Solutions to Questions - Chapter 17
Financing Land Development Projects

Question 17-1

How might land development activities be specialized? Why is this activity different from project development discussed in the preceding chapter?

Firms can specialize in acquiring raw land in suburban fringe areas and developing sites for single family detached units or for multiple uses, such as combinations of single family units, multifamily apartments, and cluster housing. Land developers and builders or project developers may, or may not, be the same entities. Land developers may or may not have the expertise to undertake building construction and/or project development.

Question 17-2

What is an option contract? How is it used in land acquisition? What should developers be concerned with when using such options? What contingencies may be included in a land option?

Option contracts are used to reserve a parcel of land so that it will not be sold to someone else, while the developer does preliminary analysis of the site. The developer should be concerned about the price of the option and the length of time until a decision is made. Contingencies might include passing an environmental inspection, being able to get the land rezoned, or receiving any necessary permits for development.

Question 17-3

What are some of the physical considerations that a developer should be concerned with when purchasing land? How should such considerations be taken into account when determining the price that should be paid?

The developer should be concerned about the physical characteristics of the land and how this affects the number of parcels that can be developed, as well as, the cost of developing them. Examples of important physical characteristics include the land's size, topography, soil condition, amenities, and accessibility.

Question 17-4

In land development projects, why do lenders insist on loan repayment rates in excess of sales revenue? What is a release price?

A lender doesn't want to wait until the last parcel sells for the development loan to be completely repaid. Thus, a lender will normally insist on a loan repayment rate that is greater than the rate for which parcels are expected to sell. The release price is the dollar amount of the loan that must be repaid when a lot is sold. Release prices may vary with different types of lots. Typically, the release price is set at an amount that results in the loan being repaid by the time a certain percentage, e.g. 80 percent, of the lots are sold. Note, this does not mean that the developer must pay back an amount that is greater than the sale price of the lot.

Question 17-5

What are the unique risks of land development projects from the developer's and lender's point of view?

Land development can be quite risky for both the developer and the lender, especially when compared to existing projects. During the development period, a developer must be concerned about changing market conditions that subsequently affects the price and rate at which parcels are sold. The cost to develop the site can also be greater than anticipated. Ultimately, the same factors affect the lender's risks because proceeds from the sale of parcels are used to repay the loan. Lenders get paid as lots are sold. As a result, the rate at which lots sell affects the lender's, as well as, the developer's, rate of return. A higher release price might reduce this risk to the lender. However, if the release price is too high, the developer may not have sufficient funds to successfully develop the project.

Solutions to Problems - Chapter 17
Financing Land Development Projects

Problem 17-1

Part (A)

Revised revenues:		**Required land cost to achieve ROC:**
32 @ $103,000 =	$3,296,000	
32 @ $118,000 =	3,776,000	
16 @ $125,000 =	2,000,000	
Total Revenue	$9,072,000	$9,072,000
Less: Land development cost		
$71,000 @ 80 =	$5,680,000	$5,680,000
Land cost	$1,000,000	$ 855,200*
Gross Profit from Sales	$2,392,000	$2,536,800
Administration	$1,134,000	$1,134,000
Net Profit	$1,250,000	$1,402,800
Margin on gross revenue:	13.8%	15.5%
Return on cost:	18.8%	21.5%

Part (B)

If the land could be acquired for approximately $855,200*, then return on cost ROC would return to about 21% and the margin would exceed 13.8%. (see right hand column above)

