, and water. Business units were also required to obtain ISO-14001 certification by establishing systems that reduce environmental risk and lead to annual improvements in performance. Kennecott Land was the first business unit to complete the process. Its drive toward incremental improvement is built top-down into Rio Tinto's operating structure. Kennecott Land pushes this ethic through builder and trade units by codifying its green requirements in design guidelines. The 180-page Daybreak manual delineates construction requirements ranging from streetscape features to indoor air and light quality, building materials, landscaping, and garage location. Before a builder can apply for a certificate of occupancy, a developer inspection is required.

PLANNING

After Kennecott Land took over Daybreak, McMahon faced a conundrum. On the one hand, he wanted to establish the company as the most sustainable developer in the United States and believed that strong market conditions supported that ambition. On the other hand, he didn't want to compromise profits by introducing communities that were too compact for the market. Salt Lake City is founded on ten-acre (four-hectare) blocks and exceptionally wide streets. In outlying areas today, most lots run from one-third to one acre (0.13 to 0.4 hectare).

McMahon selected Peter Calthorpe as master planner because of his emphasis on building strong neighborhoods and communities. All of the Calthorpe designs are guided by three goals: create an environment with as many transportation and social options as possible (pedestrian- and bicycle-friendly streets and schools, jobs, and religious institutions close to homes); offer housing options for diverse populations; and integrate existing natural features and topography, weaving open space throughout and providing recreational opportunities.

Calthorpe saw tight development as a key tool for achieving those goals at Daybreak, but the developer insisted on a compromise: Daybreak would fall between national averages for new urbanist communities and what was typical of an exurban development in Utah. If the market adjusted, the developer would ask the city of South Jordan to increase entitlements from the present 3.3 units per gross acre (8.15 units per gross hectare) to five units per gross acre (12.35 units per gross hectare), which equates to 8.5 units per acre (21 units per hectare) net of open space and roads.

Daybreak's east side, which totals 2,231 acres (903 hectares), comprises seven villages and a town center that are centered around a lake. Gridded streets with sidewalks and greenbelts support internal pedestrian circulation. Subtle shifts in design differentiate one village from the next; each village is focused around a neighborhood center, which is within a one-quarter-mile (0.4-kilometer) walking radius of the village. The neighborhood centers will feature civic uses such as libraries, churches, and daycare centers, along with small amounts of higher-density multifamily housing. Affordability and diversity are built into Daybreak by virtue of price, product type (traditional single-family detached residences, townhouses, mansions, carriage homes, and apartments), and amenities (a seniors' center, a library, a gymnasium, and programmed and unprogrammed green spaces). In 2002, Envision Utah, a public/private partnership that advocates for smart growth, gave Kennecott Land its top award for the planning and design of Daybreak.

As Daybreak moves westward, similar development patterns emerge that continue to respond to the marketplace. Kennecott Land believes that residential growth from Daybreak and surrounding areas will support a mixed-use, lifestyle-oriented town center.

In an attempt to speed extension of the Utah Transit Authority's Mid Jordan rail line, Kennecott organized area stakeholders into a lobby that successfully worked toward accelerating the environmental impact statement process. Funding for construction of the line was agreed to by the legislature through an increase in sales tax. To decrease residents' commute times, the developer is beginning to work on a village center that is intended to

promote local job creation. Another relatively short-term possibility is the location of a major university center or health care facility at Daybreak.

LANDSCAPE DESIGN

Utah law mandates that all new developments detain stormwater from a ten-year, 24-hour storm event. But Kennecott made an early commitment to retain all of its runoff—up to a 100-year storm event. Infiltration basins are located in open space throughout Daybreak; in fact, the need for basins drove the location and size of some parks. A sediment trap at the fore of each basin captures the first flush of water, heavy with sediment. Gravel galleries underneath promote percolation and prevent mosquito breeding. The developer assumed this would add to development costs. However, localizing infiltration paid for itself by reducing capital costs (fewer conveyance structures and reinforced concrete pipes) and impact fees (South Jordan charges developers for discharging into the municipal stormwater system). It also decreases maintenance costs (sedimentation removal) for the city of South Jordan, which will eventually own the system.

