The Curry Engineering Group, PLLC

November 30, 2012

Ms. Dawn Snotherly
Assoc. Planner
City of Wilmington Planning
305 Chestnut Street
Wilmington, NC 28402

RE: Mattress Firm @ Wilmington
Response to Second Review Comments

Dear Ms. Snotherly:

The purpose of this letter is to respond to your review comments dated September 26, 2012, for the above referenced project. Your comments and corresponding responses are summarized below:

Fire Department – Chris Elrod

Second Review Comments:

None

Urban Forester – Brion Capo

Second Review Comments:

None

Planning – Dawn Snotherly

Second Review Comments (11/6/2012)

1. Sheet C-01 and C-02
   - Please include the zoning and land use for all adjacent properties
     Zoning and land use for all adjacent properties has been added to revised sheets.
   - Include the adjacent properties across Oleander Drive from the site
     Zoning and land use has been added for the properties across Oleander Drive.
2. Sheet C-03
   - Note 19 – a tree removal permit and fee is required for the project prior to the release of the project for construction.
     Per phone conversation, this note has been deleted to eliminate any confusion.
3. Sheet C-04
   - The sight triangles are not drawn correctly. Please call to discuss.
     Sight triangles have been corrected on revised plans.

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- Notes 4 & 5, please change the name to the Cape Fear Public Utility Authority
  Notes 4 & 5 have been revised.

4. Sheet C-07
   - Notes
     - For all understory tree, the min. height is between 8-10 feet. Please omit 1.25"C
       Notes have been revised and the 1.25"C reference has been removed.
     - For all shrubs, the min. height is 12" vs. 18".
       All notes have been revised to reflect an 18" min. planting height with the exception of the plants used to screen the dumpster enclosure, which are noted to be 36" min.
   - Planting table
     - Min. planting height for Crape Myrtle is 8-10'
       See revised table.
     - Please verify the symbology for the Burford and Carissa Hollies. There appears to be a conflict with the table and the plan.
       See revised table.
   - Plan
     - The Burford Holly growing habit is appropriate for screening the dumpster
       Noted.
     - The sight triangles are not drawn correctly, please call to discuss.
       Sight triangles have been revised.
     - Proposed landscape material is located in the sight triangle. Only plant material with a growing habit less than 30" is permitted in the sight triangle.
       See revised plan. Trees have been moved out of the sight triangle
     - You may want to consider planting the shrubbery in several clusters in the streetyard adjacent to the alley.
       Noted. See revised plan.
     - Are you including the landscape area adjacent to the SE corner of the building as a landscape island? If so, please indicate the square footage of the island.
       This island is not included as a landscape island.

Transportation – Tara Murphy

Second Review Comments (11/15/12)

1. **TECHNICAL STANDARDS:**
   - The alley driveway is acceptable as proposed (street type). Street type driveways do require stop bars and stop signs. The Oleander driveway needs to be shown as the City standard ramp type driveway per the detail provided on sheet D-09 (detail #4).
     A stop sign has been added to the Alley driveway. The Oleander driveway has been revised per detail and phone conversation.
   - Provide centerline driveway elevations at the curb, back of right-of-way and 26 & 52 feet behind the right-of-way.
     Centerline elevations have been added to revised plans.
   - The stop bars are labeled as being "white paint" and contradict with notes 11 and 13 on sheet C-04 which indicate thermoplastic. Stop bars are not required at concrete apron type driveways.
     Labels have been revised to reflect thermoplastic paint to coincide with notes 11 and 13.

- The sight distance triangles have not been applied correctly. Please refer to the illustration below and contact me if you have any questions.
  Sight distance triangles have been revised per details.

- The northern landscape island radius on the drive aisle approaching the dumpster needs to be 25'. 15' is acceptable on the southern landscape island if trash pickup vehicles will ingress and egrass from Oleander Drive.
  The northern landscape island radius has been revised to 25'. The southern landscape island remains at 25'. This is based on the assumption that the majority of the trash pickup vehicles will enter the site from the Alley.

- Please draw the wheelchair ramp at the handicapped parking spaces.
  See revised plans.

Engineering – Rob Gordon

Second Review Comments (11/19/12)

1. City Technical Standards require the minimum pipe size to be 12" & the material to be RCP. It is recommended that all pipes meet the technical standards, but the pipe from S3 to S4 connects with the public system and is required to meet the technical standards. Please revise.
   All drain pipe has been revised to 15" RCP with the exception of the pipe from N1 to N2. This pipe was left at 8" PVC due to the limited clearance in the area. Calculations have been adjusted accordingly.

