

## Lampiran

1. Kelurahan Tanjung Mas adalah salah satu kelurahan yang termasuk dalam wilayah kecamatan Semarang Utara. Peran kawasan yang mempunyai aktifitas cukup tinggi ini, karena, mempunyai nilai akses yang tinggi, lokasinya yang strategis, dekat dengan pusat kegiatan, pusat kota, dan pusat transportasi. Adanya penurunan tanah (land subsidence) dan/atau kenaikan muka air pasang yang setiap tahun berkisar antara 0,15 m hingga 0,25 m; maka satu-satunya cara adaptasi yang bisa dilakukan oleh penduduk adalah dengan meninggikan/mengurug halaman dan lantai bangunan. Proses peninggian/pengurugan dilakukan sesuai dengan kemampuan ekonomi masing-masing.
2. **Semarangpos.com, SEMARANG** — Jumiyatun,58, hanya bisa termenung menyaksikan mesin ekskavator merobohkan satu demi satu bangunan warga yang ada di Kampung Tambakrejo RT 005/RW 016, Kelurahan Tanjungmas, Semarang Utara, Kota Semarang, Kamis (9/5/2013 siang. Tak terkecuali saat mesin buatan Jepang itu menghancurkan bangunan rumahnya. Nenek delapan orang cucu itu hanya bisa terdiam. Maklum, kenangan 15 tahun selama menempati rumah itu pun seakan muncul dan membuatnya tak bisa berlutik. *“Sudah lama saya tinggal di sini. Kurang lebih sekitar 15 tahun. Dari masih punya anak, sampai sekarang cucu saya sudah delapan. Sekarang digusur,”* ujar Jumiyatun saat berbincang dengan Semarangpos.com di lokasi.

Bagi Jumiyatun dan ratusan warga Tambakrejo, pengusuran yang dilakukan Pemerintah Kota (Pemkot) Semarang seakan menjadi kado pahit di awal bulan puasa. Bagaimana tidak? Saat masih menjalankan ibadah puasa atau sehabis santap sahur, warga tiba-tiba dikejutkan dengan derap langkah ratusan petugas Satpol PP yang ingin mengusur tempat tinggalnya karena terdampak proyek normalisasi Banjir Kanal Timur (BKT).

“Setelah digusur, warga kami minta untuk sementara menempati Rusunawa Kudu. Kami akan gratiskan selama dua tahun. Setelah Rusun di Kalibanger yang dekat laut selesai, mereka bisa pindah ke sana,” ujar Aniceto.

3. **Bisnis.com**, SEMARANG — Warga Tambakrejo Kelurahan Tanjungmas Kecamatan Semarang Utara sepakat direlokasi ke daerah Kalimati setelah tempat tinggalnya digusur. Kesepakatan tersebut diperoleh dalam pertemuan yang digelar Gubernur Jawa Tengah, Ganjar Pranowo di Gedung Moch Ichan Kompleks Balai Kota Semarang, Minggu (12/5/2019). Hadir dalam kesempatan itu Komisioner Komnas HAM Beka Ulung Hapsara, Wali Kota Semarang Hendrar Prihadi, Wakil Wali Kota Semarang Hevearita G Rahayu, Kepala BBWS Pemali Juwana Rubhan Ruzziyatno dan puluhan warga Tambakerjo. Dalam mediasi tersebut, Ganjar mengatakan bahwa peristiwa penggusuran sudah terjadi. Semua pihak diminta tidak membicarakan persoalan penggusuran, namun mencari solusi ke depan atas peristiwa itu.
- "Kami minta untuk tetap di lokasi itu, karena pekerjaan kami mayoritas nelayan. Kalau harus tinggal jauh dari lokasi, bagaimana nasib kami," kata Ketua RT 05 RW XVI Tambakrejo, Rohmadi.*
- Sebenarnya lanjut Rohmadi, sudah ada kesepakatan awal bahwa warga akan pindah sementara di daerah Kalimati yang letaknya tidak jauh dari lokasi semula. Namun, lokasi yang akan ditempati itu harus diuruk terlebih dahulu untuk kemudian dibuatkan permukiman sementara sambil menunggu janji Pemkot Semarang membuat Rusunawa di sekitar Tambakrejo.
- "Namun ini lokasi Kalimati belum diuruk dan belum ada bangunannya, kami sudah digusur seperti ini," timpalnya.*
- Hal senada disampaikan Riyanto, warga Tambakrejo lainnya. Riyanto menegaskan bahwa masyarakat tidak mau menempati Rusunawa Kudukarena terlalu jauh dari laut.
- "Yang kami inginkan adalah kami dibuatkan rumah sederhana di sekitar kampung. Sudah ada lokasi di Kalimati itu, namun sampai sekarang lokasinya belum siap," tambahnya.*
- Mendengar hal itu, Ganjar kemudian meminta tanggapan dari Kepala BBWS Pemali Juwana dan Pemkot Semarang untuk membicarakan persoalan tersebut. Setelah menggelar rapat kecil-kecilan, **akhirnya disepakati bahwa warga Tambakrejo akan ditempatkan di lokasi Kalimati tersebut.**

#### 4. Tata Cara Perencanaan Fasilitas Lingkungan Rumah Susun Sederhana

No.	Jenis yang diperlukan		Keluaran	
1.	Penghuni	<ol style="list-style-type: none"> <li>1. Jumlah kepala keluarga</li> <li>2. Jumlah penduduk</li> <li>3. Penghasilan</li> <li>4. Karakteristik sosial budaya</li> <li>5. Keinginan/inspirasi penghuni</li> <li>6. Potensi penghuni</li> </ol>	<ol style="list-style-type: none"> <li>1. Jumlah Fasilitas</li> <li>2. Besaran fasilitas</li> <li>3. Jenis fasilitas</li> <li>4. Bentuk fasilitas</li> </ol>	
	Kondisi fisik lingkungan	<ol style="list-style-type: none"> <li>1. Topografi</li> </ol>	<ol style="list-style-type: none"> <li>1. Kondisi fisik permukaan tanah</li> <li>1. bentuk bangunan dan kawasan</li> <li>2. karakteristik lingkungan</li> <li>3. aliran sungai</li> <li>4. kontur tanah</li> <li>5. transportasi</li> <li>6. sistem sanitasi</li> <li>7. pematasan</li> <li>8. pola tata ruang</li> </ol>	
		<ol style="list-style-type: none"> <li>2. Lokasi</li> </ol>	<ol style="list-style-type: none"> <li>1. Letak geografis lingkungan rumah susun terhadap kawasan lain dan fasilitas yang telah ada disekitar rumah susun sesuai dengan tata guna lahan</li> <li>1. jarak fasilitas</li> <li>2. jumlah fasilitas</li> <li>3. bentuk fasilitas</li> <li>4. hubungan dengan lingkungan sekitar.</li> </ol>	
		<ol style="list-style-type: none"> <li>3. Iklim</li> </ol>	<ol style="list-style-type: none"> <li>1. Arah jalan matahari</li> <li>2. Lama penyinaran matahari</li> <li>3. Temperatur rata-rata</li> <li>4. Kelembaban</li> <li>5. Curah hujan rata-rata</li> <li>6. Musim</li> <li>7. Kecepatan angin</li> </ol>	<ol style="list-style-type: none"> <li>1. Lokasi/letak fasilitas</li> <li>2. Jenis penghubung antar bangunan</li> <li>3. Bentuk bangunan</li> <li>4. Orientasi bangunan</li> <li>5. Tata letak bangunan</li> <li>6. Ventilasi</li> <li>7. Bukaan untuk penerangan alami siang hari.</li> </ol>
		<ol style="list-style-type: none"> <li>4. Bencana alam</li> </ol>	<ol style="list-style-type: none"> <li>1. Angin puyuh</li> <li>2. Gempa bumi</li> <li>3. Banjir</li> <li>4. Longsor</li> </ol>	<ol style="list-style-type: none"> <li>1. Tinggi muka tanah</li> <li>2. Konstruksi</li> <li>3. Tata letak bangunan</li> </ol>
		<ol style="list-style-type: none"> <li>5. Vegetasi</li> </ol>	<ol style="list-style-type: none"> <li>1. Jenis pohon atau tumbuhan</li> <li>2. Pengaruh terhadap lingkungan</li> <li>3. Masa Tumbuh</li> <li>4. Tajuk maksimal yang dapat dicapai</li> </ol>	<ol style="list-style-type: none"> <li>1. Tata hijau</li> <li>2. Vegetasi sebagai penutup ruang luar</li> </ol>

		6. Bangunan sekitar lingkungan rumah susun	1. Jenis dan macam bangunan 2. Distribusi dan kepadatan penduduk 3. Pencapaian ke fasilitas di luar lingkungan rumah susun 4. Kapasitas pelayanan tiap jenis fasilitas	1. bentuk fasilitas 2. jumlah dan daya tampung 3. jarak antar fasilitas 4. bentuk bangunan 5. keserasian lingkungan
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#### 4. Luas Lahan

No	Jenis Peruntukan	Luas Lahan	
		Maksimum	Minimum
1	Bangunan untuk hunian	50	-
2	Bangunan fasilitas	10	-
3	Ruang terbuka	-	20
4	Prasarana lingkungan	-	20

