

*Wald Residence  
HVAC Load Calculations*

for

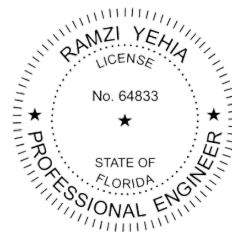
Wald Residence  
7758 Tennyson Ct  
Boca Raton, Florida 33433

# YAHYA CONSULTANTS, INC.

*Quality & Prompt*

*Engineering*

*Services*



Prepared By:

Ramzi Yehia  
Yahya Consultants  
5516 NW 58th Ave  
Coral Springs FL 33067  
954.263.9318  
Sunday, September 12, 2021



## Project Report

### General Project Information

Project Title: Wald Residence  
 Designed By: Yahya Consultants, Inc.  
 Project Date: September, 03 2021  
 Project Comment: Florida License #64833 Certificate of Authorization #27115  
 Client Name: Wald Residence  
 Client Address: 7758 Tennyson Ct  
 Client City: Boca Raton, Florida 33433  
 Company Name: Yahya Consultants  
 Company Representative: Ramzi Yehia  
 Company Address: 5516 NW 58th Ave  
 Company City: Coral Springs FL 33067  
 Company Phone: 954.263.9318  
 Company E-Mail Address: ryehia@ityci.com  
 Company Comment: Florida License #64833 Certificate of Authorization #27115

### Design Data

Reference City: West Palm Beach AP, Florida  
 Building Orientation: Front door faces East  
 Daily Temperature Range: Medium  
 Latitude: 26 Degrees  
 Elevation: 15 ft.  
 Altitude Factor: 0.999

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	47	44.1	n/a	n/a	70	n/a
Summer:	90	78	59%	50%	68	75

### Check Figures

Total Building Supply CFM:	845	CFM Per Square ft.:	0.972
Square ft. of Room Area:	870	Square ft. Per Ton:	411
Volume (ft³) of Cond. Space:	7,892		

### Building Loads

Total Heating Required Including Ventilation Air:	18,308 Btuh	18.308 MBH
Total Sensible Gain:	18,586 Btuh	73 %
Total Latent Gain:	6,816 Btuh	27 %
Total Cooling Required Including Ventilation Air:	25,402 Btuh	2.12 Tons (Based On Sensible + Latent)

### Notes

Rhvac is an ACCA approved Manual J and Manual D computer program.  
 Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.  
 All computed results are estimates as building use and weather may vary.  
 Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



### Load Preview Report

Scope	Net Ton	ft. <sup>2</sup> /Ton	Area	Sen Gain	Lat Gain	Net Gain	Sen Loss	Sys Htg CFM	Sys Clg CFM	Sys Act CFM	Duct Size
Building	2.12	411	870	18,586	6,816	25,402	18,308	237	845	845	
System 1	2.12	411	870	18,586	6,816	25,402	18,308	237	845	845	16x12
Supply Duct Latent					204	204					
Return Duct				0	549	549	86				
Zone 1			870	18,586	6,063	24,649	18,223	237	845	845	16x12
1-New Exercise			347	5,797	1,794	7,591	6,069	79	264	264	2--6
2-New Pwdr.			35	931	411	1,342	1,245	16	42	42	1--6
3-New Bdrm 8			146	2,137	669	2,806	1,626	21	97	97	1--6
4-New Bdrm 7			145	2,996	851	3,847	2,448	32	136	136	1--6
5-New Bath 7			38	1,093	270	1,363	1,024	13	50	50	1--6
6-New Hall			65	1,455	376	1,831	1,323	17	66	66	1--6
7-Stairs			94	4,177	1,692	5,869	4,487	58	190	190	2--6