2. The Permeable Pavement (PP) is adjacent to both HD asphalt pavement and HD concrete pavement. P 18-27 of the state BMP manual requires consideration for the transitions between conventional concrete or asphalt and PP. Please provide additional detail.
   Details 9 and 10 have been added to sheet D-09 to provide additional details on the required interface between asphalt/concrete and permeable pavement as outlined in the latest edition of the NCDENR BMP manual.

3. Detail 5 on D-09 is not clear. The pavement sections on either side of the transition do not match the pavement sections in detail 6 (on D-09). Please clarify.
   The pavement sections have been revised to accurately reflect the pavement thicknesses.

4. The inv (out) for S3 listed on the pipe schedule (C-05) does not match the calcs.
   The Invert (Out) for S3 has been revised.

5. Both the PP sign and the accessible parking details state "see sign post per detail this sheet". It is not clear what that is supposed to be referencing.
   These notes have been revised to reference COW Detail SD 15-03 located on D-09 showing standard details for sign installation.

6. The size of the PP sign must be listed on the detail.
   Detail for the Permeable Pavement sign has been revised to reflect dimensions of 18"w x 24"h

Miscellaneous Revisions

1. The updated impervious square footages based on recent changes exceeded the allowable 10,000sf and therefore the following changes were implemented to get back under the 10,000sf threshold.
   a. Eliminated one dumpster
   b. Decreased width of sidewalk to 5' along front of the building and provided wheelstops
   c. Added pervious concrete pavement to the 2 parking spaces near the alley driveway.
   d. Reduced drive aisle accessing the dumpster to 24' wide
   e. Reduced handicap stalls from van accessible to standard

2. Grading and drainage has been modified in conjunction with changes noted above.
3. Replace additional sidewalk along Oleander drive. In the previous submittal, we were attempting to save a portion of this sidewalk, however upon further review this does not seem feasible.

Please let me know if you have any questions or need additional information pertaining to your review.

Sincerely,
The Curry Engineering Group, PLLC

Mat Trowbridge, EI, LEED AP

Encl: Site Plan Package Documentation

Mattress Firm - Wilmington

10 YEAR STORM

# OF INCOMING DISCHARGES	FROM	TO	STORM (5-YR,10-YR)	AREA indiv. (ft²)	AREA indiv. (ac)	TOTAL AREA (ac)	C indiv.	CA indiv.	CA sum	Time of Concentration: INLET TIME (min)	IND. PIPE TIME (min.)	TOTAL PIPE TIME (min)	DESIGN (prev)+ PIPE (prev) (min)	DESIGN TIME (min.)	10-YR INTENSITY (in/hr)	Q individual (cfs)	Q total (cfs)	SLOPE	D theo. (in)	SIZE (in) 15" min.	n	V full (ft/sec)	LENGTH (ft)	ELEV. INLET TOP	ELEV. INLET INVERT	ELEV. OUTLET TOP	ELEV. OUTLET INVERT	BOX DEPTH (ft)
0	S1	S3	10	4236	0.10	0.10	0.85	0.08	0.08	5	0.111	5.00	5.00	5.00	7.23	0.60	0.60	0.50%	6.8	15	0.012	4.04	27	42.14	39.39	42.80	39.26	2.75
0	S2	S3	10	1616	0.04	0.04	0.90	0.03	0.03	5	0.093	5.00	5.00	5.00	7.23	0.24	0.24	0.50%	4.8	15	0.012	4.04	22.5	42.52	39.27	42.80	39.16	3.25
2	S3	S4	10	100	0.00	0.14	0.70	0.00	0.12	5	0.070	5.09	5.09	5.09	7.23	0.01	0.85	0.50%	7.7	15	0.012	4.04	17	42.80	39.06	41.50	38.97	3.75
1	S4	OUT	10	2307	0.05	0.19	0.90	0.05	0.17	5	1.143	5.16	5.16	5.16	7.23	0.34	1.20	0.23%	10.2	15	0.012	2.74	188	41.50	38.62	41.37	38.19	2.88
0	N1	N2	10	3373	0.08	0.08	0.85	0.07	0.07	5	0.114	5.00	5.00	5.00	7.23	0.48	0.48	2.00%	4.3	8	0.009	7.09	48.5	41.97	38.72	42.17	37.75	3.25
1	N2	N3	10	986	0.02	0.10	0.70	0.02	0.08	5	0.060	5.11	5.11	5.11	7.23	0.11	0.59	2.00%	5.2	15	0.012	8.09	29	42.17	37.65	42.11	37.07	4.52
1	N3	EX3	10	696	0.02	0.12	0.90	0.01	0.10	5	0.106	5.17	5.17	5.17	7.23	0.10	0.69	2.00%	5.5	15	0.012	8.09	51.5	42.11	36.97	41.50	35.94	5.14
0	EX1	N4	10	3058	0.07	0.07	0.90	0.06	0.06	5	0.146	5.00	5.00	5.00	7.23	0.46	0.46	0.74%	5.7	15	0.012	4.92	43	39.84	36.64	40.63	36.32	3.20
1	N4	EX2	10	6883	0.16	0.23	0.90	0.14	0.21	5	0.068	5.15	5.15	5.15	7.23	1.03	1.48	0.74%	8.9	15	0.012	4.92	20	40.63	36.32	40.80	36.17	4.31
1	EX2	EX3	10	100	0.00	0.23	0.90	0.00	0.21	5	0.213	5.21	5.21	5.21	7.23	0.01	1.50	0.74%	8.9	15	0.012	4.92	63	40.80	36.17	41.50	35.71	4.63
2	EX3	OUT	10	223	0.01	0.35	0.70	0.00	0.31	5	0.135	5.28	5.28	5.28	7.23	0.03	2.22	0.45%	11.3	15	0.012	3.84	31	41.50	35.80	39.82	35.66	5.70

