

Visions of a Subtropical City: Simultaneous Urban Paradigms for New Orleans

New Orleans is currently pursuing several entirely distinct and often mutually contradictory urban concepts. It is following multiple forks in its morphological path – each leading to a different paradigm of dwelling in a hot, humid climate, in the midst of ambiguous coastal waters, and in the presence of vast infrastructural investments and perceived geographic inevitabilities.

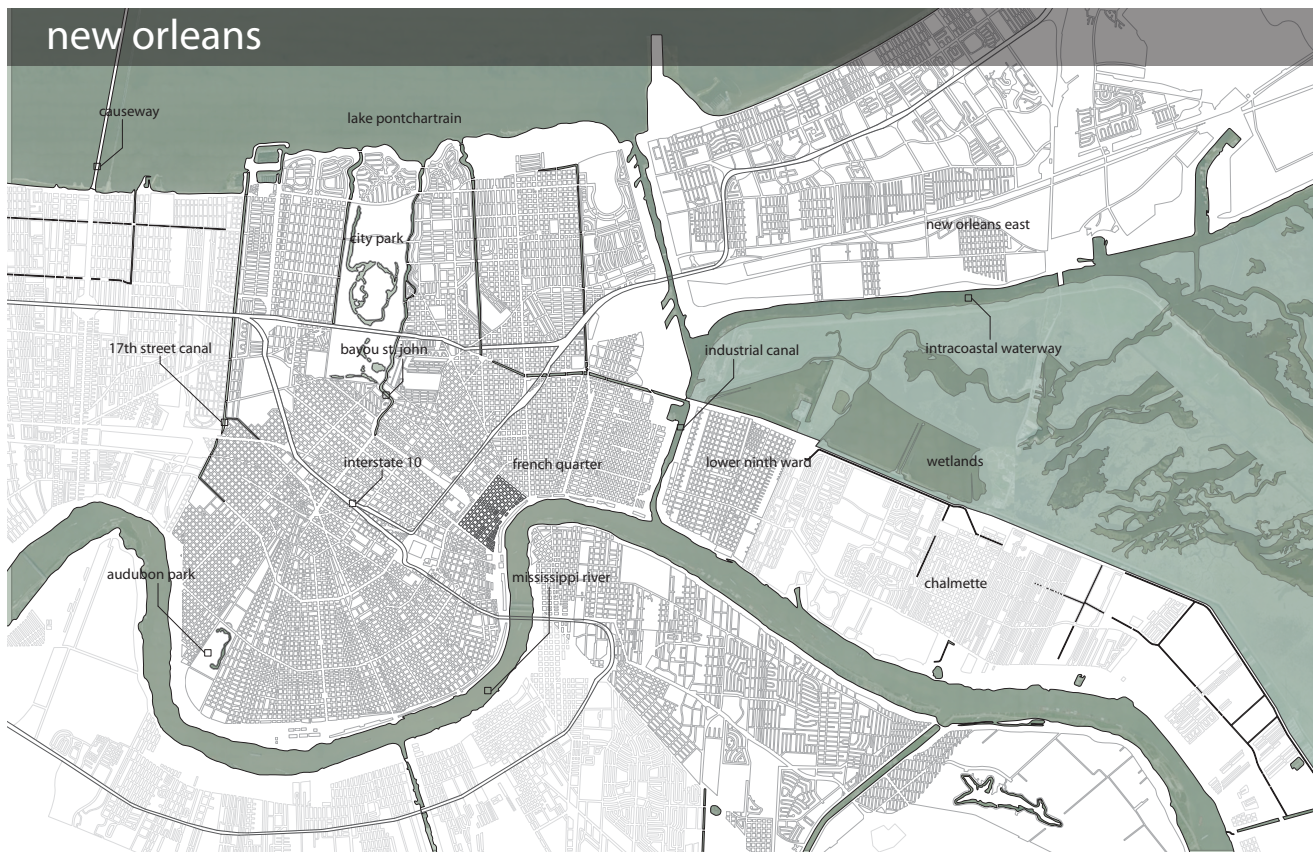
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New Orleans is a notoriously wet, subtropical city. High humidity levels, frequent rain and powerful storms saturate the city and its inhabitants. It is also a coastal city located very near the Gulf of Mexico, between and below the Mississippi River and the large, brackish Lake Pontchartrain. Surrounded by water and wetlands, the city is effectively an island reached only by boat or causeway. In addition nearly half of New Orleans is sinking through subsidence while surrounding sea-levels continue to rise due to global climate change.¹ As the city has grown it has constantly confronted its dynamic relationship to water and now stands at an ambiguous moment with not one, but multiple visions of its future and its relationship to water.

