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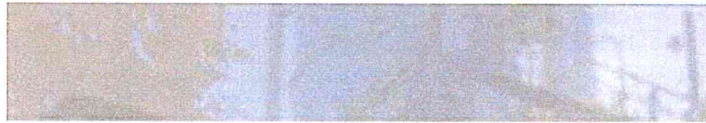
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National Office

WORK CAMPS IN THE ATHABASCA OIL SANDS - A RECONNECTION

Royal Architectural Institute of Canada Syllabus
D9 Final Thesis Report Submission

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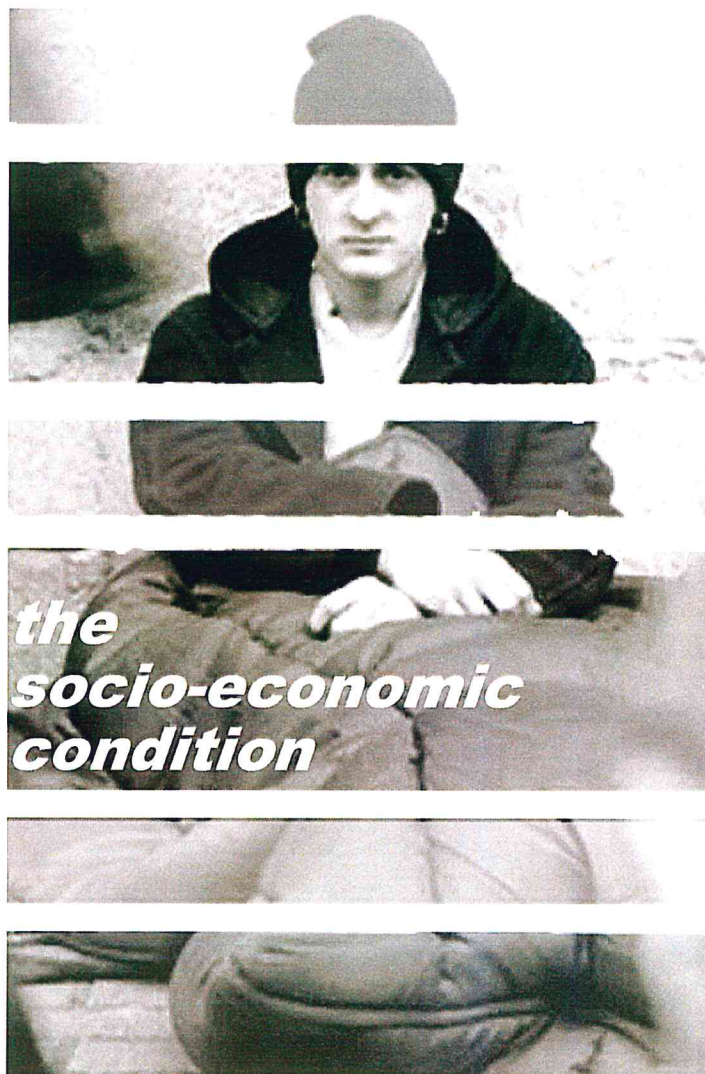
thesis statement

Historically, the exploitation of natural resources and the inflated economic times that result can create an imbalanced socio-economic environment affecting people associated with this activity. Rapid population growth places demands on local infrastructure which habitually cannot be expanded fast enough to accommodate the need. The temporary nature of economic booms also weighs heavily against the magnitude of the expenditure. None the less, the many workers required for such large scale operations require food, housing, recreation and entertainment. One response by companies dealing with manpower issues is to create work camps that are built right at the site of their operations. The speed at which these facilities are required is a challenge that is usually met with the simplest and most cost effective solution. The result typically lacks consideration of the long term well-being of the users. While the activity of resource extraction is non-sustainable, it should be possible to create living environments that have a reduced impact on and greater connection to the natural environment, thus enhancing the experience of their inhabitants.

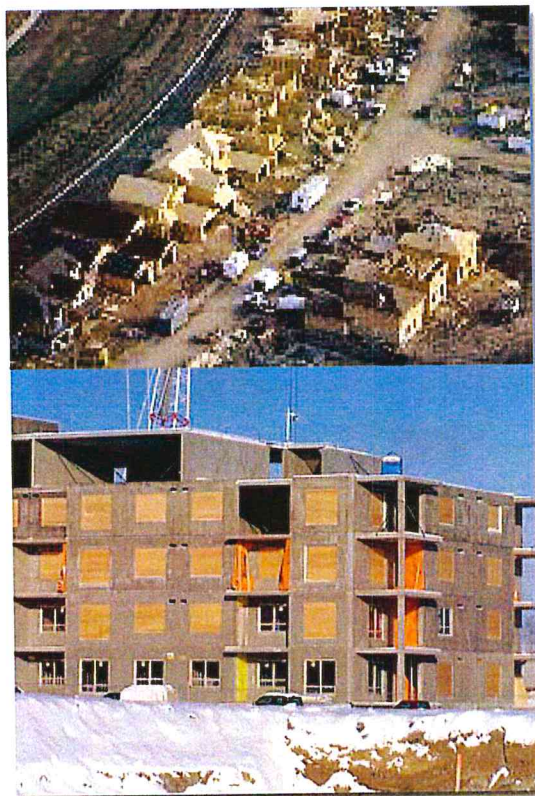
This thesis will explore the role the natural environment can play in balancing the imbalances inherent in on-site worker accommodations (the work camp).

introduction

In current North American society we have a tendency to focus on the future and ignore our present condition. A large majority of us are spending long hours at work and less time at home with our families. We do this with hope that our efforts will pay off in long term financial gain which will improve our quality of life. This practice can be detrimental to our physical and mental health as we often neglect to eat properly, exercise, and engage in cultural, spiritual, and recreational pursuits. Further to this attitude is the widely recognized fact that modern society has lost its connection with the earth which we inhabit. This connection was intrinsic in primitive and ancient cultures. There is much speculation that the connection between man and earth is the basis for our overall wellbeing and that in order to be truly sustainable, society must return to an ecocentric attitude. In recognition that truly sustainable communities are contradictory to the non-sustainable act of resource extraction, this project attempts to address the above noted issues in the provision of a temporary housing solution. Research was focused on the current socio-economic environment around Fort McMurray Alberta (which is tied to global markets), ecopsychology and its connection with environmental design, and historic and contemporary research and case studies of work camps.



The current socio-economic conditions in the Fort McMurray region of Alberta are typical of resource exploitation 'booms' throughout history. A common theme is finding and keeping workers. Oil companies and related contractors employ 62% of the work force in the Fort McMurray region.¹ The population growth resulting from the rapid expansion of oil sands production puts incredible strain on municipal infrastructure and social services. As it becomes more and more difficult to attract qualified workers, employers lower their standards. From 2002 to 2005, some form of post secondary accreditation was required for 75% of new jobs created in Alberta. This percentage is anticipated to decrease to 64% moving towards 2011.² More experienced members of the workforce are spending more time training and mentoring large quantities of inexperienced new employees. This increases pressure and stress and reduces productivity. High turn-over can result which further dilutes the level of experience and further reduces productivity. A cycle begins where additional workers are needed to fill the void left by reduced productivity levels. Companies compete for staff and offer incentives to attract and retain new people. Oil companies and related industry are profiting the most from the boom. Government and infrastructure based sectors that must



Housing Starts for Regional Municipality of Wood Buffalo

Year	2001	2002	2003	2004	2005	2006 est.
# of Housing Starts	1,063	1,018	681	1,130	1,551	1,800+

Source: Alberta Municipal Affairs

expand to deal with the increased population cannot compete with the incentives being offered by the energy industry. Oil company living allowances drive up housing costs where the demand far outweighs the supply. This raises the rate of inflation above average levels. Employees in sectors that do not directly profit from the super heated economy may not have the financial resources to find affordable housing.

HOUSING SUPPLY

In 2006, Fort McMurray was the fastest growing community in Alberta with a population nearing 65,000 people and a housing shortfall of approximately 4000 units.³ Over the next five years, a population increase of 30,000 is predicted.⁴ Based on the current legally reported occupant/unit rates of 3.3/single family dwelling and 2.5/apartment, this increase will require an additional 10,000 housing units. When added to the 2006 shortfall, an additional 14,000 units will be required by 2011. Housing starts leading up to 2006 averaged just over 1000 units per year.⁵ At the end of 2006, starts had increased to 1800 units. This is far from the average requirement of 2800 starts per year required to satisfy projected 2011 targets.

Land Available for Housing in the Fort McMurray Urban Service Area – Current and Future Development

Land Base	Number of Housing Units	Number of Residents housed	Number of Affordable Housing Units	Timing of Development
Consortium Lands, Devonian Lands, Other	1500	4400		Land previously sold by Alberta Seniors and Community Supports. Development currently ongoing.
Bond Towers – lower Townsite in-fill	600	1,200		Development permits for Bond Towers have been issued by RMWB. Development has not yet started.
Long Boat Landing – lower Townsite	1100	2,900		Construction has begun on Phase I. Timing is 2006 – 09.
Parcel D	3700	10,700	300 affordable units	Timberlea subdivision. Development currently underway by Centron. Completion expected by December 2007.
Parcel F	1700	3400	300 affordable units	Timberlea subdivision. Planning and engineering currently underway by Sureway and Beaverbrook. Servicing expected in 2007. Completion expected by December 2008.
Saline Creek	7,400	20,000	WBHDC intends to request affordable housing units. Likely about 600 units	Area structure plan not yet complete. Likely 2009 or 2010 before housing units would be under construction. There are a number of unknowns until the area structure plan is completed and approved.
North Parsons Creek	3,000	8000	300	Parsons Creek is likely to be developed after Saline Creek.
Willow Square Redevelopment	-	1000	390	Willow Square is currently owned by CMHC and is being considered for redevelopment as affordable housing.
TOTAL	19,000	51,600	1,890	

Sources: Land Release Strategy, Alberta Municipal Affairs; Alberta Seniors and Community Supports; Housing Strategy for the Future, Wood Buffalo Housing and Development Corporation; Draft Area Development and Growth Constraints Assessment for the Fringe Area, Armin A. Prellsallits and Associates Ltd.; Housing Overview and Outlook, Gary L. Gordon and Associates

When supply is below demand, costs rise. In the fall of 2006 the average cost of housing in Fort McMurray was \$483,913.⁶ This is substantially higher than the average housing costs in Edmonton and Calgary at \$326,292 and \$410,326 respectively. Rental rates are also inflated in comparison to the rest of Alberta. In the fall of 2006 a one bedroom apartment rented for an average of \$1,314/month and a two bedroom apartment rented for an average of \$1,536/month.⁷ This is up from \$760/month and \$895/month reported in 2000. With vacancy rates at or near zero, cost is less of a factor than availability. Economists identify a 3% vacancy rate as a sign of a balanced rental market.⁸

LAND AVAILABILITY

The major impediments to the development of more housing include the capacity of current infrastructure, the cost of extending current infrastructure, topography, and transportation infrastructure. These factors make the cost of developing new land for housing extremely high.⁹ The ability of the current municipal planning department to conduct the appropriate studies and development planning exercises is also extremely limited due to volume and staff shortages.



Capacity of Basic Municipal Infrastructure in the Three Oil Sands Regions

Type of Infrastructure	RMWB (Fort McMurray)		Peace River		Cold Lake*		Bonnyville*	
	2006	2011	2006	2011	2006	2011	2006	2011
Water Treatment Facilities	Moderately Over Capacity	Severely Over Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
Waste Water Treatment Facilities	Moderately Over Capacity	Severely Over Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity	Under Capacity
Solid Waste Facility	Nearing Capacity	Severely Over Capacity	Under Capacity	Under Capacity	Nearing Capacity	**	Under Capacity	**

*The Cold Lake – Bonnyville region is currently investigating the feasibility of developing regional water and waste water treatment facilities. These facilities would have a completion date beyond 2011 (likely 2012 - 2015).

** The Beaver River Regional Waste Management Commission is currently designing regional transfer stations for solid waste. The new transfer stations should be completed in early 2008 and will be owned and operated by the commission.

TRANSPORTATION

While Fort McMurray has a transit system, the majority of the population relies on the automobile to get around. As the population is highly transient, moving people in and out of the urban centre is a major transportation focus. Fort McMurray is currently connected to southern centres by a single highway.¹⁰

This highway is currently undergoing expansion to twin a 240km section to improve safety and efficiency. The urban centre is also served by a full service airport and by a rail system primarily dedicated to the transportation of goods and equipment. The airport is undergoing a runway and terminal expansion to increase its capacity from the 200,000 passengers a year it currently accommodates.¹¹

MUNICIPAL INFRASTRUCTURE

The majority of current municipal infrastructure in Fort McMurray is either at or nearing capacity. The current water treatment facility was designed to service a population of 62,000, the current waste water facility was designed to service a population of 60,000, and the population in 2006 was 64,442. Expansions are planned or underway to increase capacity to meet projected 2011 targets. The cost of municipal upgrades leading in to 2011 is projected to reach as high as

**Required Infrastructure Expenditures for Basic Municipal
Infrastructure for the Regional Municipality of Wood Buffalo**

Project	Total Project Costs	Grants	Debtenture	Reserve/Other
Wastewater Treatment Plant	\$161,000,000	-	\$153,000,000	\$8,200,000
Wastewater Treatment Expansion (2009)	\$35,000,000	\$16,300,000	-	\$18,700,000
Water treatment plant expansion	\$25,000,000	\$190,000	\$23,400,000	\$1,200,000
Southeast Regional Water Supply	\$26,000,000	\$18,900,000	\$5,200,000	\$2,000,000
Regional Landfill	\$20,000,000	\$15,000,000	\$4,800,000	\$280,000
Regional Landfill Recycling Facility	\$ 3,600,000	-	\$3,000,000	\$600,000
Total	\$270,600,000	\$50,400,000	\$189,000,000	\$30,980,000

Source: Regional Municipality of Wood Buffalo

Note: An additional \$52 million in basic infrastructure requirements is needed to cover projects not specifically identified in the above table.

Impact of Cost Escalations

Waste Water Treatment Facility	Design Population Assumed	Cost Estimate
1999 Conceptual Review	60,000	-
2002 Conceptual Report	70,000	\$41,000,000
2003 Value Engineering Report	100,000	\$90,000,000
2004 Preliminary Design Report	133,000	\$131,000,000
2005 Phase 1 Contract Award	85,000	\$161,000,000
Plus Phase 2 and Phase 3 Additions	100,000	\$65,000,000*
	133,000	-

* Total costs for Phases 2 and 3.

Source: Submission of Intervention of RMWB for Kert Oil Sands Project, Brownlee LLP; Fort McMurray Infrastructure Review, Associated Engineering

\$800 million. Costs for currently planned basic infrastructure upgrades are outlined in the adjacent table. Several issues remain to be resolved in order to successfully address infrastructure requirements. These issues include obtaining funding, cost escalation, financial risks, and the capacity of municipal departments to properly plan the expansion projects. The debt load allowed by the province for municipalities in Alberta is 1.5 times the annual revenues the municipality generates. This total was increased to 2 times revenues to accommodate a recently granted provincial loan. Fort McMurray has their own bylaw which limits borrowing to 85% of the provincial limit.¹² Current infrastructure needs far exceed the debt threshold that the city can sustain. Cost escalation is another factor making estimating future expenditures extremely difficult. Premiums for construction in Fort McMurray can be as high as double the cost of a similar project in Edmonton or Calgary.¹³ The financial risk is compounded by the fact that planning, funding, and constructing the infrastructure expansion projects must be completed before the construction of the developments that supply the tax base. This gap between spending and recovering capital can be critical. Growth forecasts can err as



much as 14% and the longer the time frame, the less accurate the forecast.¹⁴

SOCIAL SERVICES

The following factors contribute to the increased demand for social facilities:¹⁵

- high housing costs
- lack of local community services
- lack of child care spaces
- lack of support from families who are separated when a spouse works in Fort McMurray
- lack of networks of family and friends where there is a large transient/immigrant population
- feelings of isolation in northern communities

As with most boom towns, Fort McMurray is experiencing a prosperity gap between residents employed in sectors connected with the oil sands and those employed in other sectors. Homelessness has become an issue due in part to the lack of affordable housing and the high cost of living. The number of emergency shelters is inadequate to meet the demand and these facilities do not provide the mental health and drug abuse programs that are a necessity. Whether the homeless population is contributing to the rise in alcohol and drug abuse, or whether these social issues are contributing to the rise in homeless rates, addiction has become a serious

Homeless Population of Five Major Alberta Cities

City	Population	Number of homeless	Number of homeless/65,000 population
Calgary	1,000,000 (2006)	3436	223
Edmonton	712,391 (2005)	2618	239
Red Deer	82,971 (2006)	128	100
Fort McMurray	64,441 (2006)	441	441
Grande Prairie	44,631 (2005)	179	259

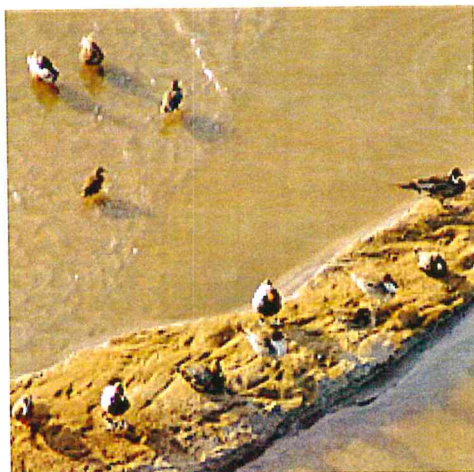
Source: Fort McMurray Housing Needs Count 2006

Community Facilities in the Oil Sands Regions

	Ft McMurray	Cold Lake/ Bonnyville	Peace River	Grande Prairie	Red Deer	Medicine Hat	Edmonton	Lethbridge	Prov. Avg.
Libraries #	2 (1planned)	2/1	1	1	2	1		1 (1 planned)	
#/ 10,000 pop.	0.16			0.22			0.23		
Recreation fee index	102	94.5/-	98.9				100		
Pools #	2(2planned)	1/1	2	2	4	3		5	
#/ 10,000 pop	0.18			0.242			0.17		
Ice arena #	3(1planned)	4/1	1	3	6	6		6	
#/ 10,000 pop	0.83			0.95			0.36		0.70
Sports fields#	23				52	50		58	17.07
#/10,000 pop	10.5			13.3			25.7		
Ball diamonds	35				97	49		65	
Art Gallery/ Theatre	0/1	0/0 0/1	0/1	1/2	1/3	1/1		2/3	
Museum	1	0/0	1		5	1		2	
Historic sites	1	0/0	3		1	2		2	

Sources: Infrastructure Review: Regional Municipality of Wood Buffalo; Alberta Municipal Affairs; Alberta First (Alberta Economic Development); Sustainable Community Indicators (Nichols Applied Management)

problem in Fort McMurray. AADAC has reported a 25% increase in addiction cases since January of 2006.¹⁶ The majority of these cases are drug and alcohol related. ADAAC statistics based on a study conducted in 2003 indicate the rate of drug and alcohol related charges are 5 times the provincial average. Another potential contributing factor to the addiction rate may be the lack of community facilities in the Fort McMurray area compared to other municipalities of a similar size. Recreation and cultural facilities provide opportunities for a healthier lifestyle. More involvement in community activities can help to reduce the feeling of isolation which can be common for new people moving to the area to work in the oil sands.¹⁷



ENVIRONMENTAL IMPACT

One of the largest environmental concerns in the Fort McMurray region is water use and the impact developments have on water quantity and quality. Currently, the oil and gas industry uses 7% of all water licenses in Alberta.¹⁸ Nearly 80% of the oil coming from the tar sands is extracted using steam injection. For every barrel of oil extracted, up to 4 barrels of water is required.¹⁹ This water is recycled, but a percentage of it cannot be re-used and goes in to tailing ponds where it sits. The majority of the water comes from the Athabasca River, but some is drawn from the ground. The use of ground water and the dewatering of mine sites have a severe impact on the water table and local wetlands. Due to the serious environmental concern, the industry is looking at ways of reducing water use. Until alternatives are found, water remains a constraint to further development.

Aside from the serious concern of water use, the oil sands are one of the leading producers of green house gases in Canada. Research is ongoing to find ways of reducing green house gas emissions. One method that appears viable is capturing carbon dioxide and using it to improve conventional oil recovery techniques. This can improve recovery rates as well



as provide economic incentives.²⁰ The oil sands also consume large amounts of energy, primarily in the form of natural gas. New technologies are being pioneered in an effort to reduce energy consumption rates.