In addition to the basins, the developer felt that Daybreak needed a major amenity and opted for an 85-acre (34-hectare) lake with a surrounding trail system. Stormwater flows into adjacent wetlands. Both wetlands and lake (a synthetic liner will reduce percolation losses) are designed to attract desirable migratory birds and other wildlife, such as deer and fox. Kennecott will fill and maintain lake levels with existing water rights that flow from Lake Utah.

More than 900 acres (364 hectares) of open space will be landscaped with native/low-water plants, a strategy that could cut irrigation in half compared with that necessary in a typical Utah development.

GREEN BUILDING DESIGN AND CONSTRUCTION

In the first phase, builders purchased finished lots and constructed product subject to criteria set forth in the design manual. Designed and built with four-sided architecture, all Phase I houses were constructed with a combination of fiber-cement board, brick, stone, or stucco. Homes are sited close to the street and typically have porches. Car access may be from an alley or the street.

Builders are currently required to recycle their construction waste. A private vendor operates the recycling program, collecting materials from large bins on site. Accepted materials include metal, concrete, dirt, wood, tin, carpet, wire, Sheetrock, plastic, and vinyl. Between 2004 and 2006, the builders and contractors recycled more than half of all the construction waste they generated and, in 2006, achieved a recycling rate of 76.8 percent.

The average housing unit (home plus lot) uses 10 percent less water than the average unit in the Jordan Valley Water Conservancy District. This is due to smaller lot sizes and to water-saving appliances, drip irrigation systems, drought-tolerant plantings, and less grass. Kennecott is investigating other options, such as diverting graywater from sinks into cisterns for lawn irrigation and stormwater retention on the lot level—an ambitious goal that would offer another source for cistern filling.

All Daybreak homes must be Energy Star certified; Kennecott anticipates that Daybreak will be the largest Energy Star community in the country. The program permits builders to select from a menu of options such as passive solar design and orientation, materials with high insulating factors, energy-efficient appliances, and instantaneous hot water heaters, in order to achieve a target that is at least 15 percent more efficient than the state's energy code. In addition to a monetary benefit for the homeowner, the 500 residences that were already occupied in Daybreak at the end of 2005 generated approximately 3,000 fewer tons of greenhouse gases than what non-Energy Star dwellings emit. At the completion of Daybreak, Kennecott expects that the 14,000 housing units will generate approximately 55,000 fewer tons of greenhouse gases per year than an equivalent number of non-Energy Star homes. This savings is equivalent to removing 12,000 cars from the road. Achieving this result costs an additional \$2,000 to \$3,000 per unit. The developer is also investigating alternative means of energy production, such as photovoltaic systems and wind turbines.

Kennecott has installed ground-source heat pumps in Daybreak's information pavilion, elementary school, and community center as another way of reducing carbon dioxide equivalents and energy consumption. The technology uses the earth's stable temperatures (55 degrees Fahrenheit at a depth of 300 feet/12.78 Celsius at a depth of 91.44 meters) much the same way an above-ground heat pump uses air temperature. Closed-loop pipes, containing an exchange fluid such as water and/or antifreeze, are driven 250 to 300 feet (76 to 91 meters) into the earth. The circulating fluid stabilizes the differential between ambient air temperature and ground temperature. Costs for the ground-source systems were comparable to those for conventional systems largely because they require less space in the building envelope. The developer hopes to use ground-source heat pumps in other elements of the community.

Built to LEED standards, the information pavilion uses passive solar design to moderate internal temperatures. Windows have low-emissivity glass. Eaves limit sun exposure in the summer but permit heat gain in the winter. Also, the framing system for the building was constructed from lumber reclaimed from dry docks in the Pacific Northwest. Gardens, comprising native and waterwise plants, surround the pavilion. Stormwater is captured and infiltrated on site for irrigation.

The elementary school incorporates natural daylighting (windows and clerestories, both exterior and interior); high-performance glass and shading devices; and energy-efficient lighting. Low-VOC products were specified for all paints, sealants, and adhesives.

The average price for houses in year one was approximately 13 percent higher than for homes of a similar size elsewhere in the area. Most of this is attributable to Energy Star certification, four-sided architecture, recessed garage designs, and community amenities. The developer plans to reduce the four-sided requirement, except on corner lots and areas of high impact, and explore ways of moving the garage closer to the house without negatively affecting aesthetics.