Mattress Firm - Wilmington

50 YEAR STORM

# OF INCOMING DISCHARGES	FROM	TO	STORM (5-YR,10-YR)	AREA indiv. (ft^2)	AREA indiv. (ac)	TOTAL AREA (ac)	C indiv.	CA indiv.	CA sum	Time of Concentration: INLET TIME (min)	IND. PIPE TIME (min.)	TOTAL PIPE TIME (min)	DESIGN (prev)+ PIPE (prev) (min)	DESIGN TIME (min.)	50-YR INTENSITY (in/hr)	Q individual (cfs)	Q total (cfs)	SLOPE	D theo. (in)	SIZE (in) 15" min.	n	V full (ft/sec)	LENGTH (ft)	ELEV. INLET TOP	ELEV. INLET INVERT	ELEV. OUTLET TOP	ELEV. OUTLET INVERT	BOX DEPTH (ft)
0	S1	S3	50	4180	0.10	0.10	0.85	0.08	0.08	5	0.111	5.00	5.00	5.00	8.15	0.66	0.66	0.50%	7.1	15	0.012	4.04	27	42.14	39.39	42.80	39.26	2.75
0	S2	S3	50	1616	0.04	0.04	0.90	0.03	0.03	5	0.093	5.00	5.00	5.00	8.15	0.27	0.27	0.50%	5.0	15	0.012	4.04	22.5	42.52	39.27	42.80	39.16	3.25
2	S3	S4	50	350	0.01	0.14	0.70	0.01	0.12	5	0.070	5.09	5.09	5.09	8.15	0.05	0.98	0.50%	8.2	15	0.012	4.04	17	42.80	39.06	41.50	38.97	3.75
1	S4	OUT	50	1923	0.04	0.19	0.90	0.04	0.16	5	1.143	5.16	5.16	5.16	8.15	0.32	1.31	0.23%	10.5	15	0.012	2.74	188	41.50	38.62	41.37	38.19	2.88
0	N1	N2	50	3373	0.08	0.08	0.85	0.07	0.07	5	0.114	5.00	5.00	5.00	8.15	0.54	0.54	2.00%	4.5	8	0.009	7.09	48.5	41.97	38.72	42.17	37.75	3.25
1	N2	N3	50	986	0.02	0.10	0.70	0.02	0.08	5	0.060	5.11	5.11	5.11	8.15	0.13	0.67	2.00%	5.4	15	0.012	8.09	29	42.17	37.65	42.11	37.07	4.52
1	N3	EX3	50	696	0.02	0.12	0.90	0.01	0.10	5	0.106	5.17	5.17	5.17	8.15	0.12	0.78	2.00%	5.8	15	0.012	8.09	51.5	42.11	36.97	41.50	35.94	5.14
0	EX1	N4	50	3058	0.07	0.07	0.90	0.06	0.06	5	0.146	5.00	5.00	5.00	8.15	0.51	0.51	0.74%	6.0	15	0.012	4.92	43	39.84	36.54	40.63	36.32	3.20
1	N4	EX2	50	6883	0.16	0.23	0.90	0.14	0.21	5	0.068	5.15	5.15	5.15	8.15	1.16	1.67	0.74%	9.3	15	0.012	4.92	20	40.63	36.32	40.80	36.17	4.31
1	EX2	EX3	50	100	0.00	0.00	0.90	0.00	0.21	5	0.213	5.21	5.21	5.21	8.15	0.02	1.69	0.74%	9.3	15	0.012	4.92	63	40.80	36.17	41.50	35.71	4.63
2	EX3	OUT	50	223	0.01	0.12	0.70	0.00	0.31	5	0.135	5.28	5.28	5.28	8.15	0.03	2.50	0.45%	11.8	15	0.012	3.84	31	41.50	35.90	39.82	35.76	5.60