Some of the visions and plans for a new New Orleans are based on desirable but perhaps short-term notions of a socially just “one-to-one” replacement of the city before the flooding accompanying Hurricane Katrina. These visions often emerge from an anachronistic optimism about the possibility of successful civil engineering projects featuring ever-higher levees and ever larger and more numerous pumps. Other visions imagine a full retreat to higher-ground with substantial increases in density on those high-ground locations and a correspondingly reduced and softer infrastructure.

In this research project, several divergent urban ideas for New Orleans have been analyzed, categorized and presented with original graphics created to show the different plans and proposals in an easily comparable format. The morphology and development history of the city is first presented with the same graphic format to facilitate a reading of the new urban visions compared the city’s established trajectory and current rebuilding activities.



HISTORIC MORPHOLOGY AND TOPOGRAPHY

New Orleans is located at a point where the easily navigable waters of Lake Pontchartrain are closest to the powerful Mississippi River. In the early days of New Orleans settlement (and even today), moving through the mouth of the Mississippi was very difficult and the much easier path of movement from the Gulf of Mexico into the wide, calm Lake Pontchartrain, and then up a natural waterway named Bayou St. John and across a narrow land area (aka the French Quarter) and into the Mississippi was preferred. Thus, as is the case with many cities, New Orleans was located relative to the requirements of economical commerce and transportation and grew to a large urban metropolis as a consequence of its position between the river and gulf.¹

It is well known that nearly half of the land area in modern New Orleans is below sea level and most of the city is well below the average water levels of the surrounding river and lake. Because the Mississippi River is primarily a “distributary system” so close to the Gulf of Mexico, water may only naturally flow from the main river into the surrounding landscape and may never flow from the land up to the river. As the river flows and floods, it deposits sediment on its banks – raising the land to the sides of the waterway and creating the very banks that ostensibly contain it. This makes the topography of New Orleans unusual – with high-ground located near the river, falling closer and closer to sea-level as one moves away from the river’s edge. The river has an annual average high-water mark of 14 feet above sea-level and is, for a portion of each year, well above the height of most of the city.³ This same distributary effect causes the river to bend and twist and to change course from time to time as the mouth and banks of the river continually build up sediment and

Figure 1: Map of New Orleans with key features highlighted. All maps and diagrams in this article were created by the author with the kind assistance of Tulane School of Architecture student Nicole Mehaffey and former student Anne Peyton.

the force of 1.6 million gallons per second of river water struggles to push its way to the Gulf. The deep curves of the river as it passes New Orleans are a consequence of the struggle to reach the Gulf and have given rise to the “crescent” shape of the older parts of New Orleans. For the first 200 years of its history (prior to the introduction of the pumping system) New Orleanians built only on the crescent-shaped sliver of high-ground near the river, staying entirely above sea-level and avoiding the wetlands areas toward the lake. The Mississippi was considered the “front” of the city, while the wetlands (swamps) were known as the “back-of-town” and were thought to be suspect regions full of primordial dangers. Not surprisingly, these parts of the city were, in the 19th century, the domain of the poor (often African Americans) who could not afford to dwell on higher ground.²