While mining and in situ methods of oil recovery in the oil sands region have a different impact on the land, they both still generate a significant footprint. This results in isolated areas of natural habitat. Ongoing efforts to reclaim affected land are inadequate and there are concerns that it will not be possible to return the wetlands back to their original state. Soil that is being removed to allow for mining activity must be managed in order to ensure it is viable for use in future reclamation activity.²¹



While the current focus is on the impact on the natural environment including the earth, air, and wildlife, not to be forgotten is the underlying social impact on the hunting and fishing lifestyle of the local aboriginal people.

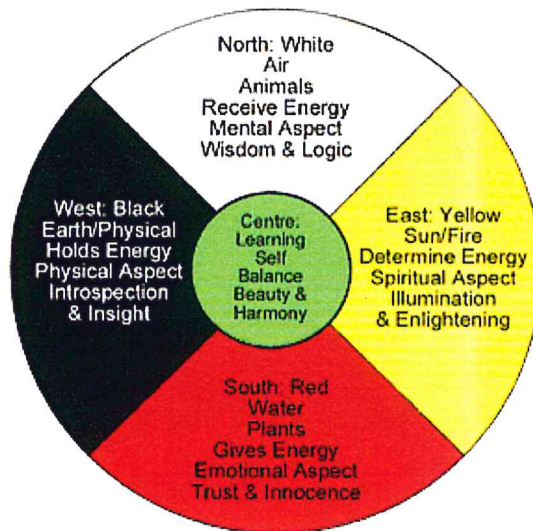


ECOPSYCHOLOGY

Ecopsychology is a relatively new term originally used by Theodore Roszak in his book *The Voice of the Earth* published in 1992. The book promotes the study of psychology connected to ecology.²² The premise is that the mental health of man relates not only to inter-human relationships, but also to the relationship of man with his environment. Arguably, the study of modern psychology is an invention of western society. Before industrialization and advances in the practice of psychiatry, all psychology was ecopsychology.²³ Imagine the reaction of a member of primitive society witnessing first hand our destructive treatment of the very environment we rely on to sustain our lives. From their perspective our actions would surely appear insane.²⁴ In fact, there are no known mental disorders that connect insanity to the nonhuman world.²⁵ The historical *connectedness*²⁶ that man has had with the natural world has become increasingly *disconnected*²⁷ in modern society. The exploitative relationship we currently have with the earth may be affecting our overall mental health. We tend to think of the brain as a complex organ when the truth may be that our minds are simply seeking to coexist within the influences of our environment.²⁸ Centuries of reliance on the earth as a provider and respect for the power of nature must

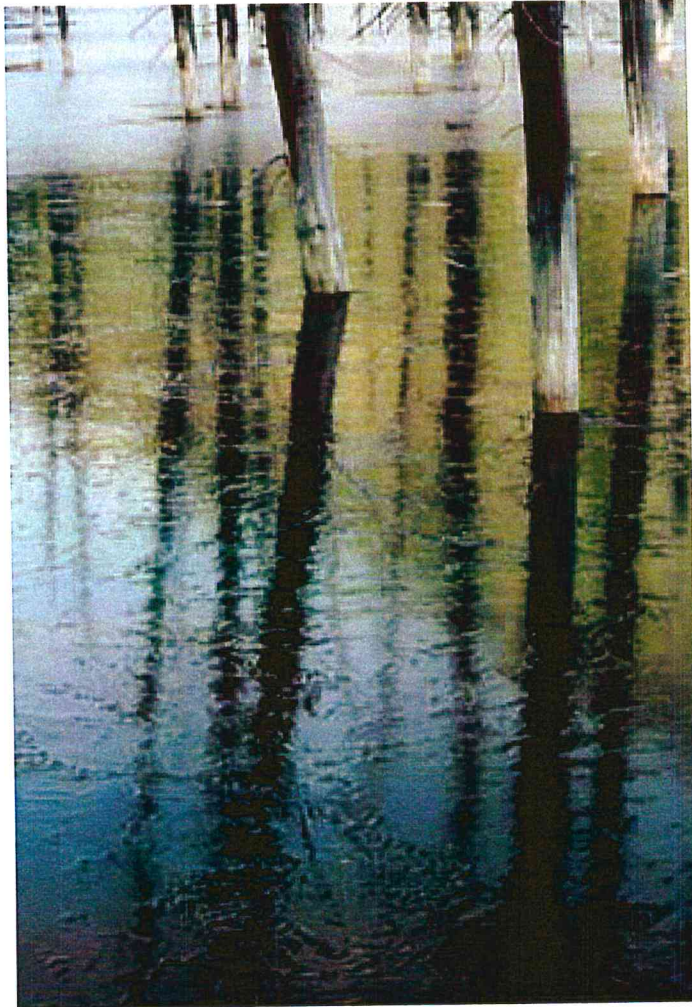


have rooted itself deep within our psyche. As we destroy our environment, it is logical to conclude that we destroy a part of ourselves in doing so.²⁹ Ecopsychology promotes the thinking that if we make efforts to improve our relationship with the environment, we will improve our own mental health. By taking the practice of psychology out of the artificial environment and in to the natural environment, we are making the connections that ecopsychology is based on. On a small scale, simply going for a walk outdoors can be rejuvenating. On a larger scale, this is manifested in practice by taking action to actively restore affected ecosystems. This action can have a healing effect on those who are feeling hopelessness, whether conscious or unconscious, in response to the continuing destruction of our environment. Our lack of ability to stop destroying our ecosystems parallels the actions of substance abusers in response to their addictions. We are compulsive users of fossil fuels and other non-renewable resources that we carelessly take from the earth and whose use is detrimental to our ecosystem. Like addicts, we need to take decisive and substantive action immediately to stop this abuse of the earth. A fundamental reversal in our current thinking is required in order to initiate a process of healing that is all encompassing.



ECOPHILOSOPHY

In the pre-industrial world, cultures lived in harmony with the natural environment out of necessity. The fear of losing the earth's endowments promoted ecologically based thinking in primitive society.³⁰ Through the exploitation of earth's bounty, modern society has moved away from this relationship. We seem to have developed a "collective amnesia"³¹ regarding the understanding and knowledge possessed by our ancestors. There does not appear to be a history of civilizations learning from each other's environmental successes or failures.³² This is interesting considering the resilience of most cultures depends on their ability to coexist with nature. Exploitive societies tend to commit some form of ecological suicide.³³ Some theories point to Western religion as one cause of this circumstance. The philosophy that only man possesses a soul and is thus set apart from nature may account for modern society's dominant relationship with the earth. This anthropocentric attitude differs from the more anthropomorphic beliefs of early cultures and Eastern religions where the human soul is linked with the souls of other species.³⁴ This is evident in the practice of totemism by some western aboriginal cultures. While it is not practical to think that modern society can or will return to the cosmology of primitive cultures, it is



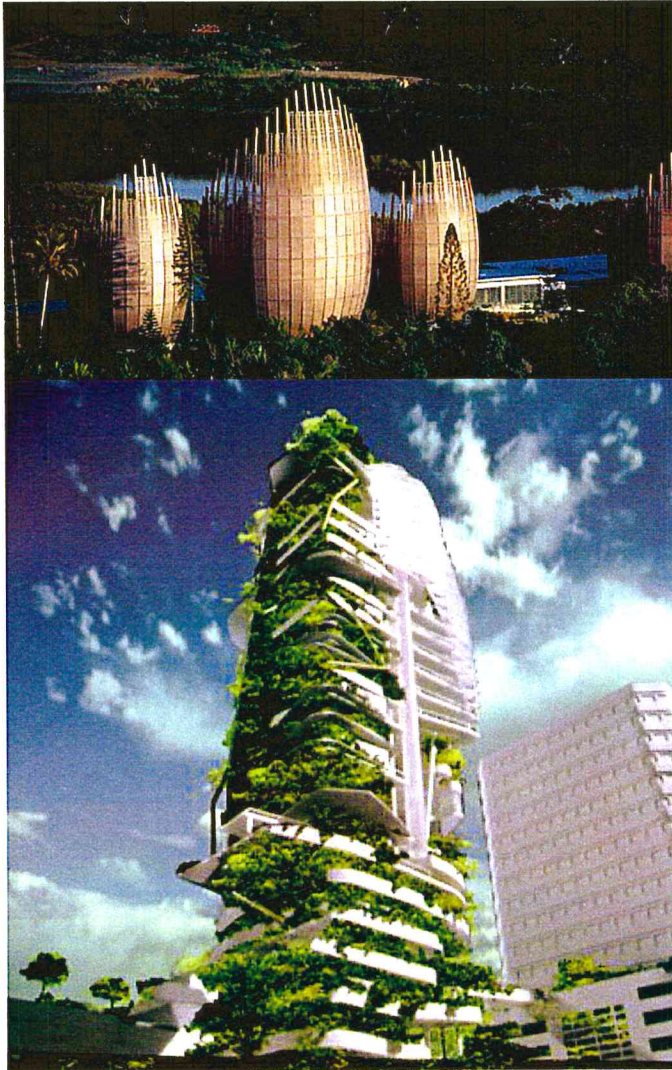
obvious that our current philosophy requires substantial reversal. Although we will never return to a primitive or ancient way of life, study of these cultures is warranted. The contemporary principles of sustainable design were largely derived from ancient practices born out of economic and technological necessity. We live with a largely mechanistic vision of the human/nonhuman relationship. We measure our progress in terms of material wealth, technological advancement, comfort, and convenience where we should be judging ourselves in terms of our impact on the environment. In order to correct and, more importantly, reverse our current destructive course, a fundamental shift in our socio-economic principles is critical.





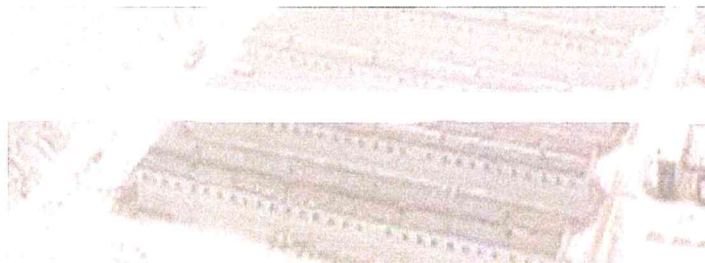
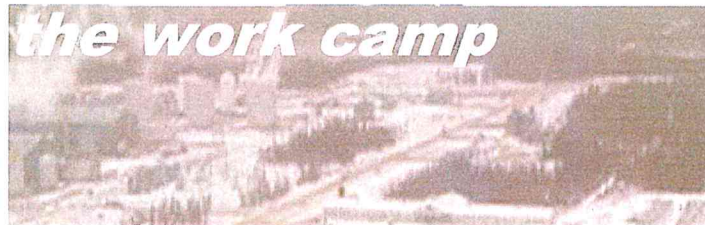
ECOARCHITECTURE

Our governments are now attempting to formulate policy to address environmental issues. As third world countries become more economically and technologically advanced, the danger to the environment multiplies. Countries such as India and China represent vastly expanding consumer markets.³⁵ Traditionally envious of first world material wealth, these large populations are gaining the means to purchase items such as automobiles, cellular telephones, and to travel. There may also be a sense of entitlement within these countries where individuals have had so little for so long. The potential increase in the consumption of fossil fuels and the resultant ecological impact are a major cause for concern. The first world has been exploiting natural resources for almost two centuries. We have established the model for measuring progress. If this model is followed by the up and coming economic powers, the results could be catastrophic. There is recognition on an international level that a new model is necessary, but the degree of reversal in idealistic and strategic thinking is not understood. The first world has traditionally viewed third world countries as primitive and unsophisticated. If developing countries are able to avoid the mistakes made by those countries who industrialized earlier, they have the



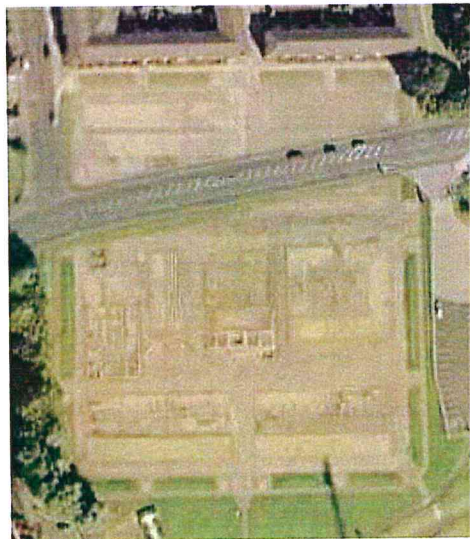
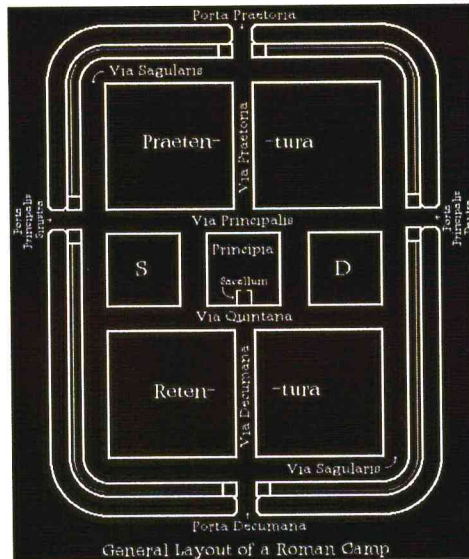
potential to surpass them in terms of ecologically responsible and sustainable methods and technologies.³⁶ More than half of the world's wood harvest is used to heat homes and cook food in the third world.³⁷ Imagine the magnitude of impact the development of an economical, environmentally responsible fuel source would have both regionally and globally.

Buildings account for over 15% of the world's potable water use, 25% of the world's wood harvest, and 40% of the world's material and energy use.³⁸ Although it is becoming more recognized, the impact buildings have on our environment is largely overlooked as environmental movements focus on more main stream issues such as the reduction of greenhouse gas emissions and recycling, among others. Improvements in the way we construct new buildings can have a major ecological impact, especially in developing countries. A further benefit is that buildings that are more environmentally responsible tend to provide a healthier environment for their inhabitants.³⁹



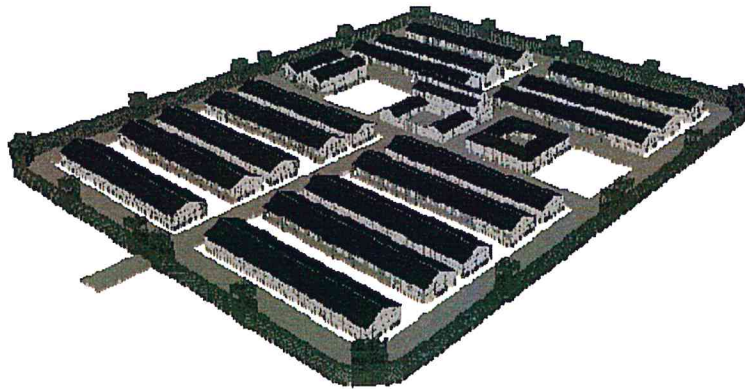
A HISTORIC TYPOLOGY

The need to house and feed a large population with immediacy and efficiency is a historic condition. Many contemporary cities and towns in Europe and around the Mediterranean owe their layouts and organizing principles to the Roman Camps that preceded them. Roman legions operating on the frontiers of the empire required a base of operations from which to project their influence over the surrounding region. Frequently these camps were initially constructed in hostile territory and potentially while under attack.⁴⁰ The Romans required quick and efficient methods with which to construct these camps. Construction materials were either found at the site, or carried with the legion supplies. Initially, the camp would consist of tent structures, with more permanent buildings evolving as a result of time. The layout was conducive to the praetorium, and camps were typically located on a rise of land with plentiful access to water and ample resources. An ideal plan was devised that could be modified to suit the population intended to be housed. A camp for one legion would require a certain sized square. A camp for two legions would create a rectangle, with the headquarters for each legion arranged back to back.⁴¹ Construction would begin with the digging of a trench around the perimeter



dimension of the camp, the sides of which were aligned with the cardinal points. The soil from the excavation would be thrown inward to create an earthen rampart (Vallum). Wooden stakes either carried with the troops or, time permitting, crafted from local forests were installed along the top of the rampart to create a palisade. Eventually, watch towers were located at intervals around the perimeter of the wall. Inside the perimeter of the wall, a clear area (Intervallum) was created to capture enemy bombardments. This space was also used for the camp's livestock. Legionaries were housed adjacent to the intervallum in close proximity to the outer wall for quick response to attack.⁴²

The camp was laid out with the main gate facing the enemy, and the headquarters (Praetorium) towards the opposite side of the camp. Supplies entered the camp through a rear gate behind the Praetorium opposite the main gate, with secondary gates located on the remaining two sides. Two main roads connected the four gates. The Via Principalis connected the two side gates and the Via Praetoria connected the main gate with the supply gate, interrupted by the Praetorium. The Forum (parade square) was located where these two main road intersected. A perimeter road (Via Sagularis) provided



access behind the ring of legionaries protecting the camp. Running perpendicular to the Via Principalis, the Via Quintana (5th Street) marked the boundary of civilian access to the camp. The intersection between these two roads became the location of the public market. The Laws of the Indies as issued over 1000 years later by the Spanish Crown outline procedures and rules for settlement of its American and Philippine possessions that reflect the same methods and criteria developed by the Romans.⁴³

Life within the camp was as regimented as the methods for its construction. The camp was organized by rank. The higher the rank and therefore, the more important the soldier, the closer his lodging to the Praetorium. Officers could have wives and keep families within the camp. Regular enlisted men served a 25 year term and were forbidden to marry and have families, although many kept common law families outside of the camp walls where off duty hours could be spent. Camp life consisted of ordinary routine where soldiers had basic jobs within the camp, as well as the Duty or the Watch which tended to consist of guard duty or specific maintenance of key facilities within the camp. Soldiers were trained to be generalists, although specialists existed and were categorized and segregated as such.⁴⁴



A CONTEMPORARY TYPOLOGY

The work camps of the 19th, 20th, and 21st centuries share similar defining principles:⁴⁵

- a narrow economic focus
- a relative geographic isolation
- connections with the global economy
- impermanence

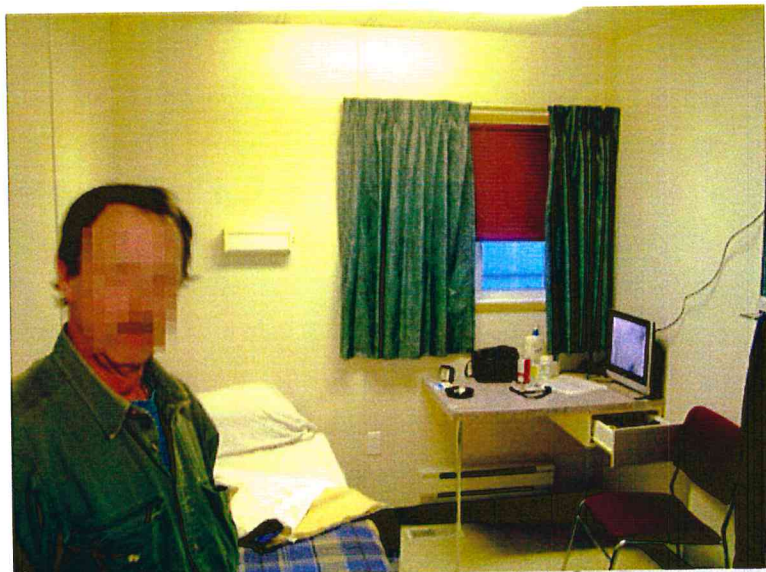
They are usually constructed and operated by a single organization and are established for particular tasks of limited duration within specific industries such as agriculture, mining, and infrastructure.⁴⁶ Work camps are typically constructed as a result of “major expansion of the global economic system”⁴⁷ in to remote areas as “outposts of distanced moneyed interests.”⁴⁸ Dependence on the global economy brings with it an inherent instability which reinforces the temporary condition. They are temporary in nature as defined by the nature of the work and thus differ from more permanent Company Towns. This mood of impermanence promotes reduced economic and social investment. Work camps tend to be constructed of more rudimentary methods, are less complex in their organization and layout, and offer fewer amenities. The workers who occupy the camps tend to

approach their working and living condition in a temporary manner either as a result of, or in harmony with the intent of the employer. Workers tend to be more transient, are less likely to have families, are more tolerant of less desirable living and working conditions, and historically demand less wages and benefits than more permanent employees. Although workers can be lured by what appear to be higher wages, the cost of getting in and out of remote locations coupled with the inflated cost of living there can have a large impact. Work camps that exist for one main purpose, be it construction, mining, or some other venture, clearly differ from more permanent communities.