Mattress Firm - Wilmington
10 YEAR STORM

INLET OR JUNCT. #	OUTLET ELEVATION	OUTLET + 0.8D	*OUTLET W.S ELEV*	D (in)	Q (cfs)	L (ft)	K	Sf	Vfull OUTLET (fps)	*Vfull INLET (fps)*	HEAD LOSSES Hf (Friction Loss)	Hc (Contraction Loss)	He (Expansion Loss)	*Change in direction of flow (ang.)*	K for Hb	Hb (Bend Loss)	Ht (Total Loss)	INLET W.S ELEV	RIM ELEV	DIFF
S4	38.19	39.19	39.19	15	1.20	188	113.8	0.000	2.74	4.04	0.02	0.03	0.09	90	0.70	0.18	0.32	39.51	41.50	1.99
S3	38.97	39.97	39.97	15	0.85	17	113.8	0.000	4.04	4.04	0.00	0.06	0.09	90	0.70	0.18	0.33	40.30	42.80	2.50
S2	39.16	40.16	40.30	15	0.24	23	113.8	0.000	4.04	0.00	0.00	0.06	0.00	0	0.00	0.00	0.06	40.36	42.52	2.16
S1	39.26	40.26	40.30	15	0.60	27	113.8	0.000	4.04	0.00	0.00	0.06	0.00	0	0.00	0.00	0.06	40.37	42.14	1.77
EX3	35.66	36.66	36.66	15	2.22	31	113.8	0.000	3.84	4.92	0.01	0.06	0.13	90	0.70	0.26	0.46	37.12	41.50	4.38
EX2	35.71	36.71	37.12	15	1.50	63	113.8	0.000	4.92	4.92	0.01	0.09	0.13	0	0.00	0.00	0.24	37.36	40.80	3.44
N4	36.17	37.17	37.36	15	1.48	20	113.8	0.000	4.92	4.92	0.00	0.09	0.13	0	0.00	0.00	0.23	37.59	40.63	3.04
EX1	36.32	37.32	37.59	15	0.46	43	113.8	0.000	4.92	0.00	0.00	0.09	0.00	0	0.00	0.00	0.09	37.68	39.84	2.16
N3	35.94	36.94	37.12	15	0.69	52	113.8	0.000	8.09	8.09	0.00	0.25	0.36	0	0.00	0.00	0.61	37.74	42.11	4.37
N2	37.07	38.07	38.07	15	0.59	29	113.8	0.000	8.09	7.09	0.00	0.25	0.27	10	0.00	0.00	0.53	38.60	42.17	3.57
N1	37.75	38.28	38.60	8	0.48	49	38.6	0.000	7.09	0.00	0.01	0.20	0.00	0	0.00	0.00	0.20	38.80	41.97	3.17