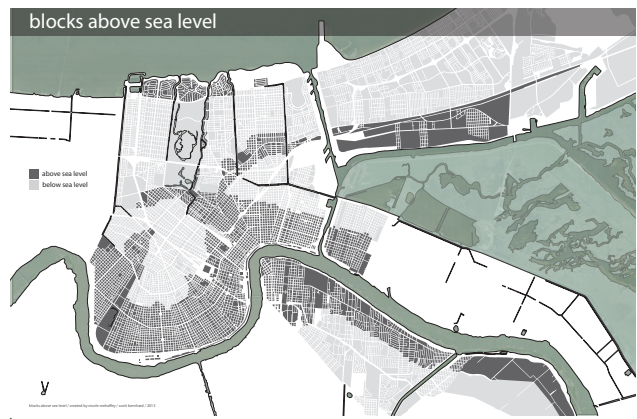
PUMPS AND THE CREATION OF LOW LAND

The pumping system of New Orleans was established in the late 19th and early 20th centuries and by 1949, nearly all the wetlands of New Orleans had been drained. This draining of the wetlands added new, buildable land area to the city and reduced the perceived dangers of the wetlands. The original wetlands were located just above sea-level and drained readily to the lake. Once water had been removed from the wetlands the dry soil sank – leading to a subsidence of this land area to elevations well below sea-level. Now, each rainfall has the potential to re-fill the low areas of the city and must be pumped out to protect the inhabitants of this low-lying territory, currently home to more than 60% of New Orleanians.⁴

All this mechanized water management carries a heavy cost to the citizens of New Orleans as well. Water is estimated to cost approximately 2¢ per gallon to pump from the urban areas of the city into Lake Pontchartrain – a process that runs continuously all year. Since rainfall totals in this subtropical region average 65 inches—with torrential downpours achieving the United States maximum of 4.8 inches per hour in severe weather events, pumping is an unending need and even the most robust systems installed in the city struggle to keep up with the task. Thus, many low-lying portions of New Orleans experience frequent street flooding and “nuisance flooding” in the rainy seasons – quite apart from the drastic flooding seen in 1965 and 2005. The low-lying portions of New Orleans are an essentially artificial creation maintained by mechanical pumping and protective levees.²

THE 2005 FLOODWATERS SPARED THE 19TH CENTURY CITY

When Hurricane Katrina hit New Orleans in 2005, more than 80% of the land area in New Orleans was covered with water by the consequent failure of the levees surrounding the city. Because the oldest parts of the city are built on the highest ground, the historic 19th century neighborhoods of New Orleans were spared the damaging flood and emerged more or less intact from Hurricane Katrina. The extent of urban development in 1879 corresponds to the high-ground of the city running along the river and along the few “ridges” of higher ground in the low-lying wetlands (figure 2c). When the extent of flooding following Hurricane Katrina is overlaid on the 1879 city map (figure 2d) it is easy to discern that the smaller and more dense 19th century city survived while the more suburban 20th century components of New Orleans, built on drained land, were flooded. It was difficult not to notice, in the frenetic period after the flood, that the builders of the 19th century city had relied on the logic



of the high-ground and the inevitabilities of gravity and had come out ahead of the more technologically advanced and naively optimistic builders of the 20th century expansion.

A SHIFT TO HIGH GROUND?

Because the 20th century infrastructure constructed by the Army Corps of Engineers had so completely failed to protect New Orleans in 2005, some citizens and experts alike began to consider the idea that only the relatively high-ground near the river presented a safe and sensible place to re-build the city. They reasoned that following the 19th century logic of building in the least precarious zones would allow protection from most storms without the extreme expense of artificial pumps and levees. Further, they reasoned that money intended to be spent on the reconstruction of the low-elevation areas and the anticipated high costs of newer and more robust infrastructure could be diverted to the task of making a more dense, high-ground city at peace with its natural environment. Surely, this faction reasoned, the people of New Orleans would prefer a safer and more logical city on high-ground to a low and artificially maintained city with unpredictable flooding and ruinously expensive insurance costs?