**Total Building Summary Loads**

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1A-hb-o: Glazing-Single pane, operable window, heat-absorbing, metal frame with break, medium color blinds at 45° with 100% coverage, u-value 1.08, SHGC 0.5	155.2	3,855	0	7,648	7,648
13A-4ocs: Wall-Block, board insulation only, R-4 board insulation, open core, siding finish	1440.8	6,627	0	6,425	6,425
16E-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Light Tile, Slate or Concrete, R-30 insulation	869.5	641	0	891	891
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil	137	3,116	0	0	0
Subtotals for structure:		14,239	0	14,964	14,964
People:	2		460	600	1,060
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,285	753	359	1,112
Infiltration: Winter CFM: 110, Summer CFM: 110		2,784	5,603	2,663	8,266
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Exhaust: Winter CFM: 100, Summer CFM: 100					
<b>Total Building Load Totals:</b>		<b>18,308</b>	<b>6,816</b>	<b>18,586</b>	<b>25,402</b>

**Check Figures**

Total Building Supply CFM:	845	CFM Per Square ft.:	0.972
Square ft. of Room Area:	870	Square ft. Per Ton:	411
Volume (ft³) of Cond. Space:	7,892		

**Building Loads**

Total Heating Required Including Ventilation Air:	18,308 Btuh	18.308 MBH
Total Sensible Gain:	18,586 Btuh	73 %
Total Latent Gain:	6,816 Btuh	27 %
Total Cooling Required Including Ventilation Air:	25,402 Btuh	2.12 Tons (Based On Sensible + Latent)

**Notes**

Rhvac is an ACCA approved Manual J and Manual D computer program. Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D. All computed results are estimates as building use and weather may vary. Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



### System 1 AHU-1 Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1A-hb-o: Glazing-Single pane, operable window, heat-absorbing, metal frame with break, medium color blinds at 45° with 100% coverage, u-value 1.08, SHGC 0.5	155.2	3,855	0	7,648	7,648
13A-4ocs: Wall-Block, board insulation only, R-4 board insulation, open core, siding finish	1440.8	6,627	0	6,425	6,425
16E-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Light Tile, Slate or Concrete, R-30 insulation	869.5	641	0	891	891
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil	137	3,116	0	0	0
Subtotals for structure:		14,239	0	14,964	14,964
People:	2		460	600	1,060
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,285	753	359	1,112
Infiltration: Winter CFM: 110, Summer CFM: 110		2,784	5,603	2,663	8,266
Ventilation: Winter CFM: 0, Summer CFM: 0		0	0	0	0
Exhaust: Winter CFM: 100, Summer CFM: 100					
<b>System 1 AHU-1 Load Totals:</b>		<b>18,308</b>	<b>6,816</b>	<b>18,586</b>	<b>25,402</b>

#### Check Figures

Supply CFM:	845	CFM Per Square ft.:	0.972
Square ft. of Room Area:	870	Square ft. Per Ton:	411
Volume (ft³) of Cond. Space:	7,892		

#### System Loads

Total Heating Required Including Ventilation Air:	18,308 Btuh	18.308 MBH
Total Sensible Gain:	18,586 Btuh	73 %
Total Latent Gain:	6,816 Btuh	27 %
Total Cooling Required Including Ventilation Air:	25,402 Btuh	2.12 Tons (Based On Sensible + Latent)

#### Notes

Rhvac is an ACCA approved Manual J and Manual D computer program. Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D. All computed results are estimates as building use and weather may vary. Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



**System 1, Zone 1 Summary Loads (Average Load Procedure for Rooms)**

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1A-hb-o: Glazing-Single pane, operable window, heat-absorbing, metal frame with break, medium color blinds at 45° with 100% coverage, u-value 1.08, SHGC 0.5	155.2	3,855	0	7,648	7,648
13A-4ocs: Wall-Block, board insulation only, R-4 board insulation, open core, siding finish	1440.8	6,627	0	6,425	6,425
16E-30: Roof/Ceiling-Under Attic with Insulation on Attic Floor (also use for Knee Walls and Partition Ceilings), Vented Attic, No Radiant Barrier, Light Tile, Slate or Concrete, R-30 insulation	869.5	641	0	891	891
22A-pl: Floor-Slab on grade, No edge insulation, no insulation below floor, any floor cover, passive, light dry soil	137	3,116	0	0	0
Subtotals for structure:		14,239	0	14,964	14,964
People:	2		460	600	1,060
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		1,200	0	359	359
Infiltration: Winter CFM: 110, Summer CFM: 110		2,784	5,603	2,663	8,266
System 1, Zone 1 Load Totals:		18,223	6,063	18,586	24,649