The amount of infrastructure investment in work camps is a factor of time and demographics. Less investment usually results from the short duration of the activity and tends to attract mostly disadvantaged single males and, historically, a large immigrant population. Camps tend to stratify along lines of skill, ethnicity, and gender. Transient workers tend to be less skilled and a language barrier can result from a large population of immigrant workers. Single men are considered rowdy, unstable, unreliable, and even dangerous. The combination of gender imbalance, minimal amenities, and isolation can make for an insular experience. These characteristics are again reinforced by time. Skilled workers tend to stay longer, reducing turn over. Married men are considered more stable and more reliable. The relationship between working and after hour's experiences is important. In camps without families, it becomes more difficult to separate work and life. The longer the duration of the work, the more investment in infrastructure, the more likelihood that families will be attracted to the camp.

Camp life is defined by the relationship between the workers, the employer, and the resources being exploited. Employers traditionally wish to maximize productivity and minimize cost.



They consider work to be the focus in camp and life to be what happens when the employees are away from camp.⁴⁹ The geographic remoteness, mental isolation, reduced amenities, minimally constructed and planned living quarters and social spaces, long shifts, and strict rules common within the camp exemplify this reality. The temporary nature of the camp is reinforced by purposefully planning the living quarters as hotel type accommodations versus apartments. Meal times are regimented and quiet hours are enforced. Shifts can be 10 to 12 hours in length 7 days a week. 6 week work periods with 2 week rest periods are not uncommon. Many camps also impose prohibition within the camp boundary. While this may serve to reduce disruptive behavior, it also has an effect on morale. As history has proven, prohibition is not the answer to dealing with issues caused by alcohol and drug abuse. Employees head to adjacent towns to satisfy their vices and blow off steam, many times creating disturbances. An increase in the sex and drug trade and overall crime rates within the nearby towns promotes negative feelings among long time residents towards the companies running the camps. Conditions can actually get to the point where employees view "camp as a refuge from the harsh aspects of town life."⁵⁰



One of the largest issues faced by companies engaged in the extraction of bitumen from the Athabasca Tar Sands near Fort McMurray in northern Alberta is finding and retaining skilled workers. Resource extraction operations are traditionally well suited to the creation of work camps and tend to attract transient employees. In Fort McMurray today, the extreme scale of activity and its planned expansion does not afford the high staff turn over that the industry traditionally experiences.

Companies are competing for employees and, once hired, retention is a major focus. This is shifting the approach that organizations have traditionally taken to the construction and operation of work camps. A greater demand is placed on the quality of life within the camp.⁵¹ Camp accommodations are becoming tools in the strategy to attract employees. Where several people may have shared a room before, modern camps are providing individual rooms.⁵² Where several rooms may have shared one washroom area, modern camps are providing one washroom for every two rooms.⁵³ Schedules are arranged so that the employees in adjacent rooms sharing one bathroom work opposite shifts, thus providing more privacy. Rooms have amenities like desks, closets, flat screen televisions, cable TV, and internet access. Camp facilities include gyms, ice rinks, weight rooms, licensed lounges, lecture halls, ball fields, and regular housekeeping and laundry service. Gourmet chefs are manning camp kitchens and extravagant menus are becoming the norm. Working shifts are being reduced, in some cases to 8 to 10 hours per day, with work weeks being shortened to 5 to 6 days. Reductions in the amount of time in camp without a break are also widespread with 4 weeks on and 1 week off becoming common place.⁵⁴

SUNCOR: A CASE STUDY

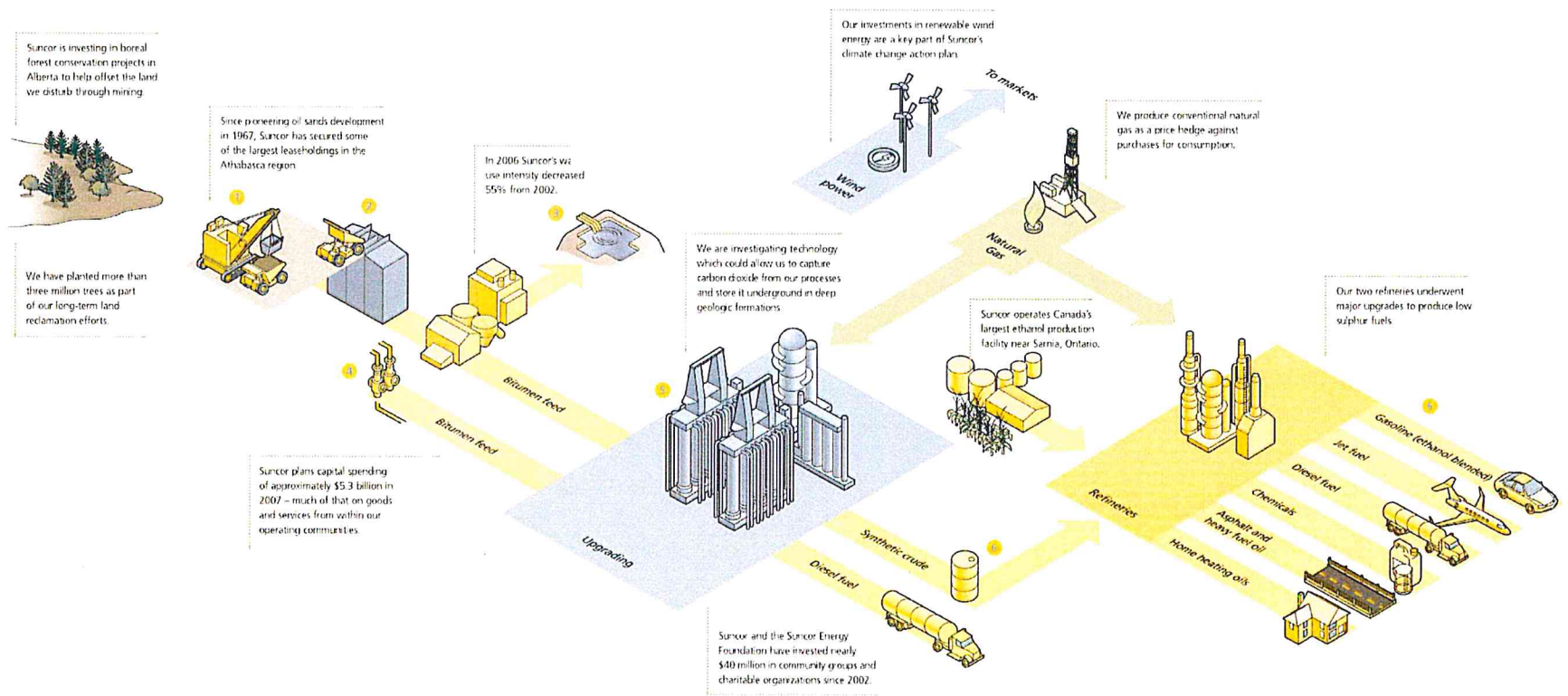
With energy use and environmental issues coming to the forefront of current global issues, resource extraction operations are under pressure to improve their performance in this regard. Suncor is a major corporation involved in oil sands operations in the Fort McMurray region. They are in the process of developing systems to improve their approach to what they are calling sustainable development. They have identified four “key challenges” as they continue to expand their business.⁵⁵ These challenges are as follows:

- i) Community Sustainability
- ii) Climate Change
- iii) Water Management
- iv) Labour Shortages

Suncor is engaged in two different extraction processes. The first process is open mining of oil sands ore. This includes clearing and stock piling topsoil and muskeg, and excavating and transporting 500,000 tonnes of oil sands ore per day. The process uses water which is taken from the Athabasca river at the rate of approximately two to four barrels of water for every barrel of oil extracted.⁵⁶ A large majority of the water is recycled through the process, but an amount is contaminated

enough with bitumen and other waste elements that it must be held in tailing ponds for a sufficient amount of time to allow the material to settle out. Sand is then poured in to these ponds to cover the waste material on the bottom. The land surrounding these ponds is planted with indigenous trees and plantings and the ponds are somewhat reclaimed as wildlife wetlands. This process can take between 20 and 30 years and the first of such ponds in the region are just now being reclaimed. The other extraction process is called In-Situ. This process entails the injection of steam in to oil sand deposits deep underground. This process does not require tailing ponds and has a smaller physical footprint, but is more energy intensive. From 2002 to 2006, Suncor has been able to reduce its water use by 55%. Once the ore is recovered, the process to upgrade it creates greenhouse gas emissions. Suncor is currently involved in research in to the potential to capture and store Co2 underground. The captured gas may assist in the recovery process as well. The upgrading process also generates excess heat, some of which is being transferred back to the in-situ extraction sites through a recycled water loop.

Some other sustainable initiatives being pursued and practiced by Suncor include the planting of over 3,000,000 trees as part of land reclamation efforts, boreal forest conservation to offset the impact of mining operations, wind farms for the generation of electricity, and ethanol plants producing alternative fuels.



Suncor has begun to develop two year initiative plans to aid in focusing on objectives and measuring progress. An example of these plans over the last four years is as follows:

2005-2006⁵⁷

- Pursue '0' injuries
- Reduce environmental footprint
- Generate prosperity and opportunity
- Address community issues related to growth
- Recruit and retain employees
- Invest in technology to improve environmental performance

2007-2008⁵⁸

- Advance new technologies & investments
- Drive environmental excellence
- Establish environmental targets
- Support community development
- Build & develop work force
- Support the safety culture

Along with these initiatives, the company has defined its values as follows.⁵⁹

- Safety leadership
- People & relationships
- High performance
- Sustainability
- Accountability

These initiatives and values have been condensed in to a policy they call Triple Bottom Line:

- Social well-being
 - Zero injuries initiative
 - Providing more jobs
 - Investing in local communities
 - Work camps reduce the pressure on local communities
 - Transition allowances and mortgage interest assistance (this has been proven to increase pressure on municipalities who have to increase public wages and provide initiatives of

- their own to help infrastructure staff keep up with inflation).
 - Capital investment in the local community infrastructure
 - Aboriginal relations
 - Improving communication
 - Solving problems together
 - Employee recruitment and retention
 - Recruit, retain, and develop
 - Support community development
 - Partner with industry
 - Encourage innovative labour practices
 - Invest in technology
 - Diversity
 - Aboriginals as a percentage of Suncor's workforce have actually declined to 5% in 2006 from 7.5% in 2002
 - Visible minorities as a percentage of Suncor's workforce have increased from 6.8% in 2002 to 9.3% in 2006
 - Women as a percentage of Suncor's workforce have increased from 19.4% in 2002 to 21.9% in 2006
- **Healthy environment**
 - Carbon capture and storage
 - Geo-thermal energy for steam generation
 - Cogeneration of electricity and steam
 - Water use reduction
 - 2002-2006 55% less water/barrel of oil
 - 12% less withdrawal from water sources
 - 90% of water used for In-Situ is captured and recycled
 - Reclamation of tailing ponds
 - Land reclamation
 - Currently 7% of disturbed lands have been reclaimed
 - **Strong economy**
 - Addressing labour shortages
 - Funding for training focused on aboriginals, visible minorities, and women
 - Immigration
 - Temporary foreign worker programs

SCIENTIFIC CAMPS: A CASE STUDY

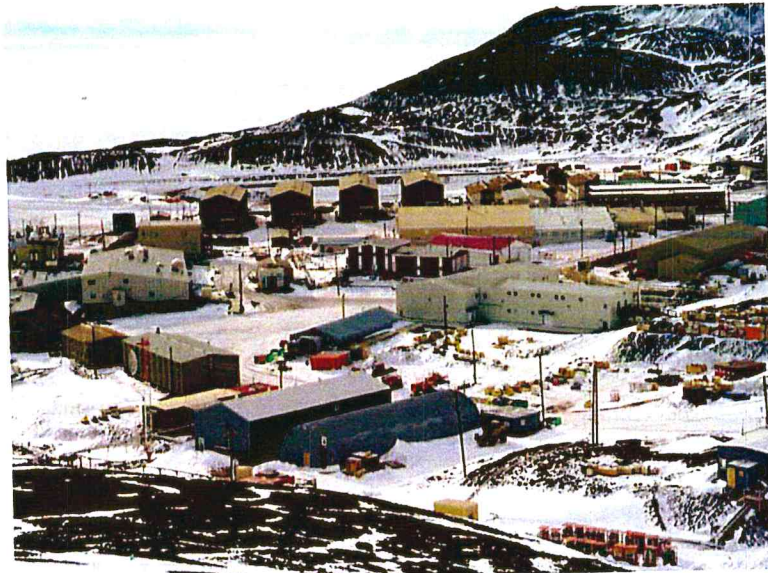
While scientific camps have some similarities to infrastructure and resource extraction work camps, there are some larger ideological differences. In the Soviet Union for example, science cities such as Akademgorodok were created to further scientific research. The remoteness and isolation considered detrimental in the case of a work camp, was purposeful in these instances. Scientific minds oppressed within a communist dictatorship were able to flourish in an atmosphere of openness and personal freedom. The disconnection from normal society promoted scientific efficiency and academic clarity.⁶⁰ Physical separation reinforced the psychological separation from politics and bureaucracy. Separation was inherent within the camp to the point that underground tunnels permitted passage between facilities without having to experience the harsh conditions of the Siberian winter, thus serving to separate the scientists from nature as well.



Another relevant study is that of the scientific camps of Antarctica. As indicated previously in the research, temporary camps have a foundation in the military and in colonization. Antarctic camps are often considered colonies. They represent the interests of several nations who have historic claim to the continent. Colonies have historically been established to project power and enable imperialist states to control territory beyond their borders. This has traditionally included the subjugation of the indigenous peoples of the territory under control. Due to the Antarctic Treaty System, however, Antarctica has been established as an international scientific preserve.⁶¹ Since no one country has true ownership over the continent, and since Antarctica has no native population, there is debate as to whether or not the term colony can apply here. On the other hand, if we define colony as a self-contained settlement whose purpose is to serve a social goal of a larger metropolitan centre⁶², the term may be relevant. As Antarctica has no indigenous population, it is nature that is subjugated. The bases there are justified by the universally acknowledged principles of scientific advancement and environmental protection. As harmonious as this sounds however, the colonies of Antarctica promote and serve differing socio-political agendas.



Mawson Station is a scientific colony established by Australia on land that it has historic claim to based on a gift of explored territory from Great Britain.⁶³ The architectural language of the colony speaks of spatial acquisition and colonization.⁶⁴ Its streets carry the names of early explorers as well as street names borrowed from back in Australia which serves to identify the colony as 'Australian space.' The original buildings of the colony remain and are important to its fabric. They signify longevity and the pioneering history of the place. From this small grouping of original buildings, the colony has grown in to a large modern complex with brightly coloured "leggo" block buildings signifying that "humans live here."⁶⁵ From the landing area in the harbour, the new buildings lead the eye further inland, signifying the "spirit of possession" flowing into the interior of the continent.⁶⁶ The original buildings are simple and utilitarian enclosures, but the new facility focus' on human comfort with an "emphasis on light and the world outside."⁶⁷ In line with the current Antarctic global strategy of scientific dominance, the architecture of the colony overcomes the challenges of the life threatening climate. Old school residents still feel that expeditioners expect some hardships. Therefore, planning intentionally requires inhabitants to circulate outdoors to get from one building to another.



McMurdo Station is an American colony located on territory historically claimed by New Zealand. In the spirit of the Antarctic Treaty System, this is intended to challenge the notion that any one nation has a right to claim Antarctic territory. Prior to the treaty, McMurdo was founded as a naval air station and thus was planned and organized as a military camp. The rigid grid plan serves the purpose of naturalizing human presence in an alien landscape. Unlike Mawson, there is no overlying connection with the colony's original architecture. New buildings replace old as the colony has grown to resemble an urban centre with a population of over 1,000. While primarily metal buildings of similar form, the colony contains a chapel whose form evokes familiar social institutions. A chalet style building has also been constructed in an attempt to dramatize and relate to the location. Living quarters are segregated according to professional status. The smallest population, the scientists, enjoy the highest level of the hierarchy, with technicians (indoor people) enjoying a slightly elevated status over trades people (outdoor people). McMurdo has evolved in to a company town with a strict structure of social order and regulation with "strong cultural antecedents."⁶⁸



design principles for temporary communities



Because a work camp may be considered temporary does not mean it cannot be a community. As discussed previously in the research, temporary communities differ from permanent communities, but they are still communities. As such, they should still meet the full range of needs of their inhabitants. In attempting to establish principles from which to approach the design of a work camp facility, we must consider the following⁶⁹:

Don't be ruled by expediency

Time is always a factor in planning and constructing a work camp. Companies wish to invest minimal resources up front in the shortest amount of time to get to the point where they are able to generate revenue. Although time is of the essence, decisions made during the design and planning phase can have an impact on the long term viability of the operation. The temporary nature of work camps may also psychologically impact the rigor of the approach to design. Camps can remain in active use for 20 years or more and companies are learning that they need to address more than the most basic needs of their employees. In order to reduce turn over and to increase productivity, high quality planning and design cannot be compromised.



Be sensitive to the surrounding area

Work camps are typically intended to be decommissioned when the work is complete, and the site restored to its original state. This does not alleviate the need for careful consideration of the impact of the camp on the surrounding area during construction, and while the camp is operational. This includes the impact on the environment, as well as social impact on the adjacent existing communities.

Foster livability

Over and above food and shelter, camps should address social, educational, cultural, spiritual, and recreational needs. Service convenience such as laundry facilities and markets should also be considered. Camps arranged in concentrations can enhance the sense of desperation that can develop. Clusters can help to alleviate this condition and provide a sense of community and identity.

Provide connectivity

Work camps are typically located in remote areas which can promote a sense of isolation. Providing transportation linkages to connect to adjacent communities and to the outside world can help to reduce the desperation that

seclusion can induce. These connections also provide individuals with some sense of control over their situation.

Integrate a variety of housing types

Camp demographics may dictate the majority of type and style of accommodations. As companies work to improve camp conditions and encourage diversity, more variety of housing types has become necessary. Options for individuals, couples, and families should be provided. Opportunities for both communal living and independent living should also be considered.

Keep people safe

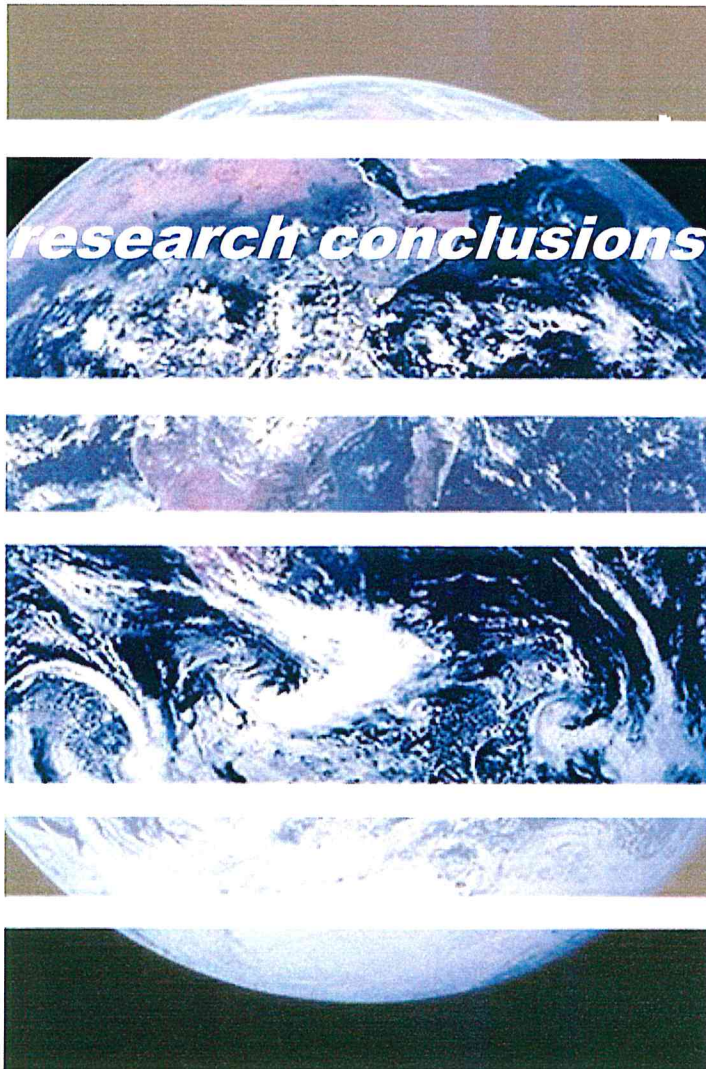
Work camps need to provide a safe environment both physically and mentally for their inhabitants. Design can play a role providing segregated areas of refuge, but of greater effect is the social structure of the camp. Providing opportunities for observation and collective involvement and participation can create a neighborhood environment where safety is a shared responsibility.