MARKETING

Market studies conducted through the 1990s established that 65 percent of Salt Lake Valley residents were Mormons, a market that, on the whole, places a high value on homeownership and education. The developer expected buyers to come from the greater South Jordan area, but many are relocating from the east side of the valley and from out of state. Empty nesters are a growing niche and the company plans to target more products to them.

Initially, the development team marketed Daybreak in a factual manner (i.e., large lake, homes spanning a wide range of prices), but shifted to a more emotional strategy aimed at selling a quality lifestyle and collective experience. Advertising and marketing pieces emphasize the South Jordan school district, which is rated number two in the nation, and the joint-use nature of the first elementary school and community center. (This concept will be repeated adaptively as additional schools are built. Prospective future partners are a library, a daycare center, and community swimming pools.)

Marketing materials, however, play down environmental features, because the developer fears that they would mark Daybreak as an expensive community. When the topic does come up, the sales team focuses on Energy Star certification and the value created through utility savings.

During the first 18 months that Daybreak was open, the developer sold 785 lots and 825 homes, becoming the second-largest seller in the valley. Higher lot prices, new building plans, more architectural control, and the Energy Star requirement are translating into a premium on Daybreak houses. Buyers are apparently willing to pay more in order to live in a community with a sense of place, a wide range of amenities, and new schools.

EXPERIENCE GAINED

Given environmental stresses in the United States and increasing regulation from local authorities, Kennecott's business model of long-term value creation represents a step forward. The same could be said for the company's definition of sustainability as a balance of environmental stewardship, community, and financial viability.

Kennecott took the time—even in the midst of setting up an organization and launching its first land development project—to pursue ISO certification. This was an enormous challenge, consuming significant staff time, but it gives the company a distinctive profile in the development industry and sets the stage for slow, steady improvement in environmental performance.

Kennecott wants to be the nation's premier sustainable developer—in a market that, on the whole, places less value on compactness and environmental sensibility than many others in the country. This has led the developer to emphasize the aspects of its sustainable development efforts that have a broad market appeal. However, if prospective homebuyers and residents are not engaged as partners in the vision, they are less likely to help optimize sustainability indicators, especially those related to resource conservation. Also, a blurred vision can undermine sales and ambitions to be an industry leader.

In the first village, the developer established a mix of different builders on each block to optimize architectural diversity. However, it led to a number of problems. For example, one builder excavated its site for a foundation and placed the dirt on a lot owned by someone else, slowing the latter's progress. In the future, the developer plans to sell entire blocks to each builder and use design guidelines to promote streetscape aesthetics.

PROJECT DATA			
LAND USE INFORMATION			
Site area (acres/hectares): 4,126/1,670			
Gross density (units per acre/hectare): 5/12.35			
LAND USE PLAN			
Use	Area (Acres/Hectares)	Percentage of Site	
Residential	1,380/558	33	
Retail	159/64	4	
Office/industrial	86/35	2	
Roads/parking	746/302	18	
Open space	1,250/506	30	
Other (civic)	505/204	13	
Total	4,126/1,670	100	
RESIDENTIAL INFORMATION			
Unit Type	Unit Size (Square Feet/Square Meters)	Number of Units Planned	Range of Initial Sales Prices
Single-family detached	1,300–4,000/121–372	8,803	\$160,000–\$450,000
Single-family attached	900–3,000/84–279	2,883	\$132,000–\$167,000
DEVELOPMENT COST INFORMATION			
Site Acquisition Cost: Historical cost basis			
Site Improvement Costs: \$574 million			
Soft Costs: \$49 million			
Total Development Cost: \$623 million			

DEVELOPMENT SCHEDULE

Planning started: April 2001
Construction started: November 2005
Village I completed: 2006
Village II completed: 2007
Villages III–VIII projected completion: 2008–2017
Estimated project completion: 2017

DRIVING DIRECTIONS

From Salt Lake City International Airport: Follow the signs leading south from the airport toward Bangerter Highway. Follow Bangerter Highway south to 11400th South. Daybreak will be on your left.

Driving time: 30 minutes in nonpeak traffic.

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This Development Case Study is intended to serve as a resource for subscribers in improving the quality of future projects. Data contained herein were made available by the project's development team and constitute a report on, not an endorsement of, the project by ULI—the Urban Land Institute.