Problem 17-2

(a) Calculation of the Release Price Per Parcel

Month	Draw	Deluxe	Standard	Cumulative Units	Monthly Sales	Cumulative Sales	MPVIF @ 11%	PV Draws	Monthly Sales
0	600,000	0	0	0	0	0	1.00000	600000	0
1	600,000	0	0	0	0	0	.99092	594549.9587	0
2	600,000	0	0	0	0	0	.98192	589149.4223	0
3	600,000	0	0	0	0	0	.97300	583797.9412	0
4	300,000	4	3	7	260,000	260,000	.96416	289247.5349	250681
5	300,000	4	3	14	260,000	520,000	.95540	286620.1832	248404
6	300,000	4	3	21	260,000	780,000	.94672	284016.6968	246148
7		4	3	28	260,000	1,040,000	.93812	0	243912
8		4	3	35	260,000	1,300,000	.92960	0	241696
9		4	3	42	260,000	1,560,000	.92116	0	239501
10		4	3	49	260,000	1,820,000	.91279	0	237325
11		4	3	56	260,000	2,080,000	.90450	0	235170
12		4	3	63	260,000	2,340,000	.89628	0	233034
13		2	5	70	256,000	2,596,000	.88814	0	227364
14		2	5	77	256,000	2,852,000	.88007	0	225299
15		2	5	84	256,000	3,108,000	.87208	0	223253
16		2	5	91	256,000	3,364,000	.86416	0	221225
17		2	5	98	256,000	3,620,000	.85631	0	219215
18		2	5	105	256,000	3,876,000	.84853	0	217224
19		2	5	112	256,000	4,132,000	.84082	0	215251
20		2	5	119	256,000	4,388,000	.83319	0	213296

	21		2	5	126	256,000	4,644,000	.82562	0	211358
	22		2	5	133	256,000	4,900,000	.81812	0	209438
	23		2	5	140	256,000	5,156,000	.81069	0	207536
	24		2	5	147	256,000	5,412,000	.80332	0	205651
Total		3,300,000	60	87	147	5,412,000			3,227,382	4,771,981
PV		3,227,382				4,771,981				

PV of Draws	3,227,382
PV of Revenue	4,771,981
PV Revenue / PV Draws	67.63%
Release Price	81.15%

The ratio of the PV of Revenue to PV of Draws above (67.63%) is what the release price would be if it was not accelerated and the loan would be repaid exactly when the last lot is sold. Increasing this by 20% (67.63% x 1.20) gives us the accelerated release price as a percent of revenue (81.15%)

For each lot type:

Deluxe	=	$38,000 x 0.8115
Deluxe	=	$30,840.15
Standard	=	$36,000 x 0.8115
Standard	=	29,216.98

(b)
Price of each parcel:

	Number of Parcels	Price per Parcel	Total
Deluxe	60	$38,000	$2,280,000
Standard	87	$36,000	3,132,000
Total	147		$5,412,000

Construction Period	6 Months
Approval Period	6 Months
Likely Financing Terms	40.00% of the land acquisition cost, 100 percent of improvement costs (subject to appraisal and feasibility analysis), and interest carry. Loan draws are to be made as improvements are completed, and interest is to be paid monthly.
Interest Rate	11.00% (or prime of 9% plus 2%) 3 points to be paid at closing.

Treetop Associated Group - Estimate of Costs to be Funded by Loan Proceeds:

40.00% Land Acquisition Costs Financed	$600,000
Direct Development Costs	2,700,000
Total Direct Costs Which Will Be Financed	$3,300,000
Estimated Interest Carry (calculated below)	299,222
Total Loan Amount	$3,599,222

Treetop Associated Group - Schedule of Estimated Monthly Cash Draws for Development Costs:

Month	Amount
Closing	$600,000
1	600,000
2	600,000
3	600,000
4	300,000
5	300,000
6	300,000
Total	$3,300,000

Treetop Associated Group - Estimated Monthly Absorption Rate After Loan Closing:

Month	Deluxe*	Standard **	Cumulative Unit Sales	Cumulative Sales Volume	Monthly Sales Revenue	Monthly Revenue Rate (percent of total)
Close	0	0	0	0	$0	0.000000%
1-3	0	0	0	0	0	0.000000%
4-6	4	3	21	780,000	260,000	4.804139%
7-12	4	3	63	2,340,000	260,000	4.804139%
13-18	2	5	105	3,876,000	256,000	4.730229%
19-24	2	5	147	5,412,000	256,000	4.730229%
Total	12	16	147	$5,412,000		100.000000%

* Price	=	$38,000
** Price	=	$36,000

Treetop Associated Group - Determining the Duration of the Construction Loan:

The month in which the loan repayment occurs must be determined to solve for the interest carry. Because the bank wants the loan paid off 20% faster than the revenue is generated, the loan must be totally repaid when 83.33% (100% / 120%) of the revenue is collected.

