A “charrette” is a term commonly used to describe a short, intense period of design effort where a collaborative group of experts come together to develop a range of creative ideas that can serve as a catalyst for further development. The term originated at the École des Beaux-Arts in Paris in the 19th century, the word charrette is from the French for cart” or “chariot.” It was common for students then, as it is today, to work vigorously up to the project deadline. In order to maximize their time, architecture students would hire a “charrette” to take them and their drawing board through the streets of Paris to the Ecole so that they could continue working to the last minute, furiously applying last touches to their designs. During this last intense effort, students were said to be working “en charrette”.

ASCO, a Belgian aerospace company, has purchased the former MerCruiser manufacturing facility in Stillwater, OK and will be opening a production site at that location. The new facility will incorporate machining, heat and surface treatment, and assembly operations for complex machined parts made of titanium, steel, and aluminum. ASCO, incorporated in 1954, is a proven technology specialist in the design and manufacturing of high lift devices and complex structural components. It develops wing, landing gear, and fuselage products for virtually all aircraft commercial platforms. ASCO engaged the OSU School of Architecture to provide them with some creative ideas in creating a vibrant work environment for their new Stillwater operation.

On October 4-6, 2012, OSU faculty and students from the School of Architecture, School of Landscape Architecture, and Interior Design came together and worked in cross-disciplinary teams in an intense design effort. Fifty-five faculty and students were divided into four teams, each team charged with developing a range of conceptual ideas for several specific areas of the facility including the (A) entry/entry sequence, (B) administrative office areas, an (C) auditorium/meeting room, a (D) canteen, and (E) functional needs on the production floor including providing natural light and interactive meeting modules. Design ideas focused on creating an appropriate and vibrant image for ASCO in the Stillwater community and providing ASCO employees with a positive, productive, and exciting work environment.

Teams were urged to provide a range of ideas from “practical” to “inspirational” in nature. Concepts 1-4 were formulated to provide some practical solutions. Concepts 5-8 are all more complex, perhaps longer-term in viability, and conceptual in nature. In addition, a special study was made on daylighting issues and potential for the facility. This study utilized the School of Architecture’s Daylighting Lab for testing. Structural analysis was provided for existing structural issues and recommendations were formulated concerning the viability of removing existing structures on the production floor.

The event was intense, creative, and a lot of fun for the participants!
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | a cross-disciplinary design effort by faculty and students from Oklahoma State University's Schools of Architecture, Landscape Architecture, and Interior Design
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | A cross-disciplinary design effort by faculty and students from Oklahoma State University's Schools of Architecture, Landscape Architecture, and Interior Design
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | a cross-disciplinary design effort by faculty and students from Oklahoma State University's Schools of Architecture, Landscape Architecture, and Interior Design
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | a cross-disciplinary design effort by faculty and students from Oklahoma State University's Schools of Architecture, Landscape Architecture, and Interior Design
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | a cross-disciplinary design effort by faculty and students from Oklahoma State University's Schools of Architecture, Landscape Architecture, and Interior Design
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | a cross-disciplinary design effort by faculty and students from Oklahoma State University's Schools of Architecture, Landscape Architecture, and Interior Design

TEAM 1,
Faculty
Jeff Williams, Architecture
Randy Sealsinger, Architecture
Steve O’Hara, Architectural Engineering
Khaled Mansy, Architectural Engineering

Students
Simon Manning, 5th year Architecture
Jerry Lavarnway, 5th year Architecture
Sara Williams, 4th year Architecture
Josh Westerman, 4th year Architecture
Jennifer Bradshaw, 3rd year Architecture
Amanda Forbenterry, 2nd year Architecture
Brad Elsbury, 2nd year Architecture
Minwoo Hahn, 2nd year Architecture
Cameron Patterson, 1st year Architecture
Hannah Walmeyer, 4th year Landscape Architecture
Liz Tucker, Liz, 4th year Interior Design

TEAM 2,
Faculty
Moh’d Bilbeisi, Architecture
Nick Nelson, Landscape Architecture
John Phillips, Architectural Engineering
Khaled Mansy, Architectural Engineering

Students
Carrie Foster, 5th year Architecture
Laurissa Gibson, 5th year Architecture
Craig Borkenhagen, 4th year Architecture
Bailey Topper, 4th year Architecture
Chris Healy, 2nd year Architecture
Vang Choua, 2nd year Architecture
Leah Adkins, 2nd year Architecture
Holly Vetosch, 3rd year Architectural Engineering
Cameron Rouze, 5th year Landscape Architecture
James Hazzard, 4th year Landscape Architecture
Malone Gordon, 4th year Interior Design