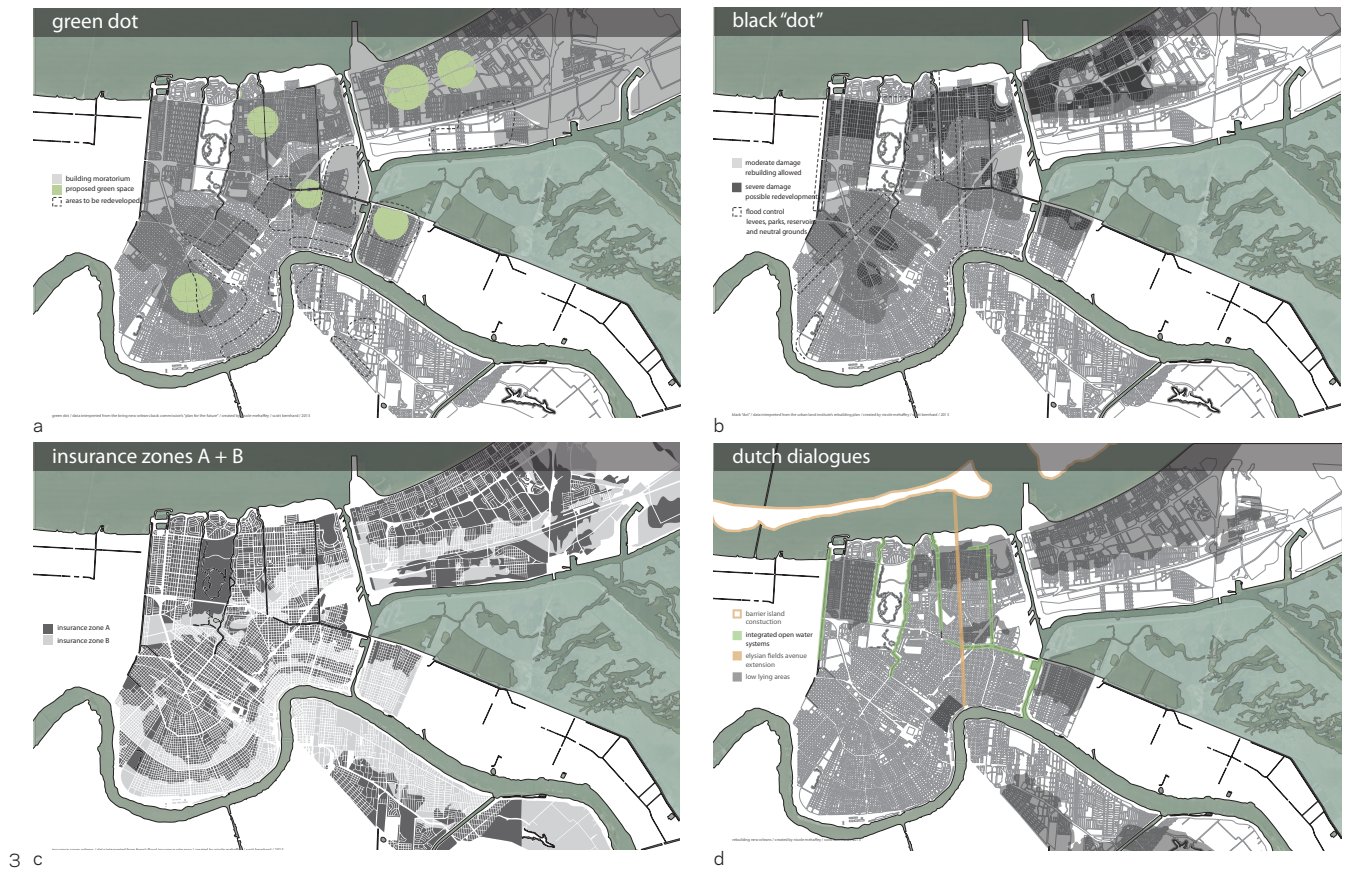
Professor Richard Campanella of the Tulane/Xavier Center for Bioenvironmental Research released a white paper in early 2006 demonstrating that merely filling in the vacant lots of the deteriorated 19th century urban fabric would yield enough new dwelling units to accommodate the cities population at that time – to say nothing of replacing blighted housing with new dwellings on the high ground. It was and is clear that, logistically speaking,