Target Revenue Amount	=	83.3333%	x	Total Revenue
	=	83.3333%	x	$5,412,000
	=	$4,510,000		

The following table illustrates the relationship between the percentage of revenue at which the bank wants the loan paid off, and the month in which this occurs.

Month	Cluster	Standard	Cumulative Sales ($)	Monthly Sales Revenue	
4-6	12	9	$780,000	$260,000	
7-12	24	18	2,340,000	260,000	
13-18	12	30	3,876,000	256,000	
19	2	5	4,132,000	256,000	
20	2	5	4,388,000	256,000	
21	2	5	4,644,000	256,000	-- Repaid during this month

(c)
Treetop Associated Group - Loan Repayments Schedule:

			Payments				
Month	**Interest**	**Total**	**Principal**	**Interest**	**Total**	**Balance**	**Cash Flow**
0	0	600,000				600,000	(492,023)
1	5,500	605,500	0	5,500	5,500	1,205,500	(600,000)
2	11,050	611,050	0	11,050	11,050	1,816,550	(600,000)
3	16,652	616,652	0	16,652	16,652	2,433,202	(600,000)
4	22,304	322,304	211,012	22,304	233,316	2,544,495	(88,988)
5	23,325	323,325	211,012	23,325	234,336	2,656,808	(88,988)
6	24,354	324,354	211,012	24,354	235,366	2,770,150	(88,988)
7	25,393	25,393	211,012	25,393	236,405	2,584,532	211,012
8	23,692	23,692	211,012	23,692	234,703	2,397,212	211,012
9	21,974	21,974	211,012	21,974	232,986	2,208,175	211,012
10	20,242	20,242	211,012	20,242	231,253	2,017,405	211,012
11	18,493	18,493	211,012	18,493	229,504	1,824,886	211,012
12	16,728	16,728	211,012	16,728	227,740	1,630,603	211,012
13	14,947	14,947	207,765	14,947	222,712	1,437,785	207,765
14	13,180	13,180	207,765	13,180	220,945	1,243,199	207,765
15	11,396	11,396	207,765	11,396	219,161	1,046,830	207,765
16	9,596	9,596	207,765	9,596	217,361	848,661	207,765
17	7,779	7,779	207,765	7,779	215,545	648,675	207,765
18	5,946	5,946	207,765	5,946	213,711	446,856	207,765
19	4,096	4,096	207,765	4,096	211,861	243,187	207,765
20	2,229	2,229	207,765	2,229	209,994	37,651	207,765
21	345	345	37,996	345	38,341	0	37,996
22	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0
	299,222	3,599,222	3,599,222	299,222	3,898,443		**15.44%** Lender's Yield

(d)

Treetop Associated Group - Estimated Project Costs and Equity Requirements

Land and Development Costs:	
Site	1,500,000
Site Closing	50,000
Site Improvements	2,700,000
Construction Interest	299,222
Const. Loan Fee	107,977
Total Direct Costs	**4,657,198**
-	
Operating Expenses:	
Selling Commissions	270,600
Property Taxes	38,000
General & Admin.	60,000
Total Indirect Costs	**368,600**
Total Project Costs	5,025,798
- Loan Amount	3,599,222
Total Equity Required	**1,426,577**
Percent Financed	71.61%

(e)