TEAM 3,
Faculty
Paolo Sanza, Architecture
Cheryl Mihalko, Landscape Architecture
Steve O’Hara, Architectural Engineering
Khaled Mansy, Architectural Engineering

Students
Matt Eccleston, 5th year Architecture
Lauren Snow, 4th year Architecture
Andy Cline, 4th year Architecture
Margaret Cottingham, 4th year Architecture
Chris Holden, 3rd year Architecture
Stephen Smith, 1st year Architecture
Keaton Munsterman, 3rd year Architectural Engineering
Morgan Brun, 2nd year Architectural Engineering
Brandon Burlingame, 5th year Landscape Architecture
Keith Jacobi, 4th year Landscape Architecture
Hannah Chang, 4th year Interior Design

TEAM 4,
Faculty
Moh’d Bilbeisi, Architecture
Nick Nelson, Landscape Architecture
John Phillips, Architectural Engineering
Khaled Mansy, Architectural Engineering

Students
Chase Winkel, 5th year Architecture
Evan Murta, 4th year Architecture
Klossner, Aaron, 4th year Architecture
Jay Putnam, 2nd year Architecture
Drew Harbour, 1st year Architecture
Fahad Al Neama, 1st year Architecture
Emily Ashbaugh, 3rd year Architectural Engineering
Audrey Clark, 5th year Landscape Architecture
Tyler Maly, 4th year Landscape Architecture
Anna Oosting, 4th year Landscape Architecture
Tanner Svoboda, 4th year Interior Design
CONCEPT 1  
west entry

This concept aims at providing an open, transparent, contemporary, daylight-infused work environment. In the existing entry block, the "bump-out" at the existing auditorium is removed, as are all extant partitions and the existing suspended ceiling. The entry is moved to the center of the rectangular block and is marked by a simple and elegant canopy. The existing parking is replaced by a circular "forecourt" parking plaza paved with pervious paver blocks. A row of new trees provide shading along the west facade. Inside the entry block, closed offices have been replaced with open work stations and windows have been cut into each of the wall panels on the east wall to provide a strong visual connection to the production floor. The auditorium is moved to the south end of the block.

The landscape around the facility would utilize low maintenance native prairie grasses while the circular planter at the entry would feature native Belgium plants and flowers which might grow in the Oklahoma climate.
CONCEPT 1
west entry and office area

- Remove "bump-outs" on production side.
- Remove all existing interior partitions.
- Move existing entry to center in rectangular form.
- Remove existing auditorium "bump-out".
- Remove all existing interior partitions.
- Windows cut into existing pre-cast wall to connect open offices visually with production floor.
- Native Belgium plants.

View from reception to open office area.
View from office area to production floor beyond.
CONCEPT 1

east office area and canteen

The area of the building around the existing canteen has been treated in a similar fashion as the west office area. All existing partitions have been removed from the office and canteen area, except at the existing toilets. Exterior walls on the north and east and the west wall fronting the production floor have all been replaced with glass walls. A garden has been created, wrapping the north and east sides with an enclosing wall to separate the garden and views from the office and canteen spaces from the employee parking area and service areas to the west. A new employee entry, with a contemporary and elegant image, greets employees as they enter the facility through the garden and canteen.
CONCEPT 1
east office area and canteen/ employee entry

View to employee entry on east

View from employee entry at garden to canteen and open office beyond

View from open office area to canteen, garden, and employee entry beyond

View from canteen to garden and employee entry beyond
CONCEPT 2
west entry

Our proposal is a balance of opposing uses, forces, and intentions. The project is a manufacturing facility that will provide efficient production space as well as a comfortable working space for those who manage that production. The office space is differentiated from the manufacturing space by having open views to nature, warm materials and colors, and ample light. The project becomes a balanced assemblage of the different functions and materials, connected through the pattern and rhythm of the building’s structure and moments of transparency through the building.

