HIGH POINT CASCADING INTEGRATED WATER QUALITY POND

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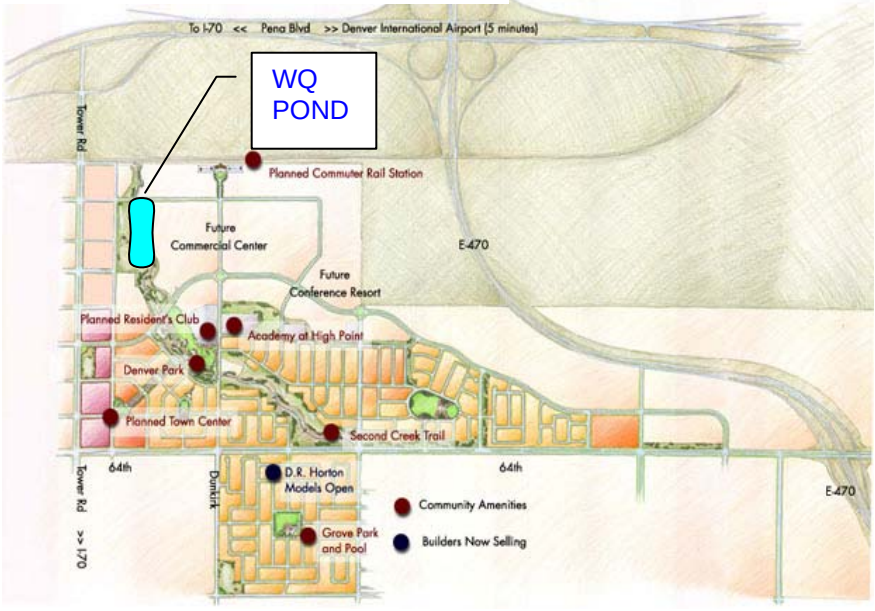
PROJECT DESCRIPTION

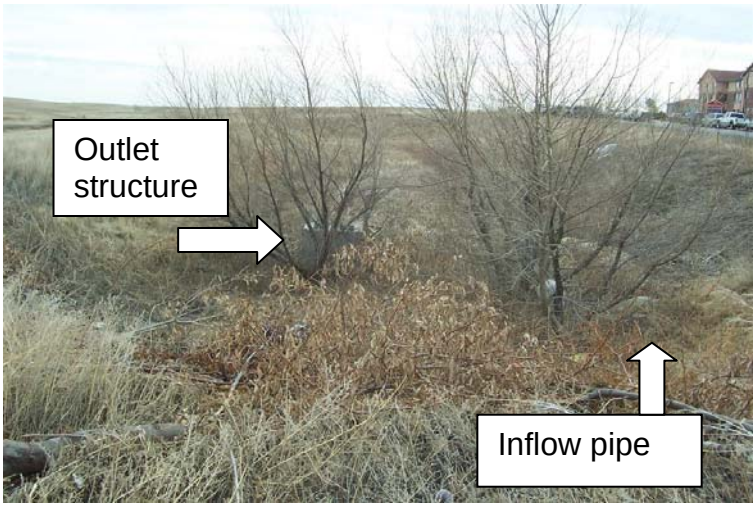
High Point is an 1800 acre multi-use project, including an 800-acre corporate park, 500,000 SF of retail, an 18-hole championship golf course, 1,600 single-family homes, and 1,400 multi-family residences. The developer is LNR Property Corporation, a market leader in the master planning and development of commercial properties and land nationwide.



The recently completed sub-regional water quality pond at the intersection of 71st Avenue and Argonne Street will provide water quality treatment for approximately 85 acres of highly impervious commercial development within High Point. Construction was done by Bemas Construction for an approximate cost of $350,000.

CHALLENGES AND CONSTRAINTS

Several challenges arose in the design to provide water quality treatment for this portion of the project. Since stormwater discharge would be conveyed to the regional detention pond by the West Fork of Second Creek, water quality treatment was required prior to discharge to the creek.



The site available for the water quality pond has about a 35 foot drop in elevation.

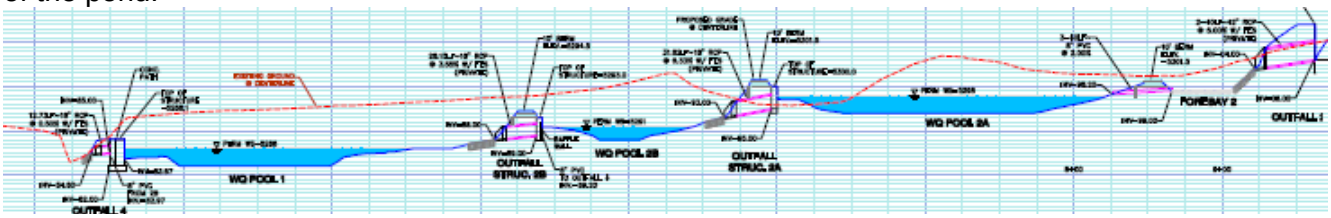
An existing storm sewer discharged into the existing wetland near the outfall, circumventing any existing water quality treatment.

Future development would add another large storm sewer discharge into the southern end of the available area.

The West Fork of Second Creek was in the process of design improvements to provide sculpted concrete drop structures, yet maintain the natural creek bottom and appearance as much as possible.

To maintain the natural appearance, direct discharge of excess stormwater into the creek was not allowed. The water quality pond would need to attenuate excess stormwater. Phased development of the tributary area would require that both major storm sewer discharge locations could be accommodated separately during the phased construction. Additionally, the developer and design team preferred a natural design, with structures hidden and integrated as much as possible into the natural terrain, with gentle natural slopes, and no retaining walls.

SOLUTIONS A cascading three-pool constructed wetland pond, integrated into the existing topography, providing separate yet combined water quality treatment for the tributary area was provided. Reinforced natural-looking trails provide maintenance and pedestrian access to all portions of the pond.



The uppermost storm sewer discharges into a forebay, above the first water quality pool that provides a portion of the needed water quality volume for the upper tributary area. This is also the first structure in the series of ponds that receives and controls the minor and major storm events. (Q_{100} in = 156 cfs)

A controlled outlet structure conveys the rest of the water quality volume into the second of the water quality pools, approximately seven feet lower than the first. This structure also controls minor and major storm events. Available storage in the upper pool also decreases discharge to the second pool. (Q_{100} out =70 cfs)

Both pools together provide enough water quality volume for the upper tributary area. Excess storm discharge is conveyed through another control structure to the lower pool.
(Q_{100} out = 47 cfs)

The lower tributary area discharges into a forebay within the third water quality pool, and will remain submerged, thus hiding the forebay. (Q_{100} in = 109 cfs) Available storage decreases the discharge to the creek in a 100-year event from 47+109 to 110 cfs.

The third water quality pool is approximately 5 feet lower than the second, at an elevation matching the Creek.

The creek and the pool are separated by a berm that doubles as a maintenance trail, and contains a small outfall structure, capable of controlling water quality discharge for storm events less than a 2-year event. In storm events exceeding the 2-year event, excess stormwater spills from the upper forebay into the upper water quality pool, through an outlet structure into the middle water quality pool, and combines with the lower water quality pool. Both the middle and lower water quality pools will become inundated by the creek, and are intended to perform just like a natural wetland area adjacent to the creek. The recent rain/snow storms have put this unique water quality pond to the test, and it has performed as designed, discharging nearly clean water to the creek, providing wildlife habitat, and enhancing the community with a natural amenity.