Treetop Associated Group - Schedule of Cash Flows

Quarter	0	1	2	3	4	5	6	7	8
Inflow:									
Sales	0	0	780,000	780,000	780,000	768,000	768,000	768,000	768,000
Loan Draw	600,000	1,833,202	969,983	71,059	55,463	39,523	23,322	6,671	0
Total Inflow	600,000	1,833,202	1,749,983	851,059	835,463	807,523	791,322	774,671	768,000
Outflows:									
Site Purch.	1,500,000								
Closing	50,000								
Loan Fee	107,977								
Loan Princ. Pmt.	0	633,035	633,035	633,035	623,296	623,296	453,526	0	
Loan interest	0	33,202	69,983	71,059	55,463	39,523	23,322	6,671	0
Direct Costs		1,800,000	900,000						
Gen & Admin			7500	7500	7500	7500	7500	7500	7500
Prop. Tax					19000				19000
Sales Exp.		0	39,000	39,000	39,000	38,400	38,400	38,400	38,400
Total Outflow	1,657,977	1,833,202	1,649,518	750,594	753,997	708,719	692,517	506,097	64,900
Net Cash	(1,057,977)	0	100,465	100,465	81,465	98,804	98,804	268,574	703,100
NPV @	15%	85,148							
IRR		20.31%							

Problem 17-3

Note: The solution below assumes the first draw is in month 1 – not month 0 as might be implied by the question in the book, which says the first draw is at loan closing which might be interpreted as month 0. Using month 1 for the first draw is more consistent with the book example and reality.

(a)

Price of each parcel

	Number of Parcels	Price per Parcel	Total
Deluxe	18	$24,000	$432,000
Standard	57	13,500	769,500
Total	75		$1,201,500

Construction Period	4 months
Likely Financing Terms	0.00% of the land cost, 100 percent of improvement costs (subject to appraisal and feasibility analysis.) Loan draws are to be made as improvements are completed, interest is to be paid monthly.
Interest Rate	13.00% (or prime rate of 11% plus 2%)
	3 points to be paid at closing

Land and Development Costs:	
Site	225,000
Site Closing	10,000
Site Improvements	775,000
Construction Interest	35,527
Const. Loan Fee	24,316
Total Direct Costs	**1,069,843**
-	
Operating Expenses:	
Selling Commissions	60,075
Property Taxes	7,000
General & Admin.	44,000
Total Indirect Costs	**111,075**
Total Project Costs	1,180,918
- Loan Amount	810,527
Total Equity Required	**370,391**
Percent Financed	**68.64%**

PRESENT VALUES, ACCELERATION, & RESALE PRICE:

Month	*Draw*	*Standard*	*Delux*	*Cumulative Units*	*Monthly Sales*	*Cumulative Sales*	*MPVIF @ 13%*	*PV Draws*	*Monthly Sales*
0	0	0	0	0	0	0	1.00000	0	0
1	193,750	0	0	0	0	0	.98928	191673.54	0
2	193,750	0	0	0	0	0	.97868	189619.33	0
3	193,750	0	0	0	0	0	.96819	187587.13	0
4	193,750	5	4	9	163,500	163,500	.95782	185576.72	156603
5	0	5	4	18	163,500	327,000	.94755	0	154924
6	0	5	4	27	163,500	490,500	.93740	0	153264
7		7	1	35	118,500	609,000	.92735	0	109891
8		7	1	43	118,500	727,500	.91741	0	108713
9		7	1	51	118,500	846,000	.90758	0	107548
10		7	1	59	118,500	964,500	.89785	0	106395
11		7	1	67	118,500	1,083,000	.88823	0	105255
12		7	1	75	118,500	1,201,500	.87871	0	104127
13		0	0	75	0	1,201,500	.86929	0	0
14		0	0	75	0	1,201,500	.85998	0	0
15		0	0	75	0	1,201,500	.85076	0	0
16		0	0	75	0	1,201,500	.84164	0	0
17		0	0	75	0	1,201,500	.83262	0	0
18		0	0	75	0	1,201,500	.82370	0	0
19		0	0	75	0	1,201,500	.81487	0	0
20		0	0	75	0	1,201,500	.80614	0	0
21		0	0	75	0	1,201,500	.79750	0	0
22		0	0	75	0	1,201,500	.78895	0	0
23		0	0	75	0	1,201,500	.78050	0	0
24		0	0	75	0	1,201,500	.77213	0	0
Total	775,000	57	18	75	1,201,500			754,457	1,106,721
Present Value	**754,457**				**1,106,721**				