As one enters the site, decorative trees are placed in such a way that visual contact with the building fades in and out. Once drivers reach the parking area, they are drawn to the building’s axial entrance. The entry is clear, breaking the rhythm of the vertical module and windows along the facades, and it will be lit naturally, drawing a user into the building on an axis toward the renovated auditorium, an open, collaborative space to accommodate gatherings of both small and large groups. It is the visual and physical connector between the factory, office, and entry areas.
CONCEPT 2
west entry

These panels are engineered and quite sustainable (below and below right). They provide the warmth that balances the industrial aesthetic.
CONCEPT 2
west entry

The reception, office, and conference areas will be intimately scaled and furnished with warm colors and materials to balance the industrial aesthetic of the factory.

The office spaces have variety to accommodate different types of collaboration and working environments. The southern offices are more private with ideal views out toward a garden, while private offices to the north of the entry balance acoustical privacy with some visual transparency into the factory, and a totally open office space is connected to both an exterior garden and the factory floor. Even within the most open office area, office furniture will vary according to the function and need for flexibility. The room and office modules throughout are determined by existing structure and window openings.
CONCEPT 2
auditorium/ open offices

Open office space: Knoll Dividers Collection w/ Horizon woven fabrics
Auditorium looking toward window to production floor

View in office area
Section thru west office block
Example of wood interior paneling

Persimmon
Ransom

Door Partitioning System in Central Hub: Barn Door Track System with Striated Wood Finish
CONCEPT 2

east office area and canteen

This design proposal focuses on the canteen and secondary office area and its relationship to the production floor. Goals included reducing the perimeter depth to increase natural daylight for the production floor while providing inviting spaces of relaxation for employees. Through the incorporation of contextual and sustainable materials, an efficient and productive workplace emerges.

Level One

The existing floor plan is a much larger area than what ASCO might need in the foreseeable future. One proposal would be to remove the exterior additions, downsizing and re-configuring the remaining space more efficiently. Not only would the two-dimensional plan for the space be altered but so would its three-dimensional presence and visibility within the production area. Currently, the area blends in with every other aspect of the factory. Such designated areas should be set apart and display the creativity and innovation in which ASCO thrives. The newly designed space will include a small kitchen, a canteen area, men's and women's restrooms, lockers and a first-aid station. One of the additional benefits to this remodel is the creation of a large outdoor space. Protected from the massive asphalt parking lot by a brick divider wall and planters, you will find a green re-energizing area. The warm sun can be absorbed in a large percentage of the terrace while a suspended shade device provides protection. Employee's breaks would be a much better experience spent in a space connected to nature.

Level Two

The reorganized second floor allows for better views, access to natural daylight, and space usage. The conference room is designed for easy access and visibility. This space would be a good environment for shift meetings or just a quiet place to observe the activity on the production floor. Likely, engineers would occupy this office area while human resources and others might be located at the front office area. There is also an open concept work area with outward facing views. This space will be connected to the canteen area below by means of a two-story light well.
CONCEPT 2
east office area and canteen

Within the existing facility there is a large natural lighting deficiency. The lack of such light creates a disconnect from the production floor and the outside environment. After a short time spent inside, one loses their sense of place. The proposed design addresses these issues by reflecting natural light across the canteen area and production floor by skylights, light wells, and such materials as channel glass. Just the act of removing physical barriers allowed a stronger connection between the natural and industrial work environments. In addition, altering the roof plane and utilizing creative means of reflecting light will aid in bringing light deeper into the space.
CONCEPT 2
east office area and canteen

Product Floor Office Pods
The modular unit is designed for easy assembly and multi-purpose functions such from office space to a conference area on the production floor. The modular units also have a standardized dimension that will be easy to combine or interchange with others to create a larger space. Some of the materials that are being used to make the module will be glass and acoustic panels. The glass wall can function as a writing board for demonstrations of designs or thoughts, and also have a relationship with the daylighting effects of the skylight.
CONCEPT 3

ASCO CHARRETTE, team 3 concept notes:

Work occupies most of our living life. Contemporary working environments must transcend the archaic notion of places of sole production purposes to engage workers in more holistic atmospheres and provide for places which entice a sense of pride while nurturing health, enjoyment and excitement. Yet, in an existing fabric, such as the former Mercury Marine plant, it is imperative to retain a connection with its past, that the memories of those that once contributed to its existence would not be completely eradicated. An architectural intervention is not, however, solely a self-contained task. It involves changing the surface of our natural environment, the reading of our cities, and impacting intellectually, educationally, or emotionally our own being. Yet, ASCO, needs to exhibit itself to the city of Stillwater, its inhabitants and the various clients, suppliers, and prospective collaborators that inevitably will flock its grounds. Our proposal(s) (Concepts 3 & 7) to a new ASCO manufacturing facility flourishes from this belief.

