

CIVE 402 SENIOR DESIGN

2009-10 PROJECT LIST

Project # 1

City of Monte Vista Community Center Design

Client: City of Monte Vista

POC: Don Van Wormer, City Manager
citymgr@ci.monte-vista.co.us , 719-852-2692

Project Description: Develop conceptual plan for combined city hall/police station/recreation center/pool (indoor and outdoor options), that includes spatial requirements, parking, landscaping, etc. property is approximately 4.5 acres. May include designing office space for an alternative city hall in a city owned facility while the current city hall is demolished.

Disciplines: Structural, Infrastructure, Planning and General Civil Engineering

Did not go

Project # 2

Town Hall Remodel for Museum Use

Client: Town of Red Cliff, Colorado

POC: Barb Smith, Town Clerk
trcbot@aol.com, 970-827-5303

Project Description: The original Town Hall built in the late 1800's has been used for different reasons other than a town hall, such as volunteer fire department, storage, etc. It has been abandoned for more than a decade. It seems to be in good condition and the town would like to see it revived for use as the town museum. The students would look at the structural integrity of the foundation and the overall building and what it would take to stabilize it. The building is in the process to see if it can be designated as a landmark by city, county or state historical societies. This may have some bearing on how it would be revived for use as the town museum. The town museum would need a clean environment with climate control and lighting upgrades.

Disciplines: Structural, Infrastructure, Planning and General Civil Engineering

Project Team

Joshua Betz

Raymond Cundiff

Brenden Marron

Katelin Crook

Faculty Advisor - Carlson

Project # 3

Coal Creek Flood Channel Study and Bridge Rehab

Client: City of Florence, Fremont County

POC: Don Moore, P.E./P.L.S
dmoore@florencecolorado.org

Project description: Using hydrology and flood study info developed by previous CSU design team in 2007, determine channel capacity and flow capacity of three bridges and flood channel. Propose solutions to mitigate flood flow restrictions, and provide preliminary design or scope for future bridge design and channel improvements on Coal Creek channel through the City of Florence.

Disciplines: Hydrology, Surveying, Hydraulic Structures, and General Civil Engineering

Did not go

Project # 4: Oak Creek Flood Channel Study and Bridge Rehab

Client: City of Florence, Fremont County

POC: Don Moore, P.E./P.L.S
dmoore@florencecolorado.org

Project Description: Confirm and revise hydrology and flood study info on file, and determine channel capacity and flow capacity of two street bridges, one railroad bridge, and flood channel. Propose solutions to mitigate flood flow restrictions, and provide preliminary design or scope for future bridge design and channel improvements on Oak Creek channel through the City of Florence.

Disciplines: Hydrology, Surveying, Hydraulic Structures, and General Civil Engineering

Project Team

Richard Graft

Oscar Mata Carrillo

Devin Mitchell

Thomas Pluemer

Faculty Advisor - Thornton

Project #5: Florence ADA Sidewalk Intersection Design

Client: City of Florence, Fremont County

POC: Don Moore, P.E./P.L.S
dmoore@florencecolorado.org

Project Description: Review existing street standards and existing intersections to develop construction plans and details for ADA compatible sidewalk/roadway improvements at twelve selected intersections. Complications include interference from irrigation channels along each street.

Disciplines: Traffic Analysis, Surveying, Hydraulics and General Civil Engineering

Did not go

Project # 6: The City of Rocky Ford Swimming pool and aquatic park.

Client: Rocky Ford Growth and Progress, Inc.

POC: Judy Worley, Executive Director
jworley@ci.rocky-ford.co.us, 719-2547414

Project Description: The city of Rocky Ford desires to design a new swimming pool complex, within a family-oriented aquatic park. Design would include using the existing pool and making changes and addition to it. The city owns land adjacent to the pool that can be used for the expansion of the pool and the aquatic park.

Disciplines: Planning, Infrastructure, Structures General Civil Engineering

Project Team

Scott Avery

Daniel Bailey

Conner Burba

Michael Lebsack

Faculty Advisor - Thornton

Project # 7: Rainbow Lake Rehabilitation

Client: Ivan's Engineering, Inc.