PV Draws	**754,457**
PV Revenue	**1,106,721**
PV Rev / PV Draw	**68.1705%**
Acceleration	**25.00%**
Release Price	**85.2131%**

Total revenue is $1,021,500 as shown above.

LOAN SCHEDULE AND LENDER'S IRR

Month	Interest	Total Draw	Payments Principal	Payments Interest	Total	Balance	Cash Flow
0	0	0				0	24,316
1	0	193,750	0	0	0	193,750	(193,750)
2	2,099	195,849	0	2,099	2,099	389,599	(193,750)
3	4,221	197,971	0	4,221	4,221	587,570	(193,750)
4	6,365	200,115	139,323	6,365	145,689	648,362	(54,427)
5	7,024	7,024	139,323	7,024	146,347	516,062	139,323
6	5,591	5,591	139,323	5,591	144,914	382,329	139,323
7	4,142	4,142	100,977	4,142	105,119	285,494	100,977
8	3,093	3,093	100,977	3,093	104,070	187,609	100,977
9	2,032	2,032	100,977	2,032	103,010	88,664	100,977
10	961	961	89,625	961	90,585	0	89,625
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0
	35,527	810,527	810,527	35,527	846,055		

Lender's Yield **22.85%**

The loan is repaid by the end of the 10th month.

(b) The total interest is $35,527 as shown above.

The release price for each lot is 85.2131% of the lot sale price. (See above for calculation of the release price as a 85.2131% percent of sales revenue.)

For the standard lot .852131 x $13,500 = $11503.76
For the deluxe lot . 852131 x $24,000 = $20,451.14

The loan repayment schedule is shown above. Total cash payments to the bank will be $810,527.

(c) Total equity requirements will be $177,842 + $11,000 = $188,842 (see below).

DEVELOPER'S CASH FLOW, NPV AND IRR

Quarter	*0*	*1*	*2*	*3*	*4*
Inflow:					
Sales	0	0	490,500	355,500	355,500
Loan Draw	0	581,250	193,750	0	0
Interest Draw	0	6,320	18,980	9,267	961
Total Inflow	0	587,570	703,230	364,767	356,461
Outflows:					
Site Purch.	225,000				
Closing	10,000				
Loan Fee	24,316				
Loan Pmt.		0	417,970	302,932	89,625
Interest Cost	0	6,320	18,980	9,267	961
Direct Costs	0	581,250	193,750		
Gen & Admin		11,000	11,000	11,000	11,000
Prop. Tax					7,000
Sales Exp.		0	24,525	17,775	17,775
Total Outflow	259,316	598,570	666,225	340,975	126,360
Net Cash	**($259,316)**	**($11,000)**	**$37,005**	**$23,793**	**$230,100**
Net Present Value		**(21,199)**	18%discount rate		
Internal Rate of Return		**8.19%**			

The investor's IRR is only 8.19%, which is significantly below the 18% required return. Thus, the land should not be developed.