ARCHITECTURE:

The current manufacturing floor of the former Mercury Marine plant is an immense dark space regulated by a grid of steel columns and punctured by obsolete industrial sized pendent light fixtures, which tirelessly illuminate the empty floors. Even during its glory when people and machines inhabited the cavernous space, the space must have been dreadful for those working there. The lack of connection to the changing lights of the day must have felt like being hundreds of feet below ground level and bordering the experiences of miners. Ironically, the final product of the assembly line would be installed to machines for recreation purposes in settings flooded with natural light. ASCO produces equipment for airplanes, machines that spend most of their useful existence crossing the skies of our world and frequently inhabiting them as none of other of our inventions. Paramount is for us to retain the connection between production and ultimate usage. We then propose to strategically open up the roof of the plant allowing the sky to filter into the cavernous space, breaking it while creating micro-gardens within the production floor, some of them at ground level, some of them above the roofs of existing one story structures scattered within the plant. If the micro-gardens allow for natural light to spread across the manufacturing floor and provide for open green spaces within the production bays, they also “connect” with the evolving weather across Stillwater. Thus if rain or snow is falling, it will also fall within the micro-garden connecting ASCO’s employees with the outdoor climatic reality of the moment.

Plant managers, engineers and administrative staff are accommodated in an open space environment. In this “practical” approach, the existing office area is cleared of any partitions along with the appendix comprising bathrooms and ancillary spaces for the auditorium. Along the current windows we propose collaborative spaces comprising of a variety of gathering furniture, from high tables where people discuss standing up to lounges and sofas. Further in is the open office where desks can be accommodated freely or to respond to projects’ needs. Floating conference rooms and management offices are scattered within the open plan supporting the egalitarian structure promoted by ASCO. Furthermore, the current concrete wall separating the office from the production plan would be removed in favor of glass allowing for a visual connection between engineering and production.

But ASCO is not the old Mercury Marine, and it must portray its own identity also to the outside viewer. In our “conservative” approach (Concept 3) we propose two simple changes to the main (west) façade of the building. The double Ts of the office complex are clad with perforated metal panels protruding from the existing structure by two feet. The perforation of the panels is done in such a way to maximize interior lighting through the existing window while minimizing the heat gain of the western exposure, as well as sublimely portray ASCO’s line of business. To further connect ASCO with the city of Stillwater and its inhabitants, we propose removing a section of the west wall of the production floor and substitute it with a glazed façade, a window to ASCO products.
CONCEPT 3

office area
CONCEPT 3

office area
CONCEPTS 3 & 7
production floor micro-gardens
CONCEPT 3 & 7
production floor micro-gardens
CONCEPTS 3 & 6
landscape concept

RESTORING NATIVE GRASSLANDS
The following plant list suggests species that can be used to replant the entire site in mixed areas and large drift shapes.

<table>
<thead>
<tr>
<th>Species</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andropogon gerardii</td>
<td>Big bluestem, Turkey foot,</td>
</tr>
<tr>
<td>Beckmannia syzigachne</td>
<td>Prairie tallgrass</td>
</tr>
<tr>
<td>Bouteloua curtipendulae side</td>
<td>Oats grama</td>
</tr>
<tr>
<td>Calamagrostis purpurascens</td>
<td>Purple Reedgrass, Purple</td>
</tr>
<tr>
<td>Elymus Canadensis</td>
<td>Wild rye</td>
</tr>
<tr>
<td>Eragrostis trichodes</td>
<td>Sand lovegrass</td>
</tr>
<tr>
<td>Hesperostipa comata</td>
<td>Needle-and-thread grass,</td>
</tr>
<tr>
<td>Muhlenbergia asperifolia</td>
<td>Scratchgrass</td>
</tr>
<tr>
<td>Panicum capillare</td>
<td>Witchgrass</td>
</tr>
<tr>
<td>Panicum dichotomiflorum</td>
<td>Fall panicgrass</td>
</tr>
<tr>
<td>Panicum virginatum</td>
<td>Switchgrass</td>
</tr>
<tr>
<td>Redfieldia flexuosa</td>
<td>Blowout grass</td>
</tr>
</tbody>
</table>

CREATE REGENERATIVE WETLAND ECOLOGY
Of the two ponds located on the site, the northern pond is to be removed and the land reshaped to form the prairie landscape that will become the base plane to the architectural structure.