#### 5. Fasilitas

No	Jenis Fasilitas Lingkungan	Fasilitas yang Tersedia
1	Fasilitas niaga/ Tempat Kerja	1. Warung 2. Toko-toko perusahaan dan dagang 3. Pusat perbelanjaan termasuk usaha jasa
2	Fasilitas Pendidikan	1. Ruang belajar untuk pra belajar 2. Ruang belajar untuk sekolah dasar 3. Ruang belajar untuk sekolah lanjutan tingkat pertama 4. Ruang belajar untuk sekolah menengah umum
3	Fasilitas Kesehatan	1. Posyandu 2. Balai pengobatan 3. BKIA dan rumah bersalin 4. Puskesmas 5. Praktek dokter 6. Apotik
4	Fasilitas Peribadatan	1. Musola 2. Masjid kecil
5	Fasilitas Pelayanan Umum	1. Kantor RT 2. Kantor /balai RW 3. Pos hansip/siskamling 4. Pos polisi 5. Telepon umum 6. Gedung serba guna 7. Ruang duka 8. Kotak surat
6	Ruang terbuka	1. Taman 2. Tempat bermain 3. Lapangan olah raga 4. Peralatan usaha 5. Sirkulasi 6. Parkir

## 6. Niaga

Fasilitas yang disediakan	Jumlah minimal penghuni yang dapat dilayani (tiap satuan fasilitas)	Fungsi	Lokasi dan jarak maksimal dari unit hunian	Letak dan posisi pada lantai bangunan	Luas lantai	Luas lahan (Bila merupakan bangunan tersendiri)
1. Warung	250 penghuni/ 50 kk	Penjual sembilan bahan pokok pangan	1. dipusat lingkungan 2. mudah dicapai 3. radius maksimal 300 M	Ditempatkan pada dasar lantai	18 – 36 M <sup>2</sup>	72m <sup>2</sup> dengan KDB 60%
2. Toko-toko PD	2500 penghuni	Menjual barang kebutuhan sehari-hari termasuk sandang dan pangan	Di pusat lingkungan radius pencapaian maksimal 500 M	Ditempatkan pada bangunan tersendiri	± 50 M <sup>2</sup>	100 M <sup>2</sup> (dengan KDB 50%) 3

## 7. Ruang Terbuka

No	Fasilitas yang disediakan	Maksimal yang dapat dilayani (Tiap satuan fasilitas)	Jarak pelayanan maksimal yang dapat dilayani (M) Luas	Luas areal minimal (K2)	Lokasi	Fungsi	Ketentuan dan persyaratan
1	Taman	40 – 100 keluarga	400 - 800	60 - 150	1. antar bangunan dan atau pada batas (periferi) lingkungan rumah susun dan atau 3. bersatu dengan tempat bermain dan olah raga	keseimbangan lingkungan 2. kenyamanan visual dan audial 3. kontak dengan alam secara maksimal 4. berinteraksi sosial 5. pelayanan sosial budaya	1. merupakan taman yang dapat digunakan oleh berbagai kelompok usia 2. Dapat digunakan untuk rekreasi aktif atau pasif 3. Mencakup area untuk berjalan atau tempat duduk-duduk atau digabung dengan tempat bermain 2
2	Tempat bermain	12 - 30	400 - 800	70 - 180	1. antar bangunan-bangunan atau pada ujung-ujung	1. Tempat bermain untuk anak usia 1-5 tahun 2.	1. Mudah dicapai dan mudah diawasi dari unit-unit hunian, karena

					cluster yang diawasi	Menyediakan rekreasi aktif dan pasif 3. Berinteraksi	kelompok usia balita masih membutuhkan pengawasan ketat. 2. 0,3 anak usia balita tiap 1 keluarga 3. 1,8 M2 tiap 1 anak
	Pelataran usaha	400-100 keluarga	$\pm 600$	40-100	Pada tempat yang memungkinkan untuk digunakan pada waktu tertentu	1. Menjajakan dagangan pada lokasi yang bersifat temporer 2. Berinteraks sosiali	Memenuhi persyaratan kesehatan, keamanan, kenyamanan dan kebersihan
	Tempat parkir penghuni						

#### 8. Lampiran Kutipan Kesimpulan Penelitian

Bahwa

*“Karakteristik Kampung Nelayan Tambak Lorok pada kajian tata ruang melalui Diagram Voronoi dapat ditemukan bahwa tiap segmen rata – rata memiliki kecenderungan untuk menjadi padat dan ada yang sudah sangat padat dari segi tata ruang melalui uji jarak , jangkauan, dan radius. Tiap segmen memiliki area – area pelayanan yang cenderung besar atau lebih luas disalah satu sisi , dan terlalu penuh di sisi lain, sehingga keefektifan serta koneksi maupun integrasi antara sel satu dengan sel lain kurang. Kesetimpangan pelayanan area mengakibatkan kepadatan , kesemrawutan pada bagian tertentu. Ruang Sosial yang terbentuk secara spontan bersifat mengumpul di bagian tertentu, sehingga jika dilakukan pembenahan tata ruang, ruang sosial diletakkan pada tiap segmen yang dapat mengakomodasi area secara luas dan mewadahi interaksi sosial akibat kepentingan ekonomi dan lainnya. Area Tambatan Perahu dan Pola Hunian tepi tanggul membutuhkan jarak atau ruang antara untuk menghindari penumpukan aktivitas.*

*Jika dikaji mengenai hasil visual komputasi voronoi beberapa segmen dalam setiap aspek ujinya sudah bertumbuh secara organis dan cukup berhasil menggambarkan pola tata ruang kampung nelayan. Seperti yang dapat terlihat*

*jalur – jalur antara tambatan perahu ke hunian tepi, pola hunian dan TPI, sudah cukup berhasil tumbuh secara organis, hanya perlu dilakukan pengkajian kembali mengenai jalur utama , bentuk sirkulasi jalur utama yang ternyata jika lurus linear saja kurang efektif dan berpotensi mengalami penumpukan di satu titik sehingga diperlukan jarak – jarak yang berbeda , yang dekat belum berarti efektif.*

*Sehingga dapat diambil kesimpulan utama bahwa tata ruang di Kampung Nelayan Tambak Lorok sudah tumbuh secara organis dan cukup berhasil menghadirkan karakteristik tata ruang Kampung Nelayan, hanya perlu dilakukan pembenahan pada titik – titik tertentu terutama titik Pasar Ikan, titik Ruang Sosial yang masih tidak terkoneksi dengan tambatan perahu, dan Ruang – ruang sosial yang lebih baik digabungkan menjadi satu luasan area tertentu pada setiap segmen sehingga tak padat. “*

#### 9. Lampiran Kebutuhan Backlog

Data Realestat Indonesia (REI) menyebutkan angka kekurangan (backlog) perumahan di Provinsi Jawa Tengah mencapai sekitar 400.000 unit, dimana 50.000 unit diantaranya ada di Kota Semarang. Wakil Ketua DPD REI Jawa Tengah, Diby K Hidayat kepada wartawan mengatakan penjualan rumah di kelas menengah ke atas di daerah tersebut khususnya Kota Semarang mulai menunjukkan kondisi yang membaik di awal semester II 2017. Kondisi itu diharapkan menjadi titik balik bangkitnya penjualan properti di Jawa Tengah.

## 10. Lampiran Sejarah Pruitt Igoe

kemudian menjadi pangkalan yang penuh teror di atas tanah tak bertuan. Halaman rumput yang direncanakan sebagai tempat bermain yang menyenangkan bagi anak-anak ternyata berserakan sampah, kaleng bir, dan kotoran manusia. Akhirnya, Pruitt-Igoe harus dibongkar karena perencanaannya tidak sesuai dengan kebutuhan masyarakat penggunaannya.

Desain arsitekturnya telah membuat apartemen ini menjadi seperti penjara. *Lift* hanya berhenti pada setiap tiga lantai sehingga terciptalah perangkap pada lantai-lantai di antaranya. Akibatnya, perampok dan pemerkosa dapat memanfaatkan ujung tangga dan ruangan tangga yang gelap untuk melakukan perbuatan kriminalnya. Bangunan ini benar-benar menjadi tempat yang tidak aman.

Demikian pula yang terjadi pada rancangan unit lingkungan di Chandigarh, India, yang terasa tak bermakna kecuali sebagai penanda lokasi. Dikarenakan taman kota sepi dan tidak menunjang gaya hidup masyarakat pemakainya. Chandigarh, dirancang oleh arsitek Le Corbusier sesuai dengan gagasan-gagasan baru dalam perencanaan kota barat modern, yang memperhatikan kebutuhan manusia akan cahaya, ruang, dan udara segar. Namun, yang tidak dipertimbangkan dalam perencanaan tersebut adalah pola hidup di kota-kota India lama. Masyarakatnya lebih suka berjubel daripada berada di ruang lengang dan lebih menyukai penataan fasilitas ala India daripada ala Eropa.

Setelah hasil desain ini dihuni, terbentuklah sebuah kota menurut kebutuhan penghuninya dan bukan menurut prediksi arsiteknya. Taman-taman kosong, sekolah jarang dikunjungi, pusat pertokoan yang rapi telah diubah oleh pola belanja penduduk sehingga tidak lagi menjadi seperti yang direncanakan.