Problem 17-4

(a)

No acceleration

PV Draws	**754,457**
PV Revenue	**1,106,721**
PV Rev / PV Draw	**68.1705%**
Acceleration	**0.00%**
Release Price	**68.1705%**

LOAN SCHEDULE AND LENDER'S IRR

			Payments				
Month	***Interest***	***Total Draw***	***Principal***	***Interest***	***Total***	***Balance***	***Cash Flow***
0	0	0				0	24,572
1	0	193,750	0	0	0	193,750	(193,750)
2	2,099	195,849	0	2,099	2,099	389,599	(193,750)
3	4,221	197,971	0	4,221	4,221	587,570	(193,750)
4	6,365	200,115	111,459	6,365	117,824	676,226	(82,291)
5	7,326	7,326	111,459	7,326	118,784	572,093	111,459
6	6,198	6,198	111,459	6,198	117,656	466,832	111,459
7	5,057	5,057	80,782	5,057	85,839	391,108	80,782
8	4,237	4,237	80,782	4,237	85,019	314,563	80,782
9	3,408	3,408	80,782	3,408	84,190	237,188	80,782
10	2,570	2,570	80,782	2,570	83,352	158,976	80,782
11	1,722	1,722	80,782	1,722	82,504	79,916	80,782
12	866	866	80,782	866	81,648	0	80,782
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0
	44,068	819,068	819,068	44,068	863,136		

Lender's Yield **21.06%**

10% acceleration

PV Draws	**754,457**
PV Revenue	**1,106,721**
PV Rev / PV Draw	**68.1705%**
Acceleration	**10.00%**
Release Price	**74.9875%**

LOAN SCHEDULE AND LENDER'S IRR

			Payments				
Month	***Interest***	***Total Draw***	***Principal***	***Interest***	***Total***	***Balance***	***Cash Flow***
0	0	0				0	24,453
1	0	193,750	0	0	0	193,750	(193,750)
2	2,099	195,849	0	2,099	2,099	389,599	(193,750)
3	4,221	197,971	0	4,221	4,221	587,570	(193,750)
4	6,365	200,115	122,605	6,365	128,970	665,080	(71,145)
5	7,205	7,205	122,605	7,205	129,810	549,681	122,605
6	5,955	5,955	122,605	5,955	128,559	433,031	122,605
7	4,691	4,691	88,860	4,691	93,551	348,862	88,860
8	3,779	3,779	88,860	3,779	92,640	263,781	88,860
9	2,858	2,858	88,860	2,858	91,718	177,779	88,860
10	1,926	1,926	88,860	1,926	90,786	90,844	88,860
11	984	984	88,860	984	89,844	2,968	88,860
12	32	32	3,001	32	3,033	0	3,001
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0
	40,115	815,115	815,115	40,115	855,230		

Lender's Yield **21.79%**

30% acceleration

PV Draws	**754,457**
PV Revenue	**1,106,721**
PV Rev / PV Draw	**68.1705%**
Acceleration	**30.00%**
Release Price	**88.6216%**

LOAN SCHEDULE AND LENDER'S IRR

			Payments				
Month	***Interest***	***Total Draw***	***Principal***	***Interest***	***Total***	***Balance***	***Cash Flow***
0	0	0				0	24,280
1	0	193,750	0	0	0	193,750	(193,750)
2	2,099	195,849	0	2,099	2,099	389,599	(193,750)
3	4,221	197,971	0	4,221	4,221	587,570	(193,750)
4	6,365	200,115	144,896	6,365	151,262	642,789	(48,854)
5	6,964	6,964	144,896	6,964	151,860	504,856	144,896
6	5,469	5,469	144,896	5,469	150,366	365,429	144,896
7	3,959	3,959	105,017	3,959	108,975	264,371	105,017
8	2,864	2,864	105,017	2,864	107,881	162,218	105,017
9	1,757	1,757	105,017	1,757	106,774	58,959	105,017
10	639	639	59,598	639	60,237	0	59,598
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0
	34,337	809,337	809,337	34,337	843,673		

Lender's Yield **23.17%**

(b) In the loan schedule for zero acceleration shown in part (a) the loan is repaid in month 12 when the last lot is sold.

Part (C) Lender’s yield is shown below each of the loan schedules above.