The southern pond is to be expanded and reworked to become a functional wetland ecology that will support wildlife habitat and bird migration. Specifically the depression will be sized so when seasonally inundated by surface water its size is sufficient to support a prevalence of vegetation typically adapted for life in saturated soil. The vegetation will become the natural filter by decreasing contaminated concentrations in the water.

The water source from the newly created wetland will remain the fire suppressant source for the plant.

LANDSCAPE:
No more turf grasses, no more trees imported from far lands. Let the site reclaim its Oklahoman origins, let native grasses spread their roots, their foliage, their colors within ASCO’s property boundaries! While advocating a return to native plants and colors, we propose to control their spread in the landscape by creating a stripe-like carpet inspired by the pre-cast double Ts of the existing building. The native grasses will lay in bands of width to match one or two of the double Ts bays, and will be interrupted at predetermined points by beams of light to give to the landscape a nocturnal sculptural feel. To enhance the feel of a structure in a field of tall grasses, the parking adjacent to the visitor entrance to the facility is sunk two feet. Added to the three feet high of most of the planned tall grasses, such depression will serve to minimize the visual impact of parked cars from street view and to immerse, although briefly, ASCO’s visitors to Oklahoma’s flora richness prior to their slowly moving to the factory floor and be drawn to an environment of extreme predictions.

The concept informing the landscape decisions for the ASCO project are to return to the early descriptions of the area around Stillwater both as an inspiration for design form and regenerative ecology. Only the occasional native oak tree will remain.

PLANT MATERIAL REMOVAL
To celebrate the regional setting of Stillwater the landscape will be edited to remove exotic and invasive species.

Specifically:
- Pyrus calleryana, Bradford Callery Pear trees line the entry drive. The angle of the Bradford’s branches is generally narrow. As the tightly crowded branches grow in girth, the tree self-destructs in strong winds or heavy ice storms. The existing stand is very soon to fail. Additionally there are escaped seedlings generating along open areas, highways, and abandoned fields. This tree is native to Korea and China and antithetical to the regional context and desired design form of a regional setting.
- Juniperus virginiana, Eastern Red Cedar. Birds spread the seeds through their waste. In 2002 the OK Department of Agriculture, Food and Forestry established the Red cedar Task Force, charged with developing a long-term strategy to deal with the problems created by the juniper infestation estimated to be expanding at 762 acres per day. As encroachment grows, natural range land disappears. This has been found to be especially problematic for species like the bobwhite quail who suffer because of the growth.

“a glorious prairie spreading out beneath the golden beams of an autumnal sun.”
Washington Irving, 1783-1859
American author, storyteller, and traveler
19th c. description of what is now Oklahoma
CONCEPT 3 & 7
landscape concepts
CONCEPT 4

This concept is formulated through the lens of what could be done simply for today, tomorrow, and in the coming years.

For today: Paint the existing building.

For tomorrow: Remove all existing trees and restore the site to its natural prairie state.
CONCEPT 5
existing facility analysis

EXISTING STILLWATER FACILITY ANALYSIS

Project Goals
- Provide economical adaptation of the existing plant initially
- Create a clearly 'ordered' facility that is organized functionally and economically and that is understandable architecturally
- Allow flexible growth/change within the plant over time
- Communicate a people and community centered, dynamic image of the corporation to the public
- Clearly identify the corporation to the public
- Allow the facility to develop into a clear and sophisticated architectural presence in the future
- Develop a high-quality, sustainably-focused facility that is economical to operate and that serves as an example for the community

Project Opportunities
- The basic shell of the existing manufacturing facility provides a relatively wide open, flexible space (wit a 40x40' structural grid) that can easily adapt to the various manufacturing needs immediately
- The open space in front of the plant provides an opportunity to manipulate the public image of the corporation
- Multiple access points to the facility allow clear separation of public, employee and service needs
- Existing utilities/systems allow relatively economical adaptation of the existing facilities to future needs
- The open, visible site provides the opportunity for a prominent presentation of the company to the public
- Controlled daylight can provide an economical and quality illumination level for the manufacturing facility

Project Issues
- The existing office space, while initially easy to adapt functionally, does not present a prominent or positive character to the public and appears very insignificant in relation to the plant facility
- The current landscape development lacks focus and sophistication
- The interior of the manufacturing facility has numerous elements that must be removed to create as open a space for redevelopment as possible
- Extreme western exposure makes it difficult to access views and/or daylight while minimizing heat gain and glare
- The current facility is a 'collection' of development that has occurred over time, rather than a clearly organized architectural ensemble
CONCEPT 5
existing facility analysis

Visitor entry is hard to find and architecturally uninspired.