Figure 2a: A topographic drawing of New Orleans showing high ground near the river and lower elevations toward the lake.

Figure 2b: A drawing depicting all the urban blocks above sea-level.

Figure 2c: Map of New Orleans as it appeared in 1879 based on period drawings.

Figure 2d: 1879 development overlaid with the extent of flooding in 2005.



it would be (and still is) entirely possible for all New Orleanians to live above sea-level in densities approximating those of the 19th century city. Since these 19th century densities are still common in many parts of New Orleans, visualizing the life implied by this plan was and is easy to do since it merely extends an existing condition.⁴

The Urban Land Institute (ULI) and the Bring New Orleans Back Commission (BNOB) each made proposals to return large swaths of the low-lying city, damaged by the flood, to wetlands, parks, and other non-residential uses. These plans were presented in the local Times-Picayune newspaper with some now rather infamous graphics (figure 3a). In the BNOB plan, areas to be returned to wetlands and parks were depicted with large, green dots. Though the green dots were not intended to make specific outlines of “expendable neighborhoods” that is exactly how they were interpreted. Some green dots fell on upper-middle class and wealthy neighborhoods though most fell on middle-class and poor neighborhoods. A vast majority of citizens owning property below a green dot expressed deep resentment at the proposal. A similar reaction followed the slightly more specific ULI proposal published some months later (figure 3b).

With no clear information about what might become of New Orleanians who owned property in these low-lying neighborhoods, or what provisions might be made for the cohesive communities that would be abandoned by such drastic urban shifts, it may not be surprising that the ULI and BNOB proposals were met with skepticism at best and vehement opposition more commonly. Added to this volatile political context was the fact that many in the low-lying

Figure 3a: The 2006 BNOB proposal for the reconstruction of New Orleans.

Figure 3b: The 2006 ULI proposal for the reconstruction of New Orleans.

Figure 3c: The insurance industries flood zone map - zone A is low; B is higher.

Figure 3d: A composite plan summarizing proposals emerging from the Dutch Dialogues

neighborhoods were middle-class African American families who had fled the deteriorated 19th century neighborhoods decades before for a much more commodious semi-suburban world in the 20th century expansion on the “new ground” of New Orleans. Many of these families were profoundly mistrustful (with good reason) of government-backed changes in the structure of the city – since they and their forbearers had been the “losers” nearly every time the city changed. Thus, homeowners and small business proprietors from the low-lying communities were inclined to see the proposed move to high-ground as a question of civil rights, or even outright racial discrimination, rather than understand the potential merits of the strategy.

Though premised on a sound geographic logic, proposals for returning the low-lying parts of New Orleans to wetlands failed to adequately address the far-reaching civic consequences of such action. Public outcry made it politically impossible to further consider the idea in any direct fashion. The only course of action understood to be socially just was the “one-to-one” replacement of the urban configuration before the storm. This course is the one pursued officially at present. Though more fair in its treatment of each homeowner regardless of their location in the urban fabric, current rebuilding efforts leave the city in the same dependent relationship to pumps and levees as before the floods of 2005. Added to this difficulty, many low-lying neighborhoods are still depopulated—placing a strain on the resources of civil services and infrastructure.