# 11. Lampiran Macam Ukuran Kapal Nelayan

**Keterangan gambar**

A : Paksi kapal / tangkapan      D : Ruang akomodasi      F : WC  
 B : Ruang navigasi / kemudi      E : Dapur  
 C : Ruang Mesin      G : Paksi jangkar / peralatan

**PERAHU NELAYAN FIBRE GLASS**

**DATA SPESIFIKASI :**

1. Ukuran Perahu :

- Penjang : 17 m
- Lebar : 4,00 - 4,10 m
- Tinggi : 0,70 - 0,74 m
- Tebal : 0,80 - 0,90 Cm
- Jarak antar klang : 0,80 - 0,90 m
- Penjang Kaki : 2,00 - 2,10 m
- Beskor Fibre Sayap / Kaki : 0,60 - 0,70 m
- Bahan : Fibre Flow Glass

2. Material Perahu :

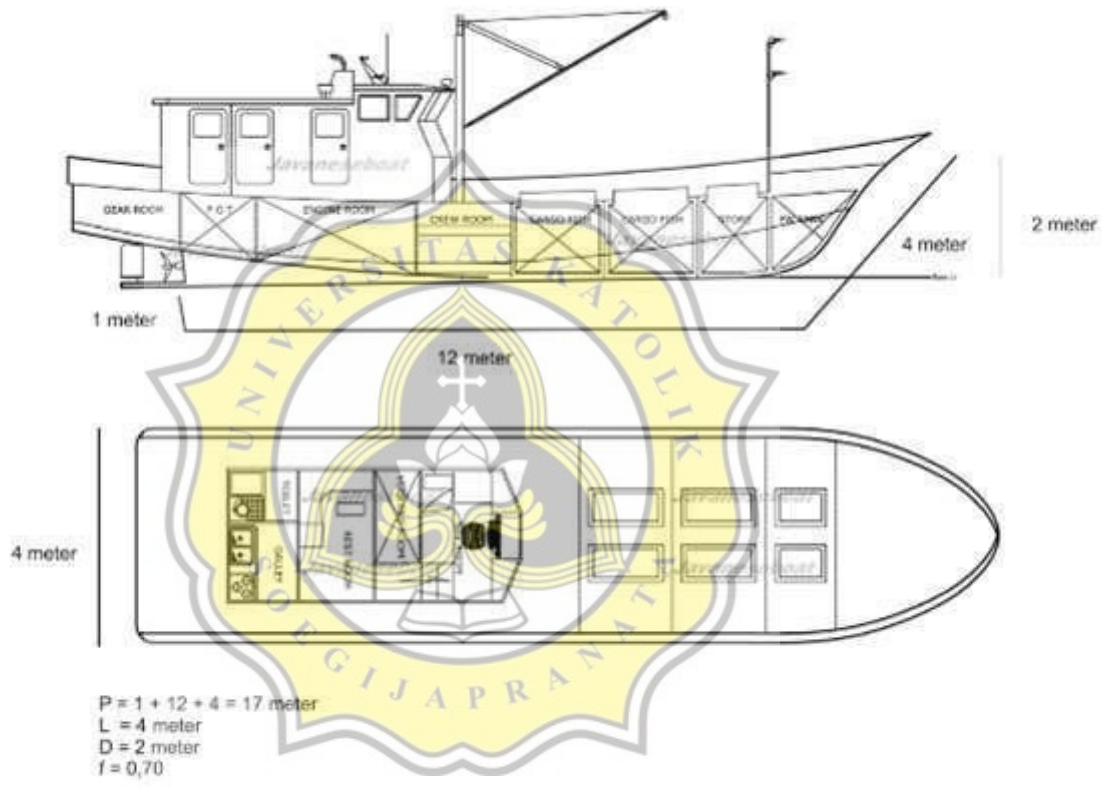
- Material Utama :
  - a. Resin : Unsaturated Polyester Resin Type V500LAC 157 80079-EX (Marine Grade Standard)
  - b. Matrik : Chopped Strand Mat Type E-Glass 200 Gram
  - c. Roving : woven Roving Type E-Glass Size 600 Gram
  - d. Gelcoat : Primer Resin Epoksi Isoking berfaedah menggunakan Gelcoat Include Pigmen Malarat
- Material Penumpang :
  - a. Kandang Perahu : Keras alabaster mesh kating ( untuk rangka sentral dan gading-gading )
  - b. Dek Arjangan / Depan : Plywood alabaster tebal 8 mm
  - c. Dek Buluh / Belakang : Plywood alabaster tebal 8 mm
  - d. Pambuang Air : Pipa PVC 1"
  - e. Sayap / Kaki : Pipa PVC 0,60" (beskor Fibre Glass 1 set bahan dan kiti)
  - f. Dudukan Mesin : Beskor Kayu Tau KW 1 ukuran 61/2 Cm

3. Keterangan lain :

- a. System Pemasangan Perahu : System Gelcoat / Pemasangan dibelakang moulding dengan hasil :
  - Hasil akhiran sudah dalam kondisi (ready) siap pakai.
  - Warna yang di berikan berhadapan Perahu lebih luas dan awet.
  - Berat Perahu lebih ringan karena tidak menggunakan Dempul
- b. Warna dan Tanda Nama Perahu Perahu akan tertera secara langsung karena system Gelcoat Glassy in Moulding.

**RANDOAN JTBERGLASS**

**Hubungi :**  
 1. +6282-561843 (office)  
 2. +62815-6984-054 (MikRsun)



**GT = 0,25 x 17 x 4 x 2 x 0,70 = 23,8 (24)**

## 12. Lampiran Keuntungan dan Kekurangan Macam Struktur Pesisir

### ADVANTAGES AND DISADVANTAGES

Building Type	Advantage	Disadvantage
Terp dwelling	<ol style="list-style-type: none"> <li>1. Can be used for large plots of land</li> </ol>	<ol style="list-style-type: none"> <li>1. Difficult access to living areas</li> <li>2. House can still be flooded due to height limitations</li> <li>3. Residents cannot leave house when flooding occurs</li> </ol>
Static elevation	<ol style="list-style-type: none"> <li>1. Elevates house to required base flood elevation level</li> <li>2. Preserves original architecture</li> <li>3. Capable of high density houses</li> </ol>	<ol style="list-style-type: none"> <li>1. Difficult access to living areas</li> <li>2. Increased vulnerability to winds</li> <li>3. House can still be flooded due to height limitations</li> </ol>
Pile dwelling	<ol style="list-style-type: none"> <li>1. A solution when there is a lack of construction ground</li> <li>2. Capable of high density houses</li> </ol>	<ol style="list-style-type: none"> <li>1. House can still be flooded due to height limitations</li> <li>2. Increased corrosion due to its submergence in water</li> </ol>
House boats	<ol style="list-style-type: none"> <li>1. A solution when there is a lack of construction ground</li> <li>2. Capable of mobility</li> <li>3. No height restrictions allow the house to rise and high as any water level</li> </ol>	<ol style="list-style-type: none"> <li>1. It is subject to stronger external loadings due to wind, rain and ice</li> <li>2. Increased corrosion due to its submergence in water</li> <li>3. House must be loaded Symmetrically to maintain even levelling</li> </ol>
Amphibious dwelling	<ol style="list-style-type: none"> <li>1. A solution when there is a lack of construction ground under normal conditions but will rise when flood occurs.</li> <li>2. house remain on the ground under normal conditions but will rise when flooding occurs.</li> <li>3. utilizes municipal pipes and electrical connection.</li> <li>4. capable of high density houses</li> <li>5. minimized carbon footprint</li> </ol>	<ol style="list-style-type: none"> <li>1. It is subjected to stronger external loading due to wind rain and ice.</li> <li>2. structure must be loaded symmetrically to maintain even levelling.</li> <li>3. height limitations are restricted to the mooring post height.</li> </ol>

### 13. Lampiran Perancangan Kampung Vertikal Oleh Yu- Sing

**5/6 keberagaman kampung vertikal**  
KAMPUNG BRATANG + BARATA JAYA

**2/6 keberagaman kampung vertikal**  
KONSEP HUNIAN

TRANSFORMASI KAMPUNG STEREN MENJADI KAMPUNG VERTIKAL, mempertahankan suasana kampung yang dinamis. Sebagai model bagi dunia dipikirkan konsep kampung vertikal (vertical village) sebagai strategi komersial terhadap ketahanan hidup, perilaku, integrasi perantara yang jarang, kampung vertikal menjadi pilihan untuk kota-kota berkembang. Banyak alternatif untuk kota-kota sedang berkembang. Namun, perlu diingat, menjadi kampung vertikal, perlu ada pola-pola yang berbeda. Apabila dibutuhkan, maka kampung vertikal tidak akan bertahan lama. (sangat penting untuk melihat orang tua atau orang-orang yang tinggal di kampung vertikal).