Lack of open work space and daylight within existing office building. Is not clearly connected to the manufacturing floor.

Current canteen and amenities lack daylighting and appear dated.

Auditorium has poor lighting, minimal control of acoustics, poor proportion of space, finishes appear dated.

Manufacturing space is dirty and lacks natural light. Some elements still need to be removed. Existing systems are loud.

Generous spacing of column grid provides potential wide open floor for equipment and facilities. Truss pattern above and existing dampeners provide potential openings for daylight.
CONCEPT 5

Bright, flexible open space flooded with light and careful application of strong color

Carefully organized equipment locations with dominant blue color and on-floor open work space

Open office space with modest simple work stations

Daylighting and clear circulation patterns compliment the well organized equipment locations and strong use of color

Well organized on-floor interactive work areas immediately adjacent to equipment and operators

Exceptionally clean and safe work environment. Open to outdoors, well-illuminated, services come from above. No ear or eye protection required

EXISTING ASCO FACILITY ANALYSIS
CONCEPT 5
long term solution

Conceptual Axonometric View

Site Plan

entry/drop-off under new cantilevered functional bar

newly redeveloped functions in blue bar [refer to longitudinal section]

employee entry with security control and shaded parking

carefully developed landscape zone to manage runoff sustainably and provide for employee use areas while creating positive image to the public

link existing ponds into major water feature
CONCEPT 5
long term solution

PRODUCTION ZONE-flexible open structure

EXISTING MASSES-walls and functions

BAR-skylight patterns and functional re-zoning

BAR DEVELOPMENT-improvement of over all company, site, and building

Daylighting Opportunities

Offices over-looking manufacturing floor to provide views similar to those illustrated by ASCO existing facilities photographs

Open Manufacturing Floor

Enclosed Floor Activities
CONCEPT 5
long term solution
CONCEPT 5
long term solution
CONCEPT 6
west entry

CONCEPT
Create a visual emphasis on important spaces (auditorium, conference).
Establish focal points for entry sequence.
Emphasize healthy work environment by creating a connection to outside.
Improve building’s relationship with nature and landscaping by reconfiguring parking.

Site plan

View at entry sequence

View to entry

Interior view

Plan

North/South section

Cross section

West Elevation

Curtain wall precedent: Church of the Sacred Heart, Munich, Germany

CONCEPT
Create a visual emphasis on important spaces (auditorium, conference).
Establish focal points for entry sequence.
Emphasize healthy work environment by creating a connection to outside.
Improve building’s relationship with nature and landscaping by reconfiguring parking.

Site plan

View at entry sequence

View to entry

Interior view

Plan

North/South section

Cross section

West Elevation

Curtain wall precedent: Church of the Sacred Heart, Munich, Germany
CONCEPT 7

In this “inspirational” approach, the existing plant is stripped of any of the small appendices that have been added it throughout the years, including the current office areas. The new office area, organized as an open office, would be within the production floor, but lifted and located towards the west end. A totally transparent long linear block to visually connect and embrace the production floor, it will accommodate all managerial, engineering and administrative staff along with a canteen open to all of ASCO employees. Here also is the “station” point of mechanized small conference rooms to be used by engineers and machine operators across the plant. Suspended from the roof, they move around the factory in an assembly line or gondola-like mechanism to reach called meeting points. They journey across the factory’s “sky” is horizontal, but vertical when reach the point of call.

The double Ts of the current west façade would be cut in correspondence of the colored glazed lifted office bar to reveal it to the outside. Two new appendices will break the monodimensionality of the façade. One will be a cantilever extension of the collaborative area of the open office, a floating element over the tall grasses of the landscape. The other appendix is a wood-cladded ameba or organic-shaped auditorium flanking the entry plaza. The auditorium and the adjacent plaza are proposed as spaces of dual purposes: private and communal, or community shared. In this inspirational approach, we also propose to open up a section of the west wall of the manufacturing floor to allow for a window into ASCO working environment.
CONCEPT 7
elevation studies
CONCEPT 7

office areas

production floor conference rooms are suspended from roof structure and move around the factory via an assembly line like mechanism or gondola and rose up and down

OFFICE PART 1, LEVEL 1
entry
entry plaza

OFFICE PART 1, LEVEL 2
managerial offices within the open office

flooding conference rooms

existing west exterior wall
CONCEPT 7
office area/ auditorium
CONCEPT 7
CONCEPT 7

canteen
CONCEPT 8

A well stated question is by far more meaningful than an answer! Who is ASCO? How will they help Stillwater? How will Stillwater benefit ASCO?