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Developed by Kennecott Land—a subsidiary of the Rio Tinto mining company—Daybreak is the largest master-planned community in Utah history. Located 20 miles (32 kilometers) south of Salt

Lake City, the development will ultimately contain over 13,500 residential units and connect to the regional light-rail system.



Designed according to new urbanist principles, the diverse housing types are situated on small lots and arranged on a traditional street grid system. All homes built at Daybreak are Energy Star certified.



Upon completion, Kennecott Land projects that Daybreak will generate 55,000 fewer tons of greenhouse gas emissions than a non-Energy Star project of comparable size.



Photo by Ed Rosenberger

Constructed to LEED standards, the information pavilion, elementary school, and community center utilize ground-source heat pumps to reduce energy consumption.



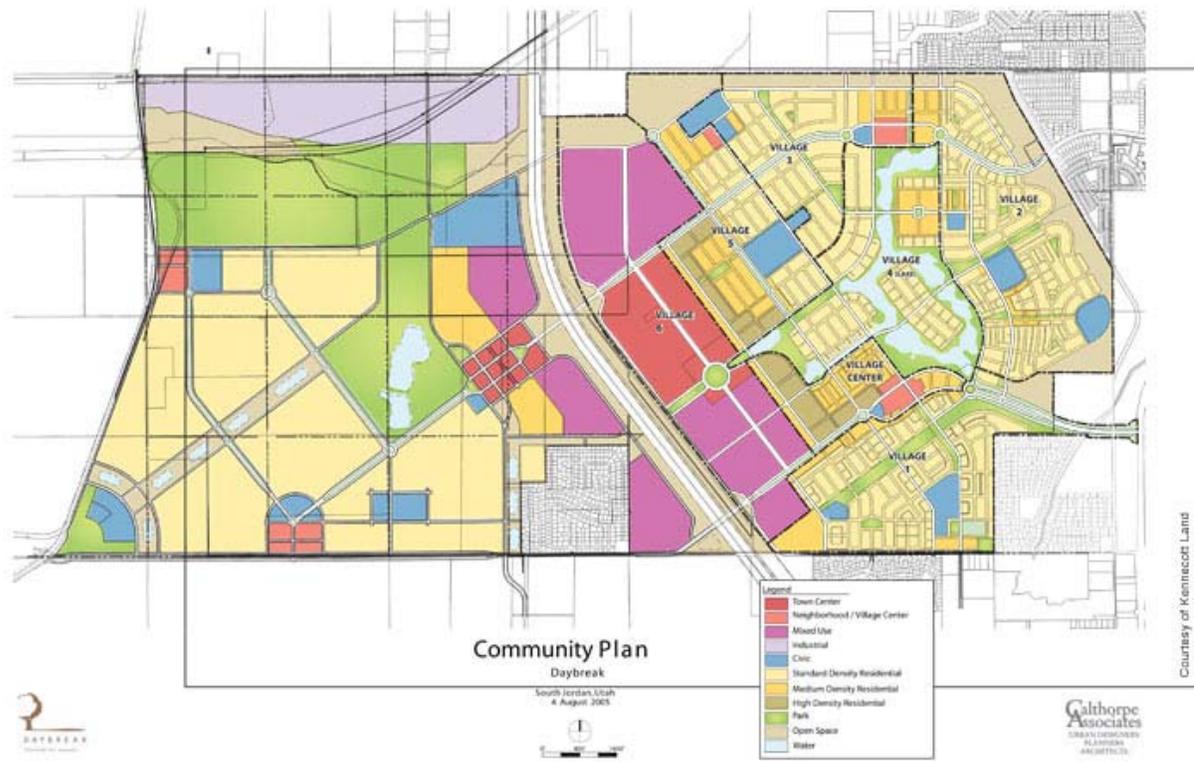
Photo by Ed Rosenberger

Over one-quarter of the site is preserved as open space, facilitating stormwater retention in addition to providing recreational amenities for the residents.



Photo by Ed Rosenberger

The principal amenity at Daybreak, Oquirrh Lake is encircled by walking trails and provides a natural habitat for migratory birds and local wildlife.



Daybreak site plan.