Mattress Firm - Wilmington
50 YEAR STORM

INLET OR JUNCT. #	OUTLET ELEVATION	OUTLET + 0.8D	*OUTLET W.S ELEV*	D (in)	Q (cfs)	L (ft)	K	Sf	Vfull OUTLET (fps)	*Vfull INLET (fps)*	HEAD LOSSES Hf (Friction Loss)	Hc (Contraction Loss)	He (Expansion Loss)	*Change in direction of flow (ang.)*	K for Hb	Hb (Bend Loss)	Ht (Total Loss)	INLET W.S ELEV	RIM ELEV	DIFF
S4	38.19	39.19	39.19	15	1.31	188	113.8	0.000	2.74	4.04	0.02	0.03	0.09	90	0.70	0.18	0.32	39.51	41.50	1.99
S3	38.97	39.97	39.97	15	0.98	17	113.8	0.000	4.04	4.04	0.00	0.06	0.09	90	0.70	0.18	0.33	40.30	42.80	2.50
S2	39.16	40.16	40.30	15	0.51	23	113.8	0.000	4.04	0.00	0.00	0.06	0.00	0	0.00	0.00	0.06	40.37	42.52	2.15
S1	39.26	40.26	40.30	15	0.66	27	113.8	0.000	4.04	0.00	0.00	0.06	0.00	0	0.00	0.00	0.06	40.37	42.14	1.77
EX3	35.66	36.66	36.66	15	2.50	31	113.8	0.000	3.84	4.92	0.01	0.06	0.13	90	0.70	0.26	0.47	37.13	41.50	4.37
EX2	35.71	36.71	37.13	15	1.69	63	113.8	0.000	4.92	4.92	0.01	0.09	0.13	0	0.00	0.00	0.24	37.37	40.80	3.43
N4	36.17	37.17	37.37	15	1.67	20	113.8	0.000	4.92	4.92	0.00	0.09	0.13	0	0.00	0.00	0.23	37.60	40.63	3.03
EX1	36.32	37.32	37.60	15	0.51	43	113.8	0.000	4.92	0.00	0.00	0.09	0.00	0	0.00	0.00	0.09	37.69	39.84	2.15
N3	35.94	36.94	37.13	15	0.78	52	113.8	0.000	8.09	8.09	0.00	0.25	0.36	0	0.00	0.00	0.61	37.74	42.11	4.37
N2	37.07	38.07	38.07	15	0.67	29	113.8	0.000	8.09	7.09	0.00	0.25	0.27	10	0.00	0.00	0.53	38.60	42.17	3.57
N1	37.75	38.28	38.60	8	0.54	49	38.6	0.000	7.09	0.00	0.01	0.20	0.00	0	0.00	0.00	0.20	38.80	41.97	3.17

BMP DESIGN

Project Name: *Mattress Firm - Wilmington*
Date: *9/4/2012*
By: *M. Trowbridge* Checked By: *D. Curry*

Total Site Acreage: **36060 sf**
0.83 ac

AREAS

Existing Impervious Area =	28974	sf	0.67 ac	
Existing Impervious With New Asphalt Overlay =	6305	sf	0.14 ac	
New Impervious Area =	9502	sf	0.22 ac	
Building =	4500	sf		
Pavement =	5993	sf		
Sidewalk =	982			
Pervious Concrete Area =	1973	sf	0.05 ac	
Adjusted Impervious Area w/Pervious Pvmt =	9995	sf		<10,000sf

Permeable Pavement - Aggregate Design (Water Quantity):

P_{10} =	6.72	inches	Rainfall Depth for 10 yr Storm (COW Chart E-5)
Ac =	0.00	sf	Built Upon Area (BUA) Contributing to Permeable Pavement
Ap =	1973.00	sf	Permeable Pavement Area
R =	0.00	unitless	Ac/Ap
d =	24.00	hours	Storm Duration
I =	0.97	in/hr	Soil Infiltration Rate
SF =	0.20		Safety Factor
n =	0.40	unitless	Porosity of aggregate base (#57 stone)
D_{10} =	5	inches	$= \frac{P10(1+R) - d * i * SF}{n}$

Permeable Pavement - Aggregate Design (Water Quality):

P =	1.50	inches	Rainfall Depth for Water Quality Storm
Ac =	0.00	sf	Built Upon Area (BUA) Contributing to Permeable Pavement
Ap =	1973.00	sf	Permeable Pavement Area
R =	0.00	unitless	Ac/Ap
n =	0.40	unitless	Porosity of aggregate base (#57 stone)
D_{wq} =	4	inches	$= \frac{P10(1+R)}{n}$

Ponding Time Calculation:

P_{10} =	6.72	inches	Rainfall Depth for 10 yr Storm (NOAA)	
Ac =	0.00	sf	Built Upon Area (BUA) Contributing to Permeable Pavement	
Ap =	1973.00	sf	Permeable Pavement Area	
R =	0.00	unitless	Ac/Ap	
I =	0.97	in/hr	Soil Infiltration Rate	
SF =	0.50	unitless	Safety Factor	
T =	0.58	days	$= \frac{P10(1+R)}{24 * SF * i}$	<5 days