ILUSTRASI SUASANA RUANG PUBLIK, TAMAN, KEBUN, DAN 'PROMENADE'

**KONSEP HUNIAN DAN MASSA BANGUNAN**

**1/6 keberagaman kampung vertikal**  
KONSEP UMUM

1. unit hunian yang beragam (kecil, menengah, besar).
2. jalan kampung dan tangga bersama.
3. ruang sosial kampung.
4. warung/ruang usaha rumah tangga.
5. ruang main + belajar anak-anak.
6. tempat jaman (pada pagar balkon).
7. tempat bercocok tanam.
8. rumah ternak peliharaan.
9. ruang ibadah bersama.
10. bale berbagai warga.
11. menara penampungan air bersama.
12. pengolahan air bekas rumah tangga bersama.
13. pengolahan dan pemilahan sampah bersama.
14. kebun (bambu, silyam, rempah, obat, buah, anti polutan, hias) bersama.
15. pengolahan wisata air dan kampung bersama.

**KONSEP PEMANFAATAN ENERGI**

**KONSEP TATA RUANG LINGKUNGAN**

**KAMPUNG VERTIKAL**

**KONSEP PERENCANAAN DAN PENYUNAN**

**KAMPUNG VERTIKAL** merupakan TRANSFORMASI dari KAMPUNG dengan STEREN KALL yang mempertahankan KARAKTER LOKAL, dan BERKAWAN BENTUK, WARNA, MATERIAL, VOLUME, GARIS LANGIT (skyline) bangunan, POTENSI EKONOMI, KREATIVITAS WARGA, dll.

PENJELASAN ATAS UNDANG-UNDANG REPUBLIK INDONESIA  
NOMOR 16 TAHUN 1985  
TENTANG RUMAH SUSUN

I. UMUM

Tujuan pembangunan nasional adalah untuk mewujudkan kesejahteraan lahir dan batin seluruh rakyat Indonesia secara adil dan merata, sebagai salah satu usaha untuk mengisi cita-cita perjuangan bangsa Indonesia bagi terwujudnya masyarakat adil dan makmur berdasarkan Pancasila dan Undang-Undang Dasar 1945.

Salah satu unsur pokok kesejahteraan rakyat adalah terpenuhinya kebutuhan akan perumahan, yang merupakan kebutuhan dasar bagi setiap warga negara Indonesia dan keluarganya sesuai dengan harkat dan martabatnya sebagai manusia.

Di samping itu, pembangunan perumahan merupakan salah satu unsur yang penting dalam strategi pengembangan wilayah, yang menyangkut aspek-aspek yang luas di bidang kependudukan, dan berkaitan erat dengan pembangunan ekonomi dan kehidupan sosial dalam rangka pemantapan Ketahanan Nasional. Dari hal-hal tersebut di atas, jelaslah bahwa perumahan merupakan masalah nasional, yang dampaknya sangat dirasakan di seluruh wilayah tanah air, terutama di daerah pekotaan yang berkembang pesat.

Oleh karena itu, sebagaimana diamanatkan dalam Garis-garis Besar Haluan Negara pembangunan perumahan untuk memenuhi kebutuhan yang terus meningkat perlu ditangani secara mendasar, menyeluruh, terarah, dan terpadu, oleh Pemerintah Pusat dan Pemerintah Daerah, dengan keikutsertaan secara aktif usaha swasta dan swadaya masyarakat. Pembangunan perumahan yang telah dirintis sejak Pelita I perlu ditingkatkan dan dikembangkan, khususnya perumahan dengan harga yang dapat dijangkau oleh daya beli golongan masyarakat yang berpenghasilan rendah.

Sehubungan dengan uraian tersebut di atas, maka kebijaksanaan umum pembangunan perumahan diarahkan untuk :

a. memenuhi kebutuhan perumahan yang layak dalam lingkungan yang sehat, secara adil dan merata, serta mampu mencerminkan kehidupan masyarakat yang berkepribadian Indonesia.

b. mewujudkan pemukiman yang serasi dan seimbang, sesuai dengan pola tata ruang kota dan tata daerah serta tata guna tanah yang berdaya guna dan berhasil guna.

Sejalan dengan arah kebijaksanaan umum tersebut, maka di daerah pekotaan yang berpenduduk padat sedangkan tanah yang tersedia sangat terbatas, perlu dikembangkan pembangunan perumahan dan pemukiman dalam bentuk rumah susun yang lengkap, seimbang, dan serasi dengan lingkungannya. Pengertian Rumah Susun adalah bangunan gedung

bertingkat yang distrukturkan secara fungsional dalam arah horizontal dan arah vertikal yang terbagi dalam satu-satuan yang masing-masing jelas batas-batasnya, ukuran dan luasnya, dan dapat dimiliki dan dihuni secara terpisah. Selain satuan-satuan yang penggunaannya terpisah, ada bagian- bersama dari bangunan tersebut serta benda-bersama dan tanah-bersama yang di atasnya didirikan rumah susun, yang karena sifat dan fungsinya harus digunakan dan dinikmati bersama dan tidak dapat dimiliki secara perseorangan. Hak pemilikan atas satuan rumah susun merupakan kelembagaan hukum baru, yang perlu diatur dengan undang-undang, dengan memberikan jaminan kepastian hukum kepada masyarakat Indonesia.

Dengan undang-undang ini diciptakan dasar hukum hak milik atas satuan rumah susun, yang meliputi:

- a. hak pemilikan perseorangan atas satuan-satuan rumah susun yang digunakan secara terpisah;
- b. hak bersama atas bagian-bagian dari bangunan rumah susun;
- c. hak bersama atas benda-benda;
- d. hak bersama atas tanah.

yang semuanya merupakan satu kesatuan hak yang secara fungsional tidak terpisahkan.

Pengaturan dan pembinaan rumah susun merupakan tanggung jawab dan wewenang Pemerintah. Untuk mencapai daya guna dan hasil guna yang setinggi-tingginya, sebagian urusan tersebut dapat diserahkan kepada Pemerintah Daerah sesuai dengan asas pemerintahan sebagaimana dimaksud dalam Undang-undang Nomor 5 Tahun 1974.

Untuk menggalakkan usaha pembangunan rumah susun dan memudahkan pihak-pihak yang ingin memiliki satuan rumah susun; Undang - undang ini mengatur kemungkinan untuk memperoleh kredit konstruksi dan kredit pemilikan rumah dengan menggunakan lembaga hipotik atau fidusia.

Khususnya bagi golongan masyarakat yang berpenghasilan rendah yang ingin memiliki satuan rumah susun, mendapatkan prioritas dan kemudahan-kemudahan baik langsung maupun tidak langsung agar harganya dapat terjangkau.

Pembangunan rumah susun memerlukan persy aratan-persyaratan teknis dan administratif yang lebih berat. Untuk menjamin keselamatan bangunan, keamanan, dan ketenteraman serta ketertiban penghunian, dan keserasian dengan lingkungan sekitarnya, maka satuan rumah susun baru dapat dihuni setelah mendapat izin kelayakan untuk dihuni dari Pemerintah Daerah yang bersangkutan menurut peraturan perundang-undangan yang berlaku. Penghuni satuan rumah susun tidak dapat menghindarkan diri atau melepaskan kebutuhannya untuk menggunakan bagian-bersama, benda-bersama, dan tanah-bersama, karena kesemuanya merupakan kebutuhan fungsional yang saling melengkapi.

Satuan rumah susun yang merupakan milik perseorangan dikelola sendiri oleh pemiliknya, sedangkan yang merupakan hak bersama harus digunakan dan dikelola secara bersama karena menyangkut kepentingan dan kehidupan orang banyak. Penggunaan dan pengelolaannya harus diatur dan dilakukan oleh suatu perhimpunan penghuni yang diberi wewenang dan

tanggung jawab. Oleh karena itu penghuni rumah susun wajib membentuk perhimpunan penghuni, yang mempunyai tugas dan wewenang mengelola dan memelihara rumah susun beserta lingkungannya, dan menetapkan peraturan-peraturan mengenai tata tertib penghunian. Perhimpunan penghuni oleh Undang-undang ini diberi kedudukan sebagai badan hukum dengan Anggaran Dasar dan Anggaran Rumah Tangga, sehingga dapat bertindak ke luar dan ke dalam atas nama pemilik, dan dengan wewenang yang dimilikinya dapat mewujudkan ketertiban dan ketenteraman dalam lingkungan rumah susun. Perhimpunan penghuni dapat membentuk atau menunjuk badan pengelola yang bertugas untuk menyelenggarakan pengelolaan yang meliputi pengawasan terhadap penggunaan bagian-bersama, benda-bersama, tanah-bersama, dan pemeliharaan serta perbaikannya. Dana yang dipergunakan untuk membiayai pengelolaan dan pemeliharaan rumah susun, diperoleh dari pemungutan iuran dari para penghuninya.

Pembangunan rumah susun ditujukan terutama untuk tempat hunian, khususnya bagi golongan masyarakat yang berpenghasilan rendah. Namun demikian pembangunan rumah susun harus dapat mewujudkan pemukiman yang lengkap dan fungsional, sehingga diperlukan adanya bangunan gedung ber tingkat lainnya untuk keperluan bukan hunian yang terutama berguna bagi pengembangan kehidupan masyarakat ekonomi lemah. Oleh karena itu dalam pembangunan rumah susun yang digunakan bukan untuk hunian yang fungsinya memberikan lapangan kehidupan masyarakat, misalnya untuk tempat usaha, pertokoan, perkantoran, dan sebagainya, ketentuan-ketentuan dalam Undang-undang ini diberlakukan dengan penyesuaian menurut kepentingannya.