The insurance industry, on the other hand, may ultimately accomplish what the ULI planners did not. As advocates for a smaller urban footprint had predicted, insurance rates for the low-lying (and even some higher-ground) portions of the city have been rising drastically. Many homeowners have faced a quadrupling of their premiums since the storm. (figure 3c).

THE QUESTION OF DENSITY

Even if one rejects the idea of relocating populations from lower elevations to higher ones, the idea of increasing density and dwelling options on the higher ground of New Orleans is still potentially valid. Indeed, much of the private and NGO development of the city since 2005 has taken place above sea-level. New mid-rise and high-rise dwellings, such as the 250 unit “930 Poydras” building (by Eskew+Dumez+Ripple, see figure 4) have been built in the Central Business District (CBD) on high-ground. Several empty office buildings have been converted to apartments and condominiums since 2005 as well. A mostly young, professional community wishing to live and work downtown has found this mode of dwelling ideal.

While the objections of many residents in historic, high-ground neighborhoods have prevented some higher density construction (there is a particularly strident objection to “towers on the river” though-out most of the city), some low-rise high-density developments have been built in the areas just above sea-level. The Muses project of Central City is one such development with 263 units of moderate-to-low-income housing in a mid-rise format located a few feet above sea-level.

As noted above, merely filling vacant lots in some portions of the 19th century city has increased the density of high-ground living. Several NGO’s have built many new, single-family houses on vacant sites above sea-level. The Tulane

School of Architecture's URBANbuild program and Tulane City Center have built eight such houses – incorporating innovative and award winning design and numerous sustainable features. Likewise, Global Green has constructed a similar number of homes featuring progressive environmental management, on-site water sequestration and a multitude of “green” features. Though projects like these single family houses do not produce drastic increases in dwelling density, they do make incremental progress toward the idea of a greener and safer mode of existence.

TRUSTING THE NEW LEVEES – REBUILDING ON THE LOW-LANDS

The largest new investment in rebuilding New Orleans' housing has been made by the federal Department of Housing and Urban Development (HUD) in partnership with the Housing Authority of New Orleans (HANO). Of the six large-scale public housing developments remaining in New Orleans in 2005, five have been raised completely and replaced with new dwellings by direct federal investment. The sixth public housing development is currently in the planning phases for yet another demolition and replacement. Of the six, three are located below sea-level. In all cases, these former public housing developments have been replaced by lower density, partially market-rate housing – leaving many former occupants of public housing with far fewer options for subsidized living in New Orleans. The new construction, though perhaps more cosmetically appealing to some, is light, wood framing on raised slab foundations replacing the sturdier concrete frame and masonry low-rise, high-density housing built in the 1940's and 1950's.

In addition to the federal investment in housing on the low-ground, a new two billion dollar medical complex is now under construction just below sea-level. The Louisiana State University Medical Center and the Veterans Administration Hospital complex will occupy more than 24 blocks on the low side of Interstate Highway 10. State and local sources as well as the federal government have funded the project in an effort to create a regional medical center and spur economic growth in the region. The nearby Charity Hospital complex, constructed by the state of Louisiana in the 1930's and 40's on land above sea-level, will remain closed with an uncertain fate.

Many well-intended NGO's have also made substantial investments in rebuilding New Orleans. Make-It-Right and Project Home Again have built and continue to build hundreds of new single family homes since the flood (figure 4). Both organizations subsidize the expense of the homes with private donations and both are deeply committed to returning people to the neighborhoods they lost during Hurricane Katrina. Both of these organizations, however, are committed to rebuilding in-place – regardless of the elevation. Both are constructing new homes on low-ground. In the case of Make-It-Right, founder and principal funder Brad Pitt has been quite explicit about his ambition to restore people displaced by the storm.⁷

Make-it-Right is sited in a low-lying portion of the Lower 9th Ward devastated by levee breaches in 2005. Despite its location in a food desert with little access to fundamental services, Pitt believes that the manifest tragedy of the flood should be addressed directly and in place. Thus, the point of greatest failure in 2005 is now the point of the most celebrated reconstruction efforts in New Orleans. The buildings, designed by a host of international architects, are all built with careful attention to green technologies and self-sufficiency.