POC: Ivan Walter
303-798-5967

Project Description: The Upper Arkansas Water Conservancy District (UAWCD) owns and manages Rainbow Reservoir a few miles southwest of Buena Vista. The spillway and outlet structure on the reservoir are in need of rehabilitation to facilitate more accurate measurement of releases of the reservoir. Therefore, a structure must be designed to permit accurate flow measurements over a wide range of outflow rates.

Disciplines: Hydraulics, Structures, Geotech and Site Planning

Project Team

Luke Javernick

Renee Mayer

Yodi Kusumo

Dustin London

Faculty Advisor - Thornton

Project # 8: New Mexico State Highway 4 Fish Passage

Client: Federal Highway Administration

POC: Scott Hogan

Scott.hogan@fhwa.dot.gov, 720-963-3742

Project Description: New Mexico State Highway 4 is a designated Forest Highway (Hwy) located on the Santa Fe National Forest (NF). The road is a rural arterial highway in mountainous terrain and connects NM State Hwy 550 with NM State Hwy 501 from San Ysidro to Los Alamos. Two highway structures have been designated as candidates for replacement due to aquatic organism passage concerns and their impact on sensitive species. The goal of the project will be to analyze appropriate site data and develop detailed aquatic organism passage designs.

Disciplines: Environmental Hydraulics, Structures, Geotech, Transportation

Did not go

Project # 9

Feasibility analysis for the development of mini-hydro electric facilities.

Client: Colorado Springs Utilities

POC: Ron Sanchez, Melissa Wetzig
719-668-4173

Project Description: Colorado Springs Utilities (Utilities) has been developing electricity from renewable sources for over a hundred years. Utilities have exhausted potential hydroelectric projects ranging from 0.50 to 1 MW and are reviewing potential sites that could produce electricity in the range of 250 to 500 kilowatts within our water transmission and distribution system. Due to the varying terrain in our service area, several pressure reducing stations are a potential source for mini-hydroelectric facilities. Much of these sites are located near existing pumping facilities and the electric grid. A mini-hydro facility has the potential to offset power consumed at these sites and be a zero-emissions site when the facilities are not pumping water. This project will identify several potential sites, conduct a feasibility analysis, identify appropriate turbines and generating equipment, prepare a conceptual layout of selected sites, prepare cost estimates, net present value analysis, and determination of pay back time frame. The team may need to address permitting issues, property acquisition, and construction methods, political and environmental benefits, and regulatory compliance.

Disciplines: Hydraulics, Structures, Geotech, Energy, Site Planning

Project Team

Brayden Jerde

Glenn Parr

Brett Sollenberger

Adam Bailey

Faculty Advisor - Thornton

Project # 10

Steel Pipe Wall Thickness Study

Client: Colorado Springs Utilities

POC: Brian Mulligan, TBD
719-668-4173

Project Description: Currently, C.S. Utilities only allow for .25" thickness of steel pipe. Generally, the reason for specifying a thickness is due to the conditions expected such as working pressures, transient pressures, handling during construction, any types of linings, coatings, and cathodic protection. In the past, it was general practice to add wall thickness to serve as the sacrificial anode. Obviously this is not the most cost effective anymore and there are now a lot of different coatings, linings, higher grades in steel, etc., than in the past. The project team will examine steel pipe projects throughout the country and provide a report based off of all these different characteristics above. The goal is to find if we truly are seeing any advantages in using thicker steel pipe verse the costs. Recommendations will be made in the form of a final report to the City

Disciplines: Hydraulics, General Civil Engineering, Data Manipulation and Analysis

Did not go

Project # 11

Spillway Overtopping and Slope Stability

Client: Ayres Associates

POC: Paul Clopper, Senior Engineer
clopperp@ayresassociates.com, 970-223-5556

Project Description: A reservoir system located in southeastern Florida has five (5) spillways that were designed for overtopping. During spring rain events, several of the protected spillways failed and the integrity of the system was compromised. The objective of the proposed project will be to determine the cause of failure where structural, geotechnical and hydraulic conditions will need to be evaluated, and design a working solution for the site. A site visit will not be required.