Undang-undang ini mengatur hal-hal yang bersifat pokok-pokok saja, sedangkan ketentuan pelaksanaannya akan diatur lebih lanjut dengan Peraturan Pemerintah dan/atau peraturan perundang-undangan yang lain.

## II. PASAL DEMI PASAL

### Pasal 1

#### Angka 1

Rumah susun yang dimaksudkan dalam Undang-undang ini, adalah istilah yang memberikan pengertian hukum bagi bangunan gedung bertingkat yang senantiasa mengandung sistem pemilikan perseorangan dan hak bersama, yang penggunaannya untuk hunian atau bukan hunian, secara mandiri ataupun secara terpadu sebagai satu kesatuan sistem pembangunan.

## Angka 2

Setiap satuan rumah susun harus mempunyai sarana penghubung ke jalan umum, tanpa mengganggu dan tidak boleh melalui satuan rumah susun milik orang lain.

## Angka 3

Cukup jelas

## Angka 4

Sebagai contoh, bagian-bersama adalah antara lain : pondasi, kolom, balok, dinding, lantai, atap, talang air, tangga, lift, selasar, saluran - saluran, pipa-pipa, jaringan-jaringan listrik, gas, dan telekomunikasi serta ruang untuk umum.

## Angka 5

Sebagai contoh, benda bersama adalah antara lain : tanaman, bangunan pertamanan, bangunan sarana sosial, tempat ibadah, tempat bermain, tempat parkir, yang sifatnya terpisah dari struktur bangunan rumah susun.

## Angka 6

Sesuai dengan ketentuan Pasal 6 Undang-undang Nomor 5 Tahun 1960 tentang Peraturan Dasar Pokok-pokok Agraria bahwa : "Semua hak atas tanah mempunyai fungsi sosial".

## Angka 7

Menurut Pasal 1162 Kitab Undang-undang Hukum Perdata Indonesia pengertian hipotik adalah "suatu hak kebendaan atas benda-benda tidak bergerak, untuk mengambil penggantian daripadanya bagi pelunasan suatu perikatan".

## Angka 8

Fidusia pada hakekatnya adalah penyerahan hak milik atas suatu benda kepada kreditur dengan perjanjian bahwa penyerahan tersebut "hanya untuk menjamin atas pembayaran kembali uang pinjaman". Debitur dan kreditur saling percaya, bahwa penyerahan benda tersebut hanya untuk jaminan.

## Angka 9

Cukup jelas

Figure 16. Characteristics of Coastal Adaptation Strategies

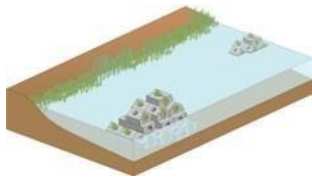

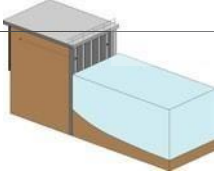
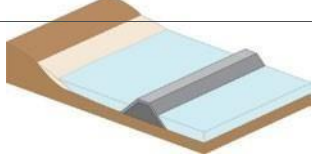
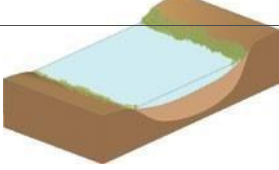
		Regional & Reach	Building & Site Scale	On-Shore	Off-Shore	In-Land	Stabilize	Protect	Accommodate
<b>Artificial reef</b>									
		●			●				●
<b>Beaches and dunes</b>									
				●			●		
<b>Building codes</b>									
			●			●		●	
<b>Buffers</b>									
		●				●			●
<b>Bulkheads</b>									
			●	●					●
<b>Breakwaters</b>									
					●			●	
<b>Coastal Morphology Alteration</b>									
		●		●				●	



Figure 16. Characteristics of Coastal Adaptation Strategies

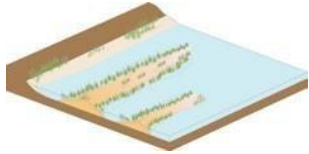
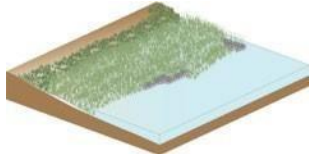
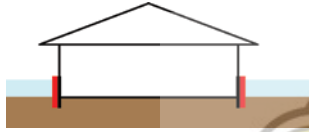
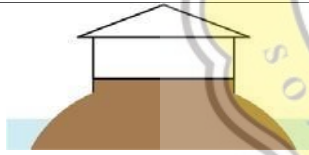
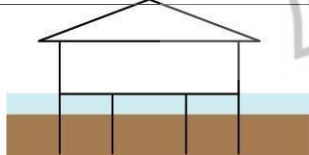
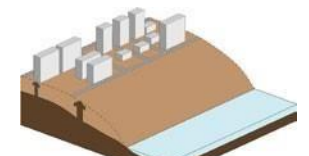

			Regional & Reach	Building & Site Scale	On-Shore	Off-Shore	In-Land	Stabilize	Protect	Accommodate
Constructed Breakwater Islands		Constructed Breakwater Islands are created with fill offshore. These islands are used to dissipate wave energy and reduce flooding from storm surges. This strategy is best suited for shallower waters where less fill and sediment management are required and where there is low potential for erosion or submergence due to sea level rise.	●			●			●	
Constructed wetlands		Constructed Wetlands describe new or restored ecosystem areas in the intertidal zone. Constructed wetlands attenuate wave action, provide wildlife habitat, and filter contaminants. They are best suited for zones exposed to low or moderate wave forces and on sites with fine grain sediment that are relatively flat.	●		●			●	●	
Dry floodproofing		Dry Floodproofing uses water-resistant materials and water-tight gates at building entry points to prevent infiltration. This strategy is best suited for mixed-use buildings on small lots. It is most effective against flooding but not wave action; it is not permitted in V zones.		●			●		●	
Easements		Easements are legal agreements between a property-owner and a government agency to restrict development in hazard-prone areas. Easements can be aggregated to a regional scale through an acquisition program to more effectively manage a shoreline. Easements can require land to be deeded for public space or a buffer area in perpetuity as part of a retreat strategy.		●			●			●
Elevation on fill or mound		Elevation on Fill or Mound raises buildings above the base flood elevation using fill. This strategy is best suited for large lots in zones that will experience flooding but not wave action.		●			●		●	
Elevation on piles		Elevation on Piles raises buildings above the base flood elevation using piers or piles. This strategy is best suited for residential or single-use neighborhoods in zones that will experience flooding and wave action.		●			●		●	
Elevated Land and Streets		Elevation of Land and Streets elevates land to a design flood elevation to reduce vulnerability to inundation and storm surge. This strategy works best on a neighborhood scale and for new developments, but has been completed in established neighborhoods as well. This strategy can be initially costly but can provide a number of public benefits by preserving street level activity and access to the waterfront under normal conditions.	●				●		●	
Waterfront Parks		Waterfront Parks can be used to capture and store floodwaters. Sometimes, these can even be restored wetlands or brownfield properties in natural flood plains. When not in use for flood control, these can provide valuable open space.	●				●		●	

Figure 16. Characteristics of Coastal Adaptation Strategies

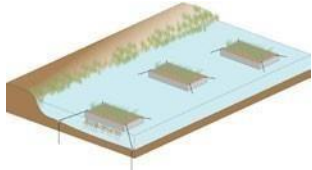
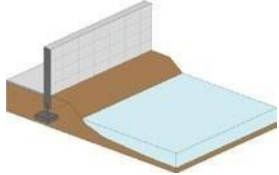
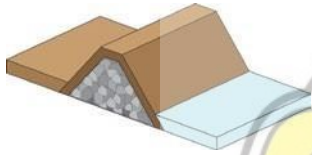
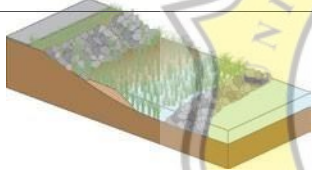
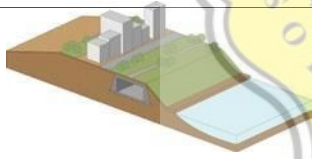

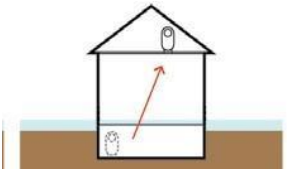
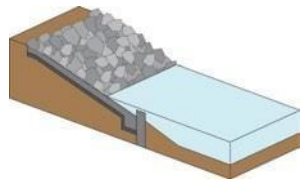
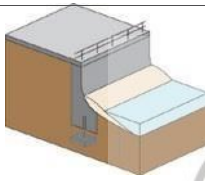