4

Standing 12 feet above the ground on piers, the new homes have created a community of isolated entities – each with a solar array for power, rainwater collection systems and rigid construction to resist high winds and storm damage.

Habitat for Humanity built 77 new single family houses in a low-lying area now known as Musicians Village. These homes also exist in a food desert and though a cohesive community has grown up among the new occupants, the surrounding neighborhood still struggles to function.

THE ARMY CORPS OF ENGINEERS VS. THE MORPHOSIS PLAN FOR NEW ORLEANS

Perhaps the most telling comparison of “visions” places the rather prosaic fortifications of the Army Corps of Engineers adjacent to the proposal for a much more compact and flexible idea of New Orleans on the high-ground proposed by Thom Mayne of Morphosis and his UCLA students. One entity is building a fortress of hard infrastructure while the other suggests a gentle give-and-take with the natural environment.

The Army Corps of Engineers has embarked on an ambitious plan to fortify New Orleans (figure 5a). The levee system has been returned to its originally designed strength and several new components of flood protection have been added. New gates have been constructed at each outfall canal and, when closed, will prevent tidal surges from the lake entering the city through the canals. New pumps have also been installed and they promise to remove water from the outfall canals even when the gates are closed so water can be pumped continuously during a severe weather event. The outfall canals are now invisible to inhabitants of the city since they are surrounded by high walls.

Figure 4: Selected redevelopment projects underway or completed in New Orleans as of September 2013.

pumps + levees



a

morphosis 2050 plan



5 b

The Morphosis proposal (figure 5b) is dramatic—essentially suggesting that New Orleans would allow 44% of its current footprint to return to wetlands and to Lake Pontchartrain in incremental stages over the next few decades. By 2050, the city would have become far more densely inhabited on a much smaller urban footprint. The current 4,147 inhabitants per square mile would become 6,923 inhabitants per square mile as the land area of the city shrank. A small percentage of the population would still inhabit the low-lying territory in specially designed homes (only 7% would live this way), perhaps to allow for some quasi-agricultural communities or to support a group living more directly in contact with the water or wetlands. In the 2050 scenario, Mississippi River flooding would still be resisted by tall levees (already in place) but the Lake Pontchartrain side of the city would be allowed to ebb and flow with changes in season and climate. This new “soft barrier” would absorb some storm impacts but periodic floods would not reach most of the urban areas. Even in the event of serious storm events with widespread flooding, the Morphosis/UCLA team imagine that houses in New Orleans would be built of materials and methods that anticipate and survive floods – such as the prototype floating foundation house they designed and built in the Lower 9th Ward. The concept is to live with the inevitabilities of the landscape rather than to spend scarce resources resisting forces beyond human control.⁵

Establishing a cost comparison between hard and soft infrastructure is difficult. Soft systems are more ambiguous and though they offer long-term savings potential, the progress of natural systems may be more complex to calculate. Still, the Morphosis team estimates the cost of the Army Corps of Engineers undertaking at \$39 billion and the cost to reach their 2050 plan at \$23 billion (including the population relocation costs implied by the effort).⁶

LIVING WITH WATER: THE DUTCH DIALOGUES

Having outlined these several divergent strategies for rebuilding New Orleans it may be tempting to look for a synthesis of the best ideas rather than dwell on the deficits of contemporary inertia and planning fatigue. If on the one hand we have a massive infrastructural investment in pumps and levees, representing the popular answer to the vicissitudes of nature; and on the other hand we are persuaded that any hard, mechanized infrastructure is doomed to eventual failure and softer solutions more compatible with the existing landscape and climate are called for, where can we turn?