ASCO is about air. ASCO is about mechanics… fluid mechanics! ASCO is about people. ASCO is about tradition. ASCO is about embracing the past while soaring towards the future. ASCO is about graceful movement through the air… a movement that is destined to create a cyclonic turbulence … a vortex so invasive that ultimately causes movement, flight, change … positive change.

ASCO is a good neighbor. It is part of Stillwater’s city fabric. Its existence is symbiotic, beneficial, and needed. The new ASCO facility in Stillwater will be nestled between a booming residential suburb and its supporting commercial development.

The area towards the front of the new facility, an area that had long suffered a lack of focus and neglect will eventually change and transform into an open public space. A “VORTICITY”… a positive change that is a catalyst for others to emulate. This “VORTICITY” will finally close a recreational loop that connects Boomer lake to Stillwater’s northern suburbs. This Vorticity is a singularity that is organic in its inception and transformation. It will be accessed by a viaduct that will permanently signify the arrival of ASCO to Stillwater.

We created a topology, a geometry that interacts with Perkins Road and ASCO. It will ultimately enter that facility to interface with the large conference space and eventually flowing, as a metallic ribbon, a high-tech inference, to create the “vessels”: a unique spatial instances that are created as dynamic vortices that punctuate the existing darkness of the existing structure, vertically reaching for the light, natural light! It will harness it, creating a natural organic space with trees to clean the air, add moisture, and provide a healthy setting for all concerned to meet, eat, and enjoy.
CONCEPT 8
CONCEPT 8
CONCEPT 8
An office pod system might be developed within the facility. These mobile, multi-functional pods could be placed where needed and moved when needed.
CONCEPT 9
office pods
DAYLIGHTING CONCEPTS

Investigations were carried out aiming to explore the potential of natural light (Daylight) in making the new ASCO facility more pleasant place to work in. Scientific evidence shows that well daylit spaces help employees perform better, i.e., being more productive with lower absenteeism rates when they feel the sense of time of day, season of the year, and enjoy the best quality of light (the daylight). Daylight does not only help boost employee performance, but also saves money. Daylight is a free source of light. In addition, it is a cool source of light that carries less heat content than any artificial source of light of a comparable quality. That is why it helps reduce the space cooling load, which makes buildings more energy efficient with significantly lower energy bills to pay every month.

Existing Conditions

The facility was built decades ago when the emphasis on the utilization of daylight was uncommon. In 2012, after energy became more expensive and new technologies and design methods made it plausible, the facility will greatly benefit from the utilization of daylight in two focus areas.

1. Office Area

Administrative offices on the west side of the building lack sufficient access to daylight since windows are small, and the building’s long east side is entirely blocked by the production halls. Furthermore, the west-facing façade is subject to harsh intensities of direct sunlight that makes it inconvenient to open the windows due to veiling glare. By any means, the existing small windows cannot bring sufficient daylight to the 60-foot deep office area.

2. Production Floor

Production halls lack any source of natural light. They suffer complete darkness without electrical light. The expansive area of 360 feet by 1,040 feet (approximately 375,000 square feet) has only three 4ft x 8ft skylights. This incurs a significant cost for light energy year round.

High-bay allows for uniform distribution of illumination level at or close to floor level.
Office Area

Office area on the west side of the plant calls for the design of a top-lighting system (skylights). Objectives of such system should include:

- Providing the recommended illumination level on the work surface (workplane) where the visual task (reading and writing) is performed. Typical height of the workplane in office spaces is 30 inches above the floor. Recommended illumination level is between 30-50 footcandles (300-500 lux).
- Preventing any penetration of direct sunlight into the space in order to avoid visual glare that may be caused by high contrast within the space.
- Providing a uniform distribution of illumination levels in the space, so occupants enjoy the same quality of space.
- Proposed system should integrate well with other building systems, such as HVAC, electric lighting, and fire protection.