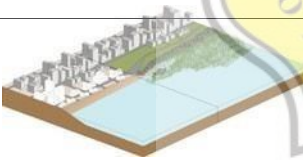
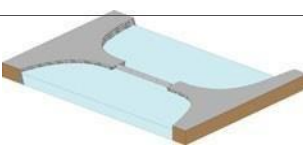
		Regional & Reach	Building & Site Scale	On-Shore	Off-Shore	In-Land	Stabilize	Protect	Accommodate
<b>Floating Islands</b>		<p>Floating Islands are offshore structures that dissipate the forces of waves. Breakwaters are constructed parallel to the shore and can be fixed, floating, submerged, or emerged. They are best suited for areas with low to moderate wave energy.</p>	●		●		●	●	
<b>Floodwalls</b>		<p>Floodwalls are vertical retaining walls used to retain floodwaters or high tides. Floodwalls can be operable with floodgates and are often used in combination with levee systems to increase the height of surge protection.</p>	●		●			●	
<b>Levee</b>		<p>Levees (or dikes) are sloped earthen embankments that can protect coastal areas from wave forces. A levee can be topped with to support development or combined with a floodwall, rip rap, or other measure as added protection against flooding. It is best used in low-lying zones that experience wave forces and where sufficient coastal property can be obtained. Both earthen and concrete levees require year-round monitoring to ensure that they are not damaged by temperature extremes.</p>	●		●			●	
<b>Living Shorelines</b>		<p>Living Shorelines protect against erosion with organic and vegetative materials used to anchor the sand below. This strategy is best suited for areas where there is sufficient space along the coast and where there is low wave action. Living shorelines can also enhance natural intertidal habitats and improve water quality through filtration.</p>	●		●		●	●	
<b>Multi-purpose levee</b>		<p>Multi-purpose Levees are levees (sloped embankments) that combine additional functions and development atop the levee structure, such as roads, parks or buildings. To be functional and to reduce overflow and seepage, the width of a multi-purpose levee is much larger than the height. They are best suited for low-lying areas require elevation to reduce storm surge.</p>	●		●			●	
<b>No-build or no-rebuild zones</b>		<p>Planners can identify no-build or no-rebuild zones, which place restrictions on development or redevelopment in hazard-prone areas. These can designate space for wetlands or beaches to migrate, retain floodwaters, or provide space for future shoreline protection measures. An example of a no-rebuild policy is Maine's Coastal Sand Dunes Rules, which prohibits reconstruction of a building located in a V-zone more than once.</p>	●			●			●
<b>Performance Zoning</b>		<p>Performance zoning allows different uses to coexist within an area as long as buildings or allows buildings to be constructed to performance standards rather than specification standards. They can require additional oversight and administration, but can be used effectively to achieve hazard mitigation and emergency management goals.</p>	●	●		●			●
<b>Polders</b>		<p>Polders are low-lying tracts of land surrounded by levees. These are used to capture and retain floodwaters. This strategy is best suited in low-lying areas with low to moderate wave action and where sufficient space can be secured.</p>	●		●			●	

Figure 16. Characteristics of Coastal Adaptation Strategies

			Regional & Reach	Building & Site Scale	On-Shore	Off-Shore	In-Land	Stabilize	Protect	Accommodate
<b>Protect building systems</b>		Building System Protection describes measures taken to remove critical building systems, such as data rooms and boilers, from areas that are below-grade or otherwise vulnerable to flooding.		●			●		●	
<b>Revetment</b>		Revetments are sloped embankments made of stones or concrete blocks used to minimize shoreline erosion and dissipate wave forces. These can be used in combination with other coastal defense strategies. It is best suited for shorelines with a high bank elevation that experience moderate wave action.	●		●			●	●	
<b>Seawall</b>		Seawalls are retaining walls designed to resist high-energy wave action and prevent flooding. They can be curved, stepped, or vertical and can be used at multiple geographic scales. They are most effective when the height of the seawall is consistent across lots.	●		●				●	
<b>Setbacks</b>		Setbacks protect structures from hazards by situating them away from sensitive areas. It is important to consider how setback lines might be impacted future erosion or sea level rise.		●			●			●
<b>Site Protection</b>		Site protection describes the use of floodwalls or a berm to prevent inundation. This is best suited for larger sites with multiple buildings and good drainage that are likely to experience wave action.		●			●		●	
<b>Strategic Retreat</b>		Strategic Retreat involves the planned relocation of development away from flood-prone areas. Strategic retreat involves a combination of regulatory and planning tools, such as eminent domain, land trusts, and transfers of development rights, to acquire and regulate development in flood plains.	●				●		●	
<b>Surge Barrier</b>		Surge Barriers cross a waterway to protect coastal areas from storm surge. Surge barriers are typically used in combination with levees, floodwalls, and pumps. They can be fixed or movable allow for navigation. These are best suited for bays with proximal shorelines.	●		●				●	
<b>Transfer of Development Rights</b>		Transfer of Development Rights (TDR) is a market-based planning tool that transfers some or all of the development rights of a property in a sensitive or hazard-prone area to an area that is safe for development. This can help manage risks in floodplains as part of a larger growth management strategy.	●	●			●			●

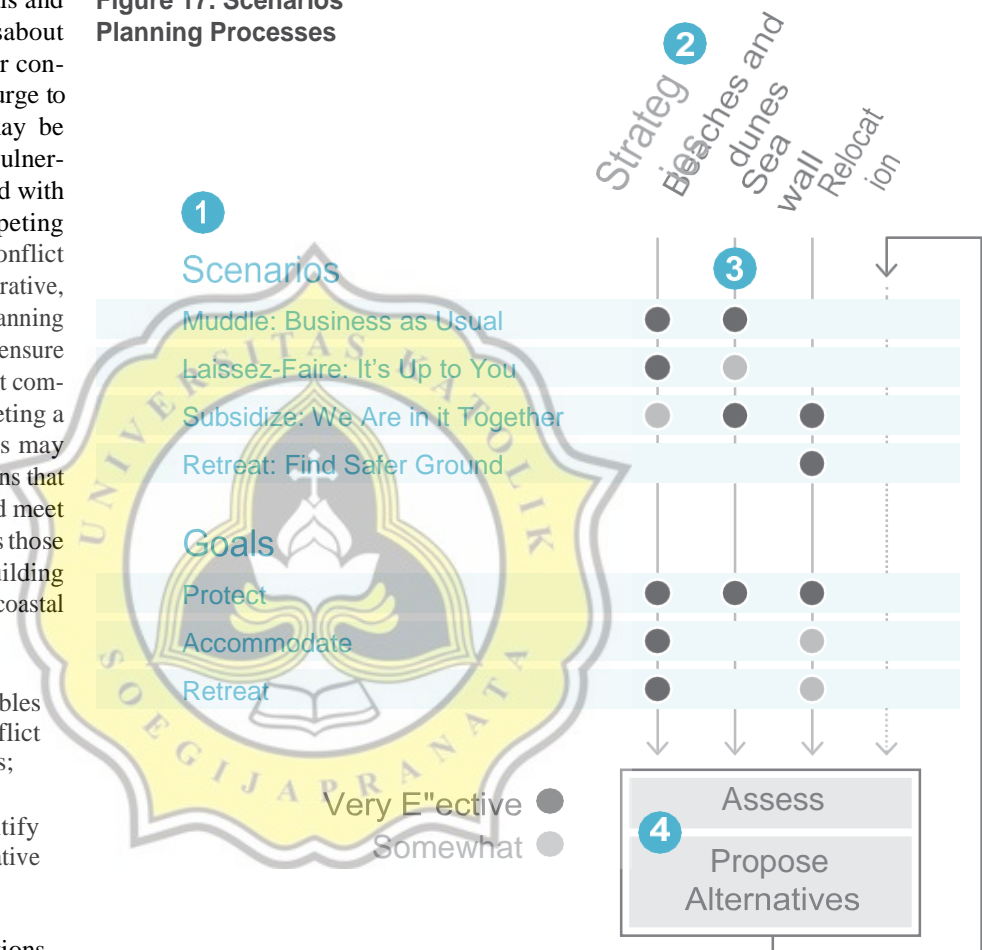
# 5. Integrate Scenarios into the Decision-Making Processes

After a severe storm, public officials and planners will have to make decisions about rebuilding and reconstruction under considerable political pressure.<sup>27</sup> The urge to return to pre-storm conditions may be strong, but it will likely exacerbate vulnerabilities to future storms. Combined with climate uncertainties, these competing desires can create polarization and conflict among decision-makers.<sup>28</sup> A collaborative, deliberative approach like scenario planning can help public officials and planners ensure that recovery investments will protect communities in the long run. By completing a scenario planning process, planners may find that the preferred response options that are robust across multiple futures and meet community goals are not the same as those proposed in the beginning of a rebuilding strategy. This approach can advance coastal resilience by:

- ◁ Creating consensus on key variables that drive change to prevent conflict over future actions and decisions;
- ◁ Helping decision-makers identify and consider a broad set of alternative response options; and
- ◁ Assessing whether response options are suitable in current and future conditions, and over the course of the strategy's lifetime.

This chapter demonstrates how to evaluate adaptation strategies in each of the four scenarios developed for this planning exercise. Two examples using two different coastal community typologies illustrate how to incorporate scenarios into rebuilding plans in a way that promotes adaptation and resilience.