In a running conversation with the New Orleans design and planning community, a delegation of engineers and planners from the Netherlands has helped forge a compelling vision of a middle ground. The Dutch Dialogues have, in a series of charettes and cross-cultural visits, established a rough method for addressing a middle road for New Orleans. Though not yet explicit in the specifics of land-use and elevation, the dialogs have pointed to the creation of a hard shell of urban protection with a soft infrastructure inside. New Orleans is envisioned to live with its water, storing it in open canals, water parks and large sequestering areas at the lower elevations. With so much more water stored and even circulated in the city, fewer pumps would be needed – even in peak storm events. A rebuilt wetlands ecology outside the city’s levees (including barrier islands in Lake Pontchartrain) would help to dampen the advent of storm surges and hurricane winds. Even the “hard shell” would be softened in places to allow more natural processes of water movement to take place.⁸ (figure 3d).

Opposite page:

Figure 5a: Army Corps of Engineers projects completed as of September 2013.

Figure 5b: A diagram summarizing the Morphosis/UCLA 2050 plan.

The challenges to this plan are twofold. First, the deep-seated cultural aversion to living with water in New Orleans must be overcome. Laws written to protect the population from Yellow Fever and other tropical diseases in the 19th century must be re-written (it is currently illegal to have a water cistern in metropolitan New Orleans). A skeptical population must be convinced that living with water can be positive and safe – that water can be an amenity rather than a feared and unpredictable entity. Much of the work of the Dutch Dialogues is devoted to helping a cautious public envision this future. The second impediment emerges when the general concepts of softer and more exposed infrastructure are applied to the real and politically charged ground of the city. Many citizens in the low-lying portions of the city have been made very sensitive to the idea of change and the first community to implement the ideas will need to be deeply engaged in the concepts with a vested interest in the success of the plan for the ideas to have a chance of spreading.

WITHOUT CONCLUSION

At present, a consensus has not formed around any of the ideas presented here. Because the Army Corps of Engineers and other federal agencies have the resources, they have done the majority of the rebuilding in New Orleans since 2005. Most of the redevelopment funded by these agencies appears to address only the recreation of the pre-flood urban scenario. Radical, ecologically sympathetic solutions like those proposed by ULI and Morphosis have not been met with popular enthusiasm but a conversation is beginning and with a new, conventional levee and pump system now in place, perhaps New Orleanians can begin to speculate on a future more in harmony with its wet surroundings.

ENDNOTES

1. Campanella, Richard. 2010. *Delta Urbanism; New Orleans*. American Planning Association.
2. Lewis, Peirce F. 2003. *New Orleans; The Making of an Urban Landscape*. Center for American Places.
3. Campanella, Richard. 2006. *Geographies of New Orleans: Urban Fabrics Before the Storm*. Center for Louisiana Studies, University of Louisiana at Lafayette.
4. Campanella, Richard. 2006. "Above Sea-Level New Orleans: The Residential Capacity of Orleans Parish's Higher Ground." (white paper) Center for Bioenvironmental Research at Tulane and Xavier Universities (available online at richcampanella.com).
5. Smith, Erin. 2009. "Redefining the Edge: Life without Levees." *Places 21. Volume 21, Issue 1*. Places, College of Environmental Design, UC Berkeley.
6. Mayne, Thom. 2011. *Combinatory Urbanism: the Complex Behavior of Collective Form*. Ed. Stephanie Rigolot. @Stray Dog Café.
7. Pitt, Brad. 2009. "Forward." *Architecture in Times of Need: Make It Right Rebuilding New Orleans' Lower Ninth Ward*. Ed. Kristin Feireiss. Prestel.
8. Morris, Dale & Waggonner, David. 2009 "A Tale of Two Urbanized Deltas." *Dutch Dialogues; New Orleans | Netherlands; Common Challenges in Urbanized Deltas*. Eds. Han Meyer, Dale Morris, David Waggonner. Sun Architecture.