Disciplines: Hydraulics, Hydrology, Geotech

Did not go

Project # 12

Engineers Without Borders – Water Storage, Treatment, and Distribution System, Santa Rosa de Dinamarca, Peru

Client: Ayres Associates

POC: Dave Frick, Vice President
frickd@ayresassociates.com, 970-223-5556

Project Description: The remote village of Santa Rosa de Dinamarca is located on the Ucayali River in the Peruvian Amazon. The shallow aquifer wells had to be abandoned due to contamination by coliform bacteria. The Northern Colorado Chapter of Engineers Without Borders has assisted the village in developing site maps and installing a deep aquifer well for potable water supply. A water storage, treatment, and distribution system for the village still needs to be designed and constructed. The project will assess various alternatives using appropriate levels of technology and identify a recommended alternative using cost, reliability, and maintenance requirements as the primary selection factors.

Disciplines: Water Resources, Hydraulics, Environmental Engineering

Project Team

Simon Schaad

Bjorn Utu

Kathleen Saller

Natalie Zeman

Faculty Advisor - Carlson

Project #13

Boys and Girls Club of Colorado – Gates Camp
Wastewater Treatment system

Client: Ayres Associates

POC: Dan Meyer, Project Engineer
meyerd@ayresassociates.com, 970-223-5556

Project Description: The Gates camp is a residential summer camp facility located at the base of the Indian Peaks Wilderness area west of Boulder, Colorado. This unique camp offers Boys and Girls Club members, mostly from economically-disadvantaged families, a chance to escape the sometimes stark realities of city life and gain new perspectives. The wastewater treatment system currently in use at the camp is outdated and in need of replacement. The objective of the project will be to identify appropriate alternatives for wastewater treatment in this remote area and provide a site design for the recommended option.

Disciplines: Environmental Engineering, Site Design

Project Team

Scott Dickmeyer

Brock Hodgson

Andre Dozier

Austin Snow

Mariah Miller

Faculty Advisor - Carlson

Project # 14

Structural Assessment and Design of Colorado River Bridge near Parshall, Colorado

Client: Martin/Martin Inc.

POC: Paul Doak, P.E., Principal
pdoak@martinmartin.com, 303-431-6100 Ext. 470

Project Description: A private bridge spans the Colorado River near the community of Parshall. The bridge is quite old and was constructed without design being conducted and plans being produced. The owners need to know the load rating for the structure and would like recommendations for a future replacement. Field measurements will need to be taken to accurately model the structure and connections. Additionally, an assessment of hydraulic capacity and scour will need to be considered.

Disciplines: Structures, Geotech, Hydraulics*

Project Team

Mohammad Amini

Cory Arends

Cole Davis

Lindsi Hammond

Peter Melander

Faculty Advisor – Carlson

Project # 15

PCB Management at the OMC Superfund Site, Waukegan Harbor, Waukegan Illinois.

Client: USEPA Region 5 and/or CH2M HILL

POC: Tom Sale 491-8413 and Mitch Olson 491-8720

Project Description: After four decades of active investment in developing solutions for Polychlorinated Biphenyl's (PCBs), two treatment technologies are seeing broad use. The first is land disposal. Typically, this is the least expensive option for handling impacted sediments and soils. Unfortunately, simply transferring a problem to a different location has limited social value. The second technology is incineration. Typically incineration offers the highest level of treatment. Unfortunately, large energy cost and sustainability issues constrain the practicability of incineration. This project will involve developing a full-scale design for application of an alternative PCB management approach for the OMC Superfund site located at the Waukegan Harbor in Waukegan, Illinois. The primary goals of the project are protection of human health and brownfields redevelopment.

Primary components of this senior design project will include:

- 1) Review of existing designs for land disposal and incineration options. Information in these design packages will form the design basis for the soil mixing option.
- 2) Development of an equivalent design package for a soil mixing option including plans, engineer's estimate of cost, and bid packages for contractors.
- 3) Conducting a multiple objective quality function deployment (QFD) analysis of the alternatives. Key decision parameters will include: protection of human health, cost, reliability, potential for development of harbor condominiums, and total CO₂ emissions.