Create a sense of responsibility

Inhabitants of isolated communities can develop a sense of shared sacrifice. This can serve to bring the community together and resist polarization. Involvement in decision making can reinforce an overall feeling of fairness in the way the camp is structured and operated. Providing opportunities for civic identity through street and building naming can promote a sense of place and ownership.

Devise an exit strategy

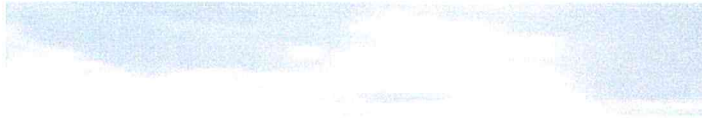
At some point the activity necessitating the work camp will cease. This may be due to reduced international market demand or due to depletion of the resource being extracted. Temporary camps are constructed with this eventuality in mind. Proper advanced planning can improve both the efficiency and effectiveness of the decommissioning and reclamation activity. Soil compaction and contamination, erosion and sedimentation, and water quality degradation are key considerations.



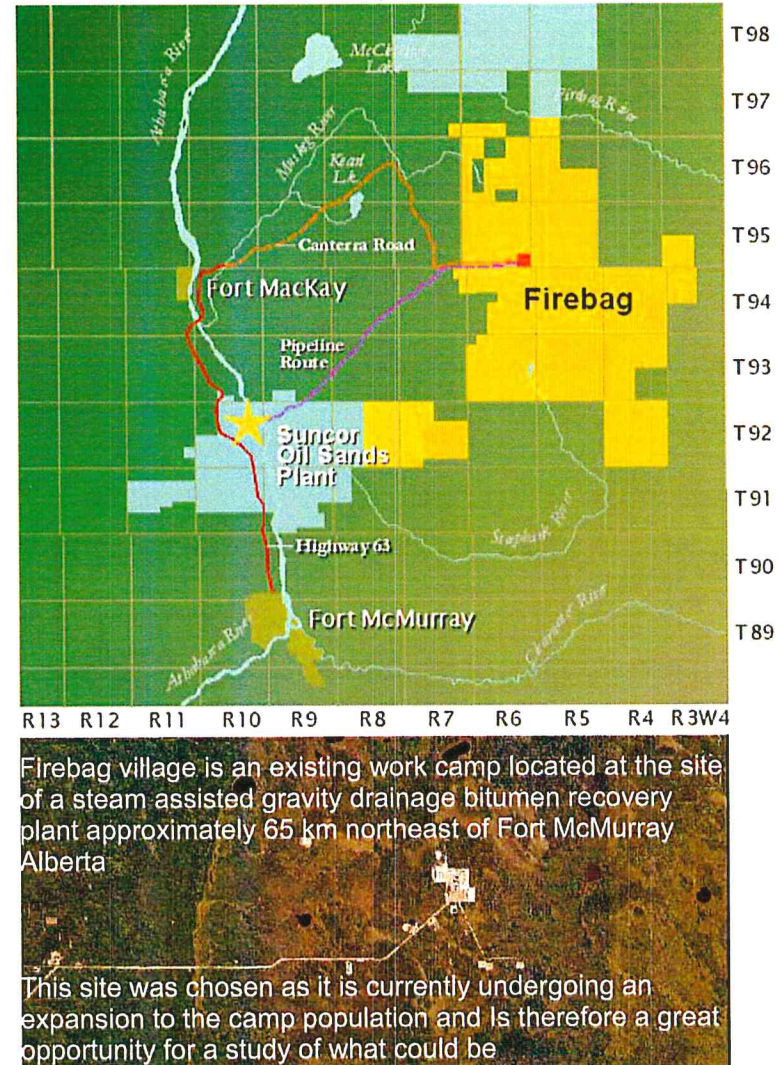
It is a common opinion that the work camp is to human life what resource extraction is to the earth; an unfavorable reality of our current human condition. The impermanent nature of camps can serve to validate this willingness to endure unfavorable conditions. The idea that 'life is what happens when you are back at home' is a common theme promoted by employers and passively accepted by employees. This postponement of satisfaction is seemingly entrenched in the structure of contemporary society.

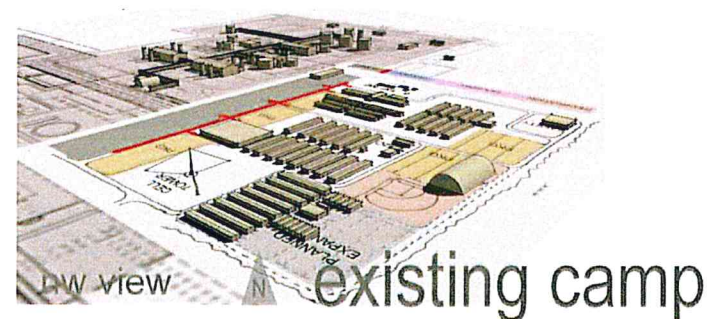
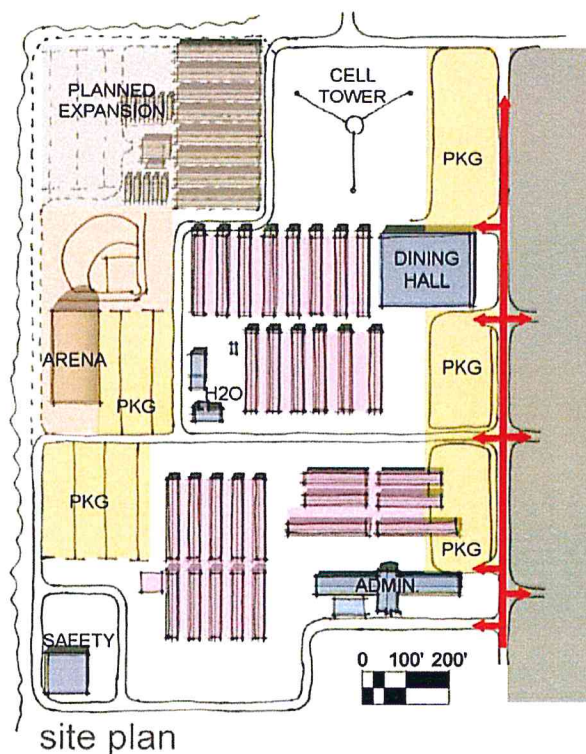
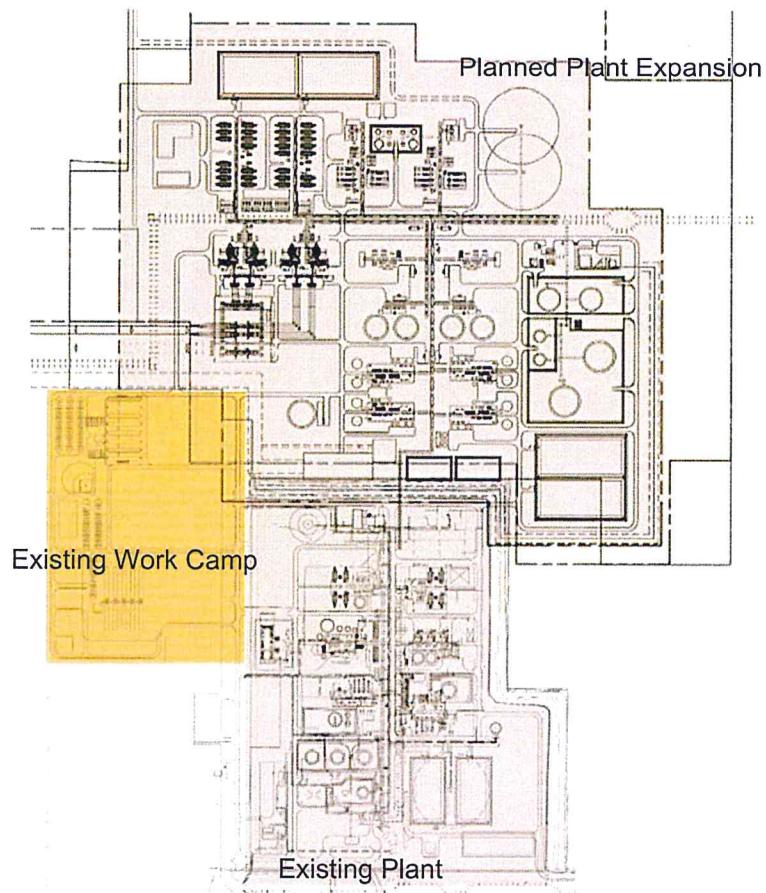
The current approach to work camp design and construction reflects this condition. The typology has not evolved a great deal throughout history. It is driven by a value system that promotes expediency and economy over quality of life. In contradiction, we must insist on the creation of spaces for the purpose of life.

The product of this thesis will be informed by historical, global, and current perspectives. The physical manifestation of the resultant work camp will consider, through architectural form, the established design principles and foster the connection between man and the environment throughout the spaces that make up the place for living.

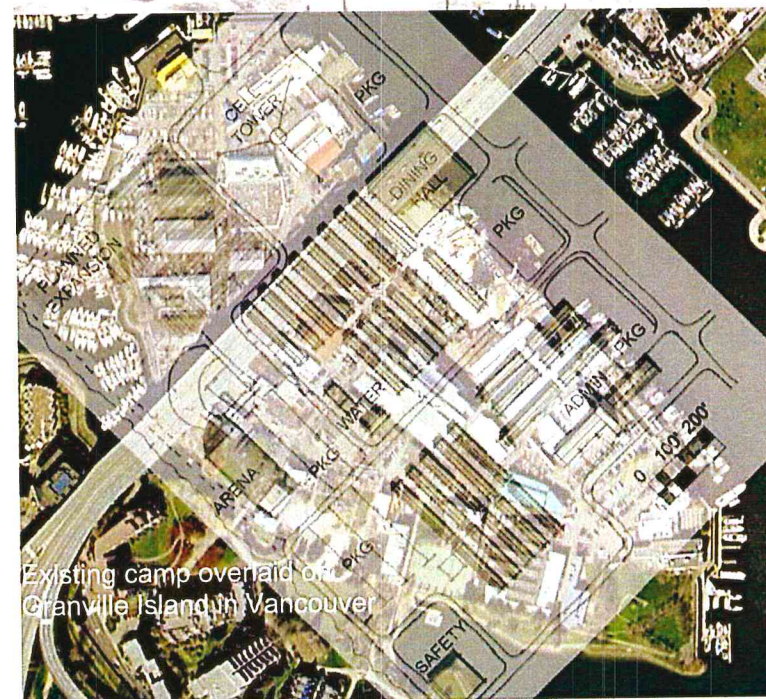


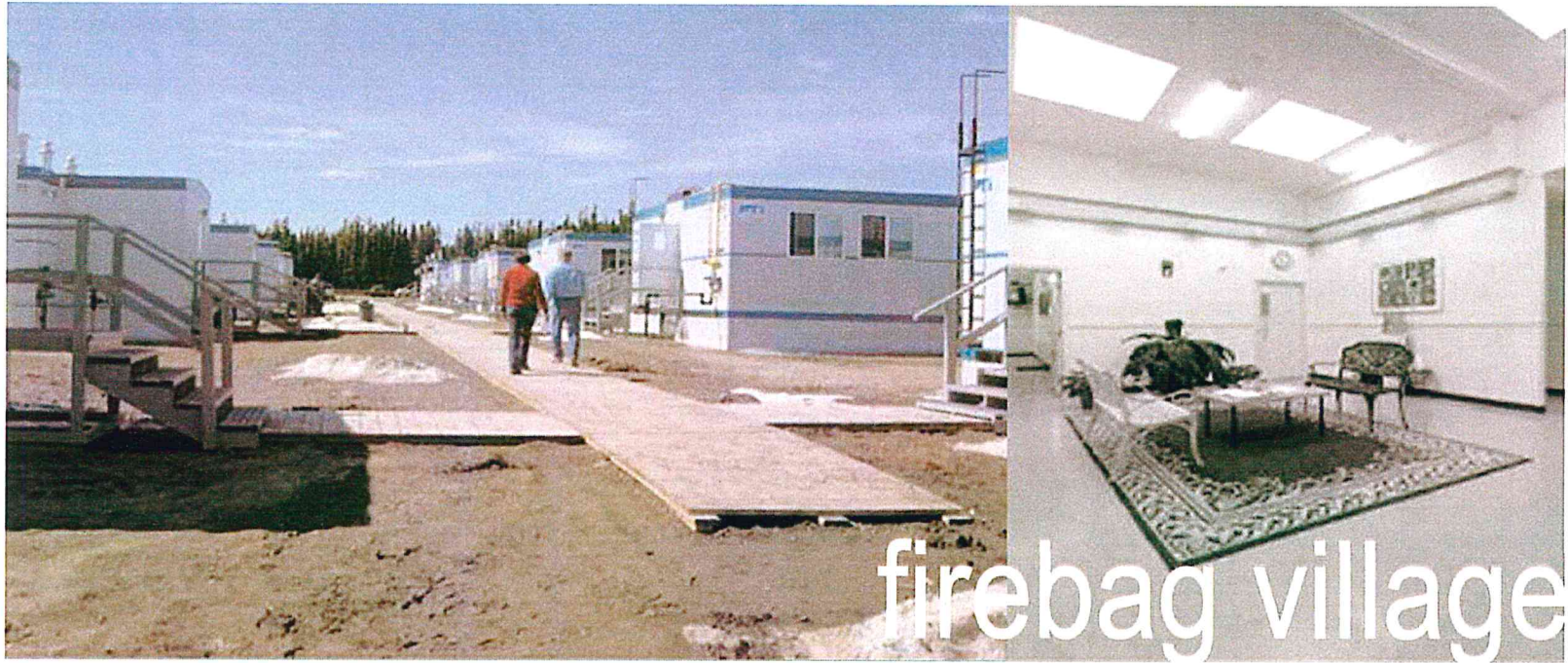
Establishing place for the purpose of living requires specific knowledge and criticism of places that we have created in the past. Creating a place for living involves stimulating one's reaction to an existing scenario that evokes positive emotion. The natural environment plays a key role in this reaction as it is already used for the purpose of healing through various static or dynamic interactions and occupies a special place in the psyche. Place must be an active participant within its scope and purpose. Specific pieces of a landscape can be used in varying ways to connect the idea of place for living to the greater context of its environment so that place acts as a facilitator for living versus just a site or form to house it. This enables the definition of a place to be less about the disconnected activity it facilitates, and more in tune with the physical nature of which it is a part. This specific derivation of place then begins to create a connection that infiltrates our current notion of work camps with what we know to be true about the natural environment. By becoming part of a rehabilitated landscape, and negating the impact tied to the activity of resource extraction, the place for living has a vital role to play in beginning the healing process for those engaged in the activity.





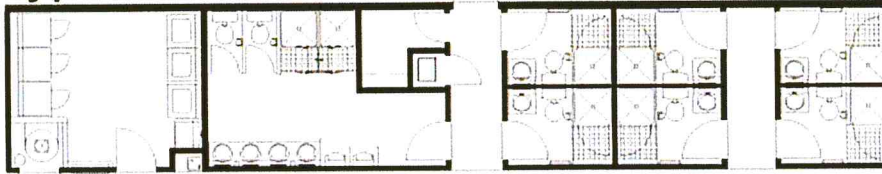
- the existing firebag village project is the result of a long term commitment providing a temporary accommodation complex for approximately 1600 workers.
- the camp provides administration, housing, food services, and recreational activities for staff that operate the existing facility as well as those who will construct and operate the expanded plant.
- the proposed expansion of the firebag village project will increase on site accommodations to approximately 2500 - 4000.
- objectives stated by suncor for the expansion project include the creation of a safe, stimulating and comfortable 'homelike' environment for employee wellness and generate a 'workplace of choice' to improve employee health, safety, productivity, and loyalty.
- innovation in design to improve efficiency, incorporate waste management strategies, and minimize the impact to the environment is desired.



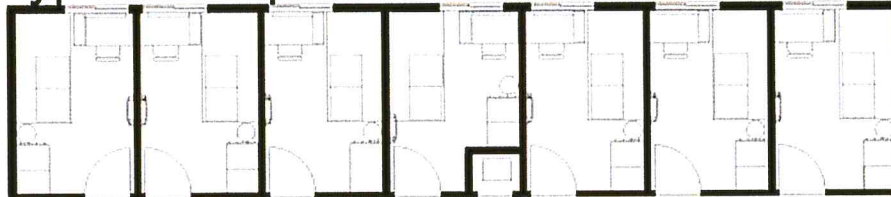


Sleeper	Sleeper	Washcar	Sleeper
Sleeper	Sleeper	Sleeper	Sleeper

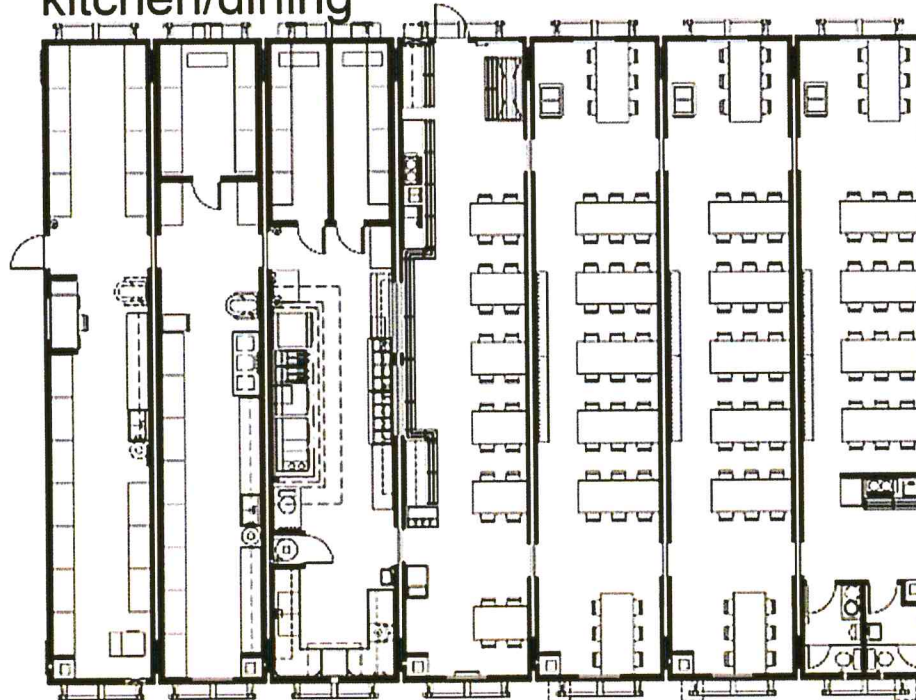
typical washcar

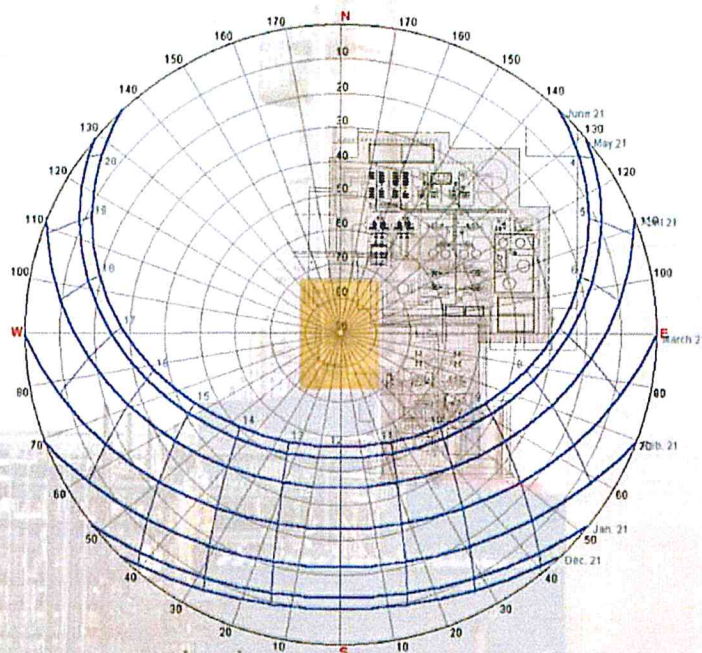


typical sleeper



kitchen/dining

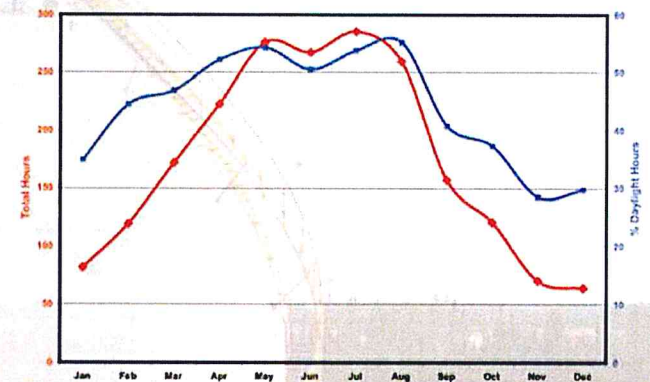




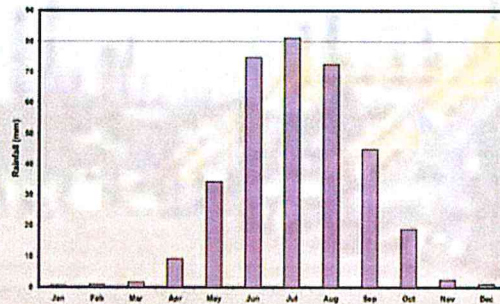
sun analysis

- low winter sun angles create opportunities for passive heating
- low eastern sun angles in early morning and low western sun angles create potential heat gain
- high summer sun angles could necessitate solar shading