**Figure 17. Scenarios Planning Processes**



## Step 1: Determine Goals or Criteria to Evaluate Response Options in Each Scenario

Before using scenarios to assess which solutions are appropriate, planners should create an independent set of criteria that can be used to evaluate proposed response options relative to each other. In some cases, participants will find that Strategy A performs very well across all four scenarios while Strategy B performs well across

to establish a shared vision or a set of measurable evaluation criteria to establish some equivalence among options. For instance, the New York City Special Initiative for Rebuilding and Resiliency puts forth four principles for resiliency that guide each of the strategies outlined in its plan.<sup>29</sup> Similarly, San Francisco orients many of its long-term planning efforts and emergency management operation to a shelter-in-place goal. An alternative to the goal-directed

only two scenarios. However, the scale of

the impact of that Strategy B—such as its ability to reduce risk may be much greater than Strategy

<sup>27</sup> Gavin Smith, *Planning for Post-Disaster Recovery: A*

*Review of the United States Disaster Recovery Framework.* (Fairfield, VA: Public Entity Risk Institute), 2011, 3.

<sup>28</sup> Jim Holway, "Scenario Planning Tools for Sustainable

Communities", *Land Lines* (October 2011), 7.

A. Therefore, it can be helpful

29 New York City Special Initiative for Rebuilding and Resiliency. 2013. "A Stronger, More Resilient New York." [http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR\\_sin-gles\\_Lo\\_res.pdf](http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR_sin-gles_Lo_res.pdf), 7.



approach is to use objective and measurable criteria. A small set of criteria is most effective and can be measured quantitatively or on an order-of-magnitude scale. Examples of these criteria include: economic cost, avoided costs, climate mitigation benefits, the number of housing units lost, environmental degradation, political feasibility, and the likelihood of performing as expected when implemented. Calibrating the response options to goals or objective criteria can provide a framework identifying alternatives and selecting preferred response strategies.

### Step 2: Identify Possible Strategies

Next, planners can identify coastal adaptation tools that are appropriate to the coastal typology and the risks and vulnerabilities that are present in their jurisdictions. These should consider the built environment and settlement patterns, existing communities and socioeconomic conditions and geomorphology. At the end of this assessment, decision-makers will have a list of coastal adaptation tools that are physically, technically, politically, and economically feasible.

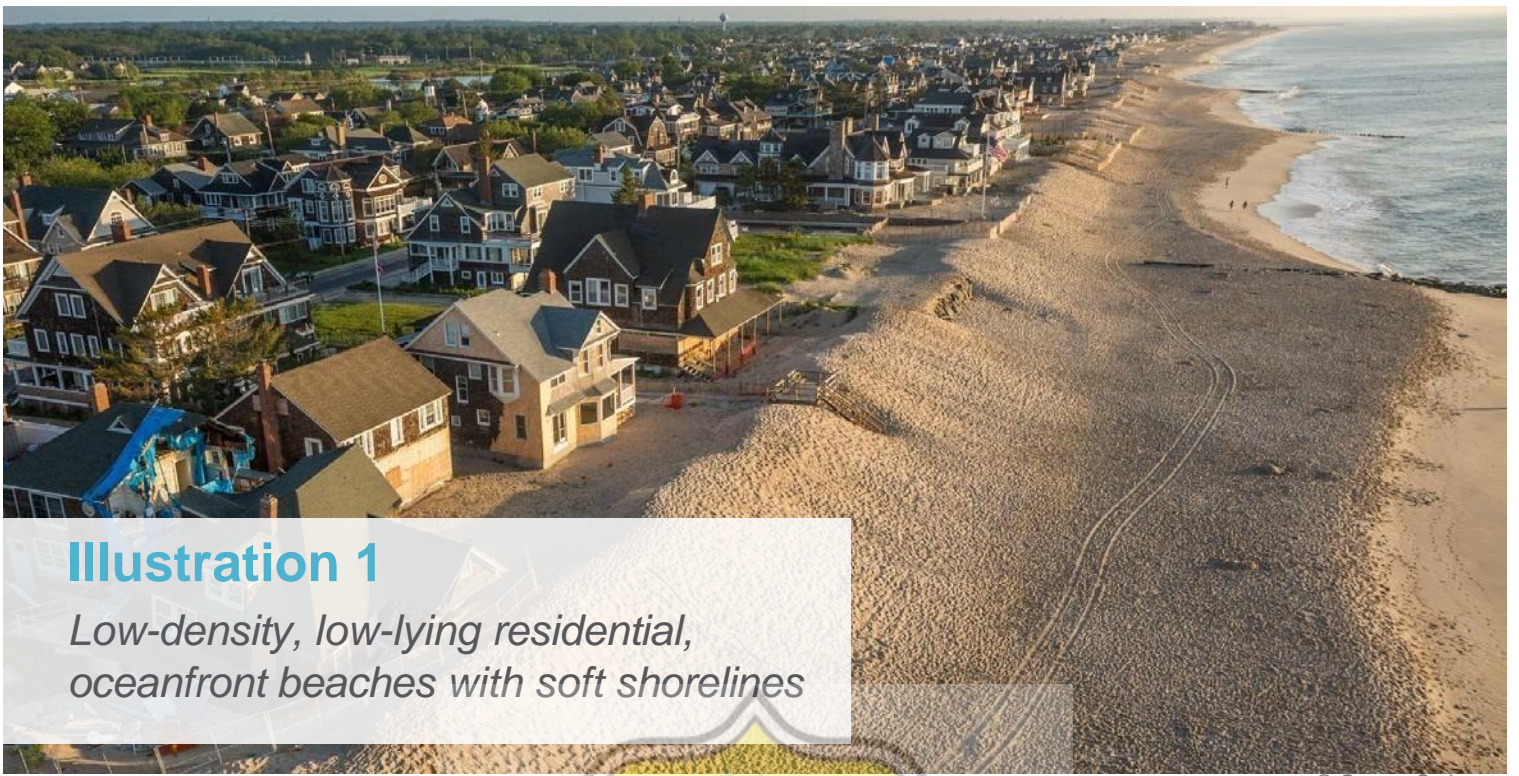
### Step 3: Assess Implications of Strategies in Each Scenario

Scenarios are used to assess whether the investments made today will deliver the desired outcomes in the future. Once a municipality has proposed a set of coastal adaptation tools, planners can assess how well each tool performs across each scenario. There are five questions that help assess whether or not a proposed solution may still be an appropriate solution in the future. For each proposed strategy in each scenario, we can ask:

1. Is the strategy responsive to the frequency and severity of coastal storms in this scenario?
2. Is the strategy responsive to the rate of sea level rise in this scenario?
3. Is the strategy appropriate, given the desire to stay or leave the coast in this scenario?
4. Is the strategy feasible, given the actions of opinion leaders and state and federal agencies?
5. Is the strategy appropriate, given the resources of the government and the market?

### Step 4: Identify Alternative Strategies

The scenarios introduce social, cultural, and institutional factors that are not always considered. The interaction of scenario elements illustrate important interdependencies and may reveal that known or current set of solutions is not fully appropriate to local conditions. For instance, many of the tools that currently exist may be well-suited for coastal defense, but do little to address the goal to keep coastal communities affordable and economically diverse. Recognizing where the existing solutions fall short can spur innovation and allow planners to propose and test alternative response options that perform well over a wider range of possible futures and optimizes limited recovery funds.



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## Illustration 1

*Low-density, low-lying residential, oceanfront beaches with soft shorelines*

### Step 1: Determine Goals or Criteria to Evaluate Response Options in Each Scenario

For the purposes of this illustration, we can assume that planners and decision-makers agree on three principal goals that they hope to achieve with their rebuilding efforts. The first goal is to reduce risk of future impacts from coastal storms, such as surge, flooding and erosion. Second, they want to enhance natural systems, such as the beaches. They hope to restore the beaches as living systems that provide natural protection against and habitat for aquatic life and migratory shorebirds. The third goal is to improve public beach access since the main driver of the local economy is the beach.

### Step 2: Identify Possible Strategies

This residential oceanfront community is situated amidst natural beaches and dunes and experiences low to moderate wave energy. Some of the natural beaches have been lost to development and erosion, but the beaches are still the main economic driver. Permanent residents and some seasonal second homes are the most prevalent type of development in this community. Many property-owners are likely to have already taken steps to protect their properties with riprap and shield panels on their own. Planners and decision-makers propose using beach replenishment, a seawall, and the relocation of coastal properties to more upland areas in order to preserve the beaches.

### Step 3: Assess Implications of Strategies in Each Scenario

Once a suite of tools are proposed, planners can assess how well each tool performs under each scenario. We refer to the five questions above to guide this thought exercise. Figure 18 provides a brief illustration of how the five questions above are used to guide the considerations for each proposed strategy. First, each tool is evaluated on how well it meets the three goals that the planners established for their rebuilding efforts. Then, each tool is compared against each of the four scenarios. For instance, although a seawall affords a high level of protection and is robust against three scenarios, it may not be well-aligned with community goals. Similarly, while beach nourishment meets many of the community's goals, it is only robust against two scenarios.

### Step 4: Identify Alternative Strategies

There are clear tradeoffs between each of the strategies. Given these tradeoffs, other response options that maybe more optimal can be considered. Floodable parks adjacent to the beach, in combination with a relocation strategy for structures closest to the shore, can help maintain beach access, reduce risk of flooding, and potentially enhance natural systems by capturing runoff from developed areas. For instance, dunes and doubled dunes systems may offer more protection against frequent storms than beach replenishment since the vegetation helps anchor the sand in place while also maintaining beach access. Through an iterative process, planners and decision-makers can arrive at a preferred set of strategies that meet community goals and are effective against multiple future conditions.