Variations of top-lighting systems include: clearstory, sawtooth, roof monitors, light wells, reflectors, and ceiling baffles (Top Figure).

The initial top-lighting system proposed for the office area is a mix of a roof monitor and light well assisted with reflectors (Below Figure). This hybrid system allows for maximum efficiency with the least opening area (least cost) while providing a good uniform distribution of illumination levels inside the space at the height of the workplane.

As shown in the sketch to the right, the proposed design collects daylight from all four sides as the vertical glass is exposed to the sky and also receives upward reflection off the roof. The light collected by the roof monitor is brought down the light well by reflections off the intermediate reflectors and not the glass since glass may allow light out. No direct sunlight penetration is allowed in case of high or low sun angles. The translucent glass reflector at the bottom of the light well diffuses the light into space as well as reflects light to the sides towards the workplane or towards other reflectors that in turn reflect light towards the workplane.

This design aims at filling the entire 60-foot space with light from wall to wall.
DAYLIGHTING CONCEPTS

Office Area – Design Development

A physical model was built for the proposed daylighting system and tested under the artificial sky dome in the daylighting laboratory of the School of Architecture. In order to simulate real conditions, the model was built for two bays of the office area with mirror paper on both the north and south ends. The mirror effect accounts for the extended space to the north and south.

Several iterations of the initial design were investigated and tested. These iterations tested the impact of several design variables, including:

- Configurations of the reflectors at the top of the light well.
- Configuration of the translucent reflectors at the bottom of the light well.
- Spacing between each of the two adjacent top-lighting systems, 20 feet on center, and 30 feet on center.

Photos on the right show the artificial sky dome, the scale physical model built with the light sensors inserted inside, and different pieces of the top-lighting design tested.
**DAYLIGHTING CONCEPTS**

As shown on the cross section above, with the minimal use of top-lighting, the space enjoys even distribution of illumination levels with natural light filling the space with light on the workplane, the walls, and the ceiling. The roof monitors are spaced 30 feet on center, which means that a total of 10 would be sufficient for the entire office area of about 12,000 square feet.

The Daylight Analysis table (right) shows the detailed output of the evaluation of the performance of the proposed design. The potential energy savings in one cycle of operation (one full year) is up to 83.19% of light energy. Seasonal energy saving is 55.12% in winter, 89.66% in spring and fall, and it is highest in summer at 98.32%. This evaluation is based on the following assumptions: (1) desired illumination level for general lighting inside the space is 25 fc (250 lux), (2) task lighting would be used were the visual task is performed, (3) the visible transmittance of the glass type used = 70% in accordance with the requirements of the International Energy Conservation Code (IECC).
**DAYLIGHTING CONCEPTS**

**Production Floor Recommendations**

The production floor will house a variety of production processes, each of which may require its own illumination level. However, utilization of natural light to replace or minimize the need for electric light will surely pay back in terms of energy savings and employee satisfaction.

The floor plan (on the right) proposes one skylight per each 40ft x 40ft bay where needed, and where there is no conflict with the equipment located on the roof or the penthouses (as shown on the floor plan). This arrangement may utilize skylights similar in size to the three existing ones, i.e., 4ft x 8ft, or larger, depending on the needs of the manufacturing process taking place within a specific area. The existing smoke vents can be converted to skylights (see floor plan).

The three existing skylights do not comply with the requirements of the International Energy Conservation Code (IECC) in terms of the Solar Heat Gain Coefficient (SHGC). Surely, the clear glass causes discomfort or veiling glare in the space due to the penetration of direct sunlight.

4ft x 8ft skylight per bay gives the ratio of 2% per bay, and 8ft x 8ft skylight doubles this ratio to 4%. IECC sets the maximum ratio to 3% without automatic lighting control and to 5% with automatic control.

After the company reaches a final layout of equipment, a detailed daylighting study can explore the best utilization of daylight in compliance with code.
STRUCTURAL ANALYSIS
existing conditions at west entry
STRUCTURAL ANALYSIS
existing conditions at canteen
STRUCTURAL ANALYSIS

demolition of existing structures in the production floor

Proposed Plant Demolition Plan

scale: 1"=80'-0"
ASCO DESIGN CHARRETTE, OCT. 4 - 6, 2012 | A cross-disciplinary design effort by faculty and students from Oklahoma State University’s Schools of Architecture, Landscape Architecture, and Interior Design