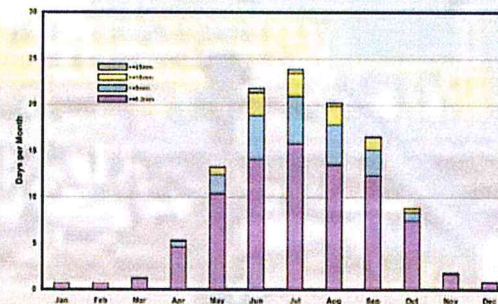
Bright Sunshine Hours (Fort McMurray)



Monthly Precipitation (Fort McMurray)



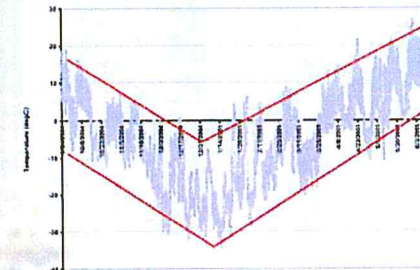
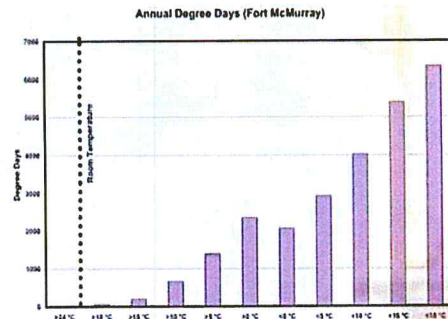
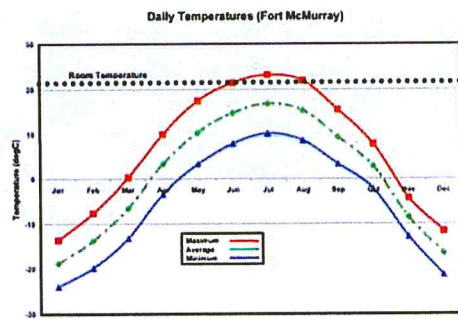
Days with Rainfall (Fort McMurray)



precipitation analysis

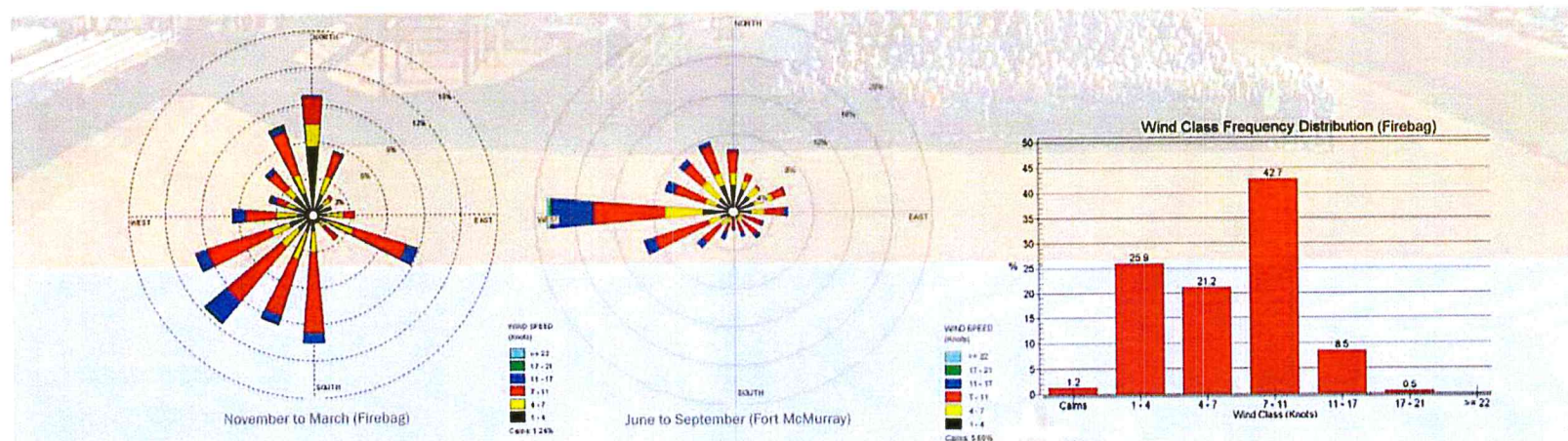
- winter air is typically dry and cold with annual average snowfall of 1560mm.
- higher summer temperatures, combined with a cool moist maritime Pacific air mass creates increased precipitation with annual average rainfall of 3420mm with June, July and August averaging 75mm per month
- an on site collection and re-use system could provide summer time irrigation (25mm/week) and gray water uses

site analysis



temperature analysis

- as is evident in the stereographic sun diagram, at this distance from the equator, the sun is usually at a low elevation in the sky, which reduces the intensity of solar energy
- in winter, ground snow cover reflects sunlight back in to the atmosphere, which serves to further reduce winter temperatures
- the resultant climate of firebag village is heating dominant, although the wide range of temperatures and swings of ± 25 degrees during most months requires the ability to rapidly switch between heating and cooling

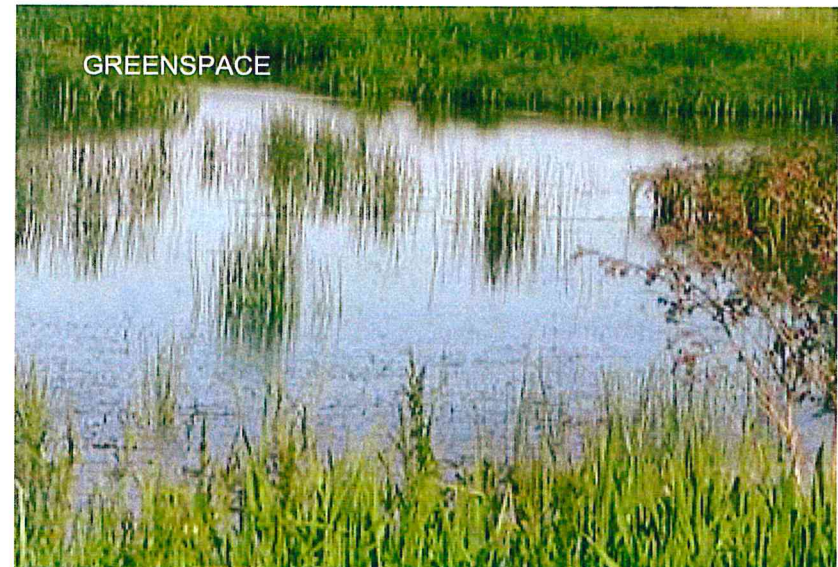


wind analysis

- predominantly north/south winter winds suggest a north/south orientation of buildings with east/west exposures consideration to be given to protection of north/south exposures
- predominantly westerly summer winds again suggest a north/south orientation of buildings with east/west exposures to take advantage of natural cross ventilation opportunities

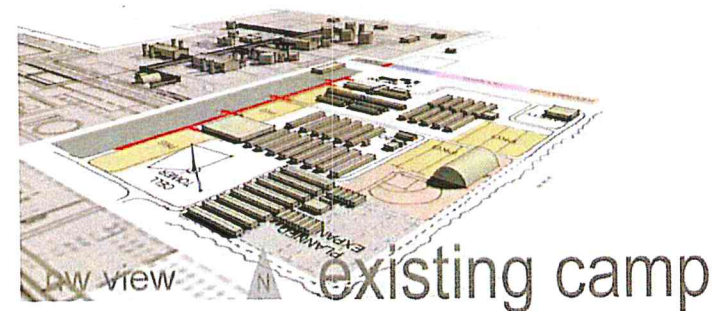
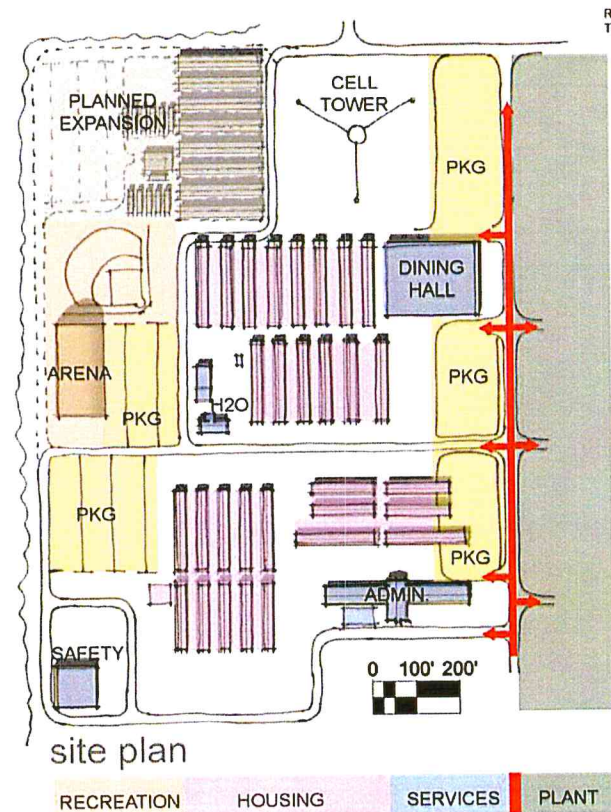


Planning concepts for the site consider opportunities for the densification of housing to reduce physical building footprints. This enables the rehabilitation of areas of the current camp to initiate the process of returning the land to a natural state while still respecting existing and new recreation opportunities on the site. The goal is to connect the built and natural environments vs. the current methodology of clearing distinct areas in the landscape and disconnecting man from nature.

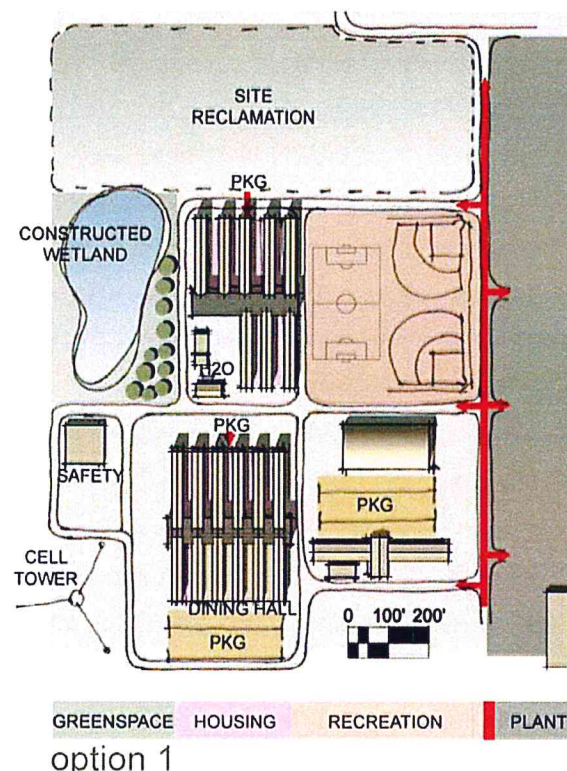


Three common themes were established to guide the planning of the site:

1. The intent is not to clear the site and re-build the camp from scratch. Therefore, elements of existing physical infrastructure will be retained. Also, the existing camp accommodation units will be used in the planning for the new camp to mitigate the energy used to relocate them to another site and to avoid passing them on to become part of somebody else's problem.
2. The services component of the program of the existing camp will be integrated with the housing component of the program wherever possible and therefore will not be treated as a separate program element for the purposes of site planning.
3. Portions of the rehabilitated site area will be utilized for the specific enjoyment of the camp occupants and will therefore be a specific component of the program. The balance of the site that remains due to densification will be re-claimed back to its natural hinterland state.

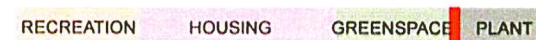
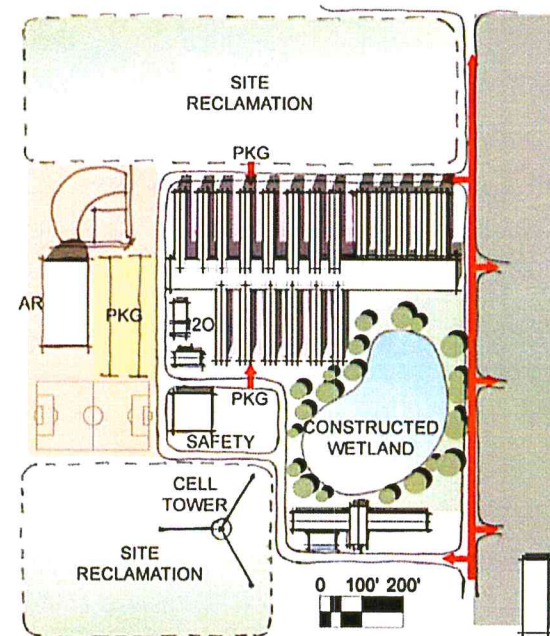


Site Planning Option 1 concentrates the built form density in the centre of the existing camp in two main groupings somewhat consistent with the existing camp layout. The residential units are oriented north/south to allow for democratic distribution of natural light and in response to cold winter northerly winds and warm summer cross venting westerly winds. Camp services are located in central spine-like enclosed circulation zones which become the hub for each pod of residential units. The dining hall trailers are relocated to the southern grouping to free up space on the site for other uses. The existing water treatment facility is maintained as well as the existing administration building, and the firehall (safety building) is relocated nearer to the centre of the site. A buffer zone is created between the living area and the work site by placing the recreation facilities in this location. Physically separating the live and work environments is hoped to psychologically enhance the quality of life in the camp. A transition zone is created from the camp to the hinterland to the west by the establishment of a constructed wetland adding additional wildlife habitat and providing a live example of the initiation of the rehabilitation process. This zone will interact with the living area of the camp to create a connection with the natural environment that is tangible for the camp inhabitants.

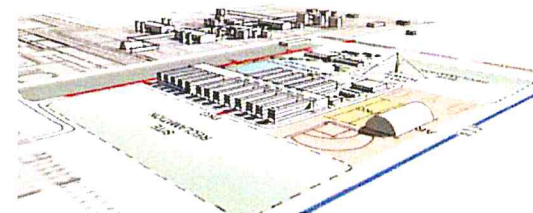


option analysis

Site Planning Option 2 recognizes the need for an efficient link from the living area of the camp to the plant area and reduces the reliance on vehicular circulation on the site. The residential units are further consolidated to a singular cluster and are connected via a central circulation and service link. The dining facility remains in its existing location and acts as the focal point at the link between the plant and the camp. Again, the water treatment facility and administration building remain and the safety building is relocated closer to the centre of the site. In this option the buffer zone is occupied by the constructed wetland which provides a better connection with the living area and a better disconnect from the work area than the recreation facilities. Psychologically, a better separation is provided between work activity and downtime activity by leaving the recreation facilities in their existing location. This also further reduces site disturbance and energy expenditure related to relocation and reconstruction. This option allows for a larger area of site reclamation as the overall planning is more compact.



option 2

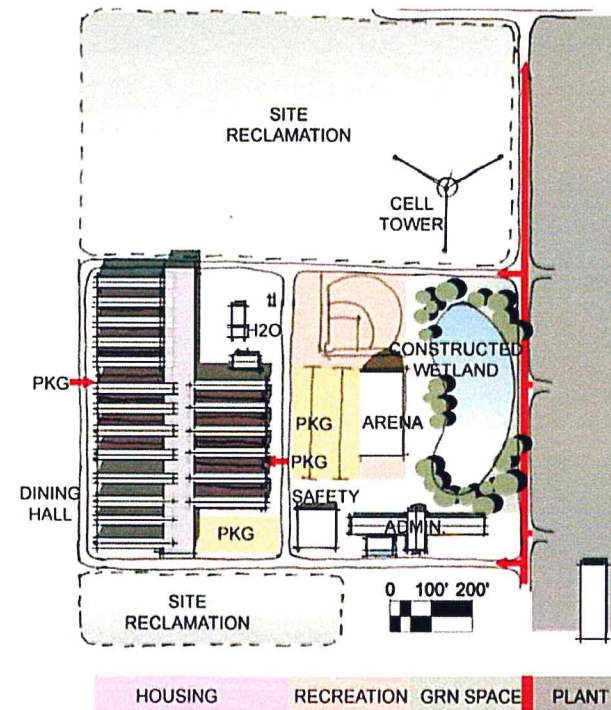


nw view

option analysis

Site Planning Option 3 further explores the stratification of the camp program and the creation of zones in the planning of the camp. This option puts the residential component of the program at the furthest distance from the plant creating as much physical separation as possible between live and work areas. Downtime activity in the form of the recreation facilities relocates to the middle of the site promoting healthy stress relieving activity at the heart of the camp, and is buffered from the plant by the constructed wetland. In this option, the man/nature connection is less direct and more visually reliant. The transition from built form to recreation area to natural area is more logical in flow, but not in orientation as the natural area borders the plant. This option also relies more on vehicular circulation than option 2 and involves a large amount of relocation and reconstruction activity. The compact orthogonal planning geometry, however, allows for efficiency in site reclamation and therefore yields the largest amount of reclaimed land area.

Based on an analysis of the options, Option 2 is preferred due primarily to the use of nature as a buffer to the plant, the reduced reliance on vehicular circulation on the site, and the minimization of relocation and reconstruction activity.



option 3



nw view

option analysis



In the same way that place fosters experience, space is its container. The ability to connect to, from, and between spaces on a variety of levels weaves an intricate pattern of experiences for the user. It provides intrigue and draws people in to engage specific aspects, allowing them to draw their own conclusions, thus forming their frames of reference for future interactions. Part of what makes the work camp environment so uninviting is the fact that it is segmented and divided from other spaces. Spatial connection is necessary to maintain interest in what might lie on the other side of a boundary, some type of inclination about what might occur in the spaces beyond. Certain activities require a level of privacy, but spatial strategies can be used to create these important connections at varying degrees, whether visual, auditory, or connective in some other manner, the importance is not to be directly involved, but at least feel some type of relationship with the space beyond that in which you are present. It is important that when engaging space, the user feels as though they belong; being part of the land, connecting with the water and feeling a part of the sky.

existing camp services

- the current administrative building contains a reception, administrative offices, EMT/First Aid, security services, and training and orientation rooms.
- the existing kitchen has a capacity to serve 800-1000 people and operates a staggered mealtime schedule to accommodate the camp population.
- camp services include a water treatment plant, waste water treatment plant, and safety services building.

expansion

- additional food services to include smaller theme areas and intimate eating zones such as internet cafes and snack bars.
- daycare facilities will be required to accommodate the growing number of families living in the village.
- shops providing groceries and supplying necessities will be required to support more independent living situations

recreation + culture

- currently, recreational activity is limited to the indoor arena, a few exercise rooms, and in warmer weather, the outdoor play fields.
- gatherings and social events are accommodated largely in the dining hall.
- with limited options for places to spend leisure time, the majority of time is spent in an individuals room.