Disciplines: Environmental Engineering, Geotechnical Engineering, Engineering, Groundwater Hydrology, and Value Engineering

Did not go

Project #16*

Landslide Analysis and Mitigation Design

Client: Colorado Department of Transportation

POC: Hsing-Cheng Liu, Geotechnical Program
Hsing-Cheng.Liu@dot.state.co.us, 303-398-6601

Project Description: The Colorado Department of Transportation has identified several active landslides affecting highways, requiring frequent maintenance. They have conducted subsurface explorations for these slides and are either in the process of collecting inclinometer data for repair analyses or have collected enough data and have done initial repair analyses. The goal of the project will be to assess the current and future threat to the area and develop a stabilization design.

Disciplines: Geotech, Transportation, Structures

** Three sites are available*

Project Team

Jon Fox

Luke Seeber

Stephen Wheeler

Nathan Alburn

Faculty Advisor – Thornton

Project # 17 Bicycle Traffic Mobility study of the CSU campus

Client: Colorado State University Facilities Management

POC: Fred Haberecht
 970-491-0162

Project Description: Perform a comprehensive study to identify volume of bicycle traffic on to campus daily, identify high traffic/high hazard areas affecting not only bicycle flow but also foot traffic and vehicle traffic, provide alternatives from reducing high hazard-high risk areas, and make recommendations to help better managed bicycle traffic through out campus.

Disciplines: Transportation, General Civil Deisgn

Project Team

Paul Diloreto

John Fink

Samuel Heilbronner

Blaze Wujek

Faculty Advisor – Abt - sabt@engr.colostate.edu

Project # 18 Glade Reservoir Subdivision Development.

Client: Colorado State University Facilitates Management

POC: Fred Haberecht
 970-491-0162

Project Description: CSU will own/control a significant land area adjacent to the proposed Glade Reservoir. One option seriously being considered is to develop a portion of the land for residential ownership. The project would be identify the location of the subdivision, plan/layout the subdivision, develop the infrastructure (i.e. water, sewer, drainage, fire protection, etc.) and execute a preliminary plat.

Disciplines: Site Design, General Civil Design, Curb and Gutter

Project Team

James Easton

Jonathan Gates

Thomas Perkins

Nicholas Sansoni

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Project #19 Bridge Crossing Analysis and Design

Client: Colorado State University Facilities Management

POC: Fred Haberecht
 970-491-0162

Project Description: The current entrance to the Vet Teaching Hospital (VTH), South Campus, is off of Drake St. A new entrance is being design directly west of the VTH off of Research Parkway. The entrance access will require a crossing of Larimer Ditch #2. The study group will assess the crossing to determine grade change, accessibility and utility impact. They will develop alternatives crossing options (i.e. culvert, bridge, etc.), make recommendations and provide a preliminary design.

Disciplines: Transportation, Hydraulics, Structures, Geotech

Project Team

Daniel Beatty

James Fellows

Mark Fischer

Rachel Gallagher

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Project # 20 Seating Expansion at Hughes Stadium

Client: Colorado State University Facilitates Management

POC: Fred Haberecht
 970-491-0162

Project Description: Currently, the south end of Hughes Stadium is grass covered (above the mechanical rooms, locker rooms, entry, etc.). It is proposed that the south end be converted from grass to additional/expanded seating. The design team would have to perform a conceptual layout(s), perform a geotechnical/structural analysis for supporting the seating, and develop a cost estimate for the recommended configuration.

Disciplines: General Civil Design, Structures

Project Team

Douglas Allen
Brett Hallock
Julie Heitland
Kyle Hrutkay
Scott McCord

Faculty Advisor – Abt - sabt@engr.colostate.edu

Project # 21 Arthur's Ditch Bridge Replacement

Client: Colorado State University Facilities Management

POC: Fred Haberecht
 970-491-0162

Project Description: The current bridge over Arthur's Ditch on University Avenue is degrading. A student team would evaluate the bridge and attempt to estimate the remaining life prior to replacement. Then, the team would analysis alternatives for replacement, recommend a replacement option, and provide a preliminary design with construction cost estimate.