**Check Figures**

Supply CFM:	845	CFM Per Square ft.:	0.972
Square ft. of Room Area:	870	Square ft. Per Ton:	423
Volume (ft³) of Cond. Space:	7,892		

**Zone Loads**

Total Heating Required:	18,223 Btuh	18.223 MBH
Total Sensible Gain:	18,586 Btuh	75 %
Total Latent Gain:	6,063 Btuh	25 %
Total Cooling Required:	24,649 Btuh	2.05 Tons (Based On Sensible + Latent)

**Notes**

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**Detailed Room Loads - Room 1 - New Exercise (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	15.1 ft.	System Number:	1
Room Width:	23.0 ft.	Zone Number:	1
Area:	347.3 sq.ft.	Supply Air:	264 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	5.7 AC/hr
Volume:	2,778.4 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	2	Actual Winter Vent.:	0 CFM
Runout Air:	132 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	671 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	671 ft./min.	Actual Winter Infil.:	35 CFM
Actual Loss:	0.291 in.wg./100 ft.	Actual Summer Infil.:	35 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
N -Wall-13A-4ocs 23 X 10	230	0.200	4.6	1,058	4.5	0	1,026
NE-Wall-13A-4ocs 21.4 X 10	164	0.200	4.6	754	4.5	0	731
W -Wall-13A-4ocs 6.7 X 10	67	0.200	4.6	308	4.5	0	299
NE-Gls-1A-hb-o shgc-0.5 0%S	50	1.080	24.8	1,242	48.4	0	2,420
UP-Ceil-16E-30 15.1 X 23	347.3	0.032	0.7	256	1.0	0	356
Floor-22A-pl 51 ft..Per.	51	0.989	22.7	1,160	0.0	0	0
Subtotals for Structure:				4,778		0	4,832
Infil.: Win.: 35.2, Sum.: 35.2	511		1.744	891	1.669	1,794	853
Ductwork:				400			112
Room Totals:				6,069		1,794	5,797



**Detailed Room Loads - Room 2 - New Pwdr. (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	7.0 ft.	System Number:	1
Room Width:	5.0 ft.	Zone Number:	1
Area:	35.0 sq.ft.	Supply Air:	42 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	9.1 AC/hr
Volume:	280.0 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	42 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	216 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	216 ft./min.	Actual Winter Infil.:	8 CFM
Actual Loss:	0.031 in.wg./100 ft.	Actual Summer Infil.:	8 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
S -Wall-13A-4ocs 4.7 X 10	41	0.200	4.6	189	4.5	0	183
W -Wall-13A-4ocs 7 X 10	70	0.200	4.6	322	4.5	0	312
S -Gls-1A-hb-o shgc-0.5 0%S	6	1.080	24.8	149	31.2	0	187
UP-Ceil-16E-30 7 X 5	35	0.032	0.7	26	1.0	0	36
Floor-22A-pl 12 ft..Per.	12	0.989	22.7	273	0.0	0	0
Subtotals for Structure:				959		0	718
Infil.: Win.: 8.1, Sum.: 8.1	117		1.744	204	1.667	411	195
Ductwork:				82			18
Room Totals:				1,245		411	931