- additional recreational space to accommodate indoor and outdoor pursuits such as basketball, soccer, archery, floor hockey, boxing, track, skateboarding, climbing walls, and a female gym.
- additional cultural spaces to include a chapel, library, music room, internet lounges, multi-use space, and reading rooms.

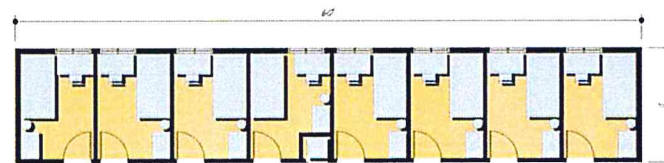
program

existing camp housing

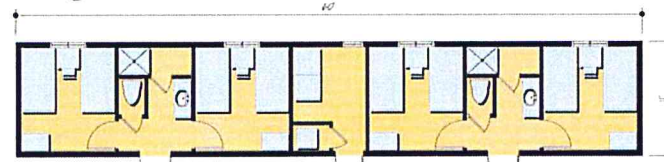
-current camp accommodations are provided by prefabricated - modular units which are economical and relatively easy to transport and arrange on the site. The current camp houses approximately 1600 people. With the exception of management, the accommodations are primarily in one and two bed hotel style units with common washroom and laundry facilities. 'Upscale' accommodations provide semi-private washrooms and laundry.

expansion

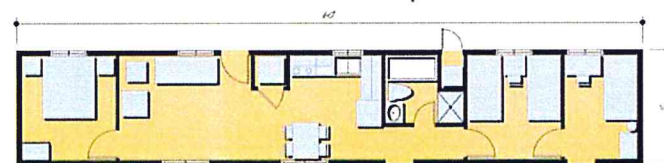
-the proposed expansion needs to address the lack of housing options currently provided.
 -new initiatives sponsored by suncor are promoting the inclusion of families into camp life.
 -accommodations also need to consider the growing female population within the camps with the provision of options for more privacy and safety.
 -additional options should be provided for couples and individuals who prefer to live independently.



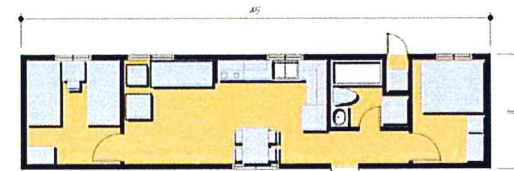
single hotel w/ common wc



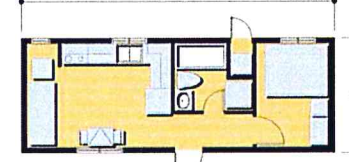
double hotel w/ semi-private wc



3 bed apartment



2 bed apartment

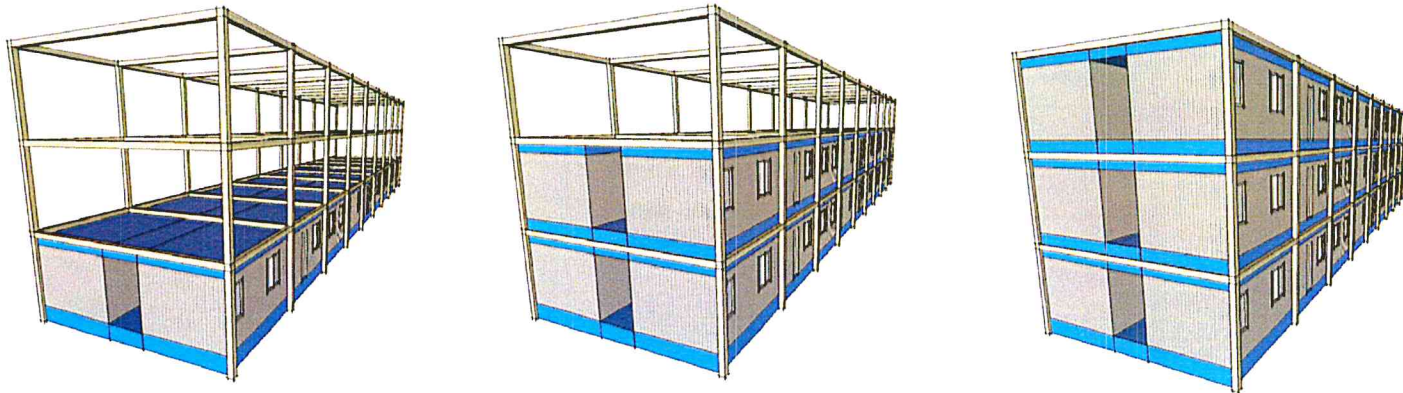


1 bed apartment



The existing work camp is comprised primarily of a series of pre-manufactured modular spaces. The spaces are defined by the form of the units that contain the space. These spaces can be arranged in a variety of ways, but an efficient layout is typically dictated by the orthogonal form of the units. Regardless of their location within the field, these spaces, if considered as positive forms, will create a second set of negative spaces.

In an effort to create additional spaces for living within the context of the camp, the existing plant can inform a framework for capturing the negative spaces and enabling their use not only for circulation, but also for physical, psychological, and social uses. The frame may be installed over existing units and allow a structure for ease of organization and servicing of existing spaces. It can also be built upon and enclosed to enable the creation of new space.

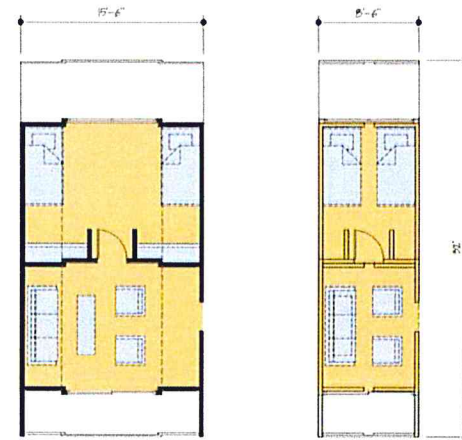




New 1 bed apartment unit

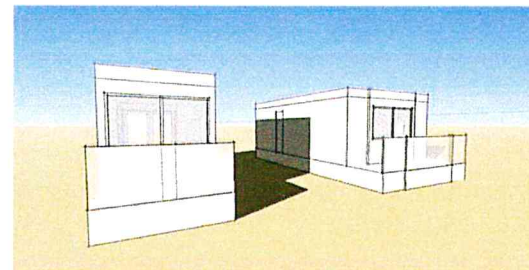
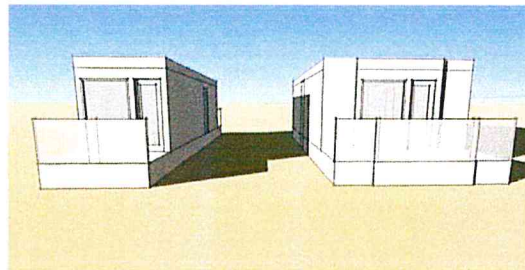
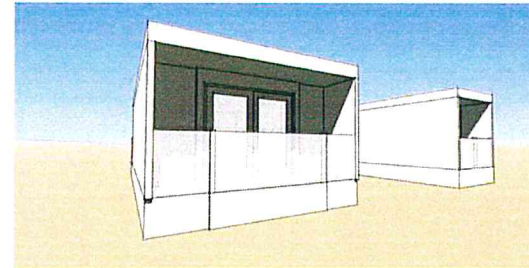
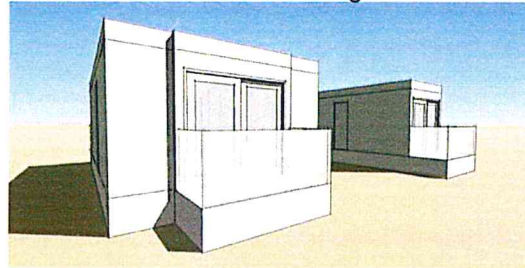


While the concept of the frame may provide a solution for the creation of new space within the camp, the existing living spaces must also be critically assessed. The long linear dimensions of those units enforces the need for long internal



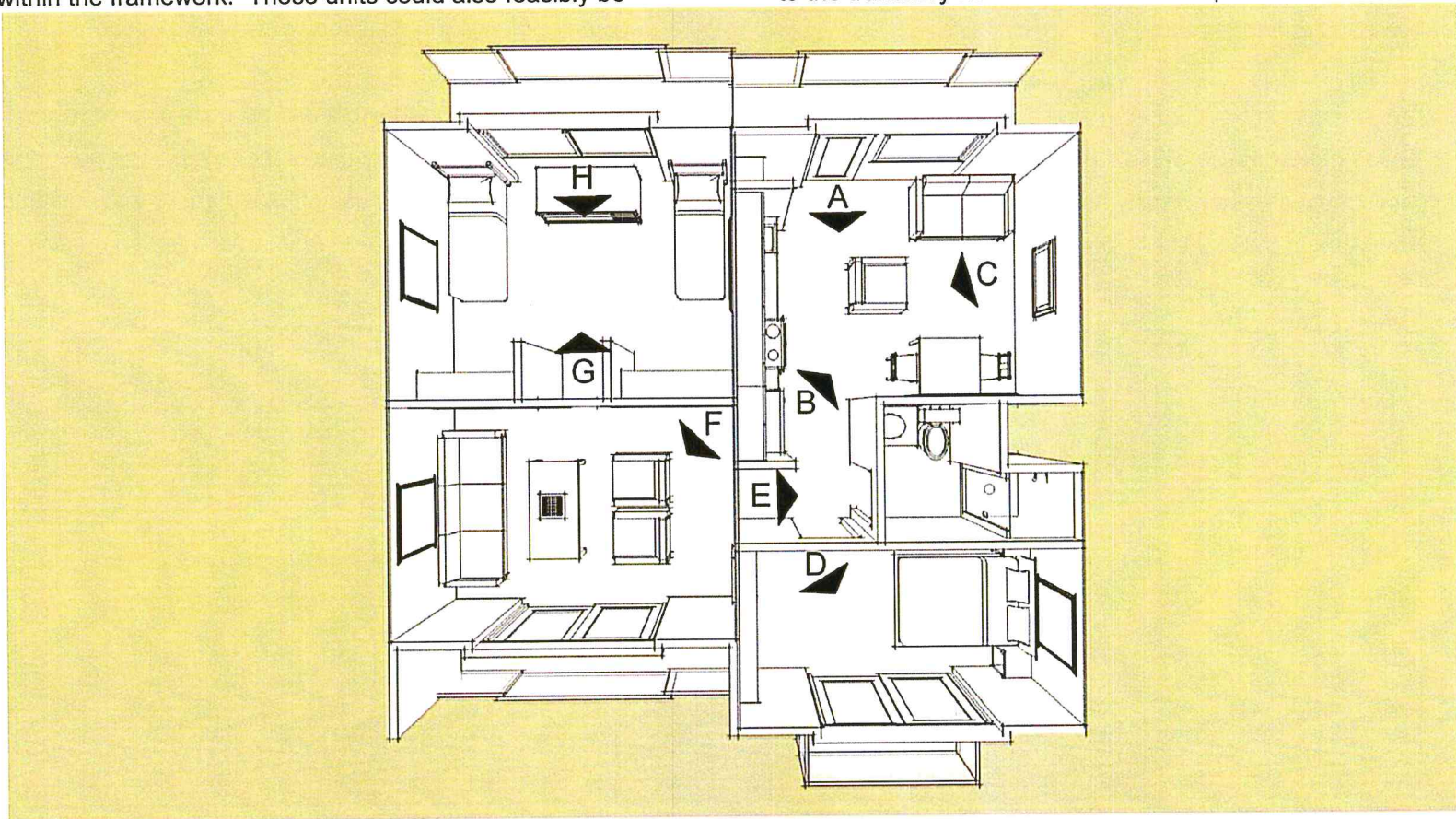
Supplemental unit to add sleeping and living space

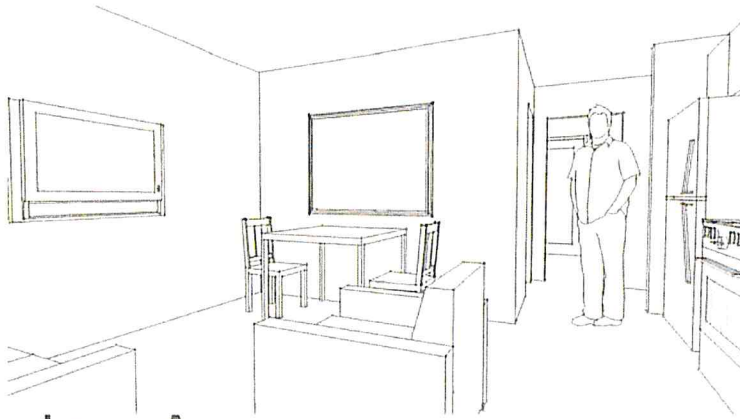
corridors within the framework and reduces connectivity with the new spaces created by use of the frame. The size of the existing units requires the use of heavy trucks and equipment to deliver them to the site and maneuver them on the site.



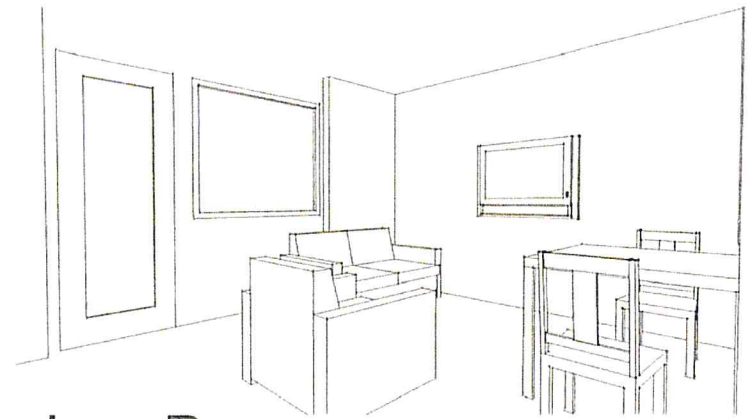
This concept explores the notion of creating a new unit type that enables a different orientation and different opportunities for circulation from the existing camp inventory. These units could be purchased by the owner of the operation and transported to the site via rail or bulk transport for installation within the framework. These units could also feasibly be

owned by individual employees and be transported to the site by personal means. This would enable long term ownership and individualization of the units with the ability to plug into or unplug from the framework as an employee joins or leaves the on site workforce. Compatibility between sites would respond to the transitory nature of the work camp.

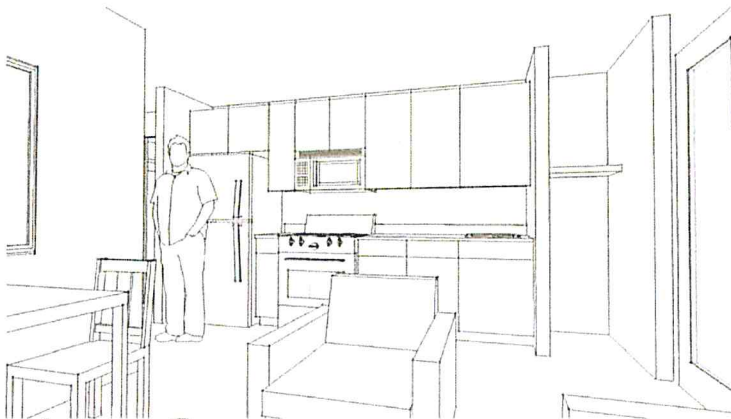




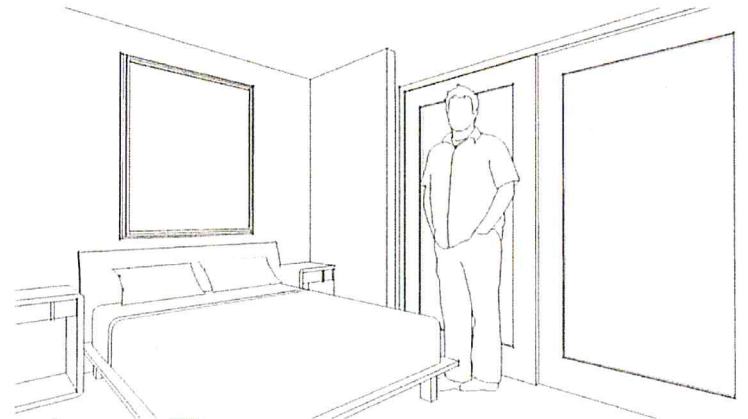
view A



view B



view C



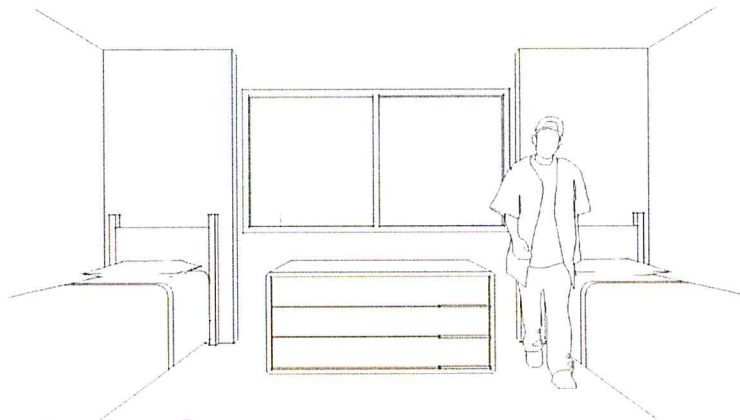
view D



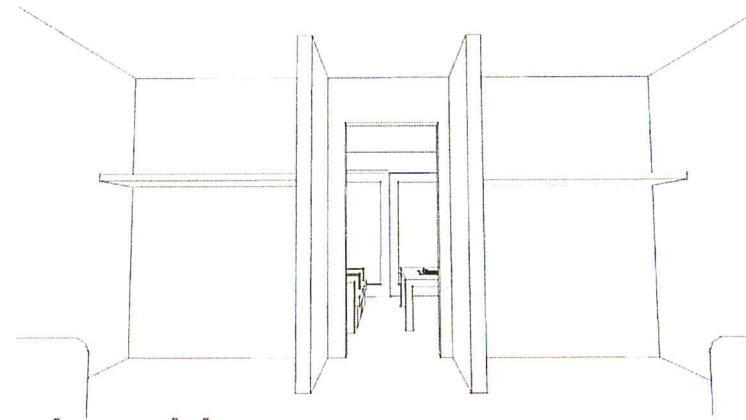
view E



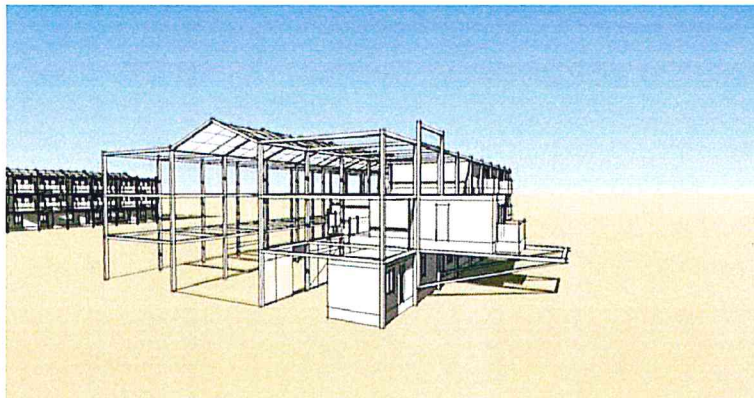
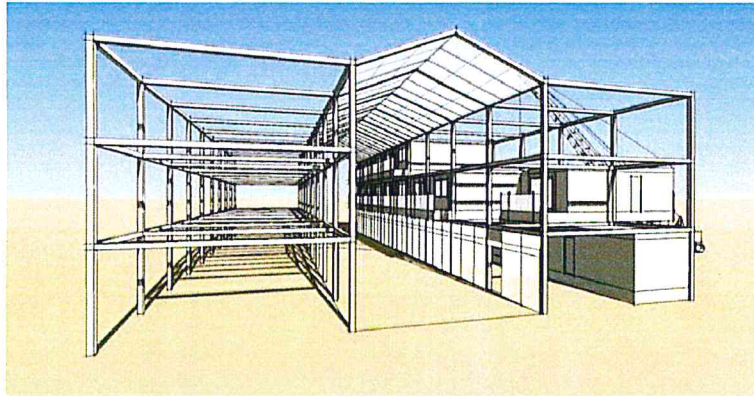
view F



view G



view H



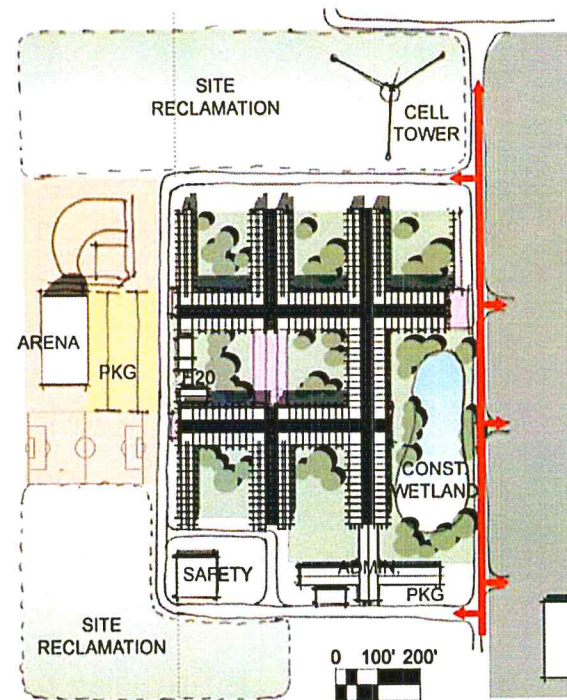
Further development of the frame concept shows how what was negative space between the rows of trailers can be enclosed to create an internal network of circulation streets. The residential units can be lifted off the ground plane and this zone can then be used for more public spaces, as well as provide the ability to visually and physically connect interior and exterior space. The formation of large open gathering areas within the climate controlled interior is made possible, as well as the ability to utilize the circulation system during all weather and for active and passive uses.