Disciplines: Structures, Geotech, Hydraulics, Transportation

Project Team

Benjamin Mountain

Catherine Oakleaf

Justin Torkilson

Jared Vantassel

Faculty Advisor – Abt - sabt@engr.colostate.edu

Project # 22 Ryan Gulch

Client: Larimer County

POC: Scott Cornell, Environmental Specialist
970-498-5732

Problem Description: Located in Loveland, Colorado off Taft and 14th street, Ryan Gulch is about 1/10 the size of Horsetooth Reservoir and discharges into the Big Thompson River approximately 1 mile away. Most of the inflow originates from groundwater and residential drainage, however the gulch is used as a recreation area containing fish and aquatic life. During the summer months the reservoir had discharges with high sulfur and sulfate concentrations. By the time the runoff reached the Big Thompson it had a strong ammonia smell and a milky white precipitate. The assumed reason for the sulfur discharge is that during the high rainfalls of the last several months the lake flipped over and the high build up of sulfur on the bottom of the reservoir rose to the top. The objective of the design team would be to predict if the high sulfur discharges could happen again, come up with a long term solution, and come up with the proper discharge amount into the Big Thompson.

Disciplines: Environmental Engineering

Project Team

Charles Bohac

Jeffery Lasker

Cherian Potherican

Paul Rhine

Faculty Advisor - Carlson

Project #23 Ordway Watershed Project

Client: Box Springs Canal and Reservoir Company

POC: Rick and Kay Markus
 TBD

Problem Description: Box Springs, in a watershed, approximately 900,000 acres in size located in southeastern Colorado, provides water to ranchers through a documented series of water rights. Junior and senior water rights can be executed at different times whereby causing a potential adverse impact to flow rates and quantities available for use. The goal of the project will be to conduct a basin wide analysis utilizing ArcGIS to determine if the junior and senior rights are disconnected from surface and groundwater and/or in separate sub basins. Through an optimization scheme, the project team will be able to quantify multiple diversion scenarios and determine at what flow rate(s) and quantity(s) the rights are in conflict.

Disciplines: Hydraulics, Water Resources Planning, Water Law

Project Team

Garrett Markus

William Mihelich

Eric Nelson

Devin Traff

Faculty Advisor - Thornton

Project # 24 Regional Watershed Supply Project – Optimize Pipeline Routing

Client: Million Conservation Resource Group (MCRG)

POC: Jim Eddy
 opllc@msn.com, 970-581-7282

Project Description: The Regional Watershed Supply Project will be diverting approximately 200,000 acre feet of water annually from the Flaming Gorge Reservoir and the Green River in Southwestern Wyoming and moving it to Colorado's Front Range municipalities and agricultural users using a buried pipeline. The 560 mile pipeline should follow pre-existing energy corridors along I-80 and avoid environmentally sensitive areas. The pipeline will shadow I-25 through Colorado, terminating in the Co. Springs/Pueblo area. The team will look at tunneling through certain areas to maximize efficiencies and cost effectiveness. Additionally, the team may have to move pipe segments to avoid native species and habitat. The team will be provided with a preliminary set of GIS mapping points to use a routing guide.

Disciplines: Site planning, General Civil Design, Hydraulics

Did not go

Project # 25 Regional Watershed Supply Project – Design of Water Reservoir

Client: Million Conservation Resource Group (MCRG)

POC: Jim Eddy
 opl1lc@msn.com, 970-581-7282

Project Description: The Regional Watershed Supply Project will be diverting water from the Flaming Gorge Reservoir and the Green River in Southwestern Wyoming and moving it to Colorado's Front Range municipalities and agricultural users using a buried pipeline. In addition to Flaming Gorge Reservoir the team will look at three already identified storage sites along the pipeline route and design the water holding facility. Each location will hold different amounts of water depending on its location and use within the larger transportation system. Additionally, the team will look at existing water storage along the route and analyze the merits of utilizing any of these storage options.