**Detailed Room Loads - Room 3 - New Bdrm 8 (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	11.4 ft.	System Number:	1
Room Width:	12.8 ft.	Zone Number:	1
Area:	145.9 sq.ft.	Supply Air:	97 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	5.0 AC/hr
Volume:	1,167.4 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	97 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	495 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	495 ft./min.	Actual Winter Infil.:	9 CFM
Actual Loss:	0.159 in.wg./100 ft.	Actual Summer Infil.:	9 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
W -Wall-13A-4ocs 12.5 X 10	109	0.200	4.6	501	4.5	0	486
W -Gls-1A-hb-o shgc-0.5 0%S	16	1.080	24.8	397	59.5	0	952
UP-Ceil-16E-30 11.4 X 12.8	145.9	0.032	0.7	107	1.0	0	149
Floor-22A-pl 13 ft..Per.	13	0.989	22.7	296	0.0	0	0
Subtotals for Structure:				1,301		0	1,587
Infil.: Win.: 8.6, Sum.: 8.6	125		1.744	218	1.672	439	209
Ductwork:				107			41
People: 230 lat/per, 300 sen/per:	1					230	300
Room Totals:				1,626		669	2,137



**Detailed Room Loads - Room 4 - New Bdrm 7 (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	13.8 ft.	System Number:	1
Room Width:	10.5 ft.	Zone Number:	1
Area:	144.9 sq.ft.	Supply Air:	136 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	7.1 AC/hr
Volume:	1,159.2 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	136 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	694 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	694 ft./min.	Actual Winter Infil.:	12 CFM
Actual Loss:	0.311 in.wg./100 ft.	Actual Summer Infil.:	12 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
E -Wall-13A-4ocs 4 X 10	40	0.200	4.6	184	4.5	0	178
NE-Wall-13A-4ocs 13.7 X 10	105	0.200	4.6	483	4.5	0	468
NE-Gls-1A-hb-o shgc-0.5 0%S	32	1.080	24.8	795	48.4	0	1,549
UP-Ceil-16E-30 13.8 X 10.5	144.9	0.032	0.7	107	1.0	0	148
Floor-22A-pl 18 ft..Per.	18	0.989	22.7	409	0.0	0	0
Subtotals for Structure:				1,978		0	2,343
Infil.: Win.: 12.2, Sum.: 12.2	177		1.746	309	1.667	621	295
Ductwork:				161			58
People: 230 lat/per, 300 sen/per:	1					230	300
Room Totals:				2,448		851	2,996



**Detailed Room Loads - Room 5 - New Bath 7 (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	4.4 ft.	System Number:	1
Room Width:	8.6 ft.	Zone Number:	1
Area:	37.8 sq.ft.	Supply Air:	50 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	9.9 AC/hr
Volume:	302.7 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	50 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	253 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	253 ft./min.	Actual Winter Infil.:	5 CFM
Actual Loss:	0.043 in.wg./100 ft.	Actual Summer Infil.:	5 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NE-Wall-13A-4ocs 7.7 X 10	64.2	0.200	4.6	295	4.5	0	286
NE-Gls-1A-hb-o shgc-0.5 0%S	12.8	1.080	24.8	318	48.4	0	619
UP-Ceil-16E-30 4.4 X 8.6	37.8	0.032	0.7	28	1.0	0	39
Floor-22A-pl 8 ft..Per.	8	0.989	22.7	182	0.0	0	0
Subtotals for Structure:				823		0	944
Infil.: Win.: 5.3, Sum.: 5.3	77		1.740	134	1.662	270	128
Ductwork:				67			21
Room Totals:				1,024		270	1,093



**Detailed Room Loads - Room 6 - New Hall (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	5.8 ft.	System Number:	1
Room Width:	11.2 ft.	Zone Number:	1
Area:	65.0 sq.ft.	Supply Air:	66 CFM
Ceiling Height:	8.0 ft.	Supply Air Changes:	7.6 AC/hr
Volume:	519.7 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	1	Actual Winter Vent.:	0 CFM
Runout Air:	66 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	337 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	337 ft./min.	Actual Winter Infil.:	7 CFM
Actual Loss:	0.075 in.wg./100 ft.	Actual Summer Infil.:	7 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
W -Wall-13A-4ocs 10.7 X 10	94.2	0.200	4.6	433	4.5	0	420
W -Gls-1A-hb-o shgc-0.5 0%S	12.8	1.080	24.8	318	59.5	0	761
UP-Ceil-16E-30 5.8 X 11.2	65	0.032	0.7	48	1.0	0	67
Floor-22A-pl 11 ft..Per.	11	0.989	22.7	250	0.0	0	0
Subtotals for Structure:				1,049		0	1,248
Infil.: Win.: 7.4, Sum.: 7.4	107		1.748	187	1.673	376	179
Ductwork:				87			28
Room Totals:				1,323		376	1,455