The new unit types can be 'plugged' in to the framework by use of a stacking crane that moves along the structure. The orientation of these units allows for flexibility in distribution of light as the units all will have access to the exterior. The interior streets will distribute natural light to the interior façade of each unit through a skylight system. The units create the interior circulation on the upper levels by interconnection of each unit's interior balcony.

The framework system will enable the efficient planning of the new facility and provide flexibility for the re-use of existing infrastructure, the inclusion of new unit types to improve livability, and the ability to create and capture new space.

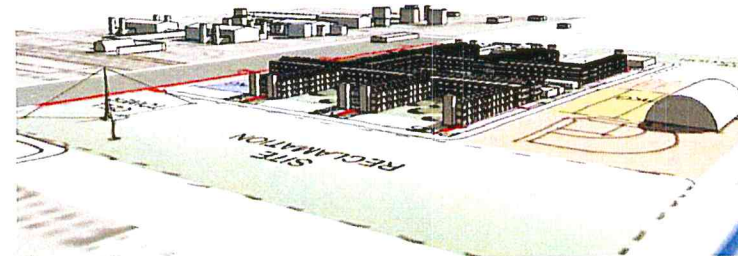
The grid plan has been used since antiquity as a basis for city planning. It is not culturally specific and can be evidenced all over the world in any time period. It is highly relevant for work camp planning as it appears in Roman military camp, scientific camp, and modern day work camp design. The ordering influence of a grid results from the regularity and stability of its pattern that encompasses the elements it organizes. The pattern establishes a regular field of references in space with which different forms and functions can share a common association. In this case, the frame facilitates the three dimensional physical manifestation of the grid plan.

Courtyards also date back to antiquity. Enclosing outdoor space with built form promotes the notion of a more private, secure, and tranquil space. It can also instill a sense of ownership. In the planning for this site, extending the grid out in fingers allows for enhanced distribution of natural light and ventilation. This aids in establishing smaller community groups sharing a common connection to the space. It also enables the differentiation of each space by what is placed within it and thus creates destination opportunities and provides dynamic experiences.



RECREATION HOUSING GREEN PLANT

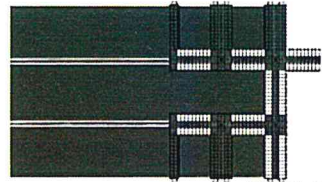
site plan



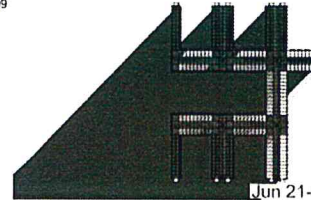
nw view



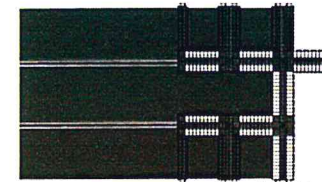
site plan



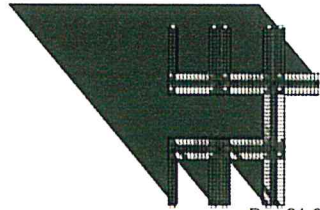
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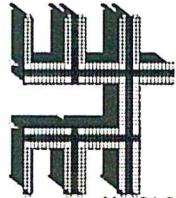
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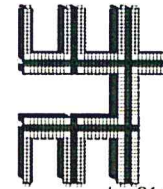
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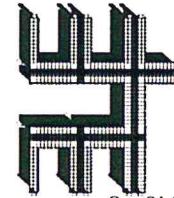
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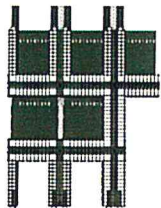
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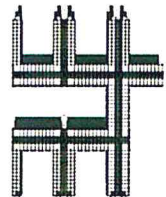
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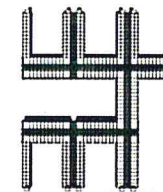
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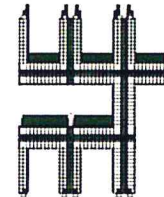
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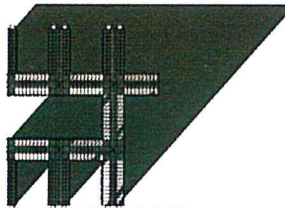
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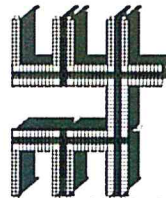
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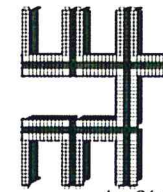
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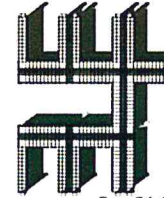
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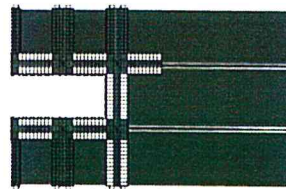
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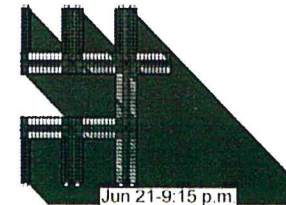
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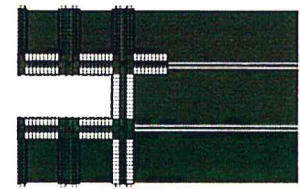
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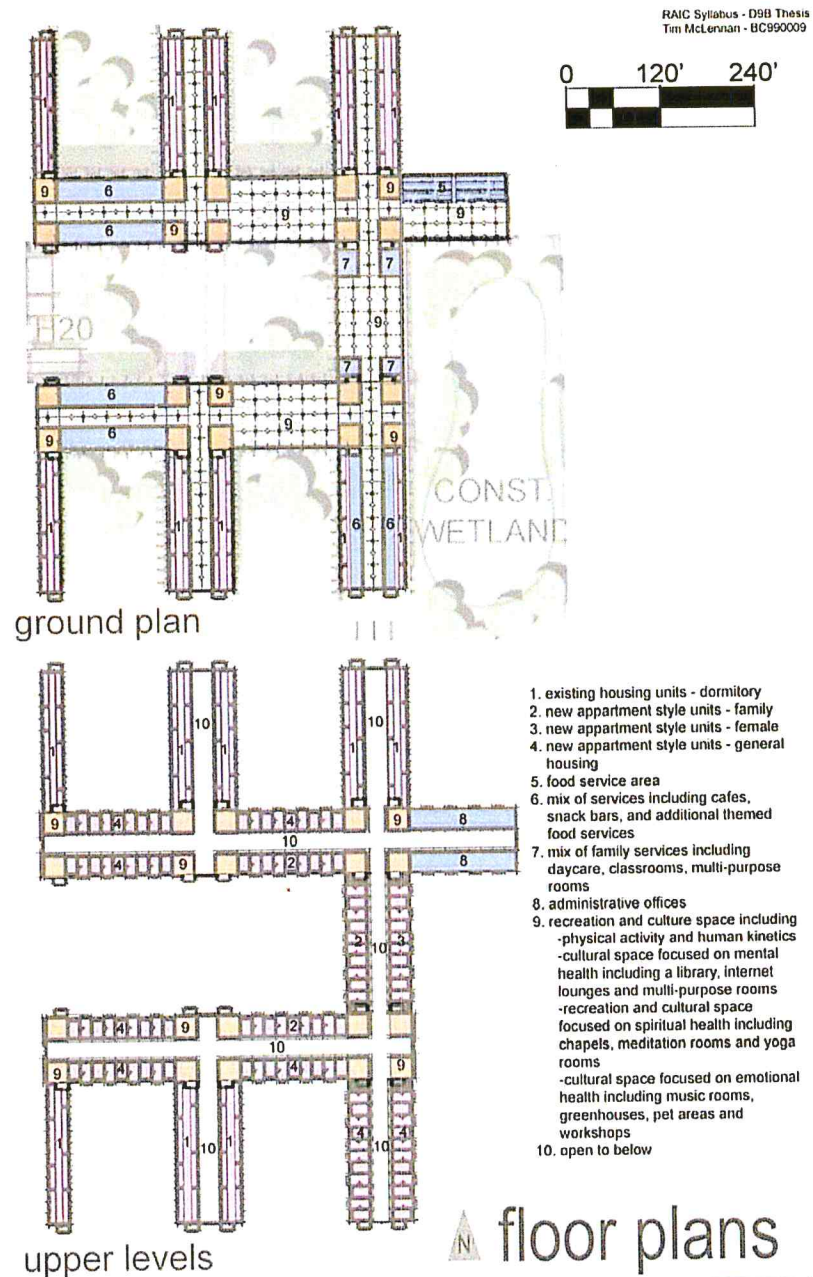
Jun 21-9:15 p.m.



Sep 21-6:20 p.m.

N shadow study

Space must also have the ability to respond to a variety of factors and conditions. The capacity for a space to respond to issues such as the passage of time, seasonality, and climatic changes allows it to exist as though living. Different times of the day accentuate or draw attention to certain details, while shifts in temperature, precipitation, or wind can have effect on materiality and direct the use of certain spaces. Different light conditions and ways of illustrating them can indicate the passage of time without ever directly acknowledging it on a conscious level. In development of the floor plan for this project, specific attention was given to the orientation of spaces for access to natural light, reducing wind exposure, taking advantage of natural ventilation in warmer months, and creating physical, visual, and auditory connections to the natural environment. Locating families and larger concentrations of the female population in the centre of the camp promotes a sense of shelter and safety. The inner courtyard becomes the protected heart and provides space for outdoor play and safe outdoor pursuits. The provision of additional physical, spiritual, and cultural activity space enhances the quality of life within the camp. Locating these spaces at key intersections within the plan encourages internal circulation and interaction along the internal public streets.



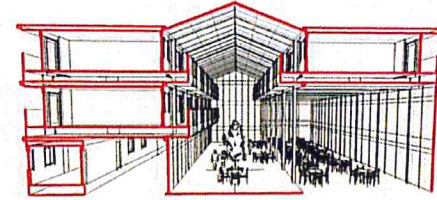


Interior Courtyard

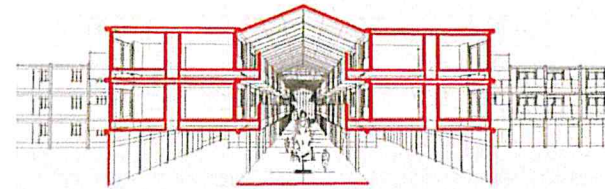


Dining Hall at Constructed Wetland

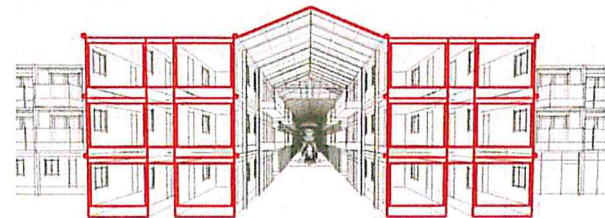
perspectives



section thru dinning hall

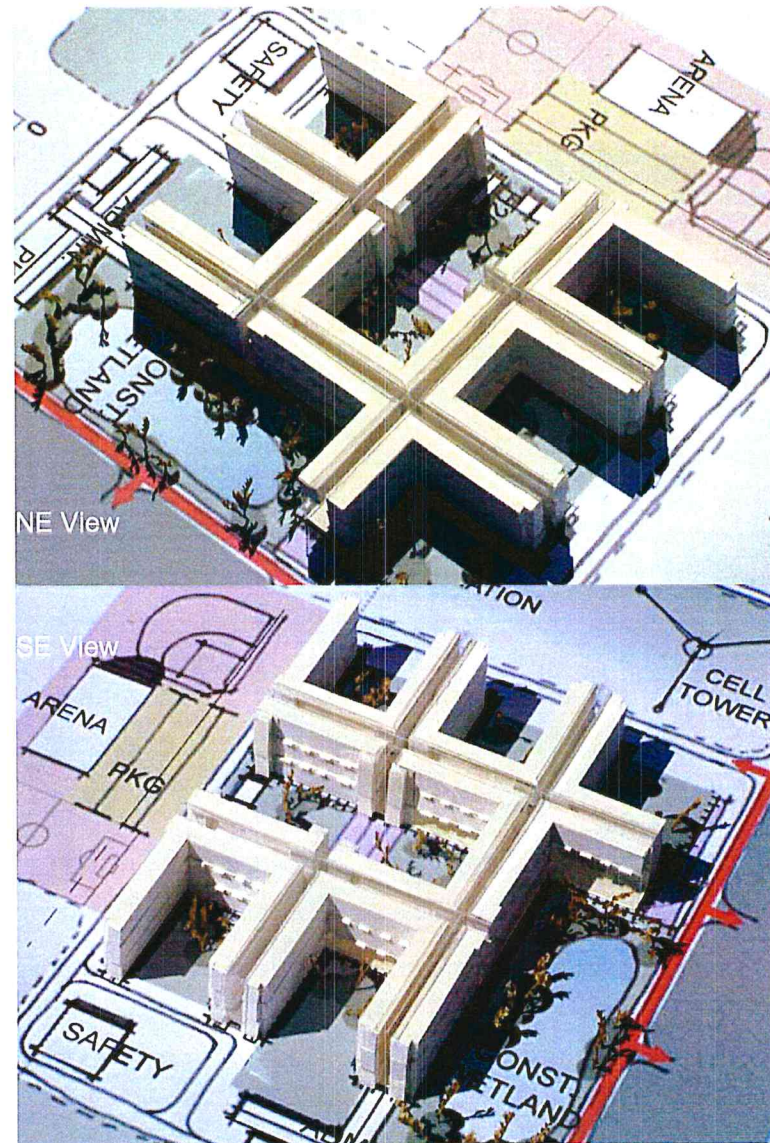
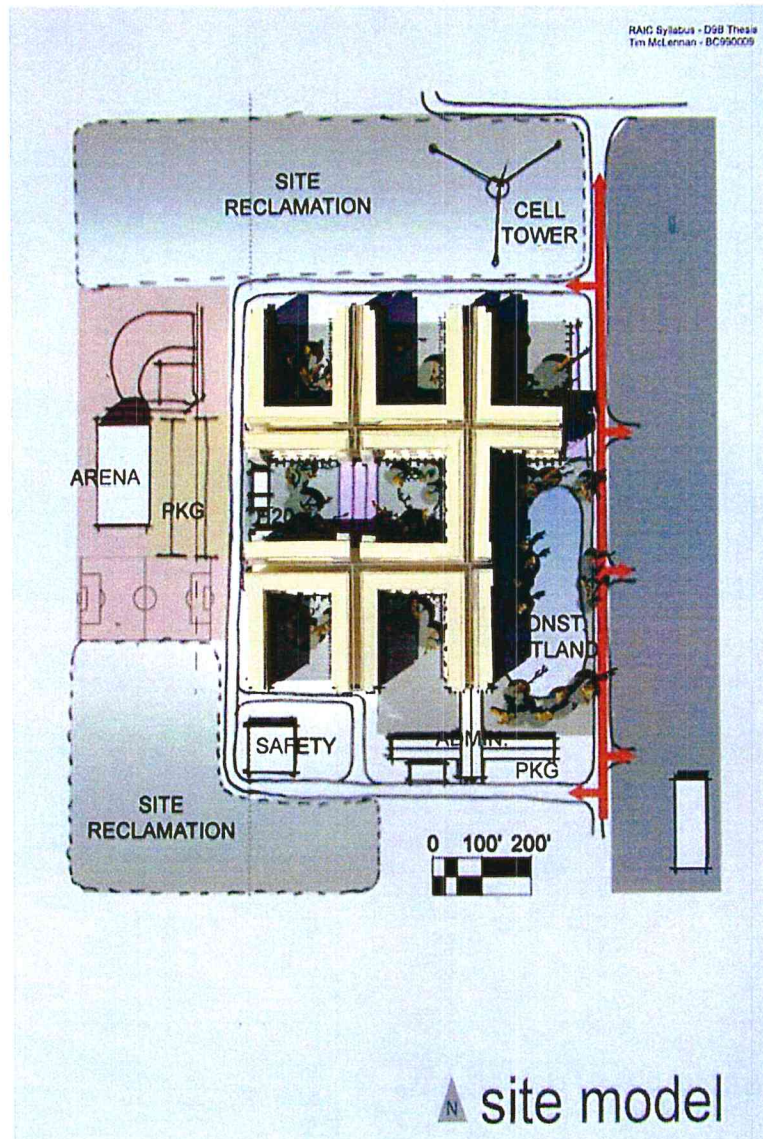


section thru apartments

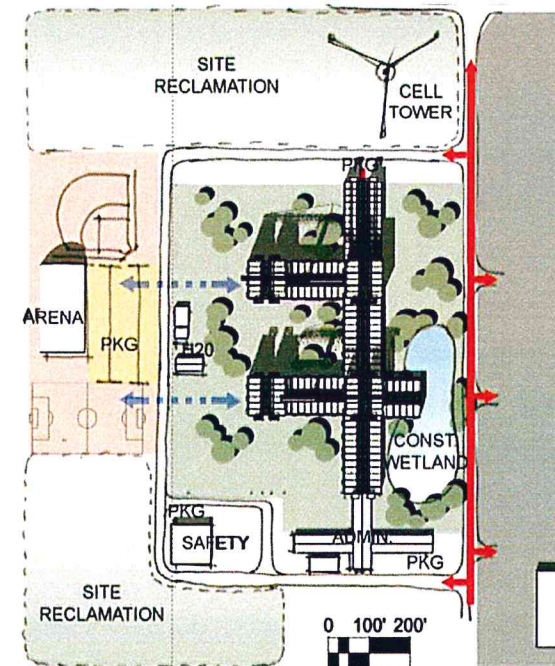
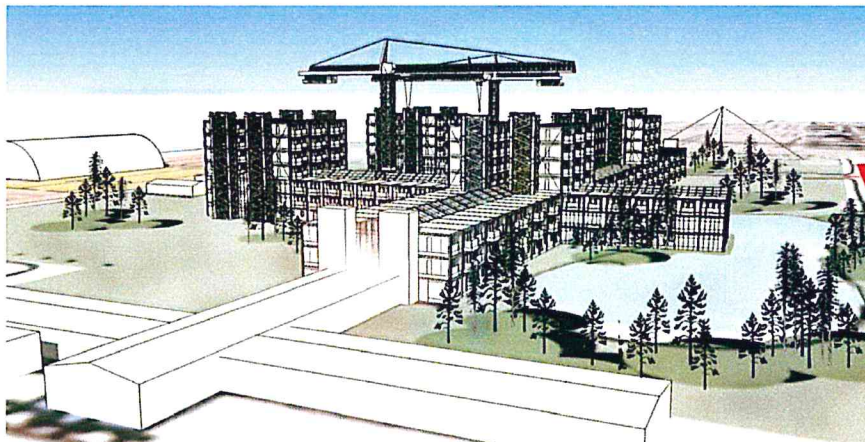


section thru dormitories

sections



The passage of time factors heavily in the development of the work camp. Work camps are temporary in nature, although some would argue that a camp that exists for a period of more than 25 years may rival the status of a permanent settlement. This thesis argues that the activity of resource extraction is not sustainable and therefore has a finite timeline. The structures built to facilitate this activity also have a finite timeline. The strategy employed in this design encourages the ability for the framework to be disassembled at some point in time and removed from the site to enable the land to be reclaimed. The size of the camp may ebb and flow over time, but the end result will be to remove it from the landscape, maybe with the potential to ultimately employ the infrastructure for some higher use.