Figure 18. Coastal Typology 1

Strategy		Reduce Risk	Enhance Natural Systems	Improve Public Beach Access	Muddle	Laissez-Faire	Subsidize	Retreat
Proposed Strategies	Levee	2	1	0	Infrequent storms may make this seem like a severe choice. However, sea level rise—even if predictable—may increase the risk of flooding. A firm desire to remain on the coast coupled with a robust public and private sector make this a feasible option.	Levees can require multi-jurisdictional cooperation. This type of regional strategy may not be desirable in a future in which the onus of protection falls on the property-owner.	Residents and businesses want to remain on the coast and urge the government to invest in protection. The properties closest to the water are destroyed in a series of storms, leaving room for a protective levee.	A levee built to a proper design height can be effective against the hazards in this scenario. However, the desire to relocate away from the coast is high so a levee may not be the right solution.
	Breakwaters	1	2	0	Breakwaters can help minimize wave action in the event of the storm, but will not provide protection against tidal flooding caused by sea level rise.	Although this tool offers protection against high energy storms, this strategy may not be well-supported by the public or markets and governments.	Breakwaters can absorb the energy from each storm but do not do much to protect against sea level rise. This approach may be useful but a more comprehensive suite of tools will be necessary.	The government, opinion leaders and private actors signal that coastal living is too risky. These suggest that giving space for natural processes may be preferable to breakwaters.
	Setbacks	2	1	1	Setbacks can offer many benefits but may not be popular among homeowners, who do not have a sense of urgency about coastal storms and dislike this intrusion on private property.	Setbacks are the right solution for some homeowners, but it is on a case-by-case basis and the use of this tool is not strategic. Many find it too costly to stay on the coast as the scenario unfolds.	Setbacks will be effective against storms and sea level rise, but may not be consistent with the desire to remain on the coast. However, as time goes on, more property-owners may recognize the need to allow room for a dynamic shoreline.	Living on the coast too risky, and there is not enough incentive to remain on the coast in the longterm. Setbacks and rolling setbacks that offer the option to relocate as risks increase is appealing. This strategy requires few resources from the public sector.
Alternative Strategies	Elevation of Land and Streets	2	2	1	This is a costly strategy; it may not be appropriate to the level of hazards in this future. However, this strategy may be more appropriate to the high-value, dense and attached housing types found in urban areas.	This tool requires enormous coordination within and across jurisdictions and would not be very suitable to the political and climate in this scenario.	This strategy is both politically and publicly palatable in this scenario but takes strong government action. It will help coastal communities remain on the coast with necessary protection, and can be used in an urban context.	Elevation of land and streets can be suitable in coastal areas that are abandoned in order to protect homes that are further from the shore but still at risk.
	Dry Floodproofing	1	2	0	The desire to remain on the coast and perceived low risk of storms and sea level rise may lend favor for this strategy. These are especially useful for mixed use and commercial corridors.	Site-specific strategies like dry floodproofing are appropriate in this scenario. Those who can afford to retrofit their homes will.	Tax credits, loans and other assistance make this a viable option to help property-owners stay in place while reducing risk of structural damage during regular tidal flooding.	Dry floodproofing is not an ideal strategy as little funding available to assist values and there will be little return on investment.





RPA / Lucrecia Montemayor

## Illustration 2

*High-density, low-lying, mixed-use area with hardened shorelines*

### Step 1: Determine Goals or Criteria to Evaluate Response Options in Each Scenario Identify Possible Strategies

Planners and decision-makers agree on three goals for rebuilding. First, they aim to reduce risk to future coastal hazards. Second, they recognize that the city is full of vibrant and historic communities that are difficult to relocate. Planners and decision-makers seek to help communities rebuild in place and to avoid disrupting these communities. The third goal is to enhance natural systems that provide important ecosystem benefits to the city yet suffer consistent threats from urbanization.

### Step 2: Identify Possible Strategies Assess Implications of Strategies in Each Scenario

This typology is representative of one of the region's many revitalized urban waterfronts. Its shorelines are already armored with bulkheads and seawalls and dotted with working piers. These facilities and adjacent commercial and residential buildings are exposed to a number of coastal hazards, which will only be exacerbated by climate change-related risks. Many property owners may have taken steps to protect their properties, such as by installing bulkhead, but not on a coordinated basis. More comprehensive protective measures such as levees and breakwaters are under consideration. These can help deflect wave energy and minimize flooding. Other policy and land use tools, such as setbacks, are also considered.

### Step 3: Assess Implications of Strategies in Each Scenario

Figure 19 provides a brief illustration of how the five questions above are used to guide the considerations for each proposed strategy. Each tool is compared first to the goals that planners established at the outset of the exercise, and then compared against each of the scenarios using the five guiding questions above. It is clear that levees and breakwaters may not be the most effective ways to meet the community's goals. Future conditions under each scenario also suggest that levees and breakwaters may not be the most appropriate strategy. Each tool appears to be insufficient for all of the future coastal hazards and social, political and economic conditions. This suggests that other options could be considered and that a layered approach may be necessary.

### Step 4: Identify Alternative Strategies

Recognizing that other strategies may offer more potential to be robust against future conditions, planners and decision-makers discuss alternative strategies such as elevating land and streets and dry floodproofing. Elevating land and streets is costly in existing urbanized areas, but can offer flood protection that may not be otherwise possible for the dense multifamily housing stock that is common in urban areas. Dry floodproofing can protect structures in a cost-effective way and can be supported by the resources available to property-owners in most of the scenarios. There are clear tradeoffs between each of the strategies, but the iterative scenario planning process allows planners to consider many different strategies to arrive at the most optimal solutions.

Figure 19. Coastal Typology 2

Strategy		Reduce Risk	Enhance Natural Systems	Improve Public Beach Access	Muddle	Laissez-Faire	Subsidize	Retreat
Proposed Strategies	Beach Nourishment	1	2	1	Infrequent storms and predictable sea level rise make this a suitable choice. Firm desire to remain on the coast coupled with a robust public and private sector support long-term maintenance for this strategy.	This strategy will not adequately withstand frequent storms and will require very regular replenishment, but the government does not have inadequate financing to do this and instead favors more private, site-specific measures.	Although the government is motivated and well-funded to support beach nourishment, frequent storms and rapid sea level rise make this option unfavorable.	As property-owners move away from the shore, more room is available to accommodate the shifting coastline. Beach nourishment is not appropriate in this scenario.
	Seawall	2	1	0	A seawall is effective against frequency of storms and rate of sea level rise, but impeded access to the beach may be in conflict with the desire to remain on the coast. There is sufficient funding to construct and maintain a seawall.	This strategy is effective against the frequency of storms and rate of sea level rise in this scenario, but it may not be feasible given the general feeling that property-owners are responsible for their own protection. Infrastructure projects like seawalls lack political support.	A seawall, built high enough, may withstand the frequent storms and rapid sea level rise in this scenario. The firm desire to remain on the coast, coupled with strong support for coordinated government action, also make this a suitable option in this scenario.	Although this strategy may withstand the extreme weather and sea level rise in this scenario, this strategy gains little traction. Public funds are very limited and the desire to remain on the coast is diminishing. Instead there is a strong sense that we can no longer protect coastal properties.
	Relocation	2	1	1	This strategy is disproportionate to level of hazards and inconsistent with firm desire to remain on the coast.	Relocation will be effective against the frequency of coastal storms, but sea level rise is still gradual. Nonetheless, this strategy is appropriate for the diminishing desire to remain on the coast and the lack of resources available to support large-scale protection.	Government may have resources to support relocation or a planned retreat, but the desire to remain on the coast makes this option undesirable. Instead, there is more support for government to subsidize the high cost of living in coastal areas that are increasingly at risk.	Opinion leaders argue that coastal living is too risky, and the actions of the government and the market send signals that they are not willing to support or protect increasingly vulnerable and exposed areas. Relocation to upland areas is a good option.
Alternative Strategies	Waterfront Parks	2	2	1	This strategy is an amenity on the highly desirable waterfront. It also helps retain water and provide a buffer when an occasional storm arrives. Agencies, which seek to implement highly visible solutions, are in favor of this strategy.	This strategy is effective against the frequency of coastal storms and rate of sea level rise in this scenario. However, the political climate does not favor solutions like waterfront parks, which can require coordinated public action and long-term maintenance.	A strong desire to remain on the coast and a coordinated government response make waterfront parks a viable option. Waterfront parks are a popular choice for containing frequent storm-related and tidal flooding.	There is little incentive to invest in new infrastructure on the coast as the property tax base diminishes.
	Dunes	2	2	2	Dunes afford a high level of protection and can be maintained easily in this relatively calm environment.	There is little support for the type of coordinated action that would be necessary to build and maintain dune systems.	Although there is strong support for public action to protect coastal properties, frequent storms and rapid sea level rise make dunes less feasible in this scenario.	This strategy will not be very effective against frequent coastal storms and rapid sea level rise that are present in this scenario. There is little incentive to try to stabilize the shoreline or protect remaining people and properties.