**Detailed Room Loads - Room 7 - Stairs (Average Load Procedure)**

**General**

Calculation Mode:	Htg. & clg.	Occurrences:	1
Room Length:	12.0 ft.	System Number:	1
Room Width:	7.8 ft.	Zone Number:	1
Area:	93.6 sq.ft.	Supply Air:	190 CFM
Ceiling Height:	18.0 ft.	Supply Air Changes:	6.8 AC/hr
Volume:	1,684.8 cu.ft.	Req. Vent. Clg:	0 CFM
Number of Registers:	2	Actual Winter Vent.:	0 CFM
Runout Air:	95 CFM	Percent of Supply.:	0 %
Runout Duct Size:	6 in.	Actual Summer Vent.:	0 CFM
Runout Air Velocity:	484 ft./min.	Percent of Supply:	0 %
Runout Air Velocity:	484 ft./min.	Actual Winter Infil.:	33 CFM
Actual Loss:	0.152 in.wg./100 ft.	Actual Summer Infil.:	33 CFM

Item Description	Area Quantity	-U- Value	Htg HTM	Sen Loss	Clg HTM	Lat Gain	Sen Gain
NE-Wall-13A-4ocs 9.1 X 20	182	0.200	4.6	837	4.5	0	812
S -Wall-13A-4ocs 7.8 X 20	143.2	0.200	4.6	659	4.5	0	639
W -Wall-13A-4ocs 7.2 X 20	131.2	0.200	4.6	604	4.5	0	585
S -Gls-1A-hb-o shgc-0.5 0%S	12.8	1.080	24.8	318	31.2	0	399
W -Gls-1A-hb-o shgc-0.5 0%S	12.8	1.080	24.8	318	59.5	0	761
UP-Ceil-16E-30 12 X 7.8	93.6	0.032	0.7	69	1.0	0	96
Floor-22A-pl 24 ft..Per.	24	0.989	22.7	546	0.0	0	0
Subtotals for Structure:				3,351		0	3,292
Infil.: Win.: 33.2, Sum.: 33.2	482		1.745	841	1.668	1,692	804
Ductwork:				295			81
Room Totals:				4,487		1,692	4,177



### System 1 Room Load Summary

No	Room Name	Area SF	Htg Sens Btuh	Min Htg CFM	Run Duct Size	Run Duct Vel	Clg Sens Btuh	Clg Lat Btuh	Min Clg CFM	Act Sys CFM
---Zone 1---										
1	New Exercise	347	6,069	79	2-6	671	5,797	1,794	264	264
2	New Pwdr.	35	1,245	16	1-6	216	931	411	42	42
3	New Bdrm 8	146	1,626	21	1-6	495	2,137	669	97	97
4	New Bdrm 7	145	2,448	32	1-6	694	2,996	851	136	136
5	New Bath 7	38	1,024	13	1-6	253	1,093	270	50	50
6	New Hall	65	1,323	17	1-6	337	1,455	376	66	66
7	Stairs	94	4,487	58	2-6	484	4,177	1,692	190	190
	Duct Latent Return Duct		86				0	204 549		
System 1 total		870	18,308	237			18,586	6,816	845	845

System 1 Main Trunk Size: 16x12 in.  
Velocity: 634 ft./min  
Loss per 100 ft.: 0.085 in.wg

### Cooling System Summary

	Cooling Tons	Sensible/Latent Split	Sensible Btuh	Latent Btuh	Total Btuh
Net Required:	2.12	73% / 27%	18,586	6,816	25,402