RECREATION HOUSING GREEN PLANT

site plan

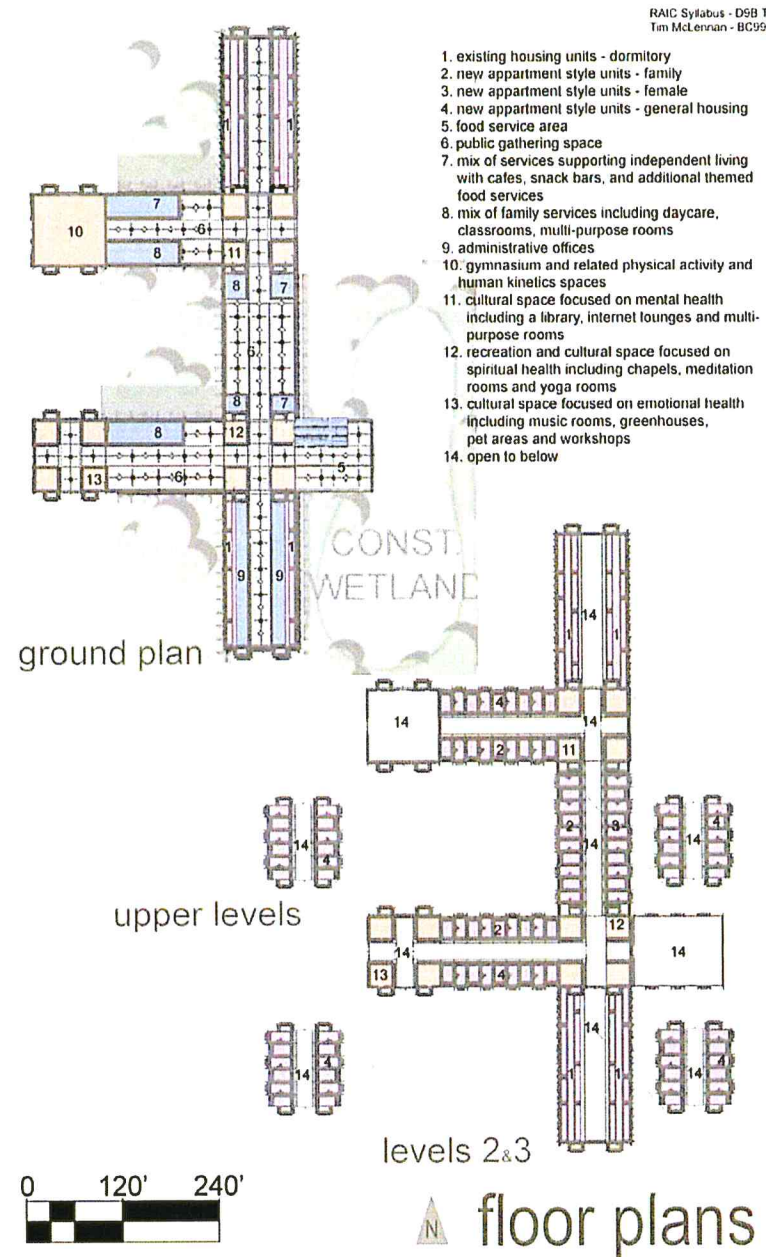


nw view

N site

As much as the concept of 'plug and play' modular units suggests flexibility to constantly modify the configuration of the camp, the reality is that some form of permanence is necessary both for practicality and for the development of a sense of community and place. This design considers the impracticality of creating a sealed building envelope with the potential for components of the envelope to be removed at any time. Therefore, consideration has been given to a base three storey structure built in semi-permanent wings that creates the main camp and provides the program infrastructure. Each of the four intersections in the plan can accommodate high-rise tower configurations where the space between the rows of units would be open. Circulation would still be accommodated by the balconies on the inner outdoor facade of the unit. A temporary walkway would be required to bridge the gaps where units may not be present in the matrix.

This iteration also considers hierarchy of space. The dinning hall is the largest social space within the existing camp, and will retain its significant importance as a social hub for the camp. To that end, the dining hall is located more central to the plan, and placed into the constructed wetland to further enhance its connection with the natural landscape.



It is noted that enclosing large amounts of circulation space and heating it in this climate will require energy. The existing plant currently 'flares off' a substantial excess of energy. As such, putting this excess energy to use to improve the quality of life for the occupants of the camp is considered an improved use.

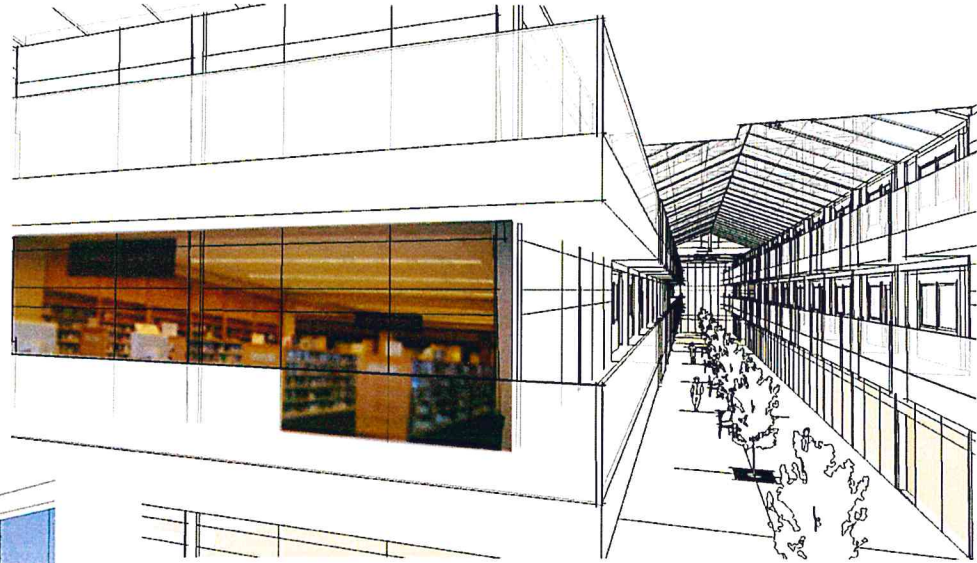
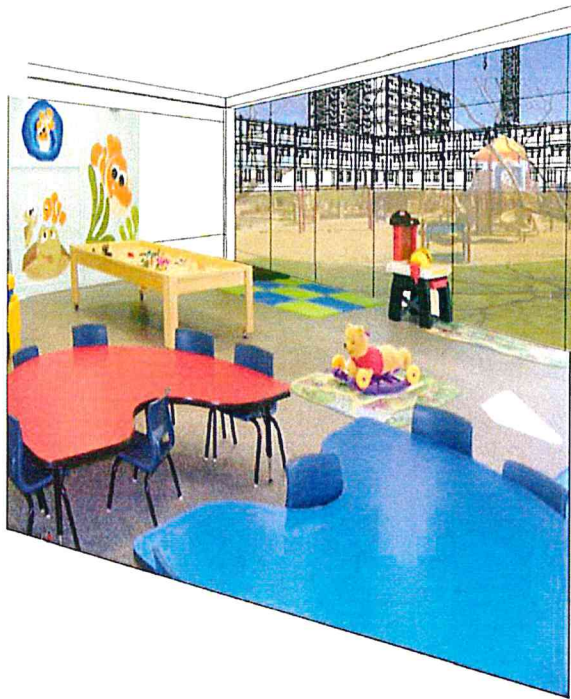


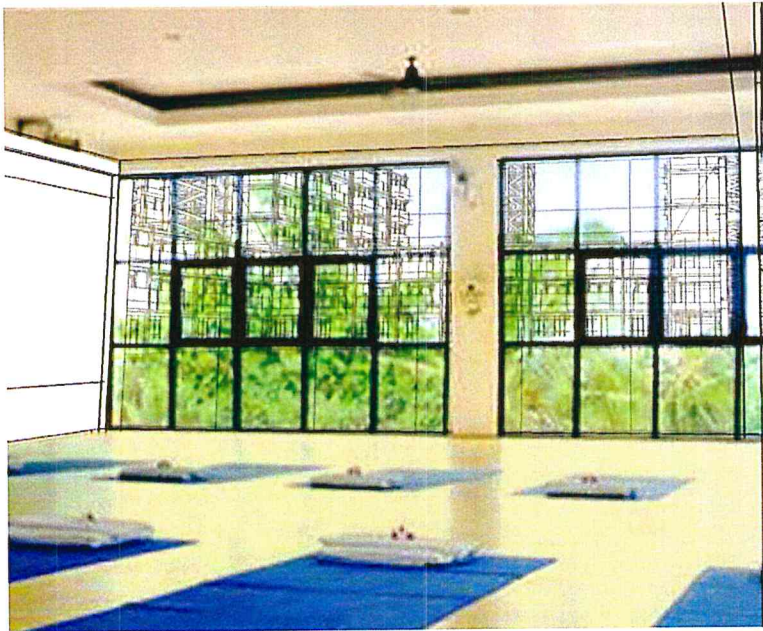
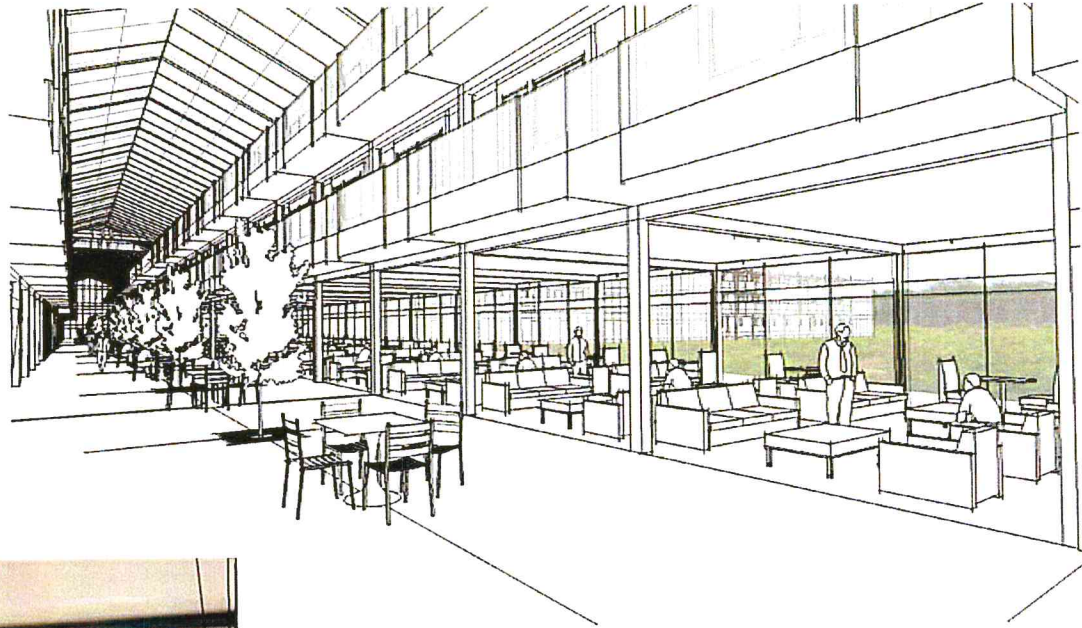


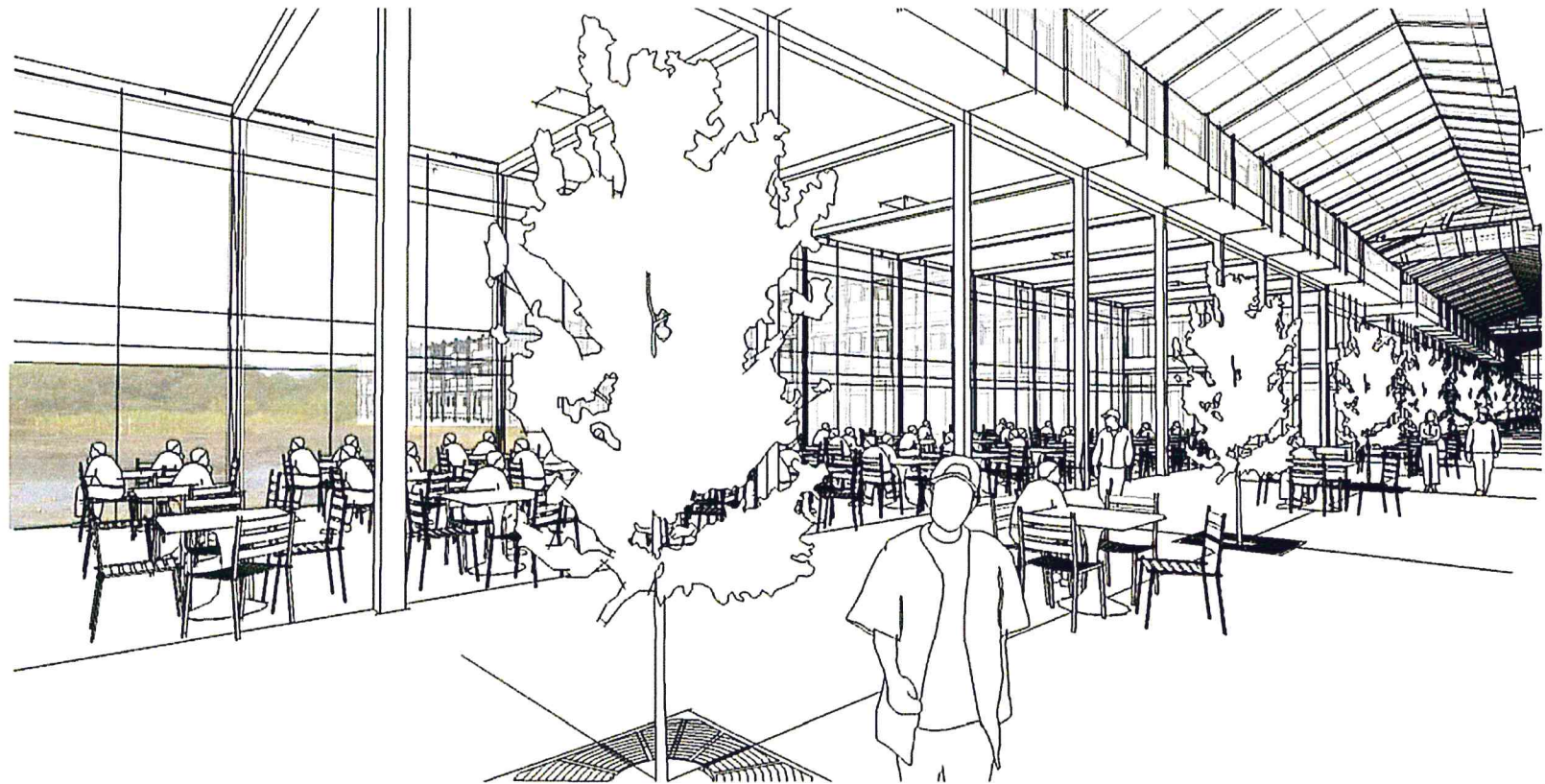
The way that users move through a space, how they are directed to move, creates and sustains different experiences and levels of interaction. Space for the purpose of living

should be a journey taken in order to fulfill what living means to them, providing the ability to pursue the physical, psychological, and social realms on their own terms.



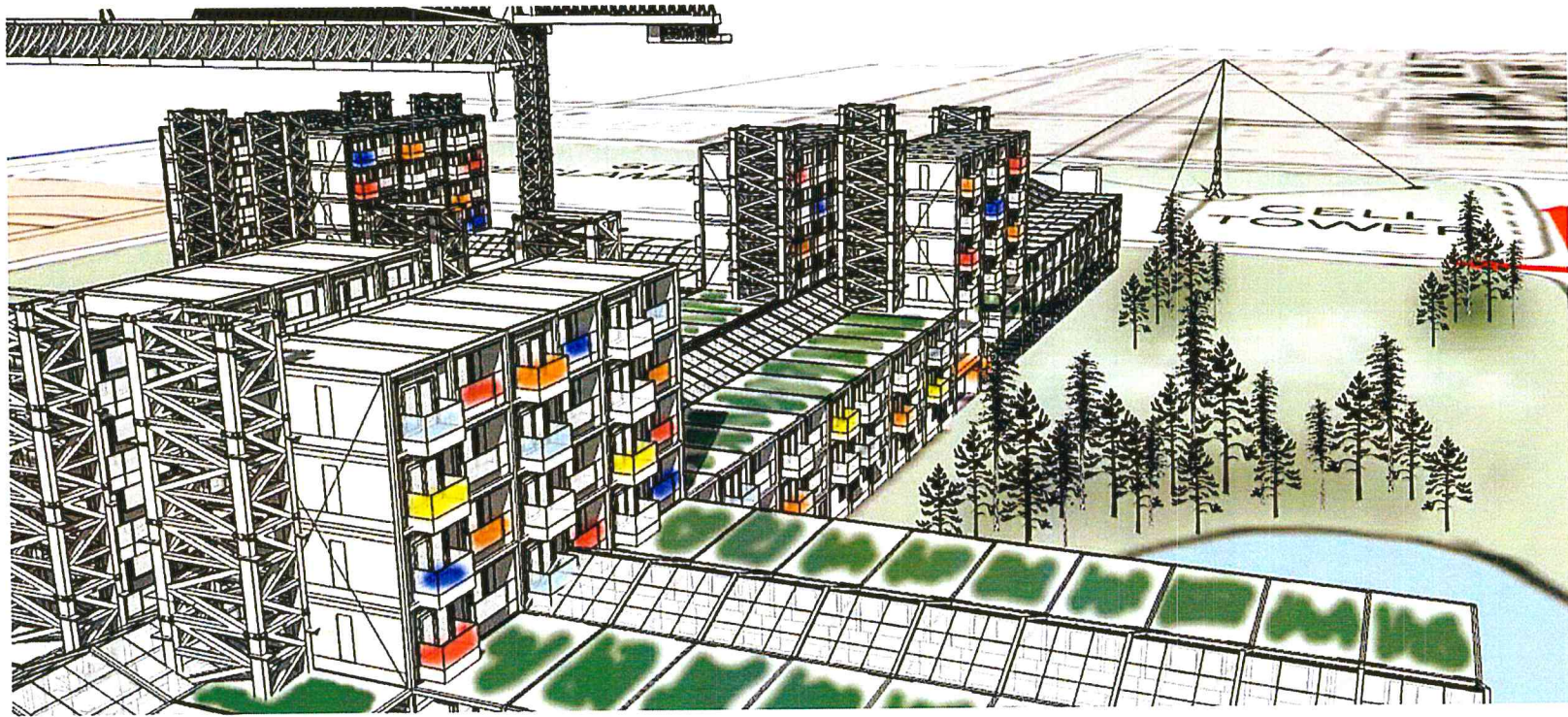






Users have the capacity to force space to respond in different ways. The notion of imprinting or leaving their mark allows the

users of a space to signify their activities, informing future users and giving space character and life of its own.





Ongoing debate exists between temporary and permanent and what values apply to each. This thesis argues that the values applied to human existence and the quality of life are not diminished by the amount of time a person is expected to occupy an environment. Time should not be an excuse for the postponement of satisfaction, nor for the postponement of the healing process. The healing attributes of nature entice people to connect with it, through breathing fresh air, swimming in a lake, or lying in a field of grass. Spatial strategies can be applied that allow these relationships and connections to occur within a structure, but still integrated with the surrounding environment. The concept of borrowing landscape, taking that which surrounds in the distance and bringing it into the foreground, allows users of a space to connect with aspects and elements that they may otherwise not have engaged. The fact that the work camp has not greatly evolved over time is a factor of our disconnected condition, and not one of necessity. It is possible to address the requirements for efficient and cost effective assembly and disassembly and still provide flexibility in program and a connection between space and place. Space and place must fit within the greater context of a landscape, similar to the idea of living being within the greater context of life.

images

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