Disciplines: Water Resources, Geotech, Hydraulics, General Civil Design

Did not go

Project # 26 Regional Watershed Supply Project - Analyze and Develop Mussel Mitigation Plan

Client: Million Conservation Resource Group (MCRG)

POC: Jim Eddy
 opllc@msn.com, 970-581-7282

Project Description: The Regional Watershed Supply Project will be diverting water from the Flaming Gorge Reservoir and the Green River in Southwestern Wyoming and moving it to Colorado's Front Range municipalities and agricultural users using a buried pipeline. One major issue with trans-basin diversions is the transference of non-native species. In particular, the movement of different varieties of fresh water mussels has begun to affect water works throughout the Western United States and is an ongoing problem that needs to be addressed. The team task will look to design a procedure to mitigate the damage that mussels do to intake structures and other components of the pipeline and storage facilities used in the Regional Watershed Supply Project.

Disciplines: Environmental Hydraulics, Environmental Engineering, Hydraulics, Water Resources

Project Team

Ellen Michelson

Daniel Workman

Garrett Banks

Margaret Hollowed

Faculty Advisor - Carlson

Project # 27 Regional Watershed Supply Project – Analyze and Design Intake Structure

Client: Million Conservation Resource Group (MCRG)

POC: Jim Eddy
 opllc@msn.com, 970-581-7282

Project Description: The Regional Watershed Supply Project will be diverting water from the Flaming Gorge Reservoir and the Green River in Southwestern Wyoming and moving it to Colorado's Front Range municipalities and agricultural users using a buried pipeline. Using topographic maps and preliminary diversion points, the team will be tasked with designing a state of the art intake facility. Each proposed diversion point presents a unique set of challenges for the team including efficiencies and impacts on local populations and aquatic habitats.

Disciplines: Hydraulics, Structures, Water Resources

Did not go

Project # 28 Regional Watershed Supply Project - Analyze and Design Hydropower Facilities

Client: Million Conservation Resource Group (MCRG)

POC: Jim Eddy
 opllc@msn.com, 970-581-7282

Project Description: The Regional Watershed Supply Project will be diverting water from the Flaming Gorge Reservoir and the Green River in Southwestern Wyoming and moving it to Colorado's Front Range municipalities and agricultural users using a buried pipeline. There are numerous opportunities for the generation of hydropower along the 560 mile pipeline corridor and the team will be tasked with identifying and designing facilities along the way. Pump storage and in-line facilities along with system analysis will be included. GIS mapping points will be provided for the length of the pipeline route along with sites of planned reservoirs.

Disciplines: General Civil Design, Water Resources, Hydraulics, Structures,
 Geotech

Project Team

David Case

Zachary Taylor

Kristopher Kemp

Daniel Woodward

Faculty Advisor - Thornton

Project #29 Homestake Creek Bridge Replacement

Client: Aurora Water

POC: Tom Hankins, Supervisor, Homestake Water Project
719-395-1595

Project Description: The Homestake Water Project is a trans-basin water project that diverts water from tributaries of the Colorado River to the east slope cities of Aurora and Colorado Springs. Homestake Dam is located about 20 miles south of Minturn, Colorado within the White River National Forest. Construction began on the project in the late 1950's and was completed in the late 1960's. Many components of the project are nearly 50 years old including the bridge over Homestake Creek. This bridge is a single lane bridge with a wood deck. No heavy truck traffic is allowed over the bridge. Heavy truck traffic is detoured through the creek just upstream. Officials with the Homestake Water Project and the Forest Service believe that the bridge must be rehabilitated or replaced. The Objective of the Homestake Water Project will be to assess the condition of the current bridge and design a retrofit or replacement.

Disciplines: Structural engineering, Geotechnical engineering.

Project Team

Riley Eaton

Cameron Leitch

Julian Maskeroni

Nathan Phelps

Bryce Johnson

Faculty Advisor – Carlson